

Yarmouth Roads Shipwreck Evaluation and Timber Sampling Campaign: Assessing the local seabed archive to answer research questions of international importance

Project Design

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Submitted by the Maritime Archaeology Trust

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Contents

1. PROJECT DESCRIPTION	3
1.1 PROJECT BACKGROUND.....	3
1.2 SITE DESCRIPTION AND ARCHAEOLOGICAL INVESTIGATIONS.....	5
2. AIMS, OBJECTIVES AND PROJECT STRUCTURE	5
2.1 PROJECT AIMS	5
2.2 PROJECT OBJECTIVES	6
2.3 PROJECT PARTNERSHIP	6
3. BUSINESS CASE – RELATIONSHIP TO RESEARCH PRIORITIES	7
3.1 NATIONAL HERITAGE PROTECTION PLAN	7
3.2 MARITIME AND MARITIME RESEARCH FRAMEWORK FOR ENGLAND.....	8
3.3 INTERNATIONAL RESEARCH AND SKILL DEVELOPMENT PRIORITIES	8
3.4 MAT & UWTSO EXPERIENCE IN RELATION TO PROJECT DELIVERY	9
4. INTERFACES	9
5. RESOURCES AND PROGRAMMING	10
5.1 PROJECT TEAM AND STRUCTURE.....	10
5.2 PROJECT STAGES	11
5.3 METHOD STATEMENT.....	11
5.3.1 <i>Stage One: Planning, Set-up and Logistics</i>	11
5.3.2 <i>Stage Two: Delivery of Fieldwork and Training</i>	17
5.3.3 <i>Stage Three: Post Excavation and Public Dissemination</i>	18
5.3.4 <i>Stage Four: Archiving, Reporting and Evaluation</i>	19
5.4 PRODUCTS AND TASKS	20
5.4.1 <i>Products</i>	20
5.4.2 <i>Draft Task List</i>	20
5.5 GANNT CHART	21
5.6 RISK LOG.....	21
5.6.1 <i>Diving Risk Assessments</i>	21
5.6.2 <i>Hard Boat Operations</i>	22
6. BIBLIOGRAPHY	24
7. SUPPORTING DOCUMENTS.....	25
7.1 QUALITY ASSURANCE STATEMENT	25
7.2 HEALTH AND SAFETY STATEMENT	26
7.3 ENVIRONMENTAL POLICY	27
7.4 EXAMPLE PAPERWORK PROFORMAS	28
7.4.1 <i>Diving Disclaimer</i>	28
7.4.2 <i>Daily Diving Risk Assessment</i>	29
7.4.3 <i>Dive Record Sheet</i>	31
7.4.4 <i>Diving Operations – Site Risk Assessment</i>	32

1. Project Description

1.1 Project Background

This project seeks to enhance understanding of the vessel represented at the Yarmouth Roads Protected Wreck Site. Despite periodic archaeological investigations since the late 1980s, outstanding research questions fundamental to determining the site's place in British and European archaeology are yet to be answered satisfactorily, including key issues of the vessel's identity and provenance. Its unique place within the framework of the ForSEAdiscovery project (Marie Curie Training Network – EU Framework 7) has provided an unparalleled opportunity to pursue further research on the vessel and its historical and environmental contexts.

Yarmouth Roads is one of only 49 Protected Wrecks around the coast of England. It is designated under the Protection of Wrecks Act 1973, and all diving and archaeological investigation must be licensed. The site is thought to encompass the remains of a late 16th century Spanish merchant carrack, possibly the *Santa Lucia*, which is recorded as lost in 1567 carrying wool to Flanders. However, there are some queries over whether the pottery assemblage supports this identification. A close investigation of the ship's timbers, the first time such an initiative has taken place on this site, may provide the information necessary to reach a conclusion on date, provenance, and identification.

During the 1980s the Isle of Wight Maritime Heritage Project (IWHMP) was undertaken with the aim of using divers to identify and record submerged heritage around the Island. Not far from Yarmouth, the site of a wooden wreck and (possible) associated cannon were discovered, and this site was to become the primary focus of the IWHMP which undertook excavation trenches on the site. The Yarmouth Roads wreck was designated under the Protection of Wrecks Act (1973) in 1984, with a 50m radius around position 50 42 31.2N/ 01 29 35.8W.

When funding for the excavation ceased, the Isle of Wight Trust for Maritime Archaeology (IWTMA) was established to continue the work. This ensured that the trenches were completed and that the associated artefact collection and data archive were lodged within suitable repositories. Any exposed areas of the site were then covered in sand bags for protection and preservation of the organic remains.

In 1991 the IWTMA became the Hampshire & Wight Trust for Maritime Archaeology (HWTMA), which attempted to push forward work on the Yarmouth Roads archive with an aim to publication. Although this aspect of the research was suspended, it is now currently being revisited. Since 2004 the HWTMA (now the Maritime Archaeology Trust (MAT)) has been the licensee for the Yarmouth Roads wreck and has established a monitoring program for the site alongside efforts to again push forward archive assessment. MAT has also supported new research on the site such as a sub-bottom profile survey conducted by the University of Southampton, and inclusion of the site within student dissertations.

Today the site archive dating from the 1980s resides with the Isle of Wight Museum Service and Archaeological Centre, with smaller amounts held by team members. Annual monitoring campaigns conducted by MAT have confirmed that the site remains buried beneath protective sandbags. However, there are still several outstanding research questions related to the site which require further diver investigation and artefact (including hull timbers) analysis to answer.

MAT have been seeking funding for the continuation of archaeological research on the Yarmouth wreck for some years. In 2013 MAT and its associated trading company Maritime Archaeology Ltd (MALtd) became a partner in the project ForSEAdiscovery: Forest Resources for Iberian Empires: Ecology and Globalization in the Age of Discovery, which is a Marie Curie

Initial Training Network funded through the European Union Framework 7 program. One of the project's aims is to reconstruct past Iberian forests and how shipbuilding from the 16th-18th centuries maybe have impacted them. Therefore, a series of known Iberian ships or shipwrecks with surviving hull timbers is necessary to provide information on the raw wood material used in ship construction. The shipwreck at Yarmouth, with a hull timber survival rate estimated at 33%, presents an ideal case study as a supposed Spanish ship dating to the 16th century. The MAT-ForSEAdiscovery partnership provides the opportunity to approach the site with updated research questions and support with which to answer them. A focused on-site investigation of this shipwreck will significantly increase understanding of the ship itself and its wider socio-economic, political, environmental, and even philosophical contexts during a period of rapid and widespread change. This vessel's selection for inclusion within this multi-partner international project serves to underscore the global research value of its remains.

MAT seek permissions to excavate specific areas of the site that provide the greatest potential for providing information on the ship's structural nuances which will lead to a more accurate identity. Specifically, to provide information in support of the project's aims, a program of targeted in-situ timber sampling is required. Structural timber samples will then be subjected to a range of scientific analyses to determine date and provenance. As supported by the ForSEAdiscovery project, these analyses will include dendrochronology, stable isotope geochemistry, wood anatomy, and molecular studies. After a close inspection of the existing timber samples housed at the Isle of Wight Museum Services archive, it was determined by the in-house MAT-ForSEAdiscovery post-doctoral researcher that they cannot be used for these studies (with the exception of dendrochronology, which requires only superficial measurements) because they were conserved using polyethylene-glycol (PEG) a process that alters the wood's structure. Therefore, divers will need to select further samples from the vessel.

Previous investigations suggest that there is nothing left of the central portion of the hull. Therefore, the sampling strategy must also take into consideration the threat of degradation to any exposed organic remains in an area of strong tidal activity. The sooner samples are taken, the better chances are of retrieving the most accurate and representative information from the site. The stern has been the focus of past excavations, and because retrieval of artefacts is not a goal, we will begin our efforts at the stern as well. It is currently protected by sandbags that can be removed to reveal the wood beneath them, while other timbers are reported as exposed at the starboard side (Wessex Archaeology 2012). The stern structure will reveal a great deal about the overall ship structure; however, selective sampling of bow timbers will also be essential to more accurately represent the ship as a whole. The 2012 report by Wessex Archaeology describes exposed timbers at the port and starboard sides of the bow, which could be accessed for sampling with minimal excavation and risk to any extant artefacts (Figure). It is hoped that this area of the vessel will be the focus of future excavation in 2016 since looking to the bow will furnish information on site formation processes, which in turn inform studies of the in-situ preservation of organic remains. For this season, we wish to focus our efforts on taking initial samples from areas of the bow and stern that are currently exposed or have been already excavated.

Besides the clear research objectives, excavation and sampling on the Yarmouth Roads site in 2015 will also provide training and on-site experience to maritime archaeologists, students and volunteers. There are few such opportunities within England where the discipline has often seen expansion through commercial projects that prefer to avoid maritime sites altogether, or through developing management and strategic projects that enhance understanding of the resource, but have not provided fieldwork opportunities.

With the sampling campaign and training program at the forefront, this project has been developed with two of Historic England's primary aims in mind: 1) increasing understanding of

maritime heritage assets, and 2) building professional capacity and developing practical skills through excavation training opportunities.

1.2 Site Description and Archaeological Investigations

As a rare coherent shipwreck site, the vessel is thought to have broken into bow and stern halves, with the stern having experienced lateral displacement and both ends having become tilted since seabed deposition. Past excavations concentrated on the west of the site towards the stern and included three main trenches. These excavations resulted in an object archive of around 1000 pieces (representing over 250 artefacts). Objects from the site include a range of metal artefacts including copper alloy, bronze and pewter, the majority of which dates to the mid-late 16th century. There are also stone shot and wooden artefacts, in addition to a cannon that was found nearby and which may or may not be attributed to the vessel assemblage. While these artefact dates are relatively homogeneous, the site's Italian pottery assemblage is thought to date from 1590 to 1620, which raises questions about the vessel's proposed identity and date of sinking. As mentioned above, the site is hypothesized to be the remains of a late 16th century Spanish merchant carrack, the *Santa Lucia*, which was recorded as lost in 1567 while carrying wool to Flanders and was reportedly salvaged soon afterward by Sir Edward Horsey. A major problem of identification therefore lies in the associated pottery assemblage that post-dates the demise of the *Santa Lucia* by at least 23 years, begging the question of further investigation.

To date, scientific interest in the shipwreck has produced a number of unpublished dissertations and published articles. The full archive assessment, analysis and publication is yet to be completed, with initial audit of the archive currently being undertaken by the MAT-ForSEADiscovery post-doctoral researcher. The current bibliography consists of the following:

- Tomalin, D., 1988, *An Alberghetti bronze minion and carriage from Yarmouth Roads, Isle of Wight*. IJNA 17.1: 75-86.
- Watson, K. and Gale, A., 1990, *Site evaluation for marine sites and monuments records: the Yarmouth Roads Wreck investigations*. IJNA 19.3: 183–92.
- Dunkley, M., 2001, *The Yarmouth Roads Wreck: A Study in Interpretation*. Unpublished MA thesis, University of Portsmouth.
- Plets, R.M.K., Dix, J.K. and Best, A.I., 2007, *Mapping of the buried Yarmouth Roads wreck, Isle of Wight, UK, using a Chirp Sub-Bottom Profiler*. IJNA 37.2: 360–73.

There are also annual reports provided to the Advisory Committee on Historic Wreck Sites (HWTMA / MAT), newsletters of the IWMHP, a site assessment through the Solent Marine Heritage Assets project (HWTMA 2010), and a report from a site assessment undertaken by Wessex Archaeology in 2012 under the Contract for Archaeological Services in relation to the PWA.

2. Aims, Objectives and Project Structure

2.1 Project Aims

The project has two key aims:

Aim 1: To enhance understanding and enjoyment of the Yarmouth Roads Protected Historic Wreck Site through archaeological research and dissemination locally and internationally.

Aim 2: To enhance maritime archaeological skill development through the provision of opportunities for gaining experience in excavation and in-situ timber sampling methods.

2.2 Project Objectives

Within these aims there are a number of objectives:

Objective 1: To enhance understanding of the Yarmouth Roads site generally and vessel specifically through dendrochronological and dendro-provenance techniques, especially with a focus toward placing this vessel within a larger industry reliant on Iberian forest resources.

Objective 2: To enhance understanding of the Yarmouth Roads site through historical research in Iberian archives in relation to other Iberian merchant vessels during the Age of Discovery.

Objective 3: To undertake an archive audit and assessment of the 1980s excavation work to aid future project development and to plan future archive analysis.

Objective 4: To aid dissemination and enjoyment of the site through social media and museum displays (e.g., Sunken Secrets Museum at Fort Victoria, Isle of Wight, managed by MAT).

Objective 5: To provide underwater archaeology training opportunities for maritime archaeologists, students and volunteers.

Objective 6: To foster an understanding of the scientific importance of timber assessment and targeted sampling within maritime archaeological investigations.

2.3 Project Partnership

The proposed Yarmouth Roads excavation and training project will benefit significantly from available partnership funding from ForSEADiscovery.

ForSEADiscovery (Forest Resources for Iberian Empires: Ecology and Globalization in the Age of Discovery) is a Marie Curie Initial Training Network funded through the European Union Framework 7 program. The aims of the project are:

- i) to consolidate a research line combining historical research, nautical archaeology, GIS and wood provenancing methods (dendrochronology, DNA, wood anatomy and geo/dendrochemistry);
- ii) to increase the background and experience of trainees in the different research areas by engaging the project fellows in training courses and workshops aimed at developing their scientific, communication, and management skills; and
- iii) to develop their transferable skills for future careers in academia or the private sector whilst advancing the research fields through the integration of research tools, development of reference datasets and new discoveries.

The project includes the following partners: Instituto de Historia, Consejo Superior de Investigaciones Científicas (Spain); Universiteit Leiden (Netherlands); Rijksuniversiteit Groningen (Netherlands); University of Wales Trinity Saint David (UK); Universidade Nova de Lisboa e do Algarve (Portugal); University of Santiago de Compostela (Spain); Wageningen University (Netherlands); and Universite de Lorraine (France).

Associated partners are: Texas A&M University (USA), Dendro DDK (Denmark), Archeonauta S.L. (Spain), Nicolaus Copernicus University (Poland), and Dixit International (Sweden).

As a project partner, MAT (and associated organisation MALtd) is hosting a post-doctoral Experienced Researcher (ER) over a two year period during which time she will work to develop best-practice techniques for investigating and sampling the wooden hulls of Iberian shipwrecks, while gaining experience of maritime archaeological practice in research and commercial environments. The full project title for the ER is 'Research protocols for interrogation of shipwreck assemblages; recovery, documentation and analyses of structural

ship timbers from in situ shipwrecks'. As such the study of the Yarmouth Roads Protected Wreck site will directly fulfil the research aims of the ForSEADiscovery project, while significantly advancing knowledge of the site in terms of dating, provenance, and its wider social-historical context.

MAT/MALtd is also hosting secondments for doctoral Early Stage Researchers and a second post-doctoral ER. These researchers will be gaining experience in a variety of aspects related to maritime archaeology, waterlogged timber assessment, and archaeological database management. Within the UK the other main project partner is the University of Wales Trinity St David, with Prof. Nigel Nayling acting as Training Coordinator for the ForSEADiscovery project.

3. Business Case – Relationship to Research Priorities

The evaluation excavation on Yarmouth Roads relates to a number of research and management priorities.

3.1 National Heritage Protection Plan

The *National Heritage Protection Plan* (NHPP) produced by Historic England (as English Heritage) sets out the framework through which the organisation believes that the historic environment of England will be appropriately protected (English Heritage 2011: 3). The NHPP covers the period between April 2011 and March 2015. It is therefore of relevance to the project presented here.

The proposed project at Yarmouth Roads is most relevant to the following areas of the NHPP:

- **Stage: Understanding**
- **Measure: 4. Assessment of Significance**
- **Topic: 4H Marine Assets and Landscapes**

“Survey and identification of submerged heritage and inundated prehistoric landscapes (Measure 3) will provide key targets for follow-up assessment. These may comprise specific assets (wrecks, crash sites etc) and wider landscapes (landforms of high potential)” (English Heritage 2011: 29).

The Yarmouth Roads site is a significant marine heritage asset, one of relatively few designated under the Protection of Wrecks Act 1973. There is a need to identify the site (if possible), and place the remains in their wider social and economic context in this period of rapid and large-scale European and international developments. There is also a threat faced to the site where timbers protrude above the seabed sediments in the port and starboard site of the bow and at the starboard side of the stern (Wessex Archaeology 2013).

- **Measure: 2. Threat: Assessment and Response**
- **Topic: Heritage Management, Conservation and Craft Skills Shortages**

The NHPP outlines: “National guidance on protection and change management cannot be implemented successfully without a suitably skilled workforce. Maintenance of significance and heritage value of heritage assets and landscapes similarly relies to a great extent on the availability of a workforce with the right key skills in the right numbers. Pressure is intense in particular skill areas for a variety of reasons, and the integrity or maintenance of assets which rely on these skills are therefore at increasing risk. We need to ensure that the relevant skills to care for and conserve our heritage remain available now and for the future, including heritage management, technical conservation skills and building and interiors crafts skills. However, EH cannot do it all, and partnership here is essential”.

The Yarmouth Roads project can contribute considerably to this area. Through fostering skill development in areas of underwater excavation, in-situ timber sampling, dendrochronology

and assessment of waterlogged wood (a.o.), this project aims to rectify the current situation where only one diving dendrochronologist practices in the UK, which in the future could represent a significant skills gap.

A program fostering the development of these professional skills and other underwater excavation experience is urgently required to support the maturation of intrusive maritime archaeological investigative techniques.

3.2 Maritime and Maritime Research Framework for England

Investigation and research of the Yarmouth Roads site has the potential to add to a number of focus areas highlighted within *People and the Sea: A Maritime Archaeological Research Agenda for England* (Ransley et al. 2013), in particular within these arenas of the Medieval and Post-Medieval periods:

Shipbuilding: There are significant research queries related to technological development and the supply of resources on a national and international basis, particularly dealing with timber trade, natural resource allocation, public/private control over timber resources, and how diminished timber resources may have been a catalyst for technological changes in shipbuilding;

Maritime Networks: The European context of England needs to be much better appreciated. We need to link into and build up comparable existing/new archaeological data with the continent. We must collaborate internationally to explore documentary and archaeological evidence.

Natural resources for shipbuilding and maritime networks of Early Modern period are the two primary research focuses of ForSEAdiscovery, and the Yarmouth Roads shipwreck represents an important element within this greater research lacuna.

3.3 International Research and Skill Development Priorities

ForSEAdiscovery has responded to key international priorities, as stated within the project outline:

In the Early Modern Age (16th-17th centuries) the construction of ocean-going ships was paramount to the development of cultural encounters in what became the Age of Discovery and European expansion. In the case of the Iberian Empires, the establishment of new trade routes brought up the need for armed merchantmen, galleons and smaller vessels, placing unprecedented demands on Iberian forests for the supply of construction timber. Forestry and sea power became inextricably linked, creating new geopolitical tensions, alliances and forest regulations.

Key questions in this context are:

- Could Iberian forest resources sustain the increasing demand of sound timber, or was the wood imported from elsewhere?
- If so, how were the trade networks organised? And,
- Did the lack of raw material force the technological changes occurred in shipbuilding in the 16th century, or were they a result of exchange between Mediterranean and Atlantic shipbuilding traditions?

This project will address these questions through a multidisciplinary and innovative training research program to improve the understanding of our historical past, our cultural heritage, and our knowledge of the use of resources for shipbuilding. The prerequisite for such approach is combining knowledge derived from Humanities and Life Sciences.

The aims of the project are:

- i) to consolidate a research line combining historical research, underwater archaeology, GIS and wood provenance methods (dendrochronology, wood anatomy and geo/dendrochemistry);

- ii) to increase the background and experience of trainees in the different research areas, by engaging the fellows in training courses and workshops aimed at developing their scientific, communication, and management skills; and
- iii) to develop their transferable skills for future careers in academia or the private sector whilst advancing the research fields through the integration of research tools, development of reference datasets and new discoveries.

3.4 MAT & UWTSD Experience in Relation to Project Delivery

MAT is a registered charity promoting public interest, scientific research and general knowledge of maritime archaeology and heritage. MAT's trading company, Maritime Archaeology Ltd, undertakes commercial projects with all profits supporting the charitable research work undertaken by MAT. MAT has more than 22 years of experience in maritime archaeology scientific research, provision of advisory guidelines, and delivery of a wide range of training, education and outreach. MAT has a significant track record demonstrating its ability to deliver this project including:

- Having undertaken a wide range of maritime archaeological excavations on heritage assets including wrecks, submerged prehistoric landscapes and other sites;
- Frequent work with timber sampling and timber specialists;
- Unparalleled experience in the integration of volunteer divers and students within maritime archaeological projects of all types;
- Detailed understanding of the Yarmouth Roads wreck site and its associated archive.

Through the ForSEAdiscovery project, MAT are working with the University of Wales Trinity St David (UWTSD), in particular Prof. Nigel Nayling, who has worked on MAT-associated projects for 15 years, including a number of shipwreck and submerged prehistoric landscape sites. As the UK's only diving dendrochronologist, he is providing an invaluable skills transfer service to a new generation of maritime archaeologists.

4. Interfaces

This section, as defined in MoRPHE (English Heritage 2006), notes any connections/links that need to be established between the proposed work and other projects.

A key project interface is with the ForSEAdiscovery program which is outlined above in sections 2.3 and 3.3. Additional interfaces include:

16th Century Vessels off England

Studland Bay Protected Wreck. Spanish Merchant Vessel from the 1520s-30s with an artefact collection numbering around 750 from excavation in the 1980s, the archive of which is held by Poole Museums. This is a directly comparable collection for Yarmouth Roads and recent work has been undertaken by Bournemouth University.

Cattewater Protected Wreck. An early 16th century armed merchant ship (1530s) located in Plymouth Sound. Archaeological investigation and an associated artefact collection provide comparative material for Yarmouth Roads.

Other relevant examples off the English coast: Church Rocks, an Iberian merchant vessel (16th C); Bartholemew Ledges armed cargo vessel, probably Spanish (1590s); St Anthony, an armed merchant carrack from Portugal (1527); Brighton Marina (early 16th century), Dunwich Bank a Spanish or Dutch ship (16th century).

Comparative 16th Century Iberian Trading Vessels Internationally

There are a range of examples of Iberian trading vessels found internationally which require further research to determine which of those provide potential research links for Yarmouth Roads. A number of wrecks will be subject to sampling and analysis as part of the ForSEAdiscovery project.

16th Century Dendrochronology Research

In recent decades, dendrochronology in Northern Europe (generally) and the UK (specifically) has established a long-term chronology based on oak tree-rings. This chronology has been the backbone of extensive dating and provenance studies going back thousands of years. However, such a chronology is yet to be put into place for Iberia, and this is one of the aims of the ForSEAdiscovery project. By establishing such long-term historical (and in the case of the UK, prehistoric) tree-ring chronologies, it becomes possible to reconstruct historical forest resources, provenance wood artefacts, and provide absolute dates to the year (or in some cases, the season) for when parent trees were felled to provide wood for a wide range of artefacts. Determining inter- and intra-regional timber trade also becomes possible, and such knowledge would contribute greatly to the archival sources. For example, archival sources claim that Iberia imported wood from elsewhere in Northern Europe but did not export local timber. However, through dendrochronology and other dendrological analyses, the wood can speak for itself. Such clarifications are essential for understanding the complex trade relationships between regions of North Europe, including Britain, during the rapid political, environmental and socio-economic changes of the Age of Discovery.

5. Resources and Programming

5.1 Project Team and Structure

For the hull evaluation and sampling, the team will consist of representatives from MAT, some members of the ForSEAdiscovery project, and volunteers. The list currently held by Historic England of authorized divers on the Yarmouth Roads Survey License should be appended thus:

MAT staff:

- A – **Julie Satchell**, Project Manager
- B – **Garry Momber**, Project Specialist
- C – Dr. **Sara Rich**, MAT / ForSEAdiscovery Project Officer
- D – MAT Project Officers: **Brandon Mason, Christin Heamagi, Jan Gillespie** and **Jose Oscar Encuentra**

ForSEAdiscovery Project Team from University of Wales Trinity Saint David (UWTSD):

- E – Dr. **Nigel Nayling**, Project Specialist / ForSEAdiscovery Training Coordinator

Volunteers

- F – Diving volunteers including up to six of the following: **Andy Williams, Dan Pascoe, Dave Johnston, Dave Robbins, Jane Maddocks, Lawrence Moran, Michael Pitts, Rachel Bynoe, Robert Yorke, Rodrigo Pacheco Ruiz**, and **Sara Hasan**.

MAT staff work to the professional standards of the Institute of Field Archaeologists. MAT is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA).

A - Julie Satchell is Head of Research for MAT. Julie is an experienced Project Manager and has a proven track record in delivering a wide range of projects related to the marine historic environment, including a significant number of projects through English Heritage/Historic England.

B – Garry Momber is the Director the MAT since 2002 and has been with the Trust since 1997, spearheading fieldwork, outreach and publication programs. He is qualified to dive at work under the HSE Scientific and Archaeological ACoP.

C – Dr. Sara Rich is an experienced maritime archaeologist and dendrologist, and she is qualified to dive at work under the HSE Scientific and Archaeological ACoP. As the post-doctoral Experienced Researcher for the nautical archaeology component of ForSEAdiscovery, she has a demonstrated publication, teaching and research agenda.

D – Project Officers at MAT will be indispensable for this campaign, as they have extensive experience in dealing with the local marine historic environment, particularly shipwrecks, and all officers are qualified to dive at work under the HSE Scientific and Archaeological ACoP. They are named on the current Survey License.

E – Dr. Nigel Nayling is Professor of Archaeology, History and Anthropology at the University of Wales Trinity St David, ForSEADiscovery's Training Coordinator and Nautical Archaeology Lead, and Lampeter's Program Director in Nautical Archaeology. He is the UK's only diving dendrochronologist and is qualified to dive at work under the HSE Scientific and Archaeological ACoP.

F – Volunteers are likely to be included in the diving team. These individuals have worked with MAT on a number of other archaeological surveys and excavations underwater, and they are eager to further develop their archaeology skills in a voluntary capacity.

5.2 Project Stages

This project will be split into the following principle components:

- Stage One: Planning, Set-up and Logistics (March – June 2015)
- Stage Two: Fieldwork (May/June 2015)
- Stage Three: Analysis and Research (August 2015 – April 2016)
- Stage Four: Reporting, Dissemination and Archive Deposition (January 2016 – Oct 2016)

It is expected that the fieldwork will take place over a three-day period in late May or June 2015, making optimal use of tides. This current plan is small-scale and will address the need for initial wood samples from the vessel; however with further funding, a larger-scale project may be undertaken later in the autumn of 2015 or in 2016. In this case, we will provide a fully updated project design.

5.3 Method Statement

5.3.1 Stage One: Planning, Set-up and Logistics

5.3.1.1 Development of excavation planning and strategy

Including:

- Obtaining all necessary permissions (including excavation licence)
- Positioning of precise areas for sampling and pre-excavation survey plan
- Development of excavation methodology
- Development of protocol for artefact encounters
- Development of sampling strategy
- Development of sample storage and delivery protocols
- Development of trainee program and associated paperwork
- Liaison with Isle of Wight Museum Service

Obtaining all necessary permissions

There is a need to ensure that all the appropriate permissions are gained prior to work on site. This will include:

- Gaining an excavation licence from the Secretary of State (via Historic England), this project design will form the basis on which the license will be requested.
- Gaining permission from the Crown Estate (owners of the seabed)

It should be noted that MAT has consulted with the MMO regarding licensing, but because this project does not require using any powered equipment for excavation, with all work being undertaken by hand, an MMO licence will not be required. Furthermore, the project will only

need to repair existing sandbags (if necessary and as needed) and will not need to add additional sandbags to the site or seabed, again negating the necessity of an MMO license for the current sampling campaign.

5.3.1.2 Excavation Methodology

The excavation methodology will follow the standard and guidelines as set down in the Chartered Institute for Archaeologists (CIfA) guide for 'Excavation'. Specific considerations for the Yarmouth Roads wreck have been included below.

Trench Location

Trench positioning on site will be targeted at areas that are most likely to answer the research aims and objectives for the work (see section 1.2). Other key drivers in the decision on where the trenches will be positioned are:

- 1) taking advantage of past excavation trenches to minimise time spent in removing surface sediments,
- 2) taking advantage of already exposed timbers as sample sources which would require little to no excavation, and
- 3) ensuring representative samples are taken from exposed or near-surface structural timbers at the bow and stern.

Because it is known that the central part of the hull timbers are no longer extant, a focus on the exposed portions of the bow and stern will provide the greatest opportunity to sample a variety of primary structural timbers, including hull planks, strakes, and frames (see Figure; Wessex Archaeology 2012). Besides sampling, a brief evaluation will be made of the exposed timbers for evidence of repairs, tool marks, material inconsistencies, and general condition. This information will be valuable for planning future larger-scale excavations.

Yarmouth Roads

Site plan and areas of focus for 2015 timber sampling campaign

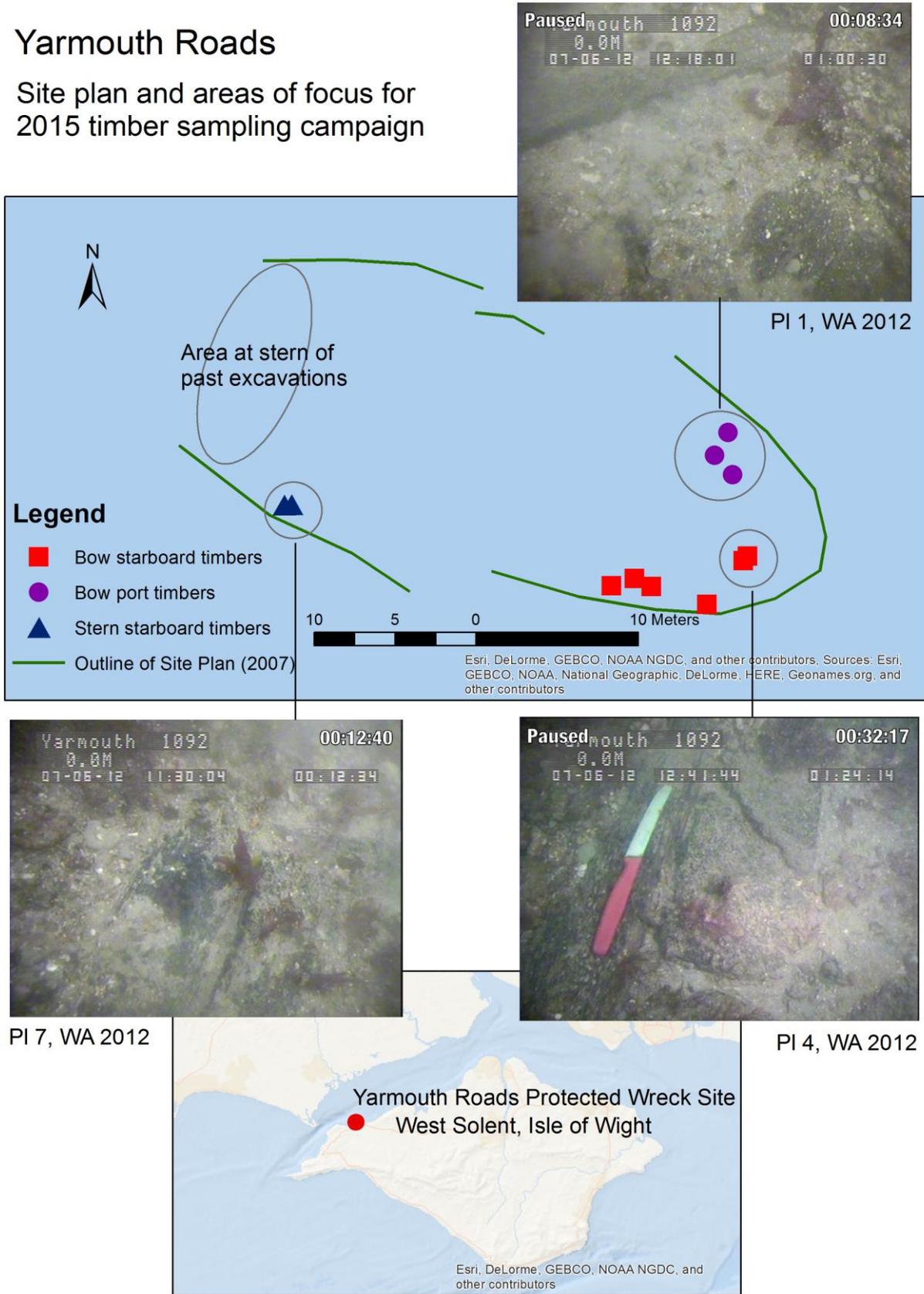


Figure: Image showing areas of the site which are expected to be targeted for excavation and sampling.

Procedures and Recording

Excavation method will follow standard procedures of a context based approach, although targeting previously excavated and pre-exposed areas means that it is not expected to encounter undisturbed contexts. Within the trench areas any overburden will be removed by hand only until timbers can be hand-sawn for sample removal. Should artefacts be encountered, they will be drawn in situ, labelled and photographed, before being reburied. Paul Simpson, conservator at the Isle of Wight Museums Service, will advise as necessary. Samples may be treated and stored in line with recommendations set out in 'First Aid for Underwater Finds' (Robinson 1998). Appropriate handling, processing (record sheets, photography etc.) and conservation of samples will be ensured at all times. There is scope to train and provide further experience to volunteers, as the Yarmouth Roads project provides a particularly valuable opportunity to gain hands-on experience of working with waterlogged wood.

Recording will be based on the Molas recording system, on which the MAT recording sheet system has been based. Additional timber and sampling record sheets will be integrated into the system where required. The main adaptation of the Molas system for work in the underwater zone is the addition of a 'Dive Log Sheet' and an 'Archaeological Record Sheet', the former are used as the primary numbering system and are used for logging individual divers. Each diver will fill in an Archaeological Record Sheet which provides details of specific work undertaken on each dive and will reference any numbers utilised e.g., context numbers, feature numbers and find or sample numbers. These sheets do not replace a 'context-led' approach to excavation and recording.

In summary the principle record sheet system includes:

- Dive Log Sheet
- Archaeological Record Sheet
- Context Log and Record Sheets
- Drawing Index
- Finds Index and Record Sheets
- Sample Index and Record Sheets
- Timber Index and Record Sheets
- Photo Index
- Video Index and Log Sheets

Additional relevant guidance documents will be drawn on for specific recording practice, such as 'Waterlogged Wood: guidelines on the recording, sampling, conservation and curation of waterlogged wood (EH 2010).

Hull structure: The excavation will proceed down until the hull structure is sufficiently exposed to reveal suitable timbers for in-situ sampling. The exact excavation and timber selection procedure will depend on the amount of overburden which is present adjacent to or over the structure and the condition of the timbers exposed and near the surface.

The hull structure will be recorded in detail as it is exposed with particular attention being paid to any tool marks and fine detail visible on the wood. The hull will only be exposed for a short period of time to allow for recording and sampling, which will minimise any potential attack by marine boring organisms.

Excavation tools: In some areas of thin overburden, hand fanning may be sufficient to expose hull timbers. In areas with deeper sedimentary cover, hand tools may be necessary to

gently remove sand and clay from timbers so that they may be sampled. No power tools will be used.

5.3.1.3 Sampling Strategy

Building on EH's 'Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood' (2010), the sampling strategy employed at Yarmouth Roads will follow sampling protocols developed through years of experience of in-situ timber sampling for follow-up analyses including radiocarbon dating, dendrochronology, species ID, stable isotope analyses, etc. This experience has been gained particularly in prior field research conducted by Dr. Nigel Nayling and Dr. Sara Rich. Dr. Rich will be producing a detailed in-situ timber sampling protocol for publication in 2016 following the 2015/2016 sampling campaign for the ForSEADiscovery project. Because so many scientific analyses are supported by the project, very specific samples must be targeted and a high level of conservation and meticulous record-keeping maintained. The details of each sample and analyses conducted on them will be made available in the forthcoming open-access project database, which is being modelled after MAT's Archaeological Atlas of the 2 Seas (www.a2s-geoportal.eu).

For each timber selected from the wreck, approximately three separate samples are necessary to conduct the series of cutting-edge laboratory studies related to provenance. One cross-section from each selected timber will be provided for 1) dendrochronology and wood anatomical marking; 2) FTIR spectroscopy for composition and Pyrolysis Gas-Chromatography/Mass-Spectroscopy (Py-GC/MS) for macromolecular composition; and 3) stable isotopic and trace element analyses. In some cases where the timber is in ideal condition (in terms of size and preservation), two samples may be taken and reused or partitioned between analyses. However, in cases where timber preservation is poor, more samples may be required to achieve accurate results. Cross-analysis consistency is necessary, which is why multiple samples from the same timber are required. An estimated 3-6 timbers will be sampled from the wreck to provide a comprehensive view of the raw materials represented and their role in the ship's structure. Therefore, anywhere from 6-24 samples could be taken from the vessel depending on condition, size, access and available time.

Precise sampling will rely on post-exposure expert assessment to determine the potential ability of timbers to contribute to answering the research objectives of the project (see section 1.2). The following general principles will be applied to sampling procedures:

- Only samples from timbers that will contribute to the knowledge of the ship will be taken (i.e., from major structural timbers representative of the ship as a whole, not treenails or minor hull elements);
- As few samples as possible will be taken and excesses will be avoided at all times (i.e., first recourse will be to consolidate samples for analyses whenever possible);
- Only samples capable of relaying reliable information will be taken (i.e., timbers that are too degraded to offer accurate ring counts or too biologically contaminated to offer accurate isotopic ratios will be left in situ).

5.3.1.4 Sample Storage and Preliminary First-Aid Conservation for Artefacts

All samples taken will be held in sterile plastic containers, kept wet, cool (<20 C) and out of direct sunlight, and they will be transported to their respective labs for analyses as soon as possible. Paul Simpson (Isle of Wight Museums Service) has offered to act as conservation advisor; however any artefacts encountered during the sampling campaign will be recorded and reburied, as artefact retrieval is not an aim of the current project.

Regarding long-term storage options, anatomy and tree-ring studies are not destructive, but if those samples are reused for FTIR, Py-GC/MS, elemental or isotopic analyses (using MC-

ICP-MS), the samples will be destroyed. Any remaining wood material may be archived by the Isle of Wight Museums Service.

5.3.1.5 Organisation of Logistics for Diving Fieldwork and Training

Booking boats, equipment, air and personnel

The organisation, booking and purchasing of equipment will be undertaken by MAT staff. MAT have extensive experience in the planning and execution of underwater excavation and will make available its full range of available equipment (see table below).

Boats: The excavation will be supported on site with:

- a hard boat moored over the site –. Boat to be used is Wight Spirit which has the capacity to take 12 divers and has good facilities for undertaking archaeological diving projects.

Diving Equipment: MAT will supply all required diving equipment for the core HSE team. MAT will also make available all its cylinders for use during the project. These are all individually identified and certified as in test.

Volunteer divers will supply their own dive equipment (other than cylinders if required) and are considered responsible for ensuring that their equipment is serviced according to the manufacturer's specifications.

Archaeological Equipment: All equipment necessary for the archaeological excavation and sampling, including planning frames, drawing boards, tapes, saws, gloves, camera and video equipment, tags and nails, baselines, sample bags and containers as well as sandbags for covering up the wreck site when finished, will be sourced and provided by MAT .

Air: Air fills will be supplied by either the National Oceanography Centre, or a local dive shop.

Personnel: The maximum dive team numbers will be dictated by the available space provided on boats. At present it is planned that the team will consist of 10 divers per day, although there will be capacity to swap team members as necessary.

At all times there will be a core team of four HSE divers and up to two ForSEAdiscovery fellows with the appropriate qualifications and medical to allow them to work as part of the HSE diving team. The diving supervisor will be responsible for making a written record of any changes of diving personnel during the working day, which at times may include highly qualified volunteers.

A detailed rota of divers including individual qualifications will be drawn up prior to the fieldwork.

Development of HSE diving paperwork including 'Diving Project Plan' and risk assessment procedure

Diving Practice

MAT is registered as a diving contactor with the Health and Safety Executive (HSE). Dives involving MAT staff and ForSEAdiscovery fellows and partners will be undertaken under the HSE Scientific and Archaeological Approved Code of Practice. Any volunteer divers will dive according to the rules and regulations of their certifying organisations, but will be under the duty of care of MAT. Any volunteer divers will be required to provide proof of: diving qualifications, medical fitness to dive and 3rd party insurance. Every diver must sign a form declaring that they have read a copy of the diving project plan and recommended diving code of conduct (copy included in appendix 7.5).

Diving Paperwork

A Diving Project Plan will be developed which will include detailed information on:

- Diving team composition
- Boats (including safety features and facilities)
- Tides (times and strengths)
- Site Risk Assessment (this is a general assessment of potential risk, it is augmented by a daily risk assessment completed on site)
- Provisional daily operations plan
- Daily supervisor check list (an aid memoire for the diving supervisor)

Examples of the following template diving paperwork have been included in Appendix 7 of this project design:

- Site Risk Assessment
- Daily Risk Assessment
- Dive log sheet
- Diving disclaimer

Organising archaeological recording paperwork

As outlined above the excavation will follow standard archaeological procedures. All required paperwork in support of the recording and documentation of work on site and for post excavation will be gathered together in folders for ease of use during the project.

5.3.2 Stage Two: Delivery of Fieldwork and Training

This section outlines the requirements, methods and approaches for the fieldwork phase of the project.

To include:

- On site management of boat and equipment
- Management of HSE diving paperwork
- Excavation tasks and progress
- Lifting, handling and processing of artefacts (note targeting of previously excavated areas will reduce the likelihood of artefact recovery)
- Sampling of timbers, recovery and storage
- Artefact storage and conservation advice

Provision of Team Training and Briefing

All individuals involved in the excavation on site will be identified on a rota that will be established prior to the work on site. All those involved will be provided with a briefing session to ensure that all team members are aware of the diving, excavation and archaeological recording procedures to be followed. Further on-site familiarisation will be carried out for any team members unfamiliar with any aspects of the work. The core team will have already spent one month working on submerged ship timber sampling campaigns in Spain, and it is expected that they will approach the Yarmouth Roads wreck site aided by this experience.

5.3.2.1 Site Backfilling and Protection Measures

Any excavated area(s) of the site will be fully backfilled to safeguard future stability of the area excavated and adjacent parts of the site.. Sand bags will be filled with material from offsite (outside of the protected area) and used as the initial fill of the trench(es).

5.3.3 Stage Three: Post Excavation and Public Dissemination

The post excavation and dissemination aspect related to the project will be on-going during the summer and autumn months after the excavation and sampling campaign.

Included within this phase will be:

- Post-excavation tasks, sample logging/ recording, notation of artefacts encountered and reburied on site, site plan drawing, video and photograph cataloguing, conservation assessment (if required).
- Timber assessment, provenance and dating via the methods outlined above in section 5.3.1.3.
- Historical archive research: in conjunction with ForSEADiscovery Early Stage Researchers based in Spain and Portugal, research in primary archives is already being undertaken to aid identification of the vessel and provide the wider context for operation. This will include review of potential trade goods previously recovered from the Yarmouth Roads shipwreck assemblage.
- Comparative research: review of other available shipwreck examples for understanding of timber use and vessel construction.

5.3.3.1 Post Excavation tasks

Post excavation tasks will be undertaken by a combination of members of MAT staff and ForSEADiscovery fellows who will help ensure that data, objects and samples are all processed to recognised archaeological standards. This work will ensure that future assessment and analysis can proceed efficiently. All post excavation work will be undertaken in line with best practice as defined in 'Archaeological Archives' (Brown 2007).

There are a number of post excavation tasks that will require completion after the excavation. These include the following procedures:

- 1) **Sample recording and photographing:** all samples will have an associated unique number for which a paper record of their dimensions, materials, condition etc will be recorded. Additionally each sample will be photographed to create a record of its condition immediately after excavation. This photography will be digital and will include the site code and artefact number and scale within the photograph. Any artefacts will be recorded similarly and reported to the Receiver of Wreck within 30 days of recovery to comply with the requirements of the Merchant Shipping Act 1995. No artefacts will be retrieved on this campaign, but any encountered will be logged and reburied.
- 2) **Record checking, ordering and indexing:** the paper record archive produced during the excavation will be reviewed to ensure all records are consistent and fully completed.
- 3) **Drawing checking, ordering and indexing:** there are likely to be some drawings produced on site. The originals, produced on permatrace, will be numbered as they are produced and referenced to the relevant archaeological record sheets, context and finds registers. As part of the post excavation process these will be checked to ensure all are labelled and consistent. Where associated areas of the site have been planned or drawn on separate drawings these will be crossed checked against each other.
- 4) **Video and photograph cataloguing:** Any video recovered from the site will be viewed to develop a detailed log sheet. Video will be collected digitally. The log will record a description of what is being viewed against time within the video. When any specific finds or features are captured on film these will be recorded in the description.
- 5) **Updating of Site Archive:** A database and GIS for Yarmouth Roads has been begun in order to aid assessment of the site archive, and it will be updated regularly during and after the 2015 campaign.

- 6) Conservation tasks and timetable:** if any artefacts are recovered, they will be noted and reburied for future excavation work, as this campaign is focused solely on the retrieval of timber samples, not artefacts per se. Any conservation activities regarding samples will be under the advice of Paul Simpson, conservator, Isle of Wight Museums Service.
- 7) Production of excavation plans, sections and drawings:** the primary site drawings will be assessed and full plans and sections will be drawn from the composite drawings. Work underwater often utilises drawing boards of A4 and A3 size which are most manageable in potentially low visibility conditions, this means that a number of plans and sections have to be worked up into single drawings.
- 8) Analysis of excavation data:** this will involve the review and quantification of the data and samples recovered from the site. Analyses of wood samples will be performed according to the ForSEAdiscovery framework, resulting in dates of the felling of Yarmouth Roads source timbers and their provenance. Plans from excavation will also be compared to those from previous site plans and survey results to check consistency and highlight any unexpected discoveries. As part of the post-excavation process a brief review of future assessment work will be undertaken.

5.3.3.2 Special Exhibition & Website

The Yarmouth Roads shipwreck will be featured in the open-access database for ForSEAdiscovery, which is based on that built by MAT staff for the Archaeological Atlas of the 2 Seas project (www.a2s-geoportal.eu). Also, because MAT manages the Sunken Secrets Museum at Fort Victoria on the Isle of Wight, near the excavation site of Yarmouth Roads, there will be ample opportunity to exhibit work on the shipwreck at the museum and to engage in special public outreach projects there. Informative displays could highlight the role of forests in shipbuilding, laboratory analyses on wood samples, the importance of dates and provenance in archaeology, or other aspects of the 2015 campaign on the Yarmouth Roads site.

5.3.4 Stage Four: Archiving, Reporting and Evaluation

This phase of work is likely to include:

- Preparation of final report
- Project web page – within MAT site (www.maritimearchaeologytrust.org) linked to ForSEAdiscovery webpage (www.forseadiscovery.eu)
- Archive deposition – with Isle of Wight Museum Service for paper or sample/artefact related material and with ADS for digital material.

Additional project tasks related to all of the phases will include:

- Project Management
- Project Administration
- Preparation and attendance at monitoring meetings

5.3.4.1 Archiving and Storage

The project archive including records, artefacts and samples will be maintained by MAT while it is being utilised within assessment and analysis, and all archive will be deposited with the rest of the site material with the Isle of Wight Museums Service.

5.3.4.2 Reporting and Dissemination

The principle means of dissemination of the results of the project will be via popular and academic digital, live, and print media. Conference presentations, museum exhibits, scientific

articles, open-access database, websites, popular articles, social networking sites, and other avenues will all be exploited to generate interest in the Yarmouth Roads site and the scientific research being done there.

Media Coverage of Project

A press release will be drafted prior to the excavation to develop awareness of the project. This will be targeted at local, regional and national audiences, but given the international framework of ForSEAdiscovery, international audiences will also be reached. MAT maintain a database of press contacts which will be used for local distribution.

Project Report

The project report will summarise the results of the excavation and will also include a quantification of data, preliminary assessments of any artefacts encountered and reburied, and laboratory results and assessments of the timber samples taken from the site. This will be utilised in future phases of work when it is brought together with the results of previous survey, excavations and artefact recovery to develop plans for assessment and future analysis. Detailed reports of samples taken and analytical results will be included. The outline of the report is as follows:

- Introduction and Brief Site Background
- Project Aims and Objectives
- Methodology
- Results
 - Site stratigraphy
 - Features
 - Artefacts (if encountered/reburied)
 - Samples
 - Hull structure
- Interpretation
- Assessment of results against objectives
- Review of future analysis requirements

The report will be created using Microsoft Word. Pdf copies will be created for distribution and 3 hard copies will be submitted to Historic England.

5.4 Products and Tasks

5.4.1 Products

The project will deliver:

- Project Archive - paper, object and sample
- Project Report – electronic and hard copy
- Webpage Update – to include images, plans and diver comments from the excavation
- Exhibition – the possibility of permanent or temporary exhibition of various aspects of the research on site at Sunken Secrets

5.4.2 Draft Task List

Task no.	Stage	Task
1	1, 2, 3,4	Project management
2	1	Obtain all necessary permissions
3	1	Develop detailed excavation plans
4	1	Develop artefact encountering, sampling and storage strategies

5	2	Book, organise and purchase equipment
6	2	Dive planning, equipment and paperwork
7	2	Archaeological planning and team preparation
8	2	Field work and logistics
9	2	Site backfilling protection measures
10	2	Provision of conservation advice before during and after project
11	3	Post excavation recording, plan production etc
12	3	Post ex specialist review of recovered samples
13	3	Analysis of excavation data
14	3	Website Update
15	4	Reporting

5.5 Gantt Chart

The proposed project timetable has been structured to take advantage of the most suitable tidal window for excavation.

No	Task	2015											
		J	F	M	A	M	J	J	A	S	O	N	
1	Project Management												
	Phase One												
2	Obtain all necessary permissions												
3	Develop detailed excavation plan												
4	Develop sampling and storage strategies												
	Phase Two												
5	Book, organise and purchase equipment												
6	Dive planning, equipment and paperwork												
7	Archaeological planning and team preparation (inc full team planning & training day)												
10	Field work and logistics												
11	Site backfilling protection measures												
12	Provision of conservation advice before during and after project												
	Phase Three												
13	Post excavation recording, plan production etc.												
14	Post excavation lab analyses of recovered samples												
15	Special exhibition												
16	Website												
	Phase Four												
17	Reporting and dissemination												

5.6 Risk Log

Risks are assessed below in three sections, with the daily and site-specific risk assessment log in Appendix 7.5.2:

- Diving risk assessment: Archaeological tasks
- Diving risk assessment: Site conditions
- Hard boat operations

5.6.1 Diving Risk Assessments

This document identifies and assesses risk in relation to the planned archaeological tasks and expected environmental conditions. This document compliments the Diving Risk Assessment

which will be undertaken on a daily basis prior to diving operations. An example of these two forms to be filled out on site is found in Appendix 7.5.4.

5.6.1.1 Archaeological tasks

Task	Potential Hazards	Anticipated Control	Risk Rating
Site inspection	Entanglement in fishing nets or objects that may have been caught on site	All divers are experienced in such conditions. All divers to configure their equipment to limit the possibility of entanglement; all divers must carry at least one cutting device.	Low
Timber sampling	Cuts from hand saws or blisters from sawing	Protective gloves will be worn at all times and personnel will be trained in the safe use of cutting equipment	Low
Site survey - tape	Entanglement in tape measures used to conduct survey	Divers to be briefed on the use of tape measures underwater	Low
Site survey - video	No perceived hazards		NA
Site survey - photo	No perceived hazards		NA

5.6.1.2 Site Conditions

Condition	Potential Hazards	Anticipated Control	Risk Rating
Poor underwater visibility	Divers become disorientated and swim off site	Divers to search for site for a maximum of five minutes. Deploy DSMB to indicate your position and return to surface	Low
	Divers become separated	Diver to search for buddy, deploy SMB (if not already using), return to surface	Low
Strong current	Divers become uncomfortable with the conditions	Terminate dive and surface using shot line, OR deploy DSMB and use this to surface	Low
	Divers drift off site	Deploy DSMB and return to surface	Low
Net/ line or objects on site	Diver becomes entangled	All divers to carry cutting devices	Low

5.6.2 Hard Boat Operations

Diving Vessel *Wight Spirit* will be in use throughout the project. Boat Skipper is Dave Wendes. Dave will oversee all boat manoeuvring operations and personnel will defer to him for all decisions relating to boat safety.

Condition	Potential Hazards	Anticipated Control	Risk Rating
Deployment and recovery of lines	Load is too great for available personnel	All personnel to understand their own limitations and be briefed on the operation prior to undertaking.	Low
	Entanglement of personnel in lines	All personnel to be experienced in the use of ropes and lines.	Low
Lifting of heavy equipment	Dropping item and/or injury of personnel	All personnel to be aware of own physical limitations and be wearing appropriate foot ware.	Low

6. Bibliography

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7. Supporting Documents

7.1 Quality assurance statement

Introduction

The aim of this document is to outline the policy adopted by MAT in relation to quality assurance. MAT is continually working towards improving documented procedures for quality assurance in all aspects of its activities.

MAT undertakes all work in line with the standards and guidance of the Chartered Institute for Archaeologists (CIfA), the discipline's professional body dedicated to setting, promoting and maintaining standards and ethics in archaeology.

MAT conducts all work in line with CIfA's 'Code of Conduct' (revised 1997) and compliance with the code is monitored. MAT also adheres to CIfA's 'Code of approved practice for the regulation of contractual arrangements in field archaeology' (revised 1998) and the Standards and Guidance (revised 1999) for desk-based assessment, field evaluation, excavation, watching brief, and building investigation and recording.

MAT senior project staff are corporate members of CIfA, and have therefore undergone a process of peer validation to determine their competence. MAT encourage all staff members to become members of CIfA.

Policy and Implementation

MAT makes every effort to ensure that all stages of a project, from the preparation and submission of a tender through to final publication, are subject to quality assurance. All Project Managers follow procedures laid down by the MAT which define their responsibilities and provide guidance on achieving standards; compliance is monitored through review of all projects.

The achievement of standards and best practice in its various activities is promoted by MAT through staff training. Staff are provided with in-house training on the performance of relevant tasks and activities, which supports the use of written guidelines, and regularly attend relevant external training courses.

7.2 Health and safety statement

A. Policy

MAT undertakes all work in line with the 1974 Health and Safety at Work Act. All staff are familiar with procedures and guidelines that are outlined to them by senior staff. The MAT follows guidelines in relation to the Health & Safety at Work Act 1974, these are supplemented by appropriate Codes of Practice and guidance notes relating to specific activities.

Relevant Codes of Practice and Guidance Notes:

Terrestrial Fieldwork

'Health and Safety in Field Archaeology' (Standing Conference of Archaeological Unit Managers, 1999) - Guidance on issues specific to terrestrial archaeology

Diving Fieldwork

1997 HSE 'Diving at Work' Regulations

HSE Archaeological and Scientific Diving Approved Code of Practice

HSE Inland & Inshore Diving Approved Code of Practice

SDSC Advice notes for the Scientific & Archaeological Approved Code of Practice

B. Implementation

Health and Safety issues and procedures are implemented and monitored according to the attached hierarchy of responsibilities (see below).

Fieldwork projects are co-ordinated by MAT staff, the most senior member of staff involved will prepare a risk assessment in compliance with the Management of Health and Safety at Work Regulations 1992.

Supervisory staff are required to be familiar with the risk assessment. They are responsible for maintaining health and safety standards during fieldwork. Site assistants and other staff in non-supervisory positions are briefed on safety standards, including instructions on what action to take in the event of any concern which may arise over safety.

Overall responsibility for monitoring the implementation of health and safety policy lies with the MAT Director, with day-to-day responsibility delegated to MAT staff.

First Aid Training is undertaken by MAT diving staff.

C. Responsibilities

The table below outlines the Health and Safety responsibilities within MAT. Inclusion of staff in this table does not indicate that they are designated 'Health and Safety Officers', it serves to highlight lines of responsibility.

MAT Health & Safety	
<i>Director</i>	
Fieldwork	Office
<i>Designated Manager or Officer</i>	<i>Designated Manager or Officer</i>
<i>Project Officer</i>	<i>Project Officer</i>
<i>Project Supervisor</i>	<i>Project Supervisor</i>

7.3 Environmental policy Maritime Archaeology Trust

1. Conscientious protection of people and the environment is an integral part of MAT's working practice.
2. It is MAT's intention that all work be carried out in accordance with the relevant statutory provisions and that all reasonably practicable measures will be taken to avoid and/ or ameliorate potential damage or nuisance to people and impact on the environment.
3. Avoidance of nuisance or damage is the first objective. Where this is not practicable, the second objective is to ameliorate the impact by appropriate methods.
4. MAT's management and supervisory staff are responsible for implementing environmental policy throughout the organisation, and must ensure that, subject to requirements of Health & Safety, environmental protection has a high priority in planning and day-to-day supervision of work.
5. All employees, sub-contractors and visitors are expected to co-operate with the Organisation in carrying out this Policy, and ensuring their own work, in so far as is reasonably practicable, is undertaken without risk or nuisance to themselves or others, or to the wider environment.
6. Garry Momber has particular responsibility for environmental matters, and reference should be made to that person in the event of any difficulty arising in the implementation of this Policy. Appropriate external advice will be sought where necessary.
7. The operation of this Policy will be monitored by the management and staff of the Organisation at all permanent and temporary workplaces.
8. This statement of Organisation Policy will be displayed prominently at all sites and work places and all staff will be issued with a copy

Date Checked:.....April 2015

Name: ...Garry Momber.....

Position:Director.....

Review Date:April 2016

7.4 Example Paperwork Proformas

7.4.1 Diving Disclaimer



Maritime Archaeology Trust

DIVING DISCLAIMER

Project:

Dates:

I am familiar with the MAT Diving Code of Practice (DCOP), which is prepared in accordance with the Diving at Work Regulations 1997, Scientific & Archaeological diving projects (ACoP) and the Diving Project Plan developed for the Yarmouth Roads Evaluation and Sampling Campaign 2015. I agree to abide by the DCOP, the Project Dive Plan and Risk Assessment and will follow any directions of my supervisor.

- I confirm that my personal diving equipment has been maintained in accordance with the manufacturer's instructions.
- During my dive I will only undertake tasks I am competent to perform.
- I hereby certify that I am medically fit and able to undertake my role in the diving Project/ Operation in accordance with 1.3 of the MAT DCOP.

I do not know of any reason that will make me unfit to dive and I recognise my responsibility not to dive if by doing so I might present a risk to myself or others.

Reasons that could make you unfit to dive include:

- Any known medical condition
- Effects of drugs or alcohol
- Effects of any medication
- Feeling tired or unwell

Copyright Statement: I recognise that this project is organised and managed by MAT / MA Ltd and forms part of an on-going research program. As such all materials generated during diving operations, or after diving operations based on the results or images gathered are copyright of the MAT / MA Ltd. In the event that I take photographs or any imagery during the dive on my personal equipment I agree to provide copies of all material to the MAT / MA Ltd and acknowledge that copyright is held jointly with the MAT / MA Ltd. The MAT / MA Ltd has the right to utilise all material as it wishes. If I wish to be recognised as the individual who took a particular shot then I have the responsibility to bring this to the attention of the MAT / MA Ltd.

Print Name: _____

Date: _____

Signature: _____

Next of Kin Details:

Name: _____ Telephone no.: _____

7.4.2 Daily Diving Risk Assessment

Site:

Date:

Time:

Completed / checked / checked

This risk assessment should be checked before each diving operation

Identify hazards	Relevant	Control (s)	Control (s) in force	Rating
Surface visibility. Injury to diver due to low visibility caused by weather/ night work		Lights/ torches rigged vessel to burn appropriate lights		
Air Temperature. Hyperthermia, Hypothermia, ice on equipment		Appropriate clothing, hot or cold drinks, check equipment		
Weather. Injury to diver due to unsafe wind/ swell conditions		Terminate diving operation if conditions become unsafe		
Entry. Injury to diver due to unseen obstructions under water surface		Stride entry NOT to be used if water depth is unknown, or likelihood of obstructions		
Exit. Injury to diver from unsafe or defective ladder		Ladder to be checked for suitability prior to divers entering		
Water Temperature. Hypothermia		Divers to be suitably dressed		
Underwater visibility. Diver disorientation, loss of buddy		Diver to search for buddy, deploy SMB (if not already using), return to surface		
Underwater current. Divers drift off site, or drift dive becomes unsafe		Divers must be competent for conditions. Deploy DSMR if carried off site		
Entrapment. Risk of diver being trapped during work.		Divers to assess risk, do not undertake task if any risk exists. Carry Knife		
Working Depth. Air supply depletion, Decompression sickness, Nitrogen Narcosis.		All dives to be NO DECO Maximum depth of 30m Tables to be applied (even if using a computer) Divers checked and monitored on return to surface		
Shipping movements. Disturbance or injury to diver from swell caused by vessel moments		Flag 'A' or lights to be displayed VHF monitored, visual lookout		

Risk Assessment Matrix

Probability

- 1 Extremely improbable, an accident could only occur under freak conditions. This should be the normal status.
- 2 Improbable, an accident might occur if other factors were present but the risk is minimal
- 3 Possible, the accident may occur if an additional event takes place. This additional event is a specific action (failure to act)
- 4 Probable, the accident could be precipitated by wind, vessel movement or human carelessness, e.g unsecured ladder
- 5 Highly probable, if work continues there will almost certainly be an accident, e.g exposed electrical conductor

Seriousness

- 1 Trivial injury, the injury can be treated on site and does not prevent the casualty from working
- 2 Minor injury, injury or disease that keeps the casualty off work
- 3 Serious injury
- 4 Major injury, serious injuries to a number of personnel
- 5 Death to one or more people

SERIOUSNESS

	1	2	3	4	5
1	LOW	LOW	LOW	LOW	LOW
2	LOW	LOW	MEDIUM	MEDIUM	MEDIUM
3	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH
4	LOW	MEDIUM	MEDIUM	HIGH	HIGH
5	LOW	MEDIUM	HIGH	HIGH	HIGH

PROBABILITY

7.4.4 Diving Operations – Site Risk Assessment

Diving Operations - Site Risk Assessment

Diving Project Dates:

Document Produced by:

Date:

Site Name:

This document identifies and assesses risk in relation to the planned archaeological tasks and expected environmental conditions.

This document compliments the MAT Diving Risk Assessment which will be undertaken on a daily basis for each site prior to diving operations.

Archaeological tasks

Task	Potential Hazards	Anticipated Control	Risk Rating
Site inspection	Entanglement in fishing nets or objects that may have been caught on site	Experienced divers to undertake initial inspection of the site	
Site clearance	Entanglement in any net/ line or object present on site	Experienced divers will clear material. Divers will be equipped with knives	
Site search	Entanglement in tape measures used to conduct searches from the central site area	Divers to be briefed on the use of tape measures underwater	
Site survey - datums	Hitting fingers/ hands when using hammer to install datum nails	Divers to be briefed before task	
Site survey - tape	Entanglement in tape measures used to conduct survey	Divers to be briefed on the use of tape measures underwater	
Site survey - frame	Entanglement in planning frames used for site survey	Divers to be briefed before task	
Site survey - video	No perceived hazards		
Site survey - photo	No perceived hazards		

Site Conditions

Condition	Potential Hazards	Anticipated Control	Risk Rating
Poor underwater visibility	Divers become disorientated and swim off site	Divers to search for site for a maximum of five minutes. Deploy DSMB to indicate your position and return to surface	
	Divers become separated	Diver to search for buddy, deploy SMB (if not already using), return to surface	
Strong current	Divers become uncomfortable with the conditions	Terminate dive and surface using shot line, OR deploy DSMB and use this to surface	
	Divers drift off site	Deploy DSMB and return to surface	
Net/ line or objects on site	Diver becomes entangled	All divers to carry knives	

