



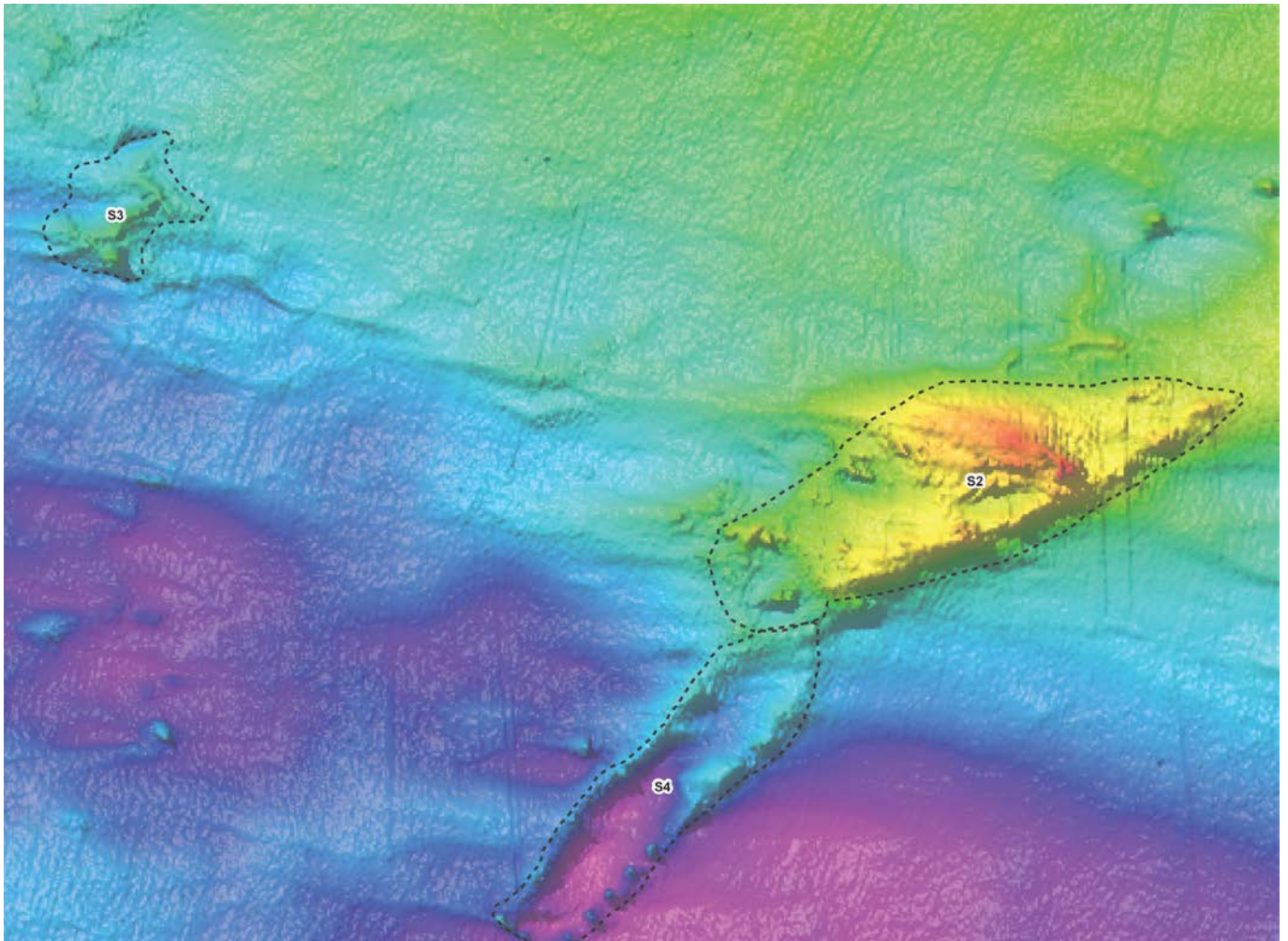
Historic England



The *London*: Updated Statement and Conservation Management Plan, 2017

Sally Evans

Discovery, Innovation and Science in the Historic Environment



The *London*: Updated Statement and Conservation Management Plan, 2017

Sally Evans

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SUMMARY

Cotswold Archaeology was commissioned in March 2016 to update the existing Conservation Management Plan for the *London* protected wreck site.

The *London* was an English Second Rate ship of the line built in Chatham during the Interregnum in 1656. The *London* served in both the Cromwellian and Restoration navies seeing action during the Anglo-Spanish war in 1657 and participating in the English show of strength during the Battle of the Sound. At the time of the Restoration in 1660 the ship formed part of the fleet that brought the future king Charles II back from exile in the Netherlands. The *London* sank in the Thames estuary in 1665 whilst preparing for the second Anglo-Dutch war. The ship was blown apart by an explosion, probably of its gunpowder magazine, and as mentioned in Samuel Pepys' diary entry of 8 March 1665 only 24 personnel survived. The site was re-discovered in 1962 and was designated under the Protection of Wrecks Act 1973 in 2008. The wreck has been on the Heritage at Risk (HAR) register since 2009, owing to the risk of exposure and environmental decay of archaeological material.

This Conservation Statement and Management Plan (the 'Plan') has been produced to enable local and regional stakeholder involvement to help Historic England achieve its aspirations for the conservation management of the *London* so as to balance protection 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 *London* can be conserved, maintained and enhanced.

The following Management Policies will be undertaken in conjunction with the a range of stakeholders, which includes, but is not limited to, Licensed Teams, the Nominated Archaeologists, the Port of *London* Authority, Southend Museums Service, the *London* Shipwreck Trust, Historic England and its nominated contractor:

Policy 1

All stakeholders will continue to support and develop appropriate access to the wreck as a mechanism to develop the instrumental value of the *London*.

Policy 2

Stakeholders will develop appropriate methods of dissemination to increase public understanding and enjoyment of the *London*.

Policy 3

Mechanisms will continue to be identified and implemented so as to continue to develop shared ownership and partnership working.

Policy 4

Key gaps in understanding the significance of the monument's component parts should be kept under regular review. Gaps in understanding significance should be prioritised and addressed in further work, so that these significances can contribute to informing the future conservation management of the site.

Policy 5

Works will be undertaken, where required, that will enable work on the site to be undertaken in accordance with relevant standards and guidance using licensed divers; this will enable remaining questions to be addressed.

Policy 6

All stakeholders will continue to support and provide guidance for a programme of environmental monitoring, sediment monitoring and targeted recording.

Policy 7

Unnecessary disturbance of the seabed within the restricted area should be avoided wherever possible in order to minimise the risk of damage to buried archaeological remains.

Policy 8

The extent of the current designated areas should be reviewed in the light of new evidence from recent work to ensure that they provide adequate protection to the wreck sites.

Policy 9

If site monitoring indicates that significant remains are being lost, or that preservation in situ is not feasible, a programme of staged archaeological work should be considered subject to the submission of a suitable Project Design.

Since the first draft conservation statement and management plan in 2013, the remains of the *London* have been the focus of a series of investigations, including geophysical survey (Cotswold Archaeology, 2017a), licensee team work (e.g. Ellis, 2013; 2014; 2015) and archaeological diver surveys, evaluation, excavation and post-excavation assessment (Cotswold Archaeology, 2016; in prep.).

Archival research has also been undertaken (Fox, 2012; Pascoe, in prep.) and investigations surrounding ordnance from the wreck have been undertaken, in preparation for a court case concerning the removal of a number of the *London*'s bronze guns (e.g. Brink, 2015; Fox, 2014; Nederlands Forensisch Instituut, 2015; Trollope, n.d.).

In addition, the *London* Shipwreck Trust was formed in 2016 by the licensee team and a Southend-on-Sea Borough Councillor, with support from Historic England, to 'advance, promote and provide for the preservation of the *London* shipwreck and its artefacts for the public benefit and to protect it for future generations'. General discussions regarding the best methods for the dissemination of this work are currently underway.

One method of dissemination that has been agreed and is currently underway is the creation of a 'virtual' diver trail for the *London*. This project, 'Interpretation for divers on the *London*', funded by the Heritage Protection Commissions Programme (HPCP) (Historic England project no. 7374) will be an online resource to promote wider

appreciation of the wreck by divers and non-divers alike. It will recount the story of the *London* and the work that has been undertaken on the site since its rediscovery.

These activities have considerably advanced understanding of the remains of the wreck, its significance and vulnerabilities. Work over recent years has also had stakeholder involvement at its heart, in line with the policies set out in this Plan.

This updated Conservation Statement and Management Plan was drafted in February 2017 and then revised following a public consultation meeting held in Southend on the evening of 3 May 2017.

CONTRIBUTORS

Authored by Sally Evans, Marine Heritage Consultant; checked by Michael Walsh, Senior Heritage Consultant–Marine; approved by John Dillon, Deputy CEO; revised by Patrick Dresch and Michael Walsh.

ACKNOWLEDGEMENTS

This project was commissioned by Historic England. The assistance which has been provided throughout the project by Michael Russell, Alison James, Angela Middleton and Mark Dunkley of Historic England is much appreciated.

This report is an update of the original conservation management plan prepared by Mark James and Alison James (English Heritage, 2013). This update incorporates work and events subsequent to the original report, including a court case, work carried out on the designated sites by the licensee Steve Ellis and his team, and excavation and survey work carried out by Cotswold Archaeology. This updated Plan was prepared by Sally Evans, Patrick Dresch and Michael Walsh. The project has been managed for Cotswold Archaeology by Michael Walsh. The draft plan was updated following a public consultation meeting held in Southend on the evening of 3 May 2017. Thanks are due to those that attended this meeting and to those who could not attend but submitted their comments on the draft Plan (see Section 10 for a full list).

DATE OF PROJECT

March 2016 to May 2017

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1 INTRODUCTION

Background and purpose

- 1.1 Wreck sites may contain the remains of vessels, their fittings, armaments, cargo and other associated objects or deposits, which may merit legal protection if they contribute significantly to the understanding of our maritime past. The Protection of Wrecks Act 1973 enables the UK Government to designate any important wreck site in territorial waters, to prevent uncontrolled disturbance. Although section 6 of the National Heritage Act 2002 enabled Historic England to assist in costs relating to works under the Protection of Wrecks Act 1973, the responsibilities of Historic England for the physical management of designated wreck sites must align with existing strategic and research priorities.
- 1.2 This document relates to the *London*, a second-rate ship of the line, lost in 1665 while preparing for the second Anglo-Dutch war, and designated under the Protection of Wrecks Act 1973 in 2008.
- 1.3 The site consists of two discrete designated areas approximately 400m apart. Site 1 (S1), identified as the *London* and Site 2 (S2), formerly known as the *King* (Figure 1).
- 1.4 An additional area of potential wreck material, Site 3 (Figure 2: S3), was noted in geophysical survey data in 2009 but has since been identified as an area of modern debris (Wessex Archaeology, 2011b). S2 is abutted by a later wreck, henceforth referred to as Site 4 (Figure 2: S4).

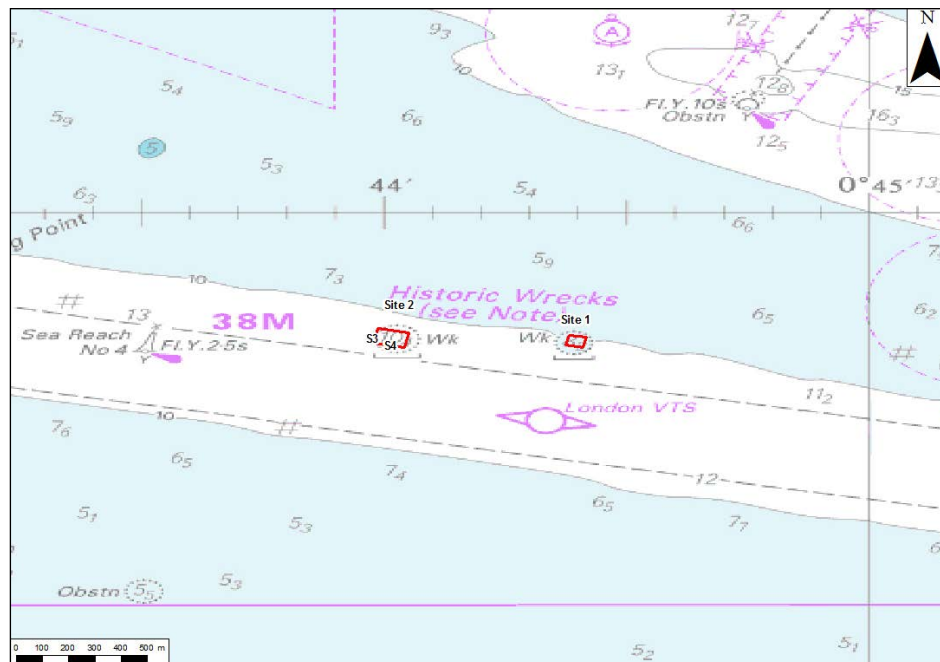


Fig. 1: Location of Site 1 (S1) and Site 2 (S2) within the Thames estuary

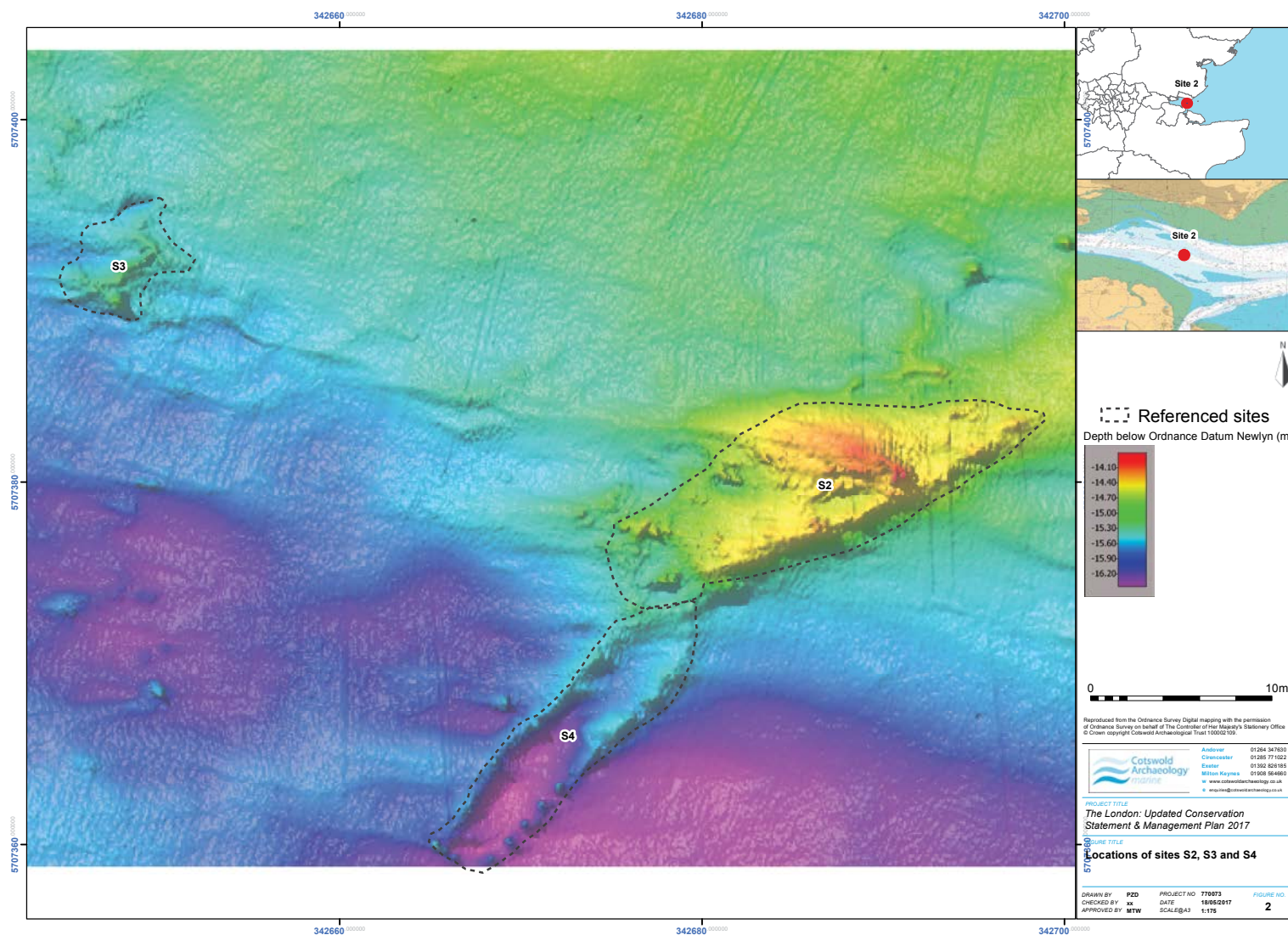


Fig. 2: Locations of sites S2, S3 and S4

- 1.5 During hydrographic surveys of the area in 1962, S2 was reported as ‘foul’ (Wessex Archaeology, 2008c), while on the 23 November 1979 S1 was reported as an ‘unusual looking feature’ (Wessex Archaeology 2006). Both sites were designated under the Protection of Wrecks Act 1973 in 2008. The designation was amended in 2012 to extend the protected area due to the discovery of associated material beyond the designated zone. The *London* wreck site comprises the remains of a mid-17th century warship that sank following an explosion off the coast at Southend-on-Sea in 1665.
- 1.6 The *London* (Casualty) is attributed the National Monuments Record (NMR) number TQ 97 NW 197, the *London* (Protected Wreck Site) is attributed number TQ 98 SW 102 and National Heritage List Entry (NHLE) 1000088. The site, until recently, known as the *King* but now known to be part of the *London* (S2) is attributed number TQ 88 SE 31 abutted by a later wreck (Figure 2: S4).

Conservation Management Plan

- 1.7 Historic England (then English Heritage) has published a set of *Conservation Principles, Policies and Guidance* for the sustainable management of the historic environment designed to strengthen Historic England’s credibility and consistency of decisions taken and advice given (English Heritage, 2008). These *Conservation Principles* are intended to support the quality of decision-making, with the ultimate 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).
- 1.8 This Plan has therefore been produced to enable local and regional stakeholder involvement in Historic England’s aspirations for the conservation management of the *London*. This document is an updated Conservation Statement and Management Plan for the *London*. This document updates the original draft Conservation Statement and Management Plan, for this wreck which was drafted in 2013, but not finalised (English Heritage, 2013), and incorporates work undertaken, knowledge gained and stakeholder relationships cemented since that time. The draft has been amended following a public consultation meeting held in Southend on the evening of 3 May 2017.

Aims and objectives

- 1.9 The principal aim of this Plan is to identify a shared vision of how the values and features of the *London* can be conserved, maintained and enhanced.

1.10 This has been achieved through the following objectives;

- Understanding the *London*
- Assessing the significance of the *London*
- Identifying where the significance of the *London* is vulnerable
- Identifying policies for conserving the significance of the *London*
- Realising the public value of conservation

Scope

- 1.11 In 2007, Historic England (formerly English Heritage) sought to develop assessment methods to characterise the state of all designated historic assets and to understand their current management patterns, their likely future trajectory and how that could be influenced to ensure their significance is maintained for both present and future generations. For historic wreck sites, methodologies were developed to allow for the systematic quantification of the resource 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 in order to provide a measure of how a site is likely to fare in the future (see English Heritage 2007).
- 1.12 Practical measures that can conserve, maintain and enhance the values and features of the *London* identified as being at risk will be delivered through this Plan.
- 1.13 There are currently 52 wrecks designated in England under 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. Of these protected sites, two lie within the Thames estuary.

Authorship

- 1.14 This version of the Plan has been produced by Cotswold Archaeology, based on an earlier version prepared by English Heritage (English Heritage, 2013). Contributions to the draft updated Plan were sought through stakeholder involvement. Those who contributed to, or were consulted on, its preparation are acknowledged in Section 10.

Status

- 1.15 This report is the final version, drafted following a public consultation which ended with a meeting held on 3 May 2017 (Version 5). Notes on its status (in terms of consultation, adoption and revision) have been maintained.

2 WORK CARRIED OUT SINCE THE 2013 CONSERVATION MANAGEMENT PLAN

Licensee team work

- 2.1 Since 2010 the licensed team, Steve Ellis, Carol Ellis and Steve Meddle have carried out regular dives on the site for the purposes of surveying and monitoring the condition of the wreck, and for the recovery of at-risk artefacts. Reports produced by the licensee team since 2013 have been incorporated here (Ellis, 2013; 2015).

Nominated archaeologist

- 2.2 Following his work on the site with Wessex Archaeology and with the approval of Historic England, Graham Scott was approached by the licensee team to be the nominated archaeologist for the *London*.
- 2.3 Dan Pascoe took on this role in 2014 and, in this capacity, has undertaken research into the *London* and has presented work at a number of conferences including Guns of the Sea (2015) (Pascoe, In prep.) and the International Shipwreck conference (2016). Results of this research relating to the conservation and management of the wreck have been incorporated here.
- 2.4 As of late 2016 the nominated archaeologist for the site is currently Mark Beattie-Edwards of the Nautical Archaeology Society.

London protected wreck site, Thames Estuary; Excavation of material at risk

- 2.5 In 2014 Historic England commissioned Cotswold Archaeology to undertake the *London* protected wreck site: Excavation of material at risk project. This phase of the project commenced in 2014 and is ongoing. It has included geophysical surveys, evaluation, excavation and assessment work, including archival research, on the *London* and its remains. A key element of the project has been stakeholder involvement, and the licensee team and the nominated archaeologist have all formed part of the project team for this work with continued support from Historic England specialists.
- 2.6 The aims of the project have been:
- to undertake three evaluation trenches (Figure 2) on the north-west side of the wreck in 2014 to determine the depth of stratigraphy above structural timbers;
 - to undertake archaeological excavation to connect the evaluation trenches in 2015;
 - to assess the density of artefacts on the site and the state of preservation;

- to ascertain the depth of deposits present;
- to ascertain which part of the vessel is present on S2, and the extent of its survival;
- to assess the extent to which the remains can shed light on the known history of the vessel, including its construction, use and loss, and details of on-board life;
- to backfill and stabilise as necessary;
- to obtain all necessary permits, licences and permissions for intrusive investigations;
- to recover artefacts at risk and provide appropriate first-aid conservation (including material previously recovered under a surface recovery licence);
- to produce a structured record of field observations; including a photographic record of the site, a site plan and pH testing of the site environment. Key artefacts will be subject to detailed examination and recording (positioned by tracked diver survey, taped measurements, photographs, video and written database entries); and
- to enable the licensee team to undertake professional SCUBA qualifications to ensure the participation of the licensed team in the project.

2.7 The results of this project, including those relating to stakeholder involvement, have been incorporated into this updated Plan.

2.8 The site is managed by Historic England on behalf of the Secretary of State for Culture, Media and Sport, and was assessed by the Contractor for Archaeological Services in Relation to the Protection of Wrecks Act 1973 in 2009, 2010 and 2011. The current licensing system for wrecks designated under the 1973 Act allows for the appointment of a licensee and team of named divers to undertake work on the site. Historic England promotes and encourages this approach as the benefits to the management of the site are significant.

Interpretation of the *London*

2.9 This project, 'Interpretation for divers on the *London*', funded by the HPCP (Historic England project no. 7374) will result in the production of an online 'virtual' diver trail to promote wider appreciation of the wreck to a much wider community. It will relate the history of the site, the story of the wreck site's discovery and the ongoing work that has since been undertaken on the *London*.

Investigations by the Maritime and Coastguard Agency

- 2.10 Remains from the *London* were the subject of a court case and associated legal proceedings which took place between 2013 and 2015. Although the proceedings of the case are not relevant here, the results of the investigations undertaken by the Maritime and Coastguard Agency (MCA) have been made available to Historic England and Cotswold Archaeology, and are referred to where they inform the objectives of this updated Plan. Specialists who contributed to the investigations included Charles Trollope, Frank Fox, Richard Endsor, Professor Louis Sickling and Nico Brink. Owing to the nature of the case this research primarily concerns the ordnance known to have been on board the *London*.

Monitoring by the Port of London Authority

- 2.11 Since 2010, the designated areas relating to the wreck of the *London* have been regularly surveyed using multibeam echo-sounder by the Port of London Authority (PLA). Additional work, included magnetometer, sidescan sonar and parametric sonar surveys, was undertaken under the *Contract for Archaeological Services in Relation to the Protection of Wrecks Act 1973* on behalf of Historic England (Wessex Archaeology, 2010b).
- 2.12 Following the 2016 marine geophysical survey, the PLA was contacted and additional multibeam echo-sounder datasets (in their raw form) acquired during their monitoring programme have been made available to Cotswold Archaeology including annual surveys from February 2010 (pre-dredge) to October 2013. These datasets have been briefly reviewed with the aim of better understanding the longer-term dynamic environment of the site.

The *London* Shipwreck Trust

- 2.13 Another key development has been the formation of the *London* Shipwreck Trust. The charitable trust was established in 2016 as a joint venture by the licensee team and a councillor from Southend-on-Sea Borough Council. The Trust has only just been formed, however its primary aim is to 'advance, promote and provide for the preservation of the *London* shipwreck and its artefacts for the public benefit and to protect it for future generations'.

Other work

- 2.14 Recently, a Bournemouth University MSc dissertation investigated biodegradation resulting from marine borers on several wrecks including the *London* (Knight, 2016). The work on the *London* included the placement on site of a stainless steel frame containing nine wood samples, comprising three each of oak, elm and pine (Knight, 2016). The frame was placed by the licensee team near the western limit of the wreck at S2 on behalf of a student at Bournemouth University. Observations by the licensee team suggested that after two weeks more than half of the frame had been covered by silt

and it remained like this throughout the experiment. This area of the wreck site was observed to be quiet stable at the time of monitoring (S. Ellis pers. comm.). The frame was recovered after six months on the wreck, with eight of the nine samples still in place (Knight, 2016). Only a few minor tunnels from *Limnoria* were identified on the samples and there was no evidence of limpets, barnacle or algae, but some minor bryozoans and polychaete worm growth was identified (Knight, 2016). Some *Teredinidae* larvae were recorded attached to the samples, but X-ray analysis carried out with the assistance of Historic England at their facilities showed that none had successfully developed into adult specimens (Knight, 2016).

- 2.15 Over the last few years, in addition to the work cited above there have been other more general studies that have included, or have been based on, the *London*. These have included geophysical surveys comprising multibeam echo-sounder and sidescan sonar funded by Historic England and sub-bottom profiling funded by Southend-on-Sea Borough Council.
- 2.16 Additionally, other key sources which may not have been available when the previous Conservation and Strategic Management Plan was written have been included here. In particular Frank Fox's study published in the *Transactions of the naval dockyards society—the London of 1656: her history and armament* (Fox, 2012),

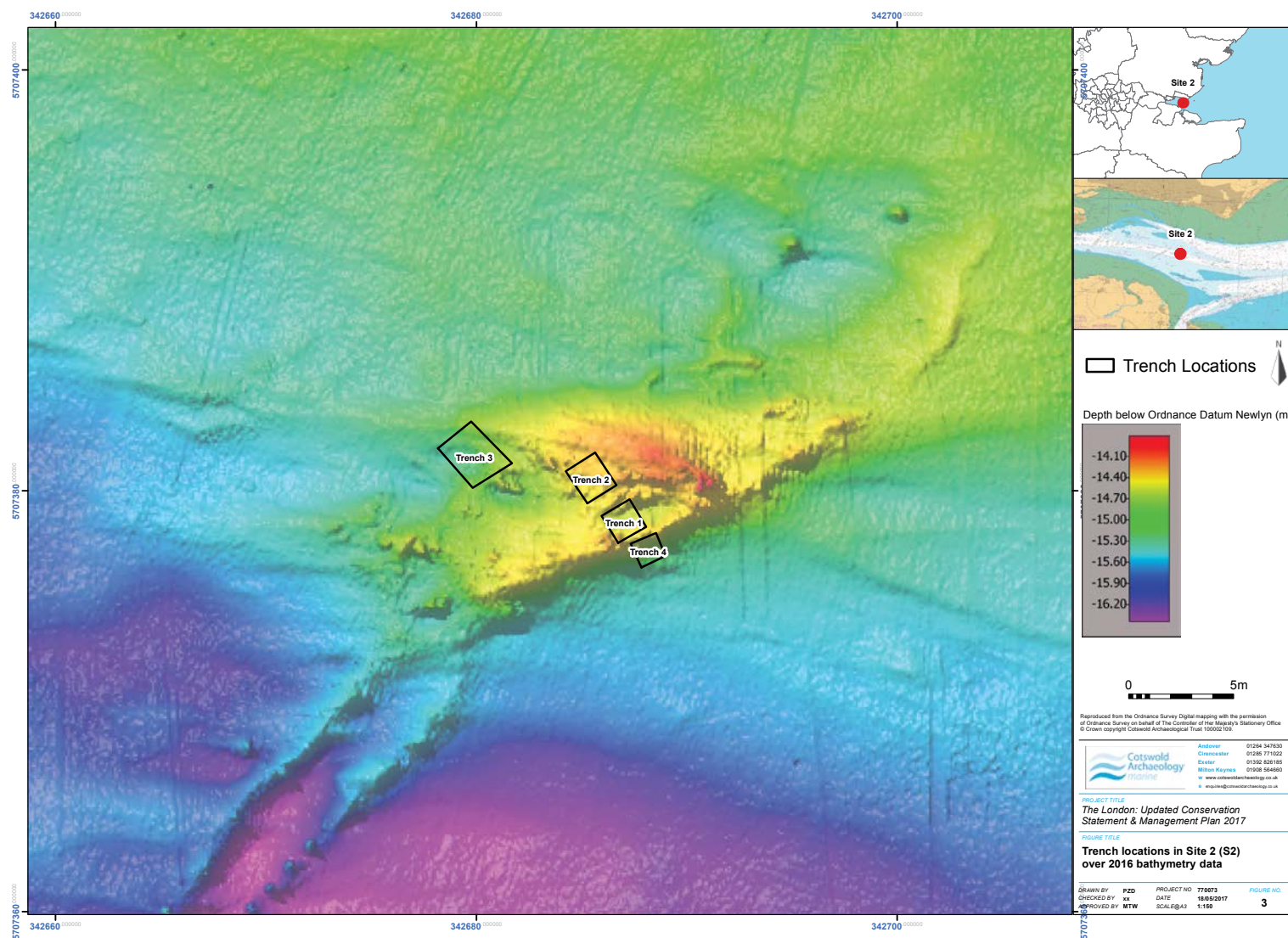


Fig. 3: Trench locations in Site 2 (S2) over 2016 bathymetry data

3 UNDERSTANDING THE LONDON

Historical development of the designated site

- 3.1 The following sections provide historic details of the *London* and the wreck site as presently understood. Considerable work has been undertaken on the site in recent years, the details of which can be found in the archaeological reports listed in the bibliography. Rather than repeating this information this Plan summarises the most relevant details, so that issues relating to the significance, conservation and management of the *London* can be identified.

The construction, use and loss of the *London*

- 3.2 The *London* was an English Second Rate ship of the line built in Chatham and launched during the Interregnum in 1656 fitted with 60 guns (Fox, 2012, pp. 60–65).
- 3.3 The *London* served as a flagship in both the Cromwellian and Restoration navies, saw action during the Anglo-Spanish war in 1657, and participated in the English show of strength during the Battle of the Sound in 1658. In 1660, at the time of the Restoration, the ship was part of the fleet that brought the future King James II back from exile in the Netherlands (NMR TQ 97 NW 197). During its lifetime, the *London* carried other royals including the wife of Charles I, Queen Henrietta Maria, and the mother of both Charles II and James II, Princess Henrietta (Fox, 2012, p. 65).
- 3.4 Between 1660 and 1663 the vessel underwent various repairs and modifications which included the addition of a ‘6-inch-thick girdling’ to the hull. This repair increased the tonnage and beam of the vessel, enabling the *London* to be fitted with a greater number of guns (76) (Fox, 2012, p. 65).
- 3.5 In 1665, at the beginning of the second Anglo-Dutch war, the *London* was appointed the flagship of the Red Squadron, under the command of Sir John Lawson. Prior to this commission the *London* had been the flagship for the Earl of Sandwich, in the Channel, at Spithead and in the Downs (Fox, 2012, p. 67). In February 1665, ahead of the change in command, the *London* sailed from the Downs to Chatham for maintenance. At this time the ordnance and stores on board were removed; once maintenance had been completed they were re-instated back on the vessel on the 23 February 1665 (TNAWO55//1667) (Anon., 1665; Fox, 2014; Pascoe, In prep.). Archaeological investigations have shown that these stores were not stowed when the ship blew up on 7 March, despite the imminent arrival of Admiral Lawson.
- 3.6 Whether this means that these stores had just been re-issued as part of the preparations for war, or that they had never been stowed, is open to debate. If the former, this would align with the evidence from the partially-loaded guns. If the latter, this inactivity between 23 February and 7 March points to a lack of leadership and ill-discipline on-board. Historical evidence suggests

that warrant officers were the most senior ranks on-board, which begs the question—where were the officers? Moreover, if there were no officers why were there women on-board? If this is evidence of ill-discipline on-board was it an isolated incident or symptomatic of a wider problem throughout the Navy?

- 3.7 On the 7th March *en route* from Chatham to Hope for Sir John to board, the ship was torn apart by an internal explosion attributed to the mass detonation of the gunpowder in the magazine. Samuel Pepys, the noted diarist, recorded the loss in his entry dated March 8th 1665.

This morning is brought me to the office the sad newes of ‘The London’, in which Sir J. Lawson’s men were all bringing her from Chatham to the Hope, and thence he was to go to sea in her; but a little a ‘this side the buoy of the Nower, she suddenly blew up. About 24 [men] and a woman that were in the round-house and coach saved; the rest, being above 300, drowned: the ship breaking all in pieces, with 80 pieces of brass ordnance. She lies sunk, with her round-house above water. Sir J. Lawson hath a great loss in this of so many good chosen men, and many relations among them. I went to the ‘Change, where the news taken very much to heart.

- 3.8 The wreck of the *London* provides a rare archaeological resource for understanding this period in the history of the Navy and illustrates why Samuel Pepys fought hard for a professional Navy in the last quarter of the seventeenth century. The reported absence of officers, the lack of discipline on board, and the explosion itself are strong arguments for the subsequent introduction of tests for potential officers, and the need for standardisation.

The wreck site

- 3.9 S1 was reported as an ‘unusual looking feature’ on the 23 November 1979 (Wessex Archaeology 2006) and S2 was reported as ‘foul’ in 1962 by the Port of London Authority (PLA) (Wessex Archaeology, 2008b). A bronze gun recovered the following day, is now on display at Fort Nelson (Object Number: XIX.237). Both sites were designated under the Protection of Wrecks Act 1973 in 2008. The designation was amended in 2012 to encompass an area of seabed in which wreck-related material had been found, but which lay beyond the area then designated.
- 3.10 Work on the wreck site over the last decade has made significant contributions to the understanding of the *London*. The main areas of work associated with the wreck site include research, surveys and underwater investigations commissioned by Historic England (formerly English Heritage) and the PLA.
- 3.11 Prior to 2013 Wessex Archaeology was commissioned by both English Heritage and independently by the PLA to provide archaeological services in relation to the *London*. In 2014 Cotswold Archaeology was contracted by Historic England to undertake this work. In addition, a court case relating to the potential recovery of ordnance from the wreck has been a catalyst for

further research on the *London*. Throughout this period, work by the licensee team, including monitoring, surveying and the recovery of at-risk artefacts, has continued on the site. The subsequent unpublished reports comprise the majority of the referenced works and largely inform the Ship's Biography below (Table 1). The Ship's Biography draws together the main attributes of the site and provides a statement of the sites archaeological interest.

Table 1 The ship's biography

Build	<p>The <i>London</i> is of high importance as a second-rate 'Large Ship' of the period. The ship was one of four 60-gun 'second-rates' that the Council of State under Cromwell ordered the Admiralty committee to construct on 3 July 1654, although only three were completed. The two other vessels, the <i>Richard</i> and the <i>Dunbar</i> (subsequently re-named the <i>Royal James</i> and the <i>Henry</i>, respectively after the Restoration) were both destroyed by fire and neither site has subsequently been identified. The ships were enlarged and modernised versions of the Jacobean 'Great Ship' design and influenced the future design of 90-gun 'second-rates' such as the <i>Association</i>.</p> <p>As one of only three similarly-constructed vessels and the only example whose whereabouts is known renders the remains of the <i>London</i> as of very high importance. The <i>London</i> therefore represents an extremely rare early stage in the evolution of the English sailing battle fleet, which is very important.</p> <p>Nigel Nayling (2005), Wessex Archaeology (2011a) and Cotswold Archaeology (2016; in prep) all report sections of fastened framing and planking as well as other worked timbers on both sites. Structural remains are well preserved on both sites. The preservation and cohesion of the remains demonstrate significant potential for further research into ship construction of the period.</p> <p>This research would be complemented by analysis of historical records which may include shipbuilders' plans for the <i>London</i> (Fox, 2012, p. 60;TNA SP18/137, fo 32), and a model of a vessel thought, potentially, to be based on the <i>London</i> in the Sjöhistoriska museet collection (Stockholm, Sweden) (Anderson, 1957; Lavery, 2014).</p> <p>Some information exists regarding the construction of the ship from contemporary accounts and records, including who, when, where and why the <i>London</i> was built. Two portraits by van de Velde the Elder (1660) provide a clear indication of what the ship would have looked like. In addition, recent archaeological work is revealing constructional details.</p> <p>The shipbuilder, thought to be Captain John Taylor, seems to have submitted a draft of the vessel prior to its construction (Fox, 2012, p. 60), copies of which survive at the National Archives (TNA SP18/137, fo 32). This document is likely to contain important details pertaining to the construction of the vessel. A model of a vessel thought to be based on the <i>London</i>, held in the Sjöhistoriska museet (Stockholm, Sweden) may provide further information on the construction details. This model may be of a Swedish vessel designed by Francis Sheldon, an English shipwright who may also have worked on the <i>London</i> (Anderson, 1957; Lavery, 2014).</p> <p>Archaeological evidence indicates that construction details of the <i>London</i>, such as gunport dimensions, may have differed from those of later ships (Cotswold</p>
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Build, cont.	<p>Archaeology, 2017b). These details hint at the potential for assessment of the archaeological remains to inform complex and precise understandings of 17th-century naval architecture.</p> <p>Dendrochronological analysis of an oak frame has revealed that the timber was British in origin and was felled after 1639 (Nayling 2005) supporting the identification of the site as that of the <i>London</i>.</p>
Use	<p>The <i>London</i> is of high importance as a rare example of a naval vessel employed in key naval campaigns during the Interregnum. The <i>London</i> served in both the Cromwellian and Restoration Navies, and the ship later formed part of the English Squadron sent to collect Charles II from exile in the Netherlands in 1660 following the death of Oliver Cromwell in 1658. The ship also carried other royals including the wife of Charles I, Queen Henrietta Maria, and the mother of both Charles II and James II, Princess Henrietta (Fox, 2012, p. 65). The <i>London</i> took part in the siege of Dunkirk and Mardyck between 1657 and 1658 and in the English show of strength at the Battle of the Sound (Øresund) in 1658 (Wessex Archaeology 2010b and NMR TQ 97 NW 197).</p> <p>Contemporary documentary sources relating to the <i>London</i> exist and are easily accessible. These include the Chatham Ledger, entries in the diary of Samuel Pepys, the Calendar of Treasury Books and a portrait from 1660 by van de Velde the Elder. These sources alongside the archaeological assemblage, including human remains, mean the ship has a high potential for further understanding the use and the social dynamics of a warship during the latter half of the 17th century. The Chatham Ledger, a document detailing the removal and re-installation of stores on board the ship on the 23rd February 1665, provides details of the stores and armament on board the <i>London</i> at the time of her loss, thereby providing a detailed account of the potential archaeological remains and giving insights into a ship preparing for battle (Cotswold Archaeology, 2016; In prep; Pascoe, in prep.). The <i>London</i> is of national interest as a ship of both the Cromwellian and Restoration navies used in an international context (Fox, 2012).</p> <p>Historical documents suggest also that the <i>London</i> may provide evidence of repairs and modifications (such as ‘girdling’) which would provide archaeological evidence of 17th century ship repair techniques.</p>
Loss	<p>The <i>London</i> is of high importance with regard to her loss and the circumstances surrounding it. The <i>London</i> was en route from Chatham to collect Sir John Lawson who was to take command of the newly appointed flagship of Red Squadron when the ship suddenly exploded. In his diary, Samuel Pepys recorded that in excess of 325 persons were on board at the time of the explosion, although it is unclear whether this includes the women known to have been on board; Pepys also reports that only 25 survived, including one woman. A number of Sir John Lawson’s relatives were killed.</p> <p>Such a catastrophic loss of life, and indeed a vessel, are likely to have had a far-reaching impact on the navy at the time. The accident was almost certainly caused by the mass detonation of gunpowder in the magazine (Wessex Archaeology, 2010a), which demonstrates the vulnerability of warships of this period. The sudden loss of the ship, its crew and other persons on board, means that the</p>

<p>Loss, cont.</p>	<p>sudden loss of the ship, its crew and other persons on board, means that the archaeological remains have the potential to answer many research questions about ship life.</p> <p>Detailed studies of five of the bronze guns recovered from the site have revealed that three were fully loaded, and had tompons in place. This confirms that the ship was not engaged in battle at the time of its loss (Brink 2015; Endsor, 2014; Fox, 2014; Trollope, 2008; 2013).</p> <p>The studies associated with the court case, have shown also that one gun was partially loaded (with charge and wad, but not shot), while the remaining gun had not been loaded. This situation is thought to be indicative of the Master Gunner loading the guns as the ship left port (Trollope, n.d.).</p> <p>Further evidence for the provisioning of gun-related equipment at this time has come from the archaeological excavations, which have recovered significant quantities of linstocks, hand spikes and bandoliers all located in a relatively small area. This is thought to indicate their temporary storage prior to redistribution around the ship, possibly to the gunner's store, in the moments prior to the <i>London's</i> loss (Cotswold Archaeology, 2017b). The precision of this data demonstrates the ability of the remains to narrate the final moments of life on board the <i>London</i> as the ship prepared for war.</p> <p>The implications of the ship's loss indicate importance within a national dimension of interest. The <i>London</i> is also of interest within a local dimension as a vessel lost in the Thames.</p>
<p>Survival</p>	<p>The survival of the <i>London</i> is of high importance. The licensee team, divers from Cotswold and Wessex Archaeology, the University of Wales Lampeter and the Port of London Authority all report broadly the same findings; sections of hull, framing and planking all exist over both sites. Recent excavations have shown that the remains on S2 probably represent a section of the side of the hull, from the main gundeck down to the base of the hold (but not including the keel), probably from the bow area (close to the galley and gunner's storeroom) (Cotswold Archaeology 2016; In prep.). The known ordnance assemblage from the <i>London</i> is of high importance both regionally and nationally. It is unclear what ordnance remains on the seabed as there have been salvage operations taking place from the date of the sinking. It has been estimated, based on historical documentation and modern records, that around 41 of the bronze guns, out of the 76 that went down with the vessel, have been recovered, by historic and modern activities (Fox, 2012, pp. 67–72). The details of these recoveries are set out by Fox (2012) and Wessex Archaeology (2010a). However, note that different authors make different estimations as to the number of guns recovered (e.g. 27 estimated by Trollope, 2008).</p> <p>Two of the recovered cannon from the sites have been examined by Nicholas Hall of the Royal Armouries; one is the only known surviving gun by the noted London gun founder Peter Gill (c.1590) the other is the only known surviving bronze gun from the Commonwealth (N Hall, pers. comm. with EH 2008). Detailed studies of the recovered ordnance are also presented by Fox (2012) and Trollope (2011; n.d.), including three bronze guns that research has shown to be from the city of Amsterdam (cast between 1600 and 1617 for terrestrial, rather than naval, use).</p>

Survival, cont.	<p>There is potential, should the remaining ordnance be located (potentially between 35 and 43 bronze guns), to learn a great deal about the arming of this type of ship at the time of sinking. Studies of the guns known to have been recovered from the <i>London</i> have identified varied origins (including England and the Netherlands), reflecting the exchange and capture of valuable brass ordnance during this period (Trollope, n.d.).</p> <p>The survival and condition of finds recovered from the site suggests that a good preservation environment exists at an unusually shallow depth of deposit in the seabed silts. This lends credence to the notion that the site is unstable and is eroding; significant movement of over-burden may have led to the exposure of well-preserved artefacts relatively recently. Pockets of scour have been identified, and there may be wider patterns of erosion across the site. This phenomenon will be addressed in detail below. Recent investigations on the site have focused on the extent and depth of archaeological remains on both sites (Cotswold Archaeology, 2017a; 2017b).</p>
Investigation	<p>Archival research has been carried out on the <i>London</i>, focusing particularly on the vessel's armament and stores (e.g. Fox, 2012; Pascoe, In prep.).</p> <p>Various archaeological investigations have been undertaken on both sites including systematic monitoring and survey (by the licensee team (Ellis 2012; 2013; 2015)), geophysical and diver surveys of S1 and S2 (Wessex Archaeology, 2008; 2010; 2011; 2012; 2013) and more recently archaeological evaluation, geophysical surveys excavations and assessments of S2 (Cotswold Archaeology 2016; in prep.). These investigations have provided insights into 17th century ship construction, and military, navigational and domestic activities, including evidence of personal belongings and human remains. The likely depth, extent and condition of surviving deposits on both sites have also been assessed.</p> <p>Further diver and archival work has a high potential to yield significantly more information about the <i>London</i> both as a ship and an archaeological site including its construction, career, use, and on-board social dynamics.</p> <p>The site has significant potential for the development of methodological approaches to the investigation of a protected wreck in such a challenging environment, therefore the site is of interest as a potentially nationally important project. Working methodologies have been adapted over the period from 2014 to 2016 to suit the particular site conditions (e.g. Cotswold Archaeology 2016).</p>

Summary of surviving features

- 3.12 As previously discussed, the site consists of two discrete designated areas (S1 and S2) approximately 400m apart. In addition to S1 and S2, an additional area of wreck material, Site 3 (Figure 2: S3), was discovered in 2009 through geophysical survey but has since been shown to be an area of modern debris (after Wessex Archaeology 2011). Immediately south of S2, S4 has been identified as a later wreck abutting S2 (Figure 2: S4). Table 2 presents a more comprehensive and chronological description of surviving features.

Table 2 Surviving features

<p>S1 London</p>	<p>Geophysical surveys indicate that S1 is much larger than its visible extent (Cotswold Archaeology, 2017a). Cohesive fragments of hull have been observed with elements of what is believed to be outer hull and ceiling planking. Evidence suggests that a large section of hull may be underpinning parts of the site. There are a large number of disarticulated timbers, freshly exposed timbers and timbers with freshly exposed surfaces, which suggests that the site remains unstable and that relatively small variations in seabed level may be causing this instability.</p> <p>A number of what appear to be heavily-concreted iron guns have been observed sitting on top of timber frames with planking (Ellis, 2011; 2015). These appear to be piled up; there is a suggestion that they may represent worn guns that were being used as ballast. Salvage operations in the 17th century also noted the presence of iron guns on the site (Fox, 2012, p. 68). S1 has produced a variety of small finds including military and domestic equipment as well as structural remains of the ship (Ellis, 2015). Lower densities of artefacts are recorded on S1 compared with S2 (Ellis, 2015).</p>
<p>S2 Previously thought to be the King. Now known to be part of the London</p>	<p>S2 contains the remains of the <i>London</i>. The remains suggest the presence of part of the hull, from the bow section.</p> <p>Investigations of S2 carried out between 2014 and 2016 recorded remains thought to represent a section of the hull from the main gundeck down to the hold. Surviving internal details include decking, internal partitions and a section of a gun port, adjacent to which was found the remains of a well-preserved gun carriage; this was recovered from the site in 2015 (Cotswold Archaeology, 2016). Owing to the density of finds and timbers within the site, in 2016 it was decided to excavate a trench (Trench 4) following the outside of the hull, in order to determine the full extent of the deposit. This trench was excavated to a depth of approximately 1.8m but neither the keel nor the bottom of the deposit was reached. This suggests that the keel of the ship is not present but does offer some indication of the depth of the deposit surviving on S2 (Cotswold Archaeology, 2017b). Remains from the upper decks indicate survival of the upper parts of the ship, although in a less coherent form than the lower sections (main gundeck to hold). Geophysical survey results indicate that there may be a c. 20m length of hull present on S2 (MSDS Marine 2017: 16).</p> <p>Galley tiles, bricks and possible fire wood have also been recorded in the investigations on S2, as have extensive remains of gunnery equipment (linestocks, handspikes, bandoliers etc.). These artefacts indicate that S2 may contain remains of the galley and gunner's store, both of which are usually located in the bow in vessels of this period (Cotswold Archaeology, 2017b). Thus in summary S2 is thought to include a section of one side of the bow, from the main gundeck to the hold (excluding the keel), with fragmentary remains from upper decks and clear evidence for domestic and military activities on board the vessel.</p> <p>Human remains have been discovered on S2, although the possibility they are from the later vessel (S4) cannot be discounted.</p>

S2, cont.	Freshly exposed and eroded timbers together with well-preserved organic material suggest the site remains unstable as a result of relatively small changes in seabed level. Recent site investigations suggest that the deposits on S2 are in excess of 2m thick (Cotswold Archaeology, 2017b)
S3 Modern debris	S3 was identified through geophysical survey, subsequent investigation revealed modern debris. However the possibility that remains from the <i>London</i> lie underneath cannot be discounted.
S4 19th century wreck	A later, c. 19th century, as yet unidentified wreck abutting S2

Post-discovery history of the site

- 3.13 This section presents a broad outline of the post-discovery history of the site, focusing on condition, material remains, salvage and archaeological work. A brief summary of the survey history can be found in Appendix II. Sediment and exposure levels are discussed separately (section 3.57), and are not included in this section.
- 3.14 S2 was reported as ‘foul’ in 1962 by the PLA’s Hydrographic Office and the discovery was recorded in *The Wreck Hunters* (Jefferis & McDonald 1966); the PLA explained that a wreck had been marked with a buoy in this location c.1820. The PLA diver reported finding many timber ribs protruding from the seabed over 30m. A bronze demi-culverin cannon 2.92m long was recovered from the site; a rare example of the first regulation series of naval cannon with the size and decoration decreed by Cardinal Richelieu. The gun is now at Fort Nelson Royal Armouries. It has been suggested that S2 may have been subject to clearance operations in the 1960s including the removal of two guns (Wessex Archaeology, 2011b).
- 3.15 S1 was reported in 1979 (presumably by the PLA Hydrographic Office) as an ‘unusual-looking feature’. The PLA reported at this time that the S2 wreck had disintegrated since the last survey and that good fouls were only obtained on the flood tide. This appears also to be the earliest reference to the site being the *King* even though there are no recorded losses of that name in the vicinity (Wessex Archaeology, 2011b).
- 3.16 Further surveys in 1985, 1990 and 1999 relocated and refined the position of the two sites. In 2001 a sidescan sonar survey commissioned by the PLA over S2 revealed a large thin rectangular-shaped anomaly approximately 10m x 20m while further survey in the following year using sidescan sonar and magnetometer identified a larger area with distinct features.

- 3.17 In 2005, multibeam and diver surveys conducted by the PLA and Nigel Nayling (University of Wales, Lampeter) identified three distinct sections of wreckage on S1. The northernmost area comprised a concentration of disturbed timbers, including both framing and planking elements. The middle section was the largest and most cohesive, comprising thick wooden planking attached to large, squared oak frames. The southernmost section lay somewhat deeper on the edge of the channel where planking attached to framing timbers was observed. Smaller round pieces of wood observed between some of the frames may represent dunnage (packing material for cargo). A sample of timber, including treenails, was brought to the surface for dating. Dendrochronological analysis identified it as British oak felled sometime after 1639 which is consistent with the site's identification as the wreck of the *London*.
- 3.18 Wreckage comprising two sections 50m apart was also identified (S2) (Nayling 2005, 4). The largest and easternmost section of S2, measuring 25m x 12m, consisted of fragments of disturbed wood over a wide area, with a concentration of timber surrounding a single cannon. The cannon overlaid a concentration of apparent roundwood; initial measurements suggested it was either a saker or demi-culverin. A chamfered beam, possibly a carling and a wooden wheel thought to be from either a gun carriage or a pulley were seen. Over the western section, two clear areas of wreckage were seen, with no debris in between.
- 3.19 Both sites were surveyed by HMS *Gleaner* in 2005. S1 was reported as measuring 47.1m x 28.4m lying north-east/south-west in a broken state. S2 was reported as measuring 37.5m x 27.4m.
- 3.20 The site was discussed at the Advisory Committee on Historic Wreck Sites (ACHWS) meeting in 2006 as a possible candidate for designation, but was not progressed as there was insufficient information to merit consideration and no threats to the site had been identified.
- 3.21 In 2006 the PLA carried out a multibeam echo-sounder survey of both sites (Wessex Archaeology, 2006; 2008a). The survey confirmed that S1 consisted of three main sections of wreckage with a large scour on the eastern side of the wreck. The overall dimensions were 30m x 20m upstanding 1.1m. The scour, orientated east/west measured 65m x 15m x 1.5m deep with steep sides. There appeared to be outlying features and scours surrounding the wreck, suggesting associated debris. Given the dramatic way in which the *London* sank and the subsequent salvage attempts this is to be expected.
- 3.22 The survey of S2 revealed that it then appeared to consist of three main areas of wreckage with an associated large scour depression. In addition, two sections of debris were located on the edge of the channel. The eastern section of wreckage was the largest measuring 25m x 15m and upstanding 1m; along the eastern edge of this there was a scour 55m x 20m x 1m deep. The western section of wreckage measured 18m x 18m and upstanding 1m, although

within this section there was a flat, featureless area measuring 10m x 7m. The third section of wreck was located further into the channel in an area of scour 30m x 20m and 0.6m deep.

- 3.23 In 2007 five bronze cannon were reported to the Receiver of Wreck (RoW). Two of these were of English origin (Droits 257/07 and 338/07), and were reported as having been salvaged from the site of the *London* (potentially S2). The remaining three were of Dutch origin (Droit 338/07) dated respectively to 1600, 1616 and 1617 and were reported to the RoW as coming from another site. However, evidence presented during the court case concerning these guns indicated that the three Dutch guns were in all probability recovered from the wreck of the *London* and were on board the *London* at the time of the sinking.
- 3.24 The two English guns recovered from the *London* represent two very rare examples of guns of the period. One was made by the noted London gun founder, Peter Gill, and is the only known surviving piece. It is in a good state of preservation and is a very impressive gun visually. The second gun bears the arms of the Commonwealth and is the only known surviving bronze gun of that period. The two English guns are now at Fort Nelson Royal Armouries, while the three Dutch guns were sold at auction in the summer of 2010.
- 3.25 A detailed study undertaken by the Nederlands Forensisch Instituut (2015) has traced the origins and movements of the Dutch cannon. These cannon were cast for use in the protection of the city of Amsterdam in the early 17th century. The cannon were not intended to be used as naval guns, although they were employed for this purpose by the Dutch during the First Anglo-Dutch War, and are thought to have been captured by English ships at this time. Following their capture the guns were redistributed on English ships, including the *London* (Fox, 2014; Trollope, n.d.; Nederlands Forensisch Instituut, 2015). The histories of these guns reflect aspects of the historical, military and political context of the period.
- 3.26 In 2007 and 2008 Wessex Archaeology were commissioned by the PLA to undertake archaeological diving investigations on the two sites as a result of further reported salvage (Wessex Archaeology, 2008b). On S2 they observed a good state of preservation of the material lying loose on the seabed but this was assessed as vulnerable to both damage and loss through natural processes. No cannon were seen but a number of artefacts, including leather string, a wooden wheel, a gun stock and a deadeye were removed to holding facilities at Denton Wharf. Little information was obtained for S1 owing to poor visibility.

3.27 Wessex Archaeology (2008c) suggested that S1 and S2 may be two sections of the same wreck (the *London*) citing the following reasons:

- The *London* is known to have broken up and the sites are in close proximity to each other. The *London* sank owing to an explosion and it is therefore likely that the vessel was broken; Samuel Pepys described it as breaking all in pieces. The possibility that S2 represents the site of the sinking and S1 is an outlier cannot be discounted. The geophysical evidence would suggest that S2 is the main part of the wreck.
- Both sites have produced similar dating evidence. A ship timber from S1 has produced a date of felling after 1639 and the gun recovered in 1962 from S2 dates from 1636.
- The identification of S2 as the *King* does not correspond with any recorded losses.

3.28 On 26 August 2008 the BBC aired a television programme ‘Thames Shipwrecks: A Race Against Time’ which featured the *London*. In it, Wessex Archaeology and Frank Pope were seen undertaking investigations into the vessel.

3.29 Owing to reports of further salvage works being planned, the *London* (S1 & S2) was put forward for emergency designation under the Protection of Wrecks Act 1973. The recommendation was presented to Parliament on 23 October 2008 and came into force the next day (Statutory Instrument 2008 No. 2775). The designation is unusual in that it identifies two separate areas of protection for the same site. These designations should now be revised in the light of recent work in order to provide adequate protection to the sites.

3.30 The following year, 2009, Wessex Archaeology was commissioned by English Heritage (now Historic England) to undertake a Designated Site Assessment of the *London* (Wessex Archaeology, 2010b). The survey revealed that S2 measured at least 40m x 12m with the wreck material buried in the seabed to a depth of at least 1m. The sites appeared to represent two distinct areas of wreckage; wreckage and scour found during the diving investigation is consistent with previous investigations. However the gun identified in 2005 (see 3.17) was not found. The shape of the structure identified suggested that the inboard face of the hull was visible. Deck beams and knees were observed to be fastened with large ferrous bolts, and several large cuprous bolts were also observed attached to the timber. The presence of these large cuprous bolts originally cast some doubt on the identification of S2 as part of the *London* because, whilst small cuprous fastenings are known to have been used in the 17th century, large fastenings were not believed to have been used until after the introduction of copper sheathing in the late 18th century. However the southern part of S2 is now known to abut a later copper-sheathed vessel (S4), which accounts for these anachronistic discoveries.

- 3.31 In 2010 diver survey by Wessex Archaeology of S1 observed both articulated and disarticulated wreck structure as well as other finds in remarkably good condition. However the site, particularly the shallower sections, did not appear stable (Wessex Archaeology, 2011a).
- 3.32 It became apparent that wreck material from two vessels was present at S2, with the southern sector of the site containing the remains of an 18th/19th century sailing vessel (referred to here as Site 4 (S4)). This was further confirmed by the analysis of the cuprous fastenings which dated to the mid-18th century (David Dungworth pers. comm.). The northern sector of S2, however, still contained remains consistent in date with the *London*. It is believed that the more recent wreck (S4) partially overlays the older site so finds cannot be assigned automatically to one site or the other. Three isolated adult human bones found in the northern sector, two skull fragments and a humerus, have been attributed by Jackie McKinley (Wessex Archaeology) to a minimum of two, but probably three, adults. It was suggested that these bones represented one male and one or two females, but the fragmentary nature of the evidence calls this interpretation into question (S. Mays, pers. comm.). Due to their location the remains are believed to be associated with the *London*. S2 is not thought to be stable and the shallower sections of the site may be particularly unstable and subject to erosion (Wessex Archaeology, 2011a). It should be noted that Simon Mays (Historic England) is now dealing with human bones.
- 3.33 The 2009 survey identified a concentration of wreck material referred to as S3 approximately 140m to the north of S2 (Figure 2). S3 was investigated by divers in 2010 but was interpreted as modern debris. However the possibility that S3 overlays or contains material from the *London* cannot be entirely discounted without further site investigations.
- 3.34 In 2010 Stephen Ellis, a local diver, came forward wishing to take on the role of licensee and was subsequently issued with a 'visit' licence. As a result of discussions with the nominated archaeologist Mr Ellis applied for a survey licence for the site which was subsequently issued on 15 June 2011. Following further discussions with Historic England and the nominated archaeologist regarding the identification by Mr Ellis of at-risk artefacts and remains a surface-recovery licence was granted in 2012 (Ellis, 2012). Mr Ellis is keen to undertake on-going survey and monitoring work. Archaeological advice is provided by a nominated archaeologist, currently the Nautical Archaeology Society (NAS), and other specialists as required.
- 3.35 In 2011, a management report was prepared for the *London* (Wessex Archaeology, 2011b). This stated that despite dredging associated with the London Gateway development, undertaken to the south of the site, there was no evidence at that time of significant change in the conditions of S1 or S2 (Figure 1). The report did, however, point out that any impacts may be long term in their evolution and that both sites should be subject to ongoing monitoring. In addition to this, the management report recommended targeted

archaeological investigations of the site to inform interpretations of the wreck itself, as monitoring alone would only improve understanding of how the site was evolving (Wessex Archaeology, 2011b) but would do little to further the understanding of how the ship was built or used.

3.36 In 2014 Historic England commissioned Cotswold Archaeology to undertake evaluation, excavation and assessment of the *London* under the *London* protected wreck site, Thames Estuary: Excavation of material at risk project.

3.37 The archaeological aims of this element of the project were:

- to determine the depth of deposits on site
- to recover artefacts at-risk
- to determine the density of objects within the wreck
- to assess their state of preservation
- to identify which part of the vessel is present at S2
- to assess the extent to which the remains can shed light on the history (including construction, use and loss) of the vessel

3.38 In addition to the archaeological aims, this project was designed to support, and work alongside, the licensee team, in line with Policy 3 of the Conservation Statement and Management Plan, concerned with identifying and implementing mechanisms to develop shared ownership and partnership working. The licensee team underwent HSE Self Contained Underwater Breathing Apparatus (SCUBA) training in order to fully participate with the dive team during the excavations. The project dive team therefore consisted of both professional archaeologists and the licensee team, licensed to dive the site by the Department of Culture Media and Sport (DCMS).

3.39 During 2014 the team opened three evaluation trenches on S2 (Figure 3). In consultation with the licensee team, work targeted the western area at of that part of S2 that was believed to be part of the *London* (the later wreckage to the western end of this area (Figure 2: S4) was avoided). The excavations revealed well preserved timbers and smaller artefacts. One of the trenches, (Trench 3; Figure 3), contained sizeable remains of a well-preserved gun carriage with the remains of the tackle and gunner's implements alongside. The remains of a second gun carriage were observed protruding from silts nearby.

3.40 Following monitoring by the licensee team the best-preserved gun carriage was considered at risk, so the excavations in 2015 focused on that gun carriage and its immediate environs (Trench 3) (Cotswold Archaeology, 2016). The carriage was situated close to the north-western edge of S2. The rear trucks of

the carriage were lying against structure thought to relate to the gundeck. The gun carriage is believed to have been lying in an area of the main gundeck of the ship.

- 3.41 In 2015 the complete gun carriage, was raised. The gun carriage and its associated (but disarticulated) trucks are currently undergoing conservation at York Archaeological Trust. The majority of the remainder of the material archive, including hundreds of artefacts recovered during excavations in 2014, 2015 and 2016 is currently undergoing assessment and conservation at Historic England. Small amounts of material are also thought to be held by Wessex Archaeology and the PLA. It is anticipated that finds from the *London* will be acquisitioned in the collections of Southend Museum Service. Cotswold Archaeology and Wessex Archaeology hold an extensive paper/digital archive.
- 3.42 Excavation at the front of the carriage revealed that the bed and front trucks were butting directly up against a horizontal timber while other timbers (frames) directly to the east protruded vertically from the seabed. Together, these timbers are thought to form structural remains relating to the side of the hull, and the remains of a gunport. The frames extending vertically were clad by both inner and outer planking. A large timber, extending vertically on the inside of the hull structure may represent a wooden knee.
- 3.43 Around 150 artefacts, including numerous gunner's implements and associated gun furniture, navigation equipment, human remains, cordage and other fibres, and metal, glass and ceramic objects were recovered during the 2015 excavations and licensee monitoring operations. These artefacts included between 20 and 30 linstocks, some of which were fragmented. According to the Chatham Ledger 30 linstocks were issued to the *London* on the 23 February 1665 (NAWO55/1667), which suggests that the majority, or possibly all the linstocks issued to the ship have been recovered from this small area (Cotswold Archaeology, 2016, p. 34).
- 3.44 The survey and monitoring work of the licensee team has continued over this period, and the team has produced a site plan showing features recorded and at-risk artefacts recovered (Ellis, 2013; 2015). This site plan has been correlated with the latest geophysical survey data. The inclusion of the licensee team within the professional archaeological dive-team has enabled the incorporation of their information and experience into the ongoing work and future strategies for the wreck site.
- 3.45 Work in 2016 focused on completion of the excavation of the trench from which the gun carriage had been recovered (Trench 3, Figure 3) and *in situ* recording of the remains. Another trench (Trench 4, Figure 3) was excavated on the outside of the hull, in the area thought to be the base of the hold, to ascertain the presence or absence of the keel and to determine the depth of the deposit.

- 3.46 In Trench 3 (Figure 3), excavation revealed a 4m² section of the main gun deck and hull. The exposed hull section included a gunport, remains of two wooden knees and a ring bolt secured to the hull, probably used to secure the gun in place. Five rows of deck planking were also recorded, with joints and caulking present. A fallen structural beam was also present.
- 3.47 Once the gun carriage had been removed, handspikes and wooden chests lying adjacent to it were recovered in 2016. Handspikes, leather finds, small fragile wooden artefacts and amongst these, glass, brass and pewter objects were found lying on the western side of the gun carriage. The leather and wooden objects comprised the remains of bandoliers and powder-boxes associated with musketeer equipment. These were located within the remains of a wooden chest, and had been packed in alternating layers; leather bandoliers overlaying wooden powder-boxes. The remains of leather powder flasks were also found amongst the leather bandoliers. A fragment of a pistol was also recorded, suggesting that small arms as well as bandoliers had been stored in this chest. The number of powder-boxes and bandoliers recovered from this chest suggests that around eight sets of bandoliers (each with c. 12 powder-boxes) are present, out of a total of 70 which were issued to the *London* on the 23rd February 1665, days prior to the sinking (Anon., 1665; Cotswold Archaeology, 2017b; Pascoe, In prep.).
- 3.48 Hand spikes were recovered from the eastern side of the gun carriage, and two further possible chests were identified, but were left *in situ*.
- 3.49 The number of linstocks and handspikes recorded in the area of Trench 3 (Figure 3) over the course of 2015 and 2016 is clearly greater than the number required for the operation of one gun. This equipment, as well as the chest of bandoliers, suggests that these items were probably placed here temporarily at the time of the sinking, prior to being distributed around the ship, possibly to the gunner's stores, located in the bow of the vessel, below the main gundeck.
- 3.50 Within Trench 4 (Figure 3), although no evidence was found for the remains of the keel, further details relating to the hull including closely spaced frames and inner and outer planking, were recorded.
- 3.51 Current investigations, including the analysis of finds and on-site observations are entirely consistent with the identification of the wreck as that of the *London*. Finds including pottery and clay pipes are all consistent with a mid-17th century date (Cotswold Archaeology, 2016).
- 3.52 Establishing the extent and level of preservation of the remains was a key area of investigation for the *London* protected wreck site: Excavation of material at risk project. As part of this project the extent of survival on S1 and S2 was investigated by geophysical survey including multibeam bathymetry, sidescan sonar and parametric sonar, to establish the extent of the remains above and below seabed level. S2 was further investigated through excavation to determine the extent of survival and level of preservation.

- 3.53 These investigations established that remains on S1 are present both above and below seabed level. The extent of buried remains (with no surface expression and therefore not visible on multibeam bathymetry data) was detected as extending beyond the wreckage visible on multibeam bathymetry data by some 4m to the north, 12m to the west, 7m to the south and 4m to the east. These data also suggest that material is buried to a depth of between 1m and 1.5m on S1 (Cotswold Archaeology, 2017a, p. 27).
- 3.54 In contrast, geophysical surveys on S2 indicated that the extent of the wreck was primarily confined to its surface expression, suggesting that there is no significant buried wreckage on S2 extending horizontally beyond what is known from the multibeam bathymetry data. The same is true also for the identified debris which, with the exception of one piece, is visible on the surface or within an area of visible debris.
- 3.55 As a result of these geophysical surveys it has become apparent that the extent of the current designated areas may require revision as elements of the wreck in some locations are at best only 15m from the boundary of the designated areas. In addition, the designation boundary on S2 actually bisects the later abutting wreck so this wreck is not wholly protected within the designated area.
- 3.56 Three of the trenches excavated as part of the *London* protected wreck site: Excavation of material at risk project were located within the area of the wreckage at S2, while one trench was excavated adjacent to the outer planking of the hull and therefore outside the wreck. These excavations established that the depth of surviving deposits on S2 extend beyond 1.8m. These excavations also found little material outside of the wreck (Cotswold Archaeology, 2017b), supporting the conclusions of the geophysical survey on S2 that the primary areas of archaeological remains are focused in locations with visible wreckage.
- 3.57 In terms of the state of preservation, the excavations and licensee team recoveries have generally produced evidence of a very high level of preservation for a wide range of materials, including environmental and organic remains (textiles, fibres, pollen, wood etc.) metal remains and bones (both human and animal). Although assessment has found that some remains are in poor condition and some have evidence of deterioration from erosion, marine organisms and the concretion of metals (e.g. Cotswold Archaeology, 2016, p. 120) possibly as a result of relatively recent exposure, the overwhelming evidence is that the state of preservation of buried remains is extremely high on S2.
- 3.58 However, once remains are exposed deterioration, as evidenced by the gun carriage, appears rapid. This object showed signs of surface deterioration when identified in 2014; however by 2015 the licensee team recorded further deterioration including detachment of a part of the gun carriage structure and evidence of damage by marine borers (Cotswold Archaeology, 2016, p. 11).

Seabed composition and site exposure

- 3.59 The following section details the known and current levels of exposure on the site and the seabed composition. It should be noted that whilst the results below are considered accurate at the time of writing, the dynamic environment of the seabed is such that they must be considered as a general baseline. Surveys have been undertaken by the PLA since 2006 using a hull-mounted Reson 8125 multibeam swath bathymetry system. All the datasets were tidally corrected and expected to produce a maximum vertical error of c. 8cm. The data were processed and interpreted by Wessex Archaeology (2011a). In 2016, geophysical surveys commissioned by Historic England and Southend-on-Sea Borough Council were undertaken by Cotswold Archaeology and MSDS Marine. The results of these surveys inform the section below.
- 3.60 The *London* lies on the edge of the Yantlet channel in the Thames estuary off the coast of Southend-on-Sea. The bed depth is between 11m and 19m (Cotswold Archaeology, 2017a). The seabed was observed in 2011 to comprise fine sand with a thin silt veneer. In places where this has been scoured away, a firm layer of gravelly sand up to a depth of 0.3m has been observed.
- 3.61 Investigations in 2016 recorded details of the sedimentary stratigraphy on S2, beyond the wreck area. In the area directly to the south of the wreck sediments consisted of stratified deposits consisting of an upper layer of mobile sand c. 100mm thick, overlying a layer of clay c. 300mm thick with organic content (weed etc.) and shell inclusions. This in turn overlies a 300mm thick layer of firm clay, beneath which is a layer of clay with shell inclusions (Cotswold Archaeology, 2017b).
- 3.62 The overall sediment transport environment tends towards depositional features in the outer Thames estuary. The source of the depositional material is largely from cliff sediments in Essex and Suffolk rather than fluvial deposition. The sediments composing the sandbanks and the troughs between them vary greatly; ranging from fine to medium grained sands to a poorly sorted mixture of gravels, sand and mud in the troughs. Near shore the proportion of mud is greater than that found offshore.
- 3.63 The depositional environment around S1 varies considerably between the western and eastern sides of the wreck. To the west there is an area of approximately 20m by 4m which shows an increase in levels of up to 0.4m. To the east, levels in an area of approximately 8m by 5m have reduced by c. 0.3m. There are also isolated patches where levels have reduced that are associated with upstanding wreck structure. The surface difference calculation shows a reduction of approximately 0.4m for most of these patches with a maximum 0.6m reduction in level at the northern part of the wreck. There has been a reduction of c. 0.5m of the bed level extending c. 15m beyond the channel toe line, though this is still c. 90m from the original dredging exclusion zone and therefore some distance from the site.

- 3.64 For the 2006 to 2011 period the surface difference shows deposition around most of S1. This includes c. 1.5m of material infilling scour to the west of the wreck and a wide spread of material extending c. 37m north of the wreck. The wreck itself shows little change over most of its length, with localised scour focused around upstanding structural elements. The largest of these localised scour patches measures c. 4.5m by 2m with a maximum of c. 0.7m material removed.
- 3.65 For S2, the surface difference analysis between the February 2010 and May 2011 datasets indicates little change. There are several areas where the bed level has increased around the wreck. Around the southern part of the wreck, the bed level has increased by approximately 0.3m to the south and c. 0.3m to the west. Small localised areas where bed levels have reduced are generally associated with upstanding structure. These tend to comprise isolated patches measuring approximately 0.5m by 0.5m to the east of structural elements with levels reduced by approximately 0.2m. The dredging area appears to extend approximately 4.5m beyond the channel toe line with some indirect reduction in bed level adjacent to the exclusion zone.
- 3.66 A general trend of deposition over S2 was observed over the period 2006 to 2011. This was particularly noticeable with the infilling of the scour, which had previously run perpendicular to the site. A maximum of 1m of material was deposited within the scour, resulting in a considerable levelling of the scour's profile. However, there are also several areas around the northern part of the site where scour seems to be associated with the wreck structure. These are isolated areas, generally measuring about 1m across with roughly 0.2m of material removed.
- 3.67 The licensee team have observed and recorded variable sediment movement across the site during their monitoring dives (e.g. Ellis 2012; 2015) which they suggest may be causing general site instability. In May 2012 the team installed control points on the wreck for the purposes of monitoring sedimentation and erosion. The control points consisted of upright, silt-level monitors, comprising 10cm black and white segments, placed to the north of S2 on the outside of the wreck. At the same time numbered yellow survey tags were also placed across the inside of the wreck. Owing to time constraints imposed by the diving conditions the monitors were recorded, along with other key features of the wreck, using camera/video footage.
- 3.68 Observations by the licensee team suggest that there was little movement of silt around the upright control points placed outside the wreck area, while the silt levels within the wreck seemed to fluctuate between Spring and Neap tides, with some areas suffering from localised erosion. Many of the yellow survey tags were lost owing to a combination of corroded fixings and deterioration of the fixing points on the wreck (S. Ellis pers. comm.).

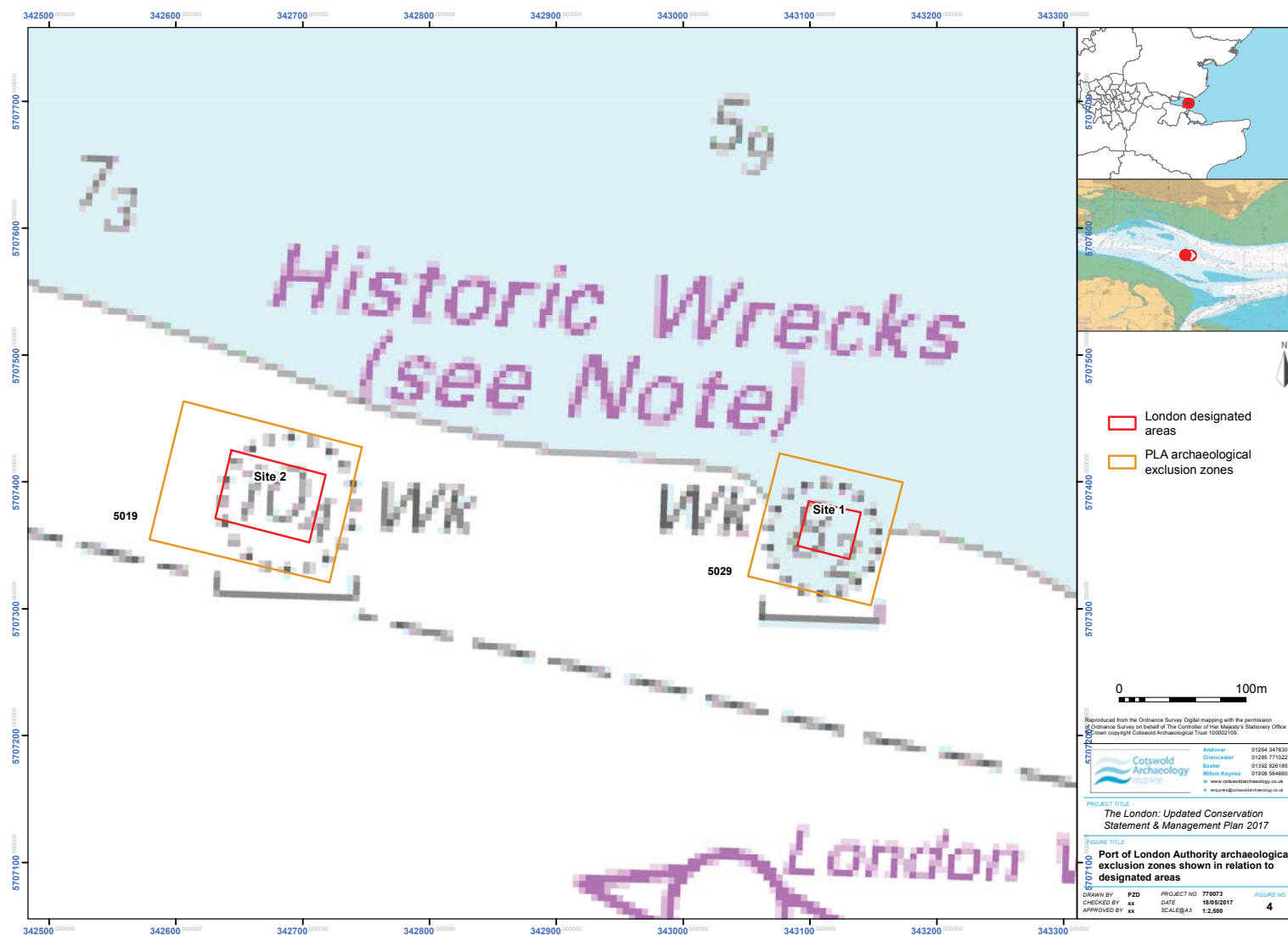


Fig. 4: Port of London Authority archaeological exclusion zones in relation to designated areas

- 3.69 A human cranium and other vulnerable artefacts, adjacent to a small timber frame inside the northern edge of the wreck (survey tag 2035) was observed to be covered and uncovered by the silt, supporting the hypothesis that deposition fluctuates between tides. All were deemed to be at risk and were therefore recorded and recovered by the licensee team.
- 3.70 A large complete wooden barrel which was starting to erode from the seabed was recorded on film in 2012. The same area was filmed in 2016 but much eroded; all that remained of the barrel was a few staves with another barrel starting to emerge from the silts underneath. Another area of scour in the vicinity, which was detected in the 2016 bathymetry data, had uncovered other artefacts including shoes, leather book covers, and a complete onion bottle (S. Ellis pers. comm.).
- 3.71 Marine geophysical surveys conducted in 2016 also provide useful data to inform on the complexity of sediment mobility across the site. In general terms this seemed to show general trends in sediment movement of slight accumulation around the wreck, with isolated areas of scour, largely associated with upstanding features, within the wreck site. Specifically, accumulation was noted to the south and east of S2 and further to the west of the site (Cotswold Archaeology, 2017a).
- 3.72 This appears to confirm the results of earlier assessments which found that, 'up to 2013 the depositional environment of the wreck of the *London* in S2 was generally stable to accumulative, with intermittent scouring in a west to east direction and isolated scouring associated with upstanding wreck features. These patterns appear to have been in evidence before dredging commenced. Although the seabed within the S2 designated area appears to be generally stable, it is the scour associated with exposed parts of the wreck which is of greatest concern as these are the most vulnerable parts of the wreck' (Cotswold Archaeology, 2017a).
- 3.73 Future work should include the rigorous comparison of these data with those collected over several years by the PLA and recently obtained by Cotswold Archaeology.
- 3.74 Recent studies and licensee reports indicate that patterns of sediment accumulation and loss on S2 may fluctuate, with localised areas of erosion and sedimentation (Cotswold Archaeology, 2017a). Significant sediment transportation has the potential to affect the remains of the wreck, leading to the loss of artefacts and exposure of the ship's structure to deterioration from erosion and marine organisms, factors which are already at work on the site (Cotswold Archaeology, 2017b). Further monitoring of the site as outlined below will inform the understanding of sediment transportation on the site.

Ownership, management, current use, and licensing

- 3.75 The site is owned by the Royal Navy and designated under the Protection of Wrecks Act 1973. The site lies within the area administered by PLA and is subject to dive permit and notice to mariners requirements. It was afforded additional protection through PLA implemented Archaeological Exclusion Zones (AEZs) (Figure 4: PLA AEZs 5019 and 5029) implemented for the deep water channel dredging works. AEZ 5029 (Figure 4) extends beyond S1 by 30m to the north, west and east, and 55m to the south. AEZ 5019 (Figure 4) extends beyond S2 by 30m to the north and south, 42m to the west, and 23m to the east. These AEZs are not currently enforced as there is no dredging work being undertaken in the area; any future work may require different AEZs to be established. The PLA, as a statutory harbour authority, has environmental responsibilities under the Harbours Act 1964 specifically for conservation and public access to archaeological sites when considering licences or exercising its functions. The PLA must comply with these requirements when considering applications for river works or dredging under the Port of London Act 1968 and also in its own activities and functions.
- 3.76 The salvage of a number of guns from the *London* in 2007 and reports of further planned salvage led to the sites' designation in 2008 which has influenced its current management and licensing regime. Consequently this has determined the current and future use of the site as one of historical and archaeological interest rather than as a target for salvage.
- 3.77 The *London* is one of two designated wreck sites in the Thames estuary, the other being the South Edinburgh Channel wreck of late 18th century date. The latter site is currently buried under up to 6m of sediment and appears to have had no surface expression since the eastward movement of the North Shingles Bank reburied the site in 1976 (Parham, et al., 2013).
- 3.78 Whilst access to the *London* is restricted to licensed divers, this has not always been the case and the site has been subject to non-archaeological salvage. It is believed that eight guns have been raised from the site since its discovery in 1962. Six of these guns are held at Fort Nelson Royal Armouries, while the whereabouts of the other two is unknown.
- 3.79 In 2014 Historic England commissioned the *London* protected wreck site: Excavation of material at risk project. This project enabled the licensee team to undertake professional SCUBA qualifications, to enable their participation in the project. Thus, since 2014 Mr Ellis and his team have accompanied the professional dive team in evaluation and excavation work on the *London*. The terms of Mr Ellis' licence were amended to include excavation work for this purpose, for the periods in which the professional archaeological team were present.

- 3.80 Following changes to the licensing system, Cotswold Archaeology applied for, and were granted, a corporate licence to undertake excavation work in 2016 as part of the Excavation of material at risk project. The named corporate licensee is Dr Michael Walsh. Mr Ellis also retains his licence for the site.
- 3.81 As with all submerged wreck sites, physical access to the *London* can only be undertaken by divers or with the use of Remotely Operated Vehicles (ROVs). However in this particular case experienced divers are required owing to the difficult conditions, while the cost of the latter may exclude this as an option.

Gaps in existing knowledge

- 3.82 In assessing the gaps in existing knowledge it is important to determine what is known about the *London* from the time of its construction through to the present day. This has been outlined above and is summarised in the table below.

Table 3 Knowledge of the *London*

Build	Through contemporary accounts and records, it is known when, where, and why the <i>London</i> was built and by whom; two portraits of the ship by van de Velde the Elder (1660) provide a clear indication of what it would have looked like, while recent archaeological work is revealing constructional details.
Use	Through contemporary records, including those of the War Office, the State Paper Office, Admiralty Records and the Calendar of State Papers to some extent the ‘working life’ of the <i>London</i> has been established. This includes actions in which it participated, details of peacetime service, armament records and to some evidence of repairs. Artefactual, environmental and structural evidence recorded within recent investigations also informs understandings of the use of the ship. The <i>London</i> was a warship preparing for action in the second Anglo-Dutch war and would have been armed for this purpose. The Chatham Ledger provides details of the number of guns and other stores on board at the time of loss. Details of the guns recovered around the time of sinking are known (Fox 2012; TNA PRO30/37/8 receipts of guns and stores and WO51/5, bill book) as well as some of those salvaged more recently. The significance of the guns more recently recovered has been demonstrated to be very high.
Loss	The circumstances of the loss of the <i>London</i> , both the wrecking event and the periods immediately before and after, are well documented. It is known where the ship had come from and where it was due to go as well as the name of the captain and the number of crew. Historical documents provide details of the stores and armament on board at the time of loss. The nature of sinking can be inferred with some degree of certainty and is consistent with an explosion in the powder magazine. Archaeological and historical evidence has brought to light intriguing evidence of the possible presence of women aboard the ship at the time of sinking which would be extraordinary for a warship preparing for battle.
Survival	Geophysical and diver survey has been able to determine the ‘visible’ and buried survival of the site, the locations of the discrete sections, and the level of preservation as well as detailing the recent sediment transport regime which will impact on preservation.
Investigation	Various tranches of geophysical and diver survey have been undertaken on behalf of the PLA and Historic England, this is all well documented. Desk-based investigations have been undertaken by specialists (Fox, 2012; Pascoe, In prep.), and additional desk-based work has also been undertaken to inform both the designated site assessments and this management plan. This has included limited research into both historical and contemporary records. More recently (2014–2016), Cotswold Archaeology have worked with the licensee team to carry out a programme of excavations on S2 of the <i>London</i> , and the recovery of material at risk which is now undergoing conservation.

- 3.83 Whilst the current knowledge of the site of the *London* is broad in some areas it is limited in others. Working to fill these gaps will greatly increase understanding of the site thus further informing future management.

Build

- 3.84 The mechanical construction details of the *London* are not currently known in detail, and whilst this could ordinarily be inferred from known wooden ship building techniques of the period, the ship was built at a time of change in the Navy, and its design and construction influenced the next generation of ships. However, sources have now been identified which may throw light on the construction details of the vessel.
- 3.85 The shipbuilder, thought to be Captain John Taylor, appears to have submitted a draft of the vessel prior to construction (Fox, 2012, p. 60), records of which survive at the National Archives (TNA SP18/137, fo 32). Fox (2010) suggests that the details of the vessel, as-built, differed slightly from the drafts, and are recorded in Samuel Pepys 'Register of Ships' (Tanner, 1903–1922). These documents are likely to contain important details pertaining to the construction of the vessel.
- 3.86 It has also been suggested that a model held at the Sjöhistoriska museet, representing a later vessel (see Table 1, ship biography for further details) may have been based on the *London* and as such may provide important information regarding the vessel's structure.
- 3.87 Although Historic England's knowledge is informed by documentary sources, there is limited archaeological corroboration and many aspects of design remain entirely unknown. As a result, many aspects of ship design and shipbuilding, for example timber supply and conversion in shipyards, could potentially benefit from the availability of archaeological evidence from the *London*. Analysis of material excavated between 2014 and 2016 by appropriate specialists will shed light on some of these areas.
- 3.88 Recording undertaken during the excavation works has also provided detail on the ship's structure including decking, planking, frames and gunport. The latter forms an area of particular interest as the dimensions recorded on the *London* gunport in Trench 3 differ from those specified for later naval vessels of this type (Cotswold Archaeology, 2017b). Thus, the remains have the potential to inform development of naval vessels in this area.

Use

- 3.89 A history of the *London*'s career has been set out by Fox (2012). Recent research has also been conducted, using the Chatham Ledger, into the activities on board in the days prior to sinking, (Cotswold Archaeology, 2016; Pascoe, In prep.).

- 3.90 Additional research into the archives would further demonstrate the significance of the site whilst providing a solid and interesting basis for public dissemination as well as informing future archaeological work.
- 3.91 Much of the work undertaken to date has focused on the armaments of the *London* (e.g. Nederlands Forensisch Instituut, 2015). Gun experts have provided a great deal of information on the guns and their subsequent salvage, as well as identifying the ordnance more recently recovered. Based on historical documentation and modern records (see Fox 2012 for detailed account), the number of guns unaccounted for has been estimated at between 35 and 43, many of which could make significant contributions to the understanding of the ordnance of this period. Few examples from this period survive in collections owing to the practice of re-casting bronze guns.
- 3.92 The gun carriage recovered from the site in 2015 shows considerable evidence for modifications, previously unknown in gun carriages of this period. Remains of other carriages have the potential to inform understanding of their use and modification to fit different guns which may have been brought aboard. The gun carriages associated with 42 pound cannon (cannon-of-seven) are an area of particular technological interest. The *London* was originally provisioned with nine iron examples, the first iron examples to be employed by the navy (Fox, 2012). While these cannon are not thought to have been on board at the time of the sinking, evidence for modifications to the gun carriage recovered in 2015 indicates the possibility that the original gun carriages, first associated with the cannon-of-seven, were retained on board.
- 3.93 On a broader level the archaeological remains may also provide evidence to confirm modifications and repairs to the ship recorded in historical documents. Further work on the archaeological remains would throw light on these areas.
- 3.94 Likewise the artefact and environmental assemblages have the potential to inform the understanding of life on board. Analysis of the existing known assemblage could shed new light in these areas.

Loss

- 3.95 Further work, both historical and archaeological, is required to fully understand the wrecking process. The ship sank owing to a catastrophic explosion and it is known that the 'roundhouse' remained above water. The known wreck site is in two distinct sections probably as a result of the explosion, but there is a high potential both for the survival of further undiscovered sections of wreck and for archaeological material to be located between the two known sections (Cotswold Archaeology, 2017a); further work might provide a more developed sequence of events.

Survival

- 3.96 The original draft Conservation Statement and Management Plan for the site indicated that the true extent of survival of the wreck was unknown, particularly what may or may not lie beneath the seabed and the total extent of the wreckage which could include structure, ordnance and cargo/personal effects. The effective management and protection of the site relies upon a clearer picture of the extent and level of preservation of the site.
- 3.97 A key area of investigation for the *London* protected wreck site: Excavation of material at risk project was to establish the extent and level of preservation of the remains, the results of which are summarised above. The current understanding of the survival of the site includes knowledge of the extent of the remains on S1 and S2 and the state of preservation of buried and exposed elements.

Investigation

- 3.98 Information on the investigations and salvage of the site prior to 2002 is lacking. It is known that salvage has taken place since the site's re-discovery in 1962 but the extent to which this occurred and the material that was recovered is poorly recorded and therefore relatively unknown. This material, and the impact caused by its removal, has the potential to be of high significance to the understanding of the site as a whole.

4 ASSESSMENT OF SIGNIFICANCE

Basis for assessment of significance

- 4.1 Significance means the sum of the cultural and natural heritage values of a place (English Heritage, 2008). Cultural heritage value has many aspects, including the potential of a 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).
- 4.2 In addition, the historic environment is a cultural and natural heritage resource shared by communities characterised not just by geographical location but also by common interests and values. As such, emphasis may be placed upon important consequential (technically, ‘instrumental’) benefits or potential, for example as an educational, recreational, or economic resource, which the historic environment provides. The seamless cultural and natural strands of the historic environment are a vital part of everyone’s heritage, held in stewardship for the benefit of future generations.
- 4.3 The basis for assessing significance therefore enables consideration of the varying degrees of significance of 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.
- 4.4 The Historic England (English Heritage, 2008) approach to significance has been used below as a framework to discuss the significance of the *London* in similar terms to those for other heritage assets in England.

Statement of significance

- 4.5 The *London* was one of four Second Rate ships ordered by Cromwell in 1654, but only three were completed. The *London* is the only surviving example as the other two were burnt, their locations are unknown, and there is little potential for their recovery.

Name	Launched	Rate	Renamed	Sank	Sank	Found
<i>London</i>	1656	2 nd	–	1665	Blew up en-route to London	1962
<i>Dunbar</i>	1656	2 nd	<i>Henry</i>	1682	Accidentally burned in Chatham Dockyard	–
<i>Richard</i>	1658	2 nd	<i>Royal James</i>	1667	Scuttled then burned by the Dutch below Chatham and broken up	–

(after Lavery 1983, 160)

- 4.6 The ships were enlarged and modernised versions of the Jacobean Great Ship design and influenced the design of future 90 gun Second Rates such as the *Association*. The *London* represents the only vessel from the 1654 commission identified in the archaeological record. Its aesthetic value as a warship is therefore closely tied to its evidential value on the seabed in terms of its historical context and technological development. The *London* represents an extremely rare survival of a very important and very early stage in the evolution of the English sailing battle fleet.
- 4.7 The bronze ordnance known to have been recovered from the site thus far has proved to be either unique or extremely rare. The armament of the *London* appears to have included much earlier guns, a number of which date to the late 16th and early 17th centuries, and probably at least one captured French gun (Nicholas Hall, pers. comm. with EH, 2008). Research undertaken for recent court proceedings in relation to five of the bronze guns recovered from the *London* provide extensive details on the life-histories of the ordnance. This has been shown to be complex, reflecting the multi-national origins of the guns, and transitions of ownership which are likely to have occurred during naval battles.
- 4.8 The five guns studied in detail were shown to include two from England and three from the city of Amsterdam. The latter, cast to protect the city, were not intended for naval use, although they were employed for this purpose by the Dutch during the first Anglo-Dutch War. One was on board the *Groote Liefde* and one on the *St Mattheus*. They are thought to have been captured by the English during this time, and redistributed to their ships, including the *London* (Fox, 2014; Trollope, n.d.; Nederlands Forensisch Instituut, 2015).
- 4.9 The guns hold high evidential and historical value, as evidenced by the specialists' ability to establish detailed biographies of the artefacts in the context of the wider military and political climate, using historical records. The use of the guns in the Anglo-Dutch war, as a notable event, gives their remains further historic (associative) value.
- 4.10 One of the two English guns is the only known surviving example by the noted London gun founder Peter Gill (c. 1600) while the other is the only known surviving bronze gun from the Commonwealth (pers. comms with EH 2008). These facets of significance relate to the guns' evidential value.

- 4.11 Calculations undertaken by Frank Fox, Charles Trollope and Wessex Archaeology suggest that there may have been between 35 and 49 bronze guns (not including ballast, which may have included iron guns (Fox, 2012, p. 68; Ellis, 2011)) remaining on the seabed. Both Charles Trollope and Nicholas Hall are of the opinion that, on the basis of rarity, all guns associated with the site (both those which have been recovered and those which remain on the seabed) are likely to be regarded as important. They date from a period in the history of ordnance that is very poorly represented in museum collections owing to the practise historically of re-casting bronze ordnance as items became worn out (Wessex Archaeology, 2010b). The cannon studied to date in detail have provided a wealth of information about the origins, use and capture of ordnance during this period.
- 4.12 The ability of these remains to enhance the understanding of a warship making preparations for battle in the moments before its loss add further evidential value to the *London's* ordnance. Detailed studies (associated with the court case) of five of the bronze guns from the site have revealed that three were fully loaded with tompions in place. This confirms that the ship was not engaged in battle at the time of its loss, lending further support to the identification of this wreck as that of the *London* (Fox, 2014; Trollope, 2008; 2013)
- 4.13 These studies have also shown that one gun was partially loaded (with charge and wad, but not shot), while the other had not been loaded. This scenario is thought to reflect the Master Gunner loading the guns as the ship left port (Trollope, n.d.). Further evidence of the distribution of gun-related equipment at this time has come from the archaeological excavations, which have found evidence of linstocks, hand spikes and bandoliers all situated within a small area. This is thought to reflect their temporary storage prior to redistribution around the ship, possibly down to the gunner's stores usually located in the bow of the vessel.
- 4.14 The detail in this evidence, relating to the last moments of activity on board the ship, demonstrates the high evidential value of the remains of the *London*.
- 4.15 The modifications found on the gun carriage recovered in 2015 highlight other facets of evidential value, as they represent the only known evidence of this kind. Further potential evidential value relates to historical documentation of repairs to the *London*, which would inform understandings of ship repairs and modifications in this period.
- 4.16 In general the high levels of preservation on the site demonstrate the potential for considerable evidential value, which has been borne out by the information recorded during recent investigations. Historic England's ability to understand and interpret these remains is connected with the plethora of historical documentation relating to the site, further strengthening the evidential value of the site, and forming the context for its historic value.

- 4.17 The *London* participated in naval campaigns which played a key role in England's national history, and has associations with numerous key historic events and people which afford the physical remains of the wreck historical (associative) value. Built during the Interregnum in 1656 the *London* served in both the Cromwellian and Restoration navies. The *London* saw action at Mardyck in 1657 when the English joined with France in her continuing war against Spain in Flanders. The Flemish coastal fortress of Mardyck was captured and garrisoned by Commonwealth troops. The *London* also participated in the English show of strength during the Battle of the Sound. In 1660, the ship played a key role in the Restoration as part of the fleet that brought the future king Charles II back from exile in the Netherlands; the *London* is believed to have conveyed Charles brother, the future James II (NMR TQ 97 NW 197). The *London* was appointed flag ship of the Red Squadron at the beginning of the second Anglo-Dutch war under the command of Sir John Lawson.
- 4.18 A large number of contemporary documents also exist that relate to the *London* from inception to destruction including the partial recovery of ordnance. Sources include entries in the diary of Samuel Pepys, an illustration by van de Velde, as well as entries in the Calendar of Treasury Books and in the Chatham Ledger. Evidence such as this serves to enhance the human aspect of the site and its place in history, demonstrating considerable associative historic value associated with the remains.
- 4.19 The levels of preservation and cohesion of the remains, which include a large section of the hull, also provide illustrative historical value. Although the ability for people to connect with past events through the warship is hindered by its inaccessibility, virtual access via an online resource will soon enable the realisation of this value (Historic England project no. 7489).
- 4.20 Members of the local community maintain a keen interest in the site, some are Historic England-affiliated volunteers, while wider instrumental and community value can be discerned through principles of integrated management and stakeholder involvement. Southend Museum Service has taken a keen interest in the *London* and the work that is being undertaken by the current licensee team; in 2012 the site was central to a large exhibition on 'Shipwrecks of the Thames'. As part of the *excavation of material at-risk* project public engagement events were held, including an event on Southend-on-Sea Pier. This was led by Southend Museum Service staff and volunteers, with additional support provided by Historic England staff, which showcased finds brought ashore by the excavation team, and provided 'hands-on' opportunities for members of the public.
- 4.21 The formation of the *London* Shipwreck Trust is a key manifestation of communal value. The licensee team and a local councillor have been the driving force behind the formation of this charitable trust, which in turn forms a focus for support and interest from within the local community, demonstrating the communal value of the *London's* remains.

- 4.22 The wider reach of the project through the use of a wide range of dissemination tools, including conferences, and social and broadcast media, has added further communal value. Key events associated with the wreck included the recovery of the well-preserved gun carriage which attracted considerable media attention, thus widening the potential communal value of the wreck.
- 4.23 Whereas historical, communal and instrumental values contribute to the assessment of significance of the *London*, these values cannot stand-alone. Without continued and sustained aesthetic and potential future evidential value, interest in the *London* would be diminished. As such, extant material remains on the seabed are vital to the significance of the site and must therefore not be lost or compromised.
- 4.24 Table 4 summarises these values of the *London* as a whole, by noting how those values relate to the surviving fabric and its constituent parts.

Table 4 Summary of assessment of significance

Aesthetic	<p>Relating to the ways in which people respond to the <i>London</i> through sensory and intellectual experience of it, the wreck's strength lies in it being a warship of both the Cromwellian and Restoration Navies. The ship was one of four 60-gun Second Rate ships that the Council of State under Cromwell ordered on 3 July 1654 from the Admiralty Committee, although only three were completed, and the <i>London</i> is the only known surviving example. The aesthetic value of the <i>London</i> as a warship is therefore closely tied to its evidential value on the seabed in terms of its historical context and technological development.</p> <p>With the potential for further discoveries there comes the potential for the aesthetic value of the <i>London</i> to increase significantly with further understanding; it is therefore imperative that undiscovered remains are not allowed to be compromised.</p>
Communal	<p>Relating to the meanings of the <i>London</i> for the people who identify with it, and whose collective memory it holds. Although a recent discovery in terms of the site, the story has long been known and is part of local history. The local community has taken a keen interest in the site as demonstrated by the licensee team, the formation of the <i>London</i> Shipwreck Trust, and the wider public reached by a variety of media focused on key events such as the raising of the gun carriage in 2015.</p> <p>The communal value is further enhanced and demonstrated by the number of requests for talks from local groups and the appearance on nationally broadcast television programs including <i>Thames Shipwrecks</i>, the <i>One Show</i> and <i>Digging for Britain</i>. With further archaeological and historical work the story of the <i>London</i> will develop thus increasing the communal value.</p>

Evidential	<p>Relating to the potential of the <i>London</i> to yield primary information about past human activity. Evaluation, excavation and post-excavation assessment have indicated survival of elements of the ship's construction. This, and the potential for similar information, throws light on the construction details of a naval warship from a period in which no other vessels of this type survive. Other evidence includes hull structure, fittings, armaments and other associated finds including evidence of life on board, military, domestic and navigation related activities. Human remains have also been found on the site, which have significance in their own right. Other strands of evidential value relate to modifications to features on board, and the potential for evidence of ship repairs. Remains are in an excellent state of preservation, and investigations have shown that they are able to provide precise details regarding activities during the last moments on board.</p> <p>The armament of the ship has been identified as being of high significance to the understanding of ordnance during this period; this understanding will increase exponentially with each identified gun. Detailed research into the guns that have already been recovered demonstrates the evidential value of these remains.</p> <p>Continued analysis of the material recovered to date and further archaeological fieldwork will continue to improve our understanding of the site.</p>
Historical	<p>Relating to the ways in which the <i>London</i> can provide direct links to past people, events and aspects of life, the wreck is identified with historical figures and military campaigns. Documentary evidence enables an understanding of the life of the <i>London</i> and the wrecking event, while archaeological material including human remains have the potential to inform about the social structure and life on board at the time of sinking.</p> <p>Additionally studies of the ordnance have shown that the guns of the <i>London</i> have fascinating biographies of their own which can be traced through historical documents. These include links with key historic events such as the first Anglo-Dutch War in which it is thought that the English captured some of the ordnance subsequently associated with the <i>London</i> (Fox, 2014; Trollope, n.d.).</p>
Instrumental	<p>Economic, educational, recreational and other benefits will exist as a consequence of the cultural or natural heritage values of the <i>London</i> which may be identified in its value as a visited dive site of historic interest, a site of media interest and museum displays.</p>

Gaps in understanding significance

- 4.25 Despite the ongoing work associated with the investigation, evaluation, excavation and assessment of the site, there remain some gaps in the understanding of the changing burial environment surrounding the wreck. The construction of the vessel has been identified as being significant, so

Historic England's knowledge of constructional details would benefit from further archival, archaeological and historical work to determine the level of significance of this particular aspect.

- 4.26 For example, it is yet to be confirmed how much of the ship survives longitudinally (fore and aft), as new traces that emerged in the geophysical data, which align with known structure, could represent either more structure or sand ripples. The excavations, which have focussed on the central areas of the site, have exposed the gundeck, the side of the vessel along the gundeck, and have established that a significant depth of deposit, more than 1.8m deep, survives.
- 4.27 As gaps in Historic England's knowledge of the site are filled and further work and research is undertaken, the significance of the site as a whole can be expected to increase across all areas.

Statutory and other designations

- 4.28 On 24 October 2008 two areas, believed to be two parts of the wreck of the *London* were designated under the Protection of Wrecks Act 1973 (SI 2008/2775). Archaeological investigation showed that these areas required revision to ensure adequate protection and the designation was subsequently amended in 2012 (SI 2012/1773) (see Figure 1). Recent work has suggested that the designated areas may require further revision in order to adequately protect the wreck sites.
- 4.29 Statutory Instrument 2012/1773 therefore affords protection to two areas of seabed at the positions below under the Protection of Wrecks Act 1973. These restricted areas relate specifically to the *London*.

Site 1 (S1) (WGS 84)

Point	Latitude	Longitude
NW	51'29.7477 N	00'44.3802 E
NE	51'29.7435 N	00'44.4159 E
SE	51'29.7108 N	00'44.4046 E
SW	51'29.7155 N	00'44.3689 E

Site 2 (S2) (WGS 84)

Point	Latitude	Longitude
NW	51'29.7622 N	00'43.9862 E
NE	51'29.7532 N	00'44.0506 E
SE	51'29.7244 N	00'44.0408 E
SW	51'29.7334 N	00'43.9764 E

- 4.30 In addition to protection under the Protection of Wrecks Act 1973 the *London* designated sites, and the surrounding seabed, is afforded a level of protection through the marine licensing system under the Marine and Coastal Access Act 2009 (MCAA) which came into force on 6 April 2011. The system updates, consolidates and replaces some previous statutory controls. In order to undertake any works that disturb the seabed, including deposits and removals, a Marine Licence must be obtained from the Marine Management Organisation (MMO). Applicants will be required to submit details of the reason for disturbance as well as a methodology. Historic England is the MMO's preferred consultant on the historic environment and as such are able to offer advice on the significance of a vessel and can recommend conditions to be attached to the licence.
- 4.31 The *London* protected area Site 1 also lies partly within the outer Thames estuary potential Special Protection Area (pSPA). The outer Thames estuary pSPA is currently being considered for re-classification. The new pSPA enlarges the existing outer Thames estuary SPA, classified solely for non-breeding red-throated divers (*Gavia stellata*). The extension of the pSPA site includes three new areas identified for foraging common terns (*Sterna hirundo*) and little terns (*Sternula albifrons*) breeding at other (already classified) SPAs on shore, which includes the marine area around Foulness. The site is currently material consideration and therefore should be included within any assessments of activities in this location. The short-snouted seahorse has been noted as a protected species under the Wildlife and Countryside Act and has been found in the Thames. Diving and flash photography are known to disturb this species and special provision may therefore need to be made for work in areas where they may be encountered.
- 4.32 In addition, Section 40 of the Natural Environment and Rural Communities Act (2006) places a duty on all public bodies to have regard to biodiversity. Guidance for this duty was published by DEFRA in 2007 but later withdrawn.

5 ISSUES AND VULNERABILITY

Introduction

- 5.1 This section summarises the main conservation and management issues that specifically affect, or may affect, the significance of the wreck site and its component parts and elements.
- 5.2 Vulnerability (and therefore risk) may be assessed against environmental factors (such as natural processes) and human impacts on the site, including the setting. Current assessment may indicate that such sites are at medium or high risk, unless they are completely buried below bed level during successive tidal cycles.
- 5.3 It is accepted that all wreck sites are vulnerable to some extent owing to the nature of their environment, though sites will be considered to be at risk when there is a threat of damage, decay or loss of the monument. However, damage, deterioration or loss of the monument through natural or other impacts will not necessarily be considered to put the monument at risk if there is a programme of positive management. Practical measures that affect site stability, preservation *in situ* and increased visitor access will be addressed here, while the necessity to address the site's (limited) post-excavation/recovery back-log is recognised (see also sections 5.29–5.32).
- 5.4 Issues relate specifically to the values identified in Section 4 above are presented here thematically rather than in order of severity or priority for remedial action. Relevant issues cover a wide range, including—but not limited to:
 - The physical condition of the site and its setting
 - Conservation and presentation philosophy
 - Visitor and other legal/ownership requirements
 - The existence (or lack) of appropriate uses
 - Resources, including financial constraints and availability of skills
 - Lack of information or understanding about aspects of the site
 - Conflicts between different types of significance

The physical condition of the site and its setting

- 5.5 The *London* lies in a tidal area of the Thames estuary and as such is vulnerable to strong currents. The overall nature of sediment transport on the site between 2006 and 2011 was one of deposition although localised scour was noted associated with the high points of the wreck. This general trend in sediment stability and mobility appears to be confirmed by the most recent geophysical surveys conducted on the site (Cotswold Archaeology, 2016) but further analysis of existing data and comparisons with future survey data would provide a much more rounded picture.
- 5.6 The licensee team have suggested that, from on-site observations, between 2013 and 2016 that gradual sediment loss has occurred as more of the structure seems exposed, and areas of localised scour and deposition are recorded, as in previous years. Sediment transportation on the site, however, seems more complex and would benefit from further monitoring to provide evidential analysis of sediment stability and mobility over the site and its environs.
- 5.7 A significant proportion of the exposed timbers show signs of decay, with evidence of marine borers rapidly colonising recently exposed timbers (Cotswold Archaeology, 2016). It is likely that the material on or close to the surface will deteriorate rapidly through the impact of various biological threats, chemical corrosion of metal fastenings and the mechanical and erosional impact of strong currents (Cotswold Archaeology, 2017a; Wessex Archaeology, 2011b);.
- 5.8 It should be noted that the good state of preservation of timbers that are being uncovered from the site suggests a favourable preservation environment, largely due to the anaerobic conditions promoted by burial in certain sediment types. This lends credence to the general consensus that a large section of the hull remains buried within S2.

Conservation and presentation philosophy

- 5.9 Geophysical survey data and diver observations suggest that certain areas of the wreck are unstable, particularly those upstanding elements around which scour has been identified by the PLA monitoring surveys. It is acknowledged that there has been deterioration in the overall condition of various elements of the *London* and the long-term survival of the ship and its contents is currently unclear. The site is vulnerable to natural processes both uncovering and subsequent impacts, with the bathymetric data suggesting that areas of scour are concentrated on the upstanding and exposed elements of the wreck, which are also those which are most vulnerable (Cotswold Archaeology, 2017a).
- 5.10 Despite evidential and aesthetic value of the *London* being of vital significance to the site, more robust monitoring and *in situ* management may be required for the site as a whole (see Recommendations).

- 5.11 Currently, the favoured option is for preservation *in situ* with limited excavation to answer specific research questions in relation to both the nature of the site, its extent, and preservation in general, and more broadly about ships of this period, for which there is limited archaeological evidence. These targeted excavations have proved highly successful to date, producing a wealth of information relating to a seventeenth century warship in preparation for battle. If, however, as a result of further systematic site monitoring and assessment the site or elements of it are deemed to be considerably at risk then more drastic measures may be required, up to and including preservation by record and full excavation of those elements considered at highest risk.
- 5.12 The *London* is a notoriously difficult site on which to work and the dive conditions are often in very low visibility with a very short dive window. The site is also in close proximity to the main shipping channel of the river Thames. Although large-scale underwater excavation is unfeasible owing to cost the selected archaeological excavation of the most vulnerable areas could be an option.
- 5.13 Southend Museum Service is keen to acquire artefacts and information about the *London* in order to inform and plan an exhibition displaying the finds from the site. This affords Historic England and the current licensee team an effective repository for the dissemination of information about the site, be it through artefacts or historical accounts.
- 5.14 Policy for the treatment of human remains from wreck sites is currently under review but their treatment should take place in established research frameworks as part of a project design.

Visitor and access management

- 5.15 Although there are no plans currently to develop underwater interpretative materials owing to the inherently challenging diving conditions, Historic England do encourage and support responsible visitor access through the licensing system—though it is recognised that extensive visits may not be without some level of damage to the site.
- 5.16 The site currently has a very keen licensee team who regularly dive the site. Initially the Licensee held a Visit Licence but after discussion with the nominated archaeologist and Historic England this was ‘upgraded’ to a Survey Licence, and subsequently to a Surface Recovery Licence. Following changes to the licensing system Mr Ellis held a licence which allowed recovery of at-risk materials from the surface of the seabed, in line with a protocol for such recoveries. Cotswold Archaeology also holds a corporate licence for work on the site, supported by a project design which includes provision for excavation and assessment.

- 5.17 Applications for visitor access will be carefully considered, in consultation with the licensee team, and will be subject to specific conditions. However, owing to the difficult conditions that are experienced on the site it is felt unlikely that there will be a great deal of interest in visiting the *London*.
- 5.18 It is envisioned that a suitable method of location and navigation of the site will be established and although primarily this will be used for survey purposes it may serve to make visitor access easier.
- 5.19 Virtual ‘access’, in the form of a non-diver trail, is also being developed for the site. This project, Interpretation for divers on the *London*, funded by the HPCP (Historic England project no. 7374) will be an online resource which will tell the story of the *London* and work carried out on the site, to allow wider appreciation of the wreck.

The existence (or lack) of appropriate uses

- 5.20 Although the site has been subject to salvage in the past there have been no confirmed instances of illegal diving since designation in 2008. The site is actively surveilled by the PLA for the purposes of navigational safety; the PLA can provide surveillance evidence should authorities wish to pursue enforcement actions relating to the protected wreck sites. The site is also regularly visited and monitored by the licensee team.
- 5.21 The current licensee team continues to actively work on the site under the guidance of the nominated archaeologist. The licensee also receives guidance and advice from a voluntary group of experts many of whom are members of the *London* Shipwreck Trust.

Resources, including financial constraints and availability of skills

- 5.22 Although the National Heritage Act 2002 enabled Historic England to assist with costs relating to works under the Protection of Wrecks Act 1973, this opportunity must be balanced against Historic England’s strategic research priorities and budgetary commitments¹.
- 5.23 There is no doubt that the recovery of archaeological material to date indicates the evidential value of the *London* and that interaction with archaeological material relates to both aesthetic and historical value.
- 5.24 Owing to the inherent risk to artefacts on the site, and the presence of a suitable receiving museum, Historic England had accepted a licence application allowing limited but targeted surface recovery. Historic England

¹ See Historic England’s Corporate Plan 2016–2019 (HistoricEngland.org.uk/about/what-we-do/corporate-strategy/) and Heritage 2020: strategic priorities for England’s historic environment 2015–2020 (<http://www.theheritagealliance.org.uk/tha-website/wp-content/uploads/2014/11/Heritage-2020-framework.pdf>)

also commissioned the Excavation of material at risk project, which has led to the recovery of hundreds of artefacts. This Plan relates to the long-term future management of the site and finds recovered from it. Historic England conservator Angela Middleton has agreed to undertake the conservation assessment of any artefacts recovered as part of the licence and as part of the Excavation of material at risk project. In addition, Historic England staff are undertaking the following assessments and analyses: Simon Mays (human remains), Polydora Baker (animal bone), Duncan Brown (pottery and tile), David Dungworth with further work to be carried out by Sarah Paynter (glass and metal), and Zoe Hazell (wood species).

- 5.25 Additional conservation of the gun carriage is being carried out by the York Archaeological Trust and assessment of the wooden artefacts by Steve Allen. Where necessary external experts have been consulted for assessments of leather (Quita Mould), cordage (Des Pawson), fibre (Margarita Gleba), clay pipes (David Higgins), gunners' implements (Alexandra Hildred and Dan Pascoe), and metal artefacts (Jörn Schuster).
- 5.26 The Excavation of material at risk project has also enabled the licensee and his team to gain key skills including HSE diving qualifications. The licensee team have also attended NAS courses on archaeological recording, and have gained training and instruction in the conservation of archaeological finds from shipwreck sites.
- 5.27 Historic England seeks to develop provision for flexible voluntary management agreements for sites underwater. This will enable greater partnership, better planning, a reduction in individual licence applications and a more holistic approach to the needs of the *London*.
- 5.28 In accordance with the Diving at Work Regulations 1997, archaeological interventions underwater commissioned by Historic England can only be undertaken by a registered Diving Contractor, and then only by such a Contractor with appropriate archaeological experience. It is therefore acknowledged that this may restrict the implementation of some of Historic England's conservation policies.

Lack of information or understanding about aspects of the site

- 5.29 *Taking to the Water* (English Heritage's initial policy for the management of maritime archaeology in England) addressed the protected wreck site post-excavation backlog. Here, it is recognised that over the last twenty-five years many licences have been issued for survey and excavation work within areas designated under the Protection of Wrecks Act 1973. Few of the licences issued required the academic reporting of fieldwork results and, as the majority of this work took place on a voluntary basis, lacking adequate financial support for subsequent analysis and dissemination of the results, very little of this work has been formally published.

- 5.30 Although there had been a backlog for the *London*, recent work is now in the post-excavation phase. Assessments of material recovered by both the licensee team and during excavations led by Cotswold Archaeology between 2014 and 2016 have been completed. Plans are in progress for the next stage of analysis (Cotswold Archaeology, 2016).
- 5.31 The archive of material relating to the *London* includes licensee team, Wessex Archaeology, Cotswold Archaeology and specialist reports, alongside statements and research undertaken in association with the court case relating to the guns from the site. The work of individual specialists (Fox, 2012) and the nominated archaeologist (Pascoe, In prep.) also forms part of the site archive.
- 5.32 Inevitably for a project with such a long history, the standard of work on the *London* is variable and in different formats, ranging from work carried out prior to designation, and subsequently by the licensee and archaeologists contracted by Historic England. Some of the projects were carried out to an extremely high standard and have resulted in accessible archives, while others have resulted in less coherent records. The data from these investigations represents the only record of that work and is, therefore, itself an irreplaceable resource.

Conflicts between different types of significance

- 5.33 There is no doubt that the recovery of artefacts and human remains, as well as *in situ* hull structure and other deposits indicates the evidential value of the *London*. In addition, interaction with archaeological material relates to both aesthetic and historical value. However, while the local capacity for professional conservation of material recovered from the site is yet to be established, there will continue to be a general presumption against intrusive investigation except for the recovery of items at immediate high risk. Future plans for the establishment of a museum in Southend-on-Sea to accession the items remains the aim of the licensee team, members of the local council, and the *London* Shipwreck Trust.

6 CONSERVATION MANAGEMENT POLICIES

Introduction

- 6.1 This section of the Plan builds on the *Assessment of Significance* section and the issues identified in the *Issues and Vulnerability* section to develop conservation policies which will retain or reveal the site's significance, and which provide a framework for decision-making in the future management and development of the site or reveal the site's significance but also:
- Meet statutory requirements
 - Comply with Historic England's standards and guidance
- 6.2 It is intended that the policies will create a framework for managing change on the *London* that is clear in purpose, and transparent and sustainable in its application. Historic England's aim is to achieve implementation through the principles of shared ownership and partnership-working so as to balance protection with economic and social needs.
- 6.3 Policies are also compatible with, and reflect, Historic England's *Conservation Principles for the Sustainable Management of the Historic Environment* and its published policies and guidelines, as well as the wider statutory framework.

The *London* is a shared resource

- 6.4 The *London* forms a unique record of past human activity which reflects the aspirations, ingenuity and investment of resources of previous generations. In addition, it is an economic asset, and provides a resource for education and enjoyment.
- 6.5 In reality, there is little conflict between the desire for access to the site and the restrictions imposed by conservation needs and legislative limitations as the challenging conditions naturally limit access. Any conflict will be reconciled through continued visitor management.
- 6.6 The *London* should be sustained and shaped in ways that allow people to enjoy and benefit from it, but which do not compromise the ability of future generations to do the same. To this end the *London* is to be made accessible via an online resource commissioned by Historic England such as the virtual 'access' non-diver trail, being developed for the site.

Management Policy 1 All stakeholders will continue to support and develop appropriate access to the wreck as a mechanism to develop the instrumental value of the *London*.

Everyone can participate in sustaining the *London*

- 6.7 Stakeholders have the opportunity to contribute to understanding and managing the *London*. Judgements about its values and decisions about its future will be made in ways that are accessible, inclusive and transparent.
- 6.8 Practitioners should use their knowledge, skills and experience to encourage others to understand, value and care for their heritage. They play a crucial role in communicating and sustaining the established values of the monument, and in helping people to articulate the values they attach to it.
- 6.9 Education at all stages should help to raise awareness and understanding of such values, including the varied ways in which these values are perceived by different generations and communities. It should also help people to develop, maintain and pass on their knowledge and skills.
- 6.10 In acknowledging the communal value of the *London*, regulation by the Police, MCA and the PLA has served to ensure that unauthorised activity on the site is minimised. Building on this success, we will develop provision for a flexible voluntary management agreement for the site. This will enable greater partnership, better planning, and a more holistic approach to the needs of the *London*.
- 6.11 The licensee team and the nominated archaeologist, in collaboration with Historic England's nominated contractor, have undertaken a program of outreach to build national and local awareness. There is potentially considerable support for the site, particularly in Southend-on-Sea, and this needs to be harnessed for its support and resources. The *London* Shipwreck Trust forms an important mechanism by which this can be secured.
- 6.12 Partnership working has also been a key aspect of work on the site in recent years; the licensee team has worked alongside the professional dive team of Historic England's nominated contractor and the nominated archaeologist. Southend Museum Service has also played a key role in the project from the outset and will be the long-term curators of material recovered from the wreck site. It is also hoped that the National Maritime Museum at Greenwich will play a role. Consultation should also be held with the site's owners, the Ministry of Defence, to explore their future role. Ongoing access to the site is a priority, but collaboration with, and resourcing of, the dissemination of the results of site investigations should also be considered. Important lessons of partnership working have been learned from this collaboration and these should feed into future work on the site. Management of roles and relationships is key, as is communication.

Management Policy 2 Stakeholders will develop appropriate methods of dissemination to increase public understanding and enjoyment of the *London*.

Management Policy 3 Mechanisms will continue to be identified and implemented so as to continue to develop shared ownership and partnership working.

Understanding the values of the *London* is vital

- 6.13 The significance of the *London* embraces all the interdependent cultural and natural heritage values that are associated with it. To identify and appreciate those values, it is essential first to understand the structure and ecology of the place, how and why that has changed over time, and its present character.
- 6.14 Judgements about values are necessarily specific to the time they are made. As understanding develops, and as people's perceptions evolve and places change, so assessments of significance will alter, and tend to grow more complex.
- 6.15 It is acknowledged that records of previous activities, including salvage, on the *London* form an irreplaceable resource to identify previous values and assist with understanding how its significance may have been altered. The impacts that twentieth century salvage works have had on the site is unknown.
- 6.16 Although recent investigations have provided a wealth of data these investigations have raised many questions and highlighted many areas in which the *London* has potential evidential value (an as yet unrealised area of significance). As such the true value of the *London* is yet to be realised. More effective methods of working on site should be explored in order to maximise returns from site investigations. The use of surface-supplied diving equipment, for example, should be weighed against the additional time gained underwater as the limitations of slack water diving are still a factor.
- 6.17 The previous nominated archaeologist formed an informal advisory group of renowned specialists to aid in the understanding of the significance of the *London* and to help identify future research priorities, many of whom form part of the specialist project team for the Excavation of material at risk project.
- 6.18 This project has brought together with its core specialists, the licensee team, the nominated archaeologist, as well as other diving and renowned external specialists. Together this team has embarked on a series of excavations on the *London* and the subsequent assessment of materials. This project resulted in a series of research questions, and the excavation work conducted to date has highlighted the potential for the wreck to answer these questions and address gaps in the understanding of significance.

- 6.19 In the time since the original draft Conservation Statement and Management Plan was first written, wider patterns in maritime research have been formalised through the publication of the maritime archaeological research agenda for England (Ransley & Sturt, 2013). This research agenda provides a framework through which future research questions relating to the *London* should be determined. However, this is not to say that the framework should be used to restrict investigations, rather it should guide lines of enquiry, while the specific interest of the *London*, evidenced through its physical remains and historical research, should also be highlighted by future work.

Management Policy 4 Key gaps in understanding the significance of the monument's component parts should be kept under regular review. Gaps in understanding significance should be prioritised and addressed in further work, so that these significances can contribute to informing the future conservation management of the site.

Management Policy 5 Works will be undertaken, where required, that will enable work on the site to be undertaken in accordance with relevant standards and guidance using licensed divers; this will enable remaining questions to be addressed.

The *London* will be managed to sustain its values

- 6.20 Conservation is 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 or reinforce those values.
- 6.21 It is inevitable that the site will undergo change and it is acknowledged that all wreck sites are vulnerable simply because of the nature of their environment. In order to quantify natural change Historic England's nominated contractor, has undertaken preliminary analysis of geophysical data to assess the erosional and depositional effects on the site. The results of this assessment broadly confirm those from previous assessments in that the environs surrounding the wreck sites largely appear to be stable possibly with some accumulation, but there is some evidence of scour within the wreck sites associated with upstanding features of the wreck (Cotswold Archaeology, 2017a). The site would, however, benefit from ongoing monitoring of the site and with detailed analysis and comparison of previous survey data to enhance our knowledge and understanding of the long-term pattern of seabed stability/mobility in the locality as detailed in the forthcoming project design for fieldwork in 2017. This is one of a package of measures recommended to monitor and evaluate the nature and rate of any sedimentary movement that may be detrimental to the survival of the site. Any measures taken to counter the effects of natural change will be proportionate to the identified risks and sustainable in the long term.

- 6.22 Other changes will be devised so as to avoid material harm. Irreversible intervention on the *London* may nonetheless be justified if it provides new information about the past, reveals or reinforces the values of a place or helps sustain those values for future generations, as long as the impact is demonstrably proportionate to the predicted benefits. The effects of changes to the condition of the *London* will be assessed through a programme of further monitoring. This monitoring includes pH testing recently carried out on the site (Cotswold Archaeology, 2017b), alongside possible ongoing high resolution geophysical surveys to assess changing sediment conditions (Cotswold Archaeology, 2017a).
- 6.23 Where appropriate, and where resources may not be available for other methods of preservation, the adoption of ‘preservation by record’ may be adopted as the most appropriate solution. Material decay is inevitable so it is imperative that a record is made for future generations.
- 6.24 Excavations on the *London* have revealed the potentially very rich and important artefact assemblage which, if exposed owing to natural processes, is at a high risk of damage or loss. As stated, previously, results from the recent geophysical surveys support those of previous surveys with localised scouring within the wreck sites, seemingly associated with upstanding features, but stability and possible accumulation in the wider environment (Cotswold Archaeology, 2017a). If, as a result of future systematic monitoring, the site is still considered to be at risk, then a response will be required. Subject to the appropriate support protocols being in place, recovery via a licence, project design and recording protocol which permit the recovery of surface materials considered to be at-risk is just one way by which this loss can be mitigated. This strategy for surface recovery addresses Management Policy 9.
- 6.25 Alongside this, ongoing controlled excavation by experienced archaeologists may be necessary mitigation for areas deemed particularly under threat, thereby creating preservation by record.
- 6.26 If retaining any significant part of the *London* is not reasonably practicable, its potential to inform us about the past will be preserved through record. This will involve the recovery of information through prior investigation, followed by analysis, archiving and dissemination of the results at a standard appropriate to its significance.

Management Policy 6 All stakeholders will continue to support and provide guidance for a programme of environmental monitoring, sediment monitoring and targeted recording.

Management Policy 7 Unnecessary disturbance of the seabed within the restricted area should be avoided wherever possible in order to minimise the risk of damage to buried archaeological remains.

Management Policy 8 The extent of the current designated areas should be reviewed in the light of new evidence from recent work to ensure that they provide adequate protection to the wreck sites.

Management Policy 9 If site monitoring indicates that significant remains are being lost, or that preservation *in situ* is not feasible, a programme of staged archaeological work should be considered subject to the submission of a suitable Project Design.

7 FORWARD PLAN

Introduction

- 7.1 In order to implement the proposed Management Policies outlined in Section 6, Historic England will continue to support a range of projects that will increase the understanding of the value and setting of the *London*. These projects are outlined below.

Proposed projects in relation to the *London*

The *London* will be managed to sustain its values

Review of designated areas

- 7.2 Recent geophysical surveys on site have indicated that, in accordance with management policy 8, the current designated areas may require revision in order to provide adequate protection to the sites. In some locations wreck material appears to be within 15m of the current designation boundary, while the latter wreck abutting S2 appears to be bisected by the boundary line and therefore is not afforded full protection.

Ongoing site monitoring

- 7.3 In line with management policies 7 and 9, a central aim of any further work on the site must be the further assessment and measurement of sediment movement across the site through the regular monitoring and quantification of changes in sediment depth in the immediate vicinity and wider environs of the wreck. There is considerable circumstantial evidence from diver observations to suggest that sediment mobility is making the site inherently unstable, and that newly exposed areas of wreck including timbers and delicate finds would not survive if exposed for any length of time.
- 7.4 In contrast, however, newly excavated areas have been observed to backfill naturally, which suggests that patterns of sediment transport on site are complex and may be characterised by localised, and possibly mobile (i.e. non-fixed) areas of scour and deposition, which requires further investigation and monitoring.
- 7.5 The results of previous attempts at on-site monitoring have not been sufficiently systematic, regularised, or rigorous to draw any firm conclusions but seem to confirm the complexity of sediment movements on site. Monitoring outside the wreck appears to indicate relatively little sediment movement, while observations within the wreck site appear to indicate localised scouring.

7.6 Further assessment of site stability can be achieved through two methods:

- Continued regular marine geophysical surveys including bathymetry, sidescan sonar and 3D Chirp to ascertain general trends in sediment movement across the site over time. In addition, this latter technique would help to confirm the depths of deposit across the site and the extent of buried structural remains.
- The re-installation of simple sediment control points across the site that could be monitored on a regular basis by the licensee team for the purposes of monitoring sedimentation and erosion.

7.7 The attempts by the licensee team to undertake this in 2012 are to be applauded, but the very brief and inconclusive results that have been outlined above are lacking in terms of site coverage, regularity, and depth of observation over time.

7.8 Any new system should be installed following a detailed re-assessment of all the geophysical survey data that have been collected over several years with siting of monitors in areas from which the most useful and informative data will be collected.

7.9 The new system should be more comprehensive and extensive, to enable intra- and extra-site observations. It should be regularised so that intra- and inter-seasonal observations can be made, and it should be robust so that observations can be conducted on the same monitoring stations over a longer timeframe.

7.10 This system should be installed, and the results monitored, under the supervision and direction of professional archaeologists.

7.11 A full assessment and comparison of the results of the 2016 survey, and any future surveys, against the datasets recently obtained from the PLA would enable comparative assessments over a wider area of the sites and over a broader timeframe.

7.12 These combined techniques would provide tangible evidence for sediment stability or transportation across the site on both a macro and micro level which would then inform future management strategies for the site.

Understanding the values of the *London* is vital

Continued field assessment

- 7.13 Undertaken through the *London* protected wreck site: Excavation of material at risk project, funded by the HPCP, survey that commenced in 2009 (under the contract for Archaeological Services in relation to Marine Designation) will be continued. To date (2017) the works have included geophysical survey of the site and diver-led evaluation and excavation, with assessment following on from this work. This project also expanded on the work to help facilitate licensee team access, by enabling the licensee team to undertake HSE SCUBA training so that they could participate alongside the professional dive team during excavation works.

Investigation and survey of exposed hull and gundeck structure

- 7.14 Clearly, the favoured option is for *in situ* preservation of the site. However, if regularised site monitoring (as outlined above) indicates that the site is at risk and in danger of exposure and destruction as a result of natural processes including sediment movement, then more pro-active techniques may need to be considered.
- 7.15 Following the recent excavations we now have a reasonable understanding of the extent to which the ship survives vertically i.e. from the main gundeck down to, but not including, the keel. However, it still remains unclear how much survives longitudinally (fore and aft), as this is not easily determined with any certainty from the current geophysical data, but should become clear if a 3D Chirp survey is conducted. The excavations exposed the gundeck and the side of the vessel along the gundeck although there was little time to record this in detail or to establish the extent of exposed structures fore and aft.
- 7.16 In the event that further monitoring and assessment of sedimentation and erosion on the site indicates that the remains are unstable/deteriorating then there may be some merit in returning to site to undertake preservation by record. This would endeavour to establish the extent of exposed structures of the hull and gundeck; to record these features, such as the frames, planking, deck beams, gunports etc in detail, and to identify what structures or artefacts lie exposed between the deck and the hull.
- 7.17 This additional work, coupled with regular geophysics, and monitored control points, will potentially give us a much better understanding and knowledge of the site and its environment.

The *London* is a shared resource; everyone can participate in sustaining the *London*

Works to help facilitate licensee team access

- 7.18 Funded through English Heritage's (as was) Designated Wrecks programme, the 'Managing change on wreck sites through community-based recording: The *London* recording' project (EH 6400 Wessex Archaeology 2013a & b) sought to identify and implement methods by which to increase the ease and productivity of licensee team access. The project was undertaken by Wessex Archaeology and funded by English Heritage through the NHPP. This project was concerned with developing a practical community-based model or protocol for recording 'at risk' designated wreck sites which experience difficult environmental or other conditions.

Interpretation of the *London*

- 7.19 This project for a virtual dive trail, funded by the HPCP (Historic England project no 7373), brings together data, interpretations and perspectives on the *London* with involvement from the licensee and nominated archaeologist. The project will result in the creation of an online resource designed to make the story of the *London*, and the significant archaeological remains, accessible to the public. This was developed from the recognition that owing to the location of the site, physical visitor access will always be very restricted, and thus other means of dissemination have been sought.

Works to support the community

- 7.20 Funded through the NHPP the *London* Community Archaeology project (no. 6784) aimed to support the team of affiliated volunteers who are working on the site to progress Historic England's knowledge and understanding and to ensure long term management strategies are in place.

Accessibility: presentation

- 7.21 It is hoped that future work will continue to closely involve the Southend Museum Service and possibly the National Maritime Museum at Greenwich to help disseminate information about the *London* and engage and enthuse the public about the site.
- 7.22 Cotswold Archaeology is currently preparing an Updated Project Design. This contains proposals that will address the need for ongoing and further conservation work, analysis of the excavated artefactual and ecofactual remains and dissemination of the excavation and analysis results to a wide audience through the publication of a monograph.

7.23 In addition, it is suggested that the broad range and remarkable preservation of the objects recovered from the wreck and the interest of the story of the ship itself, are such that a popular publication would appeal to a very wide audience. It would also be an appropriate accompaniment to the proposed exhibition of the finds.

The *London* Shipwreck Trust

7.24 The Trust was formed by the licensee team alongside a Southend-on-Sea Borough councillor, and gained charitable status in 2016. The Trust aims *to advance, promote and provide for the preservation of the London shipwreck and its artefacts for the public benefit and to protect it for future generations*. The Trust is a focus for fund-raising activities connected with these aims.

7.25 The proposed timescale for the implementation of these projects is summarised below (Table 5):

Table 5 Projects timetable

Project Title	Timetable	Management policy
Managing change on wreck sites through community-based recording: The <i>London</i> recording project EH 6400	2013–forward	1, 3, 5, 6, 7
The <i>London</i> community archaeology project: EH 6784	2013–forward	1, 3, 5, 7
Continued field assessment	2013–forward	4, 8, 9
<i>London</i> non-diver trail	2016–forward	2
Accessibility: presentation: assist Southend Museum Service with information for exhibition	2013–forward	2
<i>London</i> Shipwreck Trust	2016–forward	2, 3, 7

8 IMPLEMENTATION

Consultation

- 8.1 Once the internal review of the draft updated Conservation Statement and Management Plan for the *London* was completed it was submitted to Historic England for their consideration.
- 8.2 The Plan for the *London* was then circulated for a four-week stakeholder consultation (see Section 10 for list of consultees) to refine how the values and features of the site could be conserved, maintained and enhanced. Responses to the consultation were considered and the Plan has been revised as appropriate, into this final version.

Adoption of policies

- 8.3 Following approval, it is anticipated that the updated Plan will be adopted in 2017.
- 8.4 Responsibilities for implementation rests with Historic England (led by the Designation Department), although consultation with stakeholders will be maintained throughout. In addition, provision will be made for periodic review and updating of the Plan.

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10 AUTHORSHIP AND CONSULTATION

Cotswold Archaeology has prepared the updated Conservation Statement & Management Plan, with input from Historic England, the licensee team and the nominated archaeologist.

The original draft Conservation Statement & Management Plan for the *London* was prepared by:

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Significant contributions to the text were made by Mark James during his contract as Maritime Archaeologist at English Heritage.

The following individuals and organisations attended the public consultation meeting held in Southend on the evening of 3 May 2017:

Attendees		
Bernard	Arscott	<i>London</i> Shipwreck Trust and Southend on Sea Borough councillor
Mark	Beattie-Edwards	Nominated archaeologist
Mark	Dunkley	Historic England
Carol	Ellis	Licensee team
Stephen	Ellis	Licensee
Alison	James	Historic England
Simon	May	Southend on Sea museums service
Steve	Meddle	Licensee team
Angela	Middleton	Historic England
Georgina	Phillips	<i>London</i> Shipwreck Trust and Southend on Sea Borough councillor
Kiera	Phipps	Southend on Sea museums service
Kevin	Stratford	Cotswold Archaeology team
Michael	Walsh	Cotswold Archaeology

The following individuals and organisations were unable to attend the public consultation meeting but some provided comments on the draft Plan:

Apologies		
Steve	Allen	Finds specialist (provided comments)
Nadine	Atchison-Balmond	Natural England (provided comments)
Polydora	Baker	Historic England (provided comments)
Duncan	Brown	Historic England
Gill	Campbell	Historic England (provided comments)
David	Dungworth	Historic England
Richard	Endsor	Finds specialist
Sally	Evans	Cotswold Archaeology
Toby	Gane	Wessex Archaeology
Margarita	Gleba	Finds specialist
Michael	Grant	Finds specialist
Rachael	Haylock Jones	DP World
Zoe	Hazell	Historic England
David	Higgins	Finds specialist
Alexandra	Hildred	Finds specialist
Mark	Hobbs	Cotswold Archaeology team
Tim	Howard	Joint Nautical Archaeology Policy Committee/CIfA
Mark	James	Cotswold Archaeology team
Nick	Kelsall	Ministry of Defence
Alison	Kentuck	Receiver of Wreck (provided comments)
John	Lamb	<i>London</i> Shipwreck Trust & Southend on Sea Borough council leader
Simon	Mays	Historic England
Alex	Mortley	Port of London Authority (provided comments)
Quita	Mould	Finds specialist
Rodrigo	Ortiz	Cotswold Archaeology team
Rodrigo	Pachero	Cotswold Archaeology team
Ian	Panter	Finds specialist
Dave	Parham	Bournemouth University
Daniel	Pascoe	Nominated archaeologist (provided comments)
Des	Pawson	Finds specialist
Michael	Russell	Historic England
Dr Jörn	Schuster	Finds specialist
Graham	Scott	Nominated archaeologist
Jacqui	Shaw	National Museum of the Royal Navy
Cy	Sullivan	Cotswold Archaeology team
Karen	Walker	Cotswold Archaeology
Robert	Yorke	Joint Nautical Archaeology Policy Committee Kent and Essex Fisheries Committee

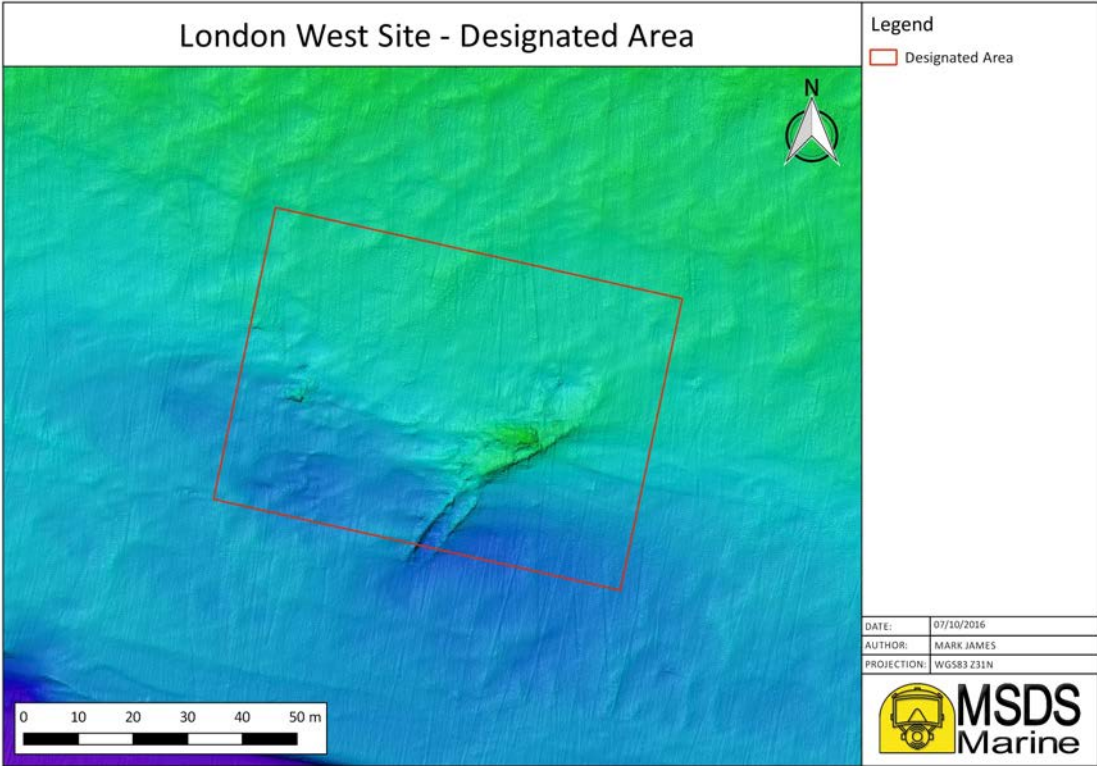
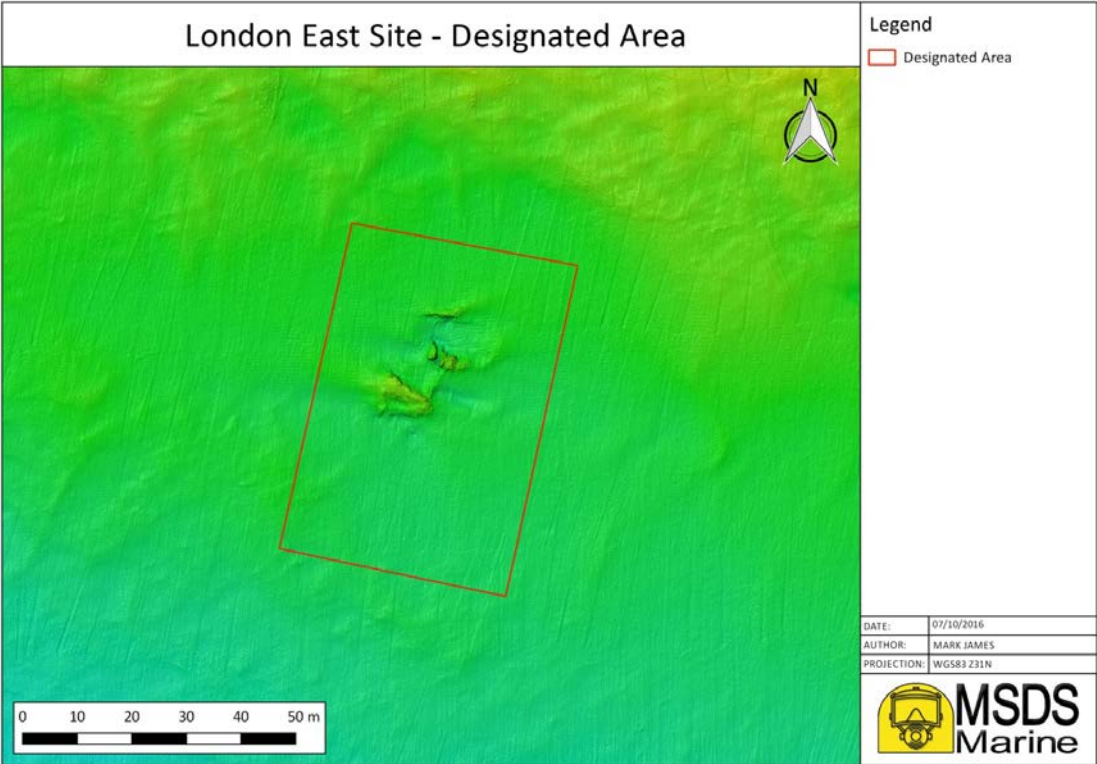
11 APPENDIX I: RECOMMENDATIONS FROM THE 2012 MANAGEMENT REPORT

Recommendation number	Recommendation	Justification	Progress/recommendations
1	Provide consistent long term management for the site.	The site is considered to have national importance but currently lacks a coordinated management plan. Long term public benefit is unlikely to accrue without a management plan.	Underway (this <i>Plan</i>)
2	Implement a ‘preservation by record’ strategy and facilitate this by supporting the work of the licensee team.	To ensure that short and long term public benefit is obtained from the site. A local survey licensee and team has been identified and appointed but lacks archaeological training and experience.	Underway (initially through the Wessex Archaeology Project 6400 and then through the Cotswold Archaeology Excavation of material at risk project)
3	Enlarge the designated area around S1	Wreck material from S1 exists on the edge of and probably beyond the southern edge of the existing designated area.	Complete
4	Monitor changes in the condition of the site on a regular basis.	The site is thought to be very vulnerable with well-preserved ship structure and a rich artefact assemblage on or close to the surface.	A twin track strategy is recommended: <ul style="list-style-type: none"> Further difference analysis should be carried out on as frequent a basis as PLA or other survey intervals will allow (subject to data access). The most recent survey was undertaken by MSDS Marine in 2016 and the results of conditions are summarised in this <i>Plan</i>. A program of sediment monitoring should be integrated in the survey work that will be carried out by the licensee team.
5	Develop an archaeological research framework/ strategy for the site.	A ‘preservation by record’ strategy requires a research framework in order to be fully effective and in order to achieve maximum public benefit.	Ongoing. The maritime research agenda for England sets out a framework in which research can be conducted. Further, site-specific strategies should take account of the particular values of the <i>London’s</i> remains. The latter should include any research undertaken by the former nominated archaeologist, who worked toward a framework based on the BULSI approach.
6	Conserve the finds from the 2010–11 fieldwork and provide long-term curation.	The finds are believed to have been conserved.	Awaiting update from Wessex
7	Conserve the finds from the 2014–16 fieldwork and provide long-term curation.	The finds are currently either in the process of conservation or are in desalination awaiting conservation.	This work is in progress and is being overseen by Angela Middleton of Historic England
8	Publish the results of Protection of Wrecks Act 1973 contractor work on the site in an appropriate journal such as Post-medieval archaeology and in popular archaeology/history magazines	To help ensure maximum academic and wider public benefit from the work that has been undertaken.	Ongoing by the archaeological contractor
9	Undertake further outreach work connected to the site	To raise public awareness of the site and its importance, promote the value of the management plan to stakeholders including the public and support the work of the licensee.	Ongoing by the archaeological contractor, the licensee team, the nominated archaeologist, Historic England’s contract manager and other Historic England staff.

12 APPENDIX II: SURVEY HISTORY OF THE SITE

Date	Site One (S1)	Site Two (S2)
1962		Reported as ‘foul’ by the PLA’s Hydrographical Office in February
1968		Resurveyed in May 1968 and the depth was amended
1973		Resurveyed in September 1973 and the depth was amended
1979	Reported as an unusual looking feature in November, presumably by the PLA Hydrographic Office	Re-examined in July and shown as wreck, in September of the same year the site was wire swept again
1981	Wire swept in November	
1985	Wire swept in October and reported to the UKHO. Further survey located the vessel in late October when the position was amended	
1985	Surveyed by Royal Navy minesweeper HMS <i>Sheraton</i>	
1990	Located and examined using Microfix. The depths and position amended	Located and examined using Microfix. The depth amended. Unclear if position was correct
1999		Located using DGPS and wire swept in June
2001		EMU Ltd–Side Scan Sonar in March
2002		Surveyed again with both sidescan sonar and magnetometer by EMU Ltd on behalf of Wessex Archaeology
2004	Relocated by the PLA using DGPS and updated the positions to WGS84 (WGD) from OSGB36 (OGB) using HMS <i>Grimsby</i>	
2004	Surveyed by the PLA with a multibeam and echo sounder, the wreck was recorded in three distinct sections	Potentially surveyed with multibeam
2005	Surveyed by HMS <i>Gleaner</i> in 2005. Reported as 47.1m x 28.4m lying ne/sw and in a broken up state	Surveyed by HMS <i>Gleaner</i> in 2005. Reported as being 37.5m x 27.4m.
2006	Surveyed by PLA with a Reson 8125 multibeam system	
2007	PLA sidescan sonar survey in August	
2007		PLA and Wessex Archaeology diver investigation on the site in October 2007. A series of artefacts were recovered
2009	High resolution sidescan sonar and magnetometer survey undertaken prior to diving operations by Wessex Archaeology	
2010	Surveyed by PLA with a Reson 8125 multibeam system	Surveyed by PLA with a Reson 8125 multibeam system
2010	Wessex Archaeology undertook diving operations which led to the recovery of 32 artefacts and 15 dendrochronology samples (from both sites)	
2011	Surveyed by PLA with a Reson 8125 multibeam system	
2011	Wessex Archaeology undertook diving operations to clarify the nature of archaeological material on the site	
2012–2013	<i>London</i> Reporting Protocol put in place for the site licensee. Diving investigations were also undertaken (2012) and a series of control points for recording positions were established on the wreck site.	
2014		Archaeological evaluation conducted on site by Cotswold Archaeology. Three trenches were excavated
2015		Archaeological excavation conducted on site by Cotswold Archaeology. Excavation focused on evaluation trench 3 and including the recovery of a well-preserved gun carriage.
2016	Marine geophysical surveys including multibeam bathymetry (400 kHz and 700 kHz), sidescan sonar (455 and 900 kHz) and sub-bottom profiling were undertaken on site by MSDS Marine on behalf of Cotswold Archaeology and Historic England.	
2016		Archaeological excavation continued on site by Cotswold Archaeology. Excavation continued in trench 3. Trench 4 was also excavated. Assessment work for 2014-2015 finds was completed.

13 APPENDIX III: BATHYMETRIC SURVEY DATA FROM 2016
WITH DESIGNATED AREAS OVERLAIN





Historic England Research and the Historic Environment

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A good understanding of the historic environment is fundamental to ensuring people appreciate and enjoy their heritage and provides the essential first step towards its effective protection.

Historic England works to improve care, understanding and public enjoyment of the historic environment. We undertake and sponsor authoritative research. We develop new approaches to interpreting and protecting heritage and provide high quality expert advice and training.

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