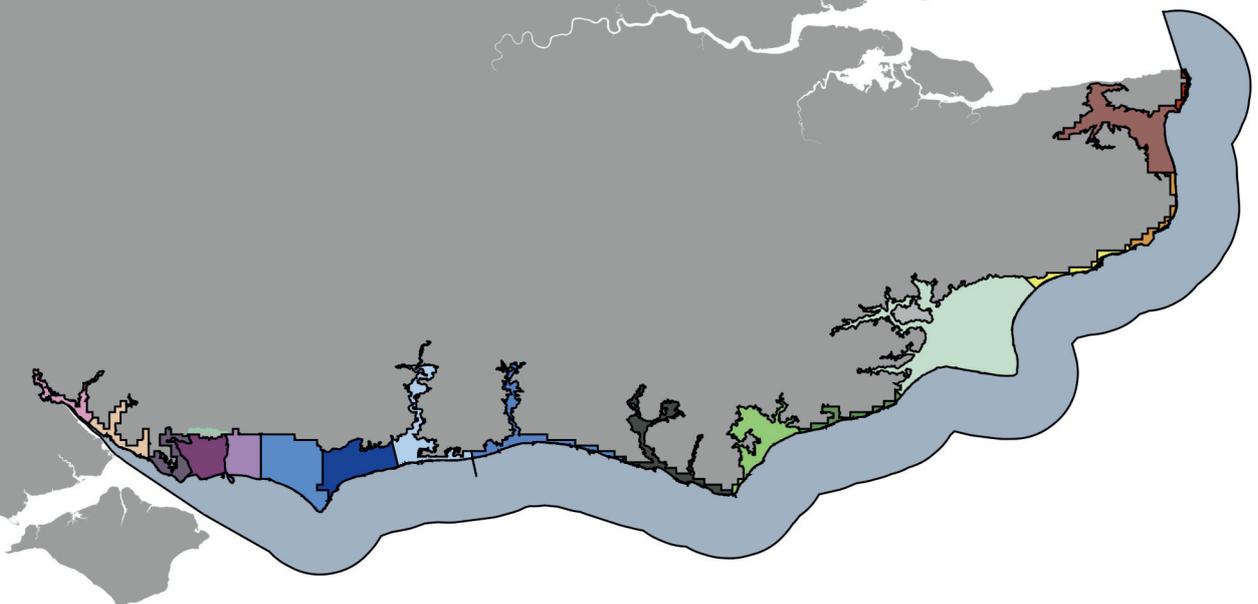




## South East Rapid Coastal Zone Assessment Survey (SE RCZAS)

Phase 1: Desk-Based Assessment





**SOUTH EAST RAPID COASTAL ZONE  
ASSESSMENT SURVEY**

**PHASE 1: DESK BASED ASSESSMENT**

**EH 5698**

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For:

**English Heritage**

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## **SOUTH EAST RAPID COASTAL ZONE ASSESSMENT SURVEY**

### **PHASE 1: DESK BASED ASSESSMENT**

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# **SOUTH EAST RAPID COASTAL ZONE ASSESSMENT SURVEY**

## **PHASE 1: DESK BASED ASSESSMENT**

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# **SOUTH EAST RAPID COASTAL ZONE ASSESSMENT SURVEY**

## **PHASE 1: DESK BASED ASSESSMENT**

**Report ref.: 71330.02**

### **Summary**

Wessex Archaeology was commissioned by English Heritage to undertake a Phase 1 Desk-based Rapid Coastal Zone Assessment Survey of the South East coast of England. The project assesses the extent to which the coastal historic environment is under threat from rising sea levels, coastal erosion, flooding, development and other threats. The South East Rapid Coastal Zone Assessment Survey (SE RCZAS) is part of a wider programme of Rapid Coastal Zone Assessments and as such contributes to the developing national picture of the coastal historic environment. The assessment was undertaken with reference to Defra's Shoreline Management Plan 2 (SMP2) data (from the North Solent SMP2, South Downs SMP2, Isle of Grain to South Foreland SMP2 and South Foreland to Beachy Head SMP2) as well as floodlines supplied by the Environment Agency. The results of Phase 1 will inform the Phase 2 fieldwork.

The terrestrial Study Area for this project extended from Totton in Southampton, Hampshire to North Foreland, Kent, and comprised approximately 1,119 km<sup>2</sup>. The complete Study Area extended from the 6 nautical mile limit offshore to the 5m contour inland, generating an overall Study Area of 4,009 km<sup>2</sup>. The Study Area was divided into 18 Coastal Stretches, to provide opportunity for local examination of the historic environment assets and threats particular to each area.

The review of the historic environment assets within the SE RCZAS Study Area has been based on several datasets:

- enhanced County Council and Unitary Authority records (records were enhanced both with results from the digitisation of features visible on aerial photographs in the National Mapping Programme element of Phase 1, and through the identification of features visible on historic mapping);
- Hampshire Archaeological and Historic Buildings Record (AHBR)
- Southampton Historic Environment Record (HER)
- Portsmouth Sites and Monuments Record (SMR)
- West Sussex HER
- East Sussex HER
- Kent HER
- National Record for the Historic Environment (NRHE) (formerly the National Monuments Record (NMR)), of which the records in East Sussex and the western Kent were enhanced during the National Mapping Programme (NMP) element of Phase 1;
- Portable Antiquities Scheme (PAS);
- lists of Scheduled Ancient Monuments, Listed Buildings, Conservation Areas, Registered Parks and Gardens, and Historic Battlefields;

- wreck and obstruction data supplied as SeaZone data through English Heritage; and
- information on 'wreck' declared to the Receiver of Wreck.

In addition to these data sets, modern mapping, secondary sources, and the results of other archaeological studies were also considered. The information was then assessed against the results of SMP 2 predicted erosion, floodlines, development proposals and other predicted threats to the historic environment.

The SE RCZAS report provides details about the project methodology, the geological background of the south-east coast, a broad overview of the coastal historic environment of the south-east coast, a brief description of the assessment of threat and vulnerability and an outline for Phase 2 fieldwork.

The Study Area as a whole has been addressed within the report – permitting the identification of general trends and distributions. This is presented as a chronological overview of known sites in the area (as identified through the National Mapping Programme and desk-based elements). This is broadly discussed, with reference to County and Coastal Stretch where relevant. An overview of the potential of the Study Area as a whole is given; importance is presented according to Coastal Stretch. An assessment of threat follows, in which sites at high risk of damage or destruction and other management priorities are identified. Finally, scoping for Phase 2 is presented including an overview of proposed fieldwork and potential constraints on fieldwork.

The SE RCZAS has established that many historic environment sites in the coastal zone are under threat from rising sea levels, coastal erosion and flooding. In Phase 2 of the SE RCZAS, the selection of sites and areas for rapid field survey will be further refined, taking into consideration time and funding constraints

# **SOUTH EAST RAPID COASTAL ZONE ASSESSMENT SURVEY (SE RCZAS)**

## **PHASE 1: DESK BASED ASSESSMENT**

Report ref.: 71330.02

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**List of Abbreviations:**

AHBR	Archaeological and Historic Buildings Record
ALSF	Aggregates Levy Sustainability Fund
AONB	Area of Natural Beauty
BMAPA	British Marine Aggregate Producers Association
BNG	British National Grid
CCHES	Cornwall Council Historic Environment Service
CCO	Channel Coastal Observatory
DBA	Desk Based Assessment
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EH	English Heritage
FIPAD	Fishing Industry Protocol for Archaeological Discoveries
GCC	Gloucestershire County Council

HER	Historic Environment Record
HBSMR	<i>Historic Buildings, Sites and Monuments Record</i> – HER management software by exeGesIS SDM
HLC	Historic Landscape Characterisation
HTL	Hold the Line
IfA	Institute for Archaeologists
LB	Listed Building
LGM	Last Glacial Maximum
LNR	Local Nature Reserve
MAREA	Marine Aggregate Regional Environmental Assessment
MHW	Mean High Water
MLW	Mean Low Water
MoD	Ministry of Defence
MR	Managed Realignment
NAI	No Active Intervention
NMP	National Mapping Programme
NMR	National Monuments Record
NRHE	National Record of the Historic Environment
OS	Ordnance Survey
OD	Ordnance Datum
PAS	Portable Antiquities Scheme
PGA	Pan Government Agreement
PMRA	Protection of Military Remains Act
PU	Policy Unit
PWA	Protection of Wrecks Act
RAF	Royal Air Force
RAMSAR	Ramsar List of Wetlands of International Importance
RCHME	Royal Commission on the Historical Monuments of England
RCZAS	Rapid Coastal Zone Assessment Survey
RIGS	Regionally Important Geological and geomorphological Sites
RNLI	Royal National Lifeboat Institution
RoW	Receiver of Wreck
SAC	Special Area of Conservation
SDCG	South Downs Coastal Group
SEA	Strategic Environmental Assessment
SECG	South East Coastal Group
SE RCZAS	South East Rapid Coastal Zone Assessment Survey
SM	Scheduled Monument
SMP	Shoreline Management Plan
SMR	Sites and Monuments Record
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TCE	The Crown Estate
UKHO	United Kingdom Hydrographic Office
WA	Wessex Archaeology
WWI	World War I
WWII	World War II

# **SOUTH EAST RAPID COASTAL ZONE ASSESSMENT SURVEY**

## **PHASE 1: DESK BASED ASSESSMENT**

**Report ref.: 71330.02**

### **1. INTRODUCTION**

#### **1.1. DOCUMENT PARAMETERS**

1.1.1. Phase 1 of the South East Rapid Coastal Zone Assessment Survey (SE RCZAS) covered the coasts of Hampshire, West Sussex, East Sussex and Kent, extending from Totton, Southampton in Hampshire to North Foreland in Kent (**Figure 1**). This phase comprised two main components:

- enhancement of County Council and Unitary Authority records. New records were created and existing records were enhanced using aerial photographic transcription, as part of the National Mapping Programme (NMP) and through the analysis and demarcation of sites visible on historic mapping; and
- an assessment of the historic environment resource on the south-east coast to identify sites and areas vulnerable to coastal change, based on the results of predicted erosion lines from the relevant Shoreline Management Plans, floodlines from the Environment Agency, and potential development pressures.

1.1.2. The Study Area was divided into 18 separate Coastal Stretches in order to assess the specific local historic environment resource and particular threats to each area; this also assists to break up the large Study Area. This Desk Based Assessment (DBA) includes an overview of the project methodology, provides detail on the geological background of the Study Area and current land use. A chronological analysis of the archaeological and historical record, as identified from the NMP, modern and historic mapping, and secondary sources, is provided. This takes into account the whole Study Area, facilitating the identification of broad trends and distributions; where relevant this is assessed on a smaller scale by County or Coastal Stretch. Archaeological potential is discussed chronologically on a broad scale, consistent with the nature of the datasets. Importance is assessed on a more local scale, by Coastal Stretch, as it is possible to specifically identify protected sites. Previous archaeological survey and research in the area is also noted.

1.1.3. An assessment of the threats posed to the identified and potential heritage was undertaken, with reference to Coastal Stretches; from which sites at risk were identified. These sites were discriminated into a list of sites which would most benefit from walkover survey and further management. An outline for Phase 2 fieldwork is also suggested.

#### **1.2. STUDY AREA**

1.2.1. The terrestrial Study Area is approximately 1,119 km<sup>2</sup> in area and encompasses the whole coast from Totton (almost to Moorcourt Copse), Southampton in Hampshire to North Foreland (almost to Foreness Point) in Kent, and extends

inland to the 5m contour (**Figure 1**). However, the entire Study Area also extends offshore to the 6 nautical mile (nm) limit and gives an overall Study Area of 4,009 km<sup>2</sup>.

Boundary	Definition	Rationale
Eastern Boundary (coastal)	White Ness, Kingsgate	Joins the North Kent Coast RCZAS
Eastern Boundary (marine)	Trend line of the second phase of Shoreline Management Plans (SMP2) Policy Unit 4a17 boundary extended offshore	
Western Boundary (coastal)	Redbridge, Totton	Joins the New Forest RCZAS
Western Boundary (marine)	Western edge of navigational approach to Southampton from near Nab tower	
Inland Boundary (low-lying coastland)	+5m Ordnance Datum (OD) contour	Local authorities stated a clear preference for adopting the 5m boundary to encompass areas of low-lying (often reclaimed) coastal land
Inland Boundary (cliffs etc.)	NMP 1km x 1km Ordnance Survey (OS) map squares	The DBA covered all areas falling within agreed NMP map squares, including areas outside the +5m OD contour. This means that the majority of land falling within 500m of Mean High Water (MHW) will be included in the DBA, so that it encompasses, for example cliff top monuments where the +5m contour is close to MHW. An initial review of SMP data indicated that 500m encompasses indicative erosion lines.
Seaward Boundary	6 nautical mile limit	Represents limit of local-authority based Sea Fisheries Committees. The line was created by buffering the OS Boundary-Line (1:10,000) Mean Low Water (MLW) / Extent of Realm. For the Overview of Past Coastal Change, relevant data outside this boundary was included, to below 30m.

Table 1: Extents and boundaries of the SE RCZAS Study Area

- 1.2.2. As previously mentioned the Study Area was subdivided into 18 Coastal Stretches to create localised areas which could be considered independently to facilitate data management and reporting (**Figure 1**).

Coastal Stretch	Location	Area (km <sup>2</sup> )
1	Kingsgate to Ramsgate Harbour	6.16
2	Ramsgate Harbour to North Deal	118.5
3	North Deal to Shakespeare Cliff	16.9
4	Shakespeare Cliff to western extent of Hythe	17.7
5	Western extent of Hythe Ranges to Cliff End	329.6
6	Cliff End to Cooden	19
7	Cooden to Beachy Head	72.8
8	Beachy Head to Telscombe Cliffs	53.3
9	Telscombe Cliffs to West Worthing	48.6
10	West Worthing to Poole Place	63.6
11	Poole Place to East Beach	76.4
12	East Beach to Chichester Harbour	108.6
13	Chichester Harbour to Langstone Harbour	48.3
14	Portsmouth Administrative Area	53
15	Portchester to Lee-on-the-Solent	31.5
16	Lee-on-the-Solent to Netley	30.6
17	Netley to Redbridge	24.4
18	Offshore Archaeology	2889.9

Table 2: Locations and areas of Coastal Stretches

- 1.2.3. Terrestrial Coastal Stretches 1-17 extend seaward to MLW and inland to either the boundary of the NMP Study Area or the 5m contour, which ever is furthest. Coastal Stretch 18 covers the offshore area of the Study Area and extends from the seaward terminus of Coastal Stretches 1-17 to the 6 nautical mile limit.
- 1.2.4. The division of Coastal Stretches was based several other key units such as Historic Landscape Characterisation (HLC) or Landscape Character Area (LCA) mapping, where available.
- 1.2.5. They areas were also based on the lines produced for the relevant Policy Units (PU) of second generation Shoreline Management Plans (SMP2) . The first generation Shoreline Management Plans (SMP) were large-scale assessments of the risks associated with coastal processes designed to help reduce these risks to people and the developed, historic and natural environments. Coastal processes under consideration included tidal patterns, wave height, wave direction and the movement of beach and seabed materials. The first SMPs were produced in the mid 1990s resulting in a particular management scheme for each length of shoreline. However, more recently new information has come to light through schemes such as *Futurecoast* and local authority *Strategic Flood Risk Assessments* which cast doubt on the efficacy of the original plans. Consequently, a second generation of SMPs are currently being produced for the English coast. Nominally referred to as SMP2, each plan is intended to provide a route map for local authorities to identify the most sustainable approaches to managing the risks to the coast over the short term (0 - 20 years), medium term (20 – 50 years), and long term (50 – 100 years). **Appendix I** displays the SMP units that are covered by each Coastal Stretch within the Study Area.

### 1.3. PROJECT BACKGROUND

- 1.3.1. The historic environment in south-east England's coastal zone contains a rich and diverse cultural legacy in the form of archaeological sites and artefacts. This legacy offers tangible insights into human activity in the region from the beginning with the region's relationship with the sea through evidence of shipwrecks, harbour installations, coastal settlements, salt production sites, military defences and other sites and material, but also details what life was like when sea levels were lower and areas that are now submerged were dry and habitable. In places, the historic landscapes continue seamlessly into the intertidal and sub-tidal areas. The variety of the historic environment resource in this region underlines the complex relationships between people and the sea: from the 500,000 year old human remains at Boxgrove to the intense WWII military activity in and over the Straits of Dover. It is unlikely that any period or theme in coastal archaeology is not represented on the south-east coast.
- 1.3.2. However, this rich resource is also fragile and irreplaceable, and it is under threat from natural pressures such as coastal change, sea-level rise, climate change and flooding as well as anthropogenic pressures such as commercial development and shoreline management.
- 1.3.3. Anthropogenic threats to the historic environment are generally managed through planning guidance such as the National Planning Policy Framework (and were previously managed through PPG 15, PPG 16 and PPS 5) and emerging local development plans. As a result of this guidance, the historic environment is a material consideration within the planning process.
- 1.3.4. Natural threats to the coastal historic environment are also increasingly coming under scrutiny. Over the last few decades, coastal managers and the Government have recognised that environmental changes are impacting the coast. In the 21<sup>st</sup> century it will not be possible to maintain the present coastline of England, and in many areas natural processes will be allowed to operate, leading to coastal erosion and flooding which could considerably impact the coastal historic environment.
- 1.3.5. In order to assess natural and anthropogenic threats to the coastline, the Department for Environment, Food and Rural Affairs (Defra), under the strategic overview of the Environment Agency, are promoting the Shoreline and Estuary Management Programme. This Programme aims to develop Shoreline Management Plans (SMPs), which in turn aim to develop a high level strategic framework to sustainably reduce the risks associated with anthropogenic and natural changes on people and the developed, historic and natural environment (Defra 2001, 2005, 2009). These plans were never intended to be static documents, and as some of the first generation of SMPs are now over a decade old, they have undergone a period of review, with the SMP2 data becoming available.
- 1.3.6. As threats to the coastal environment were being studied and assessed, it also became apparent that the coastal historic environment needed to be better understood, because in general, this resource was less understood than the terrestrial historic environment. 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 (EH & RCHME 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 was also noted that rapid baseline surveys would be required to enhance the records in order to enable a broad assessment of the range, significance and vulnerability of historic assets.

- 1.3.7. To promote the integration of the historic environment with the SMP process, EH developed *Coastal Defence and the Historic Environment* (2003), a document that provides guidance for people involved in decisions relating to coastal planning and coastal defence, including local authority archaeologists. EH has provided more detailed advice in *Shoreline Management Plan Review and the Historic Environment* (2006), and the document specifically references the role of the assessment element of RCZASs in informing Stages 2 and 3 of the SMP process, in developing shoreline management policies for each stretch of coastline. In the first instance, RCZASs are directed to provide enhanced records and assessments that will inform the SMPs. The enhancement will, both through the SMPs and directly through the availability of better historic environment data, also inform strategies for specific lengths of coast and individual schemes, such as engineered interventions.
- 1.3.8. Several RCZAS projects have already been undertaken around the coast of England, and the south-east is one of the last areas to be examined. Therefore this project contributes significantly to the developing national picture of the coastal historic environment.
- 1.3.9. In March 2009 Wessex Archaeology (WA) was commissioned by EH to undertake the Phase 1 Desk Based Assessment (DBA) of the Rapid Coastal Zone Assessment Survey (RCZAS) for the south-east coast. The SE RCZAS links two previously completed RCZASs: the North Kent Coast RCZAS (WA 2002a) and the New Forest RCZAS (WA 2010a).
- 1.3.10. The SE RCZAS has been informed by, and will in turn inform, a number of SMPs that have been developed for the south-east coast:
- Isle of Grain to South Foreland (South East Coastal Group (SECG) 2010a);
  - South Foreland to Beachy Head (SECG 2006);
  - Beachy Head to Selsey Bill (South Downs Coastal Group (SDCG) 2005); and
  - North Solent (New Forest District Council 2010).
- 1.3.11. Each of these SMPs has further divided the coast into Policy Units (PUs) in order to examine the physical and hydrodynamic effects of coastal change based on region and local scale. The PUs covered by the SE RCZAS are listed in **Appendix I**.
- 1.3.12. The results of Phase 1 of the SE RCZAS will inform Phase 2, in which selected sites and areas which have been identified as being under threat will be assessed through fieldwork.
- 1.4. AIMS AND OBJECTIVES**
- 1.4.1. The aim of this project is to enable improved local and national curatorial responses to strategic coastal planning and management initiatives.
- 1.4.2. The objectives of the project are as follows:

- to provide enhanced HER, SMR and NRHE records for coastal historic assets;
- to provide a factual basis for curatorial responses to development proposals and other schemes at the coast;
- to provide data that is compatible with the needs of other coastal managers, industry and researchers;
- to provide an overview of past coastal change from the Late Upper Palaeolithic to the present;
- to assess the overall degree and nature of threat to coastal historic assets with regard to models of future coastal change, SMPs, and other coastal pressures;
- to provide a broad assessment of the likely archaeological potential, importance and vulnerability of all stretches of the coast;
- to identify areas or sites where historic assets may be at high risk of damage or destruction;
- to provide a sound basis for developing management priorities, including identification of areas or sites meriting: further survey or evaluation; positive management action; and/or statutory protection;
- to provide a sound basis for establishing future research priorities for the coast; and
- to enhance public understanding and enjoyment of the coastal heritage.

## 1.5. STRUCTURE OF THE REPORT

### 1.5.1. The remainder of the report will cover the following subjects:

- **Section 2** discusses the methodology undertaken for the SE RCZAS project including the collation and generation of data from various internal and external sources;
- **Section 3** provides a geological background to the SE RCZAS Study Area including an overview of glaciation, sea-level change, submerged landscapes and land use that are seen in the Study Area;
- **Section 4** presents a general chronological overview of the historic environment of the terrestrial and marine Study Area with relevant examples from each of the Coastal Stretches; together with an appraisal of the archaeological potential and importance of the historic environment, previous archaeological survey and research in the area is also noted;
- **Section 5** evaluates the threat and vulnerability to the historic environment from both natural and anthropogenic causes, sites at high risk of damage or destruction are identified, and this is discriminated into a list of sites which would most benefit from walkover survey and further management action; and
- **Section 6** will concentrate on the role of the Phase 2 fieldwork which is envisaged as comprising a walkover survey of particular sites at risk within the Study Area, accompanied by an evaluation of anticipated constraints, and followed by the deliverables which will result.

## 2. METHODOLOGY

### 2.1. OVERVIEW

- 2.1.1. The project methodology was set out in the project design (WA 2009a) for *A Brief for Rapid Coastal Zone Assessment Survey of South-Eastern England (5698)* (EH 2008). The project is consistent with the Institute for Archaeologists (IfA) *Standard and Guidance for Archaeological Desk-based Assessment* (IfA 2012).

### 2.2. DATA COLLATION AND REVIEW

- 2.2.1. The Data Collation and Review phase comprised three sub-stages, as follows:

- set up communications with local authorities, museums, archives and other stakeholders;
- collate and appraise historic environment data; and
- acquire SMP and coastal change information.

#### **Set up Communications**

- 2.2.2. WA set up direct contact with EH staff relating to the project, including the Coastal Strategy Officer and Project Assurance Officer, as well as the National Mapping Programme and Aerial Survey teams.

- 2.2.3. A Liaison Group was established, and an initial meeting was held with the Liaison Group before the project commenced. The Liaison Group comprised representatives from the following:

- WA Project Team
- EH Coastal Strategy Officer
- EH NRHE
- EH Aerial Survey Team (South)
- EH South East Region
- EH Project Assurance Officer
- Kent County Council
- East Sussex County Council
- West Sussex County Council
- Chichester District Council
- Hampshire County Council
- Portsmouth City Council
- Southampton City Council
- New Forest National Park Authority
- National Trust
- Defence Estates
- Environment Agency (EA)
- Channel Coastal Observatory (CCO)

- 2.2.4. In addition, web pages were created to provide publicly accessible information about the project.
- 2.2.5. An electronic mailing list of other organisations and individuals with interests in the historic environment on the south-east coast was compiled. Details of the project and links to the web pages were circulated to the mailing list, to initiate contact with interested parties, and the results of the project will be forwarded to facilitate wider public understanding and enjoyment. The list included local archaeological and historical societies, community archaeology groups, museums and archives.

### **Collate and Appraise Historic Environment Data**

- 2.2.6. The following data was received in British National Grid (BNG) co-ordinates, unless specified otherwise, and inserted into ArcGIS 9.3 for spatial viewing.

#### *Historic Environment Records*

- 2.2.7. The following organisations supplied historic environment records relevant to the SE RCZAS Study Area:
- Hampshire AHBR
  - Southampton HER
  - Portsmouth City SMR
  - West Sussex HER
  - East Sussex HER
  - Kent HER
- 2.2.8. Datasets which were supplied in HBSMR format (Historic Buildings, Sites and Monuments Record – HER management software by Exegesis SDM) were loaded into HBSMR applications at WA, replicating the HERs systems in their entirety; those which were supplied in other formats were migrated into the HBSMR software, Datasets were enhanced with data generated by the NMP element of the project; the only exception being the Chichester District data, which was used purely to inform interpretations. All datasets, again excepting Chichester District, were enhanced with data derived from the historic mapping enhancement element (**Section 2.3**).
- 2.2.9. The data from these sources were queried in their HBSMR format with regard to the chronological periods that their date ranges covered, every monument type used for each record was considered also. This method of querying provides an overview based on known archaeological sites, permitting sites with multiple components to be fully assessed. Also this method permits full consideration of sites with multi-period use or uncertain date ranges and mediated differences in standard terminologies employed by the HERs.
- 2.2.10. The Hampshire AHBR dataset was supplied digitally to WA and was imported into the HBSMR software by WA; therefore all existing records referred to in this text are prefixed by **HANTS MWX**, as are all new records created by WA; new records created by Cornwall Council Historic Environment Service (CCHES) are prefixed by **HANTS MKM**. Pre-existing records from the Southampton HER have the prefix **MSH**; new records generated by WA have the prefix **SOTON MWX** and new records created by CCHES have the prefix **SOTON MKM**. All pre-existing Portsmouth SMR HBSMR records referred to in this report have the prefix **MPM** and new records generated by WA have the prefix **PORTS MWX**. Pre-existing

records from the West Sussex HER have the prefix **MWS**, whilst new records have the prefix **WSUSSEX MWX** if created by WA, or **WSUSSEX MKM** if generated by CCHES. Similarly, pre-existing records from the East Sussex HER have the prefix **MES**, whilst new records have the prefix **ESUSSEX MWX**. Finally, pre-existing records from the Kent HER referred to in this report have the prefix **MKE**, **MKe** or **Mke**, whilst any new records generated as part of the enhancement have the prefix **KENT MWX**.

#### *National Record of the Historic Environment*

- 2.2.11. The NRHE supplied its point, polyline and polygon datasets for archaeological features within the Study Area, to supplement the datasets provided by the various County Councils listed above. Although the full records were available in pdf form supplied by the NRHE, the point, polyline and polygon data had only the first 255 characters of the description field visible and consequently the full interpretation and dating of some records could not be fully appreciated in the time permitted. All NRHE records referred to within this report have the prefix **NRHE**.
- 2.2.12. Duplication exists between separate datasets, notably the NRHE and HER/SMR/AHBR records; and also within individual datasets, particularly the HER/SMR/AHBR records. It was beyond the scope of this report to interrogate the data to eliminate repetition, but where possible, examples of sites used within the text which are represented by more than one record (within the same, or a different dataset) have these numbers included, indicated with a = symbol.
- 2.2.13. The NRHE dataset has not been used as intensively as the HER/SMR/AHBR datasets. Although in some of the NRHE records period data was available in the min/max dates field and/or period values field, because this information was not available comprehensively across the dataset, it was determined that it would be too difficult and time consuming to sort the NRHE data by chronological period, without systematically dating each record based on the periods mentioned within the available description of 255 characters. Due to the size of the Study Area and time restrictions, this was beyond the scope of the project.
- 2.2.14. Many of the NRHE sites recorded as polygons are Recorded Losses – shipwrecks and aircraft which have been reported as lost but for which material has not necessarily been discovered on the seabed. As the Recorded Losses polygons have at best vague positional data, these are not illustrated any figures which display NRHE data. Additionally, as Recorded Losses suggest archaeological potential rather than known sites, they have only been discussed in the Archaeological Potential section.

#### *Portable Antiquities Scheme*

- 2.2.15. The Portable Antiquities Scheme (PAS) provided data about archaeological finds made around the coast by members of the public. Data was received from the PAS on 22 May 2009 and therefore will not include any finds discovered since then. WA sorted the PAS data by chronological period, using the field that stored this information provided within the shapefile. If this field was left blank or was recorded as 'Foreign', then the description was used to establish a date. If a date could not be ascertained from the description of the find then it was given an 'unknown' date. PAS data referred to in this report has the prefix **PAS**.
- 2.2.16. A limitation of the PAS data noted during the data appraisal is that often records for metal discoveries are clustered together, presumably having been collected by metal detector, and this can bias their distribution and interpretation. It is essential

that all such finds must be considered in context as to how they were uncovered and recorded.

*Scheduled Monuments and Listed Buildings*

- 2.2.17. Spatial data referring to Scheduled Monuments and Listed Buildings was downloaded from The National Heritage List for England, available from EH. The SM and LB datasets used were current for 11 January 2011; however, the 10 July 2012 LB dataset was also referred to for grade clarification. Scheduled Monuments are referred to with the prefix **SM** and Listed Buildings are referred to with the prefix **LB**.

*Defence Areas*

- 2.2.18. Other important datasets for the project were: Defence Areas – a national study of Second World War anti-invasion features in England (Foot 2005) and the Defence of Britain Archive (Council for British Archaeology 2002, 2006).

*Maritime Data*

- 2.2.19. Maritime data was gathered from the following sources:
- EH provided details about Protected Wrecks in the area covered by the Protection of Wrecks Act (PWA) 1973 – dataset up to date as of 27 January 2011;
  - the Ministry of Defence (MoD) provided information about shipwrecks protected under the Protection of Military Remains Act (PMRA) 1986 – dataset up to date as of 27 January 2011;
  - Seazone Solutions Ltd. under EH's licence provided details about known wrecks and obstructions – dataset received on 4 March 2010;
  - the Receiver of Wreck (RoW) provided information about wrecks and findspots – data received 10 May 2011; and
  - the Marine Aggregate Industry Protocol for Reporting Finds of Archaeological Interest (also referred to as the British Marine Aggregate Producers Association (BMAPA) and/or The Crown Estate (TCE) Protocol) provided information about discoveries made on the seabed during aggregate dredging – database held by WA and the dataset was accessed on 27 January 2011.
- 2.2.20. The Seazone and NRHE datasets were provided digitally, in the form of ArcGIS shapefiles, and therefore this assessment is limited to the data available in the digital format of these archives. Although far more detail is available in the paper copies and pdfs of the NRHE records, the data was not used for the assessment as it would have been too time consuming to review – and this was beyond the scope of the project.
- 2.2.21. Seazone data was received in WGS84 Lat/Long decimal degrees, and was converted to BNG using the conversion tools in ArcGIS 9.3. The Geographic Transformation employed was OSGB\_1936\_To\_WGS\_1984\_Petroleum. The spatial data for wrecks and obstructions that was received as polygons was converted to points to assist with analysis, and the shapefiles were merged. In the Obstructions data, any records that were described as known, modern features, such as pontoons, were removed, so the assessment could focus on features of archaeological potential rather than shoreline installations still in use. Records of shipwrecks and aircraft crash sites that were included in the Seazone Obstructions

shapefile have been exported for inclusion in their respective sections. Although the Seazone data generally provides relatively accurate positional data, many of the records have very limited additional information.

- 2.2.22. RoW records, where referred to in the text are prefixed by **RoW**. Similarly, records of finds reported through the BMAPA Protocol are prefixed by **BMAPA** when referred to in the text.

*Sites of Special Scientific Interest and RIGS*

- 2.2.23. Information relating to Sites of Special Scientific Interest (SSSIs) was obtained via MAGIC (Defra 2012) and Natural England's online resources. Information relating to Regionally Important Geological/geomorphological Sites (RIGS) containing geological features relevant to the SE RCZAS were sought from the Kent RIGS Group, Sussex RIGS Group and Hampshire RIGS Group.

*Relevant internal and external datasets*

- 2.2.24. Other relevant datasets held by WA were also consulted for this project. WA holds a wide range of data from previous publicly available projects, including the Hampshire Salterns Project (WA 2002c); WA's investigations of sites protected under the Protection of Wrecks Act (1973) (WA various reports); and Aggregate Levy Sustainability Fund (ALSF) projects such as: Artefacts from the Sea (WA 2004a), England's Shipping (WA 2004b), and Aircraft Crash Sites at Sea (WA 2008a).
- 2.2.25. Other external sources of relevant data including museums, record offices and local studies libraries were approached for information about relevant holdings. Local societies, organisations and individuals were also approached for information about relevant sites.

*Modern and Historic Mapping and Charts*

- 2.2.26. Modern and historic mapping was provided by English Heritage under English Heritage's existing licences, with WA, Cornwall Council and Gloucestershire County Council as sub-contractors. Data included:
- first to fourth edition 6" OS historic mapping; and
  - OS MasterMap modern mapping.
- 2.2.27. Georeferenced maps and charts already held by WA were also appraised, to address their value for informing the aerial photographic transcription and record enhancement; these were found to be broadly comparable with the historic mapping detailed above and so were not utilised.

*Aerial Photographs*

- 2.2.28. Aerial photographs informed the NMP element of this project; more information regarding which photographs were used can be found in the relevant NMP report (WA 2011a; Dickson *et. al.* 2012).
- 2.2.29. Modern ortho-rectified aerial photographs were also obtained for the purpose of record enhancement and creation. Data included:
- Next Perspectives images under the Pan Government Agreement (PGA) supplied by English Heritage; and

- Coastal images over several years, held by the Channel Coastal Observatory (CCO).

*Secondary Sources*

- 2.2.30. Secondary sources, such as published books and articles, relating to the history, archaeology, palaeo-geography and development of the south-east coast were collated from WA's library, university libraries and from record offices and local studies libraries in the region.
- 2.2.31. Relevant non-published material, known as 'grey literature', was also consulted. This material was derived from WA's library, HER/SMR/AHBRs and other external sources.

**Acquisition of SMP and Coastal Change Information**

- 2.2.32. Information about the SMP2 boundaries and predicted erosion lines was requested from the organisations in charge of the SMPs. The Policy Units covered by the SE RCZAS and their short, medium and long term (approximately 0-20, 20-50 and 50-100 year) policies for coastal defence management are listed in **Appendix I**.
- 2.2.33. Digital SMP2 boundaries were received for the North Solent SMP (New Forest District Council) and for the Beachy Head to Selsey Bill SMP (South Downs Coastal Group). However, it was necessary for WA to georeference the published figures and digitise the SMP2 boundaries from them for the Isle of Grain to South Foreland and South Foreland to Beachy Head SMPs.
- 2.2.34. Predicted erosion data was assembled from the results of four Shoreline Management Plans (SMP2) extending around the south-east coastline, undertaken by various contractors:
- Isle of Grain to South Foreland – Halcrow Group Limited 2010;
  - South Foreland to Beachy Head – Halcrow Group Limited 2006;
  - Beachy Head to Selsey Bill – South Downs Coastal Group 2005; and
  - North Solent (Selsey Bill to Hurst Spit) – New Forest District Council 2010.
- 2.2.35. As the SMPs are finalising their Round Two reports, the erosion data utilised here are the revisions of the Round One reports, or Round Two where available. The most up-to-date versions, either available online (Isle of Grain to South Foreland SMP and South Foreland to Beachy Head) or from the SMP contact or contractor (Beachy Head to Selsey Bill and North Solent) were used.
- 2.2.36. The predicted erosion lines illustrating a policy of No Active Intervention (NAI) were utilised. Digital erosion lines displaying the NAI extents were received from the North Solent SMP, however the remainder of the data was digitised by WA from the published georeferenced maps as part of the SMP2 reports. Discrepancies have been noted between erosion lines at the extents of the different SMP Study Areas; therefore the furthest erosion extent was digitised from the mapping to mitigate this.
- 2.2.37. Data regarding the risk of flooding was provided as shapefiles by the Environment Agency (EA). The data included lines for: Flood Zone 3, areas liable to flood from rivers or the sea without flood defences; and Flood Zone 2, the extent of extreme floods from severe storms.

- 2.2.38. Annual Reports regarding the Southeast Strategic Regional Coastal Monitoring Programme (Channel Coastal Observatory 2009; South Downs Coastal Group 2009; South East Coastal Group 2006; South East Coastal Group 2007a; South East Coastal Group 2007b; South East Coastal Group 2007c; South East Coastal Group 2008a; South East Coastal Group 2008b; South East Coastal Group 2008c; and Worthing Borough Council 2010) were supplied by the CCO and provided data for modern erosion and accretion rates at various sections of the coast.

### 2.3. RECORD ENHANCEMENT AND MAPPING

#### National Mapping Programme (NMP)

- 2.3.1. The first element of the record enhancement and mapping stage of the SE RCZAS was undertaken as part of the NMP. Through this programme, thousands of aerial photographs of the south-east coast were assessed, analysed and transcribed, with the aim to create new records and enhance existing records in the databases of the Southampton HER, Hampshire AHBR, Portsmouth SMR, West Sussex HER, East Sussex HER and Kent HER.
- 2.3.2. Unlike the main SE RCZAS Study Area, which extends inland to the 5m contour, the SE RCZAS NMP Study Area consisted of 618.5 individual km<sup>2</sup> squares extending along the coast, occasionally reaching further inland, but with the intent of focusing on the historic environment resource immediately on the coast. Squares that were located in urban areas protected by solid sea defences were only mapped to 100m inland of the Mean High Water (MHW) mark.
- 2.3.3. The 618.5 km<sup>2</sup> squares were divided by EH into 12 Blocks, labelled A to M (omitting the letter I) (**Figure 2**). WA undertook the NMP component for Blocks B, C, L, M; Cornwall Council Historic Environment Service (CCHES) undertook the NMP component for Blocks A, D, E and F; and Gloucestershire County Council (GCC) undertook the NMP component for blocks G, H, J and K. The results of the NMP component are covered by two separate reports - with Blocks B, C, L, M in one report (WA 2011a) and Blocks A, D-H, J-K in another (Dickson *et. al.* 2012).
- 2.3.4. The results of the aerial photographic transcription, mapping and record enhancement that was undertaken by WA were immediately available to the project.
- 2.3.5. The records produced from the aerial photographic transcription and mapping undertaken by CCHES and GCC have been made available to WA for this report, and have been supplied to the relevant County Councils and Unitary Authorities.
- 2.3.6. WA created and enhanced records during the NMP element in the Southampton HER, Hampshire AHBR, Portsmouth SMR, West Sussex HER and Kent HER datasets. During the NMP element CCHES created records in the HBSMR software for inclusion in the Southampton, Hampshire and West Sussex HER datasets. GCC created and enhanced records in the NRHE database during the course of the NMP element of Phase 1, which were inputted into the HBSMR software by WA for use in the East Sussex HER and Kent HER datasets.
- 2.3.7. Other NMP projects in the area that had either recently been completed or were still ongoing include the Richborough Environs Project in Kent, the data for which was incorporated into the Kent HER and used to inform the NMP element of the SE RCZAS and minimise overlap (English Heritage 2002b). The South Downs project from Worthing to the Weald (Carpenter 2008) and the South Downs project from Beachy Head to the River Ouse (English Heritage forthcoming) were both used to

inform the SE RCZAS. The results of the South Downs projects were made available to WA through enhanced NRHE records and shapefiles of the mapping, and were provided to WA for this assessment.

- 2.3.8. Records created and enhanced during the NMP projects form a considerable resource for the SE RCZAS assessment. The results of these projects were essential for developing a more detailed understanding of the historic environment resource on the coast, and along with the records created and enhanced from historic mapping and the previously existing County Council and Unitary Authority records, form the basis for the assessment of the coastal historic environment resource.

#### **Additional Record Enhancement**

- 2.3.9. Once the aerial photographic mapping transcriptions and data enhancement were complete, additional record enhancement was undertaken by WA. This entailed compiling information from historic OS maps and maritime sources, and entering it into the relevant HBSMR.

#### **Historic Map Enhancement**

- 2.3.10. The aim of the historic map record enhancement phase was to enhance existing records and to add new records for important or relevant coastal sites within the Study Area compiled for this element of the report.
- 2.3.11. The historic mapping enhancement area of interest covers 579.95km<sup>2</sup> squares (**Figure 3**) and is an amalgamation of several different study areas:
- the extent of the original NMP Study Area for blocks B, C, L and M;
  - the extent of the retendered NMP Study Area for blocks A, D, E, F, G, H, K and J; and
  - a small number of additional squares which were included in the original NMP Study Area but were not included in the retendered NMP Study Area (predominantly in block A).
- 2.3.12. Areas of the squares which extended further than 100m inland of the coastal strip were excluded from the historic mapping enhancement area. Altogether these excluded areas totalled 56.05 km<sup>2</sup> across blocks A, B, C, E, F, G, H, J, K, L and M.
- 2.3.13. Historic OS maps were utilised in the enhancement of the existing record, and consisted of Epochs One to Four of the 1:2500 scale mapping. The dates covered by these maps were as follows:
- 1:2500 OS Epoch 1, 1863-1895;
  - 1:2500 OS Epoch 2, 1896-1899;
  - 1:2500 OS Epoch 3, 1906-1922; and
  - 1:2500 OS Epoch 4, 1925-1947.
- 2.3.14. Enhancements were made by WA directly into the WA HBSMR databases, thus eliminating unnecessary record duplication and overlap; the historic mapping element was undertaken with reference to the records produced during the NMP element by CCHES and GCC. New records were created when suitable, and enhancements were made to existing records. Features were given monument

polygons where possible; however small sites such as sluices and sites which were no longer extant were often recorded with point data.

- 2.3.15. A specific range of sites and features of historic interest were prioritised, as listed in the table below. These were selected to represent historic activity along the coast.

<b>Feature</b>	<b>Mapping description</b>
Aqueducts	Recorded only if no longer visible on modern mapping
Ballast pits	Recorded only if no longer visible on modern mapping
Basins	Recorded even if still present on modern mapping
Boat houses	Recorded if located at the coast
Bone works	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Breakwaters and groynes	Recorded even if still present on modern mapping
Breweries	Included if had existing records in HER/SMR/AHBR
Bridges, swing bridges, foot bridges and toll bridges	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Brick fields	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Brick works	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Cargo & Passenger sheds	Recorded only if no longer visible on modern mapping
Castles, Martello Towers	Recorded even if still present on modern mapping
Causeways	Recorded even if still present on modern mapping
Chalk pits	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Churches recorded as 'site of old'	Recorded only if no longer visible on modern mapping
Clay mills	Recorded even if still present on modern mapping
Coastguard stations	Recorded even if still present on modern mapping
Corn mills	Recorded even if still present on modern mapping
Custom houses	Recorded if located at the coast
Dams	Recorded even if still present on modern mapping
Drill halls	Recorded only if no longer visible on modern mapping
Dry docks	Recorded only if no longer visible on modern mapping

<b>Feature</b>	<b>Mapping description</b>
Dye works	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Feeding ponds	Recorded even if still present on modern mapping
Fish markets	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Fishing stations	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Floating spur ponds	Recorded only if no longer visible on modern mapping
Flood gates	Recorded even if still present on modern mapping
Flour mills	Recorded even if still present on modern mapping
Fords	Recorded even if still present on modern mapping
Forts	Recorded even if still present on modern mapping
Gas chambers	Recorded if located at the coast
Gas works	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Gridirons	Recorded even if still present on modern mapping
Gravel pits	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Groynes	Recorded even if still present on modern mapping
Hards and boat hards	Recorded even if they were still present on modern mapping
Jetties	Recorded even if still present on modern mapping
Landing stages and landing places, including floating landing stages	Recorded even if still present on modern mapping
Lifeboat houses and lifeboat stations	Recorded even if still present on modern mapping
Lighthouses	Recorded only if no longer visible on modern mapping
Limekilns	Recorded even if still present on modern mapping
Locks	Recorded even if still present on modern mapping
Malthouses	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Martello Towers	Recorded only if no longer visible on modern mapping

<b>Feature</b>	<b>Mapping description</b>
Mills (of all varieties)	Recorded even if still present on modern mapping
Musketry huts	Recorded only if no longer visible on modern mapping
Officers quarters	Recorded only if no longer visible on modern mapping
Oil mills	Recorded even if still present on modern mapping
Oyster beds	Recorded even if still present on modern mapping
Piers and pleasure piers	Recorded even if still present on modern mapping
Pontoons	Recorded even if still present on modern mapping
Pumps, pump houses and wind pumps	Recorded even if still present on modern mapping
Quays	Recorded even if still present on modern mapping
Railways and railway stations	Recorded if not present on modern mapping
Rifle ranges and associated targets	Recorded even if still present on modern mapping
Rocket apparatus', rocket houses and rocket posts	Recorded even if still present on modern mapping
Roman cemeteries	Recorded even if still present on modern mapping
Salt works, salterns and salt pans	Recorded even if still present on modern mapping
Sand pits	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Saw mills	Recorded even if still present on modern mapping
Seaweed huts	Recorded only if no longer visible on modern mapping
Semaphores	Recorded even if still present on modern mapping
Sewage works	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Shipbuilding yards, boatbuilding yards, yacht building yards	Recorded only if no longer visible on modern mapping
Slipways	Recorded even if still present on modern mapping
Sluices	Recorded even if still present on modern mapping
Staff quarters	Recorded only if no longer visible on modern mapping
Stakes – if forming a coherent feature (e.g. a former jetty)	Recorded only if no longer visible on modern mapping
Stone yards	Included if had existing records in HER/SMR/AHBR, or were located at the coast

<b>Feature</b>	<b>Mapping description</b>
Submarine telegraph	Recorded only if no longer visible on modern mapping
Tanneries	Recorded if located at the coast
Tidal ponds	Recorded only if no longer visible on modern mapping
Tide mills	Recorded even if still present on modern mapping
Timber ponds	Recorded only if no longer visible on modern mapping
Timber yards	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Toll houses	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Tramway power stations	Recorded if not present on modern mapping
Water works	Included if had existing records in HER/SMR/AHBR, or were located at the coast
Weirs	Recorded if located at the coast; and recorded if not present on modern mapping
Windmills	Recorded even if still present on modern mapping
Wharves	Recorded even if still present on modern mapping

Table 3: Sites and features recorded during historic map record enhancement

### **Maritime Record Enhancement**

- 2.3.16. For the Hampshire AHBR and Southampton HER, the maritime record was also enhanced. This included the addition of records that have known or reported vestiges on the shore or seabed. Monuments recorded in the NRHE that are known only as reported losses (also known as Casualties) were not added to the record enhanced by the project.
- 2.3.17. The SE RCZAS Study Area includes the Goodwin Sands and the Downs, an area of particularly high shipping losses and wrecks, which likely warrants a separate exercise of record enhancement in its own right. Therefore no enhancement of maritime records in the Goodwin Sands and Downs was undertaken, to avoid drawing resources away from less well-known stretches of the coast.

## **2.4. SYNTHESIS AND ASSESSMENT**

### **Synthesis of Past Coastal Change Overview**

- 2.4.1. The Overview of Past Coastal Change from the Late Upper Palaeolithic to the present was developed by examining previous models of coastal change, available data and other secondary sources. It was not the intention to develop a bathymetry-based model of the coast; but the processes of coastal change have been discussed and illustrated where possible, with indicative maps.
- 2.4.2. The overview encompassed both the post-Devensian inundation of the English Channel to its natural topographical limits in the Iron Age/Romano-British period, and subsequent human modification and reclamation of coastal land through to the

present, including natural responses. Past erosion of cliff lines has also been taken into account, where data permitted.

- 2.4.3. Although focusing on the Late Upper Palaeolithic period onwards, the overview also includes a section relating to sea-level change prior to the Last Glacial Maximum (LGM). The SE RCZAS considered all archaeological periods from the Palaeolithic (c.900,000 years ago) to AD 1945. Coastal historic assets created after 1945 were included where they were considered to be of special interest.

### **Synthesis of Coastal Historic Environment Overview**

- 2.4.4. The overview of the coastal historic environment provides a regional context of the nature of the historic environment that is recorded within and beyond the SE RCZAS Study Area. It contributes towards our understanding of the likely archaeological potential and importance of the resource, provides a sound basis for developing future research priorities, and a guide to the likely overall degree and nature of the threat to coastal heritage assets.

### **Assessment of Enhanced Record**

#### *Chronological Overview*

- 2.4.5. An assessment of the historic environment of the south-east coast is presented in **Section 4**. This comprises a general chronological overview of the region, as identified from documentary sources. This is further supported with relevant examples of sites or monuments from the SE RCZAS Study Area taken from the enhanced and existing HER/AHBR/SMR records which were available to the project.
- 2.4.6. Furthermore, where appropriate, the assessment provides a critique of the data; highlighting duplicate records between and within datasets. This was not a primary aim, so was not consistently undertaken for the whole Study Area.

#### *Likely Archaeological Potential and Importance*

- 2.4.7. Each Coastal Stretch was assessed to determine its likely archaeological potential, along with the importance of the known archaeological resource. This section considers the entire Study Area, with examples from each Coastal Stretch provided where relevant.
- 2.4.8. Archaeological potential was assessed based on the enhanced record, the chrono-thematic synthesis, and the overview of past coastal change. This indicated the degree to which, as yet, unknown historic assets could be present, and identified their likely character. This was provided in a chronological format, with broad or local areas considered as appropriate.
- 2.4.9. Assessments of importance were based on the enhanced record, including designated and non-designated sites, and the assessment of potential. Reference was made to current Selection Guides for historic asset classes, and other available guidance on archaeological importance was also considered. Each Coastal Stretch was considered individually, as this provided a suitably sized area to consider fully.
- 2.4.10. Several criteria are used when assessing the national importance of sites and monuments, and for determining whether scheduling is appropriate. These criteria, listed in Annex 4 of PPG 16 and supported by PPS 5 and NPPF, include period, rarity, documentation, group value, survival/condition, fragility/vulnerability,

diversity, and potential. These are not definitive - they should be regarded as indicators which contribute to a wider judgement based on the individual circumstances of a case. The assessment of national importance is based on expert archaeological opinion, and on the Selection Guides produced by English Heritage.

### **Degree and Nature of Threat to Coastal Historic Assets**

- 2.4.11. A narrative overview of the degree and nature of threat to coastal historic assets in the south-east region has been undertaken in **Section 5**, regarding the Study Area as a whole and supported by relevant examples from each Coastal Stretch.
- 2.4.12. The assessment provides details about the natural and development processes that could impact each section of coast. These have been mainly derived from the relevant SMP reports; Isle of Grain to South Foreland (South East Coastal Group 2010a), South Foreland to Beachy Head (South East Coastal Group 2006), Beachy Head to Selsey Bill (South Downs Coastal Group 2005), and North Solent (New Forest District Council 2010). These reports include information regarding the past, present and predicted future coastal changes (over the next 100 years) that have/will occur, along with an assessment of the coastal defences in place to tackle these changes. The SMP assessments also indicate, through their short, medium and long term policies, areas of the coast that will either be fully protected (through maintained coastal defences) or left unprotected from coastal erosion should any existing coastal defences fail.

#### *Sites at High Risk of Damage or Destruction*

- 2.4.13. Sites recorded within the enhanced HER/SMR/AHBR datasets were filtered by risk, to provide a representative list of sites which are potentially at risk.
- 2.4.14. Data produced by the SMP2s, of predicted erosion lines for the next 100 years, should a NAI policy be implemented in all PUs, were used to assess risk. Funding for recommended policies has not been secured; therefore all sites in areas of predicted erosion may be at risk.
- 2.4.15. Predicted flood lines provided by the Environment Agency (EA) were analysed to indicate areas of the coastline that are vulnerable to this threat. A table identifying the number of assets potentially at risk in each Coastal Stretch is included and they are illustrated on the relevant accompanying figure.

#### *Specific Sites at Risk within the Coastal Stretches*

- 2.4.16. As it is not feasible to undertake further analysis of all sites potentially at risk within the Study Area, a number of criteria were set by EH to further refine the list.
- 2.4.17. Site types excluded by EH are: those located in a SMP area where a HTL policy is to be utilised; standing buildings located in urban areas; buried archaeological sites located in urban areas; standing buildings located in rural areas which already have some degree of record; waterfront structures which have already been recorded; temporary wartime structures; infilled features and railways.
- 2.4.18. The EH criteria were applied to all records in the enhanced dataset for the whole Study Area. These were then assessed for presence in an area deemed to be of potential risk.

- 2.4.19. The sites refined by the EH criteria, which are present in an area of risk, were considered suitable for inclusion in a list of sites and areas for Phase 2 walkover survey.
- 2.4.20. The list of sites for walkover will require further refining once funding is made available for Phase 2; **Section 6** outlines the Project Proposal for the next element of Phase 1, in which the list of sites to be visually inspected will be generated following a further discrimination phase necessitating a manual refinement of the dataset.

#### *Management Priorities*

- 2.4.21. Areas requiring positive management action were also identified. Options for positive management include further survey and evaluation, other forms of action such as works to avoid or reduce further damage, or statutory protection. The areas meriting further survey include those considered to be at risk and in areas that are vulnerable; these are often the areas which have high archaeological potential.
- 2.4.22. Areas were identified based upon the SMP2 management policy recommended for the PUs, and on the extent of the intertidal zone. No management actions are proposed, as the sites and areas for walkover survey must be first selected; this will be included in the Phase 2 Scoping section, outlined below.
- 2.4.23. The areas identified for management action are summarised in a table organised by Coastal Stretch. Maps indicating the extents of the areas to be considered for other management actions are also included.

#### *Future Research Priorities*

- 2.4.24. The SE RCZAS is intended to provide a sound basis for establishing future research priorities. A list of priorities have been developed based on the chronological syntheses and management priorities identified for each Coastal Stretch, in conjunction with the research frameworks currently being developed for the coast. Research priorities have also been identified from gaps in data, or understanding, noted during the course of the project.

#### *Phase 2 Scoping*

- 2.4.25. Funding for Phase 2 of the SE RCZAS is not finalized, and the size of the Study Area requires that further discrimination of sites be undertaken to provide a manageable list of sites and areas for walkover survey. As such, a Project Proposal outlining the process for further refining the list of sites and areas suitable for walkover has been compiled (71330.03).

### **3. GEOLOGICAL BACKGROUND AND LAND USE**

#### **3.1. SOUTH COAST AND EAST ENGLISH CHANNEL GEOLOGY**

- 3.1.1. The east English Channel lies within the Hampshire-Dieppe basin. The underlying Cretaceous bedrock (Greensand, Gault Clay and Upper Chalk) is unconformably overlain by Tertiary sediments (Woolwich Beds, London Clay, Wittering, Earnley, Selsey and Barton Beds) of the Middle Eocene Barton (or Huntingbridge) Formation (Hamblin *et al.* 1992; Wright 2004; British Geological Survey 2007).
- 3.1.2. The Pleistocene topography of the east English Channel is dominated by a complex series of palaeovalleys that developed during the last 1.2 million years

(Toucanne *et al.* 2009a). These valleys are thought to be the predecessors of French rivers including the Canche, the Authie and the Somme, and are tributaries to the Fleuve-Manche (Channel River) which during the last 4 phases of glacial low-stand sea levels drained the now-English Channel (Toucanne *et al.* 2009a; 2009b). Some palaeovalleys probably predate the formation of the Dover Strait, which current research dates to the Anglian Stadial (OIS 12) (British Geological Survey 2007, Hamblin *et al.* 1992:75-77, 80-81, Toucanne *et al.* 2009a,b; Gupta *et al.* 2007).

- 3.1.3. Recent research has suggested episodic development of the channels especially in the last 350,000 years. Several overtopping events linked to increases in discharge into the extensive southern North Sea proglacial lake held back by the Weald-Artois ridge are seen as key drivers of the erosion of the ridge and palaeochannel formation in the east English Channel (Toucanne *et al.* 2009a). Aggregates preserved in these palaeochannels are now important resources for marine aggregates extraction.

## 3.2. SOUTHERN NORTH SEA GEOLOGY

- 3.2.1. In addition to the important Permian and Triassic reservoir rocks of the North Sea which drive the distribution of oil and gas exploration, the morphology of the North Sea basin has a long and complex history. The southern North Sea was uplifted during the Palaeozoic, Caledonian uplift about 410-360 Ma BP and subject to erosion. This was followed by protracted phases of folding and faulting, and later subsidence (ending c.210 Ma BP). During the Mesozoic, fully marine conditions returned and domal uplift of the central North Sea led to the erosion of much of the sediment driving accumulation of thick chalk bodies at the margins in the Upper Cretaceous (British Geological Survey 2002).
- 3.2.2. The offshore solid geology in the vicinity of Margate and Thanet is characterised by Upper Cretaceous Chalk (98 – 65 million years ago) overlain by deposits of silts and sands known as the Thanet Beds, the oldest Tertiary formation of the Palaeocene era in the region (British Geological Survey 1989). During the Cenozoic (last 65 million years), the North Sea seabed rose and subsidence became pronounced during the early Quaternary; the reactivation of basement faults also occurred (British Geological Survey 2002). Rapid subsidence became more widespread early in the Quaternary resulting in the preservation of more than 600m of Pleistocene progradational delta deposits and glacial deposits (British Geological Survey 2002:11). The chalk and overlying Thanet beds were thrust upward by vast pressures to form the characteristic rolling folds in the landscape of south-east England. These rolling folds formed the downland hills (anticlines) such as those that form the Isle of Thanet, and were separated by deep valleys (synclines) such as the Wantsum, which separates Thanet from the rest of the North Downs.
- 3.2.3. The current seabed morphology of the southern North Sea is partly underpinned by late Cenozoic climate-driven sediments, and Quaternary glacial sediments such as diamictons. Repeated changes in crustal loading due to the expansion and contraction of polar and continental glacial ice and the associated deposition and erosion of glacial sediments in the North Sea basin underpins the current geomorphology of the region.

### 3.3. GLACIATION, SEA-LEVEL CHANGE AND SUBMERGED LANDSCAPES

- 3.3.1. The British archaeological record has recently been extended to around 900,000 years BP as a result of the findings of excavations on the East Anglian coast (Parfitt *et al.* 2005: 2010). For long periods sea levels were low enough that much of the southern North Sea and English Channel were dry land which for millennia permitted the movement of Pleistocene animals and plant species into what is now the British Isles. Several hominin species found in the archaeological record would have been able to cross the then habitable area now inundated by the English Channel. The south coast may have been an important access point at several times during at least the last 500,000 years (James *et al.* 2010). Thus the glacial history and associated flux in global sea levels is closely linked to the distribution of prehistoric archaeology within the Study Area.
- 3.3.2. Three main glaciations have shaped the landscape of the southern North Sea/English Channel zone; the Anglian (c.478,000 BP – 423,000 BP), the Wolstonian (c.380,000 BP – 130,000 BP) and the Devensian (c.100,000 BP – 13,000 BP). During these glacial periods the Study Area is likely to have been dry land and linked to mainland Europe as sea levels were significantly lower and as more of the global water budget was held in the polar ice caps and northern hemisphere glaciers (**Figure 4**).
- 3.3.3. During periods of glaciation global sea levels fell as more of the earth's water was incorporated as ice into the expanding glaciers and ice sheets. As the sea level lowered, rivers cut deeper into the substrate creating incised river valleys and terraces. This was later exacerbated during deglaciation; as the glaciers melted and sea-levels began to rise, meltwater released from the ice sheets enlarged river valleys and altered the topography of the region considerably. To the north of Thanet lies the outer Thames Estuary, which at the beginning of the Pleistocene followed a course much further to the North than at present, draining into the North Sea in Suffolk (Bridgland 1994). During the Anglian period ice blocked the course of the Thames and forced it southwards (Gibbard 1995: 16). Through the subsequent Hoxnian interglacial, glacial meltwater ran down the Thames, increasing its size and causing it to divert southward to a course approximately at the position of the present Thames Estuary (Bridgland 1994:295).
- 3.3.4. Falls in sea level associated with the later Devensian glacier also led to large scale erosion and down cutting within the three main river systems of the region: the Essex/Suffolk River Stour, the Rivers Thames and Medway and the River Stour of Kent. The latter system joined that of the Thames in the area of the outer reaches of the present Thames Estuary. Palaeo-channels can be traced offshore from the Thames Estuary (EMU 2009) and were probably cut during this period.
- 3.3.5. The Devensian glacial maximum did not directly cover the Study Area, extending as far as London and the north Cornwall coast. During this late Pleistocene glaciation, due to the lowered sea level of around -120m Relative Sea Level (RSL), the major river channels of south-east Britain and north-west Europe drained into a "Channel River" (Toucanne *et al.* 2009b).
- 3.3.6. The 'English Channel' formed between around 7,500 BC and 5,000 BC (Shennan *et al.* 2000) as post-glacial sea levels rose in the early Holocene, cutting off the peninsula and forming the proto-British Isles. Subsequent infilling of Pleistocene river channels throughout the Holocene may preserve significant prehistoric and palaeoenvironmental material from these now submerged archaeological landscapes.

- 3.3.7. During the early and middle Holocene rapid and significant sea-level rise of around 120m occurred. Climatic conditions changed from full-glacial conditions to more contemporary climates by the Mesolithic. The distribution of coastal archaeological sites, materials and artefacts during the Upper Palaeolithic and Mesolithic is closely linked to these large-scale changes in the climate and progressive configuration of the land and sea interface (Bailey & Flemming 2008, Bailey & Spikins 2008).
- 3.3.8. Catastrophic events such as late Pleistocene meltwater pulses and the tsunami initiated by the Storegga landslide may also be principal drivers of brief but large and rapid inundation events of coastal areas and impacts on human populations (WA 2008b: 80, Spikins, 2008; Weninger *et al.* 2008).
- 3.3.9. Assessing the nature, distribution, and preservation of early prehistory in the region must be undertaken in the context of postglacial, Holocene sea level change (Long 2000). The current extent of the British Isles is a fraction of the dry land area that existed during the Late Pleistocene and early to mid-Holocene. The current terrestrial archaeological record must then be considered as a fraction of the whole, much of which is likely submerged under the modern seas.
- 3.3.10. Recent coastal change projects have studied this area in detail. A study was undertaken which mapped the Hampshire Coastline from 1843 to 2002 in five stages (WA 2002b). SMPs are an important resource for modern and predicted coastal change (New Forest District Council 2010; South Downs Coastal Group 2005; South East Coastal Group 2006; South East Coastal Group 2010a). Annual reports of the South East Strategic Regional Coastal Monitoring Programme provide a consistent and detailed ongoing review of modern coastal change (South East Coastal Group 2007a; South East Coastal Group 2007b; South East Coastal Group 2007c; South East Coastal Group 2008a; South East Coastal Group 2008b; South East Coastal Group 2008c; South Downs Coastal Group 2009; South East Coastal Group 2009a; South East Coastal Group 2010b).

### **3.4. GEOLOGY, SOILS AND LAND USE OF THE SOUTH-EAST COAST**

#### **Introduction**

- 3.4.1. In order to understand the interaction between the past and present natural environment with the human exploitation that occurred along the south-east coast, several sources were utilised that included information on geology, topography, and past and current landscape use and development.
- 3.4.2. Relevant county landscape characterisations were utilised that include the:
- Historic Landscape Character Area for Kent (Oxford Archaeological Trust 2001);
  - Landscape Assessment of Kent (Jacobs Babbie 2004);
  - East Sussex HLC shapefiles (kindly provided by East Sussex County Council);
  - The East Sussex County Landscape Assessment (East Sussex County Council 2010);
  - West Sussex HLC shapefiles (kindly provided by West Sussex County Council);
  - West Sussex Land Management Guidelines (West Sussex County Council 2011a; 2011b); and

- Hampshire County Integrated Character (Hampshire County Council 2010).

3.4.3. Complementing the historic landscape character reports for the coastline are the latest SMP reports, which also contain relevant information regarding land use, exploitation and coastal defences.

## Overview

### *Background*

- 3.4.4. The coastal landscape of Kent is famously characterised by the tall cliff frontage that extends from Kingsdown to Folkestone, across Coastal Stretches 3 and 4, and is designated as a SSSI. The cliffs are formed of the exposed chalk geology of the area, and along with the open rolling countryside beyond, provide long unbroken views that are vulnerable to any form of development. Furthermore, these cliffs are actively eroding and not subject to any active protection in the medium and long terms. Alternatively, the Kent coastline is also typified by: low lying sandy bays including Pegwell Bay and Sandwich Flats and Bay, in Coastal Stretch 2, where sand dunes currently provide a line of natural coastal defence; smaller bays including Kingsgate Bay, Dumpton Gap, St. Margaret's Bay, Langdon Bay, and East Wear Bay (Coastal Stretches 1, 3 and 4); and finally strips of shingle beachfront at Broadstairs, Ramsgate and between Hythe and Dungeness (Coastal Stretches 1, 2, 4 and 5).
- 3.4.5. The East Sussex coast is comprised mainly of hard and soft cliffs composed of chalk between Eastbourne and Brighton (Coastal Stretches 7, 8 and 9) and sandstone between Hastings and Fairlight (Coastal Stretch 6). Similar to Kent, most of these cliffs currently have little or no protection from coastal erosion. Exceptions to this include the provision of undercliff walling around Brighton in Coastal Stretch 9 and riprap and stone revetments at Fairlight in Coastal Stretch 6 (Robinson 2010a: 8). Between these cliffs are located alluvial lowlands (Robinson 2010a: 8). Areas of saltmarsh and mudflats are a common landscape feature of East Sussex; around 50 hectares of saltmarsh are present at Rye and Cuckmere Haven (Coastal Stretches 5 and 8), designated as SSSIs (Beaches at Risk website). One area of sand dunes is present at Camber in Coastal Stretch 5, with occasional saline lagoons beyond, and the remainder of the coastline of East Sussex is shingle beaches (Beaches at Risk website). The wetland areas of the Pevensey Levels and Rye Harbour have RAMSAR (Ramsar List of Wetlands of International Importance) status (East Sussex County Council 2010).
- 3.4.6. The West Sussex coastline is composed of soft geology, this is mainly chalk in the east and centre of the coastal area (Robinson 2010a: 8; Williams 2010a: 2). Chichester Harbour is an important intertidal environment in this county and is designated as an Area of Natural Beauty (AONB). This is comprised of Woolwich and Reading beds, London Clay, Bracklesham Beds and Bagshot Beds, which continue as far east as Bognor Regis (Williams 2010a: 2; Williams 2010b: 6). As the rocks are soft, the West Sussex Study Area is generally low lying and suffers from continued erosion (Robinson 2010a: 8). Areas at particular risk are those which used to be bays – at the mouths of the Rivers Adur and Arun, inland around Yapton where erosion could create an island, and Pagham harbour which could make Selsey an island once more (Robinson 2010a: 8-9). Sand dune and shingle areas at Climping, Shoreham and West Wittering are protected as SSSIs, Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Local Nature Reserves (LNRs) (West Sussex County Council 2011a).

- 3.4.7. The coastal topography of the Hampshire Study Area is predominantly flat and due to the soft underlying geology is easily erodible (Hampshire County Council 2010: 47). It is for this reason, and also that much of the coastline is urban faced, that 74% of the Hampshire coastline is currently protected with artificial coastal defences (*ibid.*). Low soft geology cliffs (or steep coastal slopes) are present at Lee-on-the-Solent, Browdown and on the western shore of Hayling Island (Hampshire Biodiversity Partnership 2003). The coastline is characterised by its numerous rivers, sheltered estuaries and harbours dominated (and given protection) by Southampton Water, with the Rivers Itchen and Hamble diverting from it. The sheltered harbours of Portsmouth, Langstone and Chichester are shallow marine basins with mud flats and saltmarsh within, and sand dunes and raised beach deposits are present at the mouths. Within the Study Area, the most important shingle stretch is located at Browdown.

*Urban*

- 3.4.8. Urban settlements are prevalent along the south-east coastline; large towns and cities include Dover, Hastings, Eastbourne, Brighton and Hove, Worthing, Bognor Regis, Portsmouth, Gosport, Fareham and Southampton. These are sprawling centres of industry, tourism and affluence, supporting not only their respective counties, but the south-east region as a whole (Robinson 2010b: 5). Such settlements developed around the natural harbours, or the maritime industries which could be exploited. Dover has a particularly rich and varied history and the port is currently thought to be the world's busiest passenger port. Newhaven in East Sussex is a working port, which services ferries bound for France. The port at Shoreham is still functioning, but on a much smaller scale than other ports in the Study Area. Once Portsmouth Harbour became inundated and a natural harbour, during either the late Mesolithic or early Neolithic, the area became a focus for maritime activity. Similar to Dover Port, Portsmouth Harbour has become a major commercial ferry terminal, with services to the Isle of Wight, the Channel Islands and France, while also supporting considerable leisure sailing activities. The continued importance of harbours led to the construction of military installations at their mouths.

- 3.4.9. Numerous smaller towns have also emerged within the south-east region, whose position along the coastline further suggests the importance of the marine environment for local and regional commerce and transport routes. Prior to the development of established road networks, maritime transport was essential for the movement of goods and people around the locality, and settlements developed further due to the successful exploitation of the nearby marine environment. West Sussex, East Sussex and Kent especially have many small towns located along the coast. These include Selsey, Littlehampton, Newhaven, Pevensey, Bexhill, New Romney, Hythe, Sandgate, Folkestone, Deal, Walmer, Ramsgate and Broadstairs; many of these were sea ports and were influential for trade and transport.

*Rural*

- 3.4.10. Surrounding these urban settlements is widespread evidence of farming forming a lucrative rural economy. The relevant Character Areas of Kent include South Foreland and Alkham (an element of the East Kent Downs). These areas are predominantly used for cultivation due to their position on the chalk downs having generally good quality soils (chalky loamy) that are predominantly well drained and provide fertile ground. These agricultural areas are interspersed with woodland, scrub and small settlements (Jacobs Babbie 2004).

- 3.4.11. The West Sussex Study Area is located mainly on the Coastal Plain, with elements into the South Downs – such as the river valleys (Williams 2010: 7). The Coastal Plain has been intensively developed and much of the coastline is now settled (Williams 2010: 7). Despite this, a large area of fields is noted further inland, particularly along the Arun and Adur river valleys (West Sussex HLC shapefiles).
- 3.4.12. The coastline is also densely settled in the East Sussex Study Area; though notable absences are seen (West Sussex HLC shapefiles). From the eastern edge of East Sussex around Rye Bay, to Hastings, land use appears to be agricultural; this area is partially on the High Weald which is known for its ancient woodland and rare flora and partially in Romney Marsh (East Sussex HLC shapefiles; Williams 2010: 7). Between Bexhill and Eastbourne recreational grounds appear to be inhibiting urbanisation; this area spans Wealden Greensand and High Weald which both demonstrate ancient woodland, as well as the Pevensey Levels which have preserved grazing marsh (East Sussex HLC shapefiles; Williams 2010: 7). Between Eastbourne at Beachy Head and Seaford, unenclosed land and fields are visible; this area is located upon the South Downs which are generally open and without wooded areas (East Sussex HLC shapefiles; Williams 2010: 7). As in West Sussex, inland along the river valleys, land use is primarily seen as fields (West Sussex HLC shapefiles; East Sussex HLC shapefiles).
- 3.4.13. The Coastal Stretches located within Hampshire are predominantly urban in nature, but some of the remaining areas are being utilised for agriculture or are open coastal plains, particularly around Chilling Coastal Plain, Locks Heath Common, and Netley, Bursledon and Hamble Coastal Plain. Agriculture has also been the main land use of Hayling Island, but development in the south, and leisure activities in both the south and west are becoming influential in decisions of land use.

#### *Reclaimed Land*

- 3.4.14. Across the Study Area, reclamation is not uncommon, due to the often low-lying nature of the land, or the dynamic currents. Reclamation took place naturally, or artificially, though a combination is more often the case. In some instances areas accreted by natural sedimentation were subsequently artificially protected. One example of this is on Romney Marsh in Kent, with coastal defences dating to the Anglo-Saxon period (Young 2004: 3).
- 3.4.15. There are several areas of silted up and reclaimed land across the south-east region, namely: the Wantsum Channel, Lower Stour Marshes and Romney Marsh in Kent; Pevensey Marsh in East Sussex; Warblington Marsh and on Hayling Island in Hampshire. These are all land that was once under water and has since been reclaimed for exploitation.
- 3.4.16. The predominant Character Area within Coastal Stretch 2 in Kent is that of the Wantsum and Lower Stour Marshes; this area occupies the silted up and reclaimed former course of the Wantsum Channel and the former mouth of the River Stour. Prior to and during the Romano-British period the channel was open, but it began to silt up in the 8<sup>th</sup> century AD, and the development of a shingle spit across Pegwell Bay increased sedimentation (Young 2004: 5-6). The Channel remained partially open until the 17<sup>th</sup> 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 (Jacobs Babbie 2004). Richborough had been strategically important as a Saxon Shore fort during the late Romano-British period, while Sandwich attained a considerable level of importance as a medieval port.

- 3.4.17. Further along the coast, according to the *Landscape Assessment of Kent* (Jacobs Babbie 2004), the partially reclaimed land of the Walland Marshes comprises mixed farmland of mainly arable crops, areas of settlement, and a coastal zone. The marshes were naturally reclaimed during the Mesolithic but a rise in the sea level meant the area was lost beneath the water again. Evidence for deliberate reclamation began during the Romano-British period and this continued until the entire area was reclaimed and despite being lower than sea level in many places, the marsh is protected with sea defences.
- 3.4.18. Pevensey Marsh in East Sussex is generally a very low lying area, with some higher points, upon which settlements were located. The levels are used for grazing and artificial drainage channels are common. The coastline here is defended by groynes; these are present at close spacing without exception across the vulnerable area (East Sussex County Council 2010).
- 3.4.19. West Sussex has not seen as much reclamation of land as the other counties; however harbours in the county did suffer from shingle accretion (Robinson 2010a: 8-9). For example, much of Pagham Harbour in West Sussex was reclaimed, as a result of the gradual accretion of medieval shingle deposits (West Sussex County Council 2011b; Robinson 2010a: 8-9).
- 3.4.20. Warblington Meadow in Hampshire is valued for its reclaimed saltmarsh, whilst Hayling Island, also in Hampshire, is bordered by reclaimed land with alluvial soils (Geological Society of Great Britain 1964), particularly in the north, which is used as grazing marsh.

#### 4. HISTORIC ENVIRONMENT OVERVIEW OF THE SOUTH-EAST COAST

- 4.1.1. This section provides a general overview of the known historic environment assets within the SE RCZAS Study Area. The data has been generated primarily from HER/SMR/AHBR record databases (comprising the existing, newly created, and enhanced records) but other sources including the NRHE dataset, Seazone datasets, and Ordnance Survey mapping have also been used. The overview is written chronologically and within each period, the archaeological sites and monuments have been discussed thematically. The date ranges for each period are based on and consistent with the dating criteria used within the project HBSMR databases of the Hampshire AHBR, Southampton HER, Portsmouth SMR, West Sussex HER, East Sussex HER and Kent HER records.
- 4.1.2. Localised coastal change is assessed with key morphological variations illustrated in **Figures 5 to 11**. These include the Wantsum Channel in Kent (**Figure 5**); Romney Marsh on the Kent to East Sussex border (**Figure 6**); Rye Harbour in East Sussex (**Figure 7**); the mouth of the River Cuckmere at Cuckmere Haven in East Sussex (**Figure 8**); the mouth of the River Ouse at Newhaven in East Sussex (**Figure 9**); the mouth of the River Adur at Shoreham-by-Sea in West Sussex (**Figure 10**); and Pagham Harbour in West Sussex (**Figure 11**).
- 4.1.3. The chronological distribution of sites within the Study Area is presented in **Figures 12.1 to 12.76** and includes all the land-based sites from the enhanced dataset of the County Council HER/SMR/AHBRs. Offshore archaeological sites are illustrated in **Figure 13**. The distribution of shipwrecks within the Study Area is displayed in **Figure 14** whilst the distribution of aircraft wrecks is presented in **Figure 15**.

- 4.1.4. These Figures provide additional context allowing better analysis and interpretation of the archaeological features and their relation to each other and the landscape.

## 4.2. ARCHAEOLOGICAL OVERVIEW OF THE SE RCZAS

### Palaeolithic (900,000 BP to 9,500 BC)

- 4.2.1. Around 500,000 years ago during the late Cromerian Complex, the sea level around the Isle of Wight and Hampshire was around 40m lower than today and the coast was around 25km to the south of the Isle of Wight (James *et al.* 2010). The Isle of Wight was connected to the mainland by broad coastal marshland, estuaries and grassland forest.
- 4.2.2. There is a significant group of Palaeolithic sites abutting a series of raised beaches (relating to former interglacial coastlines) at the base of the chalk cliffs between Brighton and Portsmouth. The most notable site is that of the former gravel quarry at Boxgrove in West Sussex (**MWS3193**). Excavations at the site in 1983 led to the discovery of human remains considered to be those of *Homo heidelbergensis* (Pitts & Roberts 1998) which provisionally date the site to approximately 500,000 BP (Late Cromerian Complex) (James *et al.* 2010). These remain the earliest human fossils discovered in the UK. Stone tools also recovered from Boxgrove suggest localised hunting, scavenging, and butchery of large grazing mammals.
- 4.2.3. Several other examples of Lower Palaeolithic handaxes have been collected from the Solent coastlines of the Isle of Wight and Hampshire (WA 2007d). In particular, Red Barns on Portsdown Hill, Hampshire (just outside the Study Area) was found to contain over 6,000 lithic artefacts (Wilkinson 2007: 14). At Southfleet Road in Kent, close to the Study Area, a Palaeolithic butchery site was located alongside a lake (Bates 2008: 2).
- 4.2.4. Boxgrove and other nearby sites also contain evidence for the exploitation of marine resources, suggesting a variety of subsistence strategies were employed by early hominins. The coastal landscape between the chalk cliffs and low-lying estuaries and marshes may have provided another route into southern Britain from the continent.
- 4.2.5. Offshore Palaeolithic evidence discovered within the Study Area is indicated by isolated findspots only. Although hominin activity extended across these now drowned plains that form the southern North Sea and English Channel, the vast majority of Palaeolithic sites in the NRHE dataset were located along the coast and intertidal area. The majority of Lower Palaeolithic (900,000 BP to 300,000 BP) material was recovered from coastal locations between Meon and Bognor Regis, with a concentration around Selsey (**Figure 13**). Finds include handaxes discovered on the foreshore at Selsey (**NRHE 462593**), Selsey Bill (**NRHE 462460**), Hill Head (**NRHE 23446**), Bexhill (**NRHE 1098893**) and on the beach by South Parade Pier in Portsmouth (**NRHE 1102782**). An Acheulian handaxe (**NRHE 23482**) discovered in 1932 near Lee-on-the-Solent is thought to have come from a nearby gravel terrace.
- 4.2.6. Prehistoric discoveries with a wider potential date range include a mammoth skeleton and teeth (**NRHE 462482**) that were exposed in clay containing Pleistocene remains on the shore at Selsey in 1909. Another find comprised a Palaeolithic flint knife that was found in the Brickearth of an eroded cliff near Selsey in 1909. Although the concentration of material from around Selsey could indicate a focus of Palaeolithic activity, it could also relate to the amount of prehistoric

fieldwork that has been undertaken in the area, as well as the character of the foreshore area which preserves and reveals archaeological material. Additionally, it was the imprecise positional data that led to these finds being included in the Coastal Stretch 18 Study Area (**Figure 13**), rather than with Coastal Stretch 12 where the finds could be considered within their wider context (**Figure 12.61**).

- 4.2.7. From around 400,000 years ago Neanderthals (*Homo neanderthalensis*) inhabited southern Britain and began developing a distinctive 'Mousterian' stone tool technology.
- 4.2.8. By around 200,000 BP, the major palaeogeographical features that characterise the east English Channel had developed. A complex series of channels were formed when erosive processes led to the breaching of a chalk upland known as the Weald-Artois ridge (between Dover and Cap Gris-Nez). A pro-glacial lake in the southern North Sea which had been held behind this ridge, was subsequently allowed to inundate the region leading to the formation of what is now the Dover Straits (Gupta *et al.* 2007; Toucanne *et al.* 2009b).
- 4.2.9. During the warmer conditions around 200,000 BP, river terraces from the Thames-Medway sequence of north Kent are correlated with offshore terraces in the present-day Thames Estuary (Bridgland 2003). The route of the Thames and Medway Rivers at this time ran northwards, entering the sea near Suffolk. The route of the Medway passed through what is now north Kent and to Clacton-on-Sea on the Essex coast (Bridgland 1999) where important Palaeolithic artefacts have been found in the relict river terraces. Warm conditions are also reflected in the relict terraces underlying the Isle of Grain, during the Ipswichian interglacial (c.130,000 – 110,000 BP). These lithostratigraphic relationships highlight the potential for the presence of middle and upper Palaeolithic relict landscapes directly within the region.
- 4.2.10. During periods of low sea-level, huge offshore areas, being open plains and low hills, provided varied habitats that for millennia would have been populated by large herds of grazing animals and hominin populations. However, between around 180,000–50,000 years ago there is a dearth of archaeological evidence, suggesting hominins were absent from Britain.
- 4.2.11. Although punctuated by brief climatic ameliorations, from this period to the Devensian Glacial (c.120,000–18,000 BP), conditions grew increasingly colder and sea level fell considerably (to around 120m lower than today). Neanderthal populations receded into refugia in more southern areas of Mediterranean Europe until the onset of deglaciation and climatic amelioration during the last 18,000 years.
- 4.2.12. Global sea levels during the last glacial maximum (the Devensian at c.18,000 BP) were around 120m lower than today. Substantial thicknesses of outwashed glacial sediments deposited during deglaciation (ending c.10,000 BP) may have removed or now obscure much of the early and middle Palaeolithic archaeological record in and around the British Isles (Flemming 2002). These reworked glacial sediments may incorporate Palaeolithic material and artefacts and are potentially an important source of archaeological information. There is evidence of Palaeolithic hominin activity at Beedings in West Sussex where a unique stone tool assemblage was discovered in a fissure during the 19<sup>th</sup> century construction of Beedings Castle (Pope 2009).

- 4.2.13. Following the early Holocene deglaciation (c.12,000 BP), the English Channel and southern North Sea were dry land forming an extensive north-west European peninsula from northern France to southern Scandinavia. The English Channel was a low-lying plain whilst plains and hills extended from the Humber to Denmark across the North Sea basin. Significant collections of Palaeolithic artefacts have been recovered from this region (Coles 1998; Shennan *et al.* 2000; Gaffney *et al.* 2007).
- 4.2.14. Archaeological records from cave sites across central and southern England document the recolonisation of Britain by anatomically-modern humans after the Last Glacial Maximum (James *et al.* 2010). During this time, sea level was around 100m lower than present day; the English Channel was mostly dry land and provided a wide conduit to the continent. These people were hunting cold-climate species like reindeer and giant deer at least seasonally. As the climate progressively warmed during the late Pleistocene and early Holocene, favourable habitats for humans and their prey expanded northwards. Forests also develop in the early Holocene providing new opportunities for humans, a change which is reflected in a diversification in tool types.
- 4.2.15. Generally, only records for isolated findspots have been confidently ascribed a Palaeolithic date within the SE RCZAS terrestrial Study Area; some sites are recorded, but were often given multi-period date ranges. One site of probable Palaeolithic date is recorded in East Sussex (**MES3911**); this is a cave which contained three flint blades and a pick-like object. Examples of findspots are limited to worked flint artefacts including individual handaxes (**MKE7651=NRHE 468981**, **HANTS MWX23604**, **MES2703**, **NRHE 1102799**, **MWS3638**) along with assemblages of flint material including roughouts, flakes, cores, knives, blades, scrapers and hammer stones (**HANTS MWX23588**, **NRHE 464366**, **NRHE 465560**, **NRHE 468669**, **MES579**, **MWS2691**). Worked flint was discovered on the surface of the cliff edge north of Broadstairs and highlights the potential for loss of archaeological features through active coastal erosion (**MKE7595**). The majority of finds were discovered along the coast and around the intertidal harbours of West Sussex and Hampshire; however, some finds were made further inland, particularly along rivers. The only conspicuous absence of Palaeolithic material, both sites and findspots, is upon Romney Marsh in Coastal Stretch 5.

#### **Mesolithic (10,000 BC to 4000 BC)**

- 4.2.16. During the early Mesolithic there was still a permanent connection to mainland Europe across the English Channel and southern North Sea. The preserved offshore extent of the palaeo-Arun river channel contains peat deposits that mark the inundation of the coast (marine transgression) as post-glacial sea levels rose. Radiocarbon dating of these peat layers indicates formation around 11,500 to 10,500 years ago. Palaeoenvironmental analyses indicate a coastal, brackish marsh; a resource-rich wetland environment that human groups are thought to have exploited preferentially (Bailey & Spikins 2008). These areas provide rich sources of food and resources for these hunter/gatherer groups, as well as important transport routes inland or between islands.
- 4.2.17. For a millennium at around 11,000 years ago the climatic amelioration following deglaciation was abruptly reversed. Mountain glaciers in Scotland expanded significantly during the so-called Loch Lomond Readvance which led to the south and east coasts of England becoming cold, arid periglacial desert. Such harsh conditions may have caused the abandonment of most of Britain, people returning as climatic conditions improved. Sea levels rose and Britain became an island

again by around 7,000 years ago (Shennan *et al.* 2000; Streif 2004). During this time the Solent River was inundated in the Hampshire Study Area (Wilkinson 2007: 3).

- 4.2.18. Mobile, organised hunter-gatherer groups occupied Britain in the Mesolithic possessing both microlith technology (small stone tools that could be produced from smaller nodules of flint) and specific core tool technology to create tranchet axe/adzes (Gardiner 2006: 6). Microliths noted within the Study Area included 10-12 geometric microliths found on the beach 'east of Bleak House' in Broadstairs in Kent (**MKE8215**); also noted was an area of Mesolithic waste flakes in Drayton, Hampshire (**MPM137**). Axes and adzes were discovered at various terrestrial locations in Kent: Fordwich (**NRHE 464490**), west of Sandwich (**NRHE 468362**), Shakespeare Cliff (**NRHE 467375**) and South Foreland (**NRHE 467762**). These were also seen in West Sussex (**MWS7840** and **MWS4132**), and in Hampshire (**HANTS MWX19698** and **HANTS MWX19710**). Near Horsea Island, a number of Mesolithic implements, including two tranchet axes and a pick were discovered (**MPM172**). Another site in Finglesham, Kent revealed over 1,700 worked flints and burnt flint from an undisturbed deposit above the natural Brickearth (**MKE7458=NRHE 468674**).
- 4.2.19. There is also evidence for flint working, controlled fire and animal hide preparation recorded from campsites on the south coast (Allen & Gardiner 2000; James *et al.* 2010). Early Mesolithic sites are mainly concentrated in East Hampshire and West Sussex and generally consist of hearths associated with large numbers of lithic items (Gardiner 2006: 1, 2, 4). For instance an area of hearths was found to the east of HMS Daedalus airfield, Gosport, in the same level as a midden in a gravel pit (**HANTS MWX19712**); around the hearths was a layer of charcoal intermixed with flints and shells. A second area of hearths (**HANTS MWX20092**) was discovered in Wallington, Fareham, in a shallow depression and was excavated as part of works associated with the re-alignment of the River Wallington. Mesolithic sites are recorded from North Bersted (**MWS2384**), Appledram (**MWS1837**) and near Bognor Regis (**MWS7434**) in West Sussex. Throughout the Study Area such sites are usually found in groups of comparable age (Gardiner 2006: 4).
- 4.2.20. Late Mesolithic sites within the Study Area were more widely spread, seemingly making use of a wider range of landscapes and resources (Gardiner 2006: 5). Evidence consisted of smaller lithic scatters, particularly located on the lowland plain (Gardiner 2006: 5). More flint scatters are seen in East Sussex than West Sussex, notably between Eastbourne and Newhaven; particularly at Bullock Down (Drewett 2010a:15). Although Selsey also shows a concentration (Drewett 2010a:15). Evidence in Hampshire suggests regional exploitation with selective use of resources, but no long-distance trade (Gardiner 2006: 6-7). Some sites were used over a long period of time, such as Shoot Lane in Hampshire, which provided evidence for occupation from the mid-Mesolithic to early Bronze Age (**HANTS MWX30998**).
- 4.2.21. Other Mesolithic evidence in the SE RCZAS terrestrial Study Area was discovered predominantly around Southampton, Portsmouth, inland from Bognor Regis and around Beachy Head, with some evidence seen around Hastings, Folkestone and Broadstairs; these are predominantly isolated findspots. A carved stone mace was discovered in East Sussex (**MES732**) near Eastbourne.
- 4.2.22. The Mesolithic record of the British Isles (and Europe) indicates a strong relationship between human activity and coasts, wetlands, rivers and streams: within Hampshire, river valleys were particularly favoured areas for settlement

(Barber *et al.* 2007; Bailey & Spikins 2008; Fischer 1995; Gardiner 2007: 8). These areas provide rich sources of food and resources for hunter/gatherer groups, as well as important transport routes inland or between islands. The south coast during the early Holocene was characterised by coastal marshes, mudflats and estuaries with the higher ground of the Weald cliffs towards Brighton and Portsmouth, and the Isle of Wight. This would make for a varied landscape with a broad variety of habitats and considerable plant and animal resources to exploit, including fish, shellfish and waterfowl. Inland resources were also important along the coast, with hazelnuts potentially forming a significant part of the diet at Westhampnett in West Sussex (just outside the Study Area) (Stevens 2008: 8).

- 4.2.23. The lower global sea level during the Mesolithic, in the early to mid-Holocene, means that in addition to the rich archaeological record on the modern coast, Mesolithic landscapes may be found in intertidal and nearshore locations (WA 2008b; James *et al.* 2010). Artefacts have been recorded throughout the datasets as having been discovered eroding from cliffs – **MKE8215**, **MES2033**, **MWS1602** and **MPM295**.
- 4.2.24. Peat deposits dating to the Mesolithic are known from various offshore locations throughout the Study Area (English Heritage 2009). Deposits are seen across the coastline, with absences noted only along the chalky cliffs in Kent, East Sussex and West Sussex (Geological Society 1957). Known deposits of peat are clustered around Southampton Water, up the River Hamble, in the harbours around Portsea and offshore around Portsea, Portsmouth and Hayling Island in Hampshire (English Heritage 2009). Known peat deposits in West Sussex are limited to five, with four located at the coast and one offshore (English Heritage 2009). East Sussex has a far higher number of recorded deposits, which are located around the coast from Langney Point to Walland Marsh, where the majority of deposits are located (English Heritage 2009). Kent sees two sites located inland on Romney Marsh, one offshore near Dover harbour and one in Pegwell Bay (English Heritage 2009). These sites represent a collation of known locations of peat and are affected by investigation biases (English Heritage 2009).
- 4.2.25. During the Mesolithic period (c.10,000–4000 BP) sea levels became sufficiently high to cut off Britain from northwest Europe (MAL 2007; Shennan & Horton 2002). The east English Channel probably became inundated by global sea level rise sometime during the early Holocene, c.7000 BP (Shennan & Horton 2002; Shennan *et al.* 2000). This would suggest that the principal prehistoric archaeological record of offshore areas would be Palaeolithic to early/mid Mesolithic. Artefacts in secondary contexts (i.e. washed in from fluvial sources) are common throughout the datasets.
- 4.2.26. A submerged prehistoric forest (**NRHE 414371**) is exposed periodically on the beach at Selsey, with another known to exist off Southampton (**MSH1646**). Such discoveries are certainly consistent with the numerous offshore Mesolithic artefacts recorded in the NRHE dataset for the south east region. The submerged forest indicates an area with a high level of organic preservation and by extension, high archaeological potential. Part of a worked red deer antler was discovered in the peat of the Selsey submerged forest (**NRHE 414371**) while other discoveries in the area have included Mesolithic implements discovered in the East Beach area (**NRHE 462479**), namely a tranchet axe (**NRHE 462514**) and a 'Thames Pick' (**NRHE 462542**).
- 4.2.27. In addition to these submerged coastal landscapes, there is the potential for Mesolithic water craft such as dugout log boats, rafts and possibly hide-covered

boats to have survived within seabed, estuarine, and riverine deposits. Though very few examples exist globally, it is suggested (see McGrail 2004) that such vessels were used on inland waters and coastal areas for fishing and transportation during this period. The use of such vessels would almost certainly have proliferated as land became gradually inundated by the incursion of rising sea levels. . There is also potential for inshore and riverine water craft – in addition to palaeoenvironmental material and artefacts – where local conditions are suitable for the preservation of wooden or skin vessels. The preservation of Mesolithic water craft is most likely to occur in low energy environments with a protective covering of finer-grained sediments to minimise the impact of erosion (MAL 2007; Merritt *et al.* 2007). Exposure to oxygen through air or seawater normally results in deterioration and dispersal of organic remains over time (Ward *et al.* 1999)

- 4.2.28. By the Neolithic, around 4000 BC, sea levels were roughly equivalent to that of today (Shennan *et al.* 2000). As a consequence, archaeological material derived from the inundated areas is increasingly maritime-oriented in nature and type. Meanwhile, coastal sites and artefacts which were formerly on land have in some instances ended up in secondary contexts due to erosion or fluvial transport (Shennan *et al.* 2000; Shennan and Horton 2002; Streif 2004).

#### **Neolithic (4000 BC to 2201 BC)**

- 4.2.29. The Neolithic saw a transition from hunter/gatherer economy to a more sedentary way of life which saw the first farming of crops and domestication of animals (Ashbee 2004: 10; Drewett *et al.* 1988: 24; Bradley 2010: 3, 6). This saw parallel advances in material culture, changes to the way the landscape was utilised, and the development of new monument forms (Pollard 2002: 5-6; Gardiner 2007: 1). It is not clear whether these changes were the result of innovations derived from contact with other sedentary groups, or were the result of new groups moving into the region. Evidence of long-distance exchange is known (see Pollard 2002: 5, 6) suggesting a transfer of ideas and technologies from continental and north-west Europe, however an influx of new populations cannot be ruled out.
- 4.2.30. Early Neolithic finds from the Study Area include a large array of ceramics and lithics, The lithic collection includes flint axes, polished stone axes, and leaf-shaped arrowheads (Ashbee 2004: 10). It is likely that the flint axes were made from local flint sourced from the mines at Cissbury and Blackpatch in West Sussex (outside the Study Area) (Gardiner 2007: 2) while the polished stone axes are most likely foreign imports. Polished axes were well represented within the Study Area, with the exception of Pevensey Levels, Walland Marsh and Romney Marsh where no examples have been discovered (Drewett *et al.* 1988: 25; Gardiner 2007: 15). Several examples of polished axes have been discovered in Kent (**MKE7439** and **NRHE 468476**), in East Sussex around Newhaven, Eastbourne and Hastings (**MES219**) (Drewett 2010b: 17), in West Sussex near Selsey (**MWS1698**) and Littlehampton (Drewett 2010b: 17) and in Hampshire (**HANTS MWX23509**, **HANTS MWX23602**, **HANTS MWX18974**, **HANTS MWX18980** and **NRHE 242319**).
- 4.2.31. Two flint sickles were found in Southampton, in the Hampshire Study Area (Gardiner 2007: 14), with another discovered near Eastbourne in East Sussex (**MES635**), one on Walland Marsh in East Sussex (**MES2185**) and one in Lancing in West Sussex (**MWS280**). There was limited use of Langstone Harbour, Hampshire throughout this period, though worked flint was found (Allen & Gardiner 2000: xxi). Offshore, evidence of Neolithic occupation and exploitation has been discovered around the submerged forests off Selsey (**NRHE 414371**) and in

Langstone Harbour (**HANTS MWX56128**). Finds have included Neolithic implements (**NRHE 462479** and **NRHE 462587**), flints (**NRHE 462584**), flints and burnt stones (**NRHE 462523**), Neolithic pottery (**NRHE 462511** and **NRHE 462503**), and a polished axe (**NRHE 462485**).

- 4.2.32. Plain ware pottery finds are common, with their distribution in Kent skewed mainly to the east and concentrated upon the coast and along rivers (Ashbee 2004: 10-12). Middle Neolithic Peterborough Ware was well distributed through the Study Area, with absences in eastern East Sussex and mid-West Sussex (Garwood 2008: 2; Gardiner 2007: 11). Decorated pottery was manufactured in the Late Neolithic, with Grooved Ware particularly located in eastern Kent and western West Sussex; no Grooved Ware is known from the Hampshire Study Area (Ashbee 2004: 10, 12; Garwood 2008: 4; Gardiner 2007: 2). Six fragments of bag-shaped or shouldered bowls of Windmill Hill ware were discovered in a Brickearth pit in Deal (**MKE7347=NRHE 468483**) and a fragment of bowl with a hole pierced below the rim was discovered during the laying of a water main on Hawkeshill Down between Deal and Kingsdown, Kent (**MKE6637**). Furthermore, one record from the Hampshire dataset related to a single sherd of decorated Middle Neolithic pottery (**HANTS MWX23357**). Increased numbers of exotic and traded items such as polished flint, knives and imported stones distributed throughout the Study Area in the Late Neolithic suggests the development of individual status, though Hampshire saw less evidence of a change (Gardiner 2007: 10).
- 4.2.33. Settlement evidence is limited from this period, with preservation (and probably habitation) mainly limited to river valleys in Kent and Sussex (Bradley 2010: 3-4, 17). It is thought that settlements in East and West Sussex had a fair distribution across both counties (Drewett 2010b: 16). Hampshire has no evidence of Neolithic structures (Gardiner 2007: 11). Activity in the county was located in the downlands, with limited evidence in the coastal Study Area, suggesting exploitation, but not occupation in the early period (Gardiner 2007: 8). Loss of land surfaces due to coastal change has affected evidence and distributions: for example, Langstone Harbour was dry land with two rivers and was at least partially forested in the Neolithic (Healy 2008: 13; Allen & Gardiner 2000: xxi) (Garwood 2008: 7). This may indicate why Hampshire appeared so sparsely utilised throughout this period. Occupation sites are recorded in the enhanced dataset as being located at Dover (**MKe17871**), with a concentration seen in West Sussex between Littlehampton (**MWS7987**) and Chichester Harbour (**MWS1455**) and in Portsmouth (**HANTS MWX31004**). Temporary camps are known from within the Study Area in West Sussex, but are not seen in the record for Hampshire, East Sussex or Kent (Drewett *et. al.* 1988: 25). Most Middle Neolithic sites are represented by ceramic artefacts in pits, which may be related to settlement (Garwood 2008: 3). Examples of such pits are known from the Deal area in Thanet, and Bullock Down in Eastbourne, where there is also evidence of flint extraction and working (Healy 2008: 12-13). Late Neolithic evidence shows one occupation site in east Kent, one in Chichester and a potential building located in West Sussex (Garwood 2008: 3-4).
- 4.2.34. A large Late Neolithic or Early Bronze Age assemblage of over 620 flint artefacts were discovered in Deal (**MKe17851**), the flint was accumulated from various sources, including the downland inland and foreshore, suggesting deliberate selection. A flint working site was uncovered on Thorney Island, West Sussex (**HANTS MWX57229**). In the Hampshire Study Area flint scatters are suggestive of activity in the area and possibly settlement (Gardiner 2007: 2, 10). A kitchen midden was discovered in a gravel pit at the south-west corner of Chark Common in Hampshire, which consisted of a mass of shells, sherds of pottery, hearths and flint finds (**HANTS MWX19656=NRHE234391**). The quantity of material and

presence of pottery suggests a potential occupation site, although the shells are more commonly indicative of the seasonal or temporary encampments associated with hunting and gathering activities.

- 4.2.35. Farming was not intensive at this time and though there was woodland clearance, permanent field systems were not employed (Pollard 2002: 10). From the late Mesolithic into the early Neolithic, woodland clearance was occurring throughout Sussex resulting in localised increases in runoff and river sedimentation (Drewett 2010b: 16). At Horton Kirby in Kent (outside the Study Area) an insect carrier of Dutch elm disease was found along with cereal pollen, suggesting that not all woodland clearance was deliberate (Branch 2008: 4). Subsistence strategies during this time saw a gradual transition towards cultivated foodstuffs (Stevens 2008: 8-9). Throughout the region as a whole, the evidence suggests that a later Mesolithic style subsistence strategy continued into the Neolithic, although the domestication of animals for exploitation was already occurring (Drewett 2010b: 16). Crops known from this period include emmer wheat and barley (Stevens 2008: 8-9). In the East Sussex Study Area emmer wheat and six-row barley were found, the earliest dated crop evidence from the region (Drewett 2010b: 16).
- 4.2.36. Stone and earth-built long barrows, cursuses and causewayed enclosures were present during the Early Neolithic, but are under-represented in the south-east; the distribution of monuments was particularly sparse in Hampshire (Ashbee 2004: 10; Bradley 2010: 15-16; Garwood 2008: 2; Gardiner 2007: 10). Causewayed enclosures were present within the Study Area, with one located in Ramsgate (**KENT MKE8025**) which measured 150m in diameter with three circuits of interrupted ditches and two examples were seen in east Kent. No examples have been found in the Study Area in East Sussex, West Sussex (Drewett 2010b: 17) or Hampshire (Ashbee 2004: 10-11; Barclay 2008: 1; Gardiner 2007: 2, 10) however Whitehawk Camp on the outskirts of Kemp Town is close enough to have been constructed and used by communities from the Study Area. The site has so far yielded four burials, a large array of lithic tools, pottery, and faunal remains suggesting regular butchery activity at the site (Russell, 2002). Pits containing similar assemblages to causewayed enclosures have been found, the majority are seen in West Sussex (outside the Study Area) the only example seen in the Study Area is in East Sussex at Bishopstone (Drewett 2010b: 17). A cursus may also be present below the Ramsgate causewayed enclosure (Garwood 2008: 2-3). One Middle Neolithic bank barrow or cursus was present on Thanet Island, Kent, as was a ring ditch (Garwood 2008: 2). East Sussex contains one long barrow (MES230) along the River Cuckmere (Drewett 2010b:17), the West Sussex record contains no long barrows. Long barrows were the only monument type in Hampshire; these were located just north of the Study Area on Portsdown (Gardiner 2007: 10). Henges and stone circles were created in the Late Neolithic, though no certain examples are known within the Study Area (Ashbee 2004: 10-11; Bradley 2010: 11, 19; Garwood 2008: 1, 4).
- 4.2.37. Burials were known to have been undertaken as cremations and collective inhumations. Round barrows and burial of lone individuals were also coming into use at the end of this period with the Beaker tradition (Bradley 2010: 22; Garwood 2008: 5; Gardiner 2007: 3). At the end of the Late Neolithic the integration of Beaker burial practices was gradual and limited within the Study Area to Thanet Island, Kent (where a significant cluster of sites were located) and western West Sussex; no sites were present in East Sussex or Hampshire (Garwood 2008: 6). Kent and Sussex did see furnished individual burials; however Hampshire has only one rich burial, located at Portsdown (just outside the Study Area) (Gardiner 2007:

10, 13). Burials within the Study Area include the remains of a woman along with some flint flakes and pottery (**MKE8033=NRHE 469497**) found in Kent.

- 4.2.38. The presence of non-native species and a new subsistence base evidences maritime trade and exchange of ideas and materials (Pollard 2002: 5-6). Cross-channel interaction does not appear to have been as significant in the Late Neolithic as it was early in the period, as continued transfer of material culture and monument traditions is not seen in the archaeological record (Needham 2008: 1).
- 4.2.39. The most common watercraft from this period was logboats, although skin boats and rafts are also likely to have been used (McGrail 2004: 172, 180-181). Given the obvious navigational and operational constraints, such vessels are thought to have been predominantly used for short journeys and fishing with most outings limited to the coastal fringes, rivers, and inland water bodies. Longer cross-channel distances would only have been possible in optimum conditions (McGrail 2004: 172, 247). No logboats which pre-date the Neolithic have yet been found in Britain (Delgado 1997: 438), however examples from elsewhere suggest a variety of woodworking techniques were employed in their construction albeit with a limited selection of tools (McGrail 2004: 207).

#### **Bronze Age (2200 BC to 800 BC)**

- 4.2.40. The Bronze Age saw the emergence of larger sedentary settlement sites which were supported by intensive farming and the development of field systems (Barber 2008: 1; Pollard 2002: 10; Champion 2007:9). Land with good trade links was preferred and thus coastal, riverine and estuarine locations became desirable for settlement (Yates 2004: 13). This is supported by the distribution of settlements along the south coast and its river catchments where status items such as metalwork have been discovered. This was particularly facilitated by the short Channel crossing afforded by the Study Area, which would be important from this period onwards (Needham 2008: 1).
- 4.2.41. Lithic tools and Beakers continued to be utilised throughout this period but start to show marked variations from Neolithic forms (Gardiner 2007: 3). Worked flint was prevalent throughout the Study Area during this period (Allen & Gardiner 2000: xxi; Gardiner 2007: 3, 6) whilst other lithic finds include barbed and tanged arrowheads, scrapers, adzes, axes, and a macehead. Such finds are broadly comparable with the Early Bronze Age material culture recorded in northern Europe (Needham 2008: 1-2).
- 4.2.42. Deliberate depositions of metalwork are known from the Study Area (Yates 2004: 13; Lambrick 2010: 29). A Bronze Age hoard is recorded in Kent at South Dumpton Down, Broadstairs (**Mke19964**), including two layers of palstaves along with a penannular ring and part of a bracelet. East Sussex contains more hoards, around Brighton (**MES187**), Eastbourne (**MES7404**) and Hastings (**MES898**). In West Sussex many hoards are recorded, from near Selsey (**MWS1611**) to Worthing (**MWS5629**), with many sites seen inland, rather than along the coast. Hoards in Hampshire are generally located on the coastal plain and dated to the Middle Bronze Age (Lambrick 2010: 36; Gardiner 2007: 8, 16); hoards recorded by the enhanced dataset are seen mainly around Portsmouth (**MPM182**) and Hayling Island (**HANTS MWX33668**). Hoards contained predominantly palstaves (often broken), socketed axes, socketed tools, ingots, spearheads and swords (Gardiner 2007: 15-16) and include objects of northern French styles (Lambrick 2010: 36; Gardiner 2007: 8, 16). Bronze Age material recorded in Coastal Stretch 18, the

offshore area, comprised two palstaves (**NRHE462565** and **NRHE 462517**), bracelets (**NRHE 462562**), and an Egyptian faience bead.

- 4.2.43. In Kent, bronze artefacts which had originated in north-west Europe were deposited in the Wantsum Channel and Great Stour (Yates 2004: 13). This is not only indicative of the increasing utilisation and value of bronze (which became increasingly ornate and linked with weaponry) but also suggests wider interaction between south east communities and continental Europe, facilitated by improved navigation of the sea (Yates 2004: 13). The artefacts suggest a sharing or trading of northern European ideas and technology as well as raw materials (Clark 2007: 15-16). Bronze objects began to be produced locally and trading would appear to have intensified (Gardiner 2007: 11).
- 4.2.44. The trend towards ornate items throughout the period demonstrates the emergence of higher social classes (Yates 2004: 13, 15). Middle Bronze Age sites on the Downs in Hampshire were found to contain Deverel Rimbury pottery (Gardiner 2007: 4). In the Late Bronze Age Post-Deverel Rimbury pottery and coarser ceramics were common, particularly in Langstone Harbour (Gardiner 2007: 4). Such coarse ceramics were manufactured on the coastal plain and mainly cremation urns were produced (Gardiner 2007: 4). Pottery recovered from Hayling Island, Hampshire was predominantly domestic in use, however ten records from the area represented ceramics that had a funerary link. These were mainly urns found in groups and often containing cremations (for example **HANTS MWX19143**). Imported continental ceramic shards dating to the Late Bronze Age have been discovered around Brighton, (Hamilton and Manley 2010a: 20).
- 4.2.45. Early Bronze Age sites which demonstrate a tangible transition from the Neolithic are uncommon in the Study Area although Sussex does contain some examples (Gardiner 2007: 3). Bronze Age round house structures has been discovered in north-east Kent (**MKE15507**) with a concentration at the Wantsum Channel (**MKE15983**). Further examples exist along Kent rivers and along the coastal plain in both East and West Sussex (Bradley 2010: 24; Yates 2004: 15; Hamilton 2007: 12). East Sussex has a concentration of settlement and occupation sites around Eastbourne (Greatorex 2010:19) whilst a Late Bronze Age settlement was discovered on the coastal plain at both Shinewater. Meanwhile in Bishopstone four-post and six-post buildings have been recorded (**MES5032**) (Hamilton and Manley 2010a: 20). A site at Belle Tout, near Eastbourne, contained three domestic structures and is the only example of structures of this period in East Sussex (Greatorex 2010:18). West Sussex contains no known examples of Bronze Age settlements whilst Hampshire contains no permanent settlement sites dating earlier than the Middle Bronze Age. That said, the coast is known to have been exploited for its resources from earlier if not long-term occupation (Lambrick 2010: 7, 12; Gardiner 2007: 6, 7).
- 4.2.46. A record for a possible settlement is seen in Hampshire (**HANTS MWX37224**) and occupation is implied by the existence of a possible hut circle (**HANTS MWX23558**) on Hayling Island. Enclosed settlements were present within the east Kent Study Area in Highstead, South Dumpton Down on Thanet, in Ramsgate (one of the earliest defended settlements in Britain), and Mill Hill in Deal (Yates 2004: 15; Champion 2008: 9). A Middle Bronze Age cross-channel transfer of settlement styles may have occurred, as similar sites exist in France (Clark 2007: 15). West Kent and Sussex had unenclosed settlements set within field systems (Champion 2008: 9). Hampshire had no enclosures, though linear ditch systems existed in the Late Bronze Age (Gardiner 2007: 7). Later Bronze Age settlements in Hampshire

were permanent and open with post structures; they also appeared to be located upon non-monumental prehistoric sites (Lambrick 2010: 7, 10). Examples exist at Gosport, Havant and Hayling Island (Gardiner 2007: 12). A record for timbers on Hayling Island (**HANTS MWX33667**) implies the felling and perhaps construction of another site; which may have been facilitated by occupation of the area.

- 4.2.47. Farming in the Bronze Age utilised field systems, enclosures and droveways; which suggested mixed farming in the Study Area with spelt, emmer, barley, Celtic bean and livestock (Yates 2004: 13; Champion 2008: 10; Lambrick 2010: 14; Stevens 2008: 9). Granaries are known from this period, facilitating storage, reliance on wild species was seen to dwindle (Stevens 2008: 9). Field systems were found alongside barrow cemeteries throughout the Kent and Sussex Study Area, an occurrence that is paralleled in France and suggests cultural exchange (Clark 2007: 15). Evidence of such associated systems and cemeteries is not common in the Hampshire Study Area, though this is likely due to survival rather than a genuine lack (Gardiner 2007: 7, 8). East and West Sussex saw a move to an intensive system of organised farmsteads in cleared land, with associated enclosures and field systems; particularly on the Downs, between Brighton and Eastbourne (Greatorex 2010: 18). Later in the period the soil had eroded and land became less productive throughout the Study Area (Gardiner 2007: 10). As a result, farming diversified and cattle became the most commonly represented Late Bronze Age species in Hampshire (Lambrick 2010: 13; Gardiner 2007: 11). Some wild resources were also utilised, with the lowland and intertidal zones of the Study Area being particularly well placed for obtaining fish, birds and larger terrestrial animals (Gardiner 2007: 12).
- 4.2.48. Crafts would have been undertaken in homes, along with some (though not archaeologically distinct) workshops; these may have been spread throughout the Study Area (Lambrick 2010: 31; Greatorex 2010: 18). Salt extraction was evidenced in the Study Area through the remains of briquetage, hearths and struts: the majority of salt working is seen in Hampshire (**HANTS MWX5431**) and West Sussex (**MWS1452**), around the intertidal harbours; very few sites are seen in East Sussex (**MES5026**) and Kent (**Mke20993**). Mixed farming led to the production of more textiles, leather, meat and dairy products (Gardiner 2007: 11). Late Bronze Age metalworking sites are known to have been located in settlement areas within Hampshire (Lambrick 2010: 32).
- 4.2.49. Round barrows became more common for burial in the Early Bronze Age, with some forming cemeteries (Bradley 2010: 23). Round barrows are one of the most common archaeological features located on the Isle of Thanet (**MKE7765**, **MKE7589** and **MKE6470**), the density of which is higher than elsewhere in the Study Area. Barrows are also noted in Kent around Capel-le-Ferne (**KENT MWX51455**) and South Foreland (**MKE7383**). Round barrows with cremations and metalwork have also been located in both East and West Sussex; East Sussex boasts a better survival of barrows than the rest of the Study Area (Yates 2004: 13; Champion 2008: 9). The West Sussex Study Area does not have a representation of barrows. Round barrows are noted in East Sussex throughout the Study Area from Hove (**MES1042**) to Eastbourne (**ESUSSEX MWX50738**) (Greatorex 2010: 19). Barrows are recorded from Hampshire (**HANTS MWX18978** and **HANTS MWX19010**); burial mounds containing multiple individuals are known and were often located alongside settlements (Gardiner 2007: 10). Middle Bronze Age reuse of barrows is also known from within Hampshire (Lambrick 2010: 7, 25).
- 4.2.50. It is possible that the practice of placing cremation urnfield cemeteries along the coastal plain was widespread (Gardiner 2007: 14). Several cremations and one

inhumation have been excavated in the Kent Study Area: three cremations located in Deal (**MKE7327**, **MKe17797** and **NRHE 468435**); a Late Bronze Age cremation within a bucket urn was recorded around 27m from the cliff edge beside the Kingsdown Golf Links (**MKE6640=NRHE 467398**); and the skeleton of an Early Bronze Age female was uncovered at St. Margaret's at Cliffe (**MKE15982**). A cremation within an urn was discovered near Littlehampton in West Sussex (**MWS7996**), multiple cremations were also found at Pagham Church (**MWS5745**). Rich burials in East and West Sussex were located between Littlehampton and Newhaven (Greatorex 2010: 19). Burial was common on the Hampshire coastal plain; a flat urnfield cemetery dating to the Middle and Late Bronze Age was present in Langstone Harbour (**HANTS MWX23578**, **HANTS MWX23580** and **HANTS MWX56111**), demonstrating burial in a coastal environment (Allen & Gardiner 2000: xxi; Lambrick 2010: 27; Gardiner 2007: 8, 10).

- 4.2.51. Burnt mounds existed from the Early Bronze Age onwards and their function is as yet unknown (Lambrick 2010: 23). Burnt mounds were located mainly in West Sussex (**MWS80118** and **MWS6958**), with some found in Hampshire (**HANTS MWX57409** and **HANTS MWX57410**); none were seen in the Kent or East Sussex datasets. Ceremonial monuments were no longer created after the Middle Bronze Age (Lambrick 2010: 28).
- 4.2.52. Kent's short sea crossing to continental Europe (Lawson & Killingray 2004, v) and the placement of the Wantsum Channel at the mouth of the Thames Estuary also influenced the ability of its inhabitants to participate in trade (Yates 2004: 13). It is possible that maritime access was restricted and considered significant during the Early Bronze Age (Needham 2008: 1). During the Late Bronze Age communication between the south coast and the continent appeared to dwindle, with artefacts attesting mainly to British export (Needham 2008: 2). However, the Late Bronze Age site at Shinewater Park on the Willingdon Levels in East Sussex offered a diverse material culture assemblage and evidence of waterborne transport (Hamilton 2007: 12). Local communications were evidenced by trackways found in the East Sussex Study Area (**ESUSSEX MWX50139** and **ESUSSEX MWX50980**) (Greatorex 2010: 18).
- 4.2.53. Testwood Lakes in Hampshire demonstrates evidence of waterfront structures and bridges or causeways, presumably to service riverine and maritime craft (Gardiner 2007: 16). In the Late Bronze Age Langstone Harbour ceased to be dry land (Allen & Gardiner 2000: xxi). A possible causeway, or wadeway (**HANTS MWX23433**) between Hayling Island and the Hampshire mainland may date back to this period and have had a similar function to those at Testwood Lakes; continued use of this feature is also suggested (Gardiner 2007: 16; Allen and Gardiner 2000a).
- 4.2.54. The suitability of the available sewn plank boats of this period for cross channel journeys is currently accepted (Van De Noort 2006: 267; Weekes 2007: 4). The Dover Boat (**NRHE 1156319**) and the Langdon Bay probable wreck (**NRHE 1082119=NRHE 467995**), both discovered in Dover, provide important evidence of coastal crossing and highlight the importance of transport and trade in the Study Area (Yates 2004: 13, 15; Needham 2008: 1). The Dover Bronze Age Boat was composed of oak timbers sewn together with yew withies and at around 15m long, could have carried a crew of sixteen people in addition to a cargo of three tons (Clark 2007: 15; Weekes 2007: 4). It has been postulated that sewn plank boats were developed to hold a larger cargo than previous incarnations of water craft such as log boats and rafts, although they were certainly more seaworthy too and the necessity of crossing the English Channel may have driven the technology (see McGrail 2004: 174). A journey from Dover to France would

have taken four or five hours (Clark 2007: 16). The metalwork hoard of the Langdon Bay wreck had links to central France, demonstrating that trading and exchange was occurring between Britain and the continent (Clark 2007: 17).

- 4.2.55. Testwood Lakes in Hampshire provided evidence of a boat cleat from a sewn plank boat (indicating reuse of the elements of a boat) which was likely originally used in seafaring and riverine transport (Gardiner 2007: 14, 16). An oak logboat was found in Hampshire in 1888 (**HANTS MWX18095**) along the River Hamble, suggesting smaller scale waterborne transport. A dugout canoe of possible Bronze Age date was also found near Littlehampton, in land along the River Arun in West Sussex (MWS2699). It has been suggested that the entire south coast area should be considered as a maritime area, due to the close contact which has pervaded between this area, the continent and the sea (Milne 2007: 6), in which case, the boats evidenced from this period are of great significance (**Figure 14**).

### Iron Age (800 BC to AD 43)

- 4.2.56. The Iron Age is naturally associated with the introduction of iron however the transition was gradual and bronze working continued in many parts of the country (Parfitt 2004: 16). The period is also defined by changes to farming and subsistence strategies and perhaps more pertinently by the transition to more organised social hierarchies. A number of factors have been cited as causal in the transition including changes to the climate which impacted farming practices and resource exploitation (Lambrick 2010: 8). Farming during this period was intensive in nature and surpluses were created with grain and leather primary exports (Reynolds 1987: 7; Lambrick 2010: 15). The appearance of Gallo-Belgic pottery and wheel-thrown ceramics in the archaeological record suggests increased trading across the Channel and a desire for higher status goods (Reynolds 1987: 7; Champion 2008: 10-11). (Parfitt 2004: 16; Champion 2008: 10). However, the introduction of iron to technology had a big impact on all facets of existence in this period, from farming to warfare.
- 4.2.57. Coins have been located dating from the Late Iron Age onwards; these had a fairly even distribution in Kent, with three hoards located within the Study Area (Parfitt 2004: 16, 18). Within Broadstairs, Kent, for example, two coins (**MKE7596**), two silver Greek coins (**MKE7611**), two gold coins (**NRHE 468840**), and several other coins (**MKE8216** and **MKE8217**) were recorded in close proximity identifying this area as focal point for Iron Age activity. Furthermore, within Coastal Stretch 2, a total of 135 records from the PAS dataset refer to Iron Age coins, discovered predominantly at Worth. In East Sussex, the majority of coins were found to the east of the county, though finds were distributed throughout the East Sussex Study Area (Hamilton and Manley 2010b: 22-3) (**MES1697** and **MES206**). A vast number of coins were located in West Sussex (**MWS4159**), particularly around Chichester Harbour (**MWS1401**) and between Littlehampton (**MWS3092**) and Shoreham-By-Sea (**MWS521**) (Hamilton and Manley 2010b: 22-3).
- 4.2.58. There is a clear trend for coins to be located within reasonable proximity of the coast, with numbers decreasing further inland (Hamilton and Manley 2010b: 22). Iron Age coins have been found throughout the Study Area and most prevalently around Portsmouth (**MPM27** to **MPM30**). The prominence and accessibility of [what is now] Portsmouth suggest that even in the Iron Age, this location was a hub of trade and exchange most likely serving as a meeting point for numerous maritime communities from around southern Britain and continental Europe. (Hamilton and Manley 2010b: 22). Notable discoveries from elsewhere include a copper alloy harness fitting found near Littlehampton in West Sussex (**MWS7704**)

and an uninscribed gold quarter slater found to the north-west of Portchester (**HANTS MWX24425**). The tradition of metalwork deposition in dry and wet contexts also continued in this period throughout the Study Area (Lambrick 2010: 31)

- 4.2.59. The distribution of other types of artefact throughout the Study Area suggests strong links between Sussex and Hampshire communities and northern Europe (Lambrick 2010: 34). Ceramics from this period exhibit a wide diversity of forms and distinctive regional variations (Hamilton and Manley 2010a: 20). Meanwhile Roman amphora, Arretine and Samian ware have been found in Late Iron Age contexts in Sussex (Hamilton and Manley 2010b: 22).
- 4.2.60. Settlement evidence for the Early Iron Age Study Area is scarce, concentrated mainly around Thanet and the Kent coast (**MKE15319**) (Parfitt 2004: 16; Champion 2007: 8). Some continuity of site location is seen from the Bronze Age in East and West Sussex, with multi-period occupation noted at Bishopstone in East Sussex (**MES1663**) (Hamilton and Manley 2010a: 20). Settlements were generally unenclosed through this period (Hamilton and Manley 2010a: 20), though a hilltop settlement near Lewes in East Sussex is recorded as being enclosed (**MES1398**). At the end of this period the West Sussex coastal plain area was made habitable by new drainage systems; these may have been created through communal effort (Hamilton and Manley 2010b: 22; Hamilton 2007: 13). West Sussex occupation sites were located between Selsey Bill (**MWS1607**) and Worthing (**MWS352**).
- 4.2.61. Within Hampshire little continuity of settlement location is seen between the Late Bronze and Early Iron Ages (Lambrick 2010: 17). It is apparent that a large port was in use in the region of what is now Portsmouth and that this was a key trading hub with satellite settlements nearby (e.g. Hayling Island) (Lambrick 2010: 12). (Parfitt 2004: 16). As the region's population rose in the Late Iron Age, pressures on resources and desirable locations increased resulting in a change in settlement types and distribution. Previous unpopulated inland and riverine areas were settled and the structures left a more visible archaeological footprint (Parfitt 2004: 16, 18; Champion 2008: 10). A settlement on Cams Hill in Hampshire suggests continuity into the Anglo-Saxon period (**HANTS MWX55402**) as does another site in Southampton (**HANTS MWX25379**). Some settlements began to resemble urban sites with a prevailing trend of rectangular enclosures, again showing influence from continental Europe and particularly the Roman frontiers (Champion 2008: 10-11).
- 4.2.62. Within the Study Area Early Iron Age field systems changed entirely, with many abandoned and redefined (Champion 2008: 10). Enclosures and dividing of land again became common in the Late Iron Age, as did land clearance in Hampshire (Parfitt 2004: 16; Champion 2008: 10; Lambrick 2010: 7-8). Field systems are seen in Kent at Deal (**MKe17769**) in East Sussex between Eastbourne (**ESUSSEX MWX50110**) and Brighton (**MES247**) and in West Sussex around Littlehampton (**MWS7423**) and Bognor Regis (**MWS5841**). Ditches suggesting the use and division of land are recorded in Coastal Stretch 13 at Emsworth (**HANTS MWX23457**), whilst two enclosures, one circular and one rectangular (**HANTS MWX38215**) were seen on Hayling Island. Late Iron Age grain storage facilities have been located, normally manifesting as pits or raised structures (Parfitt 2004: 16; Champion 2008: 10). Late Iron Age subsistence appears to have included Roman products, as evidenced by amphora and other Roman ceramics (Hamilton and Manley 2010b: 22). Wild food appeared to form no part of the regular Iron Age diet (Stevens 2008: 9-10).

- 4.2.63. The Early and Middle Iron Ages saw a reliance upon cottage industry, however, large-scale industries began to develop in the Later Iron Age in Kent (Parfitt 2004: 16; Lambrick 2010: 31). Bronze working continued during this period within settlements in Hampshire, with highly ornate artefacts being produced (Lambrick 2010: 32). The West Sussex coastal plain provides evidence of many metalworkers' hoards, though none were noted in the enhanced record (Hamilton and Manley 2010a: 20). No mints were noted in the East or West Sussex data, although one was located close by at Boxgrove in West Sussex (Hamilton and Manley 2010b: 22). West Sussex saw the production of wheel-thrown ceramics, while East Sussex specialised in grog tempered wares (Hamilton and Manley 2010b: 22). The High Weald, located between the Pevensy Levels and Romney Marsh in the Study Area, was a source of fine potting clay (Hamilton and Manley 2010b: 22). Some regional wares experienced widespread distribution in Kent and continental ceramics became commonplace (Parfitt 2004: 16).
- 4.2.64. Pottery manufacture sites are unknown in Hampshire until the Late Iron Age (Lambrick 2010: 32), with one probable potters hearth seen on Hayling Island (**HANTS MWX23512**). Salt manufacture was known in Kent (**MKe20994**), East Sussex (**MES5026**) and West Sussex (**MWS1452**) from this period but was an important occupation on the margins of the intertidal harbours of Portsmouth, Langstone and Chichester, where briquetage, pot-boilers, salt pans and hearths formed the evidence for such an industry (**HANTS MWX23546**) (Allen & Gardiner 2000: xxi; Parfitt 2004: 16). A possible salt working site was uncovered near Paulsgrove, Portsmouth containing large quantities of pottery (**HANTS MWX24546=NRHE 235891** and **HANTS MWX24548=NRHE 859352**). Within the Study Area at Folkestone, large numbers of querns were produced from local material (**MKe17360**) (Parfitt 2004: 16).
- 4.2.65. Hillforts of the Early Iron Age are noted in East and West Sussex, though only in East Sussex were hillforts located in the coastal Study Area (Hamilton and Manley 2010a: 20). Sussex hillforts saw a decline in number in the Middle Iron Age and were absent in the Later Iron Age, however a few of the larger examples were expanded (Hamilton and Manley 2010a: 20; Hamilton and Manley 2010b: 22). Middle Iron Age hillforts were found in east Kent and on the Sussex Downs; a variation is seen in presumed function between hillforts in Kent and Sussex, this is yet to be explained, though hillfort function is a complicated issue (Parfitt 2004: 16; Champion 2008: 10; Hamilton 2007: 12-13; Lambrick 2010: 34). Records show a univallate hillfort located beneath Dover Castle which presumably influenced the later construction of the castle (**MKe17899=NRHE 468006**).
- 4.2.66. East and West Sussex hillforts exhibit little in the way of physical structure within their confines, suggesting that habitation and occupation were perhaps not their primary purpose (Hamilton and Manley 2010a: 20). There are hillforts in East Sussex located near Hastings (**ESUSSEX MWX49**) and Newhaven (**MES1794**) both located a significant distance from the lowland settlements (Hamilton 2007: 12). Banjo enclosures have been found in West Sussex, but none are present within the Study Area (Hamilton 2007: 13; Hamilton and Manley 2010a: 20). Within the Hampshire Study Area no hillforts have been excavated (Lambrick 2010: 20; Allen & Gardiner 2000a: xxi; Allen & Gardiner 2000b: 215). Late Iron Age hillforts were fewer in number and none were found in the Kent Study Area (Parfitt 2004: 18). Late Iron Age hillforts may have played a significant role in trade, and an example outside the Study Area in Hampshire may have functioned as a port; which implies the Hayling Island hillfort may have had a similar function (Lambrick 2010: 34).

- 4.2.67. The Chichester Dykes of West Sussex date to the Late Iron Age and are associated with land demarcation (Hamilton and Manley 2010b: 22). These take the form of earthwork banks and ditches and may be associated with water-courses (Hamilton and Manley 2010b: 22). Two cross dykes were noted in East Sussex (**ESUSSEX MWX50142** and **ESUSSEX MWX50720**). The dykes east of the Lavant are thought to have defended an *oppidum* (Hamilton and Manley 2010b: 22).
- 4.2.68. An Iron Age temple (**HANTS MWX23605=NRHE 242295**) was present on Hayling Island and had a large associated assemblage, with some objects deliberately broken; this saw a continuation of use as a Romano-British temple (Allen & Gardiner 2000: xxi; Lambrick 2010: 28-29). A possible temple was located at Worth in Kent (**MKE7198**), where three Iron Age model bronze shields were found below a Romano-British temple (Parfitt 2004: 16). Burnt mounds of unknown function existed throughout this period, with one multi-period site represented in the enhanced record in West Sussex (**MWS1883**) (Lambrick 2010: 23).
- 4.2.69. During the Early and Middle Iron Ages body disposal was undertaken in an archaeologically invisible manner; only one Middle Iron Age burial was found in Deal (Parfitt 2004: 16-17; Lambrick 2010: 24-25). Within Kent, barrows were no longer used in the Early Iron Age; conversely in northern France barrows see a continuation in use which may suggest a lack of cultural contact (Clark 2007: 16). Burials from throughout the Iron Age in Deal showed a transition from inhumation (**MKE5597**) – first crouched (**MKE19966**), then extended supine – to cremation (**MKE5594**) (Parfitt 2004: 16). Cremations in Kent were often buried in pots (or elaborate metal buckets) and accompanied by brooches, they occurred both as lone examples and as groups (Parfitt 2004: 16). One of the inhumations from Deal had two spoons, while another was buried with a sword and headdress; it has been suggested that these represent burials of religious individuals. East and West Sussex burial evidence for the Early and Middle Iron Age tends to be isolated finds of bone at hillforts and settlements (Hamilton and Manley 2010a: 20). Late Iron Age body disposal in East and West Sussex was more communal and archaeologically visible, as the cremation cemetery at Westhampnett (just outside the Study Area) demonstrates (Hamilton and Manley 2010b: 22). Iron Age cemeteries were uncommon in the Hampshire Study Area (Lambrick 2010: 25); however, two inhumations excavated at North Binness Island, Hampshire (**HANTS MWX19149** and **HANTS MWX19150**) were accompanied by pottery, implying long-term occupation.
- 4.2.70. In this period, Langstone Harbour was an intertidal environment (Allen & Gardiner 2000: xxi). Within the Kent Study Area, the Wantsum Channel was open, with Thanet an Island (**figure 5**) and the Romney Marsh area mainly inundated (**Figure 6**) (Young 2004: 5).
- 4.2.71. Both sewn-plank boats and logboats continued in use through this period (McGrail 2004: 176). The larger sewn craft were used for seafaring and smaller logboats appeared to be used upon inland waters (McGrail 2004: 176). Both types of vessel saw improvements and additions to their design through this period (McGrail 2004: 176-180). No vessels are recorded within the enhanced dataset for this period.

#### **Romano-British (54 BC to AD 409)**

- 4.2.72. The start of the Romano-British period is traditionally marked by the conquest of Claudius who landed in Richborough, Kent in AD 43 (Andrews 2004: 20). However, the cultural influence of Rome began with two invasions by Julius Caesar in 55 BC and 54 BC. Although achieving little in the way of conquests, Caesar

established a system of client kingdoms in Britain which not only increased trading links, but also paved the way for the more permanent conquest of Claudius almost 100 years hence. The decision to attempt a full-scale conquest may have been King Verica who ruled parts of Sussex, Hampshire, Berkshire and Surrey before fleeing to Rome in AD 40. The arrival of the invading Roman fleets at Verica's former harbours along the south coast suggest some transfer of knowledge, though there is little evidence to support this (Hamilton and Manley 2010b: 22; Rudling 2010: 24).

- 4.2.73. Roman influence led to developments in architecture with new villas, towns, public and buildings constructed during this period. As links with the continent were strengthened, there were also infrastructure developments in the form of new road systems, coastal fortifications, and new religious centres (Andrews 2004: 20) (Fulford 2010: 3).

#### *Material Culture*

- 4.2.74. Material culture showed little variation at the start of this period, as Roman styles of ceramic and metalwork were evidenced from the Late Iron Age onwards and local wares continued on sites into the early Romano-British period (Fulford 2010: 3). The distribution of local wares demonstrated trade routes inland and along the coast (Fulford 2010: 20). Pottery finds, as recorded by the enhanced dataset, are common across the Study Area with an even distribution. Some Roman style items are noted in the datasets, including a bronze toga pin (**MKE8060**), a figurine (**MES124**), a medal (**MES1698**), a gold ring (**MWS1696**) and an amphora (**MSH527**).

- 4.2.75. PAS finds from this period in Kent have been dominated by coins, of which the majority were found in and around Worth, Sholden and Deal. A hoard of over 2,000 bronze coins in two pots was found north of Sandown Castle, Kent (**NRHE 468144**). In East Sussex coins were a common find, with three coin hoards seen in the enhanced dataset (**MES1792**, **MES201** and **MES235**) and isolated coin finds across the county. West Sussex also saw an even distribution of coins, with hoards again found (**MWS1591**, **MWS1671** and **MWS7072**). In Hampshire, coins were evidenced throughout the dataset (**HANTS MWX23583** and **NRHE 892120**) implying increased trade and communication; Coastal Stretch 15 saw most coins found in proximity to Portchester Castle (**HANTS MWX19279**). Finds associated with warfare and defensive installations were also noted in the enhanced record in Kent, with a sword noted in Sandwich (**MKE7177=NRHE 468163**) and a lead slingbullet discovered in Minster (**MKE8074**). Hampshire sites contained material culture from the continent, but the evidence does not imply the presence of ports (Fulford 2010: 14-15).

#### *Settlement*

- 4.2.76. In the Study Area settlement location showed broad continuity with those of the Late Iron Age, despite the impact of the Roman invasion (Parfitt 2004: 16; Champion 2008: 10; Lambrick 2010: 36). Smaller settlements were continued to show a preference for coastal and estuarine frontages (Rudling 2010: 24-5). A site in Broadstairs, Kent (**MKE7597= NRHE 468841**) contained evidence for a Romano-British settlement including coins, pottery and tile; as well as Iron Age pottery. Rural settlement was key within this period; traditional farm settlements with exterior ditches, circular and rectangular huts with wattle and daub walls and thatched roofs continued and generally contained few imported or status items (Booth 2007: 12; Andrews 2004: 20).

- 4.2.77. Evidence suggests that some elite individuals built villas on their land to replace Iron Age houses; these were seen on Thanet in Kent (Andrews 2004: 20). In East and West Sussex large villas were constructed early in the period, distributed mainly along the coast – these were widely spaced, perhaps indicating areas of control (Rudling 2010: 24). One corridor villa with an associated bathhouse located at Eastbourne is seen in the enhanced record for East Sussex (**MES628**). Economic status divided settlements in the East and West Sussex Study Area, with richer settlements mainly based in West Sussex, for instance Chichester was particularly important during this period, with a high concentration of villas in the surrounding area (Rudling 2010: 24-5). Some villas are recorded from Hampshire, all located in or around Langstone (**HANTS MWX23380**, **HANTS MWX23474**, **HANTS MWX50062**, **HANTS MWX23482** and **NRHE 242160**).
- 4.2.78. New settlements were also created within the Study Area, as at Barcombe and Beddington in East Sussex (Booth 2007: 12-13). Small towns had various functions, some military, industrial, some had religious functions, or were concerned with communication and mainly lay along roads (Houlston 2007: 10; Fulford 2010: 6). One settlement in Fareham was located upon the shore of Wallington River at the north-western end of Portsmouth Harbour, ideal for the transport of people and goods, both inland and around the coast (**HANTS MWX30855**, **HANTS MWX20144** and **HANTS MWX20126**).
- 4.2.79. Larger existing settlements were almost all developed upon during the Romano-British period; particularly due to the development of the road network (Booth 2007: 13). In Richborough evidence for extensive, multi-phase settlement exists, including cropmarks delineating the extent of the *vicus* and the approaching roads (**MKE8093=NRHE 469603**). Dover was particularly large in this period and as such boasts evidence for domestic buildings (**MKe17310** and **MKE7066**) and public buildings including baths and a latrine (**MKE7071=NRHE 468041** and **MKE7074**). Parts of Romney Marsh in Kent were occupied by AD 100-200, despite the area being intertidal (**figure 6**) (Young 2004: 3; Draper 2004: 56). In the mid Romano-British period there was some movement of settlement away from the Iron Age sites in Hampshire (Lambrick 2010: 36).
- 4.2.80. From AD 300 onwards large towns became smaller throughout the Study Area; Kent in particular saw dwindling numbers (Houlston 2007: 10; Booth 2007: 17). In East and West Sussex villas along the coastal plain declined by the 4<sup>th</sup> century, perhaps due to piracy and military activity; although those inland continued in use (Booth 2007: 17; Rudling 2010: 24).
- 4.2.81. One amphitheatre is present at Richborough (**MKE7172**) and is the only such example noted in the Study Area.

#### *Farming*

- 4.2.82. Throughout the Roman occupation, agriculture and field systems remained an important source of subsistence and there is increasing evidence that land-based food sources began to prevail over more traditional foodstuffs taken from the sea. There is evidence of winkle consumption from the shells found in rubbish pits in North Hayling (**HANTS MWX23550**) (Stevens 2008: 10), but spelt, emmer, barley and Celtic bean were the staple cultivated foods throughout the Study Area (Stevens 2008: 10; Fulford 2010: 12). Cropmarks of ridge and furrow have been noted from Richborough, Kent (**KENT MWX43482**) and a Romano-British ploughshare (**NRHE 462075**) was discovered on Southsea Common in Hampshire. Field systems of this period are only noted in the enhanced record in East and West Sussex, with significantly more sites in East Sussex than West; East Sussex

shows sites present from Eastbourne (**ESUSSEX MWX50110**) to Brighton (**MES247**), while sites in West Sussex are seen around Littlehampton (**MWS7412**).

- 4.2.83. Corn drying ovens have been discovered in the Study Area, most notably at Portchester Castle (**HANTS MWX19234**). Other examples exist in West Sussex (**MWS5756** and **MWS866**). Meanwhile known granary sites have been discovered in close proximity to villas (Booth 2007: 16). Two quernstones (**MKE7365=NRHE468482**) were found in Kent with a production site recorded in Folkestone (MKe17360), the latter having been operational in the Iron Age. Brewing and malting are also evidenced, again often close to settlements (Stevens 2008: 10). Within Hampshire cattle, sheep, pigs and some domestic fowl were found on sites through the period (Fulford 2010: 12). In addition, foods such as pine nuts, figs and grapes, and wine were clearly imported from the continent during this time (Fulford 2010: 18; Stevens 2008: 10).

#### *Industry*

- 4.2.84. Within the Study Area brick making and tile manufacture were common and the area appeared to share one broad style; this industry may have declined in the late Romano-British period (Fulford 2010: 20; Allen & Gardiner 2000: xxi; Andrews 2004: 20). Various tiles have been uncovered within the coastal stretch (mainly around Dover) some are stamped (**MKE7039** and **NRHE 468009**) or inscribed (**MKE7064**) assisting in tracking trade and manufacture. A possible Romano-British kiln was identified to the north of Chark Common in Hampshire (**NRHE 2334425**), kiln waste of brick and tile is also seen within Hampshire (**HANTS MWX23587** and **NRHE 242378**); no kilns were noted in the enhanced record for East or West Sussex. Pottery manufacture was also important in Kent, East and West Sussex; pottery finds are noted throughout the Study Area (Andrews 2004: 20; Draper 2004: 56; Rudling 2010: 25).
- 4.2.85. Quarrying appeared to be regionally-based, but was widespread within Kent and Hampshire (Fulford 2010: 21; Andrews 2004: 20). One possible stone quarry in the Study Area was located at Mixon Shoal in West Sussex, this may have provided material for Fishbourne Palace and the Forum in Chichester (**MWS1669=NRHE 462383**).
- 4.2.86. Kent, East Sussex (**MES2117** and West Sussex (**MWS2201**) were heavily involved in the production of iron and were therefore significant to the Roman army; Hampshire also saw the production of iron in town and rural sites: a slagheap is recorded from Southampton (**MSH1810**) (Andrews 2004: 20; Fulford 2010: 21-22; Rudling 2010: 24-5).
- 4.2.87. Watermills are known from Ickham and Wichambreaux in Kent (**MKE6034=NRHE 466470**) and in Hampshire (Spain 2004: 62; Fulford 2010: 21), none are seen in the enhanced record for East or West Sussex.
- 4.2.88. Salt extraction was an important industry in Kent, with saltworks located around Romney Marsh (**Mke20998**) (Andrews 2004: 20; Draper 2004: 56). Salt extraction is also noted in the enhanced record for East Sussex, particularly around the Pevensey Levels (**MES5026**) and Beachy Head (**ESUSSEX MWX50111**). Some salt working is also noted in Chichester Harbour and Langstone Harbour in West Sussex (**MWS5932** Discoveries of Belgic and Roman briquetage along the coast of the Lydden Valley in Kent indicate that imported ceramics were used for Romano-British coastal salt working activities (**NRHE 468142**)). Oysters were exploited throughout the Study Area but particularly around Langstone Harbour (Allen & Gardiner 2000: xxi).

*Communication*

- 4.2.89. It is thought that roads were created in Kent initially to fulfil the needs of the invading army; later roads were associated with production and trade (Andrews 2004: 21). Roads were present throughout the Study Area, but are particularly noted running to both Richborough (**NRHE 1366500** and **NRHE 1366649**) and Dover (**MKE7038**, **MKE7153** and **NRHE 1042802**) in the Kent Study Area. Also noted are those between Canterbury and Richborough (**NRHE 1042632**), Canterbury and Upstreet (**NRHE 1042661**), Richborough and Dover (**NRHE 1042795**), Woodnesborough and Sandwich (**NRHE 1042796**) and Sturry and Reculver (**NRHE 1042797**). Most roads discovered in Kent are along the east coast, where development has been most intensive, implying that more evidence is yet to be found in the less-developed areas.
- 4.2.90. East Sussex had roads linking Hastings and Maidstone (**MES2461**), Lewes and London (**MES5138**), Pevensey and Selmeaton (**MES4753**), a section of road is also noted between Ditchling and Keymer (**MES7393**).
- 4.2.91. In West Sussex roads did provide good cross-county infrastructure, however few are noted in the enhanced record. A driveway is also present in the enhanced record for West Sussex (**MWS7424**). The Bitterne to Chichester (**NRHE 1325726**) road ran through the Study Area, thereby linking two important cultural centres within the Study Area.
- 4.2.92. In the Hampshire Study Area the Rowlands Castle to Havant (**NRHE 1008212**) road was significant.

*Religious Structures*

- 4.2.93. A Romano-British temple was located on Hayling Island, Hampshire which demonstrates continuation of use of the Iron Age temple on that site (**HANTS MWX23605=MPM360**); the same situation was seen at Lancing Down, West Sussex (Lambrick 2010: 28; Rudling 2007: 2). An inscription recording the erection of a temple was found in Chichester in West Sussex, though no temple is noted in the record (Magilton and Rudkin 2010: 26); one possible temple is noted near Littlehampton (**MWS6497**). No temples or shrines have been found in the East Sussex Study Area and as such no record is seen in the enhanced dataset (Rudling 2010: 24-5). Two temples are known from the Saxon Shore fort at Richborough (**MKE7173=NRHE 468151**) and another is noted in Worth in Kent (**MKE7198**); a possible Romano-British church is also recorded, close to the harbour in Dover (**MKE7059=NRHE 468029**).
- 4.2.94. God figurines have been discovered within the Study Area, as have household deities (Rudling 2007: 2), whilst just outside the Study Area there is a temple site at Lancing, West Sussex (**MWS1217**). It has been suggested that sacrificial depositions around this site were split into zones depending on object type (Rudling 2007: 2). The breaking of items and the deposition of small pots is also known from such sites (Rudling 2007: 2). Villas are known to have depositions placed below the floors and one such example is Beddingham Villa in East Sussex (Rudling 2007: 3). It is likely that certain Bronze Age round barrows were utilised as shrines during this period (Rudling 2010: 25) as suggested by ritual shafts recorded in Kent (**MKE7118**) and East Sussex (**ESUSSEX MWX50145**).

*Burial*

- 4.2.95. Records relating to body disposal are seen in all counties of the Study Area; however an absence of sites is noted between Rye and Eastbourne in East

Sussex, also to a lesser extent a gap is seen between Portsmouth and Southampton. Cremation was the most common method of body disposal within the Study Area, with a reasonable distribution of sites throughout the Study Area, until the late Romano-British period, when inhumation became prevalent; sites in the Study Area are seen in western East Sussex and Hampshire (Parfitt 2004: 16; Lambrick 2010: 37; Fulford 2010: 17; Magilton and Rudkin 2010: 26). Cremation burials in Hampshire follow a specific tradition of rich single and multiple burials (Fulford 2010: 16; Millett 1986; 1987).

- 4.2.96. It is thought that early Roman burial may have been a social display, perhaps reflecting social order; though burial markers are known from the wider period (Weekes 2007a: 7-8). This is supported by the cemeteries at Chichester being located along the approach roads to the settlement (Magilton and Rudkin 2010: 26). Within Kent, the simplest burials generally comprised a ceramic vessel containing cremated bone (Weekes 2007a: 7) as noted throughout the Kent HER dataset (**MKE7068**). More unusually, twenty skeletons were uncovered on a seemingly 'hurried' cemetery site between Broadstairs and Dumpton Stairs in Kent (**MKE7753=NRHE 469095**). In Kent a trend was also seen towards practices involving a greater variety of vessel types, along with secondary containers and accessories (Weekes 2007a: 7).
- 4.2.97. Burials of babies are found in a variety of funerary and domestic contexts, which suggests ritual practice (Rudling 2007: 2). An animal burial is recorded from Southampton (**MSH1810**).

#### *Navigation*

- 4.2.98. Two lighthouses from this period were present at Dover, one used the Iron Age enclosures at the site of Dover Castle (**MKE6942**) and the other one on Western Heights (**MKE26896=MKE6940=NRHE 467772**). Only the Dover Castle lighthouse is still standing (**KENT MKE6940**). Another lighthouse is recorded off Selsey, in Mixon Shoal (**MWS4054**), which is now submerged.

#### *Defence*

- 4.2.99. Kent was more defended by Roman coastal fortifications than any other county (Andrews 2004: 21). Claudian fortifications (**KENT MWX43458**) are known from Richborough. A naval fort was present at Dover until c. AD 208; a second was built c. AD 270 and lasted until late in the period (Philip 2004: 23). The late Romano-British period saw increased fortification of the coast and the Saxon Shore fortifications were created across the Study Area (Andrews 2004: 21; Fulford 2010: 22). These ran from Reculver (**MKE6483**) and Richborough (**MKE27181, MKE8063=NRHE 469547**) at either end of the Wantsum Channel in Kent, through Pevensey in East Sussex (**MES4712**), to Portchester in Hampshire (**HANTS MWX5851, HANTS MWX19234, SM 26714**) (Andrews 2004: 21; Fulford 2010: 22; Young 2004: 4-5). In addition, a possible Saxon Shore fort is known from Clausentum, at the top of Southampton Water in Hampshire (Fulford 2010: 7, 22). Between these, Saxon Shore forts were located at Portchester Castle in Hampshire (**HANTS MWX5851=NRHE 238704**). Dover was the only Saxon Shore fort to have a harbour (Milne 2007: 9).

#### *Ports*

- 4.2.100. Richborough in Kent was an important port at the start of the Romano-British period; however Dover became more influential early in the period when it was used as the headquarters of the Roman fleet (**MKE7100**) (Philip 2004: 23; Milne 2007: 8). In turn, Richborough port regained its status during the late Romano-

British period (Philip 2004: 23). Kent's Wantsum Channel was a clear channel at least 12m deep during this period, therefore transport on water was possible through this area (Young 2004: 4-5) (**Figure 5**). In East Sussex Lympne, Pevensey and Newhaven (**Figure 9**) were functioning as ports (Milne 2007: 8). Iron from the High Weald was likely transported out of the Brede and Rother estuaries (Rudling 2010: 24). Embayments in East and West Sussex were beginning to see shingle accumulation in this period, though the spits did not affect the use of ports in the area (Robinson 2010a: 8). Chichester had become a large and important harbour by the Romano-British period, both benefiting from development (Allen & Gardiner 2000: xxi) whilst other Roman settlements such as *Claustentum* (near modern day Bitterne) and *Portus Adumi* (near modern day Portsmouth) almost certainly had landing points and harbour facilities. Langstone had become a shallow and functioning harbour, but had not been artificially developed, which reflected its lack of status compared to other sites in Hampshire, such as Southampton (Allen & Gardiner 2000: xxi).

- 4.2.101. A Romano-British pier underlying a later structure was uncovered in Ramsgate Harbour, Kent (**MKE8008=NRHE 469452**), as was a similar pier or slipway in Dover (**MKE6956=NRHE 467822**). A quay was discovered along the Wantsum Channel in Kent (**MKE5514**). Few marine structures, such as harbours, quays or jetties, have been located in Hampshire (Fulford 2010: 18); however a quay has been noted in Southampton (**MSH294**).

#### *Boats*

- 4.2.102. Boats of this period were capable of both riverine transport and cross-channel journeys. Roman style boatbuilding techniques were used within Britain, as seen in the County Hall ship from London which was likely manufactured in the area (McGrail 2004: 194-195). Sawn timber is a Roman characteristic of boatbuilding and emphasises how the complexity of the tools used for boatbuilding increased during this period (McGrail 2004: 195, 207). A 'Romano-Celtic' style of boat construction utilised large, closely-spaced timbers, large nails and flush sawn planking; but vessels were very varied around this theme (McGrail 2004: 196-197, 207). Examples of this style include the Blackfriars I boat, found in London and the Barland's Farm boat from south-east Wales; there is the possibility of such boats being discovered throughout the Study Area (McGrail 2004: 197; Fulford 2010: 18). Wrecks from the enhanced dataset include two in Southampton (**HANTS MWX57487** and **MSH526**); the latter was discovered in 1848 and is considered to be a Roman galley. All wrecks of this period are displayed in **Figure 14**.

#### **Anglo-Saxon (410 to 1065)**

- 4.2.103. This period is represented by post-Roman activity and migration from northern Germany and southern Scandinavia of Anglo-Saxon people, perhaps as a result of sea level changes (Riddler 2004a: 25; Crawford 2010: 1). Continuity between Romano-British and Anglo-Saxon periods is known, but within the Study Area a change appears to have occurred in both settlement location and boundaries (Crawford 2010: 3-4). There are no accepted estimates of population influx; therefore this aspect of the period is difficult to define; as is the location of landing places, though Ebbsfleet is the suggested location of the first landing in AD 449 (**MKE8057=NRHE 469535**) (Riddler 2004a: 25). Integration of cultures resulted in a relatively homogenous archaeological signature for immigrants and existing people, making tracking migration difficult (Crawford 2010: 3). The nature of interaction between native and migrating populations is contested, but political, social and economic changes have been suggested (Riddler 2004a: 25). Battles are documented, but are not considered an archaeological certainty (Riddler

2004a: 25). The widespread conversion to Christianity is also known from this period (Crawford 2010: 1).

*Material Culture*

- 4.2.104. Coins had been widely used by the Romans, but in the aftermath of their departure, coin usage declined rapidly and was soon abandoned altogether (Fulford 2010: 23). Similarly, the archaeological record, and particularly burials, suggests a decline in the number of status goods and domestic wares indicating a decline in both trade and production (Fulford 2010: 23).
- 4.2.105. Isolated findspots of Anglo-Saxon material culture in the enhanced record are distributed across the Study Area, the only absences being at the very edge of the coast in Kent, between Rye and Bexhill in East Sussex and between Portsmouth and Southampton in Hampshire; a concentration of finds were made in the north of Romney Marsh. At this time Kent appeared to control continental trade, as implied by the presence of exotic material culture (Riddler 2004a: 28). Notable finds in Dover include a claw beaker (**NRHE 468055**), horse fittings and personal ornaments (**NRHE 468061**) and gold foils (**NRHE 468056**). In East Sussex finds were less extravagant, as late Anglo-Saxon metalwork (**MES7192**) implies. West Sussex had more finds than East, including a glass bottle (**MWS2981**) found along the River Arun. Hampshire also had little by way of elaborate finds, with a sculpture found on Hayling Island (**MPM362**); the area also demonstrates little by way of continental trade, illustrating limited continuation of links fostered in the Romano-British period (Crawford 2010: 4).
- 4.2.106. Isolated brooch finds from Kent and Hampshire imply that a marine trade existed between the regions, as the items are not found in East or West Sussex they therefore may have travelled by boat (Richardson 2007: 1-2; Crawford 2010: 9). Brooch finds in east Kent (Wantsum Channel and the Stour Valley) imply a direct link with Scandinavia; such objects are generally discovered in hoards in Denmark (Richardson 2007: 1-2). French pottery was common in Early and Middle Anglo-Saxon Kent; however, Ipswich ware replaced this from the Middle to Late Anglo-Saxon periods with a distribution strongly suggesting coastal trade (Riddler 2004a: 28). The Study Area contains little evidence of Late Anglo-Saxon international trade (Brookes 2007: 5; Crawford 2010: 4).

*Settlement*

- 4.2.107. It is thought that population levels remained stable following the end of the Romano-British period (Fulford 2010: 23). Evidence suggests that Beddingham Roman Villa in East Sussex may have been used by Saxon communities (White 2010: 29), but Hampshire as a whole contains little evidence of the continued use of villa sites. Furthermore, there is not tangible evidence of a post Romano-British period elite authority (Crawford 2010: 9).
- 4.2.108. Anglo-Saxon settlement remains within the Study Area include sunken-featured buildings, such as Little Cliffsend in Kent (**NRHE 1066630**), Near Seaford in East Sussex (**MES1664**), Bognor Regis in West Sussex (**MWS7439**) and Cams Hill in Hampshire (**HANTS MWX55402**). The archaeological footprint of these dwellings is often insubstantial as their remains lie beneath subsequent phases of settlements (Thomas 2007: 7; Crawford 2010: 13). However, there are indications that the first newly created settlements were located on the coastal plains, river valleys and Downs and were constructed of wood (Thomas 2007: 7-8; White 2010: 28). East Sussex has one settlement dating to the early Saxon period at Bishopstone, and West Sussex has a recorded site in Worthing; this lack of

evidence is due to the tendency to place settlements upon higher ground, outside the Study Area (White 2010: 28-9). One site was found in West Sussex near Selsey (**NRHE 462568**) which was revealed by coastal erosion in 1934. The geographical spread of settlement in the Study Area seems generally to have been one of dispersed farmsteads, rather than the nucleated settlements systems seen elsewhere in the country (Thomas 2007: 9; Crawford 2010: 11). Populated areas in Kent appear to have moved inland along the rivers from coastal landing points, with significant numbers present along the Wantsum Channel (Riddler 2004a: 25).

- 4.2.109. An Early and Middle Anglo-Saxon settlement was present within Dover (**MKE7096=NRHE 468066**), with a Middle Anglo-Saxon settlement at Sandwich (**NRHE 1076331**) (Riddler 2004a: 26, 28). Middle Anglo-Saxon settlements are speculated as having been flexible in their location, with either small amounts of movement around one area, or large-scale relocation to a different geographic area (Thomas 2007: 9; Crawford 2010: 11). Later settlements were created in the coastal marshes of the Study Area and moved further inland (Thomas 2007: 8). The Late Anglo-Saxon period saw great development of the Study Area, new settlements were created in Kent, East Sussex and West Sussex, including those which later became known as the Cinque Ports (Brookes 2007: 6; Gardiner 2010a: 30). Social interactions can to an extent be ascertained from settlement, and late Anglo-Saxon Hampshire shows development of an elite site at Portchester (Crawford 2010: 10; Gardiner 2010a: 30). Some of these new towns and villas are known to have been sited around former monuments, such as barrows (Crawford 2010: 5).
- 4.2.110. Existing settlements in these areas were redeveloped, with new houses, improved streets and defences (Brookes 2007: 5). The walls of the Romano-British Saxon Shore fort at Portchester Castle (**HANTS MWX5851, HANTS MWX19259**) were reused to build a settlement. Similarly elements of the Iron Age and Romano-British temple on Hayling Island were reused for building (**HANTS MWX23605=NRHE 892131**). Settlements of this period are seen in the enhanced record to have been present throughout the Study Area, excepting between Sandwich and Dover in Kent, Romney Marsh and Eastbourne in Kent and East Sussex, along the Rivers Ouse in East Sussex and Arun in West Sussex, and between Portsmouth and Southampton in Hampshire.

#### *Farming*

- 4.2.111. New crops were introduced into assemblages at this time, with free-threshing wheat, barley, oats and rye, localized use was also made of other plant foods; the new plants may imply imports (Crawford 2010: 6-7; Stevens 2008: 11). A grain dryer is noted in the enhanced record for the West Sussex HER, at Worthing (**MWS6702**). Emmer and spelt saw a decline through this period and fell from use by the medieval period, however Celtic bean was still cultivated (Stevens 2008: 11). Hampshire saw cattle, sheep, pigs and chickens in both bone assemblages and human isotopic evidence (as referenced in Crawford 2010: 7-8; Hull 2008).

#### *Industry*

- 4.2.112. The number of active industries within the Study Area decreased in the Early Anglo-Saxon period as the region adapted to post-Roman culture (Fulford 2010: 23). The production of salt, metals, ceramics, and foodstuffs all declined. Industry in Kent was limited with only one watermill known to be operational in Ebbsfleet. Meanwhile, long established industrial centres such as Hamwic (which latterly evolved into Southampton) continued to produce quality iron and fine gold items

(Riddler 2004a: 28; Spain 2004: 62; Crawford 2010: 17). Sandwich emerged as a trading centre in Kent around AD 664-5 (**NRHE 1076331**).

- 4.2.113. Minting coins occurred in Southampton from the Middle Anglo-Saxon period, while production in Kent, East Sussex and West Sussex occurred later in the period (Riddler 2004b: 33; Crawford 2010: 1, 17). The mint in Dover produced coins during the reigns of Athelstan and from Elthelred to Harold II (**NRHE 1083315**); another Kent mint has also been noted in Sandwich, which operated during the reign of Edward the Confessor (**NRHE 1083310**). Mints were located in Hastings (**MES1029**) and Lewes (**MES4368**) in East Sussex, and in Chichester in West Sussex (Gardiner 2010a: 31); late Anglo-Saxon mints were also seen on Romney Marsh (**MKE3778** and **MKE4314**).
- 4.2.114. Crafts were still undertaken, with Sunken Featured Buildings in particular associated with such activities (White 2010: 29). Watermills were widespread throughout Hampshire by the end of this period though this is not reflected in the enhanced dataset (Munby 2010: 16).
- 4.2.115. Fishing, salt manufacture, oyster exploitation and trade facilitated by boat were recorded from the Middle to Late Anglo-Saxon periods (Riddler 2004a: 28; Riddler 2004b: 33). Oyster breeding was important particularly in Hampshire, with midden (**HANTS MWX23469**) and bed evidence (**HANTS MWX56146**). The Study Area may contain evidence of fish traps, eel baskets and oyster parcs made of wicker hurdles (Crawford 2010: 8). Salt was especially important in Langstone Harbour throughout this period, with salterns located on Hayling Island (**HANTS MWX23332**) (Allen & Gardiner 2000: xxi; Crawford 2010: 8). The Stour Valley also holds evidence for salt exploitation, (**MKE6575** and **MKE6627**).

#### *Communication*

- 4.2.116. Roman roads probably continued in use in Hampshire, with markets located along them (Crawford 2010: 15). A road is recorded in Kent (**MKE6614**) as is a post-Roman road in Upstreet, Kent (**KENT MWX43103**); none are noted in East Sussex or West Sussex and one is seen in Southampton in Hampshire, which is recorded as a holloway (**MSH3004**). Communication routes also included a causeway in Emsworth Channel, which connected the intertidal islands with the mainland (**HANTS MWX58033**).
- 4.2.117. Late Saxon society was divided into hundreds to permit taxing and administration; each area had a central hundred meeting place, where court was held and often trade took place (Gardiner 2010a: 30). Such meeting places in the Kent Study Area are mainly on Romney Marsh, with one along the Wantsum Channel and one at Folkestone (Lawson 2004a: 30). In West Sussex these were well distributed, with some present near the coast in the Study Area (Gardiner 2010a: 31). East Sussex also saw a fair distribution, with more sites located in the Study Area (Gardiner 2010a: 31).

#### *Religious Structures*

- 4.2.118. The earliest minster churches in England are located in Kent, such as the 6<sup>th</sup> century Anglo-Saxon church at Richborough Fort (**MKE8090**); religious establishments were significant landholders and traders at this time (Carder 2004: 31; Riddler 2004a: 28; Riddler 2004b: 33). West Sussex had minster churches near Selsey, along the River Arun and in Steyning (Gardiner 2010a: 31). East Sussex minster churches were located in Lewes, Eastbourne and Bexhill (Gardiner 2010a: 31). St Augustine's Well at Cliffs End in Kent is significant as the location of

a natural spring where St Augustine camped with his monks on reaching England in the spring of AD 597 (**MKE8058=NRHE 469536**). Selsey in West Sussex had a Saxon cathedral, which is now submerged (Robinson 2010a: 8).

- 4.2.119. Monasteries are known from within the Study Area, particularly east Kent, though monasteries in the enhanced record are present in West Sussex (**MWS1367**); their influence over surrounding areas is not understood, but an involvement with industry is likely (Thomas 2007: 10).
- 4.2.120. Churches are known to have been sited on and around existing monuments such as barrow complexes (Crawford 2010: 5). The distribution of religious sites in the Study Area is comprehensive, with absences between Sandwich and Folkestone in Kent, a large gap between Rye and Brighton in East Sussex, and a small gap between Gosport and Southampton in Hampshire. Religious buildings were almost exclusively the only stone-built structures in Hampshire, and were interesting in that they did not reuse the available Romano-British building materials (Crawford 2010: 13).

#### *Burial*

- 4.2.121. Early Anglo-Saxon burials occurred mainly as furnished inhumations and are therefore distinctive and informative (Riddler 2004a: 25; Crawford 2010: 1-2, 13). Considering the lack of other evidence, cemeteries form a large proportion of the available information on this period (Riddler 2004a: 25).
- 4.2.122. Very Early Anglo-Saxon burials are poorly represented, but demonstrate links with the communities from which they originated; East Kent has large numbers of Early Anglo-Saxon cemeteries with hundreds of burials (Riddler 2004a: 25-27), as at Sandwich (**MKE7222** and **NRHE 468288**), Ramsgate (**MKE8007**) and Wingham (**NRHE 466435**). It appears likely from the burial evidence that landing points for migrants were located along the northern estuary and east coast of Kent, particularly at river mouths; within the Study Area, Wantsum Channel, Dover and Folkestone appear to have been key locations (Riddler 2004a: 25). Thirteen shallow graves with traces of coffins, were found associated the church at Dover Castle (**MKE7003=NRHE 467951**). Early Anglo-Saxon burials on Thanet Island had grave structures, while no markers were seen on the mainland (Riddler 2004a: 26).
- 4.2.123. Burial structures became more common towards the mid Saxon period in East and West Sussex (White 2010: 29). The burial of a man from within the Claudian ditches at Richborough Fort in Kent has been interpreted as a Saxon warrior serving with the Roman garrison (**MKE8064=NRHE 469550**). Reuse of existing monuments, notably barrows, is known within the Study Area, as at St. Margaret's at Cliffe in Kent (**MKE6915** and **MKE6919**), near Seaford in East Sussex (**MES1643**) and at Bevis' Grave in Hampshire, this may have demonstrated the taking of a territory, or appropriation of existing boundaries (Crawford 2010: 4-5; Crawford 2010: 5). Additionally, former monuments formed the basis of some deviant cemeteries, which were also placed at boundaries, meeting places, routeways and promontories – these also provide evidence of social control (Crawford 2010: 5, 10). Burials thought to represent an execution grave, perhaps from a gallows, were found at Ford in West Sussex (**MWS6290**). Towards the Middle Anglo-Saxon period Christianity eradicated regional differences in burial styles (Riddler 2004a: 28). Across the Study Area burial is evidenced through both individual burials and cemeteries of inhumations and cremations; no records are seen in the enhanced dataset for body disposal between Folkestone and the Pevensey Levels in Kent and East Sussex.

- 4.2.124. Grave goods are the most prevalent of finds from the early Saxon period; therefore they are the main source of information (White 2010: 28). Ceramics and early forms of cruciform brooches have been found in graves from the Early Anglo-Saxon period (Riddler 2004a: 25-26). While early evidence from East Sussex includes jewellery, pottery, glass and weaponry; with little Roman evidence (White 2010: 28). Kent demonstrates the strongest continental ties of the Study Area, with Hampshire having the weakest; however burials seem rich throughout the Study Area (Crawford 2010: 16). Dress styles can be charted in Dover, with female costume (generally based upon brooches, pins, necklaces, pendants, beads and belt fittings) showing more variation than male (Riddler 2004a: 26), although male variation is found in accompanying weaponry (swords, spears, knives, axes, arrowheads and shields) (Riddler 2004a: 26).

#### *Water Management*

- 4.2.125. Activities within Kent involved efforts to reclaim land and prevent subsequent inundation at Romney Marsh (**Figure 6**): the Rumensea Wall was created in the eighth century as a result (Young 2004: 3). In addition Wantsum Channel in Kent was silting up throughout this period and by the eighth century was only 600m wide (**Figure 5**).

#### *Viking Activity*

- 4.2.126. Viking raids characterised this period, but are difficult to identify archaeologically (Brookes 2007: 5; Crawford 2010: 18). Attacks on the Kent Study Area began in the Middle Anglo-Saxon period: Reculver Abbey was pillaged, Sandwich harbour was attacked, Romney Marsh was raided and Vikings wintered on Thanet Island (Lawson 2004b: 32). In the Late Anglo-Saxon period a naval engagement occurred at Stourmouth, an abbey was pillaged in Folkestone and the Viking army camped at Appledore (Lawson 2004b: 32). Later, Thanet and its Minster Abbey were raided, and an army landed at Sandwich, then marched to the Isle of Wight (Lawson 2004b: 32). A findspot relating to this activity is seen in Lewes, East Sussex, where a Viking ring was discovered (**MES1482**).

#### *Defence*

- 4.2.127. Viking aggression drove increased military and social structuring; Portchester in the Hampshire Study Area was recorded as needing increased defences and maintenance following attacks (Brookes 2007: 5; Crawford 2010: 18). The Romano-British fort at Richborough saw additions during this period (**MKE27181**) and a possible ring fort is noted at Cliffs End in Kent (**MKE8021= MKE8024**). Defences to combat the Viking raids included *Burhs* (defended settlements), such as Southampton, (**NRHE 1074367**) Portchester (**HANTS MWX851, NRHE 623248** and **NRHE1074334**), Chichester (**NRHE 1073917**), Hastings (**MES1023** and **NRHE 1074122**), a *Burh* of unknown location in East Sussex (**MES5899**), a possible *Burh* on the inland side of Romney Marsh (**MKE2708**) and Dover (**MKe17900**). These formed part of a network of maritime defences, including beacons (Brookes 2007: 5-6) and were also located along rivers to inhibit Viking advances inland (Gardiner 2010a: 30). Those located along rivers were placed along the River Arun in West Sussex; in Lewes in East Sussex (Gardiner 2010a: 31).

#### *Ports*

- 4.2.128. Dover was an important port during the Middle Anglo-Saxon period, and possibly in the Early Anglo-Saxon period (Riddler 2004a: 28), it contained the head-port of a group of south-east coast towns that were responsible for undertaking ship-service

for the Saxon kings (**MKE7096=NRHE 468066**). East Sussex had ports along the River Ouse in Lewes, and at the coast in Eastbourne, Hastings and Winchelsea (Gardiner 2010a: 31). West Sussex ports were located somewhat inland along the Rivers Arun and Adur (**figure 10**) (Gardiner 2010a: 31). Ports in Hampshire of this period were located at Portsmouth and Southampton, both of which were important. The Cinque Ports were created in the Late Anglo-Saxon period c. AD 1050 to link important ports in Kent and East Sussex – most of which were located within the Study Area (Lawson 2004c: 52). Sandwich gained an official port in AD 1023 (**NRHE 1076331**).

### *Boats*

- 4.2.129. Throughout the Anglo-Saxon period boats increased in size, capacity, and seaworthiness (McGrail 2004: 210). Although few examples exist in the archaeological record, the evidence suggests that boat building following a long established Nordic tradition of ‘plank-first’ in reference to the technique of constructing the hull first. Developments in the construction included tholes spiked to the top strake (opposed to lashed); narrower and shorter planks and variations were seen in fastenings (McGrail 2004: 211). All excavated boats from this period were rowed, rather than sailed (McGrail 2004: 212). Further changes in this style were seen in the ninth century, when a larger keel, V-shaped section and deeper hull facilitated the adoption of sail; a short keelson was employed as a mast step (McGrail 2004: 214). An example of a boat influenced by this style was found near Faversham in Kent (outside the Study Area) (McGrail 2004: 218). The Graveney boat was built in the Nordic style, but also had an almost flat bottom, a shallower hull, proportionally massive timbers and plank-fastening nails driven through treenails (McGrail 2004: 219-220).
- 4.2.130. The ‘cog’ also likely developed in the ninth century; these vessels were double-ended with a single sail and an abrupt junction between bottom and posts (McGrail 2004: 222). These may have been active within the Study Area, though none have been located within it. Near Bexhill in East Sussex a flat-bottomed clinker built boat of oak, measuring 9ft x 6ft x 18 inches was discovered in 1887 (**ESUSSEX MWX50063**), this was driven by oars.
- 4.2.131. Despite these developments, simpler styles of vessel were still employed, as demonstrated by the find of a logboat in Emsworth Channel, Hampshire, which was radiocarbon-dated to AD 500+/- 100 (**NRHE 1386016**; pers. comm. in Crawford 2010: 8). A similar find of a logboat was made in Ramsgate, Kent and was radiocarbon dated to AD 970-1160 (**NRHE 1193961**).

### **Medieval (1066 to 1539)**

- 4.2.132. The Norman Conquest began this period in AD 1066. No sudden change in material culture occurred in AD 1066 and there was continuity in industry, seen in coin and pottery evidence (Munby 2010: 3). Pottery was represented by both local wares and those imported through the ports, particularly Southampton (Munby 2010: 15, 17).

### *Settlement*

- 4.2.133. Nucleated settlement and open field systems characterised this period; however within the Study Area in Kent, East Sussex and West Sussex, dispersed hamlet farmsteads were the norm (Brookes 2007: 6), as seen at Ebbsfleet (**MKE15892**), Minster (**MKe17355**) and South Foreland (**MKE26173**) in Kent. This pattern often included the abandoning of nucleated settlements (Brookes 2007: 6; Weekes

2007b: 6). The pattern in Hampshire was of small market towns and large urban centres (Munby 2010: 7), though farms were also common (**HANTS MWX39280** and **HANTS MWX339**). Settlements migrated slightly to valley sides with better soils (Munby 2010: 4) and village size increased through the earlier medieval period (Munby 2010: 6). Increased settlement and resource exploitation were seen in Romney Marsh over this period (Draper 2004: 56). Medieval borough status was given to some towns; including Sandwich and Fordwich (**MKE9450=NRHE 623294** and **MKE9444=NRHE 623269**) in Kent and Seaford in East Sussex (**MES1750**). Brighton is recorded as likely being a medieval planned town, this interpretation results from analysis of the street plan (**MES491**). Manorial sites are known throughout the Study Area, with some in the Wantsum Channel in Kent (**MKE6379**), on Romney Marsh (**MKE3750**), the Pevensey Levels (**MES5000**), across West Sussex (**MWS6459** and **MWS1847**), around Portsmouth (**HANTS MWX23494**) and Southampton (**HANTS MWX25825**) (Munby 2010: 7).

- 4.2.134. During the later medieval period a series of plague epidemics had a significant impact on the population of southern England. This was particularly severe within the Study Area in Kent and Hampshire due to the high traffic through ports (Bower 2004: 66; Munby 2010: 6). The increased death rate coupled with communities relocating to avoid contamination resulted in diminishing village sizes, and in some cases the desertion of settlements. In Kent abandoned medieval villages have been identified around Deal (**MKE7367** and **MKE7169=NRHE 468145**) and more have been identified on Romney Marsh. Across East and West Sussex examples are seen along the coastal plain, South Downs and some are seen on the High Weald (Pennington and Platt 2010: 48). In East Sussex only around Brighton and Hove are sites lacking. In West Sussex sites are seen throughout the Study Area, the deserted medieval village at Atherington (**MWS3385**) was inundated and is visible only during very low tides (West Sussex County Council 2011a). In Hampshire, deserted and shrunken villages are seen around Portsmouth (**HANTS MWX38684**) and Southampton (**HANTS MWX38848**). Abandonment due to inundation by the sea is not uncommon within the Study Area. Both Cudlow, east of Middleton-on-Sea in West Sussex (**NRHE 392881**) and the original site of Hove in East Sussex (**NRHE 398912**) were medieval settlements lost to inundation by the sea. The walls of Winchelsea in East Sussex were breached by the sea in this period and the Church of St. Thomas was washed away before the town was re-sited (Martin 2010: 44).

#### *Farming*

- 4.2.135. Field systems are seen in the enhanced record throughout the Study Area, these are often visible as cropmarks, with absences only in the Pevensey Levels of East Sussex. Within Hampshire from the exploitation of uplands gradually gave way to the utilisation of lower lying land, perhaps as a result of overworking the upland soils (Munby 2010: 4). Farms had small areas of land tied to them, but larger enclosed areas did exist and these were under secular control (Hind 2010: 5). A general move was seen in Hampshire from agriculture to pasture, with transhumance facilitating summer grazing; although a development in crops was noted, with pulses, two-row barley and oats (Munby 2010: 4, 8-9). West and East Sussex saw the development of farming specialists, selectively growing crops suited to the soils (Gardiner 2010b: 38). Wheat and barley were exploited, with legumes grown to improve soils (Gardiner 2010b: 38). The coastal plain was known for producing wool, sheep were also kept in the wetland areas (Gardiner 2010b: 38).
- 4.2.136. Evidence for subsistence items is more varied, with sea birds, cattle, sheep and pigs exploited at the earlier medieval site of Townwall Street in Dover (Allison 2007:

11-12). Beer was also malted and brewed at Townwall Street (Allison 2007: 11-12); breweries were common throughout the Study Area, as at Sandwich in Kent (**MKE8100=NRHE 469610**). Manorial sites were relatively self-sufficient in richer foods, with fishponds (**MES4099**, **MWS1596** and **HANTS MWX30900**), rabbit warrens (**MWX51328**) and deer parks (**MWS1680** and **HANTS MWX54149**) (Munby 2010: 7). Deer parks were much more common in the West Sussex Study Area than East Sussex (Gardiner 2010b: 39), as evidenced by only West Sussex having records for such sites in the enhanced dataset.

#### *Industry*

- 4.2.137. Guilds became significant during this period (Hind 2010: 7), as craft specialism became more prominent; one guildhall is noted in Kent (**MKE7181**). The Dover mint continued production through 1066 until its closure in 1158 (**MKE7137** and **NRHE 468107**), another Kent mint is seen at Hythe (**MKE4314**), with one also in East Sussex on the Pevensey Levels (**MES4737**).
- 4.2.138. The Study Area was significant for salt production with differing techniques of extraction used along the coast. Salt mounds were common in Coastal Stretch 2, as at Chislet Marshes (**KENT MWX19399-MWX19406**), Monkton Marshes (**MKE6553**) and along the Stourmouth Valley (**KENT MWX43125**). Ditches seen as cropmarks are also noted in association with salt mounds, these are thought to have facilitated water movement for the salt industry (**KENT MWX43178**). Romney Marsh in Kent was a particularly important salt production area (Draper 2004: 56). The Pevensey Levels in East Sussex were also significant for salt production, with another site seen near Seaford. In West Sussex such activity was seen along the River Adur and around Chichester Harbour. Salterns were used in Hampshire, Portsmouth Harbour was particularly important (Munby 2010: 15), with the Great Salterns site (**PORTS MWX625**) located on the east coast of Portsea Island and other salterns near Portchester (**HANTS MWX54742**).
- 4.2.139. Oyster breeding was an essential activity in Langstone Harbour (Allen & Gardiner 2000: xxi), with beds, pits and a jetty seen in the enhanced record on Hayling Island (**HANTS MWX58032**). Fishing was also an important activity, as seen on Romney Marsh in Kent; harbours are likely to contain bones with evidence of processing (Draper 2004: 56; Munby 2010: 17). Townwall Street in Dover contained fishing items, thousands of probably net-caught herring remains, and cod and whiting caught with line and hook, all originating from the North Sea (Allison 2007: 11). Herring were commonly caught in Kent, East and West Sussex during this period (Bleach and Gardiner 2010: 42). Evidence is known of a probable fish market site in Southampton (Munby 2010: 8, 17); a fishhook (**HANTS MWX60644**) and harpoon (**HANTS MWX56149**) were found in Hampshire also.
- 4.2.140. Supplying commercial and naval ships was essential within ports of the Study Area, as emphasised by evidence on the *Mary Rose*, of salt beef, salt cod, apples and plums; along with remains of clothing, shoes, bedding and sails (Munby 2010: 18). As a response to this trade, customs houses were located at the coast, such as at Sandwich (**MKe17799**), though this site is now significantly inland.
- 4.2.141. Markets in early medieval Kent were markedly distributed along the coast; later medieval markets had spread inland also, but were still present in the Study Area (Lawson 2004d: 50-1). In East and West Sussex markets often provided only for the local population (Austen 2010: 104), these were fairly evenly distributed throughout the two counties (Bleach and Gardiner 2010: 43). Conversely, Hampshire saw a trend towards rural settlements supplying market towns (Munby

- 2010: 8); the site of a possible market place is recorded in Alverstoke, Hampshire (**HANTS MWX54946**).
- 4.2.142. Early medieval textile production was widespread within towns in Hampshire, but was seen to decline through the middle of the medieval period (Munby 2010: 15). Textile production was common within small settlements in later medieval times; evidence includes dyeing, fulling mills and tenter fields (Munby 2010: 15). Leatherworking is documented, but difficult to locate archaeologically (Munby 2010: 15); a tannery is noted in the enhanced record for Sandwich, Kent (**MKE15342**).
- 4.2.143. Brick and tile manufacture occurred in Hampshire (Munby 2010: 14), as evidenced by kilns at Portchester Castle (**HANTS MWX28004**) this also was seen nearby in West Sussex at a site near Chichester Harbour (**MWS4724**). Pottery kilns are seen in the enhanced record for Romney Marsh in Kent (**Mke20991**) and near Hastings in East Sussex (**MES882**). Stone was known to have been imported through coastal trade from the South-West and Isle of Wight into both Hampshire and Sussex (Munby 2010: 14), as such, stone yards are known from Hereson in Kent (**KENT MWX43739**). Timber was traded for firewood, charcoal, construction and tanning, with an important site known at Cakeham in West Sussex (Munby 2010: 14-15), oak and softwood were also imported from the Baltic in the later medieval period (Munby 2010: 14). Metalworking is seen from near Littlehampton in West Sussex, where a blacksmiths workshop was discovered (**MWS7413**); near Rye two bloomeries were also noted (**MES2136** and **MES3929**). This industry is not well represented archaeologically within Hampshire and it is likely that production was small-scale and local (Munby 2010: 15).
- 4.2.144. Tidal mills and windmills came in during the 12<sup>th</sup> century (Munby 2010: 16). Two windmills were noted at Richborough (**MKE8080=NRHE 469584** and **NRHE 469609**) and a tower windmill was located alongside Dover Castle (**MKE7129=NRHE 468099**). In East Sussex a record is seen for a mill (**MES7019**) on the Pevensey Levels and a windmill near Seaford (**ESUSSEX MWX50034**). West Sussex has many mills, including a mill in Bosham (**MWS5975**) and a nearby watermill (**MWS1857**) with two millponds (**WSUSSEX MKM1931** and **WSUSSEX MKM1933**). Hampshire contains Brockhampton mill (**HANTS MWX58104**) and a mill dame in Southampton (**HANTS MWX25739**); in Coastal Stretch 13 a Bronze Age barrow was reused as the foundations for a medieval windmill (**HANTS MWX23594**). Water power was important in Kent, with watermills (particularly for corn) located in the Stour Valley (Spain 2004: 62-63). Watermills were also noted in Hampshire, as at Forton Lake (**HANTS MWX19289**).
- 4.2.145. Shipbuilding was undertaken along the coast of the Study Area, with a dry dock located at Portsmouth (Munby 2010: 18); a boatbuilding site is noted at Bursledon (**HANTS MKM852**) with a shipyard in Southampton (**HANTS MWX5582**). Such sites tended to begin as fishing landing places, then became slipways for boat manufacture; subsequent boat constructions were generally offset, resulting in sites moving along the waterline (Milne 2007: 8).

#### *Communication*

- 4.2.146. Communication was important for trade routes in this period, different forms if such routes are seen throughout the Study Area, excepting between Sandwich and Romney Marsh in Kent, and around Portsmouth in Hampshire. In Kent's Coastal Stretch 2 a feature in Upstreet overlies a Romano-British road and may represent an attempt to divert the original road (**KENT MWX43103**). A long-distance road ran from Southampton to the midlands during this period (Munby 2010: 17). Roads were seen in Kent's Coastal Stretch 2 (**MKE7764**) and on Romney Marsh

(**Mke20991**), on the Pevensey Levels in East Sussex (**MES7339**) and in West Sussex near Chichester (**MWS1300**). Trackways were noted in Kent's Coastal Stretch 2 (**KENT MWX43157**), on Romney Marsh (**MKe17233**), around Seaford in East Sussex (MES2736) and throughout West Sussex; none were noted in Hampshire. Holloways are recorded in Kent (**KENT MWX43060**) and East Sussex (**MES2736**). A drove road is seen on the Pevensey Levels in East Sussex (**MES7413**) and causeways are seen in the enhanced dataset for Kent's Coastal Stretch 2 (**MKE6581**), Rye in East Sussex (**MES2299**) and in Southampton, Hampshire (**MSH1656**). Social control is seen in the enhanced dataset with a gallows in the Wantsum Channel area (**MKE7188**) and a whipping post on the Pevensey Levels in East Sussex (**MES4709**).

#### *Religious Structures*

- 4.2.147. Religious architecture saw numerous stylistic changes during this period (Munby 2010: 3). Religious structures of all types, including churches, priories, monasteries, hermitages, cathedrals and abbeys were seen throughout the Study Area (Taylor 2010: 46). Some religious centres were intricately linked to military sites: such as a monastic grange (**HANTS MWX19683**), located north of a motte and bailey castle in Hampshire. Monastic sites were widespread during this period, it is suggested that few lay in the Hampshire Study Area (Roebuck 2007: 7). However, Hampshire has an even distribution of sites in the enhanced dataset, with East Sussex and Kent seeming to have fewer sites overall. Continuity of use was seen at some monasteries between Anglo-Saxon and medieval times, as in Thanet and Folkestone (Roebuck 2007: 8). Hospitals are likely to have been linked with religious establishments; a leper hospital of St Mary Magdalene was in operation in Coastal Stretch 13 at this time (**HANTS MWX18969=NRHE 1345167**), as was the leper hospital of St. Leonard near Seaford in East Sussex (**MES1690**). Although some hospitals were independent, such as Maison Dieu, a public hospital in Dover (**MKE6972** and **MKE9160** and **SM KENT 45**). Hospitals are seen across the Study Area, but are rather few in number during this period.

#### *Burial*

- 4.2.148. Burial has been noted only in specific locations of the Study Area, perhaps due to variations in recording practices. Evidence in the enhanced record is restricted to around Sandwich in Kent, as well as around Dover and Hythe, with some burials noted on Romney Marsh. Only near Hove was burial noted in East Sussex, West Sussex has evidence for burial along the River Arun and Hampshire is well furnished for evidence of body disposal. Burial was mainly in the traditional Christian style during the medieval period (Weekes 2007b: 6). However, evidence exists of superstitions continuing in burial rites, with some individuals buried with pebbles in their mouths (outside the Study Area) (Weekes 2007b: 6). Burial evidence from this period is a valuable way to access less historically visible groups, such as lepers and Jews (Weekes 2007b: 6). Baby burials are known from domestic contexts, with two newborns found at Townwall Street, Dover (Allison 2007: 11).

#### *Water Management*

- 4.2.149. Water management became more common in this period, with water channelled for mills and opened up for fishing (Munby 2010: 16). The Delf at Sandwich in Kent is an artificial stream which provided the town with its only water supply until the end of the 19<sup>th</sup> century (**MKE7190=NRHE 468202**). Land reclamation became more intensive in this period, with coastal sea defence banks placed at strategic locations to open up space for grazing and cultivation. These were seen most intensively around Portsmouth in Hampshire, with some on Romney Marsh and fewer on the

Pevensey Levels. At Portchester, defence banks were placed to the north, south and east of Portchester Castle (**HANTS MWX60546** and **HANTS MWX60523**). Much of the reclamation of Romney Marsh in Kent occurred in this period (Draper 2004: 56). The Monk's Wall, a seawall comprising a ditch and bank, built prior to 1280, extends between Stonar and Cliffsend in Kent and provided protection to the lower lying hinterland (**MKE7179=NRHE 468169**). Areas of agricultural ridge and furrow thought to be medieval in date are often visible in reclaimed areas, as in the Stour Valley, Kent (**KENT MWX43347**, **KENT MWX43310**, **KENT MWX43419** and **KENT MWX43367**) and near Farlington Marshes in Hampshire (**PORTS MWX683**). Flood defences helped to maintain the reclaimed areas, seen around the Wantsum Channel (**Figure 5**), Romney Marsh (**Figure 6**), the Pevensey Levels, along the River Cuckmere (**Figure 8**) and on Farlington Marshes.

- 4.2.150. Areas with a high water table required special agricultural practices, such as the use of haystack stances in Kent along the Stour Valley; these were rounded earth mounds used to store dry hay in environments prone to flooding. These features would have been constructed as and when necessary, and thus they appear individually (**KENT MWX43221**) or in clusters (**KENT MWX43298**).

#### *Defence*

- 4.2.151. Castles also saw transitions in style, capacity, and function during this period (Munby 2010: 3). Several examples within the Study Area had little defensive function, such as Warblington Castle (**HANTS MWX23493**). However several others were cited intentionally in coastal locations presumably due to the defensive attributes offered (Munby 2010: 13). This was evidenced by the continual redevelopment at sites such as Portsmouth; Portchester Castle (**HANTS MWX5851**) which showed particularly complex phases of development; and the castle at Southampton (Munby 2010: 12-13). The West Sussex Study Area has no records of crenellated manors, with all castles taking the form of earth and timber castles, some improved by stone (Jones 2010: 51), these were seen along the River Arun. East Sussex did contain crenellated houses in Walland Marsh, with a stone castle in Pevensey (**MES4712**), an earthwork castle at Hastings and earthworked castles along rivers (Jones 2010: 51). Dover Castle, a Grade I listed building, was constructed by William the Conqueror immediately after the Battle of Hastings and was continually developed through the period (**MKE6942=NRHE 467778**). Motte and bailey castles were created, such as one located near Apple Dumpling Bridge in Hampshire (**HANTS MWX22561=SM 24322**) and one at Mary-le-Bone in Sandwich, Kent (**MKE7283**).
- 4.2.152. Walled towns are quite common in the Study Area (Ward 2004: 53-55); Pevensey in East Sussex and Chichester in West Sussex both had existing town walls (Jones 2010: 50). Walled towns in East and West Sussex were generally located inland along river valleys, rather than directly upon the coast (Jones 2010: 51) as seen in Arundel (**MWS2689**). Dover town was partially walled in the 14<sup>th</sup> century, with repairs first documented in the 15<sup>th</sup> century (**MKE6955**). Sandwich was given town walls and several gates to protect it after gaining medieval borough status (**MKE9450=NRHE 623294** and **MKE40292=MKE7186=NRHE 468190**, **MKE7294=NRHE 468364** and **MKE7295-MKE7302**). Much of the defence of Romney Marsh occurred in this period (Draper 2004: 56) (**MES2184**). In the late medieval period town walls were given to Southampton and Portsmouth (**NRHE 462076**); these were required due to their coastal location and subsequent vulnerability (Munby 2010: 12). Portsmouth was also well defended by a variety of sites (**NRHE 462076**) such as towers (**PORTS MPM23** and **PORTS MPM20**) and batteries (**PORTS MWX489** and **HANTS MWX6507**).

### Ports

- 4.2.153. Ports would have been significant for overseas trade, but also for coastal trade around Britain (Munby 2010: 17). The Cinque Ports in Kent and East Sussex (of Hastings, New Romney, Hythe, Dover and Sandwich) and their member ports were particularly significant in the earlier and later medieval periods (Lawson 2004c: 52). The ports across Kent, East Sussex and West Sussex suffered from silting and shingle accumulation (Lawson 2004c: 52). This resulted in only Dover being viable for continual development after AD 1500 (Lawson 2004c: 52), though Dover only continued by relocating to a more stable harbour 1km to the west in the Archcliffe area at the end of the 15<sup>th</sup> century (**MKE7100**). The port of Stonar at present Sandwich in Kent became inundated and was eventually destroyed between 1365 and 1366 (**MKE7175=NRHE 468157=SM KENT 204**). Rye (**Figure 7**), Winchelsea, Margate, Ramsgate, Faversham, Fordwich, Deal, Walmer, Folkestone, Lydd, Pevensey and Seaford were all significant at different times during this period (Milne 2007: 8). Kent's Wantsum Channel was narrowing during this time, but ships were still able to pass through (Young 2004: 4); the northern side of the channel was being eroded by the sea (Young 2004: 4) (**Figure 5**). The River Stour in Kent was made navigable during the medieval period, linking Canterbury to Richborough Port and Fordwich (**NRHE 1341693**). Presumably linked is a substantial ditch, visible on aerial photographs, c.10m wide and flanked by banks, running for 600m roughly parallel to the River Stour (**KENT MWX43344**).
- 4.2.154. In East and West Sussex, shingle spits were accumulating along the coast, causing problems for ports such as Lewes, Bramber and Pagham (**Figure 11**) (Robinson 2010a: 8). Ports including Seaford in East Sussex and Old Shoreham (**Figure 10**) in West Sussex fulfilled the roles of the obstructed ports until the later medieval, when they too experienced issues and their access had to be widened (Robinson 2010a: 8). New ports such as Newhaven (**Figure 9**) were created to combat the problem, but these were a temporary solution which saw the same issues (Robinson 2010a: 8). In Hampshire Southampton was a significant port, but Portsmouth (**PORTS MWX482**) became both a competitive port in the 12<sup>th</sup> century and a naval base; this resulted in it being larger than Southampton by the end of the medieval period (Munby 2010: 7; Hind 2010: 19). Better infrastructure was required to access the port at Portsmouth, so roads were upgraded (Munby 2010: 17).

### Boats

- 4.2.155. Wrecks become much more common in the dataset than in previous periods (**Figure 14**). The Nordic tradition of boatbuilding continued into this period, which has a good survival as wrecks (McGrail 2004: 223). These boats were characteristically almost double-ended, had smooth keel/post transitions, were plank-first, had thin split planks which were often decorated and strakes were fastened in a clinker style (McGrail 2004: 226-227). Evidence for Nordic style boats near the Study Area is comprised of reused timbers for structures at waterfronts in London (McGrail 2004: 223). This style became less common from the thirteenth century, though such vessels were still visible on town seals, as evidenced within the Study Area at Sandwich (McGrail 2004: 230). In the thirteenth century the cog became a popular vessel used by the Hanseatic League, which traded around the continent and into Britain and Ireland (McGrail 2004: 232).
- 4.2.156. From the thirteenth century the Nordic vessels became steadily larger and more complicated, with decks, fore and aft castles, tops, crossbeams, shorter planks and the loss of decoration (McGrail 2004: 231). The end of the thirteenth century saw a move towards sawn planking on English galleys (McGrail 2004: 231). This may

have been a response to the appearance of the cog, which had a straight, raked bow and sternposts, a deeper hull, castles at the bow and stern, a centreline rudder and sawn planking (McGrail 2004: 231-233). Topsails came into use in the fourteenth century, as did bowsprits and bowlines (McGrail 2004: 232). At the end of this period the cog and Nordic boats looked very similar (McGrail 2004: 232). It is suggested that some of the reused planks from London may have originated from cogs (McGrail 2004: 234). Frame-first styles of construction came in during towards the end of this period; this resulted in a stronger, more seaworthy ship (McGrail 2004: 245, 247).

- 4.2.157. The *Grace-Dieu* (**HANTS MWX18094=NRHE 1082121**) is designated under the Protection of Wrecks Act (1973). This was built in the Nordic tradition between 1416 and 1418 by King Henry V and was found on the River Hamble near Southampton. It emphasizes the potential to locate wrecks of this period within the Study Area (Munby 2010: 18). The Brighton Marina shipwreck (**NRHE 1082104**) is also designated under the Protection of Wrecks Act (1973). The shipwreck dates to the late 15<sup>th</sup> century or 16<sup>th</sup> century and comprises the remains of an unidentified armed vessel, including bronze and iron guns and other artefacts, as well as shipwreck structure that is occasionally exposed. Wrecks in the enhanced dataset are seen in Sandwich in Kent, in western East Sussex and a large number are seen in Hampshire. These include timber from a possible medieval logboat which was discovered east of Sandwich during the construction of the wastewater scheme (**MKE15424**). Just off North Foreland a wooden sailing vessel, carrying armour and other commodities stranded while returning to England from Flanders in 1298 (**NRHE 1178212**). The majority of wrecks were found along the River Hamble in Hampshire (**HANTS MKM663** and **HANTS MKM826**).

#### **Post-medieval (1540 to 1900)**

- 4.2.158. This period saw a change in social structure from the feudal system to a capitalist class system (Hind 2010: 1, 7). In 1540 the Protestant Reformation dramatically affected social attitudes and had a lasting impact (Hind 2010: 4).

#### *Material Culture*

- 4.2.159. Material culture saw a gradual change, particularly in pottery and decoration (Munby 2010: 3). The distribution of PAS artefacts appears to be predominantly around the larger trading towns, especially in Coastal Stretch 2. Finds are seen around Folkestone in Coastal Stretch 4, Hastings in Coastal Stretch 6 and Bramber in Coastal Stretch 9. However, Coastal Stretch 5 Romney Marsh also shows a large number of PAS finds, as does Coastal Stretch 8 around the River Cuckmere, Coastal Stretch 10 along the Arun, Coastal Stretch 11 in the rural area above Middleton-on-Sea, Coastal Stretch 12 around Chichester Harbour and Coastal Stretch 16 along the River Meon.

#### *Settlement*

- 4.2.160. Changes in house form occurred over the course of this period (Munby 2010: 3) and town sizes increased dramatically through the addition of both domestic and commercial buildings. As the demand for town accommodation grew across the region, so the populations of each town increased. This was tempered somewhat by successive waves of disease and plague which stifled population growth, most notably in the 1340s when Bubonic Plague devastated the country (Bower 2004: 66). By the end of the 16<sup>th</sup> Century, a third of Kent's population lived in small towns (Betts 2004: 70). Coastal Stretch 2 has the least number of towns in the Study Area which is perhaps due to their propensity to flood.

- 4.2.161. As the feudal system broke down, communities in what is now Hampshire lived in rural nucleated settlements. These were part of a system of defined nucleated villages (Hind 2010: 2). Farmers also sought new areas of land which were remote enough to efficiently farm whilst remaining close enough to villages to maintain their market connections (Hind 2010: 10). Away from the rural economy, people were also migrating towards towns such as Southampton and Portsmouth which were established urban centres (Hind 2010: 2, 10). This migration from rural settlements to larger conurbations was mirrored throughout the Study Area, and indeed, the country as a whole as the Industrial Revolution began to have an impact. The lure of paid employment amongst rural aspirants increased from late 18<sup>th</sup> Century onwards.
- 4.2.162. Short-term relocation of populations also occurred during this period, as workers followed large construction projects (Hind 2010: 31-32). Sufficient housing would have been required on such occasions, perhaps resulting in the temporary expansion of existing settlements (Hind 2010: 31-32). Numerous post-medieval gardens were developed for the urban population, such as at Haslar Royal Naval Hospital (**HANTS MWX52410**) and Gosport Park (**HANTS MWX52054**) in Hampshire, in general many public parks were present around Portsmouth. Seaside towns were a new phenomenon in this period and these were often based at small coastal settlements which gradually gained hospitality facilities and grew in size (Brodie 2007: 21). This trend led to the creation of inland resorts alongside villages (Brodie 2007: 21). Entirely new leisure settlements were also created, though these were not always successful, as in the case of Hayling Island, Hampshire (Brodie 2007: 21). The Church of England became a significant landowner, but this did not have much effect on existing settlement (Hind 2010: 2). Monasteries were redistributed, providing building materials, land and were occasionally renovated to form country houses (Hind 2010: 2, 14-15). The population of Romney Marsh declined during this time, due to the effects of economy and disease (Draper 2004: 56).
- 4.2.163. Immigration was known from this period, drawn by increasing wealth in the Kent area (Edwards 2004: 86). Initial settlement appears to have been made at the large ports of Sandwich and Dover and then moved inland (Edwards 2004: 87). Hampshire ports attracted Chinese and lascar people associated with maritime trade and travel (Hind 2010: 18). Jewish people moved to Portsmouth, and Southampton saw two influxes of French immigrants (Hind 2010: 18).

#### *Farming*

- 4.2.164. At the start of the 17<sup>th</sup> century almost all the land was enclosed and was split between arable and pastoral use (Betts 2004: 70). Horse-drawn ploughs were used, creating ridge and furrow, which is noted throughout the Study Area, particularly along the fertile Wantsum Channel, Romney Marsh, between Eastbourne and Newhaven in East Sussex, along the River Adur and around Chichester Harbour in West Sussex, and around Portsmouth in Hampshire. Field boundaries visible as cropmarks are noted across the counties, in undeveloped areas, with exceptions seen mainly around Brighton and Hove in East Sussex. Haymaking was an essential activity in the Kent Study Area, and is particularly visible in the distribution of haystack stances (**MKE15885** and **KENT MWX43167**), the distribution of these is mainly along the Wantsum Channel, but some are seen on Romney Marsh (**KENT MWX51578**) and near Bexhill in East Sussex (**ESUSSEX MWX51544**) (Munby 2010: 3). Grazing was the main economy on Romney Marsh in the post-medieval period as the marsh was rich, crops were grown but generally not to surplus (Draper 2004: 56; Betts 2004: 70; Thirsk 2004: 72).

4.2.165. A cattle market is noted from Coastal Stretch 2 (**MKE7254**), as are sheepfolds (**KENT MWX18322** and **KENT MWX18323**). East Sussex farming concentrated on rearing livestock, with sheep on Romney Marsh and cattle on the Pevensey Levels and High Weald; hops were also produced on the High Weald (Short 2010: 96). West Sussex agriculture saw cereals grown on the Coastal Plain and both sheep and cereals on the South Downs (Short 2010: 96). Hampshire's open fields, common grazing land and water meadows meant the dominant industry in this region remained dairy farming although there was a variety of burgeoning industries, particularly in the production and export of salt (Hind 2010: 10). The increased enclosure of land became more common, and private farms grew in size and wealth (Hind 2010: 5). Similarly parklands and estates began encompass more land. Duck decoy ponds are noted in parklands, with one in Kent (**MKE16839**) and another in Hampshire (**HANTS MWX62665**). Dovecotes are also seen in East Sussex (**MES2765**), West Sussex (**MWS2406**) and Hampshire (**HANTS MWX6199**). Milking parlours, barns, mill stores, stables, sheds and granaries are located throughout the Study Area. Small-scale subsistence is also seen in the urban allotments such as those in Dover and around Portsea Island (**PORTS MWX528**), which are visible on early OS mapping,.

4.2.166. Smuggling was common practice in some areas, such as Romney Marsh and Langdon Bay where a possible smuggling route is seen (**MKe17259**).

*Industry*

4.2.167. Increases in population and settlement size during this period required better provision of domestic services; most sites related to this are naturally located close to large settlements. Power stations are recorded, as at Fareham in Hampshire (**HANTS MWX55987**). Gas works became common throughout the Study Area; the only exception in the distribution for the enhanced dataset is in East Sussex, where no sites are seen between Romney Marsh and Seaford. Water supply was also addressed, with water works (**MKE34874**, **MES2201**, **HANTS MWX6395**, **PORTS MWX714** and **MSH400**) and reservoirs (**KENT MWX43768**, **HANTS MWX57095**, **PORTS MWX702** and **MSH400**) noted in the enhanced dataset. Sewage pumping stations (**MPM56**) are often located at the coast due to their nature.

4.2.168. Guilds went into decline and were reformed into companies during the post-medieval (Hind 2010: 7); though Guildhalls are evidenced within the dataset from this period, such as the Sandwich Guildhall (**NRHE 468175=MKE7191=LB 177314**), Hythe Guildhall (**MKE32410**), Lydd Guildhall (**MKE32812**) and Portsmouth Guildhall (**HANTS MWX6615**). Each town in Kent was relatively self-sufficient with industries in food, metal, leather and building (Bower 2004: 66). Industry became a more common method of subsistence in the Kent Study Area, due to trade links (Bower 2004: 66); this was particularly true for Coastal Stretch 3 and is borne out in the enhanced record. The port at Dover provided employment for 1000 individuals, with 600 reliant on exploiting fish and 400 on cargo (Lawson 2004e: 91). Osier beds are seen in Hampshire, used for basket making (**HANTS MWX54689**).

4.2.169. Grain was malted and used for brewing; evidence of this was widespread throughout the Study Area (Hind 2010: 6, 23), with exceptions seen only around Eastbourne in East Sussex and Selsey Bill in West Sussex. West Sussex appears to have been important for brewing, with many brewers concentrated in Chichester, Broadwater, and across the border at Brighton in East Sussex (**ESUSSEX MWX137**) (Holtham 2010: 113). This facilitated social interactions: public houses were seen in Kent around Ramsgate, Dover and Folkestone, some

were also present on Romney Marsh (Pennington 2010: 68). East Sussex only saw public houses in the enhanced record around Rye, in West Sussex Shoreham-By-Sea had these facilities; Hampshire boasted the greatest concentration of pubs, mainly placed around Portsmouth and Southampton.

- 4.2.170. Watermills, steam mills and windmills were common throughout the Study Area, with exceptions only between Deal and Folkestone in Kent; these were used for processing agricultural products (Hind 2010: 22). Mills could be part of complexes, with a granary, bakery, stoves, flour mill and an attached boiler and engine house seen in Portsmouth, Hampshire (**HANTS MWX41207**). Windmills are seen throughout the Study Area, with exceptions located between Deal and Hythe in Kent and around Southampton in Hampshire; one horizontal air mill is noted in East Sussex, near Eastbourne (**MES7018**), this was washed away in 1840 when the sea undercut the cliff upon which it was placed. Tower mills are only recorded in the datasets for West Sussex (**MWS3115**) and Hampshire (**HANTS MWX19268**). Smock mills were especially common in Coastal Stretch 2 and were used to mill cereal grain (such as **NRHE 498024**), these were also seen on Romney Marsh (**MES2293**) and at Rottingdean (**MES473**), both in East Sussex. Steam mills were evidenced in Fareham (**HANTS MWX54688**) and Southampton (**HANTS MWX59623**); other steam mills were located on the border between West and East Sussex, around Brighton and Hove (Cox 2010a: 109). Oil mills, such as the one located at the foot of Western Heights in Dover (**MKE16815=KENT MWX43770**), were used to create compacted cakes of animal feed. Watermills are seen around Deal and Hythe in Kent, they are absent in the enhanced record between Romney Marsh and Shoreham-By-Sea, the Rivers Adur and Arun see mills along their courses, the mills are common around Chichester, Langstone and Portsmouth Harbours, and up into Southampton (Cox 2010: 109); associated mill ponds, dams and sluices are noted. Tide mills are seen in the Hampshire enhanced dataset, located in intertidal areas such as Emsworth (**HANTS MWX7001**)
- 4.2.171. Tanneries were located along the Study Area, these are present in West Sussex at Chichester and Steyning on the River Adur (Austen 2010:105), in East Sussex these were located in Lewes on the River Ouse, Alfriston on the River Cuckmere and at Winchelsea (Austen 2010: 105); though the enhanced dataset only records tanneries from near Deal and Southampton. The wool industry was not immediately represented within the Study Area in Kent; however east Kent began to produce cheaper cloth in the middle of the period, largely due to continental immigrants (Zell & Chalklin 2004: 74-75; Edwards 2004: 86). East Sussex had many textile producing settlements, including Lewes, Eastbourne, Hastings, Winchelsea and Rye, this is likely due to local farming concentrating on rearing livestock (Austen 2010: 105; Short 2010: 96). Textile manufacture was also known from West Sussex at Chichester (Austen 2010: 105). The wool industry was particularly important in Hampshire at the start of the period, though it declined with time (Hind 2010: 23). Abandoned monastic sites in Hampshire were often used for cloth-making (Munby 2010: 4, 15). During the 17<sup>th</sup> century a silk factory formed in Southampton, driven by an influx of Huguenot refugees (Hind 2010: 24).
- 4.2.172. Iron working was an important industry in East Sussex and this spread to Kent; such sites were located alongside a water supply (Zell & Chalklin 2004: 76). East Sussex had works in Brighton, Lewes and Rye; West Sussex saw iron foundries at Chichester (Austen 2010: 105). Early sites for casting iron were located along the coast, later in the period sites moved inland and a brass was worked as well as iron (Austen 2010: 104), an iron foundry is recorded from Southampton which worked both iron and brass (**SOTON MWX3168**).

- 4.2.173. Extraction of chalk was common throughout Kent, with many chalk pits and ‘old chalk pits’ noted on historic OS mapping. Extractive pits are recorded around Eastbourne in East Sussex (MES679), Littlehampton (**WSUSSEX MKM1982**) and Selsey Bill (**WSUSSEX MKM1181**) in West Sussex, with a further example in Fareham in Hampshire (**HANTS MKM510**). Chalk was primarily used in the creation of lime mortar for construction, though it is also used to neutralise soil acidity. Limekilns are scattered across the Kent Study Area, some located at the coast, while others were inland, presumably providing fertiliser to agricultural markets. East Sussex lime works within the Study Area, generally located around Eastbourne; West Sussex had few lime works in the Study Area, only located around Beachy Head (**MES8259**) (Cox 2010b: 110). Hampshire had works in Portsmouth (**HANTS MWX42152**) and Southampton (**MSH1082**). Cement works were seen near Folkestone (**MKE17108**), Lewes (**MES8351**), Brighton in West Sussex (Cox 2010b: 110) and Southampton (**SOTON MWX3173**).
- 4.2.174. Stone yards are located along the coast, sandstone mines are noted around Hastings in East Sussex (Cox 2010b: 111). Gravel pits are seen in the Stour Valley, Romney Marsh, the Pevensy Levels, near Littlehampton, around Chichester Harbour and particularly around Southampton. Sand pits are noted in the enhanced record around the Stour Valley and near Brighton. Clay pits are evidenced in Hampshire (**HANTS MWX42156** and **HANTS MWX42157**), which would have served the brick and tile industry, which was common throughout the Study Area (Hind 2010: 24-25). Brickyards, brickfields and associated kilns were often located along the coast and somewhat inland, the only exceptions were in Kent between Deal and Hythe, and in East Sussex between Rye and Eastbourne. East Sussex produced far more bricks and tiles than West Sussex (Beswick 2010: 106-7). Pipe manufacture is recorded from Portsmouth in Hampshire (**HANTS MWX55466** and **MPM267**). Few potteries are noted in the Study Area (Beswick 2010: 107), but each county is represented by at least one site (**MKE16220**, **MES8454**, **MWS399**, and **HANTS MWX20114**).
- 4.2.175. Charcoal manufacture was required, not least to supply the kilns, with one site located at Hythe, Kent (Cocroft 2007: 5) and another in Southampton (**HANTS MKM654**). Paper making was undertaken in the Study Area, particularly in Kent, but also in Lewes in East Sussex and Southampton (**HANTS MWX25924**) (Zell & Chalklin 2004: 77; Austen 2010: 105).
- 4.2.176. Salt was exploited throughout the Study Area: Chichester, Langstone and Portsmouth harbours in particular were heavily dependent on salt manufacture (Allen & Gardiner 2000: xxi; Hind 2010: 26). Kent’s Coastal Stretch 2 also had salt processing areas, due to its low-lying nature. Fish markets are seen mainly in the enhanced record for Kent (**MKE32893**); fishing was also common throughout East and West Sussex (Austen 2010: 105). Langstone harbour and Emsworth in Hampshire were particularly known for fishing and oyster farming – Hayling Island in particular is recorded as having had 74 oyster beds prior to 1906 (**HANTS MWX54709**). Oyster beds within the Kent Study Area were only located in the north (Lawson 2004e: 91), East Sussex had beds in Romney Marsh (**ESUSSEX MWX51374**) and West Sussex in Shoreham-By-Sea (**WSUSSEX MWX8867**).
- 4.2.177. The Industrial revolution in the 18<sup>th</sup> and early 19<sup>th</sup> centuries and development of capitalism impacted the Study Area (Hind 2010: 1). The British Empire would have required significant trade and communications links across the globe, thus the Study Area was of great significance (Hind 2010: 1, 32).

4.2.178. Shipbuilding yards are located throughout the Study Area, as are a great many repairing yards, with exceptions only between Deal and Romney Marsh and between Rye and Eastbourne; sites were generally located at every functioning port (Austen 2010: 105). The Hampshire Study Area was also known for its production of sails for shipbuilding (Hind 2010: 24); rope and sail production sites are recorded from West Sussex, at Littlehampton and Shoreham and East Sussex at Brighton, Lewes, Newhaven, Hastings and Rye (Austen 2010: 105). Ropewalks are noted in Fareham, Hampshire (**HANTS MWX56015**) and in Emsworth in West Sussex (**HANTS MWX57099**). Providing services to shipping was an important industry across the coast, the Royal Clarence victualling yard in Portsmouth had an abattoir for supplying vessels (**HANTS MWX41206**). Timber yards were important, as much raw material was required by the boat building industry; saw mills were also widespread, supporting the timber yards – often the same yards are seen to change between ‘timber’ and ‘saw’ on historic OS mapping (**SOTON MWX3172**). Storehouses, rope works, dry docks and chain and cable test houses were found directly alongside the water. Ramsgate harbour even had an ice house which served the harbour fleet (**MKE16331**).

#### *Leisure*

4.2.179. Of interest also was the development of the leisure industry, with coastal resorts becoming increasingly common (Brodie 2007: 20). Hotels in the Study Area tended to be located at the coast (**HANTS MWX1059**, **MKE34884**, **MES8394**, **HANTS MWX6654**, **MPM35** and **MSH149**), though some were seen inland (**MKE23756**). Pleasure piers also served the leisure industry and were common at every resort. Records in the enhanced dataset show Ramsgate (**KENT MWX43735**), Dover (**KENT MWX43765**) and Folkestone (**KENT MWX44007**) in Kent, Eastbourne (**ESUSSEX MWX50117**) and Brighton (**MES217**) in East Sussex, Bognor Regis in West Sussex (**WSUSSEX MWX8750**), and Portsmouth (**PORTS MWX503**) and Southampton (**MSH149**) in Hampshire. Such sites had many attractions, including theatres, switchback railways, joy wheels, dance floors, show bars, camera obscuras, angling and pavilions. Of the four pleasure piers in Portsmouth, the South Parade Pier had a theatre, dance floor, show bar and café (**PORTS MWX517**). Promenades and esplanades were also created along waterfronts for social display. Other amusements are seen in the Study Area, notably the Globe Theatre, located between Deal and Walmer in Kent (**NRHE 880567**) and race courses, as at Farlington in Hampshire (**PORTS MWX684**).

#### *Communication*

4.2.180. Towards the end of this period infrastructure improved; roads, canals and railways facilitated better communication routes inland and increased trade (Hind 2010: 11, 28). The Stonar Cut in East Sussex (**MKE15239**) had no recorded canals, but in West Sussex there are records for the Chichester Canal (**MWS3240**), the Stopham to Midhurst Canal (**MWS7691**) and the Portsmouth to Arundel Canal (**MWS5754**), the latter of which links Sussex with Hampshire. The Hampshire dataset contains Portsea Canal (**NRHE 461970**). A canal in Tichfield was also created to replace the silting River Meol (**HANTS MWX37199**) (Hind 2010: 29). Although the Royal Military Canal in Kent (**MKE17366**) was primarily a defensive feature, it also served to improve communications. Weirs and locks were also created along rivers to allow the free movement of vessels (Hind 2010: 28). This permitted faster movement of goods between the Study Area’s ports and large towns and would have been useful for military coordination (Hind 2010: 11). Toll houses, gates, roads and bridges are visible in the enhanced dataset, mainly along rivers (**MWS8537** and **MWS2790**) and important trade towns, such as Ramsgate in Kent

(**MKE35321**), as are smaller features such as causeways, wadeways (**HANTS MWX23433**) and trackways.

- 4.2.181. Railway stations and lines are noted across the Study Area with a high proportion in Kent (**NRHE 1357885**, **NRHE 1357899**, **NRHE 1358015**, **NRHE 1358057**, **NRHE 1357335** and **NRHE 1357903**). Five lines passed through Hampshire (**NRHE 238788**, **NRHE 981349**, **NRHE 765522**, **NRHE 242414** and **NRHE 1358371**) with a short line identified on Hayling Island (**HANTS MWX33665**) and another light railway line at Lee-on-Solent (**HANTS MWX38766**). Meanwhile the Brighton and Portsmouth railway ran to East Sussex (**NRHE 1358371**). The presence of the railways in the area suggests that towns such as Gosport, Fareham, Portsmouth, Havant, Brighton, Dover, Deal, Sandwich and Ramsgate were increasing in economic stature and importance. Small railway lines were also located in wharves and harbours having been used to transport goods from vessels. It seems apparent that the military also took advantage of the new rail network through the creation of the Martin Mill Military Railway in Kent (**MKe17265**) and the establishment of a connection between Haslar jetty and the Royal Naval Hospital in Hampshire (**HANTS MWX54496**).
- 4.2.182. Tramways are also recorded, in Kent was noted the Isle of Thanet Electric Tramway (**NRHE 1457343**), in East Sussex a tramway was seen in Eastbourne (**MES7968**) and in West Sussex was the Selsey Tramway (**MWS5742**); Hampshire also had tramways, for military use (**HANTS MWX60400**). Telegraph stations facilitated better communications than existing beacons afforded; signal houses and towers increased communication. Semaphore signalling systems were created between Portsmouth and London, with the first station based at Portsdown Hill (**NRHE 859361**). The semaphore in Portsmouth was upgraded to a fixed arm system during this period (Hind 2010: 20).

#### *Public Buildings*

- 4.2.183. Compulsory schooling was introduced early in this period as a greater emphasis began to be placed on education and charitable institutions were built and provided for (Hind 2010: 9). Many different types of school buildings were therefore introduced to the Study Area and these are located throughout it (Caffyn 2010: 83) with exceptions in the enhanced record seen around West Sussex in particular – this is very likely due to variation in recording, rather than distribution of sites. Free schools are seen in East Sussex and Hampshire (**MES2192** and **HANTS MWX6762**), a nursery school is recorded from East Sussex (**MES8393**), grammar schools are seen in Kent (**MKE25764**) while a school is noted in a nunnery in Kent (**MKE34935**).
- 4.2.184. Town halls are seen across Kent, however they are not recorded in the HER/SMR/AHBRs for other counties, presumably due to different recording practices being utilised; other counties did indeed have town halls, as seen in the NRHE dataset in Hampshire (**NRHE 1351362**).
- 4.2.185. Workhouses were introduced at the start of this period as state-funded institutions; these were often later converted to hospitals (Hind 2010: 9), one workhouse is noted in the enhanced dataset at Alverstoke in Hampshire (**HANTS MWX55361**).
- 4.2.186. Health services improved markedly in the latter half of the post-medieval period. A great number of hospitals were located in East and West Sussex during this period, with an even distribution of institutions, naturally inclined towards urban centres (Walker 2010: 135). Hospitals, such as Blake Maternity Hospital (**NRHE 1052059**)

and the Gosport and Alverstoke Smallpox Hospital (**NRHE1052052**), both in Hampshire, provided a wide variety of services.

- 4.2.187. The Dover Convict and Military Prison is seen in the enhanced dataset, which contained amongst many other features an infirmary (**MKe17272=NRHE 1238305**) and cell blocks (**MKe17274**). Portchester Castle also housed prisoners of war at various times during this period (**HANTS MWX5851**) and the archaeological remains of prisoners were found during excavations of the site (**HANTS MWX56912**). Social control is suggested by the presence of a gaol in Portsmouth (**MPM395**), a gallows in Kent (**MKE7188**) and stocks in East Sussex and Hampshire (**MES47092** and **HANTS MWX23506**).

#### *Religious Structures*

- 4.2.188. Monasteries were dissolved in the 16<sup>th</sup> century, with a change to Protestantism and redistribution of all property by King Henry VIII (Munby 2010: 3; Hind 2010: 1, 15). This had an effect on the charitable institutions provided for by the monasteries (Hind 2010: 8). Chantries and hospitals were dissolved in 1547, with new hospitals and almshouses taking over their functions (Hind 2010: 2, 9, 16). Churches were abandoned on Romney Marsh in this period (Draper 2004: 56). Post-medieval churches are generally under-studied, due to redevelopment and a focus on earlier examples (Hutchison 2007: 6). Churches are well-represented in the Study Area, with the only exception seen on the Pevensey Levels. Late in this period synagogues were built in the Study Area, one is noted from Portsmouth (Hind 2010: 18) and another in Ramsgate, in Kent (**NRHE 1405206**).

#### *Burial*

- 4.2.189. Burial was mainly limited to within churchyards, though a change was seen late in this period towards burial in cemeteries (Hind 2010: 18), such sites are only seen in the enhanced datasets for Hampshire and Kent. Two grave watchers huts are known from Coastal Stretch 13 in Hampshire (**HANTS MWX1119** and **HANTS MWX6826**), no others are recorded from the Study area but these are likely to have been relatively common. Jewish burial grounds were created later in this period (Hind 2010: 18) and a Jewish mausoleum is noted in Ramsgate, Kent (**NRHE 1405203**). The Naval Cemetery at the Royal Marines East Barracks in Deal, Kent is seen (**MKe17643**). Memorials, commemorating both burials and wars were located throughout the Study Area (Hind 2010: 19).

#### *Water Management*

- 4.2.190. Water supply and management was a continuing issue, with wells, pumps, weirs, and dams used to reclaim land and drain marshland across the Study Area (Hind 2010: 7, 9-10). This was particularly important in Coastal Stretch 2, where the fertile but wet soils of the Stour Valley were worth the trouble taken to drain; sluices, pumps, windpumps and pumping engines were especially common in the enhanced dataset for this area, with over 50 sluices evidenced in the dataset.
- 4.2.191. The Wantsum Channel became impassable due to silting during this period and was finally closed by a dyke created in the north in 1808 (Young 2004: 4-5) (**Figure 5**). The Stonar Cut (**MKE15239**) was created in the 1770s to improve drainage on the new marshland (Young 2004: 4-5). In Romney Marsh further land reclamation was taking place (**figure 6**) (Thirsk 2004: 72); conversely, Reculver was being further eroded by the sea (Young 2004: 4-5) (**Figure 5**). Groynes and breakwaters are noted throughout the Study Area and run almost continuously around the coast, both in areas of softer geology and those defended by chalk cliffs (Geology Society 1957), mitigating erosion of the existing land mass. This was particularly necessary

in West Sussex, where the soft geology is easily eroded; despite this settlements were lost during this period (Robinson 2010a: 8). Conversely, in East Sussex land was accreting, with a Martello Tower in Rye Harbour, from 1804 now standing 1km inland (Robinson 2010a: 8).

- 4.2.192. Water was also managed for other reasons: the first sea wall was created in response to flooding of a leisure resort (Brodie 2007: 21). Land reclamation was also undertaken for military purposes, as in the case of Little Horsea Island and Great Horsea Island (**PORTS MWX432**) which were transformed into one island through the gradual reclamation of the intertidal area between them; this is evident on historic OS mapping from 1870 and 1898.

#### *Sea Safety*

- 4.2.193. Increased trade around the coast led to a need for better safety measures, these included the provision of coastguard stations, lifeboat stations, rocket apparatus and lighthouses. These were located along the coast, with coastguard stations visible across the coast, particularly dense in Kent and East Sussex, with fewer in the intertidal harbours of West Sussex and Hampshire. Lookout posts, or watch houses were often associated with coastguard stations and are few in number, but were present throughout the Study Area. Lifeboat stations were mainly located in Kent around important sites, many fewer were noted in the dataset for East Sussex, West Sussex had no recorded sites and in Hampshire these features were placed around Portsmouth. Rocket apparatuses functioned by firing a rescue line to a stricken vessel; rocket posts were used in practice to simulate the mast of a distressed ship. These were located in Kent, where two were noted (**KENT MWX43929** and **KENT MWX43933**) and in East Sussex (**ESUSSEX MWX5**). Interestingly rocket posts tended to be created early in the period and were often replaced later by coastguard stations. Lighthouses are seen across the Study Area at important ports in all four counties.

#### *Defence*

- 4.2.194. Coastal defence became particularly important during this time, to protect the wealth generated from increased trade. On a basic level many towns were walled, such as Sandwich (**MKE7186**) in Kent; Arundel (**MWS2689**) in West Sussex; Brighton (**MES490**) and Hastings (**MES7188**) in East Sussex; and Gosport (**HANTS MWX58082**) in Hampshire which also had the Gosport Lines (**HANTS MWX19298**). Often these were medieval walls which were upgraded and maintained in the post-medieval period. Coastal batteries were important both to protect the ports and defend against invasion (Brown *et al.* 1995: 93) these were seen across the Study Area, but were located mainly around Dover and Folkestone in Kent, Rye in East Sussex and Portsmouth in Hampshire. A key concept was to create centres from which troops could be mobilised (Saunders 2007: 7). Evidence for such features is often historical rather than archaeological (Barber 2007: 1).
- 4.2.195. The Henry VIII coastal artillery forts defended the coast. In Kent Sandown (**MKE7303=NRHE 468373**), Deal (**MKE7308=NRHE 468386**), Walmer (**MKE7317=NRHE 468409**) and Sandgate castles were created between 1539 and 1540; these defended Kent from continental attack, particularly the French and Spanish. East Sussex also had a Henry VIII coastal artillery fort at Winchelsea (**ESUSSEX WX50065**), but no others were improved or built due to the ports being small and silted (Woodburn 2010: 102-3). Few other defences were located in East Sussex at this time, with some gun platforms placed around the coast and along rivers (Woodburn 2010: 103). A great number of beacons were present across the coast in East Sussex and West Sussex, which formed the only defences of West Sussex,

excepting one watchtower (Woodburn 2010: 103). These beacons are not commonly recorded in the enhanced dataset, likely due to their more friable nature. Southsea Castle in Portsmouth formed part of this defence network (**MPM15=SM PO259**).

- 4.2.196. In Dover, Archcliffe Fort (**MKE7021**) had been developed by 1600 and Mote's bulwark (**MKE7020=NRHE 467990**) was completed by 1640 (Lawson 2004e: 92). The Western Heights (**MKE7019=NRHE 467989**) at Dover were developed (Smith 2004: 136). Bayle battery in Folkestone was created by 1700 (Lawson 2004e: 92). In 1759 East and West Sussex were provided with the first fortifications since the Henry VIII forts; seven forts were built across both counties (Woodburn 2010: 102-3). Dover Castle was developed into an artillery fortress in 1755 and four batteries were constructed along Dover Harbour before 1800 (Smith 2004: 136). The Napoleonic wars (1793-1815) also incited further fortification and refining of existing defences. East and West Sussex saw the addition of earthwork batteries, signal stations and a telegraph system in an initial phase of fortification (Woodburn 2010: 102-3). A subsequent phase of defences before 1815 included construction of the Royal Military Canal in Romney Marsh and Martello Towers along the coast from Rye to Eastbourne, where a redoubt was sited (Woodburn 2010: 102-3). Broadstairs Harbour was also given a defensive battery, as was Folkestone; Dungeness had four batteries and a redoubt (Smith 2004: 136). Deal, Walmer and Sandown Castle were flanked by new forts (Smith 2004: 136).
- 4.2.197. Rifled guns on mechanical carriages were added to existing strongholds in Kent at this time (Smith 2004: 138). Dover gained a rotating armoured turret (**MKE6630=NRHE 467374**) on the Admiralty Pier in 1878 (Smith 2004: 138). Breech-loading guns were added to new batteries built in Dover between 1890 and 1905; these also had searchlights, telephone communication, range-finding and command systems (Smith 2004: 138). Hampshire gained increased defences at Southampton, Portchester Castle (**HANTS MWX5851**) and Southsea (**MPM510**) over the period (Lawson 2004e: 92; Munby 2010: 13; Allen & Gardiner 2000: xxi). The Naval Base in Portsmouth saw significant new defences in the 1860s (Woodburn 2010: 102). Littlehampton, Shoreham and Newhaven also benefitted during the 1860s from artillery forts (Woodburn 2010: 102). Additionally Palmerston Forts were created to defend Portsmouth and the Portsmouth Dockyards. Portsmouth harbour was defended by the Point Battery (**MPM489=SM PO261**) and the Spur Redoubt (**MPM37=SM 20208**), amongst others. Fort Monckton defended Portsmouth Harbour (**HANTS MWX19018**), as Fort Cumberland was built to defend Langstone Harbour (**MPM45=SM 26723**). The Hilsea Lines in the north of Portsea Island comprised embankments, ravelins, curtain walls, a moat and the west, centre and east bastions (**MPM206=SM PO330**). Coastal defence at the end of this period fell to the Royal Navy, with less reliance upon stationary, terrestrial fortification (Woodburn 2010: 102).
- 4.2.198. Increased numbers of barracks and training facilities were required as the standing army grew; these saw changes in both structure and use over the period (Hind 2010: 20). Numerous barracks were created in the major centres: in Kent, around Eastbourne in East Sussex, around Bognor Regis in West Sussex and especially at Portsmouth in Hampshire, as were temporary barracks some of which were never completed (Smith 2004: 136; Saunders 2007: 7). Barracks around Portchester Castle were created for the soldiers who guarded the prisoners (**HANTS MWX52653**). Browndown Training Camp was located at the coast in Hampshire (**Hants MWX60384**), and military schools are seen, such as the artillery school in Hythe (**KENT MWX44093**). Drill Halls are seen in Kent (**Mke21154**), East

Sussex (**ESUSSEX MWX51**) and Hampshire (**HANTS MWX14738**) these are usually visible on early OS mapping. Rifle ranges and firing ranges are noted along the coast, with absences only between South Foreland and Hythe in Kent, between Seaford in East Sussex and Littlehampton in West Sussex and around Selsey in West Sussex; some ranges even projected into the intertidal area, as at Langney Point (**MES7961**) in East Sussex.

#### *Ports*

- 4.2.199. Within the Kent Study Area in 1566 the shipping tonnages were highest in the south at Dover, Folkestone and Hythe, demonstrating the significance of these ports (Lawson 2004e: 91). The north-eastern ports of Sandwich, Ramsgate and Broadstairs were also important (Lawson 2004e: 91). Sandwich was 'head port', but the port at Dover was the largest in Kent and the most maintained, due to its naval and cross-channel importance (Lawson 2004e: 91). In 1701 these figures had shifted with the north-eastern ports seeing larger tonnages (Lawson 2004e: 91). Ramsgate port saw trade links with the north-east; Thanet port was linked to London, the Baltic and the Mediterranean (and later the West Indies and the Americas) (Killingray & Crompton 2004: 129). Sandwich port was silted up and unusable after 1854, as was Deal port (Killingray & Crompton 2004: 129).
- 4.2.200. East and West Sussex ports were finally stabilised in this period, with the construction of breakwaters combating the shingle accretions which caused narrowing of port access (**Figure 9** and **Figure 10**) (Robinson 2010a: 8).
- 4.2.201. In Hampshire Portsmouth was a significant centre during this period because of the Royal Naval Dockyards (**PORTS MWX482=SM PO395** and **SM PO397**). The majority of the extant buildings and structures at the Dockyards date to the 18<sup>th</sup> century, and comprise all the facilities needed for servicing the sailing fleet, including wet and dry docks, mast ponds, timber yards, saw mills, rope walks, pitch houses, a block maker's shop as well as stables, houses, offices, chapels and boundary defences (Wessex Archaeology 2004c). Sites surrounding the port were also developed, including the Haslar Naval Hospital (**HANTS MWX60415**) and the Gosport victualling centre (Hind 2010: 2).
- 4.2.202. In addition, a great number of marine features are also noted, with quays, wharves and docks; as well as jetties, pontoons, piers, landing stages and hards found along the coast.

#### *Boats*

- 4.2.203. The post-medieval period witnessed dramatic changes in shipbuilding techniques. From the mid-16<sup>th</sup> century onwards, ships became larger, stronger, and much more specialised. Many of the innovations in the earlier part of the period were motivated by the discovery of the New World and resulting developments in trade and communications; and by the 17<sup>th</sup> century, the volume of trade and the numbers of trading vessels had increased dramatically. Passenger ships also became popular in the 17<sup>th</sup> and 18<sup>th</sup> centuries and embarked from ports such as Rye in East Sussex (Killingray & Crompton 2004: 130). Other changes were the result of military developments as battles at sea became larger and more destructive, with fighting ships designed to fight broadside to broadside with heavy ordnance. A standing Royal Navy, established during the Tudor period, grew to become an established and organised force. Wooden sailing vessels dominated coastal and international trade as well as military manoeuvres until the 19<sup>th</sup> century.

- 4.2.204. By the middle of the 19<sup>th</sup> century new technologies brought by the Industrial Revolution were employed for boat construction allowing strong steel hulls and steam propulsion (WA 2011b; EH 2003: 4; Royal Navy 2009a). These were significant developments, proving to be faster and more reliable, and sailing ships and wooden hulls gradually gave way to steam ships with iron and steel hulls. Cross-channel passenger transport within the Study Area was provided by steamboats from the 1820s (Killingray & Crompton 2004: 130).
- 4.2.205. Throughout the post-medieval period, small boats used for coastal and estuarine trade continued to flourish in Dover, Sandwich, Ramsgate (Killingray & Crompton 2004: 129) and many other coastal towns across the Study Area.
- 4.2.206. Shipwrecks from the post-medieval period are generally better represented in the archaeological record than shipwrecks from earlier periods, enabling archaeologists to develop an understanding of technological changes first hand. However, even these examples are still just a small fraction of the ships that would have been plying the seas during this period.
- 4.2.207. Numerous wreck sites are noted throughout the Study Area, with the majority located in proximity to large commercial centres; areas without records of wrecks in the HER/SMR/AHBR datasets are between Hastings and Eastbourne in East Sussex, and between Worthing and Selsey in West Sussex (**Figure 14**). Portsmouth in particular has over 50 individual shipwrecks and many shipwreck graveyards (**PORTS MWX460, PORTS MWX477, PORTS MWX484, HANTS MWX60508** and **HANTS MWX60506**). Notable examples include timber Napoleonic hulks which were used to hold prisoners of war and Navy prisoners (**NRHE 1398124**). The post-medieval shipwrecks that have been designated under the Protection of Wrecks Act (1973) include the 3<sup>rd</sup> rate ship of the line, HMS *Restoration*, lost in 1678, as well as four 3<sup>rd</sup> rate ships of the line that were lost during the Great Storm of 1703: HMS *Stirling Castle*, HMS *Resolution*, HMS *Northumberland* and the wreck possibly identified as the HMS *Resolution*, but also known as the Norman's Bay wreck. Other post-medieval shipwrecks designated under the Protection of Wrecks Act (1973) include King Henry VIII's *Mary Rose* (lost 1545), the *Hazardous* (lost 1706), the *Royal Anne Galley* (lost 1721), the VOC *Amsterdam* (lost 1749), HMS *Invincible* (lost 1758), and the *Admiral Gardiner* (lost 1809).
- 4.2.208. The NRHE and Seazone datasets characterise ship types slightly differently, but combining the query results provides a good overview of the types of ships in operation during the post-medieval period. Shipwrecks included 1<sup>st</sup> to 4<sup>th</sup> rate ships of the line, barques, battleships, a brig, cargo vessels, a collier, a dredger, East Indiamen, a galleon, passenger liners, merchant vessels, a packet, a schooner, various sailing vessels of unspecified types, steamships, two turret ironclads and a warship. The NRHE dataset provides ample details about the nationalities of the ships active in the area, and includes ships of British, Dutch, English, German, Scottish and Welsh origin, highlighting the importance of international transport and trade during the period. The Seazone dataset provides additional details about the ship's builders and owners. Overall, 39 NRHE records had a ship type, as did all 38 Seazone records.
- 4.2.209. Unfortunately, the paucity of early 19<sup>th</sup> century records in the NRHE and Seazone datasets makes it difficult to compare and contrast the first half of the 19<sup>th</sup> century to the second half. Other difficulties in interpretation arise from the ways the two datasets characterise ships by type. In the NRHE dataset, the ship type is more often described by its use (for example as a 'cargo vessel' or 'passenger vessel') it

makes it difficult to analyse technological changes. However, the Seazone dataset often describes vessels by their technological characteristics, and records six sailing vessels and eleven steamships – clearly indicating the explosion of growth in steam technology in the second half of the 19<sup>th</sup> century.

### Modern (1901 to 2050)

#### *Settlement*

- 4.2.210. Development was a key aspect of this period, existing settlements were developed first and these dramatically increased in size, then the open areas were developed upon (Hind 2010: 11). Building styles became more homogenous throughout this period, with construction in a regional style becoming rarer (Hind 2010: 32). Specific changes to settlements during wartime are discussed in the WWI and WWII sections below. After WWII, areas of prefabricated housing were developed, to re-house the population that had lost their homes due to enemy bombing. Such housing is recorded as being present in Portsmouth (**PORTS MWX468**, **PORTS MWX577** and **PORTS MWX675**) and Gosport (**HANTS MWX60404**, **HANTS MWX60407** and **HANTS MWX60411**).

#### *Farming*

- 4.2.211. Within the Kent Study Area farming of animals (sheep, cattle and poultry) and grain (corn and barley) were important activities (Booth 2004a: 111). Decoy ponds were still in use in this period, with one record for a (now levelled) example at Wade in Coastal Stretch 2 (**MKE6499**) and another on Hayling Island (**HANTS MWX54706**) in Hampshire. Changes were made to agricultural practice during WWI and WWII and these are discussed in the relevant sections below. Small scale production is seen on historic OS maps around urban areas; such as those noted in Portsmouth on the 1938 Epoch 4 mapping (**PORTS MWX561**, **PORTS MWX562** and **PORTS MWX631**).

#### *Industry*

- 4.2.212. Dramatic population and settlement increases led to better provision of utilities. Records of water, sewage, gas and power services become more common in the dataset. Water works included Gosport water works (**HANTS MWX63256**) in Hampshire, with a nearby water tower (**HANTS MWX63236**), most water works were seen in Hampshire and West Sussex, with some seen in Kent. Sewage works are predominantly recorded in Hampshire, at Stubbington, Fareham and Portchester (**HANTS MWX63221**, **HANTS MWX63262** and **HANTS MWX63266**), with one site seen at Bognor Regis (**WSUSSEX MKM1352**).
- 4.2.213. The Kent Study Area did not have intensive industry (this is mainly located in north-west Kent), however Dover was significant for food processing and ship building (Booth 2004b: 119). Brewing and malting declined during this period throughout the Study Area (Hind 2010: 23) with sites seen in Ramsgate in Kent, around Brighton in East Sussex, Littlehampton and Chichester in West Sussex and Portsmouth and Southampton in Hampshire. Brick making was still evidenced in the dataset, with brick fields, kilns and drying sheds. Sites were seen in Kent's Coastal Stretch 1 and on Romney Marsh, many sites are also recorded across the West Sussex Study Area, and some are seen around Portsmouth in Hampshire. Collieries were also still active, particularly within Coastal Stretch 2 (**MKE7473** and **MKE13599=NRHE 932817**). Dye works are noted from the record in Dover (**KENT MWX43767**) and at Portslade-By-Sea in West Sussex (**WSUSSEX MWX8797**). A bone works is recorded east of Portchester in Hampshire (**HANTS MWX63258**). Mills were still in use at the start of this period, though working mills are not

common at the end of this period. Sandwich became known for pharmaceutical production in 2000 (Booth 2004b: 119).

- 4.2.214. Industry in Langstone Harbour was still concentrated upon salt, oysters and fishing in this period (Allen & Gardiner 2000: xxi; Hind 2010: 26). Oyster beds are seen from Rye in East Sussex (**ESUSSEX MWX51374**), Shoreham-By-Sea in West Sussex (**WSUSSEX MWX8847**) and many sites were located in Hampshire (**HANTS MWX696**). Fishing was a common activity within the Study Area (Killingray & Crompton 2004: 130); it does not appear in the enhanced record readily, however rows of stakes possibly representing fishing structures were noted in Coastal Stretch 13 (**HANTS MWX39145**). Smuggling was also a significant way to generate funds in the early modern period (Killingray & Crompton 2004: 130).
- 4.2.215. Ship building was a common activity undertaken throughout the Study Area (Killingray & Crompton 2004: 130; Hind 2010: 26), with shipyards and boatyards in the Lydden Valley in Kent, Romney Marsh, Eastbourne and Newhaven in East Sussex, Shoreham-By-Sea and Littlehampton in West Sussex, and Emsworth, Portsmouth and Southampton in Hampshire. Timber yards, saw mills, ropewalks and other supporting industries are also evidenced throughout the dataset in port areas; often visible on historic OS mapping. Increased trade led to industries moving closer to ports to efficiently obtain imported materials (Killingray & Crompton 2004: 129). Industries at ports included facilities for provisions, repairs, banking, legal aid and recruitment; Deal in the Kent Study Area formed the base for the East India Company (Killingray & Crompton 2004: 129). Also based at the large marine centres alongside the provision services were customs houses and customs watch houses. Industry was affected by the First and Second World wars, the specific implications of which are discussed within the WWI and WWII sections below.

#### *Leisure*

- 4.2.216. Entertainment developed into a key industry, with cinemas and picture houses, race tracks, sporting grounds and parks becoming increasingly common throughout the Study Area (Hind 2010: 27-28). Cinemas in East and West Sussex were overwhelmingly distributed along the coast, rather than inland; the earliest cinema in East and West Sussex was located in Brighton, built in 1910 (Elleray and Eyles 2010: 137). The enhanced record does not necessarily reflect the level of detail available for this period, as modern features are recorded to different standards. Seaside resorts saw further development, followed by something of a decline (Brodie 2007: 21).
- 4.2.217. Paddling pools are noted in the dataset, as are lidos, seen around Ramsgate and Deal in Kent, and around Portsmouth and Southampton in Hampshire. The Central Swimming Baths (**HANTS MWX61355**) opened in Gosport, Hampshire in 1924. The Hilsea Lido complex (**PORTS MWX651**) in Hampshire initially included a putting green, tennis courts, a dance floor and other recreational areas. Formal gardens were used for recreation and promenades were still popular at the start of this period. The East and West Sussex coast is characterised by resort areas, wildlife reserves, protected areas and centres for water activities (Lowerson 2010: 131). Yachting sites are based in Chichester Harbour, Littlehampton and New Shoreham in West Sussex; and at Rottingdean, Newhaven and Eastbourne in East Sussex (Lowerson 2010: 131).

#### *Communication*

- 4.2.218. Communications improved further, additional railways were constructed, such as the East Kent Light Railway (**NRHE 465967**) and Betteshanger Mineral Railway (**NRHE 1358059**) which both transported coal from collieries to towns. Railways were also located in harbours, such as the Dover Marshalling Yard and Locomotive Depot (**KENT MWX43607**). The East Kent Light Railway (**NRHE 465967**) began taking passengers in 1916. Roads were of course built during this period, with an incomplete road recorded at Langdon which was intended to be used for Admiralty developments (**MKe17264**). Semaphores were still in use for communications, as at Deal (**KENT MWX43922**). An early 20<sup>th</sup> century wireless station is noted at Horsea Island (**PORTS MWX432**) and telephone kiosks became visible in the dataset. Portsmouth Airport (**PORTS MWX636**) was built in 1932 and was in use until 1973.

*Public Buildings*

- 4.2.219. Public buildings included schools, town halls, libraries, hospitals and prisons. Schools include the National School (**HANTS MWX55077**) and Fareham Home for Girls (**HANTS MWX56404**) in Hampshire which provided domestic training for young ladies. Public libraries became more common throughout the period, though these are documented only in Kent (**MKE35253**) and Hampshire (**HANTS MWX6472**). Hospitals in the enhanced record are seen in Kent at Ramsgate, Dover and on Romney Marsh, in East and West Sussex these were distributed evenly along the coast, mainly in urban areas (Walker 2010: 135), these were also seen around Portsmouth in Hampshire. St. Stephen's Hospital in Kent was later used as a military hospital during WWI and for Jewish refugees during WWII (**MKe42014**). Langstone Hospital (**PORTS MWX589**) in Hampshire was built in 1902 and was formerly known as the Portsmouth Borough Isolation Hospital for Smallpox.

*Religious Structures*

- 4.2.220. Religious buildings of all varieties are located throughout the Study Area, existing structures of previous periods are often still in use, and new churches built in this period are located across the Study Area with no exceptions. Memorials are noted in the dataset, with one located on the coast at Stokes Bay to commemorate the WWII mulberry harbour construction site (**HANTS MWX57639**).

*Burial*

- 4.2.221. Burial grounds became common outside the extents of churchyards and often served multiple denominations, though non-conformists had separate burial grounds, with government legislation permitting and facilitating this (Hind 2010: 18). The enhanced dataset shows few cemeteries and churchyards, however this is not representational. Overcrowded churchyards were also closed to further burials during this period (Hind 2010: 18).

*Water Management*

- 4.2.222. Water management was again a feature of the enhanced dataset. Dams, drainage ditches and especially sluices are visible in the record across the Study Area, with the exception of between Deal and Folkestone in Kent and between Eastbourne and Hove in East Sussex. Many pumping stations and mills are also evidenced. The sea marshes within Coastal Stretch 13 were drained during this period (**HANTS MWX54708**). Groynes and breakwaters were seen throughout the Study Area, with many original features still in use today, or replaced at a similar location. Sea walls are noted in East and West Sussex as a solid defence against erosion (Robinson 2010a: 8); however these deflect the erosive force and cause scouring

elsewhere (Robinson 2010a: 8). A recent move has been made away from hard defences to measures designed to absorb impact, such as recharging beaches and offshore breakwaters (Robinson 2010a: 8).

#### *Sea Safety*

- 4.2.223. Safety at sea was still a topic of concern, thus coastguard stations, lifeboat stations and houses, and lighthouses are visible in the enhanced record across the Study Area with only the area between Shoreham-By-Sea and Littlehampton lacking recorded features; coastguard stations in particular were very common in this period. Signalling stations are visible in the dataset from the early modern period, which used lights or flags to transmit messages, one such site is noted in Stokes Bay, Hampshire (**HANTS MWX57655**).

#### *Ports*

- 4.2.224. Increased trade levels led to port growth and development; Dover became one of the largest ports in Britain due to its cross-channel links, with regular post and passenger services (Killingray & Crompton 2004: 129-131). Southampton developed significantly and became important for overseas transport and communication (Hind 2010: 28). Portsmouth was also important, but has had a consistently naval function (Hind 2010: 28). East and West Sussex ports are not as industrial as those of Kent and Hampshire, however cross-channel services run and leisure is a large attraction in these areas. Wharves, quays, harbours and ports were still evidenced, as were smaller marine features such as jetties, boat hards, slipways, landing stages, locks, dry docks and piers.

#### *Boats*

- 4.2.225. Developments to boats and ships during this period are dominated by the two World Wars, and these will be discussed in subsequent sections. Prior to WWI, advances to ship technology continued from the post-medieval period. After WWI, there was an initial boom in merchant shipbuilding, however this soon went bust in the climate of slow stagnation caused by a worldwide depression. Not surprisingly, technological innovation slowed during the interwar period, but this period saw a boom in leisure sailing in what came to be known as the 'Golden Age of the Liner' (WA 2011c).
- 4.2.226. The different ways in which the Seazone and NRHE datasets characterise shipwreck types is clearly visible when assessing the largest number of ships in the pre-war modern period. Seazone describes the vast majority of pre-wartime shipwrecks as steamships, while the NRHE describes the vast majority as cargo vessels. Therefore it is likely that the cargo vessels active on the coast at this time were likely steamships, rather than sailing vessels, which is consistent with the rapid increase in steam technology from the late 19<sup>th</sup> to early 20<sup>th</sup> century. Other shipwrecks dating to this period include a cutter and a schooner, indicating that sailing vessels continued to be active at this time, although in smaller numbers than steamships.
- 4.2.227. The only designated wreck dating to this period is the HM Submarine *A1*, designated under the Protection of Wrecks Act (1973). The *A1* was built in 1902 and was the first British designed and built submarine used by the Royal Navy. The *A1* sunk twice – the first time in 1904 after a collision during exercises, but after being recovered, the submarine was employed for training and experimental work. In 1910, the submarine suffered an explosion, and in 1911 was rendered unfit for service, but was utilised for unmanned, automatic pilot trials. The submarine was lost off Selsey Bill during one of these operations.

- 4.2.228. Shipping was slow to recover during the interwar period, but in spite of this, there are still a number of known wrecks. Again, the largest number of ships in the NRHE dataset are cargo vessels, while the largest number in the Seazone dataset are steamships. Other vessel types included barges, ketches, lighters, merchant steamships, sailing barges, schooners, trawlers and yachts. A few military vessels were also recorded – including a submarine that was ceded to the French at the end of the war, as well as another submarine, a destroyer and a gunboat. Overall, 19 shipwrecks in the NRHE had a recorded vessel type, and 36 in the Seazone data. The nationalities represented in this period indicate ever expanding global trade networks, and include American, British, English, German, Italian, Japanese, Latvian, Norwegian, Swedish and Yugoslavian interests. Few causes of loss have been recorded, but these include collisions, foundering, catching fire, running aground, striking submerged objects, being lost while under tow, and even striking mines that had not yet been cleared after the war. In the NRHE data, only two shipwrecks had a cause of loss recorded, and in the Seazone data only 20 shipwrecks did.
- 4.2.229. The records from the post-war period highlight differences in the type of data being recorded between the NRHE and Seazone datasets, seen most clearly in the vast difference between the numbers of records in each. The NRHE dataset records only three known shipwrecks in the post-war period, consisting of a Greek cargo vessel and British Landing Craft lost in 1947 and a German tug lost in 1957. By contrast, the post-war shipwrecks recorded in the Seazone dataset encompass 144 ships, 140 of which have a recorded vessel type, indicating a wide range of types, including barges, cabin cruisers, cargo vessels, dredgers, drifters, a ferry, fishing vessels, a gravel vessel, hopper barges, a jackup barge, landing craft, a launch, a lighter, numerous motor boats and motor vessels, a phoenix unit, pontoons, a power boat, a sailing vessel, a sloop, a speedboat, nine steamships, a tanker, a military target, a torpedo recovery searchboat, trawlers, tugs and yachts (**Figure 14**). These shipwrecks clearly illustrate changes in the way people were using the sea in the modern period. In many previous periods, the highest numbers of wrecks were related to cargo transport, whereas in the last half of the 20<sup>th</sup> century, the greatest proportions were related to fishing or leisure activities. The growth in the leisure industry has seen a massive expansion in the number of yachts, motor boats and speedboats taking to the water. Other changes to vessel types are related to development and extraction activities – such as the jackup barge and gravel vessel.
- 4.2.230. The single most common cause for wrecking in the pre-war period was collision – indicating the high volume of shipping off the south-east coast. The only other recorded cause of wrecking during this period was due to stranding - on the Goodwin Sands and off Fan Bay, South Foreland in Kent. Conversely, during the post-war period there were a wide range of causes of loss recorded in the 97 records that had cause of loss, including abandonment, bad weather, capsizing, catching fire, collision, defects, engine failure, fouling, foundering, lost during a gale, running aground, stranding, striking rocks or other submerged objects, struck by a freak wave, and taking on water. It was interesting that collision was still such a common cause of sinking in the last half of the 20<sup>th</sup> century, with the most recent collision having occurred in 1990, because the improvements to communication technology throughout the period should have enabled many of these accidents to be prevented. The number of groundings, strandings and strikings of rocks or other submerged objects were also fairly high, considering that this is a period when navigational tools also far surpass those available to earlier ship's crews.

#### *Aircraft*

- 4.2.231. At the start of the modern period powered flight was invented (Royal Air Force (RAF) Museum 2010a). Frenchman Louis Blériot flew between Les Baraques near Calais and landed at Northfall Meadow next to Dover Castle. The first passenger charter flight was undertaken in 1914, during which a stopover was made in the Study Area at Eastbourne (RAF Museum 2010b). Regular passenger and mail flights began in 1919 (RAF Museum 2010c). Since WWII, there has been an exponential rise in both commercial and leisure air traffic; however wrecks of these aircraft are considerably less common. Commercial airports are not common within the Hampshire Study Area, despite the presence of many wartime military airfields (Hind 2010: 31).
- 4.2.232. **Figure 15** highlights the scarcity of known aircraft remains within and around the marine environment of Coastal Stretch 18. None of the dated aircraft crash sites date to the pre-war or interwar periods. However seven crash sites date to the post-WWII period, highlighting the increase in air traffic in the second part of the century. Additionally, there are 21 undated aircraft in the Study Area, some of which could date to this period.

### **Pre-War Military Activity**

- 4.2.233. Pre-war military features include fortified sites and training facilities. Existing facilities were often in need of updating, though defences around important sites, such as Portsmouth, were still suitable for use (Brown *et. al.* 1995: 31). New complexes were created across the Study Area. Batteries were located at strategic locations, such as upon harbour breakwaters, as in Dover (**MKe41988=NRHE 1429204**). Existing installations were updated, as in the case of Stokes Bay No. 2 Battery (**HANTS MWX41603**) which was armed with more advanced guns in 1902. Searchlights were placed around the coast, as at Langdon Bay (**MKe17260**) in Kent. Shoreham Airfield was opened in 1911 in the West Sussex Study Area (**MWS849**). In Hampshire RNAD Gosport (**HANTS MWX62615**), a Royal Navy Ammunition Depot was constructed in the first half of the 20<sup>th</sup> century; HMS Hornet (**HANTS MWX60418**), a 20<sup>th</sup> century Coastal Forces Base located at the mouth of Portsmouth Harbour; and HMS Dolphin (**HANTS MWX60419**), a military shore establishment also at the mouth of Portsmouth Harbour was built.
- 4.2.234. Sites associated with training include drill halls, revolver ranges, rifle ranges and firing ranges. Early evidence of practice trenches is also visible on Canterbury Golf Course (**KENT MWX43024**). The Eastbourne Flying School was opened in 1911, on what was one of the earliest airfields in England (**MES7491**).
- 4.2.235. Barracks were built across the Study Area, with quarters for married soldiers established in Stokes Bay and Gosport (**HANTS MWX63233** and **HANTS MWX63239**). Sites also changed uses: in 1923, the Royal Marine Light Infantry left Forton Barracks (**HANTS MWX60437**) in Hampshire and it became HMS St. Vincent Boys' Training Establishment. The Eastbourne Flying School (**MES7491**) also saw a change of use in 1914, when it became a Naval Flying School.
- 4.2.236. The only designated wreck dating to the modern period is the HM Submarine *A1*, designated under the Protection of Wrecks Act (1973). The *A1* was built in 1902 and was the first British designed and built submarine used by the Royal Navy. The *A1* sunk twice – the first time in 1904 after a collision during exercises, but after being recovered, the submarine was employed for training and experimental work. In 1910, the submarine suffered an explosion, and in 1911 was rendered unfit for service, but was utilised for unmanned, automatic pilot trials. The submarine was lost off Selsey Bill during one of these operations.
- 4.2.237. The development of military aviation began in the early years of the 20<sup>th</sup> century, with the British Army Dirigible No. 1, a semi-rigid airship that made its first flight in 1907 at Farnborough. In the years leading up to WWI, the British military experimented with planes such as the Havilland No 2 biplane with the maiden flight of the first seaplane flown in November 1911. The Royal Flying Corps, later to become the Royal Air Force (RAF) was formed in 1912, comprising one airship, a man-carrying kite squadron and two airplane squadrons. By the time of the outbreak of WWI, the Royal Flying Corps mustered some 100 officers, 63 airplanes and 95 vehicles.

### **World War One**

- 4.2.238. A movement of people towards factories for wartime production required new housing to be built (Smith & Killingray 2004a: 140). Military establishments also increased the size of a local population (Hind 2010: 21-22). This period saw the decline of existing country houses, as many families lost heirs to the war; though

new grand structures were still being created (Hind 2010: 13-14). Some shelters were created during this period to protect civilians from aerial attack. One significant example is noted in Ramsgate, where underground passages were created to render individual shelters unnecessary; despite this a WWI shelter was found in the cellar of a Victorian house in Ramsgate (**MKE17025**).

- 4.2.239. German submarine activity was particularly effective during this time and reduced Britain's food supplies, placing a greater emphasis on agriculture, particularly corn and dairy (Smith & Killingray 2004a: 140, 144). Agriculture suffered during this time and after the war an agricultural recession took hold (Smith & Killingray 2004a: 140; Brandon 2007: 4).
- 4.2.240. War industries greatly multiplied, while at the same time a reduction in other industries, particularly breweries, was seen (Smith & Killingray 2004a: 140). Shipbuilding was only undertaken at Littlehampton in West Sussex during this period; no shipbuilding was noted in East Sussex (Grieves 2010: 117). Aeroplanes were manufactured at Eastbourne in East Sussex and at Littlehampton and Middleton-on-Sea in West Sussex (Grieves 2010: 117).
- 4.2.241. Military hospitals were created throughout the Study Area (Smith & Killingray 2004a: 140). Ambulance trains operated from Dover and Southampton, bringing patients to Brighton for treatment; making this a particularly important centre for healthcare on the South Coast (Grieves 2010: 117). Other hospitals in East Sussex included Rye, Hastings, Bexhill, Cooden, Eastbourne, Beachy Head and Lewes; services included auxiliary military hospitals, volunteer hospitals and the Red Cross (Grieves 2010: 117). West Sussex hospitals were located in Shoreham, Worthing, East Preston, Littlehampton and Chichester; again including the three services noted in East Sussex (Grieves 2010: 117). St James Hospital in Portsmouth (**PORTS MWX591**) in Coastal Stretch 14 was used as a military hospital, as was Royal Victoria Hospital near Southampton (**HANTS MWX37646**).

#### *Defence*

- 4.2.242. Any invasion would have targeted the coast; however this period also saw the development of technology which increased the ability of the enemy to attack inland, forcing defences to become more widespread (Smith 2007: 4-5; Smith & Killingray 2004a: 140). Such technology included aircraft and increasingly mobile and reliable warships (EH 2003: 4). Coastal artillery had been standardized before WWI, with existing defences at Portsmouth and Dover; these were often fitted with improved technology, as at Fort Monckton (**HANTS MWX19018**) which was provided with anti-aircraft searchlights. Heavy anti-aircraft batteries were created in the area, some new, as in Deal (**NRHE 1473748**) and some added to existing sites, such as at Langdon Hole (**MKe17291**) in Kent; therefore no permanent batteries were added during WWI (Brown *et al.* 1995: 93). However, during the war a need was seen to supplement permanent defences. Temporary gun batteries, pillboxes and earthworks were created along beaches and small harbours that could have been under threat; particularly Dover and Portsmouth (Smith & Killingray 2004a: 140; Hind 2010: 20-21). Railway guns also supported existing batteries and had the added advantage of being mobile (Brown *et al.* 1995: 100).
- 4.2.243. Fighter response teams were present at airfields, supported by searchlights and anti-aircraft guns (Smith & Killingray 2004a: 140). Both the Royal Flying Corps (army-based) and the Royal Naval Air Service had planes (Royal Navy 2009b). The Royal Naval Air Service was responsible for the defence of Britain and airfields were present within the Study Area at Swingate (**KENT MKE17130**) and Walmer (**NRHE 1413679**) in Kent; Eastbourne and Newhaven in East Sussex; Shoreham

(**MWS849**) and Telscombe in West Sussex; and Gosport Airfield (HMS Siskin) (**HANTS MWX60388**) in Hampshire (**HANTS MWX39580**) (Hind 2010: 21; Brown *et al.* 1995: 104; Grieves 2010: 117). HMS Daedalus (Lee-on-the-Solent) (**HANTS MWX39580**) in Hampshire housed a seaplane base (Hind 2010: 21), as did Marine Parade in Dover (**NRHE 1488559**); Naval floatplanes were based at Newhaven in East Sussex (Grieves 2010: 117). No airship bases were noted in the East or West Sussex Study Area (Grieves 2010: 117); however one airship station is seen at Capel-Le-Ferne (**MKE16509**) in Kent. In 1917, following the bombing raid on London, the Royal Air Force was created, integrating the Royal Naval Air Service and Royal Flying Corps (Royal Navy 2009b). The inter-war years led to the closure of many WWI airfields, followed by the reconstruction and improving of many of them due to the returning threat of war (Brown *et al.* 1995: 107). Improved airfields often had a circular, or rectangular central landing space with the supporting structures tightly arranged in a small area alongside (Brown *et al.* 1995: 107-108).

- 4.2.244. Earthwork redoubts were present throughout the Study Area. As were firing ranges used for the training of troops, seen near Dover (**KENT MWX43563**) in Kent, Rye (**ESUSSEX MWX51367**) and Newhaven (**ESUSSEX MWX50753**) in East Sussex. A Royal Flying Corps training ground was located at Shoreham (**WSUSSEX MWX50166**) in West Sussex (Grieves 2010: 117) and a Naval Flying School was seen in Eastbourne (**MES7491**) in East Sussex. Barracks were located along the coast, some specifically for troops not based in the area including Canadian forces and British units from other counties (Grieves 2010: 117). Other barracks provided accommodation for those who worked at the many military centres (Grieves 2010: 117).

#### *Ports*

- 4.2.245. Richborough port was established as a military supply base in this period (Smith & Killingray 2004a: 140). Coastal Stretch 2 is dominated by Richborough Port, built during 1916 to supply the Western Front (**KENT MWX43487**). An extensive wharf, shipyards, railway sidings and station, salvage yard, sewage works, several huttled personnel camps and storage facilities were created. In addition a large tract of intertidal foreshore was reclaimed and the adjacent water channel and approaches were widened and deepened. Other water management features at Richborough Port included a sluice, breakwater, and a series of groynes. No ports in West Sussex received additional defences during this period and in fact Shoreham began to decline (Grieves 2010: 117). In East Sussex only Newhaven port was defended in this period and Rye port began to decline (Grieves 2010: 117). In Hampshire, Portsmouth was upgraded and Langstone Harbour was important for local defence (Allen & Gardiner 2000: xxi).

#### *Boats*

- 4.2.246. Developments in technology permitted the creation of iron-clad warships and later fully iron battleships driven by steam with screw propellers (EH 2003: 3-4; Royal Navy 2009a). This affected defence strategy; as such vessels were able to operate in all conditions (EH 2003: 3-4; Royal Navy 2009a). The activities and events of WWI completely shaped maritime shipping and warfare throughout the modern period. These warships were significant in driving the upgrading of land-based defences (EH 2003: 4). The improvements in ship building also required the Royal Navy to update their fleet (Royal Navy 2009a). In addition, Britain did not have naval supremacy so upgrades were undertaken in a race against other countries (EH 2003: 4; Smith & Killingray 2004a: 140). Torpedo boats, submarines and mines were developed to combat the advantages of the warships and attack enemy

shipping; such technology did little to suppress the problem of German U-boats (WA 2011c; EH 2003: 4; Smith & Killingray 2004a: 140). HMS *Dolphin* (**HANTS MWX60419**) became Britain's first experimental anti-submarine station.

- 4.2.247. The only designated wreck from this period is the HMS *Ghurka* which was designated as a Protected Place under the Protection of Military Remains Act (1986). During the War, HMS *Ghurka*, a Tribal-class destroyer, served in the North Sea and English Channel with the 6<sup>th</sup> Destroyer Flotilla. On 8<sup>th</sup> February, 1917, the vessel sunk after hitting a German mine, and only five of the crew survived.
- 4.2.248. There were a wide variety of military vessels recorded in the datasets, such as: destroyers, hospital ships, minelayers, patrol vessels, submarines, torpedo gunboats, and a navy cruiser used for mine laying (**Figure 14**). The ownership of the military vessels serves to illustrate the confrontation during the war: for example, all of the known submarines are German, while the two torpedo gunboats are British. Other vessel types, which at first would appear to be non-military included: cable layer, coaster, collier, dredger, fishing vessel, liner, ketch, merchant steamship, sailing vessel, smack, tug, tanker, trawler, and yacht. However, many of the fishing vessels/trawlers, yachts and tugs were recorded as having either been armed or were owned or operated by the Admiralty at the time of their loss. By far the largest numbers of wrecks in the NRHE dataset are described as cargo vessels, while in the Seazone data, they are described as steamships. The cargo vessels emphasise the continued importance of cross-channel and international trade during the war, and the nationalities involved include American, Belgian, British, Canadian, Danish, Dutch, French, English, Polish, Norwegian, Scottish, and Welsh.
- 4.2.249. Not surprisingly, for the shipwrecks that had recorded causes of loss, the most common causes were war-related, for example the NRHE dataset records 28 ships that sunk because they hit a mine and five that were torpedoed. The Seazone dataset records 57 vessels that sunk because they hit a mine and 21 vessels that were torpedoed. Other military related causes of loss in the Seazone dataset include vessels that were attacked by submarine, captured and sunk by German destroyers or other ships, depth charged, and sunk by German aircraft. Non-military causes of loss included collision, stranding, foundering on a reef, or springing a leak.

#### *Aircraft*

- 4.2.250. Aircraft and powered airships were used to bomb the continent in this period (Royal Air Force 2011). By the same token they were a new threat to Britain, with bombs first dropped on London in 1917; therefore a warning system was required to assist with defence (Smith 2007: 4; Brown *et al.* 1995: 32; Smith & Killingray 2004a: 140). Acoustics were utilised, with several sound mirrors located along the coast to give early warning of incoming aircraft – these became obsolete as aircraft speeds improved (Smith & Killingray 2004a: 140; Brown *et al.* 1995: 35, 36; Smith 2007: 4). Mirrors were erected at Fan Bay (**NRHE 1479430**), Abbot's Cliff (**MKe17880**), Greatstone-on-Sea on Romney Marsh (**MKE3769**) and at Selsey (**MWS8227**). Mirrors were used in conjunction with Observer Corps posts which were able to plot positions of enemy aircraft (Brown *et al.* 1995: 32). Anti-balloon and anti-aircraft guns were also brought into use (Smith 2007: 4). Aircraft were made of wood frames, covered in varnished fabric (English Heritage 2002a: 3), making them fragile, and rendering long distance and cross-channel raids unrealistic tactics. There are no known aircraft crash sites in the Study Area from WWI, however, there are 21 undated aircraft, and some of these could date to WWI.

### **World War Two**

- 4.2.251. In 1939 coastal defence was again of great importance, with the Study Area playing a significant role (Smith & Killingray 2004b: 142; Allen & Gardiner 2000: xxi).

#### *Settlement*

- 4.2.252. Housing was badly affected by bombing raids through this period, particularly within large towns of the Study Area, such as Dover. New housing of this period was characterised by prefabricated buildings. Old country houses and their estates were put into further decline during this period with increased taxes and limits on agricultural profit (Hind 2010: 13; Brandon 2007: 4). However, these structures were put to use during the war as command centres, training facilities, research bases, hospitals and prisoner of war camps (Hind 2010: 21). In addition, new examples of such houses were still being constructed (Hind 2010: 14). Domestic military structures were present in the Study Area, with camps seen in Coastal Stretch 13 in Hampshire (**NRHE 1387800**) and the South Marine barracks noted in Deal (**MKe17770**). Hospitals were present in the Study Area, with Haslar Royal Naval Hospital seeing fortifications added (**HANTS MWX57652**).

#### *Shelters*

- 4.2.253. Air raids in the Study Area necessitated significant construction of shelters (Smith & Killingray 2004b: 142). The first air raid shelters were issued by the start of WWII (EH 2003: 5); small Anderson shelters were the preferred solution to bombing raids, to limit expenditure and the potential for mass loss of life that communal shelters would create (Brown *et al.* 1995: 66). Where communal shelters were required for schools, workers, occupants of terraced housing and people away from their homes, the government provided public single storey surface shelters, as at Tortington in West Sussex (**MWS8118**) (Brown *et al.* 1995: 66-67, 71). These were open trenches (stepped, crenulated and zig-zagged when large), protected by blast walls; they were often roofed by the local population (Brown *et al.* 1995: 66-67, 71). Around Dover more comprehensive, probably public shelters are seen to the north-east of Dover Castle (**MKE6994**), and in Dover town (**KENT MWX43592** and **KENT MWX43538**). Military sites commonly employed trench shelters; many are visible throughout the Study Area, supporting the coastal defences (Brown *et al.* 1995: 67), as on Hayling Island in Hampshire where shelters are seen alongside a HAA battery (**HANTS MWX37734**). Though in Kent underground bunkers and deep shelters were excavated to function 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**). Dover was the main victim of German long-range guns, which destroyed much of the area and led to it becoming known as hell-fire corner (Smith & Killingray 2004b: 142). Air raid shelters would have been essential in this part of the Study Area; as demonstrated by the plethora of bomb crater records in the region.
- 4.2.254. Aerial attacks would have been concentrated on large urban areas; however, less significant areas also saw heavy bombing, due to the presence of military sites in much more rural areas. Around Ramsgate in Kent no over ground shelters are seen, due to the extensive underground passages that were excavated to function as protective shelters during WWI, and which were extended during this period (**KENT MWX43094**). As a response to aerial attack, emergency water supplies were placed in proximity to urban areas to assist with fire fighting. They were placed in Kent (**KENT MWX43463**), East Sussex (**ESUSSEX MWX51674**), West Sussex (**WSUSSEX MKM1794**) and Hampshire (**HANTS MWX60430**). These were also placed in proximity to industrial and commercial areas, such as across

the road from Portsmouth Airport (**PORTS MWX642**) and on the airfield itself (**PORTS MWX636**).

#### *Farming*

- 4.2.255. A great emphasis was placed on agriculture during this war, therefore this industry did not suffer as much as it had during and after the First World War (Smith & Killingray 2004b: 144; Brandon 2007: 4). Emphasis was placed on the production of wheat, barley and root crops, with animal numbers decreasing (Smith & Killingray 2004b: 144). Allotments were created across much of the open space in the Study Area, such as parks, commons, green spaces and even in urban areas, in an attempt to meet the demands of the population; as evidenced in Coastal Stretch 13 (**HANTS MWX62752**).

#### *Industry*

- 4.2.256. Industry was greatly affected by WWII, with munitions production becoming essential. Therefore a move was seen to factory work, with women filling previously male roles. Evidence of this change is recorded in Coastal Stretch 2, where a WWII sand extraction site is seen, possibly used for the creation of sandbags (**KENT MWX43269**).

#### *Active Defences*

- 4.2.257. Defence in depth was employed to protect the coast from invading forces. The Study Area was closest to the continent and the likeliest area for landings; therefore it had to be protected. Active defences were used, such as pillboxes, spigot mortars and flame weapons (Brown *et al.* 1995: 79, 90; Smith & Killingray 2004b: 142). Pillboxes lined the coast, were present at important sites, and provided protection for gun batteries, airfields, radar stations and production centres across the Study Area (Brown *et al.* 1995: 79). Standard designs were employed, but great regional variation was seen, for example the Dover style, which is naturally only seen in the Dover Area (**Mke41972**, **KENT MWX43321** and **KENT MWX43322**); construction materials were often varied to provide camouflage (Brown *et al.* 1995: 79). These were present alongside other defences and also lone, as in Coastal Stretch 2 where one is seen to have defended a river (**Mke42790**). Spigot mortar emplacements were trenches which held concrete mountings for detachable guns, sometimes known as 'Blacker Bombards'; they often provided protection for strategic areas and would have inhibited enemy access to important crossing points (Brown *et al.* 1995: 87, 90). These were present at Ramsgate (**KENT MWX43124**), Deal (**KENT MWX43669**) and Folkestone (**Mke39439**) in Kent, Rye (**MES8111**), Bexhill (**ESUSSEX MWX51529**) and on the Pevensey Levels (**ESUSSEX MWX51493**) in East Sussex and around Portsmouth (**HANTS MWX62725** and **PORTS MWX579**) in Hampshire; none were seen in West Sussex. Gun emplacements fulfilled a similar role and are again common in the Study Area.
- 4.2.258. Terrestrial defences such as these were often associated with other sites to provide increased protection, for instance gun positions were evident at Chislet Colliery (**KENT MWX43081** and **KENT MWX43082**) in Kent. Minefields were visible in the combined dataset throughout the Study Area, with a minefield along the beach at Sandwich Bay (**KENT MWX43270**) and another in Kingsdown (**KENT MWX43501**) in Kent. Minefields were seen in East Sussex particularly around the low-lying Pevensey Levels (**MES8011**), the low areas of West Sussex also had a few minefields in the enhanced dataset (**WSUSSEX MKM1818**). Flame weapons were generally mobile, though some, such as the Flame fougasse, were dug into banks (Brown *et al.* 1995: 90). Coastal installation types included the Sea Flame Barrage

and Burning Beach, which projected burning liquids both into the sea and onto beaches (Brown *et al.* 1995: 90). Three flame projection positions were situated overlooking the coast at in Coastal Stretch 1 (**Mke39418**, **Mke39413** and **Mke39412**). A petroleum site is noted in Coastal Stretch 2 (**Mke39421**), as is a Fougasse site (**Mke42016**); additional Fougasse sites are seen along the beach between Kingsdown and Sandwich Bay (**NRHE 1422521**). Flame projection sites were located at St. Margaret's at Cliffe (**NRHE 1429276**) and south of Kingsdown (**NRHE 1429281**). In East Sussex petroleum sites were located at Rye and Camber Sands on Romney Marsh (**MES8155-MES8157**) (Leslie and Mace 2010: 119). Only one petroleum site was noted in West Sussex at Church Norton near Selsey (**MKM1268**) (Leslie and Mace 2010: 119). These defensive flame site types were removed after the war (Brown *et al.* 1995: 90).

#### *Passive Defences*

- 4.2.259. Supporting these active defences were passive defences; the Study Area was encrusted with such features, particularly anti-tank blocks (cubes, cylinders, upended pipes, dragon's teeth, pimples and girders), road blocks, barbed wire, beach scaffolding, anti-tank ditches, anti-aircraft ditches, tank traps, slit trenches and barrage balloon sites (Brown *et al.* 1995: 78, 100). Road blocks were used throughout the Study Area; sites were not just common along the coast, but also further inland, a great many are seen in the Wantsum Channel area of Kent, and also in the similarly low-lying and therefore vulnerable areas of Romney Marsh and the Pevensey Levels. These were considerably more common in the Kent and East Sussex areas, with sites only seen in West Sussex and Hampshire along the River Arundel (**MWS7614**) and in Portsmouth (**HANTS MWX60583**) and Southampton (**SOTON MKM630**). Road blocks and similar passive defences were often combined with more active defences to provide effective protection; for instance in Kent where artillery supported a roadblock (**KENT MWX43259**). Tank traps are quite common through the Study Area, recorded in Kent (**MKE16729** and **MKE3729**), distributed along the coast in East Sussex (**ESUSSEX MWX50180** and **ESUSSEX MWX50236**), somewhat more inland in West Sussex (**MWS7533** and **MWS7998**) and around Portsmouth in Hampshire (**HANTS MWX26064** and **HANTS MWX60583**).
- 4.2.260. Barrage balloon sites forced enemy aircraft to fly higher, both limiting bombing accuracy and making the planes easier targets; these are noted in Kent between Deal and Dover (**KENT MWX43645** and **KENT MWX43311**), in East Sussex around Newhaven (**ESUSSEX MWX50783**) and in Hampshire around Portsmouth (**HANTS MWX60401** and **PORTS MWX650**) and Southampton (**SOTON MKM600**). No barrage balloons were noted in the enhanced dataset for West Sussex; however one barrage balloon centre is recorded as being located on Thorney Island, to protect Portsmouth (Leslie and Mace 2010: 119).
- 4.2.261. Anti-aircraft ditches were designed to make landing and take-off difficult for enemy craft, as a response to the threat of rapid enemy infiltration and exfiltration operations to damage key targets (EH 2003: 6). 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 River Stour where the land is flat and has undergone little development (**KENT MWX43262**). In Hampshire these were seen north of Browdown in Lee-on-the-Solent (**HANTS MWX60386**) and in fields around Portchester (**HANTS MWX61362**).
- 4.2.262. Barbed wire defences were placed on beaches and across open spaces as obstructions; the wire also formed entanglements to prevent troop advance.

Barbed wire enclosed military sites and particularly vulnerable targets would have wire 25m thick to provide full protection (gauged by the range of a grenade) (Brown *et al.* 1995: 100).

- 4.2.263. Anti-landing obstructions designed to impede the access of amphibious craft were common along much of the coastline, providing not only additional protection to military sites but also formed a consistent line of defence along the entire coastline by connecting the sites together. This was particularly important for low lying beaches, or intertidal areas (such as Pegwell Bay in Coastal Stretch 2) which would have been more vulnerable from invasion. Types of anti-landing defence used in Pegwell Bay included beach scaffolding (**KENT MWX43230** and **KENT MWX43182**), a length of wire or cable and a short section of fencing along the intertidal zone (**KENT MWX43183** and **KENT MWX43189**), barbed wire (**KENT MWX43188**), anti-tank cubes along the coastline (**KENT MWX43185** and **KENT MWX43230**), and an area of post alignments within the intertidal zone designed to inhibit access in the bay (**KENT MWX43173**). Similarly vulnerable shorelines such as Romney Marsh, the Pevensy Levels and Selsey Bill were also protected with these methods.

#### *Military Sites*

- 4.2.264. Military buildings were seen throughout the Study Area, with Nissen huts, personnel camps, and storage facilities. Defended houses (and some hotels) are seen in the dataset, where existing domestic structures were fortified to provide them with a defensive function, as in Deal (**KENT MWX43529**). Some military sites in the enhanced record were of unknown function, so are recorded without specifics, as seen in Kent (**KENT MWX43674**), West Sussex (**WSUSSEX MKM1175**) and Hampshire (**HANTS MWX62731** and **PORTS MWX550**). Such sites are visible throughout the Study Area and are particularly common in close proximity to the coast.

#### *Batteries*

- 4.2.265. Many existing gun batteries were located close to the coast, but these were rearmed and given protection from aerial attack in WWII (Smith & Killingray 2004b: 142; Brown *et al.* 1995: 94). Existing castles and forts in the Study Area were also re-armed and improved to meet new standards. These were supplemented with additional batteries in 1940 when France fell under German control; these batteries housed guns taken from scrapped WWI Royal Navy ships (Brown *et al.* 1995: 94; EH 2003: 6). Such batteries were accompanied by at least two searchlights, engine rooms to provide power, and an observation post for accuracy (Brown *et al.* 1995: 98). Searchlight batteries were also created to light significant locations, such as the Langdon Coast Artillery Searchlights at South Foreland (**MKe17260**) which lit up the eastern arm of Dover Harbour.
- 4.2.266. Mobile DIVER batteries of anti-aircraft guns were constructed in 1944 and 1945 to combat the new V-bomb threat; these were deployed along a busy bombing path, part of which was within the Study Area (Brown *et al.* 1995: 61). This was not successful, so the units were deployed along the coast from Dover in Kent to Seaford in East Sussex (Brown *et al.* 1995: 62). The enhanced record shows these located mainly along the coast of Romney Marsh (**KENT MWX5131**) with one site at Capel-le-Ferne (**KENT MWX5144**). Batteries were protected by barbed wire, earthworks (particularly slit trenches) and fences; they also formed part of a wider defensive network of sites which were mutually supportive (Brown *et al.* 1995: 97). Railway guns were used during this period; two were deployed to South Foreland in Kent with the aim of sinking enemy shipping (Brown *et al.* 1995: 100).

- 4.2.267. Anti-aircraft batteries were significant for defence and therefore located throughout the Study Area, with light (LAA) and heavy (HAA) versions, representing gun capabilities (Brown *et al.* 1995: 48). Some anti-aircraft batteries reused existing sites, such as the one at No. 2 Browndown Battery (**HANTS MWX18982**) in Coastal Stretch 15. Others were specifically built, such as the one near Browndown Camp (**HANTS MWX37742**). These sites were initially temporary, but were made permanent during the war (Brown *et al.* 1995: 50). As a result some sites survive – such as an anti-aircraft gunsite on Sinah Common, Hayling Island (**HANTS MWX37734=SM 33402**). Such batteries were always accompanied by ammunition stores, or magazines. Some HAA sites had gun laying radar (GL mats), such as Great Farthingloe in Kent (**MKe17930**), the early versions of these had chicken wire surrounds in an octagonal shape (Brown *et al.* 1995: 49, 59; Smith & Killingray 2004b: 142). Such sites often had searchlights to highlight enemy craft for night fire, and barrage balloons to force aircraft higher, simultaneously making them an easier target and reducing their bombing accuracy (Brown *et al.* 1995: 48, 62-63).
- 4.2.268. In addition a number of cross-channel gun batteries located around Dover targeted enemy shipping and could even reach the French coast (Smith & Killingray 2004b: 142). The ‘Winnie’ and ‘Pooh’ batteries (**Mke19895** and **Mke19896**) were the first cross-channel batteries created in South Foreland. As a result of the inaccuracy of ‘Winnie’ and ‘Pooh’, three more cross channel batteries were constructed to provide support. These included South Foreland battery (**Mke41990=NRHE 1423885=NRHE 1421774**), Fan Bay battery (**Mke41970=NRHE 1423672**), and perhaps the most successful, Wanstone battery at St. Margaret’s at Cliffe (**MKe17934=Mke41971=NRHE 1423871=NRHE 1423874**). Dummy Winnie and dummy Pooh were also located at South Foreland (**Mke19897** and **Mke19898**) these were designed to deceive enemy reconnaissance missions and simulated the real batteries, housing large artillery under camouflage netting.

#### *Aircraft Warning Systems*

- 4.2.269. WWI sound mirrors were inadequate as aircraft early warning systems, due to the speed of the new planes, so they were replaced with radar stations (Smith & Killingray 2004b: 142). The Chain Home system provided clear early warning of enemy craft (Brown *et al.* 1995: 36). The site layout used in the Study Area relied upon defended buildings with blast walls and banking to protect the equipment, along with transmitter and receiver aerials (Brown *et al.* 1995: 40). An extensive radar station was located at Swingate (**MKE9024**) and a smaller one at St. Margaret’s at Cliffe (**MKE13608**); the Kent Study Area was particularly important for early warning systems, as it saw the shortest channel crossing for aircraft. This technology improved during the war, permitting the detection of low-flying aircraft; new sites were needed for this development and were known as the Chain Home Low system (Brown *et al.* 1995: 45). Radar was present into East Sussex at Fairlight, Pevensey and Newhaven; this continued through into West Sussex at Durrington (Leslie and Mace 2010: 119). The Royal Observer Corps posts were still active after WWI and were used in conjunction with the radar warning system (Brown *et al.* 1995: 32, 48), many of these were present throughout the Study Area; though the enhanced record shows only a few on Hayling Island in Hampshire (**HANTS MWX4175**, **HANTS MWX6266** and **HANTS MWX6283**). Although none were noted in East Sussex or West Sussex (Leslie and Mace 2010: 119).

#### *Airfields*

- 4.2.270. The number of airfields increased during this period, to meet the demand for planes (Brown *et al.* 1995: 110). WWII airfields generally comprised three runways

forming a rough 'A' shape (often paved), with supporting buildings arranged around them in a dispersed fashion to avoid targeted bombing (Brown *et al.* 1995: 110-111, 113, 121). Separate sites were provided for varying functions, such as training, gliders, bombers, fighters and coastal locations (Brown *et al.* 1995: 110). Portsmouth Airfield in WWII saw a change in function to the home of the No. 163 Gliding School and factories producing gliders and aircraft (**PORTS MWX636**). Satellite airfields were small sites which operated under the control of a full airfield; satellite and relief landing grounds also existed in addition to airfields, to deal with landing and storing of aircraft (Brown *et al.* 1995: 119, 121).

- 4.2.271. A number of airfields were located throughout the Study Area: RAF Selsey (**MWS7690**), RAF Appledram (**MWS7717**), RAF Thorney Island and Shoreham in West Sussex (Leslie and Mace 2010: 119). No airfields were noted in East Sussex (Leslie and Mace 2010: 119). RAF rescue services were located at Littlehampton and Shoreham in West Sussex and at Newhaven in East Sussex (Leslie and Mace 2010: 119). The Royal Naval Air Service Lee-on-the-Solent was still operational as HMS Daedalus (**HANTS MWX39580**) in Hampshire. Airfields were camouflaged during this period through a variety of methods, which included painting field boundaries onto large open areas, parking aircraft in line with boundaries, covering items with camouflage netting and using trees as cover (Brown *et al.* 1995: 121). Pillboxes known as Pickett-Hamilton Forts were specifically designed for airfield use; these could be raised and lowered as required to avoid presenting obstacles to planes (Brown *et al.* 1995: 123).

#### *Decoys*

- 4.2.272. Decoys were used to attract bombing raids away from military and domestic areas (Brown *et al.* 1995: 48). These had been used in France during WWI to mimic airfields (Brown *et al.* 1995: 63) and their construction was begun prior to WWII (EH 2003: 5). WWII decoys were split into decoys which functioned during the day (K sites) and those used at night (Q sites) (Brown *et al.* 1995: 63). K sites simulated military sites, such as camps and airfields; these were used as decoys until 1941, after which day sites were only utilised to suggest increased resources to intelligence flights (Brown *et al.* 1995: 64). Q sites employed electrical lights to simulate airfield flare paths (Brown *et al.* 1995: 64), QF sites used fire to simulate a dropped bomb and thus draw enemy bombs away from nearby airfields (Brown *et al.* 1995: 64) and QL sites used muted lighting to resemble towns under blackout restrictions (Brown *et al.* 1995: 64). QL sites were often combined with SF sites, which simulated both large and small fires and were generally used to attract bombing intended for large urban areas (Brown *et al.* 1995: 64).
- 4.2.273. Four decoy sites were noted in Coastal Stretch 2: a QL site at Worth (**NRHE 1470218**), a Q site and a site of unknown type at Ash (**NRHE 1465070** and **Mke42950**), and a QL site on Sandwich Flats (**NRHE 1470227**), these were designed to attract bombing from Dover. A decoy site was also located at Dover, forming part of the Operation Fortitude South (D-Day Deception) programme in 1944 (**NRHE 1413717**), East Sussex decoys were located at Camber (**MES8162**), which simulated the town of Rye, at Pett Level and at Cuckmere Haven (Leslie and Mace 2010: 119). West Sussex decoys were placed at Highleigh, Birdham, Wittering (**WSUSSEX MKM1525**), Southbourne and Thorney Island (Leslie and Mace 2010: 119). Langstone Harbour was the site of a large naval decoy designed to simulate Portsmouth Harbour (**HANTS MWX60102** and **NRHE 1459703**). The individual decoy elements were normally situated on the islands within the Harbour (**HANTS MWX38272**, **NRHE 1459725**, and **NRHE 1459707**). This decoy was developed from an original decoy which was used to attract bombs from the city of Portsmouth itself; this was the most successful site of its type during WWII

(**HANTS MWX38273** and **NRHE 1459711**). Part of this decoy also included Farlington Marshes, which was a QF site (**PORTS MWX693**).

#### *Training*

- 4.2.274. Training facilities existed through this period, with areas of practice trenches located around some military sites, such as at Fort Cumberland (**PORTS MWX547**). Practice minefields were also laid out around some sites. Rifle and firing ranges are also known throughout the Study Area, in Kent (**KENT MWX51688**), East Sussex (**MES8006**), West Sussex (**MWS7557**) and Portsmouth (**PORTS MWX543**). Some of which show continuation of use from the 1800s into WWII, as at Worth and on Sandwich Flats (**KENT MWX43264** and **KENT MWX43316**).

#### *Defensive and Offensive Operations*

- 4.2.275. Kent ports within the Study Area saw significant use in the evacuation of Dunkirk (Smith & Killingray 2004b: 142). Hampshire played an important role in the offensive aspects of WWII, such as Operation Neptune, the marine element of Operation Overlord which were mobilised from Southampton in Hampshire, Shoreham in West Sussex and Newhaven in East Sussex (Allen & Gardiner 2000: xxi; Leslie and Mace 2010: 119). Mulberry Harbours were manufactured in Stokes Bay (**HANTS MWX57654**) and Langstone Harbour (**HANTS MWX62770** and **HANTS MWX62775**) in Hampshire (Allen & Gardiner 2000: xxi). Other construction sites were located in West Sussex, with two sites in Chichester Harbour and one at Littlehampton (Leslie and Mace 2010: 119). A mulberry harbour element is present off Hayling Island (**HANTS MWX62775=NRHE 1398041**) as it had a fatal crack and was discarded.

#### *Ports*

- 4.2.276. The ports and harbours of the Study Area were important to defend; this was undertaken with intensive fortification of the areas. Portsmouth harbour was defended through the intensive fortification of the whole coast of Portsea Island and surrounding areas. Coastal military features included military pontoons and piers. A pontoon was recorded in Dover forming a floating dock in the harbour, composed of six square structures creating a platform (**KENT MWX43614**). In Hampshire embarkation hards and landing stages were located to facilitate swift loading and unloading of landing craft (**HANTS MWX62650**, **HANTS MWX62677** and **NRHE 1415337**). Such sites were important, as a WWII military depot on Stokes Bay Pier was transformed into a major fuelling point before the D-Day invasion (**HANTS MWX60403**).

#### *Boats*

- 4.2.277. The warships of WWI were replaced with new models for WWII and the British fleet was the largest in the war (Royal Navy 2009c; EH 2003: 6). Submarines were also employed during this time, as were mines (Royal Navy 2009c). Amphibious warfare developed during this time; initially ships were used for raids, which progressed to specifically designed craft undertaking invasions (Royal Navy 2009c). Landing craft were a key vessel of this period, enabling the swift deposition of armed personnel in key areas (Royal Navy 2009c). Operation Neptune comprised the transportation of the mulberry harbour elements to Normandy (Royal Navy 2009c). This required minesweepers to clear the sea, tugs to pull the elements and an escort of armed and rescue ships (Royal Navy 2009d).

4.2.278. The only designated shipwreck for this period is the *U-12*, which is designated as a Protected Place under the Protection of Military Remains Act (1986). The *U-12* was a Type IIB U-boat of the German Kriegsmarine built in 1935. The submarine struck a mine on the 5<sup>th</sup> October 1939 in the English Channel near Dover, and all of the crew were lost. A wide range of other military shipwrecks are known in the Coastal Stretch 18 Study Area, including a blockship, a boom defence vessel, destroyers, an e-boat, a gun boat, numerous landing craft, mulberry harbours and phoenix caisson units, minesweepers, and submarines (**Figure 14**). Again, local maritime craft were brought into service, and the records also include a number of trawlers, drifters and tugs that were purchased by the Admiralty and armed. Vessels with military links were generally American, British/English or German. Other, non-military vessel types of the period include 25 cargo vessels in the NRHE dataset and 39 steamships in the Seazone dataset, as well as barges, fishing vessels, floating breakwaters, a ferry, lightships, merchant steamships, mooring vessels, motor vessels, a paddle steamer, tugs and yachts. These vessels were associated with American, Belgian, British, Dutch, English, French, Norwegian, Panamanian and Swedish ownership. As with WWI, the vast majority of ships with recorded cause of loss were lost as a result of enemy action. In the NRHE dataset, 14 of the 18 causes of loss were related to military activity, and in the Seazone dataset, it was 64 out of 82. Military causes of loss included aerial bombing, depth charges, enemy gun action, German e-boats, striking mines and being torpedoed.

#### *Aircraft*

4.2.279. Aeroplanes increased in reliability during this period, permitting more cross-channel raids to be undertaken. Mass production also came in with large numbers of craft being created throughout the war. This greatly increased their significance as defensive and offensive weapons (Brown *et al.* 1995: 110). Early in the war the majority of flights over the English Channel were from Luftwaffe attacks on the UK; however, by the middle of the war, there were increased Allied attacks on Continental Europe (Wessex Archaeology 2008a: 16). The Battle of Britain was a significant event, not least because Hitler required air superiority before he would commit to an invasion of Britain, which he did not gain. The large volume of aircraft traffic over the channel, combined with the presence of anti-aircraft batteries along the coast demonstrates the potential for many aircraft wrecks to be discovered within the Study Area. In particular, Manston in Kent was an important navigational point for allied aircraft returning from night raids during this period, therefore many wrecks may be present in that area (Weekes 2007c: 5).

4.2.280. There are 20 records of known aircraft wrecks in the Study Area dating to WWII (**Figure 15**). In addition, of the 21 undated aircraft wrecks, it is possible that some date to this period. Seazone data aircraft crash sites include two Supermarine Spitfires presumed lost during WWII, an aircraft of unknown type lost 24 February 1940 during a mining exercise and a short Stirling aircraft presumed lost during WWII. The RoW dataset includes the report of a sabre engine believed to be from an RAF WWII Typhoon aircraft; this was discovered by a fisherman. Fifteen known wreck sites for planes are recorded in the NRHE dataset. There were no records of aircraft crash sites in the Marine Aggregate Protocol for Reporting Finds of Archaeological Interest database. Also, it must be noted that the Protection of Military Remains Act (PMRA) (1986) has not produced a list of protected aircraft, in spite of the fact that all aircraft that crashed while in military service are automatically protected.

### ***Post- War Military Activity***

- 4.2.281. Post-war military features in Kent include an RAF station built in Sandwich during the 1950s (**NRHE 1174956**) and the Royal Observer Corps Underground Monitoring Posts constructed in Upstreet and Kingsdown in 1961 (**MKe18074**).
- 4.2.282. After WWII and until the early 1990s, military aviation activity was dominated by the Cold War. A high number of aircraft crash sites relate to military activities. Seazone data aircraft crash sites include a Meteor NF11 lost in 1952, a Tigermoth lost 06 September 1954, an aircraft that made an emergency landing in sea when it ran out of fuel on a flight from Geneva to London in June 1954, a Beagle Terrier that crashed in 1970, a G-AZWZ autogyro that hit a bird and was lost 21<sup>st</sup> September 1975, a Cessna lost 26<sup>th</sup> January 1982 and an aircraft of unknown type lost 11<sup>th</sup> December 1992.

### **4.3. ARCHAEOLOGICAL POTENTIAL AND IMPORTANCE**

- 4.3.1. Areas of archaeological potential are presented chronologically within this section. These were selected based on the presence of similar archaeological material, the geology, proximity to the coast, and relation to urban areas; therefore indicating the potential for natural and development processes to reveal further material. Importance is based both on existing designated sites (SMs, LBs and Protected Wrecks) and non-designated areas. Non-designated sites are more complex to consider, based on the assessment of potential, combined with recognised criteria for assessing importance. This suggests sites and areas that are of, or may contain, features of high importance.

#### ***Archaeological Potential***

- 4.3.2. The archaeological potential of the Study Area has been assessed mainly on the basis of the local HER/SMR/AHBR datasets. It also takes into account the relevant records from the NRHE database and PAS database. It is informed by the above chronological assessment, and by interpretation of the local geology and landscapes. The intention of this section is to indicate the likelihood that currently unknown heritage assets will be uncovered and specify their probable character and location. Coastal Stretches are referred to when relevant during this assessment.
- 4.3.3. The extent of the flood line predictions show that a vast majority of the coastal stretch is extremely vulnerable to this natural threat. In general any such flooding may cause a movement in sediment that could reveal further archaeological sites and finds.

#### ***Early Prehistoric (Palaeolithic to Neolithic)***

- 4.3.4. The possibility of uncovering, as yet unknown, prehistoric sites and material appears to be high along the hard chalky coastline; encompassing parts of Coastal Stretches 1-4 and 7-15 (Geology Society 1957). Chichester Harbour, Langstone Harbour and Portsmouth Harbour are all backed by harder chalk bedrock (Coastal Stretches 12-15) (Geology Society 1957). Palaeolithic, Mesolithic and Neolithic finds – predominantly typological flint artefacts – may be uncovered through cliff top erosion and as a result would be found either exposed on the cliff top (as either redeposited or *in situ* finds), at the base of cliffs, or within the intertidal zone. Such finds have also been uncovered further inland, and so the likelihood for further discoveries of this kind is also high.

- 4.3.5. The softer coastlines are more subject to erosion and include all or parts of Coastal Stretches 2, 4-9 and 11-17. These are composed of Oldhaven, Blackheath, Woolwich, and Reading and Thanet beds (as parts of Coastal Stretch 2, 8-9 and 11-15 are), Upper Greensand and Gault (parts of Coastal Stretches 4 and 7), Lower Greensand (parts of Coastal Stretches 4 and 7), Weald Clay (parts of Coastal Stretches 4 and 7), Hastings Beds (forming Coastal Stretches 5-6 and part of 7), London Clay (Coastal Stretches 11-15) and Barton, Bracklesham and Bagshot Beds (Coastal Stretches 11-17) (Geology Society 1957). These include parts of Sandwich and Folkestone in Kent, Romney Marsh to Eastbourne in East Sussex, around Worthing in West Sussex and From Bognor Regis in West Sussex round to Totton in Hampshire (Geology Society 1957). These softer areas erode faster; therefore redeposited material may be discovered in sediments.
- 4.3.6. Early prehistoric artefacts within the Study Area are seen to have been discovered in urban areas. Therefore, there is the potential for further finds to be made as settlements are redeveloped and expanded. Some Coastal Stretches are particularly urban in nature, such as Coastal Stretches 1, 3-4, 6, 9 and 14-15; therefore these are more likely to see further discoveries than other areas. For example, in Coastal Stretch 2 all the early prehistoric findspots are situated along the edges of the former Wantsum Channel and the original eastern coastline, south of the mouth of the River Stour (that was further inland than at present), together with the urban centres of Ramsgate and Fordwich and the edges of the River Stour that extends south-west to Canterbury. Therefore the potential for uncovering further material from these locations is high. There is also high potential for finds in areas of gravel extraction. Neolithic material has previously been discovered both along the coast and further inland and it is likely that this will continue to occur.
- 4.3.7. The quantity of alluvium within the Study Area may yield further discoveries; for instance a handaxe (**NRHE 1086088**) was discovered on flood plain alluvium beside the River Stour close to Fordwich in Coastal Stretch 2, highlighting the potential of this type of sediment to carry archaeological material. Alluvium present in the areas with softer geology may contain palaeoenvironmental material, which could provide evidence of localised agriculture and subsistence.
- 4.3.8. Portsmouth, Langstone and Chichester Harbours (Coastal Stretches 12-15) were terrestrial through the early prehistoric and submerged in the late Mesolithic. As the southern extents of these embayments are of soft geology, it is not surprising that finds are made in the large intertidal zone, on the intertidal islands, on the foreshores and eroding from sea defence banks. Some peat and submerged forests have been discovered in Coastal Stretches 13, 14 and 18 (near Selsey in Coastal Stretch 12).
- 4.3.9. Material is likely to be discovered offshore (**Figure 13**), as much of the Study Area and out to the -30 m contour was not submerged during this period. There is substantial evidence for palaeo-fluvial systems and palaeochannels across the region, and the South Coast REC (James *et al.* 2010) has identified that land surfaces associated with these palaeovalleys have the highest potential for submerged prehistoric archaeological sites and finds. The material could be discovered either in its primary context, where the material has remained relatively untouched since it was deposited, or in secondary contexts, where artefacts have been removed from their initial position through fluvial or marine processes (Wenban-Smith 2002). Finds are likely to include flint and bone tools, as well as preserved submerged landforms which may yet yield evidence for actual occupation sites.

- 4.3.10. Isolated finds reported through the PAS are mainly found between Seaford and Beachy Head, with a small concentration also seen at the coast near Fareham; therefore there is the potential for further finds in these areas.
- 4.3.11. Wrecks of early vessels may be discovered in the alluvium which is found in the softer geological areas of the Study Area. Although it is difficult to determine the level of shipping in the prehistoric period, the large sheltered harbours in Hampshire and West Sussex suggest the potential for at least local traffic and there has been maritime transport of goods and people from the Continent to the UK and around the coast since at least the Neolithic. There is potential to discover wrecks dating from the late Mesolithic to the present day. Despite the paucity of known submerged prehistoric sites and findspots within the Coastal Stretch 18 Study Area and to the -30 m contour, there is considerable archaeological potential for the discovery of wrecks across the Study Area.

*Bronze Age*

- 4.3.12. It is likely that typical Bronze Age features, including barrows and ring ditches, may be discovered as more aerial surveys and Lidar surveys are undertaken of the Study Area, and particularly at various times throughout the year. Such findings are more likely to be made on cliff tops in chalky areas, as in Coastal Stretches 1-4 and 7-15 (Geology Society 1957). These sites are also more common inland, so Coastal Stretches 2, 5, 7-12 which include rural inland areas are likely to hold such remains. Of course there is the potential for sites to also be uncovered during excavation.
- 4.3.13. Bronze Age settlement sites may be uncovered in areas where occupation has already been noted; sites are relatively common within the Study Area. Significant absences of sites are only seen between Dover in Kent and the Pevensey Levels in East Sussex.
- 4.3.14. Isolated finds are likely to be discovered in rural areas, therefore Coastal Stretches 2, 5, 8, 12-13 and 16 are better placed to produce this type of evidence than others. Finds reported to the PAS are concentrated between Littlehampton and Bognor Regis, and in the Stour Valley near Upstreet.
- 4.3.15. Floodplain alluvium is common around the River Stour in Coastal Stretch 2; therefore there is the potential for evidence of localised agriculture and subsistence in the form of palaeoenvironmental material. Wrecks of early craft may also be found in the alluvium, deposited prior to the silting of the channel.
- 4.3.16. Hoards were discovered on the coast of East Sussex, more inland around West Sussex and around the intertidal Hampshire harbours. Salt working sites were located on Romney Marsh, The Pevensey Levels and around the intertidal harbours in West Sussex and Hampshire. Large quantities of flint items have also been found on the islands in the intertidal zone of the harbours, demonstrating the potential for more discoveries to be made in these areas.
- 4.3.17. Urns containing cremations have been discovered in the north of Coastal Stretch 13, both on the intertidal islands and north Hayling Island. This is the location of a known urnfield cemetery and there is a high potential to find more artefacts both in this area and across the coastal plain (Gardiner 2007: 8, 10).
- 4.3.18. The discovery of the Bronze Age Dover Boat and the possible Langdon Bay wreck site in Coastal Stretch 3 suggests that further marine archaeological features of this type could be made in the vicinity of Dover Harbour, as this port was active from at

least the Bronze Age. These could provide greater knowledge of early boat building traditions, marine and coastal transport and trading routes, and the types of commodities that were being exchanged.

*Iron Age*

- 4.3.19. Iron Age occupation sites are also fairly common within Coastal Stretch 1, and any discoveries may also include evidence for earlier or later multi-phased occupations, for example at South Dumpton Down where Bronze Age and Iron Age features were uncovered (**Mke19966**) and at South Dumpton Gap where Iron Age and Romano-British occupation features were excavated (**MKE7594**). In Coastal Stretch 15 all known Iron Age sites and findspots have been discovered between Portchester Castle and Cams Hall Estate; this could suggest that the area had a high level of activity and occupation prior to the construction of the Roman Saxon Shore fort at Portchester. However, the localised emphasis could also indicate a bias in the existing record, and there is likely potential for Iron Age material from across Coastal Stretch 15.
- 4.3.20. Due to the fairly regular distribution of Iron Age features across Coastal Stretch 3, predominantly occupation sites, the potential for uncovering further sites at any location within the area is high.
- 4.3.21. Isolated finds are likely to be discovered in rural areas, therefore Coastal Stretches 2, 5, 8, 12-13 and 16 are better placed to produce this type of evidence than others. Portsmouth, Langstone and Chichester Harbours (Coastal Stretches 12, 13, 14 and 15) were backed by hard chalk geology in the northern extents of the Coastal Stretches; therefore it is not surprising that sites are recorded as eroding out of small cliffs in these areas and there is potential for this to continue. Between Littlehampton and Bognor Regis is a common location for PAS finds of this period. The Lydden Valley, Stour Valley, Chislet Marshes and Pegwell Bay also see concentrations.
- 4.3.22. Floodplain alluvium is common around the Stour in Coastal Stretch 2; therefore there is the potential for palaeoenvironmental material to provide evidence of localised agriculture and subsistence.
- 4.3.23. Salt working sites were also present throughout the Study Area, but especially around the Hampshire and West Sussex intertidal harbours, with clear potential for further evidence to be found.
- 4.3.24. Tournerbury hillfort and the temple located in Coastal Stretch 13 may represent areas of high potential for unusual or prestigious finds. The same can be said for the Hillfort at Dover, and the temple at Worth in Kent.
- 4.3.25. Wrecks may also be found in the alluvium of Coastal Stretch 2, as the Stour was an open watercourse in this period.

*Romano-British*

- 4.3.26. Finds recorded by the PAS are seen in the Stour and Lydden Valleys in Coastal Stretch 2 and on Romney Marsh in Coastal Stretch 5. They are also seen in the fields alongside the River Ouse in Coastal Stretch 8. Another distribution is seen east of Littlehampton in Coastal Stretch 10 and this continues west in modern fields through Coastal Stretch 11 to the surrounds of Chichester Harbour in Coastal Stretch 12.

- 4.3.27. Roman roads are located throughout the Study Area, as demonstrated in **Section 4.2**. Many findspots are often located along these linear features, therefore the potential for making further discoveries, such as coins, along the monuments is high.
- 4.3.28. The road systems run between significant locations, therefore settlements are likely to be located both along these roads and at their destinations. The substantial amount of evidence for Romano-British settlements implies that more domestic and defensive sites could be uncovered in the future.
- 4.3.29. Isolated burials and larger cemeteries are also expected, along with assemblages of small finds including pottery, jewellery and coins.
- 4.3.30. Floodplain alluvium is common around the Stour; therefore there is the potential for palaeoenvironmental material to be found in Coastal Stretch 2, providing evidence of localised agriculture and subsistence.
- 4.3.31. Redevelopment and enlargement of existing ports and harbours in the Study Area may produce evidence of Romano-British waterfront structures. Sites such as Dover and Walmer were utilised during this period and may divulge information on coastal exploitation. A pier structure has been found at Ramsgate, while a quay was found in the Wantsum Channel and another was seen in Southampton, which was developed during this time; there is the potential for similar waterfront structures to be found at operational ports. The Saxon Shore fort at Portchester in Coastal Stretch 14 may have associated materials, including the potential for shipwrecks.
- 4.3.32. Two wrecks of this period are known from Southampton in Hampshire. Wrecks are also likely to be found in the alluvium of Coastal Stretch 2, as the Stour was a significant watercourse in this period, and in the sediments of the intertidal harbours in Hampshire and West Sussex. Such material is also likely to be located around the fortified and trading centres along the coast, as in Richborough, Dover, Hastings, Eastbourne, Brighton and Hove, Worthing, Bognor Regis, Portsmouth and Southampton.

#### *Anglo-Saxon*

- 4.3.33. The Anglo-Saxons are recorded as having arrived in England at Ebbsfleet (the southern extent of the Isle of Thanet) in Coastal Stretch 1, therefore it is possible that sites dating to this period could be uncovered in Coastal Stretch 1, and perhaps also Coastal Stretch 2. Anglo-Saxon sites are known within Coastal Stretch 1 and are predominately cemeteries and burials. It appears that communities moved into the marshy regions of the Study Area after they silted up. Evidence of this has been identified along the Stour Valley in Coastal Stretch 2. Documentary evidence suggests that a number of settlements were present in Coastal Stretch 14; therefore urban excavations may discover evidence of new settlements.
- 4.3.34. The PAS database records a number of early medieval finds in the Stour and Lydden Valleys of Coastal Stretch 2, in Romney Marsh (Coastal Stretch 5), along the River Ouse in Coastal Stretch 8, and in the Littlehampton to Bognor Regis area (Coastal Stretches 10-11) and there is good cause to suppose that further finds will be forthcoming. For example a number of coin mints have been identified at Sandwich, Dover, on Romney Marsh, Hastings, Lewes, Chichester and Southampton suggesting potential for Anglo-Saxon coins to be distributed

throughout the Study Area. Other finds are also expected around centres of major occupation and industry, such as Sholden in Coastal Stretch 3

- 4.3.35. The majority of existing Anglo-Saxon information comes from documentary sources though an increasing amount of material evidence has been gleaned through the excavations of settlement sites. As more sites are excavated, the potential for further light to be shed on this era is increased. Diagnostic finds from the period are traditionally restricted to burial sites. Within the Study Area there is the potential for the discovery of more burials, particularly in Coastal Stretches 1, 2 and 3 close to where the Saxons were thought to have landed.

*Medieval*

- 4.3.36. Mints in the Study Area were noted from Dover, Hythe and the Pevensey Levels; again there is high potential for coins to be discovered close to these areas.
- 4.3.37. Finds reported to the PAS were more widespread throughout the Study Area than seen for earlier periods. The Stour and Lydden Valleys in Coastal Stretch 2 again showed many findspots; Romney Marsh showed findspots to be located mainly at the edges of the marsh, though many were also found across the wetland itself. Similarly, a cluster of finds were made on the Pevensey Levels in Coastal Stretch 7, the majority of which were located around the 5m contour at the edge of the marshland. A small cluster of finds were seen around East Dean, near Beachy Head in Coastal Stretch 8. The Rivers Ouse, Adur and Arun have seen a number of finds made inland along their courses, in Coastal Stretches 8-10. Between Littlehampton in Coastal Stretch 10 and Chichester in Coastal Stretch 12 a large number of finds were made.
- 4.3.38. Standing remains of domestic and working buildings are known throughout the Study Area. The many still extant medieval buildings could be studied in further detail to provide more information about the individual sites and the period in general. This implies a potential for discovery of further buried remains, particularly in urban areas.
- 4.3.39. Due to the high potential for the River Stour to flood, even today, the land remains largely undeveloped however it is intensely used for agricultural activities, including arable and pastoral farming, and evidence of this can be seen across the landscape dating back to when the Wantsum Channel first began to silt up. Flood prevention methods are also prevalent across this landscape in the form of drainage ditches and flood control banks, some of which date back to the medieval period. As a result of this large scale reclamation there is a high potential for discovery of evidence of past societies across Coastal Stretch 2 dating from the early medieval period onwards.
- 4.3.40. Wrecks documented as Recorded Losses within Named Location polygons in the NRHE dataset suggest that wrecks may exist offshore throughout the Study Area. Therefore there is the possibility of discovering medieval wrecks, for example the *Marie Knyght*, a foreign cargo vessel that stranded off North Foreland in 1404 (NRHE 1445896).

*Post-Medieval*

- 4.3.41. Post-medieval PAS finds were made around the Stour and Lydden Valleys in Coastal Stretch 2, Romney Marsh in Coastal Stretch 5 also saw a number of isolated finds. Again, finds were made around East Dean, close to Beachy Head in Coastal Stretch 8. The Rivers Ouse, Adur and Arun (in Coastal Stretches 8-10)

have many findspots running inland along the watercourses. Between Littlehampton and Chichester Harbour (spanning Coastal Stretches 10-12) was also a concentrated area of findspots. For this period, finds were also made around Southampton Water in Coastal Stretches 16-17.

- 4.3.42. As with the medieval period, standing remains of domestic and working buildings are present throughout the Study Area, in high numbers. The many still extant post-medieval buildings could be studied in further detail to provide more information about the individual sites and the period in general. There is therefore the potential for discovery of buried remains in proximity to these standing remains, likely in urban areas.
- 4.3.43. Brickworks and tile works are common in this period throughout the Study Area and further sites are likely to be discovered across the area. Quarries are also common and likely to be discovered around the Study Area. Salterns are recorded across the low-lying coastal areas. In Coastal Stretch 13 one record states that 74 salterns (**Hants MWX54709**) were present on the coast of Hayling Island; therefore there is the potential to locate a great many more than are known currently.
- 4.3.44. There is potential in the intertidal harbour areas of Coastal Stretches 12-15 for the discovery of fishing structures and navigational aids.
- 4.3.45. The Wadeway in Langstone Harbour (Coastal Stretch 13) is visible on historic OS 1:2500 mapping from this period and is likely much older, though this has not been confirmed. As such, it is possible that finds lost during transit may be discovered along its length and in the surrounding area, dating from the post-medieval and likely earlier.
- 4.3.46. There is also the potential for the discovery of the NRHE recorded losses. Although these are vessels for which no remains have been discovered on the seabed, they do provide some indication of the shipping traffic and losses in the area. The alluvium in the harbours of Hampshire and West Sussex is ideal for preserving the remains of vessels and should be considered as being of high maritime archaeological potential.
- 4.3.47. The England's Shipping project (Wessex Archaeology 2004b) sought to redress the chronological imbalance by assessing shipwrecks pre-1700. It examined the routes of a substantial number of ships from this period, and noted a marked concentration of shipping on the south-east coast. Additionally, it plotted the location of pre-1700 naval battles, which indicated a high number of battles took place off the south coast, with a particular concentration off the coast of Kent, around the Goodwin Sands. These results suggest that there could be a far greater number of shipwrecks dating to the mid-post-medieval period and earlier, that simply have not yet been discovered.
- 4.3.48. The discovery of cannon balls on the sea floor can also indicate the location of sea-battles, as well as the potential for the discovery of previously unknown wreck sites. The MAIPFRAI/BMAPA dataset includes a number of cannon balls that have been discovered both within and outside of the 6 nautical mile limit – and there are concentrations in the seas over 15 km south-west of Selsey as well as 54 km south and 40 km south-east of Eastbourne. Other discoveries of ship-related material, such as nails, ship fittings, ship timbers, ship badges and so forth, also indicate the high potential for the discovery of further material.

- 4.3.49. The Navigational Hazards Project undertaken by Bournemouth University (Merritt *et al.* 2007, Merritt 2008) identified the potential for the discovery of shipwrecks around the coast of the UK. It determined that the areas of highest potential were those where a high potential for ship losses coincided with a high potential for the preservation of archaeological materials. The results of the project indicated that the eastern Solent and approaches to Portsmouth, Langstone and Chichester Harbours, as well as the Goodwin Sands were all large areas of high potential (Merritt *et al.* 2007: 33). Because of this high level of potential, AMAP 1 (Merritt 2008), the second phase of the project, focused specifically on the south coast.
- 4.3.50. The eastern Solent is fairly sheltered, so ships have some protection from storms and high winds. However, the navigational hazards associated with eastern Solent include the extensive areas of mobile sand banks and extensive intertidal areas (Merritt *et al.* 2007: 36). Specific areas within the eastern Solent exhibited particularly high potential – such as the entrance to Southampton Water, which is focused around Brambles Bank, an extensive area of sandbanks. Other areas of hazard included the extensive intertidal areas around Portsmouth Harbour, Langstone Harbour and Chichester Harbour, and the area off Eastbourne. The Goodwin Sands, which lie off the east Kent Coast between Ramsgate and Dover, are characterised by shallow mobile sandbanks and are a well-known shipping hazard – the area has one of the greatest reputations in English waters for the loss of ships (*ibid*: 37). Both areas had high levels of shipping from the Roman period onwards, and the fact that the very sand banks and intertidal shallows that formed the key navigational hazards also promote the preservation of shipwreck material, signifies that there is very high potential for the discovery of shipwrecks off the south-east coast.
- 4.3.51. The Seazone and NRHE data include numerous records for obstructions. Although many of these may represent modern debris on the seabed, there is also potential for them to be shipwrecks that date from the prehistoric to modern period. Additionally, the data from the RoW includes material from over 40 unknown wrecks, some of which could have been new discoveries by divers or fishermen.
- 4.3.52. Potential also covers material which has not been assessed for this study; there are known archaeological excavations, such as the ones undertaken for the development of Spinnaker Tower/Gunwharf Quay which have not yet been noted in local records, such as Portsmouth SMR HBSMR. Details of these sites could further increase the range of potential by providing further information about the character of possible archaeological sites and material in the area.

#### *Modern*

- 4.3.53. There is the potential for the discovery of modern material across the Study Area – particularly in excavations of urban areas that were bombed during the war.
- 4.3.54. Material related to WWI and WWII activities could be discovered both on land and also within the intertidal zone. A large number of structures were installed during the wars; therefore there is high potential for finds to be made. Of particular interest would be Coastal Stretch 13 for further remains of the system of decoy sites.
- 4.3.55. Modern PAS findspots were not as common in the Study Area; however concentrations of finds are seen around Deal in Coastal Stretch 3, Romney Marsh in Coastal Stretch 5 and between Littlehampton and Bognor Regis (Coastal Stretches 10-11).

- 4.3.56. All Coastal Stretches contain NRHE Recorded Losses, which represent the recorded area of loss for both shipwrecks and aircraft. Although these losses are inaccurately positioned, they indicate the potential for future discoveries in the Study Area.
- 4.3.57. There is a particularly high potential for the discovery of WWII aircraft crash sites in the intertidal zone of the Study Area, as heavy anti-aircraft batteries, barrage balloon sites and searchlights all made enemy aircraft easier targets (Wessex Archaeology 2011a). The presence of enemy aircraft is indicated by the enormous areas that were bombed during the war. This has been highlighted by projects such as Aircraft Crash Sites at Sea (Wessex Archaeology 2008a).
- 4.3.58. There is also considerable potential for the discovery of aircraft crash sites on the sea bed off areas of coast with airports – for example HMS Daedalus (**Hants MWX3958**) in Gosport, or Portsmouth Airfield (**Ports MWX636**). Airfields further inland in Kent, such as the airfield at Manston active in WWI and WWII (Smith & Killingray 2004a & b), could also have resulted in aircraft crash sites at sea off the coast of Kent, as aircraft ran out of fuel or misjudged distances.
- 4.3.59. The vast majority of the NRHE recorded losses of aircraft date to WWII. While the remains of these aircraft have not been found on the sea floor, and the positional data for the records is often vague at best (for example crashed ‘off Portsmouth’ or ‘off Gilkicker Point’) they represent considerable potential for the discovery of further aircraft crash sites in the Study Area. Additionally, these recorded losses generally represent Allied aircraft, but there are equally likely to be roughly similar numbers of lost German aircraft.
- 4.3.60. Numbers of lost aircraft are indicated by datasets such as the WWII Royal Air Force (RAF) Air/Sea Rescue and Royal National Lifeboat Institution (RNLI) records. Both the Allied and Axis forces had Air/Sea Rescue services, with the data for the Allied records generally more readily available. Although the positional data for these losses is general at best, they provide a broad overview of where crash sites are likely to occur. Maps of WWII RAF Air/Sea Rescue records indicate a high concentration of losses, particularly off the east and south coasts of Kent throughout the War (Wessex Archaeology 2008a: Figure 2).
- 4.3.61. Although there is only one record of aircraft material in the RoW database in Coastal Stretch 18, it indicates the probable location of a previously unrecorded aircraft crash site (not previously listed in the NRHE or Seazone datasets). In addition, the fact that it was discovered by a fisherman indicates the potential for further discoveries of this type in the wider area. Additionally, there are two records of aircraft material immediately outside the Study Area, such as the fragments of aluminium found off the coast of Kent that represent possible aircraft remains (**RoW 185/10**) and a possible aircraft spark plug discovered east of the Isle of Wight (**RoW 305/10**). Still other material has been discovered during aggregate dredging nearly 40 km off the coast (such as **RoW 295/08**).
- 4.3.62. The Marine Aggregates Protocol for Reporting Finds of Archaeological Interest database indicates that there have been two discoveries of aircraft material outside of the Coastal Stretch 18 Study Area. One find consists of the levered tail wheel part from a WWII Hawker Hurricane (**BMAPA Hanson\_0188**) which was discovered in License Area 474, located 40 km south-south-east of Eastbourne. The other find consists of aluminium pieces (**BMAPA Brett\_0303**) which appear to be plating from the superstructure of a plane, and a piece with marks and numbers

which originates from an aircraft engine. **BMAPA Brett\_0303** was discovered in License Area 351, located 16 km south-south-west of Selsey.

- 4.3.63. Areas of high shipwreck potential and preservation, such as the Goodwin Sands, also have high potential for the discovery of aircraft remains. The discovery of a nearly intact German Dornier 17 WWII bomber in the Goodwin Sands highlights the potential for further discoveries. Additionally, the aircraft is so well preserved, that there are discussions around raising it for preservation in the RAF Museum at Hendon.
- 4.3.64. Additionally, some sites that are known by local people are not recorded in the HER, SMR, AHBR or NRHE databases. For example, a photograph of the Dornier 17 that crashed on the Sandwich Flats on 31 August 1940 has been uploaded onto flickr (Flickr 2010), whilst local people have mentioned that the bent propeller blades used to be visible in the intertidal zone at low tide and parts of the aircraft may have found their way to the Spitfire Memorial Museum at Manston (Forum 2010). However, the site remains unrecorded in local and national historic environment databases.
- 4.3.65. Aircraft crash sites can be difficult to detect and identify on the sea floor, and therefore not only could some of the known obstructions indicate aircraft remains, but there is also the possibility that additional archaeological geophysical survey and interpretation could recognise further sites, as much of the previous survey work has been undertaken to identify navigational hazards as opposed to archaeological sites.

#### ***Importance***

- 4.3.66. The assessment of importance is based on the evaluation of the known and potential archaeological resource, as recorded within the local HER/SMR/AHBR datasets, NRHE database and PAS database. Reference has also been made to current guidance for assessing importance, including the various Selection Guides produced by English Heritage for historic asset classes and other such guidance on archaeological importance as is available. This is evaluated and organised by Coastal Stretch, as the nature of the datasets permit a localised analysis.
- 4.3.67. Several criteria are used when assessing the national importance of sites and monuments and for determining whether scheduling is appropriate. These criteria, listed in Annex 4 of PPG 16 and supported by PPS 5 and NPPF include period, rarity, documentation, group value, survival/condition, fragility/vulnerability, diversity, and potential, but are not definitive - they should be regarded as indicators which contribute to a wider judgement based on the individual circumstances of a case. The assessment of importance is based on expert archaeological opinion, and on the Selection Guides produced by English Heritage.
- 4.3.68. Although the majority of sites and findspots across the SE RCZAS Study Area are not designated or scheduled, this does not mean that they lack importance, and they may fulfil many of the criteria for designation. The fact that they have been included in one or more of the databases indicates that they have value as historic and archaeological resources.

#### ***Protected Sites***

- 4.3.69. Protected sites are considered by Coastal Stretch, with Scheduled Monuments (SM) listed fully and Listed Buildings (LB) presented by number. SM and LB counts were obtained from the comprehensive shapefiles accessed from the MAGIC

website (Defra 2012). This helped to prevent duplication between and within the datasets.

- 4.3.70. There are no SMs within Coastal Stretch 1. However there are a total of 319 LBs, including one Grade I (**LB MKE34779**), six Grade II\* and 312 Grade II buildings (**Figures 16.1-16.2**).
- 4.3.71. There are 13 SMs within Coastal Stretch 2, shown below with their SM numbers:
- Romano-Celtic temple and Iron Age site south of Worth (**SM KE197**);
  - Anglo-Saxon cemetery, east of Sarre (**SM 31408**);
  - Saxon Shore Fort, Romano-British port and associated remains at Richborough (**SM 27039**);
  - Sandwich Town Walls: section at NW corner (**SM KE56A**);
  - Sandwich Town Walls: section incorporated in the old East Kent Brewery (**SM KE65B**);
  - Sandwich Town Walls: section extending on north side of Strand Street (**SM KE56**);
  - Sandwich Town Walls: section extending from a point east of gasworks to site of New Gate (**SM KE58**);
  - Sandwich Town Walls: section from New Gate to Woodnesborough Gate (**SM KE59**);
  - Sandwich Town Walls: section from Woodnesborough Gate to Canterbury Gate (**SM KE57**);
  - Sandwich Town Walls: the Fisher Gate (**SM KE26**);
  - Sandwich Town Walls: site of the Round House (**SM KE55**);
  - Sandown Castle (**SM KE176**); and
  - Medieval port, Stonar (**SM KE204**).
- 4.3.72. Designated sites in Coastal Stretch 2 are illustrated in **Figures 16.2-16.9**. In addition there are a total of 926 LBs within Coastal Stretch 2, including 11 Grade I, 31 Grade II\* and 884 Grade II buildings. In this Coastal Stretch there are noticeable concentrations around Sandwich, Ramsgate, Worth and Fordwich.
- 4.3.73. There are eight SMs within Coastal Stretch 3 shown below with their SM numbers:
- Artillery Castle at Deal (**SM 27014**);
  - Artillery Castle at Walmer (**SM 27015**);
  - Dover Castle (**SM 30281**);
  - St. James' Church, Dover (**SM KE135**);
  - Fortifications, Roman lighthouse and medieval chapel on Western Heights, Dover (**SM 30282**);
  - Fairburn-type crane, Wellington Dock, Dover (**SM KE326**);
  - Archcliffe Fort, Dover (**SM 26797**); and
  - Armstrong twin guns and turret, Admiralty Pier, Dover (**SM KE289**).

4.3.74. Designated sites in Coastal Stretch 3 are illustrated in **Figures 16.9-16.12**. In addition there are a total of 227 LBs including three Grade I, two Grade II\*, and 222 Grade II buildings. There are noticeable concentrations of LBs around Deal, Walmer, St. Margaret's at Cliffe and Dover.

4.3.75. There are 22 SMs within Coastal Stretch 4 shown below with their SM numbers:

- Martello Tower No 15 at Hythe Ranges (**SM 32256**);
- Martello Tower No 7, Sandgate, Folkestone (**SM 32253**);
- Stutfall Castle (**SM KE74**);
- Dymchurch Redoubt (**SM 32257**);
- Martello Tower No 4, Cliff Road, Folkestone (**SM 32250**);
- Martello Tower No 14 at Hythe Ranges (**SM 32255**);
- Royal Military Canal, Twiss Road Bridge to Seabrook Lodge Bridge (**SM KE396t**);
- Royal Military Canal, Seabrook Lodge Bridge to Seabrook Sluice (**SM KE396u**);
- Royal Military Canal, Shorncliffe Battery Wall (**SM KE396v**);
- Royal Military Canal, Town Bridge to Twiss Road Bridge (**SM KE396s**);
- Martello Tower No 9, Sandgate, Folkestone (**SM 32254**);
- Royal Military Canal, Scanlon's Bridge to Town Bridge (**SM KE396r**);
- Royal Military Canal, West Hythe Dam to West Hythe Bridge (**SM KE396p**);
- Martello Tower No 6, Sandgate, Folkestone (**SM 32252**);
- Early Medieval Flood Defence at Botolph's Bridge, West Hythe (**SM 31415**);
- Royal Military Canal, West Hythe Bridge to Scanlon's Bridge (**SM KE396q**);
- Royal Military Canal, Honey Pot Cottage to West Hythe Dam (**SM KE396o**);
- St Mary's Church, West Hythe (**SM Ke147**);
- Martello Tower No 5 at Folkestone School for Girls (**SM 32251**);
- Roman Villa, Folkestone (**SM KE82**);
- Two Martello Towers, East Cliff, Folkestone (**SM KE83**); and
- Sandgate Castle, Folkestone (**SM KE54**).

4.3.76. Designated sites in Coastal Stretch 4 are illustrated in **Figures 16.12-14**. In addition there are a total of 301 LBs including two Grade I, six Grade II\*, and 293 Grade II buildings. There is a noticeable concentration west of Folkestone and another located west of Hythe.

4.3.77. There are 46 SMs within Coastal Stretch 5 shown below with their SM numbers:

- Royal Military Canal, Heron House to Appledore Bridge (**SM KE396G**);
- Royal Military Canal, Appledore Bridge to Kenardington Bridge (**SM KE396H**);

- Royal Military Canal, Kenardington Bridge to Warehorne Bridge (**SM KE396I**);
- Royal Military Canal, Bilsington Bridge to Bonnington Bridge (**SM KE396L**);
- Rye Town Walls (**SM ES30**);
- Town Ditch N of New Gate, Winchelsea (**SM ES180**);
- Austin Friars Chapel (**SM ES147**);
- World War II Underground Operational Post, 1/3 Mile (540m) SW of Chapel Farm (**SM KE278**);
- Martello Tower No 30, 300m east of Gate Borough Cottage (**SM 32259**);
- Dymchurch Redoubt (**SM 32257**);
- Water Tower in Churchyard (**SM ES163**);
- Medieval Moated Site and Adjacent Hythe, Lowden Farm (**SM 12736**);
- Castle Toll Saxon Burgh and Medieval Fort (**SM 12841**);
- Moat and Associated Closes at Marshall's Bridge (**SM 29254**);
- Martello Tower No 28 at Rye Harbour (**SM 32258**);
- Ypres Tower (**SM ES8**);
- Royal Military Canal, Warehorne Bridge to Ham Street Bridge (**SM KE396J**);
- Part of a Cistercian Grange, North of New Romney High Street, also known as Romney Priory (**SM 24361**);
- Royal Military Canal, Cliff End to Coastguard Cottages (**SM ES488A**);
- Royal Military Canal, Bonnington Bridge to Gigger's Green Bridge (**SM KE396M**);
- 'Hope All Saints', Remains of Church (**SM KE359**);
- Newenden Bridge (**SM ES489**);
- Martello Tower No 24 at Dymchurch (**SM 27061**);
- Eastbridge Church (**SM KE358**);
- Royal Military Canal, Kent Ditch to Heron House, Folkestone (**SM KE396F**);
- Medieval Farmstead at Pilchers, 340m North East of Codhall (**SM 31416**);
- Royal Military Canal, Ham Street Bridge to Bilsington Bridge (**SM KE396K**);
- Listening Devices, Greatstone (**SM KE378**);
- Royal Military Canal, Wickham Cliff to Strand Bridge, Winchelsea (**SM ES488C**);
- The Land Gate (**SM ES17**);
- Newenden Bridge (**SM KE41**);
- Artillery Castle and Associated Earthworks at Camber (**SM 27067**);
- Romano-British Site S of Bodiam Bridge (**SM ES411**);
- Royal Military Canal, Coastguard Cottages to Wickham Cliff (**SM ES488B**);

- Royal Military Canal, Iden Lock (**SM ES488D**);
  - Royal Military Canal, Honeypot Cottage to West Hythe Dam (**SM KE396O**);
  - Royal Military Canal, Iden Lock to Kent Ditch (**SM ES488E**);
  - Part of The Rhee Wall, a Medieval Canal, at Snargate (**SM 27008**);
  - Medieval Moated Site and Adjoining Fishpond, Moat Farm (**SM 12737**);
  - Medieval Town of Winchelsea (**SM ES355**);
  - World War II Underground Operational Base 500yds (457m) SW of Bentley Cottage (**SM KE279**);
  - A Quadrangular Castle and Its Landscaped Setting, an Associated Millpond, Medieval Crofts and Cultivation Earthworks, and a World War II Pillbox at Bodiam (**SM 24405**);
  - Moated Site and Associated Fields, 460m North East of Pickney Bush Farm (**SM 31417**);
  - Lade Fort (**SM KE264**);
  - Abandoned Medieval Church and Graveyard, Midley (**SM 12705**); and
  - Royal Military Canal, Gigger's Green Bridge to Honeypot Cottage (**SM KE396N**).
- 4.3.78. Designated sites in Coastal Stretch 5 are illustrated in **Figures 16.14-16.32**. In addition there are a total of 580 LBs including 14 Grade I, 23 Grade II\*, and 542 Grade II buildings; one monument is also listed as NG (when checked against the 2012 LB dataset this was found to be a grade II building) and is included in the overall total. There is an even distribution of LBs across Romney Marsh and Walland Marsh, with a distinct concentration around Rye.
- 4.3.79. There are four SMs within Coastal Stretch 6 shown below with their SM numbers:
- Hastings Castle, The Collegiate Church of St Mary and The Ladies' Parlour (**SM 12869**);
  - St Mary's Chapel, Bulverhythe (Remains of) (**SM ES148**);
  - Hastings Town Wall (**SM ES121**); and
  - Iron Age Cliff Castle and Site of St George's Churchyard on East Hill (**SM 12870**).
- 4.3.80. Designated sites in Coastal Stretch 6 are illustrated in **Figures 16.27, 16.32-16.34, 16.35**. In addition there are a total of 513 LBs including two Grade I, 14 Grade II\*, and 497 Grade II buildings. There are noticeable concentrations of LBs around Hastings and Bexhill.
- 4.3.81. There are 13 SMs within Coastal Stretch 7 shown below with their SM numbers:
- Medieval Moated Site, Cooden (**SM 12733**);
  - Martello Tower No 55, 500m South West of Normans' Bay Station (**SM 34299**);
  - Three Bowl Barrows on Heathy Brow (**SM 20129**);
  - Remains of Northeye Village (**SM ES421**);

- Bowl Barrow 150m South of Well Combe (**SM 20188**);
- Martello Tower No 66, 320m North East of Langney Point (**SM 32261**);
- Eastbourne Redoubt (**SM 32263**);
- Medieval Farmstead at Downash, 300m North East of Freshfield Farm (**SM 31423**);
- Medieval Moated Site and Associated Earthworks, Pound Piece, Manxey (**SM 12743**);
- Bowl Barrow 200m South-East of Well Combe (**SM 20189**);
- The Wish Tower: Martello Tower No 73 (**SM 32262**);
- Martello Tower No 64 at The Crumbles, 1.3km North East of Langney Point (**SM 32260**); and
- Pevensey Castle: a Saxon Shore Fort, Norman Defences, a Medieval Enclosure Castle, and Later Associated Remains (**SM 27013**).

4.3.82. Designated sites in Coastal Stretch 7 are illustrated in **Figures 16.34-16.39**. In addition there are a total of 95 LBs including two Grade I, 11 Grade II\*, and 82 Grade II buildings. There is a noticeable concentration around Eastbourne, with few LBs located on the Pevensey Levels.

4.3.83. There are 16 SMs within Coastal Stretch 8 shown below with their SM numbers:

- Camp Near Belle Tout Lighthouse, Birling Gap (**SM ES109**);
- Medieval Moated Site and Tudor Ruins, Laughton Place (**SM 12746**);
- Pair of Bowl Barrows on Baily's Hill (**SM 31420**);
- Hillfort and a Bowl Barrow on Seaford Head (**SM 27025**);
- Bowl Barrow 500m North-East of Cornish Farm (**SM 20127**);
- Barracks at Cuckmere Haven (**SM ES435**);
- Dispersed Medieval Settlement Remains at Frog Firle, 290m South East of Tile Barn (**SM 32280**);
- Newhaven Military Fort and Lunette Battery (**SM ES430**);
- Pair of Bowl Barrows on Baily's Hill (**SM 31420**);
- Two Bowl Barrows, The South Easternmost Pair of a Group of Six Bowl Barrows, Forming Part of a Linear Round Barrow Cemetery on Rookery Hill (**SM 25484**);
- 'The Rookery' Medieval Hythe and Associated Earthworks at Milton Court (**SM 12782**);
- Bowl Barrow 500m SSE of Cornish Farm (**SM 20128**);
- Martello Tower No 74 on Seaford Esplanade (**SM 32264**);
- A Pair of Bowl Barrows Forming Part of a Linear Round Barrow Cemetery, and a Hlaew on Rookery Hill (**SM 25485**);
- Medieval Crypt, Church Street (**SM ES111**); and
- Round Barrow on Peacehaven Heights above Friars Bay (**SM ES207**).

- 4.3.84. Designated sites in Coastal Stretch 8 are illustrated in **Figures 16.39-16.45**. In addition there are a total of 155 LBs including six Grade I, four Grade II\*, and 145 Grade II buildings. There are noticeable concentrations around Seaford and Lewes, with some LBs also located around Newhaven.
- 4.3.85. There are eight SMs within Coastal Stretch 9 (minus duplicates which appeared in the dataset for this Coastal Stretch) shown below with their SM numbers:
- Group of Salterns North of St Peter's Church (**SM 29252**);
  - Long Barrow on Beacon Hill (**SM 12775**);
  - Romano-British Villa at Manor Hall Road, Southwick (**SM 27099**);
  - Group of Salterns and a Possible Moat 250m East of Bramber Castle (**SM 29253**);
  - Long Barrow on Beacon Hill, 160m North West of The Windmill (**SM 29234**);
  - Shoreham Old Fort (**SM WS390**);
  - The Marlipins (**SM WS132**);
  - Saltern in Saltings Field, 220m North of Beeding Bridge (**SM 29251**);
- 4.3.86. Designated sites in Coastal Stretch 9 are illustrated in **Figures 16.46-51**. In addition there are a total of 910 LBs including 21 Grade I, 47 Grade II\*, and 842 Grade II buildings. There is a particularly intense concentration around Brighton and into Hove; Worthing also has a large number of LBs. Smaller concentrations are seen near Rottingdean and Shoreham-by-Sea.
- 4.3.87. There are 16 SMs within Coastal Stretch 10 shown below with their SM numbers:
- Romano-British Villa and Traces of Iron Age Occupation 500m WSW of New Barn (**SM 29240**);
  - Stopham Bridge (**SM WS16**);
  - Hardham Camp (**SM WS125**);
  - Greatham Bridge (**SM WS140**);
  - Lime Kilns, Canal, Engine Sheds, etcetera (**SM WS449**);
  - Hardham Priory (**SM 29279**);
  - Old Swan Bridge, Pulborough (**SM WS139**);
  - Burpham Camp (**SM WS48**);
  - Lower Fittleworth South Bridge (**SM WS138**);
  - Ringwork 400m NNW of Batworthpark House (**SM 12858**);
  - Motte and Bailey Castle in Pulborough Park (**SM 12864**);
  - Amberley Castle (**SM WS1**);
  - Maison Dieu (**SM WS108**);
  - Tortington Priory (**SM WS116**);
  - Medieval Earthworks E and SE of St Mary's Church (**SM WS424**); and
  - Littlehampton Fort (**SM WS446**).

- 4.3.88. Designated sites in Coastal Stretch 10 are illustrated in **Figures 16.51-16.56**. In addition there are a total of 283 LBs including 13 Grade I, eight Grade II\*, and 262 Grade II buildings. There are concentrations around Amberley, Arundel and in the vicinity of Littlehampton.
- 4.3.89. There are three SMs within Coastal Stretch 11 shown below with their SM numbers:
- Keep of Tote Copse Castle, 400m North of Decoy Farmhouse (**SM 12886**);
  - Beckett's Barn and Adjoining Earthworks (**SM WS219**); and
  - Ringwork South of St Wilfred's Chapel (**SM 12887**).
- 4.3.90. Designated sites in Coastal Stretch 11 are illustrated in **Figures 16.56-16.61**. In addition there are a total of 258 LBs including seven Grade I, ten Grade II\*, and 241 Grade II buildings. There are concentrations of LBs around Yapton and Bognor Regis.
- 4.3.91. There are two SMs within Coastal Stretch 12 shown below with their SM numbers:
- Cakeham Manor (uninhabited parts) (**SM WS199**); and
  - Fishbourne Roman site (**SM WS233**).
- 4.3.92. Designated sites in Coastal Stretch 12 are illustrated in **Figures 16.59-16.65**. In addition there are a total of 422 LBs including nine Grade I, eight Grade II\*, and 405 Grade II buildings. LBs are well-distributed around this Coastal Stretch, the exception being on Thorney Island.
- 4.3.93. Four SMs are present in Coastal Stretch 13 shown below with their SM numbers:
- Tourner Bury, Hayling Island, South Hayling (**SM HA38**);
  - Black Barn, Warblington (**SM HA547**);
  - Warblington Castle (**SM HA98**); and
  - World War Heavy Anti-Aircraft Gunsite (P2) at Sinah Common, 570m South East of Sinah Farm (**SM 33402**).
- 4.3.94. Designated sites in Coastal Stretch 13 are illustrated in **Figures 16.64-16.67**. There are also 119 LBs in Coastal Stretch 13, of which two are Grade II\* and 117 are Grade II listed. These are fairly evenly distributed across the mainland and through Hayling Island; the only absence was upon the intertidal islands.
- 4.3.95. There are 12 SMs in Coastal Stretch 14 (minus duplicates which appeared in the dataset for this Coastal Stretch) shown below with their SM numbers:
- The Long Curtain, King's Bastion and Spur Redoubt (**SM 20208**);
  - Fort Cumberland (**SM 26723**);
  - Portsmouth Garrison Church (**SM PO138**);
  - Southsea Castle (**SM PO259**);
  - Point Battery including King Edward's Tower and Square Tower (**SM PO261**);
  - Hilsea Lines (**SM PO330**);

- Portsmouth Dockyard, the Block Mills and Stores 35 and 36 (**SM PO395**);
  - Portsmouth Dockyard, the Docks (**SM PO397**);
  - Eastney Forts and perimeter defences of barracks (**SM PO478**);
  - HMS Vernon – Former Board of Ordnance Gunwharf (**SM PO507**);
  - Picket Hamilton Fort, Hilsea (**SM PO595**); and
  - Eastney Sewage Pumping Station (**SM PO596**).
- 4.3.96. Designated sites in Coastal Stretch 15 are illustrated in **Figures 16.66-16.69**. In addition, there are a total of 422 LBs, of which 11 are Grade I LBs, 28 are Grade II\* LBs, and 383 are Grade II LBs. These are well distributed across the Study Area, but with a noticeable concentration around Old Portsmouth and the south-west of Portsea Island.
- 4.3.97. There are 14 SMs in Coastal Stretch 15 (minus duplicates which appeared in the dataset for this Coastal Stretch) shown below with their SM numbers:
- Earthworks defences at Priddy's Hard (**SM 20210**);
  - Motte and bailey castle near Apple Dumpling bridge, South of Rowner (**SM 24322**);
  - Fort Brockhurst (**SM 26712**);
  - Portchester Castle (**SM 26714**);
  - Fort Blockhouse (**SM HA276**);
  - Fort Fareham (**SM HA318**);
  - Fort Elson (**SM HA427**);
  - Fort Monckton (**SM HA436**);
  - Fortifications south of Trinity Church (**SM HA460**);
  - Fortifications north of Mumby Road (**SM HA461**);
  - Fortifications south of Crescent Road (**SM HA475**);
  - Haslar Gunboat Yard, gunboat sheds (**SM HA505**);
  - Haslar Gunboat Yard, miscellaneous buildings (**SM HA506**); and
  - Gilkicker Fort (**SM HA594**).
- 4.3.98. Designated sites in Coastal Stretch 15 are illustrated in **Figures 16.68-16.71**. In addition, there are a total of 353 LBs, of which four are Grade I LBs, 20 are Grade II\* LBs and 329 are Grade II LBs in Coastal Stretch 15. The sites are distributed across the Coastal Stretch, with concentrations in Gosport, Fareham and Portchester.
- 4.3.99. There are seven SMs within Coastal Stretch 16 shown below with their SM numbers:
- Netley Castle (**SM HA233**);
  - Stony Bridge, Titchfield (**SM 33404**);
  - Netley Abbey (**SM HA5**);

- Promontory Defined by an Iron Age Linear Earthwork, St Andrew's Castle and Additional Remains on Hamble Common (**SM 24323**);
- Netley Abbey; Precinct Wall and Moat (**SM HA5A**);
- Roman Site 400yds (370m) S of Fairthorn (**SM HA490**); and
- Titchfield Abbey and Fishponds (**SM 26713**).

4.3.100. Designated sites in Coastal Stretch 16 are illustrated in **Figures 16.70-16.71, 16.73-16.74**. In addition there are a total of 159 LBs including one Grade A (the equivalent of a Grade I for some churches), six Grade II\*, and 152 Grade II buildings. There are noticeable concentrations of LBs around Titchfield, Hamble-le-Rice and Bursledon.

4.3.101. There are 33 SMs within Coastal Stretch 17 shown below with their SM numbers:

- Vault S of Junction of High Street and Castle Way (**SM SP429**);
- Castle (Part of) (**SM SP242**);
- St Denys Priory (Remains of) (**SM SP274**);
- The Weigh House, French Street (**SM SP186**);
- Vaults on The W Side of French Street (**SM SP188**);
- Town Wall: The West Gate (**SM SP67E**);
- Vault Under 8 St Michael's Square (**SM SP337**);
- Town Wall: The Bar Gate (**SM SP67F**);
- Site of Norman Town House in Curtilage of St Michael's House (**SM SP279**);
- Medieval Merchant's House and Associated Deposits at 58 French Street (**SM 26711**);
- Vault Adjoining St Michael's Church (**SM SP456**);
- Redbridge Old Bridges (**SM HA180**);
- The 'Undercroft', Simnel Street (**SM SP68**);
- Castle Wall (**SM SP241**);
- Town Wall: Gods House Gate and Tower (**SM SP67A**);
- Bitterne (Clausentum) Roman Station (**SM SP143**);
- Town Wall: Section Between Bugle Street and Bugle Tower (**SM SP67J**);
- Castle Gateway, Castle Lane (**SM SP481**);
- Vaults Under School Playground, French Street (**SM SP189**);
- Vault in High Street Opposite Gloucester Square (**SM SP193**);
- Town Wall: Section Between Simnal Street and The Site of The Bugle Tower Excluding The West Gate (**SM SP67D**);
- Town Wall: Remains of E Side of Town Wall S of East Street and N of Gods House Tower (**SM SP67G**);
- Vault Under St Michael's Parish Hall, St Michael's Square (**SM SP335**);

- Castle Wall (**SM SP241**);
- Vault on N Side of St Michael's Square (**SM SP194**);
- The Tudor House, St Michael's Square (**SM SP72**);
- 'King John's Palace' (**SM SP240**);
- Redbridge Old Bridges (**SM SP180**);
- Canute's Palace, Porters Lane (**SM SP71**);
- Quilter's and Adjoining Vaults in High Street (**SM SP190**);
- Town Wall: The Water Gate, High Street (**SM SP67H**);
- Vault at Corner of St Michael's Square and West Street (**SM SP195**); and
- Town Wall: Section from 75yds (70m) E of Arundel Tower to Limit of Castle Site including Arundel and Catchcold Towers (**SM SP67C**).

4.3.102. Designated sites in Coastal Stretch 17 are illustrated in **Figures 16.72-16.76**. In addition there are a total of 159 LBs including ten Grade I, 15 Grade II\*, and 133 Grade II buildings; one NG (when checked against the 2012 LB dataset this was found to be a grade II building) building is also recorded and has been included in the totals. There is a noticeable concentration around Southampton Docks in Coastal Stretch 17.

4.3.103. There are 14 shipwrecks designated under the Protection of Wrecks Act (1973) within Coastal Stretch 18 (**Figure 14**):

- Mary Rose;
- Grace Dieu;
- VOC Amsterdam;
- Langdon Bay Wreck;
- HMS Stirling Castle;
- HMS Invincible;
- HMS Restoration;
- HMS Northumberland;
- Brighton Marina Wreck;
- Admiral Gardiner;
- Hazardous;
- Royal Anne Galley;
- HM Submarine A1; and
- Norman's Bay Wreck (possibly HMS *Resolution*).

4.3.104. The above listed wreck sites are all of high importance.

4.3.105. All aircraft lost while in military service are automatically protected under the Protection of Military Remains Act (1986). Many of the WWII aircraft known to be in Coastal Stretch 18 (**figure 15**) are therefore protected under this Act, and many of the aircraft that do not have enough information available at present to confirm military use at the time of loss could be protected with further research.

4.3.106. There are two vessels designated as Protected Places under the Protection of Military Remains Act (1986) within the Study Area (**Figure 14**).

- HMS *Ghurka*; and
- U-12.

4.3.107. Ships that were lost while in military service have to be specially designated under the Protection of Military Remains Act (1986). The 2006 designation of the SS *Storaas*, an armed merchant vessel that was torpedoed and sunk with the loss of 22 lives in 1943, has substantially increased the types of vessel that can be protected under the Act.

4.3.108. A total of 223 Scheduled Monuments are located within the terrestrial Study Area. LBs in the terrestrial Study Area totalled 6201, of grades I, II\*, II and A. Offshore, 14 wrecks are designated under the Protection of Wrecks Act (1973), a further two are Protected Places under the Protection of Military Remains Act (1986) and many aircraft in the Study Area are also protected. These all enhance the archaeological potential of the area and add to the historic character of the Study Area.

#### *Assessment of Non-Designated Sites*

4.3.109. Although the majority of sites and findspots across the Study Area are not designated or scheduled, this does not mean that they lack importance, and they may actually fulfil many of the criteria for designation. The fact that they have been included in the assessed datasets indicates that they have at least some value as historic and archaeological resources.

4.3.110. Sites and findspots related to the Palaeolithic period are of considerable national and international importance, as finds from this period are relatively rare in the British and European records (English Heritage 1998a). Records within the Study Area for this period are predominantly for findspots, generally tools which have since been removed from their primary context; any further finds would be considered of high importance. Such material is likely to be discovered along the foreshore having eroded from cliff faces, or be found along banks, or former banks or rivers. Offshore in Coastal Stretch 18 all the Palaeolithic discoveries noted in the enhanced record have been find spots (**Figure 13**), where the archaeological material has since been removed, and there is high potential for further discoveries of high importance.

4.3.111. Sites and finds of Mesolithic date are also important because of their rarity. Records relating to this period are generally for findspots, including various worked flint tools, which have been removed from their location, but any further finds would be considered of high importance. Records are skewed towards the Hampshire Study Area, with fewer located across West Sussex, some in East Sussex mainly around Beachy Head, and very few in Kent. Coastal Stretch 13 contains a Mesolithic site found within Langstone Harbour (**Hants MWX19426**) which is of especial interest, though it may have been affected by intertidal erosion. The record for Coastal Stretch 18 contains a submerged forest near Selsey and neighbouring finds which are all of high importance; therefore this area has high potential for further discoveries. There is potential for the discovery of similar sites and features in the offshore Study Area, which would also be of high importance.

4.3.112. There are a wide range of known sites across the Study Area dating from the Neolithic to post-medieval periods. These sites provide details that enrich the historic environmental resource and are locally, regionally, nationally, and in some cases, internationally important. Further discoveries of sites or material from these

periods also have the potential to be of importance. The military post-medieval sites in Coastal Stretch 14 have additional significance based on their concentration and group value. The military medieval and post-medieval sites in Coastal Stretch 15 also have additional significance based on their group value: the Napoleonic Fort Monckton has additional value in relation to other Napoleonic features on the coast; particularly significant are the Martello Towers between Rye and Eastbourne in East Sussex.

- 4.3.113. Sites related to 20<sup>th</sup> century activities would likely require additional information to support their importance. However, military sites are of elevated importance. English Heritage has produced guidance for evaluating 20<sup>th</sup> century military sites (English Heritage 1998b, 2003) based on their national importance or the presence of structures of special interest, as well as the site's survival or completeness, group value, rarity of building types and historic importance. The decoy sites of Coastal Stretch 13 in Langstone Harbour have group value, as remains of a large and successful decoy.
- 4.3.114. Shipwrecks, like terrestrial sites, need to be assessed on an individual basis to determine their individual importance and their group value within the area, region and nation. Criteria have been developed for the identification of the importance of shipwrecks, including the criteria for designating shipwrecks under the Protection of Wrecks Act (PWA) (1973) and for assessing non-designated sites (WA 2006; WA 2008c). The criteria for designation under the Protection of Wrecks Act (1973) are based on period, rarity, documentation, group value, survival/condition, fragility/vulnerability, diversity and potential. *On the Importance of Shipwrecks* (WA 2006) developed criteria particularly for shipwrecks that would not necessarily qualify under the PWA criteria, and assessment is based on the concept of 'ship biography' covering the build, use, loss, survival and investigation of the shipwreck. Generally, any shipwrecks that date to the medieval period or earlier are of special interest due to their extreme rarity in the archaeological record. Shipwrecks dating between 1500 and 1815 are also rare, and therefore the majority of boats during this period would be of special interest.
- 4.3.115. In Coastal Stretch 18, there are considerably more examples of boats and ships dating between 1815 and 1914, and because this period is fairly well represented in the archaeological record, greater discrimination is required to determine the importance of these vessels. This period was a time of considerable change in how vessels were built and used, so shipwrecks that make a contribution to understanding and appreciating this period would be of special interest. The highest volume of known shipwrecks dates from 1914-1945, spanning the two World Wars, and greater discrimination is required for wrecks from this period. Shipwrecks related to military activity or represent the magnitude of events and local and global consequences of activity during these years, or illustrating technological change, would be of special interest. Shipwrecks after 1945 would need to have demonstrated local or international interest to be of importance. In order to further develop the assessment of importance of shipwrecks dating from 1860 to 1950, Wessex Archaeology has produced additional guidance (Wessex Archaeology 2011b, 2011c, 2011d). There are numerous WWII shipwrecks in the Study Area, ranging from minesweepers to bomb scows to Landing Crafts, and because of their association with the War, these vessels are of increased importance.
- 4.3.116. The majority of aircraft losses in the 20<sup>th</sup> century have been related to military activity, and therefore they are automatically protected under the Protection of Military Remains Act (1986). Therefore, the records of aircraft crash sites across

the Study Area are of interest; although the records appear to indicate Recorded Losses rather than known remains on the seabed, if these aircraft were to be found they would be of high importance.

- 4.3.117. Non-designated aircraft crash sites are also important, because they provide a tangible reminder of the development of the aviation industry in the UK throughout the 20<sup>th</sup> century. Because aircraft crash sites belong to recent history, they can also have significance; survivors and relatives may exist, and the sites can be important for remembrance and commemoration. Aircraft crash sites also have importance through their cultural value as historic artefacts and for the information they contain about the aircraft itself and its circumstances of loss (English Heritage 2002a; Wessex Archaeology 2008b). These can be considered important for remembrance and commemoration.
- 4.3.118. For example, a German Dornier 17 WWII bomber recently discovered in Goodwin Sands is of high importance. Not only is it a military aircraft and automatically protected, but it is also thought to be one of the world's last examples in such remarkable condition. Additionally, the aircraft fought in the Battle of Britain, and therefore provides a tangible representation of this iconic event of international historical importance.

#### **4.4. PREVIOUS ARCHAEOLOGICAL SURVEY WORK AND RESEARCH**

- 4.4.1. There are a large number of national projects which cover the Study Area. Strategic Environmental Assessments (SEAs) were undertaken around the United Kingdom to facilitate sustainable and sympathetic development (Department of Energy and Climate Change 2004a). SEAs relevant to the SE RCZAS are the southern extent of SEA3, and SEA8 which was undertaken as part of the Offshore Energy SEA (Department of Energy and Climate Change 2004b; Flemming 2002; Maritime Archaeology Ltd. 2007). Work under the Protection of Wrecks Act (PWA) and the Protection of Military Remains Act (PMRA) is ongoing. The Southern Rivers Palaeolithic Project (WA 1992; WA 1993; WA 1994a) which led to the English Rivers Palaeolithic Project published a two-volume monograph (Wymer 1999). The England's Shipping project (WA 2004b) specifically focussed on pre-1700 shipwrecks and covered the South Coast. The Maritime and the Marine Historic Environment Research Framework is being undertaken (Adams *et al.* ongoing), designed to overview previous maritime research from the whole of England. The Navigational Hazards Project undertaken by Bournemouth University (Merritt *et al.* 2007, Merritt 2008) concentrated on identifying the potential for the discovery of shipwrecks around the coast of the UK, which again covered the Study Area in its remit. The South Coast was found to be of such high potential for shipwreck discovery that the second phase of the project focused specifically on this region (Merritt 2008).
- 4.4.2. Regional studies of the area include the South East Research Framework (Kent County Council, ongoing), the Solent Thames Research Framework (Oxford Archaeology 2010) and the Chichester Harbour Conservancy's Archaeology Framework (Museum of London Archaeology Service 2004). The South Coast Marine Aggregates Regional Environmental Assessment (MAREA) (EMU 2012) and South Coast Regional Environmental Characterisation (REC) (British Geological Survey *et al.* 2010) also provide assessments of the area. The South Coast and Eastern English Channel Synthesis builds upon this to provide comprehensive coverage (James *et al.* 2011). In addition a national study of defence areas was undertaken (Foot 2005) which covered elements of the Study Area's coastline.

- 4.4.3. Projects funded by the Aggregate Levy Sustainability Fund (ALSF), not mentioned above, which cover this geographical area include: the Artefacts from the Sea project (WA 2004a; WA 2007d), the Seabed Prehistory project (WA 2007a; WA 2007b; WA 2007c; WA 2008b), the Wrecks on the Seabed project (WA 2003a; WA 2006c), the England's Shipping project (WA 2004b) and the Aircraft Crash Sites at Sea project (WA 2008a). Also ALSF funded are the results of the British Marine Aggregate Producers Association (BMAPA) protocol annual reports (WA 2006b; WA 2007e; WA 2008c; WA 2009b; WA 2010b).
- 4.4.4. Research has also been undertaken in discrete areas across the Study Area, such as Langstone Harbour (WA 1994b), Chichester Harbour (WA 2006a; Museum of London Archaeology Service 2007) and Margate (WA 1997). Research into raised beaches in the Study Area has been undertaken in both the Solent Basin and West Sussex (Roberts and Pope forthcoming; Briant *et. al.* 2009). Specific site types have also been assessed, with Historic Salterns in Hampshire observed (WA 2002c). The Portsmouth Royal Dockyards were also studied (WA 2004c) by a single project.

## 5. ASSESSMENT OF THREAT AND VULNERABILITY

### 5.1. DEGREE AND NATURE OF THREAT TO COASTAL HISTORIC ASSETS

#### Natural Processes

- 5.1.1. In the most general terms, the landscape of the south-east coast varies between hard coastline, composed of areas of high chalk cliffs and stretches with hard sea defences, and soft coastline; in the form of high sandstone cliffs and lower lying areas comprised of large natural harbours, sandy bays, mud flats, shingle beaches, and saltmarshes, much of which is largely undefended with sea defences. Present coastal defences vary greatly along this coastline, dependent largely on the local authority. Their future is also under question with the publication of the most recent SMP2 reports that have developed the recommended policies of coastal protection; as present defences could either be maintained or left to fail, and where no defences exist the coast could remain exposed or benefit from the construction of defences.
- 5.1.2. Current and future erosion is a considerable natural threat to both the hard and soft stretches of coast that are present in the south-east where the policies of No Active Intervention (NAI) or Managed Realignment (MR) are the preferred SMP procedures; rather than Hold the Line (HTL) (**Figures 17.1-17.76**). Coastlines left undefended will naturally erode at different rates dependent on various factors, such as sediment type and wave strength, potentially placing the known and unknown heritage at these locations at risk. The Policy Units that have a NAI strategy are listed in **Appendix I**. HTL is generally chosen where there is the presence of an urban conurbation or industrial centre that is economically or commercially significant and therefore requires protection. Predicted epochs of erosion lines (in general 0-20 years, 20-50 years and 50-100 years) as published by the SMP groups indicate that erosion is a concern predominantly in East and West Sussex and Kent. Hampshire appears to be less affected, perhaps due to the predominance of hard coastline protecting the urban towns and cities there whilst the rivers are being left to naturally erode under a NAI policy. For instance at Telscombe Cliffs, East Sussex, the predicted erosion line for 2105 indicates that, under a policy of NAI, around 80m of coastline could have been eroded.

- 5.1.3. Furthermore, the construction of coastal defences does not necessarily cease all erosion. Although defences protect the base of cliffs, the cliff tops are still exposed to natural elements and continue to erode at a slower rate, therefore, the potential for loss of archaeological features from cliff tops is likely. For example, a Late Bronze Age cremation was excavated less than 30m from the cliff edge south of Kingsdown, Kent; if erosion rates continue then similar sites may also be at risk. Active erosion of sites is also occurring, with a quern production site at Folkestone in Kent visible as findspots on the beach, and artefacts eroding out of the cliff face.
- 5.1.4. Landslides are another natural threat to the historic assets present along the coast. They occur mainly along the chalk cliffs, where undercutting at the base of the cliffs caused by water action can leave an overhanging platform above which eventually becomes unstable and falls. Numerous landslides have occurred along the south-east coast and specific examples have been recorded at Dover, Folkestone, South Foreland and Dumpton Gap in Kent, and Beachy Head, Hastings, and Fairlight Cove, East Sussex. This natural occurrence poses a potential threat to the known and unknown archaeological material situated along the cliff tops, as illustrated by the discovery of a late Iron Age/Early Romano-British settlement just south of Dover Castle (**KENT MKE7002**) as a result of a landslide at Dover East Cliff.
- 5.1.5. Flooding is a significant threat along the lower lying coastline and inland watercourses of the south-east region (**Figures 17.1-17.76**). Predicted floodlines generated by the EA indicate that several areas are particularly at risk from both Flood Zone 3 (areas liable to flood from rivers or the sea – without substantial flood defences) and Flood Zone 2 (the extent of extreme floods from severe storms, etc). These include the Stour Valley and Romney Marsh in Kent, Walland Marsh and the Pevensey Levels in East Sussex, Pagham Bay and Chichester Harbour in West Sussex, and around Portsmouth and Langstone Harbour in Hampshire; along with smaller scale flooding of rivers located throughout the Study Area. Flooding may cause the displacement of sediments and thus move any *in situ* archaeological stratigraphy or artefacts from their primary context. One example of the extent of damage that could be caused by flooding is apparent in Kent - flooding will cover the former Wantsum Channel extending south over Sandwich and parts of North Deal, down the River Stour to Canterbury, and also on the marshy area towards Wickhambreaux. If flooding did occur it is possible that the Wantsum Channel would re-emerge, and the River Stour would re-align causing damage around Richborough and Sandwich. Finally, once the embankment between Sandwich Bay and Sandown Castle was breached it would remain breached causing inundation to the hinterland, potentially damaging the known standing heritage and also displacing the buried heritage (Halcrow Group Limited 2010: C-24-25).
- 5.1.6. A rise in sea levels, currently at a global average of two millimetres a year, is also causing a threat to the lower lying coastal landscape and potentially the unknown heritage deposited there (Hampshire Biodiversity Partnership 2003: 3). This is also combined with the continued lowering of the natural land level due to isostatic movements since the last glacial period (Hampshire Biodiversity Partnership 2003: 3). This subsidence is recorded as being between two to eight millimetres a year (Hampshire Biodiversity Partnership 2003: 3). As sea walls and defences are breached, or managed realignment is undertaken, the land beyond will be flooded.

#### **Development Pressure**

- 5.1.7. The south-east region has undergone significant development since at least the medieval period with another injection of urban expansion during the 19<sup>th</sup> and 20<sup>th</sup>

centuries. Furthermore, numerous important settlements are situated along the coast, potentially at threat from such natural pressures mentioned above.

- 5.1.8. The widespread development of this region suggests that there has already been some degree of damage or loss to the archaeological heritage, and that further discoveries of archaeological strata and material may only be uncovered through the demolition, renovation or expansion of existing structures and associated features. In the past, intertidal and maritime areas were reclaimed for the purpose of agriculture and salt production, resulting in the formation of saltmarshes and wet grassland (Hampshire Biodiversity website).
- 5.1.9. Much of the Study Area is characterised by open landscape, mainly used for agricultural purposes or leisure activities; as in Coastal Stretches 2, 5, 8, 12-13 and 16 which are mostly rural in nature. These areas are presently protecting the known and unknown archaeology *in situ*; for instance aerial photographs of the numerous golf courses along the Kent and Hampshire coastline show evidence of earlier periods. However, it is conceivable that as the population continues to increase and place pressure on urban resources, the significant urban area of the Study Area will expand into the rural landscape. This places Coastal Stretches 7, 10-11 and 17 at particular risk, as they contain significant urban areas which are surrounded by undeveloped land; expansion into these areas will potentially reveal a wealth of archaeological discoveries. Coastal Stretches 1, 3-4, 6, 9 and 14-15 have seen such pressures and are mainly urban in nature. Notably, the Isle of Thanet in Coastal Stretch 1 has been affected, with the expansion of Broadstairs, Ramsgate and Margate merging into one urban sprawl around the coastline (the only exception being in Kingsgate). Further archaeological discoveries in these areas will be made through the demolition, renovation or expansion of existing structures and associated features, such as roads and paths. The continued threat of development across the south-east region could potentially reveal a wealth of archaeological discoveries – particularly as historic environment assets are a material consideration within the planning process, as enshrined in the NPPF..
- 5.1.10. A total of 51 areas are designated as SSSIs, sporadically covering an area of around 310 km<sup>2</sup> (27.7%) of the entire SE RCZAS Study Area. These areas will protect any known or potential archaeology from development pressures, but not necessarily from natural threats.
- 5.1.11. Development pressures on the submerged archaeological resource include aggregate extraction areas, offshore wind farms, pipelines and electrical cables, oil and gas exploration, commercial fisheries, port/harbour dredging operations and the situation of marine waste disposal sites. Despite this, in general, the threats to the submerged archaeological resource from development pressures can be considered to be low, as under the system of marine licensing introduced by the Marine and Coastal Access Act (2009) more development activities will require licences more often. The present development process requires Environmental Impact Assessments for many development activities, to specifically address archaeological issues in each proposed development area and to implement mitigation measures to ensure minimal impact on the archaeological resource. Additionally, both the aggregate industry and offshore wind developers have implemented protocols for reporting finds of archaeological interest (British Marine Aggregate Producers Association and English Heritage 2005; The Crown Estate 2010). These protocols will ensure that any archaeological finds discovered during aggregate dredging or the construction, operation and decommissioning of offshore wind farms will be reported. A similar protocol for the fishing industry, the Fishing Industry Protocol for Archaeological Discoveries (FIPAD), ensures that sites or

artefacts located during fishing activities are reported, although at present this is piloting only within the Sussex IFCA region (WA 2012a).

## 5.2. SITES AT HIGH RISK OF DAMAGE OR DESTRUCTION

- 5.2.1. The assessment of degree and nature of threat for the SE RCZAS Study Area has been undertaken above in **Section 5.1**. Following on, this section will identify sites which are deemed at risk according to the parameters mentioned, focusing primarily on coastal erosion and flooding.
- 5.2.2. A similar methodology was implemented to that used by EH's Coastal Estate Risk Assessment (EH 2011).
- 5.2.3. In order to generate a list of sites at risk from the natural threats of coastal erosion and flooding, the historic environment datasets were overlaid on GIS layers depicting the extents of the potential threats, in order to visualise which sites lay within the lines, and therefore are potentially at risk. Sites at risk from development have not been specifically identified, as these would be individually assessed during the planning process prior to development.
- 5.2.4. The historic environment data investigated are those supplied by the relevant HER/SMR/AHBRs; the most comprehensive of the datasets. These datasets was queried to exclude records representing findspots, as the material represented by the record has been removed and as such is not at risk. Records for canals, landscapes and places (places were only used in the Hampshire AHBR dataset) were also excluded from the analysis. Due to large amounts of duplication the NRHE dataset was not included in the querying process, and as the PAS data contains only findspots that have been retrieved from their find location, this dataset was also not used.
- 5.2.5. GIS layers displaying the coverage of each threat were generated for this task (**Figures 17.1-17.76**). These included shapefiles based on SMP2 mapping of projected erosion lines for the next 100 years, should a policy of NAI be implemented. This is the worst case scenario policy, and was chosen because funding has not yet been finalised, therefore the policies that are currently selected for each PU may change. Below, in **Section 5.3** the list of sites at risk is discriminated: as part of this, sites which fall in PUs which benefit from a HTL policy for the next 100 years are removed from the list of recommended sites to be visited as part of Phase 2.
- 5.2.6. Shapefiles showing the predicated flood lines were provided by the EA. The data displayed lines for Flood Zone 3 (areas liable to flood from rivers or the sea – without substantial flood defences) and Flood Zone 2 (the extent of extreme floods from severe storms, etc).
- 5.2.7. The table below displays the number of sites derived from the relevant historic environment dataset that are considered at risk from predicted coastal erosion and flooding; along with the density of the sites at risk per km<sup>2</sup>, which assists in drawing comparisons between the Coastal Stretches, as they vary greatly in size.

	Coastal Stretch	Sites at risk from relevant HER/SMR/AHBR datasets	Area of Coastal Stretch (km <sup>2</sup> )	Density of sites at risk (sites per km <sup>2</sup> )
Terrestrial	1	258 (Kent)	6.16	42.53
	2	1641 (Kent)	118.46	14.38
	3	344 (Kent)	16.96	21.70
	4	532 (Kent)	17.73	30.74
	5	1200 (Kent & E Sussex)	329.62	3.95
	6	168 (E Sussex)	19.03	9.77
	7	398 (E Sussex)	72.81	5.70
	8	517 (E Sussex)	53.34	10.18
	9	377 (E & W Sussex)	48.63	8.53
	10	355 (W Sussex)	63.64	6.51
	11	259 (W Sussex)	76.40	4.12
	12	830 (W Sussex & Hants)	108.60	8.42
	13	462 (W Sussex, Hants & Ports)	48.33	12.58
	14	767 (Hants & Ports)	53.03	16.50
	15	614 (Hants & Ports)	31.53	22.04
	16	531 (Hants)	30.59	18.21
		17	554 (Hants & Soton)	24.37
	<b>Total</b>	<b>9807</b>	<b>1119.25</b>	<b>9.60</b>
Maritime	18	3163 (Hants, Soton, Ports, E Sussex, W Sussex & Kent)	2889.89	1.09
	<b>Total</b>	<b>12970</b>	<b>4009.14</b>	<b>3.47</b>

Table 4: Sites from the enhanced HER/SMR/AHBR dataset at potential risk from coastal erosion and flooding

- 5.2.8. Duplication (sites represented by more than one distinct record) is seen in the record for all Coastal Stretches (both from the original dataset and in some cases from subsequent enhancement). No attempt has been made to exclude duplicates, due to the size of the combined dataset and time restrictions.
- 5.2.9. The number of sites at risk within Coastal Stretch 18 was generated by simply querying how many records are situated within this area, as all sites are presumably either fully, partially, or periodically exposed and therefore are at risk from natural maritime environmental processes. It is likely that none of these sites will be monitored as part of Phase 2, unless they are visible at low water and are located within a safe distance from the shore; or Phase 2 includes a survey by diver element.
- 5.2.10. Sites located within an area of potential threat are predominantly found in Coastal Stretches 2 and 5. Coastal Stretches 12-17 have roughly comparable numbers of sites at risk, and are the next highest group of sites at risk. The numbers of sites seen in Coastal Stretches 7-11 are also broadly comparable with one another, but the number at risk are generally lower than are seen in Coastal Stretches 2, 5 and 7-11. This is in part due to the differing geologies within the Study Area: Coastal Stretches 2 and 5 are located in particularly low-lying areas of Kent; Coastal Stretches 7-11 have similar geological character; as do Coastal Stretches 12-17.

- 5.2.11. As the size of the Coastal Stretch has a direct effect on the value of such comparisons as those drawn above, density has been used to address this issue. Notably, Coastal Stretch 1, being the smallest in area at 6.16km<sup>2</sup>, boasts the highest density of sites at risk. Coastal Stretches 2 and 5 have large numbers of sites at risk, but also have the greatest terrestrial Study Areas, making their densities medium and low respectively. Coastal Stretches 3 and 4 had comparatively low numbers of sites at risk, but due to their small Study Areas their densities are above average. The densities show more variation between Coastal Stretches than the numbers of sites at risk; however Coastal Stretches 6-11 and 12-17 do form two groups. Coastal Stretches 12-17 have higher densities than Coastal Stretches 6-11, and have more variation between the stretches. Coastal Stretches 6-11 show less variation between the densities of sites within each Coastal Stretch.
- 5.2.12. The numbers of sites found to be at risk are high because a worst-case scenario of coastal erosion was used. This was the modelled extent of erosion in the next 100 years, should a NAI be implemented across the Study Area; rather than the expected policy for each PU recommended for implementation. Therefore many of these sites will likely not be at risk from erosion, should the recommended PU policies be put into practice.
- 5.2.13. The next section will apply criteria to this list of sites to reduce it to a list of sites suitable to consider for inclusion in a future walkover survey.

### 5.3. SPECIFIC SITES AT RISK WITHIN THE COASTAL STRETCHES

- 5.3.1. The above section produced a list of 12,970 sites present within the HER/SMR/AHBR dataset for Coastal Stretches 1-18 which are potentially at risk from flooding or coastal erosion; of these, 9807 are located in the terrestrial Study Area. As these sites are potentially at risk, it would be useful to assess their condition during a walkover survey.
- 5.3.2. It is of course not feasible, due to the nature of a Rapid Coastal Zone Assessment, to assess firsthand the condition of each site listed in **Table 4** above. In a similar manner to that undertaken by EH's Coastal Estate Risk Assessment the whole enhanced dataset for the entire Study Area (a total of 17,378 records) is reduced in this section by considering a number of criteria (EH 2011: 6). These criteria concern the various types of sites that are likely to be physically present, of some significance, and at sufficient risk to warrant monitoring through a rapid field survey.
- 5.3.3. As a first step, records for findspots, canals, landscapes and places are excluded, as was the case for the above table of sites at high risk of damage or destruction (**Table 4**).
- 5.3.4. Once the criteria were applied to the whole dataset (**Table 5**), these were filtered by the sites at risk table above (**Table 4**), to produce a list (**Table 6**) of sites which are suitable for consideration for inclusion in a walkover survey, and are at sufficient risk to warrant such a measure.
- 5.3.5. This list will require further discrimination, which is best undertaken as a separate project once the timeframe and funding parameters are known. The process for this further discrimination is outlined in a separate document (WA 2012b) and referred to in more detail in **Section 6**.

- 5.3.6. EH identified a number of site types which are not suitable for further investigation through rapid field survey. These site types are specified for a number of reasons (some types may include one or more of these reasons):
- they are unlikely to be still present;
  - they are located in an area which will be protected; and/or
  - they have some degree of existing record, including designation.
- 5.3.7. Other site types which will not be investigated include:
- those located in a SMP2 PU where a HTL policy is to be utilised;
  - standing buildings located in urban areas;
  - buried archaeological sites located in urban areas;
  - standing buildings located in rural areas which already have some degree of record;
  - waterfront structures which have already been recorded;
  - temporary wartime structures;
  - infilled features; and
  - railways.
- 5.3.8. If any of the above criteria were met, the site was excluded. The only exception to this rule is for sites located in a PU where a HTL policy is planned; for which a slightly different process is used. Even if the area in question is to be defended from coastal erosion, there is still the risk of flooding; therefore sites which fall behind an area with a HTL policy, but are within an area of flood risk, are still included in the list of sites recommended for walkover. A site located within a PU which recommends a HTL policy, and within an area at risk of flooding, would be removed from the list of sites for walkover if it met any of the other EH criteria.
- 5.3.9. There are a number of limitations on the extent to which these criteria can be applied to the enhanced dataset; these are considered in the following paragraphs. The manner in which the discrimination was applied to the data is also outlined below.
- 5.3.10. In general, the criteria were applied as a series of rules, identifying patterns in the data. As the enhanced dataset is comprised of records from multiple HER/SMR/AHBRs, there was variation in the way in which discriminating criteria could be applied. WA created and enhanced records to individual HER/SMR/AHBR standards, creating variability within the WA dataset; CCHES created records to their own and NMP standards, while GCC recorded their NMP work to EH standards.
- 5.3.11. Each Local Authority dataset recorded spatial data in a slightly different manner, some favouring points, others lines or polygons. As such, criteria which utilise spatial data may vary in their accuracy between datasets. Additionally, within the datasets sites were recorded in different ways: a site containing multiple features could have one record; in other cases the same site could have individual records for each feature of a site; and a site could also have one over-arching record,

associated with which would be individual records for each feature. Un-associated sites of the same type could also be grouped into a single record, denoting a number of individual sites, located within a specified geographical area.

- 5.3.12. Sites located above MHW in a SMP2 PU which benefit from a HTL recommendation through the short- (0-20 years), medium- (20-50 years) and long-term (50-100 years) were removed from the list of sites suitable for walkover. In addition only PUs which had a HTL policy for the total length of the coast were used to remove sites; PUs which were mainly HTL, but had a small area of NAI or another management policy were not used to remove sites from the list of sites suitable for walkover. The MHW and MLW boundaries were derived from Ordnance Survey Boundaryline and MasterMap datasets. Four SMP areas covered the Study Area; however, shapefiles were only available for the North Solent SMP2. As a result the figures from the SMP2 reports were transcribed by WA.
- 5.3.13. Standing buildings located in urban areas were difficult to identify, due to the lack of a comprehensive urban dataset. This was mitigated through the use of three datasets: the OS Strategi, the OS Meridian2, and ONS/DCLG Urban Areas. To ensure accuracy, only sites which were definitely in urban areas were excluded – presence within one or more of the areas deemed urban by the three datasets was required to be deemed within an urban area. Spatial analysis was conducted using points, lines and polygons to get the best possible representation.
- 5.3.14. Buried archaeological sites located in urban areas are complex to identify in the enhanced dataset due to the aforementioned issues with the location of urban areas, as specified above. In addition, the definition of ‘buried archaeology’ is difficult to standardise between datasets. As a result, a list of classifications used to record the current state of the site or monument (the ‘evidence’), within the monument type of the HBSMR software, were utilised. These were: buried vessel structure, demolished building, demolished structure, destroyed monument, and levelled earthwork. If a record contained any of these classifications, it was removed from the list of sites considered suitable for walkover survey. If the evidence element of the monument type was not populated in a given record, this record could not have the criteria applied to it.
- 5.3.15. Identifying standing buildings located in rural areas which already have some degree of record has the same inherent problem as identifying those located in urban areas; as such the same shapefiles were utilised. Identifying whether a record represented a building was not straightforward, as the NMR Thesaurus does not have a top term for building, each building monument type resides within a thematic top term. As such, each individual monument type representing a building was identified, totalling 516 individual types, and this list was used. In addition, not all records in the enhanced dataset had a monument type; therefore those records without monument types have not have these criteria applied, as a text search for every variant of building would not have been feasible. Within the HBSMR software sources can be ascribed to records, which may be used to note other materials that the site or monument features in; however, use of sources is variable. As such sources could not be used to ascertain if buildings already had a degree of existing record. Evidence of some level of existing record was therefore specified by the building being listed, or scheduled.
- 5.3.16. To identify waterfront structures which have already been recorded it was necessary to classify what was meant by waterfront. Waterfront was taken as an inland zone defined by MHW as mapped by the Ordnance Survey and landward 20m from this boundary. Again, ascertaining which sites already have some

degree of record was problematic; therefore presence of listing and scheduling records were used to denote existence of an appropriate level of recording.

- 5.3.17. Temporary wartime structures were excluded from the list of sites suitable for inclusion in a future walkover survey. This required the production of a list of 73 specific monument types which were military in nature and intended only for temporary use, such as barbed wire and anti-tank cubes. It is important to note that in some cases, such monuments do survive, so a more detailed analysis of records would be recommended prior to creation of a definitive list of sites for walkover. As previously noted, records which do not have a monument type applied will not have been assessed by this criteria. Records were not assessed based on the period of use ascribed to their monument type (i.e. to specify WWI or WWII sites).
- 5.3.18. Infilled features across the Study Area would have ideally been identified independently and removed from the list of sites suitable for potential walkover. However, the data do not support this level of analysis because there are too many variables, and the data would have to be manually sorted to make sense of them. Even then, the process could not guarantee comprehensive results, and therefore given the timescale, infilled features were not removed.
- 5.3.19. Railways were excluded from the list of sites suitable for walkover. This includes all aspects of railways; as a list of 17 monument types associated with railways was created. Again, this criteria could only be applied to records which had monument types, those without were not assessed and so are still present in the list of sites which may benefit from walkover.
- 5.3.20. The numbers of sites which each criterion excluded from the entire enhanced dataset of the Study Area are detailed in the table below. Also specified are the numbers of sites below MHW, below MLW and in the intertidal zone; which may assist in later selection of sites for walkover for Phase 2.

<b>Criteria</b>	<b>Sites</b>
Located in a SMP area where a HTL policy is to be utilised	8031 excluded
Standing buildings in urban areas	5992 excluded
Buried sites in urban areas	955 excluded
Standing buildings in rural areas which have some degree of record	306 excluded
Waterfront structures which have already been recorded	106 excluded
Temporary wartime structures	2721 excluded
Infilled features	-
Railways	133 excluded
<b>Total sites excluded (including duplicates)</b>	<b>18244</b>
<b>Total sites at risk</b>	<b>9807</b>
<b>Total at risk following further discrimination</b>	<b>3435</b>
Remaining records above MHW	1721
Remaining records below MLW	5
Remaining records in the intertidal zone	1709

Table 5: Numbers of sites excluded by application of the EH criteria to the enhanced HER/SMR/AHBR dataset for the whole Study Area

- 5.3.21. As highlighted in the table above, discrimination of the entire enhanced dataset, using the criteria set by EH, reduced the number of monuments at risk to 9807, of

which 6372 were further discriminated and excluded, giving a final total of 3,435 monuments which form the list of sites recommended for consideration for inclusion in a Phase 2 walkover survey.

- 5.3.22. The numbers of sites which may benefit from a walkover survey during Phase 2 of the SE RCZAS are detailed in **Table 6** below. The density of sites per Coastal Stretch is provided, which may assist in later refining which sites to visit and assessing the most efficient method for assessing a representative proportion of sites at risk.

Coastal Stretch	Sites at risk suitable for further investigation	Area of Coastal Stretch (km <sup>2</sup> )	Density of sites at risk (sites per km <sup>2</sup> )
1	198(Kent)	6.16	32.14
2	650 Kent)	118.46	5.48
3	63 (Kent)	16.96	3.71
4	98 (Kent)	17.73	5.52
5	328 (Kent & E Sussex)	329.62	1
6	37 (E Sussex)	19.03	1.9
7	33 (E Sussex)	72.81	0.45
8	235 (E Sussex)	53.34	4.41
9	43 (E & W Sussex)	48.63	0.88
10	63 (W Sussex)	63.64	1.05
11	73 (W Sussex)	76.40	1.00
12	552 (W Sussex & Hants)	108.60	5.08
13	212 (W Sussex, Hants & Ports)	48.33	4.39
14	151 (Hants & Ports)	53.03	2.85
15	78 (Hants & Ports)	31.53	2.47
16	441 (Hants)	30.59	14.42
17	180 (Hants & Soton)	24.37	7.39
<b>Total</b>	<b>3435</b>	<b>1119.25</b>	<b>3.07</b>

Table 6: Sites considered suitable for Phase 2 walkover, after application of the EH criteria and risk data

- 5.3.23. Coastal Stretch 18 is not included in the above table, as the EH criteria do not apply to offshore locations; therefore the number of sites has not been reduced. Refer to **Table 4** for the number of sites present in Coastal Stretch 18. Any offshore sites included in a Phase 2 survey would have to be of high importance to justify the action; such calculations are outside the scope of the Phase 1 report (**Section 6**).
- 5.3.24. Once again, duplication (sites represented by more than one distinct record) is seen in the record for all Coastal Stretches (both from the original dataset and in some cases from subsequent enhancement). As in earlier tables, no attempt has been made to exclude duplicates, due to the size of the combined dataset and time restrictions.
- 5.3.25. Sites suggested for inclusion in fieldwork have been identified on the basis of the list of sites at risk and the EH criteria, discussed above in **Section 5.2** and **Section 5.3**. Areas which may benefit from fieldwork, or other positive management action, are suggested below in **Section 5.4**. Areas which are predicted to suffer from considerable erosion in the next 100 years are also identified below in **Section 5.4**. In future, when identifying sites and areas to prioritise for field survey, it would be

sensible to consider all the sites and areas in the sections specified above. The need to observe a range of different types of coast should also be taken into account, to represent the different geomorphological and sedimentary contexts found in the south-east, as detailed in **Section 3.4**.

### Conclusion

- 5.3.26. A total of 3435 sites, which remain after the application of the EH criteria, are at risk from coastal erosion and flooding, these are therefore recommended for consideration for inclusion in a list of sites for the future Phase 2 walkover survey.
- 5.3.27. As might be anticipated, the majority of remaining sites are of post-medieval and modern date, though the full range of periods are represented. Site types include terrestrial structures, field systems and Earthworks; with many more coastal site types seen, such as docks, hards, groynes and a large number of wrecks.
- 5.3.28. After consideration of the EH criteria in addition to the areas potentially at risk, the numbers of sites have not become more comparable between Coastal Stretches. Coastal Stretches 2, 12 and 16 have the highest numbers of sites at potential risk and which are suitable for inclusion in a walkover survey. The mid-range of numbers of sites at risk are seen to be Coastal Stretches 1, 5, 8, 13-14 and 17; with numbers of sites per stretch between 340 and 164. The lowest numbers of sites at risk which fulfil the criteria are seen in Coastal Stretches 3-4, 6-7, 9-11, and 15; these have between 106 and 33 sites per Coastal Stretch.
- 5.3.29. The numbers change when the densities of sites at risk are considered. The majority of Coastal Stretches have low densities, between 3.71 and 0.45 (Coastal Stretches 3, 5-7, 9-11 and 14-15). A number of Coastal Stretches had densities around the average of the data, between 5.52 and 4.39 sites per km<sup>2</sup> (Coastal Stretches 2, 4, 8 and 12-13). Coastal Stretches with above average densities ranged between 32.14 and 7.39 sites per km<sup>2</sup> (Coastal Stretches 1 and 16-17). Significant changes include Coastal Stretch 5, which shows a move from having the highest number of sites in the mid-range group of Coastal Stretches, to having one of the lowest densities, due to the great size of the Coastal Stretch. Also, Coastal Stretch 1 demonstrates a great variation, having an average number of sites present, but showing the highest site density of all Coastal Stretches; this is due to its urban nature and the fact that its Study Area is highly coastal in nature, extending very little inland.
- 5.3.30. As a result, it is likely that Coastal Stretches 1, 16 and possibly 17 will require more intensive walkover than other stretches. Linked to this, it is probable that criteria to exclude sites will have to be more rigidly applied in these areas, to avoid over-representation of these stretches.
- 5.3.31. **Section 6** considers how the list of recommended sites could be further filtered to achieve a concise list of sites suitable for walkover.

### 5.4. MANAGEMENT PRIORITIES

- 5.4.1. Based on the locations of the sites at risk identified above, the assessment of archaeological potential (and areas of known findspots), and areas of the coast without solid sea defence protection (and therefore areas of increased vulnerability), the following Other Management Priorities have been identified (**Table 7** and **Figures 18.1-18.76**).

- 5.4.2. The areas identified are large, but have been compiled to represent areas of possible erosion in SMP2 PUs which do not have the advantage of a recommended consistent HTL policy for the next 100 years, and would therefore benefit from increased management. Some PUs have different policies recommended for the short, medium and long term periods, in which case, the PU does not have a consistent HTL recommendation and is suggested for other management options. On land, the predicted areas of erosion for the next 100 years, as identified from the SMPs, form part of the other management priorities zone; as specified, only PUs without a consistent HTL recommendation are included. Forming the seaward limit of the management area is the intertidal area, between the MHW and MLW marks (as obtained from OS digital Mastermap and Boundaryline mapping; this is depicted for the entire Study Area.
- 5.4.3. These areas may be used in conjunction with the list of sites at risk to prioritise monuments and areas of potential which may benefit from walkover survey during Phase 2 of the RCZAS. These could be further discriminated by excluding localised areas which already benefit from existing defences, such as sea walls.

<b>Coastal Stretch</b>	<b>Management Area</b>	<b>SMP2</b>	<b>PUs</b>
1	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	Isle of Grain to South Foreland	4b17; 4b18
2	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	Isle of Grain to South Foreland	4b20; 4b21
3	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	Isle of Grain to South Foreland; South Foreland to Beachy Head	4b24; 4b26; 4c01; 4c03
4	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	South Foreland to Beachy Head	4c05; 4c06; 4c07; 4c10
5	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	South Foreland to Beachy Head	4c14; 4c18
6	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	South Foreland to Beachy Head	4c19; 4c20; 4c21; 4c22; 4c23
7	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	South Foreland to Beachy Head	4c30
8	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	Beachy Head to Selsey Bill	4d01; 4d02; 4d03; 4d05; 4d07; 4d08
9	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	Beachy Head to Selsey Bill	4d09; 4d10; 4d11
10	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	Beachy Head to Selsey Bill	4d20
11	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	Beachy Head to Selsey Bill	4d25; 4d26

Coastal Stretch	Management Area	SMP2	PUs
12	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	North Solent	5a01; 5a03; 5a04; 5a05; 5a06; 5a07; 5a08; 5a10
13	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	North Solent	5a17; 5aH102; 5aH103; 5aH107; 5aH108; 5a18
14	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	North Solent	5a20
15	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	North Solent	5a22
16	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	North Solent	5b03; 5c01; 5c02; 5c03; 5c04; 5c05; 5c06; 5c08; 5c09
17	Intertidal zone; and NAI erosion zone (0-100 years) in specified PUs	North Solent	5c11

Table 7: Areas which would benefit from other management options

5.4.4. Areas of coast which are not expected to have the advantage of a continued HTL policy for 100 years, and which would benefit from being prioritised for other management methods are located:

- in Coastal Stretch 1 in North Kent, excepting Ramsgate Port;
- around South Foreland, Farthingloe, Folkestone and West Hythe in Coastal Stretches 3 and 4;
- around Rye Bay and as far as Hastings in Coastal Stretches 5 and 6;
- in the area around Beachy Head, as far as Brighton, excluding Seaford in Coastal Stretches 7-9;
- around Littlehampton in Coastal Stretch 10;
- in short stretches along the coast of Selsey Bill, between Pagham and Bracklesham in Coastal Stretches 11 and 12;
- around the eastern side of Chichester Harbour in Coastal Stretch 12;
- across much of the coast of North Hayling Island and Havant in Coastal Stretch 13;
- around Farlington Marshes in Coastal Stretch 14;
- on the northern side of the mouth of the Wallington River in Coastal Stretch 15;
- between Stubbington up the River Hamble on both sides as far as Botley and Curbridge and down to Hamble-le-Rice, with the exception of the coast at Newtown, in Coastal Stretch 17;

- along the coast of Southampton Water from Hamble-le-Rice to Netley in Coastal Stretch 16; and
- along the eastern side of the River Itchen as far as Swaythling.

5.4.5. In Coastal Stretch 17, the NAI erosion zone (0-100 years) for PU 5c13 would be included in the table above. However, erosion lines were not produced for this area due to its being a Wildlife Trust Reserve which will be affected mainly by inundation; therefore the conservation area will be permitted to move inland (New Forest District Council 2010: 230).

5.4.6. Positive management actions, such as field survey and evaluation, works to avoid or reduce further damage, or statutory protection, can be assessed in the next element of Phase 1 and the Project Design for Phase 2 (**Section 6**). Such an assessment is unsuitable at this point, as it is not yet known which sites will benefit from visual assessment during the Phase 2 walkover survey.

## 5.5. FUTURE RESEARCH PRIORITIES

5.5.1. In addition to the large number of known sites and findspots recorded in the HER/SMR/AHBR databases, there has been considerable research undertaken into the development of the area since prehistory. Research projects have revealed a wealth of information about the significance of the Study Area and Research Frameworks have identified themes which would benefit from further investigation. In addition, the scheduled monuments, listed and un-listed buildings provide an extant reminder of the historic environment resource (**Figures 16.1-17.76**). However, there is an ongoing need for further statutory protection of sites and buildings; as such sites are identified by in-depth survey work.

5.5.2. Future research priorities have been developed through observation of the chronological overview (**Section 4.2**), assessment of areas at risk (**Figures 17.1-17.76**) and other management priorities (**Figures 18.1-18.76**). Some have also been identified based on gaps in data, or understanding, and from the regional research frameworks (Kent County Council, ongoing; Oxford Archaeology 2010; Museum of London Archaeology Service 2004).

### Early Prehistoric

5.5.3. Any material culture from the Lower and Middle Palaeolithic is of value, regardless of where it is found, and should be assessed to improve typologies (Wenban-Smith 2010: 1-2). Concentrations of artefacts are found within gravel areas, these should be assessed and fieldwalking can be undertaken in river valleys to assist this (Wenban-Smith 2010: 2; Kent County Council 2008a: 4). Environmental evidence from sealed contexts is rare and the identification of such would be of great value; the alluvial areas of the Study Area could be prioritised to increase information (Wenban-Smith 2010: 3). Settlement sites and their period of use are of high importance for the Study Area (Wenban-Smith 2010: 1; Kent County Council 2008a: 3). Human remains when discovered should be fully analysed and are highly valuable (Wenban-Smith 2010: 3). Further studies into coastal and riverine activities from the Palaeolithic, and the changes to coastal erosion and sedimentation will assist future planning and conservation objectives.

5.5.4. It is considered likely that alluvial and colluvial soils may be obscuring Late Upper Palaeolithic and Mesolithic sites, these are areas which are quite common in the Study Area and could therefore benefit from increased fieldwork (Hey 2010: 1-3). Linked to this, evidence of woodland exploitation, artefactual or environmental, is

also a priority for further research; as is evidence for the Elm decline (Hey 2010: 2-3). Insect assemblages implying climatic change are of value, as are faunal remains which may indicate seasonality, again the alluvial and colluvial regions of the Study Area could provide evidence of these (Hey 2010: 3). Shell middens are of high priority along with hearths and burnt areas (Hey 2010: 4). Small flint scatters are considered highly important for understanding Mesolithic exploitation and field walking is encouraged across the Study Area (Hey 2010: 1). As much of the prehistoric land mass is now submerged, underwater and intertidal archaeology data should be integrated with terrestrial findings (Hey 2010: 1). As an addition to this, any biological remains would be of especial interest; survival rates are likely to vary by geology and further work on this would be valuable (Hey 2010: 3).

### **Neolithic and Early Bronze Age**

- 5.5.5. Major and minor monuments of the Neolithic and Early Bronze Age are of interest and locating these will assist in creating accurate assessments of distribution (Bradley 2010: 1). Burnt mounds require further assessment (Bradley 2010: 5); in the Study Area these are mainly located in West Sussex inland between Worthing and Bognor Regis, and in Southampton in Hampshire. Deliberate artefact deposition can occur in different contexts, making such artefacts high interest; this would be difficult to prioritise for fieldwork, but an awareness of the possibility should be maintained (Bradley 2010: 1).
- 5.5.6. Settlement sites are of course of interest, especially those distant from monument complexes; these may continue to be found as development occurs, especially in alluvial and colluvial areas (Bradley 2010: 1, 3). Timber structures in coastal areas are of unknown function and require further study; as do wooden artefacts from similar contexts which may produce information on woodworking (Bradley 2010: 5). Evidence of tree clearance is also of interest, particularly when combined with settlement evidence (Bradley 2010: 2).
- 5.5.7. Developing upon this, any evidence of craft activities would be of interest, including metalworking; any social implications of the craft that can be identified are also of importance (Bradley 2010: 5-6). Environmental evidence is also of interest in this period, with sites that have good sequencing being of particular priority, again these are likely to be found in alluvial sediments (Bradley 2010: 2-3). Animal bone assemblages, particularly those of size should be prioritised to give information on animal management during these periods (Bradley 2010: 2).
- 5.5.8. Evidence showing links between sites and along the coast would be valuable, also this should range further afield to include cross-channel links (Bradley 2010: 6). The Wadeway in Chichester Harbour may date to the Bronze Age, therefore further study, including survey is recommended (Museum of London Archaeology Service 2004: 115). A walkover of the Chichester Harbour area is also recommended to observe raised beach deposits and other features (Museum of London Archaeology Service 2004: 115).

### **Late Bronze Age and Iron Age**

- 5.5.9. Settlements became more permanent during the Late Bronze Age and Iron Age, but further analysis is required to ascertain the nature of this transition (Lambrick 2010: 3). House construction, domestic activities and pit use are also areas of interest within the Study Area (Lambrick 2010: 5). The extent to which hillforts have origins in the Bronze Age is a priority for research; as is the study of large scale land divisions (Lambrick 2010: 4-5).

- 5.5.10. The relationship of settlements to farming is also worth considering this could be achieved by looking at the origins and management of field systems in the Late Bronze Age and Iron Age (Lambrick 2010: 2). Alluvium and colluvium are likely to cover areas concerned with settlement and farming, as such these areas should be prioritised to gain information on the above points – discovery of such sites could reveal land use and whether cropping or grazing was undertaken (Lambrick 2010: 2). Changes during this period, including the exploitation of cultured plant species and the introduction of new domestic animals are important to trace through environmental and faunal evidence; sites with large assemblages of fish, birds or shellfish would greatly assist with this (Lambrick 2010: 2-3).
- 5.5.11. Environmental evidence would reveal information on woodland exploitation and clearance, issues closely linked with the development of a new subsistence base (Lambrick 2010: 2).
- 5.5.12. Material culture typological variations and geological origins should be examined, with a view to using these to enhance understanding of settlement and trade links (including cross-channel); pottery is especially well-placed for this study (Lambrick 2010: 4, 6-7). Metalwork deposited in water requires further analysis, with themes of warfare, burial and territoriality in mind (Lambrick 2010: 8).
- 5.5.13. Any information on practices of body disposal would be of value, as comparatively little is known from these periods (Lambrick 2010: 7). Ceremonial and ritual sites are also elusive, as such research into this in the Study Area would be important (Lambrick 2010: 8).

#### **Romano-British**

- 5.5.14. Continuity of settlement and social change in the Romano-British period are of interest, therefore excavations of deep, well-sealed features are required (Fulford 2010: 1). Analysis of field systems, including lynchets and sediments is a priority, associated environmental evidence is also of interest, as are faunal assemblages (Fulford 2010: 1). Woodland management and its use should be observed wherever possible in the environmental record (Fulford 2010: 2; Kent County Council 2008b: 2).
- 5.5.15. Early corn dryers are of especial interest in the Study Area with two seen in West Sussex, near Shoreham-by-Sea and Littlehampton (Fulford 2010: 2). Evidence of shellfish exploitation is also of interest in this period, for which the Study Area is particularly well-placed (Fulford 2010: 2).
- 5.5.16. Cemeteries are also of interest as a site type, providing information on diet, population and migration; temples, shrines and religious sites are also of interest (Fulford 2010: 3 and 5). The claylands of the Solent area have seen less analysis than the chalklands and river valleys, therefore this area would benefit from better study in general (Fulford 2010: 2).
- 5.5.17. Deep seafaring during the Roman period is little understood, as is the development of ports and harbours; as such any waterlogged structures would be of great interest (Fulford 2010: 1 and 7). Military activity from this period is of high interest, again the Study Area is highly likely to provide information on such topics, with the invasion having occurred on the east coast of Kent (Fulford 2010: 5-6).

### **Early medieval**

- 5.5.18. Villa sites are valuable for discerning potential continuity of use through the early medieval period; settlements in general can be assessed for origins and changes in activity through the period (Crawford 2010: 2 and 5; Kent County Council 2008c: 1).
- 5.5.19. Continuation of farming practices and exploited species are issues worthy of study, therefore field systems and faunal assemblages are valuable (Crawford 2010: 2-3). Watermills are recorded from this period across the Study Area, but these need to be located and quantified; Chichester Harbour Conservancy suggests that all standing remains of mills are surveyed (Crawford 2010: 5; Museum of London Archaeology Service 2004: 117-8). The Conservancy also recommends survey of all brick and tile kilns, salt extraction sites and sites associated with the fishing and oyster industries (Museum of London Archaeology Service 2004: 117-8).
- 5.5.20. Areas of colluvium and alluvium should be targeted, as for all periods they may disclose sites and environmental remains (Crawford 2010: 3).
- 5.5.21. Material culture is significant, with ceramics specifically being of interest for the regional traits which they exhibit (Crawford 2010: 7; Kent County Council 2008c: 1). Human remains from this period are of interest for analysis of migration and social change (Crawford 2010: 2). Cemeteries and burial patterns are of interest, reuse of existing monuments from earlier periods should also be studied (Crawford 2010: 6).
- 5.5.22. Communications are important and the Saxon road network should be reconstructed if possible, any coastal communication paths would also be worthy of further study (Crawford 2010: 7-8). Research into defensive structures is required, including the linear earthworks of this period (Crawford 2010: 8).

### **Late medieval**

- 5.5.23. The origins and development of both village settlement and dispersed settlement are of interest to studies of the later medieval; how these relate to manorial sites is also a research priority (Munby 2010: 4). For instance, detailed research which is outside of the scope of this rapid survey, into Warblington Castle and its surrounding features in Coastal Stretch 13, would be valuable (Hopkins pers comm.). In addition, towns, markets and ecclesiastical centres also require further study, medieval buildings, including churches, have been studied in recent times, but are still valuable as a resource and investigation should continue (Munby 2010: 5-7; Kent County Council 2008d: 1). Areas which would particularly benefit from study of medieval timber-framed buildings are western East Sussex and the West Sussex coastal Study area (Hughes and Martin 2010: 60-1).
- 5.5.24. The development of field systems is an important issue for this period, making ridge and furrow and drainage evidence significant (Munby 2010: 2). Changing exploitation of plants and animals can be discerned from environmental and faunal evidence; this is likely to be found in alluvial and colluvial sediments (Munby 2010: 3). Woodland management can be seen through environmental evidence, as well as earthwork divisions, notably banks (Munby 2010: 3).
- 5.5.25. Industrial and craft activities can be hard to identify, but these can be seen from sites such as mills, and products including bricks, worked stone and pottery; mills also demonstrate water management (Munby 2010: 3, 9; Kent County Council 2008d: 1). Coastal exploitation requires investigation, particularly fish weirs and traps, which are traced through aerial photographic and walkover surveys (Munby 2010: 3). Ports should be studied to assist in identifying trade links; the

identification of the road network, with fords and bridges, would assist in further tracking communication and trade (Munby 2010: 10-1; Kent County Council 2008d: 1). Town defences, coastal defences, castles and palaces are all important and require further study (Munby 2010: 8).

### Post-medieval

- 5.5.26. A study of towns could establish why some new towns were created and some existing towns were lost in the post-medieval period (Hind 2010: 3). Social hierarchy as reflected in architecture is important for the post-medieval and modern period; public buildings and utilities are also important and these structures should be investigated (Hind 2010: 2-3; Kent County Council 2008e: 1). Enclosure had a significant effect on the landscape within the Study Area, therefore field systems and their origins are of interest and should be assessed (Hind 2010: 1). Agricultural change was significant through this period and the impact this had on other aspects of post-medieval life requires further analysis (Hind 2010: 2; Kent County Council 2008e: 4).
- 5.5.27. The post-medieval and modern period has the highest availability of evidence, however accepted theories should be tested – small finds from secure contexts, such as ceramics are important for this (Hind 2010: 1 and 5). Research should be undertaken into specific industries, such as salt extraction; Chichester Harbour Conservancy recommends that fieldwork is undertaken on all industrial remains (Museum of London Archaeology Service 2004: 117). On a wider scale, the impact of the industrial revolution on the Study Area is not well understood, research into specific industries can help with this, as could observation of large industrial areas and ports (Hind 2010: 2 and 5; Kent County Council 2008e: 3).
- 5.5.28. Leisure and recreation also require further study, particularly resorts along the coast (Hind 2010: 5; Kent County Council 2008e: 1 and 6). Churches and graveyards are important to study for changes and developments in faith, which have been significant in recent periods (Hind 2010: 4; Kent County Council 2008e: 3). Communications sites should be assessed, particularly roads, railways, canals and maritime links (Kent County Council 2008e: 2). Defences from these periods are significant and require further study; specifically pre-WWII military sites and the civilian aspects of WWII (Hind 2010: 4).

### Threats

- 5.5.29. As summarised in **Appendix I**, the intent in the majority of the Study Area as a whole over the next 20 years is to HTL. Therefore, although there is a high potential for damage from flooding, erosion and intertidal activity, maintaining of the existing coastal defences should lessen the potential for impact across most of the coastal stretch. Sites which fall within areas that are subject to revision pending further study should be considered a priority for future research (SMP2 5aH108 and 5c05). Managed realignment is recommended for some Policy Units (SMP2 4c14, 4c20, 4d20, 4d25, 4d26, 5a01 and 5a08), as is Adaptive Management (SMP2 5a04) and Hold the Cliff Base (SMP2 4d08, 4d10 and 4d11), which places sites in these areas at risk and worthy of future research. Some privately owned areas will not be defended as part of the SMP2 recommendations and sites present may suffer as a result (SMP2 5a06, 5a07, 5aH102 and 5aH103); these should also be considered as priorities for future research. Additionally, some PUs which have no existing coastal defences will be left to NAI (SMP2 4b17, 4b18 and 4b20) and should be considered a priority for future research. Parts of the Study Area are recommended for NAI management (SMP2 4b21, 4b24, 4b26, 4c01, 4c03, 4c05,

4c07, 4c19, 4c22, 4c23, 4c30, 4d01, 4d03, 4d05, 4d07, 4d09, 5aH107, 5b03, 5c01, 5c02, 5c04, 5c05, 5c06, 5c08 and 5c13); as such, sites in these areas should be considered a research priority.

- 5.5.30. In the longer term, fewer PUs benefit from a consistent HTL recommendation for the next 100 years. In general, where a change is seen in policy, it is to decrease the amount of intervention. In cases where a recommendation increases intervention in an area, it is to undertake MR in a PU which had previously seen NAI. A move from MR to HTL is also seen in some cases, as for PUs 5a01 and 5a08 in Coastal Stretch 12.

## **6. PHASE 2 SCOPING**

- 6.1.1. Phase 2 of the SE RCZAS is subject to further funding, not presently available, and as such a Project Design for Phase 2 fieldwork is not appropriate at this stage. When Phase 1 is finalised the process of obtaining new data from the HER/SMR/AHBRs will be specified, tide times and constraints on access will be considered, and a Project Design assembled.
- 6.1.2. A separate document (WA 2012b) has been compiled to fulfil the Phase 1 requirement to provide a Project Outline for next stage discrimination of the SE RCZAS list of potential sites at risk. This outlines the process for further discriminating the 3,435 sites considered to be at risk, which could benefit from further investigation during the Phase 2 fieldwork part of the SE RCZAS project. In addition, the discrimination phase will consider the scope and desirability for diver-based assessments of sites in the offshore area of coastal stretch 18.

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**APPENDIX I: RELEVANT POLICY AND MANAGEMENT UNITS (EAST TO WEST)**
**Isle of Grain to South Foreland (South East Coastal Group 2010a)**

Policy Unit	Coastal Stretch	Area	SMP 2 (Short term)	SMP 2 (Medium-term)	SMP 2 (Long-term)
4b17	1	Cliftonville (Fulsam Rock to White Ness)	Hold the Line, but No Active Intervention where there are currently no coastal defences	Hold the Line, but No Active Intervention where there are currently no coastal defences	Hold the Line, but No Active Intervention where there are currently no coastal defences
4b18	1	White Ness to Ramsgate	Hold the Line, but No Active Intervention where there are currently no coastal defences	Hold the Line, but No Active Intervention where there are currently no coastal defences	Hold the Line, but No Active Intervention where there are currently no coastal defences
4b19	1	Ramsgate Harbour	Hold the Line	Hold the Line	Hold the Line
4b20	2	West Cliff (Western Harbour arm to North of the River Stour)	Hold the Line, but No Active Intervention where there are currently no coastal defences	Hold the Line, but No Active Intervention where there are currently no coastal defences	Hold the Line, but No Active Intervention where there are currently no coastal defences
4b21	2	South of the River Stour to Sandwich Bay Estate (north)	No Active Intervention	No Active Intervention	No Active Intervention
4b22	2	Sandwich Bay Estate (north) to Sandown Castle (remains of)	Hold the Line	Hold the Line	Hold the Line
4b23	2 & 3	Sandown Castle (remains of) to Oldstairs Bay	Hold the Line	Hold the Line	Hold the Line
4b24	3	Oldstairs Bay to St. Margaret's Bay	No Active Intervention	No Active Intervention	No Active Intervention
4b25	3	St. Margaret's Bay	Hold the Line	Hold the Line	Hold the Line
4b26	3	South Foreland	No Active Intervention	No Active Intervention	No Active Intervention

**South Foreland to Beachy Head (South East Coastal Group 2006)**

Policy Unit	Coastal Stretch	Area	SMP 2 (short-term)	SMP 2 (medium-term)	SMP 2 (long-term)
4c01	3	South Foreland to Dover	No Active Intervention	No Active Intervention	No Active Intervention
4c02	3	Dover	Hold the Line	Hold the Line	Hold the Line
4c03	3	Shakespeare Cliff	No Active Intervention	No Active Intervention	No Active Intervention
4c04	4	Samphire Hoe	Hold the Line	Hold the Line	Hold the Line
4c05	4	Abbots Cliff	No Active Intervention	No Active Intervention	No Active Intervention
4c06	4	Folkestone Warren	Hold the line	Hold the Line	Hold the Line or No Active Intervention
4c07	4	Copt Point	No Active Intervention	No Active Intervention	No Active Intervention
4c08	4	Folkestone and Sandgate	Hold the Line	Hold the Line	Hold the Line
4c09	4	Sandgate to Hythe	Hold the Line	Hold the Line	Hold the Line
4c10	4	Hythe Ranges	Hold the Line	Managed Realignment	Managed Realignment
4c11	5	Dymchurch to Romney Sands	Hold the Line	Hold the Line	Hold the Line
4c12	5	Romney Sands to Dungeness	Hold the Line (Accreting)	Hold the Line (Accreting)	Hold the Line (Accreting)
4c13	5	Dungeness to Power Station	Hold the Line	Hold the Line	Hold the Line
4c14	5	Lydd Ranges	Managed Realignment	Managed Realignment	Managed Realignment
4c15	5	Jury's Gap to the Suttons	Hold the Line	Hold the Line	Hold the Line
4c16	5	Camber Sands	Hold the Line	Hold the Line	Hold the Line
4c17	5	River Rother	Hold the Line	Hold the Line	Hold the Line
4c18	5	River Rother to Cliff End	Hold the Line	Hold the Line	Managed Realignment
4c19	6	Cliff End to Fairlight Cove	No Active Intervention	No Active Intervention	No Active Intervention
4c20	6	Fairlight Cove East (Sea Road)	Managed Realignment	Managed Realignment	Managed Realignment
4c21	6	Fairlight Cove Central (Rockmead Road)	Hold the Line	Hold the Line	Managed Realignment
4c22	6	Fairlight Cove West	No Active Intervention	No Active Intervention	No Active Intervention
4c23	6	Fairlight Cove West to Hastings	No Active Intervention	No Active Intervention	No Active Intervention
4c24	6	Hastings	Hold the Line	Hold the Line	Hold the Line
4c25	6	Bulverhythe and Glyne Gap	Hold the Line	Hold the Line	Hold the Line
4c26	6	Bexhill to Cooden	Hold the Line	Hold the Line	Hold the Line
4c27	7	Hope and Pevensey	Hold the Line	Hold the Line	Hold the Line
4c28	7	Sovereign Harbour	Hold the Line	Hold the Line	Hold the Line
4c29	7	Eastbourne	Hold the Line	Hold the Line	Hold the Line
4c30	7	Beachy Head	No Active Intervention	No Active Intervention	No Active Intervention

**Beachy Head to Selsey Bill (South Downs Coastal Group 2005)**

Policy Unit	Coastal Stretch	Area	SMP 2 (short-term)	SMP 2 (medium-term)	SMP2 (long-term)
4d01	8	Beachy Head to Cuckmere Haven	No Active Intervention	No Active Intervention	No Active Intervention
4d02	8	Cuckmere Haven	Hold the Line, begin Managed Realignment	No Active Intervention	No Active Intervention
4d03	8	Seaford Head	No Active Intervention	No Active Intervention	No Active Intervention
4d04	8	Seaford	Hold the Line	Hold the Line	Hold the Line
4d05	8	Seaford (Tide Mills) to Newhaven Harbour	No Active Intervention	Managed Realignment	Managed Realignment
4d06	8	Newhaven Harbour and Ouse Valley	Hold the Line	Hold the Line	Hold the Line
4d07	8	Newhaven Harbour to Peacehaven Heights	No Active Intervention	No Active Intervention	Managed Realignment
4d08	8	Peacehaven	Hold the Cliff base	Hold the Cliff base	Monitor and Manage
4d09	9	Telscombe Cliffs	No Active Intervention (but maintain Portabello Outfall Defence)	No Active Intervention	No Active Intervention
4d10	9	Saltdean to Rottingdean	Hold the Cliff base	Hold the Cliff base	Monitor and Manage
4d11	9	Rottingdean to Brighton Marina	Hold the Cliff base	Hold the Cliff base	Monitor and Manage
4d12	9	Brighton Marina to Portslade-by-Sea	Hold the Line	Hold the Line	Hold the Line
4d13	9	Shoreham Harbour (Southwick)	Hold the Line	Hold the Line	Hold the Line
4d14	9	River Adur and Adur Valley	Hold the Line	Hold the Line	Hold the Line
4d15	9	Shoreham Harbour to Worthing	Hold the Line	Hold the Line	Hold the Line
4d16	10	Worthing to Goring-by-Sea	Hold the Line	Hold the Line	Hold the Line
4d17	10	Kingston/Ferring	Hold the Line	Hold the Line	Hold the Line
4d18	10	Angmering-on-Sea to Littlehampton	Hold the Line	Hold the Line	Hold the Line
4d19	10	River Arun and Arun Valley	Hold the Line	Hold the Line	Hold the Line
4d20	10	Littlehampton Harbour to Poole Place	Managed Realignment	Managed Realignment	Managed Realignment
4d21	11	Elmer (breakwaters)	Hold the Line	Hold the Line	Hold the Line
4d22	11	Middleton-on-Sea	Hold the Line	Hold the Line	Hold the Line
4d23	11	Middleton-on-Sea to Aldwick	Hold the Line	Hold the Line	Hold the Line
4d24	11	Aldwick to Pagham	Hold the Line	Hold the Line	Hold the Line
4d25	11	Pagham to Church Norton	Managed Realignment	Managed Realignment	Managed Realignment
4d26	11	Church Norton to East Beach	Managed Realignment	Managed Realignment	Managed Realignment
4d27	12	East Beach to Selsey Bill	Hold the Line	Hold the Line	Hold the Line

**North Solent (New Forest District Council 2010)**

<b>Policy Unit</b>	<b>Coastal Stretch</b>	<b>Area</b>	<b>SMP 2 Epoch 1 - 0-20 years</b>	<b>SMP 2 Epoch 2 - 20-50 years</b>	<b>SMP 2 Epoch 3 - 50-100 years</b>
4d27a	12	Hillfield Road, Selsey to West Street, Selsey	Hold the Line	Hold the Line	Hold the Line
5a01	12	Selsey West Beach to Bracklesham	Managed Realignment with localised Hold the Line at Medmerry Cliffs	Hold the Line	Hold the Line
5a02	12	Bracklesham to East Wittering	Hold the Line	Hold the Line	Hold the Line
5a03	12	East Wittering to Cakeham	Hold the Line	Hold the Line – potential for minor Managed Realignment at Cakeham	Hold the Line – potential for minor Managed Realignment at Cakeham
5a04	12	Cakeham (including East Head) to Ella Nore Lane	Adaptive Management	Adaptive Management	Adaptive Management
5a05	12	Ella Nore Lane to Fishbourne	Hold the Line	Hold the Line (localised Managed Realignment at Ella Nore)	Hold the Line (localised Managed Realignment at Horse Pond)
5a06	12	Fishbourne	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences) (localised Managed Realignment at Horse Pond)
5a07	12	Fishbourne to west of Cobner Point	Hold the Line (No public funding available for private defences) (localised Managed Realignment East Chidham)	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences)
5a08	12	West of Cobner Point to Chidham Point	Managed Realignment	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences)
5a09	12	Chidham Point to Nutbourne	Hold the Line	Hold the Line	Hold the Line

<b>Policy Unit</b>	<b>Coastal Stretch</b>	<b>Area</b>	<b>SMP 2 Epoch 1 - 0-20 years</b>	<b>SMP 2 Epoch 2 - 20-50 years</b>	<b>SMP 2 Epoch 3 - 50-100 years</b>
5a10	12	Nutbourne	Hold the Line	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences)
5a11	12	Nutbourne to Prinsted	Hold the Line	Hold the Line	Hold the Line
5a12	12	Prinsted to Stanbury Point	Hold the Line	Hold the Line	Hold the Line
5a13	12	Stanbury Point to Marker Point	Hold the Line	Hold the Line	Hold the Line
5a14	12	Marker Point to Wickor Point	Hold the Line	Hold the Line	Hold the Line
5a15	12	Wickor Point to Emsworth Yacht Haven	Hold the Line	Hold the Line	Hold the Line
5a16	12 & 13	Emsworth Yacht Haven to Maisemore Gardens	Hold the Line	Hold the Line	Hold the Line
5a17	13	Maisemore Gardens to Wade Lane	Hold the Line	Hold the Line (further detailed studies required)	Hold the Line (further detailed studies required)
5aH101	13	Langstone Bridge to Northney Farm	Hold the Line	Hold the Line	Hold the Line
5aH102	13	Northney Farm	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences) (further detailed studies required)
5aH103	13	Northney Farm to Mengham	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences)	Hold the Line (No public funding available for private defences)
5aH104	13	Mengham to Chichester Harbour entrance	Hold the Line	Hold the Line	Hold the Line
5aH105	13	Chichester Harbour entrance to Langstone Harbour entrance	Hold the Line	Hold the Line	Hold the Line
5aH106	13	Langstone Harbour entrance to North Shore Road, New Town	Hold the Line	Hold the Line	Hold the Line
5aH107	13	North Shore Road, New Town to West Lane (Stoke)	No Active Intervention (Localised Hold the Line for Newtown)	No Active Intervention (Localised Hold the Line for Newtown)	No Active Intervention (Localised Hold the Line for Newtown)

<b>Policy Unit</b>	<b>Coastal Stretch</b>	<b>Area</b>	<b>SMP 2 Epoch 1 - 0-20 years</b>	<b>SMP 2 Epoch 2 - 20-50 years</b>	<b>SMP 2 Epoch 3 - 50-100 years</b>
5aH108	13	West Lane (Stoke) to Langstone Bridge	Hold the Line (further detailed studies required)	Hold the Line (further detailed studies required)	Hold the Line (further detailed studies required)
5a18	13	Wade Lane to Southmoor Lane	Hold the Line	Hold the Line (further detailed studies required)	Hold the Line (further detailed studies required)
5a19	13	Southmoor Lane to Farlington Marshes (east)	Hold the Line	Hold the Line	Hold the Line
5a20	13 & 14	Farlington Marshes	Hold the Line	Hold the Line (further detailed studies required)	Hold the Line (further detailed studies required)
5aP101	14	Langstone Harbour Entrance (harbour) to Portsmouth Harbour entrance	Hold the Line	Hold the Line	Hold the Line
5aP102	14	Langstone Harbour Entrance (open coast) to Portsmouth Harbour entrance	Hold the Line	Hold the Line	Hold the Line
5a21	14 & 15	Farlington Marshes (west) to Cadour Drive	Hold the Line	Hold the Line	Hold the Line
5a22	15	Cadour Drive to A27	Hold the Line	Hold the Line (further detailed studies required)	Hold the Line (further detailed studies required)
5a23	15	A27 to Fleetlands (MoD boundary)	Hold the Line	Hold the Line	Hold the Line
5a24	15	Fleetlands (MOD boundary) to Quay Lane (MoD boundary)	Hold the Line	Hold the Line	Hold the Line
5a25	15	Quay Lane (MOD boundary) to Portsmouth Harbour entrance	Hold the Line	Hold the Line	Hold the Line
5b01	15	Portsmouth Harbour entrance to Gilkicker Point	Hold the Line	Hold the Line	Hold the Line
5b02	15 & 16	Gilkicker Point to Meon Road, Titchfield Haven	Hold the Line	Hold the Line	Hold the Line
5b03	16	Meon Road, Titchfield Haven to Hook Park	No Active Intervention (localised Hold the Line for cross-Solent infrastructure)	No Active Intervention (localised Hold the Line for cross-Solent infrastructure)	No Active Intervention (localised Hold the Line for cross-Solent infrastructure)
5c01	16	Hook Park to Warsash North	No Active Intervention	Managed Realignment	Hold the Line

<b>Policy Unit</b>	<b>Coastal Stretch</b>	<b>Area</b>	<b>SMP 2 Epoch 1 - 0-20 years</b>	<b>SMP 2 Epoch 2 - 20-50 years</b>	<b>SMP 2 Epoch 3 - 50-100 years</b>
5c02	16	Warsash North to Swanwick Shore Road	No Active Intervention	No Active Intervention	No Active Intervention
5c03	16	Swanwick Shore Road to Bursledon Bridge	Hold the Line	Hold the Line	No Active Intervention
5c04	16	Bursledon Bridge to Botley & Curdridge to Satchell Marshes	No Active Intervention	No Active Intervention	No Active Intervention
5c05	16	Satchell Marshes to Hamble Common Point	No Active Intervention (but more detailed study required) (localised Hold the Line for Rope Walk and the Quay)	No Active Intervention (but more detailed study required) (localised Hold the Line for Rope Walk and the Quay)	No Active Intervention (but more detailed study required) (localised Hold the Line for Rope Walk and the Quay)
5c06	16	Hamble Common Point to Hamble Oil Terminal	No Active Intervention	No Active Intervention	No Active Intervention
5c07	16	Hamble Oil Terminal to Ensign Industrial Park	Hold the Line	Hold the Line	Hold the Line
5c08	16	Ensign Industrial Park to Cliff House	No Active Intervention	No Active Intervention	No Active Intervention
5c09	16	Cliff House to Netley Castle	Hold the Line	Hold the Line (further detailed study required)	No Active Intervention (but Hold the Line for Netley Village)
5c10	17	Netley Castle to Weston Point	Hold the Line	Hold the Line	Hold the Line
5c11	17	Weston Point to Woodmill Lane	Hold the Line	Hold the Line	No Active Intervention (further detailed study required)
5c12	17	Woodmill Lane to Redbridge	Hold the Line	Hold the Line	Hold the Line
5c13	17	Lower Test Valley	No Active Intervention	No Active Intervention	No Active Intervention
5c14	17	Redbridge to Calshot Spit	Hold the Line	Hold the Line	Hold the Line



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