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HOO PENINSULA, KENT
HOO PENINSULA HISTORIC LANDSCAPE PROJECT

Edward Carpenter, Sarah Newsome, Fiona Small and Zoe Hazell

ENGLISH HERITAGE

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SUMMARY

This project was undertaken due to proposed changes on Hoo, combined with the potential threat from rising sea levels. These issues highlighted the need to increase knowledge and promote awareness of how the peninsula's historical development contributed to its character. The project was strongly influenced by the principles of the European Landscape Convention (ELC) and English Heritage's Action Plan for its implementation. The Hoo Peninsula Project was completed under National Heritage Protection Plan Activity 4F1 Enhanced protection of significant historic assets and places. The project was designed to strengthen English Heritage landscape characterisation and related programmes, including integration with other landscape-scale research. The techniques employed included aerial survey, analytical earthwork and buildings survey, historic landscape, seascape and routeway characterisation, archive research, farmstead characterisation, Historic Area Assessments, and a palaeoenvironmental review. This report presents the results as an integrated narrative showing how changes in the Hoo Peninsula landscape produced the character and perceptions that we find today. The results of this project will help to ensure that the historic environment plays a positive role in any future changes to this part of Kent.

CONTRIBUTORS

This report was compiled, with contributions from the whole project team, by Edward Carpenter, Sarah Newsome, Fiona Small and Zoe Hazell. Dave Hooley and Peter Herring made a significant contribution to the final text; Peter Kendall made a significant contribution to chapter 8. Jeremy Lake and Bob Edwards contributed to the farmsteads sections. Helen Winton edited the report. Illustrations by Sharon Souter and Phil Sinton. Modern colour oblique aerial photographs by Damian Grady. Modern colour ground photographs by Jo Smith, Jon Clarke, Rebecca Pullen and Derwin Gregory.
See Appendix 1 for details of all involved in the project.

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DATE OF SURVEY

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Geographical location

The Hoo Peninsula is 30 miles east of central London, on the north Kent coast near Gravesend and the Medway towns of Rochester and Chatham. The peninsula is bounded by the River Thames to the west and north and the River Medway to the south and east (Fig 1). Most of the peninsula is in Medway Unitary Authority and the western end is within Gravesham District. The peninsula has just over 31,000 inhabitants with the most populous parish, Hoo St Werburgh, containing 7356 people, while the least settled parish, Cooling, has 209 residents (Office for National Statistics 2001 Census).

Project background and aims

The Hoo Peninsula Historic Landscape Project was undertaken by English Heritage between 2009 and 2012. It was strongly influenced by the principles of the European Landscape Convention (ELC) and English Heritage's Action Plan for its implementation (Council of Europe 2000; English Heritage 2009; Newsome 2009). The ELC promotes the highest quality landscape for future generations, by protecting special landscapes and by managing and enhancing all landscape everywhere. In the ELC, landscape is defined as an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors. The English Heritage Action Plan serves as an exemplar and aims to ensure the principles of the ELC and the strong cultural and historical dimensions of landscape are fully recognised in its own work.

The project incorporated the broad principles of ELC, particularly the concept that landscape includes the urban, marine, and rural, and can be ordinary or degraded as well as remarkable or highly valued. This reinforces the recognition that the historic environment exists everywhere: that cultural activity shapes all types of landscapes and that all landscape is culturally perceived, not just those with iconic monuments or those otherwise deemed rare or special.

The project aimed to develop methods to address landscape change at a strategic level and to provide baseline understanding of the heritage value of landscape capable of informing specific proposals for change. English Heritage's ELC Action Plan recognises the 'importance of clearly understanding landscape's historic character for delivering informed management' (English Heritage 2009) and acknowledges the ELC's view of landscape as the context of people's lives and as a forum for managing change.

The project was also designed to strengthen EH landscape characterisation and related programmes including integration with other landscape-scale research (English Heritage 2009). This influenced the research techniques used and an integrated methodological approach helped to foster the holistic view of landscape embedded in the ELC.

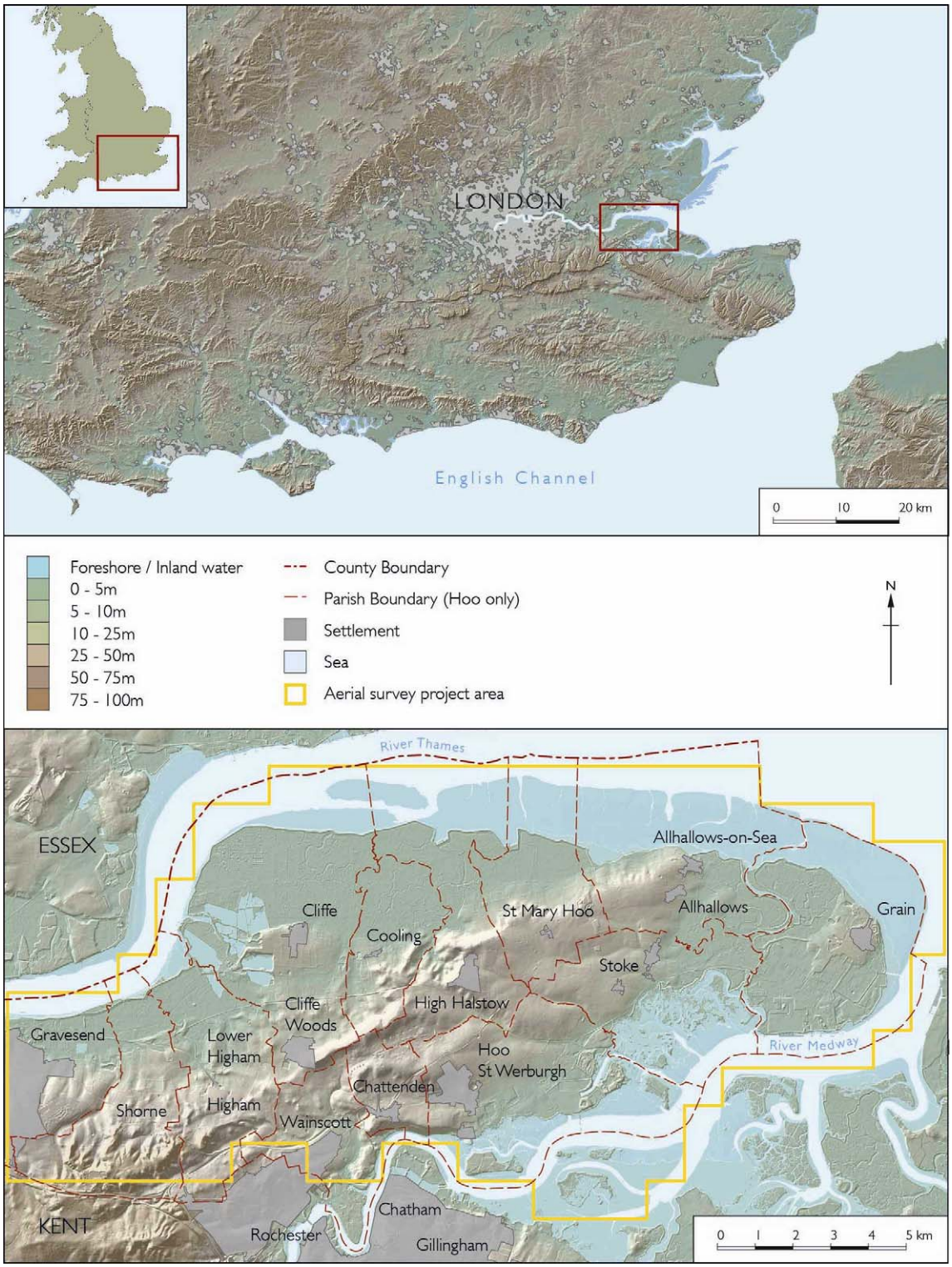

Figure 1 Hoo Peninsula with names of settlements. Top based on 90m SRTM Topography data courtesy of the CGIAR, http://srtm.csi.cgiar.org; Bottom based on lidar © Environment Agency copyright 2013. All rights reserved; both contain Ordnance Survey data © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900

Why the Hoo Peninsula?

Various factors meant the Hoo Peninsula was a good area in which to explore the application of English Heritage's ELC Action Plan and to develop a greater understanding of the contribution the historic environment makes to landscape and sense of place. The following formed key considerations:

1) At the time the project was initiated the area was part of the Thames Gateway Growth Area where major change, particularly in terms of housing, was envisaged. The 'growth area' concept was replaced in 2010 by the South East Local Economic Partnership, which brings together Essex, Kent and East Sussex but its aim to foster economic growth means the potential level of landscape change envisaged for the Thames Gateway is the same (www.southeastlep.com – accessed 2 May 2012),
2) Major changes from a number of proposals may affect the Hoo Peninsula in the short- to medium-term. These include a proposal for a new London airport and associated infrastructure (http://www.fosterandpartners.com/projects/thames-hub/ - accessed 29 July 2013); a Lower Thames river crossing to relieve pressure on the crossing at Dartford (Parsons Brinckerhoff 2009, 193) and possible managed realignment and habitat creation areas within the low-lying marshland as part of the Environment Agency's 'Thames Estuary 2100' scheme (Environment Agency 2009, 164-165); the development of the former Ordnance Depot at Lodge Hill, Chattenden potentially extending beyond the immediate bounds of the new settlement.
3) Due to the variety of the proposed changes, the Hoo Peninsula was seen as an area with a high level of anticipated change with a good range of the heritage management issues. These were considered as representative of the major landscape change likely across England, but particularly in the more economically prosperous South-East. Other forms of landscape change were envisaged, particularly through the work of green infrastructure projects which have been developed on the back of Sir Terry Farrell's 'Parkland Vision' for the Thames Gateway. The 'Parkland Vision' sought to promote a network of green spaces and pathways which could better connect the urban areas of the Thames Estuary and provide an improved environment in which to live and work (DCLG 2008).
4) There were also more specific aspects of Hoo's landscape which made it an ideal candidate for the project:
    a) The varied landscape of the peninsula, with its estuarine situation, mixture of smaller and larger villages, and major industrial areas, provided an opportunity to address landscape beyond the rural, and enabled English Heritage to 'use the [European Landscape] Convention to develop and encourage approaches which promote an integrated understanding of sub-urban, peri-urban and changing rural landscapes' (English Heritage 2009).
    b) The Hoo Peninsula can be perceived by non-residents as ordinary, lacking in value or scarred by industry. This offered an opportunity to challenge perceptions and contribute new perspectives based on the contributions that heritage makes to this landscape.

What did the project hope to achieve?

The aim of the project was to ensure that knowledge of the historic environment made a positive contribution to management of change on the peninsula. It is hoped that the project results will achieve this in a number of ways:

1) By contributing to a better evidence base for decision-makers through improved understanding of the archaeology, history and character of the peninsula.
2) By providing clear messages about the historic environment's contribution to the present landscape through drawing together of the results of a variety of different types of research to create an integrated understanding of the whole of the Hoo Peninsula landscape, not just the particularly significant or special.
3) On a broad level it is hoped that better-informed perceptions of the rich historic character of the landscape of the peninsula will lead to better-informed approaches to the management of change on the peninsula.

The project aligned well with English Heritage's National Heritage Protection Plan (NHPP), launched in 2011, which provides a framework for the work of English Heritage and its partners in the heritage sector (http://www.english-heritage.org.uk/professional/protection/national-heritage-protection-plan/ - accessed 29 July 2013).The Hoo Peninsula Project was completed under National Heritage Protection Plan Activity 4F1 Enhanced protection of significant historic assets and places.

Our approach

The project employed a number of different research techniques at the disposal of English Heritage to produce an integrated understanding of the historic development of the Hoo Peninsula's landscape, rather than one focused on a particular aspect or theme. This approach ensured that a range of historic landscape themes were addressed, enabling an integrated understanding of the landscape through the coordination of different specialists and sources of information.

See Appendix 1 for details of the individuals who contributed to the project and their roles. The main landscape approaches employed are summarised below and further details of the methodologies are available in Appendix 2 of this report. It is important to note that each approach benefitted from the cross-flow of ideas during the project's execution. See Appendix 3 for a list of reports and datasets, and how to access them.

Palaeoenvironmental review

The palaeoenvironmental review was a desk based piece of work mostly based on published and grey literature. It involved the synthesis of multidisciplinary research carried out on Hoo and further afield. The information obtained was collated in GIS format and is presented in Hazell (2011).

Aerial photographic mapping and analysis

The systematic analysis, interpretation and mapping of archaeological sites and landscapes from aerial photographs was carried out across the whole of the peninsula and included features visible in the intertidal zone. The work used National Mapping Programme methods (see Appendix 2 for further details) and systematically examined a wide range of aerial photographs dating from the 1940s to the 2000s. The aerial photographic work recorded archaeological features with a date range from prehistory to the modern era including buried remains visible as cropmarks, and surface remains seen as earthworks and structures, the latter mainly relating to 20th-century military remains. The features visible on the photographs were accurately transcribed and the details recorded in English Heritage's National Record of the Historic Environment (NRHE), available through the Pastscape website. A series of aerial reconnaissance flights over the peninsula, undertaken as part of the project, revealed further previously unknown sites and provided general views of the landscape, villages, architectural and inter-tidal remains.

Historic Landscape Characterisation and Historic Seascape Characterisation

Historic Landscape Characterisation (HLC) and Historic Seascape Characterisation (HSC) were undertaken across the whole of the peninsula as part of the project (Bannister 2011; 2012). The Historic Landscape Characterisation used the characterisation of the whole of the county of Kent, which began in 1999 (Croft, Munby and Ridley 2001), as a base from which to produce a much more fine-grained characterisation for the peninsula. The aim of HLC is to describe, delineate and interpret the historic character of the present landscape and involves digitising land parcels and recording attributes relating to that historic character. Where evidence is available it also characterises previous landscape. For the first time this HLC work was carried out alongside a similarly fine-grained Historic Seascape Characterisation which aims to capture the historic character of the coastal and marine landscape, embodying the same principles as HLC but applying them to produce a maritime perspective of the coastal land, inter-tidal and estuarine parts of the Project area.

Farmstead Characterisation

The farmsteads of the Hoo Peninsula were mapped and characterised as part of a wider project examining the historic character of the farmsteads of the county of Kent (Edwards and Lake 2012). The farmstead mapping and characterisation process involves analysing and recording the layout of buildings within the farmstead and recording the change or loss of elements of the farmsteads between the 2nd edition Ordnance Survey map of around 1895 and the modern map. In order to better understand the historic farmsteads of the Hoo Peninsula, in-depth studies of two parishes Cliffe and Higham, were undertaken using the Historic Landscape Characterisation to provide landscape context through which to understand the relationship between farmstead character and the surrounding landscape.

Historic Area Assessments

Historic Area Assessments of the nine Hoo parishes which fall within Medway Unitary Authority were carried out. Historic Area Assessments are primarily focused on the built environment and use an area-based approach to understand how development has informed character (English Heritage 2010, 4-5). In the case of the Hoo Peninsula Historic Landscape Project the buildings and landscapes of the nine parishes were rapidly assessed and a short report prepared for each parish, outlining historical development, identifying different character areas, highlighting aspects of historical and architectural significance or interest and making suggestions for further research.

Research and survey of key sites

As well as the peninsula-wide investigations described above, the opportunity was taken to undertake detailed research and survey on some key sites and landscapes which were identified during the early stages of this project as in need of improved understanding. These included the chemical explosives works and the coastal artillery fort at Cliffe, Cooling Radio Station, the Admiralty firing point at Yantlet Creek, the Lower Hope Point battery and a group of explosives storage magazines on St Mary's Marshes. Research on these sites was compiled in Research Reports (see Appendix 3).

Gathering of background data

As part of the project a number of different datasets, such as geology and soils data and archaeological information, were collated in a project GIS. This data was used as a research tool and provided a context for the different elements of the project. Wherever possible, data was collected in spatial, GIS compatible formats.

The multidisciplinary landscape approach

A project team with a range of experts from different disciplines concerned with the study of the historic landscape had many advantages for the project. The analysis of a combination of different types of data improved understanding and interpretation and allowed a more rounded overview.

A particular challenge for the project was to ensure non-expert users can easily access the information and understanding to inform their decision-making. This report, coupled with the publication of a companion volume in the Informed Conservation series (Carpenter & Newsome, forthcoming) and the pointers to further information provided in Appendix 3, are designed to address this and provide accessible outputs with clear messages.

The non-invasive approaches used in the project influenced the nature of the analysis. Information held in the National Record of the Historic Environment (NRHE) and Kent Historic Environment Record (HER) helped to provide a picture of buried, often pre-medieval, landscapes. Aerial photographs provided new evidence of buried landscapes for parts of the peninsula but any substantial enhancement of information about those, for example, beneath the alluvium in the marshland zone, is more difficult to obtain and was beyond the remit and resources of the project.

Aim of this report

The results of the project are presented in this report as an integrated narrative rather than in sections based on the different methods used. It is hoped that this approach will give the reader a clearer picture of how the Hoo Peninsula landscape developed and allow the benefits of an integrated multi-disciplinary approach to be fully realised. Appendix 3 details where associated Research Reports, project data and material is available.

By integrating the project results, the report looks at the way change in the Hoo Peninsula landscape, as seen through the history and archaeology of its constituent buildings, fields, rivers and routeways, has shaped perceptions of character. Rather than taking a traditional chronological approach, a thematic approach allowed a greater concentration on how change created the present Hoo Peninsula landscape and enabled a fuller understanding of the importance of time depth in continuity and change.

The report begins with a summary of how the present landscape of the Hoo Peninsula, and its distinctive sense of place, closely reflect its rich historical development. The report then goes on to address major themes that shaped the Hoo we see today. 'Working and Travelling', focuses on the peninsula's industry and infrastructure; 'Defending' discusses the impact of military activities on the peninsula; 'Living' focuses on the settlements; 'Farming' covers the agricultural landscape; and 'Adapting and Organising' looks at how the peninsula's landscape was divided and managed from prehistoric times. The report

therefore gives a sense of more recent changes that contributed to the peninsula's character, before going on to look at the character of the more rural and agricultural landscape, that existed before industry arrived. This allows us to track changing realities and perceptions back through time, lifting away layers of historical change to reveal influences that remain in Hoo's present character.

In writing the report the authors were aware of the influence of their own perceptions of the Hoo Peninsula's landscape. As far as possible, the report tries to be aware of the origins and validity of different value judgements and accepts that other individuals, interests and professions may place their emphases and values differently. English Heritage has established four key values to which the historic environment contributes: 'evidential', 'historical', 'aesthetic' and 'communal' (English Heritage 2008). English Heritage's 'Conservation Principles' ensures these values' full expression underpins the work the organisation does (English Heritage 2008).

2 PERCEPTIONS OF HOO

What is the Hoo Peninsula?

Geomorphological and geological setting and development

The Hoo Peninsula is located within the London Basin; a bowl-like depression between the chalk geology of the Chiltern Hills of Essex to the north, and the North Downs of Kent to the south. The peninsula is characterised by the 'Hundred of Hoo Hills' – a central ridge of high land running south-west to north-east – surrounded on three sides by extensive, low-lying salt marshes. The nature of the salt marshes differs on the Thames and Medway estuaries, and is narrower and less subject to erosion along the River Thames, but broader and exposed to higher erosion rates along the River Medway (Burd 1992). Old maps show the separation of the Isle of Grain on the very east of the peninsula, though it now forms part of the same land mass as a result of land reclamation.

The main geological deposit of the area is London Clay which forms the peninsula's ridge of hills and underlies the superficial alluvial marsh deposits. The oldest geological deposit on the peninsula is a Cretaceous chalk that outcrops at Cliffe in western central Hoo. Other important sediments in the area are the:

i) Pleistocene sands and gravels that were deposited along the former river routes as 'river terraces' and are found as discrete patches trending roughly from north-west to south-east across the peninsula's ridge, and on the Isle of Grain.
ii) More-recent Holocene alluvium (water-lain deposits) that covers extensive areas of land on the low-lying marshes of the eastern and north-western Hoo Peninsula (Dines *et al* 1954); it is mainly silt and clay, but with some sand, gravel and peat seams.

The gravels usually lack fossil material – although they can contain archaeological lithic artefacts – whereas the finer-grained sediments often yield animal and plant remains. Importantly, the region was not ice-covered during the last glaciation, meaning that older deposits that might otherwise have been eroded by ice still remain as evidence of former environments.

The Hoo Peninsula's geomorphological development throughout the Quaternary period has been dominated by the migrating routes of the Thames and Medway Rivers and by relative changes between land- and sea-levels (mainly resulting from alternating glacial-interglacial climate cycles).

During the Early Pleistocene (before the Anglian glacial period), it is thought that the Rivers Thames and Medway followed completely separate courses (Bridgland 2003). The

early River Thames (see Gibbard 1999) followed a north-easterly route – north of London, across what is now Suffolk and Norfolk, and into the North Sea region – whilst the 'Essex Medway' (an early, 'proto' River Medway) flowed from south-west to north-east across the area now defined by the Hoo Peninsula and then across eastern Essex (see Bridgland 2003). Over time, the path of the River Thames migrated southwards (helped during the early Anglian (early Middle Pleistocene) by the advancing glacial ice mass), until it met and truncated the River Medway in Essex, resulting in the River Medway becoming a tributary of the River Thames. Subsequently, the then merged river continued to shift its route further south, to where we know it today.

Extensive work by Bridgland (1983 onwards) identified at least nine separate gravel deposits on the Hoo Peninsula (Bridgland 2003). The best preserved suite of terraces found so far for the River Medway is in the central peninsula near High Halstow (Bridgland 2003: 25, 33), however it is thought that the very oldest (highest) river sediments have been lost through erosion (Bridgland 1985: 30). Most of the gravels found on the Hoo Peninsula belong to the Hoo Gravel Formation (Bridgland 1983 ; Bridgland and Harding 1985: 42, figure 1) i.e. laid down by the River Medway; the notable exception is that on the Isle of Grain: that belongs to the Low-level East Essex Gravel Formation and includes rock types found in both the Thames and Medway Rivers, indicating that this was deposited after their merger.

River deposits can be dated and correlated with each other by studying their altitudes, animal and plant remains, and archaeological (lithic) artefacts found within them. Increasingly, the scientific dating techniques known as amino-acid racemisation (AAR) 21 and optically stimulated luminescence (OSL) dating are being used.

As relative sea-levels rose at the end of the last glaciation due to melting of ice masses, the river channels of the former Thames and Medway River routes were gradually flooded and became estuaries, drowning the former landscape's features and deposits. These former river channels remain submerged in the Greater Thames Estuary (Bridgland *et al* 1993). Since then, throughout the Holocene, evidence of more recent minor sea-level fluctuations and reversals has been preserved within the alluvial deposits, some of which are visible, exposed in the peninsula's intertidal zones.

Table 1 Stratigraphy of deposits on the Hoo Peninsula, after Bridgland (2003) and Bridgland and Harding (1985). Surface elevations in italics from Bridgland and Harding (1985); non-italicised ones from Bridgland (2003). c=cold, w=warm, ?=unknown, [c/w/c] =climatic conditions from equivalent Thames-Medway terraces in Southend region, *=part of the Low-level East Essex Gravel Formation, **=thought to have originally been at a higher elevation, MOIS = marine oxygen isotope stage.

Terrace formation/gravel aggradation	River formation	Surface elevation (m OD)	Location	Climatic conditions	Age	MOIS equivalent
Grain Gravel*	Thames-Medway	13	Isle of Grain			
Tilbury	Lower Thames		Hoo Peninsula (and Tilbury-World's End)	warm	Holocene	1
Halling Gravel	Medway	*(near 0)*	Upstream from Medway towns (Rochester area)	cold	Late Devensian	Late 2
Aylesford Gravel formation	Medway		Hoo Peninsula (and Aylesford)	c/w/c	Late Saalian to Devensian	late 6 to 5d-2
includes: Kingsnorth deposits	Medway		Hoo Peninsula	warm	Ipswichian	5e?
Binney Gravel formation	Medway	8	Hoo Peninsula	c/w/c	Intra to late Saalian	late-8 to 6
includes: Allhallows deposits	Medway		Hoo Peninsula	warm		7 (or 9)
Stoke Gravel	Medway	*16*	Hoo Peninsula	[c/w/c]	Intra-Saalian	late-10 to 8
Shakespeare Gravel	Medway	*35*	Hoo Peninsula	[c/w/c]	Late Anglian to Intra-Saalian	[late-12 to] 10
?Newhall Gravel	Medway	*22*	Hoo Peninsula	cold	Anglian	12
Dagenham Farm Gravel	Medway	*45*	Hoo Peninsula	cold	Anglian	12
Clinch Street Gravel	Medway	*50*	Hoo Peninsula	c/w/c	Pre Anglian/Anglian	14-12?
High Halstow Gravel	Medway	*60*	Hoo Peninsula	c/w/c	Cromerian Complex	?
Lodge Hill Gravel	Medway	73**	Hoo Peninsula			?
H	I	A	T	U	S	
Cobham Park Gravel	Early Medway	(>130)	N.Downs dip-slope, west of Medway Gap	?	Lower Pleistocene (possibly c1.85Ma)	?

Hoo Peninsula as a concept

It is not clear when the name 'The Hoo Peninsula' originated though it is probably a modern expression. The name 'Hoo', meaning 'spur of land' in Saxon (Mills 2003, 248), has been in use on the peninsula for many hundreds of years but its earliest recorded uses (eg 'Hoge' in a charter of around 687 (Mills 2003, 248)) may have been referring to Hoo St Werburgh rather than the whole of the peninsula. A recent study of English hill names suggests that 'hōh', Anglo-Saxon for 'heel', refers also to hills shaped like 'the foot of a person lying face down, with the highest point for the heel and the concavity for the instep' (Gelling and Cole 2003, 186). This might then suggest that the name Hoo was given to the whole spine of hills, with Chattenden Beacon the heel itself (and the toes at Allhallows). It is clear that by the time of the Domesday Survey the central part of the peninsula was known as the 'Hundred of Hoo', with the western area falling in the Hundred of Shamwell (Morgan 1983) and the Isle of Grain part of the Hundred of Chatham and Gillingham (Hasted 1798, 250), a 'hundred' being an administrative area which originated in the Saxon period. Numerous references to the area from travellers and diarists such as Camden (1607) demonstrate the continued use of the name 'Hoo' to describe this part of the north Kent coast through the 17th, 18th and 19th centuries. The adoption of the name 'Hoo' to mean the whole of the peninsula may reflect the relative importance of the town of Hoo St Werburgh compared to the other settlements. However if the name is topographical it may have always have referred to the whole ridge, and thus in effect much of the central and eastern part of the peninsula. This suggests that the peninsula was regarded as an entity from the early medieval period.

How the project defined the Hoo Peninsula

MacDougall (1980, ix) eloquently summarises the challenges of defining the geographical boundaries of the 'Hoo Peninsula'. For the purposes of the Hoo Peninsula Historic Landscape Project we have taken it to be whole of the peninsula, including the parishes which fall into Gravesham District, and have used the urban area of Gravesend, the A2 road and the urban area of Strood and Frindsbury to mark the western and south western boundaries of the peninsula. To mean low water mark, the total terrestrial area of the peninsula as defined for the project is 175 square kilometres. Extending the project area to the centre of the Medway and Thames channels gives a total project area of 226.25 square kilometres, though some of the investigative techniques used during the project were applied beyond this boundary.

Brief description

The Hoo Peninsula is rural and coastal in character. Fields of arable and marshland pasture, form nearly 50% of the peninsula's area, whilst mud flats and salt flats form another 29% of the area bordering the estuaries. A much smaller proportion of the peninsula's area, 7%, could be described as industrial in character and these areas are mainly located on low-lying former marshland. The mainly rural character of the peninsula is indicated by the low proportion of its area in use as settlement (4%). With the exception of the village of Grain, settlement is focused on the slightly higher ground away from the marshes which rises to the central ridge and consists of eleven villages of varying size, a number of smaller settlements and dispersed farmsteads. The small amount of woodland (4%), focused on the higher ground, gives the peninsula a feeling of openness (Bannister 2011, 63) which is enhanced by the marshland fields which are ditched rather than fenced.

Past and current perceptions of Hoo

Any area of landscape, at any scale, can be perceived in a multitude of ways coloured by the interests, understanding and experience of the observer and when the observation is made, right up to the present. A variety of sources spanning the past 400 years mention the Hoo Peninsula. These are predominantly written (including some works of fiction), but more recent sources include documentary film and sound recordings. They are not numerous but they do provide examples of the variety of ways by which the Hoo Peninsula has been perceived. These perceptions not only reflect the different periods and aspects being considered but also emphasise the variety of interpretations and selections by individuals of what they have seen; how they have perceived the sights, sounds etc of the peninsula.

The archaeologist Matthew Johnson lists a number of definitions of landscape and identifies two common elements to all of them: the land itself, both natural and humanly created features, and how this land is viewed (Johnson 2007, 4). These ideas of landscape and perception have been drawn together and given much greater force by the European Landscape Convention (ELC) which was ratified in the UK in 2007. The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe 2000). Within the underlying philosophy of the ELC, landscape is both culturally shaped and culturally perceived, bringing together people and place, people's activities and people's thinking. It recognises that everywhere has landscape character and that within that everywhere has historic cultural character, whether perceived as urban, suburban or rural, ordinary, degraded or special, marine, coastal or terrestrial. All landscape can be perceived in different ways (ibid) and the Hoo is no exception: it does not possess a single well-defined identity. Despite this, there is a discernable common thread in the predominant tone of the vocabulary used. This is present in most (though not all) of the written

accounts, from William Lambarde's 1570 description to Peter Ackroyd's of 2007, and it is the predominant tone of the vocabulary used. As an example, in Ackroyd's (b. 1949) *Thames: Sacred River* (Ackroyd 2007), he uses the following words when describing the marshes on Hoo:

Uninhabited	Uninhabitable
Menacing	Eerie
Lonely	Strangeness
Melancholy	Wild
Inhospitable	Desolate

By focussing on the marshes, Ackroyd's book is typical of many historical accounts of Hoo which also focus on this aspect of the peninsula. Ackroyd followed the Thames from its source to where it met the sea, a point marked on the Kent side by an obelisk called the London Stone, just off the north coast of Hoo. Some of his melancholy may be associated with his journey's end but his words are also those commonly used to describe liminal places: lands at the margins of cultural life and experience, not fully attainable by the consciousness and so where beliefs and mysteries may remain unchallenged. The Hoo Peninsula fits such perceptions well in view of its extensive marshes and low-lying position between sea and land, prone to estuarine mists and fogs. There is abundant evidence from prehistoric periods of the spiritual responses invoked by such landscapes, the 'Seahenge' site on the north Norfolk coast (Prior 2008) and the Lindow Moss bog burials from Cheshire (Brothwell 1986) being well known examples. During the Anglo-Saxon period 'landscapes of the periphery' had supernatural associations (Semple 1998, 113-114) and Hoo may share some of the similar associations that borderlands or areas perceived as marginal landscapes can possess. Shade House is one of the few surviving remote marshland buildings. The current building appears externally to date from the 20th century but has re-sited or retained 18th century fabric internally. Buildings have been depicted at that location since the early 19th century when they were called The Shades (Hull 1988, map 5). The word shade or shades has a number of meanings including 'a secluded or obscure place' and 'a spectre or ghost'.

That Ackroyd was perhaps expressing more than a 'journey's end' feeling is shown by Hilaire Belloc (1870-1953) who, in 1912, travelled along the Thames in the opposite direction to Ackroyd and uses the following words to describe the marshes (Belloc 1912):

Emptiness
Desolation
Desertion
Silence
Morass

This view can also be seen in fiction. Charles Dickens's (1812-1870) descriptions of the marshes in *Great Expectations* (1861) may show us how Dickens - who knew the area

well - perceived the marshes, although it must be remembered that he is also creating an atmosphere for a work of fiction. He uses the following words:

> Insupportable
> Oppressive
> Wilderness

When walking across Hoo, or in the case of Belloc sailing past along the Thames, these three authors perceived the peninsula in similar melancholic terms, and introduce or reinforce this interpretation to those reading their books.

Sickness and sorrow

Historical accounts of Hoo from the 16th century onwards sometimes present Hoo as an unpleasant and unhealthy place. William Lambarde (1536-1601) writing in 1570 refers to the Hundred of Hoo as 'unwholesome' (Lambarde 1570 (1970 repr), 441); a word also used by William Camden (1551-1623) (Camden 1701, 249). Lambarde not only introduces a negative view of Hoo but also, by erroneously claiming that the name 'Hoo' comes from the old English word for sickness or sorrow, makes the case that this had long been an unhealthy landscape (Lambarde 1570 (1970), 441).

When considering the date these accounts were written it is likely that they were reflecting the exceptionally poor conditions that Hoo was experiencing during the mid to late 1500s. During the 16th century Hoo suffered from widespread flooding in 1555, 1564, 1568 and 1569 and practically the whole reclaimed area downriver of Gravesend was inundated (Bowler 1968, 220). The sea defences were breached to an extent that 'ships could, and did, sail over them at spring tides' (ibid 221) and a commission of inquiry in 1570 'stated that lands from Gravesend to the Medway, on both sides, and including the Isle of Grain were inundated with salt water, much of it for so long that the land was of little worth' (Bowler 1968, 220). Renewed reclamation of this land was slow and although by 1600 much of it had been reclaimed, some areas were not inned until the 1620s and 1630s (ibid 193).

What is not clear is if these poor perceptions of Hoo were exacerbated by the presence of malaria by this date. Malaria established itself in the marshy areas of Britain during the 16th and 17th centuries (Dobson 2003, 328; MacDougall 1979). Although the disease and the role mosquitoes play in transmitting it were not properly understood until the 19th century, a clear link had long been established between the illness and the land. It was thought to be a result of the inherently unhealthy nature of the marshes and went by a number of different names. The association between illness and the landscape is clearly demonstrated by one of these: marsh fever.

Mary Dobson writing about death and disease in early modern England (defined as circa 16th -18th centuries) highlights how contemporary mortality data continually demonstrate

the association of a marshland environment and an unhealthy population (Dobson 2003, 287). The following figures are the burial : baptism ratios (burials per 100 baptisms) for four parishes along the Medway in the 17th century:

Hoo	193
Frindsbury	166
Iwade	222
Lower Halstow	320

(Taken from Fig 6.1 Dobson 2003, 294).

The unhealthy character of south-east England's marshlands during this period was commented upon by 'almost every writer of south-east England topography' (ibid 295). During the 1720s Daniel Defoe (1660?-1731) claimed that 'few families of note' are found among the Kent marshes (Defoe 1724-6 (1971 repr), 131) and this situation is echoed by the writing of Edward Hasted (1732-1812) at the other end of the century. He comments that farmers and landowners do not live in the Hundred of Hoo, 'nor is there a gentleman's house, or a clergyman residing in it' (Hasted 1798, 2), though this comment can be contrasted with the number of Georgian farmhouses on the peninsula (see Chapter 5). A picture emerges of the north Kent marshes inhabited only by those directly involved with making a living from the area; 'ship-builders, fisher-men, seafaring-men, and husband-men (Defoe 1971, 131) and more specifically to Hoo, bailiffs and lookers (Hasted 1798, 2). Across the south-east of England during the 18th century vicars rarely lived in their marshland parishes, often because of malaria (Dobson 2003, 295) and Dobson concludes that marsh parishes were 'the most notorious of all black spots during the early modern period' (ibid, 287).

In complete contrast, from at least the early 17th century it was not only claimed that livestock kept on the marshes and saltings would not fall ill, but also that sick animals could be brought back to health by being allowed to graze upon them (see Chapter 6). This contradiction was noted by William Gibson in 1754 who wrote that while 'the air that comes off the marshes is very injurious to human constitutions it has no such affect upon the brute creatures that feed on them' (Gibson 1754, 177).

The association between Hoo and illness may have been further strengthened in the 18th century when quarantine was introduced to combat outbreaks of plague during the Baltic crisis, 1709-14, and the Marseilles crisis, 1720-1723. During the Baltic crisis, ships from infected areas were initially stopped from coming further up the Thames than The Nore, but were eventually held for 40 days on the south coast of the Medway in Stangate Creek and their goods were aired on Hoo Island (Booker 2007, 30-31). These areas were used again during the Marseilles crisis when airing sheds were built on Hoo Island under the watch of the governor of Upnor Castle (Booker, 2007, 94; 100). A circular enclosure on the island, only part of which survives, may be associated with the airing grounds.

Pilfering seamen

Another 16th century reference to Hoo appeared in the 'historical description of the island of Britain' which formed the preface to Raphael Holinshed's *Chronicles of England, Scotland and Ireland*. This historical description was written by William Harrison (1535-1593). First published in 1577, a revised edition was published in 1587 in which Harrison also wrote the dedication to Lord Cobham, to whom Harrison was household chaplain. Unlike the first edition this included the saying: 'He that rides in to the hundred of Hoo, Besides pilfering seamen, will find dirt enow'. Cooling Castle on Hoo was owned by the Cobham family and it seems odd that Harrison would highlight lawlessness (and poor conditions) there. Can anything be read into this saying? Is it a comment on the 'abandonment' of this area by the Cobhams if, as has been suggested, Cooling Castle was not reused after the mid-16th century (Scott Robertson 1877)? Or, if the Cobham family retained ownership, does its inclusion reflect some personal differences between the two men, which are known to have existed (see Parry 1987, 144)?

Harrison's saying introduces a perception of lawlessness to the peninsula. During the 1570s sheep were being stolen from Kent marshes by workmen employed to repair sea walls and who were threatened with fines if they did not stop (Bowler 1968 231). It is debatable that these men could be considered 'pilfering seamen', even if they were working from boats. Sailors were not the only perpetrators of crime in the area and sometimes were its victims. Daniel Defoe, writing in the early 1700s, reports that Gadshill at the south-western end of the peninsula was a noted place for robbing sailors passing through after being paid at Chatham (Defoe 1724-6 (1971 repr), 121). There are a number of stories that associate Hoo with smuggling, although these are unverified. What is generally better referenced are the ways smuggling was combated, such as the provision of government-appointed riding officers. During the 18th century two riding officers were allotted to the peninsula whose job it was to undertake patrols, apprehend smugglers and seize goods (MacDougall 1980, 95). The idea of criminality in the area is used by Dickens in *Great Expectations* (1861), where the marshes are a landscape where escaped convicts could hide, another expression of this landscape's liminal perceptions. This fictional episode has some parallels with an actual convict escape in 1810: 'A few days since, seven of the convicts confined on board *Zealand*, at Sheerness, effected their escape in a boat from that place to the Isle of Grain. Three of them have been retaken, one drowned, and the remainder not yet heard of' (Anon 1810, 3).

The stranger's view

Dr Thomas Johnson (1595x1600-1644) was an apothecary with a keen interest in botany (King 2004). In 1629 he undertook a journey into Kent to search for plants and his published account of this trip includes a description of the visit he and his companions made to the Isle of Grain in July of that year:

> 'after leaving the little ship walked five or six miles without seeing a single thing that could give us any pleasure…In the heat of the day we were tormented like Tantalus with a misery of thirst in the midst of waters – they were brackish! We were equally afflicted with hunger in that inhuman wilderness where there was no town with in easy reach, no smoke to be seen, no barking of dogs to be heard, none of the usual sights of habitation by which we could arouse our fainting spirits to any breath of hope.' (Gilmour 1972, 59)

While this would appear to be yet another negative account of the Hoo Peninsula, can it be taken at face value? On earlier travels around England undertaken by Johnson (including to Kent) he had discovered several plants that had not previously been recorded. In this light, his comment that they did not see 'a single thing that could give us any pleasure' may in part indicate that no new plant specimens were found on Grain. However, it is clear that Johnson did not enjoy his five or six mile walk (8-10km) around Grain on a hot summer's day. But the Isle of Grain is a small flat island measuring 4.5km by 3km and it is difficult to believe that they didn't even catch a glimpse of the church or any of the houses on Grain, even if they had come to shore at the furthest point from the village.

Johnson's account highlights how an outsider's unfamiliarity with a landscape can adversely affect their perception of it. It is tempting to believe that Johnson and his companions were lost, unable to easily navigate themselves through the marshes which would have been subdivided by water-filled dykes restricting movement by offering only limited crossing-points. They may have even seen a glimpse of habitation and Johnson's frustration was due to his inability to reach them. This difficulty in traversing the marshes is highlighted by Dickens in *Great Expectations* where his protagonist Pip, native to the marshland, heads onto the marshes at night:

> 'A stranger would have found them insupportable, and even to me they were so oppressive that I hesitated, half inclined to go back. But I knew them well, and could have found my way on a far darker night' (Dickens 1861 (2010 repr), 459).

The author Iain Sinclair (b.1943) is similarly frustrated in his attempts to walk across Grain to reach the London Stone (Sinclair 2009). The object of his journey is often visible but

not easily reached, and his journey is frustrated by both the lack of a clear path and 'Keep Out' signs.

The archaeologist Stephen Rippon highlighted how an outsider may come to an area 'with a range of preconceptions and prejudices' (Rippon 2009, 51). Yet accounts by outsiders are more common than those made by members of the local community (ibid). Edward Hasted owned land round Rochester (and may have lived in Cliffe for a while (Historic Area Research Report, forthcoming)) but his main residences in Kent were in Canterbury and Sutton-at-Hone. Can his negative comment on Hoo in his *History of Kent* be seen to reflect the local view? Hasted certainly did undertake fieldwork himself (Thirsk 2004) and though he may have travelled around Hoo, he also relied on local informants to complete questionnaires. Whether first hand or not, his method of working does suggest some local views are expressed in his work. However, his correspondents were from the gentry, lawyers and parsons so although these views are 'local', they do not reflect all levels of society on Hoo and, if Defoe and Hasted are to be believed, represent the views of that section of society who chose not to live on the peninsula.

The protection of the low-lying landscape of Hoo through the construction and maintenance of sea walls and drainage ditches does give an indication of how this landscape was perceived and valued by those who owned and worked the land as opposed to those observers with less direct involvement on the ground. These works were high cost, and high risk in terms of potential flooding, but created a landscape that could offer high returns (Rippon, 2009, 51). As Bowler explains for the Thames marshes of north-west Kent, 'Marshland is given value by its use; if its maintenance cost[s] more than the returns to be obtained from it, there would be little reason for perseverance in drainage schemes' (Bowler 1968, ii).

An empty landscape

A recurring theme in these accounts is the emptiness of the landscape, not just in the sense of it being featureless, but also reflecting the lack of people. As shown above Dr Thomas Johnson emphasised the feeling of emptiness or loneliness he experienced through the absence of any signs of habitation, not even the barking of a dog. In a series of quotes from *Thames: Sacred River* Peter Ackroyd's despondent view of the landscape is related to the lack of people:

> 'This land was largely uninhabited and uninhabitable. As such it exerts a primitive and still menacing force, all the more eerie and lonely because of its proximity to the great city'

> 'walking alone by the shores of the estuary, it is possible to feel a great fear – fear of the solitude, fear of being abandoned'

> 'And it is wild – or, rather, it has traces of wildness about it. This is not the wilderness of nature, but the wildness of desolation. It is not a human place. You can walk along the river wall of the Hundred of Hoo for miles, between the river and the grass, without encountering anyone at all.'
>
> (Ackroyd 2007, 396-7).

Ackroyd's response to the unpopulated feel to the marshes of the Thames estuary is also felt by Belloc, he saw the marshes along the estuary 'without a soul upon them, unbroken by tree or house or hedge' as having a 'character of desertion, silence, and morass' (Belloc 1912, 22). But despite the sparsely populated nature of the marshes, Hoo wasn't uninhabited. The census taken the year before (1911) gives a total population of Hoo as 6417 (2,465 of whom lived in the Thames-side parish of Cliffe) (MacDougall, 1980, 179).

As noted above the 18th century writings of Hasted and Defoe highlight the sparsely populated nature of Hoo as a whole, not just the emptiness of the marshes. Hasted in particular emphasises that this is a landscape that is not just empty, it has been abandoned: 'Formerly it used to be noted for the wealth of the yeomen who inhabited it, but there are now few but bailiffs and lookers who live in it'. He described Cliffe as 'daily growing into further ruin and poverty, the number of the inhabitants lessening yearly, and several of the houses, for want of them, lying in ruins' (Hasted 1797, 499).

These accounts of a sparsely populated landscape may give an insight into why the Privy Council viewed the area as a suitable one to operate quarantine in the early 18th century. Certainly their decision regarding the area where ships were to be held seems to have been made with no regard for the local inhabitants. Free fishermen paid £100 a year for the right to dredge for oysters in the creeks that were chosen to hold ships in quarantine. That it was only after ships had been held in quarantine in Stangate Creek for a number of weeks that Customs Commissioners were asked to arrange a buyout (by which time the oysters had already been ruined) (Booker 2007, 32) does suggest at best no knowledge of these fishermen or their rights, if not a complete disregard of them. Goods also had to be aired as part of quarantine and in 1709 it was originally intended for these airing grounds to be established on The Isle of Grain. That this would have impacted on the inhabitants of Grain is implied by the money demanded in compensation by the owner, in part for 'the inevitable flight of tenants from their farms' (Booker 2007, 31). Ultimately Hoo Island was used for airing goods and while the peninsula was far enough away from London for the Queen and the City (Booker 2007, 30); this choice was not without opposition from the Medway towns.

How much the view of Hoo as an empty, despondent and melancholic landscape influenced the decision to use the peninsula as a dumping ground for London refuse before the First World War and another proposal to use Stoke Saltings as a dump for

London refuse in the early 1980s (MacDougall 1980, 166) is not known. But the key point here is that Hoo clearly was considered by London's waste disposal administrators as an area suitable for such activity: that is certainly telling of their perceptions and attitude to the Hoo Peninsula.

For some, by the mid-20th century the 'emptiness' of Hoo's marshes was no longer perceived as an indicator of an unhealthy situation, a barbarous country or a wilderness but instead was its virtue. Writing about Hoo in 1948 Richard Church said 'This compact of country is cut off from the main stream of life even to-day, and I recommend it to folk who are in need of space and silence and solitude.…Bird life abounds here' (Church 1948, 232). Robert Goodsall who journeyed along the Medway recommends a visit to Hoo and highlights the 'pleasing views of the river across the marshlands and saltings', 'an enchanting prospect if the river is fine' (Goodsall 1955, 230). The marshes along the north coast of Hoo and on the Isle of Grain (and the wildlife which inhabited them) were celebrated in the Home Counties edition of the *About Britain* series printed for the Festival of Britain (Fitter 1951, 54-55).

Even Peter Ackroyd, who when on the marshes finds it 'hard to imagine a more desolate landscape' then acknowledges that 'it has its own beauty: 'it is the home of sea lavender and golden samphire, and of the flowing salt marsh grasses; its creeks and pools are fringed with sea-aster. And there are the endless birds, the ducks and heron and geese and curlews, the sandpipers and plovers and redshanks, that love the loneliness of the marshes' (Ackroyd 2007, 396).

The emphasis on the birdlife on Hoo can be heard in the Thames Estuary Recordings which form part of the London Sound Survey. They are 'recordings made along the Kent and Essex sides of the Thames estuary, capturing the sounds of industry, marshland, and towns' (http://www.soundsurvey.org.uk/). To date, four recordings have been made on Hoo and while industry is present in the form of distant sound on some of the recordings it is birdsong that predominates.

Clearly 'remoteness' was generating divergent values in post-war Britain, those celebrating the sense of spiritual enrichment and the natural environment benefits emerging in parallel with those viewing 'remote emptiness' as rendering the area eligible for uses too unsafe, noxious or unsightly for most to want on their doorstep. Work began on the building of an oil refinery on the Isle of Grain in the early 1950s which had, by 1964, expanded to be the second largest refinery in Britain, occupying almost a third of Grain. This new feature in the landscape was lamented, 'the real remoteness of the place has been lost since the oil refinery arrived' (Newman 1976, 299). However, in some respects the sense of emptiness remained. Oil refineries, despite occupying large areas are largely automated and as an industry employ a relatively small workforce for their size (Burn 1958, 187). In *The Tower*, a documentary film on the building of the refinery (Pickering & Ingram 1953), exclusion from the site is illustrated with a montage of shots showing the closing of a gate, a restricted access sign and shots of the refinery seen through the perimeter fence. A

similar refinery on the other side of the Thames from Grain was twice used as the location for the 1950s science fiction drama *Quatermass 2* (filmed first by the BBC in 1955 and followed by a Hammer production in 1957). The appeal of a refinery as location for this drama was partly its modern high tech appearance (Hunter 2002, 53) but the apparently unpopulated nature of these sites may have given them an uncanny feel. The use of oil refineries in science fiction certainly reinforces the notion to the viewer that these are otherworldly landscapes. This may be true of a number of industrial sites and it was another oil refinery on Hoo, Berry Wiggins at Kingsnorth, which was used as the location for an episode of the BBC science fiction series Dr Who in 1970.

The construction of the UK's only automated port on part of the demolished refinery site can be seen to preserve the relatively unpopulated nature of this area, as does the remaining fenced-off area of the demolished refinery and it could be imagined that the ghost of Dr Johnson could return to this part of the Isle of Grain and still not see a soul.

The shadow of industry

The construction of the BP refinery on the Isle of Grain in the early 1950s appears to mark a change in how the peninsula was perceived. When Richard Church was writing about the space, silence and solitude of the marshes in 1948 he was ignoring the presence of a number of industrial sites on Hoo including an oil refinery at Kingsnorth, oil storage on Grain and the cement works at Cliffe. So although the Grain refinery, which began processing crude in 1953, clearly didn't mark the beginning of industry on Hoo, it did mark a change in what was widely perceived as the dominant character of that area. The wide reach of its influence can be seen in the following description from 1955:

> 'the isle of Grain...now given over to the vast oil industry which has invaded the tip of the peninsular [sic]. This vast undertaking, the Anglo-Iranian Oil Refinery, is now in being but when I first visited Grain it was just beginning to take shape, changing the whole character of the area; a change destined radically to affect the lives of the former sparse population. Nearby villages, Grain, Stoke, Allhallows, High Halstow, and others farther away, must continually grow out of all recognition to house the Refinery workers in their new surroundings. I talked of this to the young incumbent of Stoke who had but recently come to work in the parish. He was under no illusions as to what the change would mean to both his ministry and the area'. (Goodsall 1955, 231).

It appears that BP were sensitive to sentiments such as this and in an official history of the company published in 1959 present a more harmonious image; 'if ever an £80 million oil refinery could hide itself unobtrusively from the public eye, this is it. Green meadows surround the fence; swans nest in the water reservoir and duck fly in on winter evenings; and nearly five hundred sheep graze contentedly on the grass banks between the storage tanks' (Longhurst 1959, 168).

The idea that the refinery may not have been welcomed by every inhabitant of Grain is addressed in one of the short films about the building of the refinery commissioned by the oil company. This documentary, entitled *The Island* (Pickering & Ingram 1952), was made in 1952 and includes a range of voiceovers offering different opinions on the coming of the refinery. They are the supposed views of an oil tanker crew member, building contractor and employee of the oil company. Although a documentary, the script was written by one of the filmmakers and it is not clear if any of the opinions expressed are genuine. Local opinion is represented by the voice of the vicar, a representation strongly reminiscent of many much earlier historical accounts. He is wary of change but unsurprisingly, given that this is a sponsored film, eventually accepts the arrival of the refinery. This endorsement by a fictional clergyman may provide the context for Goodsall's inclusion of a more downbeat view of the arrival of the refinery from a local vicar in the quote above.

Objections to the influx of industry along the Thames estuary and the conflicting landscape perceptions it generates are evident from the words of Hilaire Belloc in 1912: 'modern industrialism…has captured the lower Thames and stands in a bleak contrast against the windy emptiness of the flats. Nowhere is one more oddly struck by this than opposite the great tanks which have been put up for the storage of petrol' (Belloc 1912, 30-31).

The peninsula, in particular along the Medway coast, was further industrialised during the 20th century with the building of two power stations. Their scale can be inferred from the following facts; Kingsnorth power station (1963-1973) was unique in being the only dual-fired power station in Great Britain and the largest in Europe and Grain power station (1971-c.1980) was claimed to be the largest oil-fired power station in Europe (Guillery & Williams 1995).

Contrasts and convergence

Hilaire Belloc was not the first to feel that the marshes had a 'character of desertion, silence, and morass' (Belloc 1912, 22), but as we have seen he was also unimpressed by the creep of industry along the estuary. The coexistence of both marsh and industry along the estuary forces him to choose between the two. The presence of industry is a 'new sort of desolation. The obverse (and not a pleasant one) of that more natural desolation which Nature made by stretching out her marshes and lagoons upon either aside of the tideway' (Belloc 1912, 31). While not an effusive endorsement of the marshes - no golden samphire or sandpipers for him - Belloc does see them as preferable to oil tanks. He also introduces to perceptions of Hoo the notional contrast between 'Nature' and the 'hand of man', overlooking the roles of land reclamation and salt production in the extent and character of the marshes and lagoons he sees.

Belloc's comment is one of a number of 20th century texts in which a gradual appreciation of the marshes can be seen as a response to the growing industrialisation

along the rivers Thames and Medway. John Newman felt that the BP refinery destroyed the 'remoteness' of Grain (Newman 1976, 299) and at Kingsnorth power station he felt that the 'thumping great chimney ruins the scale of the marshes and their intricate pattern of lagoons' (ibid, 332). In the early 1950s areas of marshland that had not been built upon were valued as the survivors of a once common landscape type (Fitter 1951, 54-55). Belloc went as far as viewing the marshes as a survival of the landscape along the estuary as it must have been 'at the beginning of our history' (Belloc, 1912, 19). But the marshes are not a natural landscape; they are the result of a long history of land reclamation, sea wall construction and repair and the provision and maintenance of efficient drainage. Charles Dickens describes the marshes as a 'dark flat wilderness' but then continues his description, 'intersected with dykes and mounds and gates, with scattered cattle feeding on it'. The land may be sparsely inhabited but all the elements listed by Dickens (dykes, mounds, gates etc) are elements of a managed landscape not wilderness.

The value of these undeveloped areas was partly in the wildlife that they supported. Richard Church commented on the bird life on Hoo (Church 1948, 232) and the examples of marsh listed by Fitter were 'all of them important for the naturalist' (Fitter 1951, 55). Recognition of the value of the marshes in supporting wildlife and the threat from development (the BP refinery had been built on marshes only a few years before) can be seen in the proposal to establish a National Nature Reserve on High Halstow Marshes in 1955. Today large areas of Hoo are recognised for their importance as wildlife habitats and are designated accordingly (http://www.naturalengland.org.uk/). These values of this landscape are also now reflected in the organisation *Greening the Gateway Kent and Medway* which works in partnership to promote the sustainable regeneration of North Kent and Medway through the development of green infrastructure (http://www.gtgkm.org.uk).

Despite this recognition of the importance of the marshes, mention of the Hoo Peninsula can still evoke an entirely different set of images predominantly associated with 20th century industry. The lofty power station chimneys on the Medway and the remaining parts of the refinery at Grain contribute to a modern perception of Hoo as an industrial landscape. The art project *Soundings from the Estuary* includes a soundtrack made up of ambient and composed sound played while viewing a photograph of marsh and industrial storage tanks on the Isle of Grain. In contradiction to the Thames Estuary Recordings which are dominated by birdcalls, this constructed soundtrack is predominantly industrial in feel (http://www.soundingsfromtheestuary.com/islesofgrain.html). But the impact of industry is not consistent across the peninsula and the industrial character of the Thames-side marshes, despite the well-preserved remains of the Cliffe explosives works, is less pronounced than along the Medway. One of the criticisms of the mid-20th century industries on Hoo was that they were out of scale with their surroundings and it can be argued that their monumental size has come to disproportionately dominate perceptions of this landscape. This is underlined by the Historic Landscape Character assessment of the peninsula which revealed that only 7% of its land area is industrial in character (Bannister 2011).

Perceptions of industry on the Hoo have also been positive. An appreciation can be seen in the following description of the refinery on Grain: 'its chimneys, gleaming metal storage tanks and miles of convoluted piping' created 'an example of modern industrial landscaping hard to equal' (Matthews 1971, 142). Even Newman who wrote so negatively about the design and grouping of the refinery buildings admitted that 'the gleaming metal storage drums are splendid objects in themselves' (Newman 1976, 299). The larger buildings of Grain power station (architects Farmer & Dark) have a number of distinctive design features, such as curved eaves and pitched roofs, intended to lessen the visual impact of the site (Guillery & Williams 1995). This is reviewed positively (in a circumspect way) by Newman (Newman 1976, 332). The importance of industry is also seen in the shock and anger that met the decision to close the BP refinery in the early 1980s (Townsend 1981, 15; Anon 1981, 15).

Although most of the 20th century writers set the marshes in opposition to industry, they are both integral to the same landscape and shaped by its cultural development. The differing emphases of one aspect over the other to a dominant role in present character reflects the many ways a landscape can be perceived but also shows the strengths of 'landscape' as a concept, connecting and giving perspective to such diverse viewpoints. The inter-relationships between industry and natural environment conservation can be seen well in the water filled quarries of Cliffe's former cement works which now form Cliffe Pools Nature Reserve. The blurring of distinctions between these different elements of the landscape and the greater acceptance of once new, now inherited, landscape features, are shown by their common descriptive vocabulary in which words such as desolation, bleak, redundant, forgotten and abandonment, originally used to describe the marshes, are now also applied to industry and the industrial remains on Hoo.

3 'WORKING AND TRAVELLING' – HOO'S INDUSTRIAL LANDSCAPE AND INFRASTRUCTURE

How did industry and infrastructure change Hoo's character?

The industrialisation that occurred on Hoo in the 19th and 20th centuries can be seen as part of a wider expansion of industry in this region. This period saw an eastwards movement of industry away from London along the Thames Estuary (Barson et al 2006, 80) and the second-half of the 19th century was a period of intensified industrialisation of the Lower Medway Valley (Preston 1977, 65). Many of these industries can be seen to be part of what is sometimes termed the Second Industrial Revolution. This was based on new technologies such as electricity, new communication technologies such as radio and new materials or substances including oil, chemicals and Portland cement and it created the biggest concentration of industry in Kent (Preston 1977, 68).

The growth of London and other cities and towns during the second half of the 19th century stimulated brick making and cement production along parts of the Thames and Medway and this area became the centre of the Portland cement industry. In terms of the distribution of cement production works, Hoo was on the periphery. Cement works tended to be sited near supplies of chalk and were found along the Thames between Deptford and Cliffe; Cliffe being the only area on the peninsula which had both chalk and clay. On the Medway, cement works were concentrated near the chalk deposits around Frindsbury and further upriver. In contrast, clay extraction for the cement industry had a much greater impact, still evident in the Hoo's coastal landscape and seascape. From the middle of the 19th century clay was dug out in vast quantities. Some of the water filled pools on Cliffe marshes are the result of mud digging for the Cliffe cement works while cement works in and around Frindsbury took mud from the saltings from both sides of the Medway between Hoo and Stoke. This digging destroyed a large area of saltings and dramatically changed the coastline. Although Hoo had some clay, most of Medway's brickworks were on the south side of the river with a smaller concentration around Frindsbury. The peninsula's major 20th century brickworks was at Hoo St. Werburgh.

The attraction of the marshes was not restricted to its raw materials. They also offered a level, open and relatively uninhabited landscape with good river access where industries could be established. The industrialisation at Cliffe which began with the cement works continued at the end of the 19th century with the construction of a facility for the storing and packing of gunpowder, which was soon converted to a chemical explosives factory (Pullen at al forthcoming). The 19th century and early 20th century industrial works were centred on the north side of the peninsula at Cliffe, but developments from around the time of the First World War onwards saw a move south, away from the Thames to the Medway side of the peninsula.

For much of the 20th century the main industry on the banks of the Medway was oil storage and refining which was carried out there between 1908 and 1982. The

concentration of these industrial sites on the southern rather than the northern coast of the peninsula is in part due to the deep anchorages offered by the Medway, particularly on the south coast of Grain. While the advantages of river transport were important for the movement of bulky and cheap goods such as bricks and cement it was essential for the delivery of oil which was brought from overseas via tankers.

The presence of decommissioned sites influenced where new industrial sites were established. In the early 1930s Berry Wiggins & Co established an oil refinery on the former Royal Naval Air Service (RNAS) Kingsnorth site and reused many of the naval station's buildings and structures including a short jetty. This however was not well placed to utilise the deep Medway channel and within a few years Berry Wiggins had to construct a 2.5km long jetty. Another industry reusing part of this RNAS site that appears to have had problems with river access was a wood pulp factory. Trials to pulp wood for the paper industry were undertaken at Kingsnorth in the 1920s (Smith 2008, 11). This was carried out in the hangars and a large straight sided pond was dug beside the southern hangar to hold the logs. Construction was not completed though and a straight channel, possibly a log flume which extended south of the pond towards the river was left unfinished, the earthworks petering out on marshland north of the Medway (Fig 2). A short section of this survives in the open area between Kingsnorth power stations.

In the 19th century the growth in the cement and brick making industries had a positive effect on barge building and engineering, both of which expanded to meet their needs (Preston 1977, 66). In the mid-to-late 20th century the existence of the oil industry was a factor in the siting of oil-fired power stations on the southern part of the peninsula. The station at Grain initially received its fuel from the adjacent BP refinery while Kingsnorth power station shared jetties with the Berry Wiggins refinery. The railway on Hoo that runs along the southern side of the peninsula is another piece of infrastructure which attracted industrial development to this part of Hoo. Though used by the industries it was not built for them but was part of a failed attempt to establish a passenger terminal on Grain (MacDougall 1980, 130). The attraction to industry of available land, good anchorages and road and rail links is reflected in the construction of the container terminal at Grain on part of the brown field site left after the demolition of the refinery in the late 20th century. In contrast, the site of the explosives works at Cliffe, which closed after the First World War, was not redeveloped and the area has reverted to grazing. Cement manufacture continued at Cliffe until the1970s but this and the gravel extraction industry that operated there has left large water filled quarries whose character is no longer industrial: they are now managed as a nature reserve reflecting their value in today's landscape as assets for natural environment conservation.

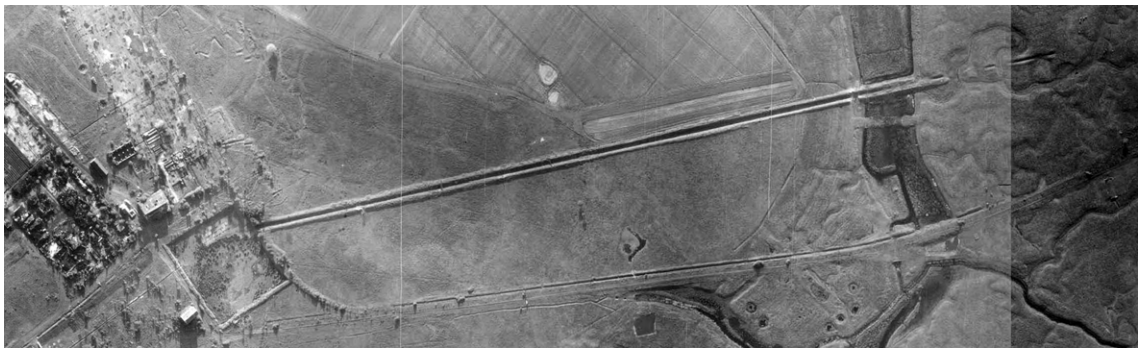

Figure 2 The log pond and water channel or flume associated with the wood pulping trials at Kingsnorth. These earthworks are incomplete and end a few hundred metres short of the river. Composite of details of RAF 58/856 3103, 3137, 4139 24-Apr-1952 English Heritage RAF Photography.

Hoo's energy industry

Electricity

Hoo's energy industry is monumental in scale and the 20th century power stations built on the peninsula at Kingsnorth (built 1963-1973) and Grain (built 1971-1982) are huge structures. Despite the strong association between cooling towers and power stations (Farley & Roberts 2011, 185), they are not required for stations situated on the coast or river estuaries. On Hoo there is no requirement for the power stations to cool the water before returning it to the Medway as it has a minimal impact on the temperature of the large volume of water at this point in the river. In the absence of cooling towers, the most obvious features of Hoo's power stations are the chimneys which are visible for miles around. Kingsnorth's chimney is 198.5m high while Grain's reaches 244m and was the second highest in Britain when built. Made of concrete, it is 20m in diameter widening to 40m near the base. Grain's boiler and turbine house block is almost half a kilometre long and its pump-house is incorporated into a coffer dam which, at 70m in diameter and 30m deep, is one of the largest in the world (Guillery & Williams 1995). Both power stations were built by the Central Electricity Generating Board (CEGB) and represent an era of large power station construction, their size reflecting increased output made possible by technical advances in boilers and generating units. Grain's original 3,300MW output can be compared with the power station at Deptford built 1888-90. Deptford, considered the most important of the early power stations on the Thames had an output of 2.8MW; a brick chimney stack 45m high and when built was of an 'unprecedented scale' (ibid).

Power stations have been a prominent feature of the Thames riverside east of London since the late 19th century. These early coal-fired stations were built close to the river which provided both access for sea-going colliers and water for cooling. They were also built close to centres of population where the electricity was needed. In 1926 these

private or municipal power stations were brought under the direction of the state with the formation of the Central Electricity Board which created the National Grid and its network of pylons. This meant that power stations no longer needed to be built close to centres of consumption. In the south-east of England this allowed the spread of larger power stations further east along the Thames and onto large and remote sites (Guillery & Williams 1995). The initial expansion was undertaken after the Second World War under the newly nationalised electricity industry. Both Kingsnorth and Grain belong to a subsequent generation of yet larger oil-fired power stations which, though not on the Thames, can be seen as part of this movement of power generation eastwards of London.

Placing these power stations on the coast meant they had to be built on marshland situated below sea level. As a result, before building commenced the ground had to be raised, by 2m at Kingsnorth and by 1.2m at Grain. Both stations reflect the change from coal to oil as a fuel which began in the late 1950s. Grain was built next to the BP refinery, from where it originally received its fuel, and was the largest oil-fired power station in Europe. Kingsnorth is dual-fired (coal and oil) and was the largest example in Europe and the only one in Britain (Fig 3). The Medway provided access for sea-going oil tankers (two jetties were built to serve Kingsnorth) and its water was used for cooling. At Kingsnorth the coastal topography was utilised and cooling water taken from the Medway to the south of the station was discharged into Damhead Creek to the north-east which then flows back in to the Medway 3km east of the inlet and avoiding any risk of mixing with cold water at the intake (Guillery & Williams 1995).

Figure 3 Kingsnorth power station. Detail of 26477/011 8-Sep-2009 © English Heritage.

While the design of Kingsnorth is largely functional and criticised in the Pevsner *Buildings of England* series (Newman 1976, 298), Grain, designed by Farmer & Dark (Fig 4), marks a 'return to monumentality' (Guillery & Williams 1995). The steel-framed turbine house has walls clad in concrete panels and stucco-embossed aluminium sheets. The main building has curved eaves, sloping roofs and a distinctive 'jellymould' roof profile to soften its bulk. In 1977 *Building Design* described it as 'the Chartres of the genre, one of the greatest in Europe' (Guillery & Williams 1995).

When the industry was nationalised in 1947 there were 300 power stations. Stations built during the following 30 years were of an ever-increasing size and by 1980 less than 100 were providing four times the output of the original 300. Many of these post-Second World War stations are now nearing the end of their operational lives but will not be replaced by similar sized plants. This means that the power stations built at the end of this period represent the last of the monumental power stations and Grain's size and design make it a notable example. Since the 1990s small gas-fired stations with lower outputs have been built instead (Stratton & Trinder 2000, 39) and at both Damhead Creek and Grain the small gas-fired plants are hidden in the shadows of their vast neighbours.

Figure 4 The oil-fired Grain power station at the centre with the smaller gas fired station in the foreground. Detail of 24065/13 23-Aug-2005 © English Heritage.

Oil

Although British coal was the principle source of energy in Britain for most of 20th century (Stratton & Trinder 2000, 19), oil began to challenge coal's near monopoly as Britain's main source of fuel in the early years of the 20th century (Cooper 2011, 33). This was when the Royal Navy began switching from coal to oil as a fuel and the increased demand for motor spirit and oil for ships was evident by 1900 (Stratton & Trinder 2000,

33). Coal was also superseded by oil in the provision of feedstock to the chemical industry; in 1950 only 6% of chemical works production depended on oil (Stratton & Trinder 2000, 85); by the 1960s oil had become the key raw material (ibid, 86). British oil consumption rose from 10 million tonnes in 1946 to 103 million tonnes in 1970 (Anon nd, 6); by which date nearly 50% of Britain's primary energy was supplied by oil (ibid).

Nationally the oil industry did much to define the 20th century. By the century's end the global economy was almost entirely dependent on oil and its by-products (Cooper 2011, 34) and oil refineries were the source of many of the products that shape our daily lives (Stratton & Trinder 2000, 35). Although the limited supply of inland crude oil in Britain was supplemented by North Sea oil after its discovery in the 1960s, the main source comes from overseas. Until the mid-1940s most of this was refined abroad and oil imports consisted predominantly of refined products. In 1912 the author Hilaire Belloc writing about the Thames commented that 'modern industrialism…has captured the lower Thames and stands in a bleak contrast against the windy emptiness of the flats. Nowhere is one more oddly struck by this than opposite the great tanks which have been put up for the storage of petrol' (Belloc 1912, 30-31). On the Hoo Peninsula it was the Medway coast that became the site for a variety of oil industry sites, initially focussed around the fledgling rail and ferry terminal at Port Victoria. Their subsequent development represents well the various aspects of the 20th British oil industry.

The switch to oil

From 1908, a group of fuel tanks was erected by the Admiralty on the Isle of Grain (Fig 5) (MacDougall 1980, 156). Unlike the coaling yards, these fuel tanks were not situated within a naval dockyard. Although availability of land may have been a consideration in deciding where these were erected it seems likely that the deep water anchorage available on the south side of Grain was also a factor.

As this was a military site and consisted of oil tanks - two classes of site that were not depicted by the Ordnance Survey for reasons of national security - its exact development cannot be understood from map evidence alone. There is however some evidence of a phased development of this site. Some drainage channels had been truncated or removed by 1931 and further channels filled-in and the farm buildings at Red Wick demolished by the 1940s presumably as the site was extended. Aerial photographs taken by the RAF in 1946 show that the site had grown to 40 oil tanks with associated buildings and jetties within a site over 800m in length. This site was enclosed and subdivided by embankments and connected by a track to the road on Grain Wall a little to the south of Wallend.

Figure 5 Admiralty fuel oil station on the Isle of Grain in 1950 (composite detail of RAF 540/393 PO20-23 30-Jul-1950 English Heritage RAF Photography.

The Royal Navy's gradual shift from coal to oil was controversial as the limited domestic supplies of oil meant Britain's naval capability would be based on a foreign fuel. Concern about the supply of oil to the navy led to the government investing in the oil company Anglo-Persian (a forerunner of BP) with a voting interest of just over 50% in 1914 (Longhurst 1959, 52). Despite the potential problems of supply, the adoption of oil was driven by the many advantages it offered to the navy. These included greater speed, a greater radius of action, the ability to refuel ships at sea and the absence of smoke from the chimney which could give a ship's position away.

This Admiralty site is typical of many oil industry sites in Britain up to the end of the Second World War in that it was a 'tank farm' whose function was to store an imported finished product. Up until the end of the Second World War relatively little crude oil was refined in Britain and most oil products were imported ready for use; for example just 6% of the total amount of petrol used in Britain in 1938 was refined domestically. Crude imports made up a small fraction of the total imports of oil but even these were usually partially refined (Burn 1958, 180, 181; table 8). Exceptions to this pattern included bitumen and lubricating oil; domestic production of both of these was undertaken due to the high cost of transporting the finished product compared to the cost of transporting crude (Burn 1958, 183).

Small scale refining between the wars

The first oil refinery was established on the peninsula in 1923. The Medway Oil and Storage Company (MOSCO) acquired 132 acres from the South Eastern Railway. This land was to the north-west of the Admiralty fuel oil station. Headed by the American Charles Francis de Ganahl until 1928, the site had facilities for storing, refining and marketing petrol products. It was connected by road and rail and had a jetty onto the Medway at which tankers could moor. The site consisted of a loose grouping of buildings, refinery units and storage tanks between the railway line and Greatchalk Fleet (Fig 6).

Figure 6 The buildings and plant of the Medway Oil and Storage Company. (Copy held by Medway Archives and Local Studies Centre DE402/22/10).

Potential dangers at oil refineries can be illustrated by two incidents at MOSCO during the 1920s. The most devastating was an oil tank explosion in 1925 which killed three men and injured five and which shook houses three miles away in Sheerness (Anon 1925, 19). Two years later a fire destroyed the barge *Irex* and damaged the jetty she was moored against while unloading coal. The fire was the result of an unfortunate series of events in which the oil tank steamship *Scottish Borderer*, moored above the *Irex*, illegally pumped out her bilges which contained some oil. This oil was ignited when a MOSCO craneman was clearing out clinkers from his crane and a live coal fell into the river (Anon 1927, 5).

MOSCO was one of the few independent companies operating at a time when retail trade was dominated by The Petroleum Distributors' Committee, a group formed by the so-called 'national' companies (Burn 1958, 192). As an independent, MOSCO attempted to undercut the nationals by selling its petrol, marketed as Power Petrol, at a lower price (in 1927 Power Petrol was 2.5d (1p) a gallon cheaper than Shell). The disparity in price between Shell and Power Petrol proved too much of a temptation for Frederick Deats, the owner of a filling station at Burgh Heath, Surrey. In the summer of 1927 he was seen pumping Power Petrol into the Shell storage tank and when the fuel he sold as Shell was tested it was found to be a mix of two different fuels and he was fined the following year. Surprisingly the chemist who analysed the fuel was employed by Shell and it is not clear if his conclusion that Power Petrol was 'a "cracked" spirit of an inferior grade, with poorer starting quality and lower running power' (Anon 1928, 9) was an entirely unbiased one.

Power Petrol could probably be sold so cheaply because MOSCO bought its crude at a low price from the Soviet Union. The USSR had its own subsidiary in England, Russian Oil

Products (ROP), which sold its products far below market price and this led to an attempt by western oil companies to boycott Soviet oil (Labban 2008, 98). During the 1920s Power Petrol suffered from this anti-soviet feeling as it refined Soviet crude, and the company had a Russian sounding acronym. In the summer of 1928 the company was forced to publish an 'Important Notice' in *The Times* (de Ganahl 1928, 8) emphasising that they were contractually obliged to buy this oil - 'contracts binding under the laws of His Majesty's Government' - presumably signed as part of the Anglo-Soviet trade agreement . They emphasised that there was no Soviet money invested in the company. They were also to pay a percentage to those 'who may justifiably claim former ownership to Wells from which the oil so supplied may be derived' – a reference to the seizing of private companies after the revolution little more than a decade earlier; the restoration of confiscated property being the main aim of the boycott of Soviet oil (Labban 2008, 98). These issues also provide the context in which a Power Petrol advert the following year made the relatively rare claim their petrol was 'Produced in England by British Labour' (Anon 1929, 19).

The second inter-war refinery on Hoo was owned by Berry Wiggins & Co, which opened in 1931 and primarily produced bitumen (Fig 7). The refinery utilised the former RNAS station at Kingsnorth which had closed in 1920; it reused a number of buildings and built the oil tanks to the east of these. Berry Wiggins also used an existing jetty onto the Medway but this proved inadequate and was superseded by Bees Ness Jetty to the east which opened in 1937 (Fig 8). This huge jetty runs for 2.5km over Stoke Saltings and Stoke Ooze to the deep channel of the Medway and was still recorded as the longest jetty in Britain in 1995 (Matthews 1995, 103). It survives but is derelict (Fig 9).

Figure 7 Berry Wiggins & Co oil refinery in the 1930s. Detail of Aerofilms EPW047583 © English Heritage.

A third oil installation on Hoo in use between the world wars was situated on the Isle of Grain. Unlike MOSCO (and perhaps in response to MOSCO's difficulties), there was no ambiguity in its name. It was the Britannic Oil Storage Company and some of the oil storage tanks on the south-eastern side of the Isle of Grain may have belonged to the company. The storage of oil, which was typical before the Second World War, became *de facto* the oil industry in Britain from April 1941 when oil refining was suspended (Stratton & Trinder 2000, 34). The war years also saw the beginnings of a network of oil pipelines built across Britain. This was continuously extended and by 1999 most oil products were taken to regional distribution depots via this network (ibid). By 1942 a group of 22 storage tanks buried under mounds of soil in an attempt at camouflage had been built on the Isle of Grain (Fig 10). These connected to this oil pipeline network and to the pipeline known as PLUTO, laid to continental Europe to supply the allied armies after D-Day.

Figure 8 Bees Ness Jetty opened in 1937 for Berry Wiggins oil refinery. At 2.5km it is the longest jetty in Britain though it is now derelict. Composite detail of RAF 1906G/UK/1444 3034-5 3037 1-May-1946 English Heritage RAF Photography.

Figure 9 Collapsed section of Bees Ness Jetty. Detail of 27196/023 31-Aug-2011 © English Heritage.

Figure 10 Buried oil tanks on Grain built during the Second Word War. They were later incorporated into the BP refinery built there. RAF 540/393 PO-28 30-Jul-1950 English Heritage RAF Photography.

Post-war expansion of oil industry

Britain's economic plan for 1948-1949 included a substantial programme of oil refinery construction (Anon 1948a, 4) while the Anglo-Iranian Oil Company (later BP) had already announced its intention to build a refinery in Kent (Anon 1948b, 7). The proposals were for a large facility on the Isle of Grain to meet the growing demand for petroleum products. Construction of this huge refinery commenced in the early 1950s and an indicator of its size is that it incorporated the Admiralty oil storage, MOSCO, Britannic Oil Storage and the wartime buried storage tanks. Before the refinery was built a huge programme of civil engineering was undertaken which involved the filling-in of fleets and channels and the alteration of the coastline including the enclosing of a bay to create a reservoir. Approximately 1000 construction workers were housed in a purpose built camp on Grain. This and many other aspects of the site can be seen in the two films produced by the oil company about the building of the refinery *The Island* and *The Tower* (Pickering & Ingram 1952 and 1953). Where possible the refinery was laid out on a regular grid though this pattern was interrupted by the pre-existing oil installations. Within this grid were the various component parts of a refinery including distillation units, catalytic cracker, lubricating oil production as well as the numerous storage tanks. The Kent Refinery (as it was known) processed its first crude in 1953 and continued to expand to become by 1964 the second largest refinery in Britain which occupied almost a third of the Isle of Grain (Anon 1964, 16) (Fig 11 and Fig 12). The increased demand for housing for the refinery workforce had an impact on some of the settlements of Hoo and led to the proposal for the building of a New Town at Allhallows (see Chapter 5).

Figure 11 Grain refinery and power station in August 1978. Composite of OS/78123 67, 70, 72; OS/78125 224, 226,260, 262, 264 17/18-Aug-1978 © Crown copyright. Ordnance Survey.

Just 20 days before going on stream Hoo was hit by the 1953 North Sea flood on the night of 31 January – 1 February which affected the east coast of Britain, Belgium and the Netherlands. Hoo's sea defences were breached or overtopped at a number of locations and the refinery was inundated. The refinery construction workers living on Grain in the temporary labour camp repaired the sea wall. The inundation appears to have affected the final layout of the refinery as flooded areas being prepared for storage tanks on the north-eastern edge of the site were subsequently abandoned; the earthworks of these survived until the mid-1970s when work began on Grain power station. Despite the floods, the first crude oil was processed on schedule.

Figure 12 BP refinery jetties on the Isle of Grain in1953. The tanks on the left were formerly part of the Admiralty fuel oil station. Floodwater can also be seen amongst some of the buildings. RAF 540/1017 118 5-Feb-1953 English Heritage RAF Photography.

The major post-war refineries on the Hoo attracted other industries and it began to develop into a new industrial centre. In 1957 Segas set up a plant adjacent to the Grain refinery to produce gas from petroleum products (MacDougall 1980, 158). This was followed in 1960 by a petrochemical plant, a joint venture by British Petroleum and California Chemicals known as BP California, using oil by-products for synthetic fibres. However the most significant development was that of power generation. When the Central Electricity Generating Board started to build a new generation of power stations in the 1960s both Kingsnorth and Grain were selected as locations.

Contraction of oil industry

The 1970s showed some signs of the further expansion of the oil industry in Britain. Britain's own oil fields in the North Sea came on stream in 1975 and the first oil from there was pumped to the Isle of Grain refinery in June of that year (Vielvoye 1975, 27). In 1976 planning permission was given to Burmah Total to build an oil refinery on 360 acres of Cliffe marshes; the plans given the final go-ahead in 1981 'after 10 years of debate' (Anon 1981a, 17). But during the same period, the 1973 oil crisis resulted in a massive decline in demand for oil. In an attempt to minimise the rising cost of petrol, many oil companies were threatening to load price increases onto heavy fuel oil which was used by

power stations. This resulted in the Central Electricity Generating Board reducing its oil usage; in 1974, 21 million tons of heavy oil was delivered to power stations; the following year it had dropped to 13.7 million tons. Although Kingsnorth was a dual-fired station only one of its four boilers could burn coal and in 1975 work began on converting two more into dual-fired units at a cost of £4 million pounds (Anon 1975, 19). Reduction in demand for oil was such that by the early 1980s BP estimated that only 58% of European refining capacity was being used and that most of these refineries were operating at record losses. Planning permission for the Total Burmah refinery at Cliffe (which was never built) came the same week the company announced the closure of its Ellesmere refinery (Parker 1981, 18). A European-wide reduction in BP's refining capacity included the closure of the refinery on Grain. The Kent refinery was a 10.5 million tonnes a year operation but even after its closure it was estimated that Britain would still have the capacity to distil 45 million tonnes a year of excess crude oil. The refinery closed in 1982, just under 30 years after it started operating and much of the site was cleared. The government sold the last of its BP shares in 1987 (Vickers & Yarrow 1988, 162).

Civilian technological innovation

Cooling Radio Station

The nature of the Hoo Peninsula's marshland landscapes attracted another form of 20th century technology. Short-wave transatlantic radio communication was developed in the 1920s but initially experienced problems. Signals faded because the transmitted radio waves divided and travelled different paths, bouncing between the surface of the earth and the ionosphere and eventually cancelling each other out as they arrived at the receiver. From the mid-1930s onwards, two scientists called Friis and Feldman developed a method of isolating one of these paths by being able to steer the receiving antennae, which significantly reduced noise and distortion of the signal. The increasing need for transatlantic communication and the idea that sun spots could cause disruptions in communications led to the decision to construct a MUSA (Multiple Unit Steerable Antenna) system at both sides of the Atlantic (Gregory and Newsome 2012, 5-9).

The British receiver was installed across Cooling marshes with the apparatus building located to the north of Eastborough Farm. Construction of the apparatus building started in 1938 and is shown in Humphrey Jennings' GPO Film Unit production *Speaking from America* of that year. It needed a foundation of one hundred and fifty 80 feet (24m) long concrete piles in order to prevent the building from sinking into the marshy ground. The radio station was completed before the outbreak of the Second World War, as was its counterpart at Manahawkin, New Jersey, which received signals from a transmitter in Rugby just as Cooling received signals from Lawrenceville in the USA. The antenna array consisted of 16 diamond-shaped antennae, 60 feet (18m) high, arranged in a two-mile (3.2km) long line pointing towards the source of the signals in Lawrenceville (Fig 13). Though the outbreak of war interrupted testing, Cooling Radio Station came into

operation in July 1942 and its clear and reliable signal would have been valuable at this time. The MUSA was followed in 1959 by a MEDUSA system, which involved 288 masts grouped into six circles. This system was highly adjustable and could be steered in any direction so it was not restricted to picking up signals from New Jersey alone (Gregory and Newsome 2012, 18; 21-22; 35; 38-39).

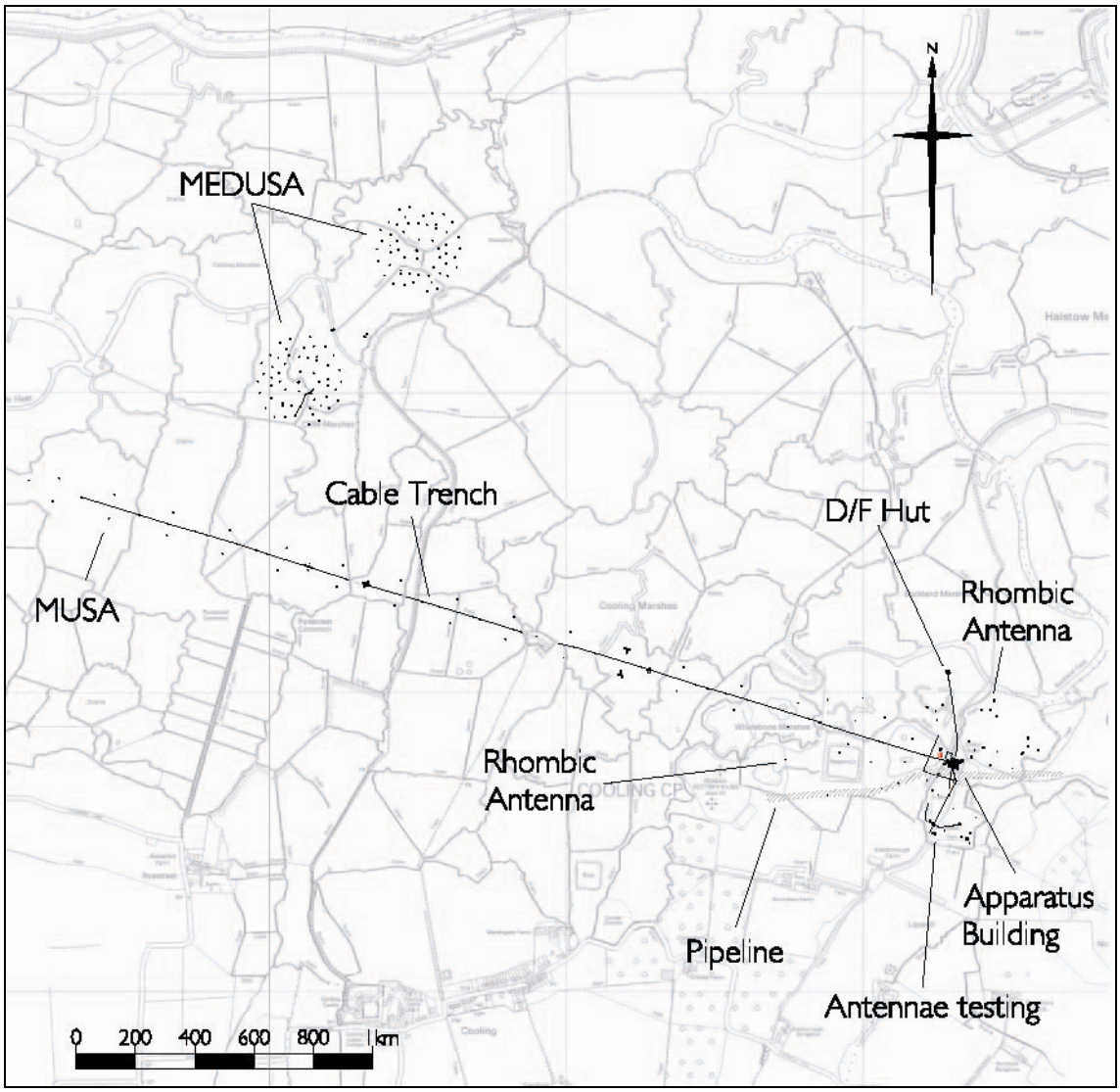

Figure 13 The two-mile antenna array is marked by a central cable trench to the east of the main building, along which the diamond-shaped antennae run Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

Cliffe and Cooling marshes offered a set of unique conditions that were ideal for the construction of the MUSA radio receiving station: on the open marshes there was ample low-lying, flat land available for a two mile (3.2km) antenna system with a three mile (4.8km) forward clearance to the centre of the river; the saline water-logged nature of the marshes provided the highly conductive conditions necessary for successful operation

without being too close to the sea wall as this would disturb the wave patterns of the radio signals; the site was only 27 miles from London and there was found to be minimal radio interference (Gregory and Newsome 2010, 9-11). Similar considerations led to the later construction of the MEDUSA system at the same location.

Figure 14 The surviving remains of Cooling Radio Station. The main apparatus building was demolished to basement level but the lower portion of the generator room at the north-eastern corner of the building remains intact. © English Heritage.

Today only the basement and the lower portion of the generator room from the apparatus building remain intact and all the antennae have been removed (Fig 14). It is not clear whether any pipe work that linked the antennae survives below ground but a track recorded on the modern Ordnance Survey map of Cooling marshes does follow the alignment of the array. What survives of the apparatus building stands testament to the crucial role that Hoo played in the story of radio communication. The MUSA array system was the last major technological development in the short-wave radio communication era and represented the ultimate short-wave receiving system. The MUSA receiver built at Cooling is thought to be one of only three MUSAs ever built, the others being an experimental system at Holmdel, New Jersey, USA and the counterpart to the radio at Cooling at Manahawkin. Unlike the other two, the Cooling array used an electrical, rather then mechanical, phase-shifting system and, with its 1,079 valves, was probably the most complex radio receiver ever built. The existence of the radio station

prevented the construction of a major airport and seaplane base on the marshes in the late 1940s. The experimental MEDUSA system continued the association with technological innovation until the advent of satellites rendered the technology obsolete in the 1960s (Gregory and Newsome 2010, 59).

Chemical landscapes

The 'estuarial marshes beside the river are liminal areas; they are neither water nor dry land' (Ackroyd 2007, 395) and this is particularly true of the areas of rough grassland that fringe the peninsula. These low lying areas, known as saltings, are unprotected by sea walls and are washed by the tide resulting in a brackish landscape and it was there that sea salt was obtained through evaporation. After a high tide the salt-rich sand was washed and the resultant strong brine evaporated by boiling. The waste from these processes was dumped on-site creating irregular mounds known as salterns. The inning of much of Hoo's low-lying land made this technique for producing sea salt impossible. The mounds in the inned grounds which comprise salt-making waste must have been created before the sea walls were built in the years between the 12th and 15th centuries (see Chapter 7). Charles Dickens's 19th century view of the marsh was as a 'dark flat wilderness intersected with dykes and mounds and gates' (Dickens 1861 (2010 repr), 4) and mounds with a variety of origins are still evident on the marshes. There is a concentration of mounds thought to be associated with salt production in and around Cliffe and they form the most visible remains of the medieval salt industry on Hoo. Elsewhere, erosion, ploughing and excavation have revealed evidence of earlier episodes of salt production on Hoo stretching back to prehistory. Salt made the storage and preservation of meat possible and it can be supposed that some routes leading away from Hoo were utilised in the transportation of salt produced on the peninsula.

Prehistoric and Roman salt production

Some of the most common finds associated with salt production are the fragments of pottery vessels used in the salt making process. These fragments may have been part of evaporation vessels or salt moulds and are collectively known as briquetage. Structural remains include hearths and brine tanks. The origin of salt production can be traced to the Later Bronze Age and evidence on Hoo from this date has been found at Hoo St. Werburgh (Moore, 2002, 269) and, though identified with less certainty, at Allhallows (Greatorex 2005, 77).

There is better evidence of Iron Age and Roman salt production on Hoo. Much of this comes in the form of briquetage such as that seen as a result of erosion on the foreshore between Hoo St. Werburgh and Stoke in the 1950s and 1960s (Miles 1975, 26-7). The remains of production sites have also been excavated at Cliffe and Cooling (Miles 1968; Miles 1975. These sites appear to have been long-lived and the gradual build-up of waste material created vast mounds; for example a mound at Cooling measured 53m by 36m.

Due to the subsequent deposition of alluvium these mounds are now below ground level. Most waste mounds probably also supported the various structures associated with salt making such as hearths, brine tanks and huts. The longevity of these sites is indicated not just by the accumulation of waste mounds but by the sequence of features excavated. Twin hearths and four brine tanks on the mound at Cooling were dated to the late first century AD but the hearths were subsequently replaced by a single oval example. Next to these features were the remains of a third-century building within which was a hearth and two associated brine tanks (Miles 1975, 29). In general the Roman material occupies the area where the marshes meet higher ground.

Medieval salt production

Although the Roman mounds show no traces on the modern land surface and have only been identified through excavation, mounds thought to date to the Middle Ages are still visible on the surface. Documentary evidence indicates salt production was being undertaken in Stoke in the 8th century (Matthews 1971, 149) and in the Stoke and Grain area in the 10th – 11th century (Bowler 1968, 108). Medieval saltern mounds have been identified on historic aerial photographs in every marshland parish on Hoo, although they have not all survived. They are more numerous on the Thames side of the peninsula and most of these are in Cliffe parish (Fig 15).

Cliffe's marshes have a band of saltern mounds running across their centre and these can be divided into two groups by an east-west line extending from a tributary of Cliffe Fleet. Those to the north of this line are larger than those to the south suggesting that they were in use for longer. The smaller salterns presumably fell out of use after an initial phase of innings cut them off from the sea. This could have been as early as the later Saxon period and may have been followed by the establishment of the more northerly salterns. Salterns are most evident in salt marsh innings which are of early post-medieval date, irregular in shape and with sinuous fleets as boundary types (Banister 2012, 41). However these are the most dominant attributes of salt marsh innings themselves so coincidence is to be expected (ibid, 41-42). Salterns from further east on Seasalter Level near Whitstable had gone out of use by the early 14th century when the sea defences were built (Thompson 1956, 47) and during the same period rising sea level was also a factor in the ending of the salt making industry on the river Adur in Sussex. Foreign competition may also have been a factor in ending of salt production on Hoo: most British production from salterns was undermined from the mid-14th century by cheaper French imports (Holden & Hudson 1981, 141).

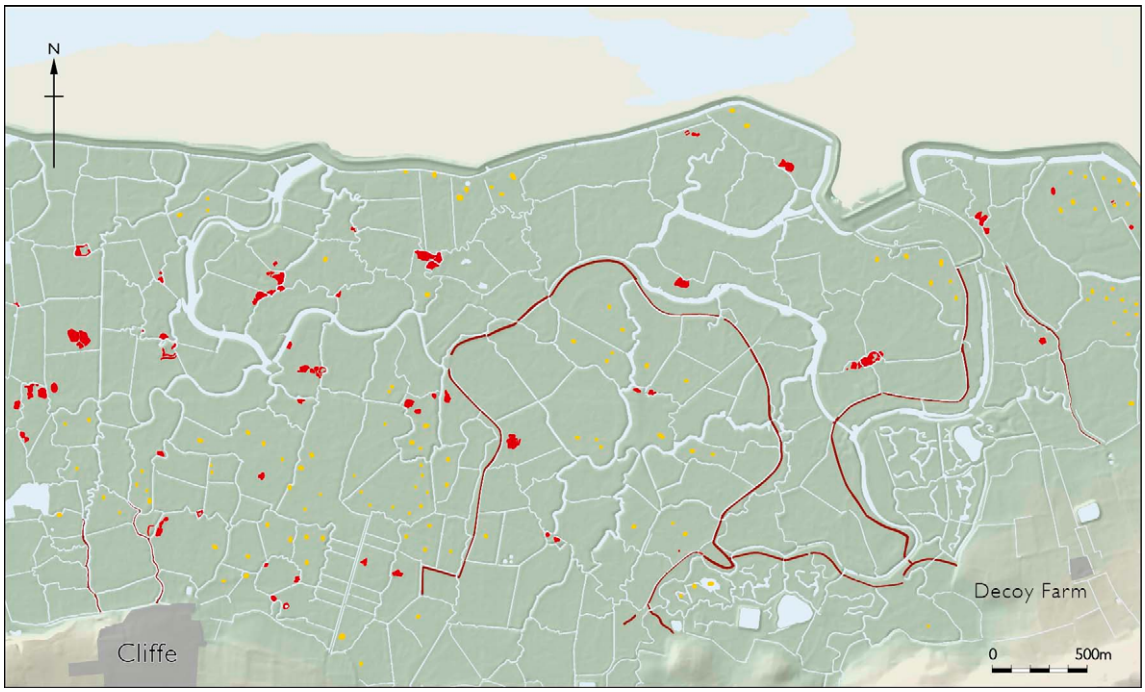

Figure 15 Mounds identified from historic aerial photographs, not all of which survive. Those in red are generally thought to represent salt making waste. The origin of the yellow mounds is less certain but some may be 19th century livestock refuge mounds. Based on lidar © Environment Agency copyright 2013.

Post medieval salt production

Attempts were made to re-establish a salt industry on the Medway in the 1500s (Preston 1977, 29). Salt pans were in place on the Isle of Grain by the 17th century, possibly to meet increased demand for salt as a preservative for fish and meat as a result of 16th-17th century population growth (Preston 1977, 29). This site was situated on the south coast of Grain and earthwork remains of this site were still in existence until the mid-20th century, when they were largely built over by the BP refinery. These remains however, give little indication of the 10 boiling pans, 1800 brine pans, lead cisterns and store house that made up this 24 hectare site in 1669 (Preston 1977, 29-30). These works were small compared with the coastal pans on the Tyne and Wear and Firth of Forth where most of Britain's sea salt was produced (Preston 1977, 29). By 1709 the wharf was in disrepair and the buildings nearly derelict (Booker 2007, 31). The site also had a house (Saltpan House) and a wind pump. To the north on the Yantlet there was a second set of salt pans built before1750. This site burnt coal to warm iron boiling pans while the 17th century site on the Medway had lead pans which would have been heated by a wood fire. These sites were not able to produce enough salt to meet local demand; foreign and British salt was imported to the region while imports of cheap British rock salt were partly responsible for the closure of both sites in the first half of the 19th century (Preston 1977, 30-31).

Explosives

Cliffe explosives works

The remains of a large early 20th century chemical explosives factory are located at Lower Hope Point on the low-lying marshes to the north of the village of Cliffe in the north-western corner of the peninsula. This site is also the subject of a separate report (Pullen et al, forthcoming) on which the following text is based. For most of its life the factory was owned by Curtis's and Harvey Limited, though during the First World War one half of the factory was run by the Government and known as HM Cordite Factory. The site consisted of acid handling and guncotton production buildings, nitroglycerine hills, guncotton and cordite drying stoves, incorporating houses, press houses, acetone recovery facilities, storage magazines, cartridge filling huts, power houses and administration facilities, all linked by networks of tramways, pipes and drains (Fig 16).

The first two buildings were constructed in or shortly after 1892 when the site was originally purchased by Hay, Merricks and Co of Roslin, Midlothian. These essentially functioned as storage magazines for gunpowder and were part of a larger scheme that was never completed. After 1898 Hay, Merricks and Company became part of Curtis's and Harvey Limited and the new company began acquiring adjacent parcels of land before setting up its factory in 1900 and constructing a cordite production plant in 1901. The 'Cliffe-at-Hoo' site was Curtis's and Harvey's only new factory to be established after 1898 (Hodgetts 1909, 364). The factory expanded rapidly throughout the first decade of the 20th century and by 1908 was described as 'one of the largest in the kingdom' (Cooper-Key 1908). A second, more defined phase of expansion occurred in 1916 during the First World War, when the factory became a 'Controlled Establishment' and quickly increased production in order to meet the demands for ammunition needed for the Royal Navy's warships. Though never developed, the company owned a substantial amount of additional land south of the factory, suggesting that they anticipated even greater expansion.

Figure 16 A small area of the 128 hectare Cliffe Explosives Works site as seen from the air. 26890/13 8-Mar-2011 © English Heritage.

The factory began by making a number of different products including the nitroglycerine-based explosives, cordite, blasting gelatine and gelatine dynamite, and also guncotton (a component of cordite). The range of authorised explosives produced at Cliffe placed the factory as one of a handful at the forefront of explosives technology. Rapid diversification into a wide variety of explosive recipes and brands followed along with physical expansion across the site at an impressive rate. Other important developments at Cliffe included construction of facilities for the manufacture of chlorate explosives or 'cheddites' in 1903 and for the production of dynamite in 1905. By 1914 the factory was licensed to produce and handle as many as 38 different explosive products (Explosives Inspectorate 1915, 48-54). These were predominantly explosives whose preparation wholly or partly involves nitroglycerine or other liquid nitro-compounds, or chlorate mixture explosives, as well as fuses and percussion primers.

Curtis's and Harvey's acquisition of the pre-existing small gunpowder storage and packing facility as part of the purchase of Hay, Merricks and Company clearly had some bearing on the choice of location for the chemical explosives works. However more space was needed and Curtis's and Harvey set about buying up parcels of land around the original site, demonstrating that they believed it was a suitable location for their venture. The isolation of the marshland site almost 2km from Cliffe village, the nearest centre of population, was ideal for the location of such a dangerous activity and is mirrored in the siting of chemical explosives works elsewhere. With the construction of three purpose-

built jetties on the Thames, the factory also had access to one of the world's major shipping routes, advantageous not only for the distribution of its finished products but also for the importation of the raw materials needed for explosives production. These included cotton waste from the Lancashire cotton mills but also chemicals such as nitric and sulphuric acid which were probably imported from other factories along the Thames, another advantage of the factory's location. The river also provided a plentiful supply of water which was needed in the manufacturing processes. The Thameside location also potentially provided good access to the explosives testing facilities at Woolwich and the shell-filling factories on the Thames.

By the time the factory had expanded eastwards across the marshes to reach it fullest extent in 1916, it covered 128 hectares of the marshes and contained around 300 structures (Fig 17). As such it radically changed the character of the marshland from quiet sheep pasture to a busy industrialised complex which employed several hundred people. The pre-existing network of drainage ditches, deriving from the pattern of marshland management over many hundreds of years prior to construction of the factory, had a varying influence on the factory's development. In some areas they dictated the layout of the buildings, particularly on the earlier, western portion of the site whilst they were largely ignored in the layout of the rapidly expanded eastern half of the site, perhaps reflecting the latter's imposition of a remotely-drafted plan.

The explosives works also had an impact on the village of Cliffe, as along with the cement factory to the south, it led to the construction of workers housing in the early 20th century. For example, those at the western end of Cooling Road and the larger house intended for Thomas Shacklady the manager of the factory: 'Curhar' on Station Road built in 1912. After the closure of the factory around 1921, materials were salvaged from the site and may have been reused in a number of sheds and outbuildings which can be seen around the village. The factory at Cliffe suffered a significant number of accidental explosions during its operating years, many of which caused horrific and often fatal injuries to staff working in the immediate vicinity. Official accident reports produced by HM Inspectors of Explosives, along with contemporary newspaper articles, provide insightful contemporary descriptions of these events and the effects on the workforce and the nearby village, which was sometimes rocked by the explosions.

The light-weight superstructures of many of the buildings were salvaged for metal or timber and none of the factory buildings are now roofed. Most of the brick from the buildings was also removed along with all the floor coverings of brick, tile and grit-free asphalt. What remains mainly consists of ruined structures, concrete floor slabs, machine

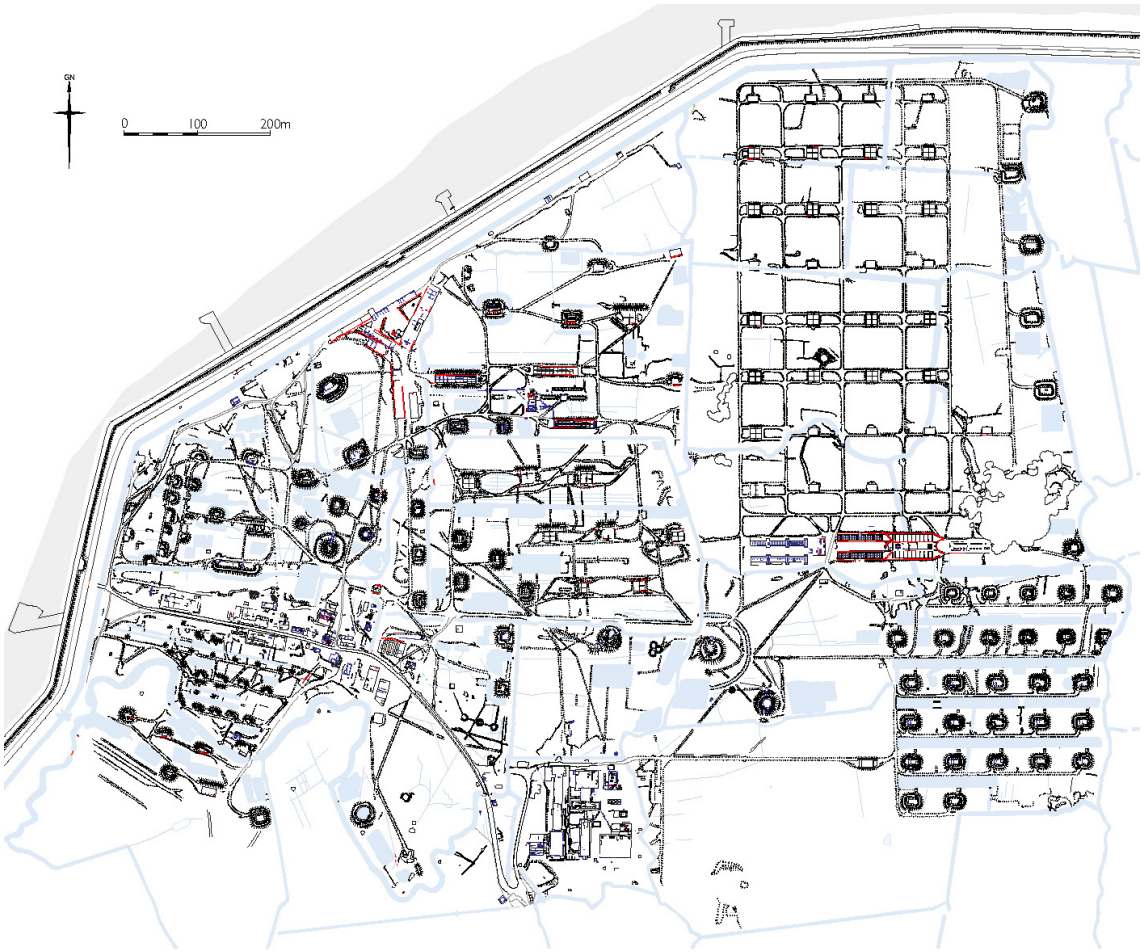

Figure 17 The 2011 survey undertaken by English Heritage clearly shows the contrast between the earlier, western part of the site which grew organically and the eastern half of the site which was rapidly constructed during the First World War. © English Heritage. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

bases, earthen trambeds and protective earthen traverses that contained or protected the structures from the impact of explosions (Fig 18). In some areas the complex network of drains can also partially be seen and the remains of four jetties that served the factory are visible on the other side of the sea wall.

Figure 18 The concrete remains of machine beds at the Cliffe Explosives Works. Despite few buildings surviving beyond floor slabs and machine beds the layout of the factory can still be clearly understood. © English Heritage.

Despite the post-closure salvage of the remains, the plan-form and layout of the site are virtually as they were when the factory closed in 1921. As such, their survival captures not only the complete manufacturing process that occurred on the site but also the wider story of the rapid development of chemical explosives which occurred at the start of the 20th century. Perhaps most significant is the large grid-like extension to the eastern side of the factory laid out in the First World War when this part of the site was controlled by the Government. The change in scale and drive for rapid expansion instigated by the war is clearly visible in the form and layout of the factory – the earlier western areas have developed organically and pragmatically whereas the more geometrically planned and single-phase development eastern site of the site looks distinctly 'designed' and pays little regard to the pre-existing drainage features. This regimented eastern area tells the story of Cliffe's brief role in a global war and what may have seemed an insatiable demand for ammunition that the conflict created.

St Mary's Marshes explosives magazines

A group of seven late 19th or early 20th century explosives storage magazines are located on the low-lying St Mary's Marshes in St Mary Hoo, close to the seawall. The concrete, roofless structures are in a ruinous state and in most cases are surrounded by an earthwork mound or bund which would have prevented any explosions from spreading between the structures (Fig 19).

Figure 19 One of seven surviving concrete explosives storage magazines located on St Mary's Marshes. © English Heritage.

The first five magazines were constructed - in brick according to 1905 Explosive Inspectors report (Desborough 1905) - by the Thames Storage (Explosives) Company around 1892 and two more had been added by 1900 (Medway Archives and Local Studies Collection DRcEgz 151/1; Medway Archives and Local Studies Collection CCRc/T082). Documentary evidence suggests that the company went into liquidation in 1907 (The National Archives BT 34/826/35679) but that the magazines had a second life as 'Government' magazines, eventually going out of use in 1913 around the time that the lease on the land expired (Kelly's Directory 1909; 1915). It is not clear but it is possible that the magazines were rebuilt in concrete in this final phase

During their life as a commercial venture, the magazines were used for the packing, repacking and storage of explosives, such as sporting powders. When one of the magazines accidentally caught fire in 1905 it contained rifle, flameless, cannon and sporting

powder imported from abroad by Normal Powder and Ammunition Co as well as Walsrode KO and KL powder imported by Messrs G Beutner and Co (Desborough 1905, 6).

The magazines were built on land leased from the Dean and Chapter of Rochester Cathedral. The location probably enabled the repacking of imports into smaller quantities in order to comply with restrictions relating to shipping explosives further up the Thames, as well as being suitably isolated. The chairman of the Thames Storage (Explosives) Company was Athol Thorne, also chairman of the National Explosives Company who had a very large factory on Upton Towans near Hayle, Cornwall (Earl 2006, 190). Initially only an acre of land was thought necessary for the magazines themselves but a large exclusion zone of 440 acres was designated around the site where no new building was permitted. The tramways and caretaker's cottage that were planned do not appear to have been built. The development raised concerns in the local community, due to the 'factory' licence which was necessary to pack and repack the explosives (Medway Archives and Local Studies Collection 151/1; Medway Archives and Local Studies Collection 151/2).

Though there are examples of concrete buildings used in an explosives context, such as at the nearby Curtis's and Harvey explosives factory at Cliffe (Pullen et al, forthcoming), mass concrete is a particularly unusual material to find in explosives storage magazines. The Upton Towans factory at Hayle in Cornwall has some of the earliest mass concrete magazines, built around 1890 (Earl 2006, 212). Given the connection between the two sites via Athol Thorne, it suggests that Oscar Guttmann, a leading engineer of his time who was working at Hayle (Cocroft 2000, 144), may have had an involvement in the design or construction of the St Mary Marshes magazines. Finally it is also unusual to find a small group of isolated magazines which are not obviously directly linked to a major factory.

Earth industries

The earliest extant post-medieval brick buildings on Hoo include the late 17th century Marshgate House, Cooling Court, built 1700 (which also had a brick barn, now demolished) and Mackays Court Farm, a 17th century house re-fronted in brick in the 18th century. Some brick built buildings on Hoo, have the word 'brick' in their name (Brick House, Grain; Brickhouse Farm, Allhallows; Brick House, Cooling - demolished). Local bricks may have been used but the Medway brick industry, which grew up in the 17th century was small-scale and some bricks were imported at that time to meet local demand (Preston 1977, 51).

The expansion of the local brick industry at the beginning of the 19th century reflected the demand for bricks brought about by the rapid expansion of London and other towns such Rochester and Chatham. This demand for building materials also encouraged the growth of the Portland cement industry (Preston 1977, 65) and large scale quarrying of sand and gravel during the 19th century.

Brickworks

Around the beginning of the 19th century hundreds of millions of bricks were sent from the Medway area to London for both residential and industrial building works (Preston 1977, 51). One of the most important pre-1850 brick making areas on the Medway was Manor Farm, Frindsbury (ibid 1977, 54) which consisted of three sites. In 1844 it produced over 14 million bricks which equated to 1% of the nation's output (ibid). By the mid-19th century the clay was nearly exhausted (ibid, 54) though it was still marked as brickworks on the 1866 OS map. Other brickworks on Hoo included the short-lived brick and tile works at High Halstow which was present in the early 1880s but gone by the mid-1890s and the longer-lived works at Hoo St. Werburgh, which appears to have been the main brickworks on the peninsula after the decline of Manor Farm.

Figure 20 The brickworks at Hoo St. Werburgh. The washbacks where the clay settled are at the top of the photograph; some are partly dug out. The moulding sheds are below the washbacks. The straight and narrow rows across the middle are evidence of drying bricks. RAF 106G/UK/1444 3132 1-May-1946 English Heritage RAF Photography.

The brickworks at Hoo St. Werburgh (Fig 20) is depicted on 1867 map and was situated to the south of the village near the coast. Its clay pit was almost 1km away on the northern edge of the village and linked to the brickworks by a tramway. The location of the brickworks near the coast rather than the source of clay would have made loading finished bricks onto barge easier and indicates that these bricks were not just for the local market. The component parts and layout of the brickworks changed considerably over the years and included wash mills where the clay was mixed with water, large embanked washbacks where the liquid clay mixture was allowed to dry out and moulding sheds

where the bricks were formed. The open area between these features and the coast was used to lay out the bricks to dry. Since its closure, the major plan components remain visible as subsequent housing redevelopment of the Hoo Marina Park still perpetuates much of the layout in its pattern of access tracks and blocks of co-aligned houses (Fig 21 and Fig 22).

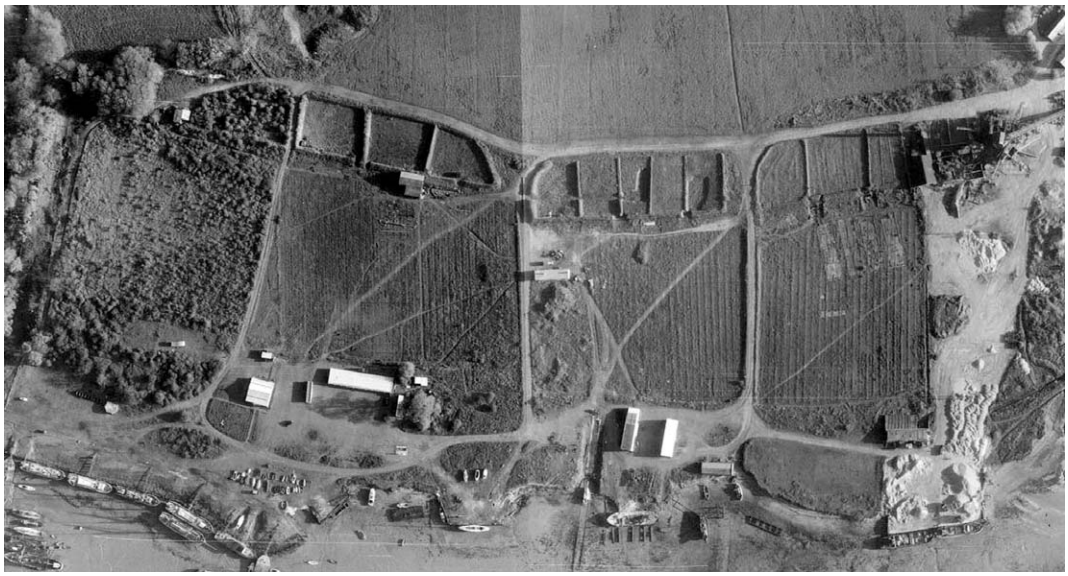

Figure 21 The brickworks in Hoo St. Werburgh detail of RAF 58/856 4178-9 14-Apr-1952 English Heritage RAF Photography.

Figure 22 The brickworks clearly influenced the layout of Hoo Marina Park which now occupies the same site. Next Perspectives PGA Tile Ref: TQ7771/7871 21-APR-2007. Aerial Photography: Licensed to English Heritage for PGA, through Next Perspectives™.

Although the original clay pit had been abandoned by 1909, the brickworks continued in use (pace Preston 1977, 178) and new clay pits were dug to the north and east of the works and these too were linked to the works by a tramway. Although brick making in the Medway was in decline by 1900 (Preston 1977,159), Hoo St. Werburgh continued in use to the middle of the 20th century with the abandonment of the most easterly clay pit by 1947 marking the end of production. Some elements of the now overgrown clay pits remain on Hoo but most are not obvious features in the landscape as the land has been returned to arable.

Portland cement industry

The good communications provided by the Thames and Medway and the relevant raw materials found in the vicinity of these rivers ensured that this area became the centre of the Portland cement industry during the second half of the 19th century (Francis 1977, 160). Cement is made by firing a mixture of chalk and clay which were mixed together and fired in a kiln, the resultant clinker being ground into a powder that is cement. The cement works at Cliffe was established in 1853 when I C Johnson took out a lease on some chalk and marshland there (Preston 1977, 71). Cement works tended to be positioned close to the sources of chalk rather than the clay thus the only cement works on the peninsula were in Cliffe where cement manufacture continued until 1970. However the substantial effects of this industry on the Hoo's seascape, although largely from mud extraction, also included cement manufacture and the 1862 Ordnance Survey map shows a cement works was located on Bishops Saltings, a small island in the Medway now largely lost to the sea. I C Johnson (in partnership with G Burge) also founded the earliest Portland cement works on the Medway at Frindsbury in 1851. By the early 20th century there were 26 cement works on the Medway (Francis 1977, 180).

What Hoo did have in abundance was mud or clay and the Medway mud with a high silica and alumina content was thought to produce the best Portland cement (Francis 1977, 180). Millions of tonnes of mud were removed from the Medway saltings between the Isle of Grain and Hoo St Werburgh, during the 19th and early 20th century. This exploitation began around 1850 but was at its height between 1870 and 1910 (Kirby 1969 399-400) and continued at a much reduced scale until 1965 (ibid 406).

The clay was hand dug by labourers known as 'muddies' and loaded onto barges which were beached on the saltings as the tide went out. A vast quantity of clay was removed and between 1881 and 1911 in East Hoo Creek alone 1,356,000 tons of clay was dug by one firm (Preston 1977, 75). Digging this quantity of clay had a significant impact on the coastline, landscape and seascape of the Hoo Peninsula, for example Stoke Saltings was almost entirely removed as was much of Hoo's salt marsh. Other areas of marsh that had been protected by sea walls were also dug for clay, a process which involved the breaching of the sea defences. The reclaimed and then improved land on Oakham Ness and its associated farm buildings were eventually lost to the sea after the defences had been breached sometime after 1896. This abandonment of reclaimed land sometimes

reflected the decision by the owner to sell the clay rather than maintain the sea walls and continue to use the area for grazing (Kirby 1969 404).

The value of excavated material can be seen in an 1823 advertisement for flints (for the manufacture of porcelain) three grades of chalk (block, cobble and rubbish) and loam (for ballast) that could be loaded from Frindsbury canal dock (Hadfield 1969, 89). These goods were presumably from the digging of the canal and tunnel (which was not completed until the following year). The potential value of the excavated chalk from building a canal had been highlighted in the original canal proposal and can also be seen in the canal company's income for 1821. This totalled £4,646, most of which (£3,261) had come from the sale of 28,535 tons of chalk and flint (ibid).

Gravel was also dug and processed on Hoo. Activity on a small scale is indicated by a small group of gravel pits in Lower Stoke marked 'old' on an 1864 Ordnance Survey map. It is unclear when gravel digging began on Grain but the existence of Gravel Pit House in the 1851 census indicates that extraction was already underway by this date. In the early 20th century the activity increased, with gravel being removed from the Yantlet area and on land at Whitehall Farm (MacDougall 1980, 161). At the latter site a wharf for loading barges was built in *c.*1906 connected to a tramway. A steam plant for washing and sorting was also installed (Burnett 1906, 134). Whitehall Farm seems to have been overwhelmed by the sand and gravel extraction works that was in operation here for much of the 20th century. This is witnessed by the presence of water-filled extraction pits, sand and gravel conveyors and other structures (Historic Area Research Report, forthcoming). Extraction continues and a works at Perry's Farm was established in the 1990s (Historic Area Research Report, forthcoming). At the opposite end of the peninsula a gravel works at Cliffe still washes and grades gravel dredged from the Thames (MacDougall 1980, 161).

The relationship between Hoo's industry and its infrastructure

From some perspectives, Hoo seems to have been perceived as divorced from the rivers that flow either side of the peninsula. Belloc notes that for sailors 'the river is but a continuation of, or an access to, his port, and the Lower Thames is thus universally known from the sea as London River' (Belloc 1912, 7). This perception may have been reflected in, and reinforced by, the Thames's administrative arrangements. There is a long history of the City of London maintaining control over the lower Thames and the limits of its jurisdiction (which also included part of the Medway) was marked by stones. There are stones on the riverbank at Upnor (Fig 23) and at the Thames side mouth of the Yantlet is an obelisk known as the London Stone. The public assertion of the conservancy jurisdiction of the Lord Mayor of London was undertaken every seven years. The 1849 visit is described in the *London Illustrated News*, when the mayor and his entourage travelled by boat and over three days attended ceremonies at the boundary stones (Anon 1849). These could be elaborate occasions and at Upnor, entailed a procession which included among others, six watermen in state liveries with colours, a band, the Lord Mayor's Bargemaster in state livery with City Colours, the City Marshal in uniform and a

Sword Bearer. These events were attended by numerous spectators who were rewarded with the distribution of wine and coins, 'the scramble for the money was a robustious affair' (ibid). The excesses of such processions, akin to periodic 'beating of the bounds' along parish boundaries, were designed to instil the course of such boundaries in the minds of those who needed to observe them.

Figure 23 The London Stone at Cookham Wood photographed in 1959. AD577/391-July-1959 © English Heritage.

But the rivers also served those living and working on Hoo. A mid-16th century map of the mouths of the Thames and Medway appears to show a water channel leading from the Thames right to the gate of Cooling Castle. Issues of map accuracy aside this does raise the possibility that travel to and from the castle could have been undertaken by boat (*Mouths of the Thames and Medway from Ipswich to Sandwich and Maldon to Rochester to the sea'* 1544, British Library: Cotton Augustus I.i f.53). A schematic map from 1560 of the north Kent coast does not show this channel but does depict others leading from the Thames through the salt marsh which are likely to have been used as waterways (*Villages and Castles on the north Kent coast* 1560, British Library: Harley MS 590 f.1). More secure evidence can be found on a 1688 chart of the Medway. This not only shows the varying depth of the main river channel but also the depths of Stoke Creek and East Hoo Creek suggesting they were used by shipping.

The ferrying of people across the rivers is indicated in written accounts. The botanist Dr Johnson and his party took a boat from Sheerness to Grain in 1629 (Gilmour 1972, 59) while the painter and engraver William Hogarth and companions travelled by boat in the opposite direction in 1732 (Nichols & Steevens 1817, 121). Permanent landing stages may not have been necessary for many of the river journeys, but some wharfs did exist. There is a 1709 reference to the wharf serving the salt pans on the Isle of Grain (Booker 2007, 31). The Andrews' and Dury's map of 1769 does not depict any wharfs or landing stages but does depict some roads on Hoo extending to the coastline such as the road leading out of Grain village to the east coast of the island (Andrews' and Dury's *Map of Kent*

1769) . No wharfs or landing stages are depicted on the tithe maps for the Hoo parishes (circa 1840) but as with the 18th century map, some roads are shown meeting the coast. These roads confirm the Hoo communities' provision for regular access to the coast, whether or not wharfs or landing stages were in place. Such access would be needed to the coastal resources, for example the oyster fisheries, and much riverine transport serving those communities need not have involved more than beached small craft. However absence of evidence is not proof that landing facilities were absent. One road shown by the tithe mapping meets the Medway south of Hoo St. Werburgh which is an area that did have wharfs and landings depicted on the 1867 1:2,500 scale OS map.

The tithe map for Frindsbury includes the large basin marking the Medway end of the Thames and Medway canal which was opened in 1824 and connected the River Thames at Gravesend to the Medway at Strood. The canal was an attempt to improve the journey between the Thames and Medway as vessels no longer had to pass along Hoo and around the Isle of Grain, reducing the journey by 75-80km.

The petition that preceded the proposal for the canal noted that the waterway would avoid the 'long and circuitous, and sometimes dangerous' sea passage (Hadfield 1969, 82). The dangers of leaving the rivers and going out to sea can be illustrated by two incidents reported in *The Times.* In February 1841 two colliers had run aground on the Isle of Grain and would have to dump their ballast if they could not be got off at the next high tide. In November 1863 a 'Perilous Adventure' was reported in which a Medway ferryman named Everett and his passenger (the wife of a blacksmith on Grain) had left Sheerness at 5 o'clock Monday evening to cross to the Isle of Grain (just over 1km away). Bad weather and the loss of an oar kept them at sea all night and drove them 45km east to Margate where they reached land 13 hours later (Anon 1841, 7; Anon 1863, 5).

The detrimental effect the canal had on sea-going trade can perhaps be seen by the sale of seagoing hoys (a vessel used for coastal trading) in 1828 (Hadfield 1969, 94), though the route around Grain was not completely abandoned (ibid, 93; 95).

The cement and brick making industries were heavily reliant on barges which provided the cheapest form of transport (Francis 1977, 160). Barge numbers appear to have peaked around 1900 (Hazell 2001, 9) before going into a steady decline (Fig 24). The large number of abandoned hulks along the Medway and Shorne Marshes on the Thames attest to the decline in the use of barges over the 20th century. Remains can be seen individually or in groups but many hulks identified on air photos taken in the 1940s are no longer visible having been subsumed by mud or perhaps removed. Of those that remain, some have been reused as sea defences such as those along the eastern side of Hoo Island. Others have been used to form pontoons as at Buttercrock Wharf.

Figure 24 Barge under sail on the Medway, June 1950. RAF 58/482 5200 5-Jun-1950 English Heritage RAF Photography.

A hulk abandoned on the mud south of Hoo St. Werburgh, probably in the 1940s, was considerably larger than most others and measured approximately 73m by 12m. It was not securely identified but some large vessels were operating on the Medway. In the late 1900s one cement company owned a 'large ship…which received loads of cement below Rochester Bridge from barges and lighters' (Preston 1977, 84). First photographed in 1950, the wreck had already drifted to the east, from an earlier position which was still marked by depressions in the mud. Two years later the wreck had moved some 500m further east, its progress again marked by depressions in the mud including, remarkably, its position from two years previously still visible (Fig 25). This eastwards drift may have continued into the 1960s as a wreck can be seen on air photos taken in this decade on the saltings by Abbots Court Wharf, 1km east of Hoo St. Werburgh. The outline of this wreck is different to that seen at Hoo St. Werburgh but it is not clear if this is due to the loss of the upper parts of the hulk or because it is another vessel. The wreck had gone from Abbots Court Wharf by 1973 and appears to have been moved to the other side of the Medway Channel and abandoned within a creek on Bishop Ness where it remains (Fig 26).

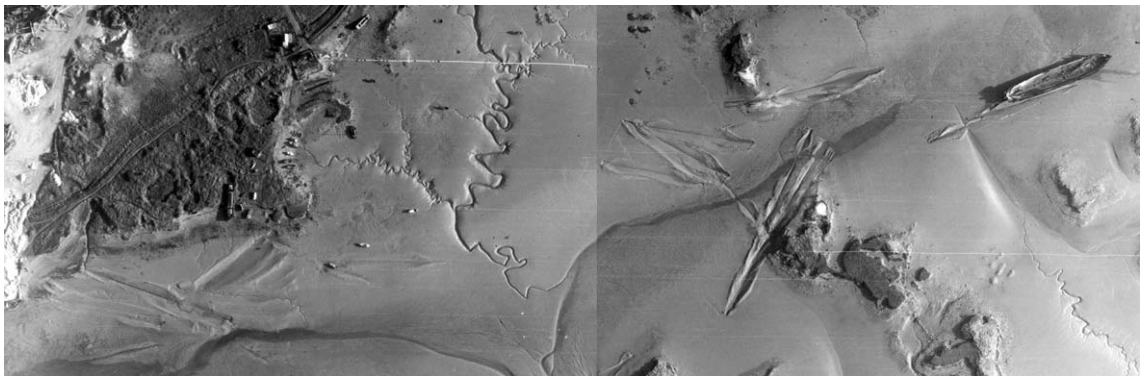

Figure 25 Wandering wreck photographed in April 1952. The impressions on the left hand side of the photograph mark its location in late 1950/early 1951. RAF 58/856 4176-4177 24-Apr-1952 English Heritage RAF Photography.

Figure 26 This already degraded hulk was first seen in Bishops Ness in the early 1970s, possibly the wreck seen at Abbots Court in the 1960s. 27196/005 19-Aug-2011 © English Heritage.

The limited number of industrial sites on Hoo during the 19th century and the ready availability and suitability of water-borne transport, in the form of barges, to move their raw materials and products meant that it was left to the farmers of Hoo to make a bid for a railway to serve the peninsula. In 1878 they approached the South Eastern Railway to build a railway onto the Hoo Peninsula and had drawn up plans and agreed to sell the necessary land at agricultural prices (MacDougall 1980, 129). While the local promoters of the Hundred of Hoo railway seem to have been interested primarily in improving access to markets for their produce, the South Eastern Railway, under its chairman Sir Edward Watkins, had different ambitions for the venture. Their intention was to create a rail and ferry port on the Isle of Grain for both Atlantic and continental traffic to compete with the London, Chatham and Dover Railway's venture at Queenborough, Isle of Sheppey (MacDougall 1980, 129-130). Five hundred acres of marshland was purchased and in 1882 the railway was extended from Sharnell Street to Grain. The port site, named Port Victoria, consisted of a wooden pier, hotel and station. Despite Queen Victoria using the pier to embark and disembark from the Royal Yacht on a number of occasions and the construction of the Royal Corinthian Yacht Club headquarters there in 1899, the site was never fully developed. The author Joseph Conrad described Port Victoria as a 'few low buildings like the beginnings of a hasty settlement' (Conrad, J 1906 (repr 1946) 91). In 1914 the yacht club building was requisitioned by the Royal Naval Air Service and the club relocated to Essex. The pier was partially demolished by 1916 and the yacht club building had gone by the 1940s. The hotel was not demolished until the early 1950s

during the building of the refinery and footage of this building is included in the BP sponsored film *The Island* (Pickering & Ingram 1952). Despite the very limited success of the Port Victoria initiative itself, it did provide the initial stimulus for the development of Grain first by the military and later, massively by the oil and power generation industries, as noted earlier in this chapter.

The Medway and particularly the route of the main channel route passing close to the south east of Grain, also had a formative influence on both the location of the railway line on Hoo and the location of industrial sites such as the 20th century oil and power generation complexes and container port on Grain (London Thamesport). Both the BP refinery and the container port utilised the railway. The container port began operation in 1990 and subsequent development made it one of the country's busiest container ports realizing some part of Watkins's earlier vision for Grain's Medway riverside (Historic Area Research Report, forthcoming).

4 'DEFENDING' – MILITARY DEFENCE ON HOO

Introduction

The Hoo Peninsula, rich in agricultural and marine resources, and located between the Rivers Thames and Medway, was historically a prime location for settlement, trade and communication. This is borne out by abundant Palaeolithic finds deep in the sediments beneath the marshes and the cropmark traces of later prehistoric settlements are testament to a rich past, but unlike elsewhere in the region no large 'defended' prehistoric enclosures, such as hillforts, have so far been found on the peninsula.

Until the 20th century the defences on Hoo were not to protect the peninsula as such, but rather used its strategically important position between the Thames and Medway rivers to control or prevent access. Before the later 18th century the defensive scope was limited to protecting nearby vulnerable strategic assets such as Chatham Dockyard.

Much of the historical detail in the following section is paraphrased from Saunders 1967. As an island nation, threat from attack has usually come from the sea. London was the largest trading centre and the capital since the 11th century but few defences were established on the lower Thames until the Tudor period. Earlier fortifications such as the castle at Rochester guarded the bridge over the Medway and Queenborough castle was built in the 14th century to protect the Isle of Sheppey rather than the Medway (Saunders 1967). Initially a safe anchorage for ships in Henry VIII's navy, the Medway gradually developed into the prime focus for a Royal dockyard during the reigns of Elizabeth I and James I, joining the ranks of the shipbuilding and repair yards at Woolwich and Deptford. By this time, defence of the Thames, the direct route into the heart of the London, and protection of the Woolwich Arsenal, the Purfleet magazines and the Deptford revictualling yard was imperative to the nation's safety (Lowry 2006, 89). The naval establishments and the placement of defences affected the character of the peninsula, influencing its urban development, patterns of land use and instigating several of the major industrial developments on Grain. For example the first petrochemicals storage depot was established on land owned by the Admiralty (see Chapter 3). As the failure of the late 19th century Port Victoria enterprise on Grain showed, without the interest of the military and its 'pump-priming' effects on the subsequent associated developments, Hoo might have developed quite differently in the 20th century.

Due in part to the marshy topography of the peninsula's coastline providing a 'natural defence' and to limitations of the available defensive technological capabilities, most of the early defence works were concentrated along the upper reaches of the Thames estuary and along the Medway to protect the dockyard at Chatham. It is not until the later 18th century, with greatly increased artillery ranges and the development of more integrated and effective systems of gun batteries and associated defences that the strategic location of the Hoo Peninsula was able to play a vital role in the wider defence of the Thames.

Middle Ages

One of the first known conflicts to leave its mark on Hoo and shape the future of the defences was the prolonged period of hostility between the French and English in the 14th century. Following a number of English triumphs in France, the French retaliated with a campaign of raids on southern and south-eastern England. In 1377 they invaded the Isle of Wight and then mounted a series of attacks on towns along the south coast from Devon to Essex over several years (Smith 2001). John the 3rd Baron of Cobham was ordered by King Richard II to head a commission to survey and fortify possible landing sites in Kent in advance of any future attack by the French (Coulson 1992, 92). That threat was realised in raids on Thameside villages in1380, and the burning of Gravesend in 1380 and Sandwich in 1400. In response, existing castles such as Queenborough (built 1361-77) were repaired and strengthened, and towns and individuals encouraged to improve their defences.

Figure 27 Cooling Castle gatehouse from the road. © English Heritage 2009.

Cooling Castle (Fig 27), the home of John de Cobham on Hoo was one of several castles and towns including Canterbury, Saltwood and Dover to request royal permission to crenellate their walls, and were equipped with firearms and gun loops in the 1380s (Smith 2001). Cooling Castle was completed in 1385, but recent scrutiny revealed it was largely indefensible, overlooked by high ground to the south and facing inland rather than to the river so it was probably designed as much for prestige as defence (Johnson 2002). The castle experienced its first and only episode of hostility in 1554 when Thomas Wyatt, nephew of the then occupier, Sir George Brook Cobham, besieged the castle during a

failed rebellion against Mary Tudor (MacDougall 1980). The curtain wall of the inner ward remains as a ruin surrounded by dried-up moats – whether they were originally for defence or as garden features or both is not entirely clear. Though little of the wall around the outer ward survives, the outer gateway stands alone facing the road – an ornate and showy façade facing those to be impressed rather than repulsed (Johnson 2002).

16th and 17th centuries

The 16th century saw a change from locally organised fortifications to defences whose design, siting and inter-relationships resulted from national strategic considerations. This period was also marked by a leap forward in artillery technology as better and safer guns were developed (Hill and Wileman 2002, 127-8). This produced a need for more robust defences. Following the break from the church in Rome in 1533 after Henry VIII's divorce of Catherine of Aragon, alliances were forged between France (seeking the return of Calais from English hands), the Pope and Charles V the Holy Roman Emperor and Catherine's kinsman in the Franco-Hapsburg truce of 1538. In anticipation of invasion, Henry undertook a survey of existing coastal defences and potential landing points, initiating the construction of a string of bulwarks and fortifications around the south coast and Thames region (Hill and Wileman 2002, 126-7). Five bulwarks or blockhouses were built on the Thames to guard the approaches to the capital; these were Tilbury, East Tilbury, Gravesend, Milton and Higham (Lowry 2006, 89). The Medway and the Royal Naval vessels moored there were protected by a blockhouse at Sheerness. Further upstream is Upnor Castle (Fig 28), construction of which began in 1559. By1564 the majority of Queen Elizabeth's fleet was moored below Rochester Bridge and was protected by Upnor Castle which had been redeveloped 1599-1601 to protect the warships there (Saunders 1967).

With hostilities with Spain increasing and consequent fears of attack from Spanish-controlled ports in the Low Countries, further defences were erected along the rivers. Bay and Warham Sconces were added in the 1560s on the Medway just downstream of Upnor, and a small fort at Swaleness, near Queenborough, was started but not finished in the1570s (MacDougall1980). As a precaution St Mary's Creek was blocked with piles to cut off the passage to Upnor, and ships were stationed off Sheerness to guard and check ships passing through the estuary. Beacons were used to warn of an approaching enemy and on Beacon Hill, Frindsbury are the remains of a beacon which was in place from at least 1570 (White 1934, 86 & pl 2). When war with Spain was declared in 1585 a chain was stretched across the Medway just downstream of Upnor to halt enemy ships sailing up the river. The chain remained in use, though was moved further downstream over time and by 1667 ran between Hoo Ness and Gillingham (Saunders 1967 (1985, 15).

Figure 28 Upnor Castle 7570/39 14-AUG-2003 © English Heritage.

Upnor Castle was strengthened and enlarged between 1599 and 1601. A ditch and palisade were added along with a gatehouse with a drawbridge. However, the castle was found to be in need of considerable repairs in a survey of 1623. Upnor and the two adjacent sconces were surrendered to Parliament at the outbreak of the Civil War in 1642 and served as a prison for Royalist officers. It was briefly seized in 1648 during a Royalist uprising before it was returned to its original role of protecting the Medway anchorage.

In 1667, during the Anglo-Dutch wars, Upnor Castle finally saw action. Following victory in a sea battle the English, fearing no further reprisals, brought their fleet home. The Dutch put to sea again in June and sailed up the Thames to Gravesend. They then took the unfinished fort of Sheerness and the Isle of Grain with little resistance and sailed up the Medway, breaching a newly wrought chain spanning the river between Hoo Ness and Gillingham and setting fire to a number of ships including the King's flagship at anchor in the river. Having struck at the heart of the English fleet and being unable to pass beyond the guns at Upnor Castle, they withdrew as the tide turned, returning the following day only to be beaten off by guns placed overnight adjacent to Upnor Castle (Middleton's Battery). They burned more ships before retreating to join the main Dutch fleet at Queenborough and off Sheerness, taking the English flagship the *Royal Charles* with them as a captured prize. Here they remained at anchor until well into July, blockading the Thames and forcing in their favour the treaty negotiations for the Peace of Breda which brought the conflict to an end (Saunders 2001).

In the wake of the Dutch raids England's coastal defences were revised. As Chatham was now the primary naval base it was necessary to strengthen the Medway fortifications. The sites for three new forts were sought in 1668. A bastioned fort was built at Sheerness to protect Garrison Point, and a pair of forts was sited one mile south of Upnor Castle. These were Gillingham Fort at the entrance to the former St Mary's Creek and Cockham Wood on the opposite bank, significant parts of which still survive (Saunders 2001). By the late 17th century Middleton's and James Batteries (formerly named Bay and Wareham batteries) downriver of Upnor Castle were restored, and a new battery was built on Hoo Ness to offer protection to ships being moored further downstream (Smith 2001, 34). Another pair of 17th century batteries was sited at Oakham Ness and Bishops Ness. These have long since been destroyed by tidal erosion and 'gone to sea' (English Heritage Archive records 418886 and 418891 at http://www.pastscape.org/ accessed 20/04/2012). Following the accession of William of Orange to the English throne in 1689, England and the Netherlands became allies. It was about this time that the three earthen gun batteries (Buda, Middle and Quaker's Battery) were constructed near the mouth of the Medway on the Isle of Grain to cross fire with Sheerness (Smith 2001, 34).

18th and 19th centuries

Much of the historical detail in the following section is paraphrased from Kendall 2012. During the 18th century there were repeated scares of invasion, principally from the French but also the Spanish. **Increasing strategic importance was accorded to the naval bases at Portsmouth and Plymouth, especially during the reorganisations that followed the Seven Years War, but Chatham became the main building yard for the navy from the 1770s. All the major yards came to be situated within the most heavily defended towns in the country which, more than any others in England, resembled the fortified towns of continental Europe.** Chatham dockyard continued to expand and it remained a principle base for the navy. Though first proposed in 1708 adequate defences around the dockyard were not provided until the building of the Chatham Lines in 1755. These defences comprised a bastioned line 2.4km long on the high ground behind the dockyard extending down to the river at either end. Initially in earth and wood, but later clad in brick, the bastions had provision for artillery and musket positions. As a result of the American Revolution, there was a fear of invasion by America's allies the French and Spanish in the early 1780s and the Chatham Lines were reformed incorporating more brickwork. In addition two redoubts were constructed within the lines to further strengthen the dockyard defences.

Following the French Revolution in 1789 and France's declaration of war in 1793 there was again a serious threat of attack and invasion and this fear grew under the period of Napoleon's reign in France. The coastal defences of Britain were strengthened with the construction of Martello Towers and by a succession of masonry forts and batteries placed at strategic points along the coast and along the approaches to major ports and rivers, all supplemented with floating batteries and guard ships. In addition to existing beacons, a new semaphore communication system was set up between London and the

naval bases, including Chatham and Sheerness. New fortifications were not however built at Chatham until after 1803 when the old Chatham Lines were effectively rebuilt and extended and supplemented by new forts. The early 19th century defensive strategy for south east England was to create two highly defended troop concentrations, one at Dover the other at Chatham, in the expectation of forcing the French to lay siege to one or other of these places or else to risk a counterattack on their lines of communication should they invade and make a rapid advance upon London. At Chatham the reformed Chatham Lines were accessed from the Upnor shore by a pontoon bridge so that the garrison could be reinforced by land from the Hoo Peninsula. Strangely little preparation was made to guard against the French landing from the Thames and advancing across the peninsula to bombard the dockyard from its vulnerable western side.

This period also saw the first defences on Hoo for purposes other than protection of the dockyards on the Medway. A new battery was constructed at Lower Hope Point around 1779-98 on the north-western corner of the peninsula overlooking the Thames. This was subsequently dismantled in 1820 after the long peace following the Battle of Waterloo (Crookshank 1916, 220). In *Great Expectations*, Charles Dickens refers to a battery on the marshes in this area as 'that old Battery over yonder' (Dickens 1861, 8). If, as generally agreed, he was using sites known to him from the area for his descriptions, reference to the battery as 'out of use' in 1861 would fit with the period in which the battery at Lower Hope Point was obsolete but still standing.

The Hoo Peninsula, because of its strategic position, was the focus for a high concentration of forts built between the 1840s and 1901. The first of these was Grain Tower (1855), a three storey roughly oval artillery tower sited on a tidal mud flat 160m off the eastern tip of the Isle of Grain, accessed by a hard (Fig 29). The tower is one of the last examples of the British Gun Tower, the principal examples of which are the Martello Towers built along the south and east coasts in the early 19th century. It was designed to defend the entrance of the Medway and the dockyards at Sheerness and Chatham, and was at its inception at the forefront of defence design. However, in the seven years it took to build, advances in weapons technology along with the development of the almost impenetrable new iron-clad warships, had rendered the tower, with its smooth-bore weaponry, almost obsolete. The rapid pace of naval artillery and shell development was the driver behind a revolution in coastal defences from this period onward. **The artillery revolution of the mid-19th century, along with the development of steam-powered warships and ironclads, initiated a period of change which rendered much of the coastal crust of defence which had developed around these dockyards redundant; experience in the Crimean and American Civil Wars proved that such fortifications merely delayed the eventual and inevitable destruction of ships at anchor. Dockyards would be rendered helpless once an enemy equipped with shell-firing guns had put ashore and denied main base facilities to the fleet, a fact which spurred the Admiralty to hasten the development of the steam navy and, after the Crimean debacle and a perceived threat from the French, the War Office to construct rings of mutually-defensible fortifications around the principal dockyard towns. In due course, dockyards**

became targets for attack from moored mines, torpedoes and the air: in order to deter and react to this threat, an increasingly specialised variety of measures were taken to provide an envelope of protection around these bases.

Grain Tower's construction coincided with renewed fear of a French invasion under Napoleon III. This initiated the most intensive and costly programme of fort construction on the peninsula following the report of the 1860 Commission on the Defences of the United Kingdom (Smith 2001, 54). In this report, the Hoo Peninsula was proposed as a strategic entrenched camp, though not all elements of this were built, and suggested that the marshes should be flooded in the event of invasion (V Smith pers comm). These new forts had substantial stone-built casemates designed to withstand naval bombardment and were grouped to provide crossing fire with other forts. The first five forts of the outer Thames defences were built in the 1860s (Lowry 2006, 88): Cliffe, Shornemead and Slough forts on the main peninsula forming part of the River Thames' coastal defence system, and Grain Fort and Grain Battery (latterly Dummy Battery) on the Isle of Grain at the mouth of the Medway. A massive fort was built at Garrison Point, Sheerness on the Medway and the two circular forts were built further upstream in 1872 (Smith 2001, 60). Known as Hoo and Darnet Forts (Fig 30), these two circular forts were built on low marshy islands on either side of the Medway channel to provide an inner line of defence for the approaches to Chatham dockyard. They replaced two 17th century batteries sited at Oakham Ness and Bishops Ness.

Figure 29 Grain Tower at low tide with Sheerness in the background. Note the line of the hard to the fort exposed in the mud and the stumps of piles from a late 19th century jetty. © English Heritage 2009.

Figure 30 Hoo Fort built in 1872. 26599/008 © English Heritage.

Cliffe Fort and Shornemead Forts formed a trio of forts with Coalhouse Fort across the Thames on the Essex coast, providing a triangle of crossing fire over the Thames (Lowry 2006, 88). Part of Cliffe Fort was rebuilt in 1885 as a Brennan Torpedo Station, one of five of sites in the UK experimenting with this newly developed form of waterborne armament – the world's first guided weapon invented by Louis Brennan (www.victorianforts.co.uk). Launching ramps and remains of the control points still survive (Smith 2001, 72).

Much of this paragraph is based on the Outline Historic Area Assessment for Grain parish. At the opposite end of the peninsula Grain Fort and Grain Battery, commanded both river mouths acting in conjunction with Slough Fort at Allhallows and Garrison Point at Sheerness across the Medway on Sheppey. Two further auxiliary batteries were added to the group in the late 1890s, certainly by 1901. Slough Fort was first built to command an area of on the Thames foreshore where it was feared an enemy landing might be possible. As first built and based on the recommendations of the 1860 Royal Commission it was a highly visible granite faced artillery fort. However the pace of development in coastal artillery was so rapid that soon after construction the highly visible fort was substantially adapted in order to conceal it an thus make it less of a target. The granite face was earthed up and the main armament was moved to two wing batteries in which the initial guns were on pneumatic disappearing carriages in deep gun pits. Even the latter were however replaced in the early 20th century when the wing batteries were again redesigned to take more conventionally mounted guns. Where farming and fishing had previously set the pace of life for the villagers of Grain, the building of the forts and the

stationing of troops (Grain Fort accommodated over 260 military personnel) must have had a massive impact.

Dickens' fictional reference to an old battery (possibly Lower Hope Point) across the bleak and lonely marshes (Dickens 1861, 8) gives a sense of the remoteness of the peripheries of the Hoo Peninsula where many of these forts were sited. For the billeted troops these forts would have been small hubs of activity in an otherwise lonely landscape, with the river on one side and the marshes with their brackish creeks and grazing animals on the other.

20th century

Although by the early 20th century some of the coastal forts were still armed with obsolete muzzle-loading guns, these were being gradually replaced by long-range breach-loaders (Smith 2011, 164). After the 1905 review of Britain's coastal defences it was concluded that the outer line of defences at Grain and Sheerness were sufficient and the inner line, which included Cliffe, Lower Hope, Hoo and Darnet forts could be discontinued (ibid 165), though some of these forts were brought back into use during the First and Second World Wars as batteries and troop accommodation. The early decades of the 20th century also saw a range of new military establishments develop on the Hoo Peninsula. In 1900 the Admiralty built a new Coastguard Station on the eastern edge of Grain village (National Archives, HO 45/9952/B31935; HO 45/9953/B32198). This replaced a watch vessel, *Roebuck*, moored near Elphinstone Point, in the south west of the Isle of Grain, until the flood of 1897. It was in the vicinity of Elphinstone Point that the Admiralty established an oil storage facility in 1908, serving a naval fleet then in the process of converting from coal to oil and utilising the deep-water access provided by the Medway (MacDougall 1980, 156-7) (see Chapter 3). An area of marsh to the south of Grain village, near the Dummy Battery, was commissioned for a Royal Naval Air Service seaplane base in December 1912, one of the earliest naval air stations in the country (MacDougall 1980, 145). Three years later an experimental aircraft depot was established nearby, at Port Victoria, and the two bases were known as Marine Experimental Aircraft Depot (Delve 2005, 258). These were substantial facilities employing around 800 officers and men, who were accommodated in a temporary settlement known as Bungalow Town adjacent to the village and in the Coastguard cottages. Grain Air Station was integrated into the Royal Air Force in 1918 and remained in operation until 1924 when the experimental depot was transferred to Felixstowe.

World War I

As matters in Continental Europe became more volatile in the years leading up to the First World War, steps were being taken to put defences in place around the coast of Britain, particularly in the east and south-east of England which would bear the brunt of any naval attack.

The 19th century batteries on the Thames and Medway were re-used to mount guns. These included Lower Hope Point Battery on the Cliffe Marshes, Cliffe and Slough Forts on the Thames shore, and Grain Coastal Battery, Wing Battery, Grain Battery, Grain Dummy Battery and Grain Tower on the Isle of Grain. Grain Tower was also the tethering point for an anti-shipping boom stretched between the tower and Garrison Point on Sheerness. The chain still remains wrapped around the tower, and there are the eroded stumps of a wooden pier in the mud to the north of the Grain Tower hard, built to protect the hard at low tide.

The late 19th century and early 20th century saw a marked change in the technology of warfare with the development of more powerful coastal artillery searchlights, fixed (submarine) minefields and fast gun and torpedo boats (Smith 1985). Torpedo-firing submarines made the naval blockade of merchant shipping a means of economic warfare and more importantly the invention of 'flying machines' created a new threat. For the first time in history, the threat of direct assault would come from the air as well as the sea and defences had to be developed to detect and intercept air raids by planes and airships.

Two searchlight batteries served the Grain batteries and a third, recorded as a set of 'fighting lights' at Cockleshell Beach, covered Whitehall Anti-Aircraft (AA) Battery on the northern shore of Grain (traces of which still remain). An Observation Post tracked shipping in the Thames and plotted the fall of shells fired from the Yantlet Velocity Testing Range to the south. This was in use from at least 1924, but its searchlights also covered an area with a World War I AA emplacement, so they may been established during the First World War. Other anti-aircraft batteries established across the peninsula included those placed around the munitions depots of Upnor, Chattenden and Lodge Hill (Smith 2011, 172).

Before the First World War, steps were taken to provide anti-aircraft cover for the ammunition stores of Lodge Hill and Chattenden. These were in the range of the Zeppelin and fixed-wing aircraft bombing raids which were anticipated (ibid 170). A pair of anti-aircraft batteries, the first of their kind to be built in Britain, was sited on the northern and southern perimeters of the depot at Lodge Hill and Beacon Hill. These were built in late 1913 or early 1914 (Smith 2011, 170). With no experience of aerial warfare, both batteries were initially armed with conventional 6-inch breech loaded howitzers on improvised mountings. These were replaced in 1914 with purpose- built guns (1-pounder Pom Pom and 1 x 3-inch gun) in permanent concrete emplacements, the model for all subsequent AA guns. In 1916 two 3-inch 20-hundredweight guns were

added. By 1915-1916 there were ten anti-aircraft batteries on the peninsula (Smith 2011, fig 6, 171).

The first air raids were mounted in 1914, initially from Zeppelins and later raids in 1917 used Gotha bombers. Chatham was attacked in 1917 (Smith 1917, 172). Anti-aircraft guns and fighter interceptor planes were employed (Smith 2001, 82). The guns at Chattenden, Upnor, and Lower Hope Point on Hoo, and across the Medway at Chatham, saw their first real action on Christmas Day 1914 when a German bomber came in over the peninsula on its way to London. It returned, pursued by a British fighter which engaged in the first dogfight over Kent and dropped an 18lb bomb on Cliffe. Though little damage was caused, this was a taste of things to come (MacDougall, 1982).

The Admiralty Naval Wing, later the Royal Naval Air Service, established its headquarters at Eastchurch on Sheppey and assumed responsibility for the deployment of airships in 1912. Its airship base at RNAS Kingsnorth, established on Hoo from late in 1912, was the only operational airship station at the start of the war. Airships from Kingsnorth patrolled the Thames and Channel waters, searching for and attacking enemy submarines. The remains of a First World War German U-boat lie in the mud off Stoke Saltings to the west of Humble Bee creek, within sight of Kingsnorth (Fig 31). This is one of a number of surrendered German U-boats that sank on their way to be broken up in 1921 rather than a casualty of wartime patrols, but it is a tangible reminder of the threat British coastal waters were under.

Figure 31 World War I German U-Boat hulk on Stoke Saltings. Detail of 27196/025 19-Aug-2011 © English Heritage.

World War II

By the interwar period most of the 19th century forts on Hoo were decommissioned and lay abandoned and empty. Grain Fort still remained in use, but Slough Fort became part of a 1920s seaside resort established at Allhallows and around 1929 a lion tamer by the name of Bill Cargill opened a zoo in the fort. [Chatham Standard 10th May 1966]. The following year Kent Coast Development Co. acquired 1,600 acres of land on and beside the Thames foreshore and began planning a new development which they christened 'Allhallows-on-Sea' (MacDougall 1980, 160). The Southern Railway Company was approached to build a branch line from Stoke Junction; Kent Coast Development Co. provided the land and £20,000 and the line opened in 1932 (ibid). At Allhallows the resort was revived and expanded with the fort put to various uses, for a long time as stabling for trekking ponies, but now as a historic fort open to visitors.

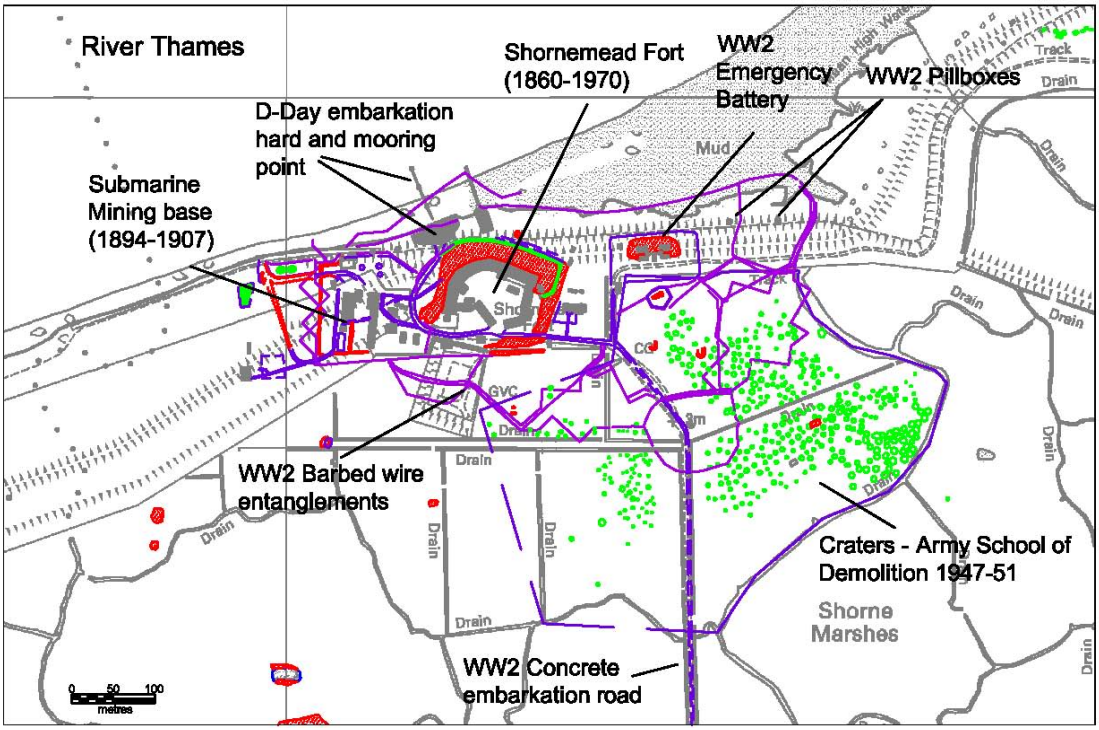

Figure 32 Extract of mapping from aerial photographs illustrating early 20th century and World War II military features around the 19th century Shornemead fort. Background mapping © Crown copyright and database right 2012, all rights reserved. Ordnance Survey Licence number 100024900.

The Second World War saw the revival of activity at a number of the decommissioned forts. Some were reused as batteries and troop accommodation, whilst other empty fortifications were made into defended areas and incorporated into the coastal and anti-invasion defences for fear of their becoming enemy strongpoints in the event of an invasion. A D-Day embarkation hard was constructed beside Shornemead Fort and three more were established at Upnor. Shornemead is a good example of a fort location re-used in the Second World War. Aerial photographs record a complex of military

installations and structures around it (Fig 32). The island forts of Hoo and Darnet were employed as mine-watching posts monitoring the Medway.

A civil airport opened at Gravesend in1932. By the late 1930s it was also home to the aircraft modification and support company Essex Aero and was used as a flying training school that trained both civilians and RAF personnel (Delve 2005, 116-7). In 1939 the whole airfield was requisitioned and allotted to 11 Group, Fighter Command group at the forefront of the Battle of Britain in 1940. Aerial photographs taken in 1942 show the ground defences including pillboxes and barbed wire encircling the site. Later in the war the base was expanded for use by three American fighter squadrons, and as an emergency landing runway for bombers returning from action over occupied Europe. A perimeter road defined the original and extended layout of the airfield. Although the main landing surfaces remained grass, by 1944 it had 30 hard standings, eight blister aircraft hangars, and one type T1 aircraft hangar. After the war the site went into Care and Maintenance. Essex Aero left the site in 1956 and later that year the RAF relinquished control. Much of the site was built over with houses, a sports ground and a golf course (ibid) though part of the perimeter road on the southern side of the airfield still survives.

Coastal defence

Invasion was a serious threat following the fall of France and the Low Countries, and the Hoo Peninsula was yet again in the frontline, not only because of any potential invasion but also as it was on the path of air raids directed at London. The reality of this threat is illustrated by a German map of November 1940, which clearly annotates all the important military sites on the peninsula identified from aerial reconnaissance (Foot 2006, 408). Luftwaffe aerial photographs and maps have also been found outlining the routes of the proposed invasion (Operation Sealion) through Kent and Sussex (Foot 2006b, 13).

From May 1940, steps were taken to secure the vulnerable sections of Britain's coastline (Dobinson 1996). On the Hoo Peninsula the areas of tidal mud exposed at low tide backed by expanses of marshland were seen as a natural defence from coastal invasion needing little additional protection. Post-war RAF aerial photographs record drainage ditches, behind the flood defences in the northern marshes, enlarged during the war to impede invasion. The more vulnerable beaches at Allhallows-on-Sea and the Isle of Grain were secured by lines of obstructions and defences including barbed wire entanglements, mine fields, concrete anti-tank blocks, dragon's teeth and road blocks (Fig 33). Post-war aerial photographs also show the second layer of defences inland from the coast. Pillboxes and gun emplacements were placed at regular intervals across the fields, at junctions and railway crossings. Though the barbed wire and minefields have been cleared, many pillboxes remain and concrete slots for roadblocks can still be seen in hedge lines (Foot 2006b, 124). Sections of lines of concrete blocks and dragon's teeth still remain on the coast to the north of Grain village.

Figure 33 Coastal anti-invasion defences –dragon's teeth on the beach on the Isle of Grain. Extract from 27197/011 19-Aug-2011 © English Heritage.

Wartime aerial photographs show each battery surrounded with layers of barbed wire, the entire eastern shore of Grain divided into defended cells which would have effectively impeded any movement from the shore westwards. A camp to accommodate the large number of troops required to man the numerous batteries, gun emplacements and installations was built around Whitehouse Farm on the southern side of Grain village, probably doubling the wartime population of Grain and making it very much a militarised zone. In common with most wartime camps, accommodation was provided in huts with separate HQ, mess and ablutions blocks. Most of the camp has gone, but the footprint is still preserved in the layout of the housing on Puffin Road and Sea View off Chapel Road, and three of the original camp huts still stand. One was converted into housing and two were used as sheds or garages on Chapel Road.

Continuing the long tradition of chains and booms in and across the Medway, a boom was constructed across the Thames from St Mary's Bay to Canvey Island during the Second World War. Seen on aerial photographs taken in 1941(Fig 34), it consisted of a pier-like structure of wooden piles that extended across Blyth Sands for a distance of 1240m. The remaining distance to Canvey Island (circa 1400m) was obstructed by wire nets. Three Defence Electric Light Emplacements and a Directing Station were attached to the pier 900m off the shore – illuminating the estuary in conjunction with lights on Canvey Island supporting the coastal batteries there (Smith 1985, 43). A small camp by St Mary's Bay served as accommodation and housed the generators for the searchlights on the boom (Smith 1985, 43). The entire boom was removed by 1953 and all but two

camp buildings were demolished, though the hard standings remain. Aerial photographs taken in 1955, 1973 and 2007 recorded series of six 700m-800m long linear features in the mud north-west of St Mary's Bay which may be the remains of the boom's wire nets.

Figure 34 Aerial photograph of the Thames Boom looking south-east towards the Hoo Peninsula TQ7979/001/1416 S412H54 17-AUG-1941 English Heritage RAF Photography.

The Hoo Stop Line

The most extensive single defensive feature was an anti-tank stop line constructed between Hoo St Werburgh on the Medway and Higham Marshes on the Thames. This was part of the principal GHQ (General Headquarters) line from the North Somerset coast, to the south and east of London, then running up the east coast to Richmond (Foot 2006). It was built between 1940 and 1941 after Dunkirk and designed to halt the advance of an armoured enemy force if the initial coastal defences had failed.

The form and layout of the stop line are recorded on wartime and post-war aerial photographs (Fig 35). For much of its course on Hoo the stop line was constructed as a broad machine-cut ditch, some stretches using existing drainage ditches widened and deepened to impede tank movement. Road blocks were placed where roads and tracks crossed the line and it was supported along its entire length by pillboxes and defended areas. It extends from Hoo St Werburgh, a 'defended village' (Foot 2006, 408), continued north past Kingshill Camp, a 'defended locality', and then headed north-west, skirting the eastern and northern perimeters of Lodge Hill munitions depot, incorporating existing blocks of woodland as natural obstacles. The line extended to Cliffe Woods, and then headed north-west over the railway line, crossing several lanes south of Cliffe village before meeting a large disused quarry. The ditch cut diagonally down the edge of the

quarry for a short distance. In Higham Marshes the line again utilised flooded quarries and drainage ditches before reaching the Thames shore. At both ends anti-tank blocks were placed over the sea wall and down onto the shore. These blocks still survive at either end.

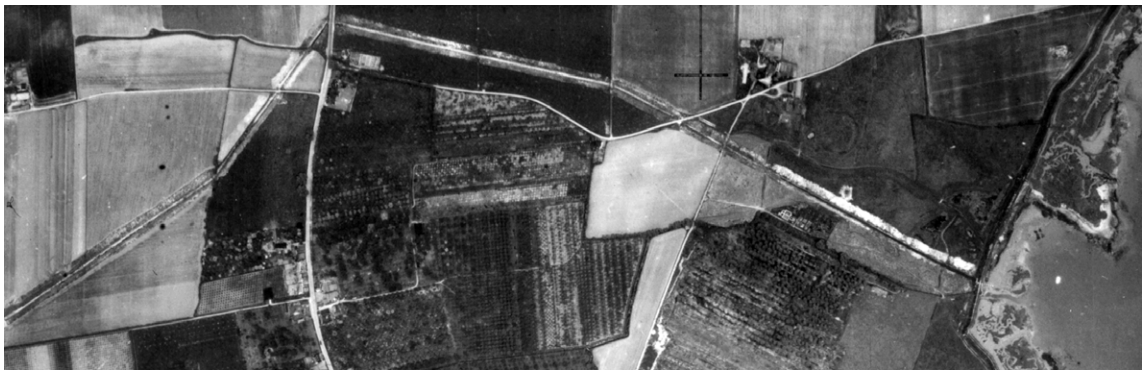

Figure 35 Aerial views of the WW II Stop line ditch across the Hoo Peninsula at Hoo St. Werburgh Detail from RAF HLA/542 2066 18-MAY-1942 English Heritage RAF Photography.

Most of the stop line ditch was filled-in before the end of the war. At each end of the line a short stretch of the stop line ditch was formed created by re-cutting an existing drainage ditch (MacDougall 1980, 160) and these survive behind the sea walls. A further short section by the quarry south of Cliffe can also still be seen. Filled sections have been identified as slight depressions crossing fields (Foot 2006b, 124-5); whilst other levelled stretches are visible on recent aerial photographs as cropmarks and soilmarks, indicating sub-surface survival of the in-filled ditch. The ditch was also recorded by an archaeological section cut across it near Hoo St. Werburgh in connection with minerals extraction.

Countering aerial attack

From the onset of the war air raids were a continual threat both day and night. The south-east coast of Britain again was in the front line both as a target and on the path of aircraft passing over the area on their way to and from targets inland, frequently receiving off-loaded bombs dropped by returning enemy aircraft. The munitions depots, military installations and industrial sites on the Hoo Peninsula made it a prime target for raids. To counter aerial attack, anti-aircraft gun emplacements were placed throughout the country. The pre-First World War northern Lodge Hill battery was reused in the Second World War as a Bofors light anti-aircraft battery, and later as a Z-rocket anti-aircraft battery. Despite the passage of time, all of the structures of the site are present with intact roofs, although the two emplacements are in a damaged state.

On Hoo a large number of both heavy (HAA) and Light Anti-Aircraft (LAA) batteries supported by searchlights were sited at regular intervals across the peninsula, and concentrated in greater numbers around important sites such as Chattenden, Lodge Hill and Chatham (Smith 2011, 178). These batteries were laid out on roughly the same plan

– a cluster of four or more defended gun emplacements in a clover leaf formation with a command point, generator and accommodation, all linked by support road. Some had Gun Laying (GL) radar, the receivers set at the centre of an octagonal arrangement of wire adjacent to the gun emplacement (Brown et al, 1996). As the war progressed some of the HAA batteries, such as Fenn Street HAA, were strengthened with larger guns set within concrete gun emplacements. The HAA at Tower Hill had a gun layout typical of those built before or in the early years of the war.

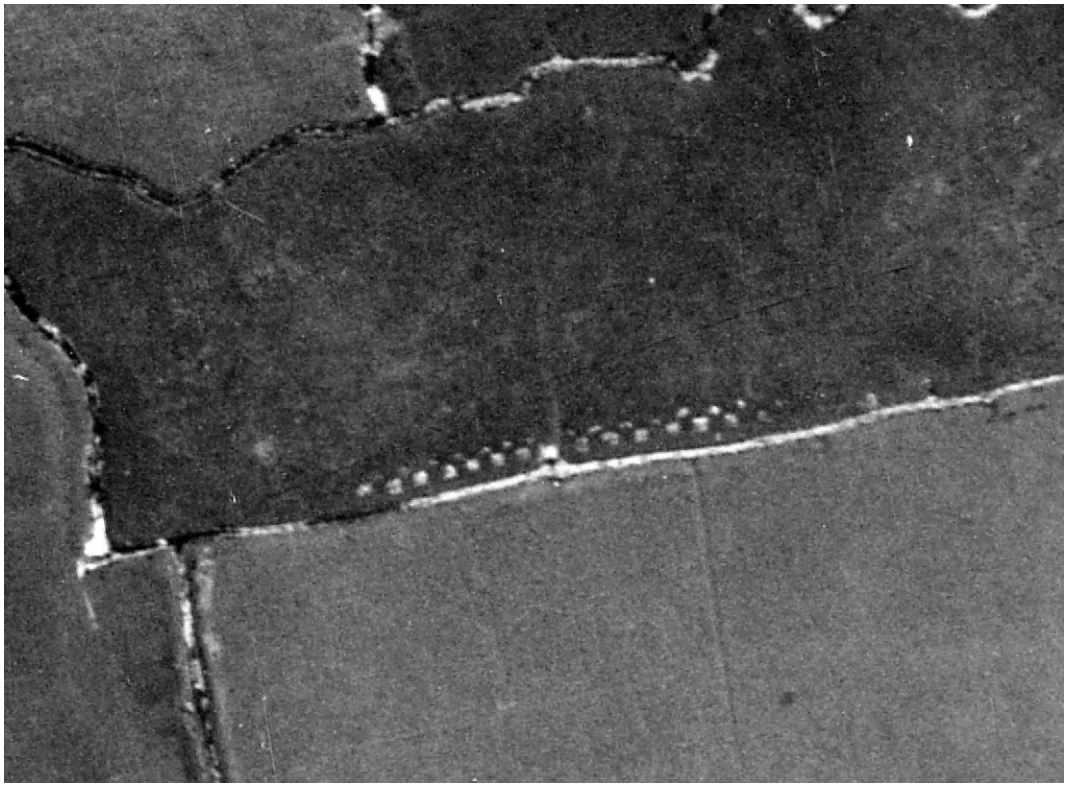

Figure 36 The site of a Diver battery on St. Mary's Marshes (north is to the left). Each pale square is the former location of individual emplacements. Detail from RAF 106G/UK/1447 1058 01-MAY-1946 English Heritage RAF Photography.

In August 1944, after D-Day, the air defences of Britain were redistributed in Operation Diver to counter the threat of the V1 flying bombs, and these batteries became known as Diver sites (English Heritage 2000). Many of these were temporary and often mobile emplacements leaving little trace, but the possible sites of at least five of these have been identified in St Mary's Marshes and Allhallows Marshes, in the north of the peninsula. The remains of the Diver gun emplacements were seen as lines of square pale patches in the vegetation visible on RAF photographs taken in 1946 - each marking the location where a single gun emplacement had compressed the ground. For example, the site of one LAA on St Mary's Marshes recorded in a wartime listing (Dobinson 1996) was identified by a line of 16 pale squares separated mid-way by larger mark at the edge of a field on the marshes (Fig 36) and is thought to mark the site of a battery of sixteen 22mm guns, an

arrangement typical of RAF regiment LAA Diver batteries. Similar marks were also seen on Allhallows Marshes (Fig 37).

Figure 37 The remains of an eight gun Diver battery in Allhallows Marshes. The white mark at the centre of the photograph indicates the position of the command post. Detail from RAF 106G/UK/1444 4011 01-MAY-1946 English Heritage RAF Photography.

Figure 38 Maunsell fort remains in Higham Creek 26604/011 6-Apr-2010 © English Heritage.

Midway through the war a number of marine anti-aircraft forts were built and placed in the Thames Estuary. Maunsell sea forts, named after their designer Guy Maunsell, were designed to allow anti-aircraft batteries to be established within the estuary. Four naval forts and three army forts were placed in the Thames Estuary (Turner, 1994; 1995). One of the three Maunsell army forts, Nore (U5), was located east of the Isle of Grain, north of Sheppey.

These army forts were constructions of seven interconnecting steel platforms with steel top-houses set on four legs. A central control and accommodation tower was surrounded by five gun towers and a searchlight tower. After the war these were left in the estuary, but that at Nore was struck by a ship in 1953 (Turner 1995, 144). The wrecked remains became a hazard to shipping and it was dismantled and scrapped in 1959-60 (ibid 146) and the remains of the base and the legs of at least one tower were dumped in the mud at Higham Creek. The remains, along with a number of wooden hulks, including that of the Hans Egede (1922) can still be seen at low tide (Fig 38).

Bombing decoys

From the start of the war a network of sophisticated bombing decoys was set up across the country to draw enemy bombing raids away from major urban, industrial and military targets (Dobinson 2000). Various ingenious methods were employed to deceive the enemy: for daytime raids fake airfields with dummy tents and cut-out planes (Q sites), and to mislead night raids there were decoys with lights simulating depots, towns and airfields (QL sites), and controlled fires (QF sites) simulating burning buildings from bomb damage. Special Fire (SF) sites, also known as Starfish decoys, simulated a range of fires. After the bombing of Coventry in November 1940, all major towns were provided with decoys to draw fire (ibid).

Because of the concentration of military installations, depots (Chattenden, Lodge Hill and Upnor), the dockyard and industrial sites on the Hoo Peninsula, a number of decoys were established on Hoo and around the Medway. Because of the ephemeral nature of many decoy structures, survivals can be limited and difficult to identify.

The well preserved remains of a decoy were located in Allhallows Marshes south of the Yantlet Creek (Fig 39). It was built by the Petroleum Board in 1941 as part of the 'P-series' of oil decoys to deflect enemy bombing from the oil storage on the Isle of Grain. Fuel oil was burned in specially-shaped pools and channels lined with brick or clay designed to replicate fuel storage tanks targeted by bombs when seen from the air. The decoy ponds were linked to a single external sump by a narrow channel and contained within bunded enclosures. The decoy was ignited electrically from a remote shelter or control building. Aerial photography from 1978 shows the earthwork remains of four firebreaks and traces of the channels containing the charge control wires. A control building and ancillary building also survive in good condition to the north-west of the main site (EARTH.GOOGLE.COM 21-APR-2007 accessed 13-JUN-2011).

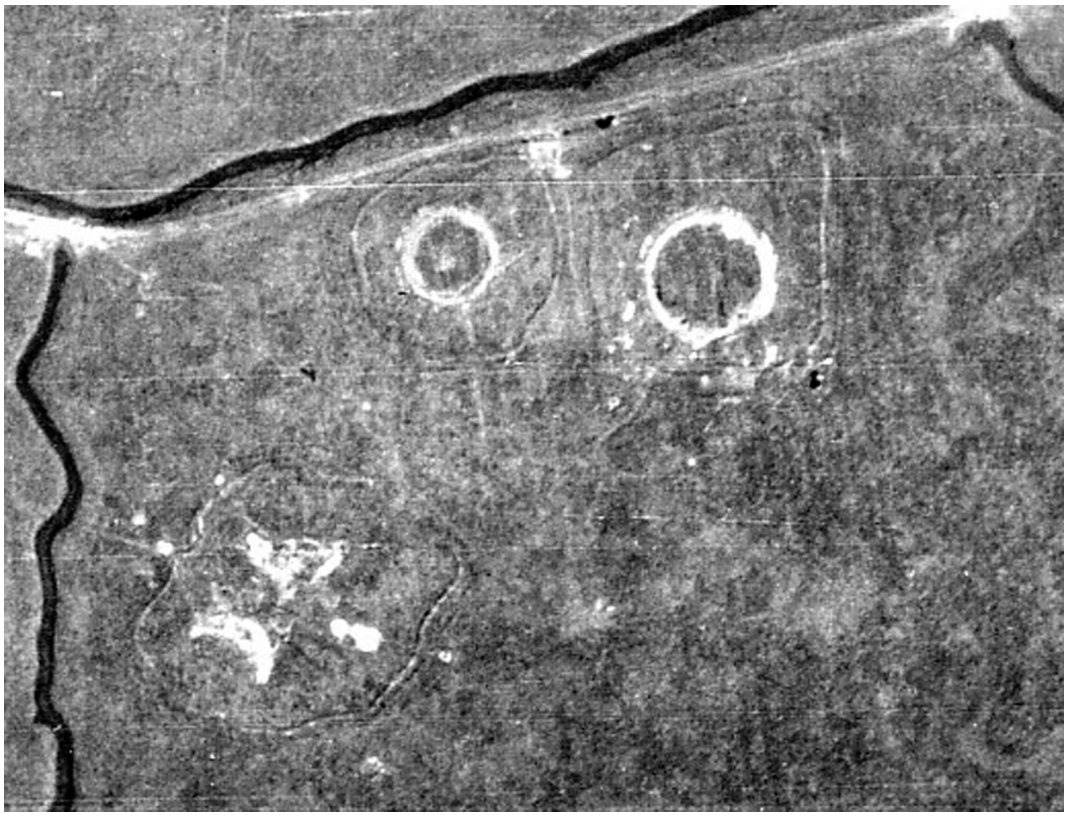

Figure 39 The P-series oil decoy on Allhallows marshes. The channels that held the burning fuel oil, their shapes helping to create the impression that storage tanks were alight. Narrow banks surrounding these features acted as firebreaks. Detail of RAF 106G/UK/1444 4013 01-MAY-1946 English Heritage RAF Photography.

The largest site was a combined QL and Starfish decoy with at least seven dispersed sites located on Nor Marsh, an island in the Medway. The lights of the QL sites were designed to resemble a port during blackout. The 'Starfish' decoy comprised dispersed groups of embanked ponds in which oil was lit to create a series of controlled fires.

A smaller QF Naval bombing decoy was recorded in fields to the west of Lower Stoke, directly north of Malmaynes Hall Farm. Comprising four oval embanked ponds and small buildings within a triangular fenced area, this site appeared on aerial photographs taken in 1946, but has since been destroyed by the excavation of a small agricultural pond.

There is a record of a QL site within the extensive site of the former Cliffe Explosives works on the Cliffe Marshes, which was abandoned in the inter war years, a site which provided an ideal remote location for a decoy. There is a surviving control building to the south of the explosives factory (R Pullen pers comm) but no other trace of the decoy was found, perhaps because it only comprised lights mounted on poles.

Post-war decommissioning

At the end of the war the coastal batteries were put into care and maintenance before being decommissioned, along with Britain's other coastal defences, in 1956 (Smith 1985, 45). Most now exist in varying states of repair, closed off to prevent access (Fig 40).

Figure 40 Slough Fort in 2011 as used for stabling for trekking ponies. © English Heritage.

The areas around the forts, especially those in the peripheral marsh areas of the peninsula, have suffered neglect their military stories long forgotten by many encountering them. Cliffe Fort, which was dogged by problems with rising ground water from the outset, is now flooded and overgrown. It sits surrounded by piles of sand and gravel from an adjacent aggregates works (Fig 41).

During both world wars the then-existing fortifications on Grain were adapted and reused. In 1961 demolition began of the fort and batteries, but not Grain Tower.[163/44/SR, Medway Archives]. The retained earthworks and in-filled fort then became part of a recreation area named St James Park. In the years following the Second World War, Grain village underwent residential expansion, meeting increased housing demand accompanying the growth of the petrochemicals industry and power generation, which changed the dominant character of Grain from military to industrial.

Figure 41 Aerial view of the flooded remains of Cliffe Fort surrounded by heaps of aggregates. 26604/008 6-Apr-2010 © English Heritage.

Figure 42 Shornemead fort in 2011 © English Heritage.

Shornemead fort (Fig 42) is believed to have been partially demolished by the Royal Engineers of the Army School of Demolition and very little remains other than the facing wall and casemates. The underground magazines have been flooded and closed off. By the late 1970s the barracks were in a derelict state. Some time between 1947 and 1951 the marshes to the south of Shornemead Fort became a military testing range leaving a swathe of craters which are now water-filled, their military character having become transformed into a landscape of conservation: the Shorne Marshes Nature Reserve, an important RSPB reserve.

The siting of the 20th century ranges at Shornemead may well have been connected to the presence of the 19th century Milton Rifle Range in Eastcourt Marshes to the west. This had been home to a small arms range since 1860, established shortly after Shornemead Fort was constructed and is depicted on the 1862 Ordnance Survey map. Milton Range was sited here following a refusal of permission for a similar site opposite the dockyard at Chatham (Anon 1859). The Eastcourt Marshes offered a location away from a populated area close to the river's edge. Modernised in 1898 for rifle training of regular and reserve forces it consists of around 15 parallel firing points - each a linear north-south bank of c.100m in length - spaced 40m apart, perpendicular to the riverbank. At the eastern end is the target mound or butt (appearing as two parallel banks). Drainage ditches criss-cross the site and the firing points, though thought to survive are no longer being used to their original full width. It is now a Metropolitan Police training facility utilising the central portion of the original range (Smith 2010, 8).

Major military establishments – The Hoo Peninsula and the arming of the fleet

The role of the Hoo Peninsula in the defence of the nation is not just represented by the historic forts and defences around the coasts. Since the 17th century, starting with Upnor Castle, Hoo was one of the key national sites for the manufacture, storage and distribution of munitions to the navy. It also became associated with the Royal Engineers from their regimental home at Brompton Barracks, near Chatham – developing techniques of trench warfare and transportation at their base at Chattenden. The site of RNAS Kingsnorth – an experimental airship station of 1912-20 later added to the military use of the peninsula. On Grain, an early seaplane base and Marine Experimental Aircraft Depot (known as RNAS Grain) was established 1913-24.

Upnor and Lodge Hill (munitions and training)

Upnor Castle, in particular, stands as testament to the long naval and military importance of the River Medway and the Hoo Peninsula. A bulwark built in1559 beside the Medway at the beginning of the reign of Elizabeth I to protect her warships moored at Chatham dockyards (Saunders 1967). The initial bulwark was strengthened in the first half of the 17th century to create a single large angled bastion with masonry towers. Improvements were also made to the keep and a barrack block was built (Lowry 2006). In 1668, a year after the Dutch raid on the Medway, Upnor Castle was converted into a magazine and store (Evans 2006, 13). A second barrack block was added in 1718 and a storekeeper's house is also of early 18th century date. The castle's capacity as a magazine was insufficient under the demands placed on it by protracted warfare in the middle of the 18th century and so in 1763 an existing storehouse with a pier in Upnor Village was converted into a temporary magazine (Evans, 2006, 43 & WO44/143).

In the 19th century repeated periods of war - the French Revolutionary and Napoleonic wars and the Crimean War - and rapid developments in armaments requiring more space and specialist buildings prompted expansion at Upnor Castle. A storehouse was converted to a temporary magazine after the Seven Years War (Evans 2006, 43). By the early 19th century this was no longer serviceable and in 1808 a new magazine (completed 1812) was built downstream of the castle (ibid 44-5). A new magazine and shell store were begun in 1856, completed the following year (ibid 65-6; 247). The 1812 magazine has been demolished but the 1857 magazine, which is of the same design, survives (Evans 2006, 247; 66). It is internally distinguished by its catenary arches, previously employed by the Royal Engineers in the Drop Redoubt and Napoleonic Tunnels at Dover. The gabled facades and use of Tudor Gothic detail has resulted in a uniquely 'architectural' 19th century magazine, possibly in response to its prominent location on the Medway and close to the Castle.

In the 1880s Upnor was transferred to Admiralty control becoming a Royal Naval Armaments Depot in 1891. Following the Naval Defence Act of 1889 the navy was

significantly expanded and correspondingly the amount of ammunition and stores required for ships in commission increased (Evans 2006). Gunpowder required merely to be kept well aired and protected against sparks, and the magazines up till now had been constructed with these requirements governing their construction. Massive shell stores were now required, requiring a much larger footprint than the gunpowder magazines, together with mine stores though at that period the Naval use of mines was very limited. As a result, a large amount of Upnor's stock had to be dispersed to other depots as well as hulks and barges in the Medway. The Upnor site, however, continued to expand eastwards along the Medway in the late 19th century, with storage for wet and dry guncotton in 1895-6 – the main explosive in mines and torpedo warheads - but it was not until 1902 that the Admiralty decided to establish a shell filling facility on the Medway, which was to be further downstream, at Teapot Hard. That scheme was abandoned in January 1905 and a set of six Shell Filling Rooms was finally added to Upnor in 1906-7 (Evans 2006, 247). This is later than and also reverses the normal sequence of development evident at Priddy's Hard and Bull Point, the depots respectively for Portsmouth and Plymouth.

On Tower Hill to the west of Upnor is an area known today as Ordnance Plantation. Plans of 1806 show the fields divided into parcels and sub let by the Board of Ordnance to private individuals and described in correspondence of 1824 and 1839 as 'a plantation of walnut, ash, willow, brushwood and furze for use by the Board' (Evans, 2006, 45, TNA167). Walnut was used for gun stocks and the quicksets and brushwood for trench revetments and gabions for use in fieldworks. A plan of 1821 shows trench lines with bastions to the north of Tower Hill described as works thrown up in the course of 'Col. Pasley's instruction'. Further works including destroyed galleries, entrenchments and mine craters extended north across the slope through the plantation to a small hill above the Upnor Road. Col Sir Charles Pasley (1780-1861) was appointed the first director of the Engineers Establishment at Chatham in 1812 and this was the predecessor of the Royal School of Military Engineering that remains at Brompton Barracks (Evans, 2006, 253). As the Engineers were part of the Board of Ordnance until 1855 he would have had access to Board of Ordnance Land and the depiction of musketry holes (slit trenches) and further entrenchments on the side of Tower Hill suggest that he made full use of this for instructional earthworks before obtaining use of the land at Lower Lines Chatham as it was closer to the engineer barracks at Brompton and did not require a daily crossing of the river Medway by boat to Upnor. During the Second World War a Heavy Anti Aircraft battery and military camp were sited on Tower Hill defending the both Upnor and Chatham opposite. The Royal Engineers practised pontooning on the Medway and at Upper Upnor they retain a practice ground, latterly known as Gundulph Pool.

Today both the Ordnance Plantation and Tower Hill remain clear of development, but there has been extensive activity associated with heavy plant training by the Royal Engineers and other parts remain largely wooded. Only a few areas of the ground, mainly east and west of Upnor Road, have been developed, notably for a small barracks in the late 19th century, with the majority of the area left as managed woodland. Traces of the

plantations and mine craters, entrenchments connected with Pasley's activities may remain, with some of the planting following the trench lines left by these works.

Chattenden Barracks, magazines and railway

On the hill above Upnor, woods conceal an extensive complex of military buildings and installations. The oldest of these was Chattenden Barracks (now demolished) which provided extensive accommodation and later training facilities for the Royal School of Military Engineering. The barracks were completed in 1872-73, and in response to increased demand for munitions storage five new magazines (separated by broad earthen traverses to absorb any blast and set within a high perimeter enclosure wall) were built at Great Chattenden Wood, completed in 1875 (Evans 2006, 92).

The magazines were connected to Chattenden Barracks and Upnor, and later to the Lodge Hill Armament Depot by the Chattenden and Upnor Railway. The railway was begun in 1837 by the Royal Engineers at Upnor for instructional purposes for the (8th Railway Company) School of Military Engineering based at Chattenden Barracks, and it conveyed men and stores to the new Chattenden magazines. By 1875 there were some four miles of track from Pontoon Hard to the Railway Depot, with a spur line going from the crossing towards Lower Upnor and a line from Chattenden to Hoo Creek. The line was re–laid, converted to 2ft 6in gauge in 1885, and extended to the east end of the new magazines at Lodge Hill in 1902, connecting the wharfs and piers at Upnor and the transfer point with the standard gauge main line running from Sharnal Street. Chattenden Barracks was vacated in 1980 and demolished. The site is now designated as brownfield land available for redevelopment for residential and light industrial use.

The presence of many different types of trench on land adjacent to an RSME facility suggests that the site was used (potentially from the 1870s onwards) to develop types and methods of trenching, rather than simply for practice. One area occupied by First World War style trenches (Fig 43 and 44) corresponds with an area on a War Department map of the Lodge Hill field defences 1914 which is labelled 'New field works ground' (PRO: WO 78/4400 Chatham Field Defences 8.11.1914). There are several different types and configurations of trenches, including at least four tightly concentrated groups or systems, possibly representing defended locations or redoubts. Over 90 hectares of these trenches were seen as earthworks on aerial photographs from the 1940s and 1950s, extending across the west and south west facing slopes between Chattenden Barracks, Round Top Wood and Islingham Farm. Although the trenches to the east and south of Islingham Farm were destroyed by road construction in about 1950, photographs taken in March 2011 show that many of the trenches survive as earthworks.

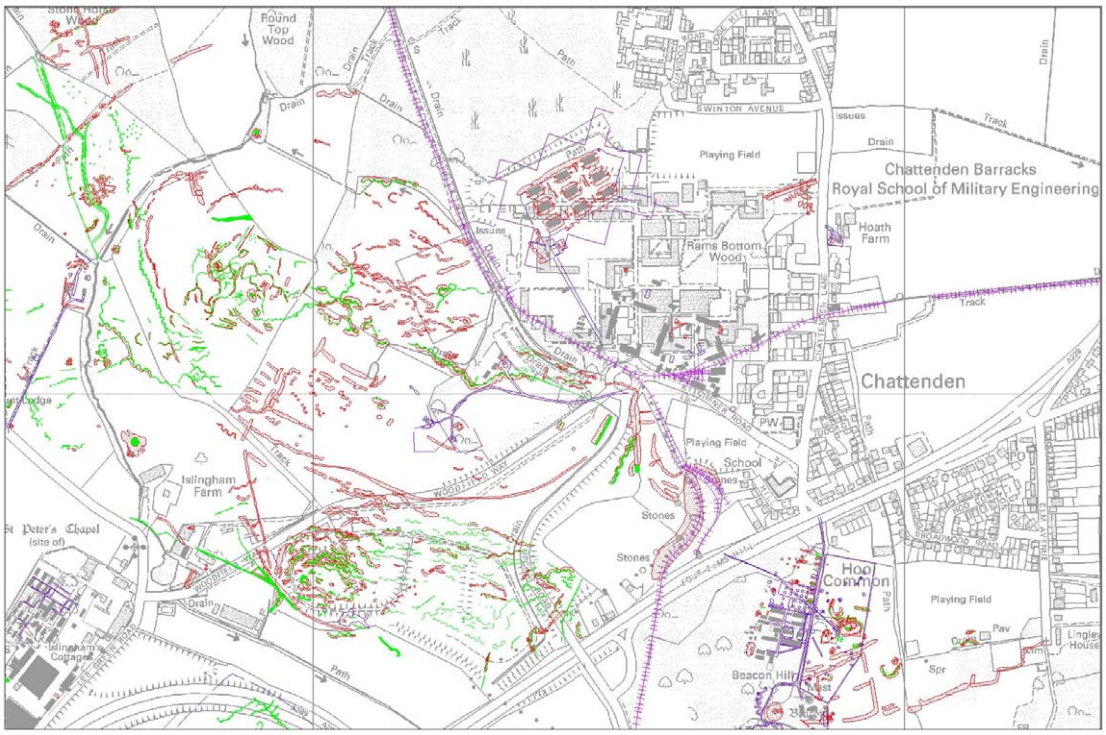

Figure 43 Extract of mapping from 1940s and 1950s aerial photographs showing the extensive practice trenches associated with the Chattenden Royal School of Military Engineering © English Heritage Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

Figure 44 The remains of practice trenches at Chattenden. Detail of RAF CPE/UK/1923 3086 16-JAN-1947 English Heritage RAF Photography.

Lodge Hill naval ordnance depot

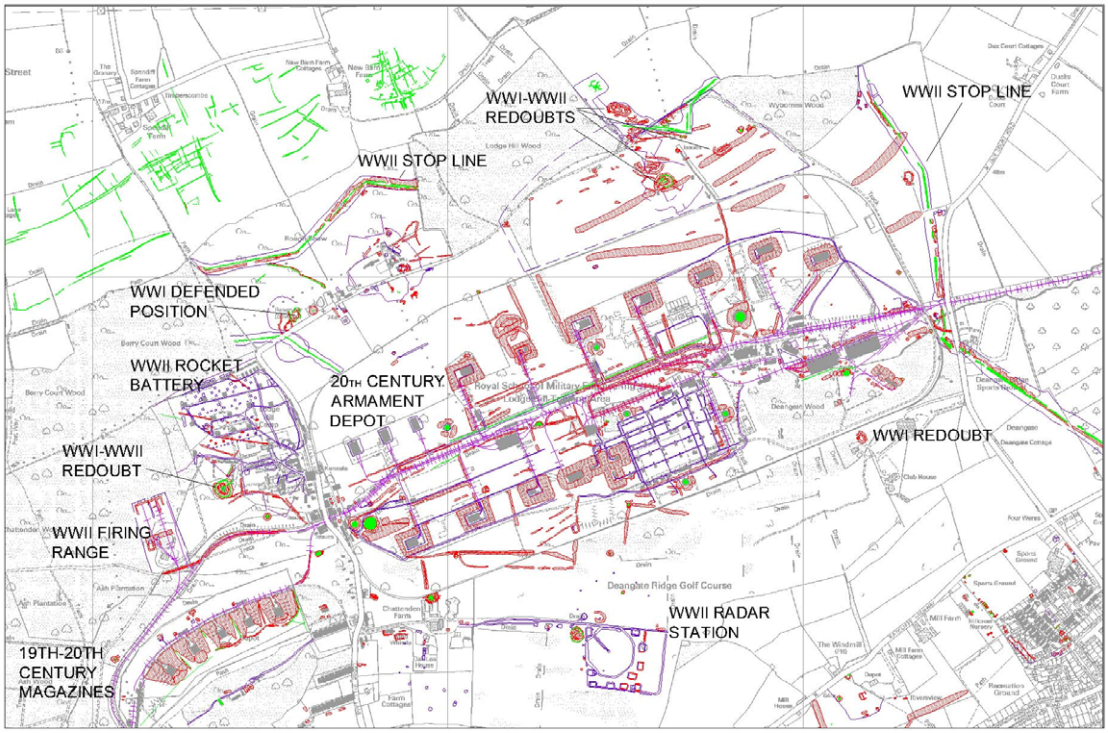

Figure 45 Extract of mapping from aerial photographs of Lodge Hill Naval Ordnance Depot with World War I and World War II defences including the World War II stop line skirting the northern and eastern sides of the complex. © English Heritage. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

By far the largest of the naval establishments in the complex sited above the Medway is the Royal Naval Ordnance Depot on Lodge Hill (Fig 45) and much of the following is taken from Evans 2006. The later part of the 19th century had seen a number of accidents and explosions at munitions stores in Britain and abroad, giving concern that many old depots were not adequate for the storage of modern armaments. The solution was to build a new central depot on a convenient site. With Chattenden Magazines already in existence with its rail link to Upnor, the undeveloped site at Lodge Hill presented an ideal site to lay out a new purpose-built depot. Construction of the principal elements of the 125 hectare site began after 1898. The buildings were arranged in sequence on either side of a railway line which formed the main axis of the whole establishment, making it the first ordnance depot which could be supplied independently of the sea. By 1904 the Hoo Peninsula was furnished with the most advanced depot in the country. As at Chattenden, the cordite, guncotton and returned ammunition magazines were protected by earthen traverses but these were less substantial than for the black powder storage for which the Chattenden Enclosure had been designed. Other buildings and a laboratory complex of numerous small huts were arranged on a grid pattern and served by an internal tramway. The railway connected at its western end with the Chattenden and Upnor Railway and at its eastern end, via a standard gauge

connection, to the main line at Sharnal Street. During the First World War Lodge Hill was heavily defended against air raids, with two anti-aircraft batteries – the first such purpose built examples to be provided in Britain - initially with Howitzers on improvised mountings, later replaced with permanent purpose-built emplacements (Evans 2006, 79). Also thought to be of World War I date are a series of one man concrete sentry posts in which it is thought guards would have taken shelter during aerial bombardment. These are of a specific design only known to date at sites in Medway (there is also an example at Lower Upnor Ordnance Depot) and may thus be a local response to high risk of being in an explosives depot whilst being bombed. Around the perimeter were a number of earthen redoubts, seen on aerial photographs taken in the 1940s and noted on a 1914 War Department map of Lodge Hill field defences. The facility continued in use throughout the Second World War, during which time additional stores and support structures were added to the site, including two HAA gun emplacements and a large Z1 Battery (64 single rocket projectors supported by radar), smaller gun emplacements and numerous air raid shelters. In addition to these precautions Lodge Hill was also protected by the stop line discussed earlier.

Places of innovation and experimentation

Yantlet Creek artillery velocity testing facility

Adjacent to the Yantlet Creek on the Isle of Grain are the remains of the Yantlet artillery testing range and the following account is largely derived from (Edgeworth, forthcoming). Established in 1917-18, this facility was an Admiralty proving and experimental establishment for proof-testing naval ordnance. Guns were brought by rail and by barge from the Woolwich Arsenal to a dock on the Yantlet Creek. Two barges, *Gog* and *Magog* were used, towed by the steamship *Katherine II.* One track of the SECR (South Eastern and Chatham Railway) Hundred of Hoo branch line near Grain terminated on raised embanked platforms to the south of Police Cottages south-east of the main site. These were labelled as firing points on a 1924 plan of the site.

The main testing range was aligned on a north-east – south-west axis, extending for over 270m from the dock to the second of two pairs of masts (Fig 46). A rail mounted steam gantry built by Vickers Armstrong hauled the guns from the dock onto a concrete apron. Beyond the apron to north-east were the two pairs of masts with stays. Suspended between each pair were screens of electric wires forming a circuit. Shells were fired through the two screens of wires and the velocity of the gun calculated. The shells were fired north-east across the Thames Estuary, the danger area extending in a fan as far as Shoeburyness. The establishment was decommissioned in the 1950s.

A site visit in 2011 by English Heritage found that although the masts and gantry have been removed, the main concrete sub-structure with traces of fixing points and the tethering blocks for the mast cables still remain. Many of the original buildings, hard

standings and parts of the ruined dock also survive. Parts of the branch line embankment and the terminal firing point (with rails in situ) can still be seen to the south of the main installation.

Figure 46 Yantlet Creek Velocity Testing Range from the north with the two pairs of masts in situ. Detail from RAF 540/393 PO58 30-JUL-1950 English Heritage RAF Photography.

RNAS at Kingsnorth

Midway along the southern side of the peninsula is Kingsnorth power station, built between 1963 and 1973 on the site of the hydrogen plant and open landing grounds of RNAS Kingsnorth. The site at Teapot Hard was earmarked in 1905 by the Admiralty as the site of a proposed torpedo range, but the project was shelved in 1907 (Evans, 2006 176-180). The Admiralty developed its deployment of fixed wing aircraft and airships in parallel, commissioning Kingsnorth as a Class G Airship Station in 1912. Airships were originally perceived to have an important role to play in the protection of our shores. By the outbreak of the First World War Kingsnorth was operational with one airship, the *Astra Torres*, joined shortly after by *Perseval*, to carry out anti-submarine patrols over the Thames and English Channel. Experienced staff from the Royal Aircraft Factory at Farnborough were moved to Kingsnorth to develop a workable anti-submarine airship. Farnborough ceased airship production in 1915 and Kingsnorth became the centre of airship experimentation, development and training (Delve 2005, 259).

Various non-rigid airship types were developed at the base including the 'SS' Submarine Scout and the 'C' Coastal classes. These first ships were cheap, but functional constructions using readily available materials. The 'SS' class was essentially the fuselage of a BE2c plane suspended beneath a simple 'Willows' gas envelope. The subsequent C class airship used a similar gas envelope, but with a cabin constructed from two AVRO 504 fuselages. Development, testing and training continued at Kingsnorth throughout the First World War until the base was closed in 1920 (ibid).

The station consisted of two main airship hangars (Fig 47) and smaller buildings including accommodation and a hydrogen production plant with four large gas holders linked by a

central light railway (Fig 48). Aerial photographs taken in the 1940s show the remaining foundations of the hangars with traces of the arced runners at either end for the hangar doors and adjacent slit trenches which would have offered some protection during an air raid.

Figure 47 Outline of southern hangar at Kingsnorth taken in 1952. The arcs followed by the doors when opened or closed can be seen top right. Detail of RAF 58/856 3103 24-APR-1952 English Heritage RAF Photography.

The sheer size of the airships called for huge hangars and equally large crosswind screens to shield the moored ships. With the large hydrogen gas holders this would certainly have been an eye-catching site on the low lying ground at the head of the Damhead Creek.

Following its closure the base was decommissioned and component parts sold off – two of the gas holders and tanks were advertised in a 1919 edition of *The Times* under 'Surplus Government Property for Sale' (Anon 1919, 23). In 1921at least one of the airship hangars was re-used as a wood pulp factory, but both had been demolished by 1942 (the date of the earliest aerial photographs of the site), their floors and other features were still visible on these and later photographs. In 1931 the buildings to the north of the hangars were incorporated into the Berry Wiggins & Co oil refinery (see Chapter 3). Subsequent redevelopment of the area resulted in demolition of almost all of RNAS Kingsnorth though one building may survive within the later development. Another building on the peninsula from this period is a small hangar (or part of one) re-erected at Moat Farm, St. Mary Hoo which is used as a farm building. A slight parchmark of a short section of the railway line which ran through the site to a jetty on the river is visible in a

grassed area to the south of the power station, and it is possible that traces of the foundations of other airship station structures survive beneath this undeveloped part of the site. There may also be subsurface survival of some features.

Figure 48 Remains of the hydrogen plant at RNAS Kingsnorth photographed in 1952. The faint outline of four circular gas holders can be seen on the left. Detail of RAF 58/4106 24-Apr-1952 English Heritage RAF Photography.

RNAS at Grain

Whilst Kingsnorth became established as an airship base, the southern side of the Isle of Grain was chosen as the location of a Royal Navy Air Service (RNAS) seaplane base and later also the Marine Experimental Aircraft Depot (Fig 49). The location chosen was near Horseshoe Point and Cockleshell Hard. A possible surviving part of the site, with traces of hard standings, is sandwiched between Grain Power Station and the Medway Power Station and Container Depot.

Grain's seaplane base was commissioned in 1912, becoming one of the earliest Naval Air Stations in the country. However the Isle of Grain's association with naval aviation pre-dates this station as the first plane to take off from a Royal Naval ship (in Sheerness harbour) landed at Grain before being transported on a coaling lighter to the waiting

battleship *HMS Africa* in January of that year (Anon 1912, 7). Other experimental work was carried out at Grain before the creation of the Marine Experimental Aircraft Depot and in 1914 it was reported that during tests from RNAS Grain a Short seaplane fitted with wireless telegraphic equipment reached a speed of 78miles/hr and climbed 4000 feet in 7.5 minutes (Anon 1914a, 6). The importance of RNAS Grain may be reflected in the visit from Winston Churchill, then First Lord of the Admiralty, in April 1914. One of four biplanes visiting from the Naval Flying School at Eastchurch took off and performed several circuits of the harbour as the First Lord arrived (Anon 1914b, 8).

Figure 49 The remains of the site of the RNAS on Grain in1950. RAF 540/393 PO29 30-JUL-1950 English Heritage RAF Photography.

The Port Victoria Marine Experimental Aircraft Depot was established in 1915, comprising an Experimental Construction Depot, a Seaplane Test Depot and an Experimental Armament Section. The base rapidly grew, with hangars and ancillary buildings, a landing-ground, two slipways and a jetty added. New aircraft designs, flotation systems and armaments were developed here, and deck-landing trials were undertaken on the landing-strip the size of a deck-landing area. The base was renamed the Marine and Armament Experimental Establishment in 1920 and then renamed again in 1924 as the Marine Aircraft Experimental Establishment before it was moved to Felixstowe.

The exact location of the landing strip could not be identified from aerial photographs but map evidence shows some change in the ditches on the marshes between 1908 and

1931. It is possible that the filling-in of a drainage ditch was carried out as part of the preparation of the ground for a landing strip.

RNAS Grain was demolished between the wars and the site re-used during the Second World War for dispersed storage, probably a military armaments depot. This wartime site consisted of a complex of buildings along the coast immediately north of Cockleshell Hard and an area of dispersed hard standings, linked by a narrow road, in the area to the north of Horseshoe point. Although most of the earlier seaplane base was demolished, the aerial photographs indicate that some of the buildings and the jetty survived to be incorporated in the Second World War installation on the site. Most of the south western site was destroyed in the construction of the post-Second World War BP oil refinery; the north-eastern corner of this site is now under Grain power station. The dispersed buildings were still present in 1966 but all but two had been demolished by 1978. Although the main area occupied by this site remains undeveloped at the edge of the power station complex, very little trace other than a few building hardstandings remains visible. The remains of the slipway at Horseshoe Point were still visible in 2003 (Google Earth 2003 Accessed 1-Sep-2011) but may have been totally removed in the building of a new jetty visible on aerial photographs taken in 2007 (Google Earth 2007 Accessed 1-Sep-2012).

5 'LIVING' – SETTLEMENT ON HOO

How did industrial expansion change Hoo's settlements in the 19th and 20th centuries?

The 19th century

Much of this chapter is based on the Outline Historic Area Assessments – see appendix 3 for a list of the parishes included. The impact of industrialisation on the settlements of the peninsula in the 19th century was most closely focused on those parishes where industry was developing, namely the Isle of Grain, Stoke and Cliffe Between the 1870s and 1880s the population of Cliffe doubled, reflecting the expansion of the cement works followed by the establishment of the explosives works, and an associated growth in the parish's service economy. This led to the establishment of the many terraces visible in the parish which contribute much to the character of the settlement (Fig 50).

Figure 50 Terraced housing on the south side of Cooling Road, Cliffe, thought to have been constructed for the workers of the Curtis's and Harvey Ltd explosives factory © English Heritage.

Some of the houses and cottages were built by the owners of the cement works, Francis and Co, in the 1870s to house their workers, such as the Concrete Cottages on Salt Lane which survive today (Fig 51). The social standing of the workers is reflected in the status of these properties, with foremen living in the semi-detached residences and workers

occupying the terraces. However, most houses built in Cliffe in the late 19th century were constructed on a speculative basis by builders cashing in on market demand from the industrialisation of the parish. Restricted space within Cliffe's village core meant these terraces were developed to the south and east, which had a striking impact on the layout of the village.

Figure 51 Francis and Company provided some accommodation for its workforce, including Nos 1 and 2 Cliffe Villa Cottage (in foreground) and Nos 1-5 Concrete Cottages, Salt Lane. The grandest house built by the company, Cliffe Villa, which housed a Foreman at the works, no longer survives. © English Heritage.

The need to accommodate industrial workers, and to a lesser extent agricultural workers, also saw the expansion of Middle Stoke in the late 19th century when new housing in the form of terraces was built. Previously the clay diggers that worked on the saltings had lived on the river in barges or converted lighters. Terraced housing was also constructed in Grain village in the late 19th century, probably to house the poorest agricultural workers and those working clay and gravel pits. Many of these houses survive, albeit altered, but temporary accommodation was cleared, such as the camps established for construction workers building Grain Fort, which periodically swelled Grain's population in the mid-19th century.

The development of industry on the peninsula and the increasing population during the 19th century also led to the provision of some 'middle class' housing. A number of detached houses and villas were built, particularly in the settlements with industry or good

transport connections, for example Coningsby Villa in Stoke and in Cliffe, where some of the properties had river views.

Pre-war 20th century housing

The building of houses across the peninsula in the first half of the 20th century was generally done in a piecemeal fashion through private enterprise. A large private development was attempted at Cliffe Woods (Fig 52). The 'Rochester Park Estate and Garden Suburb' was a 'plotland' settlement, the result of woodland clearance in the south of the parish. A private speculator, WH Talbot, parcelled up and sold off plots between 1918 and 1939. This resulted in a haphazard layout of small buildings and chalets served by a network of unmade tracks and poor water, electricity and sewerage connections. The development of 'plotland' settlements was part of a wider movement related partly to the rise of car ownership as marginal land was laid out for housing in the inter-war years. Many, such as the Rochester Park Estate, were less than two hours from London (Morrison and Minnis 2012, 288). Though the area was redeveloped it is still possible to see where the original estate's layout influenced the north-west corner of the modern Cliffe Woods settlement.

Figure 52 Rochester Park Estate and Garden Suburb either side of Town Road in 1952 before it was redeveloped in the 1960s (RAF 58/856 4134 24-APR-1952) English Heritage RAF Photography.

Inter-war council housing

Local authority housing began to be built in the Hoo Peninsula between the First and Second World War. The impetus for construction was related to the need to improve the quality of accommodation for the poorest agricultural and industrial workers. This was part of a nation-wide recognition of the need for improved living conditions embodied in the 1919 Housing Act after the poor health of many recruits was noted during the First World War. The naming of these cottages reflects this national context such as 'Kitchener Cottages', Lower Stoke after the famous Field Marshall, 'Trenchard Cottages', Grain after the 'father of the RAF' and 'Beatty Cottages', Allhallows and 'Jellicoe Cottages', High Halstow, probably named after famous naval commanders of the First World War, the latter perhaps popular choices given the proximity of the naval dockyard at Chatham.

This inter-war housing was built by Hoo Rural District Council (which was subsumed into Strood Rural District Council in 1935) and involved the construction of small groups of houses across the parishes of the peninsula. The houses appear to reflect two inter-war periods of construction, one phase in the 1920s of which the houses follow a standard design and are very plain and rendered semi-detached houses with hipped tiled roofs. For example, 'Beatty Cottages', Stoke Road, Allhallows, 'Trenchard Cottages' on Chapel Road, Grain and St. Werburg Crescent, Ho St. Werburg (Fig 53). Other examples survive in High Halstow and St Mary Hoo, where the cottages are located outside the village itself, possible due to availability of land.

Figure 53 The first generation of local authority housing on Hoo was built in the 1920s and includes these houses in St. Werburgh Crescent, Hoo St. Werburgh (P1090842) © English Heritage.

The next phase of local authority house-building on the peninsula started in the 1930s and in some cases continued after the Second World War. These houses, bungalows and terraces differ from the early council housing in that they have some minimal 'arts and crafts' tile detailing. For example, those found north and east of Allhallows church laid out on 'Garden City' principles and terraces in Church Street, Cooling Road and, Thatchers Lane, Cliffe (Fig 54) which stand amongst other housing built in the parish at the time by private developers catering for people moving into the parish.

Figure 54 The second generation of local authority housing on Hoo took its cue from elements of Garden City housing and includes these houses in Thatcher's Lane, Cliffe and Cliffe Woods (P1080146) © English Heritage.

Post-war housing

As with many other aspects of the Hoo Peninsula's historic character, post-Second World War settlement expansion was heavily influenced by the construction of the oil refinery and power stations on the peninsula. Although the impact was varied between settlements, it has been felt on a broad level which probably reflects, at least to some extent, the increase in car ownership within the workforce of this period. Grain village, on the Isle of Grain, saw considerable change in this period and its expansion in order to house the workers of the oil refinery has given it the character of an industrial settlement.

The Kent Oil Refinery, as it was known, was begun in 1950 and by 1964 was the second largest in Britain (Anon 1964, 16; Matthews 1971, 128), bringing with it other associated industries and eventually power generation (see Chapter 3).

Much of the new post-war housing in Grain was built by the local authority (Strood Rural District Council). The first houses were built around 1949 as a continuation of pre-war housing policy and pre-date the refinery. These were constructed in brick or in a non-traditional system, pre-cast concrete-framed Airey Rural Houses. A vast expansion of council housing took place from 1950s to 1970s. Initially, another pre-cast concrete building system known as the Cornish Unit Type 1 was used in Grain and elsewhere in the peninsula including High Halstow and Hoo St. Werburgh. This system has subsequently been found to be structurally unsound and walls have often been rebuilt in brick although a few original examples survive (Fig 55). Later housing used 'rationalised traditional' construction methods, mixing conventional materials such as brick with concrete panels. When the refinery closed in 1981 residential development in Grain slowed. Recent development has been relatively modest consisting of individual properties, a small close of private houses off Chapel Lane and a block of flats on the site of the Cat and Cracker pub.

Figure 55 Example of surviving unfaced Cornish Unit Type 1 pre-cast concrete house in Hoo St. Werburgh. The use of these types of pre-cast building system reflects the need to respond to housing demands quickly and cheaply (P1090914) © English Heritage.

The pattern of post-war housing expansion for industrial workers seen at Grain was replicated in other parishes at the eastern end of the peninsula including Allhallows, Lower Stoke and Hoo St Werburgh. The provision of post-war council housing here, the main focus for the peninsula's industry in this period, was partly a consequence of the

failure of a scheme for a new town at Allhallows. In the 1950s British Petroleum and Dolphin Development and Management Co Ltd commissioned W Eric Adams and F Gibberd (who had formerly been involved in the development of Harlow New Town) to devise a scheme for a new town for a proposed population of 25,000 (Fig 56). The scheme was rejected due to objections over its size, the loss of agricultural land and the potential effects on the towns of Sheerness and Minster-in-Sheppey, leading to the dispersal of the required housing around the peninsula (Adams 1957, 181-190; Historic Area Research Report, forthcoming).

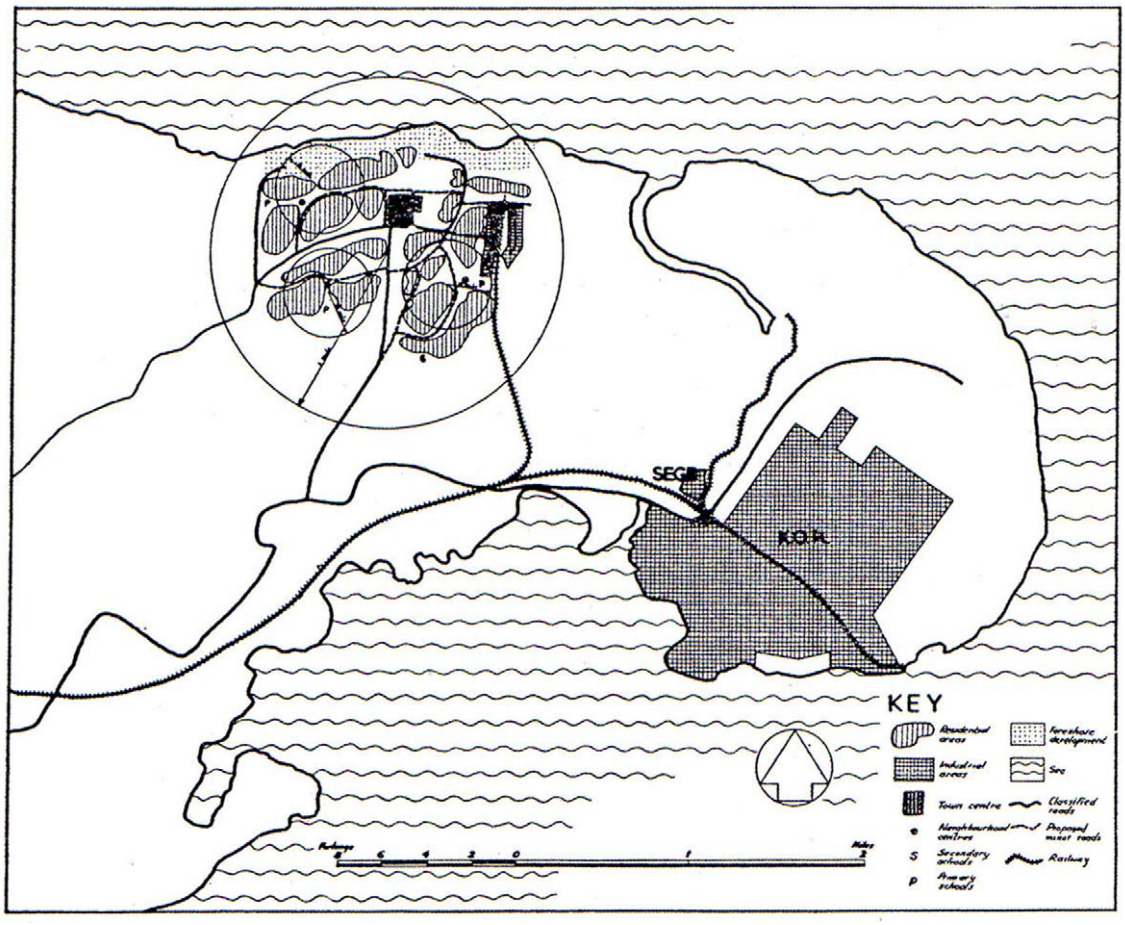

Figure 56 Proposed Allhallows New Town and vicinity (Reproduced with permission from Adams, WE 1957 'A private enterprise New Town' Town Planning Review 28, 3; Fig 2, 185).

Consequently like Grain village itself, other villages such as Allhallows, Stoke, Hoo St Werburgh and High Halstow were subjected to local authority building programmes in the 1950s and 1970s as well as private housing development. This occurred in two phases broadly relating first to the development of the oil refinery in the 1950s and then the power stations in the 1970s. In High Halstow, the late 1940s brick-built council housing with gable tile details was greatly expanded in the 1950s. Mid to late 20th century housing spread along the road between Allhallows-on-Sea and Allhallows village, followed by an expansion of council housing in the 1970s. In Stoke 1950s local authority housing such as

Coronation Cottages and Medway View, built in Upper Stoke and Middle Stoke respectively, was followed in the 1970s by a large estate built by Strood Rural District Council in Lower Stoke, favoured perhaps due the latter settlement's better transport connections and its perceived less rural character.

Figure 57 Post-war expansion of housing estates on the eastern side of Cliffe catered for employees of new industries based at the site of the former Portland Cement Works. 26474/012 8-SEP-2009 © English Heritage.

The post-war expansion in Cliffe and Cliffe Woods into the 1950s and 1960s was driven by Strood Rural District Council but was less directly related to the industrial focus at the eastern end of the peninsula (Fig 57). The development of the local authority Swingate Estate, using traditional and non-traditional building systems, catered for workers at Jet Petroleum and Marinex located at the site of Cliffe's Portland cement works, continuing a pattern of industrial influence on the settlement which began in the 19th century. The redevelopment of Cliffe Woods in the later 1960s was partly driven by problems with the original Rochester Park Estate residences but also a general need for housing provision across the peninsula. Cliffe Woods, located at the neck of the peninsula, was particularly well-placed for commuters accessing the Medway towns. Strood Rural District Council planned the redevelopment using the guiding principles of the 'New Town' movement and was influenced particularly by the increase in car ownership although the housing was privately developed.

Other substantial private housing developments on the peninsula were constructed after the Second World War. Private housing estates were developed in Allhallows in the 1970s and also in Upper and Middle Stoke in the 1960s and 70s, probably catering for workers at the oil refinery and power stations and possibly also commuters working in the Medway towns. High Halstow saw a great expansion in private housing, perhaps driven by buyer's valuing the aesthetics of the parish's rural scenery. This changed the village's character as much as the expansion of council housing did at Grain village. The village saw redevelopment and infill in the 1960s, 1970s and expansion to the north and east from the late 1950s to the 2000s a process producing a marked contrast with neighbouring villages formerly of similar size and character (Fig 58). In the late 20th century Upper Stoke and Lower Stoke also saw expansion through private housing developments. In Upper Stoke, this was sometimes been in the form of detached housing, reflecting, like the expansion of private housing in High Halstow, the greater desirability of the location. In all parishes there has been incremental change through private developments in this period, a significant proportion of which has involved farmstead redevelopment as described above.

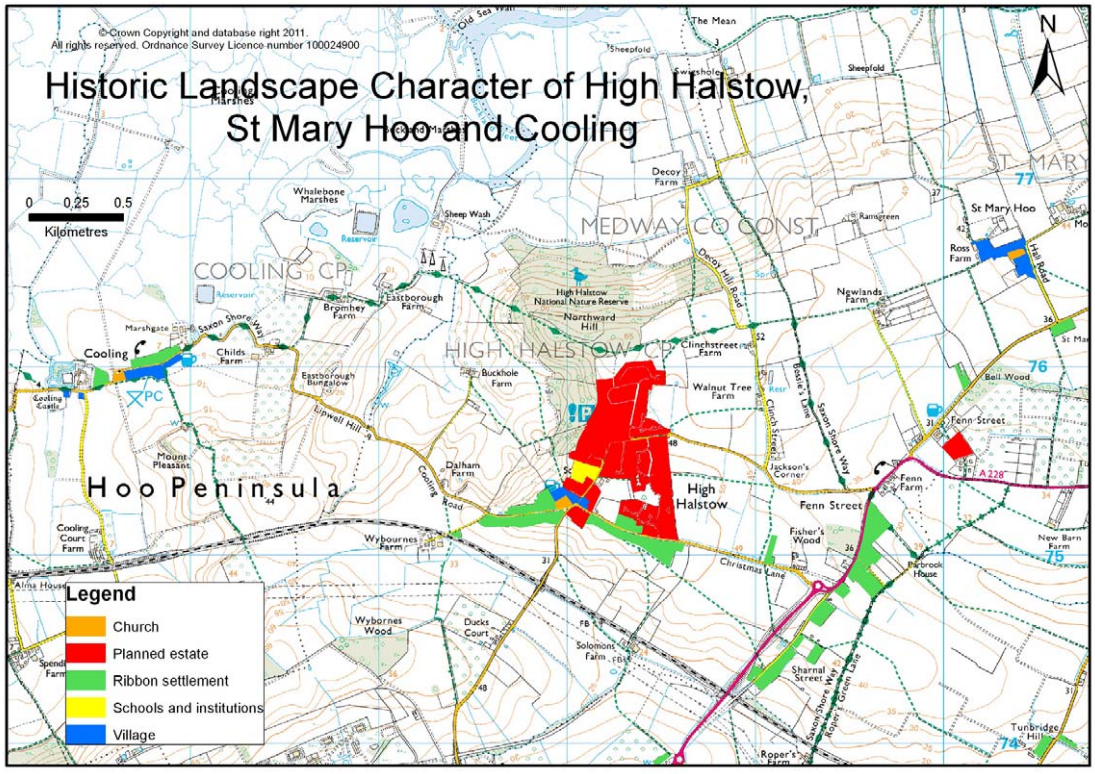

Figure 58 The differing impact of the 20th century on the historic character of High Halstow village and its neighbouring unexpanded settlements of Cooling and St Mary Hoo © English Heritage.

Impact of changes in farming practice on farmsteads

In the mid to late19th century a significant number of farmer workers' cottages were built across the peninsula. In many cases this was probably to replace very poor existing accommodation for agricultural workers. In St Mary Hoo and High Halstow it seems that cottages were built in the villages and on higher ground at the expense of maintaining outlying cottages, particularly on the marshland due to the shift away from sheep farming. The amalgamation of farms in St Mary Hoo led to the sub-division of farmhouses into cottages.

These 19th century changes are also reflected in the layout of the historic farmsteads which survive on Hoo today. Their plan form has been recorded from Ordnance Survey maps of around 1895, which were compiled after the last major phase of building traditional farmsteads in England, which reached its height in the 'High Farming' years of the 1840s-1870s. The main farmstead plans found in England are illustrated in Fig 59, and exhibit significant differences in the siting of buildings and spaces for those functions that shaped the development of historic farmsteads – to house the farming family and any workers, store and process the harvested corn crop, fruit and hops, shelter farm vehicles and implements, shelter farm animals, and keep their manure for returning to the fields around them. Barns for storing and processing the corn crop, and sometimes for housing other functions as well, date from the medieval period. Single or multiple yards for containing livestock are of fundamental importance in shaping the historic character of farmsteads as seen in their plan form, and can provide clues to how they developed in association with the fields around them. Other open and enclosed spaces within and around the farmstead were used to stack crops and move animals and vehicles. They can range from spaces that are fully or partially enclosed by buildings to more open areas that serve to link the outer edges of the farmstead to its surrounding landscape. In Kent, the high ratio of male farm workers per farmer (9.2:1) reflected the labour-intensive nature of crop rotations, yard management and horticulture (including of hopyards) in the county. The 1870 Agricultural Returns significantly have double the number of holdings (10,319) than farmers and graziers (Shaw-Taylor 2005, 168). Whereas farmers would have required buildings for the housing and processing of animals and harvested produce, many owners or tenants of agricultural holdings (such as small-scale horticultural businesses) were far less likely to have required the infrastructure of yards and buildings.

The impression gained from the late 19th century maps is of middling-scale farmsteads which indicate successive reorganisation of farmsteads over the 19th century. These matched the intensification of arable production, hop growing and fruit in tandem with the decline of sheep husbandry and the increasing importance accorded to yard-fed cattle which played a key role in manuring arable and hop fields in particular. Courtyard plans, which have the working buildings arranged around one or more yards, are the predominant type. Across the south east of England generally, loose courtyard plans comprising detached buildings are usually the most common form and were probably the dominant historic form of Hoo farmsteads. However, by the late 19th century the

proportion of loose and regular courtyards was about equal (44% and 46% respectively), possibly reflecting a phase of building or re-building farmsteads in the 19th century where the loose courtyard plans were formalised in association with their surrounding fields. For example, almost all the large, high status farms in Higham and Cliffe were of regular courtyard form by the end of the 19th century (Edwards and Lake 2012, 157). The development of these middling to large scale courtyard plans took place within the context of historically large fields. These were albeit smaller in general terms than the remainder of the North Kent Plain, a common theme being their successive reordering and enlargement into predominantly regular patterns of enclosure which may have retained traces of earlier boundaries. Arable farming and hop production placed different requirements on farmstead planning, as straw from the corn crop threshed in the barn was taken to be trodden down into manure in cattle yards and associated cattle housing and stabling. These developments are represented by the regular multi-yards, which together with the middling-scale loose courtyards are the dominant type across Hoo. These display a strong association with the corn- and hop-producing parts of Kent, where other large-scale courtyard farmsteads developed, and with high-status large-scale farmsteads in the Weald where dispersed-plan farmsteads are particularly significant. They are also associated with high status farmsteads built close to a church – often called Court (Lodge) Farms in Kent (Rigold 1973, 20-22). Of the recorded farmsteads incorporating 'Court' as part of their name, by far the greatest proportion (27% in Kent), were of regular multi-yard plan type. This piecemeal tendency to expand and reorganise both large and small-scale farmsteads contrasts with the rarity on Hoo and in Kent of single-phase planned layouts typical of large areas of eastern England. These fall predominantly into the plan types marked at (h) on Figure 59 and are mostly found in landscapes of planned enclosure in eastern England.

Dispersed plans comprise 25% of recorded sites across Kent and 8.8% of those on Hoo. A distinguishing feature of all dispersed plans is the seemingly random arrangement of buildings within a single farmstead boundary which is often irregular in shape and in the case of dispersed cluster plans; there is no focal yard area. Dispersed cluster plans, the most common of the dispersed plan types incorporate a wide range of farmsteads in terms of scale; the largest examples are concentrated in the Weald and especially in landscapes of irregular and often small-scale fields, including those cleared from woodland and are thought to represent early farm layouts, whilst in areas if common-edge, coastal marsh (in Romney in particular) and horticulture this plan type can include small-scale steadings. Most of the dispersed cluster plans found on Hoo are small scale and consist of the farmhouse and one or two small buildings, often set within relatively regular roadside plots. Numbers of surviving dispersed cluster plans are generally lower in the north Kent plain and around the marshlands of the Thames than in areas such as Romney Marsh; this is thought to reflect higher levels of 18th and 19th century farm improvement (Edwards and Lake 2012, 60; 69), which is examined later and, in Hoo, the decline of horticulture and fruit growing.

Outfarms and field barns serviced land sited away from the main holding, and in the case of the marshes it is clear that some represent the sites of former farmsteads (see Chapter 6).

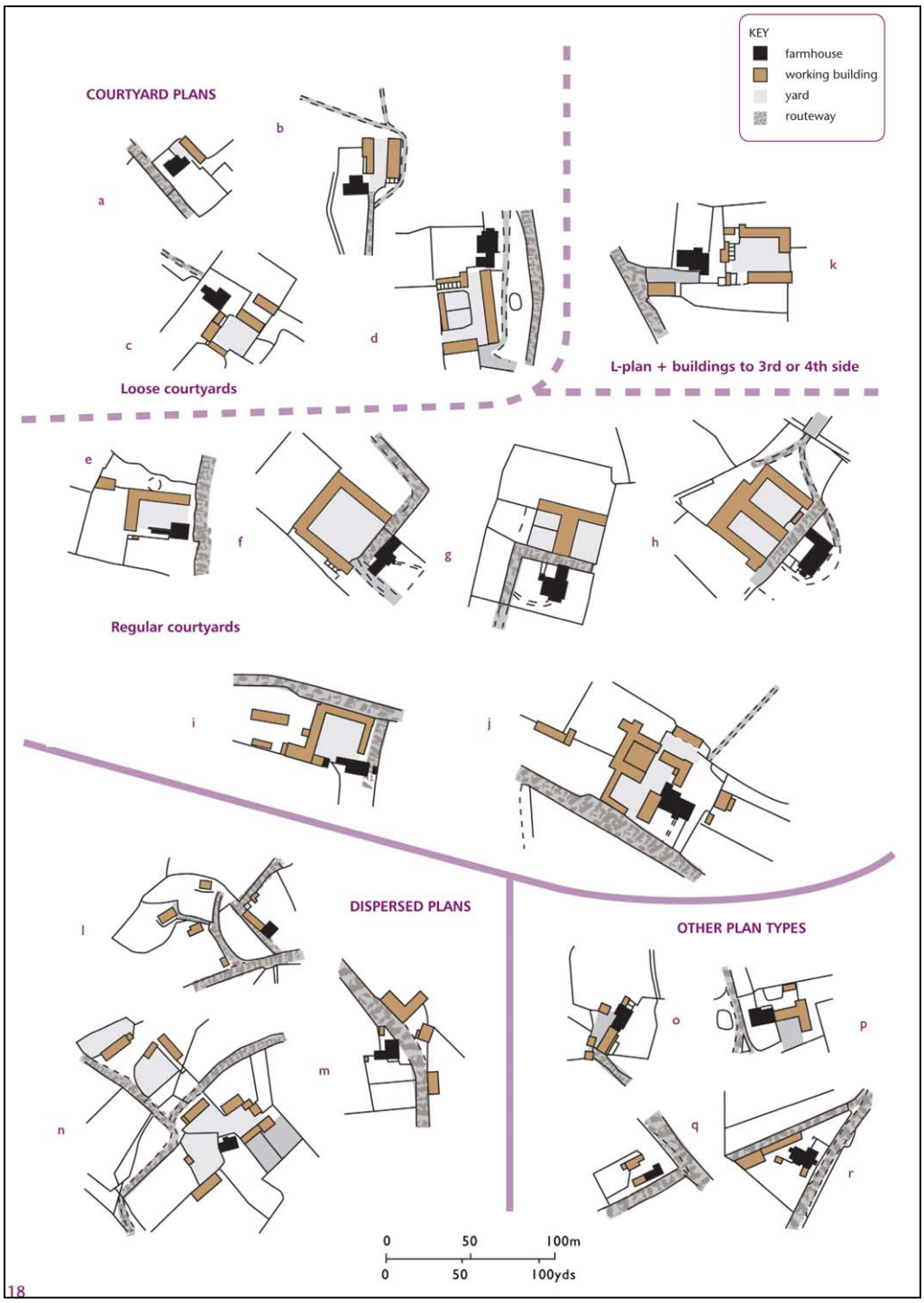

Figure 59 Farmstead plan types.

Courtyard plans (top of Fig 59) These account for 73.3% of all recorded farmsteads and have the working buildings arranged around one or more yards together with the farmhouse, which faces or is set gable end into the yard, or detached and set away from the working spaces of the farmstead.

Loose courtyard farmsteads (a-d top left Fig 59) These account for 43.9% of farmsteads. This is the predominant plan type in south-east England, have buildings loosely arranged around one (a), two (b), three (c) or more rarely four (d) sides of a yard. The smallest (a—b) are concentrated in the Weald and the largest (c-d) in the North Downs, the North Kent Plain (which extends into the Hoo) and along the edge of the Thames Estuary, and are most likely to be associated with rectilinear fields which suggest successive reorganisation of the landscapes around them. Across Hoo the medium scale plans with buildings to two or three sides of the yard were dominant with 30 (17.5%) and 26 (15.2%) of examples. Loose courtyards were probably the dominant historic form, tithe maps shows that some loose courtyards were reorganized or rebuilt to create regular courtyard plans in the mid to late 19th century.

L-plans with additional detached buildings to the third or more rarely fourth sides of the yard (K top right of Fig 59). These comprise 9.4% of farmsteads and are generally medium to large in scale and in Kent have the same pattern of distribution as the regular multi-yard plans (j) along the foot of the downs in the Wealden Greensand, in the North Downs, North Kent Plain and Thames Estuary.

Regular courtyard farmsteads (e-j mid Fig 59). These comprise 46.2% of farmsteads and consist of linked ranges formally arranged around one or more yards. They tend to have a higher proportion of sites where the farmhouse is detached than loose courtyard types, and are more likely to be associated with fields that have been reorganised with regular boundaries: L-plans (e) are widespread (8.8%) and more common than across Kent (6.9%). U-plans (f) are more common than across Kent (3.4%) with 6.4% recorded indicating the reorganisation of medium-scale farmsteads matching that seen in the western part of the Weald. Larger-scale examples (h: built to F-, E-, T- and H-shaped plans, found in areas of England associated with large-scale agricultural improvement and landscape transformation) are rare in Kent (0.9%), and even rarer in the Hoo (0.6 %). Full courtyard plans (i) which have a similar distribution and are slightly more common in Kent than the Hoo (2.7%; 2.3%). Multi-yard plans (j) which are the largest and often most high-status (16.4% in Kent and the Hoo).

Dispersed plans (l-n bottom left Fig 59). These comprise 9.3% of farmsteads on Hoo and, 24.9% in Kent. These are concentrated in the Weald and especially in those landscapes of irregular and often small-scale fields, including those cleared from woodland and coastal marsh elsewhere in Kent. A distinguishing feature of all dispersed plans is the seemingly random arrangement of buildings within a single farmstead boundary, which is usually irregular in shape. They subdivide into: l) dispersed clusters (7.6%), where the working buildings are located within the boundary of the steading. Numbers of surviving dispersed

cluster plans, thought to represent early farm layouts, are generally lower on the north Kent than in areas such as Romney Marsh; this is thought to reflect higher levels of 18th and 19th century farm improvement (Edwards and Lake 2012, 60; 69). m) dispersed driftways (no recorded examples which are grouped around routeways for moving livestock and are almost all concentrated in the Weald. n) dispersed multi-yards (1.7%), which are often large-scale farmsteads containing two or more detached yards and which in Kent are concentrated in the Weald.

Other plan types (o-r bottom right Fig 59). The remainder, which have the working buildings set out in a row (r: 0.6%) or attached in-line to the house (o and p: 0.6%), are very rare and – as elsewhere in south east England – are concentrated on small plots that developed within settlements and in areas of small-fields, especially within, or on the edges of, the small fragments of remaining heathland. They are far more important, and sometimes dominant, in upland and upland fringe areas of England, and around lowland moss and heaths in the west of the country.

Twentieth century farmstead redevelopment

In general the traditional farmsteads of the Hoo Peninsula have experienced higher levels of change than elsewhere in Kent, with almost 50% of those extant at the beginning of the 20th century being either totally lost from the landscape or only retaining their farmhouse at the end of the century. A further 20% lost over half their 19th-century footprint of buildings and enclosures in this period (Fig 60). This degree of change has not been seen in any other area in England where Historic Farmstead Characterisation has been undertaken (see Appendix 2 for an explanation of Historic Farmstead Characterisation), except in areas that have been subject to urban expansion (Bob Edwards, pers comm). Taking as landscape units the National Character Areas (NCAs) identified by Natural England (www.naturalengland.org.uk/publications/nca) it is interesting that the levels of change and loss seen in the Greater Thames Estuary NCA and North Kent Plain NCA, which have experienced a similarly high rate of loss of field boundaries, are also recorded on Romney Marsh (Edwards and Lake 2012, 47). Dispersed and loose courtyard plan types have been the most vulnerable to loss of their historic form. However, more than 40% of surviving traditional farmsteads have retained one or more listed buildings. It is common for listed houses and/or barns to be the only remaining buildings on the farmstead, making the survival of smaller (and less adaptable) ancillary buildings and coherent farmstead groups all the more rare.

These levels and patterns of change thus result from a diversity of factors, the most important being the functional redundancy of traditional buildings, the difficulty in adapting the smaller ones in particular to the needs of modern agriculture, and the tendency for the largest and most adaptable buildings – mostly barns – to have been converted into non-agricultural use, especially housing. A growing population, with many residents commuting beyond the peninsula for work, has helped to drive the demand for conversion, which is particularly prevalent to the south of the peninsula's central ridge,

where there is easier access for commuters into the Medway towns (Historic Area Research Report, forthcoming; Bob Edwards, pers comm). Particularly vulnerable to loss have been the small farms that were located in settlement cores and the outfarms and field barns which were so significant in the historic farming regime of the peninsula (Edwards and Lake 2012, 158; see Chapter 6). The amalgamation of farmsteads in the mid to late 19th century may also have left farm building groups as still legible by the 1895 mapping but which were functionally redundant and subsequently demolished.

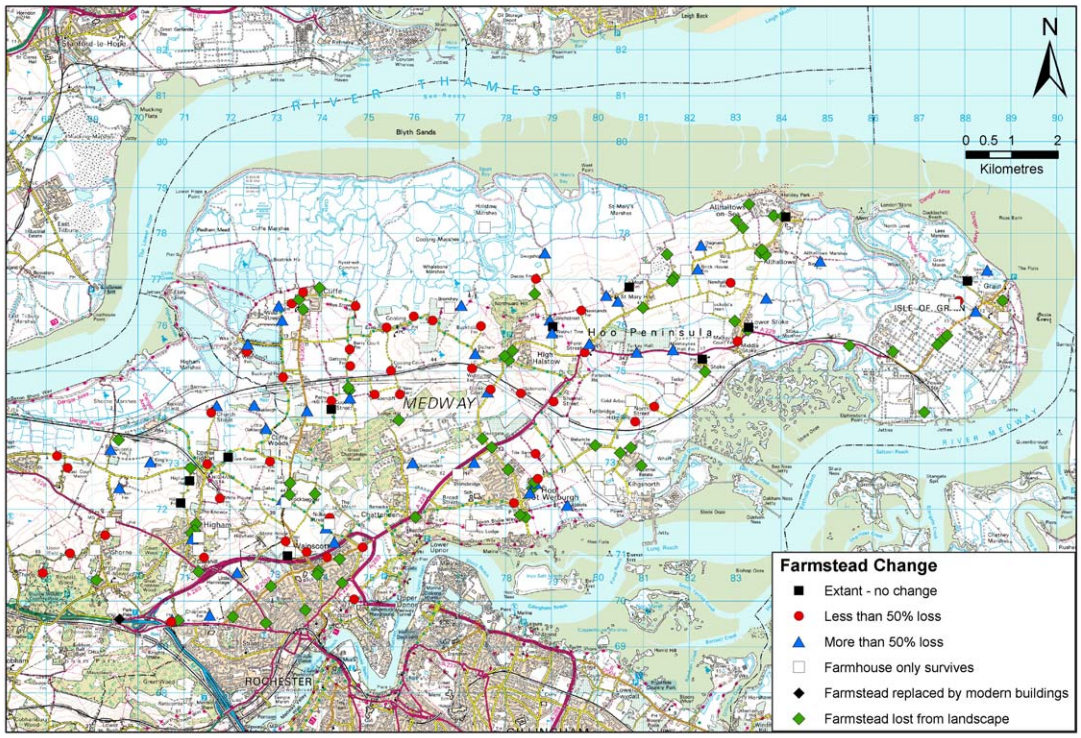

Figure 60 Change to the historic form of farmsteads on the Hoo Peninsula © Crown Copyright and database right 2013. All rights reserved. Ordnance Survey Licence number 1000124900.

On the Isle of Grain, where the impact of 20th-century industrial development has been greatest, few historic farmsteads remain in agricultural use; for example Whitehouse Farm and Perry's Farm were used by sand and gravel extraction operations, whilst the farming settlement at Wallend did not survive proximity to the oil refinery and was privately redevelopment. In Stoke all the original manorial farm sites were redeveloped and only Court Lodge and Mackays Farm retain any significant amount of historic fabric, but in St Mary Hoo parish, where there has been less industrial change, the manorial farmstead sites retain some historic buildings and some new farmsteads were established in the 20th century. Spendiff in Cooling was redeveloped from an agricultural settlement into new residential accommodation due to the reduced need for an agricultural workforce. Cooling Castle Barn has been converted to a party and wedding venue (Fig 61).

Figure 61 Cooling Castle Barn, is an example of a converted farm building which is now a party and wedding venue (P1080200) © English Heritage.

Civic and community buildings

The increases in population and wealth on the peninsula during the 19th century, as well a new legislative requirements also led to the construction of civic or community buildings such as schools and chapels (Fig 62 and 63). Surviving examples of the former include Cliffe School, begun in 1854 and incrementally expanded, St Mary's Parochial School, built in 1868, and Stoke Community School, constructed in 1876.

The expanding population of the peninsula in the 20th century also saw the construction of civic and community buildings to serve their needs. Some of these date to the early part of the 20th century, such as the Memorial Village Hall built in 1920 in High Halstow, but unsurprisingly many public buildings date to the periods of major expansion in the 1950s and 1970s. BP helped fund the construction of a number of these village halls (MacDougall 1980, 175).

Figure 62 Stoke Community School, Allhallows Road, Lower Stoke. One of the two schools built in the peninsula by the local education board in the wake of the 1870s Education Act. P1090154 © English Heritage.

Figure 63 A number of community buildings were constructed on Hoo after the Second World War including Cliffe Memorial Hall (P1080907) © English Heritage.

Variation in 20th century change

The villages of Cooling, St Mary Hoo and Upper Stoke are notable as they appear not to have experienced the 20th-century residential growth seen in the peninsula's other settlements. In fact a decline in the status of St Mary Hoo is reflected in the post-war conversion of the church and school to residential use, as is the adoption of the church at Cooling by the Churches Conservation Trust. In the case of St Mary Hoo there was a small industrial and military presence in the parish, but the fact that it was bypassed by the main road (A228) and Hundred of Hoo railway suggests that poor transport links were a strong consideration reducing demand from property developers and buyers. Though it is hard to quantify it seems that Cooling is also by-passed by the main roads of the peninsula and it may be this perceived lack of connectivity or shortage of suitable land for expansion that has preserved its unexpanded character. Upper Stoke also has the character of an unexpanded Hoo village, again apparently due to its lack of transport connection. Lower Stoke on the other hand was more suitably placed to exploit road and rail connections. Differences in land ownership between the different parishes may also have played a part in determining the degree to which private land was developed.

The effects of Conservation Area Status on preserving the character of the peninsula's settlements are unclear. The table below shows the dates when the peninsula's various Conservation Areas were created:

Conservation Area	Created	Amended
St Mary Hoo village	1994	
Upnor	1970	2005
Cliffe village core	1973	
Church Street Higham	1979	2001
Queen's Farm, Shorne	2001	
Shorne village	1970	2001
Chestnut Green, Shorne	1976	2001
Thong, Shorne	1981	2001

Table 2 Conservation Area creation and amendment dates.

Upnor and Cliffe Village Core were designated not long after Conservation Area legislation was introduced (1967), whilst St Mary Hoo village was designated in 1994. The late designation date for St Mary Hoo and the lack of Conservation Area Status for Cooling suggests that the lack of expansion or little of threat of development was as important as the surviving historic fabric on the timing of this designation's implementation. Unfortunately the parishes of Shorne and Higham were not examined in detail as part of the project but it is clear that for the Hoo Peninsula, there are more Conservation Areas in Gravesham District than in Medway.

The historical character of Hoo's settlements

Vernacular building types

The survival of pre-19th century building types is fairly rare across the peninsula. Vernacular buildings appear to have been timber-framed and sometimes timber-clad as well as of red brick and tile. Some rare examples of timber-clad (or weather-boarded) buildings do survive, such as South View in Lower Stoke, the possibly 18th century Whitehouse Farm, Chapel Road, Grain (Fig 64) and at Fenn Farm, St Mary Hoo parish, where the 15th or 16th century farmhouse has a brick and timber-clad frame. There are a number of other timber-framed buildings across the peninsula. Church Street and Pond Street in the historic core of Cliffe are notable in having a number of surviving early (particularly 16th century) timber-framed buildings (some timber clad). Many of these are survivals of medieval hall houses. It is possible that this surviving collection of buildings reflects Cliffe's medieval port wealth. Other reasons why further buildings of an early date have not survived include a fire thought to have occurred in 1520 in Cliffe and the lack of investment in Cliffe buildings by absentee landlords in the 16th century perhaps caused by the increase in malaria (Lambarde 1570 (1970 repr) 441; MacDougall 1979, 57; 59). It has been noted that many of Cliffe's timber-clad vernacular buildings have been lost since the Second World War but the creation of a Conservation Area in Cliffe Village Core in 1973 may have helped to preserve this relatively unusual cluster of early buildings.

Figure 64 Whitehouse Farm, Chapel Road, Grain; an example of a house with weatherboarding. P1090641 © English Heritage.

The present historic character of the settlement at Cooling is not solely dependent on the survival of historic buildings as, whilst few pre-19th century buildings survive, its distinctiveness is also shaped by its lack of expansion and the existence of the castle, church and village farm. Similarly St Mary Hoo retains a traditional character (in layout and density) and some traditional buildings, not all now used for their original purposes, though much of its housing stock dates from the 19th or 20th century. Layout, density and continuity of building types are therefore important factors which help to retain its traditional feel.

Non-domestic village buildings

The parish church is usually the oldest building surviving in the historic core of the peninsula's villages. The now deconsecrated church in St Mary Hoo appears to be built on or next to a very large spread mound, possibly the site of an earlier Saxon wooden church, or even potentially indicating much earlier activity in the parish. The grandeur of Hoo St Werburgh and particularly Cliffe parish churches are in part a consequence of their historic wealth and status on the peninsula.

The construction of Nonconformist chapels on the peninsula in the 19th century reflects the beliefs of the incoming populations seeking work in the developing industries. These include the construction of chapel in Fenn Street, beyond the parish boundary of St Mary Hoo, an early Congregational chapel in Grain in 1826 and three non-conformist chapels in Lower Stoke which may reflect the influx of military personnel as well as workers in the mid to late 19th century employed to dig mud from the saltings for the Portland cement industry (see Chapter 3). The United Methodist Church of 1889 (built as a Bible Christian Chapel) is the last surviving of these three chapels. Following broader national trends a number of rectories, which were constructed or substantially rebuilt on the peninsula at this time, include those at Allhallows, Cooling, Cliffe, Grain and High Halstow.

Historic public houses are another non-domestic building type which contribute to the peninsula's character. Many of the these pubs were rebuilt in the 19th century, such as the Nags Head in Lower Stoke and the former pub The White Horse in Stoke, but others still have earlier fabric, for example the 18th century building that was the Rose and Crown in Allhallows, or the listed pub in High Halstow, the Red Dog, where the earliest fabric may be 17th century.

Farmsteads – upland, marshland and village

Despite extensive farmstead redevelopment across the peninsula, the pattern of surviving scattered farmsteads, though often shorn of their out-buildings and no longer in agricultural use, indicates the importance of farming in the development of the settlements and their character (also see Chapter 6). They have developed in response to physical and historical factors and how individuals and communities have worked and

managed the land in response to local and distant markets. Arable farming was especially important across the fertile loams of northern Kent. Cattle rearing and fattening was a feature of the Weald in particular and in combination with sheep in the coastal marshlands.

Differences can be seen between the types of farmsteads that are found in the villages and those dispersed across the central ridge. In general 'regular courtyard' farmstead layouts are more prevalent near villages and hamlets and in the North Kent Plain (Bannister 2011, 51; Bannister 2012, 40) whereas dispersed layout farmsteads are distributed across the central ridge and loose courtyard layouts are found everywhere across the peninsula, in particular dominating the Greater Thames Estuary (Bannister 2012, 39). Outfarms on the marshes, which have now gone, may relate to when marshes were managed by bailiffs, lookers and shepherds for absentee landlords. Although the farms in the marshland appear to be 19th century in date from the Historic Farmstead Characterisation, and early farms, eg from medieval period (dated from fabric), appear to be well-inland, this probably only reflects differences in the modern evidence available, such as the survival of early fabric in the farmsteads on the higher ground as opposed to the documentary evidence largely from later maps for the marshland farms: it is clear that there were farmstead structures in similar locations on the marshes well before the 19th century and in some cases in the medieval period (see Chapter 6).

Most farmsteads are isolated, and are set within a landscape of generally medium and large-scale fields largely created by the 18th century but which have since been subject to considerable boundary loss. Kent, including Hoo, is distinguished by its predominantly dispersed settlement pattern of isolated farmsteads and hamlets, established by the ninth century and sometimes earlier, set in anciently-enclosed landscapes with a pastoral origin carved out of woodland and wood pasture as indicated by the place-name evidence (Everitt 1986, 142-143). On the Hoo Peninsula, farmsteads are concentrated on the central ridge and around the marshes as seen in Cooling. Eastborough Farm and Bromhey Farm were originally located in a detached part of Frindsbury parish next to the marshes, demonstrating the value of being able to exploit these grazing areas. Grain parish is one exception where the farmsteads are located on the marshes proper. Elsewhere outfarm sites, in this area mainly representing small buildings associated with sheep pens, are largely a feature of the marshland areas. This pattern of dispersed farmsteads reflects the nature of farming in Kent where 'gavelkind tenure did create a form of strip field system whereby the individual partitions, managed on the whole from isolated farmsteads, were scattered through many arable fields and not just two or three main ones around a village' (Edwards and Lake 2012, 26) and this lead to a pattern where 'more farmers lived in scattered farms and hamlets rather than nucleated villages'. In Cliffe parish, farmsteads (including some manorial complexes) appear to ring the open fields (Edwards and Lake, 2012, 156). In general farmsteads also developed on existing trackways or droveways (Edwards and Lake 2012, 17) for example, along Clinch Street.

Village farms, although now rare in contrast to Thanet and other parts to the south of the North Kent Plain, have had a fundamental influence on the character of the settlements. In some villages, such as Allhallows, only the outlying farmsteads now survive whilst in other settlements these village farmsteads persist, for example Court Lodge Farm, in Upper Stoke, Marshgate Farm in Cooling and St Mary's Hall in St Mary Hoo. These complexes may have helped to retain the present 'unexpanded' character of these villages. In Cliffe parish, 17th century and earlier farmhouses remain surrounding the village itself but the pressure of population expansion in Cliffe means that all have seen substantial modification in the 20th century. The barn at Rye Street Farm is probably the only working building to survive from the late 19th century map although the courtyard form of the group has been retained through redevelopment. The barn is a rare surviving example of a type that would have been formerly more common especially on the smaller farms around the coastal marshes and in the Weald of Kent. To the south of the yard there is a pair of houses that may occupy an earlier building which could have been the farmhouse. This house has early brickwork to the front elevation and a large central stack (re-built) and may have been a lobby entry house.

Generally in Kent, from the medieval period until the late 18th century, many farms consisted of a farmhouse and a single barn, which might house a granary or (especially in the Weald) be subdivided into stabling and cattle housing. Manor and estate farms were often the largest and had more than one barn. After the 18th century other more specialised buildings were added to farm complexes and farmhouses were often rebuilt in order to look away from the working areas of the farm (Edwards and Lake 2012, 17). There are some timber-framed and weather-boarded farmhouses, such as Great Dalham in High Halstow, and there is extensive evidence for refronting and building in red brick between the late 17th and early 19th centuries. An example is Brickhouse Farm in All Hallows, where the house was rebuilt in the mid-18th century with a brick façade aligned westwards to the road and an aisled barn is the only traditional building left from a formerly extensive regular multi-yard plan. In some cases specific buildings, such as the late 19th century hop-kilns at Spendiff in Cooling, reflect the industrialisation of agriculture the types of crops grown on the peninsula.

The relatively unchanged settlement of St Mary Hoo appears to exemplify the wider story of farming on the peninsula, unlike other parishes which have seen great change in the 20th century. St Mary Hoo still retains marshland farms, village farmhouses and 18th and 19th century modernised farmhouses. The manor farm in St Mary Hoo, St Mary's Hall was the home of the innovative 19th century farmer Henry Pye who pioneered farm improvement not just in St Mary Hoo but also in other parishes across the peninsula such as Stoke (MacDougall 1980, 128). This saw a move away from traditional crops and sheep towards fruit and seed production, potatoes, hops and market gardening. Pye's improvements led to late 19th century farm amalgamation in St Mary Hoo and elsewhere – sometimes resulting in the sub-division of farmhouses into cottages at Bells Farm, Ross Farm and Hoppers Farm. Significantly, Pye's own farmstead at St Mary's Hall is shown on the c.1895 Ordnance Survey map as a regular courtyard multi-yard plan, which as we

have seen is the largest and most high status of the courtyard plan types. The decline in sheep-grazing led to a loss of the marshland farms at this time probably as they were less adaptable to new regimes but farms on higher land in St Mary Hoo were being renewed in the mid-19th century with regular courtyard plans, such as Coombe Farm and Moat Farm. The latter comprises a late 19th century U-shaped group of pale brick in single-storey ranges facing a cattle yard. By the late 19th century large multi-yard farmsteads had developed **around the marshlands, and with yards for feeding cattle which made use of the marshland grazing: surviving examples are now very rare.**

Manors and moats

The enclosing of manorial complexes within moats does not appear to have been the norm on the Hoo Peninsula, unlike other parts of Kent and Essex. However, Cooling Castle is moated and a farm in St. Mary Hoo, with a linear pond which may be the remains of a moat, is named Moat Farm. F J Hammond's (1928) suggestion that New Hall Farm may have originally been a moated site may be tentatively supported by historic map evidence and this may be related to the spring marked at the site.

Leisure

The impact of the tourism and leisure industry has not affected the overall character of most of the peninsula's settlements, perhaps a reflection of the mixed responses to the area's characteristics discussed in Chapter 2, or perhaps indirectly so, to the industrial and military developments resulting from earlier responses. As a result its impact has been limited to very specific locations. Probably the most significant of these is the seaside resort at Allhallows-on-Sea. Although the 1930s scheme was largely unsuccessful it did lead to the construction of some large buildings which changed the character of the otherwise small fishing hamlet known as Avery, such as the British Pilot Public House, the flats at Avery Court and related residential development of semi-detached houses. The scale and quality of these developments seems to reflect the high hopes of the developers. The post-war caravan and leisure park at Allhallows-on-Sea is the legacy of these earlier developments. Here, local authority built wooden chalets from the1960s were supplemented by static caravans and the riverside is shared with Allhallows Yacht Club, dating from 1964.

Topographic influences on settlement development

Although it is a broad generalisation, the main settlements of the Hoo Peninsula and their associated routeways are situated to facilitate access for the farms of the parishes to a range of land and coastal resources available in the vicinity: the higher agricultural land and the marshland pasture, as well as presumably the saltings and river frontage. Cliffe could be considered a good example. This pattern reflects a mixed economic model which was probably established well before the Norman Conquest though, as the main episodes of

reclamation probably occurred after this date, salt making rather than grazing was probably the main activity carried out (see Chapter 7) However, differences can be seen between the settlements within the parishes and these appear to be particularly related to differences in topography within each parish. For example, compared to Cliffe, other settlements such as High Halstow and St Mary Hoo take a much more prominent position on the central ridge of high ground. This may be a reflection of the steep topography that leads up to the ridge proper, which may have made marsh-edge settlement less favourable, or possibly to the routeways that the ridge-way position provided.

It is possible that the balance between the higher ground and the marshes also had an influence on the character of the settlements. For example neither Allhallows nor High Halstow have seen the development of industry and this may be because they lack the wide open areas of marsh available for development in other parishes. Conversely Cliffe was perceived to be in decline due to the impact of malaria (though this does not appear to be borne out by population figures) in the late 18th and early 19th century (Hasted 1797, 498). This malaria-related decline is not noted as prominently in other settlements on the peninsula – it is possible that the greater expanse of marshes in Cliffe was having an affect on the perception of settlement as well as the settlement itself. Grain village and the nearby hamlet of Wallend are situated in a very different topography to the other settlements on the peninsula and Grain Village is situated on an area of relatively higher ground compared to the surrounding marsh. As with many ancient names, the topography also had an influence in the name of some settlements. Obvious examples include Grain where the name is thought to have originally referred to gravely, sandy shore now lost to the sea (Evans 1954, 192) and Cliffe where it seems likely that the settlement name is derived from its topographic position.

The new seaside resort of Allhallows-on-Sea was located in order to exploit the views of the Thames. Interestingly its location close to the sea, at the end of the peninsula's central ridge, means it is the only settlement on the peninsula, apart from Grain, where easy access to the seafront can be gained. Another topographic feature of Allhallows, its sandy beach, was already attracting day-trippers before the 1930s development was proposed. With the failure to establish the new town at Allhallows, it is probably its location close to the sea at the far eastern end of the peninsula's central ridge that has enabled the village's isolated character to endure.

The influence of the routeways on settlement

Routeways are noted above as being integral to the settlement pattern, providing the means of access between the peninsula's farming settlements and the resources they relied upon (including other settlements). The later development of the peninsula's routeway network also appears to have had a close interrelationship with how settlements developed. The villages of St. Mary Hoo and Cooling, less closely connected to the main roads of the peninsula, did not develop as much as other villages on or close

to main roads. Cooling also lacked a halt on the Hundred of Hoo railway. Cooling Street (located in Cliffe parish) with better transport connections and a situation on the 'long-established upland routeway' had a larger population than Cooling in the late 18th century. In High Halstow, Clinch Street - the main land route on to the marshes - had farmsteads established along it. Changes to riverine and maritime access also influenced the development of industry in certain settlements on the peninsula. For example available clay and brickearth were not extracted at either Dagenham or Brickhouse Farm in Allhallows parish in the 19th century as a causeway across the Yantlet restricted the transportation route formerly provided by the creek. Many small farmsteads and settlements appear to have grown up along the main ridgeway routes heading eastwards along the peninsula from the London – Canterbury Road (now the A2) to the bridge over Yantlet Creek at Grain and along the road towards Allhallows, known as the Ratcliffe Highway. Osterland (Lower Stoke) originated on the ridgeway route to Grain across Stoke marshes and it appears that the settlements of Sharnal Street and Fenn Street in High Halstow also grew up along this ridgeway route.

19th and early 20th century ribbon development along the major routeways can be seen across the peninsula. In the 19th century the better connected hamlet of Fenn Street had a higher population than St Mary Hoo and this section of the Ratcliffe Highway became the main road route to Grain's industrial hub (A228), continuing the pattern of influence of the east-west routeways along the peninsula. Ribbon development seen in the 19th century at places such as High Halstow, Stoke Road, Allhallows and High Street, Lower Stoke seems to have continued in the mid and later 20th century on those main east-west routeways which maintained their significance, such as the A228 at Sharnal Street and Fenn Street. In some cases the importance of the traditional manorial ecclesiastical centres seem to have been eclipsed by more significant commercial centres with better transport connections by the late 19th century. This is typified by Upper Stoke which has subsequently retained more of its earlier historic character than Lower Stoke. Lower Stoke's rise to social and commercial importance is reflected in its 19th century buildings such as the Victorian school building and the United Methodist Church (built as a Bible Christian Chapel 1889), the last surviving of three Nonconformist chapels in the settlement.

The construction of the Thames and Medway Canal between 1800 and 1824 and the South Eastern Railway in 1845 (later to be extended with the Hundred of Hoo Railway) appears to have had a varied impact on the settlements of the peninsula. It is possible that the significant settlement shift in the parish of Higham, away from Church Street and south to Higham itself, in the late 19th century where a new church was built (Edwards and Lake 2012, 152) may have been due to the opening of the railway station in the mid-19th century. In contrast, though Lower Stoke appears to have thrived due to good road connections, the opening of Stoke Halt on the Hundred of Hoo railway appears to have had little effect on the settlements of the parish.

The influence of the riverine activity on settlement

The Rivers Thames and Medway were also important routeways serving and influencing the peninsula as well as providing an important resource base. Despite the clear evidence for heavy and diverse uses of both the Thames and Medway rivers throughout the history of the peninsula, demonstrated by the Historic Seascape Characterisation (HSC), the rivers do not appear to have had a direct influence on the types of buildings themselves which survive within Hoo's settlements; though exploitation of the rivers' coastal resources did influence the siting of many settlements, farmsteads, outfarms and associated routeways. The presence of the rivers was also a driving factor in the establishment of the industries which brought so much change to the land as well as demand for housing and its consequent settlement growth (see above and Chapter 3). The character of the buildings in the settlements of the peninsula today does not strongly reflect its fishing-based economy and the roles fishing activity certainly played in the peninsula's past development (see Chapter 6, 'fishing and fisheries'). The HSC revealed that shell-fisheries, particularly for oysters in the Medway, were extensive and economically important in the post medieval period right into the 19th century. Cliffe too was a port which brought it some affluence. The early importance and later the medieval decline of the salterns around the peninsula's estuarine margins is described in Chapter 3, an industry whose coastal access requirements may well have generated still-extant routes down to the former coastline. The extensive medieval and later land reclamation for coastal grazing along that coastline, which extinguished most of the Hoo's salt-making industry and radically altered the coastal landscape and seascape character, created its own patterns of routeways and farming settlement. In Stoke, water transport across the creeks gave good access from Grain Bridge to the London and Rochester markets for farmers to sell their goods and this is a pattern that may have been repeated for other parishes with a Medway shoreline. As noted earlier, clay extraction from the Medway estuary for the Hoo's Portland cement industry (Chapter 3) required accommodation for its workforce, initially met using moored barges and lighters but, in the later 19th century, in rows of terraces built to house them in Middle Stoke and possibly Grain, many of which no longer survive. The River Medway's strategic military significance also had a major impact on the character of the peninsula's settlements away from the shore.

Surviving buildings whose form directly relates to riverine activities are generally of 19th century date. Beyond those related to industry and military activity, buildings which directly reflect the riverine location of the parishes include coastguard stations and cottages, such as those built at the end of the 19th century in Allhallows, Cliffe and to the east of Grain village, which were designed to combat smuggling (Fig 65). Shade House on Halstow Marshes has also been connected with smuggling, at least anecdotally, but the building that survives today has been substantially rebuilt and may also be related to coastguard activities.

It is clear that the proximity of the river was more influential on the development of some settlements than others, particularly at the eastern end of the peninsula such as at Stoke,

Grain and Allhallows which are much closer to the river than other settlements. It is clear from Cliffe's medieval history that the riverine influence on settlement can be complex and nuanced.

Figure 65 Nos 1-10 Coastguard Cottages, Chapel Road, Grain. AA98/07957 © English Heritage.

The influence of military activity on settlement

The general impact of military activity on the peninsula has been discussed in Chapter 4. Many of the military installations on the peninsula had little impact on the character of the settlements beyond their own boundaries, apart from possibly when under construction. The main exception relates to the Upnor and Chattenden/Lodge Hill Ordnance Depot where various types of military housing were constructed and where the depot site will continue to influence Hoo's landscape by having its layout encapsulated in the new settlement to be built there.

Military activity was particularly intense on the Isle of Grain due to its strategic location in relation to Chatham military installations and the defensive opportunity afforded by the narrowed mouth of the Medway Estuary. This does appear to have made a small but lasting contribution to the character of the settlement, as older housing in Grain was

replaced by new cottages for agricultural workers and workers building the military installations in second half of the 19th century. The need to accommodate military construction workers must also have arisen during the construction of the artillery forts in Cliffe, Higham and Allhallows in the mid-19th century; in the case of Cliffe Fort this appears to have taken the form of a shanty town on the site (Williams and Newsome, forthcoming). Just prior to the First World War the settlement of Grain grew dramatically to house the staff of the Royal Naval Air Service's seaplane base and Grain Air Station. The 800 personnel were housed in temporary accommodation known as Bungalow Town, of which some buildings survive around Chapel Road, albeit altered for residential use. The Police Cottages, which were built to house officers guarding the Yantlet Creek firing range, also survive (Fig 66). Re-use of probable military buildings, particularly in the context of farmyard storage, is also a feature on the peninsula. Examples include a barn located on New Hall Farm Lane and the reused airship hanger roof, which probably originated at Kingsnorth, now located at Moat Farm, St Mary Hoo.

Figure 66 Police Cottages, Yantlet Firing Range, Isle of Grain. Built c.1935 and of traditional construction and design © English Heritage.

The influence the Medway towns and London on settlement

The influence of the proximity of the Medway towns and London, with their large populations and markets, can be seen in the development and character of the buildings and settlements on the Hoo Peninsula. Developing markets, in the late medieval period in London and in 17th century Chatham and Sheerness, led to a relative prosperity

throughout the Kent Plain and on the peninsula that can be seen in the building and remodelling of houses in the Georgian period. There are many examples of these red-brick Georgian farmhouses across the peninsula, demonstrating through their adoption of a national architectural language and their siting in the landscape the status, wealth and metropolitan aspirations or sensitivities of their owners: these include Dagenham and Brickhouse Farm, Allhallows (Fig 67), and Malmains and Tudors in Stoke and also Newlands, St Mary Hoo which was rebuilt in the mid- 18th century. Some farms buildings, such as those at Mackays Court Farm in Lower Stoke, were also refronted in brick in the 18th century. In Cliffe there are a number of 18th century village houses in addition to the farmhouses. The Historic Landscape Characterisation showed a concentration of large landscape gardens and smaller parkscapes on the south-west edge of the peninsula between Shorne and Frindsbury and overlooking Chatham docks, perhaps indicating that some wealthy citizens or naval staff had properties on this side of the River Medway.

Figure 67 Brickhouse Farm, Allhallows. DSC 9740 © English Heritage.

The proximity of the Medway towns and London is also likely to have influenced the development of leisure facilities on the peninsula. The proposed development of the Allhallows-on-Sea resort in the 1930s was considered viable because of its close proximity to London's population as its advertising brochures made clear (Fig 68). The extension of the Hundred of Hoo railway in 1882 from Sharnal Street to Grain and the subsequent development of Port Victoria for Atlantic and cross-channel maritime traffic was probably also made viable economically by the close proximity of the large populations.

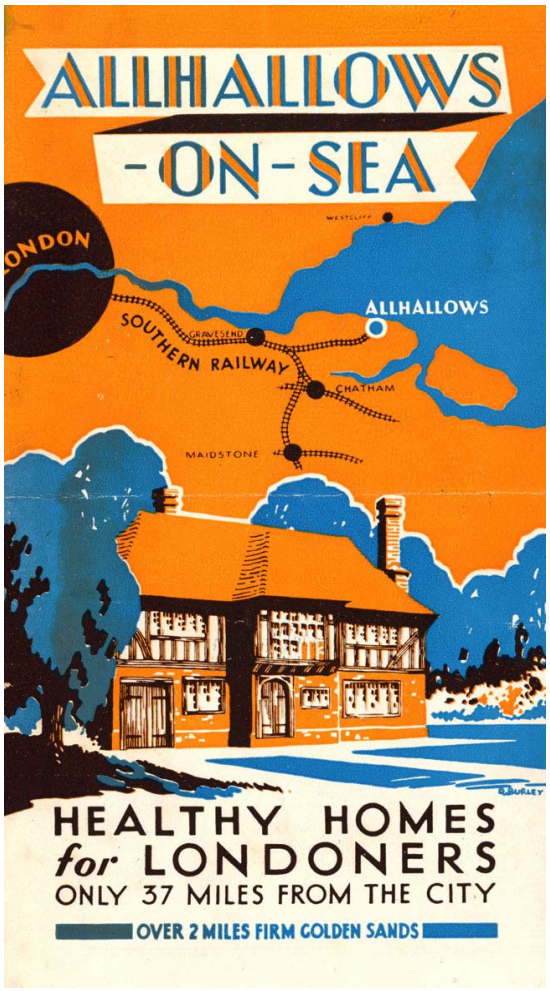

Figure 68 Southern Railway brochure from 1932 which emphasises the proximity of London to the planned seaside town of Allhallows-on-Sea with 'Healthy Homes for Londoners Only 37 Miles from the City' (reproduced courtesy of John Minnis).

6 'FARMING' – HOO'S AGRICULTURAL LANDSCAPE

Farming on Hoo

The farming landscape

The backdrop or context to the later industrial and military aspects of the peninsula, and its associated settlement expansion, is the agricultural land. This reflects farming practices going back through the medieval period into the centuries before the Norman Conquest. Until the 19th century, the mostly arable areas of the central ridge would have been farmed as part of a system which integrated use of the upland with the marshes through the folding of sheep. This counteracts the modern perception of the marshes as something 'other', or separate from the core of the peninsula. The position of a number of villages on the peninsula may reflect the importance of the interface between the arable and the marshland facilitating access to both, as at Cliffe Cooling, Lower Higham, Allhallows and Stoke (Bannister 2012, 29).

The Medway Landscape Character Assessment describes the central ridge of the peninsula (not including Higham and Shorne) as 'predominantly agricultural' and describes three landscape types, flat or undulating arable farmland – large open arable fields with long views, mixed farmland with orchards and shelter belts – smaller fields with a stronger sense of containment and isolated wooded or farmed hills (Medway Council 2011, 37). Whilst most of the farmed area is predominantly 'flat or undulating open farmland', variations are noted at Cooling and Cliffe Woods which is described as 'mixed' farmland (Medway Council 2011, 40); St Mary's Farmland, Chattenden Ridge and Deangate Ridge, which are described as 'Isolated wooded or farmed hills' (Medway Council 2011, 44; 56) and Lower Stoke and Hoo Farmland both described as 'rural fringe' (Medway Council 2011, 50; 58). These character type descriptions do not articulate the historical influences that have created these present farming landscapes; in order to give meaning to their character we also have to understand the historic cultural narratives they embody and which give them distinctiveness.

Farming history in Kent

A particular pattern of farming developed in north Kent through the medieval period that saw a concentration on arable farming to serve the large London markets, with sheep farmed on the coastal marshes. This pattern of farming developed throughout the centuries after the Norman Conquest and the north Kent region was considered 'high value arable' by the first half of the 14th century (Brandon 1988a, 183). In particular, farmers in the coastal districts of the South-East 'first decisively broke with the limited round of agricultural techniques' and began to intensify crop rotations, leaving less fallow and in some cases undertaking continuous cropping, and growing fodder crops to sustain

animals before the first spring grass was available (Brandon 1988b, 318-319). Brandon (1988b, 320) states that the 'main areas of intensified husbandry lay in a narrow ribbon of country 4-5 miles deep between Watling Street and the Thames and the sea, the rich marshlands', an area which includes the Hoo Peninsula. In particular, the new farming practices seem to have been taken up by the major ecclesiastical landowners in a pattern of improvement reflected in their reclamation of the marshes (Brandon 1988b, 322). The availability of so much reclaimable land on Hoo effectively gave it the best of both worlds: it could capitalise on expanding its sheep production while maintaining much of its inland arable to benefit from high grain prices: both reliant on its proximity to the London market Transport costs were also relevant to these medieval markets and it seems that grain prices in Kent and the North Downs were higher than the norm due to the proximity and accessibility of the London markets (Farmer 1988, 743).

It is possible that the Hoo Peninsula, due to its prime location in the fertile coastal zone and close to the London markets, saw only marginal contraction in arable farming after the Black Death and other troubles in the 14th century although Kent and Sussex in general did see conversion of arable to pasture at this time (Mate 1991, 119-120). Profits from pasture farming collapsed in the mid-15th century due to the Hundred Years War and a prevalence of sheep disease and this was followed by soaring wheat prices caused by plague and bad weather (Mate 1991, 121-122). Again the higher values of the Kent marshland, compared to Sussex for example, seem to be related to the proximity of the London and European markets and the lack of rich grazing elsewhere in the country (Mate 1991, 132).

The unique nature of the coastal farming regime and its close relationship with the London market led to a major shift in the mid-19th century when fruit growing and market gardening on an industrial scale developed around stations and concentrated on fertile coastal margins. In particular the region's proximity to London led to specialist production as 'The North Kent Plain was best placed for the export of agricultural produce' (Edwards and Lake 2012, 13) via the rivers and the London to Canterbury road (now the A2). Kent's mixed economy meant it was a little insulated from the late 19th century agricultural depression (ibid), echoing the pattern seen in earlier periods.

The cropmark evidence for the existence of post-built windmills on the Hoo Peninsula indicates that grain was ground into flour before being transported but also reminds us that some of Hoo's grain production would have been consumed on the peninsula itself.

Farming on the peninsula in the 19th century was particularly influenced by the innovative farmer Henry Pye who introduced hops and seed-growing to the area as well as a number of agricultural techniques to improve productivity. Although he was based in St Mary Hoo, initially at St. Mary's Hall Farm he also influenced other farmers on the peninsula who adopted his method of drainage (Pateman 2007; (Historic Area Research Report, forthcoming for St Mary Hoo, Stoke and Grain). Evidence for hop-growing

survives in the form of oast houses located on Hoo's central ridge (Edwards and Lake 2012, 99).

Historic character in the farming landscape

Analysis of the field patterns visible on modern and historic maps and aerial photographs undertaken as part of the project's Historic Landscape Characterisation (HLC) helped demonstrate how the peninsula's historical development, particularly in terms of agriculture, contributed to the character of the landscape today and revealed that some of the large, arable fields which characterise the peninsula had earlier origins than might appear at first glance.

Figure 69 Arable land on Hoo looking east along the peninsula with Grain power station in the distance. 26474/033 8-Sept-2009 © English Heritage.

In many cases the 'large open arable' fields which dominate the central ridge of the peninsula today (Fig 69) represent a 20th century landscape whose character is dominated by 'Modern Field Amalgamation' where fields have lost 50% or more of their field boundaries in the 19th and 20th centuries (Bannister 2011, 47; 51). This probably reflects a greater economic imperative to remove boundaries and use modern agricultural techniques on the arable central ridge than on the marshland pasture, as land values in the marshes decreased through the modern period. The arable central ridge area benefited from its adaptability and proximity to modern transport links. In contrast, fields with a pre-modern or medieval character are generally found to the north and west of the peninsula

(Bannister 2011, 50) possibly reflecting a farming regime and landscape which has seen less change or is difficult to adapt to modern techniques.

Analysis of the fields on the Hoo Peninsula revealed that, in some areas, the open character of the landscape is even more ancient, particularly at Cliffe where there is still evidence of open fields, which were subdivided but not enclosed with hedges (Bannister 2011, 47). This landscape type is typically of medieval origin and the 'core area of the parish retains its medieval character of open fields and dispersed farmsteads, with the routeway network having a dominant north-south orientation' (Bannister 2012, 28). Approximately 500 acres of open fields survive at Cliffe, about a quarter of the 'upwards of two thousand acres of arable' of 'common uninclosed field' which Hasted described as being in Cliffe in 1797 (Hasted 1797, 499). It is possible that the open character of Cliffe's fields survived due to the prevalence of post-medieval absentee landlords in the area which slowed the rate of enclosure (Historic Area Research Report, forthcoming).

The character of other areas of the peninsula also originated from open subdivided fields of the medieval period, particularly those areas which are now characterised by consolidated strip fields. These survive most extensively at St Mary Hoo (Bannister 2011, 47-48) and are where open field strips have been enclosed to create regular fields and where some subsequent boundary loss has occurred. Enclosure probably occurred in the early post-medieval period (AD 1540 - AD 1699) but distinctive boundary patterns reflect the much earlier origins of these fields. Though most of the fields around Stoke were formed by modern field amalgamation, a line of consolidated strip fields follows the main road between Upper and Lower Stoke. The character of fields to south and east of the parish therefore has an older origin (Bannister 2012, 26), which may reflect the proximity of these areas to the marsh and the benefits, particularly the increased stock capacity, of an agricultural system which exploited both the higher ground and the marshland landscape. It is also thought that the modern field amalgamation in Stoke has affected an area of former consolidated strip fields (Bannister 2012, 27). Formal planned fields with a regular pattern occur across the peninsula, but are concentrated in Cooling and Higham. These fields were probably deliberately planned by agricultural surveyors, rather than originating through farming practice, and probably date to the 18th or 19th centuries. These fields may also represent later enclosure of open field areas.

The modern, relatively simple character of the fields across the peninsula can belie a complex history. Those around Binney Farm, Allhallows (a settlement first recorded in 1292) are large but not typical of the modern field amalgamation of the west of the peninsula. Field enlargement has certainly taken place in the 20th century but from regular but informal enclosures rather than open strip fields, which suggests the fieldscape was always enclosed (Bannister 2012, 30). This may reflect a particular history of landholding relating to the farm or manor here.

Within the parish of Hoo St. Werburgh the character of the enclosures differs. Described in the HLC assessment as a 'farmed landscape dominated by enclosures (42%)' it is, like

many of the other parishes, largely made up of enclosures created from modern field amalgamation. However 'there is a clear difference between the eastern side of the parish where the open fields dominated, compared with the western side where the field pattern is more complex reflecting the presence of ancient woodland and common' (Bannister 2012, 33). Around Chattenden the presence of 'regular informal enclosures' suggest a different type of farming, possibly stock rearing on heavier soils (Bannister 2012, 33).

What has contributed to this historic character?

The character of Hoo's farming landscape today is largely due to the amalgamation of fields. Changes in farming, from the cultivation of market garden crops to a more cereal based system, had the most extensive impact since the early 20th century. The farming of top-fruit and vegetables, which retained the character of strip farming in some areas, has largely gone as a result of the creation of huge arable fields for the growing of cereals. The loss of boundaries has impacted on the 'intimacy' and complexity of the landscape even though hedgerows did not formerly typify the peninsula (Bannister 2011, 53).

The character of the peninsula's farming landscape was also influenced by the types of field boundaries. The marshlands are divided up by drainage ditches of various widths and sinuosity, whereas the inland field boundaries comprise grassy baulks which appear to relate to former medieval open strip fields. The exception is St Mary Hoo which is characterised by hedgerow-bound regular fields. Hedges mainly surround fields on the upper slope and top of main ridge, with treed hedges indicating assarts (land cleared of trees to be used for cultivation) around Chattenden Woods and Shorne (Bannister 2011, 48).

In parts of Allhallows, Stoke and St Mary Hoo low boundary banks were recorded from aerial photographs in areas of consolidated strips, planned formal fields and modern field amalgamation. However analysis of their previous historic character suggests these were all areas of open field strips in the medieval period. These strips appear to have been farmed in groups in late post-medieval and early modern period and are shown enclosed on the relevant tithe maps dated around 1839 (Bannister 2012, 45). Interestingly Cliffe's open fields do not appear to have had these low banks and it is not clear whether they represent later enclosure of the strips. It is noticeable that all the areas with these low banks seem to be on slightly steeper slopes than are present at Cliffe so it is possible that the banks could reflect the formation of lynchets (the scarps caused by the building up of cultivated soil along field boundaries) on the slopes. It is also possible that Cliffe never really had substantial demarcation between strips: as Baker (1964, 6) noted, a survey of Gillingham manor in 1447 stated that 'land was held in open parcels marked by boundary stones'. In an earlier rental of 1285, the demesne land appeared to be demarcated by paling and also by the temporary growing of corn (Baker 1964, 13). Hall (1998) also suggested that from the late 14th century onwards, wider gaps were left unploughed to demarcate important groups of strip fields. These grassed over strips are known as leys

and they may be the origin of the low banks described above, though they do not exhibit the typical curving pattern that might be expected from former strip fields.

This raises an interesting question about the nature of 'open fields' on the Hoo Peninsula and in the wider context of Kent in general. In the early post-medieval period a predominance of open fields over much of the peninsula's non-marshland areas has been identified with consolidated strips to the west (Bannister 2011, 51; Bannister 2012, 55). However fields that appear to be open, and therefore were probably farmed in a communal manner, would have had a much more complicated pattern of ownership, tenure and management than their signature in the landscape suggests. In fact unenclosed fields as we can identify them today may not have been communally farmed, particularly in the later medieval period, but farmed by individuals. This suggests a quite common stage in the process of enclosure of open fields, in which individual strips became the fixed property of individuals, and then these were enclosed 'piecemeal' to create the fossilised strip fields. These were identified on Hoo in the HLC (Bannister 2012, 47). In Baker's (1964) study of the manor of Gillingham, located across the Medway from the Hoo Peninsula, it was shown that Gillingham's field system in the late medieval period 'comprised both enclosed fields and unenclosed parcels lying within sub-divided fields' and that gavelkind tenure, the form of partible inheritance which was customary in Kent resulted in both the partitioning of land parcels and the ability to sell pieces. This also lead to some consolidation (Baker 1964, 20) meaning that holdings were concentrated in one area of the township and 'Co-operative ploughing may in places have produced a pattern of unenclosed parcels within enclosed fields. So, too, did the partitioning of inheritances' (Baker 1964, 21; 22). This complex situation is indicative of fields worked as part of a collaborative exercise from villages and more commonly hamlets and isolated farmsteads, rather than in the communal way typical of the Midlands system of medieval open fields worked from villages.

Related to the debates regarding the nature of Kent's open fields, and impacting on the peninsula's landscape character, is the traditional view that no ridge and furrow exists in the county. Ridge and furrow is the earthwork evidence of medieval ploughing with a fixed mouldboard plough drawn by a team of oxen, most commonly seen in the Midlands. The ridges were likely to have been less important on freer draining soils such as found on the Hoo Peninsula and may have been destroyed by flat-ploughing in the post-medieval period (Hall 1998). However three concentrations of possible ridge and furrow were identified on the Hoo Peninsula from aerial photographs. The first two areas centred around Cooling Street and just east of the centre of Hoo St. Werburgh are both adjacent to areas related to horticulture and are characterised as 'formal planned fields' from the Early Modern Period. These mostly seem to relate to either very late post-medieval ridge and furrow, or to the ridging created in orchards for the growing of top-fruit. However, though one small area near Cooling Street, checked against the Cliffe tithe map, does seem characteristic of open fields. The third concentration of ridge and furrow is located around Allhallows and St. Mary Hoo within the area subsequently subdivided into small fields defined by low banks.

Orchards and market gardening have strong traditional associations with the North Kent Plain. On the Hoo Peninsula the HLC has shown that the 'Horticulture' Character sub-type is dominated by the scattered remains of orchards across the western half of the peninsula's ridge. These are reduced survivals of a much more extensive industry of top-fruit growing in the 19th century. The farmers of Hoo, driven by Henry Pye, approached the South Eastern Railway Company with a proposal to build a railway on Hoo for the transportation of their produce (Bannister 2011, 48). Later 20th century horticulture mapped by the HLC seems to represent a move onto the London Clay Formation (Clay and Silt) which forms the highest part of the ridge. The early modern and early 20th century horticultural sites seem to be concentrated on the sandier Thanet Sand Formation (Sand, Clay and Silt) and the Lambeth Group (Sand, Silt and Clay), free draining and off the central ridge. It is possible that modern production techniques can cope better with more challenging geologies and topographies.

The aerial photographic evidence from the peninsula suggests that orchards were more extensive in earlier periods than shown in the HLC. Two of three concentrations of ridge and furrow – one centred around Cooling Street and one to the east of Hoo St. Werburgh – are both adjacent to areas of 'Horticulture' mapped on the HLC suggesting that the ridges may represent linear mounds on which fruit trees were planted to improve drainage. Some orchards have been planted since the HLC was completed.

Hoo farmsteads

Changes to agricultural practices, population increase and industrialisation had an impact on Hoo's historic farmsteads in the 20th century (see Chapter 5 for further details). The pattern and character of historic farmsteads, in their historic form (Fig 59 above) and their relationship to the wider landscape, tell us much about historic patterns of farming on the Hoo Peninsula prior to the rapid changes that the 20th century brought.

Where are Hoo's farmsteads located?

In general, Historic Farmstead Characterisation demonstrated a pattern of dispersed settlement across the North Kent Plain, although more historic farmsteads are located in a village context than is typical across the rest of Kent (Edwards and Lake 2012, 40). In the case of the Hoo Peninsula, with the exception of Grain, historically most farmsteads were located on the central ridge, either dispersed or within villages. Outfarms, which mainly take the form of sheepfolds but may also include former farmsteads shorn of their houses, are located on the marshes, particularly north of Cliffe and on Grain (J Lake, pers comm, see also Chapter 5). This indicated that much of the land was exploited for agriculture across the peninsula and that buildings were erected where necessary to help that process (Bannister 2012, 39). Unsurprisingly, given the differences between the higher ground and the marshes, a higher proportion of farmsteads are located on the North Kent Plain compared to the lower-lying Greater Thames Estuary. Within the North Kent

Plain, the marshland areas have the lowest proportion of farmsteads with early (pre AD 1600) buildings (Edwards and Lake 2012, 55) presumably as virtually no historic farmsteads have survived, on Hoo's marshes at least. Historic farmsteads also occur in clusters with higher concentrations in the west of the peninsula where as we have seen the earlier amalgamations of strips are concentrated (Edwards and Lake 2012, 44).

How does the pattern and type of farmsteads relate to land use, HLC and historic routeways character?

It follows that in broad terms there is a relationship between the plan type of the historic farmsteads and the historic character of the adjacent fields, although this is not so clear as elsewhere in England (Bannister 2012, 40; Lake and Edwards 2006 and 2007). On the Hoo Peninsula, as in other parts of England where farmstead plans indicate piecemeal rather than planned development (J. Lake, pers comm), this may in part reflect a very dispersed historic pattern of ownership and tenure where those operating from farmsteads may not have been managing the immediately adjacent land. For example, tithes from Higham show that not all land was held by people who lived in the parish and this can be seen as a 'typical feature of the area' (Edwards and Lake 2012, 153). However, some general trends in farmstead location may reflect historic land use.

In the parish of Allhallows very few farmsteads or outfarms are located on the marshes themselves. This is very different from the number of outfarms seen at Cliffe and may be related to the accessibility of the marshes, which are less extensive at Allhallows and therefore their further parts are more easily accessible, or the pattern may reflect available routeways through the marshes. It is also possible that a tradition of outfarms on the Allhallows marshes died out in the post-medieval period and so has not been recorded as part of the Historic Farmstead Characterisation mapping. In the parish of Hoo St. Werburgh, HLC showed that the character of the enclosures differs between the western and eastern side of the parish. 'There is a clear difference between the eastern side of the parish where the open fields dominated, compared with the western side where the field pattern is more complex reflecting the presence of ancient woodland and common' and historic farmsteads are more common in the east (Bannister 2012, 33) suggesting they developed in the more traditionally arable parts of the peninsula and along a routeway which follows the edge of the higher ground. It appears that the type of farmsteads also varied according to the different landscape types with dispersed plans occurring more in the west of the peninsula where more woodland predominated, as seen in rest of Kent particularly the Weald (Banister 2012, 40).

In the parish of St Mary Hoo, Bannister (2012, 49) noted that the 'grid-like' pattern of routeways is confined to HLC former 'open field' areas suggesting that they may be contemporary with this field system or may have developed at a later date. Loose courtyard plan farms appear to be associated with pre-1800 routeways in the parish so their origins may also relate to the open field system (Bannister 2012, 52). Regular courtyard farms lie on the edge of consolidated strip field areas and are linked together by

a pre-1800 routeway (Bannister 2012, 54). This suggests that the reorganisation of these farms may relate to the consolidation of the open field strips but the detail of such a relationship is not clear.

Detailed study of the historic farmsteads in Cliffe and Higham parishes shows that the survival of early buildings is lower in these parishes than in most other landscape areas of Kent, which has some of the highest concentration of 17th century and earlier dated buildings in England (Edwards and Lake 2012, 154). It was also noted that the farmsteads in Cliffe that have been dated are predominantly associated with the settlement foci of Cliffe village and West Street and/or the marshland edge, whereas in Higham the marshes exerted less influence on farmstead siting (ibid, 154-5). This may be because the marshes covered a smaller proportion of the area of Higham than of Cliffe.

There are significant differences with respect to the dating and distribution of farmsteads in relationship to the enclosure of open fields. Those farmsteads with a medieval farmhouse within the parish of Cliffe are concentrated within the village and adjacent to its once open fields. A ring of farms seem to define the eastern and southern limits of the open fields, three of which, Berrycourt, Carden's and Mortimer's were of manorial status. To the west, Buckland Farm, which is dated by two 17th-century buildings, probably marks the western limit of the open fields.

The farmsteads with a surviving medieval farmhouse in the parish of Higham occur at the hamlet of Lower Higham and also on isolated farmsteads. The tithe map shows that there were still areas of the former open fields that were sub-divided but largely unenclosed, although large parts of these fields could be in a single ownership. For example most of the fields to the east and south of Whitehouse Farm, then called Brick House Farm belonged to it, but further to the south there were a series of smaller blocks belonging to several different farmers, suggesting that there had been considerable consolidation of strips, but the process was not complete by the mid-19th century. Whitehouse Farm is one of three farms shown in the tithe apportionments as being over 300 acres in extent. There was one farm of between 200-300 acres and two of 100-200 acres. The remaining holdings were generally between c.20 and 50 acres. It is in these areas of field rationalisation that many of the single outbarns with 19th-century buildings occur, suggesting a farming system that required storage facilities out in the fields and away from the main farmstead. Scattered across the salt marsh innings are outfarms and field barns which date to the 19th century. In the parish of Cliffe they appear to form a line which coincides with the extent of innings which were relatively secure from seasonal flooding.

Emerging from the analysis of farmsteads and historic fieldscapes is a picture of remarkable stability. The areas of open fields do not have farmsteads built at a later date within them, in contrast to those areas of the country where farmsteads were located in newly-enclosed fields and the recorded dates of their buildings provides a terminus ante quem for the date of enclosure. This suggests that the method of managing those fields has continued well into the post-medieval period, as shown at Cliffe, whereas the areas of

consolidated strip fields in Higham parish are associated with farmsteads with no recorded pre-18th century buildings suggesting that as the fields and the farming systems were reorganised, so new farmsteads were built or existing ones reorganised.

How has the pattern of farmsteads changed over time and what has affected their survival?

The farmsteads on Hoo appear to have experienced a period of rebuilding in the 19th century. By the end of the century loose courtyards and regular courtyards were equal in number, a result of both the replacement of dispersed by courtyard plans and also the expansion of courtyard plans with new separate or interlinked buildings. Almost all the large, high status farms in Cliffe and Higham were of regular courtyard form by the end of the 19th century, and in both parishes the largest and most prestigious farms had developed into regular multi-yard plans (Edwards and Lake 2012, 157).

The detailed study of Higham revealed that dispersed cluster plan farmsteads in the parish was subject to considerable change and by the end of the 19th century only a small number retained their dispersed plan. Although in the mid-19th century there were a similar number of loose courtyard plan farmsteads, these showed more stability and most survived to the end of the 19th century (Edwards and Lake 2012, 157). This is perhaps not surprising as the dispersed plans on Hoo were mostly associated with small steadings and may have been less adaptable to changing farming regimes. It has been noted that 'In contrast to Romney Marsh, the marshland areas of the north coast had considerably lower proportion of dispersed cluster plans at just 8.2%, possibly reflecting greater levels of 18th and 19th century improvement' (ibid, 69) though on Hoo it may be that there were higher rates of loss on the marshes, possibly prior to the 19th century and so not recorded by the Historic Farmstead Characterisation. Distinctive dispersed plans are shown on earlier maps (see Figs 80 and 81). Based on the evidence from Higham and from Cliffe the historic farmsteads of the Hoo Peninsula were subject to higher levels of change in the 20th century. Regular courtyard plans survive better than loose courtyard plans (ibid 157), the reasons for which are discussed in more depth in Chapter 5. Farmstead loss seems to have been greatest in the small farms that were located in settlement cores and on the marshes (ibid, 158).

The changing agricultural uses of the marshes and saltings

The low lying land on Hoo consists of marshes which are reclaimed land maintained by a sea wall, and saltings which are open to the sea and overrun by the spring tides. Both areas were used for grazing but the unimproved character and less intensive management of the saltings, with correspondingly lower economic productivity, probably explains why they were placed low on the scale of land values. The 1843 land prices from Swanscombe, Kent (to the west of Gravesend) provide an example of the relative value of saltings compared with other types of grassland: meadow 63s an acre; pasture 35s an acre; downland 22s an acre; saltings 20s an acre; (Kain & Prince 2006, 141).

'To fat in the salt marshes'

Despite the low monetary value, saltings were successfully utilised. William Ellis noted that large numbers of sheep were sold to marsh graziers in Essex and elsewhere 'to fat in the salt mashes' (Ellis 1749, 48) and a Mr Curling, who was described in 1813 as 'an excellent grazier' kept sheep and fattened cattle on salt marsh on the Isle of Thanet, Kent (Boys 1813, 172). At least two centuries earlier, the advantages of saltings were written about by Gervase Markham (1568?-1637). First published in 1623, Markham's work stated that the 'masters of the salt-marshes find a singular and rare profit in those grounds for the feeding, breeding, fatting and sustaining of their great flocks of sheep' (Markham 1676, 52). Saltings were also seen as beneficial to the health of the livestock. Sheep 'upon these salt grounds, they say they will never rot or perish by that universal disease' - caused by liver flukes - due to the salt 'which they lick up in the grass, and to the salt quality of the grass, which is…an antidote or preservative against that noisome and pestilent mortality' (ibid).

A mid-17th century account related the benefit of saltings to horses, thought in part to be due to the salt 'with which that grass is more or less impregnated as the tides rise higher or lower upon them' (Gibson 1754 177-8). As late as the 1870s it was claimed that London horses 'worn down by hard travel' or long afflicted by lameness or illness had 'frequently been restored to their pristine health and vigour' after a few months on the marshes and 'especially on the saltings' (Loudon 1871, 748).

The 'rule well known in Lincolnshire and Kent, that upon the salt marshes sheep never die of the rot' led to a belief that it was the salt that effected the cure and that rot could be prevented if salt was rubbed on the mouths of sheep. Significantly this remedy still maintained a link with the saltings as it was stated that the salt used had to be 'gathered from the salt marshes in the heat of the summer when the tide is going away, and leaving certain drops of salt water on the grass, then the violent heat of the Sun turns it to salt' (Gervase Markham quoted in Ellis 1749, 140). By the 19th century it was concluded that keeping sheep on salt marsh could only act as a preventative to this disease, not a cure (Simonds 1862, 153). If this is the case, it is presumably because the environment of the saltings interferes with the complicated life cycle of the liver fluke – perhaps in not

providing an ideal habitat for the freshwater and amphibious snails which act as an intermediate host (Haskell 2008, 346).

'Safely confined by their large watery ditches'

The saltings on the north coast of Hoo had almost entirely eroded away by around 1800 (Bowler 1968, 256) but even if they had survived longer, they were probably too far from London to be used as grazing for its sick or lame horses in the 1870s. Saltings on the Medway were more extensive and survived for longer and a wide expanse of saltings was still in existence at Stoke in the mid-19th century. After this date, the Medway saltings experienced considerable impact, both direct and indirect, from the mud-digging supplying clay to the Portland cement industry (Chapter 3 and see below).

A number of mounds and embanked enclosures on Hoo Saltings and Stoke Saltings indicate how these areas were used for grazing in the 19th century. William Ellis noted that on marshland, sheep were prevented from straying as they were 'safely confined by the …large watery ditches' (Ellis 1749, 48). Further protection was offered by enclosures (Fig 70), which could hold livestock and provide refuge when the saltings were flooded, and mounds (see below and Fig 86).

Figure 70 A livestock enclosure on Stoke Saltings. At the top left corner of the enclosure are the remains of the causeway that connected it to the village of Lower Stoke. 27196/36 19-Aug-2011 © English Heritage.

The enclosures were thought to have been built when a larger refuge than a mound was needed, although mainly enclosures were seen on the saltings (Spurrell 1885 283-284). In

Stoke the smallest sites were mounds (about 15-20m across) and the largest were embanked enclosures (the largest 55.8m by 48.3m). A huge circular enclosure on Hoo saltings (Fig 71) measured 83m in diameter; though it is possible it was not originally intended as a livestock enclosure and may instead be associated with quarantine requirements in the 17th century (see Chapter 2). An exception to this pattern was a large tear-drop shaped mound, measuring 61m by 26m, which may be a reused saltern mound on Stoke Saltings. This was still visible in the mid-20th century but was eroded away. The 1876 Ordnance Survey map depicted what appear to have been two buildings either side of an internal division. The two halves of this site each had an entrance suggesting sorting and separation of flocks or herds.

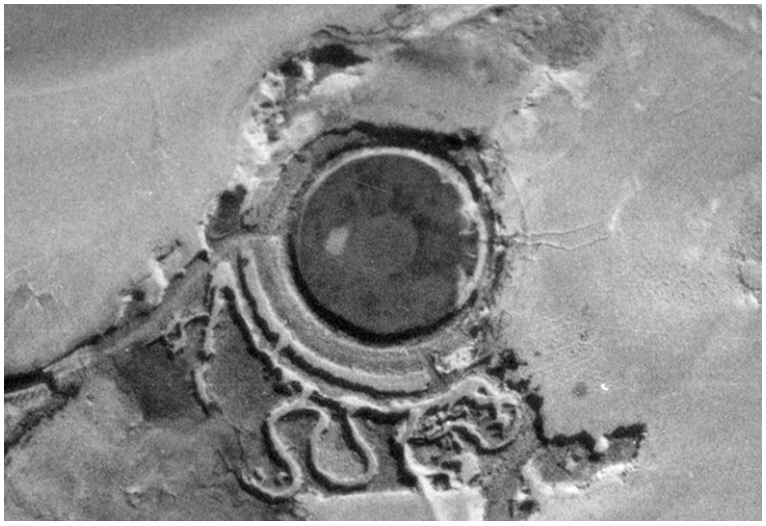

Figure 71 The large circular enclosure on Hoo Island may originally have been associated with airing goods as part of quarantine. Its later reuse as a livestock enclosure is suggested by its connection to the paths on the island. RAF CPE/UK/1923 3096 16-JAN-1947 English Heritage RAF Photography.

All but one of these mounds or enclosures was accessed via raised causeways. The 1870 Ordnance Survey map shows Stoke Saltings had two main causeways with various branches leading off them (Fig 72). These also led to open areas on the saltings but none met the coast, indicating that they were exclusively for access within the saltings. However the earlier 1801 and 1813 maps suggests the opposite and show the two routeways leading to the coast, one at Coalmouth Creek and the other on the Medway. A similar arrangement was present on the islands that made up Hoo Saltings. Causeways or paths led to open areas of saltings and linked enclosures, although as these were on a number of different islands paths were taken across channels on hards.

That none of these enclosures was marked 'sheepfold', 'cattle pen' or similar on the 1870 map, combined with the partial loss of the most easterly enclosure to the sea, may suggest that by this date this area was no longer used for grazing.

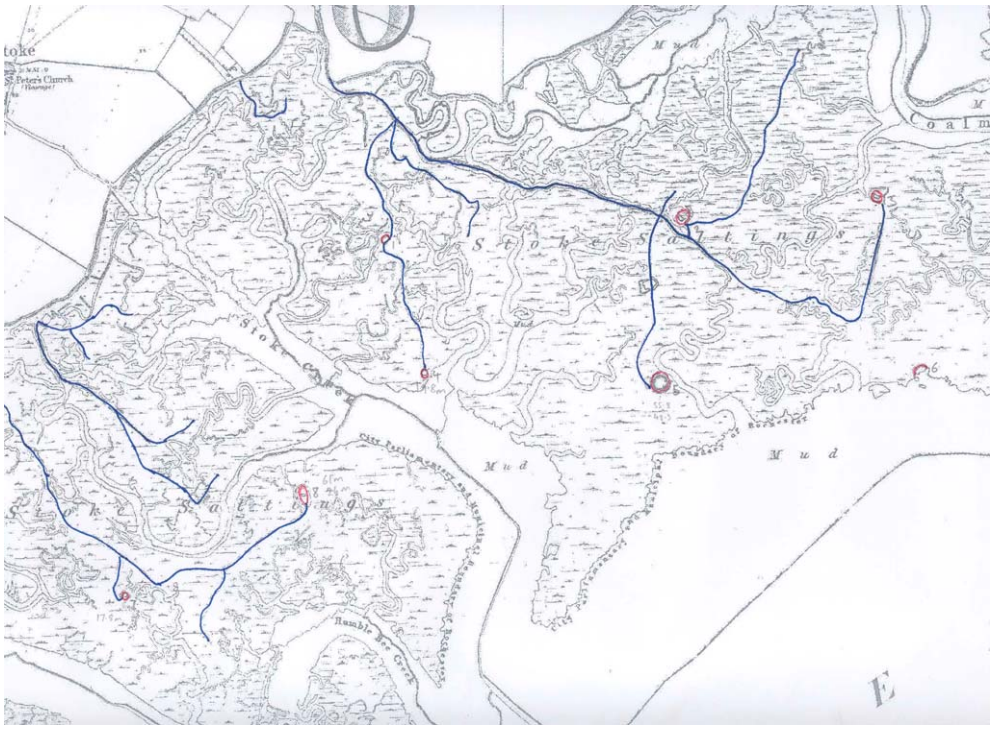

Figure 72 Stoke Saltings in 1870. Causeways or paths ways are marked in blue and livestock enclosures in red. Base map © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2013) Licence numbers 000394 and TP0024.

This impression of abandonment is strengthened by the clay digging undertaken there from the mid-19th century. By 1897 clay digging had removed a significant area of Stoke Saltings including refuge mounds, enclosures and sections of causeways. The eastern end of the saltings however remained intact and still included two enclosures connected to a causeway and significantly, a new enclosure is also depicted which was marked 'sheepfold'. The exact order of events is not clear and this new sheepfold may have been built before clay digging in Stoke was undertaken. The fall in land values after 1880 certainly makes it more likely that it was built before that date. It is clear that grazing on Stoke Saltings had been completely abandoned by 1908 when mud digging had extended across the whole of the saltings leaving only fragmentary remains of the causeways and only one intact though isolated enclosure (Fig 73).

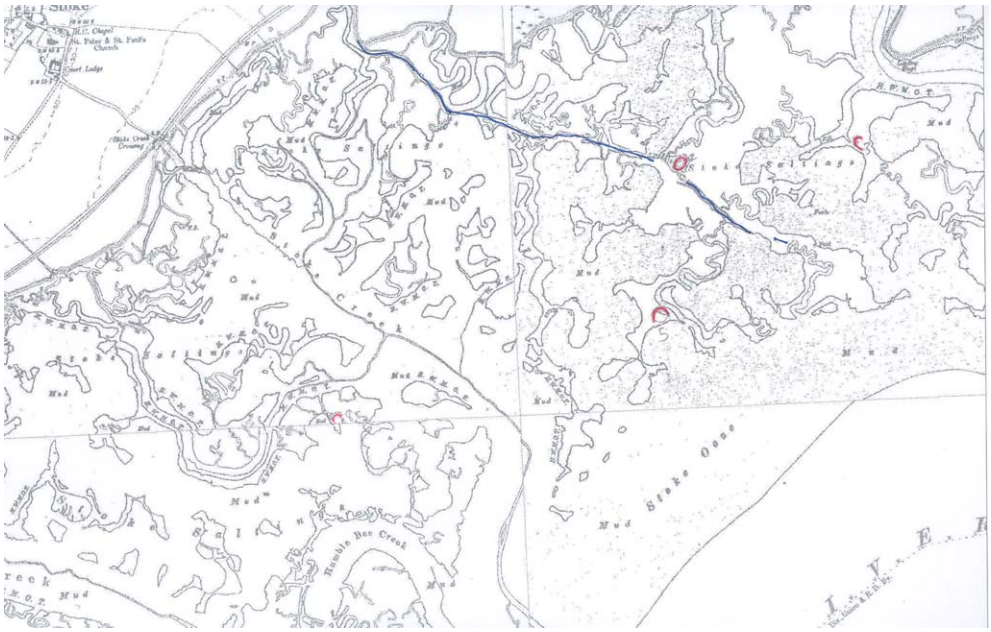

Figure 73 Stoke Saltings in 1908. Causeways marked in blue, enclosures in red. Clay digging had removed much of the saltings by this date totally or partially destroying the livestock enclosures and causeways. Base map © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2013) Licence numbers 000394 and TP0024.

Post medieval inning

Inning was the process of reclamation where land was protected from the incursions of the tides by a seawall and then divided into plots The first areas were probably inned around the time of the Norman Conquest if not earlier and by the end of the medieval period, extensive areas had been protected by sea walls (see Chapter 7); certainly much of Cliffe had been reclaimed by the 1540s (Bowler 1968, 224). This left relatively small areas to be inned such as the saltings north of Cooling near what is now Egypt Bay. This area was eventually reclaimed by the 1630s when the sea wall from Woolwich to the Medway had approximately reached its present position (Bowler 1968, 238). Although this appears to be a modest expansion, major reclamation work was carried out in the 16th century due to the floods of the 1550s and 1560s which 'inundated practically the whole reclaimed area' (Bowler 1968, 193). From 1530 construction and maintenance of the sea walls on Grain was mainly the responsibility of the North and East Kent Sewer Commission. From the 16th to the 18th century the Commission struggled to prevent incursions but the rising sea level and periods of bad weather meant regular flooding and a significant loss of land to the sea. Thereafter, improved construction, with higher walls of stone or ragstone pebbles instead of chalk blocks improved the protection. Fewer innings took place on the Medway coast, particularly in the parish of Stoke where a large area of saltings was left unenclosed. The presence of fisheries in this area, which would have utilised the creeks and fleets that subdivided the saltings, may help explain why this area was not inned as this would have closed these waterways off from the sea. Conversely, it

has been suggested that the inning of the saltings at St. Mary Hoo may explain the apparent lack of exploitation of the coastal resources there (Bannister 2012, 54).

The damaging effect of wave action resulted in programmes of maintenance which included the replacement of eroding or exposed sea walls and the digging of new ditches to improve drainage. The new sea walls built to replace eroding sections were generally set back from the coastline and created insets, often forming straight lines and sharp angles (Bowler 1968 238). The straight length of sea wall at Hope Point was built at a date prior to 1694 behind the earlier wall which had become dangerously exposed to the waves (Bowler 1968, 273). Similar setting back of the sea wall in insets can be seen elsewhere as at Cockleshell Beach, Grain (Bowler 1968, 238).

Figure 74 Cliffe Marshes. Russell's 1695 map 'A Plot of Cliffe Level' KHLC S/NK/P/8a (Kent History & Library Centre, Maidstone).

A comparison between the 1695 map of Cliffe and High Halstow marshes and air photos taken in the1940s and 1950s show that very little had changed in the way they were subdivided (Figs 74 and 75). Despite some changes since the 1940s much of this pattern still survives. The watercourses that subdivide the marshes are either sinuous and therefore are the result of natural drainage, or straight indicating that they are artificial. Bowler has commented on the tendency to use natural drainage where possible with artificial drains only being used if natural ones were inadequate as was the case in north-west Cliffe (Bowler 1968, 256). An unfortunate and unforeseeable consequence of the post medieval period of reclamation was the flourishing of malaria in the area as the pools of stagnant water that formed in these reclaimed areas became breeding grounds for malaria carrying mosquitoes. The disease became established in Britain during the 16th

and 17th centuries, a period which coincided with the final reclamation of the marshes (see Chapter 2).

Figure 75 Cliffe Marshes detail of RAF 540/1699 116 12-Aug-1955 © English Heritage RAF Photography.

Map evidence indicates that the small islands in the Medway, Oakham Ness, Bishop Marsh (now Bishop Saltings) and Nor Marsh were protected by sea walls, possibly during the 17th and 18th centuries. Inning an area allowed the grazing to be improved and narrow furrows dug to improve drainage can be seen. Building could take place and a large house had been erected on Nor Marsh by 1797 and a building on Oakham Ness by 1801; other farm buildings included sheepfolds. These apparently late innings did not last long. Bishops Marsh was already reverting back to saltings by 1862 and Oakham Ness began a gradual return to saltings after the sea wall south-west of the farm buildings had been breached at some time between 1896 and 1908 (Fig 76).

Figure 76 shows that although the Oakham Ness sea wall was breached in the early 20th century the difference between the central enclosed marshland and the saltings beyond was still apparent in the mid-1940s. Access to the island was via a hard which can be seen as a curving dark line across the mud on the left hand side. The lighter area within a ditched enclosure at the bottom of the inned area was the location of the farm; one building can still be seen.

Figure 76 The Oakham Ness sea wall RAF 106G/UK/1444 4048 1-May-1946 English Heritage RAF Photography.

Nor Marsh began to revert to saltings after the Second World War but its use as farmland had probably come to an end at some point between 1896 and 1908 when what may have been dredged material was being dumped along the northern edge of the island, probably via the large jetty erected there by 1908. This dumping of material slows or reverses the process of erosion and can be seen most dramatically at Hoo St. Werburgh. By the 1860s Hoo saltings consisted of a number of islands but the vast quantities of mud that made up these saltings was dug out during the second half of the 19th century for the cement industry and little of these islands survived by 1909. By 1933 many of these fragmentary remains had been joined together through the dumping of dredging waste. This dumping created the present Hoo Island, which was reaching its present shape by the late 1940s, a shape maintained by continued use as a dredging deposition site (Figs 77 and 78).

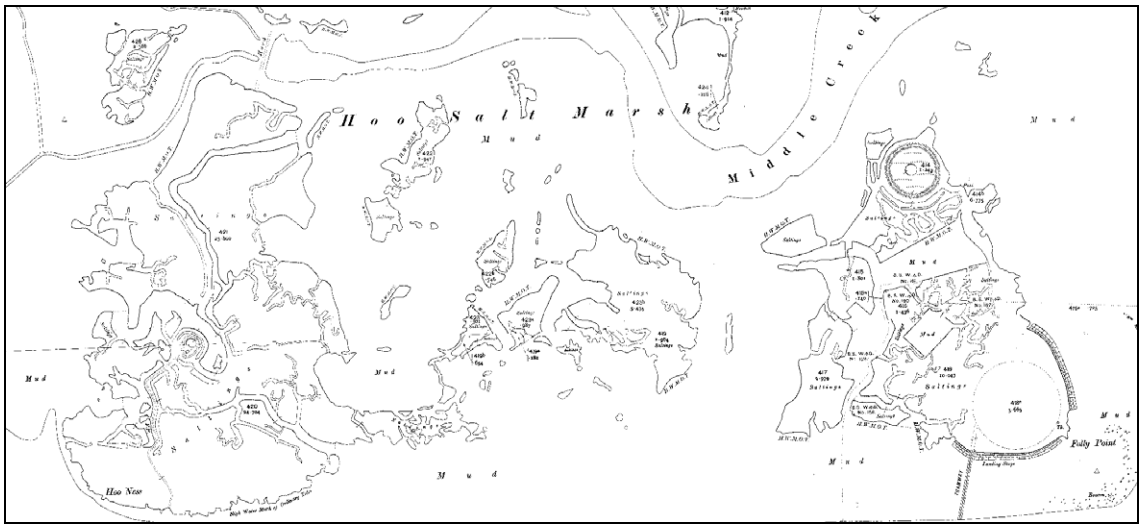

Figure 77 Fragmented remains of Hoo Saltings in 1909 OS map © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2013) Licence numbers 000394 and TP0024.

Figure 78 The new island created on Hoo Saltings in 1947 RAF CPE/UK/1923 3097 16-Jan-1947 English Heritage RAF Photography.

Settlement on the marshes

A strong impression of the relative emptiness of Hoo in terms of settlement is gained from written works from the 17th century onwards (Johnson 1629; Hasted 1798 etc; see Chapter 2). This perception, particularly for the marshes, seems to be confirmed on the ground by the late 18th and early 19th century maps of the area (Andrews' and Dury's 1769; Ordnance Survey 1801 & 1813). The emptiness of Hoo's marshes on the early 19th century maps stands in stark contrast to the depiction of the more widely settled Essex marshes on the opposite bank of the Thames. Hoo's marshes only begin to be shown as populated on the Ordnance Survey's later revisions of the 1813 edition undertaken in the first half of the 19th century.

Figure 79 A 1717 map showing a farm on Halstow Marshes. These drawings of buildings are likely to be indicative rather than an accurate depiction of buildings RBT: E18/01/009. (By permission of the Wardens and Assistants of Rochester Bridge. Rochester Bridge Trust).

However, earlier maps from the late 17th and early 18th centuries indicate that the picture of a marshland uninhabited prior to the mid-19th century is wrong. These earlier maps both show a number of buildings with pitched roofs singly or in pairs across the marshes. These depictions seem to be symbols rather than accurate illustrations of the buildings seen there. The function of the buildings is not clearly distinguished on the 1695 map but the inclusion of chimneys on some structures depicted on the 1716 and 1717 maps suggest that some at least were houses, almost certainly farms and associated buildings (Fig 79). These sites are all enclosed by drainage ditches and despite the

presumed advantage of building on mounds in a marshy area, very few are shown to be thus constructed. This general avoidance of mounds is also illustrated by the examples of buildings or sheepfolds that were built close to but not on mounds.

Figure 80 Buildings on Cliffe Marshes 1695. Russell's 1695 map 'A Plot of Cliffe Level' KHLC S/NK/P/8a (Kent History & Library Centre, Maidstone).

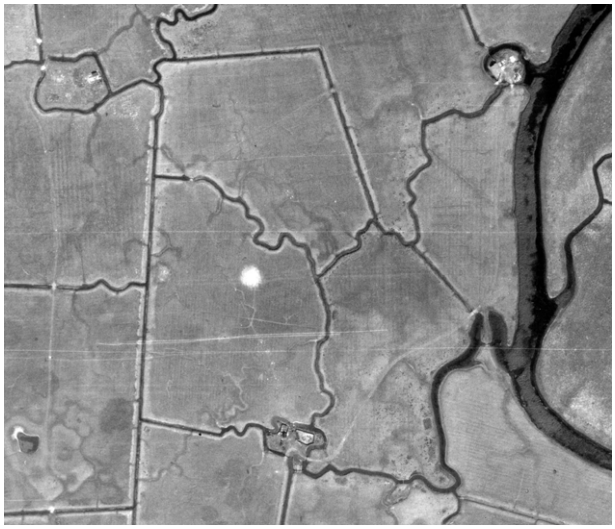

Figure 81 Buildings on Cliffe Marshes 1955. RAF 540/1699 116 12-AUG-1955 English Heritage RAF Photography.

Figure 82 Modern but derelict building next to Cliffe Fleet. This site has had buildings on it since at least the late 17th century and is located top right in the previous figures (Figs 80 and 81). 26866/37 23-Jan-2011 © English Heritage.

The locations for these farms or farm buildings remain in use for a considerable period of time and many sites that were occupied in the 1690s still had buildings present in the 20th century. This can be seen on Cliffe Marshes where three ditch-defined plots that contained one or more buildings in the 1690s were still occupied by buildings in the 1950s (Figs 80 and 81). Although the choice of location for building on the marshes had not changed the structures themselves are almost certainly not the same Two of these still have the remains of farm buildings there today (Fig 82).

A similar pattern is also seen on Halstow Marshes. The plot of land to the east of Egypt Bay that was the site of a house with farm building in the early 18th century had been reduced to one building by 1840. This appears to be in a slightly different location within its plot and may be a newer building (though the difference in location may reflect the inaccuracy of the 18th century mapping). To the south-west of this site, although buildings are depicted at the location of Shade House in 1695, most of the surviving building remains at this site are relatively modern.

Maps provide a constantly changing picture of settlement at Rose Court on Grain Marshes. No buildings are depicted in 1640 (RBT E15/01/012); a barn is depicted in 1701 (RBT E15/01/032), which had been joined by a house by 1716 (Fig 83). By 1840 this house had apparently been demolished, all that remained being a regular U-plan outfarm complex apparently incorporating the earlier barn (Fig 84). The two smaller flanking buildings had been demolished and replaced by others on a different alignment in the 1890s (Fig 85). This building layout also appears in an 1890 plan for proposed cattle shed and enclosure stockyard (Rochester Bridge Trust 'Proposed Cattle Sheds and Enclosure

to Stock Yard' RBT: E15/01/099. Although it is not stated in those plans, it appears that the main barn depicted in 1895 was retained. The site was demolished in the mid-20th century. These buildings were not at the site of the present Rose Court farm which is to the north-west of Grain village and dates to the 1870s. Rose Court was the name of a manor owned by the de Cobham family until 1397 when it was presented to the Rochester Bridge Trust. The map evidence combined with a lack of firm evidence of earlier buildings on the marshland suggests settlement expanded onto the reclaimed marshes during the post-medieval period and that this was incorporated into a marshland pattern of fields and settlement sites that remained essentially unchanged into the 20th century. The potential inaccuracy of maps, frequent rebuilding of marshland buildings and the movement of place names all require some research to establish finer detail and secure identifications but the overall pattern is clear.

Figure 83 Rose Court, Grain Marshes 1716. North is to the right. RBT: E01/02/014 (By permission of the Wardens and Assistants of Rochester Bridge. Rochester Bridge Trust).

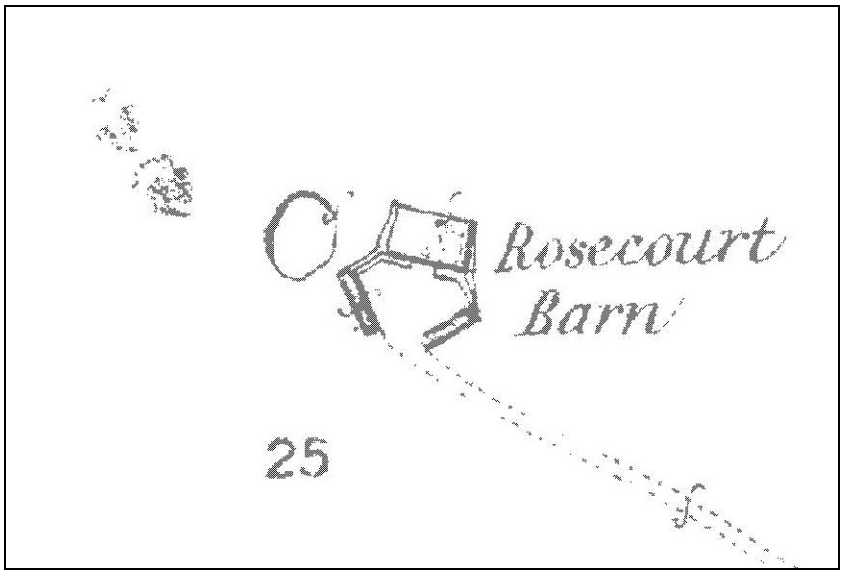

Figure 84 Rose Court, Grain Marshes 1895. No house survives. The symmetrical arrangement of buildings and walls created a stockyard. A pond is to the left. Kent OS 1:2,500 1895 © and database right Crown Copyright and Landmark Information Group Ltd (All rights re reserved 2013) Licence numbers 000394 and TP0024.

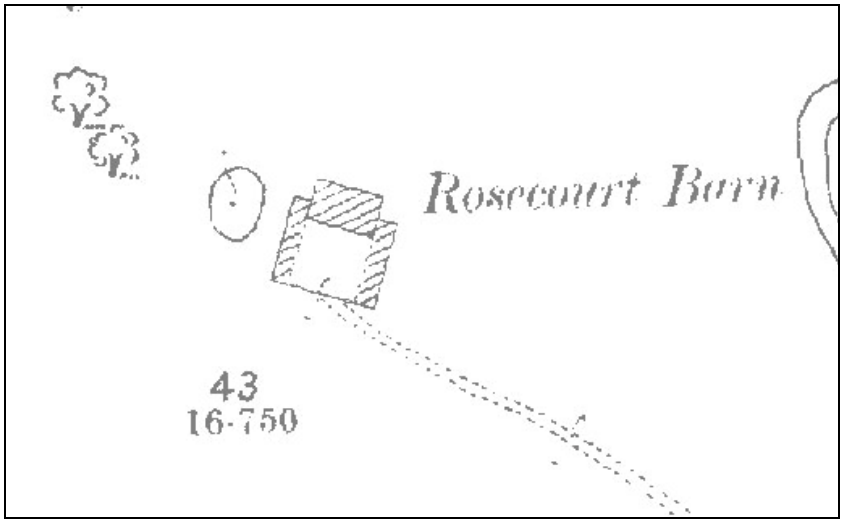

Figure 85 Rose Court, Grain Marshes 1898. Kent OS 1:2,500 1898 © and database right Crown Copyright and Landmark Information Group Ltd (All rights reserved 2013) Licence numbers 000394 and TP0024.

19th century improvements

The third quarter of the 19th century was a prosperous time for farmers in the South-East and is reflected in the increase in land values. This encouraged a wave of improvements in drainage and the building of animal sheds (Bowler 1968, 333). Improved drainage is apparent over much of Hoo's marshes and appears in the form of closely spaced furrows that sit within the existing pattern of drainage ditches. This pattern of ditches dates to at least as early as 1695 and these improvements must post-date them: the later 19th century phase is the most likely occasion for their implementation. Many of the improvements on Hoo were associated with Henry Pye. He came to the peninsula in 1850 and undertook various improvements, including establishing better drainage. Each of the farms he rented was treated in the same way and 'it is said by 1880, that every farm on the Peninsula had been drained according to the principles of Henry Pye (MacDougall 1980, 128).

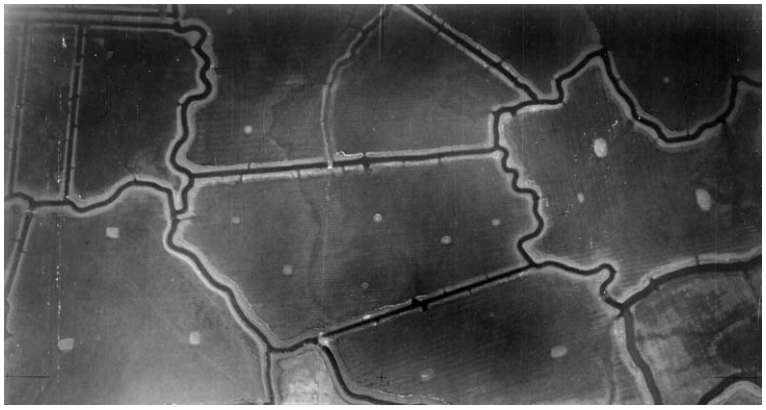

Figure 86 Possible livestock refuge mounds showing as light marks on Cliffe Marshes (possibly due to frost) after the 1953 flood. RAF 82/713 449 6-Feb-1953 English Heritage RAF Photography.

Some of these fields on the marshes have small earthwork mounds which sit on top of the drainage furrows (Figs 86). Although on top, they may have been built as part of the same phase of improvement as the furrows, probably between circa 1850 and 1880. These mounds are numerous and there is a concentration in Cliffe and Cooling but they are not evenly distributed; some fields have none while others may have three or more. The examples in Cliffe are generally in the southern half of the marshes. They could be haystack stands but it is notable that haystacks on Hoo photographed in the 1940s were not built on the mounds. An alternative suggestion is that some if not all of these small mounds might be livestock refuge mounds and would have provided high ground for flocks or herds to retreat to if the area was flooded. According to Spurrell (Spurrell 1885, 283) there were mounds for this purpose on some Thames marshes in the 19th century. Flooding was a danger and some or all of the marshes were flooded in 1881, 1897, 1902 and 1905 (Bowler 1968, 335). The need to safeguard livestock is reflected in the story of a shepherd named Talbot who went missing for a time during the 1897 flood while out

rescuing sheep and was eventually found in an exhausted condition hanging from a high fence (Anon 1897, 8). If these mounds were indeed for refuge they do not always appear to have been successful; the 1897 flood resulted in the drowning of hundreds of sheep (ibid). There was another devastating flood in 1953 and while there are no figures specific to Hoo, for Kent as a whole 40,000 acres were inundated and animal casualties in the area of Faversham, Sittingbourne, and the Isle of Sheppey were estimated at 4,000 sheep, over 400 cattle, and about 100 pigs (Anon 1953, 3).

Wildfowling

On Halstow marshes are the remains of a duck decoy pond (Fig 87). The earliest English decoy ponds were built in the 1600s but the majority are thought to have been constructed from the early 18th to the mid-19th century (Heaton 2001, 5-6). Decoy ponds consist of a central pond with a number of gradually narrowing channels, known as pipes, leading away from the main body of water. The pond would have been surrounded by trees to provide seclusion and the pipes would have been enclosed by nets with a screen along one side. Ducks that settled on the pond could be lured along the pipes, trapped and killed.

Figure 87 Duck Decoy on High Halstow Marshes. 26889/038 8-Mar-2011 © English Heritage.

The decoy pond at High Halstow is approximately square c.74m across with four pipes, one at each corner. The ground slopes down from the central pond's outer margins to its diamond-shaped water-filled centre. This sloping ground may have provided a place for

the fowl to rest known as landings. The 1872 Ordnance Survey map shows a building, probably a cottage for the decoyman within a garden plot to the east of the pond. The duck decoy not only gave its name to 'Decoy Fleet' immediately to the north but also 'Decoy Farm' about 800m to the south-east. Map evidence suggests that the decoy was in place by 1801 but may have been built between 1654 and 1697 (Robinson 2005, 234). On the 1801 map Decoy Farm is depicted and named and a series of dots at the site of the decoy can be interpreted as representing the tree cover there. A Decoy Pond Farm in High Halstow was one of the lots in a 1797 sale (and had already been let to Mr Richard Knight from 1796 for 14 years (*The Times* 19 Dec 1797, 4). Although a 'farm house, barns and stables were already present' in the 1650s (Robinson 2005, 234), this may be a reference to the farm complex at Decoy Farm to the south-east not the cottage site to the east of the pond.

Based on Ordnance Survey map evidence, the decoy may have been in use as late as the 1880s but as it is not one of the two decoys listed in Kent by Payne-Gallwey in 1886, it may have gone out of use by that date (Payne-Gallwey 1886). By 1897 no trees were depicted at the site and while the cottage was still there it was no longer within a garden plot. By 1908 the pond was marked as marsh and the cottage had been demolished.

Fishing and fisheries

The Medway and Thames have long been historic fishing grounds (Bannister 2012, 56; Goodsall 1965). Cliffe was once a thriving medieval fishing port (MacDougall 1980 54-60) and shellfish formed an important part of the local economy. Three fisheries operated in the Thames and Medway estuaries: fishermen of the Thames and the City of London; the free fishermen and dredgermen of the City of Rochester, and the fishermen and dredgermen of the Lord of the Manor of Milton. The industry was regulated, determining both when oysters could be taken and in what quantities; these rules were enforced by Water Bailiffs (Pike et al 1992, 40). Disputes over oyster grounds between fisheries and dredgermen were common (Bannister 2012, 17).

Although there were over 300 men working in the industry in 1728 the Medway 'never attained equal prominence as an oyster fishery with the Kentish Flats' (Fig 84; Kirby 1969, 416). By the later 19th century the industry was in decline. Lines of small pits can be seen on the edge of the peninsula in a variety of places including Higham Saltings (Fig 88) and part of what was Egypt Saltings (now behind the sea wall). Some of these are likely to have been dug in the later 19th century for rearing oysters (Kirby 1969, 417), presumably in an attempt to reverse the decline in numbers, and they are all that now remains of the shellfish industry on Hoo. Artificial beds were seeded with spat (young oysters) from other estuaries and in some instances new beds were discovered that had seeded themselves naturally (Kirby 1969, 417). After 1850 industrial pollution caused the oyster beds to decline (see below) with numbers were further reduced through a combination of poor spatting seasons in 1851-6 and 1860-4 and severe frosts in 1860-1, 1879, 1891

and 1895 which killed the shellfish. Conditions were so severe in 1895 that ice in the Medway carried away some oyster beds (Kirby 1969, 417).

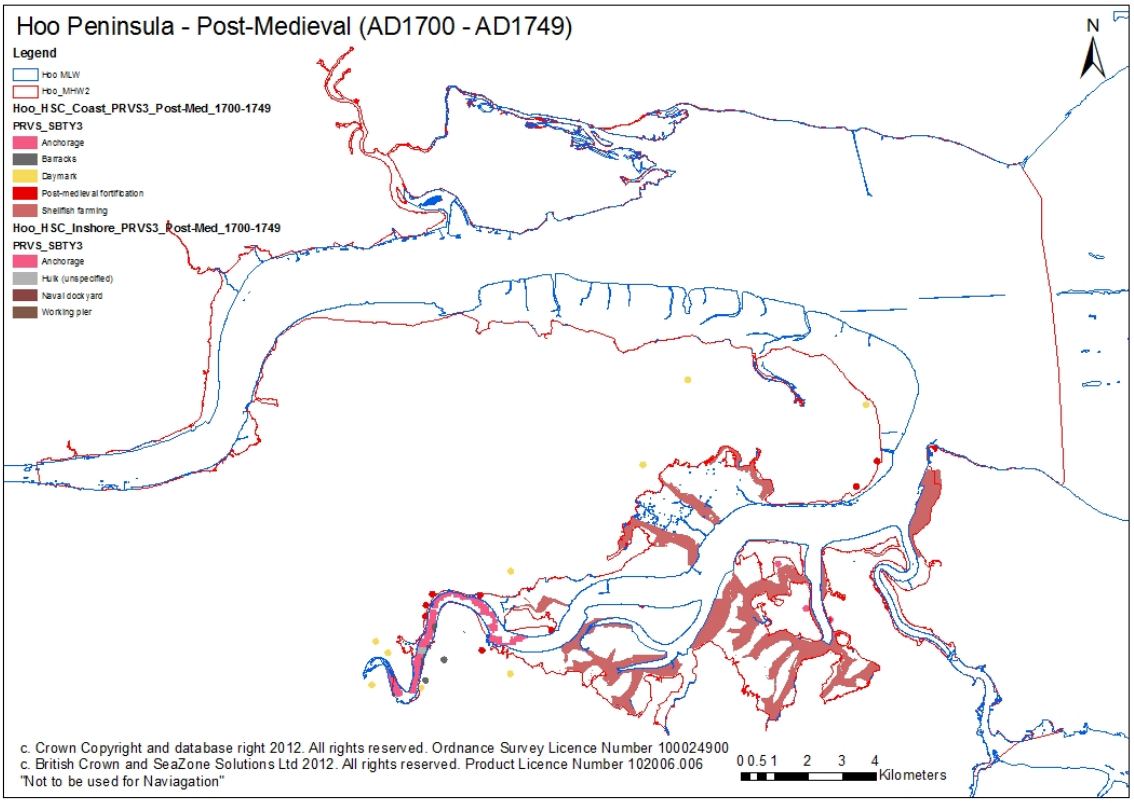

Figure 88 HLC/HSC map indicating area of post medieval fisheries (in this illustration fisheries are shown as broad pink bands (Bannister 2012).

In addition to these natural setbacks the beds suffered from over-exploitation, including the newly discovered beds, which were short lived as a result (Kirby 1969, 417). The large colonies of mussels in the Medway, particularly off Coalmouth Creek were exploited in the 1860s. Some of these were sold for food, but hundreds of tons were sold to farmers to be used as manure (Kirby 1969, 421).

Pollution and increased quantities of silt caused by mud digging and other industrial activities within the rivers had a devastating effect on fish stocks and the oyster population (Fig 89). In 1865 there were still 500 dredgermen working 80-90 boats but this had been reduced to 20 men and 5-6 boats by 1914. The limited oyster fishing that subsequently took place was ended when the remaining oysters in the Medway were killed in the cold winter of 1939-40 (Pike et al 1992, 40-41).

Figure 89 Oyster Pits on Higham Saltings. 26598/022 6-Apr-2010 © English Heritage.

7 ADAPTING AND ORGANISING – MANAGING THE LAND

Creation and maintenance of the marshland landscape

The sequence of land reclamation on Hoo

Analysis of the sequence of reclamation on the Hoo Peninsula raises a number of challenges in understanding the order in which various sea walls were constructed to protect the salt marsh from the tides,. The pattern of sea walls that we see today appears to have been established by the early 17th century, in a period of stabilisation after major floods which occurred in the 16th century (Bowler 1968, 2). Some of these floods were very significant, such as those described by a 1570 commission of inquiry which stated that 'lands from Gravesend to Medway, on both sides, and including the Isle of Grain were inundated with salt water' … 'and that walls were so breached that ships could, and did, sail over them at spring tides' (Bowler 1968, 220). Consequently there is much evidence for the re-inning of many areas of inundated marsh across the Hoo Peninsula in the 1500s and it is through this process that the modern marshland landscape pattern is thought to have been established (Bowler 1968, 219; 237).

However the pattern of walls we see today (Fig 90), even if a true reflection of the extent of marshland reclamation in the early 17th century belies the complexity and dynamism of this changing landscape in the medieval period. The Hoo marshland field systems are currently the subject of a separate piece of research (Draper forthcoming). Referring in her PhD thesis to the surviving documentary evidence, Bowler (1968, 11) noted that the major floods of the 16th century 'effectively wiped out pre-existing field boundaries, so that even when a marsh name survives it might not refer to exactly the same area as it did originally. For Cliffe it is possible to build up a map of main marsh locations, but it is not possible in most cases to draw a firm boundary'. This situation is repeated all around the peninsula and although much information survives relating to marsh landholdings from the 13th century onwards it is difficult to relate the references to specific areas and place-names in today's marshland landscape or to specific surviving relict walls (Bowler 1968, 141-144).

In addition to the possibility that floods erased the pre-existing marshland landscape, Evans (1953, 119) also suggested that 'many of the earlier walls have been destroyed to provide material for newer walls, and indeed, there was a regulation that when a new wall was built the earlier wall which it had replaced must be removed', again adding to the difficulty of understanding the process of medieval reclamation in terms of today's landscape. In discussing post-flooding reclamation in Cliffe in 1634, Bowler (1968, 226-7) noted that the lack of cross or counter walls also suggested that the Cobhams undertook the re-inning of a large swathe of the marshes in one campaign. This also implied that these later reclamation practices are likely to have reduced the potential for surviving medieval reclamation evidence, at least in terms of surface archaeological remains.

However, differences in the form and patterns of drainage ditches within inned areas may also offer clues to the scale and sequence of reclamation phases in a given area.

In their study of the Romney marshes, Eddison and Draper (1997, 87) noted that 'Perhaps more than any other historical landscape, marshland can only be understood by [such] interdisciplinary research'. If, as Bowler (1968, 11) stated, there appears to be 'only one map prior to the sixteenth century' surviving for the area and the modern pattern of seawalls reflects the last major phases of reclamation in the 16th century, then more detailed studies of marsh landholdings as well as geoarchaeological and soil studies (cf. Eddison and Draper 1997, 78) are needed in order to untangle the sequence of wall-building and reclamation on the Hoo Peninsula. The research could also be taken further by establishing to what extent the patterns of drainage ditches seen today within the reclaimed areas reflect those of earlier periods. This has been established for another area of Kent marshland at Walland (Eddison and Draper 1997, 76).

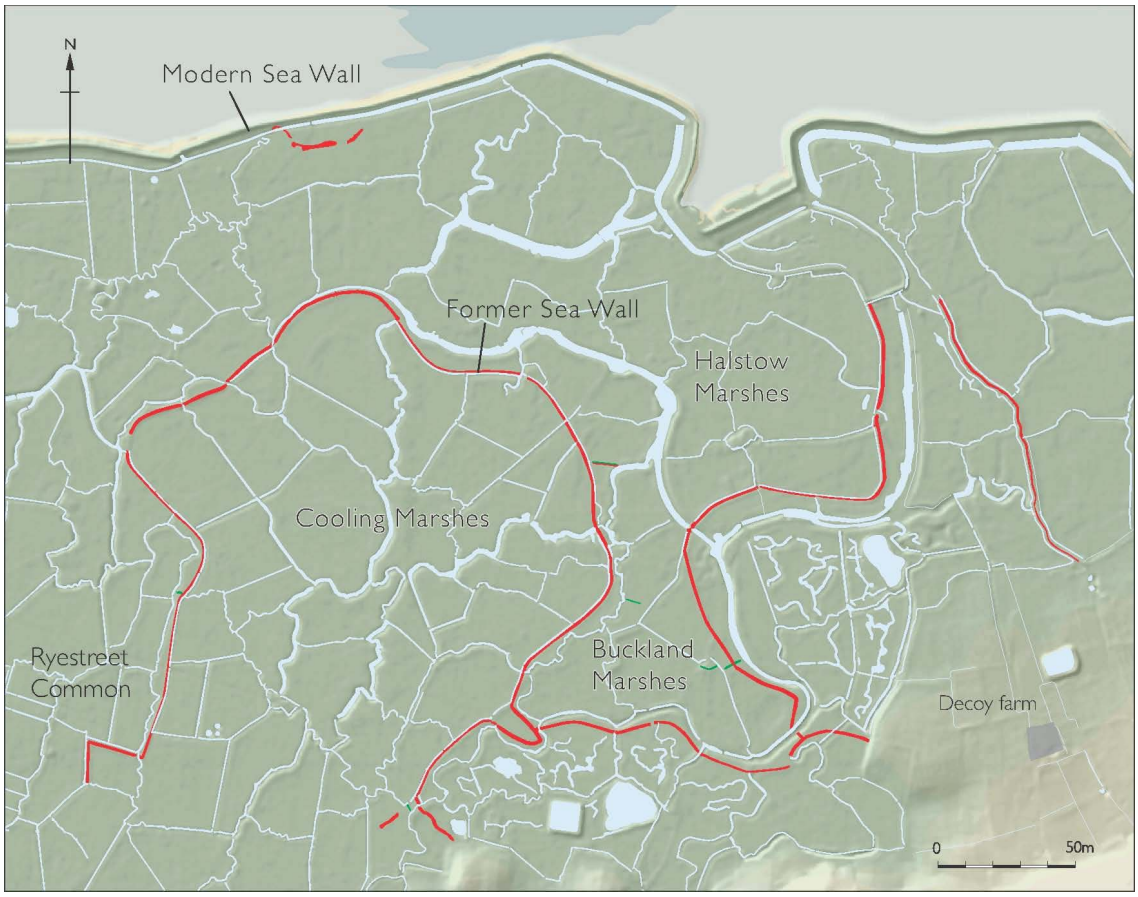

Figure 90 Map showing former seawalls identified from air photos and historic OS maps, not all of which survive. Unlike areas of Romney Marsh (see Eddison & Draper 1997), the pattern of walls on Hoo's marshlands does not show an overall steady advance of the reclaimed coast.

When was Hoo's marshland reclaimed?

The analysis of enclosure patterns, recorded through HLC, and the mapping of relict sea walls from aerial photographs can suggest sequences of reclamation over hundreds of years. The absolute dating of the earliest major phases of salt-marsh reclamation on the peninsula remains the subject of some debate. The subject requires further study, as Eddison and Draper's (1997, 75) work on Walland Marsh demonstrated that the chronology of the reclamation in that area did not 'coincide with general expectations of advance and contraction based on other areas'.

The most detailed study of the medieval documents relating to the peninsula's marshland was undertaken by Bowler (1968, 9) who wrote that 'All the evidence suggests that [weather and flood] conditions deteriorated continuously from the late 12th to the early 15th century, and it was during this time that much embanking and drainage was carried out'. This accords with Evans' (1953, 117-120) earlier study of the North Kent Marshes. Rippon (2000, 200) further indicated the possible nature of these works in his suggestion that after 1230 there are less references to new phases of embankment and more references to maintenance of walls. Bowler also stated that there is no 'direct evidence that any of the marshland was protected along the Thames before 1200 in North West Kent' (Bowler 1968, 129) though evidence of usage suggests some banks were constructed by this date and in the Medway money was spent in 1184 by St Andrews Priory repairing walls.

Witney's (1989, 30) study of the Domesday Survey valuations of marshland parishes in Kent suggested that a major phase of reclamation occurred immediately after the Norman Conquest with the Norman lords and bishops driving forward the expensive inning process on their new estates. This is earlier than the works referred to by Bowler (1968) and Evans (1953). Examination of the value of manors before and immediately after the 1066, as well as at the time of the Domesday Survey in 1086 (Witney 1989, 30-33), showed that after an initial drop in value caused by the activities of the Norman armies in the immediate post-Conquest period, manors with marshlands across Kent saw much higher values by 1086 than in the pre-Conquest period. In particular Witney noted that 'places like Chalk, Cliffe and Cooling' had 'doubled in value in the same period'.

Witney (1989, 33) stressed that this increase in value was not seen in the manors along the Medway estuary. It is possible that this reflects areas where marshland was already inned and consolidated in the pre-Conquest period perhaps by rich owners, such as the Bishop of Rochester in the case of Stoke or Earl Godwin, father of the late King Harold, in the case of Hoo St Werburgh (Morgan 1983, 5:3; 4:16; 5:92). Witney (1989, 34) also pointed out that impact on values of marshland improvement may be less significant in manors with a high proportion of arable to marsh, as the entries for Stoke and Hoo St Werburgh suggest. Whereas in Cliffe the high proportion of demesne meadow is

reflected in the increase in the value of the manor as held by Christ Church, Canterbury from £6 before 1066 to £16 in 1086 (Morgan 1983, 3:6).

While suggesting that the major phases of reclamation on the Kent marshes came in the post-Conquest period, Witney acknowledged that the marsh was already an important part of the economy in the pre-conquest period but that inning was expensive and needed the resources of wealthy, often ecclesiastical, landowners (1989, 30). Rippon (2000, 167) also questioned the traditional view that most reclamation in North Kent occurred in the 12th and 13th centuries, as suggested by Bowler (1968) amongst others, and adds that 'relatively little has been written about reclamation in North Kent'.

When considering the potential evidence for pre-Conquest reclamation, Bowler (1968, 4) noted that Saxon charter information is patchy and detailed boundary information is rare for the North Kent Marshes. However, Rippon cited a series of Saxon charters which record the accumulation of land on Cliffe Marshes by the Bishop of Rochester. These provided 'the best evidence for at least limited drainage' (ibid). Despite these pointers to early phases of reclamation it is difficult to glean the extent of any pre-Conquest reclamation from these references. Rippon also noted that the incomplete documentary record may explain Bowler's (1968, 127) observation that there is no evidence of wall building in this period.

Rippon (2000, 199) recognised the continuing impact that ecclesiastical landlords had on the North Kent marshes in the post-Conquest period, which also supports the evidence of reclamation in this period demonstrated by Bowler (1968) and Witney (1989). He noted that Christ Church Priory came to dominate Cliffe Marshes and St Andrews (Rochester) the Isle of Grain, whilst new foundations also wanted to exploit this marshland resource, such as Boxley Abbey which acquired land at Little Hoo, Allhallows and High Halstow, and Lillechurch Nunnery which acquired land at Higham and the College of All Saints Maidstone which owned a house in their marsh at Hoo. By the 12th century references to the physical process of inning or 'embanking' are clear and well documented for Cliffe at Canterbury Cathedral Priory. Rippon (2000, 200) also pointed out that the documentary record is biased towards ecclesiastical landlords citing, as a different model, the example of the Cobham family who also built up estates in marshland in Medway.

Impact of reclamation on landscape

As discussed above the process of reclaiming the marshland on the Hoo Peninsula probably took place over hundreds of years, quite possibly from well before the Norman Conquest and more certainly from soon after, continuing perhaps to the 15th century. It is a process which changed the peninsula forever and today HLC shows that 'Salt marsh innings together with the inter-tidal mud flats and sand flats surrounding the peninsula extend to about a third of the area of the Hoo' (Fig 91) (Bannister 2011, 47). The fact that the reclaimed marshes contribute so significantly to the character of the Hoo

Peninsula also means that 'another third of the present Hoo landscape has its origin in the [deeper] historic i.e. pre-modern, and this landscape of salt marshes, and medieval fields lies on the north and western edge of the peninsula…….Enclosures (including the salt marsh innings) and settlement are the dominant HLC types which contribute to the present landscape' (Bannister 2011, 50).

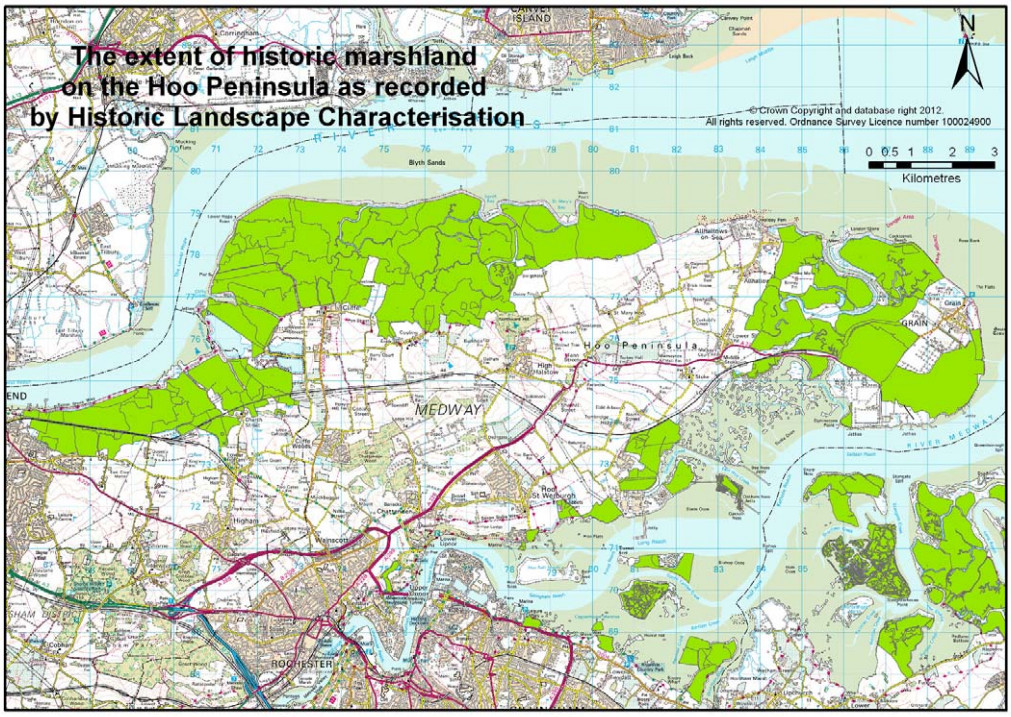

Figure 91 Marshland on Hoo. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

Bannister (2012, 32) also noted that on the Isle of Grain the salt marsh innings constituted the dominant enclosure type at 87%, illustrating the differing impact that reclamation may have had on different parts of the peninsula. It is clear that the dynamic landscape of the Medway marshes was impacted on differently by changing conditions. Bowler (1968, 182) observed the differences seen in the 15th century between the Thames and Medway marshes as the Thames marshes are much more exposed to flooding. In addition Stoke marshes on the Medway returned higher rents than those on the Thames at least until the late 15th century when rents there were also affected by flooding.

The process of reclamation slowly changed the way in which the land was used. Witney (1989, 43) discussed the close relationship between salt panning and pastoralism on the Wantsum marshes, a practice which was in existence by at least the 8th century at Stoke on the Medway (Rippon 2000, 226). However the reclamation of land essentially curtailed salt production (Rippon 2001, 140) which has implications for the dating of both the reclamation and the remains of the medieval salt industry on the Hoo Peninsula (see

Chapter 3). Clearly reclamation would have changed the balance of pastoral and salt production activities.

Smith (1940, 31) stated how the drying out of the land following reclamation leads to shrinkage, the fall in ground level therefore increasing liability to flooding. Smith (1940, 32) also noted that reclaimed land then needed to be levelled if it were to be cultivated. This levelling may provide a way of identifying areas of marshland which were used for arable rather than pasture, though it may be hard to identify when any type of levelling improvements took place and later drainage ridges on the marshes may confuse the picture.

Figure 92 Extract of Russell's 1695 map 'A Plot of Cliffe Level' showing the termination of the Ham and Farthing 'Walls' as they head north into the marshes beyond Cliffe village, KHLC S/NK/P/8a (Kent History & Library Centre, Maidstone). This early map also shows a relationship between these routeways and the smaller enclosures close to the village which may suggest some phasing in the reclamation (cf Eddison and Draper 1997).

The process of inning different parts of the salt marsh would have changed the ways in which people moved around the marshland landscape and it is clear that the sea walls provided convenient routeways (eg Bowler 1968, 41; Draper 2005, 33). Bowler suggested two origins for the relationships between routeways and walls, either that routeways could have formed along older sections of wall, representing stages of reclamation (Bowler 1968, 152) or that existing routeways in the marshes became known as 'walls' because they were raised into causeways in order to prevent flooding (Bowler 1968, 232). It is not clear in which way the 'Ham Wall' and 'Farthing Wall' routeways originated to the north of Cliffe but the fact that both routes appear to terminate about 500m north of the village, coincident with a marked change in the character of Cliffe's marshland enclosures with much larger enclosures often bounded by sinuous drainage ditches to the north (Fig 92), may suggest that the area beyond the 'walls' to the north represents later reclamation or perhaps an area where later inundation and re-establishment of the flood defences led to the loss of such routes through the marsh landscape. Interestingly Hasted (1797, 483) notes the Higham ferry crossing which he describes as the:

> 'visible remains of the raised causeway, or road, near thirty feet wide, leading from the Thames side through the marshes by Higham, southward to this ridgeway before-mentioned, and thence across the London high road on Gads-hill to Shorne ridgeway, about a half mile beyond which it joins the Roman Watling-street-road, near the entrance to Cobham Park'.

Drivers for reclamation

There were different motivations for going to the expense of reclaiming the saltmarsh from the tides. The primary reason was to create valuable nutrient-rich pasture which could sustain higher numbers of animals. Marsh was considered to be the best form of sheep pasture and was reflected in its high value. Witney (1989, 41) notes that in the immediate post-Conquest period, land at Stone-in-Oxney on the Romney marshes, was worth 2d an acre outside the sea wall but 12d acre within. Another advantage of reclamation was the possibility of managing the reclaimed marsh as meadow in order to provide winter fodder. This was particularly significant in Kent as its free-draining chalk and sand sub-soils were not ideal for meadow (Witney 1989, 38-41). Rippon (2001, 140) also noted the high yields of both grass and cereals that could be expected from alluvium-rich reclaimed salt marsh, significant in the context of the pressure on agricultural land from the growing population (Bowler 1968, 120-121).

The Hoo Peninsula was a very important area in the relationship between the Saxon Kingdom of Mercia and the Kingdom of Kent in the middle Saxon period (Bowler 1968, 105-6) and there may have been political drivers or precursors for the process of reclamation on Hoo. Rippon (2001, 151) stated that in the case of the marshland components of estates, increased productivity was achieved through the physical transformation of the landscape and, referring to the early post-Conquest period, was

'part of a coherent policy through which the new Anglo-Norman lords stamped their authority on their new estates and sought to improve their productivity'. Whatever the political motivations behind the reclamation of the marshes, the main incentive of acquiring and reclamation marshlands for the church establishments was financial, both in terms of higher productivity and the higher rents that could be charged. It seems that the church and other landlords had greater interest in those parts of Britain where investment of their wealth would have the greatest multiplier effect, in terms of increase in value and thus return. Marshes, like moors, would thus have been a prime target. Bowler (1968, 1) noted the length of the river frontage relative to marshland area on Hoo and therefore the 'very high cost of reclamation and maintenance' highlighting the clear perceived financial and productivity benefits of inning.

By the end of the12th century the marshes of the Hoo Peninsula largely belonged to religious establishments and new grants were being made, for example: to the Templars who acquired land on banks of Medway; Lillechurch Nunnery gained lands in Higham; Reading Abbey held an estate in what is now St Mary Hoo; Christchurch extended its lands in Cliffe and had lands in Stoke and Rochester increased its estates on Isle of Grain and also leased land from St. Sexburgh and St. Augustines on Isle of Grain (Bowler 1968, 121-6). Clearly the way in which the ecclesiastical establishments managed their marshland estates changed over time. Draper (2005, 30; 33) noted that Canterbury Cathedral Priory leased out marsh on Romney from the mid-12th century on the basis that it was reclaimed and or maintained as freshwater marsh and that it would be inherited by the lessee's heirs (presumably this process then increased the rents the church could charge). However the Priory changed its policy in the 13th century and started directly exploiting its manors.

General climatic deterioration and increasing numbers of flood events through the medieval period has also been seen as a driver for reclamation. Greater storminess and higher sea levels meant that reclamation was necessary to maintain the value of marshland (Bowler 1968, 120-121). Bowler (1968, 9) states that 'all the evidence suggests that conditions deteriorated continuously from the late 12th to the early 15th century, and it was during this time that much embanking and drainage was carried out' with periods of particularly bad flooding in the late 11th to early 12th century and at the end of 12th to mid-13th century, as well as poor periods in the 15th and 16th centuries (Bowler 1968, 35). The steady submergence of the land through the medieval period would also have increased the incidence of flooding (Evans 1953, 120; Bowler 1968, 22).

The relationship between reclamation and patterns of enclosure

In their studies of the Romney marshes, and specifically Walland Marsh, Eddison and Draper (1997, 77; 79; 84) analysed different patterns of enclosure in relation to relict sea banks, along with documentary evidence, in order to interpret phases of inning. They found that the smallest enclosures were related to trackways and seem to represent the earliest and most intensively exploited marshland zone, as may be the case in the example

at Cliffe noted earlier (Fig 92). The intermediate zone appears to have more irregular enclosures, fewer tracks and bigger fields and the later reclamation appears to have no roads and much larger and more irregular enclosures. They noted that the later phases of reclamation gave rise to a different type of landscape as they were intended for pasture and were much larger and more irregular in shape. Draper (2005, 22) also suggested that the medieval arable fields on the Romney marshes were small, inter-locking, often irregular in shape and around 7-16 acres but divided by medieval ditches into plots of 0.5-1.5 acres so tenants held land in enclosed fields and as parcels in small open fields.

These interpretations are supported by detailed documentary research and it is not clear to what extent the pattern of reclamation on Romney marshes might be analogous to that on the Hoo Peninsula. For example, Bowler (1968, 212) noted that to the west of the Hoo Peninsula at Erith, inundated land was quickly reclaimed and 'the land remained divided into many small plots, a feature which disappeared in other areas where marshes remained drowned for any length of time' suggesting that many factors can influence field patterns. Rippon (2000, 237) also noted that fragmented patterns of land holding could reflect the value of the marsh, where people were buying up bits of marsh particularly near London, or it could reflect the conversion of former rights into consolidated holdings on common marsh when enclosure occurred. However, Draper (2005) also demonstrated the differences between the documentary evidence for land holdings and its physical manifestation on the ground.

The character of the fields in the reclaimed saltmarsh on the Hoo Peninsula was studied using the HLC data created for the project. Variation between areas of reclamation was noted: Salt marsh innings exhibit the greatest amount of irregularity in their pattern, especially those at Cliffe and Cooling. However at Halstow and St Mary Hoo the marsh innings exhibit a greater degree of regularity in their layout. As one would expect, the irregular enclosed innings coincide with those fields where the dominant boundaries comprises creeks and fleets. The salt marsh innings also show some areas of semi-regular enclosures, at Cooling for instance (Bannister 2011, 47). Further research on these different patterns of association with other features, coupled with their historical context along with detailed study of the documentary evidence, would provide a better understanding of these variations.

Significant numbers of medieval saltern mounds were recorded through the aerial photographic mapping and analysis. In terms of reclamation, these mounds would become redundant at the point when they were cut-off from the sea by wall-building. As the use of salterns appears to have gone into steep decline from the mid-14th century (see also Chapter 3), the presence of the mounds could indicate phasing within the marshland enclosures. Comparison of the aerial photographic mapping of the possible saltern mounds on the peninsula with the Historic Landscape Characterisation data did not elucidate the complex pattern of enclosure in the marshes. The majority of salterns were located in irregular early post-medieval enclosures with sinuous boundaries, although given that this is the dominant character of the reclaimed marsh, this is unsurprising

(Bannister 2012, 40). None of the peninsula's salterns are mentioned in the Domesday Book (see Rippon 2000, 227). In addition HLC analysis did not reveal any explanation for the relationship between irregular and regular boundaries or sinuous or straight boundaries with the reclaimed saltmarsh (Bannister 2012, 44). It is worth considering also that the river walls and the drainage ditch patterns may not be of the same date.

What is the relationship between marshland reclamation and settlement patterns?

Rippon (2000, 200) discussed the reuse of saltern mounds as 'wicks' or 'sheep cotes' on the north Kent marshes. Post medieval re-use of salterns was also noted on the Hoo Peninsula and probably reflects a much older tradition. References to agricultural buildings certainly exist from the medieval period; Bowler (1968, 167; 184) noted that a lease of Cobham land in Cliffe in 1369 required 'the tenant to maintain the marsh and buildings, probably a sheepwick' and that Redeham Mead contained two cow houses in 1492 and that Dalam Marsh had two sheepfolds in 1467. It is not clear whether the sheepcotes replaced or supplemented permanent settlements on the marsh or if they had a domestic character, perhaps seasonal, akin to the role of shielings in upland areas subject to transhumance. Baker (1964, 18) states that in Gillingham 'Sheep were tended in the marshes by three shepherds with one helper and in the uplands by one shepherd; all five were employed all the year round'. This might suggest some permanent occupation of the marshes, but if the marshes were only exploited seasonally, with the sheep perhaps kept on the arable fallow in the winter, it may simply mean that the shepherds stayed with the sheep wherever they were.

The distribution of outfarms and sheepfolds is not consistent across Hoo suggesting that the marshes were managed differently (Fig 93). The pattern at Allhallows is of very few outfarms, implying that they were managed from a distance (Bannister 2012, 31). On Cliffe marshes the numerous outfarms suggest that grazing was managed on the innings themselves. In other parishes, St. Mary's marshes has a similar lack of outfarms to Allhallows while in Cooling and High Halstow marshes only the northern extremities of have evidence of outfarms.

Though many of Hoo's settlements are located at the edge of the marshes, this probably reflects an earlier pre-Conquest pattern of marshland exploitation rather than a shift towards the reclaimed marshland. Bowler (1968, 6), examined 11th century documents for the North Kent Marshes as a whole, and noted that 'most evidence suggests that settlement was on the marsh fringe, between the available 'upland' and the marsh pastures' but that at that date the distinction between fresh or salt marsh was not made.

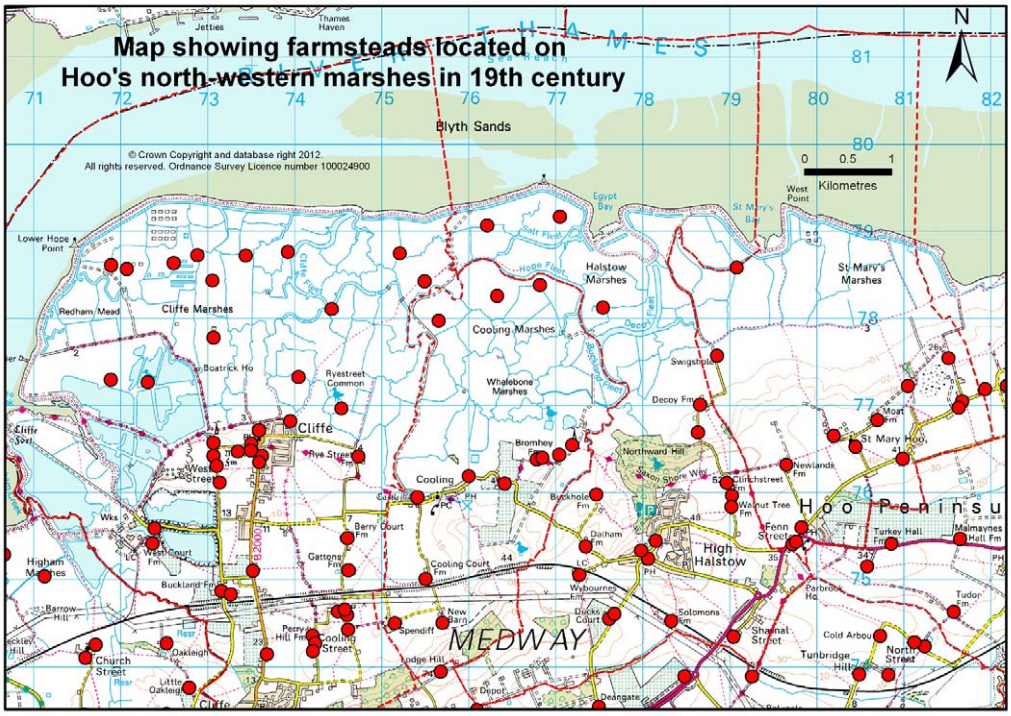

Figure 93 The contrast in outfarms on Cliffe marshes compared to St Mary's Marshes in the 19th century may reflect an historic pattern of exploitation. On St. Mary's Marshes outfarms and sheepfolds appear to have been less necessary on St Mary's Marshes due to their restricted extent. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

Earlier settlement and land division

Earlier evidence of land division on the Hoo Peninsula was seen when buried remains of enclosures, fields and track ways were revealed as cropmarks and photographed. Very few of these sites have been excavated but most are thought to be probably late prehistoric (circa 2600BC-43AD) or Roman (circa 43AD-410AD) in date. The earliest remains identified on Hoo during the survey are the cropmarks of ring ditches. These are generally thought to be the ditches surrounding, now levelled, burial mounds of probably Bronze Age date (circa 2600BC-700BC).

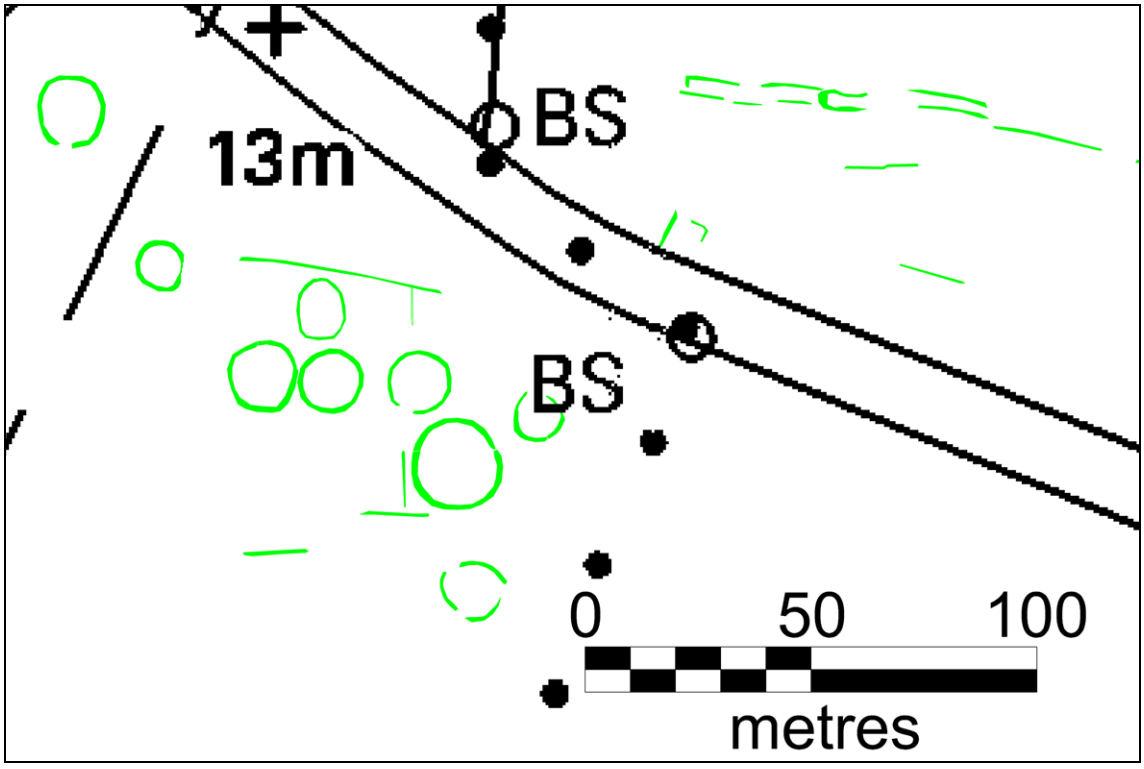

Figure 94 Ring ditches north of Shorne next to the old Gravesend-Shorne parish boundary – BS stands for boundary stone. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

Though many barrows are associated with burials, either constructed over pre-existing inhumations or becoming the focus for later burials, these earthworks can also be considered as monuments in the landscape (Woodward 2000, 49-50). During the early Bronze Age, when a predominantly mobile way of life was still followed, these barrows seem to have marked out land and defined pathways (Woodward 2000). On Hoo, ring ditches were identified in most parishes, either as isolated examples or in groups. For example, single ring ditches were seen north-west of Lower Higham or west of Noke Street. Examples of ring ditches grouped together include three to the west of Grain village and nine to the north of Shorne (Fig 94).

By the Later Bronze Age there is evidence of the division and exploitation of the agricultural landscape (Champion 1999, 95). Small excavations at Malmaynes Hall Farm, Damhead Creek and Middle Stoke (Yates 2001); Hoo St Werburgh (Moore 2002) and just outside the project area at Coldharbour Road, Gravesend (Mudd 1994) have all revealed evidence of ditches in use in the Bronze Age. While the aerial photographs have not provided evidence of an extensive field system across the peninsula discreet sites have been identified, parts of which may relate to a Bronze Age subdivision of the peninsula.

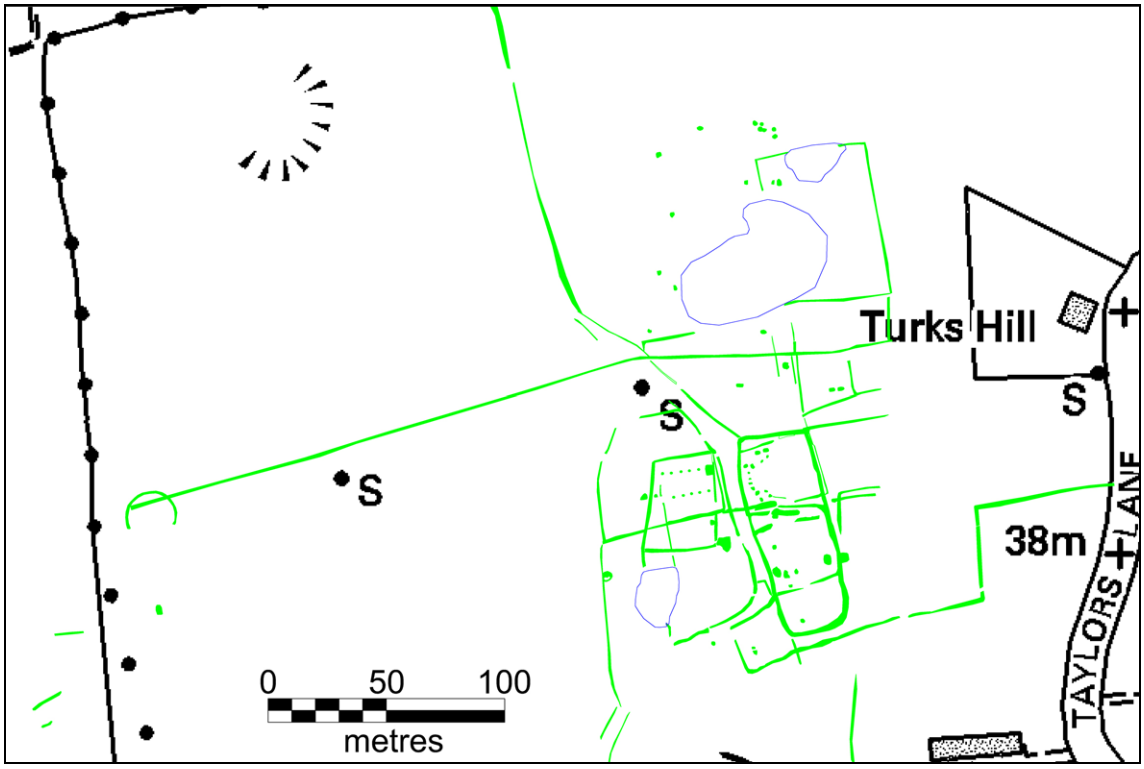

Figure 95 Settlement remains and boundaries from more than one period at Turks Hill near the Shorne-Higham parish boundary – S indicates the site of stones noted by the OS. A Bronze Age ring ditch is to the left. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

At Turks Hill, south-west of Lower Higham, an interesting arrangement of the medieval parish boundaries and potentially much earlier land division warrants further research (Fig 95). An area of settlement is indicated by cropmarks of ditched enclosures and pits. A double row of pits (centre-right Fig 95) could indicate the location of a large building or structure. The settlement, and associated boundaries, have a potential date range from the Bronze Age through to the early Medieval period and the cropmarks indicate several phases of land division. A ring ditch, probably the site of a former Bronze Age burial mound seems to either sit on top of a boundary, or be cut by it. Near Mockbeggar Farm ditches associated with a possible later prehistoric settlement appear to cut across the edge of a ring ditch while at Allhallows a rectilinear field appears to adjoin a ring ditch.

These examples can be contrasted with the ring ditch close to St. Mary's Marshes where two parallel ditches thought to define a trackway cut across the centre of the ring ditch suggesting that no trace of this earlier monument could be seen when the track was laid out. Further research is required to explore the role of these plough levelled Bronze Age burial mounds and their influence, or not, in the development of land division on Hoo.

Excavations identified an Iron Age settlement, partly overlain by a Roman cemetery on Grain (Philip and Garrod 1980; Philip 1982) and a number of possible prehistoric or later settlement sites have been seen as cropmarks on Hoo. These are defined by a series of rectilinear enclosures or fields. In some cases the remains are complex with overlapping features suggesting more than one phase, for example at Turks Hill (see Fig 95).

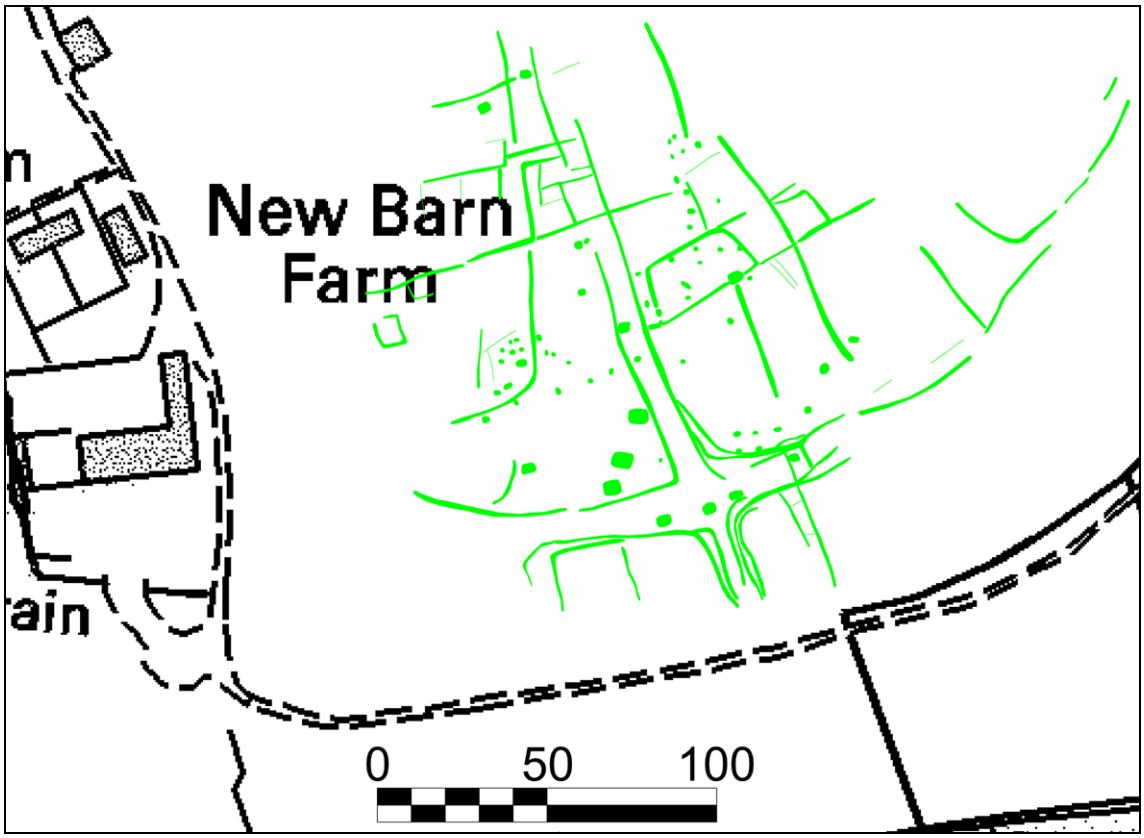

Figure 96 Cropmarks of settlement and boundaries with a potential date range from the later prehistoric through to the early medieval period at New Barn Farm. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

Very few of the prehistoric or later settlements identified are close to each other, a notable exception being the two settlements on the northern edge of Lodge Hill (one illustrated in Fig 96). However, almost all settlement sites identified have evidence of trackways or droveways indicating their integration with the wider landscape. These routes are defined by parallel ditches, some aligned north-south, others east-west. At

some settlements evidence of both alignments can be seen and at New Barn Farm these meet to form a crossroads (Fig 96).

These two orientations show movement took place along the main axis of the peninsula and from the centre to the coast. These main axes of Hoo's topography still influence boundary and route way alignment, but there is no apparent direct relationship between the earlier and modern features indicating the degree of settlement shift and change in pattern over time.

It has been argued that some of the boundaries near Cliffe are the remnants of a Roman reorganisation of the land, known as Centuriation (Dilke 1971). Centuriation was a system of land allotment that divided the land into a grid pattern. However, none of the field patterns, ancient or modern, on Hoo are comparable to the Roman land divisions seen in Italy and some parts of the Roman Empire.

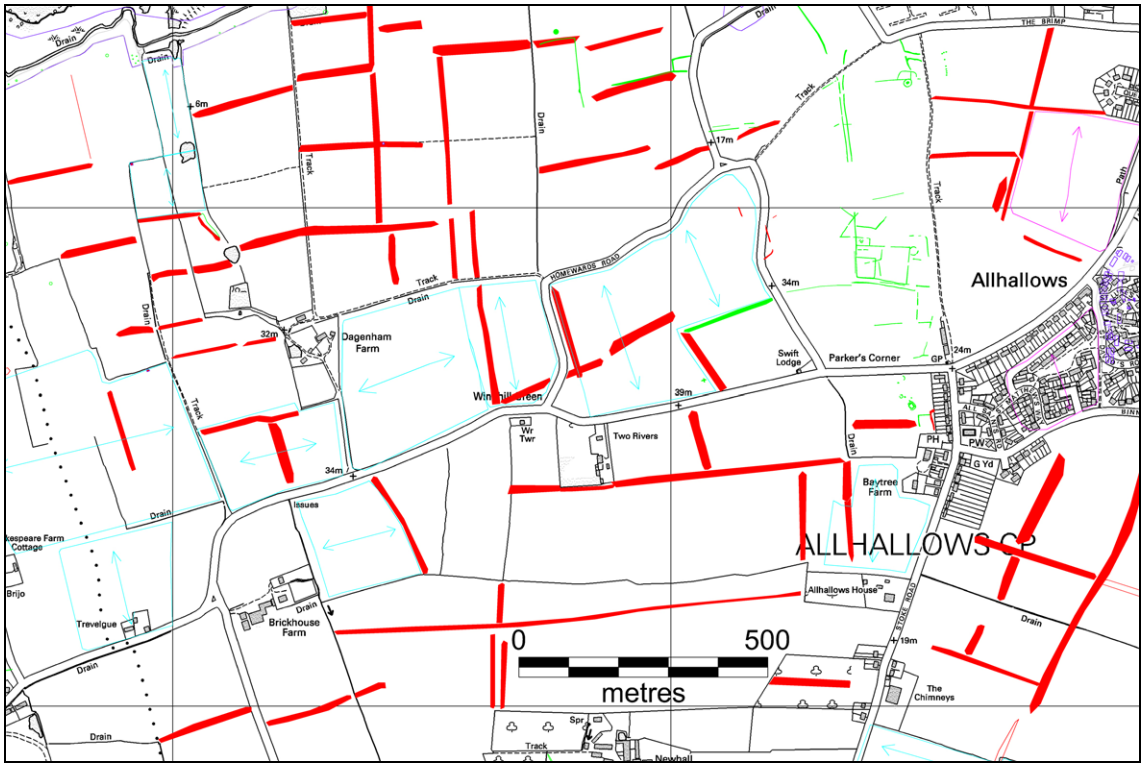

Figure 97 Former field boundaries at Allhallows. Background mapping © Crown copyright and database right 2013, all rights reserved. Ordnance Survey Licence number 100024900.

The slight earthwork remains of former field boundary banks were recorded at a number of locations including St. Mary's, Stoke, Hoo St. Werburgh, and Allhallows (Fig 97). These were seen on aerial photographs taken in the 1940-50s, but most were recorded from lidar (airborne laser scanning). Based on map evidence some of these banks represent field boundaries still in existence in late 19th century, while others are clearly part of the same arrangement but had already been removed by that date. Prehistoric or later

settlement remains and boundaries (indicated by the green ditches on Fig 97) were seen as cropmarks in the same area at All Hallows. Some of these are on a similar alignment to the boundary banks perhaps suggesting that some of the boundary lines had much earlier origins.

When compared with the Historic Landscape Characterisation (HLC), for Allhallows and Stoke the pattern of boundary banks occurs in areas of modern field amalgamation; for St Mary's of consolidated strip fields. However when compared with the HLC layer showing the landscape up to the medieval period they coincide with an area of open fields. The strips that made up these fields were consolidated or farmed in groups in the late-post medieval period and early modern periods (Bannister 2012, 40). This can be compared with Cliffe where land was farmed in open fields into the early modern period where no banks have been identified on aerial photographs (ibid 41).

There is widespread evidence of continuity of settlement location in Kent and many farms and hamlets are on sites continuously occupied for 800 years or longer (Everitt 1976, 12-13). One of the oldest surviving land divisions still in use today in Britain, the parish boundary was established from the 10th and 12th centuries, dividing the land up into ecclesiastical units centred on the parish church, but many have their origins in earlier estates and territories served by Anglo-Saxon minsters (Winchester 1990, 11). Many of the parish boundaries in rural Kent still follow their historic courses, the parish unit perpetuated by the collection of tithes, then from the 1840s, then parish rates, and now as a basic unit of local government (Everitt 1986, 278).

On the Hoo Peninsula the churches and villages are often located on the spring line on the scarps of the high ground. Place name evidence indicates strongly that this central NE-SW ridge was partly wooded in the Romano-British to Saxon period with the occurrence of the Celtic word for forest - 'céto' probably surviving in names of Chattenden and Chatham, along with a host of other woodland names and terms (Everitt 1986, 292).

The parishes on Hoo, with the exception of Cooling, extend from the central ridge to the coast, with marsh accounting for up to half of the northern and eastern parishes (see Fig 1). Elsewhere (the Wiltshire Downs and Chiltern Hills) this occurrence of strip parishes extending from high ground to valley bottom has been interpreted as an attempt to give access to a share of good and less productive land. There are thought to have been two early medieval estates on Hoo, one centred at Cliffe-at-Hoo and the other at Hoo St Werburgh (Brookes 2010, 68). It is possible that the strip parishes are a result of dividing these large Saxon estate at Cliffe-at-Hoo.

Cooling parish is cut off from the northern coast by extensions of High Halstow and Cliffe parishes curving around its northern extent, following the course of the Hope Fleet. As noted in earlier discussions, areas of the marsh were reclaimed by enclosing an area with a sea wall and digging drainage ditches to remove the water. North of Cliffe and Cooling these earthen walls still remain extending out into the marshes – the Ham Wall, the Farthing Wall and the wall which forms the parish boundary. Records indicated that Cliffe

marsh was inned by the 1540s, but north of Cooling the salt marsh was not reclaimed (Bowler 1968, 224). It is likely that High Halstow and Cliffe parishes were enlarged by acquiring the marshes around the northern part of Cooling, known as Halstow Marshes.

The examples given above indicate the potential for research into the earlier land division and settlement but also highlight the need to see these remains in the context of later land use or as part of continual, but changing, land use. There are clear examples where change and possible continuity are seen in the alignment of boundaries in particular. Continued aerial reconnaissance, and other survey techniques, could provide more evidence for earlier use of the peninsula.

The early development of the peninsula

Palaeoenvironmental evidence

Past environments and climates can be reconstructed using a variety of techniques, generally referred to as 'proxy indicators'. Commonly-used methods include plant remains such as pollen; plant macrofossils eg leaves, seeds; waterlogged and charcoal wood remains; diatoms; and animal remains such as mammals, ostracods, foraminifera, molluscs (see Appendix 4 for selective glossary). Based on our understanding of the environmental and ecological conditions of their preferred modern habitats, and assuming that these preferences have not changed over time, it is possible to 'reconstruct' the past landscapes of the sites where their subfossil/fossil remains have been found. By studying the past environments it is possible to put the landscape-wide understanding gained from archaeology about past human activities into its environmental context.

The types of palaeoenvironmental (and archaeological) evidence used – and the potential for their recovery – depend on the nature of the sediments and their preservation conditions. For example, flint tools and large mammal bones will be found in the coarser river gravels associated with the migrating river systems, whereas smaller-sized biological remains will be found more with the finer-grained channel infill sediments and other highly organic deposits (eg peats).

Overall, the Hoo Peninsula suffers from a lack of detailed palaeoenvironmental investigations; Bridgland (2003) noted that until Bates *et al* (2002), no interglacial pollen or molluscan data had been recovered from the Lower Medway. Often, studies have been undertaken as archaeological interventions resulting from quarry extensions and industrial/construction development, for example in advance of power stations and waste water treatment works. Whilst this is often preliminary assessment work, lacking dating evidence, on rare occasions these investigations have progressed to more-detailed studies.

In order to be able to establish when things happened, it is vital to be able to date the sediments. The most common methods used on the types of sediments encountered in this region are radiocarbon dating and Optically Stimulated Luminescence (OSL) dating, with occasional amino-acid racemisation dating. Examples of recent projects with extensive dating of multiple sites around the Hoo Peninsula and wider region are those by Wessex Archaeology (see Russell *et al* (2011)) (radiocarbon dating) and by the Medway Valley Palaeolithic Project (Wenban-Smith *et al* 2007) (OSL dating).

Human activity and agency in early landscape

Although tools found at Happisburgh, on the north-east Norfolk coast, indicate that the earliest known human occupation of the British Isles is thought to have occurred there more than 780,000 years BP (Parfitt *et al* 2010) no human bones have been recovered

yet. In fact the earliest human remains in the British Isles are from Eartham Pit, Boxgrove, West Sussex, thought to be pre-Anglian, from Marine Oxygen Isotope Stage 13 (MOIS13 c.5000,000 years BP (Parfitt and Roberts 1999). As the next earliest (Hoxnian interglacial; c 400,000 BP) direct evidence of early humans (that consists of human skull fragments, together with flint tools and debris) comes from Swanscombe over 10km west of the Hoo Peninsula, this part of Kent is important in terms of hominin ('early human') remains.

Given the presence of sand and gravel deposits on the Hoo Peninsula, as well as its relative proximity to Swanscombe, it is somewhat surprising that there are relatively few Palaeolithic sites and find spots on Hoo (Wymer 1999a: 93; 1999b ; Wenban-Smith *et al* 2007). The majority of individual Palaeolithic records often consist of only a few artefacts and most are also of insecure provenance (S Newsome, pers comm, from English Heritage NRHE). This could be in part due to either commercial exploitation of the gravels (as Wymer (1999a) suggests) or a lack of studies, rather than a genuine absence of sites. For this reason, most of the main sites described below – that have evidence of human occupation and some sort of past environmental information – are from beyond the peninsula. For additional more detailed site records, see Hazell (2011).

As part of the Medway Tunnel scheme, the stratigraphy of multiple borehole records was analysed (Barham 1993; Pine *et al* 1994; Barham *et al* 1995; Bates *et al* 2000). Two, sealed, former occupation surfaces – one Neolithic/Bronze Age (with hearth and ditch features) and one later Iron Age/Romano-British – were excavated on a buried chalk 'headland'. Within the main deposit, three separate peat layers were radiocarbon dated to the i) Mesolithic period – using oak wood, ii) Neolithic period – using oak, alder, hazel and hornbeam and iii) Late Neolithic/Bronze Age – using oak and alder (Barham *et al* 1995). These wood types provide information on the types of wood/trees in the local environment for the timeframes with which the archaeological remains can be associated. The peat layers also demonstrated high research potential for the animal and plant remains preserved within them – which included wood and charcoal – and, together with the waterlain deposits (that contained molluscs, beetles and foraminifera), can provide important information for sea-level change studies.

Also on the River Medway, at Upnor, evidence of human activity in the form of eight flint flakes (recovered by Wessex Archaeology) (1993: 131-132) was found from the same level in which fossil bones of a (now) extinct *Palaeoloxodon antiquus* (straight-tusked elephant) had previously been found (Andrews 1915). Unfortunately, these deposits are undated, as the stratigraphic context of this find remains unclear. This species was present in the British Isles during the last four warm periods (integlacials) (Bridgland 2003).

Further up the River Medway, at Cuxton, was an important Acheulian (Lower Palaeolithic) site OSL dated to c 230,000 BP (MOIS 7) (Wenban-Smith *et al* 2007). There are flint tools that, although possibly redeposited, are thought not to have moved far from their original context (Cruse 1987). Animal bones were also recovered. Some preliminary pollen investigations were carried out on sand and gravel sediments by Hubbard (in Cruse

1987: 78-81), however, pollen concentrations were low and preservation was poor. In this context of poor preservation (and likely sediment mixing), the better represented vegetation included pine, birch, alder and herbaceous types, and the least represented were oak and elm, giving some indication as to the nature of Lower Palaeolithic vegetation.

In the Medway estuary, at Lower Halstow, an 'Epipalaeolithic' flint factory site was excavated. It rested on a gravel layer and then on redeposited London Clay, and was covered by a thick peat layer, and then marsh deposits. Some limited pollen analysis was undertaken by G Erdtman on sediments overlying the factory site's 'northern floor' (Burchell 1925-1927, 296). Pollen from the peat layer immediately overlying the archaeological deposit contained alder, birch, elm, lime, hazel, oak and willow (but no pine); this was very similar to the pollen recovered from the marsh (clay) deposits on which the 'floor' rested, indicating that the people were living in an environment containing deciduous trees/woodland. The presence of lime and absence of pine was taken as evidence that the activity occurred during the 'Atlantic' period (Burchell 1925-1927) (i.e. early to mid-Holocene; c.8000 cal BP); a time when the (earlier Holocene) pine forests had been lost, but by which time lime (that prefers warmer conditions) was established.

On the Isle of Sheppey, pollen from ditch fills of the Neolithic causewayed enclosure at Kingsborough were analysed (Scaife 2004/5); where present, the pollen was dominated by grasses and grassland herbs, suggesting a largely open landscape during the site's use. The presence of lime pollen suggested a date before the late Neolithic or Early Bronze Age (Scaife 2004/5).

Also on the Isle of Sheppey, near Queenborough, research associated with the A249 road improvement scheme produced diatom, foraminifera, ostracod and pollen assessment data. For the interpretation of these in terms of past vegetation cover, Pratt *et al* (2003) concluded that significant change was only evident (based on the pollen record) during the last 3000 years, when indirect indicators of human activity – a reduction in woodland cover (clearance) and evidence for agricultural activity (cereal cultivation) – occurred.

At Peter's Pit on the east bank of the River Medway pollen analysis was carried out by Scaife (2007) on a 5.5m Holocene profile consisting of alternating peat and clay layers. Towards the top of the profile, as well as evidence for wetter site conditions developing, indirect evidence of human activity in the area was evident from indicators of arable cultivation within the sediments; mainly the pollen of cereals and herbs (weeds) often associated with agriculture. Although there was a possibility of sediment mixing, overall, the pollen spectra were interpreted as of mid-to-late Holocene age (after 5000 cal BP).

On the Hoo Peninsula itself, sediments at Allhallows Golf Course consisted of late Middle Pleistocene fluvial deposits layered with interglacial deposits (Bates *et al* 2002). Although amino-acid dating suggested MOIS 9, and the mollusc and ostracod assemblages

suggested either MOIS 7 or 9 age (Bates *et al* 2002), Bridgland (2003) favoured MOIS 7 based on correlating the terraces of the Medway and Thames Rivers. Some archaeological excavation was carried out, and found evidence of (much) later prehistoric occupation on site, with Neolithic and Late Bronze Age/Early Iron Age (LBA/EIA) pottery and LBA/EIA cremation deposits (evident as unurned burnt bone and charcoal) (Greatorex 2005).

At Middle Stoke, archaeological investigations uncovered Bronze Age features in advance of a road-building scheme (Greatorex 1995 ; James; 1999, 2006). The site, consisting of river gravels overlain by hillwash deposits (Bates in James 1998) yielded some environmental remains. These samples were recovered for archaeoenvironmental purposes and so provide some indication of human activities at the site, marine molluscs (oysters), charcoal and poorly preserved cereal grains suggesting exploitation of marine resources and farming, but give very little idea of the nature of the immediate environment of the settlement.

Early work at the Gravesend Wastewater Treatment Works (WTW) site on Denton Marshes by Harker (1978) reported the presence of Romano-British pottery in association with an occupation site. More recent work recovered an archaeological rubbish deposit, including Romano-British pottery, ceramic building material, charcoal and edible marine mollusc shells (Wessex Archaeology 1998 ; Russell *et al* 2011) located in sediments inferred from pollen analysis to indicate an inner estuarine channel environment (Russell *et al* 2011). Pollen from sediments below the archaeological layer show evidence of human activity with cereal (and associated) pollen types – indicating the spread of agriculture in the region; as well evidence of walnut, a Roman introduction (Russell *et al* 2011). Together with the presence of the edible molluscs, this evidence demonstrates how people were using and altering their environment at the time. Pollen evidence (Scaife 2001), from deeper in the sequence was interpreted as indicating a transition from i) freshwater grass-sedge fen, with woodland (oak, lime and hazel) and expanding sedge-reed swamp, through ii) increasingly saline conditions due to sea-level transgression, resulting in vegetated saltmarsh. The transition between these two broad environmental zones has been radiocarbon dated to the later Neolithic (Russell *et al* 2011) and, although no direct archaeological evidence for this period has been found at this site so far, it indicates the types of environments that people at the time would have been inhabiting.

At Motney Hill Water Treatment Works, an occupation surface (identified from the presence of lithics; *in situ* flint working) was identified at the base of trench excavations, and thought to represent Mesolithic/Early Neolithic technologies. Radiocarbon dating of an estuarine alluvial peaty clay layer immediately above the occupation layer, gave an Early Neolithic date (Russell *et al* 2011), and the contemporaneous pollen indicated an environment of saltmarsh and estuarine mudflats (supported by the diatom evidence), with surrounding woodland of oak, lime and hazel, with some pine, elm, yew and juniper (Scaife 2001). The remaining, younger deposits consist of alternating peat and minerogenic layers suggesting a fluctuating sea level throughout.

Can we predict where other evidence will be found?

In order to target research resources effectively, it is desirable to be able to predict reliably the location, age and nature of sediments that might yield important palaeoenvironmental and or archaeological remains, that is, deposits that have good/high research 'potential'. This involves locating and mapping buried features and sediments before any (expensive) intrusive investigations are carried out. For example, finer-grained sediments (eg silt fills of former river channels) and organic layers (eg peat layers) preserve organic remains well, and are therefore of high palaeoenvironmental research potential. This contrasts with sands-gravels that have low palaeoenvironmental potential, but which are more commonly associated with archaeological artefacts. The types of methods used could be i) geotechnical boreholes – prior to excavations, or ii) a variety of geophysical 'remote sensing' techniques – prior to geotechnical boreholes and/or excavations. Examples of the techniques are described in Bates and Bates (2000) and Bates *et al* (2007) and, apart from directly sampling the sediments by sinking boreholes, mainly involve identifying the nature of buried deposits by measuring their resistivity; either physically (by cone penetration testing (CPT)) or electrically (by direct current resistivity and indirect electromagnetic methods); coarser sediments (sand, gravel) are more resistant than finer sediments (clay, silt, organics).

In all cases, the accuracy and reliability of these methods needs to be checked; for example, assessing in the laboratory the plant and animal remains preserved within borehole samples, or taking cores in order to 'ground-truth' the remote sensing studies.

There are several examples of studies from the region that have included such geotechnical and geophysical techniques to successfully identify sediment patterns and features at depth:

i) On the Hoo Peninsula itself, around Allhallows–Binney Farm, Bates *et al* (2007) used intersecting electrical section profiles in conjunction with ground-truthing boreholes to map the below-ground sediments. Certain fine-grained alluvial deposits were interpreted as Holocene channel sediments. In addition to subsequent confirmation that these sediments did preserve palaeoenvironmental evidence (plant macrofossils, insects, cladocera foraminifera and ostracods), the location of the channels themselves can be used to predict areas of high archaeological potential on the inference that the edges of these channels would have been places where features such as trackways and fishtraps may have been constructed (2007)

ii) Extensive geotechnical work (eg by Bates (1995, 1999)) was carried out across the region before construction of the Channel Tunnel Rail Link (CTRL). Part of this was on the Thames River Crossing (across Swanscombe Marsh) where previous non-intrusive survey informed targeted locations of CPT and borehole investigation; two buried peat layers (of high palaeoenvironmental potential) were successfully identified from the targeted work, together with

what would have once been a headland feature and therefore inferred to be of high archaeological potential due to its favourable location for human activity (Bates *et al* 2007)

iii) In the Ebbsfleet Valley, Bates and Bates (2000) demonstrated that peat and gravel deposits identified from boreholes could also be identified reliably from the geotechnical data.

It is clear that by using a combination of geotechnical and geophysical investigative techniques, areas and sediments of high archaeological and palaeoenvironmental potential can be identified, and then targeted for more-detailed research. This is more cost-effective and less disruptive than large-scale intrusive works. Therefore, as the types of deposits on the Hoo Peninsula are ideal for the application of these kinds of research methods, their use in the area would go far to help address the current relative absence of combined palaeoenvironmental, archaeological and geoarchaeological studies there.

8 HOO'S FUTURE LANDSCAPE

Why should we value the historic character inherent in the Hoo Peninsula landscape?

All aspects of the Hoo Peninsula's present landscape have historic character, often subtly expressed and frequently of unexpected time-depth and complexity, but its legibility creates the rich cultural narratives we have seen in this report. If we are to sustain future generations' ability to read and build upon that legibility, creating their own cultural narratives and perceptions from the landscape we hand on to them, it is essential that an understanding of that historic character informs planning for the Hoo's future landscape. This does not mean 'preservation' of the status quo everywhere. Some heritage features and sites are indeed assessed as special or of national importance, often with designations signalling appropriate conservation considerations, but historic character resides more widely in the typical and commonplace throughout the landscape. Hoo has always been shaped by change from forces both within and beyond its boundaries and this will continue in the future. These changes create Hoo's distinctiveness and the ability to read its cultural development through its landscape so the Hoo Peninsula is far from being a cultural blank canvas. Sustainable planning for the distinctive future landscape of Hoo must recognise this and will rest on decisions informed by its cultural narratives rather than taken in ignorance of them.

As a way of understanding the complexity of the historic environment through a logical consistent approach, English Heritage published its *Conservation Principles* (English Heritage 2008). This approach defines a family of values that in combination can be used to describe and understand the significance of a place at a range of scales. Four types of value were adopted by English Heritage under the following definitions:

Evidential value, which derives from the potential of a place to yield evidence about past human activity.

Historical value, which derives from the way in which past people, events and aspects of life can be connected through a place to the present.

Aesthetic value, which derives from the ways in which people draw sensory and intellectual stimulation from a place.

Communal value, which derives for the meanings of a place for the people who relate to it or for whom it figures in their collective experience and memory.

The Hoo Peninsula's landscape has clear 'evidential' value: this report has demonstrated the major potential within that landscape to tell us much more about the rich and varied human activity that has shaped it and which, at least in part, explains the distinctive form and character of the peninsula today. There is also evidence for a range of changes that

have had minimal impact on present-day character. The story of the Hoo Peninsula is told not only through its buried archaeological remains and surviving early historic buildings and monuments but also through the patterns embedded in the detail of its landscape and seascape everywhere: in the fields and marshes, ditches and routeways too. The project has concentrated almost entirely on non intrusive means of studying and understanding the evidence of Hoo's past and important new evidence has been revealed. We think that the potential to follow up our work through a diverse range of methods of study has been demonstrated and this will yield yet more evidence with which to understand Hoo as a place.

The landscape of the peninsula also has 'historical value': for instance it tells us how the individuals and communities associated with the Hoo Peninsula contributed to north Kent's local story, helping establish the distinctive character and ways of living and working within this particular part of the county. They also occasionally contributed to England's national story. We use two types of 'historical' values. 'Illustrative values' deal with visible evidence as a means to connect past and present people, for example by confirming the role played by Hoo's inhabitants in historic processes that have shaped our nation. In the case of the peninsula this could be through their reclamation of extensive marshes, their involvement in the development of important industries or their role in the defence of the nation against invasion. 'Associative values' are derived from the linking of a place to a notable person, event or movement. As an example for the peninsula this might mean such major national events as the Second Anglo-Dutch War (1665-1667) and both World Wars. Hoo's historical value is thus reflected in the place's patterns, forms and ways.

An understanding of the 'evidential' and 'historic value' of the Hoo Peninsula landscape also contributes to its 'aesthetic value': the extent to which residents and visitors take an interest in the landscape's development through time can affect their perceptions of it, but landscape's historic cultural character also forms the setting for all using or living in the peninsula, whether interested in its history or not: landscape perceptions are our mind's mediation with the environment and landscape that is familiar for each of us is often very personal and precious. The use of the peninsula as a backdrop for novels, films and projects, ranging from Dickens' *Great Expectations* to the Kent Cultural Baton for the 2012 Olympics, has also been influenced by the historic character of the landscape. Music, such as that of Dr Feelgood, whose 1970s rock celebrated the Thames estuary's more recent industrial landscape of refineries, power stations and docks, also contributes to the local 'aesthetic value'. This then enhances people's attachment to the place, the satisfaction they gain from being associated with it and also its amenity and tourism potential of the peninsula.

Closely related to aesthetic value, the Hoo Peninsula landscape also holds a 'communal value'. A sense of pride and belonging in the communities who live or work in a place can be engendered through experience of a place and especially when that is linked to its history and consequent historic character. This is demonstrated through the action of

groups such as friends of the North Kent Marshes, amongst others. As the European Landscape Convention has clearly articulated, landscape is the context through which people live their lives and develop their sense of place.

There are other values that make the Hoo Peninsula special but these may not be as convincingly derived from historic character as those described above. Natural heritage values would be an example of this. The historic character forming a dimension of the present landscape has also intimately shaped the character of the 'semi-natural' environment of the Hoo Peninsula, many areas of which are already recognised through national and international designation (itself a cultural management process), particularly in the marshland areas reclaimed from the sea. The perception of their ecological values today is also a cultural phenomenon, while the peninsula's expressions of biodiversity and many of the processes that have extinguished or rendered rare or scarce many of its habitats and species are a direct consequence of historical processes for better or worse, as shown in this report. In this sense the 'natural' environments that are today so highly valued for ecological and landscape reasons are themselves most often the direct result of past human activity.

Processes of change

As this report has demonstrated no place is immune from change. Sometimes this can be at a landscape scale as seen in the impact on the peninsula of extractive industries in the 19th century (Chapter 3), but it can also be incremental and more subtle in character. It is by such change that the layers of history applicable to a place are created and by understanding the time depth represented in this we can understand and derive enjoyment from the history of that place. Just as past change has left its evidence on the Hoo Peninsula we must expect that the present and future generations will also leave their marks on the character of the place. Such change is inevitable, often to be embraced and always to be planned for and managed. The Government published its National Planning Policy Framework (NPPF) (Department for Communities and Local Government 2012) which included a definition of conservation as it relates to the historic environment, which is 'the process of maintaining and managing change to a heritage asset in a way that sustains and, where appropriate enhances its significance'. In this instance significance can be defined as the sum of the heritage values as described in *Conservation Principles* (2008). NPPF also defines sustainable development by ascribing three dimensions for managing change, which are an economic, a social and an environmental role. These roles are mutually dependant and cannot be seen in isolation Sustainable development looks to achieve gains in each of these dimensions jointly and simultaneously for example by decisions taken through the planning system. As evidence of the validity of such an approach it is possible to see how past historic processes that shaped the Hoo landscape are a blend of some or all of the three main drivers for change.

Although the approach inherent in *Conservation Principles* (2008) pre-dates NPPF it is enhanced and not undermined by current policy and practice. There are six headline or guiding principles laid out in this document which can be summarised as

Principle 1 – The historic environment is a shared resource.

Principle 2 – Everyone should be able to participate in sustaining the historic environment.

Principle 3 – Understanding the significance of places is vital.

Principle 4 – Significant places should be managed to sustain their values.

Principle 5 – Decisions about change must be reasonable, transparent and consistent.

Principle 6 – Documenting and learning from decisions is essential.

A clear motivation for English Heritage to carry out this study of the Hoo Peninsula was to address each of the above principles and thus to enhance the ability of everyone to participate in management of its historic landscape in a sustainable way. The processes of change that have shaped this historic character are ceaseless and on-going today. By understanding the historic dimension to how the place we call the Hoo Peninsula has been created we can hope to better appreciate and plan for the inevitable ways in which it will continue to evolve to serve the needs of present and future generations. Some of the proposals for change at the time of writing are of a kind and scale that could substantially alter the present character of the peninsula and with this the evidence of its historic past. Other processes of change are already underway and unstoppable and these too will leave their indelible mark on the place. After this introductory diversion into the theory of sustainable management of the historic environment it is now time to consider the future landscape of Hoo, in so far as we are able to predict this. The likely causes of significant future change can be summarised under a number of headings and as will be seen, most if not all of these reflect a continuum with the past

Major infrastructure projects as apparent in January 2013

Against the backdrop created in the previous century by the construction of the oil refinery at Grain, the power stations at Grain and Kingsnorth and the development of the Thamesport container port facilities (also on the Isle of Grain), large infrastructure projects are likely to remain agents for major landscape change on the peninsula. This is a process of change at a landscape level that can arguably be traced back to the early post medieval period. The significance of the resulting evidence for this long period of change is not universally accepted and whilst some people value positively the industrial archaeology of Hoo others afford greater value to the areas of more 'natural' appearance, such as the marshes. We hope that by enhancing our understanding of historic character we can contribute to this ongoing debate. Nowhere is this debate more active than regarding

increased airport capacity in the South-East of England. This has seen two proposals recently mooted which would affect the peninsula, one involving an airport located on islands in the Thames Estuary, but requiring infrastructure connections on the land and another involving an airport focused on the eastern end of the peninsula at Grain.

An examination of the image of the scheme as proposed by Foster and Partners demonstrates that the second proposal would involve the reconfiguration of over half the terrestrial area of the peninsula and would therefore result in a scale of change that has never been seen before. This does not of itself make it therefore unacceptable and the NPPF provides the context in which decisions must be considered. It must balance public gain against the inevitable harm to the historic and natural environment that such a large project could not avoid. A Government consultation on airport capacity in the South-East is underway but not expected to report until 2015. The results covered by this report will we hope enable all parties to engage in a more informed debate in relation to the historic environment of Hoo and thus to better understand the effects of any airport related development and what might be done by way of mitigation. The historic environment is a finite resource and once lost or damaged it cannot be recreated. Recording of the evidence for its historic past is not the same as the continued existence of a specific place with all its heritage values.

Whilst the potential to increase airport capacity is one of the most prominent and widely publicised agents for change on the peninsula, the drive to increase port capacity, both at Thamesport on the Isle of Grain and at Shellhaven across the Thames in Essex, also has the potential to bring about landscape change and may pose particular challenges for the marine historic environment and seascape character through the dredging of new shipping channels. Compensation measures agreed for ecological and landscape reasons may have consequences for the historic environment for example as salt marsh lost to development is recreated elsewhere. An example of this is already current at Hoo as part of the planning permission granted for the major new port in Essex. Additionally, though the coal-fired Kingsnorth power station is due to close in March 2013 and Grain's oil-fired power station sometime in 2015, we can expect the use of the peninsula for energy related development to continue and possibly expand. National energy usage is likely to rise in coming decades and possible replacement schemes, perhaps including renewable energy such as wind or tidal power, may be considered for the peninsula, particularly given its history of power generation and the consequent infrastructural capital in the form of pylons etc. All these major infrastructure schemes are likely to be supported by extensions and adjustments to road and rail networks which could bring landscape changes beyond the main focus of the developments. One of the largest changes could be seen if the proposed Lower Thames Crossing, between Essex and the Kent, landing on the western end of the peninsula, was to go ahead. The aim of this development would be to relieve pressure on the existing river crossing at Dartford and foster the economic links between Essex and Kent/Medway desired by the South East Local Enterprise Partnership (www.southeastlep.com).

Other new developments as apparent in January 2013

The creation of a significant new settlement at the Lodge Hill former Ordnance Depot / Ministry of Defence site is one scheme that is very likely to create major change on the peninsula, including beyond its immediate boundaries. At the time of writing this major planning application awaits determination. A new town, which will comprise of thousands of new homes, will bring change to the wider peninsula as its new inhabitants seek to use the peninsula's landscape in different ways. Beyond the settlement at Lodge Hill, economic recovery will undoubtedly see the drive for growth resumed around the Medway towns and it is likely that the conurbation's population will seek leisure opportunities on the peninsula which may lead to further landscape change. A general trend to encourage growth east of London may create similar effects. Smaller scale, incremental change, seen in the visible historic character of some of the peninsula's villages and historic farmsteads, is also likely to increase as an economic recovery brings more affluence or increased attention to the energy performance of older buildings. Hoo might in future come under increased pressure for residential development particularly on the back of the Lodge Hill development and perhaps if the potential blight associated with the suggestion of a Hoo Peninsula-based London airport is eventually lifted.

Green infrastructure

Linked to this growth agenda, and through a desire to reap the economic benefits of tourism in general, will come pressure for enhanced access to and enjoyment of the peninsula's landscape. In the first instance this may be focused on the well known ecological designations and nature reserves, and on the birds that flock to the muds and saltings. It may also begin to exploit the wider landscape character, including its visible historic components. Public access too much of the peninsula is poor, particularly to some of its most significant historic monuments, but the desire for an improved tourism offer might have an important role to play in seeking management solutions for major heritage assets at risk. The peninsula-wide GIFT-T (Green Infrastructure For Tomorrow-Together!) project has highlighted that green infrastructure is seen as a priority in the Hoo landscape (http://www.nweurope.eu/index.php?act=project_detail&id=4195).

Climate change and sea level rise

Climate change and sea level rise are related issues that will drive major change particularly to the littoral parts of the peninsula. The Environment Agency's Thames Estuary 2100 (TE2100) study provides a context for the management of this change (Environment Agency 2009, 164). We can anticipate the potential need to protect strategic assets, such as settlements, businesses and industries, by enhanced or new defences and this may have implications for the historic landscape and heritage assets of the peninsula. Flood risk measures and mitigation may take the form of hard engineering, managed retreat or realignment. It is worth noting that areas of land that might be given

back to the sea were sometimes first reclaimed in the medieval period. Reversal of such a historic process is not by definition a bad thing but its effects must be understood and any harm limited and mitigated. Historic evidence that would be destroyed by the process of coastal management or as a result of the consequences of permitting controlled flooding by the sea needs to be understood and change planned for. Where such actions are part of deliberate development normally requiring planning permission, the promoters of such schemes should expect to be asked to contribute to mitigation of harm. The creation of new habitats or the enhancement of the existing ones can be harmful to the historic environment and similar considerations must therefore apply.

An outer Thames barrier may be beneficial to the heritage of the Hoo Peninsula by maintaining present levels of flood protection but other significant heritage assets, such as Cliffe Fort, may be at risk of harm but might not continue to be defended. Realignment of the flood defences is a potential major issue for the marshland areas of Hoo where the case for holding the present line might be weak in Environment Agency terms and for which there could be natural environment benefits in allowing some areas to be returned to saltings (see above), but such changes could have negative impacts on historic assets and character.

Climate change may also affect the peninsula's landscape beyond the coast, perhaps affecting the dynamic relationship between the use and character of the marshland and areas of higher ground. It may lead to the loss of current species of plants and animals and the arrival of new ones which would lead to changes in the historic character of the landscape, just as actions to try to address the loss of ecologically-valued habitats and species could do the same.

Agriculture

The project has demonstrated that arable production and grazing have been a fundamental part of the historic development of the peninsula for at least a millennium, and probably since the Bronze Age, making a significant contribution to its historic character by shaping its fieldscapes, routeways and villages. As always, these landscapes are dynamic and change is ongoing. Variations in commodity prices and the introduction of new crops could drive modification of existing agricultural practices with consequences for present historic character and individual heritage assets (such as buried archaeological sites surviving as cropmarks) through the expansion of cultivation, or in changes in cultivation practice or to boundaries, routeways and agricultural buildings. It is not clear whether statutory controls and incentives for conservation (such as through agri-environment schemes and cross-compliance rules under the Single Farm Payment Scheme) will be sufficient to secure sustainable decisions for agricultural related developments and change and if so how far consequences for the natural and historic environment can be balanced in such situations.

Minerals

The project has demonstrated how extractive industries, particularly related to the Portland cement works, have made a major contribution to the character of the present day Hoo landscape. These industries might conceivably continue to be a factor in the future of the peninsula. On the other hand, reflecting shifts in prevalent values, redundant workings might become sites for landscape enhancement as has happened at the nature reserve at Cliffe Pools. A new minerals permission was granted at the Medway end of the Second World War GHQ stop line close to Hoo St Werburgh and as part of this the pill boxes that constitute the remains of the line are to be preserved. Although the landscape in which they were built will change significantly, divorcing them somewhat from their historic context.

Natural environment initiatives

The desire to enhance existing habitats and to create new ones may not always be appropriate in historic environment terms. Mitigation of harm from development might be required through the planning process and can include creation of new habitat to replace any lost to development. Planning for this must balance all issues as the key difference between natural and historic environments is that historic assets once lost cannot be re-created, unlike natural habitats. Habitat creation actions such as inundation will have complex implications for buried historic remains aside from the more tangible issues of change to the present historic landscape character.

Enhanced understanding of the historic component of the landscape will help to explain that the Hoo Peninsula is a product of the interaction of past human activity with nature that has come to be highly valued for ecological and landscape reasons. This might help better integrate the conservation of the natural and historic dimensions of the environment. Natural environment designations such as SSSIs, ESAs or RAMSAR are area-based, whilst heritage designations tend to be more site specific.

Suspension or reduction of established land use

This widespread form of change, affecting land cover and the condition and visibility of remains and patterns, may also be characterised as a form of neglect. It is perhaps best seen in the context of longer-term patterns in changes in intensity and viability of certain forms of land use (agricultural, industrial etc), and utilisation of the sea and rivers. These tend to be guided by national or even global economic and social drivers that are difficult to address locally.

Designation and the historic environment

It is hoped that the work to produce this report has shown that the historic environment is much, much more than the sum of its designated heritage assets (listed buildings, scheduled monuments, and conservation areas). Historic character is to be found everywhere and whilst it may often not reach the level of perceived significance necessary to justify designation it is no less important as a result. We must anticipate that new discoveries could yet add to our knowledge of the peninsula, particularly with regard to buried archaeological remains, the likely presence of historic wrecks and the coastal locations most subject to erosion. Some of these might be designated as might other assets as public appreciation of their significance becomes better established but designation is a management tool and not an end in itself. Assets can be significant without being designated. Undoubtedly the Hoo project will feed into a limited number of new designations but this was not the principal motivation of our work. Our aim was to better understand Hoo as a place and to document how historic character is present throughout the peninsula and has for example contributed to the creation of ecologically special areas. By enhancing understanding of the wider historic environment and making this information available to as wide an audience as possible using modern technologies we expect that consideration of historic environment issues in decision-making will improve but also critically that more people can understand and enjoy the influence of the past on present day Hoo.

How could the historic character of the Hoo Peninsula be used when considering change at a landscape level?

As described above, there are many mechanisms for change which impact on the Hoo Peninsula's historic landscape and seascape and there are a wide variety of possible consequences, some harmful but also including those that might be considered as enhancements. By adopting the tools of characterisation on land and at sea we have created a means for people to understand the historic environment, in which they live, work and spend time. In due course all can use the GIS based data for this purpose but it will also enable those proposing change to consider the consequences of their actions and to know when it might be appropriate to give specific consideration to historic environments issues, including when to seek specialist advice. This is equally applicable to small scale proposals for change as to much larger proposals. For the latter sensitivity analysis might indicate places where change is more readily acceptable without substantial harm to the historic environment.

By understanding what attributes contribute to historic character it should be possible to propose change that reinforces or enhances existing historic character and or to create new character that future generations may come to value for its heritage values.

Loss of heritage assets and erosion of historic character

Many changes may have direct and specific effects on a range of historic assets such as historic buildings, archaeological sites and monuments, and the palaeoenvironmental resource. This could involve loss or damage to both visible and buried archaeological sites through inundation, agricultural regime changes, river channel dredging, increased visitor erosion, increased river traffic, hard engineering solutions to flooding and piecemeal loss of assets through infill, dredging, ploughing and neglect. The anticipated changes could also see the loss or alterations of historic buildings through redevelopment, conversion and demolition. It is already apparent how many farmsteads, and to some extent the villages, on the peninsula have seen significant changes in historic character.

A loss of specific heritage assets of course can also contribute to the more general loss of historic character from the landscape as, along with fields and routeways, buildings and monuments are some of the many elements which contribute to this character. Broader landscape changes can also affect this historic character. This may occur through inundation or managed realignment which would also change the aesthetics of the peninsula and the historic balance between the low-lying marshland and arable. Pressure to expand some of Hoo's smaller 'unexpanded' settlements might also affect their historic character. For example, should development not be embedded in an understanding of the fabric of individual buildings or in the existing size and layout of the settlements. Development may also alter some of the peninsula's wide open vistas which make places like High Halstow and Cooling desirable places to live. Settlement, agricultural, infrastructure or industrial developments may also lead to the loss of structural element of the landscape which gives it historic character such as fleets, relict counter walls and field boundaries which evidence earlier field patterns. Habitat creation schemes which involve tree planting or changes to drainage, for example, may also change the character of the landscape or effect palaeoenvironmental remains, while climate change may lead to the loss of current species of plants and animals and the arrival of new ones.

Positive effects

As indicated earlier, developments shaping the future of the Hoo Peninsula, if well informed , have enormous potential to bring positive changes, building on the present historic landscape and creating a culturally and historically distinctive place for its future local communities and those large populations living near and using the peninsula, such as in the Medway towns. Apart from those quality of life considerations, there is much potential for improving access to the wider peninsula for leisure purposes where the historic landscape can take a greater active role. Greater public access to some areas of the peninsula might have an important role to play in raising the profile, understanding and public care for the Hoo's heritage assets, many of which are currently at risk. An outer Thames barrier may also be beneficial to the heritage of the Hoo by maintaining present levels of flood protection.

How can an understanding of the historic landscape make a positive contribution to the future of Hoo?

The 'heritage cycle', drawn from English Heritage's *Corporate Plan 2011-2015*, constitutes what is known as the 'virtuous circle' in which a better understanding of the historic environment increases how much people value it and therefore their desire to care for and enjoy it, thereby increasing a desire to understand yet more. This link between understanding the historic environment and valuing and caring for it is key to the way in which a better understanding of the historic landscape can make a positive contribution to the future of the Hoo Peninsula, as it will encourage people to change some of the negative perceptions about its value. The European Landscape Convention likewise sees landscape as the mechanism through which people understand their place in the world. Knowledge of the historical development of landscape can greatly increase that understanding.

An understanding of the historic landscape and seascape can also contextualise nationally important assets or elements like historic buildings or archaeological sites requiring the strongest levels of protection might be used as one possible tool to help conserve the historic value of a particular historic building, archaeological site or landscape. The recent designation of the 19th century artillery fort at Slough, Allhallows-on-Sea has helped assure its status as a monument of national importance and facilitate the development of a sustainable management plan for its future.

Most importantly a better understanding of the historic character of the Hoo Peninsula and its historic assets enables everyone to make better decisions about future change in this landscape.

A historic environment research framework for the Hoo Peninsula?

It was almost inevitable that the work by English Heritage would raise almost more questions than it could provide answers but this should not be seen as any form of failure. By raising questions and then seeking answers the process of gaining knowledge is advanced and it is hoped that the enhanced understanding of the Hoo Peninsula will now create new thoughts about its historic environment and a desire to seek answers to questions yet to be posed. The experience of studying Hoo will inform future projects and we hope they will be better as a result.

The investment of resources at Hoo is deserving of a legacy beyond the enhanced level of understanding that this project will leave behind. One possibility would be to agree a series of questions that further work might then look to try to resolve. To do so might need a research framework and one for Hoo could be derived as a sub set of the existing research agenda for the Greater Thames Estuary (Heppell 2010). Knowing questions to try to answer is not however the same as having the means to do so. If there is a sufficient appetite for it amongst those people who value the Hoo landscape it might be

possible to promote a community based historic environment post the holder of which would be charged not with seeking answers per se but rather with co-ordinating and encouraging actions to do so, including securing funding and other support. Funding streams by the Heritage Lottery Fund might be applicable to the establishment of measures to assist people to deepen their understanding and enjoyment of the Hoo historic landscape and thus to carry on where English Heritage must now leave off

APPENDICES

Appendix 1

Project team members and their roles

English Heritage staff

Project Executive: Pete Topping (Head of Archaeological Survey and Investigation) Oct 2009 – Dec 2011; Pete Herring (Head of Assessment) Jan 2012 - present

Project Manager: Sarah Newsome, Senior Investigator, Archaeology

Project Board members:

Peter Kendall, Inspector/Team Leader for Medway, National Planning Department

Alan Byrne, Regional Planner (Historic Areas & Planning Adviser), National Planning Department

Veronica Fiorato, Designation Team Leader (South)

Roger M Thomas, Historic Environment Analyst (Development)

Gill Campbell, Head of Environmental Studies

Helen Winton (Aerial Investigation and Mapping Manager)

Susie Barson (Assessment Team Manager – South)

Project experts:

Analytical Aerial Survey:

Edward Carpenter, Fiona Small, Cathy Stoertz (Investigators - Aerial Investigation and Mapping). Damian Grady (Aerial reconnaissance and photography).

Outline Historic Area Assessments:

Susie Barson, Jo Smith, Jon Clarke (Senior Investigators – Architecture)

Historic Landscape Characterisation:

Pete Herring (Head of Assessment)

Historic Routeways Characterisation:

Pete Herring (Head of Assessment); Gareth Watkins and Caroline Howarth (Project Officers, NHPCP)

Historic Seascape Characterisation:

Dave Hooley (Senior Investigator)

Historic Farmstead Characterisation:

Jeremy Lake (Historic Environment Intelligence Analyst – Resources Impacts)

Palaeoenvironmental Review:

Zoe Hazell, Senior Palaeoecologist

Analytical Archaeological Survey:

Wayne Cocroft, David McOmish, Sarah Newsome, David Went and Magnus Alexander (Senior Investigators – Archaeology)

Rebecca Pullen, Marcus Jecock (Investigators – Archaeology)

Andrew Williams (Research and Support Officer – Architecture)

Derwin Gregory (EPPIC)

Selected illustrations and photographs:

Phil Sinton, Sharon Souter (Graphics Officers)

Damian Grady (Aerial Reconnaissance Manager)

Steve Cole, Derek Kendall (Senior Photographers)

External Consultants

Project Board Advisor:

Lis Dyson, Head of Heritage Conservation, Kent County Council

Historic Landscape and Seascape Characterisation:

Dr Nicola Bannister Landscape Archaeologist

Historic Farmstead Characterisation (as part of wider Kent project):

Dr Bob Edwards

Hoo Marshlands Documentary Research:

Dr Gillian Draper

NB In consultation with the whole project team this report was drafted by Edward Carpenter, Zoe Hazell, Sarah Newsome and Fiona Small and edited by Helen Winton.

Appendix 2

Methods

Aerial Investigation and Mapping

Aerial reconnaissance and aerial photography were carried out by Damian Grady during the main phase of the project. This included photography of archaeological remains seen as earthworks, structures and buried remains seen as cropmarks, landscape views, farmsteads, villages and other architectural sites.

Aerial Investigation and mapping work used National Mapping Programme (NMP) methods. For further information see the English Heritage webpage: http://www.english-heritage.org.uk/professional/research/landscapes-and-areas/national-mapping-programme/

The aerial investigation covered the whole of the peninsula including marshland and inter-tidal areas and comprised c225 square kilometres. Fiona Small and Edward Carpenter completed most of the peninsula and Cathy Stoertz surveyed the Chattenden area.

The scope of the aerial investigation phase included all archaeological features visible on aerial photographs. These ranged in date from the Neolithic period to the 20th century and included sites visible as cropmarks and/or earthworks but also structures, in particular those relating to the Second World War. A trial was carried out to determine if aerial photographs could be used to identify areas of peat in the inter-tidal zone.

Aerial photographs consulted included those from the English Heritage Archive (EHA; formerly the National Monuments Record (NMR)), Cambridge University, Kent County Council, online sources such as Google Earth, georeferenced Pan Governmental Agreement images, those available on the Channel Coastal Observatory web site http://www.channelcoast.org/. Environment Agency lidar jpegs were available for most of the peninsula. Other sources included readily available documentary evidence (historic maps etc) and synthesised background information on the area (published material, NRHE and HER records) were also consulted.

Rectified and georeferenced digital images were produced by transforming scans of oblique and vertical photographs using the AERIAL 5.29 Photograph Rectification program designed by John Haigh at the University of Bradford. A digital terrain model function, using OS 5m interval contour data, was used to compensate for undulating terrain. Archaeological features were traced from georeferenced photographs and lidar using AutoCAD Map. Archaeological features were depicted on different layers based on the form of remains (e.g. bank, ditch etc). A monument polygon was created for each site. A unique identifier number was attached to each group of objects corresponding to the

monument description in the English Heritage AMIE database (part of the National Record of the Historic Environment).

Monument records in the EH AMIE database were created or amended where appropriate. The monument record consisted of a textual description of the site linked to indexed location, period, type and form of evidence. The record also included digital cross references to other monuments and datasets (usually the HER or scheduling information) as well as a list of the main aerial photographs and other sources for the site. An Event record in the EH AMIE database was created to provide data on project scope and procedures. Event and archive records are linked to each monument record.

Archaeological Survey and Investigation

The remains of Curtis's & Harvey Ltd's early 20th century chemical explosives factory on Cliffe Marshes were recorded as a Level 3 survey (Ainsworth et al 2007), that is, an enhanced programme of investigation and analysis. The primary aim of the investigation was to present for the first time a detailed and accurate plan of the whole site, complemented by a comprehensive description and analysis of the nature of the archaeological remains, from which the story of the site's development and use could be inferred (Pullen et al forthcoming).

The field investigation was carried out by English Heritage intermittently between November 2010 and February 2011. The earthwork survey used survey grade differential Global Navigation Satellite System (GNSS) equipment to record points fixed on to the Ordnance Survey National Grid. Survey of the standing buildings, where satellite reception was obscured by walls, was carried out using a combination of total station theodolite (TST) equipment and graphical survey, and all point data gathered using the TST was checked for errors and transformed to OS National Grid coordinates based upon GNSS observed control point data collected at each TST station setup point. Additional measured survey was undertaken with tapes to produce plan and section drawings, and detailed building descriptions, for any buildings with standing remains.

All archaeological features within the area of investigation were surveyed, from large earthwork traverses and borrow-pit ponds down to individual iron studs protruding from the remains of machine beds. A system of line coding was used in the field to differentiate between topographical points on the earthworks and between different material types such as concrete, brick or metal. At times the fieldwork encountered adverse weather conditions including widespread ground water-logging and heavy snowfall; every effort was made to re-check areas surveyed in conditions of low visibility.

Production of a composite draft survey plan was followed by a programme of rapid walkover checking and annotation, relevant alterations and additions based on these field notes were then used to tidy and enhance the raw survey data. From this, the final hachured earthwork plan was then produced at scale 1:1000m. A comprehensive numbering system was established to accompany the survey drawing and to provide a

way of tying individual descriptions to specific features across a site of such great size and complexity; this includes structures 1 to 284, linears L1 to L5, and jetties J1 to J3. The site was also been subdivided into 11 spatial zones named areas A to K.

Historic Farmstead Characterisation

Farmsteads were plotted as a separate map layer in GIS so that they could be overlaid onto, and analysed in relationship to, Landscape Character Areas and Historic Landscape Character areas. The principal features (attributes) for each farmstead were captured from the second-edition six-inch Ordnance Survey maps (dated c. 1877), listed-building data and other records held in the Kent Historic Environment Record and from modern 1:10,000 Ordnance Survey mapping. Each record noted the farmstead's plan form split into primary and secondary attributes, the siting of the farmhouse in relation to the farmyard, the degree of survival and its location, specifically whether the farmstead lay in a village, hamlet or isolated location.

These classifications were used to record the principal attribute of the plan. Secondary attributes were also recorded allowing, for example, the distinction between a U-plan regular courtyard and an E-plan regular courtyard. This approach follows a similar methodology to that taken by Wiliam in recording Welsh farmsteads (Wiliam, 1982, 37).

Other secondary attributes included, for example, where a loose courtyard plan was the principal plan form but there were some detached or dispersed building elements whilst some farmsteads clearly have two yards. A coding system using upper case and lower case letters was devised to represent the combination of plan forms possible.

Extant – the plan of the farmstead appears largely unaltered; Partial Loss – evidence of some change within the farmstead and loss of buildings; Significant Loss – farmsteads where a large proportion of the farm buildings appear to have been demolished, possible leaving only the farmhouse which may now be removed from agriculture or within agricultural use but with modern farm buildings; Total Loss – either where a farmstead has been totally removed from the landscape or where the site is still occupied but with no built elements that can be associated with the 1877 map surviving

In addition, the earliest recorded date for any building within the farmstead, including the farmhouse, was used to identify a terminus ante quem for the origin of the farmstead. This was structured by century except where the earliest building dated from before 1599, in which case it was recorded as 'pre-1600', and farmsteads not shown on the first-edition map but were shown on more recent mapping were recorded as 'Modern'. During field checking it was noted that on some farmsteads where it appeared from modern mapping that the historic buildings had been lost, the buildings survived, but that modern sheds around and within the yard had obscured the plan. To allow a better interpretation of the possible survival the roll-out of the point data project will expand the Survival attribute list, changing the Total Loss category to identify those farmsteads that have been completely lost from the landscape (either Greenfield sites or modern

development) and those that remain farms but that have been completely altered. The addition of a new field recording the presence of large sheds on the site will act as a warning that the mapping of the sheds may conceal historic buildings.

Historic Landscape Characterisation (HLC) and Historic Seascape Characterisation (HSC)

Map-based characterisation of the Hoo Peninsula's historic landscape and, concurrently, of its historic seascape (including that of its adjacent estuaries), was undertaken in two successive Stages. In Stage 1 (Bannister 2011) overall coverage by HLC and HSC was completed, including an assessment of previous historic seascape character informed by 1880s map and chart data. In Stage 2, (Bannister 2012) additional earlier sources were assessed to extend the time depth of the HSC and a series of analyses was made using the HLC and HSC to give an integrative context for the various themes within the Hoo Peninsula Historic Landscape Project. An opportunity was also taken in a separate strand of the Historic Landscape Project to trial the application of historic characterisation approaches to historic routeways, building on growing interest elsewhere (eg Green 2009; Rouse 2010). Limited resources curtailed this trial but interim results fed usefully into the later discussions during the Stage 2 HLC/HSC project.

The HLC applied the approach developed and now well-established by English Heritage and its partners through the national HLC programme (http://www.english-heritage.org.uk/professional/research/landscapes-and-areas/characterisation/historic-landscape-character/). Underpinned by common principles of historic characterisation, the approach incorporates the flexibility to enable application at a scale and with a range of historic attributes appropriate to the purpose of the exercise. For the detailed understanding necessary in this project's assessment of the Hoo Peninsula, HLC was undertaken at a fine grain and shared a similar attribute range and structure already applied nearby in the Sussex HLC. Landscape areas sharing the same historic attributes reflecting similar cultural processes in their development were defined from OS MasterMap's polygons, the resulting polygons' attribute structure being allocated, populated and incorporated into the HLC typology before being added to the main HLC database using ArcGIS 9.3, with attributes stored in a field table within the GIS. HLC's primary focus is on assessing time depth within the present landscape but in addition, previous HLC Types were assessed from historic mapping sources. The assessment of historic character used the existing Kent HLC as a starting point, moving on to consider a breadth of map and other data sources (Bannister 2011, 27-29) such as aerial photos (2007 and 1945), early epochs of the OS 6":1 mile mapping and Natural England's 'Ancient Woodland Inventory'.

The HSC was undertaken following English Heritage's published HSC Method Statement (http://archaeologydataservice.ac.uk/archives/view/seascapes/) as updated in the light of more recent HSC implementation projects (Tapper and Hooley 2010). Largely applied to date to guide English Heritage's national strategic level HSC of England's coasts and seas, as with HLC, the HSC method is capable of implementation at whatever scale is

appropriate to the application in hand. The Hoo Peninsula Historic Landscape Project provided an exemplary opportunity to apply HSC at a fine grain, in coordination and concurrently with an HLC for the overlapping and adjacent land area. This enabled, for the first time, a fully integrated consideration of both landward and maritime character perspectives and their overlaps. The resulting characterisations provide full comprehensive coverage across land, coast and estuary and encompass both the 'view from land' and the 'view from sea': views sometimes similar in character, sometimes contrasting, thereby emphasising the plurality of landscape perception (Hooley 2012). The Hoo Peninsula HSC also added several new entries to the cumulative gazetteer of terms in the HSC typology: for 'hulks (unspecified)', 'prison hulks' and 'clay and mud extraction'.

Outline Historic Area Assessments

Historic Area Assessments of 9 parishes (NB THE TOTAL IF SB'S ARE COMPLETED IN TIME OTHERWISE 7 parishes) were carried to the Outline Level (English Heritage 2010), that is less-intensive survey and research to enable coverage of a wide area. The primary purpose was to provide and enhanced understanding of the character and development of the peninsula's built environment. For each parish the key elements of its architectural and historical interest and significance were assessed, its character areas were identified and aspects suitable for further research were highlighted. Furthermore, each parish was considered with regard to the potential for enhanced designation.

Rapid field observation was carried out by English Heritage during a number of visits to the area between 2010 and 2011consisted of external photography and field notes. A limited amount of documentary research was undertaken in the local archives. Extensive use was made of historic mapping, principally the OS sequence and Tithe maps, along with on-line resources such as census data and historic newspapers as well as secondary sources, to produce the assessments. These were written by the team members during 2011 and 2013.

The assessments have been issued as reports in the Research Report Series and the associated archive of digital images, field notes and research material has been deposited in the English Heritage Archive.

Palaeoenvironmental Review

The palaeoenvironmental review was a desk based piece of work based on published and grey literature synthesising the multidisciplinary research that has been carried out. A GIS layer was produced plotting sites with palaeoenvironmental information; specifically these are only sites that have included an assessment or analysis of one or more biological proxies (such as pollen, ostracods). The data was first compiled and stored in an Access database. In order to follow historic environment data standards, the fields and categories of the GIS layer were selected – as far as possible – from MIDAS (2007). The terms used to complete the fields were taken form English Heritage's National Monument Record Thesauri (English Heritage 1999), particularly the Archaeological Sciences thesaurus. Only

sites for which their original reports were obtained were entered into the database so as to ensure detailed, accurate reporting of the original data.

Appendix 3

List of datasets and specialist reports and how to access them.

This report can be downloaded in PDF format from the English Heritage website at http://research.english-heritage.org.uk/

Analytical aerial survey: Mapping and monument records are available on request from the English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2EH archive@english-heritage.org.uk Data was also supplied to the Kent HER.

Monument records are also available via http://www.pastscape.org.uk/

Analytical Archaeological Survey reports: The following published or forthcoming reports are/will be available from English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2EH and will also be available for download in PDF format from the English Heritage website at http://research.english-heritage.org.uk/

Edgeworth, M forthcoming *Yantlett Creek Firing Range, Isle of Grain CP, Hoo Peninsula, Medway:* Archaeological Desk-Based Assessment. English Heritage Research Report Series 1-2013

Gregory, D & Newsome, S 20120 *An Archaeological Investigation of a short-wave Receiving Station*. 110-2010

Pullen, R and Newsome, S Forthcoming *Lower Hope Point, Cliffe and Cliffe Woods, Medway: Analytical Archaeological Survey of Two Coastal Battery Sites*. English Heritage Research Report Series

Pullen R, Newsome S, Williams A and Cocroft WD forthcoming *Curtis's and Harvey Ltd Explosives Factory, Cliffe and Cliffe Woods, Medway: Archaeological Survey and Analysis of the Factory Remains*. English Heritage Research Department Report Series 11-2011

Newsome, S Forthcoming *St. Mary's Marshes Magazines.* English Heritage Research Department Report Series

Newsome, S & Williams, A Forthcoming Cliffe Fort, Hoo Peninsula, Kent: Survey and Analysis of the 19th-Century Coastal Artillery Fort. 15/2011

Historic Farmstead Characterisation: Deposited with English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2GZ and at Kent County Council Historic Environment Record

Historic Landscape Characterisation: Deposited with Heritage Data Management, Designation Department, English Heritage, The Engine House, Fire Fly Avenue, Swindon, SN2 2GZ and at Kent County Council Historic Environment Record

Historic Seascape Characterisation: Deposited with Heritage Data Management, Designation Department, English Heritage, The Engine House, Fire Fly Avenue, Swindon, SN2 2EH and Kent County Council Historic Environment Record

Historic Routeways Characterisation: Deposited with English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2GZ

Marshlands Historical Research: Forthcoming, English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2GZ

Outline Historic Area Assessments: The following Historic Area Assessments will be published as English Heritage Research Reports (all forthcoming) and will be available from English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2GZ and will also be available to be downloaded in PDF format from the English Heritage website at http://research.english-heritage.org.uk/

Allhallows

Cliffe and Cliffe Woods

Cooling

Frindsbury Extra

Grain

High Halstow

Hoo St. Werburgh

St. Mary Hoo

Stoke

Palaeoenvironmental Review: The following report is available from English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2GZ and is also be available for download in PDF format from the English Heritage website at http://research.english-heritage.org.uk/

Hazell, Z 2011 *A Palaeoenvironmental review of the development of the Hoo Peninsula*. 14-2011

Appendix 4

Palaeoenvironmental Glossary

These definitions are based principally on those given in the Archaeological Sciences Thesaurus (http://thesaurus.english-heritage.org.uk/thesaurus [Accessed April 2013]) *and in the* English Heritage guidelines (2008, 2011) (http://www.english-heritage.org.uk/publications/luminescence-dating/ [Accessed April 2013]) (http://www.english-heritage.org.uk/publications/environmental-archaeology-2nd/ [Accessed April 2013])

Alluvium/alluvial = waterlain deposits eg silts deposited through flooding

Anglian = a glacial period; during no subsequent glacial period did ice reach as far south over the British Isles, as in this one. Equivalent to MOIS 12.

Atlantic = a period from the Scandinavian-based Blytt/Sernander scheme (of late Devensian and Holocene climatic phases) derived during the late 1800s to early 1900s. It lasted from around 8000 to 5000 cal BP

AAR = amino-acid racemisation; a dating method based on the measurement of chemical alterations in the amino acids present bones, shells and teeth over time.

Cladocera = freshwater crustaeans including *Daphnia* spp. (water fleas).

CPT = Cone Penetration Testing. A method of determining the penetrability of a deposit, strongly correlated to compaction, cohesion and mineral content using a probing device.

Devensian = a mainly cold period, covering MOISs 4 to 2.

Diatoms = single-celled algae, they can be used to establish water quality, including the degree of salinity.

Epipalaeolithic = period that shows features of both the Upper Palaeolithic and Mesolithic and may be transitional between them.

Foraminifera = marine protists, the tests or shells of which survive in archaeological deposits and are used in palaeoecology to investigate the nature of marine environments often in conjunction with diatoms.

Glacial/glaciation = a time of cold climatic conditions, when large ice masses were present, resulting in reduced global sea-level. They alternate with interglacials.

Holocene = the current warm epoch; the second, most recent subdivision of the Quaternary Period that started at the end of the last glaciation c 12-10,000 years ago. Equivalent to MOIS 1.

Hoxnian = an interglacial period, equivalent to MOIS 11.

Interglacial = a time of warm climatic conditions, when ice masses were reduced, resulting in increased global sea-level. They alternate with glacials.

Minerogenic = derived from minerals.

MOIS = Marine Oxygen Isotope Stage; a classification of the past climate cycles, based on marine oxygen isotope records

OSL = Optically-Stimulated Luminescence dating; a dating method based on the light emitted from sedimentary minerals or mineral inclusions when stimulated in the laboratory by light of a different wavelength. Minerals within deposits accumulate energy from exposure to natural radiation over time. The date obtained, is the date when the sediments were buried/ last exposed to sunlight. Exposure to sunlight releases the accumulated energy.

Ostracods = small crustaceans with two-valved calcareous hells founds in both freshwater and marine environments.

Pleistocene = the first epoch (a subdivision) of the Quaternary Period, preceding the Holocene

Quaternary = the geological time period equating to the last 2 million years, characterised by cycles of alternating cold (glacial) and warm (interglacial)

River terraces = suites/staircases of sand-gravel sediments deposited along former river courses during phases of downcutting that occurred at glacial to interglacial boundaries (see Bridgland (2000)); the age of the terrace deposits increases with altitude. Rock types within the terraces indicate the geologies over which the river previously flowed (eg those of the River Medway are from its Wealden source), meaning that a (migrating) river's former routes can be mapped.

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