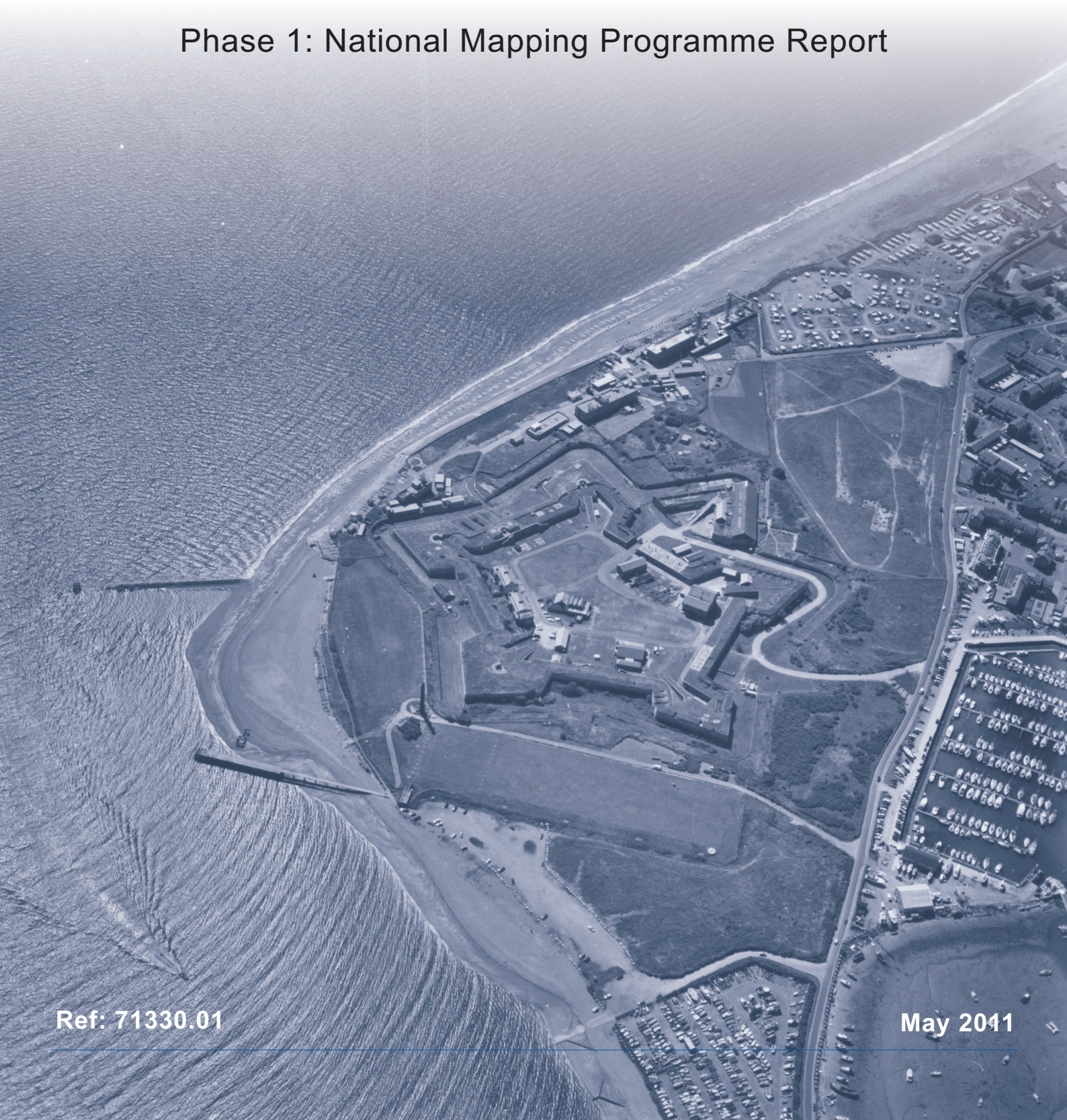
Wessex Archaeology

South East Rapid Coastal Zone Assessment Survey (SE RCZAS)

Phase 1: National Mapping Programme Report



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SOUTH EAST RAPID COASTAL ZONE ASSESSMENT SURVEY (SE RCZAS)

PHASE 1: NATIONAL MAPPING PROGRAMME REPORT – BLOCKS B, C, L AND M

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Executive Summary

This National Mapping Programme (NMP) aerial photographic mapping project forms a component of the South East Rapid Coastal Zone Assessment Survey (SE RCZAS), funded by English Heritage and undertaken by Wessex Archaeology. The aerial survey mapping component of the project was undertaken by Wessex Archaeology's dedicated aerial photographic team, who trained with English Heritage's Aerial Survey and Investigation team based in Swindon.

The results discussed in this report are from two distinct Study Areas – in Hampshire and in Kent. These Study Areas cover the areas labelled Blocks B, C, L and M of the original SE RCZAS NMP Study Area. Blocks B and C cover an area administered by the Hampshire Archaeology and Historic Building Record (AHBR) and Portsmouth City Sites and Monuments Record (SMR), and the area extends along the coast between Hill Head on the western side to Emsworth in the east. Blocks L and M cover an area administered by the Kent Historic Environment Record (HER), and the area extends along the coast from just west of Maxton in the west to Kingsgate in the east and included a section of the River Stour that extends 18km inland. The project Study Areas comprised 254 km^2 squares which covered a strip of land from the lowest astronomical tide level to up to 1km inland, including large intertidal areas in Portsmouth and Langstone Harbours, and some of Chichester Harbour. At the start of the project, the entirety of each individual km square was mapped, however as the project progressed, urban areas protected by solid sea defences were only mapped to 100m inland of Mean High Water; a total of 13 km^2 squares were subsequently reduced in size depending on the extent of the urban area within.

The project mapped and recorded previously unrecorded archaeological sites dating from the early prehistoric through to the modern period, with sites varying in form from prehistoric enclosures to WWII military sites, and from shipwrecks to ridge and furrow. Overall records for 1,991 previously unrecorded sites were created, and records for 1,195 existing sites were enhanced. The records were input into the databases for the respective local county or city records: Hampshire Archaeology and Historic Buildings Record (AHBR), Portsmouth Historic Buildings Sites and Monuments Record (HBSMR) and Kent HBSMR.

This report presents an overview of the project background, aims and objectives, data sources, methodology, results, and conclusions.

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List of Abbreviations:

AHBR – Archaeological and Historic Buildings Record
ARS – Air Raid Shelter
CA – Character Area
CC HES – Cornwall Council Historic Environment Service
CCO – Channel Coastal Observatory
DBA – Desk-based Assessment
DEFRA – Department for Environment, Food and Rural Affairs
DTM – Digital Terrain Model
EH – English Heritage
EWS – Emergency Water Supply
GIS – Geographic Information Systems
GCC – Gloucestershire County Council
HAA – Heavy Anti Aircraft Battery
HBSMR – Historic Buildings, Sites and Monuments Record
HER – Historic Environment Record
HCC – Hampshire County Council
IfA – Institute for Archaeologists
KCC – Kent County Council
Lidar – Light Detection And Ranging
MHW – Mean High Water
MIDAS – Metadata Integrated Data Analysis Server
NMP – National Mapping Programme
NMR – National Monuments Record
NNR – National Nature Reserve
PGA – Pan Government Agreement Aerial Photos
PCC – Portsmouth City Council
QA – Quality Assurance
RCHME – Royal Commission on the Historical Monuments of England
RCZAS – Rapid Coastal Zone Assessment Survey
SM – Scheduled Monument
SMP – Shoreline Management Plan
SMR – Sites and Monuments Record
SSSI – Site of Special Scientific Interest
UKHO – United Kingdom Hydrographic Office
WWI – World War I
WWII – World War II

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1. INTRODUCTION

1.1. BACKGROUND

1.1.1. This report highlights the results of the aerial photographic mapping project that constituted part of the deliverables for Phase I of the South East Rapid Coastal Zone Assessment Survey (SE RCZAS) that was undertaken by Wessex Archaeology for English Heritage (Wessex Archaeology, in progress).

1.1.2. This desk-based aerial photographic survey aimed to improve historic environment records in order to facilitate the assessment of the coastal archaeological resource, which will contribute directly towards the long-term management of the resource through Shoreline Management Plans (SMPs).

1.1.3. The project was undertaken in line with National Mapping Programme (NMP) guidance in order to ensure that the results could be integrated with this country-wide programme.

National Mapping Programme

1.1.4. NMP projects have been undertaken around the UK in order to inform English Heritage's capacity to investigate and understand the historic environment at the landscape scale.

1.1.5. NMP projects that have already been undertaken cover vast areas of England's landscapes. Ones of particular interest to this project included those with an NMP phase that had been undertaken on the coast, those that were particularly recently completed, and were also close to the Study Area. These included:

- Suffolk (Suffolk County Council / Hegarty & Newsome 2005);
- Severn Estuary (Crowther & Dickson 2008);
- North East (Archaeological Research Services Ltd 2008a);
- North West (Archaeological Research Services Ltd. 2009a); and
- New Forest (Cornwall Council 2010).

1.1.6. These projects have significantly enhanced the National Monuments Record and the relevant Historic Environment Recods with the addition of new records and the addition of further information to existing records.

1.1.7. All available RCZAS and NMP reports were analysed to ensure that this report meshed seamlessly with previous formats, discoveries and descriptions.

Rapid Coastal Zone Assessment Surveys (RCZAS)

1.1.8. Development threats to the coastal historic environment are managed through guidance such as PPS 5. As a result of this guidance, the historic environment is considered during the development process and is evaluated in detail at the Environmental Impact Assessment (EIA) stage, where mitigation measures are

identified to ensure the future appreciation and enjoyment of the archaeological resource.

1.1.9. Over the past couple of decades, threats to the historic environment from the natural processes of coastal change have been recognised. To address this situation, English Heritage (EH) and the Royal Commission on the Historical Monuments of England (RCHME) published a joint policy statement on the management of coastal remains (1996) and a nationally-based assessment of English coastal archaeology (Fulford *et al.* 1997). The assessment noted the poor quality of the available record of coastal remains and recommended further studies of the historic environment in the coastal zone. It promoted rapid baseline surveys that could enhance the records in order to enable a broad assessment of the range, significance and vulnerability of historic assets. As a result, EH has supported the development of RCZAS around the coast, the results of which contribute to Defra's programme of shoreline and estuary management. Therefore these projects are vital for informing coastal management decisions and future development. Further details concerning advice on the implications of coastal and flood defence for the historic environment for those involved in coastal planning, coastal defence and local curators have been developed by English Heritage (2003).

1.1.10. A number of RCZAS have already been undertaken around the coast of the UK, including:

- North East (Archaeological Research Services Ltd. 2008b; Archaeological Research Services Ltd. 2010);
- Yorkshire and Lincolnshire (Brigham *et al.* 2007; Buglass and Brigham 2007a, 2007b);
- Norfolk (Robertson *et al*. 2005);
- Suffolk (Everett *et al*. 2003; Suffolk County Council 2003);
- Essex (Heppell & Brown 2001, 2002; Heppell *et al*. 2004);
- Isle of Wight (Isle of Wight County Archaeology and Historic Environment Service 2000);
- Isles of Scilly (Cornwall Council 2004);
- Severn Estuary (Gloucestershire County Council 2008);
- North Kent (Wessex Archaeology 2000; 2002a,b,c; 2004a,b,c; 2005);
- Dorset (Wessex Archaeology 2004d);
- North West England (Archaeological Research Services Ltd 2009b); and
- New Forest (Wessex Archaeology 2010).

1.1.11. The South-East of England is one of the last coastal areas to be addressed by a RCZAS. A National Mapping Programme component has formed the basis for many of the recent RCZAS (for example those discussed above), providing detailed information about previously unrecorded sites, updating existing records, and identifying features that have been lost to coastal erosion or development.

1.2. AIMS AND OBJECTIVES

1.2.1. The aim of the NMP component of the SE RCZAS was to map archaeological sites visible in aerial photographs in order to enhance the local historic environment database records. This updated dataset is crucial for developing a greater understanding of the character of the historic environment resource along the coast, and the ways in which the resource could be impacted by future coastal change or development.

1.3. SCOPE OF THE PROJECT

1.3.1. The NMP project Study Area for the SE RCZAS spans the entire South East Coast – from Redbridge, Totton, Hampshire in the west to White Ness, Kingsgate, Kent in the east. The Study Area consisted of 723 individual km^2 squares, based on Ordnance Survey mapping squares. The squares were divided into 13 blocks and labelled A-M (omitting the letter I).

1.3.2. This report summarises the results for Blocks B, C, L and M that were undertaken by Wessex Archaeology (**Figure 1**). Blocks A, D, E and F are being completed by Cornwall Council Historic Environment Service (CC HES) (CC HES, in progress), and Blocks G, H, J, and K are being completed by Gloucestershire County Council (GCC) (GCC, in progress).

1.3.3. Blocks B and C cover an area that is administered by the Hampshire Archaeology and Historic Buildings Record (AHBR) and Portsmouth City Sites and Monuments Record (SMR). The Blocks extend along the coast between Hill Head in the west to Emsworth in the east, including Portsmouth Harbour, Langstone Harbour and part of Chichester Harbour, and comprise 132 km^2 squares. A total of 124km^2 squares were fully mapped and 8km^2 squares were partially mapped due to the urban presence protected with solid coastal defences.

1.3.4. Blocks L and M cover an area that is administered by the Kent Historic Environment Record (HER). The Blocks extend along the coast from just west of Maxton in the west to Kingsgate in the east and include a section of the River Stour that extends 18km inland. The area comprises 122 km^2 squares. A total of 117km^2 squares were fully mapped and 5km^2 squares were partially mapped due to the urban presence protected with solid coastal defences.

1.4. DATA SOURCES

1.4.1. Data for the project was gathered from the following sources:

- Aerial photographs supplied by:
  - National Monument Record (NMR), Swindon;
  - Channel Coastal Observatory (CCO);
  - Pan Government Agreement Aerial Photos (PGA); and
  - Google Earth.
- Local Council and City Historic Environment datasets:
  - Hampshire Archaeology and Historic Building Record (AHBR);
  - Kent HER; and
  - Portsmouth City SMR.
- NMR / AMIE records accessed through the PastScape website (http://www.pastscape.org.uk/)
- Historic mapping:
  - Ordnance Survey mapping Epochs 1 – 4 (1:2,500 and 1:10,560) supplied by English Heritage.
- Modern mapping:
  - Mastermap mapping supplied digitally by English Heritage (extracted 3 March 2009); and
  - Digital Terrain Model (DTM) data supplied digitally by English Heritage.
- Secondary Sources
  - Books, articles, maps, charts, and other materials regarding the history, archaeology, coastal change and development of the South East Coast held in Wessex Archaeology's library and other libraries in the South East.

Aerial Photographs

1.4.2. All readily available aerial photographs were consulted, and the aerial photographs held by the NMR were the prime source.

1.4.3. Initial estimates from the NMR regarding the number of photographs in their collection covering the Study Areas indicated a total of 17,118 vertical photographs and 1,558 oblique photographs (Helen Winton, e-mail 05/11/2009). However, the cover search completed by the NMR indicating which photographs were available to be loaned identified 7,509 vertical photographs and 2,870 oblique photographs, of which the NMR agreed to loan 6,462 vertical photographs and 2,851 oblique photographs. The loaned photographs comprised all oblique and vertical photographs up to 1950 and selected post-1950 vertical photographs as filtered by area and decade to ensure complete coverage. The filtering process was undertaken by the Aerial Survey team (Luke Griffen, various e-mails 2009-2010). The vertical photographs held by the NMR comprise mainly RAF sorties, with some photographs from the Ordnance Survey and Meridian Airmaps Ltd., which together ranged in date from 1939 to 1999, with the vast majority dated to World War II (WWII) or the years immediately following. The oblique photographs ranged in date from 1925 to 2005 and included photographs from the Crawford Collection, military obliques, and photographs from more recent NMR Aerial Survey sorties.

1.4.4. The photographs from the NMR were supplied by Block, so for example, all of the photographs for Block B were supplied at the same time. The NMR permitted four blocks of photographs to be loaned out at any one time - which facilitated working in the two Study Areas simultaneously. The photographs were initially used at the NMR offices in Swindon during the aerial photographic recording training period, and then later externally at Wessex Archaeology's Salisbury office.

1.4.5. However, difficulties were encountered with regard to photograph loan requests by other NMR users. Numerous photographs that were required for the project would be removed from the SE RCZAS photograph loans and loaned out, sometimes for considerable amounts of time. Up to 80 photographs could be requested from each external loan, and over 30 loan requests were made during the mapping phase. The North West Coast RCZAS refers to a problem regarding the M-Series photographs, whereby the supply of photocopied versions of these photographs were less clear than the originals (Archaeological Research Services Ltd. 2009a: 17) - this also became apparent during the SE RCZAS NMP project.

1.4.6. The aerial photographs from the CCO and PGA were supplied as digital files, already rectified and georeferenced. These were added as layers in the GIS. The CCO data covered the years 1986, 1994, 2001, 2002, 2003, 2005, and 2008-2009, although not all areas were covered by aerial photographs from all years. The PGA data spanned the years 1999, 2001, 2003, 2007 and 2008. The PGA data was not available at the outset of the project; only part of Block M was supplied with PGA date, and Block B received no PGA data, although it was fully employed for Blocks C, L and the southern area of M. Both datasets proved to be exceedingly useful.

1.4.7. Other forms of remote sensing imagery (for example Lidar) were not used during the mapping phase of the project. Although Lidar data tiles were downloaded from the CCO website and data held at the CCO office, an initial evaluation indicated that the resolution of the data was too low to identify small scale features, and it was decided not to use the data for the mapping project. However it is felt that in the future, higher resolution Lidar data could make a significant contribution to future coastal or inland archaeological surveys.

2. METHODOLOGY AND RECORDING

2.1. OVERVIEW

2.1.1. The following section provides a brief overview of the project methodology and recording. A more detailed version can be found in the Project Design (Wessex Archaeology 2009).

2.2. PROJECT ORGANISATION

2.2.1. The aerial photographic mapping project staff comprised four archaeologists, divided into two teams. Each pair of archaeologists worked on both aerial photographic mapping and record enhancement. The two teams worked alongside each other, but each was responsible for a different part of the Study Area, with one team working in Hampshire and Portsmouth and the other team working in Kent. Because of this division of labour, each team was able to develop an in-depth and comprehensive understanding of their part of the Study Area based on the combined use of both aerial photographic and desk-based sources. As outlined in the Project Design, this approach not only enabled greater thoroughness and encouraged overall efficiencies, it also had the benefit of extending the professional development and capacity-building aspects of the project.

2.2.2. During the training period in Swindon, the teams alternated their schedules, working two weeks in Swindon focussed on aerial photographic mapping and two weeks in Salisbury spent creating and enhancing HBSMR records - while one pair focused on aerial photographs, the other team focused on records. The National Mapping Programme staff anticipated that it would take three to six months of aerial photographic training for each member of the Wessex Archaeology aerial photographic interpretation team to become fully competent, and each team spent a total of four months in training in Swindon. After the eight months (from the beginning of July 2009 to the middle of February 2010) the project relocated to Salisbury, where the aerial photographic mapping and record creation was undertaken simultaneously.

2.3. NMP METHODOLOGY

Aerial Photographic Mapping

2.3.1. Archaeological features on aerial photographs were mapped to an appropriate level of detail in accordance with guidance developed by the National Mapping Programme (Aerial Survey and Investigation, Swindon 2010; Bishop S. and Oakey, M. 2010; National Mapping Programme 2010), using the conventions described therein. The majority of features have been mapped to illustrate the form in which they were visible, for example solid square polygons indicate extant buildings while polylines indicate walls or other linear structures, however, the convention for shipwrecks is slightly different. Shipwrecks were mapped with either a polyline or polygon illustrating the visible extent of the site, as often the structures were at least partially buried in intertidal mud, and it was not always possible to determine the full extents of the sites.

2.3.2. All available oblique and vertical aerial photographs were examined, and where possible, aerial photographs were examined under magnification or stereoscopically. The aerial photographs were scanned at a reasonable resolution, generally 600 dpi, and rectified using Aerial 5.33. Mastermap data supplied by English Heritage were used for rectification control and Ordnance Survey 1:2,500 historic maps were used when required. Topographic information, used to improve

the accuracy of aerial photograph rectification, was derived from Digital Terrain Model (DTM) data (5m) supplied by English Heritage. Modern aerial photographs, such as those supplied by the PGA and CCO were already available as geo-referenced digital images, and therefore no further rectification was required.

2.3.3. The Ordnance Survey maps and Mastermap data have an accuracy in the range of ± 2.8m. Aerial photographs were rectified to less than 2m, generally in the range of 1m accuracy. However, in the intertidal area, rectified photographs may have had accuracy of over 2m, resulting from a lack of control points on the available source photographs.

2.3.4. Rectified images were output from Aerial 5.33 as uncompressed geo-tiffs at a resolution of 1:5,000 and a resolution of 600dpi. The World file (.tfw) created alongside each tiff file and the control information were retained in the Aerial rda file.

2.3.5. Sites that were visible on the aerial photographs were mapped in ESRI ArcGIS 9.3. The Mastermap data and Epochs 1-4 Ordnance Survey maps (approximately dating from 1866 to 1946) were used as base mapping in the GIS, with Ordnance Survey mapping after 1946 consulted as required. The HER, SMR and AHBR datasets were consulted, as well as additional datasets available from MAGIC such as the NMR AMIE dataset, Scheduled Monuments, Listed Buildings, Battlefields, Conservation Areas and Historic Landscape Characterisation, were also accessed in the GIS to enable record comparison and to facilitate adding records from the NMR.

2.3.6. At the outset of the project, all sites within each individual km square of the NMP Study Areas were mapped. However, due to density of sites and limits on time and budget constraints, it was determined that within urban areas, sites would only be mapped up to 100m inland of Mean High Water (MHW). Additionally, at the project outset, every feature or site visible on aerial photographs was mapped to NMP standards, even if they had already been fully drawn on historic Ordnance Survey maps or more recent mapping. However, as time and funding constraints became more apparent, it was agreed to limit mapping to features not visible on historic or modern mapping.

2.3.7. A monument polygon was created in GIS and attached to every record that was created or enhanced. The polygon enclosed the mapping data and, in general, buffered the mapping by 5m. Once the records and associated mapping have been incorporated back into the relevant HER/SMR/AHBR, it is possible that data requested from their databases could receive the HBSMR records along with only the monument polygon that will provide a spatial element to the record. Dependent on the relevant HER/SMR/AHBR, the detailed mapping displaying every element of a site may not be available alongside the HBSMR records.

Report Figures and Plates

2.3.8. The figures that accompany this report do not show the monument polygons as their extents would be not be clear due to the density of sites recorded. Instead the points displayed on the figures show the centre point for each monument polygon.

2.3.9. The plates illustrate a range of sites in more detail – displaying an aerial photograph and the associated mapping. However, not all of the features that have been mapped are visible on the selected aerial photographs – because often a number of aerial photographs were used to fully map each site.

Recording / Use of Records

2.3.10. All mapped features were recorded in a stand-alone Historic Buildings, Sites and Monuments Record (HBSMR) database, in order to be uploaded to the relevant HER, SMR or AHBR at the end of the project. For Portsmouth and Kent, records

were created and enhanced directly in their respective HBSMRs. Although Hampshire uses a different system – the Archaeological and Historic Buildings Record (AHBR) - the records were transferred into an HBSMR system in order to have consistency through the project. Records created and enhanced in the Hampshire HBSMR set up for this project will be converted to their existing AHBR database and returned to them. New records were created or existing monument records were amended, following National Mapping Programme (2010) guidelines. Initially, all records were assessed for Quality Assurance by the NMP mentors, and therefore all records in Blocks B and most from block M were QAd. Satisfied with the level of accuracy and detail, it was agreed that 5% of the records for Blocks C and L would be QAd.

2.3.11. Record enhancement focused on creating and amending monument records of sites visible on aerial photographs, as it was assumed at the outset that existing records provided by Portsmouth City SMR, Hampshire AHBR, and Kent HER were already consistent with documented recording practice. Therefore the project did not revise or 'clean' existing records, except where relevant to the project. Each of the new or enhanced records had the SE RCZAS Event appended to it. Additionally, Source records were created and appended to monument records as required.

2.3.12. As record enhancement occurred through HBSMR, it is consistent with MIDAS (Metadata Integrated Data Analysis Server) and draws on INSCRIPTION wordlists: the Monument Types and Evidence terms were selected from the built in thesaurus browser which is based on the English Heritage NMR Monument Type Thesaurus also accessible through the Thesaurus website (http://thesaurus.english-heritage.org.uk/). **Appendix I** provides a Monument Data Table indicating the HBSMR fields that were utilised for this project.

2.3.13. All records were fully referenced – indicating the earliest aerial photographs where the site is visible, the aerial photographs that were used for mapping, and aerial photographs or mapping indicating if the site had been demolished. All aerial photographs were referenced denoting the stereoscopic pair where possible.

2.3.14. Recording practices were consistent with the practices documented by the NMP and reflected the relevant practices by Portsmouth City SMR, Hampshire AHBR, Kent HER and the NMR. In case of conflict, recording practice followed the NMP guidelines and examples available in each relevant HBSMR or AHBR covering the area to which the record related.

2.3.15. At the outset, it was determined that duplicate monument records would be highlighted for consolidation and deletion of the duplicate record by Portsmouth City SMR, Hampshire AHBR, and Kent HER. However, in many instances it was difficult to confirm that records were in fact duplicates, and in these cases, records were simply linked and a comment was added to the main record indicating the possible relationship.

2.3.16. This report has used the dates and categories defined by the HBSMRs and AHBR in order to analyse the records chronologically.

2.3.17. A gazetteer containing all the records that were created and enhanced as a result of the project has not been generated for this report not only because of the restrictions posed by reproducing large amounts of HER / SMR data but also due to the enormous volume of records that would need to be included. However, if required, the full records for each monument can be accessed either directly from the relevant HER, SMR or AHBR. The Kent and Hampshire data will be made available online, accessible either through the Heritage Gateway website, or directly from the Kent County Council website and Hampshire County Council website (all accessed May 2011. The Portsmouth SMR data is not yet available online.

2.4. ARCHAEOLOGICAL SCOPE

2.4.1. The archaeological scope of the project was based on that adopted by the NMP, and included all archaeological features visible on aerial photographs that ranged in date from the prehistoric period to 1945. All known, probable and possible archaeological features visible on aerial photographs as cropmarks, soilmarks, parchmarks, earthworks and structures were identified, interpreted, mapped and recorded.

Feature	Mapping description
Earthworks	All extant earthworks (banks and ditches) identified as archaeological in origin were mapped. Drainage ditches were not mapped except when associated with other archaeological features.
Extraction	As advised by the NMP mentors, extraction features, such as quarries, were not mapped, unless such features were deemed important to the project, for instance if they could be mistaken for other archaeological features. NMP guidance indicates that mapping of extractive features should be limited to groups of features (ie: complexes with extraction, spoil, buildings and transport features) while small-scale extraction sites for local use (ie: chalk pits, marl pits and other quarries are not mapped).
Cropmarks	All cropmarks, soil marks and parchmarks identified as archaeological or possibly archaeological in origin were mapped.
Field boundaries	Field boundaries that were depicted on Ordnance Survey maps were not mapped. However, if they were not included on the mapping or they were integral to the understanding of an archaeological site, they were mapped.
Ridge and furrow	Medieval and post-medieval ridge and furrow was mapped with a polygon indicating the extent of the covered area and with an arrow indicating the direction of the furrows. Extant or levelled ridge and furrow were differentiated in the mapping, and the assessment of survival was based on the most recent aerial photographs, generally those supplied by Google Earth, CCO or PGA.

Feature	Mapping description
Military features	Post-medieval and 20th century military features were mapped, including pillboxes, bomb craters, anti-tank cubes, barbed wire and other obstructions. At the outset, all visible military sites and features were mapped, even if they were fully drawn on historic or modern Ordnance Survey maps. However, as the project progressed, sites already recorded on historic or modern mapping, as well as extensive sites that were still active, were outlined as an extent of area. All previously unrecorded sites visible on aerial photographs were mapped. In Hampshire and Portsmouth, every pillbox was given an individual record, as requested by the NMP mentors. However, given the concentration of WWII records in Kent, pillboxes were often included in a single record covering the wider defence landscape. The WWII military features in Portsmouth Dockyard were not mapped due to the density of features of all periods; features would have to be mapped in a way that they could be interrogated chronologically which is not yet possible at this time with the NMP methodology. Bomb craters in the intertidal zone and bomb-levelled urban areas were also not mapped.
Buildings	Extant buildings as well as the foundations of buildings visible as cropmarks, soilmarks, parchmarks, earthworks, and ruined stonework were mapped. At the outset of the mapping project, all significant buildings were mapped. However, due to time constraints, this was reduced to only buildings not visible on available mapping. Key sites previously recorded and extensively surveyed and mapped by the Ordnance Survey were generally mapped as an extent of area and outlined with a monument polygon.
Natural features	Natural features, including geomorphological features, organic sediments and palaeochannel fills were not mapped, in reference to NMP methodology.
Parkland, landscaped parks, gardens and country houses	If these features were visible on Ordnance Survey mapping or already included in the HER/SMR HBSMR or AHBR database, they were not mapped. However, previously unrecorded features within these areas that were visible as earthworks or cropmarks were mapped.
Maritime features	Shipwrecks, pontoons, fish traps, and other features visible in the intertidal zones were mapped.

2.5. FACTORS AFFECTING THE RESULTS

2.5.1. A number of factors influence the ability to interpret aerial photographs (Wilson 2000). Of particular importance for coastal aerial photographic surveys, it is impossible to interpret intertidal features at high tide, as most of the feature would be obscured beneath the water. In areas with certain types of surface vegetation, or covered by woodlands or tree cover, archaeological sites such as earthworks or building foundations can be obscured. Additionally, earthwork or ditch features can be obscured when aerial photographs are taken when the sun is high in the sky and therefore do not have much shadow. Potential archaeological sites can also be

masked by weather events – for example many cropmarks are only visible after extremely wet or extremely dry weather or only at certain times of the year. In some cases, earlier sites can be obscured by later developments, for example medieval or post-medieval ridge and furrow obscuring earlier archaeological features. In addition, urban expansion and industrial activities may have already damaged, destroyed or hidden potential archaeological features, thus making it more difficult to interpret any known sites within their wider context.

2.5.2. There were additional difficulties mapping in the intertidal area, as it was complicated and time consuming to rectify aerial photographs in these areas. As a result of this, although every effort was made to ensure a high level of accuracy even in the intertidal zone, the accuracy of the mapping is sometimes lower than that for terrestrial coastal sites.

2.5.3. Another difficulty was assigning dates to the sites visible on aerial photographs, with decisions made generally based on the site morphology or layout. The problem was particularly apparent with many of the cropmarks, which were often just labelled as 'prehistoric' or 'unknown'. It was also difficult for sites such as ridge and furrow or drainage ditches, which could date from the medieval to modern periods.

2.5.4. Finally, difficulties were encountered in clearly defining the edges and extents of features when using the photocopied versions of the M-series photographs rather than the originals – see paragraph 1.45.

2.6. PROJECT ARCHIVE

2.6.1. The project archive created in the course of the project will be consolidated and collated in accordance with current professional standards, including *Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation* (Brown 2007) and the IfA's *Standard Guidance for the creation, compilation, transfer and deposition of archaeological archives* (IfA 2009).

2.6.2. It is anticipated that the project archive will be deposited on completion of the overall SE RCZAS at a suitable long-term repository, as advised by English Heritage and in discussion with the Liaison Group. Pending Phase 2, the project archive will be held by Wessex Archaeology at its Salisbury office.

2.7. PROJECT DISSEMINATION

2.7.1. This SE RCZAS NMP project report will be available, along with other NMP reports, on the English Heritage website (http://www.english-heritage.org.uk/professional/research/landscapes-and-areas/national-mapping-programme/).

2.7.2. The digital mapping records will be available from the NMR in Swindon and through the Portsmouth City SMR, Hampshire AHBR, and Kent HER. The associated HBSMR database records including their spatial location data will be available through Portsmouth City SMR, Hampshire AHBR, and Kent HER. The Kent and Hampshire data will be made available online, and will be accessible either through the Heritage Gateway website, or directly through the Kent County Council website and Hampshire County Council website (accessed May 2011). However the Portsmouth SMR data is not yet available online.

2.7.3. Information about the project has been available through the Wessex Archaeology website (http://www.wessexarch.co.uk/projects/marine/rczas/south-east) since the project commenced, and additional information about the NMP results will be accessible there.

2.7.4. An initial presentation at the outset of the project shared the project aims and objectives with the Liaison Group, and invited further discussions, comments and recommendations for how the project should proceed.

2.7.5. Preliminary results for the project were presented at the 2009 and 2010 NMP Conferences, and presentations discussing the project methodology have been made during University Student visits to Wessex Archaeology.

3. PROJECT RESULTS: BLOCK B & C (HAMPSHIRE AND PORTSMOUTH)

3.1. PREVIOUS ARCHAEOLOGICAL SURVEY WORK AND RESEARCH

3.1.1. A considerable amount of research has been undertaken on the South East coast, from wide scale assessments of the regional resource to individual site excavations, and this information provides a rich backdrop for aerial photographic interpretation. It would be impossible to discuss all previous archaeological survey work and research here; instead, a detailed chronological overview of the historic environment resource in Hampshire and Portsmouth can be found in the Main SE RCZAS Report (Wessex Archaeology, in progress).

3.1.2. Additionally, information regarding recent archaeological work in Hampshire and Portsmouth can be found in the draft versions of the Solent Thames Research Framework Resource Assessments (Oxford Wessex Archaeology, 2010a) which provides a survey of all aspects of the rich and diverse past of the areas it covers. The Solent Thames Research Framework Research Agenda (Oxford Wessex Archaeology, 2010b) indicates areas where there are gaps in knowledge and recommends future research priorities.

3.2. GEOLOGY

3.2.1. The solid and drift geology in the Hampshire and Portsmouth Study Area varies depending on the area of coast (Geological Survey 1957, 1958 & 1964), and will be discussed in more detail within the Historic Landscape Characterisation Units identified below. Generally, the geology comprises Plateau Gravel around the coast of Gosport and the west coast of Portsmouth, with large areas of Brickearth or Bracklesham Beds Formation further inland and around Portchester and Cosham. A band of Combe deposits extends east-west along the north side of Langstone Harbour, and is also apparent at Portchester Castle and Lower Quay. The area around Cams Hall Estate comprises Reading Beds. The harbours and low-lying areas such as Farlington Marshes comprise alluvium.

3.2.2. The soils in the Hampshire and Portsmouth Study Area generally comprise argillic brown earths, with parent material comprising Brickearth and associated drift (Avery *et al.* 1965). The soils are characterised as deep silty soils with high groundwater mostly controlled by ditches.

3.3. LANDSCAPE CHARACTER

3.3.1. Information about the Historic Landscape Character (HLC) of Hampshire has been derived mainly from the *Hampshire County Integrated Character Assessment* (Hampshire County Council 2010).

3.3.2. The Study Area is represented by the following Historic Landscape Character Areas (**Figure 2**):

- 9F: Gosport and Fareham Coastal Plain
- 9H: Hayling Island Coastal Plain

- 9G: Havant and Emsworth Coastal Plain
- 10A: Portsmouth Harbour (details not available at time of writing)
- 10B: Langstone and Chichester Harbours
- 11C: Eastern Solent
- Portsmouth / Portsea Island do not have a specific Historic Landscape Character Area.

3.3.3. The coastline of the Gosport and Fareham Coastal Plain (9F) comprises areas of open coastal shore, river valley terrace, small areas inland of enclosed coastal plain, a discrete area of coastal plain and grazing marsh near Cams Hall Estate, and considerable areas of settlement. The geology in this area comprises plateau gravel along much of the coast, with areas of Bracklesham Beds Formations around Priddys Hard and further inland. There are also areas of Plateau Brickearth (Geological Society 1964). Much of the historic landscape has been altered over time or built over. In the early 19th century, much of the area consisted of an intensively farmed landscape of small enclosures and common fields. The area does not appear to have been favoured for salt production, and at the beginning of the 19th century, the only major salt producing area was at the entrance to Fareham creek, with a small area by current day Hill Head. Significant parks in the area include the grounds of Haslar Hospital and Cams Hall. Many of the roads and lanes derive their courses from earlier ladder field systems. The settlement pattern was focused on Fareham and Gosport as important market and defence related towns, although there was dispersed settlement around what is now Stubbington. Most development in the area has occurred since 1945. Much of the character of this area has been influenced by activities and construction regarding the defence of Portsmouth Harbour – from the Roman Saxon Shorefort origins of Portchester Castle to the declaration by Henry VIII that Portsmouth harbour would be the home of the British Navy, and over the following centuries with the addition of defences at Stokes Bay, Fort Monckton and Fort Gillkicker. The modern airport HMS Daedalus is also a prominent feature of the area.

3.3.4. The coastline of the Havant and Emsworth Coastal Plain (9G), situated to the north of Hayling Island, is characterised as a former river terrace landscape which developed during the Pleistocene (before the end of the last Ice Age 12,000 years ago) and comprises extremely fertile agricultural silty loam and alluvial soils. The majority of the area was enclosed by the late 18th century, and much of the lower lying areas had been embanked and the coastal landscape reclaimed. There are several medieval saltern sites, but the major period of activity on the coast was between 1600 and 1900. Tide mills are a particular characteristic of this area. During the 20th century, there have been drastic changes to the rural agricultural landscape as a result of expansion of Havant and Emsworth and the reorganisation of field patterns into a much more regular pattern. The development of the M27 has also led to loss of the former rural landscape. The towns of Emsworth and Havant have strong historic associations and are situated along an east-west Roman road. Emsworth had strong maritime ties, and was an important port for ship building, rope making, net and sail making, fishing and oyster fishing. The area in general was a focus for early industries such as salt making, tanning and parchment making. Local industries had declined by the beginning of the 19th century, but the area saw notable post-war expansion as housing developments were built to re-house many of the residents from bomb-damaged Portsmouth.

3.3.5. Hayling Island and Coastal Plain (9H) is a low lying, predominantly open island separated from the mainland by shallow tidal harbours. The maximum height of the island is on average about 5m above Ordnance Datum (aOD). Chalk underlies the coastal plain in the north; the south coastal plain is underlain by London Clay, and on the south coast, the geology comprises sand and silty clays. River deposits cover

most of the island, resulting in good agricultural soils, but the coastal fringes include storm beach shingles and sands. The east side of the island comprises large areas of reclaimed land, often located in former coastal inlets that have silted up and been enclosed by sea walls. The historic landscape has been heavily influenced by coastal processes – such as land reclamation. The land has been farmed over a long period, and had been largely enclosed by the 1870s. Typical settlement on Hayling is low density, and early development was concentrated in the north of the island. The south of the island developed as a result of leisure interest in the late Georgian period, and continued to grow until the 1970s.

3.3.6. Despite the fact that the HLC for Portsmouth Harbour (10A) is not yet available, a general description is presented below. Portsmouth harbour is a large natural harbour, and the mouth of the harbour is protected by military installations at Gosport on the west side of the entrance and Portsmouth on the east. The solid geology of the harbour comprises Barton, Bracklesham and Bagshot Beds in the south, with bands of London Clay and Brickearth to the north, with Chalk at the north-eastern-most reaches of the harbour (Geology Society 1957). The solid geology is overlain by alluvium (Geological Society of Great Britain 1964). The harbour has been used intensively since at least the Roman period, as represented by the remains of a Roman Saxon Shore Fort at Portchester Castle. Maritime activity in the area would have increased steadily in the medieval period, with a significant increase in the 1600s, when Portsmouth became the home of the Royal Navy. Because of the strategic nature of the harbour, and of Portsmouth and Gosport, much of the coastline has been developed with military fortifications from the post-medieval period onwards, including a wide variety of forts, while other complexes, such as victualling yards, provided support to the Navy. In addition to military traffic, maritime traffic in the harbour would also have included local fishing boats and trading vessels. In modern times, the harbour has become a major commercial ferry port, with services to the Isle of Wight, the Channel Islands and France, while still supporting considerable leisure sailing activities.

3.3.7. Langstone and Chichester Harbours (10b) are characterised as shallow marine basins with mud flats, sand banks and raised beach deposits of shingle. These sediments overlay White Chalk in the northern part of the area and London Clay and Reading Beds in the south. Much of the coastline comprises sea defences. The harbours are sheltered and have historically seen a wide variety of uses including salt production, oyster farming, wildfowling, sheltered navigation, and so forth. In recent times, development in the area has focused on recreational activities.

3.3.8. The Eastern Solent (11C) comprises the body of water from Cowes/Calshot in the east to West Wittering. During the Pleistocene, the Eastern Solent consisted of a river which drained the Hampshire basin into the English Channel to the south-east of the Isle of Wight. The geology of the area comprises Barton clays in the north and Becton and Barton sands to the south, overlain by the periglacial gravel beds of the drowned Solent river system. The seabed sediment generally comprises mud and shingle. This is one of the busiest waterways in the world for commercial shipping, and it is also important for shellfish harvesting and recreational activities. There has been active use of the waterway since at least the Roman times, for example from the Roman settlement in Bitterne, and by the 10th century, Southampton was an established port. Around 1650, Portsmouth and the Hamble became important for the construction and repair of naval ships. Since then, the area has remained important for defence. The Palmerston forts, built as a ring of defences around Portsmouth in the late 19th century, guard the entrance to the eastern Solent.

3.3.9. Although Portsmouth and Portsea Island are not specifically described as an Historic Landscape Character unit, they can be considered within the Historic

Landscape Characterisation of the surrounding areas. Similar to Hayling Island, Portsea Island comprises a flat, low lying island separated from the mainland by shallow tidal harbours and Ports Creek. The solid geology of the area comprises Barton, Bracklesham and Bagshot Beds in the south, with bands of London Clay, Brickearth to the north, with Chalk at the north-eastern-most reaches of the harbour (Geology Society 1957). On the west coast of the island, and in a few inlets on the east coast, the solid geology is overlain by Plateau gravel, while in the centre and east side of the island, the solid geology is overlain by Brickearth. To the west of the Great Salterns, an area of Reading Beds Eocene geology is exposed. The soils on Portsea Island generally comprise argillic brown earths, consisting of deep silty soils with high groundwater mostly controlled by ditches, and suitable for horticulture and general arable activities (Avery *et al.* 1965). During the medieval or post-medieval period, large stretches of the east coast of the island were used for saltworking activities, such as around the Great Salterns area. At this time, coastal defence banks were constructed around much of the coast, and land reclamation activities would have provided additional agricultural and grazing areas. Although there was likely a settlement at Portsmouth from at least the 12th century, development would have increased considerably after 1650 when Portsmouth became the home of the Royal Navy, and the ship building, repair and victualling industries that accompanied it. Because of its strategic location, the coast of Portsea Island has been fortified throughout the post-medieval and modern period with sites such as Fort Cumberland, Eastney Fort East and West, Southsea Castle, and the Point Battery. Today, Portsmouth largely comprises settled urban area, with modern coastal sea defences protecting the land from inundation.

3.4. OVERVIEW

3.4.1. This section provides a brief overview of the results of the SE RCZAS project in Blocks B and C. It indicates the quantity of records created and enhanced, and it describes the types of sites that were encountered and mapped. This section does not attempt to situate the monuments within a wider context or the broader archaeological landscape, as a more detailed and comprehensive report has been produced assessing the resource (Wessex Archaeology, in progress). Sites discussed in this report are referred to by their unique Hampshire AHBR or Portsmouth HBSMR identifier number. The Portsmouth HBSMR covers the extent of the Portsmouth Administrative area (**Figure 1**), while the Hampshire AHBR covers the rest of Blocks B and C. In the Hampshire AHBR, all records have been assigned MWX numbers, while in the Portsmouth HBMSR, pre-existing records are noted as MPM while new records were provided with MWX prefixes.

3.4.2. The vertical and oblique coverage of this area was extensive and provided ample evidence for archaeological sites. However, as the majority of photos were taken either during or immediately after WWII, this may have led to a bias in the number of military sites that were identified, and these may obscure earlier archaeological sites. However, on Hayling Island and to the north of Hayling Island, the vast majority of photographs were dated to 1948 and later, thus limiting the number of WWII sites identified, as many military sites had already been demolished by this time.

3.4.3. Prior to the project, there were 292 existing records in the Hamsphire AHBR within the Study Area and 204 existing records in the Portsmouth HBSMR. Overall, 638 records were added - 333 in Hampshire and 305 in Portsmouth, and 482 records were enhanced – 466 in Hampshire and 16 in Portsmouth (**Figure 3**). In Hampshire, the creation of 333 records more than doubled the number records in the database, while in Portsmouth, the creation of 305 new records resulted in a 150% increase.

3.4.4. The vast majority of new and enhanced sites were related to WWII – with 186 new WWII records and 67 enhanced records in Hampshire and 181 new WWII records and 1 enhanced record in Portsmouth.

3.4.5. Any features that extended outside of the Study Area were mapped to their full extent, in order to be recorded as a cohesive monument, rather than individual features.

3.4.6. In both the Portsmouth HBSMR and Hampshire AHBR, new sites ranged from the medieval period to sites built immediately after WWII, with a few undated sites of possible prehistoric date, and the site types ranged from unidentified cropmarks to WWII air raid shelters, wrecks, railways and reservoirs.

3.4.7. The dating of sites recorded from aerial photographs relied on a number of methods. For WWII sites, often the development of sites could be explored by viewing a range of photographic sources from before, during and after the war. However, for the vast range of other site types, dating relied on recognising morphologically characteristic forms. Other sources of archaeological and historical data, including historic maps, were consulted to complement the aerial photographic evidence and aid interpretation.

3.4.8. The following sections examine the data chronologically, based on the divisions in the HBSMR and AHBR databases, to provide broad 'period' overviews (**Figure 4**). Sites are discussed within the earliest recorded date range, rather than in each of the periods in which they were active or development occurred.

3.5. PREHISTORIC TO ROMANO-BRITISH (C. 700,000 BC - AD 409)

3.5.1. No prehistoric or Romano-British records were created in the Portsmouth HBSMR, but one Mesolithic record was enhanced by adding its NMR reference (**Ports MPM163**).

3.5.2. In the Hampshire AHBR, no prehistoric or Romano-British records were created, however nine existing records were enhanced. The existing record for an Iron Age or Romano-British temple on Hayling Island (**Hants MWX23605**) was enhanced, and the site was mapped to NMP standards. The temple was clearly visible as cropmarks in modern aerial photographs taken in 1975 (courtesy of the NMR) and in 1999 (courtesy of PGA) (**Plate 1**), despite the fact that it was not visible in aerial photographs taken in 1946. This site and the aerial photographs covering it highlight the importance of thoroughly examining modern photography and of repetitive aerial survey over the same area. They also demonstrate how different environmental conditions highlight different sites, as sub-circular and sub-rectangular enclosures (**Hants MWX38215**), visible immediately adjacent to the temple on aerial photographs taken in 1946, were not visible on the later photographs. The existing record of the enclosures (**Hants MWX38215**) was also enhanced and the site was mapped to NMP standards. In addition, the record was linked to existing records of sites located nearby, including the record of Romano-British inhumations (**MWX37319**) and an archaeological evaluation on land at Northney Road (**MWX57314**) that revealed late Iron Age and Roman features including pits, a funeral pyre, cremations and ditches.

3.5.3. The record for Portsmouth Castle (**Hants MWX5851**), which began as a Roman Saxon Shore Fort, was also enhanced.

3.5.4. The extents of a round barrow near Lee-on-the-Solent (**Hants MWX18978**) were mapped to provide more information about the size and shape of the monument.

3.5.5. Much of the coastline around Portsmouth and Hampshire has been developed, and in the developed areas where the ground has already been disturbed or built over,

there is considerably lower potential for the discovery of prehistoric sites. Therefore, although disappointing, it was understandable that no unrecorded features of prehistoric or Romano-British date were recorded.

3.6. SAXON AND MEDIEVAL (AD 410-1539)

3.6.1. There were no new Saxon (AD 410-1065) records created in the Portsmouth HBSMR or Hampshire AHBR, but existing Saxon records related to Portchester castle were linked to the parent record.

3.6.2. In Portsmouth, the majority of medieval sites are associated with coastal sea defences or flood protection (for example -- from Portsea Island: **MWX415, MWX462, MWX566, MWX616, MWX6369, MWX679,** and **MWX701**). The sea defences provide solid evidence for land reclamation activities that were undertaken from the medieval to the modern period. The medieval date of these sea defences reflects their earliest possible date range, and some may not have been constructed until the post-medieval period. Evidence for sea defences generally comprises still extant earthworks, although in some areas earthworks have since been levelled, while in others they have been replaced with concrete barriers. There were also considerable sea defence banks built to the south, east and north-east of Portchester (**Hants MWX60523, Hants MWX60546,** and **Hants MWX61367**), and associated drainage ditches (**Hants MWX61416**)

3.6.3. One of the sea defences (**Ports MWX462**) west of Tipnor, was associated with a saltern site (**Ports MWX461**). The saltern site was visible as an irregular shaped area of rough ground and earthworks including ditches.

3.6.4. Other areas of known and potential salterns were mapped from the historic mapping, for example the Great Salterns (**Ports MWX625**) on the east side of Portsea Island, which were mapped from the 1870 1:10,560 Ordnance Survey map, to ensure the full extent of the site was recorded. Areas marked as 'Saltings' on Ordnance Survey maps could indicate areas of previous salt-making activities, and include **Ports MWX663** and **Ports MWX664**, although the marking on the Ordnance Survey maps may simply indicate an area of marshy ground occasionally inundated by seawater. The extents of areas of known and potential salterns that had been previously identified by Wessex Archaeology's Hampshire Salterns project were also added to the Hampshire AHBR (Wessex Archaeology 2002d).

3.6.5. A possible medieval or post-medieval fish trap (**Hants MWX60537**), visible as a U-shaped line of stones, was situated in the intertidal zone immediately south of Portchester Castle. Although many areas of the coast of Britain have high concentrations of fish traps, for example in the Severn Estuary (see Gloucestershire County Council 2008), there was a notable paucity of remains discovered in Blocks B and C Study Area, which could be due to a wide range of factors – including tidal conditions, heavy vessel traffic or redevelopment of the harbour over time.

3.6.6. A hard or former pier (**Hants MWX61397**) in Fareham Lake, Gosport, in proximity to the Royal Navy Ammunition Depot, was visible as a structure on aerial photographs. It would have enabled people and goods to reach vessels and ships moored at low tide.

3.6.7. The features visible in Portsmouth Dockyard (**Ports MWX482**) were not mapped, as it was felt that the wide range of surviving features, and the evidence for previous buildings and features (as represented on historic maps and charts of the Dockyard) had been better represented elsewhere (for example Wessex Archaeology 2004e). The dockyard has been used intermittently as a royal dockyard since the late 12th century, although the 'Navy Royal' was not established there until the early 16th century. The earliest extant buildings on the site date to the 18th century. The

surviving structures and buildings comprised all the facilities needed for servicing the sailing fleet, including wet and dry docks, mast ponds, mast houses, timber yards, saw mills, rope walks, pitch houses, a block maker's shop, as well as stables, houses, offices chapels and boundary defences. Aerial photographs taken in the 1940s illustrate the WWII developments of the dockyards. Instead of mapping Portsmouth Dockyard, a polygon indicating the extents of the site was created based on the 1911 Ordnance Survey map (1:2,500).

3.6.8. Other medieval sites mapped from aerial photographs include areas of ridge and furrow (**Ports MWX683**) visible as earthworks. At this site, the irregularly shaped field was partially enclosed to the south and west by earthen banks, and the widely spaced rig extended roughly north-south.

3.6.9. In the Hampshire AHBR, the vast majority of new medieval sites were related to ridge and furrow, in Gosport (**Hants MWX60585**), North Binness Island (**Hants MWX62759**), and Brockhampton (**Hants MWX62777 and MWX62778**), with a large concentration of fields on Hayling Island (including **Hants MWX62785 and MWX62790**). Between Portchester Castle and Fareham Sewage Works, five fields of possibly medieval or post-medieval ridge and furrow or field drainage (**Hants MWX61411**) were visible as earthworks on aerial photographs taken in 1946. However, by 1967, all five fields had either been levelled or developed. A pre-existing record of ridge and furrow (**Hants MWX54712**) on Stoke Common was enhanced by updating the positional data with a monument polygon.

3.6.10. Other sites visible on aerial photographs were mapped to enhance the existing record, such as: Fort Blockhouse (**Hants MWX19017**), Gosport, an 18th century fort that guarded the entrance to Portsmouth Harbour; a landing stage on Hayling Island (**Hants MWX58035**); and sites on the coast of Portsea Island such as the Square Tower (**Ports MPM20**) and Round Tower (**Ports MPM23**), both visible as structures at either end of the Point Battery (**Ports MWX489**). The mapping of the Square and Round Towers not only provided more detail for the coast of Portsmouth, but also corrected errors in the original record location data. The Round Tower is only located about 75m to the south-west of its original recorded location, but due to a typing error in the original location of the Square Tower, the position's co-ordinates in the database initially indicated that the site was located over 426km to the west of its actual location.

3.6.11. At Portchester Castle (**Hants MWX5851**), the medieval record was also enhanced, as aerial photographs taken in 1925 and 1938 show parchmarks in the outer bailey of the castle that illustrate the below ground remains of a Tudor storehouse. The extents of the storehouse were mapped, and add a further dimension to the extant remains of the castle.

3.7. POST-MEDIEVAL (AD 1540-1900)

3.7.1. A wide variety of post-medieval sites were mapped from aerial photographs – this section presents a brief overview.

3.7.2. Numerous military sites were mapped, and at the outset of the project, the entirety of the known military sites was mapped to NMP standards, even when the sites were also illustrated on Ordnance Survey mapping. For example, the records of: Fort Monckton (**Hants 190018**), Fort Gilkicker (**Hants MWX6364**), Gosport Lines and the Gosport Lines Bastion No. 1 (**Hants MWX19019** and **Hants MWX19298**), the site of Gosport Town moat (**Hants MWX31356**), , Batteries No. 1, 2, 3, 4, and 5 and the Stokes Bay Lines (**Hants MWX57643**, **Hants MWX6464**, **Hants MWX38772, Hants MWX57644**, **Hants MWX27653,** and **Hants MWX18977**), Haslar Gunboat Yard (**Hants MWX38758**), Browndown Battery (**Hants 6322**), Priddy's Hard (**Hants MWX33512**) (**Plate 2**), Royal Clarence Yard (**Hants**

MWX17568) and the Royal Clarence Yard railway (**Hants MWX57678**) were considerably enhanced by the mapping of all visible buildings, structures and earthworks. At Priddy's Hard and Royal Clarence Yard, this work complemented earlier work that had identified and recorded the existing buildings and structures and the new mapping provided more detailed visual information.

3.7.3. Some large sites, such as Haslar Royal Naval Hospital (**Hants MWX60415**), had been studied in detail previously, but no 'parent record' had been created to collate previous work. At Haslar Royal Naval Hospital, the 'parent record' was created and linked to all existing records relating to the site. In addition, the site was mapped in its entirety to NMP standards.

3.7.4. Other sites that had not yet been recorded in the HBSMR or AHBR, such as Gosport Barracks (**Hants MWX60436**), Haslar Barracks (**Hants MWX60405**), HMS Hornet (**Hants MWX60418**), Forton Barracks / HMS St Vincent (**Hants MWX60437**) and Browndown Training Camp (**Hants MWX60384**) were also mapped in their entirety and new records were created. For example, the mid-19th century Browndown Training Camp (**Hants MWX60384**) was visible on aerial photographs taken in the 1940s as a number of regularly arranged buildings, with a rifle range to the west comprised of a number of banks and ditches. Smaller sites, such as the Drill Hall or TA Centre (**Hants MWX60427**) on Walpole Road, Gosport, were also mapped.

3.7.5. Previously unrecorded features related to existing sites, such as the bulwark (**Hants MWX60394**) and moat (**Hants MWX60412**) associated with Fort Monckton, were mapped and new records were created.

3.7.6. As the project progressed, it was decided that any sites already drawn in detail on Ordnance Survey maps would not be mapped, but additional features would be mapped, for example previously unrecorded earthworks or parchmarks, and additional WWII features, such as pillboxes, air raid shelters or temporary military camps. Examples of known military sites that were not mapped in full include the torpedo testing range on the man-made Horsea Island (**Ports MWX432**), Southsea Castle East and West Battery (**Ports MWX510**) and HMS Excellent on Whale Island (**Ports MWX479**), a late 19th century Royal Naval shore training establishment. Two causeways linking Whale Island and the mainland (**Ports MWX433** and **Ports MWX434**) were visible on aerial photographs as structures and as earthworks in the intertidal zone, but as they had not previously been recorded they were mapped in detail. Various rifle ranges and batteries were also identified. At Tipner Magazine and Firing Range (**Ports MWX464**) only features not visible on the Ordnance Survey mapping were mapped, because a far more detailed survey of each of the buildings at Tipner had already been commissioned by English Heritage (Lake 2003). Thus, the mapping work at Tipner was designed to enhance the previous research. Existing post-medieval monument records were also enhanced by adding a monument polygon to the record that encompassed the extents of the site, such as at Southsea Castle (**Ports MPM15**), Fort Cumberland (**Ports MPM45**) (**Plate 3**), and the Hilsea Lines (**Ports MPM206**).

3.7.7. There were also a number of known non-military post-medieval sites mapped for the project, reflecting a wide range of activities on the coast. Some sites were built for recreation and pleasure, such as Clarence Pier (**Ports MWX503**) and South Parade Pier (**Ports MWX517**), which have been important coastal features since the mid to late 19th century, and were visible on the aerial photographs as structures. The remains of the late 19th century Farlington Race Course (**Ports MWX591**) was visible as earthworks and the platforms for demolished buildings. A bathing pond (**Hants MWX61357**) at the west end of Forton Lake, dating to 1898, was mapped along with its associated landing stage.

3.7.8. Other sites were related to health and welfare, such as the late 19th century St. James Hospital (**Ports MWX591**). The building was designed by George Rake and built between 1875 and 1879, and originally housed the Portsmouth Borough Lunatic Asylum.

3.7.9. Industrial sites such as a former brickworks (**Hants MWX62666**) on Hayling Island and Portchester Windmill (**Hants MWX60534**) in Fareham were identified and mapped. Transportation sites such as the remains of Gosport Railway Station (**Hants MWX1243**) were also mapped, providing additional positional information for the site. Other sites related to the supply and storage of water, such as Farlington Water Works East and West Reservoirs (**Ports MWX702** and **Ports MWX707**), which were recorded and their extents mapped, as they had already been drawn in detail on Ordnance Survey maps.

3.7.10. On some stretches of the coast, the interrelations between industry, education and transport were clearly visible. For example in Gosport, the 19th century Submarine Mining Establishment (**Hants MWX57645**) (which later became the School of Electric Lighting), was built on Stokes Bay Beach, just to the east of Stokes Bay Pier (**Hants MWX57650**), and the sites were linked by a military road (**Hants MWX60413**). The 19th century Stokes Bay Pier (**Hants MWX57650**) was demolished in the 1970s, although aerial photographs taken in 1986 still clearly show the pilings of the pier. Between 1863 and 1915, the Stokes Bay Railway (**Hants MWX38765**) extended between Stokes Bay Pier and the Gosport Line, and aerial photographs taken in the 1940s showed that the railway embankments were still visible as earthworks in a number of places, despite the fact that the tracks had already been removed. The remains of a tramway (**Hants MWX60400**) were also visible as embankments and were recorded on early Ordnance Survey maps. All of these sites were mapped in detail for the project, and together they show not only the interrelations between sites, but the way aerial photographs can be used to illustrate changes to sites over time and to demonstrate how much of sites that have already fallen into disuse or been removed can still be visible in the wider landscape.

3.7.11. Some of the known sites such as Priddy's Hard (**Hants MWX33512**), Stokes Bay Lines (**Hants MWX18977**), Royal Clarence Yard (**Hants MWX17568**), Cams Hall Estate (**Hants MWX51624**), and Haslar Royal Naval Hospital (**Hants MWX60415**) had well-studied and individually recorded components, for example 197 records were associated with Priddy's Hard. In these cases, all of the individual records were linked to the main 'parent record' for ease of access.

3.7.12. At Cams Hall the main estate buildings were not mapped because they were visible on historic and modern Ordnance Survey mapping. However two previously unrecorded features were mapped and recorded, including banks and ditches to the south-east of Cams Hall (**Hants MWX61406**) whilst further to the south of the Hall in the designed landscape, water channels (**Hants MWX61404**) extending from a post-medieval fish pond were mapped as earthworks.

3.7.13. Two sites of earthworks visible on Hayling Island (**Hants MWX62670** and **Hants MWX62686**) and one site on South Binness Island (**Hants MWX62763**) are of unconfirmed provenance. **Hants MWX62670** comprises a series of rectangular and square shaped earthworks, located on Middle Marsh to the immediate east of Sunshine Holiday Camp, Hayling Island, and although the earthworks could be post-medieval, they could also be related to WWII underground ammunition stores. **Hants MWX62686**, south of Honeyrings Copse, comprises two circular ditches flanked by earthen banking and may relate to either wartime bombing or post-medieval small-scale extraction pits for chalk or clay. Earthworks comprising a series of banks and ditches, located on South Moor (**Hants MWX62706**), are also of

unknown function although they could be related to military activities, as they appear similar to earthworks on South Binness Island (**Hants MWX62763**) that were related to a WWII bomb decoy site.

3.7.14. During the post-medieval period, vast stretches of the coast were protected against the encroachment of the sea by the construction of coastal banks such as **Hants MWX54707** and sea defence walls, for example **Ports MWX626**, **Ports MWX665** and **Ports MWX678**. These sites are associated not only with sea defence but also with the reclamation of coastal land during the post-medieval period. Post-medieval drainage ditches were also often associated with the protection of the coast and removal of excess water from fields, such as **Hants MWX54707**.

3.7.15. Other sites were associated with agricultural, subsistence or settlement activities. These included a cockle pond (**Hants MWX60429**) in Gosport and a duck decoy (**Hants MWX62665**) on Hayling Island. By far the most widespread evidence for agricultural activities was in the form of ridge and furrow, generally visible as earthworks in earlier photographs, although often levelled or redeveloped in later photographs. There were numerous fields of ridge and furrow identified around Havant (for example **Hants MWX62742**, **Hants MWX62781** and **Hants MWX62817**) and Hayling Island (for example **Hants MWX62692**), although on Hayling Island, the majority of ridge and furrow sites were identified as medieval and were discussed above. A post-medieval bank or field boundary (**Hants MWX61413**) in Fareham was located between a coastal bank and fields of ridge and furrow. Three areas of ridge and furrow (**Ports MWX698, Ports MWX699**, **Ports MWX700**) located in and around Farlington Marshes, were visible as earthworks on aerial photographs taken in the 1940s, although the areas to the north and the south were later levelled. The still extant **Ports MWX698** comprises almost 30 individual fields of ridge and furrow. The ridge and furrow in these fields remains extant because the area is protected from development and modern agricultural activities as part of the Farlington Marsh nature reserve, managed by Hampshire & Isle of Wight Wildlife Trust, which has enabled their preservation.

3.7.16. Another relatively well-preserved site located within Farlington Marshes is a post-medieval banked enclosure surrounding a ditched enclosure (**Ports MWX692**) that was visible as earthworks - a perimeter bank surrounding a smaller ditch.

3.7.17. Within the urbanised area of Eastney, there were two areas of 19th century allotment gardens (**Ports MWX537** and **Ports MWX555**), illustrated on the 1898 Ordnance Survey map and still visible as gardens in aerial photographs taken in the 1940s. Both areas have since been redeveloped.

3.7.18. There were also sites associated with subsistence activities in the intertidal zone, such as the oyster beds of New Milton Fishery in Langstone Harbour (**Ports MWX696**) and possible fish weirs such as a V-shaped row of posts south of Tipner Range (**Ports MWX463**), an irregular linear feature near an intertidal causeway south of Emsworth marina (**Hants MWX62705**), and a V-shaped structure in Langstone Harbour (**Hants MWX62745**). Four areas of post-medieval saltings (**Hants MWX60525**), to the east of Portchester, at Wicor Mill, were visible on aerial photographs taken in 1946 as areas of rough ground and irregular shaped ponds, with a coastal bank that enclosed them to shore-wards (**Hants MWX60523**) (**Plate 4**).

3.7.19. Gosport Quay (**Hants MWX60434**) and its associated docks, slips, wharves, landing places and boat yards were mapped in detail. The site highlights the importance of marine industry on the coast during the post-medieval and modern period. On Portsea Island, two boat hards (**Ports MWX587** and **Ports MWX662**), used for landing or loading ships, a former jetty or foreshore structure (**Hants MWX62834**), and former wharf or row of stakes (**Hants MWX58029**) were mapped from aerial

photographs. The extent of the remains of a sea lock and basin (**Ports MWX588**) on the Portsea Canal was also mapped and associated with its National Monument Record number.

3.7.20. Other sites for controlling water included the existing record of former post-medieval sluice gates west of Hayling Island (**Hants MWX56154**). The sluice gates are located in the intertidal zone, and would have connected and controlled the flow of water from an area of intertidal mud, in front of the former North Hayling Railway Station out into Langstone Harbour via the Stoke Common Lake. They are still visible as extant structures on aerial photographs taken in 1999 and 2005.

3.7.21. Also located in the intertidal zone were lines of posts associated with terrestrial industry – such as west of Rudmore Works (**Ports MWX434**) and north of McKinley's Engineering Works (**Ports MWX475**). An unidentified V-shaped wooden structure (**Ports MWX416**) that could represent the remains of a jetty, sea defences or even possibly a fishtrap was also mapped, south of Southampton Road.

3.7.22. A range of known and/or previously unrecorded unidentified intertidal features were mapped and recorded, including structures, foreshore debris, banks, ditches and various other obstructions (for example **Hants MWX56188-56191, Hants MWX62709**, **Hants MWX62820, Hants MWX62824**, **Hants MWX62832** and **Hants MWX62698**).

3.7.23. The category with by far the largest number of new records was 'shipwrecks', which were generally visible as structures in the intertidal zone. In Forton Lake, there were two intertidal shipwreck graveyards (**Hants MWX60506** and **Hants MWX60508**) (**Plate 5**). These shipwreck graveyards include numerous wrecks of ships such as barges, gunboats, landing craft and other vessels, which have been studied in detail by the Hampshire & Wight Trust for Maritime Archaeology (HWTMA) and the Nautical Archaeology Society (NAS) (2007, 2008 and 2009). The decision was made to group all of the visible wreckage into 'shipwreck graveyards' rather than attempt to associate the wrecks and wreckage with previous records, because in some cases, it was not possible to determine which wrecks identified on the aerial photographs corresponded with the wrecks studied by HWTMA and NAS, and often the aerial photographs illustrated additional, previously unrecorded material which it was not possible, from the aerial photographs, to associate with particular wrecks or to determine whether the material was even related.

3.7.24. In the Portsmouth HBSMR there were 37 new shipwreck records created (including for example **Ports MWX573** and **Ports MWX673**). In addition, four areas of ship wreckage (dispersed areas of wreckage where the individual wreckage was mapped, but the evidence was grouped together for lack of being able to identify a single wreck site (**Ports MWX460**, **Ports MWX477**, **Ports MWX484**, and **Ports MWX660**)), 12 possible wrecks (for example **Ports MWX659** and **Ports MWX418**), and three possible pontoons (for example **Ports MWX571**) were mapped. Shipwrecks visible on aerial photography dating from the 1940s to present day were generally given a post-medieval to modern date range, as it was not possible to determine the actual date of the wrecks from aerial photographs alone, and statistically the wrecks were most likely to date to these periods. The following example illustrates the difficulties: a wreck visible on aerial photographs taken in the 1940s or even 1990s could represent a late 19th century vessel that had still been afloat and in use until not long before the photograph was taken.

3.7.25. In Hampshire, in addition to the known wrecks at Forton Lake grouped into shipwreck graveyards, the records of four other known post-medieval wrecks were enhanced (**Hants MWX27657**, **Hants MWX57879, Hants MWX60108** and **Hants MWX62624**). New records were created for shipwrecks in Gosport, Portchester and near Cams Hall (**Hants MWX60519, Hants MWX61408,** and **Hants MWX61410**), a

possible wreck (**Hants MWX62710**), as well as a wreck or abandoned pontoon (**Hants MWX62614**) and a group of abandoned pontoons (**Hants MWX60814**).

3.8. MODERN (AD 1900-PRESENT)

3.8.1. The vast majority of modern sites mapped for the SE RCZAS project are associated with WWII, which may be a reflection of the fact that so many high resolution aerial photographs were available from the period during and immediately after the war. However, there are also some notable sites dating to the early 20th century, WWI and the period between the wars.

3.8.2. A number of military sites were built before WWI. For example, two Drill Halls or TA Centres (**Hants MWX60428** and **MWX60435**) in Gosport were mapped; both sites were first visible on the 1911 Ordnance Survey mapping, but were expanded later in the 20th century. The early 20th century site of Monckton Hutments (**Hants MWX60399**), Gosport, was visible on aerial photographs taken in 1946 and 1948 as an assortment of buildings, foundations of former buildings, and roads, which were completely mapped. The site was located immediately to the south-west of Haslar Barracks and the north-east of Fort Monckton, and was likely associated with these sites. Although the majority of the Monckton Hutments site has been built over, aerial photographs taken in 1994 reveal parchmarks indicating part of the curved road to the east of the site. An early 20th century military depot (**Hants MWX60403**) associated with the military use of Stokes Bay Pier was visible on aerial photographs as barbed wire, tanks and probable storage buildings, and was fully mapped. Although early 20th century in date, the site was particularly important in WWII when it was transformed into a major fuelling point for the D-Day invasion. On the coast of Gosport to the east of Stokes Bay, there was evidence for the foundations of at least four probably early 20th century buildings and a flagpole base (**Hants MWX60416**), visible as concrete slabs on aerial photographs taken in 1946. The buildings may have had a military use, as they are in the proximity of Fort Gilkicker. HMS Dolphin (**Hants MWX60419**), a 20th century military shore establishment, was built by the Royal Navy around the site of the old fortifications known as Fort Blockhouse, at the entrance to Portsmouth Harbour. During WWI, Britain's first anti-submarine station was located at HMS Dolphin, and during WWII, defences were improved. The site was fully mapped. On the other hand, at RNAD Gosport, a Royal Navy Ammunition Depot constructed in the first half of the 20th century, and now renamed Defence Munitions Gosport, only features not visible on Ordnance Survey mapping were mapped, and these were largely limited to enhancements made during WWII.

3.8.3. Portsmouth Airport (**Ports MWX636**), built in 1932, went on to play an important role in wartime military aviation activities. In contrast, HMS Vernon (**Ports MWX486**), a Royal Navy shore establishment, had an intrinsically military role, but is included as a 'modern' site, because it was set up on shore during the inter-war period.

3.8.4. A wide range of non-military modern features that had not yet been recorded in the Portsmouth HBSMR or Hampshire AHBR were mapped and recorded for this NMP project. These included communications sites, such as the early 20th century wireless station on Horsea Island (**Ports MWX432**) (**Plate 6**) that was in operation until the 1960s. Evidence of the station is visible on aerial photographs as a series of shadows cast by the aerials that were operational across the south-eastern side of Horsea Island.

3.8.5. Other non-military sites were health and welfare related, such as the former Portsmouth Borough Isolation Hospital for Smallpox, built in 1902, now known as Langstone Hospital (**Ports MWX589**).

3.8.6. Sites related to recreational activities included Stamshaw open air pool (**Ports MWX467**) built in 1900 and Hilsea Lido (**Ports MWX651**) built in 1935. Built in 1924, the Gosport Central Swimming Baths (**MWX61355**) included a pavilion and multi-level diving platform, visible on aerial photographs taken in the 1940s. Modern aerial photographs indicate that the site has since been redeveloped as a parking lot.

3.8.7. There were various sites located in the intertidal zone, including a barrier or dividing wall, located between two old oyster beds at the termination of a creek near Fleet, Hayling Island, that was visible as a structure on aerial photographs taken in 1946 and 1963. Existing records of modern coastal defences, such as groynes (**Hants MWX60397**) were enhanced, and new records for groynes were created (such as **Hants MWX60398**). A former pier located at Lee-on-the-Solent was also mapped (**Hants MWX60387**).

3.8.8. Two modern shipwrecks (**Ports MWX480** and **Ports MWX481**) (**Plate 7**), recorded in the Portsmouth HBSMR, were located in the intertidal zone immediately south of Whale Island and are thought to be possible torpedo boat destroyers, and are visible as structures in aerial photographs taken in 1939.

3.8.9. New records have been created in the Hampshire AHBR for at least 24 modern shipwrecks. The majority of these new wrecks were located in Emsworth Marina, although there were also examples in Chichester Harbour, Fareham Creek, near Cams Hall Estate, and around Hayling Island. The wrecks were generally visible as structures in the intertidal zone, in varying stages of decomposition. The wrecks were described by their length and breadth, if visible, and their orientation, but any additional details that were visible were also noted. The wrecks in Emsworth Marina were generally visible on aerial photographs taken in the 1940s, but were no longer visible in modern aerial photographs, whereas other wrecks were still visible in modern aerial photographs and on Google Earth.

3.8.10. New records were also created for six abandoned pontoons or wreckage of possible pontoon or pier structures located around the coast (such as **Hants MWX62758, Hants MWX60522** and **Hants MWX62977**), and at least 13 features described as possible wrecks, obstructions, intertidal debris, foreshore debris, and other unknown intertidal features (such as **Hants MWX62762, Hants MWX62727, Hants MWX62835**, **Hants MWX62740**, **Hants MWX62749** and **Hants MWX6267**).

3.8.11. Known modern shipwrecks that were already recorded in the Hampshire AHBR were mapped and more detailed information included in the record, such as the wreck of the sailing barge *Langstone* (**Hants MWX57339**), as well as wrecks at Priddy's Hard (**Hants MWX53063** and **Hants MWX53061**). Modern shipwrecks located in Forton Lake were grouped into shipwreck graveyards (**Hants MWX60506** and **Hants MWX60508**), and as these have been studied in detail by HWTMA and NAS (2007, 2008 and 2009), they have not been discussed in detail here.

3.8.12. In addition, wrecks recorded by the UKHO were added to the Hampshire HBSMR, and any sites visible as structures in the intertidal area were also mapped and the records were enhanced, for example wrecks near Fareham, Fareham Creek, and Fleetlands (including **Hants MWX61162, Hants MWX61168, Hants MWX61215** and **MWX61276**). Sunken pontoons and possible obstructions recorded from the UKHO database were also mapped and enhanced if visible in the intertidal zone, such as **Hants MWX60774** and **Hants MWX61134**.

WWI (1914-1919)

3.8.13. In comparison to the vast quantity of WWII sites visible on aerial photographs, there is very little evidence for WWI activities visible in the aerial photographs. This can be partly explained by the fact that many of the sites were likely dismantled or

removed after the war, but could also be due to the re-use of sites during WWII, which reclaimed, removed or obscured any traces of previous activity.

3.8.14. The Royal Navy Air Service military airfield HMS Daedalus (**Hants MWX39580**), in Gosport, was established in 1917. When it was built, it was one of the most important Air Stations in the world, and it covered around 500 acres with three multi-directional grass runways. The airfield was greatly improved during WWII, and many of the features visible on aerial photographs date to that period, and therefore will be discussed later. However, some features dating to WWI are still in evidence, such as the layout of the runways, seaplane hangers and slipway remains.

3.8.15. In 1914, Gosport Airfield (**Hants MWX60388**) was established as one of five Military Landing Grounds. It initially consisted of canvas shelters and was particularly concerned with military balloons under the Royal Flying Corps, but it developed further to service a variety of airplanes, and at one time had two tarmac runways. A number of hangers and accommodation blocks were constructed. Similar to HMS Daedalus, this site was considerably improved during WWII.

3.8.16. The remains of another WWI military site, a depot and ammunition dump (**Ports MWX685**) (**Plate 8**), located on Drayton and Farlington Marshes, were still visible on aerial photographs taken in 1942, 1945 and 1946. The remains of a tramway were visible as earthwork banks, the tracks likely having been removed after the final disposal of ammunition following the war. A number of still extant military buildings were also visible. Much of the area has since been redeveloped with industrial and commercial buildings.

3.8.17. An area of WWI military practice trenches (**Hants MWX60383**) (**Plate 9**), located to the north of Browndown Camp, between Lee-on-the-Solent and Gosport, comprised a complex network of practice trenches visible as cropmarks representing ditches and banks. Practice trenches were developed to prepare newly recruited soldiers for the demands of modern warfare. The trenches in these fields include both front-line and communication trenches – the front-line practice trenches are predominantly crenellated as this pattern prevented artillery shells travelling along the length of the trench, and would also slow enemy progress if the trench was captured. A central command post and a series of bomb craters thought to be the result of target practice, were also visible on aerial photographs taken in the 1940s.

3.8.18. Langstone Redoubt (**Hants MWX62728**) was built during WWI on the planned position of a Palmerston Redoubt that was cancelled in 1867. The site was visible as earthworks and structures on aerial photographs taken in 1946 and 1948. The redoubt faced east to cover the eastern approaches to Portsmouth and the site provided an ideal position to prevent an enemy advance. The site is significant, as it is one of only a few surviving WWI defences left on Portsdown, and the site was fully mapped and recorded.

3.8.19. The record for a WWI searchlight base (**Hants MWX56160**) on Oyster Island, Langstone Harbour was enhanced.

WWII (1939-1945)

3.8.20. By far the greatest proportion of the new sites that were recorded for the SE RCZAS NMP project date to this period. The coast is particularly rich in WWII military sites, as it was the first line of defence against attack from the continent, and the SE RCZAS NMP project has complemented earlier defence related projects, such as the Defence of Britain Project (Council for British Archaeology 1995-2002) and the Defence Areas Project (Foot 2005), which show a concentration of military sites in the area.

3.8.21. The study of wartime aerial photographs for this study has revealed a vast number of WWII sites, many of which had not previously been recorded. In the Hampshire

AHBR, 191 new records were created for this period and 58 records were enhanced, while in the Portsmouth HBMR 174 new records were created but no records of this period were enhanced. The records ranged from complicated, intricate sites, such as HMS Daedalus airfield to single pillboxes. The aerial photographs taken by the RAF during the war and immediately afterwards have captured a snapshot of Britain's coastal defences during this period. The evidence gained from aerial photographs is vital to understanding these coastal defences, as so many of the sites were removed shortly following the end of the war – for example, aerial photographs taken in 1945 or 1946 illustrate considerably more sites than those taken in 1948.

3.8.22. Many sites developed for WWI were re-used, modified and improved during WWII, for example airfields such as HMS Daedalus (**Hants MWX39580**), in Gosport, and Gosport Airfield (**Hants MWX60388**).

3.8.23. HMS Daedalus (**Hants MWX39580**) was considerably improved during WWII: the grass runways were converted to concrete between 1940 and 1942, the airfield was expanded eastwards, and a host of wartime structures, hangars, barracks, stores, sheds and huts were constructed (**Plate 10**). Other wartime structures included gun emplacements built by 1940, banking/blasting pens built after 1942, blister hangars, practice trenches, fake fields, Emergency Water Supplies, and a number of associated pillboxes, which were also visible on the aerial photographs. The existing record was considerably enhanced through the mapping of all visible features. Many of the changes to the site are visible on the wartime aerial photography, and in fact, the aerial photographs provide almost a 'stop motion' look at development at the airfield during the war. Modern aerial photographs also illustrate changes to the airfield, and eight ammunition stores which lay to the north-east of the site were only visible as soilmarks in aerial photographs taken in 2007.

3.8.24. Gosport Airfield (**Hants MWX60388**) was targeted by German Stukas during the Battle of Britain in 1940, which resulted in a number of hangars and buildings being damaged or destroyed, and aerial photographs show that by 1942, an attempt had been made to disguise the airfield from enemy planes overhead, and a number of thick black tar markings are visible. These marks are thought to represent 'fake fields': a painted camouflage pattern which sought to disguise the flat open area of an airfield.

3.8.25. Non-military airports were also brought into service, such as Portsmouth Airport (**Ports MWX636**) which was built in 1932, and it, too, was considerably modified (**Plate 11**). During WWII, the airfield was used for military aircraft, which were also constructed there in onsite factories, along with the No 163 Gliding School that was also based there. Aerial photographs taken in 1945 illustrate a number of remaining military aircraft, as well as changes to the site such as a line of WWII air raid shelters extending northwards along the eastern perimeter of the site and the camouflage roofs of a number of buildings. The airport was in use until 1973. For the NMP project, only buildings not visible on historic mapping were mapped, although this included the majority of the airport.

3.8.26. Other sites were also modified during WWII, such as South Parade Pier, Southsea (**Ports MWX517)**. Aerial photographs taken in 1942, 1945 and 1946 illustrate that a section of the pier had been removed to prevent enemy landings, and that the roofs of the buildings had been painted in camouflage to protect them from enemy bombings.

3.8.27. A vast number of military and non-military sites visible on the coast of Hampshire and Portsmouth were modified during the war, for example WWII defences (**Hants MWX57652**) were added to Haslar Hospital, Gosport (**Hants MWX60415**), along with air raid shelters and Emergency Water Supplies. At St James' Hospital (**Ports**

MWX591), Portsmouth, air raid shelters and Emergency Water Supplies were also added. The addition of air raid shelters also marked the changes to a former Submarine Mining Establishment - later the School of Electric Lighting (**Hants MWX57645**). At other sites, such as Gosport Quay (**Hants MWX60434**), WWII Nissen huts were constructed along the roads and in the public park. The majority of the WWII additions have simply been included in the existing or main record for the site, rather than creating additional WWII records for each site. This has streamlined the record databases, however because so many sites were modified during the war, it is impossible to discuss them all here, and therefore except in exceptional circumstances, these WWII additions to sites will not be discussed in detail below.

3.8.28. However, in some cases, such as RNAD Gosport, a Royal Navy Ammunition Depot, WWII military features that were visible within the site were mapped and given individual records. WWII features at the site included military buildings (**Hants MWX61384, Hants MWX61412** and **Hants MWX61419**), three areas of concrete hardstanding (**Hants MWX61409**), a pumping station (**Hants MWX61415**) and a series of buildings, one of which was surrounded by a wide earth bank (**Hants MWX61402**) that were associated with Frater Pier, the cranes and the loading area.

3.8.29. Aerial photographs taken in the 1940s also indicate changes in the usage of urban land, for example an area of former allotment gardens was taken over by Stamshaw Camp (**Ports MWX441**), a site built after the war to assist the Royal Naval Barracks staff at HMS Victory, in Portsmouth, to manage demobilisation. The site was visible as a collection of regularly arranged buildings, roads and a perimeter fence. Other WWII military camps were also visible on aerial photographs – some were similar to Stamshaw Camp, in that they comprised regularly laid out solidly constructed buildings, such as at Belmont Camp I and II in Bedhampton (**Hants MWX62806** and **Hants MWX62729**), while others were comprised solely of tents, such as the temporary WWII military camp at Cams Hall, Fareham (**Hants MWX61403**) or in a Drill Field (**Ports MWX539**) adjacent to Eastney Barracks, where changes to the parchmarks on the grass indicated that in subsequent years, the tents had been reorganised and regrouped. Still other WWII military camps re-used existing holiday camps, such as three on Hayling Island (**Hants MWX62662, Hants MWX62657** and **Hants MWX62809**), by erecting additional structures such as Nissen huts, storage buildings and military tents, and sometimes painting existing building roofs with camouflage to provide protection from air raids.

3.8.30. A wide variety of unnamed WWII military sites were visible on aerial photographs – some were identified by their camouflaged roofs or arrangements of Nissen huts, while others were identified by their absence on earlier aerial photographs or Ordnance Survey maps, their sudden appearance during the war, and their rapid dismantling or destruction after the war. On Portsea Island, military sites were situated at various locations on the coast: immediately north of Hilsea Lines protecting a bridge (**Ports MWX653, Ports MWX653**); in public parks and gardens (**MWX448**) to the east of Portsmouth Airport (**Ports MWX630, Ports MWX644, Ports MWX645**), on the spit north of Fort Cumberland (**Ports MWX550, Ports MWX551**); and along the south coast (for example **Ports MWX506**, **Ports MWX508**). The sites ranged from small collections of buildings to large military depots including a possible bunker (**Ports MWX544**), two rifle ranges (**Ports MWX543**, **Ports MWX557**), and a shipbuilding yard and military depot (**Ports MWX404**).

3.8.31. Many military sites were related to larger sites nearby, for example three sites (**Hants MWX60440, Hants NWX60441** and **Hants MWX60473**) situated near Priddy's Hard, a late 18th century Royal Naval Armaments Depot. To the west of Priddy's Hard, a military depot (**Hants MWX60440**) was visible as a number of

Nissen huts arranged along a central road. Another military depot and associated military buildings (**Hants MWX60441**), located immediately north of Priddy's Hard, comprised a range of buildings located on either side of a railway line. On one side of the railway, the storage depot comprised large buildings, while on the south side, there were a number of Nissen huts and outdoor storage areas. The third WWII military storage site (**Hants MWX60473**), located to the north-west of the previous one, had a particularly unusual layout. The site was centred on a large roughly triangular embankment, with rounded edges that measured 56m across by 48m with two entrances on the eastern side, which was surrounded by a perimeter fence. Immediately to the north of the embankment was a circular storage tank 9m in diameter. An additional fence surrounded the storage tank. There were a few additional buildings, including a Nissen hut, and the entire site was surrounded by a perimeter fence.

3.8.32. Near to the Stokes Bay No. 2 Battery and the Stokes Bay Lines was a large military site (**Hants MWX60529**), comprising military storage buildings with a large area of hardstanding possibly used as a storage area for military vehicles and supplies during the war. In addition, the site had easy access to maritime transport, as it was located in close proximity to a disembarkation hard (**Hants MWX60581**). A small military site (**Hants MWX62731**) comprised of four extant buildings and areas of parchmarks thought to indicate either storage areas or the location of demolished buildings was visible on aerial photographs taken in 1946 immediately to the east of a WWII military camp, Belmont Camp II, and the sites were likely associated.

3.8.33. Two WWII military sites in Havant (**Hants MWX62807** and **Hants MWX62808**) were likely related, based on their proximity and similar regular layouts, and they may also have been related to the nearby WWII military rest camp at Belmont. **Hants MWX62807** was fully mapped for the project, however, as **Hants MWX62808** was outside of the Study Area and fully illustrated on the 1952 Ordnance Survey map, a new Hampshire AHBR record was created and a monument polygon placed around the site.

3.8.34. A WWII military depot (**Hants MWX60592**) in Portchester was particularly interesting because it was situated in the middle of an urban area, between Cornaway Lane and The Fairway. As it was spread out over four blocks, the site comprised four separate compounds. Each of the compounds was surrounded by a perimeter fence, and each had large areas for storage, although only two of the compounds had associated buildings, consisting mainly of Nissen huts.

3.8.35. A small WWII military depot (**Hants MWX60421**) was visible on aerial photographs taken in 1946 and 1948, located between Haslar Royal Naval Cemetery and the Stokes Bay Railway. The site consisted of a variety of buildings laid out on either side of a central road. The site would have had easy access to Portsmouth Harbour as it was located on the south side of Haslar Lake, and had a small pier or jetty extending into the intertidal area. Another site with easy access to water was located near Saltern Quay in Fareham (**Hants MWX62622**). It comprised up to nine buildings of various sizes and associated pathways.

3.8.36. There were a number of WWII jetties, piers and landing stages situated around the coast, for example in Fareham (**Hants MWX61260**), west of Portchester Castle (**Hants MWX61407**), north of Priddy's Hard, Gosport (**Hants MWX60482**), on the coast of Hayling Island (**Hants MWX62677** and **Hants MWX62831**) and on the east side of Fort Cumberland (**Ports MWX689**).

3.8.37. The most numerous WWII features identified in the Study Area were pillboxes of various shapes and sizes. These included the easily recognisable hexagonal Type 22 pillboxes (such as **Ports MWX496** and **Ports MWX512**) as well as square and rectangular pillboxes of various sizes. Sites included as 'possible pillboxes'

included square and rectangular buildings in strategic positions or in line with known pillboxes, as well as circular structures located on the coast that were removed after the war. During WWII, the majority of pillboxes were constructed in association with beach defences and stop-lines, although they were also used to defend coastal batteries, airfields, radar stations and factories (Brown *et al.* 1995: 79). Overall, there were 54 new records created for pillboxes or possible pillboxes in the Portsmouth HBSMR and 46 new records in the Hampshire AHBR. In the Hampshire AHBR, 16 existing pillbox records were enhanced with NMP mapping. In addition, pillboxes were occasionally included within the records created or enhanced for large sites or other pre-existing records. An interesting pillbox variation, that within the Study Area was only visible around the coast of Portsea Island, were pillboxes with additional defences, such as embankments in the intertidal area or facing the mainland (such as **Ports MWX445/446, Ports MWX601, Ports MWX617,** and **Ports MWX619**). Many of the pillboxes, particularly those along urban seawalls, were removed after the war, however some recent aerial photographs indicate that a few of the pillboxes remain. In addition, recent aerial photographs illustrate changes to the environment around the pillboxes, for example pillboxes **Hants MWX62715, Hants MWX62716** and **MWX62717** on Sinah Common, Hayling Island, were no longer visible in aerial photographs taken in 2005 or 2007, but aerial photographs indicate that the area is now part of the intertidal zone, and presumably any remains of the pillboxes have eroded into the sea.

3.8.38. The record of a Pickett Hamilton Fort gun emplacement (**Ports MWX208**) was enhanced by adding details about the NMR reference and the NMR record polygon to locate the site. The record of a possible WWII gun emplacement at Conigar Point (**Hants MWX58143**) was also enhanced. Other existing records were also updated with NMR or Scheduled Ancient Monument (SAM) references and site extent polygons.

3.8.39. Previously unrecorded gun emplacements were mapped at Conigar Point (**Hants MWX62814**), Warblington, and on Hayling Island (**Hants MWX62691** and **Hants MWX62671**). The site at Conigar Point (**Hants MWX62814**) was square, measuring 9m by 9m, possibly constructed of sandbags, one site north of Stoke, Hayling Island (**Hants MWX62691**) comprised a circular structure, and a site on Middle Marsh, Hayling Island (**Hants MWX62671**) comprised an almost circular U shaped bank approximately 11m in diameter, which may have been related to a nearby Royal Observer Corps monitoring post. A possible WWII gun pit (**Hants MWX62645**), located on Haying Island, was visible on aerial photographs as a large ditch approximately 7m in diameter surrounded by circular earthen banking, and a slight shadow visible in the centre of the feature suggested a small artillery gun or machine gun. The gun pit was strategically situated near a line of anti-tank cubes.

3.8.40. Four spigot mortar gun emplacements were visible on aerial photographs taken in 1942 and 1946 as ditches with a central structure. Spigot mortars comprise central concrete ‘thimbles’ for the gun, surrounded by a narrow ditch. Spigot mortars were among the most durable of the anti-tank or personnel defences, and were also known as ‘Blacker Bombard’s. Spigot mortars were often located near bridges, road junctions and other crossing points and were often associated with coastal batteries (Brown *et al*. 1995: 87-91). One site (**Ports MWX410**) was located immediately south of the railway tracks near Southampton Road, adjacent to a line of anti-tank cubes, while another (**Ports MWX579**) was located adjacent to the remains of a sea lock and basin on the Portsea Canal. Two spigot mortars (**Hants MWX62725** and **Hants MWX62726**) were situated near Almond Close in Farlington, within an area that by 1945 was being redeveloped for housing. They were located near an area of open air storage that could have been related to a nearby WWII bomb decoy site, although it could also have been related to the housing development.

3.8.41. There were many areas of anti-tank obstructions across the Study Area. Anti-tank obstructions took several forms, from anti-tank cubes (concrete blocks with sides just over a metre in length) to anti-tank stop-lines (formed by ditches). At Fort Brockhurst in Gosport, anti-tank cubes and a roadblock (**Hants MWX60583**) were situated close to a Heavy Anti-Aircraft battery. A pre-existing record of anti-tank cubes at RNAD Gosport (**Hants MWX26092**) was enhanced with mapping and additional information in the record. Several sections of a line of WWII anti tank cubes extended along the beach from the eastern end of Eastney (**Plate 12**), around Fort Cumberland and then extended up both sides of the spit north of the Fort (**Ports MWX534**), and some sections of the line are still visible today. **Ports MWX534** was also linked to pre-existing NMR records. A short line of anti-tank cubes (**Ports MWX533**) was located to the west of Eastney Fort East, and extended roughly 60m along Esplanade, parallel to the beach. On the south coast of Hayling Island, a line of anti-tank cubes (**Hants MWX62629**) extended approximately 6km, with additional lines of cubes set back from the coast which would have acted as additional lines of defence. At Sandy Point, Hayling Island, the anti-tank cubes were supplemented with WWII defence works comprising four circular banked features which could have been larger anti-tank cylinders (**Hants MWX60683**). Two existing records for anti-tank cubes were enhanced (**Hants MWX26064, Hants MWX26088**) with mapping and additional information in the record. Occasionally, lines of barbed wire (**Ports MWX540**) accompanied the anti-tank obstructions, increasing the fortification. Barbed wire obstructions (such as **Hants MWX60510**) were also found associated with military training complexes, and could prevent easy access from the beach to the military complex or nearby gun emplacements. An anti-tank stop-line (**Hants MWX62617**) located in Gosport to the north-east of Gosport Airport was visible on aerial photographs in 1942 as a ditch, however by 1946, the ditch had been in-filled and was subsequently visible as a cropmark.

3.8.42. In addition to the anti tank obstructions, beach defences provided formidable obstacles to enemy approach from the sea. There are various areas of WWII beach defences along the coast of Portsea Island, visible in aerial photographs taken during and immediately after the war. Beach defences, visible as lines of posts, or occasionally scaffolding, were located seawards of Southsea Common (**Ports MWX505**), along the beaches surrounding Fort Cumberland (**Ports MWX535, Ports MWX536**). Defensive post alignments in intertidal or riverine areas were used to protect railway bridges (for example **Ports MWX680**).

3.8.43. The beaches and low lying coastal areas were also occupied by other military sites, such as Mulberry Harbour Production Sites. A Mulberry Harbour Production Site in Stokes Bay (**Hants MWX57654**) was visible on aerial photographs taken in 1946 as a range of buildings, huts, storage units and slipways, as well as caisson unit frames. The production site constructed caisson units, each weighing 5,500 tons, which were subsequently towed and sunk for the Normandy Landings in June 1944. A number of caisson units are visible on the aerial photographs taken in 1946, suggesting that not all the units were constructed in time, or were utilised for, the D-Day landings. An existing record of a signalling station (**Hants MWX57655**) was linked to the Mulberry Harbour Production Site. Another Mulberry Harbour Production Site was located on the south side of Whale Island (**Ports MWX479**), and was visible on aerial photographs as a series of slips and buildings. A Mulberry Harbour Production Site at Sinah Warren, Hayling Island (**Hants MWX62770**) was also mapped (**Plate 13**). It comprised 51 military buildings, 11 of which had camouflaged roofs, a series of slipways and the frames for four Phoenix caissons. The north-east extent of the site was demarcated by barbed wire.

3.8.44. Three hundred metres to the north of the Mulberry Harbour Production Site on Hayling Island an abandoned Mulberry Harbour (or Phoenix caisson unit) (**Hants**

MWX62775) (**Plate 14)** was visible in the intertidal zone – it had remained near the production site, rather than being towed across the English Channel for the D-Day landings, possibly because of a fault which made it unusable (Hayling website – accessed June 2010). For the D-Day landings, Mulberry Harbour units were used as breakwaters for the harbour units, permitting the successful unloading of cargo and supplies at a faster rate than could be achieved with conventional landing craft. A line of ten Mulberry Harbours (**Hants MWX60385**), located off the coast of Gosport, near HMS Daedalus, were visible as floating structures in aerial photographs taken in 1945. It is not known whether these caissons were intended for use during D-Day, or were used as decoys or for training purposes leading up to the operation.

3.8.45. The threat of attack by enemy aircraft was confronted by a wide range of WWII military sites, from heavy anti-aircraft batteries to barrage balloon sites.

3.8.46. An analysis of records of Heavy Anti-Aircraft Batteries from 1940 indicate a concentration of sites around Portsmouth (Dobinson 2001: 173), strategically positioned to protect the ports of Southampton and Portsmouth. Overall one new Heavy Anti-Aircraft Battery record was created in the Portsmouth HBSMR and seven existing records were enhanced in the Hampshire AHBR. Generally the sites were enhanced with full mapping, however the previously recorded anti-aircraft battery at Fort Blockhouse (**Hants MWX37843**) was not visible on aerial photographs and therefore the record was simply linked to the main Fort Blockhouse record.

3.8.47. A Heavy-Anti Aircraft Battery (HAA) on Southsea Common (**Ports MWX497**) illustrates the typical layout of Heavy Anti-Aircraft Batteries - with four gun emplacements in an arc and various associated buildings (some with camouflage roofs) located nearby, connected by roads and pathways (**Plate 15**). Aerial photographs taken between 1940 and 1947 show how the site developed over time, such as the addition of small banks built up around the gun emplacements and changes to the arrangement of buildings. Similar to **Ports MWX497**, a Heavy Anti Aircraft Battery on Hayling Island (**Hants MWX37737**) changed considerably between 1940 and 1946, and the four gun emplacements in the usual arc-shape were replaced by larger, more widely spaced gun emplacements to the south of the former emplacements (**Plate 16**). The changes to the site are clearly illustrated on aerial photographs taken in 1940, 1942 and 1946. At another Heavy Anti-Aircraft Battery on Hayling Island (**Hants MWX37734**), a large military site (**Hants MWX62811**) was located immediately adjacent. The military site comprised a number of buildings including Nissen huts, and a number of areas of hard standing, probably indicating the locations of former buildings. A Heavy Anti Aircraft Battery to the northwest of Fort Brockhurst, Gosport (**Hants MWX37736**) also included a GL-mat (a gun laying radar) of hexagonal shape about 125m across, with an additional radar command post 50m from the GL-mat. Before the introduction of GCI radar, GL-mats were used to provide cover against night raiders (Dobinson 2001: 287).

3.8.48. During WWII, barrage balloon sites were plentiful along the south coast (**Plates 17 & 18**) – they were located in public parks, farmer's fields, and in some cases in existing monuments (such as at Portchester Castle (**Hants MWX5851**)). The site at Portchester Castle illustrates the re-use of earlier military sites for WWII defence. The barrage balloons formed a defence network that forced enemy aircraft to fly high, reducing the accuracy of bombing, and forcing enemy aircraft to become easier targets for fighters and anti-aircraft gunners (Brown *et al.* 1995). The barrage balloon sites were generally positioned to protect vulnerable points. There were 13 new barrage balloon site monument records added to the Portsmouth HBSMR and 13 new records added to the Hampshire AHBR, however additional barrage balloon sites, such as the one at Portchester Castle, were included in pre-existing or larger

site records. In addition, one existing record for a barrage balloon site was enhanced. The majority of barrage balloon sites were visible in aerial photographs taken in 1945 and 1946 as parchmarks indicating where the structures tethering the balloon had been removed, although sometimes the small square or rectangular associated buildings were still extant (examples of barrage balloon sites include **Ports MWX408, Ports MWX431, Ports MWX511,** and **Ports MWX641,** and **Hants MWX60527**) (**Plate 17**). In some cases all that remained was a large circular parchmark (roughly 23m in diameter), typical of barrage balloon sites (for example **Hants MWX61374**) which would occasionally be accompanied by parchmarks representing a characteristic teardrop shaped road. However, on some of the early WWII photographs the barrage balloon tether structures were still visible – sometimes even accompanied by an aloft barrage balloon (such as the 1942 aerial photographs of **Ports MWX513, Hants MWX60406, Hants MWX60409** and **Hants MWX61387**).

3.8.49. Similar to barrage balloon sites, WWII searchlights forced enemy aircraft to fly high, decreasing their bombing accuracy (Brown *et al.* 1995: 62-63). Searchlights could also be used to guide allied aircraft back to their bases. Two searchlight emplacements were identified and added to the Portsmouth HBSMR (**Ports MWX504, Ports MWX708**). The searchlight **Ports MWX504,** located on the beach to the north-east of Southsea Castle, was identified based on its typical searchlight building morphology – square corners facing inland, with a rounded frontage facing towards the sea. In the rest of Hampshire, a searchlight on Hayling Island (**Hants MWX62695**) and a possible searchlight at Sandy Point with the typical searchlight morphology (**Hants MWX62632**) were identified and mapped, as well as two further possible searchlights or gun emplacements (**Hants MWX60496** and **Hants MWX60420**), and a searchlight control centre in Brockhampton (**Hants MWX62813**). The searchlight control centre was functionally related to a searchlight base located 90m to the south-south-east (**Hants MWX41723**). The example of the coastal searchlight or gun emplacement at Lee-on-the-Solent (**Hants MWX60496**) also illustrates the processes of coastal erosion at work. Aerial photographs taken from 1942 onwards show that the site was already heavily eroding into the sea, and by 1986, there was no trace of the site, as it had been lost to coastal erosion, but aerial photographs taken in 2007 show that the area has subsequently been reclaimed and redeveloped. The existing records for three searchlights in the Hampshire AHBR were enhanced.

3.8.50. Anti-landing obstacles, also referred to as aircraft obstructions, anti-glider ditches and anti-aircraft obstacles, protected open fields and prevented landings by enemy aircraft. Anti-landing obstacles had a wide variety of forms. For example, obstacles at Lee-on-the-Solent (**Hants MWX60386**) comprised a series of cross-shaped ditches flanked by earth banks on alternate sides, while at Southsea Common (**Ports MWX507**), the intersecting lines were comprised solely of ditches, with small shallow pits at the extremities of each ditch-line, possibly indicating removed posts or other structures. At Bridgemary, Fareham, three linear features (**Hants MWX61618**) comprised of small circular banks 2m to 3m in diameter, were probably built to prevent German aircraft from successfully landing in close proximity to the nearby Royal Navy Ammunition Depot, Gosport. At Cranleigh Road in Portchester four low embankments with a slight zig-zag shape (**Hants MWX61365**) also appear to have formed anti-landing obstacles. South of Portchester Road, Portchester, obstructions were visible on aerial photographs taken in 1946 as rows of small, circular pits, probably indicating where posts had been removed after the war. In three fields to the west of Portsmouth Race Course, anti-landing obstacles were visible on aerial photographs taken in 1945 and 1946 as lines of posts and small oval embankments. The embankments may represent soil up-cast from the post-pits, but could also indicate areas of higher crop or grass where the farmer had to

manoeuvre his farm machinery around a post (**Ports MWX407**). An area of banking on arable land in Northey, Hayling Island (**Hants MWX62782**) is also thought to be related to WWII anti-aircraft defences.

3.8.51. Records for a known and a possible Royal Observer Corps Monitoring Post, both on Hayling Island (**Hants MWX62668** and **Hants MWX62830**) were created. **Hants MWX62668** was visible on aerial photographs taken in 1946 as a roughly square structure that measured approximately 10m by 9m, while **Hants MWX62830** was oval in shape and measured approximately 6m by 7.5m. The sites were constructed as part of an extensive network of monitoring posts designed to confirm and report hostile aircraft, and later nuclear attacks, on the United Kingdom. The record for a WWII underground Royal Observer Corps Monitoring Post (**Hants MWX41754**), located on Middle Marsh, Hayling Island, was enhanced with mapping and additional information. The site was visible as a structure on aerial photography taken in 1946 and 1963.

3.8.52. Bomb decoy sites were used to confuse enemy bombers, by replicating as far as possible a city under incendiary attack through the use of street lighting, flare paths and pyrotechnical effects. Starfish sites, such as the one in Farlington Marshes (**Ports MWX693**) which was used to deflect enemy bombing from Portsmouth Harbour and the City of Portsmouth, were able to create the random fire effects of burning houses, factories and power stations. Aerial photographs of the site taken in the 1940s show the bomb decoy control sites used to set off the explosions, stock piles of material, and possible linear flare paths or lighting lines, but also massive bomb craters that illustrate the success of the site (**Plate 19**). Existing records in the Hampshire AHBR of bombing decoy control shelters (**Hants MWX60098, Hants MWX60099,** and **Hants MWX60103**), a bomb decoy site (**Hants MWX38272**), Starfish and QL light bomb decoy (**Hants MWX60102**) were enhanced by adding mapping. The bombing decoy control shelters were visible as individual buildings. The WWII Starfish and QL light bomb decoy (**Hants MWX60102**), which was part of the wider Langstone Harbour 'Q' decoy site, was visible on aerial photographs taken in 1946 and 1948 as a single line of poles that extended through a farmed field crossed by a double line of posts and a number of storage areas, with a control shelter located 125m to the south. The QL lights mimicked the appearance of urban areas, while the Starfish site presented the illusion of a city under incendiary attack. A probable bomb decoy shelter or hut (**Hants MWX62764**) located on the west side of Hayling Island was visible on aerial photographs taken in 1946 as a small rectangular structure 3m by 2m, and was located approximately 80m east of a possible 'QF' decoy fire and 275m southeast of a line of bomb decoy shelters. Three areas of earth banks, one on Sinah Common, Hayling Island (**Hants MWX62723**) and the others on South Binness Island (**Hants MWX62763** and **Hants MWX62766**), as well as three rectangular structures on South Binness Island (**Hants MWX62757**) are thought to have been related to nearby WWII bomb decoy sites.

3.8.53. The need for bomb decoy sites is best illustrated by the profusion of bomb-levelled urban areas, such as vast swathes of Portsmouth. The distinctive presence of bomb-levelled urban areas in the aerial photographs taken during and immediately after the war brings home the terrible devastation of the War and the way it impacted on the lives of ordinary civilians. Urban bomb craters and levelled urban areas were not mapped as part of this project, because wartime aerial photographs were generally limited to June/Sept 1942 then 1945, with no coverage in between, and because more comprehensive records exist elsewhere (for example the 'bomb census' data held by the National Archives). Outside of urban and industrial centres, smatterings of bomb craters were visible as earthworks across the landscape. Examples from Portsea Island include WWII bomb craters on Southsea Common

(**Ports MWX498**), near Fort Cumberland (**Ports MWX549**), east of Portsmouth Airport (**Ports MWX643**) and in Drayton Marshes (**Ports MWX687**). Around the rest of the Hampshire coast, there were bomb craters mapped near Portchester (**Hants MWX60593**), at numerous locations on Hayling Island (for example **Hants MWX62711**), on Baker's Island (**Hants MWX62768**) and on North Binness Island (**Hants MWX62760**) among other places. Other bomb craters were recorded within larger site records, such as the ones located within the WWII bomb decoy site on Farlington Marshes.

3.8.54. In order to protect the civilian population, thousands of WWII Air Raid Shelters (ARS) were constructed across Britain. Along the coast, numerous shelters were mapped, generally visible as earthwork banks, or occasionally as slit trenches or surface shelter temporary buildings. The ten new WWII air raid shelter monument records added to the Portsmouth HBSMR and 27 new monument records added to the Hampshire AHBR belie the much higher number of actual shelters, as each of the records included between one and 37 individual shelters. In addition, air raid shelters were not always given individual monument records, instead they were included within larger site records, such as at St James Hospital, Milton. Many of the air raid shelters, such as **Ports MWX485** were located in bombed out urban areas (**Plate 20**), while others were located in public parks, school playing fields, hospital gardens, lining the perimeter of airfields, in the back gardens of private homes or even along public roads.

3.8.55. Earthwork air raid shelters were visible as either banks or ditches. Banked sites comprised both oval (such as **Ports MWX601** (**Plate 21**)) or roughly S shaped semi-sunken shelters (such as **Ports MWX592**) and large banked rectangular features (such as **Hants MWX62654**), with the earth covering the air raid shelters providing additional protection from bomb blasts. Some of the banked semi sunken air raid shelters featured square chimney-like emergency exits of concrete protruding at one end of the mound. Ditch features were either crenulated linear features not intended to be covered (for example **Hants MWX60408** in Gosport Park north of the Dell) or the remaining evidence of semi-sunken shelters after the banks had been removed (such as **Ports MWX531** located between Eastney Forts East and West (**Plate 22**)). The banks covering air raid shelters **Ports MWX531** had been removed by April 1946, and aerial photographs taken in 1947 indicate that the infilling of the trenches had begun, and work was complete by August 1947.

3.8.56. The surface shelters comprised temporary small rectangular buildings that were concentrated in four distinct areas between Fareham and Portchester Castle (**Hants MWX60528, Hants MWX60587, Hants MWX60589** and **Hants MWX60590**), and were situated on small public roads along the pavements in front of houses (**Plate 23**). Due to their size and location, these shelters have been interpreted as 50-person public surface air raid shelters (Roger Thomas, pers. comm.). Although this type of shelter was not designed to resist a direct bomb hit, and therefore could not be described as 'bomb proof', they were 'blast proof' meaning they could resist the blast of a near miss and the impact of bomb fragments. These types of shelters were provided for public shelter in the case of people being caught out in the open when an attack commenced, or for communities where there was not sufficient ground for 'private' shelters. As with many other WWII features, air raid shelters were generally levelled or removed after the war, and so aerial photographs provide a great resource for studying their locations and morphologies.

3.8.57. Other protection was afforded by Emergency Water Supplies (sometimes referred to as EWS), that provided the Fire Service with ample water to draw on to extinguish fires after bombing attacks. At least 17 new records for Emergency Water Supplies were created in the Portsmouth HBSMR and eight in the Hampshire AHBR – these are in addition to the Emergency Water Supplies that were recorded as components

of larger sites, such as at HMS Daedalus airfield. Emergency Water Supplies were often located either within or immediately adjacent to urban areas, in parks, school grounds and sometimes even in previously bomb-levelled sites (such as **Ports MWX488**). There were three main types of Emergency Water Supply visible on aerial photographs – round ones generally 5-10.5m in diameter (for example **Ports MWX623** or **Hants MWX62660**), square ones 11-12m (for example **Ports MWX499**), and larger square ones 20-22m across (for example **Ports MWX488**), although there were also rectangular ones of various sizes as well (for example **Hants MWX60422**). Some of the larger square sites had particularly wide concrete sides and were surrounded by a low embankment. **Ports MWX500** was a large square Emergency Water Supply that was situated in Southsea Common, surrounded by a low embankment and a perimeter fence with a pillbox immediately adjacent for additional protection (**Plate 24**). Adjacent pillboxes, although relatively uncommon, were seen at a few other Emergency Water Supply sites as well. Emergency Water Supplies were generally ephemeral features removed immediately after the war, and therefore aerial photographs provide an important resource for information about them.

3.8.58. The 'Dig for Victory' campaign launched by the Ministry of Agriculture was not just an extremely memorable slogan: it had a huge impact on the urban landscape. From its inception, the whole of Britain's home front was encouraged to transform their private gardens into mini-allotments, and wide areas of previously public park or unused space were converted to allotment gardens. Vast areas of WWII allotment gardens were visible on aerial photographs taken during and immediately after the war. On Portsea Island, examples of WWII allotments include **Ports MWX451** in Alexandra Park, **Ports MWX442** at Stamshaw, and numerous others, such as **Ports MWX509, Ports MWX561,** and **Ports MWX671**. There were also allotment gardens visible in Havant (**Hants MWX62752**), and in Walpole Park, Gosport (**Hants MWX60423**). The allotment gardens in Walpole Park were particularly interesting – not only because of the way they illustrate the reuse of public parkland but also because of their close association with other WWII features in the park, including a barrage balloon site and semi-sunken air raid shelters.

Post WWII

3.8.59. After the war, in order to re-house the civilian population who had lost their homes to bombing raids, areas of prefabricated ('prefab') housing were developed. Although prefab housing constructed after the war technically lies outside of the date range for the project (up to 1945), it was initially mapped in full because the sites directly resulted from WWII activities, and many were under construction by 1945. At the outset of the project, all areas of prefab housing were mapped in detail, however as the project progressed, areas of prefab housing that were illustrated on Ordnance Survey maps were simply marked with a monument polygon around their extents. A review of aerial photographs of the Portsea Island coast revealed three areas of prefab housing, in Stamshaw between Newcomen and Winstanley Roads, near Langstone Hospital, and on either side of the eastern end of Hawthorn Crescent (**Ports MWX468, Ports MWX577,** and **Ports MWX675**). Three further areas of prefab housing were identified in Gosport: east of Haslar Royal Naval Hospital (**Hants MWX60404**), to the north of Gosport Park (**Hants MWX60407**) and north of San Diego Road (**Hants MWX60411**) (**Plate 25**). In general, prefab housing sites were temporary, and aerial photographs taken in 1967 indicate that all of the prefab housing areas had been redeveloped.

3.9. UNDATED

3.9.1. There were a number of sites identified from the aerial photographs that could not be dated because the features on the site did not exhibit typological or

morphological characteristics that would enable dating. Generally, these sites were previously unrecorded cropmarks, soilmarks, parchmarks or occasionally earthworks. Although every effort was made to provide broad dates for features based on characteristic features, in these cases it was impossible. These undated features are discussed in detail here.

3.9.2. A roughly circular area of parchmarks, visible as on aerial photographs taken in 1946, could indicate a possible ring ditch or circular enclosure (**Hants MWX62687**). The site was located in a farmer's field on Hayling Island, 60m from the farmhouse. The centre of the ring ditch was mapped as a ditch because it was darker than the surrounding ground, and had a diameter of 8m. The ditch was surrounded by what appeared to be a bank, visible as a lighter area of parchmarks. Overall, the site had a diameter of 14m. Alternatively, the site could represent an in-filled WWII bomb crater.

3.9.3. Two circular cropmarks (**Hants MWX62688**) were visible on aerial photographs taken in 1946, 1999 and 2007. The cropmarks were located on arable land to the north of Manor Farm, central Hayling Island. One feature is no more than 19m in diameter, while a smaller, less defined feature, located 33m south-west of the larger feature, is about 10m in diameter. Both cropmarks were visible as lighter than the surrounding field, indicating differential growth over buried features, which could suggest either earlier banked features or compacted surfaces.

3.9.4. Two sets of sub-circular cropmarks of unknown provenance (**Hants MWX62773**) were visible on aerial photographs taken in 1946 on arable land, Hayling Island. An Iron Age and Romano-British temple was located to the east, but although the cropmarks could be related to these sites, they could also be considerably older, or more modern.

3.9.5. Three further features (**Hants MWX62776**) were visible as two sub-circular and one sub-rectangular areas of cropmarks, located on arable land on Hayling Island near the Iron Age or Romano-British temple. The features were noticeably darker than the soil surrounding them, and although they could be contemporaneous with the temple, they could be earlier or more recent. One of the sub-circular features formed an almost complete circle 40m in diameter, while the other sub-circular feature was more U shaped and measured 40m end to end. The sub-rectangular feature measured 50m in length by 30m in width, and appeared to have an internal division wall.

3.9.6. A backwards-C-shaped cropmark (**Hants MWX62780**) was visible on aerial photography taken in 1948 on arable land near Brockhampton. The cropmark possibly indicated part of a ditched enclosure of unknown date. However, as it was only visible on aerial photographs taken in 1948, it could have been an agricultural mark. The cropmarks measured 22m across and had a width of 2.5m.

3.9.7. An area of cropmarks (**Ports MWX609**) visible on aerial photographs taken in 1945, possibly indicate the north side of an enclosure. However, the marks were only seen on a limited number of photographs, and therefore they could have been related to agricultural activities, and the site has since been redeveloped for housing.

3.9.8. Two linear cropmarks showing ditches of unknown date or function (**Hants MWX62779**) were visible in aerial photographs taken in 1946 and 1948. The features were located on arable land near Brockhampton. The ditches extended parallel to one another, and measured 80m and 120m in length and between 1.5m and 4.5m in length.

3.9.9. Linear cropmarks (**Hants MWX62805**) of unknown date or purpose were visible on aerial photographs taken in 1947 on arable land in South Hayling. The features are

visible as dark cropmarks and cover an area approximately 400m by 200m, and the ditches vary between 2m and 10m in width. The alignment of the features suggests that they are not ridge and furrow, and the fact that the lines occasionally cross perpendicularly suggest that they are not likely to be geological in origin. Additionally, they do not relate to known field boundaries dating back to the latter half of the 19th century. However, they could be related to the 'Old Brickkilns' recorded on historic Ordnance Survey mapping, located approximately 100m to the west.

3.9.10. Three narrow banks of unknown date (**Hants MWX60391**) were visible on aerial photographs taken in 1946. The banks extended roughly perpendicular to the Fort Monckton Moat, and could have been associated with this site. The banks have since been levelled, and the area is presently part of a golf course.

3.9.11. A circular embankment (**Ports MWX428**) was visible in aerial photographs taken in 1945 and 1946 in the intertidal zone near Trafalgar Warf, Portchester. The embankment had a diameter of 17m. It was still faintly visible as a semicircular mark on aerial photographs taken in 2002 and 2005.

3.9.12. One site has been included in the 'undated' records for a different reason. Unlike the above sites which are of unknown date and unknown provenance, this site comprises a known, identifiable earthwork feature. A possible hard (**Hants MWX60538**) immediately east of Portchester Castle, which likely dates to the medieval to modern period has been classed as 'undated' because of the long period of time that Portchester Castle was occupied: the hard could date to any point between the Roman and modern period. The possible hard was visible on aerial photographs taken in 1946 as an embankment in the intertidal zone, and it was still slightly visible on aerial photographs taken in 2005. The bank perpendicularly abuts the Portchester Castle sea defences and extends east-south-east into the intertidal zone, and Ordnance Survey maps record a 'water port' and a 'hard' in the area.

3.10. DISCUSSION

3.10.1. The NMP project within Blocks B and C of the SE RCZAS Study Area has revealed a wide range of archaeological sites, from the medieval to modern period, leading to the creation of a large number of new records in the Hampshire AHBR and Portsmouth HBSMR, and has enabled the enhancement of a considerable number of records dating from the Iron Age to modern period. New sites range from medieval coastal defences to WWII barrage balloon sites, as well as undated sites, while updated existing features range from an Iron Age and Roman temple to HMS Daedalus airfield.

3.10.2. Overall the majority of new and enhanced sites dated to the post-medieval and modern period, which is largely due to the fact that many of these sites were still extant and clearly visible on aerial photographs taken in the 20th century. Within these post-medieval and modern records, there is a distinct concentration of military sites, which emphasise the strategic and military importance of Portsmouth, Gosport and the surrounding areas. With military sites, such as Portchester Castle, that date back to the Roman period, it is clear that the area has had a long military tradition. But the site of Porchester Castle also illustrates the ongoing re-use of sites – as the site was re-used in the Saxon, medieval, post-medieval periods and during WWII.

3.10.3. The lack of new prehistoric, Roman, Saxon and comparatively small numbers of medieval sites, may be partially due to this very issue – the re-use of strategic or well-situated sites, and the continuous development on the South-East coast, which has intensified in the post-medieval and modern period, in many cases obliterating any trace of earlier sites. However, it may also be due to the difficulties in dating

sites based on typological or morphological features, thus resulting in potential sites from these periods being included in the 'undated' category, or possibly being assigned to the wrong date category – such as sites of ridge and furrow being assigned to 'post medieval' when they could actually date to the medieval period.

3.10.4. Another site type that could be affected by the difficulties in dating sites is 'shipwrecks' and other maritime features. In Portsmouth, shipwrecks visible on aerial photographs dating from the 1940s to modern day were generally assigned a 'post-medieval to modern' date, because although they may have first appeared as wreckage in aerial photographs taken in 1996, the vessel could have been built in the late 19th century, or earlier. However, in the Hampshire dataset, wrecks were also referred to as 'modern' if it was suspected that they dated to the 20th century.

3.10.5. The small number of fish weirs or fishing-related evidence revealed by the project was possibly somewhat surprising, considering the long period of time that the coast has been occupied, and the reliance of populations on coastal resources for subsistence. Evidence for possible salt-making activities was more plentiful along the coast than evidence for fishing-related activities.

3.10.6. The project has identified a wide range of threats to archaeological sites – in addition to the re-use of sites and the pressures of coastal development mentioned above, there are additional threats, such as coastal erosion, improvement of coastal defences and ploughing damage. The particular threats to the archaeological resource depend on the area – for example urban areas with protected coastline are more likely to have archaeological sites under threat from development, whereas rural areas with unprotected coastlines are more likely to have sites under threat from coastal erosion.

3.10.7. Aerial photographic evidence from WWII and shortly after demonstrates the immediate dangers to military sites once a conflict has ended: the majority of barrage balloon sites, pillboxes, gun emplacements, Heavy Anti Aircraft Batteries and other sites were demolished after the war – leaving, in many cases, the aerial photographs as one of the best records to understand the layout and use of the sites.

3.10.8. In conclusion, although many of the archaeological sites identified on the coast have already been levelled or redeveloped, information about which sites are still extant and which have been levelled have been consistently added to new and existing records, providing information that will be key for future management decisions. Of the newly created or modified records, 264 newly created or modified records in the Hampshire AHBR and 214 in the Portsmouth HBSMR included evidence types that indicated that at least part of the site was categorised as a demolished building, destroyed monument, levelled earthwork or demolished structure. Sites with these evidence types fall into three main categories: sites where some of the buildings or walls have been removed; sites where the vast majority of features have been demolished or levelled, but for which there are still some remains visible on the surface, such as at the Submarine Mining Establishment in Gosport; and sites such as the substantial number of WWII sites which were levelled immediately after the war which have no remaining extant material, although archaeological material could still be discovered underground.

3.10.9. Overall the project has provided a key source of information for further scholars regarding the archaeological resource of the coast of Hampshire and Portsmouth – and in particular regarding the intensive militarisation of the coast during WWII.

4. PROJECT RESULTS: BLOCKS L & M (KENT)

4.1. PREVIOUS ARCHAEOLOGICAL SURVEY WORK AND RESEARCH

4.1.1. In Kent, a considerable amount of research has been undertaken, and projects range from wide scale assessments of the regional resource to individual site excavations. The information that has been gained from these projects presents a rich backdrop for aerial photographic interpretation. It would be impossible to discuss all previous archaeological survey work and research here; instead, a detailed overview can be found in the SE RCZAS Main Report (Wessex Archaeology, in progress), and this section highlights a few of the broad ranging regional overviews and previous NMP projects in the area.

4.1.2. The South East Research Framework is currently in progress to create an overview of the historic environment for an area encompassing the counties of Kent, East Sussex, West Sussex and Surrey. Currently, the Research Framework comprises detailed seminar notes on specific archaeological periods along with discussions of key themes relevant to the area (Kent County Council, ongoing).

4.1.3. Other detailed resources providing a historical and archaeological background for Kent include *An Historical Atlas of Kent* (Lawson & Killingray 2004).

4.1.4. Kent was one of the first areas of England to be selected for a pilot National Mapping Programme (NMP) project, which was designed to produce maps and records to form part of the first data for the Kent Sites and Monuments Record. However, as it was a pilot project, it did not follow the now-standard NMP methodology, and only plough-levelled archaeological features visible as cropmarks were recorded. Hence the coast of Kent was selected to undergo a more detailed survey as part of the SE RCZAS.

4.1.5. More recently, the Richborough Environs Project (English Heritage 2002) produced an aerial photographic analysis and transcription of the Roman fort and *vicus*. As this site falls within the SE RCZAS NMP Study Area, the data has been incorporated into the project database, rather than re-mapped.

4.2. GEOLOGY

4.2.1. General information about the geology and soils are derived from maps (Ordnance Survey 1977; Geological Survey 1980; Avery *et al.* 1965). More details can be found in the Landscape Character section.

4.2.2. The Quaternary geology around Thanet and inland south of Deal comprises Brickearth, mainly loess. Inland between Pegwell Bay and Deal, the Quaternary geology comprises Alluvium. Areas of the coast to the north of Sandwich and south to Deal comprise blown sand. The underlying geology of Thanet is generally Upper Chalk with areas of Thanet Beds, and the Thanet Beds formation continues south from Pegwell Bay. South of Great Stonar, the underlying geology changes again to Chalk, and this Formation extends to just north of Folkstone.

4.2.3. The soils of Thanet and the coast between Deal and Langdon Bay comprise Rendzinas – brown calcareous earths and argillic or palaeo-argillic brown earths from chalk and associated drift parent material. The well drained shallow chalky soils are associated with deeper loamy or clayey flinty soils. The land is used for dairying mixed farms or general arable.

4.2.4. The soils along the former Wantsum Channel are generally alluvial gley soils derived from marine alluvium. The soils are characterised as clayey with high

groundwater levels often combined with slow permeability. The area is generally suitable for arable land use or horticulture.

4.2.5. The River Stour valley around Canterbury has palaeo-argillic brown earths derived from Brick Earth associated drift and Tertiary sand and silt. The soils are generally well drained and often silty with areas that are stony or associated with coarser textured soils. The land is suitable for horticulture or a mixture of arable and horticulture.

4.2.6. The far south of the Study Area, around Dover, comprises palaeo-argillic brown earths derived from brown calcareous earths and argillic brown earths. The soil is characterised as plateau drift of clay with flints and associated drift over chalk. The soils are generally well drained to moderately well drained and loamy or silty over-clayey or occasionally clayey soils with associated less clayey or calcareous soils. The land is generally used for mixed livestock and mainly for dairy, although locally there are mixed farms or forestry.

4.3. LANDSCAPE CHARACTER

4.3.1. Information about the Historic Landscape Character (HLC) of the Kent coast has been derived from the Historic Landscape Characterisation report by Oxford Archaeological Trust (2001) and the *Landscape Assessment of Kent* report by Jacobs Babtie (2004).

4.3.2. The Study Area is represented by the following Character Areas (CA), as defined by Jacobs Babtie (**Figure 5**):

- Thanet
- The Wantsum Channel and Lower Stour Marshes
- The Stour Valley
- East Kent Horticultural Belt
- East Kent Arable Belt
- South Foreland
- Broadstairs, Ramsgate, Deal, St. Margaret's at Cliffe and Dover do not have specific Character Areas

4.3.3. Thanet CA represents a distinct area defined as the historic Isle of Thanet that was disconnected from the mainland by the Wantsum Channel until it silted up approximately 1,000 years ago. There are two distinct landscape types in this area: flat plateau which are located above the 40m contour, and the marshes which are located between the 20m and 40m contours. The seaward side of Thanet is characterised by steep chalk cliffs and small sandy bays. Most of the area consists of Upper Chalk covered by arable soil or pockets of woodlands. The farmland has been in use since at least the Bronze Age, and occasionally Bronze Age fields can be seen or coin hoards discovered. The majority of settlements are centred on mills and former small ports or ferry landings at the edge of the Wantsum Channel, while settlements on the seaward side that once comprised small fishing villages have now been subsumed into the urban network that follows the coastline. Land occupied by urbanised areas has increased steadily since 1960.

4.3.4. The Wantsum and Lower Stour Marshes occupy the silted up and reclaimed former course of the Wantsum Channel and former mouth of the River Stour. Along the east coast is the Sandwich Bay to Hacklinge Marshes Site of Special Scientific Interest (SSSI) and the Sandwich and Pegwell Bay National Nature Reserve (NNR). The land form is generally flat and is bordered by the gentle slopes of Thanet chalk and the horticultural belt. During the Romano-British period, the channel was open,

but it began to silt up in the 8th century, and the development of a shingle spit across Pegwell Bay increased sedimentation (Young 2004: 5-6). The Channel remained at least partially open until the 17th century, but reclamation was effectively complete in the early 1770s (*ibid*). There is no settlement within the marsh, and the present field pattern is fairly small and regular, outlined by a network of drainage ditches, dykes and flood control banks. Around Sandwich and Worth, the eastern marshes have a more coastal influence with views to the sea. Sandwich attained a considerable level of importance as a medieval port, while Richborough had been strategically important since Roman times.

4.3.5. The Stour Valley extends south-west from the Wantsum and Lower Stour Marshes CA towards Canterbury, and comprises the flat-bottomed floodplain of the Great and Little Stour rivers. The valley extends through the Stodmarsh SSSI which includes the lakes at Westbere, and is protected as an NNR. The course of the river extends through lands considered to be agriculturally poor, as the alluvial soils are generally waterlogged with areas of peat. The original settlements in the area were built at the edges of the fluvial marshland, and Roman roads followed the edges of the floodplains or higher ground. The valley is characterised by old watermills and mill ponds, as well as areas of gravel extraction.

4.3.6. The Study Area briefly catches the edges of the East Kent Horticultural Belt on either side of the Stour Valley and on the edges of the Wantsum Channel and Lower Stour Marshes CA. The geology of the area mainly comprises the Thanet Beds of fine-grained grey and brown sands with local silty clays that overlie chalk, with areas of Head Brickearths and Sandgate Beds. The area is mainly large-scale arable with limited areas of grassland. Many of the villages along the Stour River, including Stodmarsh, Chislet, and Upstreet are of historic interest.

4.3.7. The Study Area also includes the small, coastal section of the East Kent Arable Belt immediately to the south of Deal. The Arable Belt is situated on the chalk downs, and the soils are generally chalky and loamy. The good quality soils are generally well drained and provide fertile ground for agriculture. The Sutton Downs are characterised by the open, remote rural landscape with long views. The Lydden Valley, north-west of Deal, has dramatic steep slopes and is a landform with classic areas of grazing characteristic of the adjacent downland in the East Kent Downs CA.

4.3.8. The South Foreland CA extends between Kingsdown and Dover and includes the famous White Cliffs of Dover. The landscape behind the cliffs includes an Area of Outstanding Natural Beauty and the South Foreland Heritage Coast. The landscape is also furrowed by gentle valleys which were enclosed in the 19th century. Before the 19th century, the landscape comprised unenclosed downland or arable fields. Important landmarks in the area include Dover Castle, St. Margaret's Lighthouse and the War Memorial. The area is largely undeveloped, and the rolling, open countryside provides long views, which makes the area very vulnerable to any form of development.

4.4. OVERVIEW

4.4.1. This section provides a brief overview of the results of the SE RCZAS project in Blocks L and M. It indicates the quantity of records created and enhanced, and it describes the types of sites that were encountered and mapped. This section does not attempt to situate the monuments within a wider context or the broader archaeological landscape, as a more detailed and comprehensive report has been produced assessing the resource (Wessex Archaeology, in progress).

4.4.2. Sites discussed in this report are referred to by their unique Kent HBSMR identifier number. All newly created records have been assigned MWX numbers, whilst the

existing records that were enhanced kept their original prefixes (MKE, MKe and Mke).

4.4.3. In order to minimise the incidence of creating new records that duplicate an existing record, the HBSMR dataset was analysed in great detail. This also revealed sites that already had two or more either duplicating or similar records. In these cases, the records were linked so they could be analysed together - for example two records for ring ditches positioned less than 50m apart were linked together so that they could be understood as either an area comprising several features or investigated further into whether they are in fact duplicate records (**MKE7575** and **MKE7546**).

4.4.4. The vertical and oblique photographs covering this area were extensive, and provided ample evidence for archaeological sites. However, as the majority of photographs were taken either during or immediately after WWII, a much greater number of military sites were identified and mapped. It is also possible that the quantity and size of these military features may also have obscured earlier archaeological sites. There was also a greater concentration of photographs covering specifically the coastline, in particular the M-series photographs, which meant that the inland areas (Block M and the north part of Block L) utilised not only fewer photographs but fewer military photographs.

4.4.5. Prior to the project, there were 2851 existing records in the Kent HBSMR within the Study Area. Overall, 715 new records were added and 231 existing records were enhanced (**Figure 6**). Subsequently, the Kent dataset has been expanded by almost 25% more records due to this phase of the SE RCZAS project.

4.4.6. New sites recorded in the Kent blocks ranged from the prehistoric period through to military sites from WWII, and the site types ranged from cropmark enclosures and ring ditches to WWII coastal batteries and barrage balloon sites.

4.4.7. The vast majority of new and enhanced sites were related to WWII – over 60% of the newly generated records were dated to this period, using 64 distinctive military monument types, out of a total 124 types used overall. This was mainly due to the quantity of military aerial photographs that were investigated for the area, but is also due to the Kent HER dataset having a limited record of military sites compared to other archaeological features such as cropmarks and findspots. Less than 10% of the original Kent HER dataset was related to modern military sites.

4.4.8. Any features that extended beyond the Study Area were often mapped to their full extent in order to be recorded as a cohesive monument, rather than individual features.

4.4.9. The following sections examine the data chronologically, based on the divisions in the HBSMR and AHBR databases, to provide broad 'period' overviews (**Figure 7 & 8**). Sites are discussed within the earliest recorded date range, rather than in each of the periods in which they were active or development occurred.

4.5. PREHISTORIC (C. 700,000 BC - AD 42)

4.5.1. Several prehistoric sites were observed during aerial photograph analysis, visible as cropmarks, soilmarks and earthworks. In some cases it was difficult to accurately date the feature to a more specific archaeological period and consequently all the features will be discussed together and given a more accurate date range where possible.

4.5.2. One new archaeological feature thought to potentially date from within the prehistoric period was recorded as part of the NMP mapping phase. It comprises a series of irregularly occurring cropmarks (**MWX43572**) located at St Margaret's at

Cliffe; these span an area of 320m by 100m and have been interpreted as possible levelled earthworks. A ring ditch (**MWX6936**) appears to truncate the earlier cropmarks, and therefore it is presumed that the earlier site dates prior to the Bronze Age.

4.5.3. Three records dating from the Palaeolithic were enhanced as part of the mapping phase. One of these records was originally described in the Kent HER as a rectilinear enclosure (**MKE6610**), however no such feature was visible on aerial photographs, and this information was added to the record. It is believed that the feature may have originally been misidentified as cropmarks derived from periglacial features that are common in this area.

4.5.4. Frequent cropmarks (and occasional soilmarks) indicating possible linears, enclosures, boundaries, and pits have been identified from modern aerial photographs. It has often been difficult to accurately date the features, but due to their size, shape and proximity to other similar features, they have been assumed to be later prehistoric in date; from the Neolithic to the Iron Age periods.

4.5.5. Generally these cropmarks exist in groups of features rather than singularly, and this has meant that one record may relate to several cropmarks, assumed to be associated. Furthermore, these clusters of prehistoric features appear to suggest potential occupation sites.

4.5.6. The earthwork remains of two parallel banks situated 5m apart and extending around 35m between two plots of land north-west of Broadstairs Harbour (**MWX43050**) was also recorded. It is impossible to confirm the function and date of this feature from the aerial photographs especially since the area was redeveloped by 1979, however it could date from between the early Neolithic (forming a possible cursus) and post-medieval periods (as a possible trackway).

4.5.7. On the headland at North Foreland, a ditch feature flanked on either side by levelled banking (**MWX43002**) is visible extending west from the cliff edge for 360m. At its western extent is a cluster of sub-circular cut features (probable pits) that are potentially related (**MWX43023**). These features may also be associated with another pit further south, visible as a cropmark (**Mke9115**), and this record was enhanced accordingly. This complex of features may date from the Bronze Age or Iron Age and is thought to be a boundary feature with associated evidence of habitation.

4.5.8. Overlooking Pegwell Bay at Chalk are the cropmark remains of a series of features that date from the late Bronze Age or Iron Age periods. A ‘parent record’ was created for the entire area (**MWX43158**) and the ‘child records’ were accordingly linked (**MKE8018**, **MKE8021**, **MKE8024**, **MKe17684** and **MWX43170**). This complex includes a small oval enclosure to the west of two large sub-circular enclosures; the interior of the central feature contains five circular pits and an east facing entrance. Surrounding these enclosures are numerous circular pit features together with irregularly aligned linears. WWII military features (**MWX39435**) were later constructed at the same location as the cropmarks; see Section 4.9 for more details. Two ring ditches were also visible on this busy chalk upland area (**MKE8021** and **MKE8024**).

4.5.9. Another complex of cropmarks was mapped between Chislet and Upstreet. Three of the features were interpreted as two- or three-sided rectilinear enclosures measuring over 40m in length (**MWX43092**, **MWX43104** and **MWX43105**), whilst the other components were various linear features thought to be boundaries or trackways that extend for a length of 360m (**MWX43095**).

4.5.10. A further series of prehistoric features visible as cropmarks were mapped from aerial photographs taken over Fordwich (**MWX43014** and **MWX43027**). These included a

D-shaped enclosure (40m x 24m), possible parallel land boundaries aligned NW-SE, two pit groups and several larger cuts that indicate possible quarrying in the area (**Plate 26**).

4.5.11. Around 1 km to the south-east of these features are the cropmark remains of more linear features, thought to date to the later prehistoric periods (**Plate 27**). A new record was created for a north-south orientated linear (presumably a ditch) (**MWX43158**) and this was linked to an existing record for an Iron Age ditch located 45m to the east (**MKE4513**); although it is possible that these are duplicate records for the same feature. Two rectangular cropmarks were mapped 50m to the north-west of the ditch, and could represent former structures or small enclosures (**MWX43058**). These features measure between 10m and 11m in length and are around 7m wide.

4.5.12. A soilmark of a linear ditch feature was observed from aerial photographs north of St. Margaret's at Cliffe (**MWX43495**); possibly a duplicate for an existing cropmark record (**MKE6675**). Two sub-circular pits were also mapped (**MWX43494**), along with two ring ditches (**MKE6679**), a sub-circular enclosure (**MWX43491**), a curvilinear ditch (**MEX43492**), and a D -shaped enclosure visible as a soilmark (**MWX43490**) that may be a duplicate for an existing record (**MKE6676**). Some of these features appear to be overlain by more modern parallel linears (**MWX43498**) running almost perpendicular to the ditch feature, **MWX43495**; these are interpreted as possible medieval or post-medieval land boundaries.

4.5.13. Another linear, extending over 200m and visible as a cropmark, was mapped less than one kilometre to the south-west of these features and was interpreted as a boundary (**MWX43496**).

4.5.14. An extensive area of cropmarks was visible on oblique aerial photographs in fields between the Sandwich Bay Estate and the North Stream (**MWX43591**). These formed an overlapping pattern interpreted as sub-rectangular ditched enclosures of varying sizes, curvilinear trackways and possible field boundaries.

4.5.15. Two parallel curvilinear bank features and a series of interlinking ditches were visible as cropmarks beside the Betteshanger Colliery (**MWX43476** and **MKE7579**) and were interpreted as a boundary and part of a possible field system dating to the later prehistory.

4.5.16. Cropmarks in the Lydden Valley have been identified as the site of a Bronze Age settlement since an existing record using this description exists at the same location. This complex of features received a new record (**MWX43703**) and the existing record (**MKE7449**) was enhanced.

4.5.17. Finally, several series of cropmarks were mapped that are presumed to be of later prehistoric date but whose function was not ascertained. These included sites at Worth (**MWX43700**-**MWX43702** and **MWX43704**-**MWX43706**), North Deal (**MWX43698** and **MWX43699**), and South Deal (**MKE6678**, **MWX43683**-**MWX43686** and **MWX43689**-**MWX43695**). The features included numerous linear ditches, banks, pits and one possible enclosure (**MKE6678**), and are potentially evidence of human occupation.

4.5.18. Three other features were recorded in Blocks M and L within the Kent Study Area that could not be accurately identified or dated, possibly due to their incomplete survival as cropmarks or their association with leisure activities in the area, namely golf courses. These features received new records: **MWX43000**, **MWX43439** and **MWX43369**.

4.5.19. A total of 36 partial or whole ring ditches were mapped within Blocks M and L of the Kent Study Area using aerial photography. Nine new HBSMR records were created for these typical Bronze Age features and five existing records were enhanced.

Records containing duplicate information were appropriately linked, thus tidying the database further.

4.5.20. In six cases the ring ditch features were solitary occurrences, however in nine examples a cluster of ring ditches (in one case including up to seven ring ditches (**MKE7575**)) were mapped along with other archaeological features such as linears and pits, possibly also dating to the Bronze Age.

4.5.21. All of the ring ditch features were identified as cropmarks, and generally consisted of a single ditch (**MKE6647**, **MKE8021**, **MKE8024**, **MKE6936**, **MWX43536** and **MWX43080**). Three examples show the features to have a double ditch (including **MKE6935**) and one example has a triple concentric ditch (**MKE7575**) – **Plate 28**. One feature may have a plough levelled mound in the centre, visible as a lighter cropmark (**MKE6936**), and another feature appears to have associated pit cuts on the interior (**MWX43080**).

4.5.22. Three Bronze Age circular barrow features were observed and mapped from aerial photographs of Kingsdown; two of which lie approximately 10m apart (**MKE6679**), see **Plate 29**, whilst the third lies around 180m to the south-east (**MKE6680**). The two pre-existing records were enhanced with the mapping data and dimensions.

4.5.23. One cluster of features visible as cropmarks was mapped east of Sarre and received a new HBSMR record (**MWX43172**). These are believed to be Iron Age in date due to their proximity to an existing record that describes a settlement from this period (**MKE6462**). The mapped features comprise various linears including a sinuous ditch extending north for 440m and then curving east for 250m, overlain by three irregularly shaped pit-like features that may be post-medieval chalk extraction pits.

4.6. ROMANO-BRITISH (AD 43-409)

4.6.1. A significant Romano-British site within the Kent Study Area is the designated fort located at Richborough (**MKE8063**). A broad survey area centred on the fort was mapped from aerial photographs as part of the Richborough Environs Project undertaken by English Heritage (Small 2002). More information regarding this project can be accessed from the English Heritage website (English Heritage, accessed March 2011).

4.6.2. The data generated from this project was integrated into the SE RCZAS's mapping data to prevent duplication, and the associated records were enhanced or linked (a total of nine existing records were updated with subsequent information). Also where necessary, new records were created to make the overall site archive more logical (**MWX43458**, **MWX43462**, **MWX43480** and **MWX43482**).

4.6.3. Two other previously known Romano-British sites were also updated with information gained from aerial photograph analysis for elsewhere in the Study Area.

4.6.4. A general record for a Romano-British road (**MKE6614**) was enhanced as a 'parent record' and linked to 'child records' that contained more detail regarding the mapping data and other geographically associated features (**MWX43102** and **MWX43103**). The Romano-British road, located north-west of Upstreet, was intermittently visible as two parallel ditches running for at least 780m and aligned southwest–northeast. The cropmarks continue the alignment of the present road (A28), derived from the Roman route from Canterbury to the Isle of Thanet, after it kinks southwards to pass through the village of Upstreet; likely to be a later diversion.

4.6.5. Two linear ditches and a circular pit were visible as cropmarks on military aerial photographs taken in 1942 and are believed to be associated with the Romano-

British settlement known to exist in the area (**MKE7649**). This record was accordingly enhanced with the mapping details. The parallel ditches are thought to be a possible boundary around the site whilst the pit is another indicator of human occupation. This area has since been redeveloped and as a result these features may have been lost.

4.7. MEDIEVAL (AD 410-1539)

4.7.1. Almost 300 sites were observed and mapped from aerial photographs that were subsequently dated to the medieval period. The photographs used ranged in date, but were predominantly WWII military vertical photographs from the 1940s and 1950s.

4.7.2. A typically medieval site that was encountered during the analysis of aerial photography was the motte and bailey castle in Mary-le-Bone (**MKE7283**). This defensive feature was not mapped as part of the SE RCZAS project since it was comprehensively completed as part of the Richborough Environs Project by English Heritage. However earthwork features lying just to the north of the site were mapped as part of the SE RCZAS and were recorded in a new record (**MWX43564**). These features include a substantial ditch and bank along with a shallower set of double ditches, and could potentially be associated with the motte and bailey site. Alternatively these features are merely former landscape boundaries; further investigation would be necessary to confirm this.

4.7.3. Two records were created for possible medieval hollow ways and trackways in Fordwich and Upstreet (**MWX43060** and **MWX43103**). Both features were mapped as ditches visible as earthworks. The feature at Upstreet overlies a Romano-British road and may represent an early attempt to divert the original road through Upstreet, which the present road does.

4.7.4. Numerous earthworks have been mapped across the Study Area that were visible on aerial photographs. In some cases these features may have been associated with the hay stack stances, saltmounds and enclosures that were scattered across the marshy landscape of the former Wantsum Channel, discussed in more detail below.

4.7.5. A majority of the features mapped in the Stour Valley, on the reclaimed land of the former Wantsum Channel, are field boundaries dividing up the landscape. Twenty-nine new records have been created for earthworks, visible as ditches and banks, interpreted as field boundaries or drainage ditches forming a much wider agricultural field system around the River Stour (**MWX43020**, **MWX43021**, **MWX43110**, **MWX43115**, **MWX43117**-**MWX43121**, **MWX43123**, **MWX43133**, **MWX155**, **MWX43156**, **MWX43163**-**MWX43165**, **MWX43171**, **MWX43178**, **MWX43227**, **MWX3280**, **MWX43291**, **MWX43312**, **MWX43315**, **MWX43328**, **MWX43498**, **MWX43583**, **MWX43585**, **MWX43588** and **MWX43971**).

4.7.6. These field boundaries were not visible on the earliest Ordnance Survey historic mapping from 1877 but were mapped from aerial photographs taken in the 1940s. This not only suggests their early origin but also indicates the removal of boundaries in order to enlarge fields during the post-medieval and modern periods due to changing techniques in agriculture.

4.7.7. Seven new records were created for areas of agricultural ridge and furrow thought to be medieval in date (although some hay stack stances were also included with these records). See the post-medieval section (4.8) for later examples of ridge and furrow. The medieval features mostly occur within the field boundaries of the Stour Valley, described above (**MWX43225**, **MWX43284**, **MWX43302**, **MWX43347** and **MWX43367**) and would be a frequent occurrence on this exclusively agricultural

landscape. The remaining two ridge and furrow features are situated in the Lydden Valley between Sandwich and Deal (**MWX43310** and **MWX43319**).

4.7.8. Other earthworks dated to the medieval period onwards have been interpreted as enclosures of varying sizes, shape, and form visible as bank or ditch earthworks. A majority of the thirteen enclosures (documented in nine new records) are associated with the large field system in the Stour Valley, discussed above. Most of these features, mapped from aerial photographs taken during the 1940s, were subsequently plough levelled during the 1960s, highlighting the importance of aerial photograph investigation.

4.7.9. Five enclosures were circular in plan and were often positioned in the corner of a field (**MWX43255**, **MWX43332**, **MWX43346** and **MWX43254**). The remaining features were either square or sub-rectangular (**MWX43345**, **MWX43366** and **MWX43368**), or two or three sided with the remaining edges utilising the existing field boundaries (**MWX43327**, **MWX43226**, **MWX43444** and **MWX43484**).

4.7.10. Another large three-sided enclosure, visible as a banked earthwork, has been mapped beside the site of the deserted medieval village (DMV), Spruckelham, **Plate 30**. It is thought that the earthwork may be associated with the former medieval site, especially since two medieval finds are recorded as having been discovered on the interior of the enclosed area (**MKE7170** and **MKE7407**). The existing record for the DMV has been amended accordingly (**MKE7169**) and linked to the medieval find spots.

4.7.11. A total of 184 hay stack stances (used to store dry hay in environments prone to flooding) were recorded as circular earthwork mounds in many low lying areas in close proximity to a water source. These features were recorded in 91 newly created HBSMR records and four enhanced records. A majority of the hay stack stances (161) were mapped in fields on either side of the River Stour, between Stodmarsh in the west and Richborough Port in the east, **Plate 31**. A further nine were mapped around Sandwich, and fourteen in the Lydden Valley. These features would have been constructed as and when necessary, and thus they appear individually (for example **MWX43221)** or in clusters (for example **MWX43298**).

4.7.12. Other than agriculture, another common medieval industry was salt manufacture. All of the salt work features mapped from aerial photographs have been recorded as saltmounds, which were raised areas created by accumulating sediments rich in salt from the shores of nearby water sources prior to salt extraction. A total of 41 saltmounds were mapped from photographs over an area of approximately 10 km^2 around the River Stour between Wall End and West Stourmouth in the west to just south of Minster in the east (**Plate 32**). These features were recorded on 22 new records whilst six existing records were accordingly enhanced.

4.7.13. The saltmounds mapped from aerial photographs (and are occasionally visible on historic Ordnance Survey maps) are generally visible as either upstanding earthwork mounds or as plough-levelled mounds visible as cropmarks or soilmarks. These features vary in size and shape, and have been mapped as circular, sub-rectangular, trefoil, or irregular in form (for example **MWX43079**).

4.7.14. Often the saltmounds are associated with other features. These include ditches visible as cropmarks thought to be drainage systems used for the movement of water for salt processing (**MWX43079**, **MWX43178** and **MWX43228**), and earthwork banks interpreted as enclosures (**MWX43149**). One saltmound at Docker Hill appears to have been reused as an occupation site and adapted with the addition of a moat and earthwork banks (**MKE6566**). It was presumably reused since the raised area provided a drier environment than the surrounding marshy landscape. Finally, other examples of saltmounds that were mapped from military aerial photographs

taken during the 1940s have since been levelled, and would potentially not be identified from modern photography (**MKE6555**).

4.7.15. Other drainage features that have been mapped include flood defences; mostly located in the reclaimed land in the Stour Valley. Fourteen new records have been created for these feature types (**MWX43153**, **MWX43256**, **MWX43329**, **MWX43330**, **MWX43343**, **MWX43344**, **MWX43370**, **MWX43371**, **MWX43373**, **MWX43375**, **MWX43437**, **MWX43442**, **MWX43587** and **MWX43590**), whilst one existing record has been enhanced (**MKE7206**). Such features would have been essential in a landscape such as the Stour Valley, where the reclaimed land meant flooding was a common hazard. The remaining features were mapped around Sandwich, presumably to protect the town from flooding of the nearby River Stour.

4.7.16. Finally, three clusters of earthworks of unknown origin were mapped at Plucks Gutter (**MWX43223**), north-east of Westmarsh (**MWX43293**) and north-east of Worth (**MWX43709**-**MWX43716**). These features are assumed to be associated with the agricultural industry of the area; the first comprises a bank and ditch system, an area of hollows and a group of parallel shallow ditches, and is possibly associated with an existing record (**MKE16110**). The second site appears to be two discrete circular pits of unknown function, whilst the features in the third cluster are possible former field boundaries and enclosures, visible as several curving ditches and sections of banking; although it is possible that they may be associated with WWII military activity in the area.

4.8. POST-MEDIEVAL (AD 1540-1900)

4.8.1. Relatively few features were mapped that were interpreted as originating in the post-medieval period; this may be due to their similarity to equivalent medieval features, and without further investigation are difficult to accurately date.

4.8.2. An extent of area was mapped around Sandown Castle (**MKE7303**), one of Henry VIII's coastal fortifications, from military aerial photographs taken in 1941 (**Plate 33**). The castle has suffered dramatically from coastal erosion since its construction in 1545. An 18th century theory for this is that the construction of Ramsgate Harbour to the north caused a diversion of the tides, impacting greatly on Sandown (Chapman 1890: 90). This is a prime example of the importance of the SE RCZAS for understanding the threat to archaeological features, and to survey these features preserving them in record as soon as possible before they are lost.

4.8.3. The full extent of Archcliffe Fort (**MKE7021**), a defensive post-medieval site in Dover, was not mapped as part of the SE RCZAS since an accurate depiction of it already exists on modern mapping. However, the 17th century northern bastion was mapped as part of the project since its full extent was not visible on modern mapping. The existing record for the fort was enhanced with a description of this feature.

4.8.4. The East Pier and associated building (**MKE34840**) located at Ramsgate were mapped from military aerial photographs taken in 1941. The pier was first constructed in the mid to late 18th century, with various repairs and extensions being added throughout the 19th century. Both structures are still evident in photography from 2008.

4.8.5. Several industries dating to the post-medieval were mapped from aerial photographs, including a brickfield and chalk quarry.

4.8.6. The brickfield (**MKE16460**) was located on the coast, at Little Cliffsend, west of Ramsgate, presumably for ease of transport. It was visible on aerial photographs as regular earthworks running parallel to the coastline (similar in appearance to ridge

and furrow) and also less regular areas of banks and hollows. The site covers an area of approximately 0.02km².

4.8.7. The chalk quarry on Fox Hill Down, Dover (**MKe17284**) is thought to date to at least the early 19th century. The large sub-circular cut, measuring 36m by 30m, was mapped from aerial photographs taken in 1945 and since then the area has been levelled.

4.8.8. Continuing from the medieval period, agriculture was still an essential industry in the post-medieval period. Four new records were created for ridge and furrow features thought to date to this period. Three of these (**MWX43215**, **MWX43253** and **MWX43336**) are located in fields along the Stour Valley (the former Wantsum Channel); a reclaimed area used extensively for agriculture. One of these (**MWX43253**) overlies an area of former medieval saltmounds (**MWX43252**) – **Plate 31**. The earthworks of the fourth example of ridge and furrow, located just west of Sandwich (**MWX43432**), are linear and fairly narrow in form so this feature is more likely to be post-medieval rather than medieval in date.

4.8.9. Four examples of post-medieval field boundaries were also mapped from photographs as part of the project; generating three new records and one enhanced record. They are located around Sandwich (**MKE8097**, **MWX43035** and **MWX43038**) and west of Richborough Port (**MWX43972**), and were visible as a mixture of cropmarks and earthworks. The enhanced record, **MKE8097**, was originally thought to include two pits, however these were identified in the SE RCZAS project as bomb craters; indicating the importance of the NMP phase of the project for enhancing and improving existing records.

4.8.10. One new feature interpreted as post-medieval flood defence (**MWX43331**) was mapped from photographs taken in 1946 (**Plate 34)**. The feature comprised a curving ditch and bank earthwork located to the west of North Stream in the Lydden Valley. The mapping does not show the drain and stream connecting, but it is likely that when the water level in the stream rose, the drain could be opened and the excess water would feed into it. The bank on the western side of the drain would have minimised flooding to the adjacent fields.

4.9. MODERN (AD 1900-PRESENT)

4.9.1. A vast majority of the modern features mapped during the project are military in nature; predominantly from WWII. This may be due to the high proportion of specifically military aerial photographs available. The remaining features from the modern period were all early modern in date and include the only shipwrecks discovered in the area.

4.9.2. A total of six wreck sites were mapped during the project; recorded on three new records and two enhanced records. Two hulks (**MWX43286**) were visible within intertidal mud in a small inlet on the eastern shore of the River Stour, south of Richborough Port. These hulks may have been deliberately deposited due to their position within the inlet that is close to the flood defence embankment, and would help to prevent further coastal erosion.

4.9.3. A wreck believed to be the *Nora* (**MKE10743**) was visible on Deal beach. The vessel detonated a German magnetic mine in 1940 and drifted ashore smashing through the inshore end of Deal pier (**Plate 35)**. The *Nora*, mapped from military aerial photographs taken in 1943, is visible lying 30m to the north of the damaged pier. The vessel is no longer visible by 1946, presumably after it had been towed to its current position; just under 1km offshore.

4.9.4. The remaining three wrecks were located in and around Dover; two were mapped in Dover Dockyard (**MWX43618** and **MWX43625**) and although their age is unclear

they have been dated to the modern period (**Plate 36)**. Neither is visible on modern aerial photography. The final site comprises the remains of a metal hulled vessel wrecked at the base of Langdon Hole, Dover and is only visible at low tide. The SS *Falcon* (**MKe17303**) wrecked in 1926 after its cargo of hemp and matches caught fire (**Plate 37**).

4.9.5. Several early modern features associated with industry and transport were also mapped from aerial photographs. Two collieries were mapped and their existing records accordingly enhanced with further information. The spoil heaps associated with Chislet Colliery (**MKE13599**), originally constructed in 1913, were mapped as part of the project. These elevated features were later reused as gun emplacements sites during WWII.

4.9.6. The other colliery at Betteshanger, near Deal, was mapped with an extent of area polygon encompassing the colliery, spoil heap, mineral railway and associated housing estate, covering an area of 0.63km² (**MKE7473**).

4.9.7. Six forms of transport and movement were also mapped from aerial photographs, including three new records and one enhanced existing record for railways or tramways in the area. Remains of a section of the Guilford Tramway were visible as cropmarks near Sandwich (**MWX43589**). The tramway was short lived and originally was used to serve the nearby golf club, Royal St. George's, with deliveries from the wharf, and then occasionally during WWI in order to assist military camps in the area.

4.9.8. Sections of the Dover Marshalling Yard and Locomotive Depot (**MWX43607** and **MWX43619**) located within Dover Harbour were partially mapped from military aerial photographs depending on whether they were already visible on historic Ordnance Survey maps. Similarly, only sections of the Martin Mill Military Railway (**MKe17265**), located along the coast north-east of Dover, were mapped. The railway was originally constructed to move materials for the construction of the Eastern Arm of Dover Harbour, but was later used during WWII to connect Wanstone Battery to the 'Winnie' and 'Pooh' cross channel gun sites.

4.9.9. The entrance to a Grade II listed lift at Ramsgate Harbour (**MKE35230**) was mapped from photographs, and was used to link Western Undercliffe to the Royal Esplanade above. Finally, the tunnel entrance to the Tilmanstone Aerial ropeway (**MKe17266**) was mapped at Langdon Hole, east of Dover.

WWI (1914-1919)

4.9.10. The remainder of the modern features mapped from aerial photographs are military in date. A minority of the sites date to WWI rather than WWII; this may be due to their having been dismantled or entirely removed after the war, or that they were reused, modified or obscured by later military activity.

4.9.11. Richborough Port (**MWX43487**), however, is a prime example of a large WWI military feature. It was constructed in 1916 to supply the Western Front and covered an area of approximately 4.8km by 2km, comprising an extensive wharf, shipyards, several large railway sidings, hutted personnel camps and storage sheds. Although Richborough Port eventually became disused in the 1920s, parts of the site was later reused during WWII. This included Weatherlees Siding (**MWX43282**) and Robertson Camp (**Mke42003**), and additional defence features were also constructed, including slit trenching and associated banking (**MWX43550**).

4.9.12. Seven other HBSMR records were created or edited for the remaining WWI features visible within the Study Area. These included a pillbox (**MKe17932**) located on the northern edge of Great Farthingloe HAA battery, Dover (**MKe17930** or **MWX43443**). It is presumed that the structure would have been reused during WWII due to its military function and strategic position.

4.9.13. Further to the east of Dover are the remains of a WWI gun turret (**MKe17299**); according to the existing record this feature is visible on historic Ordnance Survey mapping, however the feature mapped for this project appears to be the reused turret during WWII with the addition of a protective earthen bank flanking it.

4.9.14. Two discrete sections of typical WWI slit trenching were mapped at Langdon Hole (**MWX43582** and **Mke42050**). **MWX4358** is within the extent of a WWI firing range (**MWX43563**), and appears to have been reused during WWII. However, it is unclear whether these features were associated with the firing range or were a slightly later addition that respects the range's earthworks. The slit trench system to the north (**MKe42050**) is the remains of a WWI redoubt visible as a faint earthwork. Similarly, these features were reused during WWII for either defensive or training purposes (**Plate 38**).

4.9.15. Finally, sections of WWI or inter-war practice trenching were visible as cropmarks on Canterbury Golf Course (**MWX43024**). Much of the western extent is comprised of a clear trench system consisting of front and rear lines with fire-bays, and interlinking zigzag crenellated communication trenches (**Plate 40**).

WWII (1939-1945)

4.9.16. Over 60% of all the HBSMR records that were created and enhanced for the NMP mapping phase in Blocks M and L are dated to WWII. This emphasises the density of WWII military features that were constructed along the south-east coastline, the first line of defence, in order to protect Britain. The SE RCZAS NMP project also complements earlier defence related projects, such as the Defence of Britain Project (Council for British Archaeology 1995-2002) and the Defence Areas Project (Foot 2005), which also show a concentration of military sites in the area.

4.9.17. Almost 450 records were newly created (out of the overall total of 715 new records), clearly indicating the importance of the NMP mapping phase for revealing an extensive and diverse range of military features that were previously unknown and unrecorded due to their post-war removal. The military aerial photographs (taken from 1940 to beyond the end of the war) were essential for this task, illustrating the emergence and development of these features throughout this unstable period, and often their eventual dismantlement.

4.9.18. The variety of sites recorded range from large military complexes where each monument record could encompass many individual elements of the site, for instance Wanstone Battery (**MKe17934**), to smaller discrete sites comprising just one military element, such as a solitary pillbox at Broadstairs (**Mke39687**).

4.9.19. Occasionally in order to simplify the larger military sites, a 'parent record' was generated for the entire site and each subsequent component was given a 'child record', for instance the military complex at North Foreland (**MWX43234**), where the various elements of the site received their own records.

4.9.20. The aerial photographs have revealed that a majority of the military sites along the coast were often intrinsically linked, forming one coherent line of defence. This often made understanding and recording sites as discrete features more challenging.

4.9.21. Often the largest and most complex sites encountered on the aerial photographs were the coastal batteries. Numerous battery sites of varying sizes and forms were periodically mapped along the south-east coast. These sites often comprised camouflaged and banked over structures for housing the long range guns, suitable for firing upon ships and other amphibious craft. Along with the guns were other associated structures and earthworks including smaller gun emplacements and machine gun pits, buildings for storage or personnel, air raid shelters, pillboxes, Nissen huts, slit trenching, and barbed wire. The frequency and occurrence of such associated features varied between each site. Examples of these coastal batteries

were visible south of Broadstairs Harbour (**MWX43064**), Pegwell Bay (**MWX43184**), Joss Bay (**MKE17194** and **MWX43035**) – **Plate 41**, Deal (**MKE16748**), Sandwich (**Mke41944**), St. Margaret's at Cliffe (**Mke41964**), and Swingate (**MKe17935**).

4.9.22. The batteries at Langdon Bay (**Mke41979**) and St. Margaret's at Cliffe (**Mke41964**) were also assisted by searchlights (**MKe17260**). Three searchlights were constructed at Langdon Bay built into the cliff face so were not visible on vertical aerial photographs, but the four searchlight positions at St. Margaret's at Cliffe were clearly visible in both vertical and oblique photographs (**Plate 42**).

4.9.23. Other batteries specifically designed for cross-channel warfare were present around South Foreland, providing aggressive force rather than acting solely as defensive features. These differed from the majority of sites along the coast whose function was purely defensive. Located at South Foreland were the propaganda-fuelled 'Winnie' and 'Pooh' batteries (**Mke19895** and **Mke19896**); although 'Winnie' and its 'dummy' battery were not within the Study Area the site of 'Pooh' and its 'dummy' counterpart were fully mapped (**Mke19897** and **Mke19898**). The 'dummy' batteries were designed to deceive enemy reconnaissance missions and simulated the real batteries, housing large functioning artillery under camouflage netting.

4.9.24. As a result of the inaccuracy of 'Winnie' and 'Pooh', three more cross channel batteries were constructed in order to provide support. These included South Foreland battery (**Mke41990**), Fan Bay battery (**Mke41970**) – **Plate 43**, and, perhaps the most successful, Wanstone battery at St. Margaret's at Cliffe (**MKe17934**) – **Plate 44**.

4.9.25. Servicing these cross channel gun sites was the Martin Mill military railway (**MKe17265**). Originally built to move material inland from Dover Harbour, the railway was adapted during WWII and was used to supply ammunition and provisions to the batteries.

4.9.26. Other large coastal defence sites included Anti-Aircraft (AA) or Heavy Anti-Aircraft (HAA) sites, dependent on whether they were isolated cases (for example **MWX43017** and **Mke39272**) or part of a series of emplacements. In order to be effective, the one or more guns at these sites were attached to a central pintle-mount that could be swivelled, giving greater manoeuvrability. Mapped examples show that surrounding each gun was either a square or circular protective earthwork, or a more substantial brick structure.

4.9.27. Sites with more than one gun emplacement were generally constructed in a circular formation (**MWX43192** and **MWX43313**), often with a protectively banked over command post in the centre, for example at the Dumpton Gap AA site (**MWX43078**) – **Plate 45**. The particularly complex HAA battery at Great Farthingloe (**MWX43443**) consisted of four gun emplacements surrounding a command post, smaller machine gun pits, a gun laying (GL) radar mat, storage and magazine buildings, barracks, bunkers and air raid shelters, pillboxes, slit trench systems, and an accommodation camp with storage facilities, all of which was surrounded with barbed wire.

4.9.28. In between these larger military sites were smaller complexes of military features, essential for observing a possible enemy invasion from either the sea or the air, and providing suitable defence. Examples of these sites include integrated elements such as smaller gun emplacements and machine gun pits, pillboxes, air raid shelters, Nissen huts and other military buildings, slit trenching, and were often enclosed with barbed wire (**Mke39435**, **MWX43005**, **MWX43396**, **MWX43195**, **MWX43394**, and **MWX43633**). Around 140 sites of this nature were mapped throughout the Study Area, and were identified by their emergence on early military photographs and removal at the end of the war, together with their association with typical military features (for instance pillboxes and Nissen huts).

4.9.29. Other sites that were mapped include a large area along Sandwich Bay thought to be a military training base (**MWX43263**). This area contained two rifle ranges positioned looking towards the bay (**MWX43264** (**Plate 46**) and **MWX43316**), along with discrete earthworks thought to be rifle butts (**MWX43267**), and a gun pit (**MWX43265**). A freshly laid mine field was visible on the beach behind a length of barbed wire (**MWX43270**) – **Plate 47**. Other anti-landing obstructions were also mapped along the shoreline including barbed wire (**MWX43271** and **MWX43272**), fencing (**MWX43275**), and beach scaffolding (**MWX43267**). The active extraction of sand was thought to be occurring further inland amongst the sand dunes, possibly used for sandbags and other defence features (**MWX43269**). The extraction area was visible as eight rectangular mounds of varying sizes, measuring no more than 15m by 10m. Alongside these mounds are several shallow excavated hollows, presumably from where the sand has been extracted.

4.9.30. Another training area was mapped on Canterbury Golf Course that included an extensive trench system, numerous practice fox holes, intense pitting believed to be for training purposes, along with associated military buildings (**MWX43016**, **MWX43022**, **MWX43026**, **MWX43028** and **MWX43029**).

4.9.31. Five new records were created for barrage balloon sites. These sites were constructed along the south-east coast in order to force enemy aeroplanes to fly above the balloons making their sight of targets and thus their bombing less accurate and also making the enemy aircraft easier targets for fighters and anti-aircraft gunners (Brown *et al.* 1995). Within the Kent Study Area, these features were apparent in Dover (**MWX43311**, **MWX43606**), South Foreland (**MWX43530** – **Plate 38** and **MWX43571**), and Walmer (**MWX43645**). Generally these sites consisted of a series of concentric concrete circular blocks onto which the balloon was attached, along with other associated military structures and defences.

4.9.32. Three radar stations were also recorded from the military aerial photographs; two constructed side by side in Dover (Swingate Chain Radar Station) (**MKE9024** and **MWX43573**) – **Plates 38 & 39**, and one in Sandwich (**Mke42021**). Other than the large aerials, these sites comprised structures with external banking and blast walls, gun emplacements, and barbed wire. Eight possible observation posts were also recorded along Sandwich Bay in three new records (**MWX43393**, **MWX43399** and **MWX43975**), two near St. Margaret's at Cliffe (**MWX43516** and **MWX43517**), and one in South Foreland (**MWX43574**). These either consisted of a short trench surrounded by banking running parallel to the coastline, facing onto the bay, or comprised a U-shaped protective earthwork.

4.9.33. Machine gun pits and spigot mortar emplacement sites were another common feature along the coast and further inland, frequently associated with other military features providing additional protection. Examples have shown that the circular gun pits may or may not be cut into the ground but were always surrounded by sandbags or an earthwork bank. Spigot mortar sites were circular cuts with an internal concrete 'thimble' onto which the gun was attached (Brown *et al.* 1995: 87).

4.9.34. Over 70 sites were mapped that included a small gun emplacement or gun pit feature. Predominantly these were associated with other military features (including **MWX43017**, **MWX43077**, **MWX43107**, **MWX43116**, **MWX43181**, **MWX43234**, **MWX43514**, and **MWX43652**). However there were isolated incidences of gun pits, located in fields and along the coastline, possibly for use as observation posts or by the Home Guard in the event of an invasion (including **MWX43007**, **MWX43008**, **MWX43065**-**MWX43067**, **MWX43708**, and **MWX43967**).

4.9.35. Many other smaller military features were mapped that would often comprise either an earthwork, a building or cluster of buildings, barbed wire or a combination of features that were presumed to be military in nature due to their appearance and

disappearance on the military aerial photographs. Due to the nature of aerial photographic interpretation, it was often difficult to accurately identify a building's function and thus many records relate to 'possible military structure'. Buildings of this nature included **MWX43274**, **MWX43427**, and **MWX43707**). Isolated earthworks and slit trench systems included **MKe17280**, **MWX43637**, **MWX43671**, **MWX43658**, and **MWX43511**. Individual incidences of barbed wire were mapped at various locations including **MWX43012**, **MWX43510**, and **MWX43648**, and are believed to be lines of protective defence associated with nearby military features.

4.9.36. A total of 39 new records were created and 59 existing records were enhanced for pillboxes within the Study Area. The overall number of pillboxes is higher since many were included within general site records for a complex of features and not given individual records. Pillboxes were common along the coastline, providing good observational and defensive platforms, and were commonly constructed in association with other military features (Brown *et al.* 1995: 79), for instance at either end of beach defences (**MKE16752**, **MWX43011**, and **MWX43400**) and also within larger military sites (**MWX43396**).

4.9.37. The most common types of these archetypal WWII features were the hexagonal Type 22 (**MWX43528** and **MWX43643**), rectangular Type 23 (**MWX43626**), pentagonal Type 24 (**MWX43428** and **MWX42085**), and square Type 26 (**MKE16752** and **MWX43697**). Several examples of 'Dover Quad' pillboxes, square structures with a concrete overhang, were also mapped from the higher ground specifically around Dover (**MWX43321** and **MWX43322**). Records were also created for 'possible pillboxes' that could not be clearly identified from the photographs (**MWX43036**, **MWX43056**, **MWX43059**, and **MWX43305**).

4.9.38. Nissen huts were another common military feature visible on aerial photographs, with their regular dimensions (around 11m by 5m), curved roofs and earthwork bank surround. They were apparent as a component within a majority of the military sites in the Study Area, although occasionally they were mapped as discrete features, for instance around Dover (**MWX43479**, **MWX43484** and **MWX43594**) and Deal (**MWX43459** and **MWX43469**).

4.9.39. Anti-landing obstructions for amphibious vessels were common along much of the coastline within Blocks M and L of the Kent Study Area. Not only did they provide additional protection to military sites, they also connected these sites together, forming a consistent line of defence along the coastline. This was particularly important for low lying beach or intertidal areas that would have been more vulnerable from invasion. Types of anti-landing defence included beach scaffolding, visible extending along a majority of the beaches in the Study Area. Eight new records were created for discrete occurrences of this monument type (including **MWX43276** and **MWX43629**); the length of which could be considerably long, extending over 5km in one case (**MWX43276**).

4.9.40. The beach scaffolding was often laid in association with barbed wire and anti-tank blocks that would extend directly behind the scaffolding – Plate 47. One example north of Ramsgate Harbour includes beach scaffolding, a barbed wire enclosure and anti-tank cubes that were visible along the seafront (**MWX43108**). Anti-tank blocks in the form of cubes were also mapped along Sandwich Bay (**Mke42015**) and in the form of cylinders at Dover Harbour (**MWX43611**). Not all the examples of anti-tank cubes extended along the beach; one length was visible stretching inland for over 650m from the beach at Sandown (**Mke41946**).

4.9.41. Due to the low-lying nature of Pegwell Bay providing easy access for invasion, further anti-landing measures were installed (**Plate 48**), including beach scaffolding (**MWX43182**), a length of wire or cable and a short section of fencing along the intertidal zone (**MWX43183** and **MWX43189**), barbed wire (**MWX43188**), anti-tank

cubes along the coastline (**MWX43185** and **MWX43230**), and an area of post alignments within the intertidal zone used to inhibit access in the bay (**MWX43173**). Furthermore, along the western pier at Dover Harbour, anti-tank cubes (**MWX43489**), barbed wire and beach scaffolding (**MWX43488**) were used to protect the military railway behind.

4.9.42. Anti-landing measures were also mapped further inland to prevent enemy aircraft from landing and to impede access over land for enemy troops and vehicles. These were in the form of stop lines; lengths of intercutting ditches excavated in fields large enough to be used as a landing strip, with the removed soil deposited in piles beside the open ditch. Evidence for these was prevalent in the low-lying area around the mouth of the River Stour where the land is flat and has undergone little development (**MWX43262 (Plate46)**, **MWX43268**, **MWX43337**-**MWX43342**, **MWX43372**, **MWX43387** and **MWX43558**).

4.9.43. Road blocks were also common anti-invasion measures employed during WWII to obstruct enemy movement inland. Examples were evident of the use of anti-tank cubes for this purpose, visible north of Deal (**MWX43524**), in Pegwell Bay (**MWX43194**), Dover (**MWX43615** and **MWX43621**), Ramsgate (**MWX43109**) – **Plate 49**, and Sandwich (**MWX43422** and **MWX43424**). Markings were also visible on roads around Fordwich, that were interpreted as a template for a road block (**MWX43034** and **MWX43045**). Recently removed road blocks were visible in Dover (**MWX43612**, **MWX43416**, **MWX43417** and **MWX43620**) from photographs taken just after the end of the war.

4.9.44. Military features specifically designed for use by both the civilian population and military personnel were also mapped from aerial photographs along the coastline. In particular, this included air raid shelters of which there were 19 examples across the Study Area, recorded in six new records and one existing record. This figure does not include air raid shelters that were recorded as components of larger military sites. Four shelters (**MWX43470**) believed to be specifically for military personnel were mapped just to the south of the large military site in Dover (**MWX43622**). Another military air raid shelter was mapped within the South Foreland battery (**Mke41990**). Often on larger military sites, underground bunkers and deep shelters were excavated that functioned as protective air raid shelters in the event of an attack. These were apparent at Fan Bay battery (**Mke41970**), Langdon Bay (**Mke41979**), and South Foreland battery (**Mke41990**) (Underground Kent website, accessed March 2011).

4.9.45. The civilian air raid shelters were either solitary features within urban contexts (**MWX43006**, **MWX43041** and **MWX43592**), or were situated in groups of up to seven shelters (**MWX43306**, **MWX43470**, **MWX43538** and **MWX43592**). These features were visible on aerial photographs as oval earthworks with one or two entrances, **Plate 50**. Photographs revealing the dismantling of such shelters show that these were in fact partially submerged rectangular structures (often Nissen huts) covered by soil, providing protection and concealment.

4.9.46. Interestingly, no over ground air raid shelters were visible in Ramsgate. This was due to the extensive underground passages that were excavated to function as protective shelters during both WWI and extended to accommodate more of Ramsgate's population during WWII. Eight entrances into the Underground Air Raid Shelter tunnel system were mapped from military aerial photographs (**MWX43094**). A similar underground air raid shelter was also believed to be visible in Broadstairs (**MWX43042**).

4.9.47. Another military feature common within the civilian landscape were Emergency Water Supply (EWS) sites. These features were observed in urban towns and cities along the coast and were essential for providing ample access to water often

necessary after a bombing raid. These features were generally removed after the war, so it is essential to map them from the military aerial photographs and adding them to the military archaeological record. Twelve EWS features were mapped from photographs and recorded on nine new monument records and enhanced on one existing record. The EWS features evident were of two types; large square /rectangular reservoirs measuring around 25m by 25m (**MWX43009**, **MWX43040**, **MWX43093**, **MWX43099**, **MWX43112** (**Plate 51**), **MWX43650** and **MKe17287**) or small circular tanks with a diameter of around 10m (**MWX43463**, **MWX43513**, **MWX43679**). The reservoirs were identified individually or in two cases were constructed in pairs (**MWX43093** and **MKe17287**). Often the reservoirs had an earthwork bank surrounding them and were associated with other military buildings and features. For instance a EWS site north-west of Broadstairs Harbour (**MWX43009**) was associated with a gun emplacement and structure that could be a pillbox. The EWS tanks were smaller circular corrugated iron structures, and one example was surrounded by an earthwork bank (**MWX43513**) – **Plate 52**.

4.9.48. The mapping phase of the project has also illustrated that existing sites (dating prior to WWII) were routinely adapted or enhanced during the War. Although harder to accurately determine, many sites certainly would have been reused from WWI. However there are several examples of much earlier sites having being modified. For instance extensive WWII features were apparent around Richborough's Roman fort (**MWX43455**), including a probable machine gun pit, lines of barbed wire entanglement, and a length of crenellated slit trenching. A small feature believed to be a gun pit was mapped on top of the mound at Mary-le-Bone's medieval motte and bailey site (**MKE7283**). Larger defensive features were mapped at former defence works, including the late 19th century South Lines battery (**Mke41972**), around the 19th and 20th century Citadel battery on Dover Heights (**Mke41972**), and at the early 20th century South Breakwater battery at Dover Harbour (**MKe17928**) where heavier artillery was constructed specifically for WWII. Further evidence for WWII additions was mapped at Deal Castle (**MKE7308**), on the spoil heaps at Chislet Colliery (**MWX43081**-**MWX43083**), and at a defended house on the seafront at Deal (**MWX43529**).

4.9.49. Due to the quantity of anti-invasion features constructed along the coastline, this area was an important target and was heavily bombed by the enemy during WWII. This is a reason why this area of the Britain was known as 'Hellfire Corner'. As a result, bomb craters were a common feature across the landscape visible as earthworks on military aerial photographs. A total of 84 new records were created for bomb craters within the Blocks M and L. Often these included more than one crater, visible as a linear series generated from a bombing run (for example **MWX43015** and **MWX43309**). One existing record, originally for two ring ditches (**MKE16060**), was updated with information that these features were actually bomb craters, visible as fresh earthworks with surrounding up-cast on the military aerial photographs. Bomb craters were visible across all sorts of landscape within the area; close to military installations, in civilian urban areas, and in fields that appeared not to contain military sites. This highlights the intense nature of bombing during WWII.

4.9.50. Finally, several features were mapped that were deemed WWII in nature but whose function was unknown. Predominantly these included a series of regular earthworks visible at St. Margaret's at Cliffe (**MWX43515** and **MWX43520**), Dover (**MWX43540**, **MWX43547**, **MWX43595** and **MWX43602**), South Foreland (**MWX43576**), and Walmer (**MWX43675** and **MWX43676**).

4.10. UNDATED

4.10.1. All of the features mapped within Blocks M and L of the Kent Study Area were given an accurate date where possible, or where this was unfeasible, a more general date was provided; therefore no undated features were recorded.

4.11. DISCUSSION

4.11.1. The number of archaeological features that were mapped from aerial photographs clearly indicates that the NMP element of the project was greatly beneficial for the overall understanding of the south-east coast - over 700 new records were created and over 230 already existing records were enhanced. Records were created and enhanced for a vast range of different types of archaeological site that were previously unrecorded, significantly adding to Kent's archaeological record.

4.11.2. By analysing a series of aerial photographs taken periodically of a site, it is possible to appreciate the site's general occurrence, and in particular its appearance, modification, truncation/phasing, and disappearance. For example, 382 newly created or modified sites in the Kent HBSMR included evidence types that indicated that at least part of the site was categorised as a demolished building, destroyed monument, levelled earthwork or demolished structure. Sites with these evidence types fall into three main categories: sites where some of the buildings or walls visible in early aerial photographs have since been removed; sites where the majority of the upstanding features on the site have been demolished or levelled, but for which there are still some remains visible on the surface – such as the concrete bases for buildings; and sites such as the substantial number of WWII sites which were levelled immediately after the war which have no remaining extant material, although archaeological material could still be discovered underground.

4.11.3. Examining the aerial photographs and comparing them to the existing HBSMR records has also revealed where a feature has been misinterpreted. For instance, two features west of Upstreet were originally identified as a trackway and linear, however thorough investigation of the aerial photographs did not reveal these features, which were actually thought to have originally been a misidentification of ice-wedge polygons that were visible as cropmarks in the area (**MKE6611** and **MKE6624**). This information was included on the HBSMR record along with the original interpretation, so that both descriptions could be considered together.

4.11.4. This project has identified several potential threats to archaeological sites within Blocks M and L of the Kent Study Area. Other than deliberate removal, another main cause for the disappearance of features on aerial photographs is development of areas for housing and industry - something that frequently occurred across the county during the post-war era. For instance two parallel linear earthworks in Broadstairs were first visible in 1941 and throughout the war, although by 1979 the area had been developed and the banks were no longer visible (**MWX43050**).

4.11.5. Another threat to the preservation of sites is coastal erosion and flooding. Sandown Castle (**MKE7303**) is a prime example of a once substantial structure that now only partially exits due to the dynamic power of coastal erosion in this area. Other possible examples include earthworks along the sand dunes north of St. Margaret's at Cliffe (**MWX43517** and **MWX43522**) and at Fan Bay (**MWX43574**).

4.11.6. Overall though, the aerial photograph mapping phase has revealed many interesting archaeological features throughout Blocks M and L. These have comprised various forms utilising over 120 different monument types, dating to a large range of periods from the prehistoric period through to WWII.

4.11.7. **Figure 7** shows that the sites dating to the prehistoric periods are fairly evenly spread across Blocks M and L, with sites visible directly on the coastline and also further inland. Romano-British sites were only mapped within Block M, and were concentrated in particular around Richborough Fort (**MKE8063**). There is also a clear concentration of medieval and post-medieval sites along the reclaimed land of the Stour Valley, between Upstreet and Pegwell Bay. A majority of these sites are associated with agricultural farming techniques, land divisions and features related with marshy wetlands; clearly the agricultural industry was extremely important and prevalent across this landscape during these periods. However due to the similarity of many of the medieval and post-medieval features mapped, it is possible that some features may have been recorded with the wrong period.

4.11.8. As discussed, a majority of the features mapped were military in nature. It is possible that the bias of data towards military features, particularly on the coast, is caused by the large amount of specifically military aerial photographs, where the large coverage of military sites and their associated disturbance may conceal earlier archaeological features. The military features also predominantly appear along the whole length of the coastline within Blocks M and L. This indicates not only the strategic and military importance of the south-east coast, but also its vulnerability from attack prompting its need to defend during both World Wars. As a result this area of Britain was commonly referred to as 'Hellfire Corner'.

4.11.9. In particular, the density of these military features was more evident around Dover, where a broader range of military sites were concentrated in a relatively small area. Nevertheless considerable numbers of military features were also mapped across the inland areas of Blocks M and L, revealing the effect that the War had not just on the coastline but also further inland as the next line of defence.

4.11.10. Overall the sites observed, mapped and recorded as part of the NMP mapping phase have greatly added to Kent's archaeological record especially considering a majority of those sites have since been removed or developed, leaving the only tangible evidence for their existence visible on the aerial photographs stored at the NMR.

5. CONCLUSIONS

5.1. OUTCOMES

5.1.1. The SE RCZAS has resulted in a vast increase in the number of coastal records in the Kent and Portsmouth HBSMRs and the Hampshire AHBR. Not only have a large number of new sites been identified, but existing records have also been updated. Overall records for 1,991 previously unrecorded sites were created, and records for 1,195 existing sites were enhanced. Updates to the records have included providing more up-to-date positional data, recording the extent of area that these sites cover, further research, and, importantly, have assessed whether the sites are still extant, or whether they have already been affected by post-war demolition, development or coastal change.

5.1.2. These new and improved records form a sound basis for future management decisions, and are a key component of the SE RCZAS assessment of archaeological sites at threat from development or coastal erosion (Wessex Archaeology, in progress).

5.2. ASSESSMENT OF COASTAL CHANGE

Overview

5.2.1. Although changes to the coast – including coastal erosion, the strengthening of sea defences, and development – are clearly visible on aerial photographs taken over the last century, it was not the intention of the NMP element within the SE RCZAS project to assess the impact of coastal change on the archaeological sites situated on the coast. For a detailed assessment of coastal change and the coastal archaeological resource, refer to the SE RCZAS Main Report (Wessex Archaeology, in progress).

Case Study – Coastal Erosion and Development

5.2.2. A clear example of how the archaeological study of aerial photographs can aid in assessments of coastal change is provided by the site of a coastal searchlight or gun emplacement (**Hants MWX60496**) on Lee-on-the-Solent. This site not only illustrates the powerful forces of coastal erosion, but also how modern development pressures are changing the coast. Aerial photographs of this site, taken from 1942 onwards show the site heavily eroding into the sea, and aerial photographs taken in 1986 show that no trace of the site is visible, the site having eroded into the sea. More recent aerial photographs indicate that the coastal area has subsequently been reclaimed and built over.

5.3. RECOMMENDATIONS

Further directions

5.3.1. In general, the SE RCZAS mapping project was very successful, and therefore it is recommended that further NMP mapping projects are undertaken across the wider landscape. The results of this project were limited to a fairly narrow strip of the coast, and NMP projects further inland would assist in the interpretation of the area as a whole. For example, further NMP work covering the rest of Portsmouth and Portsea Island could provide a wealth of information about changes during WWII, and similarly mapping further inland along the Kent coast would provide more evidence of WWI and WWII military features, including airfields; a feature that was not encountered within Blocks M and L.

5.3.2. Specific areas could also be researched in further detail. For example an in-depth study of Portsmouth Dockyards (**Ports MWX482**) could combine detailed studies of aerial photographs with previous studies (such as Wessex Archaeology 2004e).

5.3.3. Lincolnshire NMP identified a link between waste mounds created from salt extraction and coastal reclamation and settlement – the mounds create a convenient area of dry land within the marshy landscape which pushes out useable land surface (Grady 1998). The Wantsum Channel along the Stour was historically open, cutting Thanet off from ‘mainland’ Kent. It fully silted up by the late 1700s, and many saltmounds became apparent at this time. For example a site at Docker Hill (**MKE6566**) comprises a saltmound with a moated site built on top – possibly indicating a similar occupational activity to the sites described in the Lincolnshire NMP. This phenomenon would be worth additional research to clarify the issue.

5.3.4. Additional archaeological aerial reconnaissance is also recommended, as the vast majority of photographs have been taken for other purposes (for example, the military photographs or Google images), and the existing archaeological aerial photographs provide interesting details about otherwise little studied sites. Areas of particular interest are highlighted in the SE RCZAS Main Report (Wessex

Archaeology 2011). In addition, as so much of what is visible relies on very particular conditions, such as certain cropmarks or parchmarks only being visible during really dry summers, when such conditions are prevalent it would be advantageous to undertake additional archaeological aerial reconnaissance.

5.3.5. Furthermore, other data sources could be utilised. For this survey, Lidar data was not reviewed, as the data made available was not of high enough resolution. However, should high resolution Lidar data become available, it could provide a great deal of insight into the archaeological resource of the coast and surrounding areas.

Sites for Further Investigation

5.3.6. As this project forms part of the SE RCZAS, sites selected for further investigation based on threats, such as coastal change and development, as identified by the North Solent, South Downs, Isle of Grain to South Foreland and South Foreland to Beachy Head Shoreline Management Plans (New Forest District Council 2010; South Downs Coastal Group 2005; Halcrow Group Limited 2010; Halcrow Group Limited 2006), are discussed in detail in the SE RCZAS Main Report (Wessex Archaeology, in progress).

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APPENDIX I: MONUMENT DATA TABLE

The Monument Data Table consists of the fields that were input in the HBSMR. The examples are from **Hants MWX60406**.

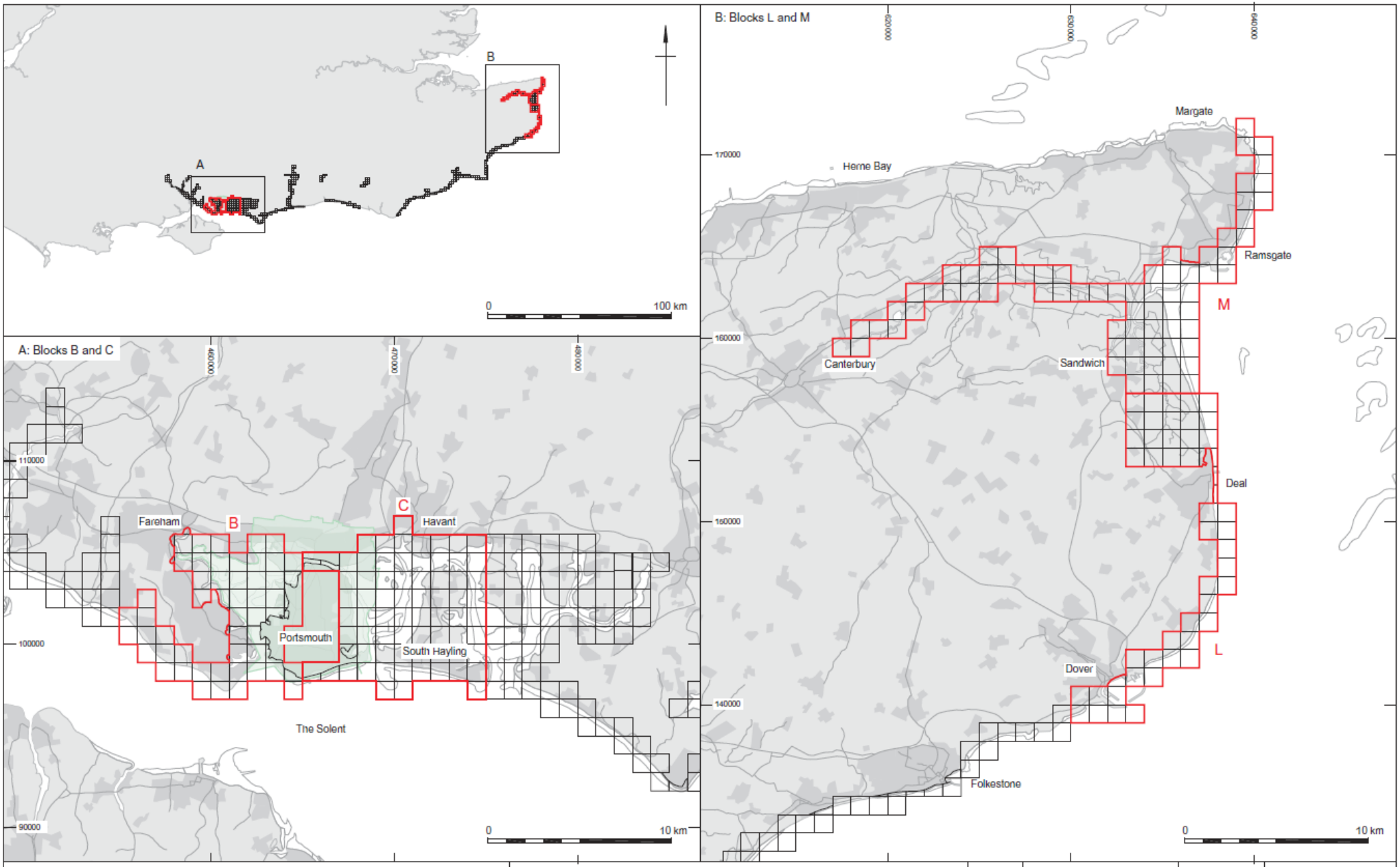
Screen / Tab	Field Name	Field Content	Source	Sample Data
Opening screen	Monument number	HBSMR Unique Identifier	Automatically created	MWX60406
Opening screen	Record Type	Type of record (Monument, Building, etc)	EH Thesaurus	Monument (MON)
Opening screen	Name	Name of monument	Input by Wessex Archaeology	World War Two barrage balloon site, Gosport
Opening screen	Summary	Brief summary of monument description	Input by Wessex Archaeology	A Second World War barrage balloon site was located in the Recreation Ground to the east of Haslar Royal Naval Hospital (MWX60415). In aerial photographs taken in 1942, a barrage balloon is visible tethered to mooring posts, however, by 1946 aerial photographs indicate that the site had been dismantled, and the site is visible as parchmarks in the grass. The parch marks consist of two concentric circles. The centre of the inner circle has a diameter of 24m, while the outer circle has a diameter of 53m. This site is one of a number of airborne defence sites located around the coast of Gosport and Paulsgrove.

Screen / Tab	Field Name	Field Content	Source	Sample Data
Description & Sources	Description	Description of site	Input by Wessex Archaeology	A Second World War barrage balloon site was located in the Recreation Ground to the east of Haslar Royal Naval Hospital (MWX60415). It was centred on SZ 62060 98889. In aerial photographs taken in 1942 [1], a barrage balloon is visible tethered to mooring posts. However, by 1946 aerial photographs [2] indicate that the site had been dismantled, and the site is visible as parchmarks in the grass. The parch marks consist of two concentric circles. The centre of the inner circle has a diameter of 24m, while the outer circle has a diameter of 53m. This site is one of a number of airborne defence sites located around the coast of Gosport and Paulsgrove.
Description & Sources	Photo Source ID	Drop down menu of data sources	Input by Wessex Archaeology	SWXN1 Aerial Photograph (National Monument Record AP Collection)
Description & Sources	Photo Reference	Reference	Input by Wessex Archaeology	NMR RAF/FNO/13 6-8 - 6-9 24-JUN-1942
Description & Sources	Photo Number	In text reference number	Input by Wessex Archaeology	[1]
Description & Sources	Photo Date Compiled	Date input	Input by Wessex Archaeology	23/11/2009
Location	Administrative Areas	Type	Input by Wessex Archaeology – automatically created based on monument polygon	Parish
Tree	Monument Type	Type of monument	Input by Wessex Archaeology from drop-down thesaurus	BARRAGE BALLOON SITE
Tree	Monument Type – Evidence and materials	Evidence for monument	Input by Wessex Archaeology from drop-down thesaurus	CROPMARK

Screen / Tab	Field Name	Field Content	Source	Sample Data
Tree	Monument Type – Date Range	Dates site was active	Input by Wessex Archaeology – known dates if known, otherwise date range from drop down Period menu	1942 AD / 1945 AD C20
Tree	Event	Indicates project identity indicating when record was created or amended	Input by Wessex Archaeology – from drop down menu of events	South-East Rapid Coastal Zone Assessment Survey (Event – Interpretation) (EWX113077 – 71330)
Status and Codes	Designations	Reference to designations	Input by Wessex Archaeology	[no designations for this record]
Status and Codes	Other Statuses and Codes	Reference to other ID number – for example NMR, Portsmouth City SMR, etc	Input by Wessex Archaeology	[no other references for this record]
Contacts	Associated People and Organisations – Surname	Surname of contact	Input by Wessex Archaeology from drop down menu	Hamel
Contacts	Associated People and Organisations – Initials	Additional name information	Input by Wessex Archaeology – automatic from Surname	Andrea
Contacts	Associated People and Organisations – Organisation	Details about contact organisation	Input by Wessex Archaeology – automatic from Surname	Wessex Archaeology
Contacts	Associated People and Organisations – Role	Role of contact	Input by Wessex Archaeology – from drop down menu	Aerial Photograph Interpreter

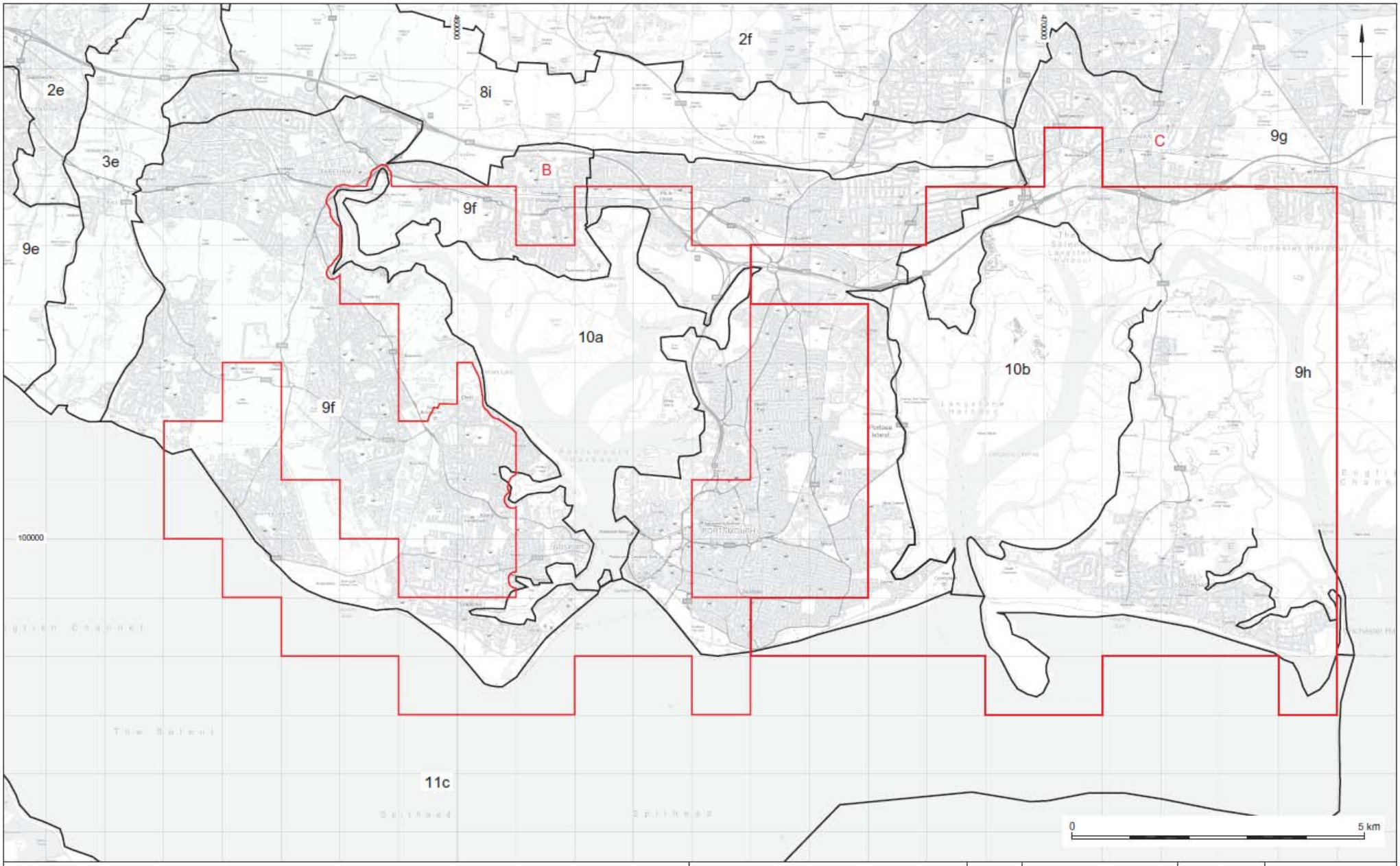
For Maritime records (MAR), the Maritime tab was also completed. This example is from **Ports MWX421**.

Screen / Tab	Field Name	Field Content	Source	Sample Data
Maritime	Length	Wreck length	Input by Wessex Archaeology	11.00 (m)
Maritime	Breadth	Wreck breadth	Input by Wessex Archaeology	4.00 (m)



Study Area

Figure 1



Wessex Archaeology

Blocks

After Hampshire County Council, 2010.

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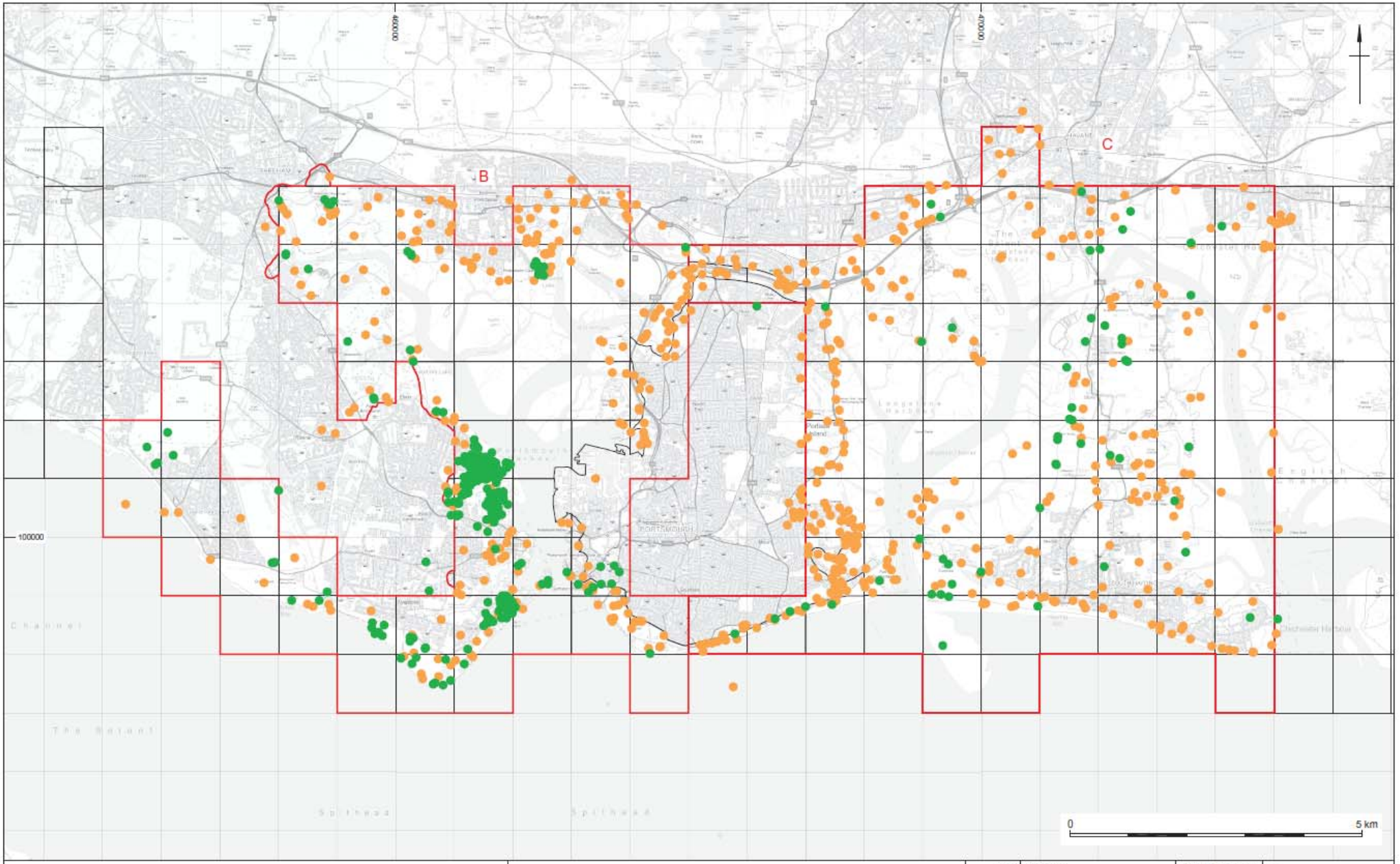
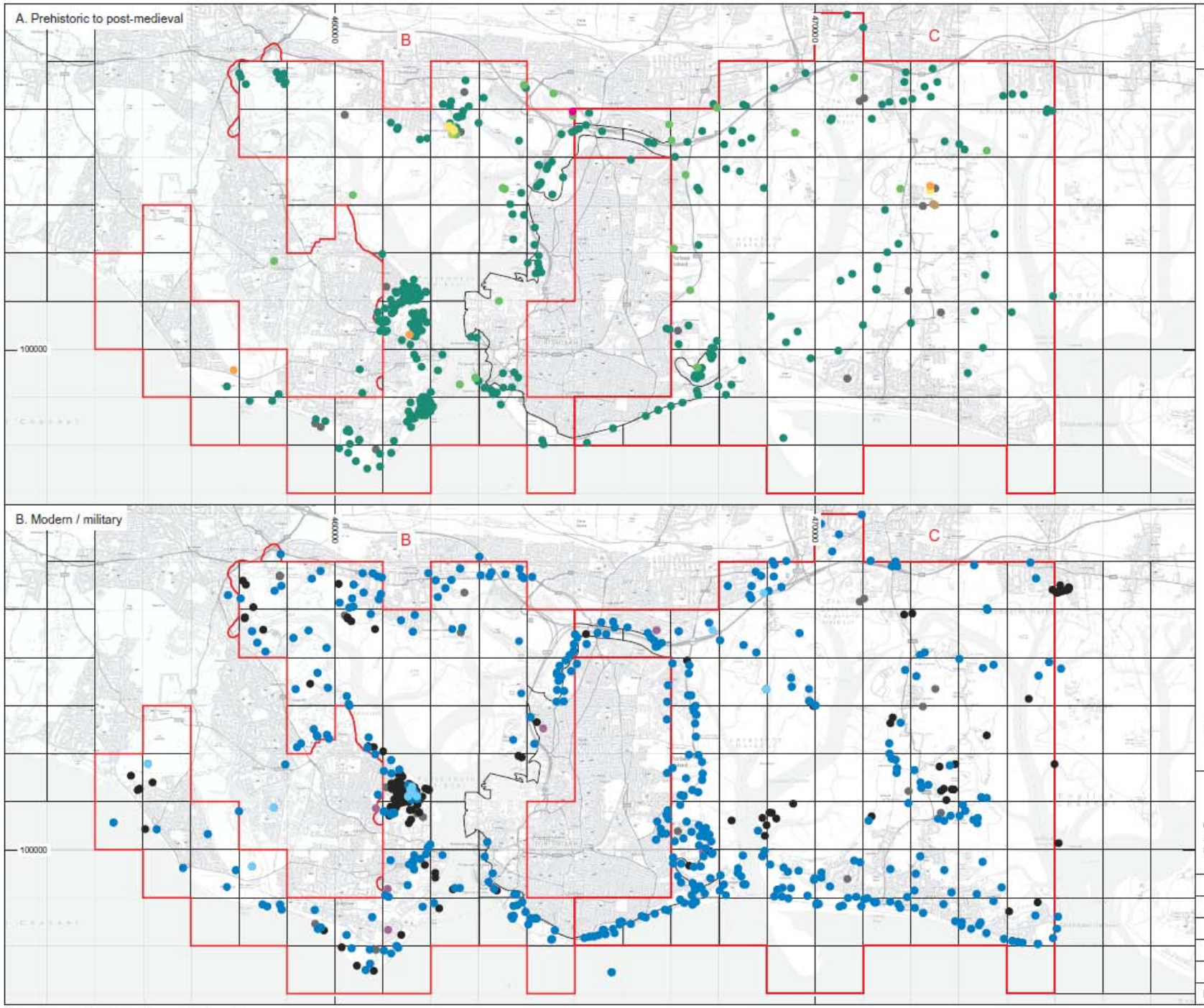
Hampshire and Portsmouth - Historic Landscape Characterisation

Figure 2



Hampshire and Portsmouth Records – New and Enhanced

Figure 3



Wessex Archaeology

Study Area
Blocks
Mesolithic
Bronze Age
Iron Age
Romano-British
Anglo-Saxon
Medieval
Post-medieval
WWI
WWII
Post-WWII
Modern
Undated

0 5 km

Revision Number:	0
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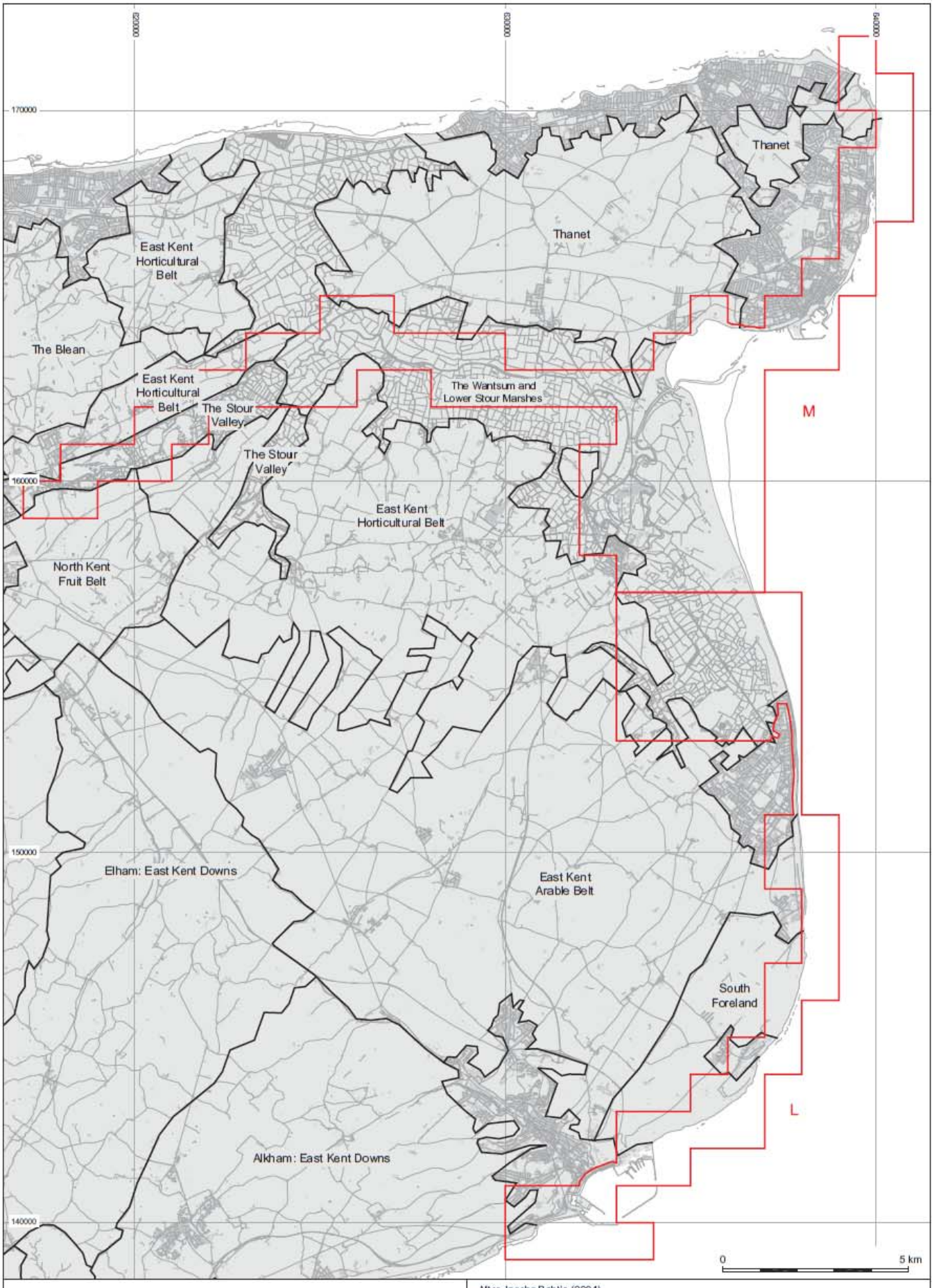
Hampshire and Portsmouth records - by date

Figure 4



Blocks

After Jacobs Babtie (2004)

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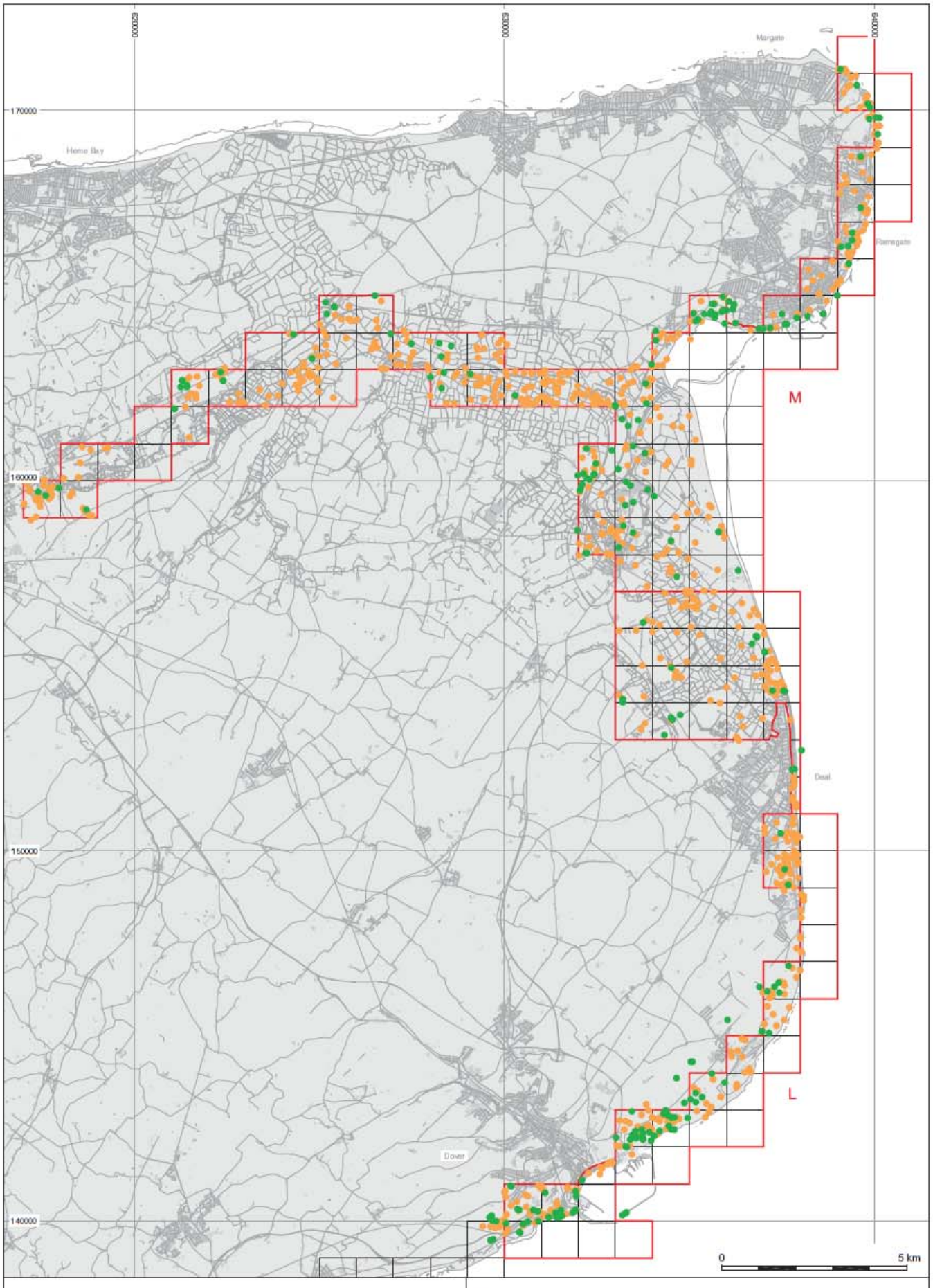
Wessex Archaeology

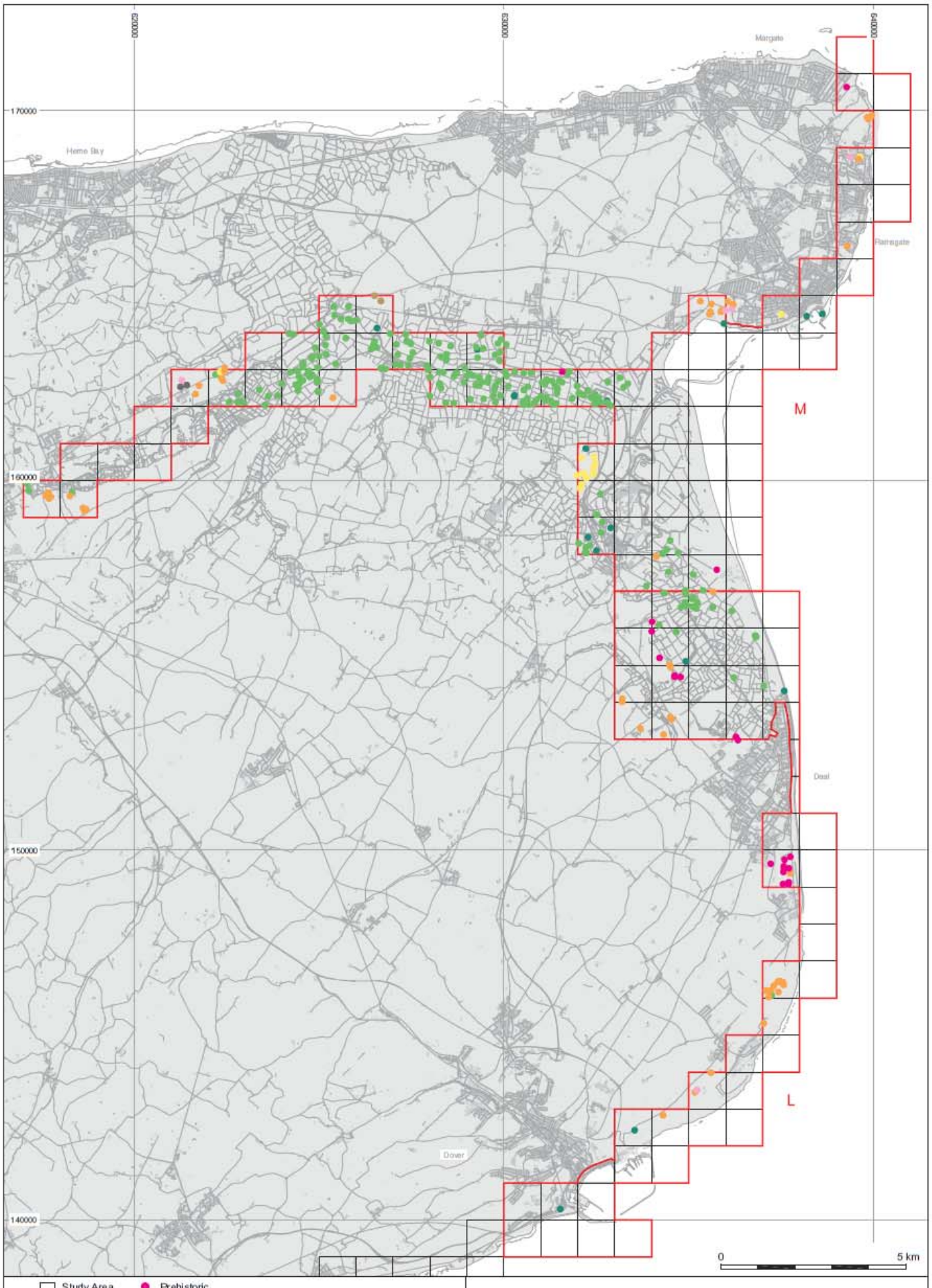
Kent Landscape Character Areas

Figure 5



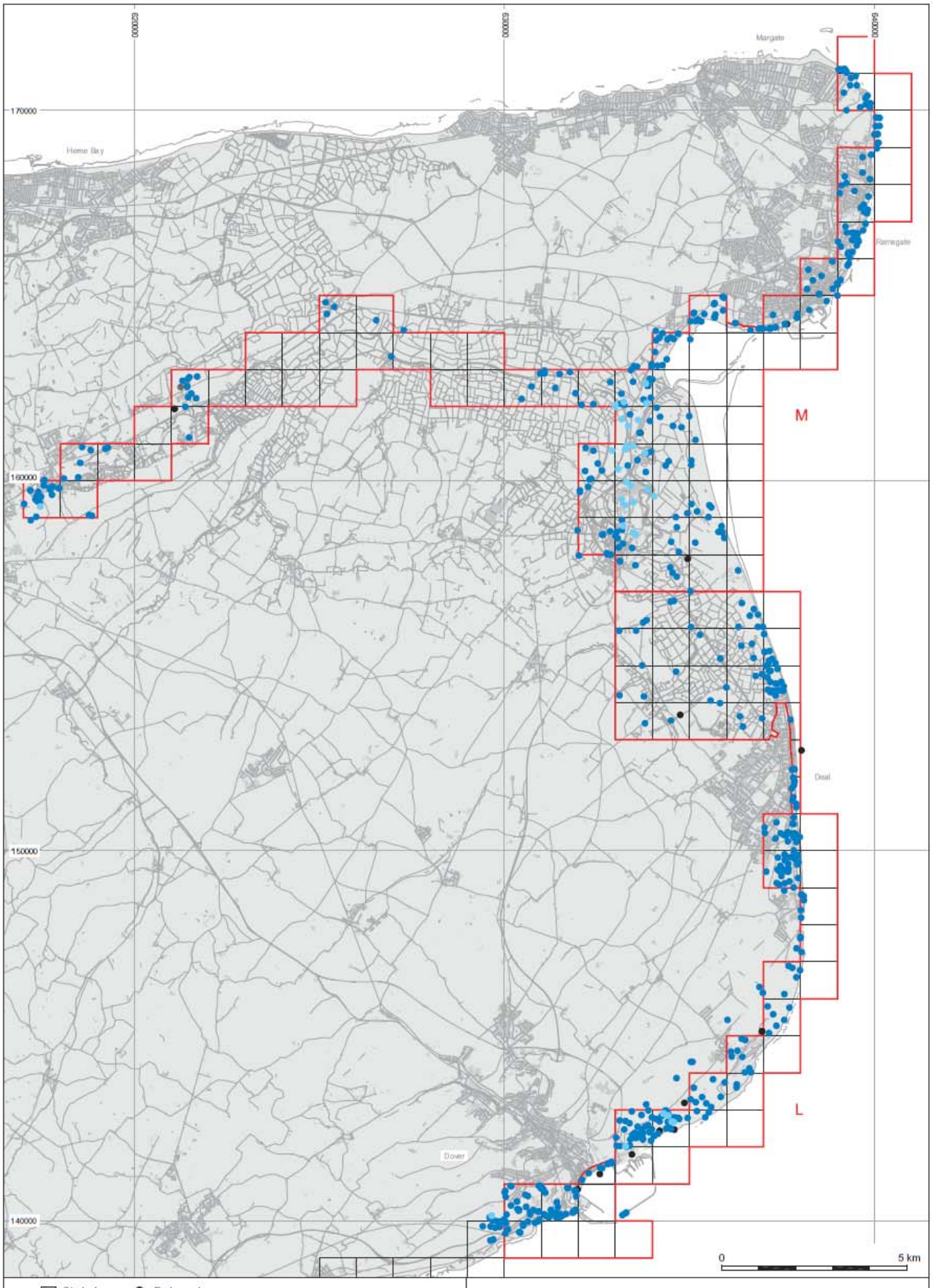
Kent Records - New and Enhanced

Figure 6



Kent records by date (prehistoric to post-medieval)

Figure 7



Kent records by date (modern and military)

Figure 8

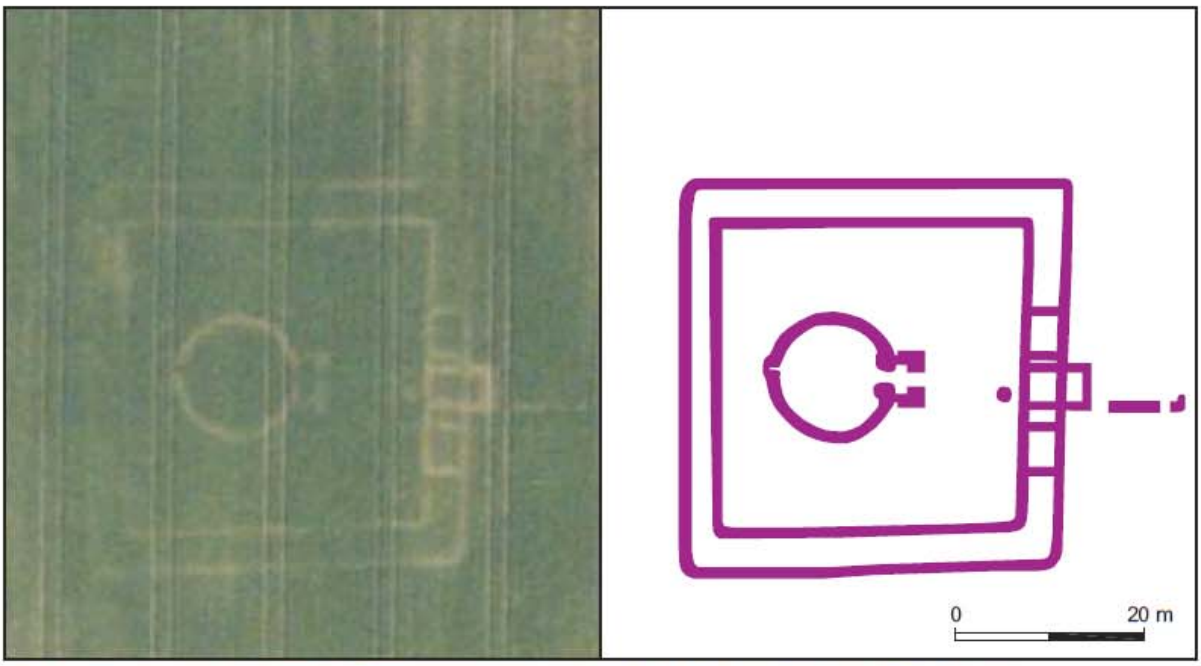


Plate 1. Hayling Island Temple (Hants MWX23605). Next Perspectives PGA Tile Ref: SU7202 and SU7203 24-JUN-1999 © Pan Governmental Agreement Next Perspectives

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

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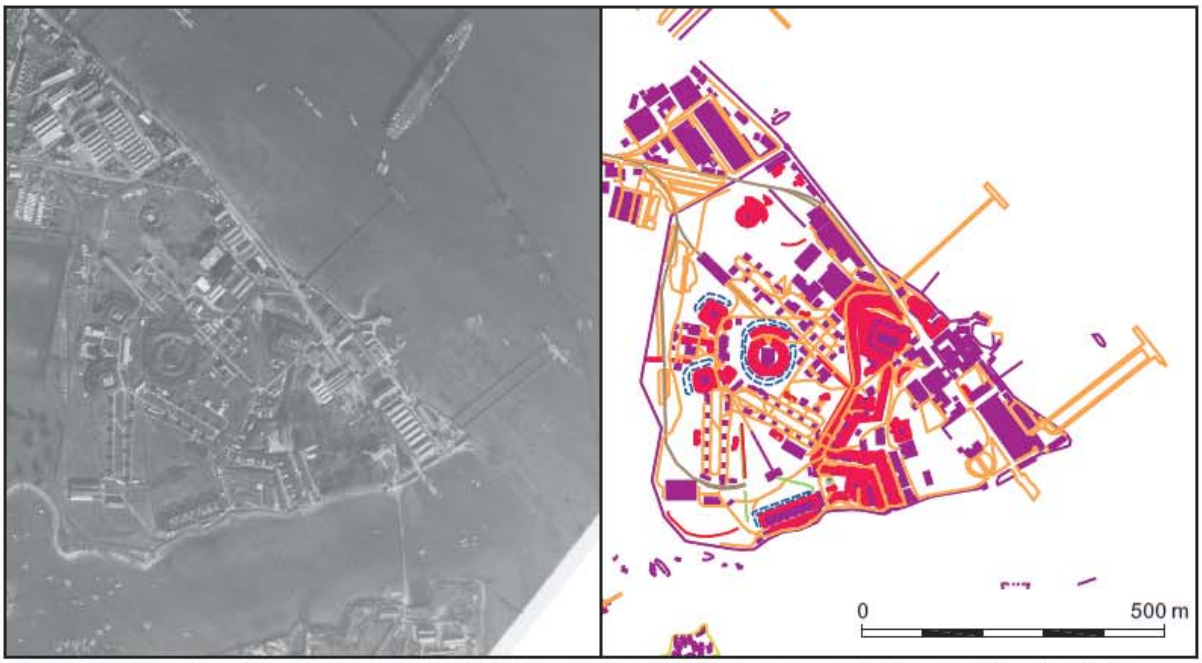

Plate 2. Priddy's Hard (Hants MWX33512). NMR RAF/CPE/UK/1768 4015 07-OCT-1946 © English Heritage (NMR) RAF Photography

Plate 3. Fort Cumberland (Ports MPM45). NMR RAF/106G/UK/491 5041 8-JUL-1945 © English Heritage (NMR) RAF Photography

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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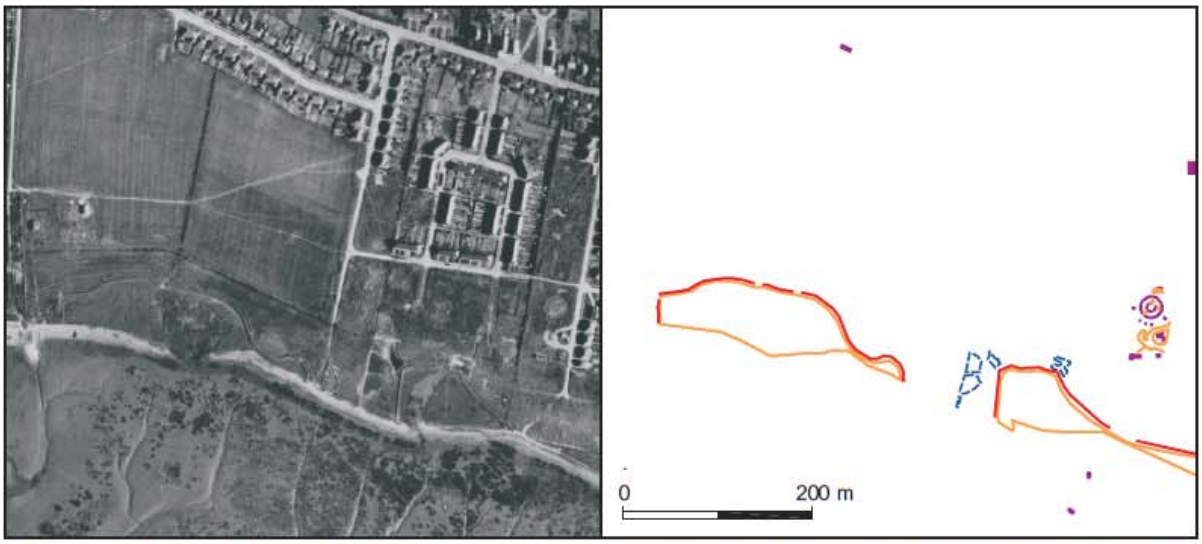

Plate 4. Post-medieval saltings, Wicor Mill, Portchester, visible as rough ground and irregular shaped ponds (Hants MWX60525) surrounded by a coastal bank (Hants MWX60523).
NMR RAF/3G/TUD/UK/156 5005 19-APR-1946 © English Heritage (NMR) RAF Photography

Plate 5. Shipwreck Graveyard at Forton Lake (Hants MWX60506). CCO Tile Ref: SU6100NW
© Channel Coastal Observatory

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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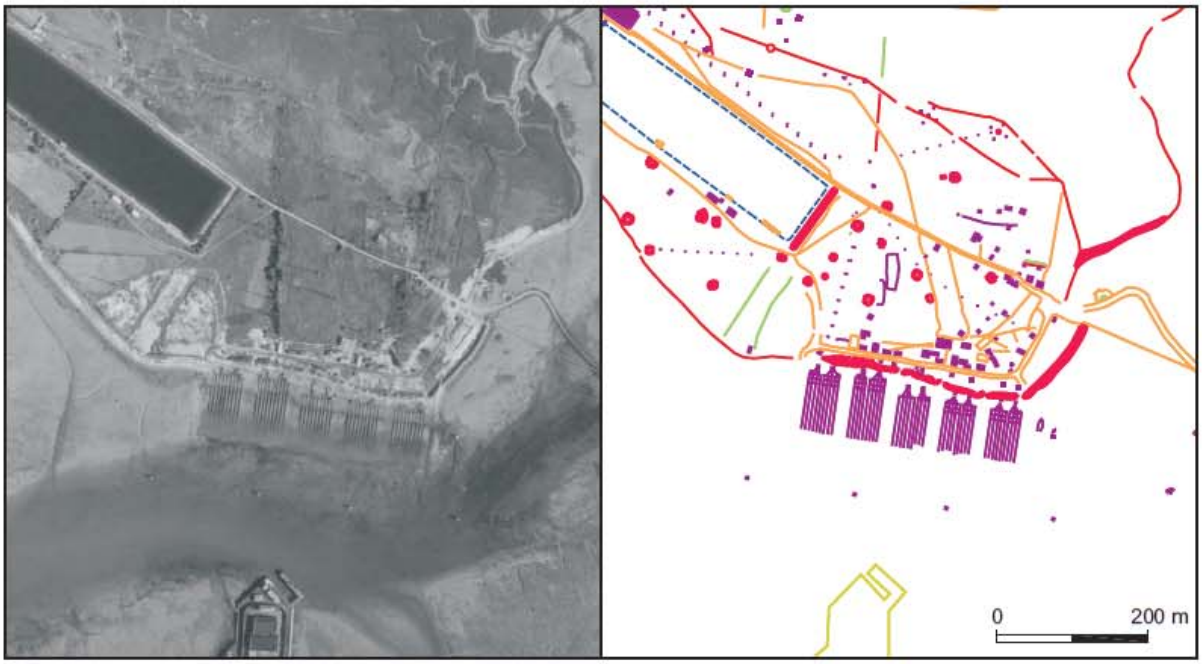

Plate 6. Horsea Island (Ports MWX432) - Early 20th Century wireless station - masts visible in aerial photograph as shadows. NMR RAF/3G/TUD/UK/156 5008 19-APR-1946 © English Heritage (NMR) RAF Photography

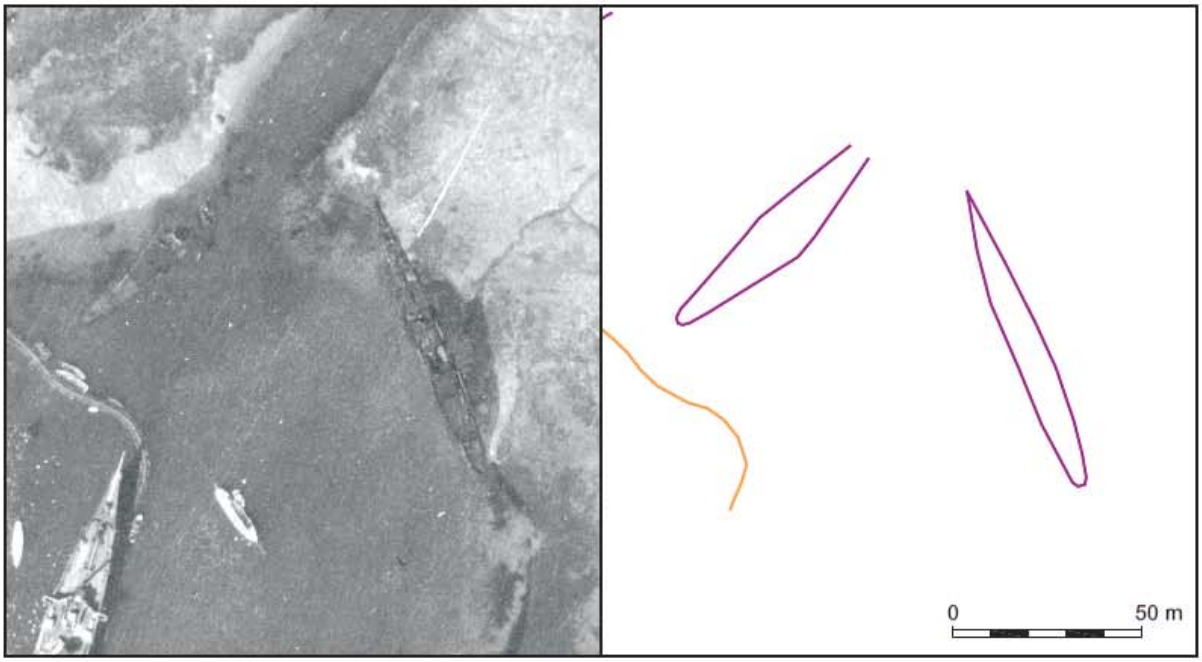

Plate 7. Modern shipwrecks south of Whale Island (Ports MWX480 and Ports MWX481).
NMR RAF/CPE/UK/2122 5001 30-MAY-1947 © English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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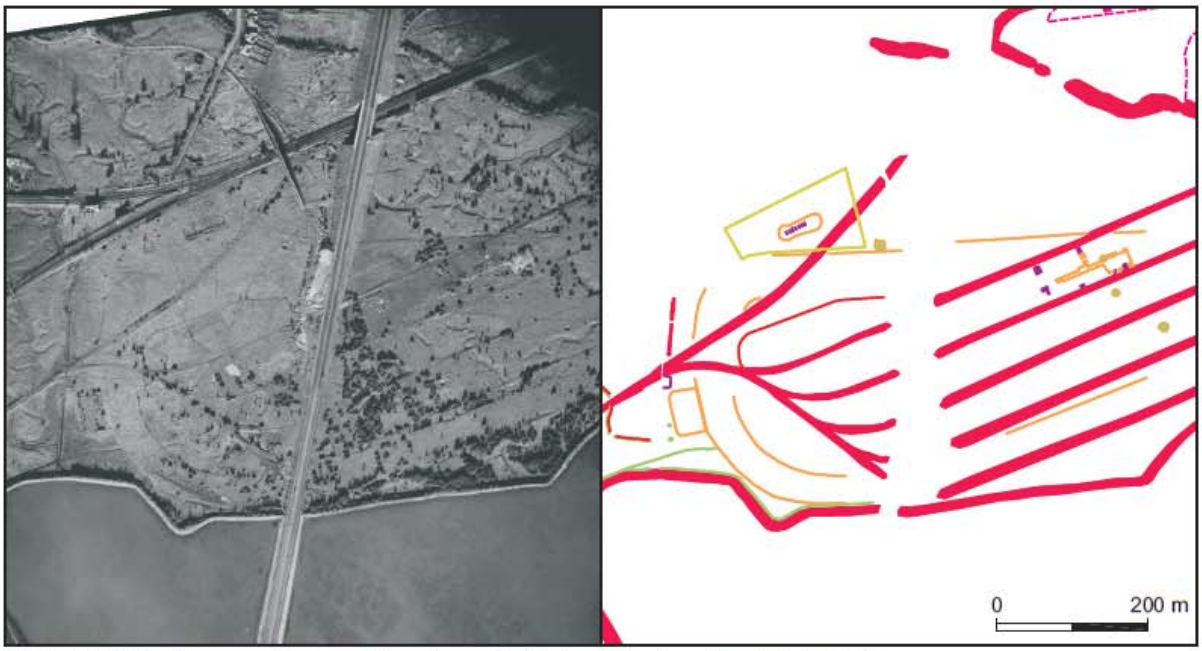

Plate 8. WWI military and ammunition dump, Farlington Marshes (Ports MWX685).
NMR RAF/106G/UK/1066 5049 5-DEC-1945 © English Heritage (NMR) RAF Photography

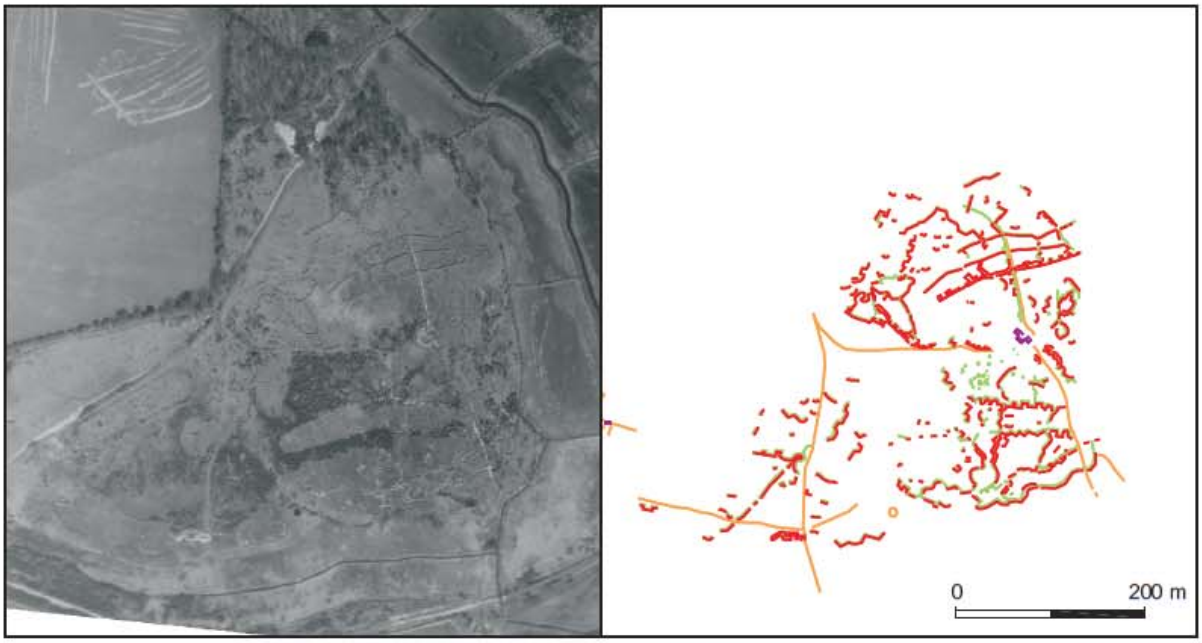

Plate 9. WWI military practice trenches, Gosport (Hants MWX60383). NMR RAF/540/453 4185 5-APR-1951
© English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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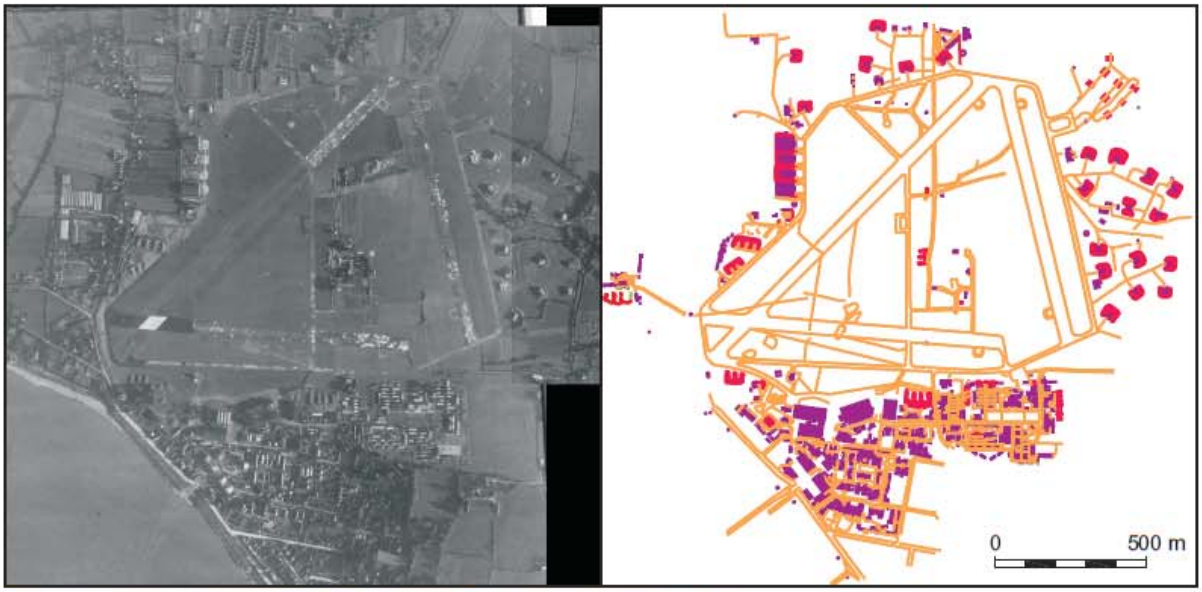

Plate 10. WWII activity at HMS Daedalus, Gosport (HantsMWX39580).
NMR RAF/CPE/UK/1749 4022 21-SEP-1946 and NMR RAF/CPE/UK/1749 4023 21-SEP-1946

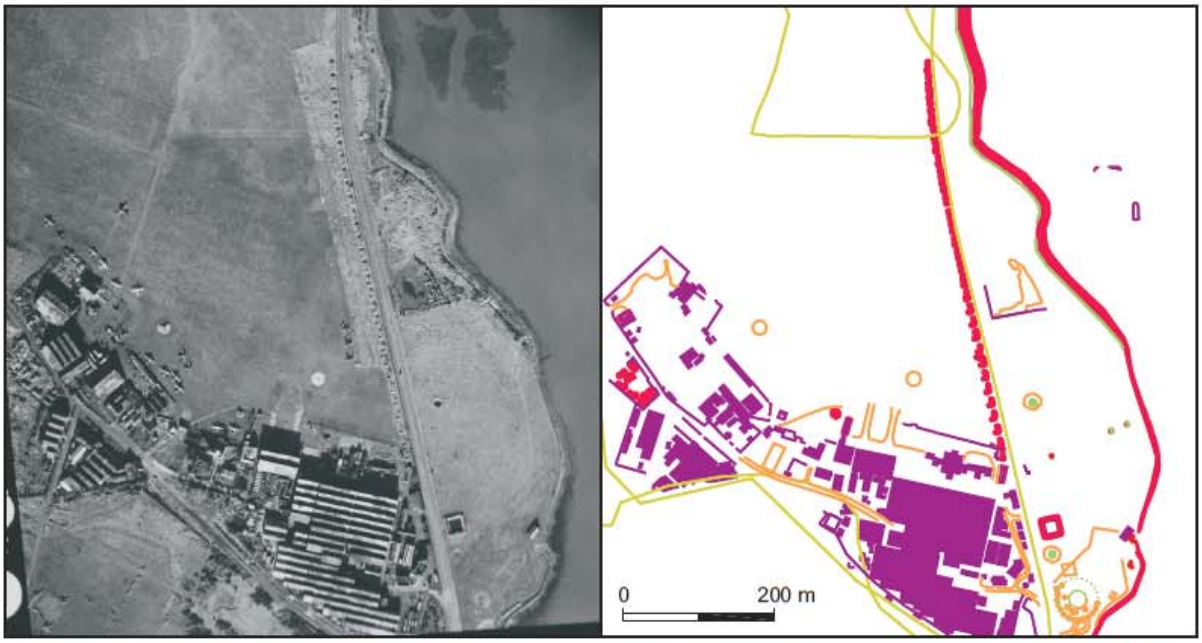

Plate 11. WWII activity at Portsmouth Airport (Ports MWX636). NMR RAF/106G/UK/1066 5071 5-DEC-1945

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
Scale:	(10) 1:25,000 (11) 1:10,000 @A4	Illustrator:	KJB
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Plate 12. WWII Anti tank cubes near Fort Cumberland (Ports MWX535). NMR RAF SZ 6689/8 12-OCT-1950 © English Heritage (NMR) RAF Photography

Plate 13. WWII Mulberry Harbour Production Site, Hayling Island (Hants MWX62770). NMR RAF/106G/UK/1066 5003 5-DEC-1945 © English Heritage (NMR) RAF Photography

Plate 14. WWII Mulberry Harbour – abandoned in the intertidal zone (Hants MWX62775). NMR SU 6800/006 21-March-2000 © English Heritage (NMR) Aerial Survey

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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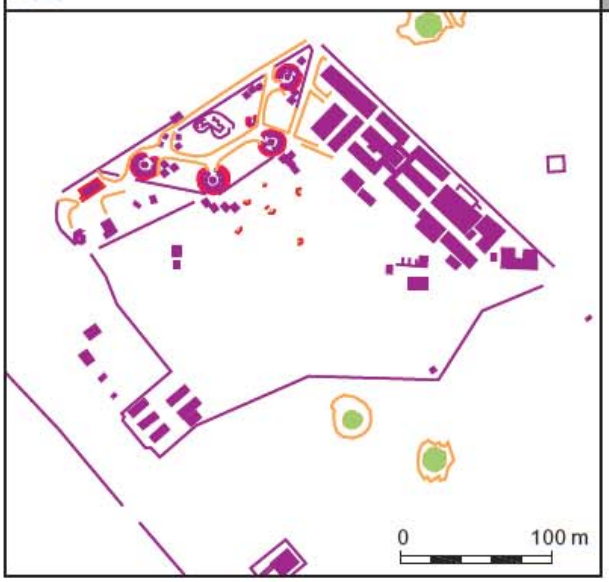

Plate 15. WWII Heavy Anti-Aircraft Battery, Southsea Common (Ports MWX497).
NMR RAF/6643 10861 12-AUG-1940 and
NMR RAF/3G/TUD/UK/162 5302 20-APR-1946
© English Heritage (NMR) RAF Photography

Plate 16. WWII Heavy Anti-Aircraft Battery, Hayling Island (Hants MWX37737).
NMR RAF/CPE/UK/1843 4022 18-NOV-1946 © English Heritage (NMR) RAF Photography

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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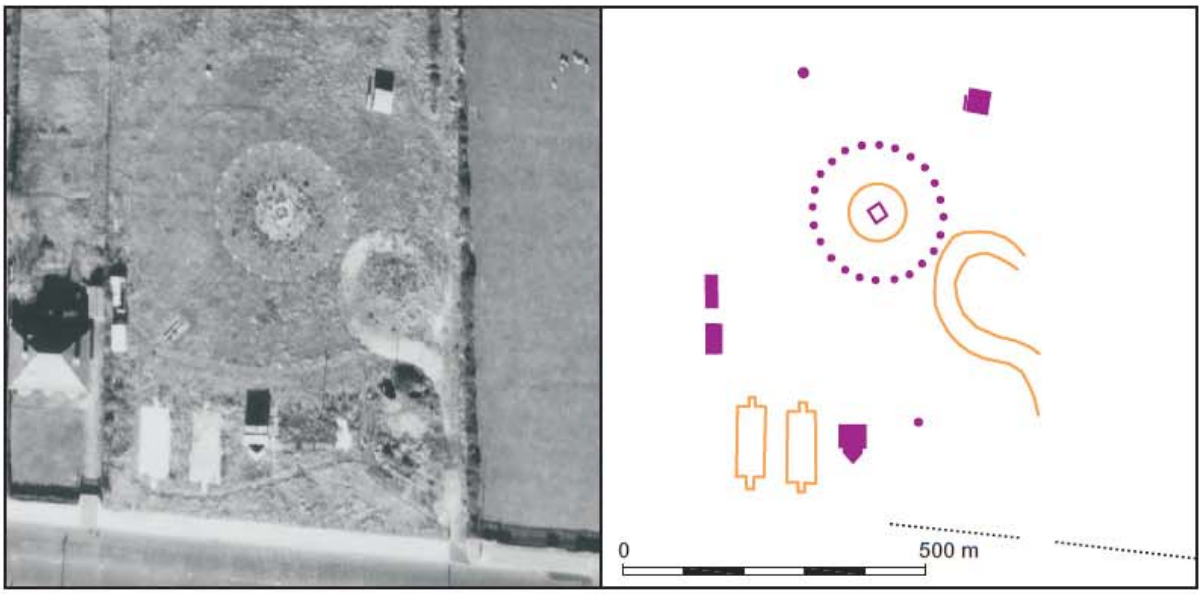

Plate 17. WWII Barrage Balloon Site, Paulsgrove, with tethering structures still extant (PortsMWX408).
NMR RAF/106G/UK/955 6295 30-OCT-1945 © English Heritage (NMR) RAF Photography

Plate 18. WWII Barrage Balloon Site, in Portchester Castle (Hants MWX5851).
NMR RAF/3G/TUD/UK/156 5007 19-APR-1946 © English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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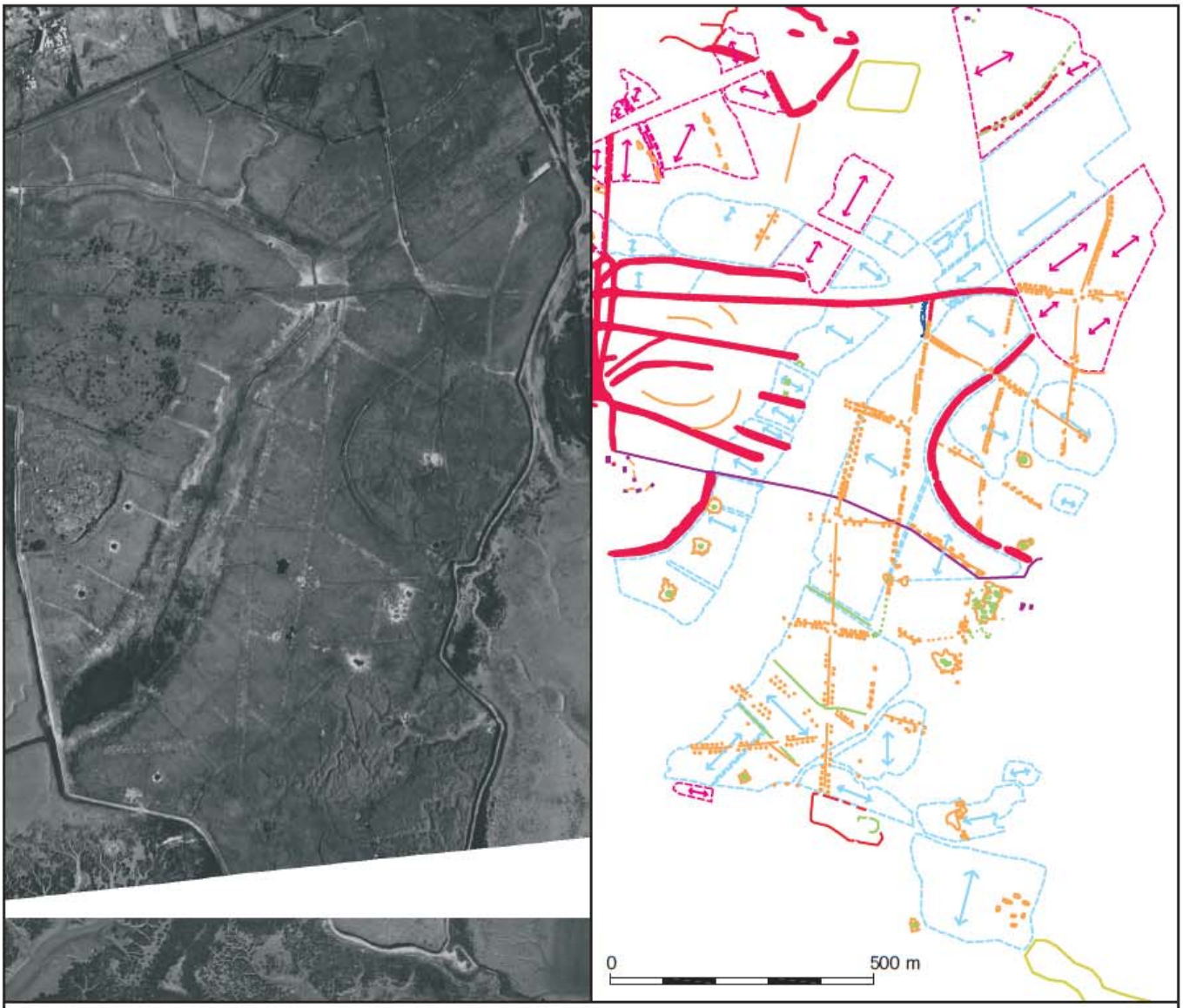

Plate 19. WWII Starfish site / bomb decoy site, Farlington Marshes (Ports MWX693) with associated bomb decoy control shelters (Ports MWX694 and Ports MWX695) – as well as post-medieval ridge and furrow (Ports MWX698, Ports MWX 699 and Ports MWX700), a post medieval banked enclosure (Ports MWX692), and medieval embankments possibly indicating past sea or flood defences (Ports MWX701) and the eastern extent of a WWI ammunition dump (Ports MWX685). NMR RAF/3G/TUD/UK/156 5014 19-APR-1946 and NMR RAF/CPE/UK/1843 4027 18-NOV-1946 © English Heritage (NMR) RAF Photography

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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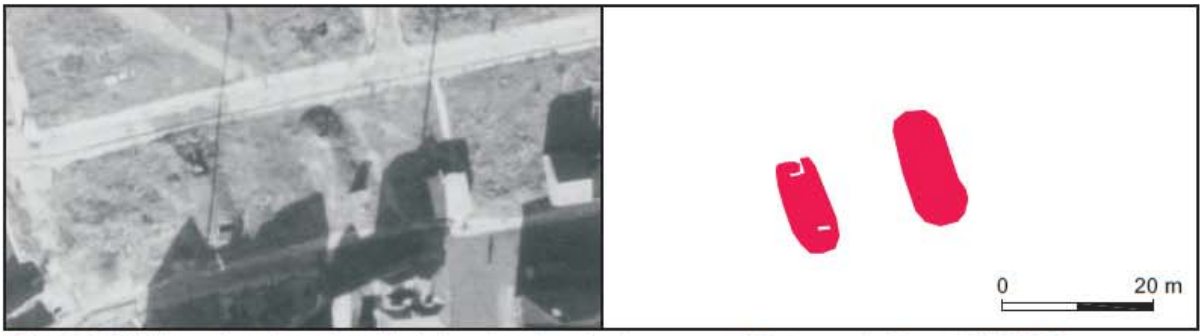

Plate 20. WWII semi-sunken air raid shelters in a bombed out area of Portsmouth (Ports MWX485).
NMR RAF/106G/UK/955 6268 30-OCT-1945 © English Heritage (NMR) RAF Photography

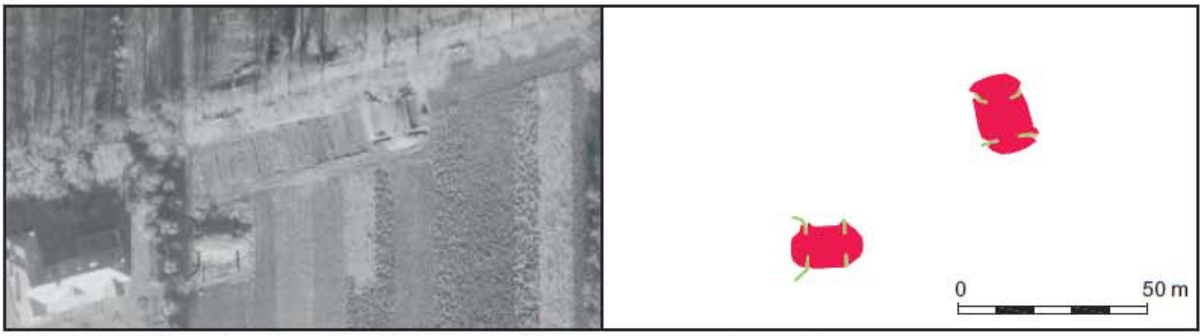

Plate 21. WWII semi-sunken air raid shelters on the grounds of St. James Hospital (Ports MWX601).
NMR RAF/106G/UK/1066 5062 5-DEC-1945 © English Heritage (NMR) RAF Photography

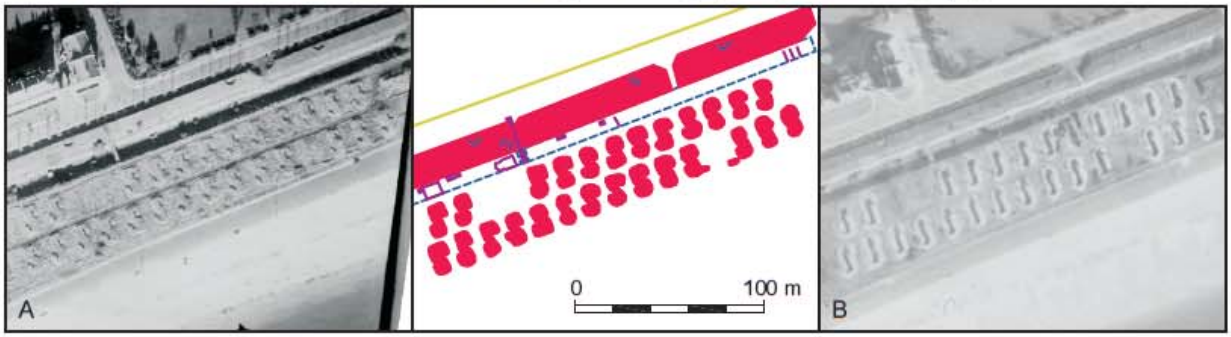

Plate 22. WWII semi-sunken air raid shelters, Eastney Forts, with earth covering visible (A) and after earth covering has been removed (B) (Ports MWX531). NMR RAF/106G/UK/9631 6228 31-OCT-1945 and
NMR RAF/3G/TUD/UK/162 5298 20-APR-1946 © English Heritage (NMR) RAF Photography

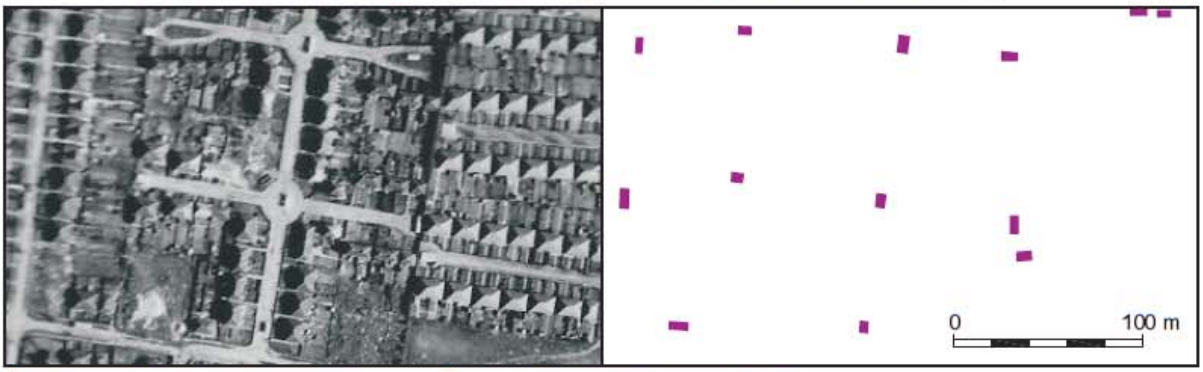

Plate 23. WWII surface air raid shelters, Portchester (Hants MWX 60528).
NMR RAF/3G/TUD/UK/156 5006 19-APR-46 © English Heritage (NMR) RAF Photography

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

Wessex Archaeology

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Plate 24. WWII Emergency Water Supply (Ports MWX500) with adjacent pillbox (Ports MWX502), Southsea Common. NMR RAF/106G/UK/955 6219 30-OCT-1945 © English Heritage (NMR) RAF Photography

Plate 25. Post WWII Pre-fabricated houses, Gosport (Hants MWX60411). NMR RAF/CPE/UK/2463 5137 26-FEB-1948 © English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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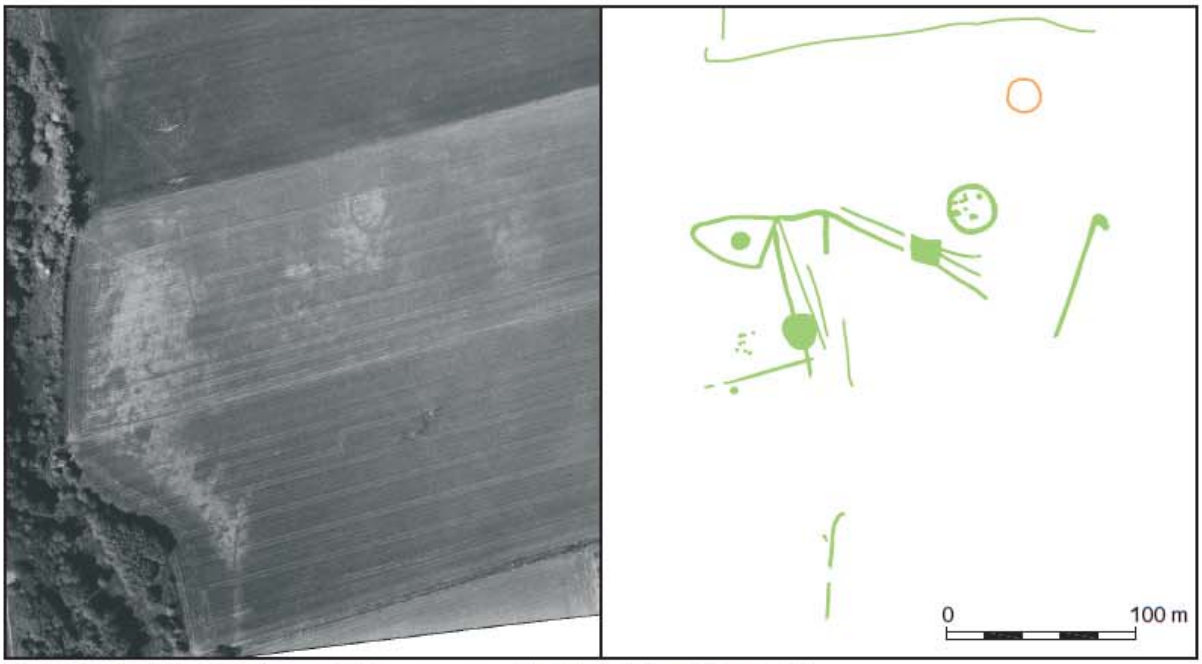

Plate 26. Prehistoric features visible as cropmarks, Fordwich (MWX43014).
NMR TR 1759/3 NMR 1763/174 28-MAY-1980 © English Heritage (NMR)

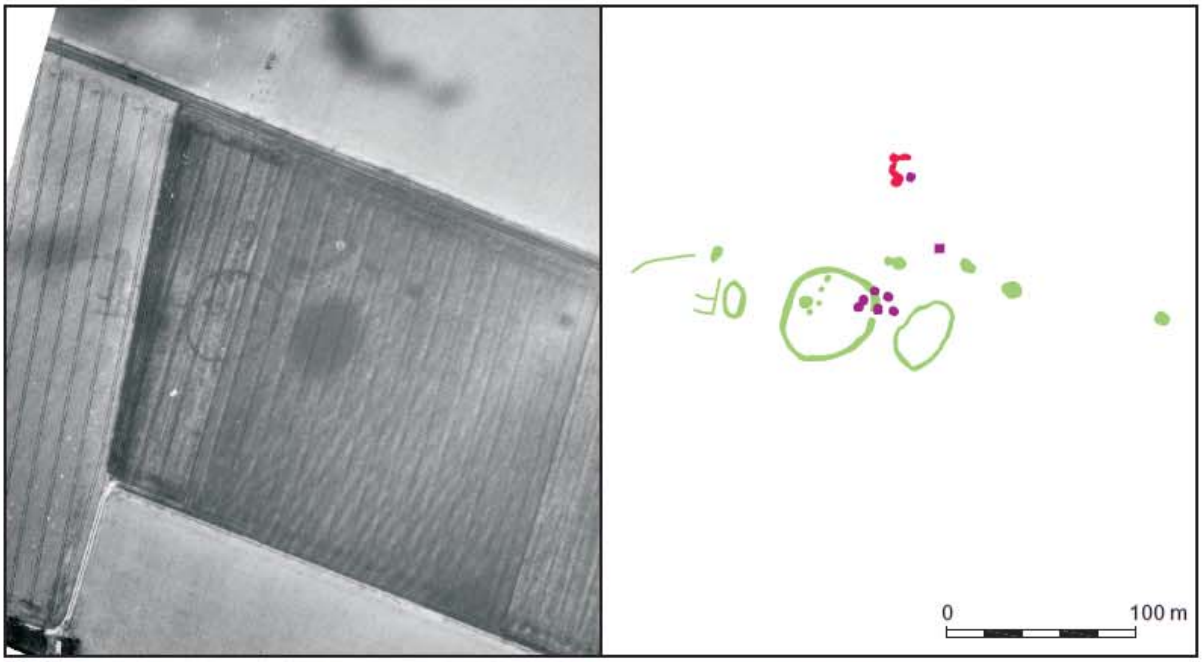

Plate 27. Prehistoric enclosures and associated features visible as cropmarks, Chalk Hill
(with later WWII gun pits and a structure) (MWX43158, Mke39435). NMR TR 3664 NMR 4135/67 18-JULY-1988
© English Heritage (NMR)

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

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Plate 28. Bronze Age ring ditches visible as cropmarks, Finglesham (MKE7575).
NMR TR 3354/18 NMR 2602/157 24-APR-1985 © English Heritage (NMR)

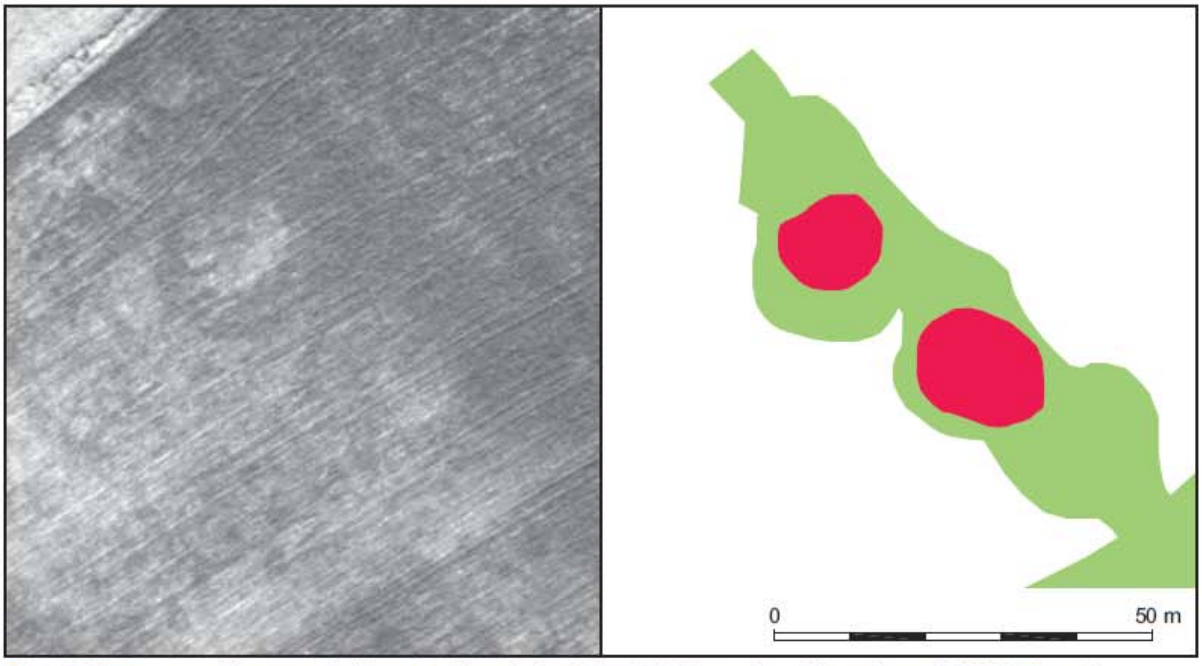

Plate 29. Two round barrows visible as soilmarks beside a field boundary, Kingsdown (MKE6679 and MWX43498). NMR TR 3746/9 NMR 0272 22-FEB-1982 © English Heritage (NMR)

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

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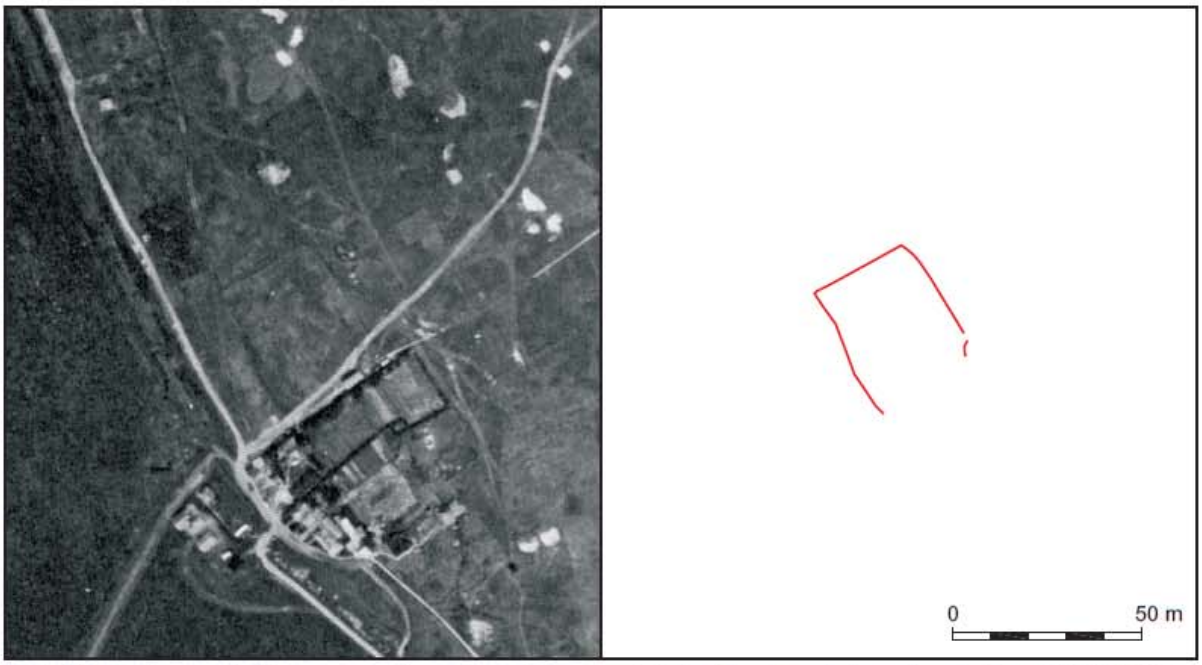

Plate 30. Enclosure visible as an earthwork possibly associated with a deserted medieval village (MKE7169). NMR RAF/S446 36 27-AUG-1941 © English Heritage (NMR) RAF Photography

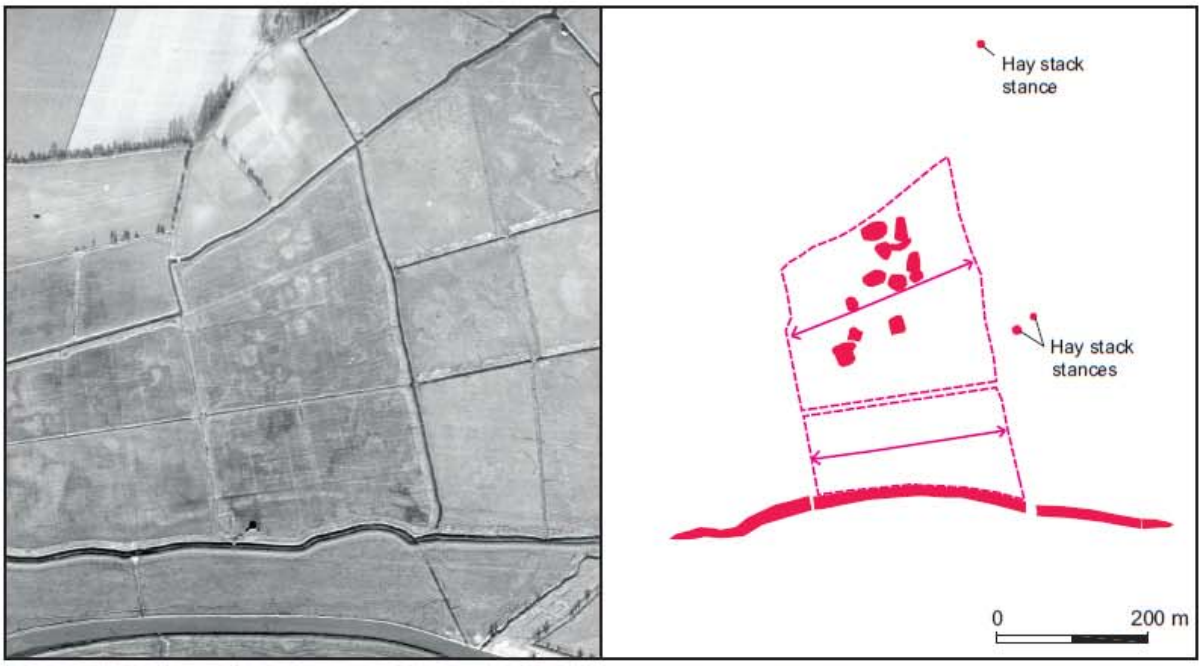

Plate 31. Three medieval hay stack stances visible as earthworks located to the east of an area of medieval saltmounds that are overlain by post-medieval ridge and furrow (MWX43246, MWX43249, MWX43252, MWX43253)

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

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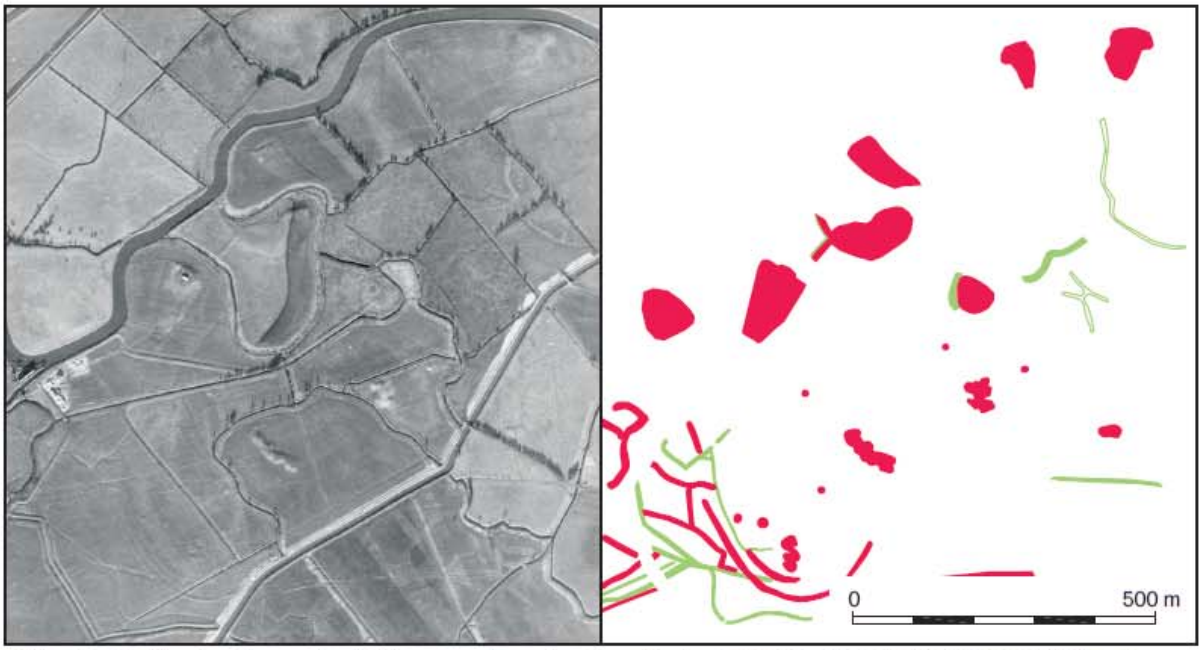

Plate 32. Medieval saltmounds visible as earthworks, Stour Valley (MWX43138, MWX43140, MWX43135, MWX43137, MWX43139, MWX43142, MWX43144, MWX43145 and MWX43146).
NMR RAF/106G/UK/1131 3059 17-JAN-1946 © English Heritage (NMR) RAF Photography

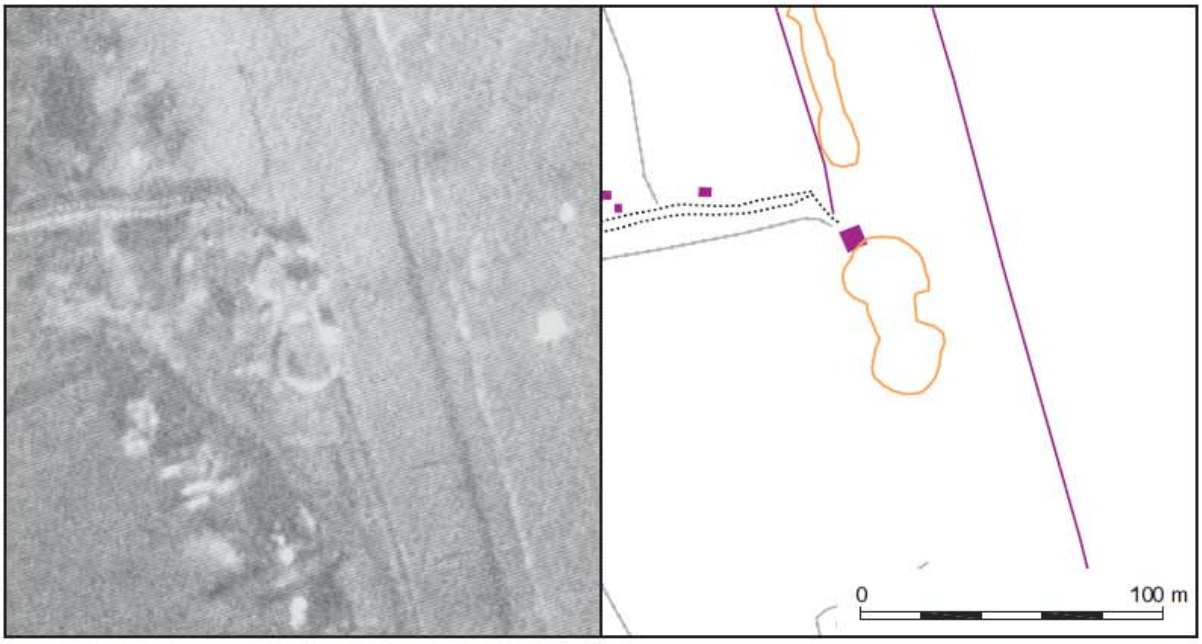

Plate 33. Sandown Castle (MKE7303). NMR RAF/26H/UK/1443 34 2-FEB-1941 © English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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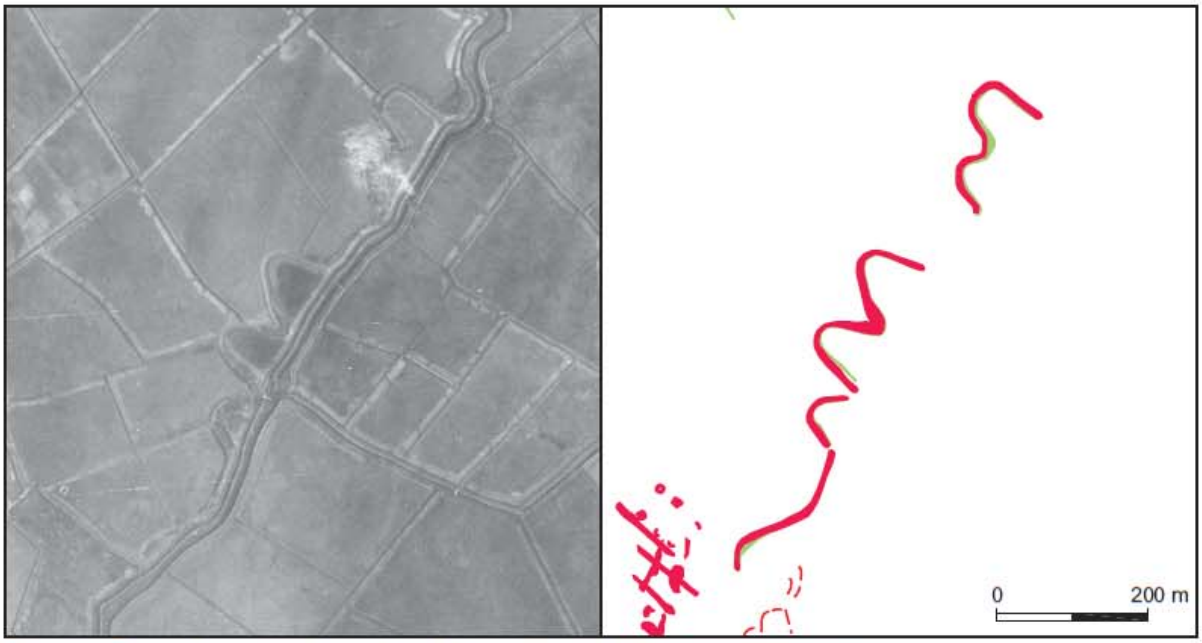

Plate 34. Flood defence in the Lydden Valley visible as earthworks (MWX43331).
NMR RAF/106G/UK/1378 5144 4-APR-1946 © English Heritage (NMR) RAF Photography

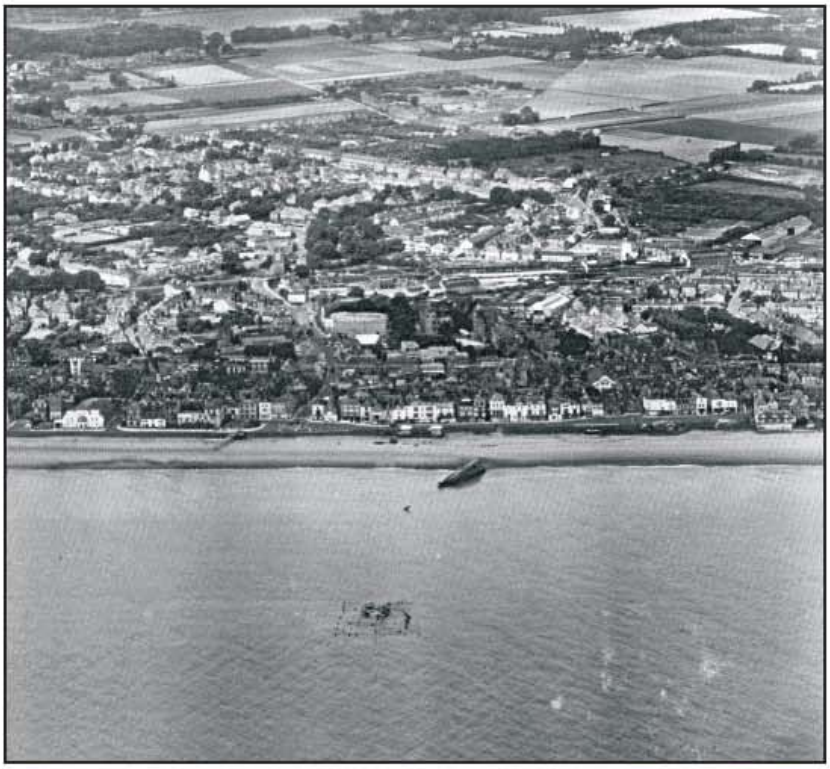

Plate 35. Wreck of the Nora and part of the demolished pier at Deal (MKE10743).
NMR TR 3752/026 RAF PO-09 16-JUL-1941 © English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
Scale:	(34) 1:10,000 @A4	Illustrator:	KJB
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Plate 36. Unidentified wreck in Dover Harbour (MWX43625). NMR RAF/106G/UK/610 6359 05-AUG-1945
© English Heritage (NMR) RAF Photography

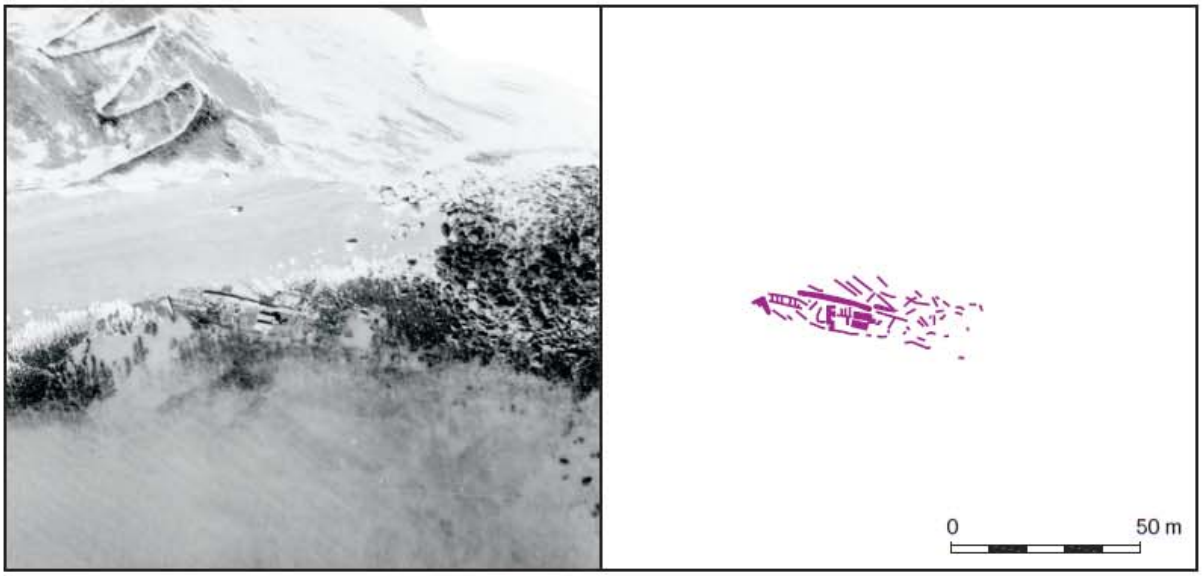

Plate 37. Wreck of the SS Falcon, Langdon Bay (MKe17303). NMR RAF/106G/UK/1310 5238 27-MAR-1946
© English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

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Plate 38. Military sites in Dover including WWI redoubt (reused during WWII) and firing range, along with a WWII barrage balloon site and Swingate Chain Radar Station (Mke42050, MWX43563, MWX43530, MKE9024 and MWX43573). NMR RAF/106G/UK/1087 4158 20-DEC-1945 © English Heritage (NMR) RAF Photography

Plate 39. Radar station (MWX43573).
NMR TR 3442/009 MSO 31176/3003 30-AUG-1942
© English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

Wessex Archaeology

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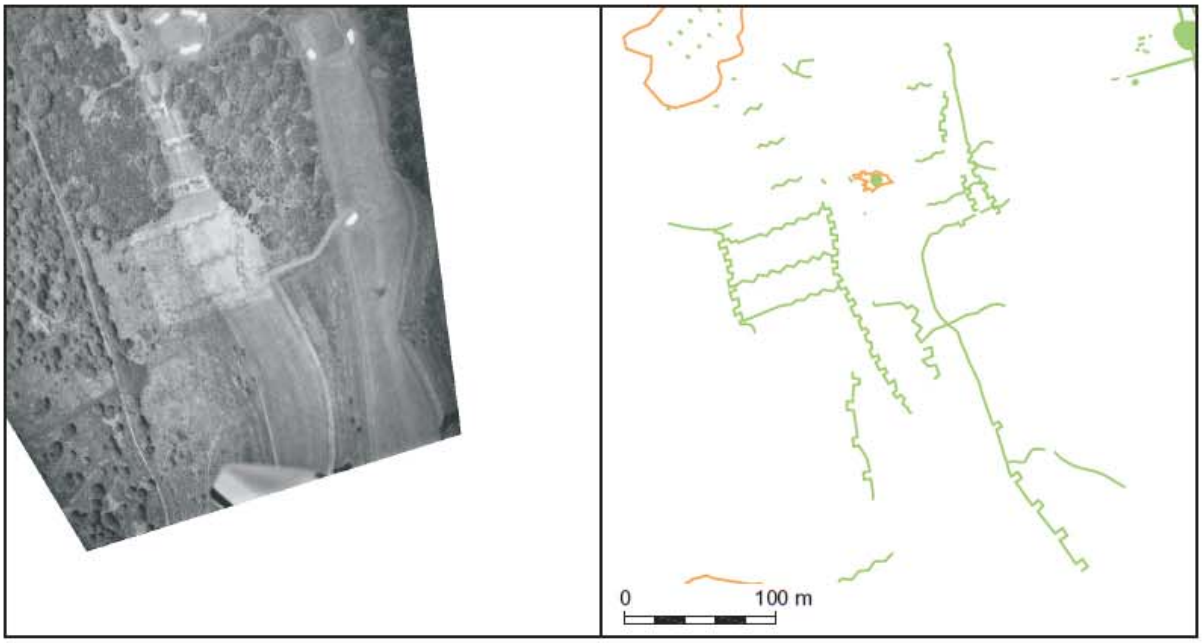

Plate 40. WWI practice slit trenching visible as cropmarks, Canterbury Golf Course (MWX43024). NMR TR 1759/7 NMR 3156/33 09-MAY-1987 © English Heritage (NMR)

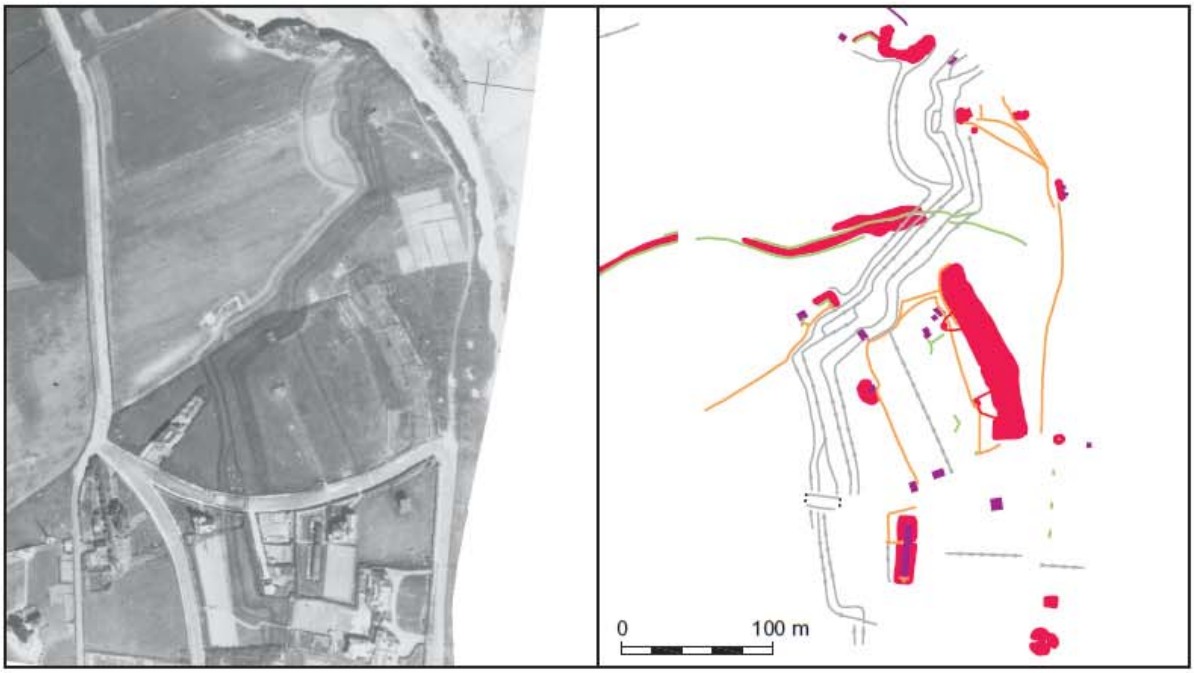

Plate 41. Joss Bay coastal battery (MKE17194). NMR RAF/HLA/540 6034 17-MAY-1942 © English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

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Plate 42. Four searchlights associated with the St. Margaret's at Cliffe battery (Mke41964).
NMR TR 3745/11 RAF 30194/PSFO 0027 18-AUG-1949 © English Heritage (NMR) RAF Photography

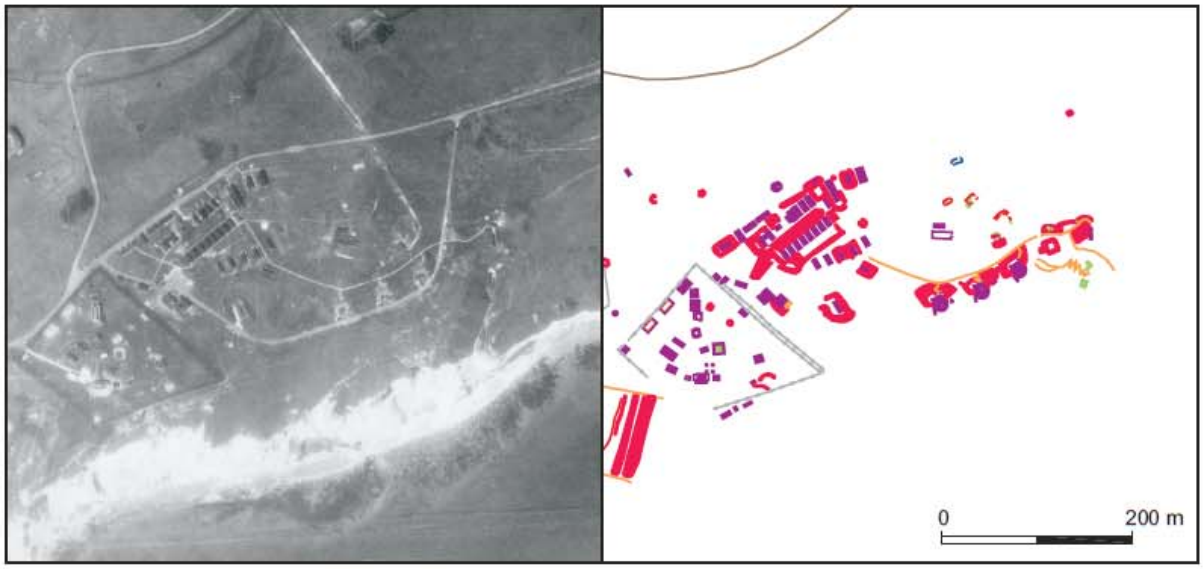

Plate 43. Fan Bay cross-channel gun battery (Mke41970). NMR RAF/106G/UK/1443 3348 30-APR-1946
© English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

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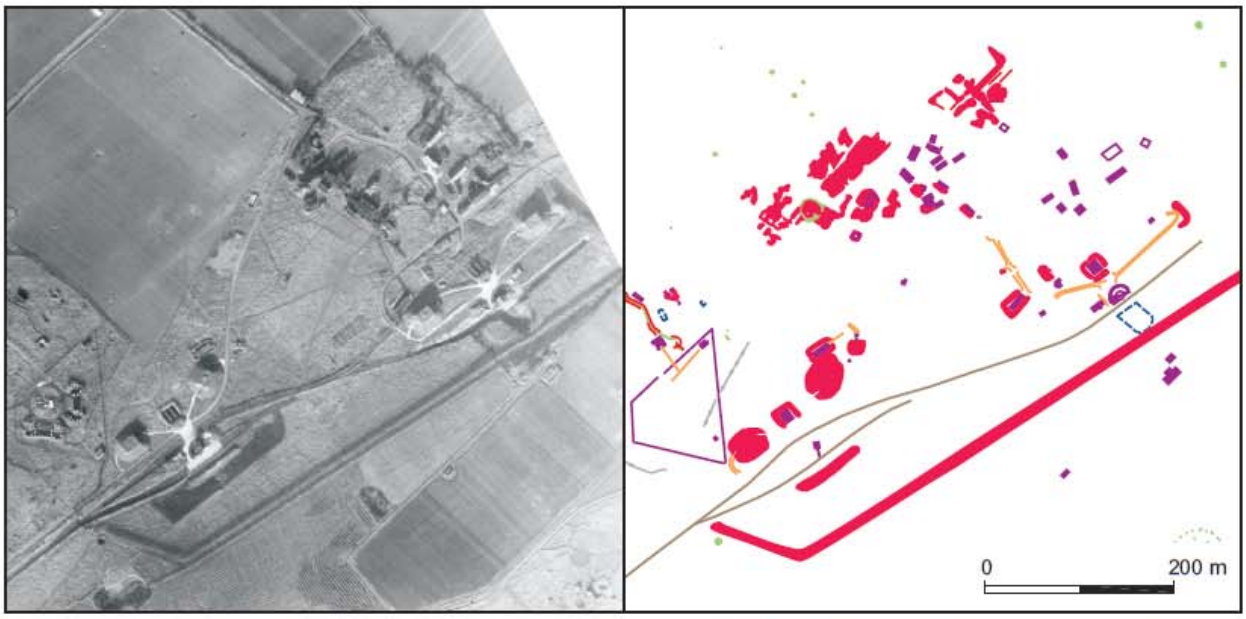

Plate 44. Wanstone cross-channel gun battery (MKe17934). NMR RAF/541/399 3006 15-NOV-1949. Other features visible on the photograph were not mapped as they are already present on OS Mastermap 2009.
© English Heritage (NMR) RAF Photography

Plate 45. Dumpton Gap anti-aircraft site (MWX43078). NMR RAF/106G/UK/1378 5070 04-APR-1946
© English Heritage (NMR) RAF Photography

Monument polygon
Structure
Extent of area
Anti-tank cubes
Barbed wire
Ridge and furrow, no surface expression
Ridge and furrow, still surviving
Railway
Large cut feature
Bank
Ditch
Top of slope
Bottom of slope

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Date:	31/03/11	Revision Number:	0
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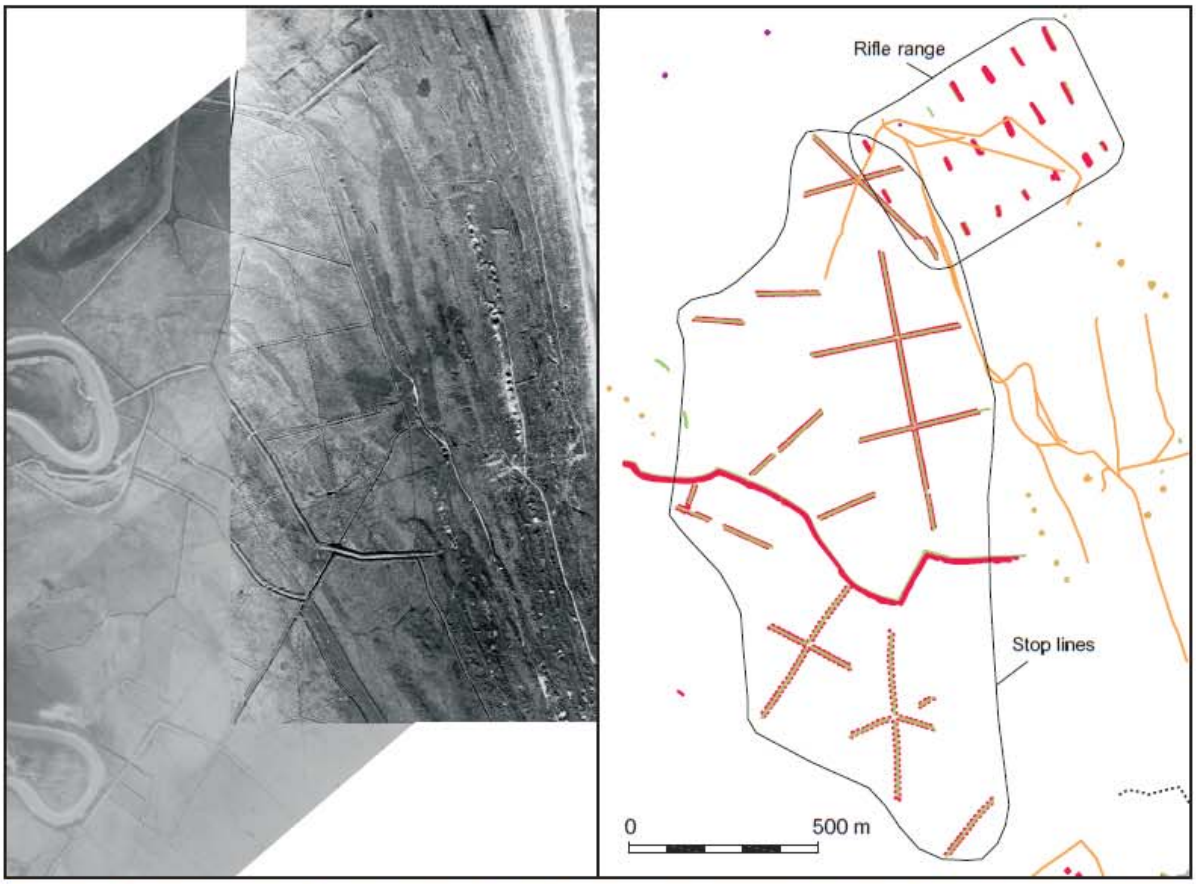

Plate 46. Stop lines and a rifle range visible as earthworks, within a training area on Sandwich Haven (MWX43262 and MWX43264). NMR RAF/106G/UK/1131 4037 04-JAN-1946 and NMR RAF/106G/LA/90 4033 04-JAN-1945 © English Heritage (NMR) RAF Photography

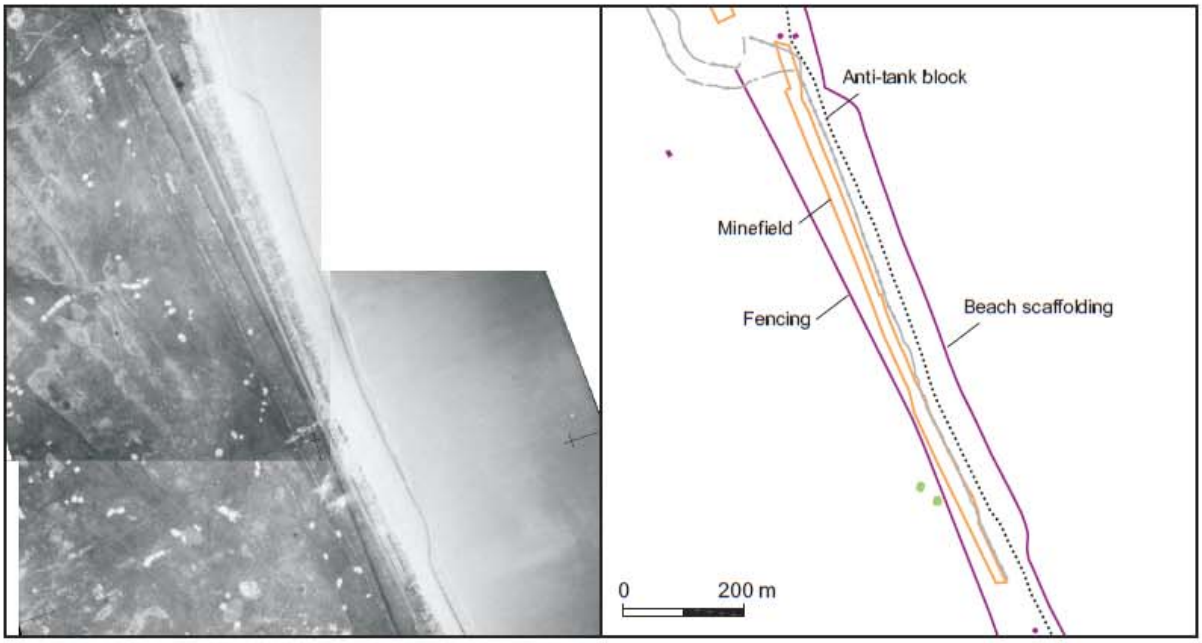

Plate 47. Anti-landing obstacles, Sandwich Flats, including a minefield, anti-tank blocks, beach scaffolding and fencing (MWX43270, Mke42015, MWX43276 and MWX43275). © English Heritage (NMR) RAF Photography

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

Wessex Archaeology

Date:	31/03/11	Revision Number:	0
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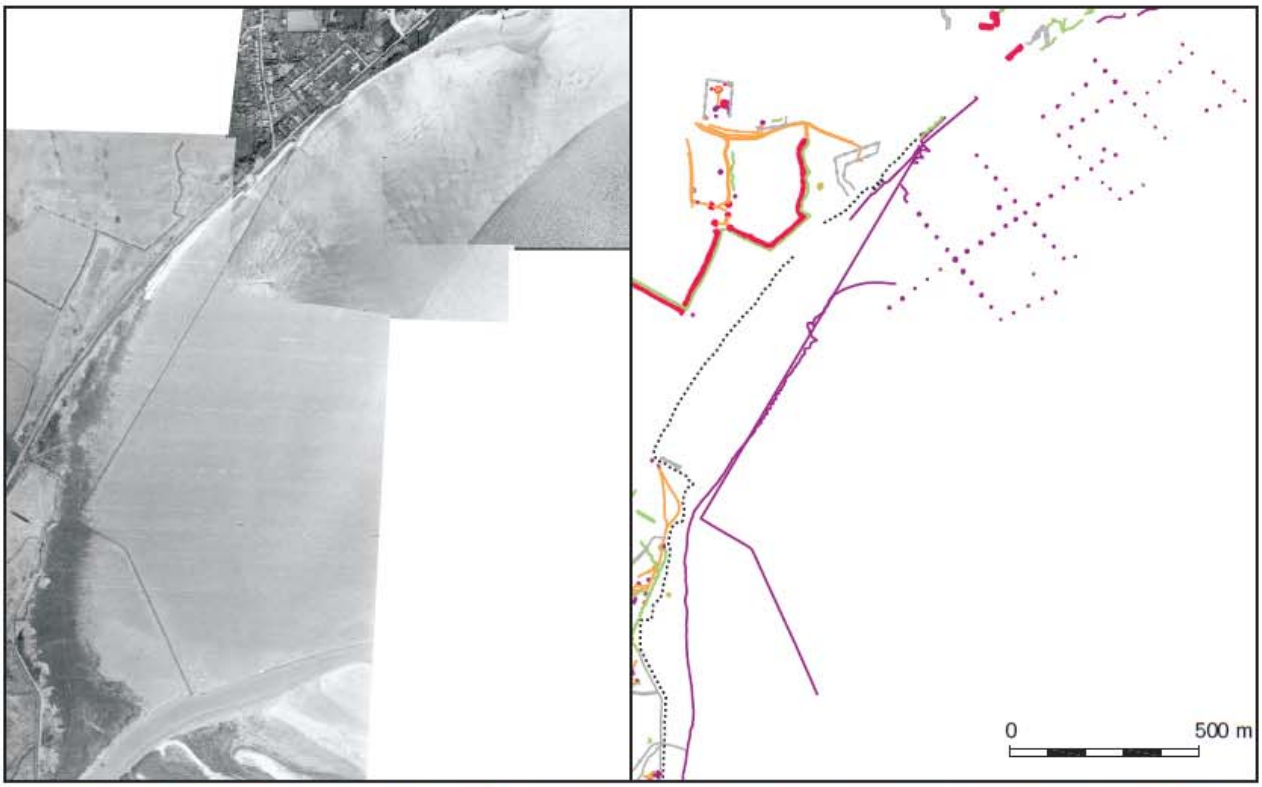

Plate 48. Anti-landing obstacles, Pegwell Bay (MWX43182, MWX43183, MWX43189, MWX43188, MWX43185, MWX43230 and MWX43173). NMR RAF/HLA/540 6052-6053 17-MAY-1942 and NMR RAF/106G/UK/1110 4077 10-JAN-1946 © English Heritage (NMR) RAF Photography

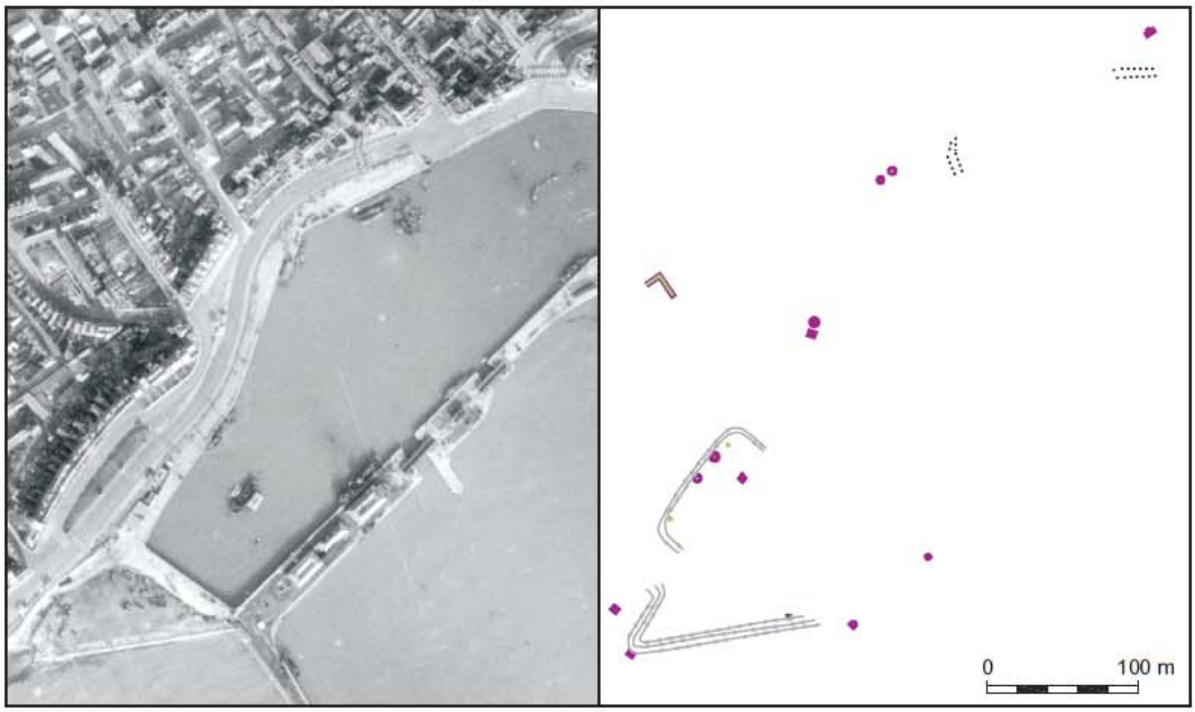

Plate 49. Road block and other coastal defences, Ramsgate (MWX43109). NMR RAF/26J/BR267 4 22-FEB-1941. Other features visible on the photograph were not mapped as they are already present on OS Mastermap 2009 © English Heritage (NMR) RAF Photography

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

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Plate 50. Public air-raid shelter, Broadstairs (MWX43041). NMR RAF/HLA/540 6082 17-MAY-1942 © English Heritage (NMR) RAF Photography

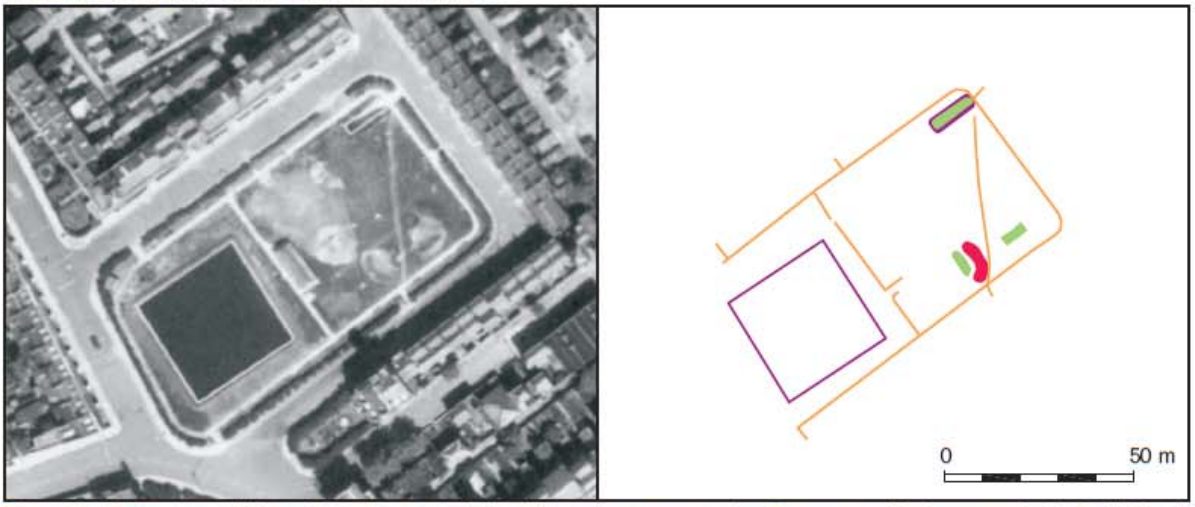

Plate 51. Emergency Water Supply reservoir beside an entrance to the Ramsgate Underground Air Raid Shelter (MWX43112 and MWX43094). NMR RAF/HLA/540 6095 17-MAY-1942 © English Heritage (NMR) RAF Photography

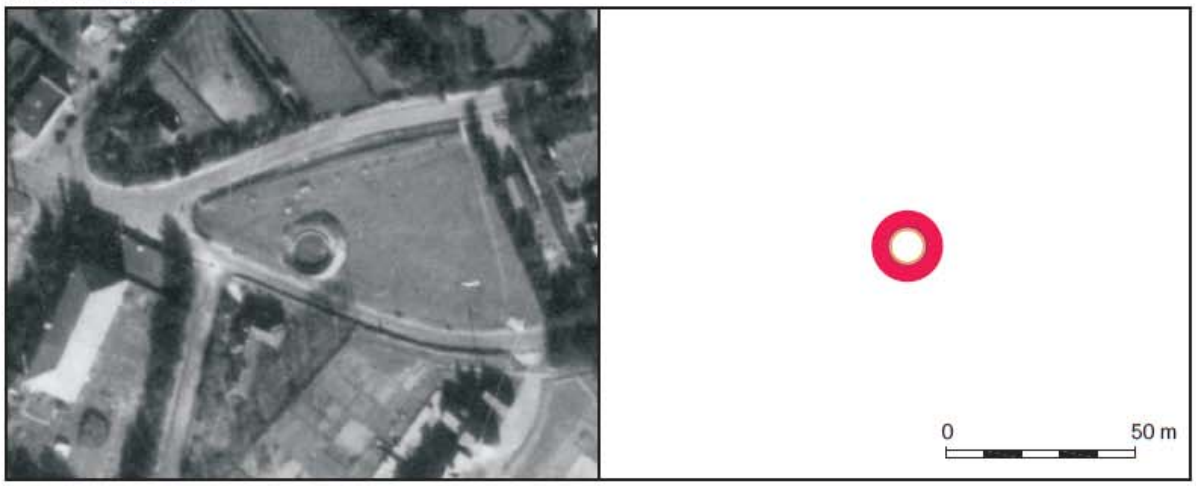

Plate 52. Emergency Water Supply tank with surrounding earthwork, St. Margaret's at Cliffe (MWX43513). NMR RAF/106G/UK/1178 4028 20-FEB-1946 © English Heritage (NMR) RAF Photography

- Monument polygon
- Structure
- Extent of area
- Anti-tank cubes
- Barbed wire
- Ridge and furrow, no surface expression
- Ridge and furrow, still surviving
- Railway
- Large cut feature
- Bank
- Ditch
- Top of slope
- Bottom of slope

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