

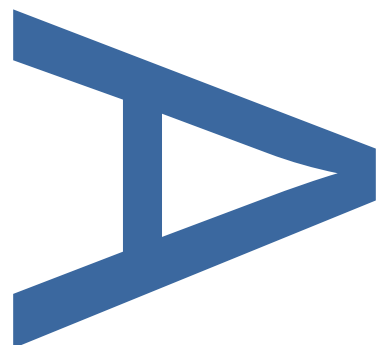
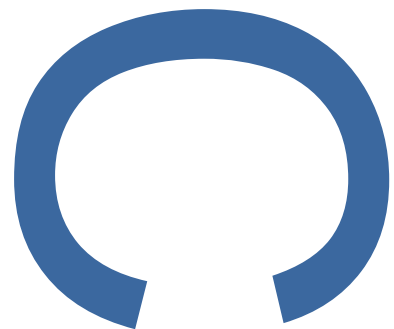
**BOREHOLE INVESTIGATION AT NO.
2 DOCK
PORTSMOUTH HISTORIC
DOCKYARD, PORTSMOUTH
HAMPSHIRE**

**AN ARCHAEOLOGICAL WATCHING
BRIEF**

**LOCAL PLANNING AUTHORITY:
HAMPSHIRE**

SITE CODE: PPDY11

MAY 2011



DOCUMENT VERIFICATION

BOREHOLE INVESTIGATION AT NO. 2 DOCK
 PORTSMOUTH HISTORIC DOCKYARD
 PORTSMOUTH, HAMPSHIRE
 ARCHAEOLOGICAL WATCHING BRIEF

Quality Control

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**An Archaeological Watching Brief on a Borehole Investigation at No. 2
Dock, Portsmouth Historic Dockyard, Hampshire**

**Central National Grid Reference: SU 62850 00650
Site Code: PPDY11**

**Written by Stuart Watson
Pre-Construct Archaeology Limited, May 2011**

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May 2011**

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1 ABSTRACT

- 1.1 This report details the results of an archaeological watching brief on geotechnical boreholes undertaken adjacent to Dock No.2, (the berth of HMS Victory), Victory Arena, Portsmouth Historic Dockyard, Portsmouth, Hampshire between 21st-25th March 2011.
- 1.2 The original plan called for the sinking of two boreholes, but due a time overrun on the drilling of the first borehole, BH5, the second, BH4, had to be abandoned.
- 1.3 No archaeological finds, remains or evidence of the dock structure were encountered during the drilling operation.
- 1.4 Comprehensive data was obtained on the underling ground strata, down to a depth of 25m (the final depth of Borehole 5) that revealed made-ground and alluvium layers overlying natural geological layers of Bracklesham Group – Wittering Formation and Bagshot sands to the top of the London Clay. Much of this information confirms data from other, earlier, borehole results. The main difference here was the deeper level of the London Clay. This has been interpreted as an indication of the original profile of the shoreline, prior to land reclamation in the 16th & 17th centuries.

2 INTRODUCTION

- 2.1 This report details the results and working methods of an archaeological watching brief on a geotechnical borehole investigation into ground conditions at No.2 Dock, Portsmouth Historic Dockyard, Portsmouth, Hampshire.
- 2.2 The site is adjacent to the western side of HMS Victory, the historic flag ship of the Royal Navy, which is permanently berthed in Dry Dock No.2 (Fig. 1). This forms the centrepiece of the Victory Arena, the core of the publicly accessible historic area of HM Dockyard, Portsmouth.
- 2.3 The investigation was undertaken by Pre-Construct Archaeology Limited and comprised the monitoring and recording of a single geotechnical borehole (a planned second one was abandoned) drilled principally to install monitoring equipment to record ground water pressure as it effects Dry Dock No.2 and HMS Victory (Fig. 2).
- 2.4 The investigation was conducted over five days between 21st-25th March 2011 and was commissioned by Building Research Establishment Limited.
- 2.5 The National Grid Reference of the site centre is SU 62850 00650.
- 2.6 The site was allocated the code PPDY11.
- 2.7 The investigation was conducted by Stuart Watson, and the project was managed by Tim Bradley, both of Pre-Construct Archaeology Limited.



Figure 1
 Site Location
 1:20,000 at A4

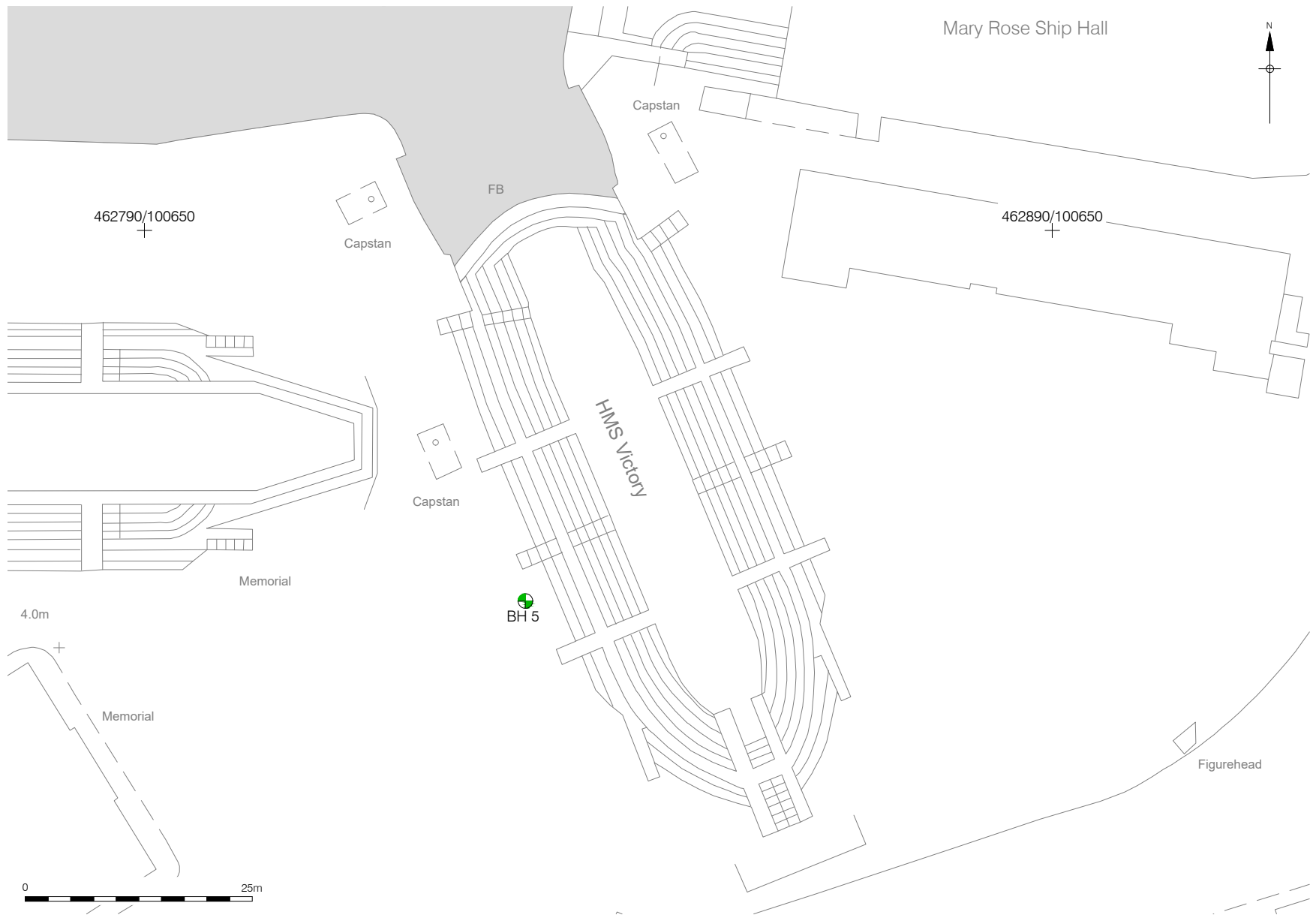


Figure 2
 Borehole Location
 1:625 at A4

3 PLANNING BACKGROUND

- 3.1 The development site falls under the jurisdiction of national, regional and local planning guidance. Dry Docks Nos.1-6 and Basin No.1 which lie within Portsmouth Historic Dockyard represent a unique archaeological resource that has a nationally important status. As such the Dock complex has been designated as a Scheduled Ancient Monument (SAM) under the Ancient Monuments and Archaeological Areas Act 1979. This act requires that permission must be obtained from the Department of Culture Media and Sport (DCMS) to undertake any works within the site of the SAM and English Heritage, as the guardians of the national heritage, must be consulted on, and approve all proposed works.
- 3.2 Planning for the Historic Environment (PPS5 March 2010) is now the national policy which provides guidance to managing archaeology, historic buildings, conservation areas and other elements of the historic environment within the planning process, and is supported by regional and local plans which provides more detailed guidance specific to a particular area (replacing PPG15 and PPG16).
- 3.3 The Historic Dockyard at Portsmouth is part of Conservation Area 22 designated by Portsmouth City Council, and planning permission is required for certain types of development within the conservation area. Conservation Area Consent is required for certain types of demolition of any buildings within the area, and with new national planning guidance implemented this year, a Heritage Statement is required to support this type of application. Portsmouth City Local Plan 2005 and the Hampshire County Council Structure Plan Saved Policies 2007 provide guidance specific to the local area, while retaining many of the points in PPG16.
- 3.4 The dock structure forms part of the Scheduled Ancient Monument (SAM) comprising of Basin No.1, Dry Dock Nos.1-6 and the associated masonry sea walls. The monument is scheduled as a single item in accordance with Section 2 of the Ancient Monuments and Archaeological Areas Act 1979 (AMAAA) (As Amended) County Monument No. 397 for the County of Hampshire. The docks are also Listed Grade I, listed building number 476637.
- 3.5 The scope of the works required two geotechnical boreholes drilled to a depth of approximately 22m, 4m from the east and west sides of No.2 Dock. Scheduled Monument Consent has been received for the work (Ref. HSD 9/2/13004), with the following condition:
- iii): *No ground works shall take place until the implementation of a programme of archaeological work has been secured in accordance with a detailed method statement*

which has been submitted to and approved by the Secretary of State advised by English Heritage.

- 3.6 A Written Scheme of Investigation¹ (WSI) was submitted and approved and the archaeological work followed the specifications detailed in that WSI.
- 3.7 The fieldwork followed the guidelines set out in English Heritage² and IFA guidance papers³.

¹ Bradley 2011.

² English Heritage Guideline Papers (revised June 1998).

³ IFA Institute of Field Archaeologists 1993. Standards in Archaeological Practice.

4 GEOLOGY AND TOPOGRAPHY

- 4.1 Dry Dock No.2 is located in the western central section of the Historic Dockyard in Portsmouth, at approximate NGR SU 62850, 00650. The southern end of the dock lies adjacent to part of Main Road through the dockyard. The northern end of the dock lies adjacent to Basin No.1.
- 4.2 The geological information is based on a review of the British Geological Survey Map (Sheet 331, Portsmouth) and logs from a limited number of exploratory holes previously carried out on the site and within the area.

Geology	Thickness (m)
Made Ground	1.50 to 7.00
Recent Deposits – Alluvium	0.00 to 1.00
Bracklesham Group – Wittering Formation	6.00 to 10.00
Bagshot Sands	5.10 to 6.50
London Clay	>18.80

- 4.2 The Bracklesham Group was found to extend from -9.50 and -11.60m (OD) and comprise orange-brown silty sandy Clay and grey slightly clayey sandy silt and grey sand with black pebbles.
- 4.3 The Bagshot Sands were described as a very dense orange-brown, pale brown and pale grey silty fine and medium sand and were encountered from -9.50 to -11.60m OD and extended to depths ranging from -14.80 to -17.90m OD.
- 4.4 The London Clay Formation was encountered at depths ranging from -14.80 to -17.90m OD and is described as very stiff silty clay with partings of sand. Below this depth shell fragments are present and discontinuous layers of siltstone.
- 4.3 The ground surface immediately around the dock comprises a mixture of uneven stone cobbles and larger stone slabs surrounded by a chain-link fence, with gangways leading to HMS Victory on the western, eastern and north-eastern sides. The area of the study site is generally flat and a height of 4.35m OD was recorded adjacent to the works.

5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

- 5.1 It is thought that the origins of Portsmouth town began at some point soon after the Domesday survey, as the Norman invasion and closer ties to the continent made Portsmouth the ideal place to establish a port and settlement.
- 5.2 The first mention of a dock in Portsmouth was in 1212. King John ordered a 'good and strong wall' to be constructed to protect the King's dock at Portsmouth together with storehouses to contain the accoutrements belonging to the king's ships and galleys. The dock at this stage was located just outside Portsmouth town in what is now known as Vernons Creek. The dock during this period apparently consisted of a small creek where a ship was hauled as far as possible at high water, and where a fence and mud bank were constructed when the tide was out to hold back the returning tide. This dock did not stand the test of time and eroded away. After twelve years it was filled in.
- 5.3 It was not until Henry VII's reign (1485-1509) that another dock is recorded. In 1496 Henry VII's dry dock at Portsmouth became the first to be constructed in England. It was built on the site of the present Historic Dockyard where the King had purchased eight acres of land to build his dock and yard and was approximately where Dry Dock No.2 is today.
- 5.4 When Henry VIII came to the throne in 1509 the navy was enlarged to counter the perceived threat from France and Spain, and as a consequence of this the dockyard was enlarged by nine acres, fortified and new buildings were constructed. Henry VIII's flagship the Mary Rose was constructed in Portsmouth dockyard, begun in 1509.
- 5.5 Further expansion of the dockyard occurred during the first Dutch war of 1652-4.
- 5.6 Under Charles II in 1665 new fortifications were erected around the town and dockyard, which are described as an earthen rampart with a wooden palisade protected by a moat, and were completed by 1667.

5.7 The Dry Docks

- 5.7.1 As France became increasingly powerful, the dockyard at Portsmouth once again became important. In 1689 William III initiated a major building programme of major importance in military and civil engineering terms. The plan was designed by Edward Dummer, Surveyor to the Navy Board, and included the construction of a square non-tidal basin, (known as the Great Ship Basin and in the second half of the 19th century Basin No.1), and a dry dock which led from it later known as Dry Dock No.5.
- 5.7.2 The Seven Years War between Britain and France (1756-63) highlighted changes needed to improve the efficiency of the dockyard and from 1761 the dockyard was re-organised and new buildings were constructed.

- 5.7.3 In 1793 England was at war with France again and the Napoleonic wars continued until 1815. This stimulated further changes to the basin and the building of the dry docks we see today.
- 5.7.4 The group of docks arranged around Basin No.1 can be traced back to the late 17th century with Dry Dock Nos.4 and 5, originally known as South and North Dock respectively, being the oldest remaining in existence. Dry Dock No.2 was constructed by 1802 as part of the extension and improvements to Basin No.1 undertaken in the late 18th/early 19th century.
- 5.7.5 In 1922 HMS Victory found a permanent home (having remained afloat in the Solent since its return from Trafalgar) when it was berthed in Dock No.2, which was then sealed with a concrete caisson.

6 ARCHAEOLOGICAL METHODOLOGY

- 6.1 The boreholes were required principally to install monitoring equipment to record ground water pressure as affected by tidal flows and its effects by movement on Dry Dock No.2 and HMS Victory. The monitoring equipment will be linked by cable to computers that are also connected to a series of movement sensors located throughout HMS Victory. The secondary requirement of the borehole was to establish the nature of below ground deposits in the immediate vicinity of the current works.
- 6.2 The numbering system employed for the boreholes follows on in sequence from previous borehole investigations conducted at various locations around the site. Thus this present investigation is numbered as Boreholes 4 & 5.
- 6.3 Two geotechnical boreholes were originally planned for the project, one on the west side of HMS Victory (Borehole {BH} 5), and one on the east (BH 4). However, due to the length of time it took to drill BH5 on the west side, the east side borehole was subsequently abandoned.
- 6.4 Borehole 5 was located on the western side of HMS Victory, 4.85m from the edge of Dock No.2 (Fig. 2). The borehole was drilled to a depth of 25.00m below current ground level (-20.65m OD) using initially a 0.18m diameter core bit, which was later increased to a 0.26m core bit. The piling rig (supplied and operated by Jacksons Drilling Ltd, the sub-contractors) was a two ton portable rig which employed the Shell and Auger method of drilling. The principal contractor was Building Research Establishments limited (BRE), represented on site by Ken Watts, senior engineer of BRE.
- 6.5 The drilling operation was monitored throughout by the attendant archaeologist and a log of the results of the borehole was entered onto a *pro-forma* recording sheet. A record of the location of the borehole was made, along with a digital photographic record.
- 6.6 A temporary bench mark was established at the site (value 3.76m OD), transferred from one already established on the Warnings (Mary Rose) site at Dock No.3. The level at the top of the BH5 was recorded at 4.35m OD.
- 6.7 The ground surface at the site of BH5 consisted of granite cobble setts, and a small number of these were lifted prior to drilling and retained on site to be re-instated when the work was completed.
- 6.8 As soon as drilling had commenced an obstruction was encountered, which necessitated a temporary adjournment of drilling operations. The obstruction was caused by a 0.35m thick modern concrete slab, reinforced with steel mesh, the top of

which was 0.30m below ground level. This layer had to be broken out by hand, a time consuming process that caused a long delay. An inspection of the position of BH4 on the east side of HMS Victory revealed the presence of the same concrete slab, which is presumed to extend all the way around Dock No.2. Because of the time taken to break through the concrete layer at BH5 the decision was then taken to abandon BH4.

7 BOREHOLE SUMMARY

7.1 Borehole 5 (BH5)

- 7.1.1 Borehole 5 was located on the western side of HMS Victory, 4.85m from the edge of Dock No.2. The sequence as observed is presented below.
- 7.1.2 From existing ground level, at +4.35m OD, to 0.30m below ground level (b.g.l.), it was composed of granite cobble setts, originally 19th century in date, but re-laid in the modern era.
- 7.1.3 From 0.30m (+4.05m OD) to 0.65m b.g.l was a 0.35m thick modern concrete slab.
- 7.1.4 From 0.65m (+3.70m OD) to 2.00m b.g.l was a 1.35m thick layer of a dark silty sand deposit, with occasional fragments of Ceramic Building Material as inclusion, interpreted as post-medieval made-ground.
- 7.1.5 From 2.0m (+2.35m OD) to 3.5m b.g.l was a 1.5m thick layer of loose/soft sandy gravelly clay, interpreted as a natural alluvial deposit.
- 7.1.6 From 3.5m (+0.85m OD) to 6.0m b.g.l was a 2.5m thick layer of grey clay, getting progressively softer after c.5.0m b.g.l. This is interpreted as the start of the natural geological deposits of the Bracklesham Group – Wittering Formation.
- 7.1.7 From 6.0m (-1.65m OD) to 8.0m b.g.l. was a 2.00m thick layer of grey very soft sandy gravelly silt/clay, mixed with soft brown sand, containing very occasional fragments of wood.
- 7.1.8 From 8.0m (-3.65m OD) to 10.5m b.g.l was a 2.5m thick layer of stiff yellow sandy silt.
- 7.1.9 From 10.5m (-6.15m OD) to 12.0m b.g.l was a 1.5m thick layer of softer yellow sandy silt.
- 7.1.10 Ground water was recorded at 11.0m b.g.l, at -6.65m OD.
- 7.1.11 From 12.0m (-7.65m OD) to 20.0m b.g.l was an 8.00m thick layer of very stiff grey clay.
- 7.1.12 From 20.00m (-15.65m OD) to 24.2m b.g.l was a 4.2m thick layer of wet grey silty sand, the top of which was at which is interpreted as the start of natural deposits of the Bagshot Sands sequence.
- 7.1.13 From 24.2m (-19.85m OD) to the end of the borehole at 25.00m (-20.65m OD) was a 0.80m+ thick deposit of very stiff blue/grey clay interpreted as natural geological deposits of London Clay.

8 INTERPRETATIONS AND CONCLUSION

- 8.1 No archaeological finds or features were revealed during the investigation.
- 8.2 The cobble sett surface laid around HMS Victory was presumed to be an historic ground surface. However, the presence of a modern concrete slab, with steel reinforcing mesh, directly below them would indicate the setts, while likely to be 19th century in origin, had been re-laid in recent times. The concrete was probably laid to provide a stable ground support in areas that are regularly subject to heavy traffic (delivery and maintenance vehicles, access platforms etc) around HMS Victory. The cobble setts, laid onto the concrete, act merely as an attractive ground finish.
- 8.3 Evidence was revealed for made ground deposits extending down to 2.00m b.g.l. which overlay alluvial deposits extending down to 3.5m b.g.l.
- 8.4 The remainder of the sequence was composed of natural geological deposits of the Bracklesham Group – Wittering Formation, extending down to 20.0m b.g.l, which overlay deposits of Bagshot Sands extending down to 24.2m b.g.l, where deposits of London Clay were encountered.
- 8.5 Much of this information correlates with data obtained from earlier borehole results⁴. The main difference here was the deeper level of the London Clay. The earlier borehole data indicated that the top of the London Clay was expected at approximately -16.70m OD (20.0m b.g.l.). However, in this current investigation, the top of the London Clay was not encountered until -19.85m OD, (24.2m b.g.l.) c.4m deeper than any other of the previous borehole results. This has been interpreted as the London Clay layer dipping down sharply, indicating the original profile of the shoreline, prior to the land being reclaimed in the 17th/18th centuries. This reclamation of land allowed for the construction of the complex of dry docks, including No.2 Dock, built around No.1 Basin in the late 18th /early 19th centuries.

⁴ Boreholes 1 and 2 located north and south of Dock 3 (Mary Rose) Borehole 3 located north east of Dock 2 (HMS Victory). Information collated by BRE.

9 ACKNOWLEDGEMENTS

- 9.1 Pre-Construct Archaeology Limited would like to thank Building Research Establishments Limited for funding this project and in particular Ken Watts for help during the work.
- 9.2 The author would also like to thank the sub-contractors from Jacksons Drilling Limited for their assistance.
- 9.3 The author would also like to express his gratitude to the PCA graphics department who produced the drawings, Tim Bradley who managed the project and Jon Butler who edited the present report.

10 BIBLIOGRAPHY

Bradley, T. 2010. *A Written Scheme of Investigation for archaeological monitoring of Geotechnical Investigations, No.2 Dock, Portsmouth Historic Dockyard, Hampshire.* PCA unpublished report

APPENDIX 1: SITE PHOTOGRAPHS



Plate 1. View of Borehole 5 location and the cobble sets. Looking SE, scale 0.5m



Plate 2. Modern concrete slab at top of borehole 5. Looking E, scale 10cm.

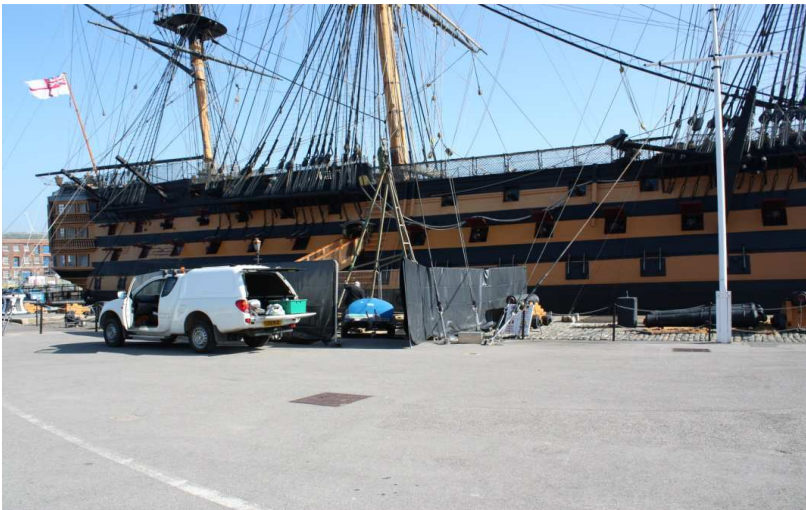


Plate 3. General view of the site, HMS Victory in background. Looking NE.

APPENDIX 2: OASIS FORM

Project details

Project name	Geotechnical Borehole Investigation at No.2 Dock Portsmouth Historic Dockyard
Short description of the project	A single geotechnical borehole, located on the western side of Dock No2, the berth of HMS Victory, HM Dockyard Portsmouth, was drilled to a depth of 23m. No archaeological finds or features were encountered, but comprehensive record of the below ground deposits was obtained. Evidence for the original shoreline of Portsmouth was suggested by the data.
Project dates	Start: 21-03-2011 End: 25-03-2011
Previous/future work	Yes / Not known
Any associated project reference codes	PPDY11 - Sitecode
Type of project	Field evaluation
Site status	Scheduled Monument (SM)
Current Land use	Other 8 - Land dedicated to the display of a monument
Monument type	NONE None
Significant Finds	MADE-GROUND DEPOSITS Post Medieval
Methods & techniques	'Gravity-core'
Development type	geotechnical borehole
Prompt	Listed Building Consent
Position in the planning process	After full determination (eg. As a condition)

Project location

Country	England
Site location	HAMPSHIRE PORTSMOUTH PORTSMOUTH HMS Victory, No.2 Dock, Portsmouth Historic Dockyard, Portsmouth, Hampshire
Study area	0.05 Square metres
Site coordinates	SU 62850 00650 50.8014316401 -1.108021656270 50 48 05 N 001 06 28 W Point
Height OD / Depth	Min: -19.85m Max: 2.35m

Project creators

Name of Organisation	Pre-Construct Archaeology Ltd
Project brief originator	Building Research Establishment Ltd
Project design originator	Tim Bradley
Project director/manager	Tim Bradley

Project supervisor Stuart Watson
Type of sponsor/funding body Building Research Establishment Ltd

Project archives

Physical Archive Exists? No
Digital Archive recipient Hampshire County Council
Digital Contents 'none'
Digital Media available 'Images raster / digital photography'
Paper Archive recipient Hampshire County Council
Paper Contents 'none'
Paper Media available 'Context sheet','Photograph','Plan','Unpublished Text'

Project bibliography 1

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