Dunwich Bank Wreck Site: Conservation Statement and Management Plan

Historic England 7385

July 2017

Dunwich Bank Protected Wreck Site:

Conservation Statement and Management Plan

ArcHeritage Campo House, 54 Campo Lane, Sheffield, S1 2EG

Phone: +44 (0)114 2728884 Fax: +44 (0)114 3279793
archeritage@yorkat.co.uk www.archeritage.co.uk

Key Project Information

Project Name	Dunwich Bank Wreck
Report Title	Dunwich Bank Protected Wreck Site: Conservation Statement and Management Plan
Report status	Final
ArcHeritage Project No.	443
Historic England Project No.	7385
Type of Project	Conservation Statement and Management Plan
Client	Historic England
Position	Lat: 52 15.165 N; Long: 01 38.423 E [WGD]
Authors	Rowan May and Anna Badcock with Ian Panter and David Parham
Illustrations	Rowan May, SUS and Wessex Archaeology
Editors	Glyn Davies, Anna Badcock
Report Number and Date	2016/47 10th July 2017
Version and filename	Version 1.5: HE7385 Dunwich CSMP v1-5.docx

CONTENTS

Figures

Plates

EXECUTIVE SUMMARY

The Dunwich Bank site lies off the coast of Suffolk, and was found following the recovery of timbers and encrusted cannonballs in a fisherman's net, and through subsequent investigation by a local nautical archaeologist. In 1994 investigations included the recovery of a bronze gun of 16th-century date. Subsequent dives dive confirmed the presence of at least one more bronze cannon, and a 2m high concretion mound. The site was designated on the basis of the presence of the ordnance under the Protection of Wrecks Act 1973 in 1994. As no timbers have been recorded it is not currently known if the site constitutes a wrecked vessel or a lost cargo without a vessel.

This Conservation Statement and Management Plan has been produced to enable local, regional and national stakeholder involvement in Historic England's aspirations for the conservation management of the Dunwich Bank site to balance conservation with economic and social needs. The principal aim of the Plan is to identify a shared vision of how the values and features of the Dunwich Bank can be conserved, maintained and enhanced.

In 2016 the site was placed on the Heritage at Risk register as a result of apparent theft of a bronze gun. Addressing this is a key priority for the future management of the site.

Policy 1: We will seek to implement an investigative programme to try and establish the date and provenance of the Dunwich Bank wreck

Policy 2: We will strive to remove Dunwich Bank from the Heritage at Risk Register through appropriate intervention

Policy 3: We will seek to secure for the long-term any un-archived primary records relating to the discovery and investigation of Dunwich Bank

Policy 4: We will use this Plan to underpin our management approach; all decisions and evaluation will be recorded in full and any interventions will be carried out to approved Research Designs

Policy 5: We will nurture our stakeholder relations to create a supportive and collaborative management structure

Policy 6: We will seek to explore opportunities to resource substantial intervention into the site as a creative community engagement project

Policy 7: We will work with local organisations to maximise the opportunities for learning and interpretation

Policy 8: We will use any interventions to highlight the complexity of caring for heritage sites in blackwater conditions and explore opportunities to sustain and enhance survey skills within the avocational diving community

1 INTRODUCTION

1.1 Origin of the project

1.1.1 The country's designated wrecks form just a tiny sample (c.52) of all known wreck sites containing physical remains (c.5,500) around the coast. Serena Cant (2013, vii) has argued that while they are historical monuments like any other, they are also 'completely different'. Wrecks are woven into myth, religion and the nation's psyche, and stand as a testament to human efforts to overcome, or at least survive in, an alien and often hostile environment (*ibid*). The understanding of shipwrecks needs a multi-disciplinary approach, perhaps more than any other type of historic monument. They also require an understanding of international context in terms of trade, warfare and the movement of people; and many of the wrecks within our territorial waters are not of English or British origin. Their unique circumstances of existence, and their unique burial environment make them difficult objects or sites to investigate and manage.

1.1.2 Wreck sites may contain the remains of vessels, their fittings, armaments, cargo and other associated objects or deposits and they may merit legal protection if they contribute significantly to our understanding of our maritime past. The Protection of Wrecks Act 1973 (PWA) allows the UK Government to designate, in territorial waters, an important wreck site to prevent uncontrolled disturbance.

1.1.3 Although the National Heritage Act 2002 enabled Historic England to assist in costs relating to works under the Act, the responsibilities of Historic England for the physical management of designated wreck sites must align with the strategic priorities set out in the Corporate Plan 2015 to 2018. This seeks to identify and protect England's most important heritage.

1.1.4 The Heritage Environment Forum, a partnership of key heritage agencies led by the CBA has drafted their own strategy, Heritage 2020, which sets out the framework whereby collaboration between key groups will add value to 'understanding, protection and enjoyment of the historic environment'. The Historic England Action Plan 2015-2018 forms the organisation's contribution to Heritage 2020, and details how the objectives of the Historic England Corporate Plan will be delivered.

1.1.5 Assessing the significance of England's Protected Wreck Sites is an acute priority identified within Historic England's Action Plan. Individual Conservation Statements & Management Plans assist with an improved understanding of the significance and character of these priority areas of our heritage.

1.2 Purpose

1.2.1 This document seeks to set out a Conservation Statement and Management Plan (CS&MP) for the Dunwich Bank wreck site, an archaeological site designated under the Protection of Wrecks Act 1973. The wreck site lies off the coast of Suffolk, and was found following the recovery of timbers and encrusted cannonballs in a fisherman's net, and through subsequent investigation by a local nautical archaeologist. Early investigations included the recovery of a bronze gun of 16th-century date in 1994. An Archaeological Diving Unit (ADU) investigation dive confirmed the presence of at least one more bronze cannon, and a 2m high concretion mound. Due to the

significance of the gun, and the presence of further guns of a similar date at the site, the wreck was recommended by the ADU for designation, which was rapidly undertaken in 1994.

1.2.3 The National Monuments Record number for the Dunwich Bank wreck site is TN 46 NE 16. The most recent Statutory Instrument (SI) site number is 2004/2395 (earlier SI number 1994/1842) and Protected Wreck reference/NHLE number is 1000073. It is recorded in the UK Hydrographic Office under wreck number 10848. There is a 300m radius Restricted Area around the site.

1.2.4 Historic England has published a set of *Conservation Principles, Policies and Guidance* for the sustainable management of the historic environment, in order to guide an understanding of the special interest and cultural values of a site or asset, and to provide the foundation to contextualize change. These principles are intended to support the quality of decision making, with the objective of creating a management regime for all aspects of the historic environment that is clear and transparent in its purpose and sustainable in its application. As such, *Conservation* is taken to be the process of managing change in ways that will best sustain the values of a place in its contexts, and which recognises opportunities to reveal and reinforce those values (English Heritage 2008).

1.2.5 The CS&MP has therefore been produced to enable local, regional and national stakeholder involvement in identifying aspirations for the conservation management of the Dunwich Bank wreck site.

1.3 Aims and objectives

1.3.1 The key aims of the CS&MP for the Dunwich Bank wreck site are to:

- identify a shared vision of how the values and features of the site can be conserved, maintained and enhanced;
- find the most appropriate balance between conservation, economic and social needs for the long-term management of the site; and
- produce a set of policies which the key stakeholders can adopt.
- This has been achieved through the following objectives:
- understanding the Dunwich Bank wreck;
- assessing the significance of the wreck;
- identifying where the significance of the wreck is vulnerable;
- identifying policies for conserving the significance of the wreck;
- realising the public value of conservation; and
- identify management policies.

1.4 Scope and liaison

1.4.1 There are currently 52 designated wrecks on the National Heritage List for England (NHLE) and they are protected by the Protection of Wrecks Act 1973. Access to these sites is managed through a licensing scheme and authorisation by the Secretary of State for Culture, Media and Sport. The Dunwich Bank wreck is also on the Heritage at Risk Register.

1.4.2 In 2008 English Heritage published methodologies to allow for the systematic quantification of historic wreck resources and to set benchmarks for the monitoring of future change. A major

component of this process comprises the identification of risks to historic wreck sites so as to provide a measure of how a site is likely to fare in the future (English Heritage 2008b).

1.4.3 Practical measures that can enhance knowledge, conserve, maintain and enhance the values and features of the Dunwich Bank wreck identified as being at risk will be delivered through this Conservation Statement and Management Plan.

1.4.4 Principal consultations have been undertaken with the current and former licensees for the wreck site (Andy Rose and Stuart Bacon) with Historic England, and with Graham Scott of Wessex Archaeology, the current Nominated Archaeologist to the licensee. During initial data gathering stages, meetings were also held with the Manager of Dunwich Museum and the Assistant Harbour Master at Southwold and a diver working with Andy Rose. The UK Hydrographic Office provided the wreck report. The HER, Portable Antiquities Scheme and Southwold Museum were contacted but no additional material or information was held by these repositories.

1.4.5 The draft document will be circulated to key parties and stakeholders for comment. Full acknowledgements of those who have contributed to initial discussion, and/or have provided comments on this draft report will be provided in the final version.

1.5 Authorship

1.5.1 This Plan has been prepared by Rowan May and Anna Badcock (both ArcHeritage), with Ian Panter (York Archaeological Trust Conservation Laboratory) and Associate Professor David Parham (University of Bournemouth Marine Archaeology Department).

1.5.2 This document is based on the Historic England standard for Conservation Statements for Historic England sites and draws on previous management plans for shipwreck sites (e.g. Dunkley and Hamer 2009) and previous archaeological surveys and reports by Sussex Underwater Studies and Wessex Archaeology.

1.6 Status

1.6.1 This current version is the final version (Version 1.5), issued 11th July 2017 and ready for adoption by Historic England. Minor amendments on the draft version were made following receipt of comments from the IFCA.

2 UNDERSTANDING THE SITE

2.1 Historical development of the designated site

2.1.1 The Dunwich Bank wreck site was discovered in 1994, with accounts varying as to the circumstances of the discovery. In 1974 and 1992 or 1993, a local fisherman recovered ship's timbers with concreted cannonballs embedded into them during a trawl (ADU 1994; Bacon 1995); this has previously been stated as the first evidence for the site, but Wessex Archaeology (2010, 3) note that it remains uncertain if these timbers were recovered from the Dunwich Bank site. A magnetometry survey in 1992, possibly attempting to locate the wreck of the *Royal James*, is stated to have recorded an anomaly in the vicinity of the site (Bacon 1994, 1995).

2.1.2 The site was reportedly first dived on the 2nd June 1994 by Stuart Bacon of Suffolk Underwater Studies (SUS), with a 16th-century cast bronze muzzle-loading gun discovered and salvaged on

the following day, according to the late George Spence, whose boat was used in the salvage operation (Wessex Archaeology 2010, 3). The salvaged gun was treated in a specially built tank at Sizewell B nuclear power station, and subsequently put on display. It was first displayed at Mr Bacon's private SUS museum in Orford, then in 2001 it was taken to the Royal Armouries at Fort Nelson. From 2009, it has been on display at Dunwich Museum (plate 1, figure 5). Details of the gun were published in 1996 by Rudi Roth in the *International Journal of Nautical Archaeology* (Roth 1996).

Plate 1: Bronze muzzle-loading gun (Gun 1) now on display at Dunwich Museum

2.1.3 The site and gun were reported to the authorities, following which an ADU inspection dive was made, confirming the existence of a *c.*1.8m high concreted mound and at least three further bronze guns. Designation was recommended due to the presence of the guns, and this was rapidly adopted under the Protection of Wrecks Act in July 1994. From 1994 to 2003, a series of inspection and survey dives and geophysical surveys were undertaken by both the ADU and SUS, the latter under a survey licence granted to Stuart Bacon. The surveys were undertaken with the aim of producing a suitable pre-disturbance survey, to provide a basis of evidence to

guide potential future recovery of artefactual material from the site. Part of SUS's work was funded by Shell UK and Caribbean Marine Recovery Plc (Bacon 2000).

2.1.4 From 2003, Wessex Archaeology were appointed by English Heritage as the archaeological consultants for designated wreck sites, and took over the survey work from the ADU. Wessex Archaeology undertook archaeological survey[1] to Level 2a and 3a across the site in 2003 and 2006, as well as magnetometry survey, and prepared Management Reports (Wessex Archaeology 2006a-b, 2009, 2016). SUS appear to have continued to undertake survey dives on the site into 2006, but following this, no licensee reports are recorded. The licensee from 2016 to the present has been Andy Rose, with Graham Scott of Wessex Archaeology as the Nominated Archaeologist.

2.1.5 The designation of the Dunwich Bank wreck site was amended in September 2004 - the reason for the amendment is not known although the latitude and longitude of the exclusion zone central point is slightly different from the 1994 designation. The most recent Wessex Archaeology management report (2016) records the likely theft of one of the bronze guns at the site. This is thought to have occurred *c*.2012, and verbal information suggests that it was lifted by a (now deceased) member of the original salvage team and sold to a cash buyer in the Netherlands. In late summer 2016 the wreck site was placed on the Heritage at Risk register.

2.1.6 The limited information currently available for the wreck site is presented in the summary Ship Biography.

Ship Biography

Build	The date and location of the ship's construction is unknown, though the date of the recovered cannon (a Flemish saker) is thought to be c.1536-1540, and the ship may be roughly contemporary with that. It has not been definitively established that the site represents a wreck, though the presence of ordnance suggests that this is the most likely explanation for the remains.
Use	As no details of a ship are clear beyond the cannon, its size and function are also unknown. If the remains do derive from a wreck, it is uncertain whether it was a warship or an armed merchant ship, or whether the guns were being carried as cargo by a merchant vessel.
Loss	The date of the recovered bronze Flemish saker and presence of at least three further bronze guns of a very similar nature gives the current working hypothesis that they are likely to have been deposited in the period between 1536 and 1600. If the guns constitute the remains of a wreck, it is possible that a vessel became grounded on the coastal sands. At present, no other useful dating evidence has been recovered from the site, though it is known that 19th- to 21st-century material is present. There is also the possibility that the material represent a cargo of mixed scrap being carried by a vessel of unknown date (post 1600). A further hypothesis for the presence of the cannon is that the site comprises a dump of material jettisoned to lighten a ship that was grounding on the bank.

[1] The survey Levels are defined by Wessex Archaeology and are explained in their Management Reports

Survival

Recording undertaken in 2010 indicates that the main part of the site consists of a small, steep artificial mound surrounded by a scatter of bronze and iron guns and various other concretions, covering an area of c.650m^2. The central mound covers approximately 6m^2 and around 1.8m high.

At least three bronze muzzle-loading guns and an unknown number of iron breech- and muzzle-loading guns have been recorded as partially exposed on the seabed, with a further bronze gun having been recovered and conserved. One of the three bronze guns on the seabed appears to have been stolen since 2010. Other features including possible ship's timbers, anchors, a quern stone and possible ballast stones have been recorded on the site, though not recovered. Pottery fragments were observed for the first time on a dive in summer 2016.

Investigation

Since the discovery of the wreck site in 1994, the site has been regularly visited by the licensee under a survey license. One bronze gun was recovered shortly after the discovery and before the designation of the wreck site, and a quern stone was recovered and photographed in 2000, then replaced on the site. Archaeological monitoring and survey was undertaken by the ADU from 1994-2002, and subsequently by Wessex Archaeology.

No excavation or systematic recovery of surface material has been made at the wreck site.

2.2 Description of surviving features

Site location and geology

2.2.1 The wreck site lies at a charted depth of either 6m (UKHO) or 7m (CEFAS 2001), relative to the Lowest Astronomical Tide, with the maximum water depth recorded by pneumofathometer in 2003 and 2005 in the range 10-12.25m (Wessex Archaeology 2006, 10). It is located within Dunwich Bay, approximately 725m east of the current Suffolk coastline, in an area known as Minsmere Haven. The wreck site lies on the western, inshore side of Dunwich Bank, which forms part of a sandbank known as Sizewell-Dunwich Banks, running roughly parallel with the shore and around 11km in length and 2.5km wide. The coastal area is subject to constant erosion and southward longshore sediment movement (Wessex Archaeology 2006, 10).

2.2.2 The geology of the nearshore area between Thorpeness and Dunwich consists of unconsolidated Pleistocene sediments of Norwich Crag Series sands, clays and gravels. This is overlain by marine alluvial clay, with the upper surface comprising Holocene sediments of reworked sands, silts and clays and shell fragments (CEFAS 2001, 7). The Dunwich-Sizewell Bank and inshore region in which the wreck is located largely comprise fine to very fine sands, with a deeper channel of consolidated clay material separating the two regions (CEFAS 2001, 25).

2.2.3 Visibility at the site is generally nil due to suspended sediment in the seawater. Wessex Archaeology recorded a distinct horizon at about 4m above the seabed, above which visibility is poor to moderately poor. Below this, visibility is generally zero, with 'blackwater' conditions. On rare occasions, visibility of up to 2m has been recorded at seabed level, though the reason for

this variability is not certain. It has been reported that visibility is best towards the end of a period of neap tides (Wessex Archaeology 2006, 3).

2.2.4 The adjacent coastline is part of the Suffolk Coast and Heath Area of Outstanding Natural Beauty, and the wreck site is within the Outer Thames Estuary Inshore Special Protection Area with Marine Components (UK9020309). A seascape characterisation project identified the predominant characteristic of the Dunwich Bay character area as being the historical importance of the lost Anglo-Saxon settlement of Dunwich, the Dunwich Bank wreck and the 1672 Battle of Sole Bay (Oxford Archaeology 2007). There is a high potential for drowned historical landscapes within the area, in particular the medieval settlement of Dunwich, which lies to the northwest of the site (Wessex Archaeology 2006, 10).

Plate 2: The landscape context of the Dunwich Bank Wreck

Site features

2.2.5 Physical and geophysical survey have identified that the main site consists of a steep, artificial conglomeration (sometimes referred to as the central mound), c.6m^2 in area and around 1.8m high, surrounded by a scatter of bronze muzzle loading guns, iron muzzle and breech-loading guns and various concretions. The main site covers a total area of no more than 650m^2, though it is possible that further remains or artefacts covering a wider area may be buried. A parametric sonar survey undertaken in 2009 suggests the presence of a very thin band of 'wreck material' concentrated within the area of previously recorded remains and covered by c.0.2m of fine mobile settlement. The site does not exhibit any form of 'wreck mound' (i.e. a mounding of sediment around and above wreck material). The parametric sonar results failed to identify the presence of any buried timber structure within the main part of the site. Though this cannot be taken as conclusive proof of the absence of timbers, Wessex Archaeology (2010,

10) suggest that the evidence increasingly points to the lack of vessel remains on the site. A recent dive by the licensee in summer 2016 identified what may have been a previously unrecorded timber protruding from a scour adjacent to the central mound. This has yet to be examined in detail, but if it below or part of the mound it could represent wreck material.

2.2.6 A number of shallow depressions are located beyond the main site, but these all appear to relate to modern debris, which is also found across the main site. Modern debris includes lost or dumped fishing nets[2] and ropes (some of which are associated with survey navigation), a wire rope or cable, and redundant diver mooring blocks or survey control points. Timbers have been reported in various surveys, but many of these are likely to be loose fragments and trees of relatively modern origin, carried through the site by the current. No timbers definitively worked or associated with a ship have been identified by Wessex Archaeology. A possible second smaller mound was recorded by SUS in 1996, but has not been subsequently located by any other organisation (Wessex Archaeology 2006, 23).

2.2.7 The central mound is irregular in shape, and there has been some evidence to suggest that it is partially buried and may be more extensive in both area and height (Wessex Archaeology 2006, 16). It appears likely to incorporate multiple objects of different composition, rather than a single homogenous object. A group of three ring-like features are set in its upper surface, in a triangular arrangement *c.*0.4m apart from each other. These are of ferrous metal with an outer concretion layer, though less concreted than other mound features (Wessex Archaeology 2010, 11). A sample of mound material taken in 1997 was analysed by Nuclear Electric at the Berkeley facility, and was described as a metal conglomerate (Bacon 1997). The ADU suggested the mound could derive from a consignment of ironwork stored in the ship's hold (ADU 1998), but there is currently insufficient information to identify the nature of this feature (Wessex Archaeology 2010, 11). Similarities can perhaps be drawn with the West Bay wreck (NHLE 1000083) which also contains a mound of concreted iron bars, a concreted iron gun and a muzzle-loading bronze gun dating to *c.*1627-1750. The site has been interpreted as a consignment of cargo.

2.2.8 Two concretions at Dunwich Bank appear likely to be anchors, though at least one of these may be relatively modern and not associated with the wreck site (Bacon 2000). Ballast stones and worked stone were recorded at the site by SUS from 1996, but Wessex Archaeology surveys have not located material positively identified as either of these categories (Wessex Archaeology 2006, 22).

Ordnance

2.2.9 The most significant feature of the site is the 16th-century bronze ordnance. The exact number of guns is currently uncertain due to problems of recording in poor visibility conditions and the active sediment movement across the site. Six guns were recorded by SUS, of which one was salvaged. Of the remaining five guns, only three have been located by both the ADU and Wessex Archaeology (Guns 3, 4 and 6), and one of these (Gun 3) is thought to have been stolen *c.*2012. The other two (Guns 2 and 5) have not been located by Wessex Archaeology (2010, 11) and there are doubts as to their existence.

[2] Sometimes trawled fishing gear is dumped on known obstructions to prevent it being caught again.

2.2.10 Gun 1 was recovered in 1994 and is now on display at Dunwich Museum (see Plate 1). A study by Rudi Roth concluded that though the decorative elements, including the coat of arms, have been eroded, the gun can be identified 'with considerable certainty as a Flemish Saker of 11 ft 6 in (Spanish feet; 3.12m) made for land service according to an adapted design by Gregor Löffler and cast by Remigy de Halut at Malines between 1536 and 1556 for Emperor Charles V'. The calibre is of about a 6-pounder, with a likely casting date of between 1536 and 1540 and it appears to be in roughly the first quarter of its service life, based on the number of shots fired (Roth 1996, 30). It has a bore diameter of 0.096m. Minor patches of active corrosion were noted on the gun during a site visit in June 2016 (Plate 3).

Plate 3: minor patches of active corrosion (pale areas) on Gun 1

Gun 2 was recorded in 1994 but has never been relocated or planned. A description of the gun by Rudi Roth was annexed to the SUS 1995 site report (Bacon 1996, 11-12), based on a video believed to be in the possession of Stuart Bacon. Roth's report stated that the gun was likely to be a 4- to 5-pounder Löffler Augsburg design of *c*.1530, again cast by Remigy de Halut *c*.1536, with a coronice muzzle indicating it was cast for land service. It is very similar to a 1551 de Halut gun at Enkhuizen (Roth 1996, 31) Wessex Archaeology (2006, 14) considered that there is a strong possibility that Gun 2 is the same as Gun 3, recorded twice.

2.2.11 Gun 3 was also first recorded in 1994, and drawn from memory by Stuart Bacon. It was also recorded by ADU in 1995, who noted engraved letters and numbers that correspond closely to those recorded for Gun 2 by Roth (1996, 11-12), again suggesting it may be the same gun. Wessex Archaeology located this gun, recording a length of 2.78m (muzzle face to base ring),

and a bore of 0.092m, similar to that of Gun 1, though the former is longer. The similarities suggest that Gun 3 is also a saker cast by Remigy de Halut. An inspection dive in 2010 identified a linear object thought to be Gun 3, buried beneath a thin layer of gravel and 0.3m of sediment (Wessex Archaeology 2010, 12). In 2015, following rumours of its theft, a specific dive was made by Wessex Archaeology to inspect the site. The gun was not located, and it was concluded that it was likely to have been moved or salvaged after 2012 (Wessex Archaeology 2016).

2.2.12 Gun 4 is to the west of the central mound, and was first recorded in 1996. It was measured by WA in 2005 as 3.48m in length (base ring to muzzle face), with a maximum bore diameter measurement of 0.171m, Concretion over the upper surface has made it difficult to determine any details of decoration, including whether it has the breach dolphin ornamentation and coronice muzzle previously suggested (Wessex Archaeology 2006, 14). By 2009, the gun appeared to be completely buried by over 0.5m of sediment (Wessex Archaeology 2010, 12), though its upper surface was mostly re-exposed by 2015 (Wessex Archaeology 2016, 2). A dive in December 2016 confirmed the presence of Gun 4.

2.2.13 Gun 5 is first mentioned in 1996, but has never been plotted on a site plan and its location is unknown. It was described as being 'of similar length' to Guns 1-4 (Bacon 1996). Wessex Archaeology (2006, 15) conclude that it is uncertain whether this gun is either a double-recording (perhaps the same as Gun 6), or whether it was illegally salvaged soon after its discovery, as was reported to SUS by divers based in Lowestoft.

2.2.14 Gun 6 was found in 1998, located to the southwest of the central mound. It appears similar in length and design to Gun 3, and may be another saker by de Halut. It was recorded by SUS as being 2.76m in length with a 0.10m bore diameter. By 2005, the muzzle was too deeply buried for WA to check this measurement (Wessex Archaeology 2006, 15). A side-scan sonar image obtained in 2009 showed the gun as completely buried by sediment at that date (Wessex Archaeology 2010, 12), and this also appeared to be the case in 2015 (Wessex Archaeology 2016, 3). The location of Gun 6 could not be reached in a dive in December 2016 and its presence can thus not be confirmed.

2.2.15 In addition to the bronze guns, a series of linear concretions have been tentatively identified as iron guns, though the total number is uncertain. SUS recorded nine (see Figure 2), but the 2005 Wessex Archaeology survey investigated these and recorded only five as probable or possible guns, a further one as dubiously a small gun, and the other three were not found (see Appendix 2). Of the probable guns, one was identified as a smoothbore muzzle-loading cast iron gun up to 2.5m long, another as a possible breech-loading iron swivel gun. The extent of concretions on the guns makes definitive identification impossible while they remain on the seabed (Wessex Archaeology 2006, 17-19).

Artefacts

2.2.16 Apart from the guns and potential ballast stones, few artefacts have been recorded at the Dunwich Bank wreck site; this is likely to be largely due to a combination of sediment movement and poor visibility. Pottery sherds of unknown date were noted during a 2016 licensee dive in exceptional visibility for the site (A. Rose pers. comm.). A Wessex Archaeology dive of 2009 recorded a leather shoe, though this was identified as being of at least 19th-

century date (Wessex Archaeology 2010, 13-14), and is not necessarily associated with the wreck, given the presence of modern material accumulated at the site. Stuart Bacon notes that the wooden 'Armada chest' currently on display in Dunwich Museum may have originated from the wreck. The chest was found on the shore and its provenance is difficult to determine.

2.2.17 A quern stone with a circular indentation in the centre was recovered, recorded and returned to the site by SUS in 2000. This was initially identified as 'almost certainly of Mediterranean origin', probably for grinding and pressing olives or similar produce (Bacon 2000). On the basis of a photograph, Wessex Archaeology (2006, 23) classified it as a 'pot quern', believed to have been used for food processing and found in domestic assemblages from the 13th century into the post-medieval period, with any potential association with olives being speculative.

Stratigraphy and sediment deposition

2.2.18 At least two layers have been recorded by CEFAS (2001) and Wessex Archaeology (2006; 2010). The upper layer comprises a soft silty-loam sediment, recorded as between 0.2 and 0.7m in depth in 2010, overlying a gravel deposit comprising a firm, poorly sorted layer of sand, shell, pebbles, stones and cobbles. The archaeological features lie within or on top of this gravel sediment.

2.2.19 Though the 2001 CEFAS desk-based study concluded that sediments at the site were relatively stable, the ongoing survey work has suggested a far more active environment. Wessex Archaeology (2010, 10) noted a gradual accumulation of 'extremely mobile fine silt sediment' across the site between the 2005 and 2009 surveys. In addition, the 2009 survey noted short-term increases in sediment in the location of one of the possible iron guns and over the bronze guns; the sediment had been reduced in places by 2016, with Gun 4 re-exposed for much of its length, though Gun 6 appeared to be entirely buried beyond the depth of probing at that date (Wessex Archaeology 2016, 3).

2.2.20 Scouring has also been noted around the central mound, extending up to 7m away from its base in 2005, with a depth of between 0.2-0.3m. This had reduced by 2009, when the maximum extent was up to 1m away from the east of the mound, but had extended again by 2016 (Wessex Archaeology 2010, 11; 2016, 2). The scouring appears to be localised and has not been recorded around all large site features. The repeated exposure and burial of the bronze guns has been mentioned by Wessex Archaeology as potentially detrimental to their condition (Wessex Archaeology 2006, 31). Preservation of timber also appears to be a problem, with exposed timbers (apparently unworked) recorded as being extensively attacked by marine boring organisms (Wessex Archaeology 2006, 21; Upton 2004). The former licensee also stated that timber does not survive for long following exposure (S. Bacon pers. comm.).

2.3 Ownership, management and current use

2.3.1 The wreck site lies within England's Territorial Sea. The owner of the seabed in this area is the Crown Estate. As the origin of the material is unknown, no title to the potential vessel and its cargo is available.

2.3.2 Following its discovery in 1994, the site was assessed by the ADU and recommended for designation on the basis of the presence of the rare bronze guns. It was subsequently designated under the Protection of Wrecks Act 1973 in 1994 by the Minister for Culture, DCMS (SI 1994/1842; SI 2004/2395).

2.3.3 Condition surveys of the site and its vulnerability have been undertaken by the licensee and ADU from 1994 to 2002, and subsequently by the archaeological contractor, Wessex Archaeology. Archaeological and conservation management reports have been submitted to Historic England by Wessex Archaeology (2003a-b; 2006a-b; 2009, 2010; 2016.).

2.3.4 Physical access to the wreck site is restricted to licensed divers, currently under a survey license. Any recovery of artefactual material would need to be managed through the current licensing system. Three groups of archaeological material previously recovered are identified:

- timber and up to 56 concreted iron shot recovered during fishing operations prior to discovery of the site, location currently unknown;
- bronze Flemish saker recovered prior to designation, currently at Dunwich Museum;
- bronze gun presumed stolen from the site between 2012 and 2015, location currently unknown.

2.3.5 A License to Survey the site is currently held by Andy Rose, advised by Graham Scott. Fieldwork is currently concentrated on surveying the visible remains at the site and establishing the seabed conditions. The previous licensee was Stuart Bacon of SUS, who also discovered the wreck. Several reports on the SUS survey work have been produced, though not all appear to be deposited with Historic England. The ADU and Wessex Archaeology reports and survey archives are deposited with the Historic England Archive.

2.3.6 The recovered bronze gun is currently held at Dunwich Museum, on loan from the Royal Armouries. The destination for any material subsequently recovered is not currently certain, but Dunwich Museum may be the primary repository, subject to the investigations of the Receiver of Wreck.

2.3.7 There has been no authorised recovery of material from the Dunwich Bank wreck site since designation; however, as noted above, one of the bronze guns is believed to have been stolen after 2012, possibly having been sold to a private buyer in the Netherlands (Wessex Archaeology 2016, 3).

2.3.8 There is currently a Restricted Area radius of 300 metres around the site. However, there is no physical marker for the exclusion zone and it is known that lobster fishing takes place very close to the wreck.

2.3.9 The role of the Eastern Inshore Fisheries and conservation Authority (IFCA) is to lead, champion and manage a sustainable marine environment and inshore fisheries. IFCA's remit is linked to several policies within the East Marine Plan. See section 3.4 for further details.

2.4 Gaps in knowledge

2.4.1 There are currently numerous information gaps contributing to the fragmented understanding of the Dunwich Bank wreck site. The most important is the current lack of definitive evidence for any vessel timbers, either from observations or geophysical survey. Possible explanations for this proposed by Wessex Archaeology (2010, 15) include:

- the site represents the main focus of a 16th-century wreck site with the main structural timbers being either buried or dispersed through tidal action and/or biological degradation;

- the site represents the partial remains of a 16th-century wreck site with the main wreck mound lying some way from the collection of artefacts on the Dunwich Bank site;
- the site represents a cargo of scrap metal lost in transit, either as a wreck or material jettisoned from a vessel in trouble.

2.4.2 Having greater certainty about the presence or absence of vessel timbers is a key research objective, although if no timbers were identified the dual possibility remains that the site could be either a lost cargo or a wreck with no surviving timbers.

2.4.3 The identification and recovery of any potentially dateable artefacts would be important for narrowing down the date of loss of the vessel or its cargo. Our understanding of the site has not changed greatly since its discovery, and the recovery of some material is needed to help move our knowledge forwards. Further study of the concretions tentatively identified as iron guns would assist in assessing the extent of ordnance at the site.

2.4.4 Once a potential date and the presence or absence of a vessel has been established, detailed documentary research would be required to try and identify the vessel's name, function, place of origin and date of loss.

2.4.5 A definitive survey and quantification of the ordnance would help to establish the magnitude of risk of further losses though theft.

3 ASSESSMENT OF SIGNIFICANCE

3.1 Basis for assessment of significance

3.1.1 The significance of a site, feature or place derives from 'the sum of [its] cultural and natural heritage values' (English Heritage 2008). Aspects contributing to cultural heritage value include the potential of a site or place to yield primary information about past human activity (evidential value, which includes archaeological value), the ways in which it can provide direct links to past people, events and aspects of life (historical value), the ways in which people respond to a place through sensory and intellectual experience of it (aesthetic value, which includes architectural value) and the meanings of a place for the people who identify with it, and communities for whom it is part of their collective memory (communal value).

3.1.2 The historic environment is also a resource shared by communities characterised not just by geographical location but also by common interests and values. As such, it may be important as an educational, recreational, or economic resource. The basis for assessing significance requires a consideration of the different elements of the site. By identifying those elements which are vital to its significance and so must not be lost or compromised, we are able to identify elements which are of lesser value, and elements which have little value or detract from the significance of the site (Dunkley and Hamer 2009).

3.2 Statement of significance

3.2.1 Given the current lack of information relating to the origin and nature of the probable wreck site, the principal reason for its designation under the PWA 1973 was the presence of several bronze guns of probable 16th-century date. At least four guns have been confirmed, one now in Dunwich Museum and one probably having been stolen after 2012. Two of the guns are thought to survive on the seabed. A study of the recovered gun by Rudi Roth concluded that it

is as a 6-punder Flemish Saker made for land service to a design by Gregor Löffler and cast by Remigy de Halut for Emperor Charles V, probably between 1536 and 1540 (Roth 1996, 30).

3.2.2 On the basis of video footage of a second Dunwich gun (recorded as Gun 2 but quite likely actually the now missing Gun 3), Roth (1996, 31) identified it as a similar Löffler Augsburg design. The available information for the two other recorded bronze guns suggests that all four are likely to be roughly contemporary and to a similar design.

3.2.3 The evidential and aesthetic values of the guns are enhanced by their rarity and relate to their design, which originates from a very crucial period of continental ordnance development between 1530-1550 and offers information on the transfer of ordnance technology and design within the Habsburg Empire, a subject which has remained largely unexplored (Roth 1996, 21). The design indicates manufacture during the period of transition from the use of serpentine to corned gunpowder in the first half of the 16th century.

3.2.4 The historical associative value of the guns lies in their links with the designer, caster and commissioner. Both de Halut and Löffler are significant figures in the history of bronze cannon, with Löffler credited as being one of the first master gunners to become an arms manufacturer, becoming a specialist bronze caster on an industrial scale (Long 2012, 9; Scholten 2006, 43) and regarded as possibly the best gun founder in Europe at this time (Roth 1996, 24). Remigy de Halut carried out the same trade at Malines, Antwerp, from 1536-1568 and was appointed master gun founder to Charles V's son, Phillip II of Spain. Malines was probably the best gun foundry under Spanish control and had been a royal foundry since 1520. Several de Halut guns from the 1550s, including two 2.5 ton, 40-pounder siege cannon, are known to have been carried on ships forming part of the Spanish Armada (Martin and Parker 1999, 22-24; Roth 1996, 27-28).

3.2.5 The circumstances of the deposition of the guns on the seabed at Dunwich Bank is currently unclear; further archaeological investigation would be required to establish whether they were part of a warship's or armed merchant vessel's ordnance, or were cargo items lost either through wreckage or as part of a deliberate jettison of material to lighten a foundering ship, although the latter seems fairly unlikely. The presence of at least two, and likely four guns of a similar date and design suggests that it is unlikely that they were lost after *c*.1600. There is also a strong suggestion that the guns may have been a Spanish commission, though this does not necessarily mean that the vessel carrying them at the time of their loss was also Spanish.

3.2.6 Though the lack of information on the nature of the wreck site means that communal value is more difficult to define, as there is currently no direct relational association with the Suffolk community. There is a strong sense of communal value in the dedication of the former licensee, Stuart Bacon, and the SUS team in investigating the wreck site and in campaigning for the return of the recovered gun to the local area after it was transferred to the Royal Armouries at Fort Nelson. The gun is now in Dunwich Museum, where it provides an educational benefit to both locals and visitors and a tangible link to an otherwise unseen site. The wreck site is also identified as an important component in the historic character of Dunwich Bay Seascape Character Area (Oxford Archaeology 2007).

3.2.7 The natural heritage value of the Dunwich Bank wreck site is associated with its location within the Outer Thames Estuary Inshore Special Protection Area, which is designated mainly as an

over-wintering habitat for red-throated divers (*Gavia stellata*), and through its proximity to the Suffolk Coast and Heath Area of Natural Beauty.

3.2.8 The following table seeks to summarise the values of the Dunwich Bank wreck site as a whole, by noting how those values relate to the surviving fabric and its constituent parts.

Evidential	Relating to the potential of the site to yield primary information about past human activity, investigation and survey of the Dunwich Bank wreck site has indicated the survival of bronze ordnance of 16th-century date and probable iron ordnance. One gun has been recovered and is on display at Dunwich Museum. The early archive of the site's discovery investigation is also of evidential significance.
Historical	Relating to the ways in which the site can provide direct links to past people, events and aspects of life, at least two of the bronze guns are directly linked with the important 16th-century gun-makers Remigy de Halut and Gregor Löffler, as well as with the Holy Roman Emperor Charles V. There is potential for much greater historical value to be recovered through additional survey and research. Such research should include research into the point at which bronze guns may have ceased to become valuable as scrap and became objects or works of art with their own aesthetic and financial value.
Aesthetic	Relating to the ways in which people respond to the site through sensory and intellectual experience of it, the value of the recovered bronze gun is in the details of its design and technological importance. This value is harder to articulate for the guns still on the seabed.
Communal	Relating to the meanings of the site for the people who identify with it, and whose collective memory it holds, the designation of the site under the PWA 1973 is, in itself, an expression of communal value. The value of the wreck site to the local community was demonstrated by the contentious removal of the salvaged cannon from display in Dunwich and a successful campaign to bring it back to Dunwich Museum from the Royal Armouries at Fort Nelson.
Instrumental	Economic, educational, recreational and other benefits which exist as a consequence of the cultural heritage values of the Dunwich Bank wreck site may be identified in its value as a visited dive site of historic interest, the value of the recovered bronze cannon on display in Dunwich Museum and the bronze guns remaining on the site. The natural heritage value is associated with the site's location within the Outer Thames Estuary Inshore SPA and adjacent to the Suffolk Coast and Heath AONB.

3.3 Gaps in understanding significance

3.3.1 Whilst there are major gaps in knowledge regarding the nature of the wreck site, most of these do not impact on the current understanding of significance of the guns, which are the key features of the site and the primary reason for its designation. A 16th-century wreck with *in situ* bronze ordnance holds very different significance values to a much later ship carrying a cargo of scrap.

3.3.2 One factor impacting on the understanding is the poor visibility conditions and variations in sediment deposition across the site, which mean that the number of guns is currently uncertain, and the nature of the design and extent of decoration has been difficult to record or confirm. The available information does suggest that the identification of the four confirmed guns as a group of contemporary guns of a similar design, and probably by the same manufacturer, is valid.

3.3.3 The significance of the whole site itself is much harder to determine; there is currently some uncertainty as to the nature of the site; some have questioned whether it is a wreck at all. Further archaeological and documentary investigation of the Dunwich Bank wreck site is critical to enhance our understanding of its significance and inform future conservation management. Archaeological investigations would need to involve the removal of some material for further investigation and dating.

3.4 Statutory and other designations

3.4.1 Statutory Instrument 2004/2395 affords protection to a circular area of seabed (radius 300m) around position 52°15.1647' N 001°38.4231' E (WGS84) under the Protection of Wrecks Act 1973. The previous SI number was 1994/1842. The Restricted Area was extended in 2007 to 300m (centred on 52 15.1647N 001 38.4231E WGS 84)[3]. This area is shown on Admiralty Chart 1543.

3.4.2 Archaeological interventions that impact the seabed may require a licence issued by the Marine Management Organisation (MMO), under the terms of the Marine and Coastal Areas Act 2009. The MMO is an executive non-departmental public body, sponsored by DEFRA.

3.4.3 The adjacent coastline is part of the Suffolk Coast and Heath Area of Outstanding Natural Beauty. The wreck site is within the Outer Thames Estuary Inshore Special Protection Area with Marine Components (UK9020309). Natural England should be contacted for advice in relation to any proposed new activities within this area.

3.4.4 The site lies within the southern North Sea candidate Special Area of Conservation (proposed for the protection of harbour porpoises). Natural England should be contacted for advice in relation to any proposed new activities within this area (cf Marine Protected Area Network MPA1).

4 ISSUES, VULNERABILITIES AND OPPORTUNITIES

4.1 Introduction

4.1.1 This section summarises the main conservation and management issues that specifically affect, or may affect, the significance of the monument and its component parts and elements. Any vulnerabilities will also be identified, as will any opportunities to enhance the significance of the site.

4.1.2 All wreck sites are vulnerable simply because of the nature of their environment. When there is a threat of damage, decay or loss of the monument, sites may be considered to be at risk,

[3] Note: the NHLE entry does not reflect this latest amendment, and still notes the old 100m Restricted Area.

although damage, deterioration or loss of the monument through natural or other impacts will not necessarily put the monument at risk if there is a programme of positive management.

4.1.3 The Dunwich Bank wreck was placed on the Heritage at Risk Register in 2016, primarily in response to the apparent theft of a bronze cannon (Gun 3). This was reported locally and nationally by a number of organisations including the BBC.

4.2 The physical condition of the site and its setting

4.2.1 One of the key issues is that of visibility. There is usually zero visibility at the site, although periods of limited visibility have been encountered on very rare occasions. This factor, coupled with fishing nets and ropes entangled in the wreck material make diving and survey conditions both difficult and dangerous. Conversely, the poor visibility also may afford some protection to the site, by deterring some unauthorised access.

4.2.2 There have been conflicting reports about the stability of the sediment around the wreck, but recent surveys and divers' reports indicate that the wreck is in a very changeable sedimentary environment. Fairly significant changes in sediment levels can expose or completely mask features. Scouring has also been noted around the central mound, sometimes extending up to 7m away from its base; the scouring appears to be localised and does not affect all parts of the site.

4.2.3 The lack of visibility and the mobile sediments mean that archaeological investigation is much less efficient than normal, even for very experienced divers familiar with zero visibility conditions. These condition also impact upon the survey and excavation methods that can be used. For these reasons it can also be hard to make comparisons between surveys, and this can hamper assessments of threats or other direct impacts (e.g. loss through theft, see 4.3). The repeated exposure and burial of the bronze guns is also potentially detrimental to their condition. Preservation of timber also appears to be a problem, with exposed timbers recorded as being extensively attacked by marine boring organisms.

4.2.4 The setting of the site appears to be fairly stable, and there are no direct threats or vulnerabilities arising from its setting at present.

4.3 Inappropriate uses of the site and theft

4.3.1 The site is in a busy fishing zone. The exclusion zone is not marked in the water. The wreck site is marked on Admiralty Chart 1543 (1:75,000) but a conversation with the section of the UKHO that supplies Admiralty charts suggested that exact Protection Zone radius is not plotted - the site is located by a standard symbol. Rapid changes in technology, and the ever increasing availability/affordability of accurate GPS and subsurface detection systems means that the site can be located readily, potentially placing the site at increased risk.

4.3.2 Lobsters are attracted to wrecks and other subsurface features and it is known that Dunwich Bank, and other wrecks in the area, are used as targets to set lobster pots. The licensee has reported removing large quantities of snagged or discarded fishing gear, and a lot of monofilament fishing net was reported after a dive in November 2016 (G. Scott pers. comm.). As well as creating a diving hazard, discarded net and rope may damage the site features. Discarded net can alter the speed of environmental change, encouraging both scouring and the build up of sediment, depending upon conditions.

4.3.3 It is fairly certain that Gun 3 was removed from the site around 2012 and it was allegedly taken abroad to be sold. There is a market for bronze ordnance and it is common knowledge that there are still bronze cannon on the site; the risk of further theft must be taken very seriously. At present it is uncertain whether Gun 6 is still present or has also been removed. The cannon are a major part of the wreck's evidential and historical significance and any further loss would greatly damage this significance of the site. If the cannon were lifted, this would provide an opportunity to discover more about the wreck (from the cannons themselves, and any material trapped beneath them) whilst removing the threat of future theft. Adequate funding would need to be identified for lifting and conservation.

4.4 Lack of information or understanding about aspects of the site

4.4.1 Our lack of understanding about the site means that its true significance is likely not yet fully known or articulated. This is a major issue; for example, clarity on the origin of the material, whether from a wreck or jettisoning act, could completely alter the site's significance and may alter the conservation approach to it (see 4.6 below). A more accurate understanding of the date of the material would be very valuable. This would help target more detailed documentary research which might provide information on the origin and ownership of the vessel.

4.4.2 A more secure survey of the site would also be beneficial; for example, there are still some unresolved queries about the total number of guns and their exact locations. Again, this lack of understanding hinders our assessment of risk and our ability to monitor change.

4.5 Resources and skills

4.5.1 There is a complex balance of resourcing to be made at Dunwich Bank. Additional information on the site is urgently required in order that its significance can be more fully understood and the recovery of material from the seabed will be necessary. This has additional resourcing implications beyond the normal monitoring programme currently funded by Historic England. Should a more ambitious programme of work be undertaken (e.g. larger scale survey, excavation or the lifting of ordnance), much more significant sums would be required, including in the long term for conservation. There are, however, good museum and archive repository resources now available at Dunwich Museum to support the long-term protection of recovered material.

4.5.2 The diving at the Dunwich Bank wreck site is difficult and dangerous and its amenity value is minimal. Through conversations with the licensee, it is clear that this type of diving does not appeal to everyone, and there is a tendency for the new generation of avocational divers to wish to dive sites with greater visibility. There is felt to be a general reduction of diving and survey skills within the diving community for zero visibility conditions. In the long term, this could impact upon the ability to monitor and investigate complex archaeological wreck sites in these conditions.

4.5.3 The longer-term potential skills shortages and resourcing issues could be an opportunity for the Dunwich Bank site to act as a pilot or test-case for establishing alternative ways of investigating, curating and caring for sites like this whilst capacity-building within the avocational diving community. In this case, the licensee works within a commercial diving environment and already brings a great deal of added value to our ability to understand the site, through survey and resourcing; there may be other opportunities to develop commercial partnerships or

sponsorship, coupled with skills training and a creative community engagement programme (see also 4.6 below) whilst gaining a better understanding of the site and reducing risks to it.

4.6 Conservation and presentation philosophy

4.6.1 The sediment is fairly mobile, but it is not fully understand how damaging this is to the features of the site; there is a possibility that repeated covering and uncovering of the bronze ordnance may be harmful to them. It is also known that exposed wood is rapidly attacked and does not seem to survive well. The site has almost certainly been damaged by theft, and this significant risk is ongoing.

4.6.2 A clear conservation approach to this site needs to be based upon as full an understanding as possible of the site and its condition. Some of the Conservation Policies for this site (below) are necessarily influenced by the placing of the site on the Heritage at Risk Register, and the perceived risk of further theft of ordnance, but more complex decisions about the overall conservation approach to this specific site are needed, swiftly.

4.6.3 The recovery of some of the smaller concretions may reveal artefacts or information about the materials and processes forming the concretions.

4.6.4 Radical interventions could be considered. For example, given the commercial and renewable energy infrastructure and services in the region, it would be possible to resource the lifting of the concreted central mound and to examine it (e.g. by X-ray) it to gain an understanding of what it is made of. Artefacts could be retrieved from the concretion.

4.6.5 If excavation and recovery were undertaken, the site and the material could be used as a means to disseminate information about the complexity of wreck sites, the conservation challenges they present and the differing approaches that can be taken. It could be actively used as a teaching tool and to engage the public with our marine heritage.

4.6.6 The contribution of Stuart Bacon to the discovery and subsequent survey of the site should not be forgotten. It is likely that he can still remember things about the site that he has not put into writing. Likewise his archive would be a valuable research resource. The long-term security of Stuart's (and others') oral and documentary archive should be given high priority and should be considered an integral part of this site's history and significance.

4.6.7 The site is not a leisure diving attraction. Visitor access is essentially limited to information placed in the community. The cannon at Dunwich museum is prominently displayed, but the accompanying interpretation could be strengthened if further investigative work is carried out on the site. We know that the museum would be willing to curate additional material from the site. It should be noted that the SUS exhibition has now closed following sale of the premises. The exhibition material is currently being held by the Dunwich Museum and they hope to be able to display it when the museum is extended.

4.6.8 There are other potential opportunities to place the site within its wider landscape and historical context, for example by placing interpretation information at key sites such as Dunwich Heath and beach (National Trust).

5 CONSERVATION MANAGEMENT POLICIES

5.1 Introduction

5.1.1 This section of the Conservation Statement and Management Plan builds on Sections 3 and 4 to develop Policies that will retain, reveal or enhance the site's significance, and provide a framework for decision-making in the future management of the site.

5.1.2 The Policies will create a framework for managing change at Dunwich Bank that is clear, transparent and sustainable. The importance of stakeholder involvement and investment into this site to date and into the future is acknowledged and implementation of the Policies will involve continued partnership working.

5.1.3 Policies are also compatible with, and reflect, Historic England's Conservation Principles for the Sustainable Management of the Historic Environment (English Heritage 2008) and its published policies and guidelines, as well as the wider statutory and policy framework.

5.1.4 Each Policy is discussed under individual sub-headings, below, although it is acknowledged that certain issues may cross-cut more than one Policy theme. All policies are tabulated in the Executive Summary for clarity.

5.2 Understanding the significance of Dunwich Bank

5.2.1 The significance of the site as currently understood is based largely on the presence, form and likely provenance of bronze cannon. However, our understanding of the site is partial, thus we must acknowledge that the significance of the site cannot be fully appreciated or articulated at present. The degree of significance determines what protection is appropriate under law and policy.

5.2.2 The previous work that has been undertaken at the site is vital, but a further programme of investigation is required to contribute towards a fuller understanding of the site and how it should be managed. Further work should include:

- additional survey and some limited excavation (requires a licence)
- retrieval of material that may help to date the site (requires a licence)
- further archival research, if dating evidence can be recovered from the site
- revisiting the Statement of Significance in this Plan on the basis of the results

Policy 1: We will seek to implement an investigative programme to try and establish the date and provenance of the Dunwich Bank wreck

5.3 Dunwich Bank should be managed to sustain its values

5.3.1 Change to wreck sites is inevitable and influenced by many factors. Changes must be managed in ways that will best sustain the significance of the site, in its setting, while recognising opportunities to reveal or enhance its values for present and future generations.

5.3.2 Action taken to counter harmful effects of natural change, or to minimise the risk of disaster or adverse impact, should be timely, proportionate to the severity and likelihood of identified consequences, and sustainable in the long term. Intervention that causes limited harm to some of the values of a place may be justified if it increases understanding of the past, reveals or enhances particular heritage values, or is necessary to sustain those values for future generations, so long as any harm is decisively outweighed by the benefits.

5.3.3 If retaining any significant part of the site is not reasonably practicable, its potential to inform us about the past will be exploited. This could involve the recovery of information through intrusive investigation, followed by analysis, archiving and dissemination of the results at a standard appropriate to its significance.

5.3.4 The presence of Dunwich Bank on the Heritage at Risk Register is a direct result of the apparent theft of at least one bronze cannon. The risk of further theft is uncertain[4], but must be taken very seriously. Given that the many of the site's significance values are linked to the bronze ordnance, the negative impact of further theft on the significance of the site would be immense.

5.3.5 A major priority consideration must be to lift the remaining bronze ordnance (Gun 4 and possibly Gun 6 if present) following additional survey. The areas below the guns could then be excavated. This would secure the most tangible evidence of the wreck's significance, reduce the risk of further theft and allow new research to potentially enhance the evidential value of the site.

5.3.6 Stuart Bacon's personal archive and knowledge is an important part of the evidential value of the site. It would be beneficial to work with Stuart and the Dunwich Museum to facilitate the accession and long-term protection of his archive and to make it available for future research.

> *Policy 2: We will strive to remove Dunwich Bank from the Heritage at Risk Register through appropriate intervention*
>
> *Policy 3: We will seek to secure for the long-term any un-archived primary records relating to the discovery and investigation of Dunwich Bank*

5.4 Decisions about change must be reasonable, transparent and consistent

5.4.1 Decisions about changes to Dunwich Bank require the application of expertise, experience and judgement by those advising on and making decisions, in a consistent, transparent process guided by public policy and the most up-to-date research.

5.4.2 Potential conflict between sustaining the significance of a place and other public interests should be minimised by seeking the least harmful means of accommodating those interests. If conflict cannot be avoided, the weight given to heritage values in making the decision should be proportionate to the significance of the place and the impact of the proposed change on it.

[4] the alleged perpetrator of the theft of Gun 3 is deceased, but there may still be a market for such objects and the site is well known

5.4.3 This Plan will be used to guide future approaches to the site. The effects of changes to the condition of the site will be monitored and evaluated, and the results used to inform subsequent action(s). This Plan and its Policies will be updated as necessary when new information comes to light, and at least on a five-year cycle.

5.4.4 Decisions made about the site and any evaluation procedures will be documented fully in Project Designs, Research Frameworks or other report and will be made available to the authors of any revised Plan.

> *Policy 4: We will use this Plan to underpin our management approach; all decisions and evaluation will be recorded in full and any interventions will be carried out to approved Research Designs*

5.5 Dunwich Bank is a shared resource

5.5.1 Dunwich Bank forms a unique record of past human activity which reflects the aspirations, ingenuity and investment of resources of previous generations. The provenance of the wreck is not known, but it certainly has important international connections. Dunwich Bank is therefore a social asset as a resource for learning on a global scale.

5.5.2 Learning is central to sustaining the historic environment. It raises people's awareness and understanding of their heritage, including the varied ways in which its values are perceived by different generations and communities. It encourages informed and active participation in caring for the historic environment.

5.5.3 We may be able to learn much more about the site through carefully planned intervention. The evidential, historical and communal values of the site have the potential to increase.

5.5.4 The existing stakeholder partnerships (e.g. between HE, the licensee and other bodies) are crucial for the long-term protection of the site's values. Using this existing network, new opportunities and partnerships could be built to bring additional resources to the investigation and enhancement of the site's values. The site is close to an active harbour and port (Lowestoft) with associated commercial marine and renewable energy infrastructure, research and development. It is also close to the fishing harbour at Southwold and a number of beaches, tourist attractions and nature reserves. The investigation of the site has the potential to attract and benefit from a great deal of public and commercial support and interest.

5.5.5 Engagement with local fishing groups may help to raise awareness of the fragility and heritage significance of the site, and may help to foster a sense of ownership, which in turn aids the site's protection.

Policy 5: We will nurture our stakeholder relations to create a supportive and collaborative management structure

Policy 6: We will seek to explore opportunities to resource substantial intervention into the site as a creative community engagement project

Policy 7: We will work with local organisations to maximise the opportunities for learning and interpretation

Policy 8: We will use any interventions to highlight the complexity of caring for heritage sites in blackwater conditions and explore opportunities to sustain and enhance survey skills within the avocational diving community

6 FORWARD PLAN

6.1 Approach

6.1.1 This section details a number of Actions that will help increase our understanding of the site and inform its most appropriate management, in line with the Polices detailed in Section 5. A staged approach is necessary; the merit of individual Actions may be dependent upon the results of earlier Actions. The table incorporates recommendations in the Designated Site Assessments of 2006 and 2010 by Wessex Archaeology (see also Appendix 1). some of the Actions would require significant financial resourcing.

6.2 Proposed actions

Action	Rationale	Timetable
Continue with scheduled monitoring. Increase environmental monitoring	Continue monitoring through the Contract for Archaeological Services in relation to the Protection of Wrecks Act (1973) Monitor the environmental conditions of the wreck (bathymetric survey may be more effective than sediment monitoring rods) and help influence management	ongoing
Enhanced pre-disturbance survey and retrieval of smaller material from the wreck (pottery, timber, small concretions etc)	[this may need a sustained period on site] Establish if timbers are present Relocate Guns 4 & 6 Help to provide dating Further our understanding and help direct more detailed archival research	2017
Lift remaining bronze ordnance and conserve them [high priority]	Reduce risk of further theft Remove site from Heritage at Risk register	2017

	Examine guns to enhance site significance Contribute to enhanced public understanding and learning	
Wider survey	Set the wreck within its wider seabed context and establish if other wreck material is located nearby, or associated with the site Full swath / side scan / mag survey of the general area	2017
Undertake additional archive research	Target archive research using dating evidence, if retrieved e.g. more detailed examination of losses during the Anglo-Dutch Wars	2017-19
Strengthen a collaborative stakeholder group and deliver a feasibility study for large-scale intervention	To examine feasibility for the design, resourcing and delivery of a large-scale intervention project, if appropriate Community engagement Increase heritage awareness Capacity building within related marine professions and avocational diving	2017/18
Work with Stuart Bacon (and older fishermen) to secure oral histories and written archive	Secure a valuable resource for future research and public interest	2018
Enhance interpretation	Examine opportunities to create new and enhanced interpretation on land	after any new results

7 IMPLEMENTATION AND ADOPTION

7.1 Consultation

7.1.1 This Conservation and Management Plan for the Dunwich Bank has been reviewed by Historic England will be circulated for a three-week stakeholder consultation to refine how the values and features of the site can be best conserved, maintained and enhanced. Responses to the consultation have been incorporated into this final version.

7.2 Adoption of Policies

7.2.1 Following consultation, the Plan will be adopted by Historic England. A programme that identifies a realistic timescale for implementing the Plan and Forward Plan will be devised.

7.2.2 Responsibilities for implementation lie with Historic England (led by the Maritime Archaeology Team). Consultation with stakeholders will be maintained throughout adoption and delivery of the Plan and Forward Plan. In addition, provision will be made for periodic review and updating the Plan; it is recommended that the Plan is reviewed after five years.

8 REFERENCES

ADU. 1994. Assessment of the Cannon Site on Dunwich Bank, Suffolk, England. Unpublished Archaeological Diving Unit monitoring report 94/06.

ADU. 1998. Dunwich Bank Wreck, Suffolk England. Unpublished Archaeological Diving Unit monitoring report 98/21.

Bacon, S. 1994. Dunwich Bank. Unpublished Licensee report to ACHWS.

Bacon, S. 1995. The Dunwich Bank Wreck. Unpublished Licensee report to ACHWS.

Bacon, S. 1996. The Dunwich Bank Wreck. Unpublished Licensee report to ACHWS.

Bacon, S. 1997. The Dunwich Bank Wreck. Unpublished Licensee report to ACHWS.

Bacon, S. 2000. The Dunwich Bank Wreck Pre-Disturbance Survey. Unpublished Licensee report to ACHWS.

Cant, S. 2013. *England's Shipwreck Heritage: From Logboats to U-boats*. English Heritage.

CEFAS. 2001. Dunwich Sediment Transport: A Desk-Study. Unpublished report.

Dunkley, M. and Hamer, A. 2009. *Rooswijk*, Goodwin Sands, of Kent: Conservation Statement and Management Plan. Unpublished English Heritage report.

English Heritage, 2008, *Conservation Principles, Policies and Guidance, for the Sustainable Management of the Historic Environment*. Swindon: English Heritage.

English Heritage, 2008b. *Protected Wreck Sites At Risk: A Risk Management Handbook.* Swindon: English Heritage.

Long, P.O. 2012. Trading zones: arenas of exchange during the late medieval/early modern transition to the new empirical sciences. *History of Technology* 31, pp.5-25.

Martin, C. and Parker, G. 1999. *The Spanish Armada*. Revised Edition. Manchester: Mandolin.

Oxford Archaeology. 2007. England's Historic Seascapes. Marine HLC pilot study: Southwold to Clacton. Final Project Report. Unpublished Oxford Archaeology report.

Roth, R. 1996. The cannon from Dunwich Bank, Suffolk. *International Journal of Nautical Archaeology* 25/1, 21-32.

Scholten, F. 2006. *Adriaen De Vries 1556-1626: Imperial Sculptor*. Malibu: Getty Publications and Zwolle: Waanders Publishers.

Upton, J. 2004. Individual Dunwich Bank Wreck dive report, 8th August 2004. Unpublished SUS report.

Wessex Archaeology. 2003a. Dunwich Bank, Suffolk: Designated Site Assessment Summary Report. Unpublished Wessex Archaeology report 53111.02d.

Wessex Archaeology. 2003b. Dunwich Bank, Suffolk: Designated Site Assessment Full Report. Unpublished Wessex Archaeology report 53111.03d.

Wessex Archaeology. 2006a. Dunwich Bank, Suffolk: Designated Site Assessment Archaeological Report. Unpublished Wessex Archaeology report 53111.03hh.

Wessex Archaeology. 2006b. Dunwich Bank, Suffolk: Designated Site Assessment Management Report. Unpublished Wessex Archaeology report 53111.02hh.

Wessex Archaeology. 2009. Dunwich Bank, Suffolk: Designated Site Assessment Management Report. Unpublished Wessex Archaeology report 53111.02uuu.

Wessex Archaeology. 2010. Dunwich Bank, Suffolk: Designated Site Assessment Archaeological Report. Unpublished Wessex Archaeology report 53111.03uuu.

Wessex Archaeology. 2016. Dunwich Bank Designated Site Assessment Management Report. Unpublished Wessex Archaeology report 108280.04.

9 CONTACT DETAILS AND CONSULTATION

9.1 Contacts

The authors can be contacted via:

Anna Badcock, Regional Director, ArcHeritage, 54 Campo Lane, Sheffield, S1 2EG

Tel: 0114 2728884 abadcock@yorkat.co.uk

The Historic England contact is:

Mark Dunkley, Maritime Archaeologist

Historic England, Fort Cumberland, Eastney, Portsmouth, PO4 9LD

Tel: 023 9285 6768 Mark.dunkley@historic-england.org.uk

9.2 Consultees

The following individuals and organisations were invited to comment on the draft Plan:

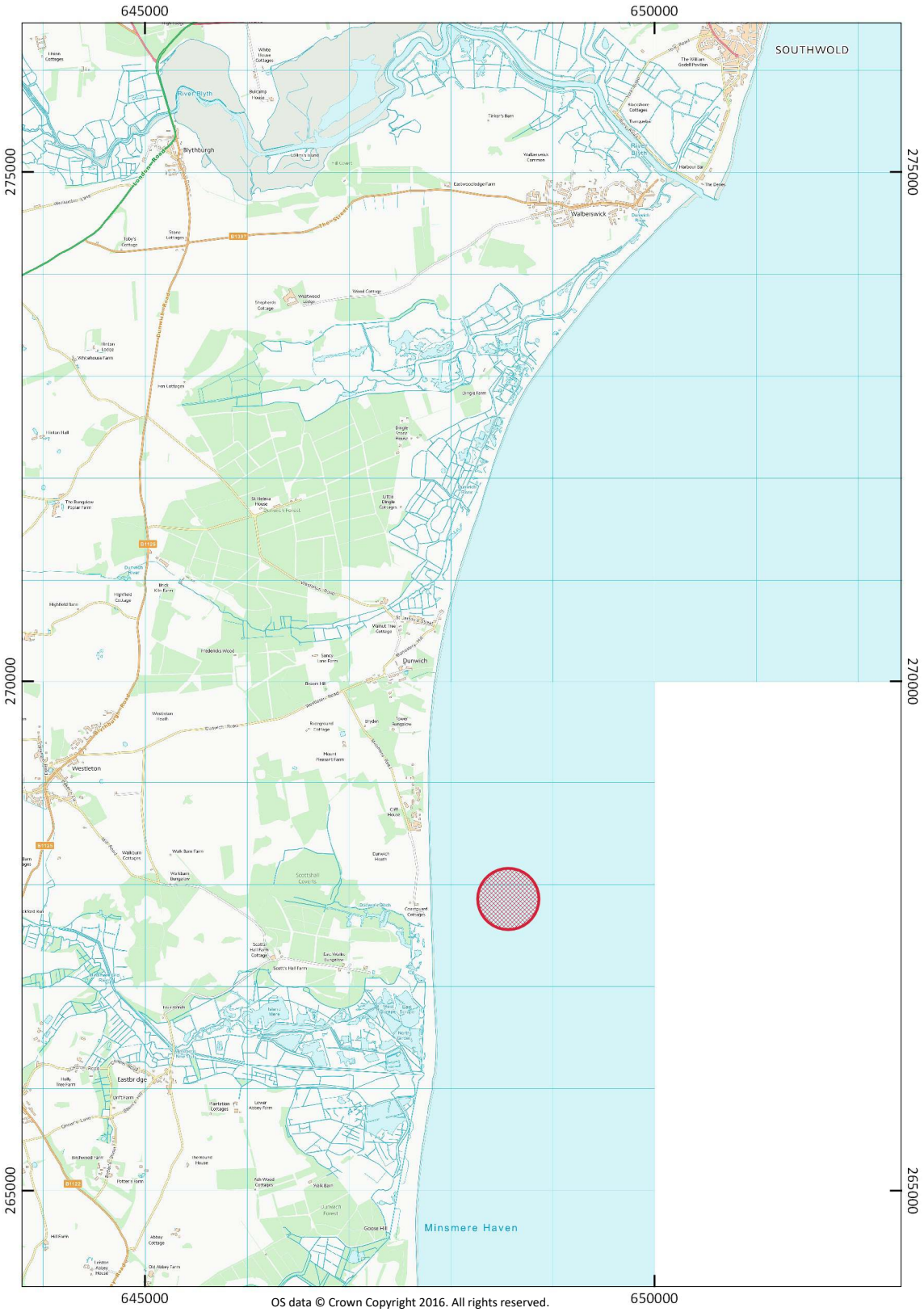
- Architecture & Historic Environment Division, DCMS
- Local Authority Historic Environment Team
- Eastern Inshore Fisheries and Conservation Authority
- Dunwich Museum
- Licensee
- Nautical Archaeology Society
- Nominated Archaeologist
- The Crown Estate
- Southwold Harbour Master
- Mike Pacey, Stuart Bacon, Jane Hamilton

9.3 Acknowledgements

The authors would like to acknowledge the help, contributions and hospitality of the following: Graham Scott (Nominated Archaeologist), Andy Rose (Licensee), Mike Pacey (diver), Stuart Bacon (Sussex Underwater Studies), Jane Hamilton (Manager, Dunwich Museum), the Assistant Harbour

Master (Southwold), Mark Dunkley (Historic England), and staff of the UKHO and the Crown Estate. Thank you to Wessex Archaeology for allowing reproduction of figures and relevant report extracts.

FIGURES



ArcHeritage

Figure 1: Site Location

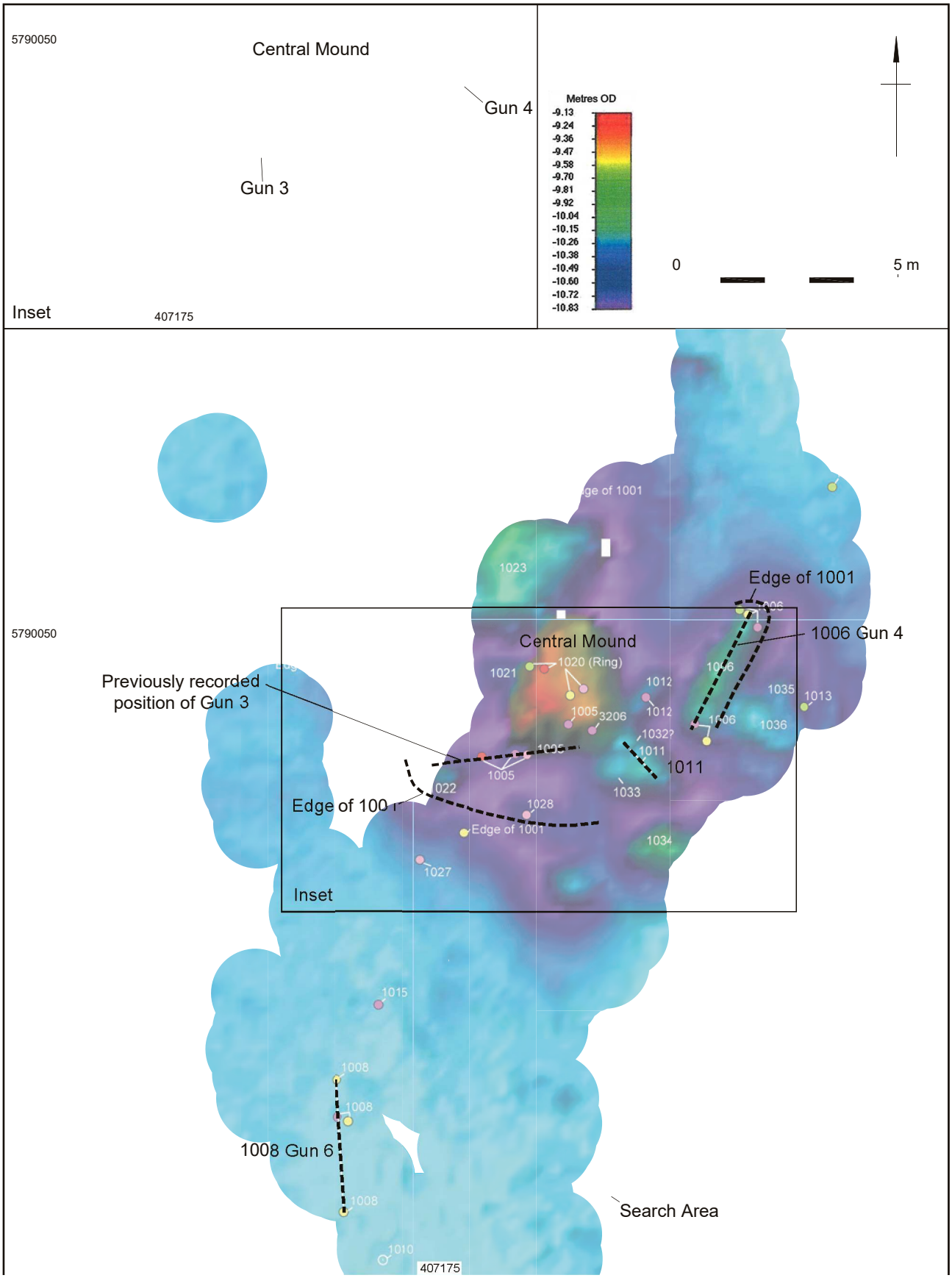
Dunwich Bank Wreck Site Plan.
Stuart R. Bacon, 25.10.2001.
Suffolk Underwater Studies.
Coloured annotation by ArcHeritage

Key:
- Bronze cannon
- Supposed site of cannon
- Possible iron gun
- Possible iron object
- Concretion mound
- Modern net
- Quern find spot
- T Timber (unknown provenance)
- UMO Unidentified metal object

Gun E
UMO
Approx. site of Cannon 1
Quern
Cannon 4
Gun B
Gun F
Mound 2
Metal rings
UMOs
Hole
Gun G
UMO
Gun D
Supposed site of Cannon 2
Cannon 3 (site of)
Anchor
Gun C
Gun I
Cannon 6
Swivel gun muzzle
Cannon balls?
Gun A
Gun H
N
0
5
Metres

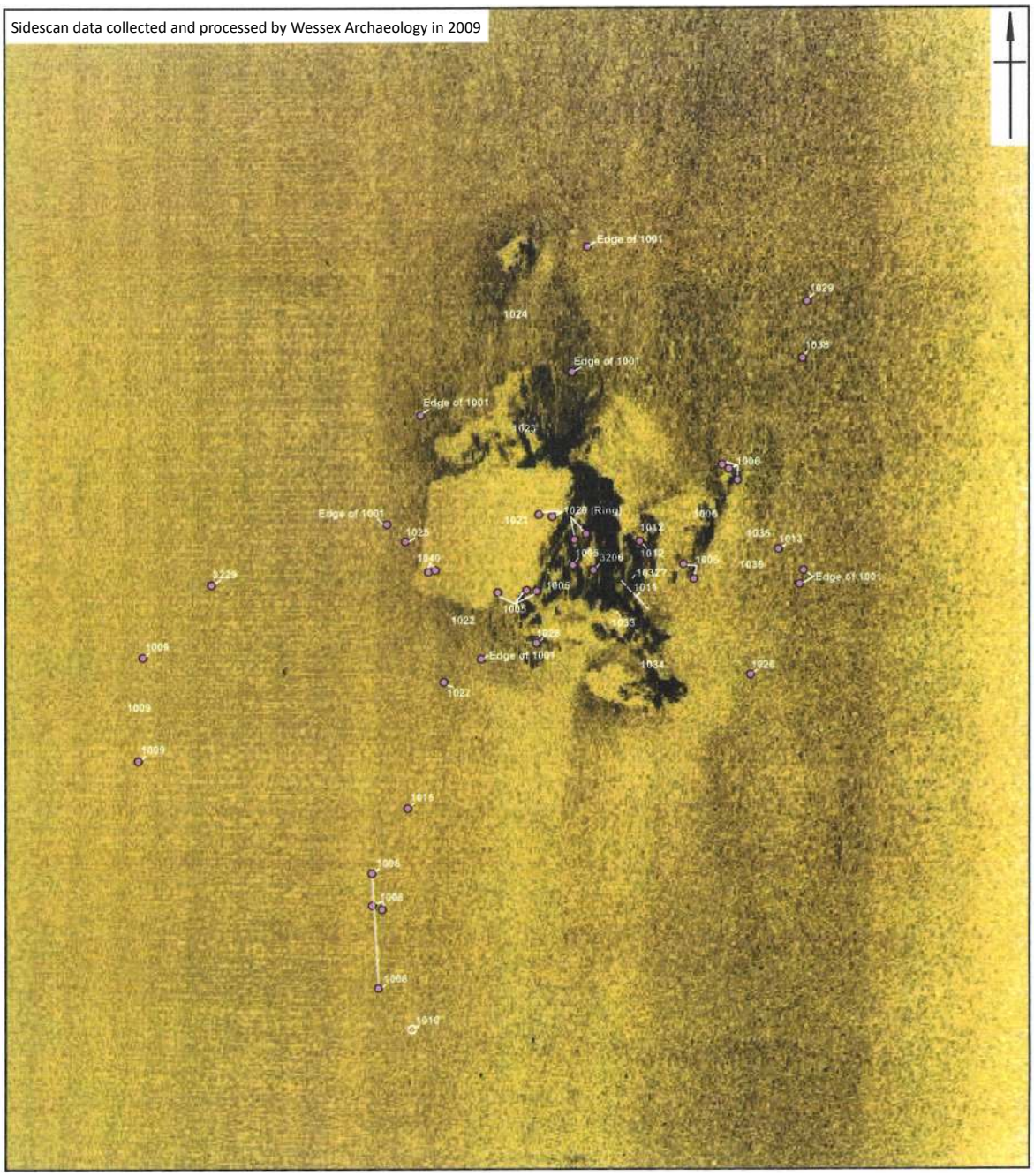
ArcHeritage

Figure 2: 2001 SUS plan of the wreck site



Multibeam data collected by ADU St Andrews University in 2002 and processed by Wessex Archaeology in 2009, with feature numbers from Wessex Archaeology surveys in 2006, 2009 and 2015. Reproduced with permission from Wessex Archaeology 2016 report 108280.04, figure 2.

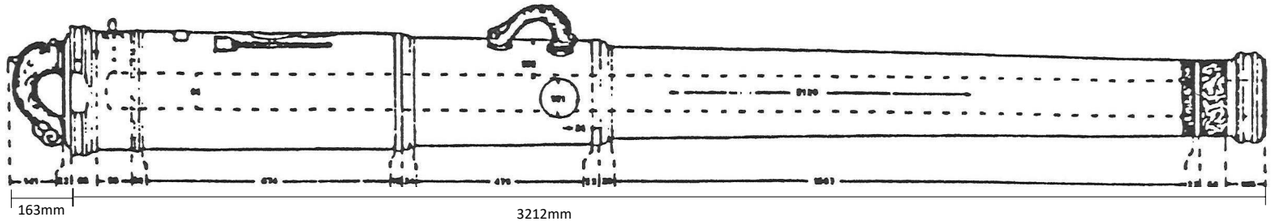
Figure 3: 2002 multibeam data



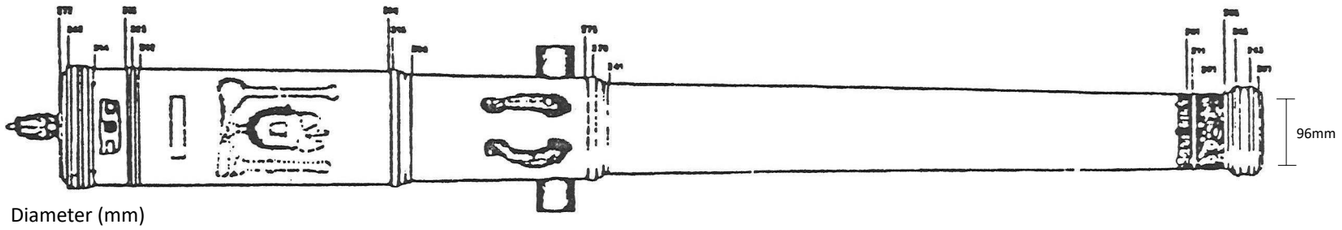
Feature numbers from Wessex Archaeology surveys in 2006 and 2009.
Reproduced with permission from Wessex Archaeology report 53111.03uuu, 2010.

Figure 4: 2009 sidescan data

Cannon 1
Bronze Saker, Dunwich Museum.
Drawn by R. Roth (1996 fig 1/drawing 709).



Length (mm)

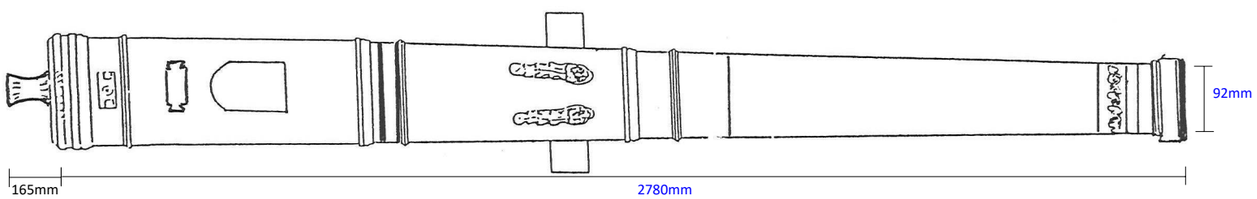


Diameter (mm)

Holy Roman Emperor Charles 1519-1558

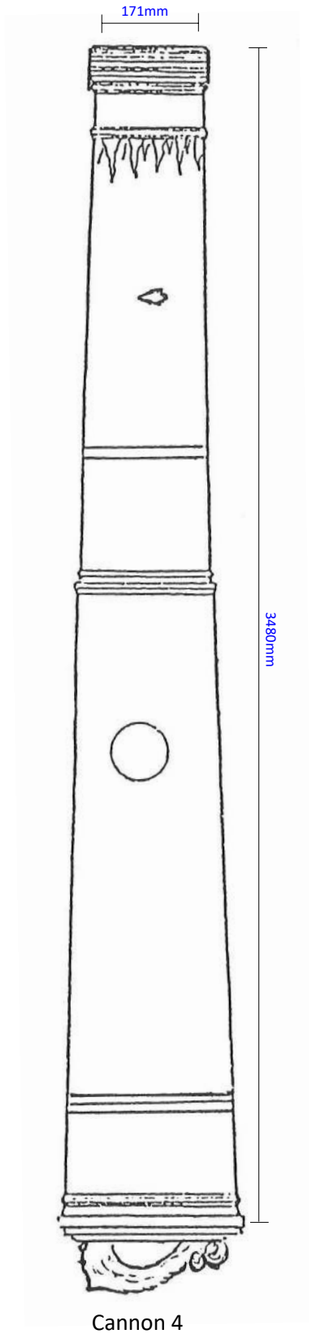
Length: 3.212m (10’6”) [11’6” Spanish feet]; Bore diameter: 9.6cm (3.7”); Button length: 16.3cm (6.4”).

Cannon 3



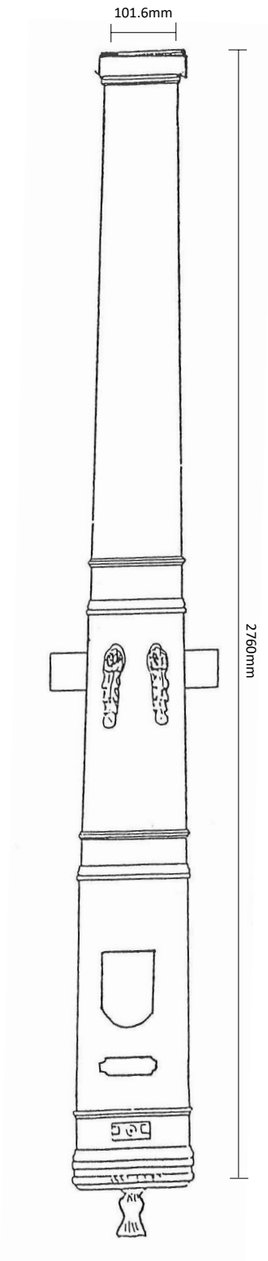
Length: 2.78m (9’1”); Bore diameter: 9.2cm (3.6”); Button length: 16.51cm (6.5”); Muzzle 080 degrees; Blank plates.

Sketches of Cannon 3, 4 and 6 drawn by S. Bacon (1998); measurements and details largely taken by touch and drawn from memory. Measurements made by Wessex Archaeology (2010) have been used where these exist (in blue).



Cannon 4

Length: 3.48m (11’4”); Bore diameter: 17.10cm (6.7”).
Muzzle diameter 33.02cm (13”), 355 degrees;
Trunnions: diameter: 10.16cm (4”); length 12.7cm (5”).



Cannon 6

Length: 2.76m (9’1”); Bore diameter: 10.16cm (4”);
Button length: 12.7cm (5”);
Muzzle diameter 19.05cm (7.5”), 360 degrees;
Trunnion diameter: 9.25cm (3.75”);
Blank plates.

Figure 5: Recorded details of the bronze guns

APPENDIX 1: RECOMMENDATIONS FROM THE 2006 DSA

From Wessex Archaeology's 2006 designated site assessment

Publication/archive

SUS should be encouraged to publish the results of their work to an appropriate archaeological standard, and to deposit a copy of their archive with the NMR as soon as possible. Until this occurs, there is a significant danger that data will eventually be lost.

Environmental monitoring

The licensee should be encouraged to put in place a suitable long-term environmental monitoring program. If the licensee is unable to undertake this work, then alternative arrangements should be made. Multiple visits to the site per year are likely to be required, given that there is a need to assess the extent of any short-term changes in the burial environment. A degree of technical expertise may be required in respect of the geotechnical work or chemical sampling that may be required. Repeated geophysical surveys, particularly high-resolution multibeam bathymetry, would be particularly valuable, although these are likely to be beyond the resources of an un-funded group.

In the meantime, licensee diver observations and measurements relating to erosion and deposition of seabed sediments should be collated and/or published or otherwise made available to Historic England.

The coring recommended by CEFAS (2001, 25) should be undertaken for analysis by CEFAS.

Desk-based assessment

A desk-based assessment of the site and its wider environment, undertaken by an archaeological contractor, would greatly aid the generation of a long-term archaeological management plan. This assessment should be multi-period and should, for example, consider the potential of the seabed for the survival of a full spectrum of post-Holocene landscapes and finds, including the generation of a model for the erosion of the nearby coastline. Any such assessment would benefit from the active cooperation of the licensee/SUS.

Further archaeological recording

A search of the wider seabed concentrating on known fishing snags should be undertaken. The radius of c.1km could be used for a magnetometer survey, and a wider area of multibeam and/or sidescan survey would also be desirable. Thereafter a programme of diver anomaly identification might help to establish whether the known site is part of a wider spread of archaeological material.

It may be advantageous to undertake an intrusive evaluation in order to establish the full extent of the central mound, the nature of the unidentified concretions and whether buried ship structure is present. Depending upon which area/s of the site was to be selected for this, additional pre-disturbance survey work may be required in order to add sufficient detail.

A sample of the cobbles and boulders identified by SUS as ballast should be recovered for analysis. This should help establish whether or not this material is in fact ballast and, if so, what its origin is.

Bronze ordnance

It is also recommended that further consideration should be given to the future of the bronze ordnance that remains on the site. It is unlikely that these guns are in a chemically or mechanically inert condition, even though the resultant changes in their condition may be very long term. No evidence has been seen that suggests that this is likely to change in the foreseeable future and it may therefore be, given their historical significance and likely amenity value (at either the Royal Armouries or a regional registered museum), that recovery could and perhaps should be contemplated. Furthermore, this would avoid any future risk of theft.

APPENDIX 2: LIST OF KNOWN FEATURES AND CONTEXTS

(taken from Wessex 2006 - Archaeological Report, Appendix 3)

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1001	Not labelled	Layer	Natural seabed layer.	Silt/sand and silt	Across most of the site area, a fairly level layer of very soft silt and, in places, partly fine sand, that is not resistant to probing. This layer appears to be subject to extensive erosion and re-deposition and is variable in depth, although the upper surface of the layer is generally level. Some laminations have been noted within this layer by SUS and the ADU observed silty sand overlying soft clay-like silt with 1002 (described as shingle) below at a depth of about 0.20m (ADU 1998: 2). This suggests that 1002 has a complex history of erosion and re-deposition.
1002	Not labelled	Layer	Natural seabed layer.	Sand, shell and stone mix	Below 1001. Hard stony layer that has variable but generally compact resistance to probing. SUS have observed the presence of cobbles and boulders extensively within this layer and have characterised this as probable ballast (Bacon, 1998), although this is currently unproven. The depth of this layer is unknown. Probing during WA 2005 operations suggests that the depth of the surface of this layer may vary slightly across the site, with depth of burial appearing to be greater to the south and possibly to the northeast. Artefacts, including modern debris lie on or within this layer. It consists of sand (c.20% by volume), shells (c.40%) and stone (c.40%). The sand is fine-medium grain size. The stone content is a poorly sorted mix of sub-angular gravel (c.35%), sub-angular cobbles (c.15%), rounded coarse gravel and cobbles (c.45%) and flat, shale-like medium gravel (c.5%). Small struck flint found within sample.
1003	Bronze Gun 1	Gun	Smooth bore muzzle loader	Bronze alloy	Salvaged in 1994 by SUS and currently at Dunwich Museum. Flemish Saker, made for land service according to an adapted design of Gregor Loffler and cast by Remigy de Halut at Malines between 1536 and 1556 for Emperor Charles V. A casting date of 1536-1540 considered most probable within the above date range. Calibre is that of a 6 pounder and the piece as being in serviceable condition, in roughly the first quarter of its service life. Published by Rudi Roth in IJNA (1996:21-32).

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1004	Bronze Gun 2	Gun	Smooth bore muzzle loader	Bronze alloy	Discovered in 1994 but never been relocated and does not appear on any of the site plans; possibly the same as Gun 3 (1005). A preliminary report by Rudi Roth was annexed to the SUS 1995 site report (Roth 1995). Although Roth viewed a video of the gun (believed to be in the possession of Stuart Bacon), no measurements were taken other than that of the bore. Roth thought that the form of the cascabel and mouldings indicated that the gun was of an Augsburg design of c.1530 by Gregor Loffler, with the decoration and particularly the coat of arms indicating that it was cast by Remigy de Halut in c.1536. The gun had a coronice (cornice) muzzle, as used on guns cast for land service. Length and proportion were similar to 1003 and the Enkhuizen piece at the Royal Armouries (it also had some of the features of the latter). The report text suggests that 'OPUS REMIGNY DE HALUT' and 'ANNO' (possibly followed by a date) may have been engraved on the double base ring. The square plate for the paymasters name and the shield for his coat of arms were blank. The hinges and lock cover of the base plate were intact. A further inscription on the second reinforce ring appeared to read 'ZUI4Z', which Roth identified as the weight mark and possibly 2042 Castilian pounds. Roth states that the bore of the gun was 8085mm and that it must therefore have been a 4 or 5-pounder, commonly known by the Hapsburgs as a falcon. The bore measurement is clearly a typographic error, and the bore was probably 80-88mm in diameter.

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1005	Bronze Gun 3	Gun	Smooth bore muzzle loader	Bronze alloy	Gun 3 was located immediately to the south of the central mound, the correct way up with the muzzle to the east. It was located in 1994 and has been drawn from memory by Stuart Bacon (July 1994), with a cornice ring. SUS have taken the following measurements, though it should be noted that it is not certain whether the length measured was the distance between the base ring and the muzzle face (the usual measurement of gun length), or the overall length; the measuring method is also unknown. Length - 9'2" (2.8m); Bore diameter - 4.7" (12cm); Button length – 6.5" (16.51cm). The bore of Gun 3 was re-measured during the 2005 operations using Vernier Calipers. The bore was reported to feel slightly irregular in shape, possibly as a result of damage or erosion. The maximum measurements obtained, 91mm (3.58") and 92mm (3.62"), are significantly smaller than the previous measurements. The ADU reported the gun length as 2.78m, with a bore of 8.5cms, with measurements probably taken by hand tape (ADU 1995). Their length measurement of 2.78m was confirmed by measurement (muzzle face to base ring) during the 2005 WA operations. It is not known whether any irregularity in the shape of the bore was observed. The gun has two decorated dolphins. The hinges and lock cover of the base plate are intact. It has a blank plate and shield. The gun is intact but the blank decoration and slightly abraded feel of the dolphins to touch suggests that it has suffered long term surface erosion . The ADU observed engraved letters and numbers on the gun (ADU 1995): 'OPUS REMIGNY D…' and 'ANNO ..4' and 'ZUI 4Z'. The latter was on one of the reinforces, whilst the location of the former was not stated. The bore of the gun, as measured in 2005 (92mm), is very similar to the bore of Gun 1 (96mm), although Gun 1 is longer. The length of Gun 3 is close to that of a bronze saker cast by Remigny de Halut for Philip II of Spain in 1555 (2.776m), although that gun had a larger bore (Roth 1996). However the similarities suggest that the Gun 3 is also a saker.

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1006	Bronze Gun 4	Gun	Smooth bore muzzle loader	Bronze alloy	Gun 4 is west of the central mound, orientated approximately northeast to southwest, on its side with the muzzle to the northeast. It first appears in the 1996 SUS site plan, where it is shown with muzzle to the southwest. The following measurements appear to have been taken by then (Bacon, 1996): Length - 10'2" (3.1m); Muzzle diameter - 13" (33.02cm); Bore diameter - 7" (17.78cm); Trunnions diameter - 4" (10.16cm); Trunnions length - 5" (12.7cm). Bacon (1996) drew the gun, presumably from memory. It is shown with a breach dolphin, and is described as having "a mass of concretion covering the upper area" and as having one trunnion visible. The 1999 SUS report has three video screen grabs shot in 1996 by George Spence. The muzzle face, one of the trunnions and the muzzle from the side is shown, but little detail can be seen apart from what is probably at least one wide cornice ring. The bore was re-measured during the 2005 WA operations using Vernier Calipers, when it was slightly obscured by concretion, but a diameter could be measured horizontally (top to bottom if the gun was the correct way up) to a maximum of 171mm (6.73"). Muzzle face diameter was 334mm (13.5"). The length of the gun (base ring to muzzle face) was measured as 3.48m. Although this measurement was taken with a touch-marked folding rule and therefore has a degree of approximation (up to 0.05m) associated with it, the piece is nevertheless significantly longer than previously recorded. Gun 4 was inspected during the 2005 operations and was subsequently sketched by the inspecting diver. The sketch shows a breach dolphin or ring as opposed to a button and what appears to be a coronice muzzle. Subsequent inspection suggested that concretion made it difficult to be certain about the presence of a ring or dolphin and that that the breach may in fact be an ordinary trunnion. The gun was noted to be on its side, with one straight and probably central trunnion.
1007	Bronze Gun 5	Gun	Smooth bore muzzle loader	Bronze alloy	Gun 5 appears to have been located by 1996. However it has never appeared on a site plan seen by WA and its location is unknown. The dimensions of the gun are unknown, although it is described as being "of similar length to those guns already found" (Bacon 1996). In the circumstances, it is conceivable that this gun does not exist and that it is instead either Gun 3 or, more plausibly, Gun 6.

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1008	Bronze Gun 6	Gun	Smooth bore muzzle loader	Bronze alloy	Gun 6 is the most recently located gun, found in 1998. It is located approximately southwest of the central mound, with a roughly north-south orientation. The muzzle is to the south and the gun is the correct way up. It appears very similar in appearance to Gun 3, with ornate dolphins, a similar cascabel and button and what appears to be a cornice ring. The gun was drawn by Stuart Bacon in July 1998 (presumably from memory) and SUS have taken the following measurements using an unknown "touch" technique: Length 9'1" (2.76m); Bore diameter 4" (10.16cm); Button length 5" (12.7cm); Trunnion diameter 3.75" (9.53cm); Muzzle diameter 7.5" (19.05cm). An attempt was made to measure the bore of Gun 6 during the 2005 WA operations, but this was unsuccessful because the muzzle was too deeply buried. The length and form of the gun appears to be similar to Gun 3, with worn, blank plates. The bore diameter is slightly larger but nevertheless the gun may be a saker and could be another piece by de Halut.
1009	D	Probable gun	Probable smooth bore muzzle loader	Probably iron	Approximately 10m WSW of the central mound and orientated approximately north to south, this irregular cylindrical concretion is the most westerly site feature located by WA and was located in 2003. The position of this concretion corresponds fairly well with the position of Gun D on the SUS site plan and they are therefore likely to be the same feature. Layer 1001 has been scoured around the feature, which lies in a small shallow depression on layer 1002. The cylinder appears to be concave at the northern end (suggesting that it may be hollow) and convex at the southern end and was roughly measured in 2003 as 2.7m long. No other characteristics of its form were detected. It is interpreted as a probable iron smoothbore muzzle loading cast iron gun. The advanced state of corrosion means that effective measurements of barrel length and bore are not possible, but the gun may have been up to 2.5m (8' 2.5") long (muzzle face to base ring).
1010	H?	Possible gun	Possible iron swivel gun	Probably iron	Approximately 0.7m from 1008 (Gun 6), this linear concretion is the most southerly site feature located by WA. It is approximately 10m SSW of the central mound. Approximately 1.25m long, it is vaguely cylindrical in places and orientated roughly northwest to southeast. Although the form is obscured by very heavy concretion, it has been identified by both SUS and the ADU (ADU, 2002, 3) as a probable breech-loading iron gun. Shown in the SUS 2001 site plan as having its muzzle to the southwest, WA examined the object in 2003 and concluded that it was a possible breech-loading swivel gun (WA 2003d: 5). Nevertheless the object is so heavily concreted that this identification must be regarded as potentially unreliable.

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1011	Shown but not labelled	Possible gun	Possible iron gun	Probably iron	This is an irregular but possibly gun-like concretion to the east of 1005 (Gun 3). Vaguely linear, its orientation is approximately northwest to southeast. The northwest end is heavily concreted but appears to be a hollow cylinder and is very close to the base of the central mound. To the southeast the shape becomes highly irregular and ill defined. As a result it was not possible to determine the length. Identification of this feature as a gun is not certain but it may be the swivel gun reported to be in this position (Spence pers. comm.). It is believed to be a possible iron gun located during WA operations in 2003 (WA 2003d: 5).
1012	Not shown	Possible gun	Possible iron gun	Probably iron	Situated on the east side of the central mound, this linear concretion is orientated roughly southwest to northeast, with the southwest end almost touching the base of the mound. It is similar to 1011, although it has a more defined shape along its entire length. No dimensions were taken, although it appears from the multibeam and acoustic tracking data to be at least 1.25-1.50m long. It was estimated to be up to 0.50-0.75m high and partly in freespan. This feature appears to have been located in 2003 and identified as an iron gun (WA 2003d: figure 4, Dive Obs. 314-316 or 273/313). However, examination in 2005 suggested that it is so heavily concreted that features diagnostic to touch are not present, although it does appear to be have a hollow opening at the north-east end. Therefore this feature can only be identified as a possible iron gun. It does not appear in the latest SUS site plan seen by WA. Instead what appears to be 1006 (Gun 4) is shown in approximately this position. Although SUS members appear to believe that 1006 is this close to the central mound (Spence pers. comm.), it is in fact further to the east.
1013	Not shown	Possible gun	Possible iron gun	Probably ferrous	This linear concretion is situated approximately 5m east of the central mound and to the southeast of 1006 (Gun 4). It appears to contain a metal cylinder on the underside of the concretion and is about 1.5m long. This could conceivably be a small iron gun but as the cylinder appears to be only 0.10m in diameter, this identification is somewhat dubious.
1014	Not shown	Possible gun	Possible iron gun	Probably ferrous	Located during WA operations in 2003 (WA 2003d: 273/313 or 314-316) this iron gun was not relocated despite careful searching. The most probable explanation is that it does not exist and is instead a misidentification of either 1011 or 1012.
1015	Shown and possibly labelled 'I'	Possible gun	Possible iron gun	Probably ferrous	A linear concretion located during both 2003 and 2005 WA operations, believed be the concreted iron gun shown in the 2002 site plan just to the northeast of 1008 (Gun 6). The feature was buried in both 2003 and 2005 and could not be examined; therefore Its identification as an iron gun could not be confirmed by WA.
1016	E	Possible gun	Possible iron gun	Probably ferrous	Concretion shown on the 2002 SUS site plan and identified as an iron gun but not located by WA; therefore Its existence could not be confirmed. It is shown as being some distance from the central mound and discussions with SUS members during WA operations in both 2003 and 2005 suggest that the positions of 1016-1019 may not be highly accurate.

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1017	F	Possible gun	Possible iron gun	Probably ferrous	Concretion shown on the 2002 SUS site plan and identified as an iron gun but not located by WA; therefore Its existence could not be confirmed. It is shown as being some distance from the central mound and discussions with SUS members during WA operations in both 2003 and 2005 suggest that the positions of 1016-1019 may not be highly accurate.
1018	C or G	Possible gun	Possible iron gun	Probably ferrous	Concretion shown on the 2002 SUS site plan and identified as an iron gun but not located by WA; therefore Its existence could not be confirmed. It is shown as being some distance from the central mound and discussions with SUS members during WA operations in both 2003 and 2005 suggest that the positions of 1016-1019 may not be highly accurate.
1019	A	Possible gun	Possible iron gun	Probably ferrous	Concretion shown on the 2002 SUS site plan and identified as an iron gun but not located by WA; therefore Its existence could not be confirmed. It is shown as being some distance from the central mound and discussions with SUS members during WA operations in both 2003 and 2005 suggest that the positions of 1016-1019 may not be highly accurate.
1020	Mound 2	Large mound	Unknown	Probably ferrous, may be composite	This is the most prominent and central feature of the site. It is a large, steep-sided mound, believed to consist wholly or partly of concretion or concretion-like material. Analysis of the multibeam data from 2002 suggests that it covers an area of approximately 6m². It is up to 1.5m high, and appears to be partly buried in 1002, although the extent of burial is unclear. It appears to be undercut on the east side. Four small ring-like concretions are set in the upper surface and traces of the shape of discrete objects can be felt. The mound has not been identified and it may be intrusive.
1021	Not shown	Small concretion	Unknown	Probably ferrous	A small concretion approximately 1.5m west of the central mound. The concretion is 0.5m wide by 0.6m long by 0.5m high. Context 1001 is scoured from around the concretion and an unknown proportion is buried in 1002.
1022	Not shown	Small concretion	Unknown	Probably ferrous	A small irregular concretion immediately west of the cascabel of 1005 (Gun 3). No form has been distinguished, although the concretion is noticeably tall for its size, being at least 0.30m high.
1023	Not shown	Low mound	Unknown	Possibly ferrous/stone composite	Low mound to the northeast of 1020, only 0.15m away at the closest point. It has an irregular lozenge-like shape. It appears to be comprised of concretion or a concretion-like material, possibly with large cobbles or small boulders incorporated within it. Steep sided, it appears to be partly buried in layer 1002. A thick, probably modern rope is attached to it.
1024	Not shown	Low mound	Unknown	Possibly ferrous/stone composite	Smaller low mound to the northeast of 1020 and 1023. It is approximately 3.5m away from the central mound at the closest point. It appears to be comprised of concretion or a concretion-like material, possibly with large cobbles or small boulders incorporated within it. Steep sided, it appears to be partly buried in Layer 1002.
1025	Not shown	Small concretion	Unknown	Probably ferrous	A small irregular linear concretion, possibly cylindrical, approximately 1.2m long by 0.15m wide. In the middle of this is a ring-like protrusion, approximately 0.3m high. Concretion 1025 is approximately 4m from the central mound and 1001 is scoured around it. An unknown proportion is buried in 1002.

WA Context No.	SUS ID	Type	Sub-Type	Material	Description
1026	Not shown	Small concretion	Unknown	Probably ferrous/stone composite	A small roughly oblong composite concretion and cobble feature, 0.6m long by 0.5m wide and 0.2m tall. The feature was approximately 5m southeast of the central mound.
1027	Not shown	Small concretion	Unknown	Probably ferrous/stone composite	A small, low concretion composite concretion and cobble feature, 0.1m long by 0.1m wide and 0.1m tall. The feature was approximately 5m southwest of the central mound.
1028	Not shown	Small concretion	Unknown	Probably ferrous/stone composite	A composite concretion and cobble feature, 1.0m long by 0.5m wide and 0.4m tall. The feature was approximately 2m southwest of the central mound.
1029	Not shown	Small concretion	Unknown	Probably ferrous/stone composite	A roughly circular composite concretion and stone feature, approximately 0.5m diameter and 0.2m high, surrounded by what may be modern fishing pot debris. It is approximately 7.5m northeast of the central mound.
1030	Not shown	Small concretion	Unknown	Probably ferrous/stone composite	An irregular but vaguely oval shaped composite concretion and stone feature, approximately 1.5m by 1.0m and approximately 7.5m northeast of the central mound. The feature felt concrete-like, with matted organic material incorporated. The feature may be modern.
1031	Not shown	Worked stone	Probable pot quern	Unknown, apparently hard stone	Probable pot quern. Place of manufacture and use unknown. SUS believe that it was used for processing olives and has a Southern European origin but this appears to be speculative and the artefact could be Northern European.
1032	Anchor	Concretion	Possible anchor	Probably ferrous	The 2001 SUS site plan shows a T-shaped feature approximately 2m to the southeast of the central mound (Context 1032). No such feature could be distinguished during the 2005 operations. However during the 2003 WA operations a T-shaped concretion was located in this area of the site, although slightly to the north (WA 2003d). This feature was highly concreted and, although identified as possibly two iron guns, it is conceivably the feature identified by SUS as an anchor.
1033	Not shown	Concretion	Unknown	Probably ferrous	Concretion south of 1020 visible in 2002 multibeam data.
1034	Not shown	Concretion	Unknown	Probably ferrous	Concretion south of 1020 and 1033, visible in 2002 multibeam data. Possibly a large, unidentified concretion 1.0m long by 1.0m wide by 1.0m high.
1035	Not shown	Concretions	Unknown	Probably ferrous	Group of unidentified concretions, probably incorporating modern debris, including angle iron and other debris from previous site investigations (Spence pers. comm.)
1036	Not shown	Concretions	Unknown	Probably ferrous	Group of unidentified concretions, probably incorporating modern debris, including angle iron and other debris from previous site investigations (Spence pers. comm.)
1037	Not shown	Concretions	Unknown	Probably ferrous	Group of unidentified concretions, probably incorporating modern debris.

ArcHeritage
54 Campo Lane, Sheffield, S1 2EG

tel: +44 (0)114 2728884
email: archeritage@yorkat.co.uk

www.archeritage.co.uk