Maritime Archaeology Trust

East Winner Bank Shipwreck

Archaeological site visit report

Arch-Manche

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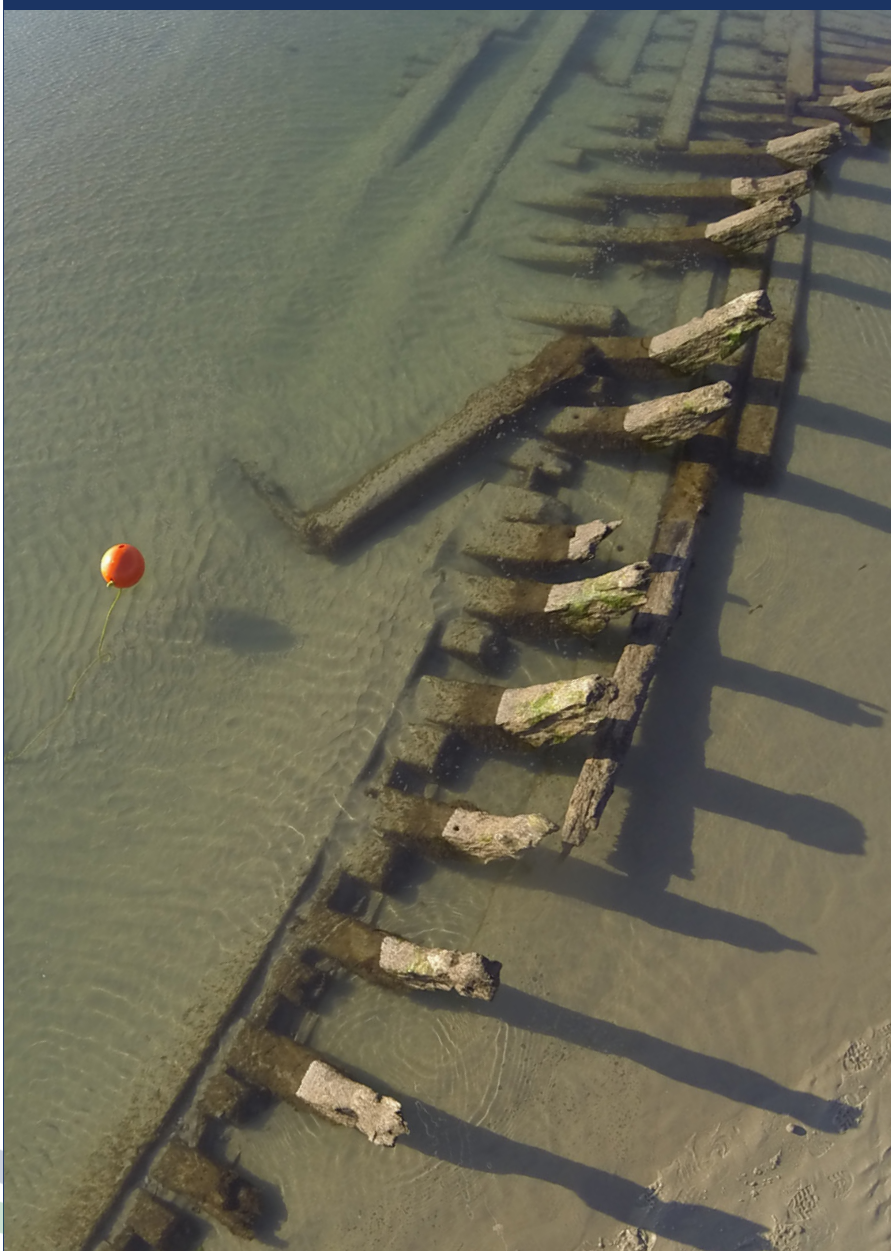

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Archaeological site visit report

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The Arch-Manche project aims to demonstrate how archaeology, art and maritime coastal heritage can be used to show long-term patterns of coastal change and the impact on human settlement. The East Winner Bank wreck is located within the project case study area of the Solent. Due to its exposure from recent extreme weather and a shifting sand bank the site is a key example of how archaeology can be used to help understand our changing coasts, and can also be used to help monitor future change.

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1. Introduction

The Maritime Archaeology Trust (MAT) was alerted to the appearance of a previously unknown shipwreck on the East Winner bank, Hayling Island in mid-January 2014, following a period of severe winter storms. Subsequently, photographs of the site were sent to the MAT by members of the public, along with a GPS position for the remains. The wreck was visited by archaeologists from the MAT on 16th and 29th April 2014 during a low-water spring tide of 0.7m and 0.6m respectively (Chart Datum Portsmouth). The following report outlines the location and nature of the East Winner bank and the likely cause of the current period of exposure of the site. The archaeological remains as observed during the site visit are then described, along with a discussion of the possible date of the vessel. The report concludes by outlining future avenues of investigation that may allow the wreck to be more fully understood and its archaeological potential realised.

2. Site Location and Context

2.1 The East Winner Bank

The East Winner is a large sandbank located at the south-west corner of Hayling Island that firmly demarcates the eastern seaward side of the entrance channel into Langstone Harbour (Figure 1). The much smaller West Winner bank is a north/south aligned spit lying on the western side of the Langstone Harbour channel. Both banks have the alternative historic name of the Woolsener(s), or derivatives based on that name, for example 'Woolsonor'. A large part of the East Winner is dry and exposed at low tide, with a further extensive area of very shallow water lying to the south and east of the exposed sand bank.

The situation of the East Winner within the surrounding sediment regime is described within the 'Portsmouth Harbour Entrance to Chichester Harbour Entrance' section of the Sediment Transport Study published by the Standing Conference on Problems Associated with the Coastline (SCOPAC). The tidal flow in the Langstone Harbour channel is dominated by the ebb tide when tidal rates can reach 1.5 knots (Bruce, 2008: 44-45). This has had the noted effect (SCOPAC: LT7) the effect of flushing sediment seaward from the Langstone harbour channel to be deposited along the western side of the East Winner. The SCOPAC project also notes (O1) that there has been previous suggestion that the East Winner bank itself is partially fed through the westward movement of sand from the Chichester tidal delta. Although the mechanics of this are not proven, the overall sediment transport pathway within Hayling Bay is considered to be from east to west, allowing for deposition of material onto the East Winner (SCOPAC: O1).

The circulation of sand on the East Winner itself is also covered by SCOPAC (O3) based on the previous work of Harlow (1980). This has noted that the East Winner bank is covered by ripples, sand waves and low dunes; analysis borne out by aerial photos (Figure 1) and observation while on site (Figure 2). Such features are noted by SCOPAC as characterising high sediment mobility, but in this instance operating within a closed system because of the inability of sediment to move in a westerly direction across the Langstone Harbour channel. Accordingly, a system has been proposed (SCOPAC: O3) of net transport in an offshore direction by tidal currents on the western face of the bank and onshore transport on the eastern flank as a result of wave action. Study into the overall shape and volume of the East Winner by Whitcombe (1995) has highlighted the fluctuating expansion and regression of the bank caused by shifts in the alignment of the outer Langstone Harbour channel.

2.2 The East Winner Shipwreck

The site of the East Winner shipwreck is located at 50° 46.600'N 001°00.433'W (Datum=WGS84), E470094.34 N97931.15 (Datum=OSGB36). The remains (Figure 3) are orientated north-south and became exposed following the severe winter storms of early January 2014 (Figure 4). Reference to the most recent aerial photographs (Figure 1), taken in June 2013, illustrate that there is no evidence of any exposed timbers at the site location. Exposure of the wreck appears to have taken place following a shift in the eastern side of the East Winner. Local residents interviewed during visits to the site describe more exposed sand in that area during low tides, than has previously been seen. They also noted that they could not remember seeing the wreck at any point during the last forty years.

As the tide falls and water drains from the East Winner bank, a number of streams emerge, draining standing water off the bank into the sea. One of these channels seems to have altered course slightly to the north or south as a result of wider changes, and its route during the main period of drainage has

served to scour out the wreck remains (Figure 3) to expose the degraded stern post and much of the port side of the vessel. While on-site it was possible to observe the build-up of sediment in the drainage stream to the west of the exposed remains as the flow rate slows down towards the end of the drainage period and sand becomes deposited. This area probably corresponds to the middle and starboard side of the vessel and it therefore seems likely that a significant amount of the bottom of the vessel is still buried in the centre of the drainage stream (Figure 5). Between the two visits undertaken on the 16th and 29th April, a significant amount of additional structure was exposed at the north of the site, revealing the stern of the vessel, including the stern post. It is clear from this that there is ongoing potential for further elements of the original vessel to become exposed in the future. At present, there is little evidence of any processes of reburial taking place.

In addition to the site visits, further information and photographs were provided by the Langstone Harbour Master during the Spring of 2014. This included a number of wooden structural elements that were washed up on Hayling Beach and which may have been part of the East Winner wreck or another currently unknown site. The Beachlands officer of Havant Borough Council, reported that wooden elements such as these had been 'disposed of' because they were not thought to be important. The example illustrated (Figure 5, inset) comprises a floor timber, with a rebate to accommodate the keel, in addition to a pair of limber holes. A group of metal fastenings indicate where an outer plank end was previously attached.

3. Survey methodology

Access to the site is limited to a period of around 1½ hours, straddling low water. This results in a reduced window of around 45 minutes when the water is at its lowest and conditions for working on the site are optimal. Even at that point, significant areas of the site continued to be underwater during the normal spring tide conditions of 0.6m (CD) during which the site was visited. Accordingly, successful work on site required limited objectives that could be effectively completed within the access window. Site visits were therefore concerned with documenting the characteristics of the site in as much detail as possible through recorded observations of the extant features, in conjunction with the creation of an extensive photographic and video record. The latter included the use of a pole-mounted camera in order to record overhead images of the site; proving especially helpful in identifying features that were not visible at ground-level.

This work has served to establish a basic set of information about the site and the vessel itself that can be further informed through subsequent visits. In particular, the creation of a traditional site-plan was considered to be of relatively low-priority because of the amount of time required to complete it. Instead, focus was placed on recording the detail of the vessel's dimensions and constructional features to produce the written archaeological description presented below. It can be reiterated that such a description is not reliant on an overall site-plan but on the careful observation and recording of the archaeological detail present on the site.

4. Archaeological Description

The extant remains are 21m in length and of variable width between two and four metres depending on the elements exposed. The visible remains are in a good condition overall and photos from the initial exposure in January 2014 illustrate that the wood was very 'fresh' (Figure 4). Since then, there has been a gradual build-up of sand and weed on exposed surfaces (Figure 5). The rapid period in which this has taken place suggests that although exposed, the site is afforded some protection from biological decay. Some evidence for gribble is present on the upper ends of the frames, and around the stern post indicating that there have been previous incidences of exposure limited to just the extremities of the wreck. Across the two week period in which site visits were made a large amount of new material was exposed at the northern end of the site.

The disposition of the exposed remains indicate that the hull of the vessel is orientated in a roughly north-south direction. The presence of the stern-post and associated rudder gudgeon indicates that the stern of the original vessel lies to the north and the exposed remains therefore represent the portside of the vessel. Four inaccessible upright posts lie to the west of the site that seem likely to represent the centreline of the vessel, although this is not confirmed. There is no surviving indication of any mechanical propulsion of any sort and so the vessel is considered to have been a sailing vessel. The curvature of the visible framing timbers suggests that the entire bottom of the vessel is likely to be preserved *in situ* under the sand to the west of the extant remains. Visible surviving hull elements are comprised of floor timbers, futtocks (first to third), top timbers, ceiling planking and outer planking. The

partial remains of a beam is located in the centre of the site. Preserved fastenings and fixtures include treenails, copper bolts and a rudder gudgeon, additionally, a number of holes indicate the location of former fastenings. These elements are now described in turn; framing, planking, fastenings.

A lump of coal was found immediately to the south of the wreck structure and its rounded appearance indicates a relatively long period in the sea. The presence of the coal may be purely incidental, but it does not occur naturally on the East Winner bank and its close vicinity to the site may therefore represent the remains of the former cargo, or stores, from the wrecked vessel.

4.1 Framing

The type of preserved, extant framing elements varies along the length of the site. In the southern end, towards the bow of the original vessel these are mainly first and second-futtocks (Figure 6) with the partially visible or inferred presence of floor timbers. Towards the north of the site, the stern of the original vessel, the remains comprise second and third-futtocks along with top timbers. There, the tops of the third-futtocks and top-timbers have been trimmed off flush with one another (Figure 7), indicating the total extent of the original framing of the vessel in that area. Visual inspection on site suggested that all of the framing timbers were made from oak.

Also in the north of the site is the partial remains of the vessel's stern post, indicated by the *in situ* remains of a rudder gudgeon. The stern post itself is heavily degraded by gribble as well as being difficult to access. A rebate to receive the hood ends of the planking is still visible, along with a line of copper fastenings to secure the hood ends (section 4.3). The diameter of the gudgeon hole is c.60mm and the strap at this point is 65mm tall, before being broken off. The overall form of the gudgeon, albeit slightly larger, is nearly identical to that illustrated by McCarthy (1996: fig. 16). The width of the stern post where the gudgeon strap spans around it is c.200mm.

The floor timbers were for the most part inaccessible during site visits and their presence was only confirmed when clearing a small area of sand from the central area of the site, to the west of the edge of exposed ceiling planking. The sided dimensions of all the first-futtocks was accessible, but only four of them were exposed enough for the moulded dimensions to be recorded. This produced an average sided dimension of 192mm and an average moulded dimension of 170mm. Sided and moulded dimensions were recorded for all of the visible second-futtocks, producing an average sided dimension of 196mm and an average moulded dimension of 174mm. At the stern, the third-futtocks and top-timbers average 160mm sided and 240mm moulded. It is clear from this that the cross-sectional form of the framing timbers in that upper area of the vessel are much taller than they are wide, when compared to the framing timbers from lower down in the hull that survive towards the bow.

The framing timbers are arranged in pairs, with the first-futtock being placed adjacent to a floor timber and overlapping the floor and the second-futtock. The latter is laid in line with the floor and butts up against it, before running outboard to the turn of the bilge. In the southern portion of the site the head of the floor timber and heel of the second-futtock is located 120mm inboard of the ceiling planking. In the same area, the first-futtock overlaps the second-futtock by 1.36m when measured along the frame timbers from the heel of the second-futtock to the head of the first-futtock, which stops just short of the turn of the bilge. The heads of all the first-futtocks in the southern half of the site are trimmed off straight with no indication of the use of any joint, or other mechanism to attach the heads of the first-futtocks to the heels of the absent third-futtocks. This pattern continues in the northern part of the site at the vessel's stern with third-futtocks being placed in line with the first-futtocks and the entire frame being completed with a top-timber laid in line with the second-futtocks. As before, there is no obvious joint between the ends of the timbers, they are therefore reliant on lateral bolts between them, within each pair to fasten the entire frame together and the evidence for this is discussed below (4.3). The structural integrity of the vessel is then further reinforced through the role played by the outer and ceiling planking.

The room and space between the aft face of a second-futtock and the aft face of the next second-futtock has a range of 550-570mm. In the central area of vessel remains, a small flat square piece of wood is located between the forward face of each first-futtock and the aft face of each second-futtock slightly outboard of the line of preserved ceiling planking (Figure 6e). This is presumably to prevent debris from falling into the space between the frames and may therefore signify the upper extent of the ceiling planking in the bottom of the vessel.

The remains of a substantial timber are located in the middle of the site (Figure 8) that was only fully interpreted when the photographic record of the site was reviewed. This, along with the inaccessible nature of the timber meant that it was not recorded in detail. The timber appears to represent the partial remains of a deck beam, with an iron knee still *in situ* at the western end of it to attach it to the sides of the vessel.

Taking into consideration the arrangement of timbers at each frame station, described above, there is a pattern of first-futtocks being set on the side of the floor timbers (themselves in line with the second-futtocks) towards the midships part of the vessel. This contrasts with an expected arrangement whereby the first-futtocks are placed on the side of the floor timber and second-futtock towards the bow or stern of the vessel (for further discussion see Steffy, 1994: 139 & 164). In one area towards the south-centre of the site, a group of two first-futtocks and three associated second-futtocks do not exhibit this patterning and have very little room and space between the timbers. This area marks the changeover from first-futtocks being located on the northern (aft) side of the floor timber and second-futtock to being located on the southern (forward) side (Figure 9). This area is therefore assumed to either represent the midships area of the vessel or an area of significance to the builder when setting up of the original master frames of the vessel. The distance from this point to the stern post is c. 13m. This, along with the 20m recorded length of the extant remains gives an indication that the original vessel probably fitted into a length range of 21-26m.

4.2 Planking

A number of extant planking elements survive on the site and include both outer planking and ceiling planking (Figure 6c&d). As with the framing described above, it seems highly likely that further planking of both types is well preserved beneath the exposed remains and in still buried areas to the west. A number of outer planks survive *in situ* along the eastern edge of the site. On average these are 140mm in width, with a thickness that varies between 70mm and 90mm in thickness. There is no discernable pattern to this, with variation in plank thickness by up to 10mm within a single plank. There is no evidence of any edge-to-edge joining between planks and all observed scarphs are simple butt end joints located at a frame station. One stealer plank was observed that was fastened into place with treenails. There is no evidence of any hull-sheathing, copper or otherwise, on the exterior of the vessel at the time of loss, or having been applied/removed previously.

A number of ceiling planks are preserved in good condition in different areas of the site. Four coherently arranged ceiling planks are located at the southern end of the site; laid across the heads and upper part of the first-futtocks and the heels and lower part of the second-futtocks. These ceiling-planks averaged 260mm wide and 50mm thick. Further ceiling planks were accessible towards the stern of the original vessel, in the northern end of the site; laid across heads of the second-futtocks and the middle of the third-futtocks. These ceiling planks average 160mm in width and are 60-70mm thick.

4.3 Fastenings

The majority of fastenings are wooden treenails, used to secure the planking, both outer and ceiling, to the frame timbers. Where surviving and visible, treenails used to secure the outer planking measure 30mm in diameter, on average. They are distributed with one treenail per frame element, per plank, alternating towards the upper and lower edges of the planking (Figure 10). The heads of the treenails are difficult to access and in many cases are not preserved, so establishing the method used for tightening the treenails was difficult. However, one example appeared to retain the remains of a cross-cut in the head of the treenail. In a number of cases, the tips of the treenails protruded through the inside face of the frames to a length of c. 20mm. These had no evidence of being worked or tightened and had simple spiked ends. On this basis it is concluded that the treenails used to secure the outer planking were driven blind and not tightened on their inside head.

Treenails are also present in large numbers on the interior of the hull where they are used to secure the ceiling planks to the frames, these have an average diameter of 22mm and are tightened with a wooden wedge. The pattern of these follows that for the outer planking; one treenail per frame element, per plank, alternating towards the upper and lower edge of the plank. At one location in the centre of the site, two of the treenails used to attach the ceiling planking had been replaced by copper bolts, rove over by a 35mm diameter washer made from yellow-metal, bronze or gun-metal, rather than copper (Figure 11) as might be expected (see McCarthy, 2005: 91). The occurrence of this in only one observed location probably indicates that it was a repair.

As noted above (4.2), the ends of the planks are secured with a simple butt joint, located at a frame station. This butt end is secured in place using a pair of fastenings, located vertically in-line, at the end of the plank. At one location on a section of sprung outer planking this fastening is preserved in the form of a copper bolt with a round shaft 14mm in diameter (Figure 12). The dimensions of the surviving fastening holes at this location and elsewhere indicate that the other planking butt ends were secured with a pair of such bolts. Towards the stern (north) of the remains a larger number of copper bolts are visible protruding through the internal face of the frames, indicating where they have been driven into the plank from outboard. All of these have simple spike ends and a round shaft with a diameter of 14mm. Further examples exist in the southern half of the site where the bolt is left *in situ* in the frame, although the outer planking is no longer present. Finally, at the stern of the vessel, adjacent to the preserved rudder gudgeon, a line of copper bolts is exposed that would have secured the hood ends of the planks into a rabbet in the stern post (Figure 13). All of these bolts have round shaft with a diameter of 14mm and a head diameter of 17mm average. All of the copper bolts seen on the site and used to secure the outer planking can probably be more properly classified as dumps, spikes or drifts because they are not secured at their inboard end (see McCarthy 1996: 188-191; 2005: 178-182).

Fastening holes visible towards the surviving heads of the second-futtocks indicate that they were laterally fastened to the adjacent timber (third-futtock/top-timber). These fastenings are no longer *in situ*, but the surviving holes have an average diameter of 17mm. This is smaller than any of the treenails recorded on the site and larger than all of the extant copper bolts. The preservation of large numbers of copper fastenings, including some adjacent to the lateral frame fastening holes perhaps indicates that the missing fastenings were iron.

4.4 Summary of construction

The recently exposed wreck on the East Winner bank is the remains of a wooden sailing vessel, likely to have been between 21m and 26m in length. The construction of the vessel was frame-based, with carvel laid planking. The surviving remains indicate a clear pattern of frame stations that in the original vessel would have comprised a floor timber, three futtocks and a top-timber. There were no joints or scarph between these elements within each frame station, but the individual elements of each frames were laterally bolted together, probably with iron bolts. The distribution of the frames potentially indicates the midships or master-frame area of the original vessel.

The outer planking was attached to the vessel's frames with a single treenail per plank at each frame station. It is possible, although the evidence is not conclusive, that the treenails were tightened using cross-cut caulking cuts. Planks were formed into strakes with simple butt end joints, located at a frame station and secured using a pair of copper dump/spikes. The hood-ends of the outer planking at the stern of the vessel were also secured with copper fastenings. A layer of ceiling planking on the inside of the vessel provided further structural support and were also fastened into place with treenails tightened with wedges. There is no evidence for the application of sheathing of any sort to the outside of the hull.

5. DATING

Dating the vessel is largely reliant on comparative evidence relating to the materials and method of construction, as described above. The overall method of construction is consistent with a general technique of frame-based carvel building that was common in the post-medieval period and continued in use until large-scale wooden shipbuilding declined towards the end of the 19th century. Additionally, perhaps the most diagnostic feature observed on the site is the presence of copper dumps/spikes being used to secure the plank ends (both butts and hoods) to the vessel's frames and stern post. The development of copper as a shipbuilding material for sheathing and fastening is well-documented through historical and archaeological sources (e.g. Bingeman, *et al*., 2000; Harris, 1966; Knight, 1973; McCarthy, 2005: 102-7; Northover, 2011; In-Press). The presence of copper fastenings therefore situates the East Winner wreck firmly in the period after 1783 when such fastenings were initially adopted by the Royal Navy. The application of an iron knee to connect a surviving beam end to the side of the vessel fits this broad chronology (see Stammers, 2001).

Refinement of this date is difficult without further information relating to the context in which the vessel was built; Naval yard, merchant yard, etc. Copper fastenings were rapidly adopted by the East India Company, as demonstrated by their presence on the remains of the *Earl of Abergavenny*, lost in 1803 (Cumming and Carter, 1990) but the rate of adoption of copper fastenings in regular shipyards outside of the major institutions of the Royal Navy and the East India Company is unclear. The mid-19th century

witnessed the widespread adoption of a copper-alloy, known as yellow-metal, for fastenings that was favoured by many shipbuilders over pure copper because it was cheaper (see Clarke, 1997: 85). Yellow-metal bolts were patented by Muntz in 1832, however, both copper and yellow-metal continued to be used and there are archaeologically attested instances of both materials being used within a single vessel during the mid-19th century (McCarthy and Stanbury, 2003: 49; Northover, 2011). Meanwhile reference to copper fastenings continues in the Lloyds Register throughout the 19th century, although these could refer to both copper and copper-alloy as the latter did not have a dedicated coding in the Lloyds system. The uniform use of copper, rather than yellow-metal, or a mixture of the two could perhaps date the construction of the vessel to the period before the mid-1830s when the use of yellow-metal became widespread.

The presence of two non-copper washers in conjunction with a copper bolt for a repair to the ceiling planking in one area of the vessel is therefore instructive. Such a combination was unlikely to have been used prior to the mid-1830s and its use on the East Winner vessel is a clear deviation from the tradition within which the rest of the ceiling planking was fitted. It therefore seems likely to be a repair to the vessel carried out during its lifetime. Overall, the most plausible explanation is probably for construction of the East Winner vessel prior to 1832 with a subsequent repair after that date, but probably not significantly later. It should be emphasised that this is based only on visual inspection of the copper and copper-alloy fastenings, rather than on any metallurgical analysis which would probably serve to refine the date further.

The absence of any hull sheathing remains, or indeed evidence that such sheathing may have been applied and removed during the vessel's life does not alter the broad date of the vessel assigned above. Such sheathing became widespread after its development by the Royal Navy in parallel with the development of copper fastenings just described. However, many wooden vessels remained unsheathed well into the middle of the 19th century, while others only received sheathing if destined for warmer waters than those of northern Europe (e.g. Auer and Belasus, 2008: 137). The absence of sheathing on the East Winner vessel is therefore consistent with a vessel from the 19th century that was engaged on voyages to northern European destinations.

6. Further Work

The characteristics of the archaeological remains are relatively well recorded and understood, given the limited time that can be spent on site. However, the significance of those archaeological remains and their potential for informing us about past maritime activity cannot be easily established without further work. A number of related lines of research and/or analysis can therefore be suggested, these rely largely on establishing an accurate date for the wreck remains. This in turn will allow identification of the most suitable comparative material with which to conduct further analysis of the archaeological remains, including any attempt to identify the original vessel. In particular, three complimentary avenues of investigation can be identified;

- **Dendrochronological analysis** to allow a refined date for the felling of timber used in the construction of the vessel. Information relating to the origins of the timber is also a possibility. The process of selecting samples for analysis will also allow expert identification of timber species used in the construction of different areas of the vessel; frames, planking, etc.
- **Metallurgical analysis** to allow a refined understanding of the composition of copper fastening elements, including their situation within the overall trajectory and chronology of industrial copper manufacturing for shipbuilding during the industrial revolution.
- **On-Site Survey** of the extant remains to produce a full site plan. This will allow samples taken for dendrochronological and metallurgical analysis to be accurately situated. It will also provide a complete baseline record of the existing archaeological resource and allow effective future monitoring of the site to be undertaken. Such a survey can be rapidly undertaken using RTK GPS or Total Station equipment.

Application of these methods is likely to facilitate a much wider understanding of the archaeological remains, both in their own right and within their broader context. This in turn has clear potential to increase and contribute to our overall understanding of the archaeology of north European shipbuilding and seafaring during the 19th century.

More specifically to the immediate surroundings of the shipwreck, the site can also be used as a means to monitor changes to this area of the East Winner bank. Ongoing monitoring of the site, facilitated by further photography and site recording can provide micro-scale information on environmental changes

to such sites and how their exposure and resulting vulnerability varies over time. Comparable schemes are in place for fully submerged sites in the eastern Solent, including the *Flower of Ugie* (see Whitewright, 2011) on the Horse Tail sand. Data from the East Winner site therefore has potential to contribute to a wider understanding of the impact of sediment processes, at a site specific and intra-site scale, within the eastern Solent.

7. CONCLUSION

The East Winner bank wreck is the remains of a previously unknown shipwreck preserved to a length of 20m. The vessel's high degree of on-going exposure during a short period of stormy weather clearly demonstrates the potential for similar archaeological sites lying in the inter-tidal zone to be rapidly exposed. At the present time the wreck has continued to remain exposed, although the surfaces of the extant timbers have become covered with a protective layer of sand and weed relatively quickly. The disposition of the visible timbers indicates that a large number of other timbers are highly likely to be preserved on the site. It is also probable that timbers previously washed up on the beach nearby belong to the wreck, or indicate the presence of other wrecks, currently unknown, on the East Winner bank.

The vessel itself is a wooden sailing vessel, built using a frame-based method of building common to the post-medieval period in England. Further insight into the date of the vessel is provided by the presence of copper bolts in the planking butt ends, indicating a date after the 1780s when such materials began to become widespread. A repair utilising yellow-metal indicates that the vessel was operational after 1832. The vessel could have been constructed after either of those two dating landmarks. The absence of outer hull sheathing indicates that the vessel was probably restricted to voyages in northern European waters. The overall size of the vessel is difficult to establish without extensive analysis of comparative archaeological and historical sources, however, an estimate of in the region of 150-200 tons seems likely, with a corresponding length of 21-26m.

This report has described the archaeological investigation undertaken in a reactive capacity, during a very short timescale. Despite this, it is clear that much has been learnt about the vessel with the potential for further desk-based comparative research. In addition, a number of proactive investigative approaches were outlined in section 6 that would greatly expand our knowledge of the site in terms of its dating and origin and allow effective future monitoring of it to take place. The need to urgently undertake these avenues of investigation is illustrated by the sudden emergence of the wreck from the East Winner bank and the clear potential for it to continue to become exposed and degraded over time due to further sand movement.

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8. FIGURES

8.1 Figure List

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Figure 4. General view of the wreck, looking north, on the 3rd January 2014 following its initial exposure. (Image courtesy of Richard Smith).

Figure 5. General view of the wreck structure, looking north, on 29th March 2014. Structure, now buried, is visible in the scour hole to the west of the main structure (Image courtesy of Langstone Harbour Board).

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Figure 13. Stern post, upper end is to the top-right. Preserved copper bolts used to secure the planking hood ends into the adjacent rabbet remain preserved and the surviving rudder gudgeon is visible to the left.

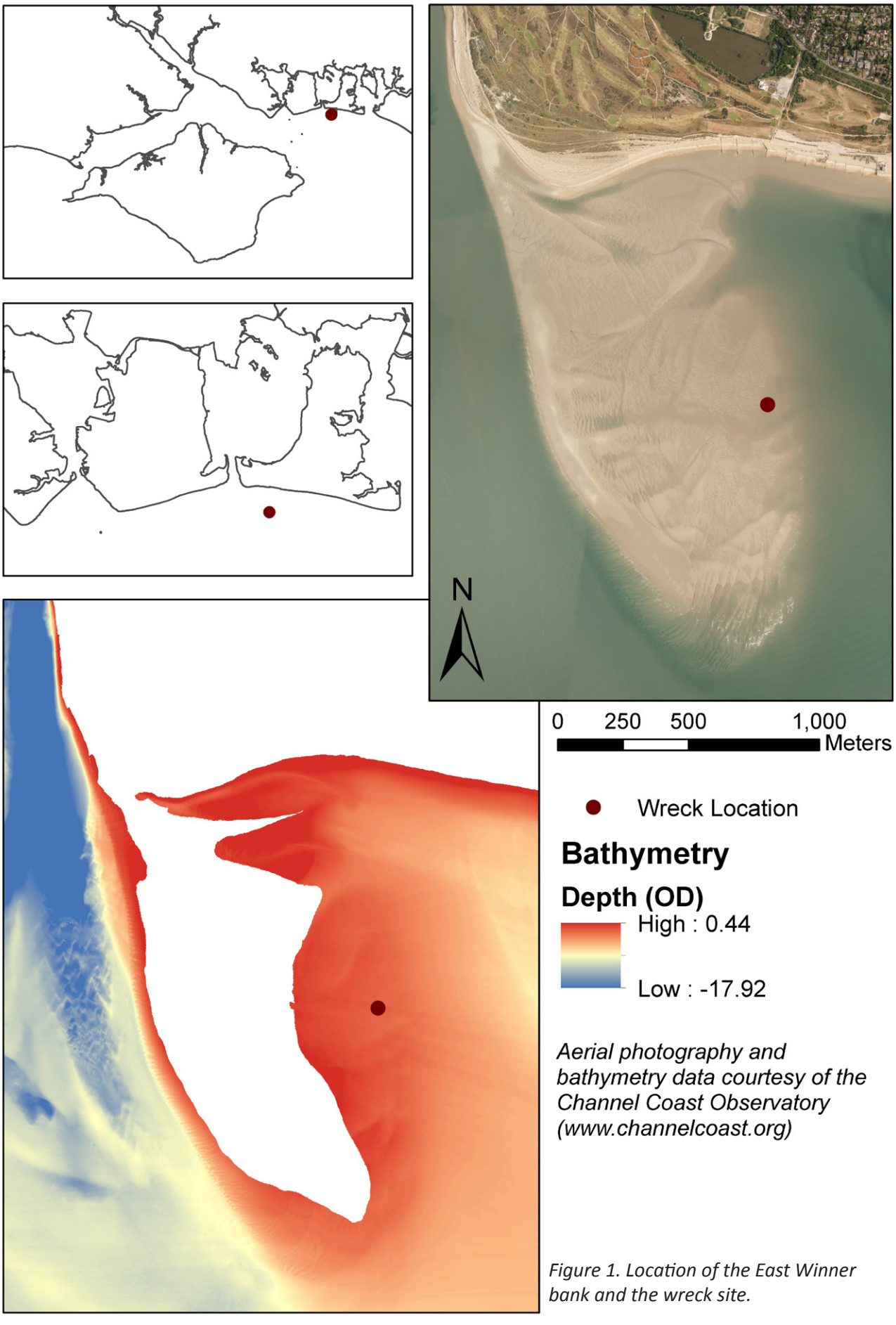

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Figure 3. General view of the wreck structure, looking northwest on the 29th April 2014.

Figure 4. General view of the wreck structure, looking north, on the 3rd January 2014 following its initial exposure. The surfaces of the timbers are largely free from sand and weed cover (Image: Richard Smith).

Figure 5. General view of the wreck structure, looking north, on the 29th March 2014. Structure, now buried, is visible to the west of the main structure (Image: Langstone Harbour Board). Inset: Timber washed up on Hayling Beach in February 2014 (Image: Dave Robbins).

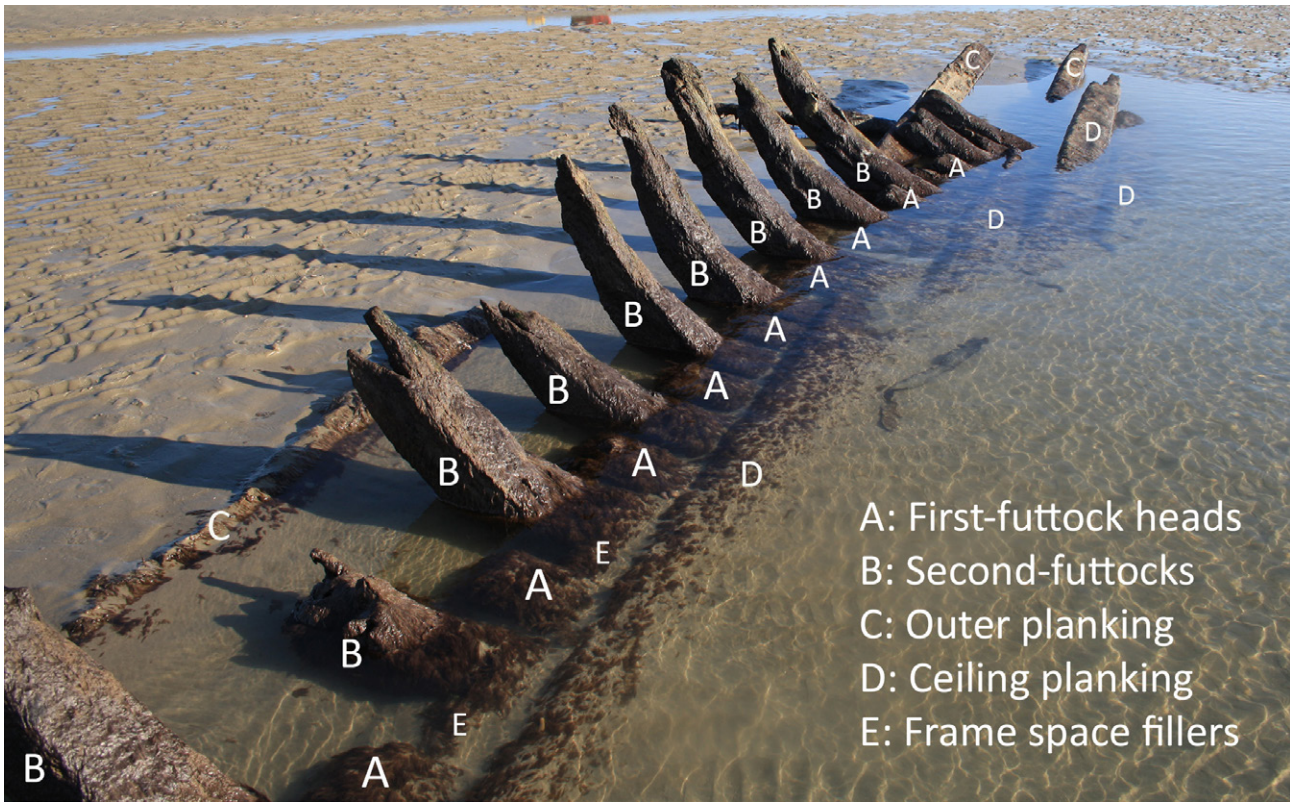


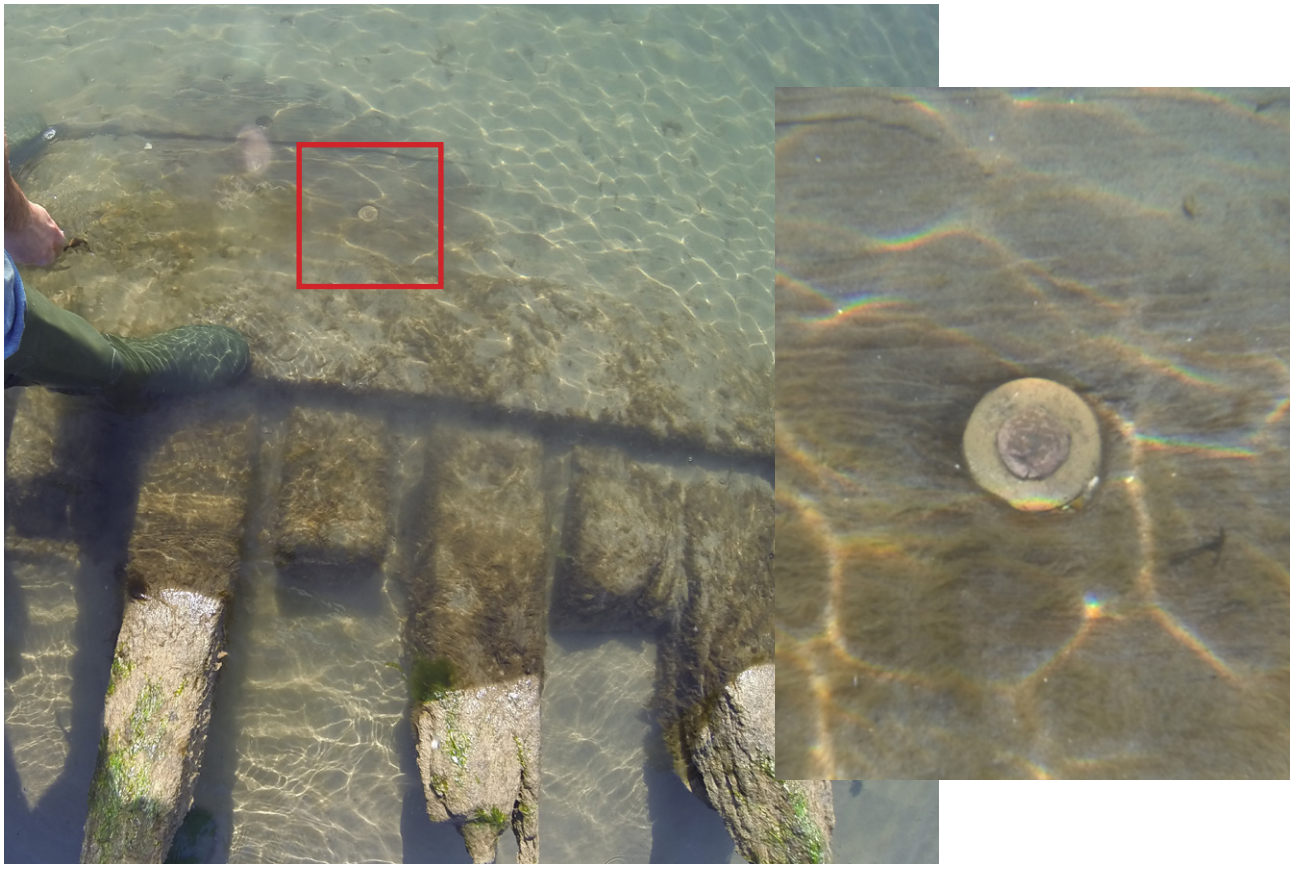
Figure 6. Overview of the wreck, looking south-east towards the bow, annotated with an interpretation of the main structural components observed during site visits.

Figure 7. The stern of the vessel at northern end of the wreck, looking west. The stern post is visible at the righthand side of the picture. Third-futtocks and top-timbers have been trimmed off flush with one another. This area of structure would have originally been far more vertically aligned but has fallen outboard, to lie flat on the seabed.

Figure 8. The central area of the vessel, looking west. A partial beam is located in the centre of the wreck with the remains of an iron knee at the western end.

Figure 9. Overview of the disposition of floors and first-futtocks, looking west in the same area as Figure 6 illustrating the transition in the alignment of first-futtocks from the aft face of the floor/second futtock towards the bow (left) to the opposite alignment towards the stern (right). The timber marked 'A' is considered to be the midships timber and/or master-frame.

Figure 10. Detail of the inner face of an outer plank, following the removal of some of the covering sand. Treenails are visible in the form of circular patches of darker wood (scale = 10cm).



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Maritime Archaeology Trust

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The Maritime Archaeology Trust will promote interest, research and knowledge of maritime archaeology and heritage.

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- Promote archaeological awareness and competence.
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- Support the publication of the results of maritime archaeological investigations, surveys and research.
- Liaise with other regional, national and international organisations involved in maritime archaeology and related disciplines.
- Provide maritime archaeological services to heritage agencies, local authorities and a wide range of marine operators.
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Images (top to bottom): Inspecting a gun on the stern section of the SS *Serrana*, disseminating maritime archaeology to the next generation, augering to recover samples of Bronze Age palaeochannels in Langstone harbour, representing the Trust at the INTERREG annual event in Rotterdam.