

EAST ANGLIAN ARCHAEOLOGY

**Aerial Archaeology in
Essex:
the role of the National
Mapping Programme
in interpreting the
landscape**

**by Caroline Ingle and Helen
Saunders**

with illustrations by
Helen Saunders

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Cover photograph

Cropmarks of a pit-lined elongated enclosure and two large ring-ditches at Mount Bures
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Contents

List of Figures	vi	Sub-area 2	49
List of Tables	viii	V. Conclusions	53
Contributors	viii		
Acknowledgements	ix	Chapter 3. Prehistoric and Roman Settlement in Essex, by Helen Saunders	
Abbreviations	ix	I. Introduction	55
Summary	ix	II. Distribution of sites	55
		III. Cropmark evidence	56
Chapter 1. Introduction, by Caroline Ingle and Helen Saunders		Enclosures	56
I. The Essex Mapping Project	1	Ditches	59
Introduction	1	Trackways	59
National Mapping Programme	1	Field systems	60
Essex aerial survey	1	IV. Settlement evidence	60
Background to the Essex Mapping Project	1	Early settlement evidence	60
Analysis and synthesis of aerial photographic evidence	2	The Bronze Age	60
The Essex Mapping Project: background and methodology	2	The Iron Age	63
Photographic sources	2	Hillforts	68
Geographical extent	2	Burial and religion	70
Archaeological scope	3	The Roman period	71
Methodology	3	Villas and farmsteads	72
Results/outputs	3	Roads	78
Biases within reconnaissance	3	Temples and religious activity	80
Nature of archaeological features	4	V. Case study: prehistoric and Roman settlement in the Mucking and Orsett area	81
Reconnaissance programmes	4	VI. Conclusions	89
Land use	4		
Research priorities	5	Chapter 4. Saxon, Medieval and Post-medieval Landscapes, by Helen Saunders	
Distribution of mapped features	5	I. Introduction	91
Cropmarks	5	II. Biases	91
Earthworks	8	III. The archaeology of the medieval and post-medieval period	92
Conclusions	8	IV. Distributions	93
II. The physical landscape of Essex	8	V. Cropmark and earthwork evidence	93
Geology	8	Saxon	93
Soils	10	Enclosures and settlement	95
Topography	10	Moated sites	97
Landscape regions	10	Motte and bailey sites and ringworks	98
Coastal marshland	10	Field boundaries	101
Sands and gravels	13	Abbeys and priories	104
London Clayland	13	Water management	106
Bagshot Hills and South Essex Hills	13	Other mapped sites	106
Dissected Boulder Clay plateau	14	VI. Case studies	107
Chalk dip slope	14	Upper Roding Valley	107
		The Blackwater estuary	111
Chapter 2. Prehistoric Landscapes, by Helen Saunders		VII. Conclusions	113
I. Introduction	15		
II. Distribution of prehistoric sites	15	Chapter 5. Fish, Fowl and Salt: Economy of the Essex Coast, by Caroline Ingle	
III. Monuments	18	I. Introduction	115
Causewayed enclosures	18	II. The changing coastline	115
Elongated enclosures	22	III. Salt-working	115
Long enclosures and mortuary enclosures	22	Late Iron Age–Roman	118
Cursus monuments	26	Distribution	118
Hengiform monuments	28	Dating	119
Ring-ditches and round barrows	30	Gaps in distribution	121
IV. Case studies	34	Decline	122
Chelmer and Blackwater river valleys	34	Medieval	122
The lower Chelmer Valley	36	IV. Fish weirs	124
North-west Uttlesford	43		
Tendring	45		
Sub-area 1	45		

	Typology	125		Diver batteries	160
	Dating	125		Other anti-aircraft measures	163
V.	Oyster cultivation	128	IV.	Airfields	163
	Collection and husbandry	128		Background	165
	The Essex estuaries	131		Specifications	167
	Crouch and Roach	131		Landing field	167
	Blackwater	132		Dispersal	167
	Colne	133		Services	167
	Thames	134		Essex airfields	168
	Tendring and Stour	135		Consolidation	168
	Mapping the industry	135		Defence: 1940–41	168
VI.	Wildfowling	135		Offence: the Class A airfields	169
	History of decoying	139		Other features	171
	Essex decoys	139		Airfield defences	171
	17th century	139		Impact on the landscape	171
	18th century	141	V.	The surviving military landscape	172
	19th century	142		Anti-invasion defences	172
	Evolving design?	143		Anti-aircraft batteries	173
	Gaps in the record	143		Airfields	173
	Demise of the decoys	144		The impact on earlier landscapes	174
VII.	Discussion	144	VI.	Discussion	174
Chapter 6. The Military Landscape of Essex during the Second World War, by Caroline Ingle			Chapter 7. Conclusions, by Caroline Ingle and Helen Saunders		
I.	Introduction	147	I.	Aerial reconnaissance and the NMP	177
	History of research	147		Aerial photographic interpretation	177
II.	Anti-invasion measures	148		Landscape management	177
	The stop-lines	148	II.	Planned landscapes	178
	Coastal defence	150		Coastal	178
	Defence in depth	152		20th-century military	178
	Anti-airborne invasion measures	152		Historic Landscape Characterisation	178
III.	Defence against aerial attack	154	III.	The future	178
	1939 to mid 1944	154	IV.	Conclusions	179
	Specifications	154		Bibliography	180
	Four-gun batteries	157		Index, by Sue Vaughan	188
	Six-gun batteries	159			
	5.25" batteries	160			

List of Figures

Introduction

Fig. 1.1	Location of the county of Essex	xii
Fig. 1.2	Distribution of crop and soil mark sites mapped as part of the NMP	6
Fig. 1.3	Distribution of earthwork sites mapped as part of the NMP	7
Fig. 1.4	Solid and drift geology of Essex	9
Fig. 1.5	Topography of Essex and places in the text	11
Fig. 1.6	Landscape regions of Essex	12

Prehistoric landscapes

Fig. 2.1	Distribution of prehistoric sites	16
Fig. 2.2	Location of mapped sites on the Dengie peninsula relative to topography	17
Fig. 2.3	Location of study areas and places mentioned in the text	19
Fig. 2.4	Causewayed enclosures mapped as part of the NMP and examples visible on the aerial photographs after excavation	20

Fig. 2.5	Orsett causewayed enclosure in relation to other prehistoric monuments in the surrounding landscape	21
Fig. 2.6	Examples of possible mortuary enclosures mapped as part of the NMP	23
Fig. 2.7	Location and morphology of mortuary enclosures in the Blackwater Valley	24
Fig. 2.8	Aerial photograph of a pit-lined elongated enclosure at Mount Bures	25
Fig. 2.9	Aerial photograph of a cropmark of a long enclosure with rounded terminals at Feering	26
Fig. 2.10	The cropmark landscape of the Springfield cursus monument	27
Fig. 2.11	Elongated enclosures visible as cropmarks in north-west Essex	28
Fig. 2.12	Cropmark Enclosure Project sites	29
Fig. 2.13	Cropmarks of a possible round barrow cemetery at Elmstead	32

Fig. 2.14	Distribution of round barrows and viewshed at Brightlingsea	33	Fig. 3.2	Examples of possible prehistoric enclosures and known prehistoric settlement enclosures visible as cropmarks	57
Fig. 2.15	Distribution of mapped prehistoric cropmark sites within the Chelmer and Blackwater study area	35	Fig. 3.3	Aerial photograph of Lawford Ring	58
Fig. 2.16	Aerial photograph of the Langford Hall cropmark enclosure and ring-ditches	37	Fig. 3.4	Comparative plans of mapped circular enclosures visible as cropmarks	61
Fig. 2.17	Possible first phase of proposed monument development	38	Fig. 3.5	Cropmark complex north of Southminster	63
Fig. 2.18	Possible second phase of proposed monument development	39	Fig. 3.6	Mapped Iron Age cropmark enclosures visible as cropmarks	64
Fig. 2.19	Possible third phase of proposed monument development	39	Fig. 3.7	Aerial photograph of an Iron Age settlement enclosure near St Osyth	64
Fig. 2.20	Possible fourth phase of proposed monument development	41	Fig. 3.8	Orsett and St Osyth causewayed enclosures and associated Iron Age settlement	66
Fig. 2.21	Possible fifth phase of proposed monument development	41	Fig. 3.9	Comparative plans of rectilinear enclosures visible as cropmarks on aerial photographs	68
Fig. 2.22	Possible sixth phase of proposed monument development	42	Fig. 3.10	Three examples of mapped Iron Age hillforts found in Essex	69
Fig. 2.23	Possible seventh phase of cropmark development	42	Fig. 3.11	Aerial photograph of Sparrow's End, a multi-ditched enclosure near Saffron Walden	71
Fig. 2.24	Distribution of possible prehistoric ceremonial sites within north-west Uttlesford	43	Fig. 3.12	Cropmark plots of identified Roman villa sites	73
Fig. 2.25	Distribution of mapped prehistoric sites, visible as cropmarks, within the Tendring study area	46	Fig. 3.13	Cropmark evidence for Roman settlement types in Essex	74
Fig. 2.26	Possible first phase of monument development in sub-area 1 in the Tendring study area	47	Fig. 3.14	Cropmark evidence for possible Roman settlements in Essex	76
Fig. 2.27	Possible second phase of monument development in sub-area 1 in the Tendring study area	47	Fig. 3.15	Aerial photograph of the cropmarks of a possible Roman settlement near Langford	77
Fig. 2.28	Possible third phase of monument development in sub-area 1 in the Tendring study area	48	Fig. 3.16	The Roman cropmark landscape near St Osyth and location of find spots and EHER records	78
Fig. 2.29	Possible fourth phase of monument development, (earlier phases in grey) where linear features associated with the earlier 'pairs' of ring-ditches may have been constructed	48	Fig. 3.17	Aerial photograph of a section of possible Roman road visible as a cropmark north of St Osyth	79
Fig. 2.30	Possible fifth phase of monument development in sub-area 1 in the Tendring study area	50	Fig. 3.18	Examples of the aerial photographic evidence for Roman temples	80
Fig. 2.31	Possible sixth phase of monument development in sub-area 1 in the Tendring study area	50	Fig. 3.19	Cropmark plot of sites in Thurrock	82
Fig. 2.32	Possible seventh phase of monument development in sub-area 1 in the Tendring study area	51	Fig. 3.20	Neolithic and Bronze Age cropmarks in Thurrock	84
Fig. 2.33	Possible eighth phase of monument development in sub-area 1 in the Tendring study area	51	Fig. 3.21	Iron Age cropmarks in Thurrock	85
Fig. 2.34	Possible ninth phase of monument development in sub-area 1 in the Tendring study area	52	Fig. 3.22	Roman cropmarks in Thurrock	86
Fig. 2.35	Cropmarks of the causewayed enclosure, possible cursus monument, possible henge monument, round barrows, roundhouses and trackways at St Osyth	53	Fig. 3.23	Details of Roman cropmark complex	88
Prehistoric and Roman settlement			Medieval landscapes		
Fig. 3.1	Distribution of sites listed in Table 3.1	54	Fig. 4.1	Distribution of mapped medieval sites	94
			Fig. 4.2	Excavated and cropmark examples of medieval settlement enclosures	96
			Fig. 4.3	Aerial photograph of a water-filled moat at Starling's Green (EHER 3903)	97
			Fig. 4.4	Aerial photograph of a moated site visible as a cropmark at Battles Wood (EHER 3875)	98
			Fig. 4.5	Examples of mapped moated sites	100
			Fig. 4.6	Aerial photograph of Pleshey (EHER 1126)	101
			Fig. 4.7	Aerial photograph of the motte at Mount Bures (EHER 9161)	102
			Fig. 4.8	Examples of field systems, using OS 1st edition maps, modern mapping and mapping the cropmarks of field boundary loss	103
			Fig. 4.9	Parch marks of the abbey buildings and water features at Waltham Abbey, as mapped by the NMP	105
			Fig. 4.10	Location of Chapter 4 study areas	108

Fig. 4.11	Distribution of mapped medieval sites in the Roding area	109	Fig. 5.14	Grange decoy, Dengie	140
Fig. 4.12	Cropmarks of Hubbards moat and surrounding field boundary loss	110	Second World War		
Fig. 4.13	Distribution of mapped medieval sites in the Blackwater study area	112	Fig. 6.1	The framework of the main Essex stop-lines	149
Fig. 4.14	Cropmarks at Joyce's Farm and Highams Farm, Blackwater	113	Fig. 6.2	The GHQ line along its southern extent between Chelmsford and the Thames	151
Coastal			Fig. 6.3	Anti-landing ditches on the Thames marshes to the south of Corringham, around the industrial sites at Shellhaven and Thames Haven	153
Fig. 5.1	Extract from the Chapman and Andre 'Map of Essex'	117	Fig. 6.4	Distribution of recorded heavy anti-aircraft batteries in Essex	155
Fig. 5.2	Distribution of recorded salterns in Essex, from NMP and EHER	119	Fig. 6.5	Comparative plans of selected heavy anti-aircraft batteries in Essex	156
Fig. 5.3	Distribution of red hills in the Peldon area	120	Fig. 6.6	Aerial photograph of heavy anti-aircraft battery at Bowaters Farm, Thurrock	158
Fig. 5.4	The red hills around Peldon showing as soil marks	121	Fig. 6.7	Aerial photograph of heavy anti-aircraft battery at Dovercourt, Harwich	159
Fig. 5.5	The medieval saltern complex at Morris Farm, Stow Maries	123	Fig. 6.8	Distribution of Diver anti-aircraft batteries in Essex	161
Fig. 5.6	The distribution of recorded fish weirs in Essex	125	Fig. 6.9	Diver batteries as part of the Diver Box deployment on the Dengie	162
Fig. 5.7	Comparative plans of four of the fish weirs in the Blackwater estuary	126	Fig. 6.10	Distribution of Second World War airfields and First World War landing fields in Essex	164
Fig. 5.8	The distribution of oyster pits recorded by NMP	129	Fig. 6.11	Comparative plans of selected Second World War airfields in Essex	166
Fig. 5.9	Oyster pits in the mouth of the Salcott and Strood Channels near West Mersea	130	Fig. 6.12	Earls Colne Airfield in 1944	169
Fig. 5.10	Oyster pits along the Brightlingsea Channel and Cindery Island	134	Fig. 6.13	Boreham Airfield in 1944	171
Fig. 5.11	Distribution of duck decoys in Essex	136	Fig. 6.14	NMP extract for part of Bradwell airfield	175
Fig. 5.12	Comparative plans of mapped Essex decoys	137			
Fig. 5.13	RAF aerial photograph taken in 1946 recording three duck decoys along a stretch of the north shore of the River Blackwater	138			

List of Tables

Table 2.1	Total number of mapped prehistoric sites	15	Table 3.2	Orientation of enclosure entrances	58
Table 2.2	Average length and width of identified and possible long and mortuary enclosures visible as cropmarks	25	Table 4.1	The number of mapped sites assigned to each period in MORPH2	92
Table 3.1	Settlement site types and cropmark features that may indicate settlement by period	56	Table 4.2	The number of mapped sites assigned to each interpretation	92

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Abbreviations

ACS	Airport Catering Site (Stansted)	GTE	Greater Thames Estuary
CBA	Council for British Archaeology	LIDAR	Light Detection and Ranging
CIS	Car park I site (Stansted)	LOS	Line of Sight (GIS)
CUCAP	Cambridge University Collection of Aerial Photographs	NGR	National Grid Reference
ECC	Essex County Council	NMP	National Mapping Programme
EH	English Heritage	NMR	National Monument Record
EHER	Essex Historic Environment Record	OD	Ordnance Datum
ERO	Essex Record Office	OS	Ordnance Survey
HAA	Heavy Anti-Aircraft	RCHME	Royal Commission on the Historical Monuments of England
HER	Historic Environment Record	RAF	Royal Air Force
HLC	Historic Landscape Characterisation	SCS	Social Club Site (Stansted)
GDA	Gun Defended Areas	USAAF	United States Army Air Force
GHQ	General Headquarters line	WWII	World War Two
GIS	Geographical Information System		

Summary

The National Mapping Project in Essex has been carried out by the Historic Environment Branch of Essex County Council (ECC) as part of the English Heritage (EH) (formerly RCHME) National Mapping Programme (NMP) of Archaeological Recording in England.

The project started in 1993 based on the well-established foundation of skills and data that had been developed by ECC since the mid 1970s. The NMP in Essex is part of the continuing development of a broader Historic Environment Record for the county that includes Historic Environment Characterisation and other thematic information. The project covered 190 Ordnance Survey (OS) 1:10,000 quarter sheets and has examined all easily

available aerial photographs, from several sources and archives, for visible archaeological features. Over the course of the project more than 10,700 archaeological sites have been mapped and recorded, of which 13.2% were new to the Essex Historic Environment Record (EHER).

All features were recorded morphologically, which then aided the classification of features based on monument type, form, location, size and shape. There is a well established assumption that sites of a comparable shape and size in similar geographical locations may be of a similar date and/or function and this report presents the analysis of some of the features mapped in thematic chapters.

Much of the analysis has been carried out using GIS, which has allowed the archaeological features that have been mapped to be viewed in a landscape context and in conjunction with other geographical information such as geology, topography and historic mapping. This has both aided the interpretation of features and allowed new classifications to be established. Consequently, detailed analysis has been carried out on Neolithic monuments within their surrounding landscapes, as well as an assessment of prehistoric and Roman settlement within Essex.

Many aspects of the medieval landscape still exist in Essex today, of which some are recorded in the EHER, such as Listed Buildings, field systems, churches and moated sites, and some have been mapped as part of the NMP. The NMP also mapped the field boundary loss that has occurred in the county since the Second World War

and this, combined with settlement patterns, has enabled analysis of the medieval landscape to be completed.

Essex is a county with a long and varying coastline and the NMP mapped many new coastal sites including fish weirs, red hills and oyster pits, all of which have given an insight into the use of the coastal resource. Without the NMP many of these sites would have gone unrecorded and, in some case, unprotected, as the mapping allowed some fish weir sites to be managed and scheduled.

The final aspect examined in this report concerns the varied monuments of the Second World War, many of which have been recorded and mapped for the first time as part of the NMP. Aerial photography is often the only record for many of these sites and by examining RAF and other contemporary photography a better understanding of the defences within the county has been gained.

Resume

Le National Mapping Project a été conduit dans l'Essex par l'Historic Environment et l'Essex County Council (ECC), ces deux organismes appartenant en Angleterre au English Heritage (EH) National Mapping Programme (NMP).

Le projet a débuté en 1993 et il s'est appuyé sur une base solide de compétences et de données développées par l'ECC depuis le milieu des années 70. Dans l'Essex, le NMP fait partie d'un ensemble plus large de description continue de l'environnement du comté sur le plan historique. Ces travaux comprennent la définition de l'environnement historique ainsi que d'autres informations thématiques. Représentant 190 quarts de feuille au 1:10,000 du service national de cartographie, ce projet a permis d'étudier les photographies aériennes disponibles provenant d'archives ainsi que d'autres sources afin de dégager les matériaux archéologiques visibles. Au cours de son déroulement, le projet a permis de cartographier et d'archiver plus de 10,700 sites archéologiques dont 13,2 % ne figuraient pas encore dans l'Essex Historic Environment Record (EHER).

Toutes les caractéristiques sont archivées sur un plan morphologique, ce qui facilite leur classification en fonction du type de monument, de son aspect, de son emplacement, de sa taille et de sa forme. Il existe une hypothèse bien établie selon laquelle des sites de forme et de taille comparables, situés dans des zones géographiques similaires, datent approximativement de la même époque et possèdent des fonctions proches. Ce rapport contient ainsi l'analyse de quelques-uns des éléments présentés sous forme de chapitres thématiques.

Une grande partie de l'analyse a été effectuée en utilisant un système d'information géographique (SIG), ce qui a permis de visualiser les éléments archéologiques cartographiés dans le contexte du paysage et en relation avec d'autres informations géographiques telles que la géologie, la topographie et la cartographie historique. Cela a facilité l'interprétation des éléments archéologiques et a permis d'établir de nouvelles classifications. En

conséquence, une analyse détaillée a été effectuée sur des monuments néolithiques considérés dans le contexte des paysages environnants. De plus, il a été possible d'évaluer une implantation préhistorique et romaine découverte dans l'Essex.

L'Essex présente encore de nos jours de nombreuses caractéristiques du paysage médiéval, dont certaines sont archivées dans l'EHER (Essex Historic Environment Record). C'est le cas des bâtiments classés comme monuments historiques, des systèmes de champs, des églises et des sites fossoyés, certains d'entre eux ayant été cartographiés comme partie intégrante du NMP (National Mapping Program). Le NMP a également cartographié la disparition des limites de champs qui s'est produite dans le comté depuis la deuxième guerre mondiale, et cet élément, combiné à la configuration des implantations, a permis de compléter l'analyse du paysage médiéval.

L'Essex est un comté qui possède un littoral étendu d'une grande variété et le NMP a cartographié un grand nombre de nouveaux sites côtiers comprenant des barrages à poissons, des collines rouges et des claires pour l'élevage des huîtres, ce qui a permis à chaque fois d'apporter des éclaircissements sur l'utilisation des ressources côtières. Sans le NMP, beaucoup de ces sites n'auraient pas été archivés, ce qui, dans certains cas, se serait traduit par une absence de protection. Au contraire, la cartographie a permis de gérer et de classer comme monuments historiques certains barrages à poissons.

L'aspect final examiné dans ce rapport concerne les différents monuments de la deuxième guerre mondiale, dont certains ont été archivés et cartographiés pour la première fois dans le cadre du NMP. La photographie aérienne est souvent la seule trace concernant ces sites et l'examen des photos provenant de la RAF (Royal Air Force) et d'autres sources a permis d'approfondir la connaissance des défenses.

(Traduction: Didier Don)

Zusammenfassung

Im Rahmen des in England von English Heritage durchgeführten »National Mapping Programme« (NMP) unternahm die Abteilung Historic Environment des Essex County Council (ECC) ein »National Mapping Project« in der Grafschaft Essex.

Das im Jahr 1993 begonnene Projekt stützt sich auf Basiskompetenzen und -daten, die vom ECC seit Mitte der 1970er Jahre zusammengetragen wurden. Das NMP in Essex trägt zur laufenden Entwicklung einer umfangreichen Datenreihe zur Beschreibung der historischen Landschaft in der Grafschaft bei, die daneben weitere themenbezogene Informationen enthält. Bei dem Projekt, das 190 Ordnance-Survey-Karten im Maßstab von 1:10.000 umfasst, wurden in verschiedenen Quellen und Archiven vorhandene Luftaufnahmen auf sichtbare archäologische Befunde hin untersucht. Im Verlauf des Projekts wurden mehr als 10.700 archäologische Stätten erfasst und kartiert — 13,2 % davon wurden neu in den Essex Historic Environment Record (EHER) aufgenommen.

Sämtliche Strukturen wurden morphologisch kartiert, um ihre Klassifizierung nach Art, Form, Lage, Größe und Gestalt zu erleichtern. Es besteht die begründete Annahme, dass Stätten vergleichbarer Größe und Gestalt in ähnlicher geografischer Lage vermutlich ungefähr gleich alt sind oder eine ähnliche Funktion besaßen. Der vorliegende Bericht analysiert einige der Befunde, die in thematisch geordneten Kapiteln festgehalten sind.

Ein Großteil der Analyse wurde mit Hilfe eines Geo-Informationssystems durchgeführt. Dadurch konnten die kartierten archäologischen Befunde in den Kontext der Landschaft und anderer geografischer Informationen wie geologische, topographische und historische Angaben eingebettet werden, was die Interpretation der Befunde erleichterte und die Aufnahme neuer Klassifikationskategorien ermöglichte. Anschließend wurden ausführliche

Analysen zu neolithischen Strukturen im Kontext der Umgebung durchgeführt und Bewertungen zur prähistorischen und römischen Besiedlung in Essex vorgenommen.

Zahlreiche Aspekte der mittelalterlichen Landschaft in Essex sind auch heute noch vorhanden. Einige davon sind im EHER-Verzeichnis erfasst, zum Beispiel denkmalgeschützte Bauwerke, Feldsysteme, Kirchen und Grabenanlagen, andere wurden im Rahmen des NMP kartiert. Durch das NMP wurde auch der seit dem Zweiten Weltkrieg aufgetretene Verlust an Flurbegrenzungen innerhalb der Grafschaft aufgezeichnet. In Verbindung mit dem Siedlungsmuster konnte so die Analyse der mittelalterlichen Landschaft abgeschlossen werden.

Die Grafschaft Essex besitzt eine lange, abwechslungsreiche Küste. Im Rahmen des NMP wurden zahlreiche neue Küstenstrukturen, darunter Fischwehre, auf die Salzgewinnung zurückgehende rote Bodenerhebungen (»red hills«) sowie Austernbänke erfasst, die Aufschluss über die Nutzung der an der Küste vorhandenen Ressourcen geben. Ohne das NMP wären viele dieser Stätten nicht verzeichnet worden und in einigen Fällen ohne Schutz geblieben. Durch die Kartierung gelang es, einige Fischwehre der Verwaltung zuzuführen und unter Denkmalschutz zu stellen.

Schließlich befasst sich der Bericht auch noch mit den verschiedenen Baudenkmalern aus dem Zweiten Weltkrieg, von denen viele im Rahmen des NMP zum ersten Mal erfasst und kartiert wurden. Diese Stätten sind häufig nur durch Luftaufnahmen belegt. Die Untersuchung von Fotos der Royal Air Force und anderen zeitgenössischen Fotografien erhöhte das Verständnis über die Verteidigungsanlagen innerhalb der Grafschaft.

(Übersetzung: Gerlinde Krug)



Figure 1.1 Location of Essex

Chapter 1. Introduction

by Caroline Ingle and Helen Saunders

I. The Essex Mapping Project

Introduction

Not all the features which make up the historic environment are easily classifiable but...they need to be recorded in a more general way to assist future more detailed survey and investigation (Bewley 2001, 81).

The Essex Mapping Project was carried out between 1993 and 2003 by the Historic Environment Branch of Essex County Council as part of the English Heritage (formerly Royal Commission on the Historical Monuments of England) National Mapping Programme of Archaeological Recording in England (NMP). The aim of NMP is 'to enhance our understanding about past human settlement, by providing primary information and syntheses for all archaeological sites and landscapes (visible on aerial photographs) from the Neolithic period to the twentieth century' (Bewley 2001, 78).

This chapter outlines the background to and methodology of the National Mapping Programme and the Essex Mapping Project.

National Mapping Programme (NMP)

The establishment of the National Mapping Programme (NMP), in 1992, was initially prompted by the need for the English Heritage Monuments Protection Programme (MPP) to be able to address cropmark sites, to enable the identification of features visible in this form which would merit preservation and protection (Bewley 2001). Three pilot classification projects were carried out in 1988, funded by English Heritage for the MPP: Thames Valley (Fenner and Dyer 1994); Kent (Edis *et al.* 1989) and Hertfordshire (Fenner 1992). While two of these early pilot projects only recorded cropmark sites (Kent and Hertfordshire), the Thames Valley project was the first to include earthwork sites. These projects were aimed at assessing the methodology and resource requirement for mapping and recording sites visible as cropmarks and soilmarks to standard specifications at a scale of 1:10,000. A fourth pilot project was initiated in 1989 to examine the same questions for an upland environment in the Yorkshire Dales (Horne and Macleod 1995). The success of these projects led to the creation of a National Mapping Programme (NMP) for England (Bewley 1998), aimed at providing an inclusive and standardised approach to mapping archaeological landscapes of all periods, over extensive survey areas.

The principles and procedures for recording have been presented by Edis *et al.* (1989). In summary, the NMP draws on all the information from existing records and utilises all easily accessible aerial photographs (vertical and oblique), whilst the relatively small scale of mapping has the advantage of speed of plotting and of placing sites into their landscape context. The standard mapping scale (1:10,000) and recording system are aimed at ensuring consistency in site descriptions and interpretations to facilitate analysis at not only local, but also regional and national level. The NMP is being carried out as a series of

individual projects, initially on largely administrative areas, but more recently focusing on discrete geographical units.

Acquisition of new information is one aim of NMP, to improve coverage of both local and national records, and in this aim it has achieved significant success. English Heritage, reporting on their website on results to 2006 (when 33.4% of the country had been completed (English Heritage 2003)), noted that some 50% of the sites being mapped had not previously been recorded (either on the National Monument Record (NMR) or on local Historic Environment Records (HERs)). However, the project is not intended solely as a data gathering exercise. Morphological classification attempts to understand classes of sites in a landscape context and to explore and analyse their distributions. As part of the wider record the data forms a significant contribution to our understanding of the historic environment and provides part of the information base for day to day management of the resource. In providing more consistently derived datasets, the results are facilitating comparative studies of classes or other groupings of monuments, as was demonstrated by studies of Romano-British settlement in Lincolnshire (Jones 1998a), the Salisbury Plain Training Area (Crutchley 2001) and the Trent Valley (Deegan forthcoming). Completion of mapping projects adjacent to Essex will enable syntheses and comparisons over wider areas in order to help both address and define research priorities in the region.

Essex aerial survey

Essex, whilst rich in archaeological remains of all periods, has few visible prehistoric earthwork monuments, a consequence of both a long history of cereal cultivation and a lack of hard stone for building. Conversely, over much of the county, geology and current land use is conducive to cropmark formation, as is the increasingly dry climate. In addition to mineral extraction and urban development, intensive agriculture in particular remains both a constant threat to the archaeological remains and a means of identification of sites as cropmarks. Since the establishment of the county archaeological service in the early 1970s, aerial survey has made a significant contribution to increased knowledge and perception of prehistoric Essex (and much of eastern England), enabling identification and recording of extensive cropmark evidence for settlements, field systems and monuments.

Background to the Essex Mapping Project

An aerial photographic archive has been developed at Essex County Council since the establishment of the County Sites and Monuments Record (SMR) in 1972, together with early recognition of the fact that cropmarks formed by far the largest source of unpublished archaeological evidence for the county. Many of the cropmark sites in Essex were first discovered during regular flights by Cambridge University Collection of Aerial Photographs (CUCAP), between the 1950s and

1970s (Strachan 1998a). Along with the acquisition of material from the national archives (the NMR and CUCAP), the Essex Historic Environment Record (EHER), developed from the SMR, includes photography from the County Council's own programme of regular archaeological reconnaissance carried out since 1974 with funding support from English Heritage (formerly the RCHME). In addition, a number of local fliers were involved in actively recording archaeology prior to the County Council's programme, but were also particularly active in the 1970s and 1980s, contributing a significant amount of photographic material to the record.

Aerial reconnaissance targeted areas under threat from development and mineral extraction, such as the Blackwater and Chelmer valleys, but new discoveries were also made on the heavier soils of the boulder clays, including an active flying programme to record sites during the extensive excavations at Stansted Airport, as well as inter-tidal sites (Bennett and Ingle 1992; Strachan 1995a; Strachan 1996a).

A programme of sketch plotting of archaeological sites had been implemented (albeit not continuously) since 1979, in order to make the information easily available through the EHER. The sketch plotting mostly targeted cropmarks and was used to produce film overlays for the 1:10,560 OS maps, used in the EHER and these cropmark plots remained in use until the commencement of the Essex NMP.

Analysis and synthesis of aerial photographic evidence

Reports on discoveries of sites from aerial photography and their interpretations have formed a significant element of local journals, as well as analysis in excavation reports. Comparative studies of cropmark sites in Essex were published for Thurrock (Babbige 1972), and as part of a county archaeology survey (Buckley 1980). An assessment of Essex cropmark enclosures, looking at particular classes of site across the county was published by Priddy and Buckley (1987). Using information from all excavated enclosures in the county, it compared these to a selection of unexcavated examples representative of the types known in Essex, to assess the extent to which the cropmark examples could be interpreted. The study highlighted the diversity of enclosures to be found, and suggested that correlation of size and shape with date and function was more straightforward for some types than others; though one class cited, circular enclosures, has thrown up a few surprises in more recent studies (see below).

Other studies have used aerial photography as part of wider archaeological assessments of blocks of landscape within the county. They include the archaeology and environment in South Essex (Wilkinson and Murphy 1988), the lower Blackwater estuary (Wallis and Waughman 1998) and Ardleigh (Brown 1999). The Blackwater study encompassed a number of sites that had been identified from cropmarks and were excavated in advance of gravel extraction, in an area that contains some of the largest and most complex concentrations of cropmarks in Essex. Others have focused on particular classes of monument, for example, the cropmark enclosures project, which investigated circular cropmark enclosures that were thought to be possible Neolithic henge monuments, through excavation and field walking (Brown and Germany 2002).

The Essex Mapping Project: background and methodology

Essex, with its history of reconnaissance and mapping, was selected in 1993 as one of the first NMP projects. Despite the long history of the use of aerial photography in the county, this project presented the first opportunity systematically to assess archive vertical and specialist oblique aerial photographs. In accordance with the NMP methodology, the Essex Mapping Project plotted, at a scale of 1:10,000, archaeological features visible on both oblique and vertical aerial photographs.

Photographic sources

A quantification assessment for the county (Ingle 1993a) identified far more photographic material than was feasible to include in the project, encompassing commercial photography and surveys by the Environment Agency. Focusing on specialist material and the most readily accessible sources, the project drew on aerial photography from the NMR, CUCAP and the EHER, which includes photographs from reconnaissance by ECC, as well as a number of other local fliers, notably Ida McMaster, Edward Clack and Richard Farrands (Strachan 1998a). These sources include both specialist oblique photography and vertical photographs taken for non-archaeological survey purposes, including many RAF vertical prints taken in the 1940s and 1950s (now held by the NMR), providing a valuable resource pre-dating most of the specialist aerial reconnaissance in the county. Together these provide wide geographical and chronological coverage for the county.

The vertical photography from the 1940s to 1960s proved particularly valuable in recording a number of monument classes including Second World War defences, duck decoy ponds and oyster pits, which have suffered significant loss over the past fifty years (Chapter 5, Section VI and Chapter 6). For example, many of the duck decoys in Essex were destroyed by reclamation and conversion of land to arable farming in the immediate post-war period, and whilst some have been recorded as cropmark sites during recent aerial survey, many more have been plotted by NMP from vertical aerial photographs of the 1940s and 1950s.

The majority of the prints used in the mapping project were black and white, although the sources used also included colour (recent specialist photographs in particular) and a limited number of infra-red. Many sites are visible on a combination of all of these types, and the use of a selection can provide added confidence in identification and interpretation of features. For a few classes of monument, particular types of photography may be of greater benefit and this has been particularly the case with the red hills, the remains of prehistoric and Roman salt working (Chapter 5, Section III), for which aerial survey has demonstrated the effectiveness of colour photography taken soon after the autumn ploughing (Strachan 1995b).

Geographical extent

The Essex Mapping Project covered the county of Essex as it was defined in 1993 (Fig. 1.1), thus including the two Unitary Authorities of Thurrock and Southend created by Local Government Reorganisation in 1998, but did not include the six Boroughs that became part of Greater London. The project encompassed 190 Ordnance Survey

1:10,000 scale quarter sheets covering the county and totalling 4,250 square kilometres. Of the total area of the county, approximately 20% is currently urban fringe, 5% woodland or used for leisure purposes, and 73% under agriculture (Ingle and Saunders 2003).

Archaeological scope

The mapping encompassed all features up to the terminal NMR recording date of 1945, and in terms of form, all features visible on aerial photographs as cropmarks, soilmarks, earthworks or stoneworks. It specifically excluded roofed buildings, and field boundaries depicted on the OS 1st edition maps of the 1880s (Ingle 1993b; Ingle 1994). Some modifications were agreed during the course of the project to meet local needs, for example it was decided to include the timber post-alignments and fish traps visible in the estuaries (Chapter 5) even though these did not correspond to any of the specified forms.

Methodology

The methodology and procedures for transcription and recording (as summarised in the original Project Specification (Ingle 1993b; 1994) and in the project Management Report (Ingle and Saunders 2003)) were developed by English Heritage for the NMP pilot surveys. The mapping conventions devised by English Heritage for NMP enable banks, ditches and a variety of other features to be depicted consistently on the transcribed 1:10,000 overlays (RCHME 1994).

The overlays were produced at a scale of 1:10,000 using manual transcription methods, supplemented with the use of the AERIAL 5.1 program, developed by John Haigh of the Department of Mathematics at the University of Bradford (Haigh 1993; 1999). The use of AERIAL 5.1 increased the accuracy and speed of plotting complex areas. Features have been sketch plotted to a level of accuracy of 5–15m. The inked overlays have subsequently been scanned as raster plots for incorporation as a layer into the County Council's GIS as part of the EHER.

The mapped features have been recorded onto the MORPH2 database, a computerised database developed by the RCHME Air Photo Unit between 1987 and 1989 (Edis *et al.* 1989) and subsequently applied to NMP. Whilst MORPH2 allowed for recording an interpretation of monument class, function and date, the key benefit of the system is that it also records more objective characteristics relating to size, form, layout and location of features. For each individual mapped feature, the database records location information (administrative and topographical), interpretation of date and function (with some assessment of interpreter's confidence of these), and morphological data under broad classification of enclosure, linear feature, macula or industrial complex. A hierarchical system of group and record numbers indicates perceived chronological and functional relationships between adjacent features. Systematic recording in this way enables analysis and assessment on the basis of morphology alone, and comparison with similar sites of known date, which can assist in the interpretation of features not yet subject to other forms of investigation.

Results/outputs

The Essex Mapping Project has mapped and recorded over 10,700 individual features in the MORPH2 database.

The vast majority of these (over 89%) were visible as cropmarks or soilmarks. The absence of stonework in a county devoid of hard stone is not surprising, nor is the relatively small percentage of surviving earthworks, given the extent of arable cultivation. The NMP map overlays and MORPH2 database now form part of the EHER and the information is available to all users of the record. Although they can be displayed at all scales, these cannot be considered accurate for use at a scale less than 1:10,000. Elsewhere, more recent NMP projects now produce a full vector copy of the plots for digital use. Within Essex this conversion to vector data may be possible in the future, which would greatly aid the functionality of the data (thus ensuring that good quality plots could be produced for consultations and development control work, without the problems of pixellation encountered at present), but viewing the data at a scale less than 1:10,000 would still be subject to the same inaccuracies as the current raster plots. Features in adjacent counties within the border sheets were also mapped although these were not included on the MORPH2 database.

NMP recording has encompassed classes of monuments that had not previously been systematically recorded on the EHER. These include oyster pits and fish traps, whilst analysis of historical photography and continued aerial survey is also demonstrating just how much has been lost (and is being lost) to coastal erosion and loss of the coastal marshes. In addition to the mapped sites, examination of photographs also enabled identification of sites that lay outside the remit of the Mapping Project, for example, Second World War pillboxes; although these sites were not mapped they were added to the EHER.

More accurate plotting of known features is also facilitating reassessment and reinterpretation of a number of features. Identification (and removal from the record) of spurious or non-archaeological features has also been possible through assessment of archive photography from several years. This is of significant value in using the EHER data, not least for development control work.

Detailed morphological recording of individual features will enable targeted searches by users of the EHER for a range of purposes, giving greater scope for searches than the current EHER word lists offer. This should be facilitated with the integration of MORPH2 data and the EHER through use of the additional Exegesis software module. Whilst each entry will have the interpreter's views on date and function, analysis can be carried out on morphological detail only.

At present the overlays and database remain a point in time survey, as no updating has yet taken place, but to achieve maximum benefit a programme of updating and revision is needed, both to add new features that are found by continuing aerial survey and to refine interpretation and dating as sites are subject to field investigation.

Biases within reconnaissance

No single archaeological survey technique will provide a fully comprehensive picture of any area, and analysis of the results needs to take into account the particular limitations of the information source, both arising from natural and human factors. As Wilson (1979, 36) observed, the development of cropmarks in East Anglia can 'furnish us with a remarkable window on the

prehistoric and later landscapes, but it is a window with a disappointingly limited view' and it is therefore important to define the limits. Inevitably, as a record of one aspect of the historic environment, there will be biases in the NMP data, although these will not necessarily be consistent across the county or through the archaeological record. They include the suitability of soils for the development of cropmarks, land use, climate, flying restrictions and identified research priorities, not to mention the need for a surveyor to be in the right place at the right time. The following section will assess these various factors in order better to understand the potential contribution of the NMP results to our understanding of the historic environment of the county.

Nature of archaeological features

Some categories and periods of sites are less well represented in the archaeological record than others, regardless of the volume of survey carried out. The Saxon period in Essex is very poorly represented, as is settlement evidence from the early prehistoric. Whilst some factors might be compensated for by use of photography from a range of sources and of various dates, other factors will always limit the available evidence in certain areas or for certain classes of monument.

As a consequence of other factors, results are also biased towards certain periods or at least for certain categories of features. Inevitably, given the form of recording, size is a factor in visibility of features. Larger features are more readily visible than small, and enclosed settlements are more visible than unenclosed; the same is true for Bronze Age barrow burials compared to inhumation graves without associated barrows. In the Blackwater estuary (Wallis and Waughman 1998) during the late Bronze Age, evidence points to fairly dense occupation, though often in open settlements, within a planned landscape. Though these features are harder to identify on aerial photographs than many other classes of monument, there are suggestions that the Bronze Age and early Iron Age landscape in this area was hedged, given the absence of evidence for ditched enclosure. Only in the middle Iron Age, when evidence points to settlement nucleation and trend towards enclosed settlements, are these features developed in a form more readily identified from the air (Saunders, Chapter 3, Section IV).

For other areas of the county, the absence of features of a certain date is (on current evidence from a range of sources) likely to reflect their absence (though in part a circular argument as these conclusions also remain hypotheses to be proved or otherwise). For example, current evidence indicates that although the areas between the Stour and Colne, together with southern and the far north-west of Essex were a focus for Neolithic occupation, there is no evidence that the Boulder Clay plateau was occupied before the middle Bronze Age (Brown and Murphy 1997, 12–16). However, aerial reconnaissance was one identified research strategy for further work to confirm or challenge this hypothesis. There is a general dearth of sites in south Essex away from the coastal terraces, although few sites are known from the London Clay areas.

Reconnaissance programmes

Visibility of individual sites (or site types) can depend on both the time of year and time of day that reconnaissance

occurs. Reconnaissance for specialist archaeological oblique photography is focused with regard to timing flights for optimum potential for visibility of archaeological sites, although clearly the nature of sites recorded in any flight will also depend on other factors (Chapter 1, Land use) and economic and practical constraints limit extent of survey. Conversely, not all sites are at their most visible at the same time, and flights to record cropmarks need to be scheduled to coincide with optimum timing for ripening of different crops, which in adjacent fields may occur some weeks apart, or for visibility of sites in other ways, for example, as soilmarks. For some of the coastal sites, the fish weirs in particular (Chapter 5, Section IV) timing with regard to the tide is the most crucial aspect, as many of these are visible only at the lowest tides.

The programming of flights for the vertical surveys has generally been dictated by factors other than the requirements for archaeological recording, although vertical sorties are more likely to give systematic geographical coverage. Repeated survey does build up a more comprehensive picture and provides a more reliable indication of the likely visibility of features in an area and the use of archive photography from numerous sources and years does help address this through NMP. For some site types, what might be considered less desirable weather traits can actually assist in the identification of features, for example the benefits of light snow and (limited) waterlogging for revealing low earthwork features. The extent to which features are visible is thus, to some degree, a matter of luck (or not) as regards time of year and weather conditions.

For many of the Second World War features (Chapter 6), the timing of photography relative to the date of construction and use of the features being recorded has been valuable. The photography of the 1940s (and to some extent 1950s) recorded structures while in use, before many of them were removed. For other types of sites, these RAF photographs have also been valuable in recording sites that have since been destroyed by subsequent development, or denuded by continued ploughing.

Land use

One of the most crucial aspects that affects how and what is visible on aerial photography is the physical and man-made landscape (Chapter 1, Section II) and this is essential in understanding the mapped features.

For cropmarks in particular, which are the predominant form that can be seen from the air in Essex, it is little surprise that recorded distributions largely reflect the underlying geology. Soil types developed on the Boulder Clay do not so readily lead to the development of cropmarks, and in consequence sites recorded on these soils tend to be both fewer in number and more scattered than those developed on the sands and gravels. This has to some extent been addressed through NMP with the use of vertical photography that has more general coverage.

Within these broader geological areas, the detailed soil types are important for cropmark development. The character of glacial deposits can have a significant effect on soils and hence cropmark development and this has been discussed by number of authors including Riley (1979). The effects of geology can be subtle, especially over the glacial deposits whose character can change rapidly over relatively short distances. Riley (1983, 72)

noted: 'the relation between cropmarks and soils can rarely be explained simply' and cropmark development is highly dependent on the interaction between the type and the depth of soils, geology, climate and the type of crop.

Publication of results from the Lincolnshire NMP (Bewley 1998) included a detailed assessment of the nature and extent of cropmarks recorded relative to soil types (Carter 1998). It concluded that cropmark features can be recorded over almost the entire county, but there are several areas where conditions would appear to be more favourable for cropmark development. This could be ascribed to a lack of specialist survey, a consequence of restricted airspace around military airfields, or may reflect a more genuine absence of settlement (Carter, A 1998, 102).

The physical landscape contributes to the pattern of visible sites in a number of ways, not just the likelihood of cropmarks being formed. It has in turn influenced land use and the extent to which sites survive and are visible from the air. The distribution of features appearing on aerial photography as earthworks can be partly understood by the geology, with the densest areas on the Boulder Clay plateau. A significant proportion of these sites comprise moats and water meadows (Chapter 4), the former occurring predominantly on the interfluvies and the latter in the river valleys, which is more likely to be a case of geology influencing distribution than survival or identification.

One of the most self-evident factors is the effect of woodland on visibility. Wooded areas obviously have a low potential for recording from the air, although discovery is not impossible. Where this has been possible, it tends to involve the larger features, for example, the route of an anti-tank ditch was tracked through a line of felled trees in Epping Forest. Conversely, historically wooded areas have a greater chance of preserving earthworks.

The use of LIDAR over wooded areas elsewhere in the country has demonstrated that these earthworks can be detected successfully, but this was beyond the scope of the NMP and maybe an area for a future research project.

Research priorities

Over the years perceptions of those aspects of archaeology which can usefully be surveyed from the air have changed. For example, in the early years of the Council's survey, attention was directed to the cropmarks on the sands and gravels and it was not considered worthwhile to survey Boulder Clay areas. This was partly a decision based on the likelihood of cropmarks developing on these geologies and partly on what, in archaeological terms was (or was not) thought to exist there. As our understanding of the settlement and exploitation of these areas has changed, and the potential for sites to be recorded has been recognised, so the technique of aerial survey has been more widely applied to this part of the county. The results of the quantitative assessment demonstrated that specialist aerial photographic coverage is very much concentrated on the sands and gravels of the county, with a consequent bias towards the south and east.

Restrictions on airspace are a further limiting factor to research through aerial photography. There is increasing difficulty in carrying out reconnaissance in the expanding airspace of Stansted Airport, and around Southend Airport, whilst in the south-east, military use of Foulness

is similarly restrictive. It is crucial that these areas are not simply ignored because they are problematic to survey. The NMP and more recently the Online Aerial Reconnaissance Project (Saunders 2008) have shown that these restricted areas were occupied and utilised in the past and it is important that the aerial reconnaissance continues as a priority within these areas.

Distribution of mapped features

Cropmarks

Clearly the distribution of cropmark sites mapped through NMP (Fig. 1.2) reflects a combination of the factors discussed above. These patterns are particularly evident when the distributions of cropmarks are viewed without the field boundary records (which account for over 3000 of the total cropmark records).

There are remarkably high concentrations of cropmarks on the Tendring plateau east of Colchester, in areas of Thurrock, along the Chelmer and Blackwater river valleys, and significant densities in the lower Stour Valley, all of which are predominantly the areas of sands and gravels. The NMP plots reinforce the distributions of sites from earlier reconnaissance mapping and from excavations in these areas, which have uncovered a wealth of multi-period, multi-function sites of prehistoric to Roman date, such as those at Ardleigh (Brown 1999), Mucking (Clarke 1993) and Chigborough and Slough House Farms (Wallis and Waughman 1998) that will be discussed in Chapter 3. There are high concentrations of early prehistoric ritual monuments along the major river valleys, with groups of sites around the Dengie peninsula and Thurrock. How these sites fitted into a prehistoric landscape and how they related to each other has been debated. The NMP mapping has enabled the relationships between some of these monuments to be examined in Chapter 2.

There are also a significant number of sites on the Boulder Clays, some recorded for the first time by the NMP, especially along the lower valleys; this is in part a result of focused reconnaissance in the late 1980s and 1990s, which has led to an increase in the number of cropmark sites recorded in these areas. On the Boulder Clay, recorded sites are more widely scattered, more likely to be isolated monuments or small groups of features. Recent work has highlighted the level of domestic settlement in the Iron Age and Roman periods (especially in the Stansted area (Havis and Brooks 2004)) on at least parts of the Boulder Clay through excavation.

While the distribution of Roman sites was similar to the prehistoric period, with many of the sites located in river valleys on the lighter soils, there is a proportion of sites allocated to the Roman period that are located on the Boulder Clay areas, with small clusters around the Roman towns of Colchester, Chelmsford and Great Chesterford. The distribution of recorded sites on the Boulder Clay also reflects significant amount of field boundary loss since the Second World War (Fig. 1.2), recorded as cropmark features (Chapter 4). The clusters of field boundaries can be seen in Figure 1.2 and it is evident that the main concentrations are often in areas where there are very few other cropmark sites, such as the Roding Valley. Although their loss is well documented, there is greater uncertainty of their antiquity, as many of the field systems could be of medieval or earlier date.



Figure 1.2 Distribution of crop and soil mark sites mapped as part of the NMP



Figure 1.3 Distribution of earthwork sites mapped as part of the NMP

Earthworks

The distribution of mapped earthwork sites is widespread across the county (Fig. 1.3). There are several differences in the areas of concentration, from those of the cropmarks, that can be explained by different classes (and dates) of monuments. In particular, medieval moats are mainly concentrated in the north-west of the county (mostly on the Boulder Clay plateau between river valleys), while duck decoys and oyster pits are found along the main estuaries (Chapter 5), with Second World War defensive features along inland stop-lines and focused on specific locations along the coast, for example, Southend and Hamford Water (Chapter 6).

Conclusions

Given the range of factors affecting the visibility of archaeological features on aerial photographs it would not be appropriate to attempt a broad overview of the county based solely on the results of the project. However, aerial photographic recording does make a valuable contribution to certain aspects, particularly the monitoring and recording of sites in inaccessible areas such as the coastal marshes and the ability for rapid coverage of large areas that does ensure that sites and landscape zones can be re-visited on a regular basis. This, along with the fact that certain site types — particularly those enclosed or consisting of ditched features — are conducive to cropmark formation, makes aerial photography an extremely important primary source for archaeological recording.

Ongoing aerial reconnaissance within the county, programmes of excavation, field survey and other projects have all added considerably to the understanding of cropmark sites and the number of excavated examples against which these cropmark sites can be compared is increasing. It is timely to reassess many of these as yet undated features in order to gain some possible interpretation of their date and function, and to guide further more focused research. It is equally true that for particular periods, monument types and areas, aerial survey results can make a particularly valuable contribution to study.

The chapters in this report deal with selected themes or geographical areas that have been highlighted through the mapping as being important areas of research and where the NMP results have produced particularly valuable information. Though broadly chronological, the chapters make no attempt to give an overall assessment of historical development of the county in these periods, but examine certain site types within a landscape context, which has not been possible before.

II. The physical landscape of Essex

Of the many factors influencing the visibility of archaeological features from the air, the physical nature is one of the most fundamental, itself partly dictating current and historic land use.

Geology

Whilst the solid geology of the county is relatively straightforward, at the surface the situation is complex, a result of the effects of recent glaciation and the varied characteristics of the drift deposits (Lucy 1999; Allen and Sturdy 1980).

Essentially Essex occupies part of a trough-shaped syncline, the London basin, which is bounded by Chalk and filled with Tertiary and more recent deposits. The Chalk, of Cretaceous age, crops out in two areas; in the south-west in the Thurrock, Purfleet and Grays area, and in the extreme north-west of the county around Saffron Walden, where it forms part of the downland landscape of the Chilterns to the south-west and the Gog Magog Hills of Cambridgeshire to the north (Hunter 1999, 1).

The chalk is overlain by deposits of Tertiary age. Stratigraphically above the chalk are the fine grained Thanet Beds and generally coarser and more pebbly Woolwich and Reading Beds, but these are only seen at the surface in Thurrock. Elsewhere, London Clay, a stiff dark clay, overlies the chalk over much of the county, although to a large extent it is covered by later glacial drift, occurring at the surface mainly in the south and east of the county. The overlying sandy Claygate and Bagshot Beds would once have covered the whole region, but have been reduced by erosion to isolated patches on hilltops in central Essex.

The glaciations of the Quaternary period added much of the complexity to the county's geology. The actions of the ice sheets resulted in the migration of the Thames and Medway rivers, the formation of the present river drainage system and deposition of the varied glacial deposits. Extensive deposits of sands and gravels (Fig. 1.4), which overlie the solid geology of Essex are derived from the former courses of the Thames and Medway rivers, forming several distinct groups of deposits. The Kesgrave Sands and Gravels represents the former bed of the Thames as it flowed to the north of London, through north Essex, Suffolk and Norfolk and out across what is now the southern North Sea to become a tributary of the Rhine. This proto-Thames appears to have migrated progressively south-eastwards through northern Essex during the Quaternary period, settling initially into the mid-Essex Depression through Chelmsford and Colchester before the final diversion by the Anglian ice sheet into its modern course (Bridgland 1994, 6–8). Largely covered by glacial till, subsequent erosion has exposed these deposits in some of the main river valleys of the Boulder Clay plateau.

Originally the River Medway flowed north across east Essex to join the Thames near Clacton, leaving behind a ribbon of distinctive gravel (known as the High-level East Essex Gravels), which can be found between Burnham-on-Crouch and Bradwell-on-Sea deposited at the same time as the deposition of the Kesgrave Sands and Gravels (Lucy 1999). Following its diversion, the Thames combined with the Medway in the late stage of the Anglian to create a channel from Southend through Asheldham and Cudmore Grove to Clacton. This filled with deposits during the Hoxnian and the channel moved progressively eastwards leaving beds of gravel, known as the Low-level East Essex Gravels, seen at Southchurch, Rochford, Shoeburyness, Barling and across the Dengie peninsula (Hunter 1999, 5).

A fourth group of deposits are those of the Lower Thames Terraces laid down following the diversion of the river, and can be found at Little Thurrock, Orsett Heath and Mucking (Hunter 1999, 5). The modern (post-diversion) Thames has numerous bench-like terraces on either side of the valley, the oldest being at the highest elevation. There were also other northward-flowing tributaries of the early Thames, which have left as



Figure 1.4 Solid and drift geology of Essex

evidence patches of gravel that are found on the tops of the hills in south Essex, such as the Langdon Hills, Warley and High Beach in Epping Forest.

The most extensive glacial deposit is the Till, a substantial thickness of boulder clay consisting of poorly sorted clays, silts and sands with many erratics deposited by the Anglian ice sheets over most of the north-west third of the county, which overlies much of the old Thames gravels. At its furthest extent, the ice sheet reached the line of hills formed of Bagshot and Claygate Beds, penetrating at points to leave deposits of till and glacial outwash (Hunter 1999, 7), comprising partly sorted glaciofluvial sands and gravels. During the final glacial stage, the Devensian, Essex lay beyond the extent of the ice sheet, but permafrost conditions left a legacy of ice wedge polygons that are revealed by cropmarks. Beyond the limits of the ice, in the periglacial zone, thin unsorted Head deposits were formed locally, whilst silt and sand blown from this relatively bare region have been redeposited as aeolian silt and sand.

Alluvium and peat of Recent Holocene age are widespread in river valleys and along the coast. The position of the Essex coastline has changed extensively during post-Glacial times. In general sea levels have risen as the Arctic ice has melted and in response to the isostatic sinking of southern England and localised depression of the southern North Sea floor between Essex and Europe (Allen and Sturdy 1980). This is of particular relevance for the analysis of coastal features and will be discussed further in Chapter 5.

Soils

Over much of the county the soils in Essex are derived from the glacial drift deposits, which are often thin, rarely more than 50m thick, and of variable nature, including Head, glaciofluvial and river terrace deposits, Aeolian drift, alluvium, lacustrine sediments and peat. In consequence the most significant characteristic of Essex soils is their great variety, in texture and composition, both over the county as a whole and within small distances (Scarfe 1942; Hodge *et al.* 1984). Some areas, mainly London Clay, were not covered in later drift deposits. Along the coast this in turn has been overlain by alluvial deposits.

Topography

Essex is situated on one of the major estuarine embayments of southern England, and its deeply indented coastline presents a marked contrast to that of neighbouring Kent and Suffolk. The relatively soft geology gives rise to a landscape of low relief, generally rising from the south and east (Fig. 1.5), but it is only on the chalk in the north-west of the county that the land attains elevations of over 120m above sea level (Allen and Sturdy 1980). The gradual rise is interrupted by a series of hills and ridges south and south-east of Chelmsford, the highest being Danbury at a little over 110m. The areas underlain by boulder clay lie mainly between 60m and 120m and this area is predominantly dissected and drained by south-easterly flowing rivers (Fig. 1.5), the Stort, Roding, Chelmer, Blackwater, Colne and Stour and their tributaries. In the far north-west the Cam runs northwards, whilst in the south-west the Roding and Mar dyke flow south and west to the Thames. Through the gently undulating southern part of the county the Crouch flows

due east, being joined by the Roach to form an estuary complex with low-lying Wallasea, Potton and Foulness Islands (Hunter 1999, 16).

Large areas of coastal Essex are below 30m and essentially consist of extensive marshland areas, some of which have been reclaimed relatively recently. The coastline has a nearly complete fringe of marshland, but between the Colne and Stour estuaries and at Southend there are short stretches of cliff. The Essex coastline is broken by the estuaries of the Colne, Blackwater and Crouch and shelters many small islands.

Landscape regions

On the basis of its geology, soils and topography a number of broad landscape regions can be identified (Fig. 1.6), which to some extent reflect their economic potential and land use. Given that these, in turn, have influenced their historical landscape development, the nature of sites that may have existed and the likelihood of these being visible from the air, an appreciation of this general landscape character is important in analysis and interpretation of mapped sites in considering the results of NMP. The following discussion uses a combination of zones identified by different authors (Allen and Sturdy 1980; Hunter 1999), which are most relevant to the present analysis of the NMP results.

Coastal marshland

Much of the Essex coast is low-lying and historically bounded by extensive areas of salt marsh (Fig. 1.6). Until the end of the 17th century, the coastal marshlands were an important element in the rural economy for sheep pasturage, for which they had long been valued. The sea walls protected pasture from flooding but otherwise had only a limited impact on the character of the coastal areas for many centuries. In the post-medieval period, marshes were also of value for other elements of the economy, the salt marshes beyond the sea wall for oyster cultivation and the secluded grazing marshes for site of decoy ponds (Chapter 5).

The character of the marshes has changed considerably in the most recent centuries, as land was reclaimed and drained for arable agriculture, particularly from the 18th–19th centuries. Today the traditional grazing marshes are mostly arable, with saltmarsh, mudflats and shingle beyond the sea walls, which extend a distance of some 300 miles around the Essex coastline. The reclaimed areas are characterised by heavy soils in clayey alluvium and the area is still at risk from sea flooding, though with the development of better sea defences, less so than in the past. Within the eastern part of the Dengie peninsula runs a distinctive north-east to south-west ridge, along which there is a significant concentration of archaeological sites (discussed further in Chapters 2 and 3), as this would have formed a valued dryland location at a time when the surrounding land was marsh.

Coastal change has therefore had a marked impact on the archaeological resource. The early prehistoric shoreline lay some distance seaward of the present coastline and many former dryland sites in the coastal zone were submerged and buried by alluvium as a result of post-glacial sea level rise. Within reclaimed areas, evidence for earlier occupation, if present, may be buried at considerable depth below marsh deposits although the

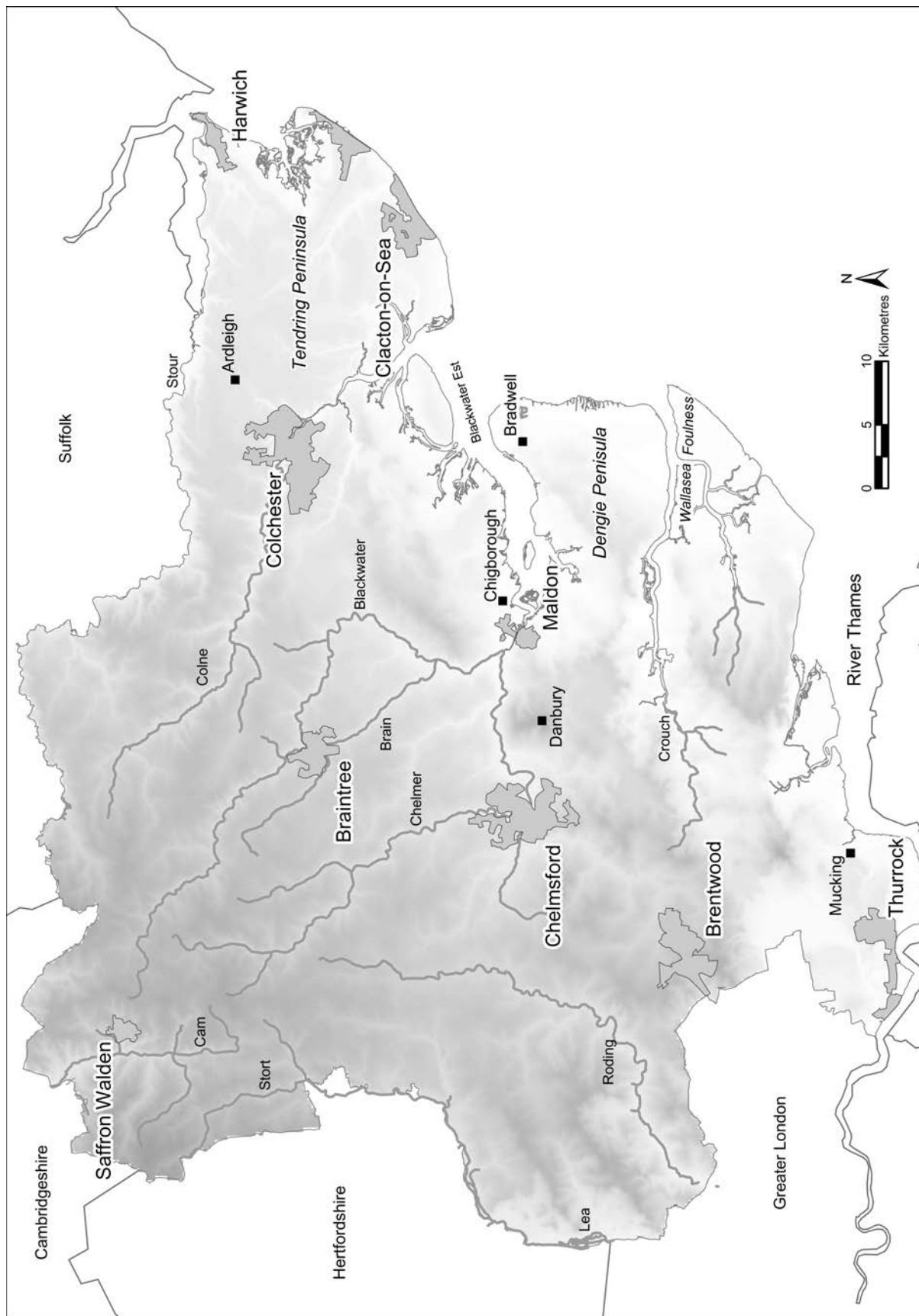


Figure 1.5 Topography of Essex and places mentioned in the text

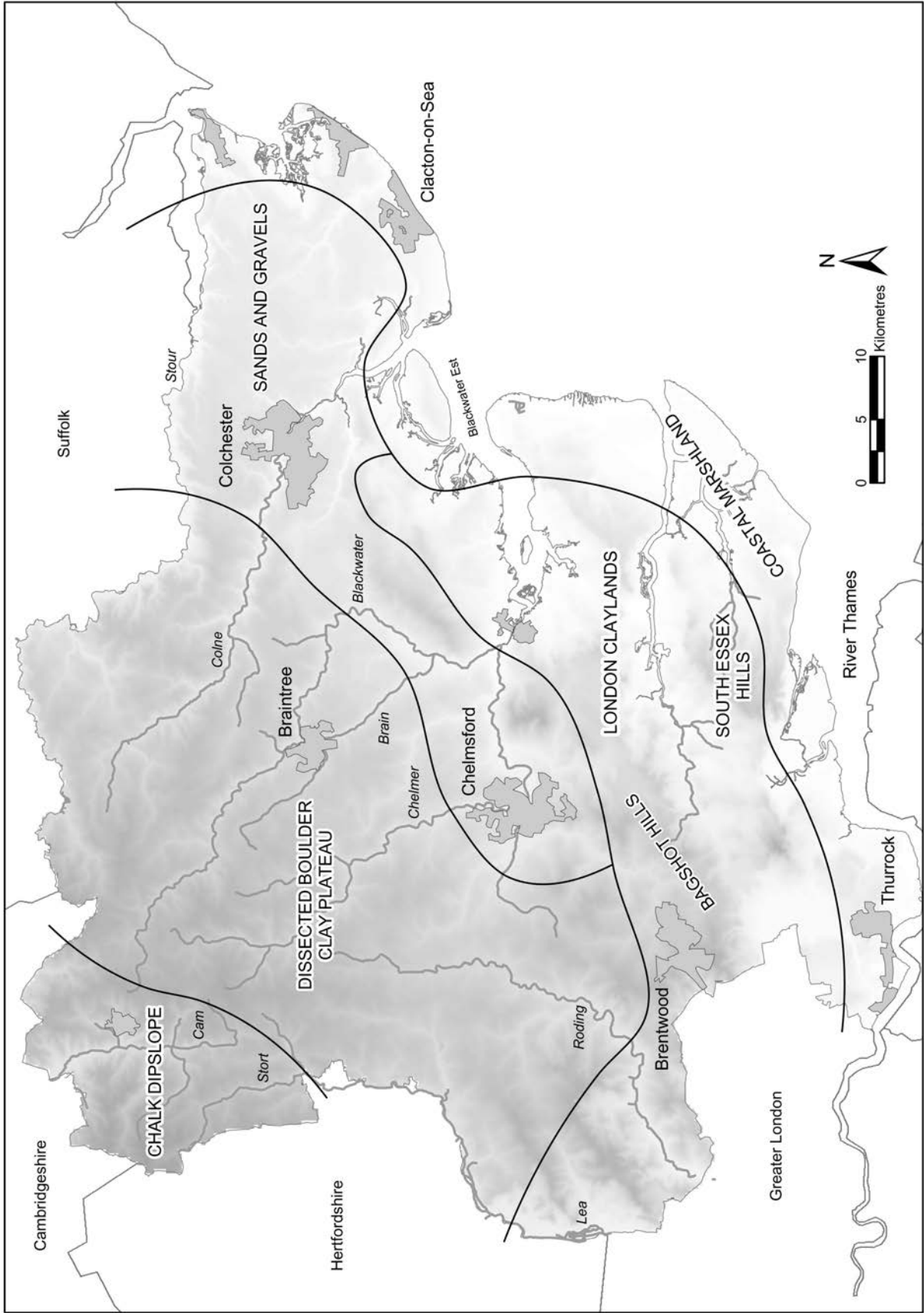


Figure 1.6 Landscape regions of Essex as discussed in the text

depth and the nature of the overlying soils mean that there is relatively little potential for the development of cropmarks of such sites. Later, post-medieval features have been recorded as cropmarks on reclaimed marsh, for example, a decoy pond near Bradwell, that was visible in rape on reclaimed land during 1992 (EHER 2075), and vertical photography of the 1940s has recorded coastal features which have subsequently been destroyed by reclamation (Chapter 5). Conversely, beyond the sea walls, changes to the dynamics of coastal and estuarine systems can also result in exposure and erosion of archaeological remains, for example, the red hills (Wilkinson and Murphy 1995, 8), the fish traps of the Blackwater estuary and the Neolithic settlement site at the Stumble in the Blackwater estuary (Wilkinson and Murphy 1995, 1). In places, the coastline is continuing to erode, for example, Walton-on-the-Naze, with the loss of features, including a Second World War pillbox at Cudmore Grove, East Mersea (EHER 10032).

Sands and gravels

Overlying much of the London Clay outcrop in mid Essex and the coastal zone are various glacial deposits resulting from direct action of the ice sheets, and those that represent reworking of those sands and gravels (Hunter 1999, 6). These are of variable nature and hence landscape character.

Around Colchester lies an area of low relief and light, often sandy soils developed on glacial sands and gravels, which extend northwards towards the edge of the Stour Valley (and south-eastwards to Tiptree). The soils are more acid and less inherently fertile than the river terraces, glacio-fluvial sands and gravels and the brickearths, so show a rather different character. It is an area of the county that has seen significant landscape change in recent centuries. The Chapman and Andre map of 1777 shows extensive heaths ringing Colchester, including Stanway and Lexden to the west, where the complex cropmarks highlight where the area has been densely occupied since the prehistoric period, Bergholt, Mile End, Boxted and Dedham in the north, Ardleigh, Crockleford, Whitmore, Wivenhoe, Elmstead and Alresford in the east, and Layer and Donyland to the south of the town (Hunter 1999, 32). The heaths depicted in 1777 generally followed boundaries that had been established by 1300, although some internal enclosures may have taken place subsequently and at an earlier time the heaths may have been more extensive. Farms and smallholdings abutted the edges and in between the former heaths are winding lanes and relicts of the medieval landscape that once linked the tracts of open land. In the areas once covered by heaths, straight roads and lanes are visible within a landscape of late enclosure (Hunter 1999, 33).

Further towards the coast, sands and gravels over London Clay have offered more freely draining soils, which were intensively used for occupation from the prehistoric period, something which is attested by the concentrations of features appearing as cropmarks, for example the cropmark complexes on the north shore of the Blackwater, Chelmer–Blackwater Valley, east of Chelmsford and the area around Brightlingsea.

Around Southend and on the Tendring peninsula reworking of the glacial sands and gravels has resulted in quite extensive areas of brickearths and loams. Although soils developed on those around Southend are deeper, in

both areas they are free draining and have always been attractive for agriculture. The brickearths have also been a source of raw materials for the construction industry in particular, for brick-making around Southend.

The river terraces were created along the former courses of the Thames and some of its tributaries as they moved in response to advances of the ice sheets. The light, free-draining soils, which have long been attractive for arable agriculture, contain some of the best agricultural land in Essex. The soils are easily worked loams and the region contains many prime sites used for early occupation and farming. These soils are also conducive to the development of cropmarks and it is this area that some of the densest concentrations of features are recorded (including geological features such as ice polygons). They indicate continuous occupation of the landscape from at least the Neolithic, for example, on the Thames terraces around Mucking where intensive excavation, prior to gravel extraction, has revealed successive settlement from the Neolithic to the Saxon period (Hamerow 1993; Clarke 1993).

London Clayland

The outcrop of London Clay extends around the edge of greater London from the Lea to Brentwood, across south Essex from Thurrock through Rochford to the gently rising topography of the Dengie peninsula and the land north-east of Maldon, whilst some London Clay also crops out in the east of the Tendring peninsula. Soils developed in this area are mostly heavy clays, fertile but prone to waterlogging, presenting difficulties for agriculture until the increase in the development of underdraining in the 18th century. The soils shrink and crack on drying and swell on re-wetting, making them difficult to cultivate, and this led to sparse settlement and an emphasis on pasture. The field patterns and boundaries of this region display the characteristics of early planned landscapes, with fields in a roughly rectilinear pattern except where crossed by main water courses (Hunter 1999). A rectilinear field pattern predominates over much of the Dengie peninsula, which has been assigned to the Iron Age or Roman period although no firm evidence has yet been recorded (Rodwell 1978). Rippon (1991) has suggested a middle or late Saxon date.

Between Maldon and Colchester, the London Clays crop out from beneath Kesgrave deposits and with some scattered Thames/Medway deposits, slope down to the north shore of the Blackwater estuary and Mersea Island. In consequence there is a marked contrast in the number of recorded sites to the north and south of the Blackwater; a distribution that may reflect an actual difference in site numbers, although in the absence of similar levels of development or mineral extraction there have not been the opportunities to investigate the southern side as extensively. The undulating topography is sparsely settled and the field patterns of this area do not display the planned rectilinear pattern of the London clays to the south on the Dengie peninsula (Hunter 1999, 23).

Bagshot Hills and South Essex Hills

The Bagshot Hills (Fig. 1.6) form a transition zone between the low-lying London Clay and the Boulder Clay plateau to the north-west. They are formed mainly on Tertiary sandy Bagshot deposits that overly the London Clay and are in turn capped in most places by Pebbly Clay

Drift. They comprise several ridges from Epping Forest to Thorndon, Galleywood and Tiptree, rising above the general level of the London Clay lowland to about 100m. Further south, the South Essex Hills, sharing the same geological origins, comprise two groups of hills, the larger based on Rayleigh, Hockley and Hadleigh and the smaller, some distance to the west forming the Langdon Hills (Hunter 1999, 20).

The soils are readily cultivated although of low natural fertility with rather acid character. The fields have tended to remain relatively small but it was an area conducive to woodland and pasture farming. Much of this zone remains covered in woodland, some ancient and some secondary, on former common land. There are indications that the area was once subject to intercommoning, but whilst many commons have survived, including Epping Forest, many more were lost to parliamentary enclosure (Hunter 1999). Although much of this woodland is secondary, archaeological features are preserved within it, though aerial reconnaissance is rarely able to advance recognition and recording of earthwork features. The former heathlands show planned landscape features characteristic of late enclosure, although they are rich in archaeology as evidenced by aerial photography.

Dissected Boulder Clay plateau

This zone covers at least one third of the county, and comprises a thick till of chalky boulder clays, the southern extent of which is generally defined by the Bagshot Hills. Two main types of soil are developed: wet clayey soils and drier clayey soils. Both types require under draining for modern agriculture and it was formerly common to use ridge and furrow as an aid to drainage. Many of the common land sites remaining today are associated with the wetter level sites.

The plateau is dissected by the valleys of the Stort, Chelmer, Ter, Brain, Blackwater, Colne and Stour, the rivers of the drainage system established after the end of the Ice Age. These contain a variety of deposits of glacial origin, mostly glacial sands and gravels, brickearth, head and alluvium, whilst post-glacial erosion by these rivers has exposed earlier fluvial deposits in the valley sides including Kesgrave Sands and sometimes London Clay.

There are occasional deposits of glacial sands and gravels on the watersheds, and these less fertile soils are sometimes clothed with ancient woodland (Hunter 1999, 34). For the most part, the chalk content of the Boulder Clay renders the soils fertile and the plateau is sprinkled with spring lines, all of which formed the basis for

scattered settlement of villages, greens, hamlets and farms. Whilst on the whole there has been less threat to archaeological remains from extensive urban and industrial development, there have been opportunities for landscape investigation, most notably in various phases of development of Stansted Airport. Excavation and survey at Stansted Airport have provided a better understanding of the settlement and landscape history of the Till (Havis and Brooks 2004). The Boulder Clay is extremely varied geologically with sand and gravel from stratigraphically below the drift exposed on the valley sides and with brickearth overlying the clay surviving on higher ground.

The settlement pattern is scattered and diverse although not sparse (Bennett *et al.* forthcoming). Landscape features such as roads, lanes and field boundaries relate closely to topography and soil type, suggesting slow evolution over a long period of time. In the second half of the 20th century (following the Agriculture Act of 1950) the Boulder Clay region changed from one of mixed farming to an area dominated by arable with associated removal of hedgerows to enlarge fields (Hunter 1999, 36).

Chalk dipslope

In the extreme north-west of the county (Fig. 1.6), the chalk emerges in the valley of the Cam and on the higher ground along the county boundary with Cambridgeshire. Historically, this is the only area of Essex where an open field system resembling that of the Midlands was developed. Large common fields developed here and were enclosed late, in the 18th and 19th centuries. The Tithe Maps of the 1840s still depicted strip farming in some parishes, for example Langley. Great Chesterford is truly on the 'Midland' model, being fully open field until enclosure in 1804; it lies on the county boundary where 'woodland' Essex meets 'Champion' south Cambridgeshire (Hunter 1999, 40).

This landscape was traditionally more open than the Till countryside, but a skim of clays on the higher land developed features more characteristic of Essex than neighbouring south Cambridgeshire. The rolling landscape is predominantly open chalkland fields on the Cam Valley floor and ancient enclosed field patterns with species-rich hedges where it adjoins the clay plateau. Villages and woodland avoid the true chalk and cling to the better water supply of the patchy drift cover. It retains the winding lanes, dispersed hamlets, greens, and ancient woodlands (Bennett *et al.* forthcoming).

Chapter 2. Prehistoric Landscapes

by Helen Saunders

I. Introduction

Over the last thirty years Essex has seen much research into the prehistoric period, often using the good cropmark evidence (Hedges and Buckley 1978; Brown 1999; Brown 2001). Recent publications on work carried out in Essex have highlighted areas of potential research. Projects such as the Stour Valley Project have used aerial photography and GIS to aid the understanding of the variety and complexity of monuments within their landscape context (Brown *et al.* 2002, 5). Figure 2.1 shows that there are areas within the county that have high concentrations of apparent prehistoric monuments; these should be considered for further investigation following the NMP mapping, both within this volume and with future research. After examining the types of prehistoric monuments found, their general distributions and the nature of prehistory within the county, three areas will be examined in more detail using the aerial photographic evidence, the NMP mapping and GIS based resources.

Due to the size of the county, extensive arable farming and the geological potential of large areas of Essex for the development of cropmarks, the NMP has produced a large corpus of data, particularly on the responsive soils in the east of the county and along the river valleys. This, combined with extensive fieldwork and excavation material, has ensured that there is a broad evidence base for the study of the later prehistoric period in Essex. While settlement evidence from the aerial photographs for the early prehistoric period is lacking, many monuments that attest to activity of this date have been mapped.

It is perhaps misleading to distinguish between domestic and non-domestic landscapes. A clear distinction between ritual/religion and domestic activity in the landscape is essentially a modern attitude. The landscape in the prehistoric period would have been suffused with ceremonial practice and symbolic meaning; the issues regarding the division between domestic/ritual have been discussed elsewhere (*e.g.* Bradley 1998; Thomas 1999a). Furthermore, the physical landscape is the same whether used for domestic or ritual purposes and is not static, but constantly changing due to varying seasons and, on a smaller scale, use and exploitation. Two people would experience the same landscape in a different way (Darvill 1997, 4) as each person observed different aspects and might therefore judge different characteristics of the landscape to be more significant than others. Therefore it can be problematic for us to reconstruct how a monument fitted into its surroundings and how structures were perceived by the people who built them.

In addition to this aerial photographic evidence is inevitably biased regarding the types of archaeological sites that can be recognised. For example, size, physical form and location all affect whether a site would be visible on certain aerial photographs. Within the early prehistoric cropmark landscape many sites identified on aerial photographs appear to be of a ceremonial type, as the nature of their construction ensures that some evidence of

their existence is still visible in the crop, under the right conditions. In Essex, as in many other areas of the country, these monuments appear spatially clustered and are often found in similar topographic locations. This leads to the question of how the monuments were related to each other and how their presence in the landscape was both a by-product of people and, in turn, influenced people.

II. Distribution of prehistoric sites

In Essex, NMP has mapped and assigned 2990 sites to the Prehistoric period, which included Neolithic, Bronze Age, Iron Age and unknown prehistoric sites. Table 2.1 gives the number of mapped sites and the percentage of sites assigned to each period out of the total number of sites mapped overall.

<i>Period</i>	<i>Number of sites</i>	<i>% of total</i>
Neolithic (NE)	35	0.3
Bronze Age (BA)	1077	10.0
Iron Age (IA)	87	0.8
Unknown Prehistoric (UP)	1791	16.0
Total	2990	27.1

Table 2.1 Total number of mapped prehistoric sites

As discussed in Chapter 1, the mapped information derived from the aerial photographic interpretations are subject to many biases and the project classification methodology has also contributed to some biases within the project database. For example, the system used within the MORPH2 database meant that only one period could be assigned to each feature so multi-period sites were assigned as ‘unknown prehistoric’ (Ingle and Saunders 2003, 48), especially if there was uncertainty regarding the date. This accounts for some of the higher proportion of ‘unknown prehistoric’ sites. The smaller numbers of both Neolithic and Iron Age sites reflects the small number of monuments generally known from these periods (for example, only 372 monuments are listed as being of Neolithic date within the EHER out of over 2700 cropmark sites). Many of the sites that have been assigned a specific prehistoric date have been excavated rather than dated on morphology alone, such as the Springfield cursus (EHER 5778) or the Orsett Causewayed Enclosure (EHER 5158).

The vast majority of prehistoric sites are located along the major river valleys, especially those of the Stour, Chelmer and Blackwater (Fig. 2.1). There are other smaller areas with distinct clusters of sites such as Thurrock and the Dengie peninsula. Although the numbers of sites within these areas are higher than in other parts of the county the biases inherent within aerial photography (Chapter 1) cannot be ruled out as a

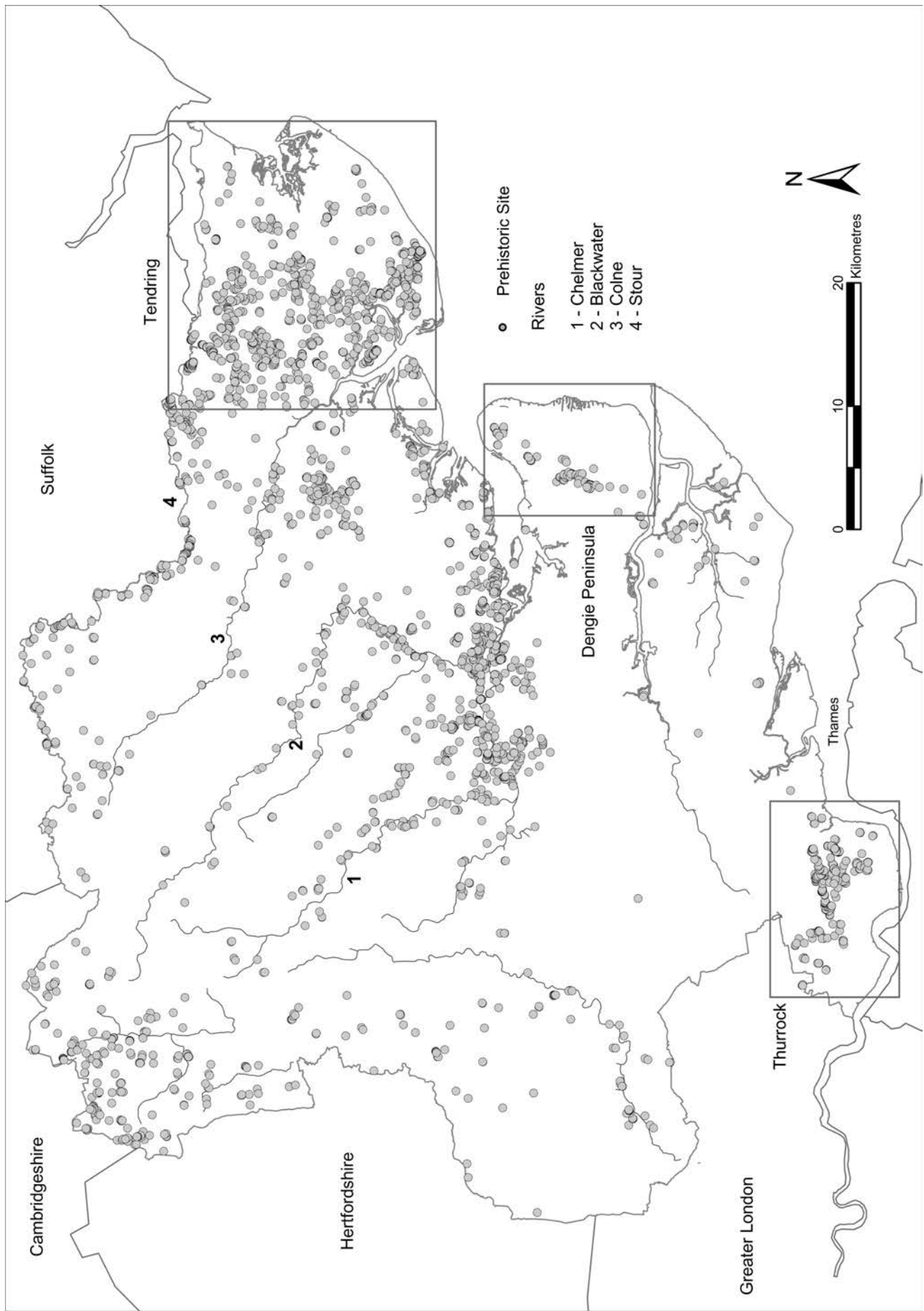


Figure 2.1 Distribution of prehistoric sites mapped as part of the NMP in Essex

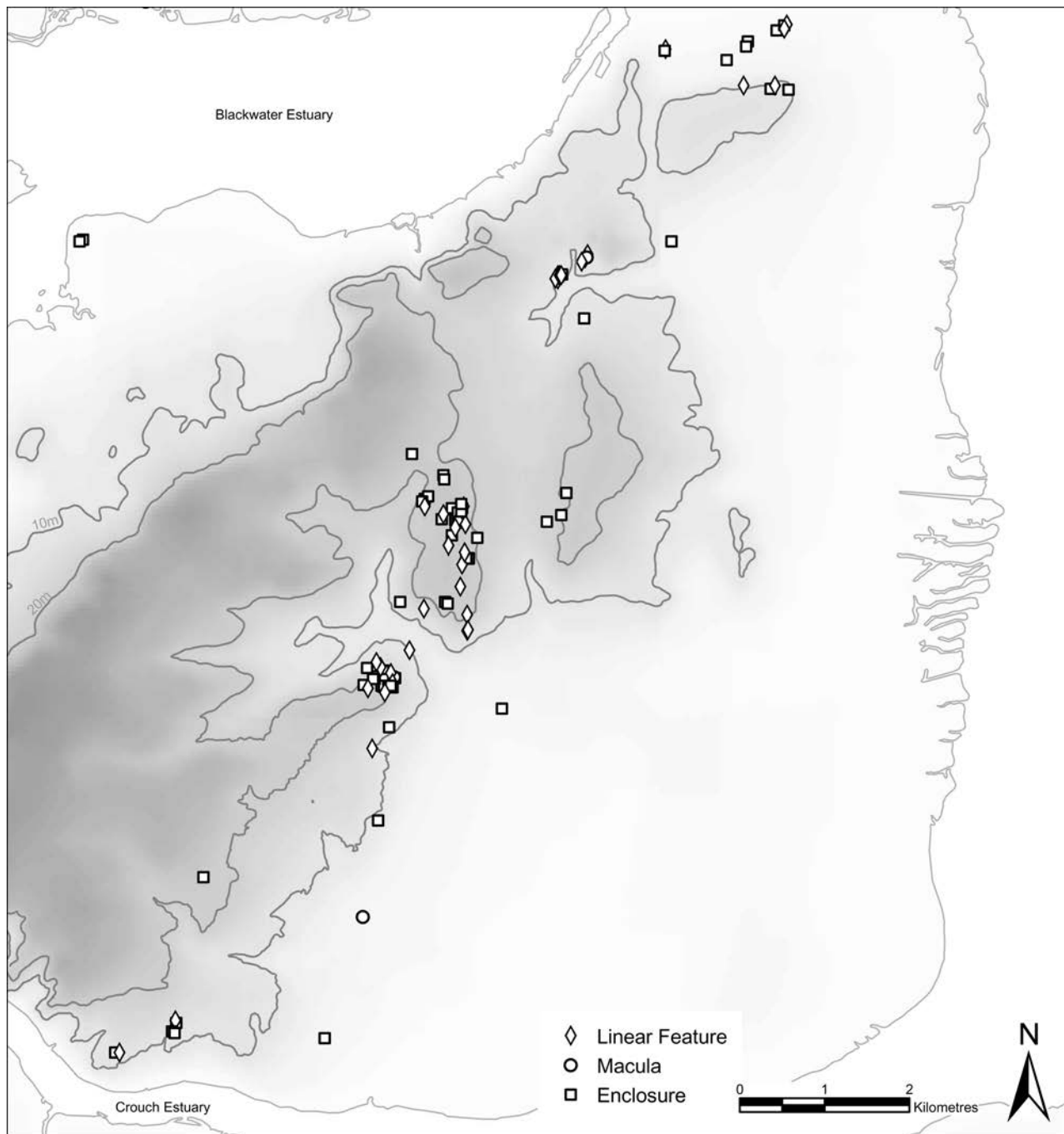


Figure 2.2 Location of mapped sites on the Dengie peninsula relative to topography

fundamental cause of these patterns, though in some areas there may be a combination of reasons to explain the distribution pattern. This point is well demonstrated on the Dengie peninsula where an interesting linear pattern of sites can be distinguished running north-east to south-west between the Blackwater and Crouch estuaries (Fig. 2.2). The visible sites appear on the responsive sands and gravels, but run along the boundary of the London Clays. This distribution could be attributed to the poor response of crops on the London Clays, but if this were the sole reason for the distribution then more sites would be expected on the east coast of the Dengie peninsula where there is similar responsive geology. Topography can also affect site location. While the geology to the east of the Dengie peninsula is suitable for cropmark development,

the area is very flat and, before the construction of the sea wall, would have been subject to either seasonal or frequent inundation from the sea, consequently making the location unsuitable for occupation. However, on the higher sand and gravel ridge, access to resources such as the sea would have been possible, while a certain level of protection from flooding together with a defensive advantage would have made it more suitable for occupation, which is reflected in the dense cropmark complexes. This begins to highlight the complex interactions of both the environment and human factors that influence archaeological recording from aerial photography.

The distribution of visible sites in the district of Tendring appears denser compared to the rest of the

county (Fig. 2.1). Twenty-eight percent of the total number of recorded prehistoric sites can be found in the Tendring district and 37.5% of these sites are within 500m of rivers or streams. Tendring does not have any major rivers running directly through it, but the district is bordered by the Stour, the North Sea and the River Colne. Consequently, the sites are located close to small tributaries and water courses that run into the surrounding rivers and estuaries. The general topography of Tendring is a relatively flat plateau, with a well drained sand and gravel geology, which has enabled agricultural development both today and historically. Arable farming in the area has ensured a long history of regular aerial reconnaissance and the soils have proved responsive for archaeological cropmarks. The good soils would also have enabled farming and settlement in the prehistoric period when the heavier clays of the north and west of the county may have proved more difficult to farm. This may mean that the denser distribution of sites in the Tendring district is a result of the higher population in the prehistoric period.

Three main concentrations of sites will be more closely examined in this Chapter. They are the Chelmer and Blackwater valleys, the area surrounding Clavering and Saffron Walden in north-west Uttlesford, and an area approximately 15km by 15km, covering a wide selection of the most important prehistoric sites in Tendring (Fig. 2.3). These selected areas cover different landscape zones which relate to geology, soils and topography, so offer an opportunity to study similar monuments in different landscape contexts. The area in Tendring is influenced by flat, well drained and easily worked soils on the terrace gravels, the Chelmer and Blackwater area consists of river valleys that dissect the boulder clay plateau and the north-west Uttlesford area has undulating hills of the chalk dip slope.

Before specific areas are examined it is important to look at monument types, distributions and morphology of sites within Essex as a whole.

III. Monuments

Several major classes of early prehistoric monuments have been found and mapped within Essex, including cursus monuments, mortuary enclosures, causewayed enclosures, long enclosures (thought to be ploughed out long barrows), henge monuments and round barrows, which are visible as ring-ditches in the crop. Many of the major monuments mapped fit into standard classification categories and can be interpreted with reasonable confidence on morphology alone, such as the mortuary enclosure and cursus monuments that are located along the Stour Valley (Brown *et al.* 2002). Small prehistoric sites such as barrows are much more frequently found, whereas large Neolithic monuments are considerably rarer, but they still appear in significant numbers. For example, one cursus monument has been confirmed through excavation, with a further four sites with a morphology that suggests possible cursus monuments.

The terms applied to cropmark monuments visible on aerial photographs have been much debated (can a ring-ditch be interpreted and called a round barrow when there is no evidence for a mound?), although not necessarily at a county level or within individual NMP teams. Consequently, this had led to a mixture of both

descriptive and interpretive terms to be used within the Essex NMP — often within the constraints of the MORPH2 project database, the Essex Historic Environment Record (EHER) and the HBSMR thesaurus — and this should be borne in mind during the following discussions.

Causewayed enclosures

Two causewayed enclosures were mapped over the course of the project, Orsett (EHER 5158) and Matching Green (EHER 17064); a further two, Springfield Lyons (EHER 5788) and St Osyth (EHER 2970), have been identified through a combination of excavation and aerial photography. This is a similar number of monuments to the adjoining counties. For example, in Kent there are four causewayed enclosure sites, two of which have been confirmed as prehistoric through excavation, and Suffolk has five probable causewayed enclosure sites visible as cropmarks, although as yet none has been excavated (Oswald *et al.* 2001, 153, 155).

One of the least complex sites is at Matching Green, which, although it has two circuits of relatively unbroken ditches (the inner circuit is made up of only three ditch sections), is symmetric (Fig. 2.4). However, the circuits are widely spaced, with up to 44m between them. Matching Green is similar to Robin Hood's Ball, Wiltshire, which still survives as an earthwork (Oswald *et al.* 2001, 157). There are very few other features known within the vicinity of this site, though this could be caused by geological factors (being located on boulder clay) rather than a true representation of archaeological remains. While the site is close to two rivers, neither would have been visible from the site (one, to the north, is 2.5km away, while the river to the south is only 1.8km). The site is located on higher ground, for this area, but has a lowland orientation as it faces downhill towards the river in the north. This could be significant to the interpretation of the site as river valleys in Essex are often thought to have been used as routeways across the landscape and the location of this site could have been chosen deliberately to benefit from access to and from the river.

The second mapped causewayed enclosure is at Orsett (Fig. 2.4), located in the south of the county. The Orsett enclosure has similarities with Windmill Hill, Wiltshire and Longford, Oxfordshire (Oswald *et al.* 2001) and has three irregular concentric circuits of interrupted ditches, none of which appears to be complete. The Orsett causewayed enclosure lies within a complex cropmark landscape and has several features overlying it. At over 175m across, the two outer circuits are relatively close (with only 10m between them). However, the inner circuit is, in places, 40m from the outer ones. This has led to the suggestion that the outer two circuits were laid out at the same time, although after the inner one. As the circuits are not complete it has been suggested that the monument was open to the south, which would have faced downslope (Hedges and Buckley 1978, 248). This is not unique as the orientation and the open side can also be found at Broadwell, Oxfordshire and Southmore Grove, Gloucestershire (Oswald *et al.* 2001, 93, 96).

Excavation at Orsett revealed a higher concentration of finds within the inner ditch and it was suggested that this was due to a degree of occupation within the interior. The excavation evidence appears to conform to evidence from other sites elsewhere, as post-holes and pits were

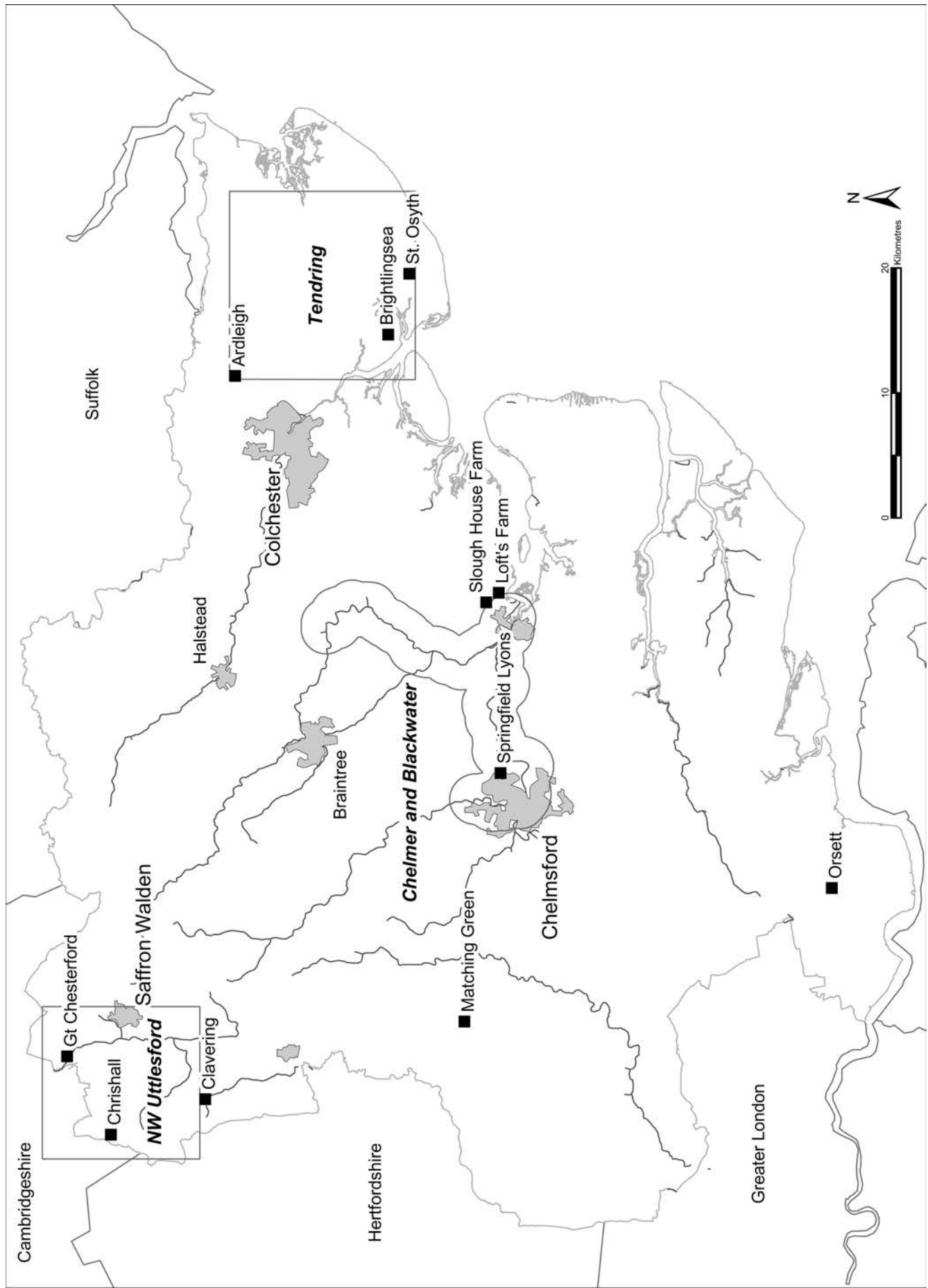


Figure 2.3 Location of Chapter 2 study areas and places mentioned in the text

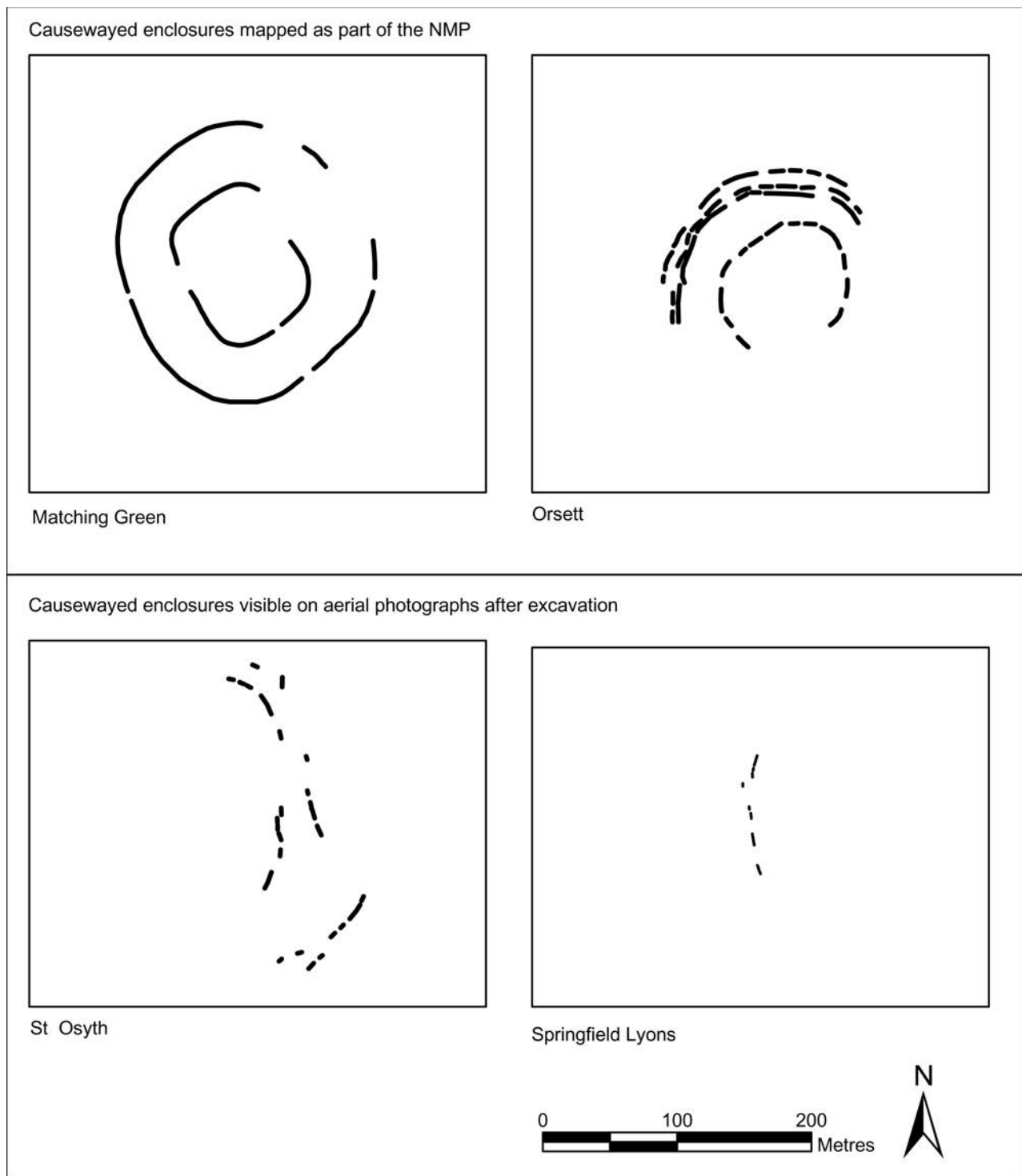


Figure 2.4 Causewayed enclosures mapped as part of the NMP (top) and two examples visible on the aerial photographs after excavation of the ditch sections (bottom)

identified and pottery from the earlier Neolithic through to the Iron Age was recovered. While the site is a considerable distance from water or a river it would have been prominent when viewed from the lower land to the south. The site is located just above the 30m contour with the land to the south lower than at the causewayed enclosure site (Fig. 2.5). Unlike Matching Green, there are many features that could be associated. Within a 1km radius of the site there are thirty-four mapped prehistoric sites, most of which are ring-ditches interpreted as round barrows, with a small cluster 500m to the east (A, Fig.

2.5); other sites include enclosures and trackways. Although none of the round barrows and trackways are identified as Neolithic at present, it has been shown that Bronze Age and Iron Age activity often occurred in close proximity to causewayed enclosures and it may be specifically due to the Neolithic site at Orsett that the round barrows were built, so they have a direct association. Of particular interest at Orsett is the possible mortuary enclosure, *c.*940m west of the causewayed enclosure (B, Fig. 2.5). The elongated enclosure is 20m by 9m in extent and is aligned east–west. The location of this

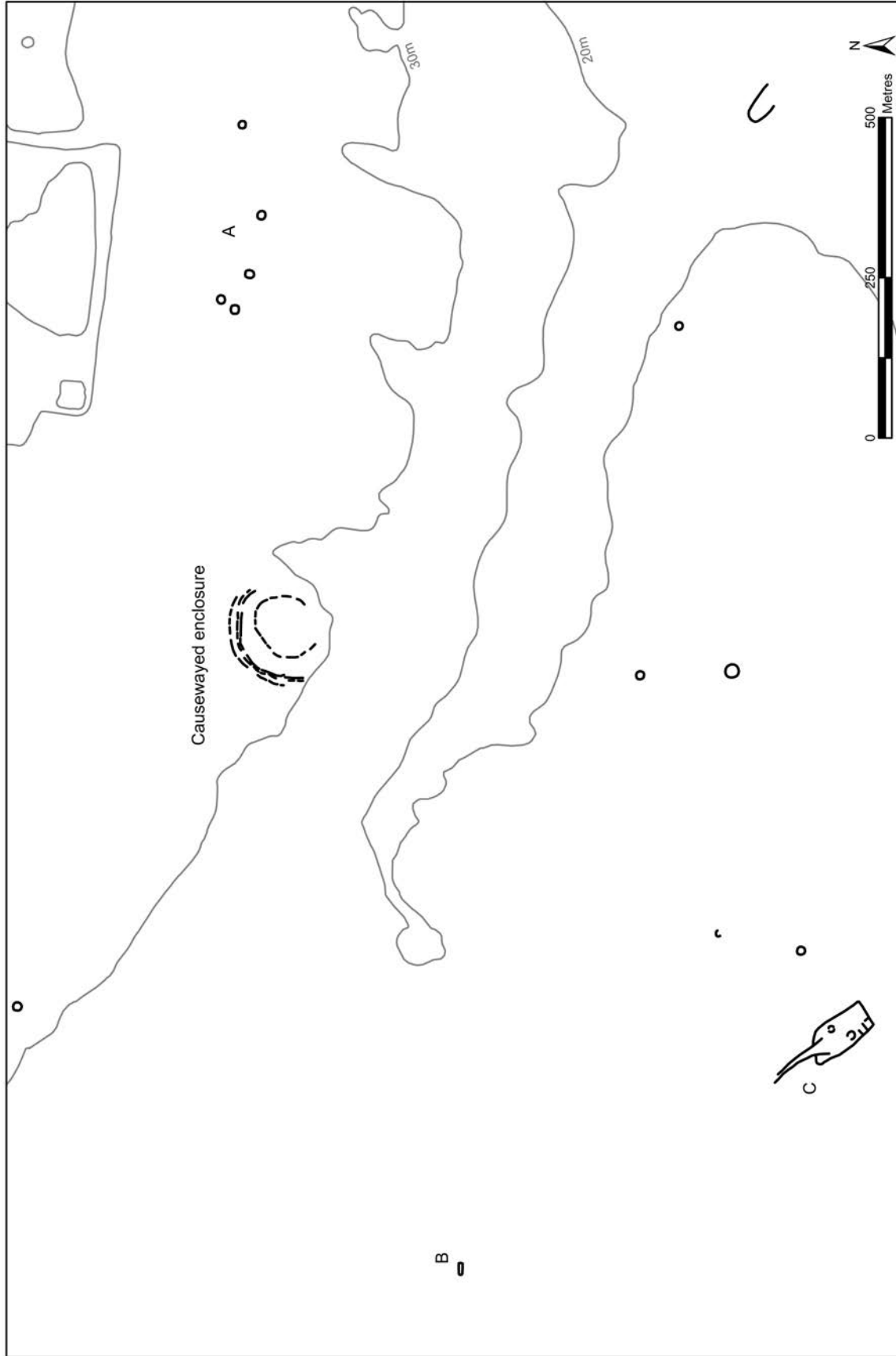


Figure 2.5 Orsett causewayed enclosure in relation to other prehistoric monuments in the surrounding landscape as mapped by the NMP, including a group of round barrows (A), a possible mortuary enclosure (B) and a possible Neolithic settlement enclosure (C)

possible enclosure, in relation to both the causewayed enclosure and the surrounding landscape, is very similar to the relationship between the causewayed enclosure at Springfield Lyons and the mortuary enclosure to the east of the Springfield cursus (Strachan 1996a, 305). Also of interest is a cropmark of an enclosure 1km to the south-west which is thought to represent a Neolithic settlement enclosure (C, Fig. 2.5) and will be discussed further in Chapter 3.

Causewayed enclosures at Springfield Lyons and St Osyth can be identified, with hindsight, on aerial photographs (Fig. 2.4). Springfield Lyons is a small, partially excavated, site with one incomplete circuit visible, lying on a slight spur of land between two streams. It was not obviously visible on the aerial photographs, but an arc of large pits found during excavation could later be identified on them. The site is situated within a rich cropmark landscape. Within a 2km radius there are many identified prehistoric monuments including thirty round barrows, sixteen enclosures, a cursus monument and a possible mortuary enclosure, all of which set the causewayed enclosure within a landscape context that will be examined more closely later in the chapter.

St Osyth, again, was only located on aerial photographs after some of the ditches were identified during the course of an excavation. This site demonstrated the problems of geological formations and distinguishing between natural and cultural cropmark features. There are three lines of ditches all visible on the south and east of the site (Fig. 2.4), but no complete circuit is visible. This apparent incompleteness is not unique and the site has similarities to other causewayed enclosures such as Salmonsbury, Gloucestershire (Oswald *et al.* 2001, 63). The topography of the surrounding land is generally flat, but the open side of the monument does face down-slope like other causewayed enclosure sites. Like Orsett, the site is surrounded by a wide variety of features. Of interest is a cursus-like monument to the south-east of the causewayed enclosure. This monument is over 280m long and over 80m wide and is very similar to other identified cursus monuments like Eynesbury, Cambridgeshire and Bennybeg, Perth and Kinross (Malim 1999, 79; Brophey 1999, 126). If this long enclosure is a cursus monument, it would help to 'cut off' the low promontory of land on which both monuments are situated. The relationship between the causewayed enclosure and the cursus monument will be discussed further in the case studies, later in this chapter (Section IV). Within a 2km radius there are twenty-five identified ring-ditches, thought to be round barrows, and sixteen trackways. While not all would be contemporary, especially as many overlay the causewayed enclosure, they are all within the same landscape.

Bradley (1998, 71) points out that while the use of sites may not have been constant over time the earthworks may have been constantly visible whether they were in use or not. This implies that the location and presence of larger monuments could have influenced the location of other monuments over time, the same land or area being chosen for further sites. This is certainly the case with the St Osyth, Orsett and Springfield Lyons causewayed enclosures that all have later features surrounding them, and built over them. Although there are later features associated with causewayed enclosures in many places around the country, they are often closely associated with

mortuary activity and while several of the Essex examples do have round barrows, two also have an apparent relationship to a mortuary enclosure (Springfield Lyons and Orsett), as previously discussed.

Elongated enclosures

Essex has 173 mapped cropmark sites that are classified as elongated; their length is at least twice their width. Not all these sites are prehistoric in origin, but many are and correspond to well documented monument types such as levelled long barrows and cursus monuments. While morphological analysis often aids the interpretation of these monuments, it is sometimes more difficult to assign a clear function; this is particularly true with cursus monuments.

Long enclosures and mortuary enclosures

A long barrow is a roughly rectangular or trapezoidal mound of earth or stone, usually between 25m and 120m long, with a length exceeding twice its width (English Heritage 1988a), which may have a ditch surrounding the mound, while a mortuary enclosure is an oblong shaped area of land bounded by a narrow, fairly straight ditch on all sides, with rounded corners (English Heritage 1988a).

Unlike other counties within the east of England there are no upstanding long barrows in Essex, due to intensive agricultural practice. This is not to dismiss their existence within the county, but for the purposes of this discussion cropmarks thought to be ploughed-out long barrows will be referred to as long enclosures rather than long barrows. The latter term implies the existence of a mound, which is not identifiable from the available cropmark evidence (note that within the MORPH2 database the term long barrow (LOBW) is used as long enclosure was not part of the database thesaurus). As the central mounds of any long barrows within Essex have long since been ploughed away, the remaining long enclosure and mortuary enclosure often have a similar morphology and it can be difficult to distinguish between the two, even when excavated (Buckley *et al.* 1988, 90).

Long mounds and long enclosures containing the remains of the dead are a distinct feature of the Neolithic in Northern Europe (Thomas 1999a, 131) and while the main characteristic of long barrows is the central mound, it has also been suggested that there was often a timber structure associated with the enclosures. However, it is only through excavation that these structures become evident and few in Essex have been excavated (only two to date, Rivenhall and a small mortuary enclosure at Slough House Farm). The function of these sites, like so many from the Neolithic, has been much debated and there would appear to be an overlap between the functions of long barrows and mortuary enclosures. There is excavated evidence from sites that there may have been a 'second burial' rite, as well as evidence that shows that not all long enclosure sites even had burials. The elongated oval ditched long barrow at Eynesbury, Cambridgeshire, lacked any inhumations within the monument, but did appear to be associated with mortuary activity because of the structured deposits that were dominated by human and animal remains (Ellis 2004, 23). Mortuary practices associated with earthen long mounds should not be considered homogeneous (Thomas 1999a, 136-7), likewise some of the construction detail changed over time. For example, simple mounds became more elaborate

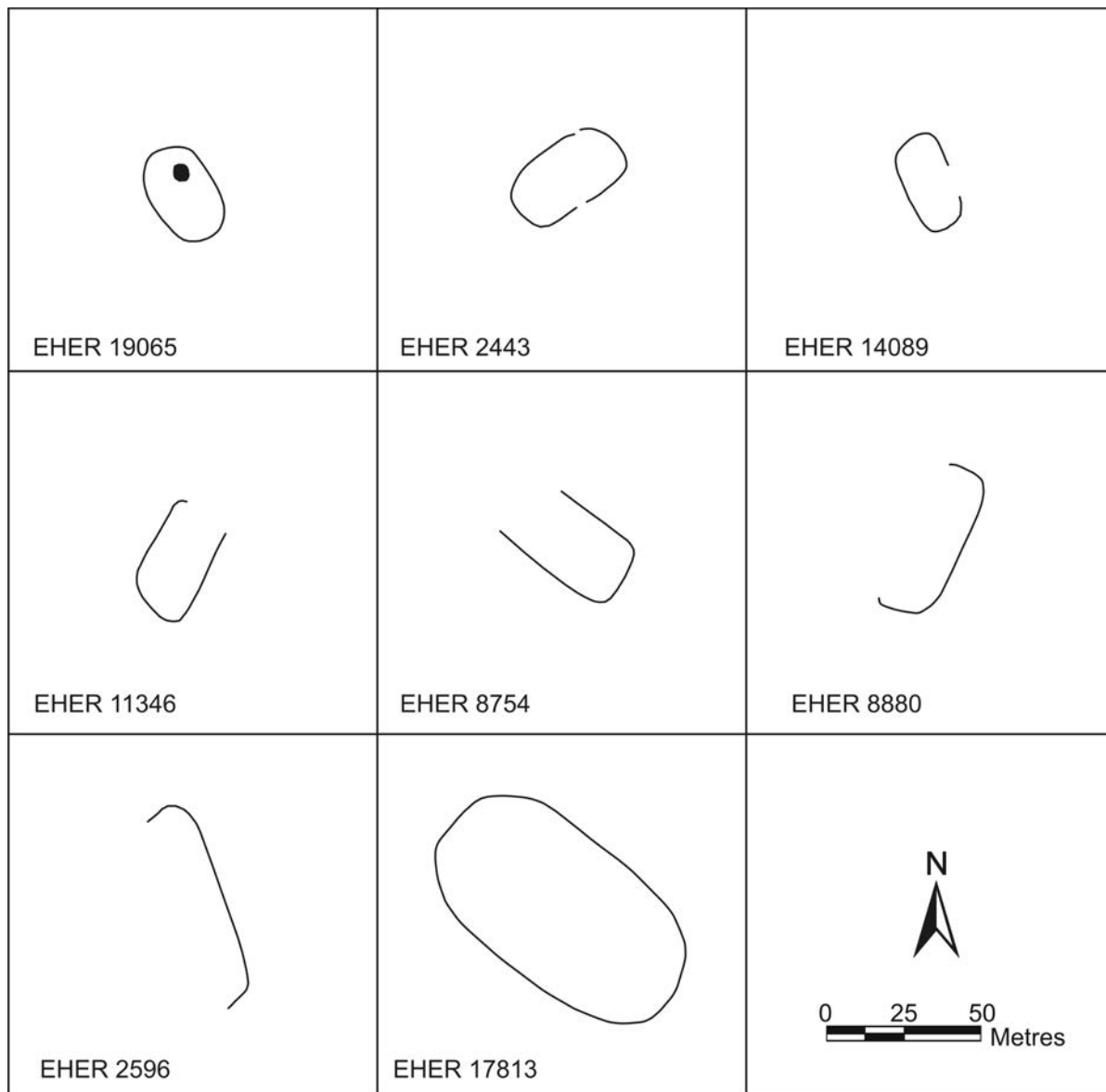


Figure 2.6 Examples of possible mortuary enclosures mapped as part of the NMP

or enlarged, but such detail is probably not recognisable in the aerial photographic record in Essex. However, there is evidence that these types of monument were built in proximity to other monuments such as causewayed enclosures (*e.g.* Springfield Lyons or Hambleton Hill, Dorset (Oswald *et al.* 2001, 78)). This might be a reflection of the reduced importance of the earlier monuments as they were abandoned, left to decay and other new sites were built close-by. However, it might emphasize the continuing importance of the area as the new monuments were built in proximity to existing ones. The reuse of an area for later monuments might also help to identify this type of monument when it is associated with other recognisable sites.

While the use of such long enclosures is different, morphologically they can be very similar to each other, as well as other site types and this can lead to misinterpretation. A levelled pillow mound could be interpreted as a long barrow as they share very similar morphology when visible as a cropmark. Within Essex there are only seven recognised pillow mounds, so it seems unlikely that this

type of site is incorrectly interpreted as a long barrow here. Within the region, long enclosures are relatively rare, although there are examples in Essex comparable to those found in Norfolk and Suffolk (Buckley *et al.* 1988, 87). Long mortuary enclosures are more common in Essex (Brown and Murphy 1997, 14) and twenty-one cropmark monuments have been interpreted as either mortuary enclosures or long enclosures within the MORPH2 database, mainly distinguished by their morphology or their location and juxtaposition with other prehistoric monuments. A further eighteen sites, when identified using morphology alone, have similarities with the more certain mortuary and long enclosures, a selection of which are shown on Figure 2.6; making a total of thirty-nine possible or identified sites. Measurements taken from the cropmark evidence demonstrate the similarities between these sites. Table 2.2 shows the average length and width of the classified sites in Essex, along with the possible sites.

The measurements of sites within Essex, which range from 12m to 70m in length and 8m to 24m in width, are

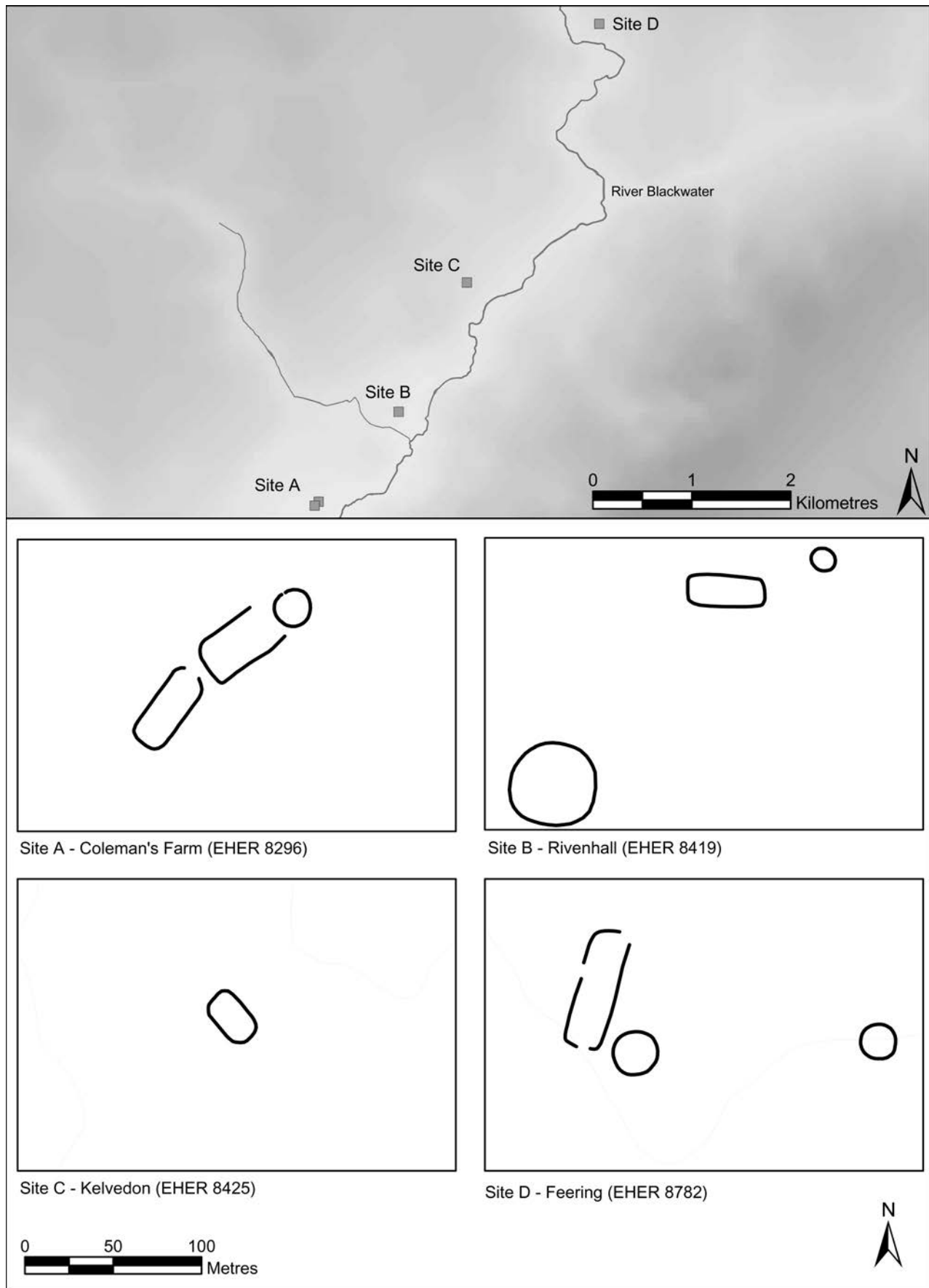


Figure 2.7 Location and morphology of mortuary enclosures in the Blackwater Valley

Site type	Average length (m)	Average width (m)	No of sites
Mortuary enclosure	34	23	11
Long enclosure	29	14	10
Possible site	50	22	18

Table 2.2 Average length and width of identified and possible long and mortuary enclosures visible as cropmarks

comparable with those found elsewhere. For example, in Lincolnshire long barrow and mortuary sites were mapped as part of the Lincolnshire NMP and range from 24m to 64m in length and 12m to 23m in width (Jones 1998a).

The Essex site types conform to the three known basic shapes for these sites: oblong, ovate and trapeziform. Examples of these can be seen on Figures 2.6 and 2.7. The sites have varied morphology and size and they range from ovate to oblong. All have rounded corners and at least one site has, what appear to be causeways over the ditch (EHER 2443). None of the sites on Figure 2.6 was identified as a possible long or mortuary enclosure in the original interpretation; most were simply classified as ‘enclosures’. Unlike the identified mortuary enclosures these sites do not appear to have an association with other prehistoric sites and many are isolated within the cropmark landscape at this time. Classic sites in Essex include Rivenhall (Site B, Fig. 2.7), which has parallel sides and rounded corners, with no causeways in the ditches, and measures 49m by 16m. The site was excavated in 1986 and finds supported the Neolithic date (Buckley *et al.* 1988, 86). The site had an internal bank but it was unclear if it was an example of a long barrow or mortuary enclosure. The morphology of all the Essex sites is very similar to the cropmark evidence for sites in Lincolnshire (Jones 1998a) and Cambridgeshire (Ellis 2004).

While they are scattered widely across Essex, twenty-two of the thirty-nine sites (56%) are within 500m of rivers or water courses and thirty (77%) are within 1km of rivers. This is a common pattern for these site types and occurs elsewhere in the country (Loveday and Petchey 1982, 18). The sites found across Essex are located in a variety of topographic areas, ranging from along the Blackwater Valley to the numerous sites located on the slopes above the Thames in Thurrock. Some of these sites are located in the lower river valleys, for example the site 800m north-east of Chadwell St Mary (EHER 1769), while others are on the higher undulating slopes in the area, for example the site 250m north of Orsett Heath (EHER 5235) and the site on the outskirts of South Ockendon (EHER 14636).

Long enclosures are often found in conjunction with other monuments within a prehistoric landscape. In Essex, 393 prehistoric monuments are situated within 1km of a long enclosure or mortuary enclosure, the majority of which (37%) are potential round barrows. As round barrows are thought to be of a later date, they demonstrate a continuity of use of the landscape. In almost every case the long enclosure or mortuary enclosure forms part of an apparent complex (Buckley *et al.* 1988, 89) and is not isolated within the landscape. Only four monuments are not closely associated with other prehistoric sites and all four are morphologically similar to long enclosures or

mortuary enclosures, but were not originally identified as such within MORPH2. The long barrows found in Lincolnshire had a similar pattern of distribution as only 20% were isolated sites without close spatial associations (Jones 1998a, 92).

The Stour Valley in the north of the county is particularly important for elongated enclosures, with all of the identified monuments there associated with other possible prehistoric features. The elongated enclosure at Mount Bures (EHER 9189) is a good example of this. The monument is 45m by 20m and has a line of pits along the inside of the northern boundary ditch, which can be clearly identified on Figure 2.8. The site is situated just above the flood plain (Brown *et al.* 2002, 15) and forms part of a linear complex of cropmarks that appear to ‘cut off’ a meander in the modern river, as it is at the south-east end of a complex of round barrows (some of which are dual concentric) and linear ditches (Brown *et al.* 2002, 18).



Figure 2.8 Aerial photograph of a pit-lined elongated enclosure at Mount Bures (copyright Essex County Council CP/96/11/15)

Other elongated enclosures in the Stour Valley include a cropmark at Dedham where a long enclosure (EHER 2736) is located 160m south of two nucleated round barrow cemeteries (Brown *et al.* 2002, 23). The orientation of both the Bures and Dedham examples of long enclosures are very similar (SE–NW and E–W respectively). This orientation can also be seen just north of the river at Long Melford in Suffolk where a pair of long mortuary enclosures in close proximity can be found. While these two monuments at Long Melford are presumably the earliest in the cropmark complex, they are overlain by ring-ditches and this possible destruction of an earlier monument by later ones is unusual.

Elsewhere in the county an area of particular interest lies between Witham and Kelvedon along the River Blackwater. Within 3.2km five potential long enclosures or mortuary enclosures have been recorded from aerial photographs at four locations (Fig. 2.7). They range in size from 30m to 66m in length and all have rounded corners and straight sides. This clear morphology can be clearly seen on the aerial photograph of the long enclosure site at Feering (Fig. 2.9), where the narrow ditch is broken by a causeway and the site has smooth rounded corners. This range of monuments includes the excavated site at Rivenhall (Fig. 2.7, site B). The sites vary in size and all have a similar



Figure 2.9 Aerial photograph of a cropmark of a long enclosure with rounded terminals at Feering (copyright Essex County Council CP/96/40/01)

morphology, but different orientations (SW-NE, E-W, SE-NW and SSW-NNE respectively). Orientation is often associated with local topography as the monuments are aligned to run parallel with the contours along ridges (Tilley 1994, 159). Tilley suggests that barrows that were not visible from all directions were placed so that they were approached from a certain location or direction, while fitting into their immediate topography, rather than being governed by more abstracted rules stipulating how they should be orientated (Tilley 1994, 161). This could be the case at site A, as the two closely spaced sites run along the bottom of the river valley and are therefore following the contours of the landscape. The enclosures at A have their long axis in line with the river (in fact the monuments do not form a straight line but appear to curve around in line with a bend in the current course of the river). Sites B–D are orientated so the long axis points towards the river, but the long axis of site B at Rivenhall is also aligned on a smaller tributary to the south of the monument. It may be that site A was approached following along the river while the others were designed to be approached from the river.

Tilley (1994) also states that the locations of long barrows differ and while some are located with panoramic views in all or three-quarters of the cardinal directions, others have a restricted view in one or more direction. This would appear to be the case at these sites, with at least two of the sites (C and D) not having 360° panoramic views. These two sites, the most northern ones, are possibly intervisible with each other, but the other sites further down the valley are not visible. Site C is clearly visible from the river, but views in the other directions are restricted by the topography. Four of the five long enclosures also have associated possible round barrows or circular enclosures and this is common at other sites. One site (Site A, Fig. 2.7), has four possible round barrows within 300m. Interestingly the ring-ditches associated with site D are clearly visible from site C, while C has no visible circular sites of its own. Sites A and B are fully intervisible as they lie within the river valley bottom. Intervisibility, of course, assumes that the landscape was treeless and environmental sampling, completed during

the Essex Cropmark Enclosure Project, indicated that the site at Rivenhall (Site B) was surrounded by grazed grassland during the middle Bronze Age (Murphy 2002, 37), so it is possible at the time when the sites were in use the visibility would have been unaffected by vegetation.

Intervisibility of long enclosures can be found elsewhere in the county. Four mortuary enclosures or long enclosures identified near the Stour estuary are located within 4km of each other and three of the four would have been completely intervisible (vegetation permitting) and would have been visible from the surrounding monuments, which include a large number of clustered round barrows. This intervisibility may be due to the very flat topography in the area, but it seems likely based on other areas that the locations of the monuments were chosen, in part, for the inter-visibility with other important monuments in the area.

Cursus monuments

It would appear that the long enclosures and mortuary enclosures are smaller forms of a larger tradition that includes cursus monuments (Buckley *et al.* 1988, 90) and within Essex there are two identified cursus monuments, with a further two possible monuments that have a similar morphology.

Cursus monuments have a defined range of shapes and components, though sites can vary considerably in length and width (Barclay and Harding 1999, 1). Within Essex the cursus monument at Springfield is the most well known and has been excavated prior to housing development (Buckley *et al.* 2001). This monument (Fig. 2.10) measured over 600m in length and 50m in width and had angled corners and straight sides, with several causeway entrances along the ditch length. The Springfield cursus was surrounded by many other possible prehistoric monuments, which will be discussed later in this chapter. While Springfield fitted classic morphology, the site at Harlow is not so clearly defined. The Harlow cropmark is 200m by 20m but is cut by field boundaries making it difficult to clearly identify the terminals with confidence; the interpretation of this monument is now doubtful.

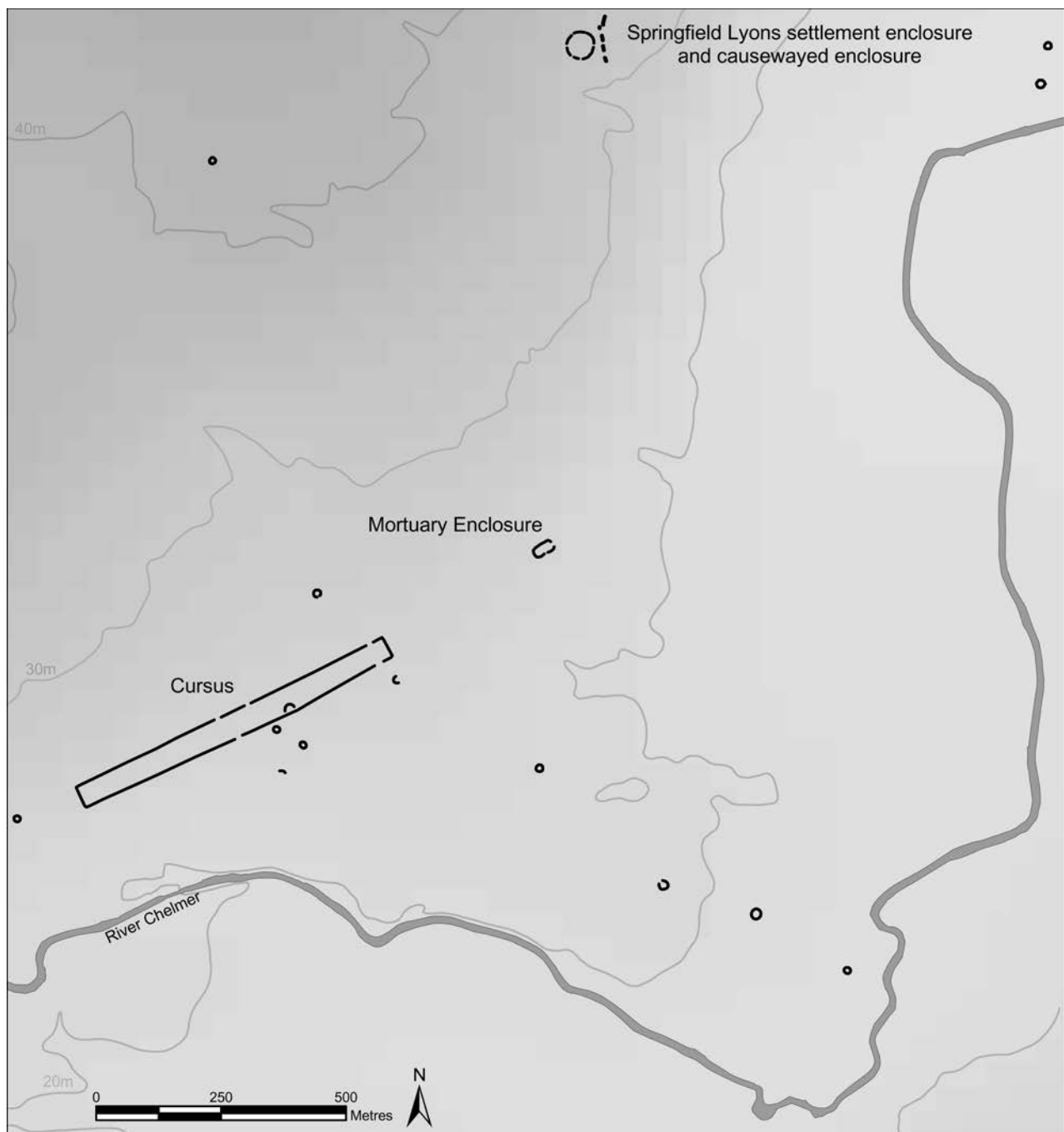


Figure 2.10 The cropmark landscape of the Springfield cursus monument, in relation to the local topography, the River Chelmer and surrounding cropmarks, including the mortuary enclosure to the north-east and the Springfield Lyons Bronze Age settlement enclosure

Other sites have been identified as possible cursus monuments including the site 300m south-east of the causewayed enclosure at St Osyth (see Fig. 2.35, below). This possible cursus site measures *c.*285m by 85m with ditches that appear to be of varying character, with the east side of the monument more substantial and segmented and a less substantial ditch to the west side of the monument (Saunders 2007, 6). It is possible that the apparent causeways across the ditch formed part of formal entranceways. Of particular interest is the ring-ditch 85m to the north of the monument which appears to be aligned with the cursus. This association of a cursus and a ring-ditch can be found elsewhere including at the Springfield

cursus site (Fig. 2.10) (Buckley *et al.* 2001, 103), which will be discussed in context later in this chapter (Section IV).

While not all large elongated sites can be definitively identified as cursus monuments, some do have enough similarities with the established morphology to be included as possible cursus sites. Two such sites are located in the north-west of the county (A and C, Fig. 2.11). One of these elongated enclosures (EHER 19716) measures 260m by 32m and could have evidence for a central bank or mound, which is faintly visible as a darker mark between the parallel ditches, and includes a possible macula at the east end. A second enclosure (EHER 19719)

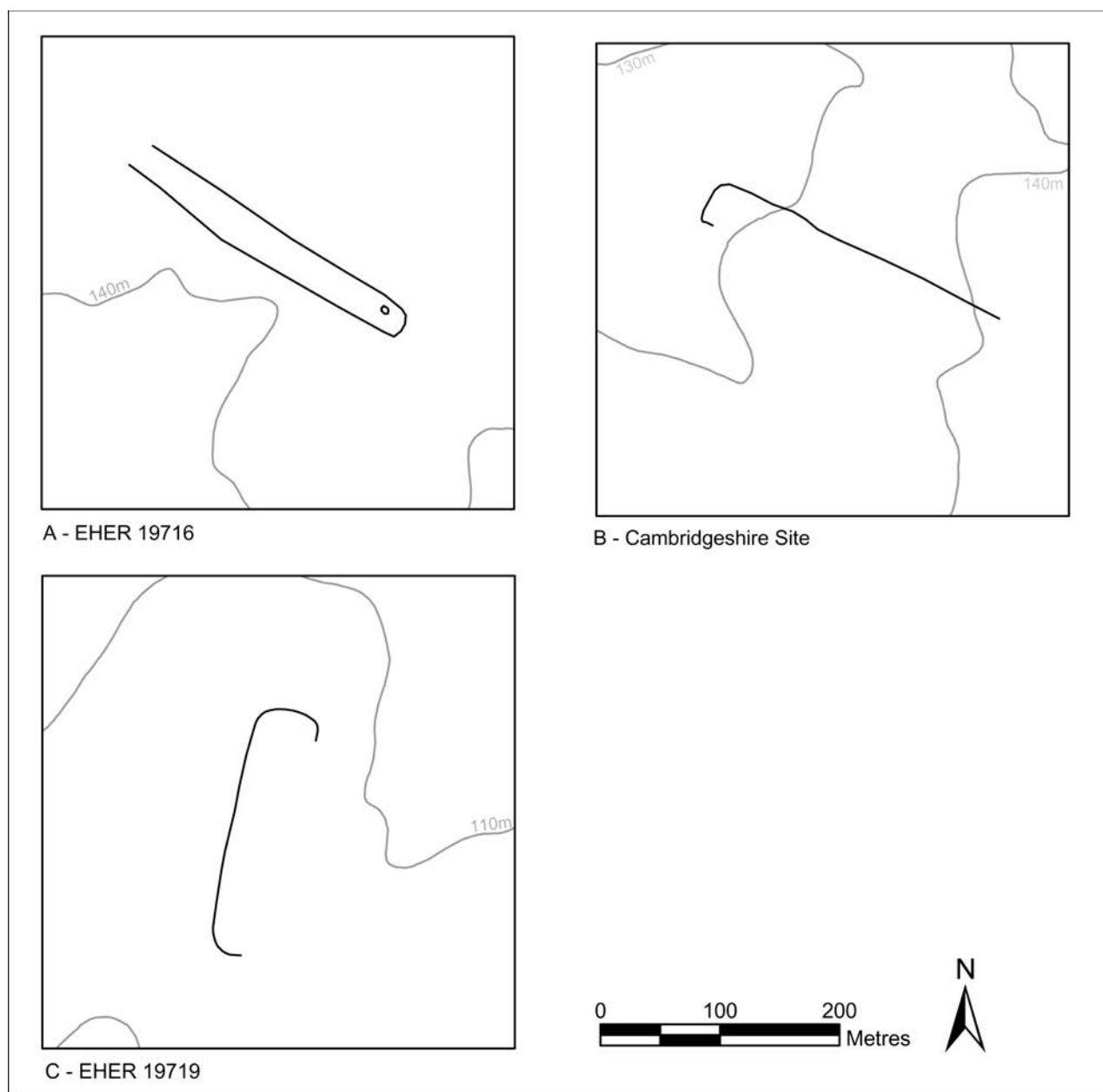


Figure 2.11 Elongated enclosures visible as cropmarks in north-west Uttlesford

is a short distance to the north and measures approximately 200m by 50m and has rounded corners. A third elongated site was also identified close by (B, Fig. 2.11), but is over the border in Cambridgeshire, so while it was mapped it was not included in the MORPH2 database. The relationship between these sites and their topography will be looked at later in this chapter (Section IV).

While the morphology of a cursus monument appears to be well defined there have been problems with misinterpretation on the basis of aerial photographic evidence in the past so it should not be assumed that all elongated enclosures have prehistoric ritual origins.

Hengiform monuments

The definition of a henge incorporates roughly circular sites with a wide spectrum of diameters, an external bank and an internal ditch, with one or more entrances. Often the ditches appear to have been constructed in segments rather than as single ditched features (e.g. at Cairnpapple, West Lothian

and Milfield North, Northumberland; Harding and Lee 1987, 42), which is similar to construction methods noted for causewayed enclosures (for example Burford in Oxfordshire and Freston in Suffolk, Oswald *et al.* 2001, 35), but this can often only be detected when the site is excavated rather than seen from the aerial evidence. According to English Heritage, no henge ditch is less than 2.5m across and many are over 8m wide (English Heritage 1988b). The original classificatory system of Class I (ditch and bank and single entrance) and Class II (single ditch and bank, with two or more opposing entrances) was used by Piggott and Piggott (1939) and was further developed by Atkinson *et al.* (1951). Other classification methods have been suggested (e.g. Clare 1987), but none is completely satisfactory, so the traditional classificatory system, based on the number of entrances and ditches, will be adhered to here; this classificatory system is used in both the EHER and the MORPH2 project database.

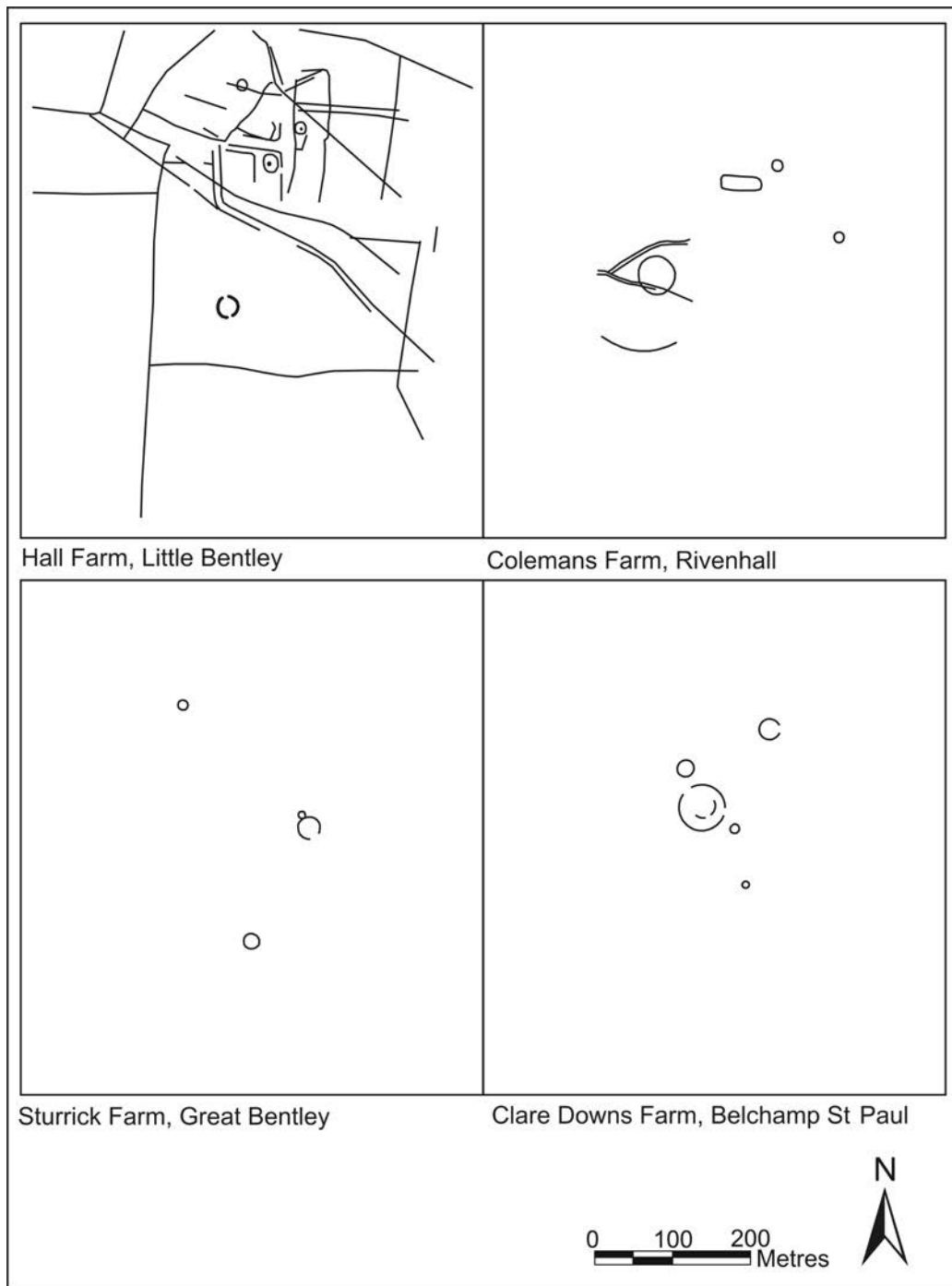


Figure 2.12 Cropmark Enclosure Project sites

The original purpose and function of henge and hengiform monuments is not fully understood. Due to the construction of a henge, with the bank outside the ditch, it would appear to be generally unsuitable for defence (Atkinson *et al.* 1951; Burl 1969). However, Thomas (1999a, 54) suggests that the banks would have restricted the visibility of actions taking place within the interior; indeed it would also have restricted the visibility from inside the monument to the surrounding landscape. The lack of evidence for domestic or secular use had led to the suggestion that henge and hengiform monuments were used for ceremonial purposes and Thomas again argues that the construction of these monuments and the way in which they were used may have provided ‘stations’ in

space, keyed into the movement of people and animals (Thomas 1999a, 61). This is a key point as the actual location of the site may be an indicator to its interpretation. Henges are often associated with other ritual, ceremonial and burial monuments and it may be this that allows the identification of the monuments through aerial photography, rather than an interpretation based on morphology alone. For example, the henge at Hutton Moor, North Yorkshire has several smaller round barrows associated with it and the three classic henges at Thornborough also have smaller round barrows in the vicinity (Harding and Lee 1987). Therefore circular sites with one or more entrances, with associated round barrows, could be considered as henge monuments.

In addition henges across the country are located in both upland and lowland positions, although locations in wide river valleys are the most common. Aspects such as proximity to water/streams might also be of integral importance to henges and their use. Richards (1996, 316) uses movement and flow of water through the landscape as a metaphor for movement and journeys within and to the henge monuments.

Using morphological analysis seventy-six sites could be identified as possible hengiform monuments, ten of which are visible on aerial photographs and classified as henges in the EHER and eight of these sites have one or more entrances. All the sites recorded by the NMP are either circular or sub-circular and range between 18–25m in diameter. The remaining sixty-six sites could be included within this category of monument, as they all have a single ditch, one or more entrances and are between 10–35m in diameter. The interpretation within MORPH2 of these sixty-six sites varies from ‘hutcircles’ and ‘round barrows’ to ‘windmills’, all of which can produce similar cropmarks when ploughed out (Bradley 1998, 144).

At a large scale it is not possible to narrow down the significant number of circular enclosures and identify them as henge monuments with confidence and to date Essex has no unambiguous henge monument sites identified from aerial photographs. Harding and Lee (1987, 41) demonstrate that all two-entrance sites have a ditch on the inside of the bank. None of the Essex sites (including the ones identified as henges) have any indication of an external bank. Even excavation at the sites such as Belchamp St Paul revealed little evidence to indicate mounds or banks (Brown and Germany 2002, 47). A newly discovered site near Boreham has also demonstrated this; excavated remains have been tentatively interpreted as a henge based on morphology, internal features and finds. This site, located within a round barrow cemetery, has opposing entrances, a number of large post-holes with remnants of timber still *in situ* within the enclosure ditch, but most importantly, no evidence for a bank has been identified (M. Germany, pers. comm.). This leads to the question why? Are the Essex henge sites slightly different from ‘classic’ sites elsewhere in the country? Or is it that the banks have not survived and are not identifiable on the aerial photographs? Or it may simply be that the sites so far identified on the aerial photographs based on their morphology are not henges, but hengiform or causewayed ring-ditches, and there never was an external bank.

As simple morphology alone does not appear to benefit the interpretation of henge and hengiform monuments, other aspects of these sites should be considered. While the diameter of henge sites varies nationally between 10–190m, sites with two entrances appear to be larger on average. The circular enclosures within Essex have, on average, an internal diameter between 10–20m which, while not diagnostic in itself, it may help when the location of these sites is also considered. As mentioned previously, the proximity of water is considered to be an important factor in the location of henge monuments. Twenty-seven (35.5%) of the seventy-six sites are located within 500m of a river, while forty-one (53.9%) are within 1km, though this does not take into account whether the river was visible from the monument. Only four of these sites were considered to be possible windmills and it would seem likely that many have prehistoric origins, although Essex does have a

considerable number of windmills (297 are identified within the EHER to date, of which only thirty-two were identified and interpreted/mapped during the NMP).

An example of the difficulties in reliable interpretation based on cropmark morphology alone is the outcome of the recent Essex Cropmark Enclosures Project (Brown and Germany 2002). Four sites were examined, all of which had been considered to be possible henge monuments (Fig. 2.12). The sites, all circular enclosures with one or more entrances, at Coleman’s Farm, Rivenhall, Sturric Farm, near Great Bentley, Hall Farm, near Little Bentley and Clare Downs Farm, Belchamp St Paul, were investigated by excavation and the surrounding area fieldwalked. The results of this work showed that the two sites at Great and Little Bentley were the remains of medieval windmills. The Little Bentley site, prior to the project, was considered to be one of the best examples of a Neolithic henge monument in the east of England (Brown and Germany 2002, 50) and has been discussed as an important example of a henge elsewhere (Holgate 1996; Harding 1995). The finds at Rivenhall indicated that the enclosure was of prehistoric date and had an extensive period of use (Brown and Germany 2002, 47), but was probably not a henge monument, and the enclosure at Belchamp St Paul was considered to be more than just a simple barrow, but the interpretation could not be taken further.

This category of monument highlights the grey area within prehistoric studies, where aerial photography is essential initially to identify sites, but is limited in the amount of further information that can be gained, when fundamental aspects of the monument class, such as a bank, are not visible.

Ring-ditches and round barrows

Another category of monument closely linked to henge monuments is the round barrow. Like henge monuments, round barrows can be seen as an indication of social change with a move away from communal burial, within mortuary enclosures and chambered tombs to perhaps single burials.

Morphologically a round barrow is a sub-circular or circular (though few are strictly circular) mound, which may or may not be defined by an enclosing ditch that can range in size from 3m to 65m (English Heritage 1988c). In reality Essex has very few round barrows still extant in the landscape as they have been ploughed out in a similar way to long barrows. Only twenty-four round barrows are still upstanding in Essex. They are, however, visible as ring-ditches in various forms, from single ditched to concentric multi-ringed monuments. Some have a central pit (taken to be evidence for a burial), while others have one or more entrances (sometimes referred to as causewayed ring-ditches). Within this project sites that were visible as ring-ditches were often interpreted as round barrows (unless there was evidence to the contrary) and will be referred to as such, as it is the interpretation of these features that is of concern here rather than the descriptive form. While it is not disputed that technically a round barrow is a physical mound, which may or may not be surrounded by a ditch, this does not mean that a ring-ditch should not be referred to as a ‘round barrow’ or interpreted as such, especially as there are many comparable examples of ring-ditches that, when excavated have been shown to be the remains of ploughed-out round barrows.

In 1979, 1542 ring-ditches and barrows had been recorded in Essex (Priddy 1981, 90), although not all of these are of prehistoric origin and some now fall outside Essex as boundary changes have occurred (for example, the Bartlow Hills are now within Cambridgeshire). Ring-ditches are the most prolific site type identified and many, based on their morphology, have been interpreted as round barrows, probably dating to the Bronze Age. The identification of barrows poses a similar problem to that of henges, as there is not necessarily a single typology for this kind of site and therefore ring-ditches could be mistaken for many other site types, including small henges, roundhouses and possibly windmills.

The MORPH2 database records individual round barrows whereas the EHER assigns a single record number to spatially clustered groups, therefore the number of recorded round barrows appears higher in the project database. However, 684 round barrows or ring-ditch sites or groups are recorded within the EHER, twenty-four of which are still upstanding; of these several have been mapped. Those upstanding sites that were not mapped were not visible on the aerial photographs due to tree cover. This number of upstanding round barrows is considerably less than survive in adjacent counties, such as Suffolk and Norfolk. This is mainly due to intensive agricultural practices, rather than an initial lack of this monument type. Many of the upstanding barrows are of Roman date and some have been excavated. This has highlighted that there is often nothing morphological to distinguish them from other prehistoric round barrows.

In Essex 1,605 circular or sub-circular enclosures have been mapped by NMP (including 1,055 sites that have been interpreted as prehistoric round barrows), of which 1,599 are less than 65m in diameter. It cannot be assumed that all of these sites represent the vestiges of prehistoric burial activity.

The use of round barrows as burial monuments has a long history and some may have been constructed earlier than the Bronze Age, for example, Westbury 7, Wiltshire (Thomas 1999a, 151–2) and the ring-ditch excavated within the cursus monument at Springfield (Buckley *et al.* 2001, 155), both of which were Neolithic. Others may be considerably later in date as the use of this monument type lasted from the Neolithic through to the Roman and Saxon periods (as shown in Oswald *et al.* 2001, fig. 1.2). This hampers the identification of prehistoric ring-ditches and while many individual sites probably are round barrows, further interpretation is not possible without more complete investigations. Consequently, discussion here will focus on clusters of three or more monuments, as it is felt that these sites are more likely to be round barrows, given the many examples ring-ditch groups forming clustered cemeteries across the region, although dating is still problematic.

Round barrows are often regionally clustered and, although found right across Britain, areas such as Derbyshire and the upper Thames Valley have a large number of sites. More local to Essex are the areas around Stratford St Mary and Brightwell, Suffolk that both have high concentrations of round barrows (Martin 1981, 83–4). Within these regions, barrows are often clustered and this suggests that single burial was practised by some communities and not others (Thomas 1999a, 152). There are various types of clustered cemetery, including linear, nucleated and dispersed. Sites were often located near

other monuments; in this way the location of sites further identified people and location (Bradley 1998, 146). It would therefore make sense to see round barrows within the landscape of earlier monuments, including cursus monuments, causewayed enclosures and henges. The re-use of henge monuments as cemeteries or the construction of round barrows in relation to henge monuments shows the continuity within communities even when burial and ritual practices were changing (Thomas 1999a, 155). There could be examples of this type of monument continuity within Essex.

Analysis of these monuments is made easier when looking at clusters of sites, as it is less likely that other forms of monument would be clustered together in the same way. Spacing at round barrow cemeteries varies considerably but few sites have spacing greater than 150m (English Heritage 1988c). A total of 754 circular enclosures are in clusters no more than 150m from their nearest neighbour and these sites form 107 clusters around the county. It would seem sensible to suggest that these are more likely to be round barrow cemeteries of possible Bronze Age date.

Several of these ring-ditch clusters within Essex have been excavated. Fieldwalking over several decades at Ardleigh led to one of the most extensive investigations of a cropmark complex and one of the largest concentrations of Bronze Age burials in East Anglia (Brown 1999, 1). Excavations at this site revealed many more monuments than were identified from the aerial photographs. None of the round barrows was particularly big, with the largest excavated only 25m in diameter and this may have contributed to the lack of identification from the aerial photographs. Interpretation of the excavated evidence suggests that the larger barrows were constructed in pairs with further monuments constructed around them over a prolonged time, infilling the area (Brown 1999, 162–172). This is backed up by the excavated evidence that showed a ditch that apparently had to be ‘flattened’ in plan to avoid cutting into another adjacent and earlier ring-ditch. The final stage of development of the cemetery is thought to be a series of cremation burials centrally placed within small ring-ditches located very close, within 1m in some cases, to established barrows. While the phases of developments of the Ardleigh barrow cemetery are based on excavation evidence, it is important for the phasing of non-excavated sites elsewhere.

Within a short distance of Ardleigh there are several other large clusters of possible round barrows, such as the site at Elmstead Hall (EHER 2580), where fourteen small ring-ditches, measuring no more than 10m in diameter, are clustered to the west of a single larger ring-ditch with a diameter of 25m (Fig. 2.13). It could be suggested that the individual larger ring-ditch (A) is perhaps the original monument and that the cluster of small ring-ditches, which are all within an area 70m by 70m, are later additions. There appears to be pairs of monuments, where two similarly sized ring-ditches were constructed very close to each other, in some cases almost touching. The concept of ordered construction was used to interpret the cemetery at Ardleigh, where the barrows were divided into groups based on their diameter and the width and depth of the ditches. Such a division of monuments into size groups gives a good insight into the layout and structure of the cemetery at Ardleigh (Brown 1999, 162–4) and has also been discussed for numerous sites

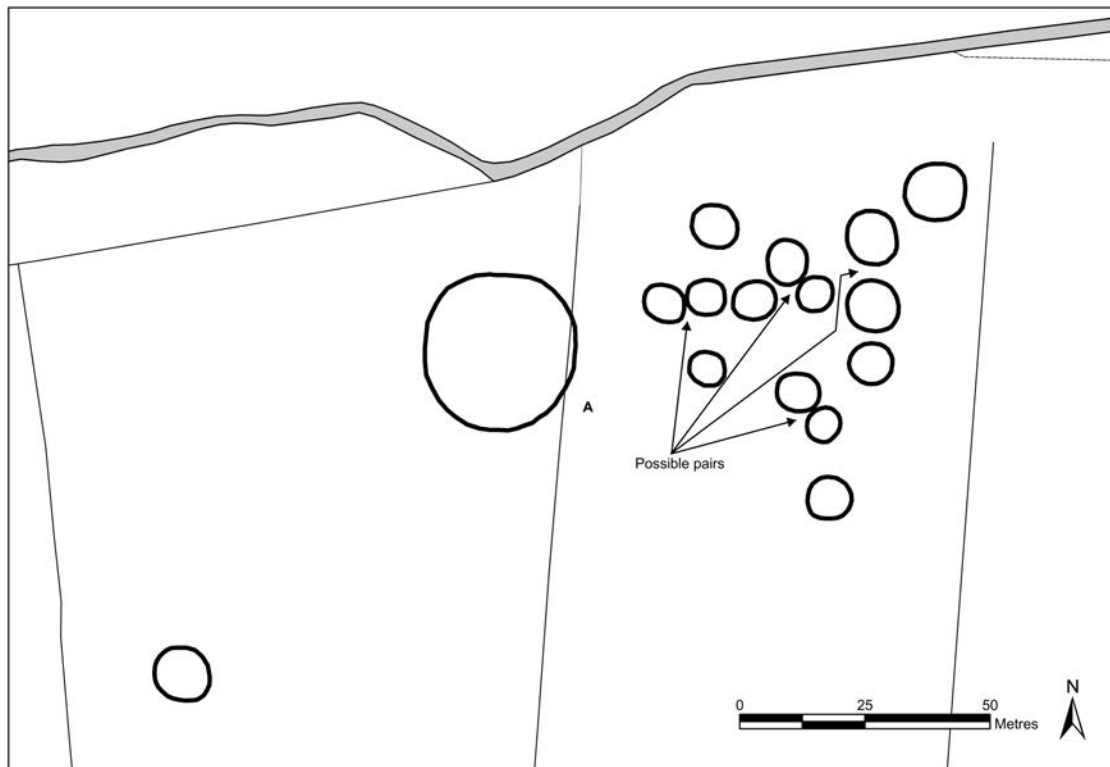


Figure 2.13 Cropmarks of a possible round barrow cemetery at Elmstead showing a single large ring-ditch (A) and possible 'pairs' of ring-ditches within the main group

across southern England by Garwood (1991). This concept will be used in the case studies later in the chapter to examine the possible development of the cropmark landscape, expanding from a single site or cluster of monuments to a larger landscape zone.

A number of cemeteries similar to Ardleigh and Elmstead are known across north-east Essex. At White Colne (EHER 8627), a number of urns were recovered during the 1920s, but no aerial photographs exist, and similar barrow sites can be found at Brightlingsea, Little Bromley and St Osyth. The excavations at Brightlingsea showed that the site was strikingly similar to Ardleigh (Lavender and Clarke 2008). The site comprised a mixture of larger round barrows (seen as ring-ditches) with smaller ring-ditches and cremation burials. Whilst it is not necessarily the case that all the densest concentrations of ring-ditches are Bronze Age (Brown 1999, 175), it would seem likely that most are.

Another common spatial pattern of possible round barrows involves tight nucleated clusters of small ring-ditches sometimes numbering up to 30 individual sites, with larger individual more isolated sites within 150m. This pattern of tight clusters and isolated sites essentially 'connects' the nucleated clusters into a more linear form across the landscape. For example, this can be seen in the location of the groups of round barrows at Lodgewood, Brightlingsea (EHER 2142, Site C, Fig. 2.14) and Moverons Pit, Brightlingsea (EHER 16932, Site A, Fig. 2.14). The various clusters of round barrows and single monuments are spread over a distance of 1.2km and it is likely that elements of the clusters were intervisible. The general distribution of the round barrows can be seen in Figure 2.14. There are two clusters located at C and G, with larger more isolated monuments between the clusters (A, B, D, E and F). From this it can be seen that the

monuments form a coherent linear distribution along the ridge of higher ground. Viewshed analysis demonstrates that from the cluster at C, monument D is visible, along with sites B, F and some of cluster G. This changes very little even when the area is viewed from locations at B, D or F, although the cluster at G is only partially visible. This suggests that the linear nature of these monuments within the landscape could have been apparent and important when the structure of the cemeteries was established.

While the ring-ditch at B has been excavated and found to be of Neolithic date, the pair of larger monuments located at A are of particular interest. These are not visible from any of the other sites in the area. It would seem possible that as one moved along the ridge this pair came into view, after visual contact was lost from the other locations. Alternatively this pair might be more obvious from elsewhere in the landscape and the location was chosen so they were the first monuments visible as one approached from below the ridge, and the linear nature of the further monuments then became more apparent.

These tight nucleated clusters of round barrows appear to be particularly common on the Tendring peninsula. Elsewhere in the county there is a tendency towards more linear or wider clusters of sites, where monuments are still within 150m of each other, but not in tightly formed groups. A good example of this can be found at Loft's Farm (EHER 7904), north of the Blackwater estuary, where several round barrows are located within 150m of each other, but it would appear that only a small proportion of them would have been intervisible despite the close proximity.

While it is likely that many of these larger clusters are Bronze Age, there is still a problem with identifying individual or smaller ring-ditches. There appears to be a distinction between smaller clusters with between three

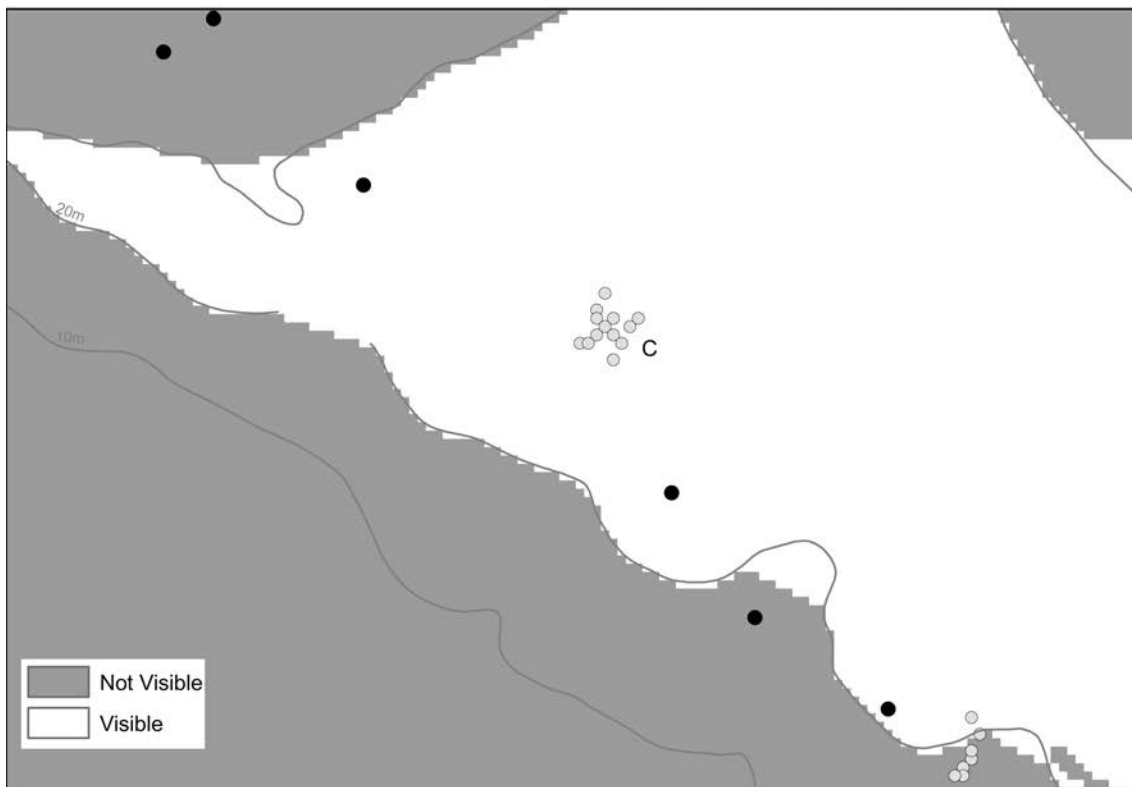
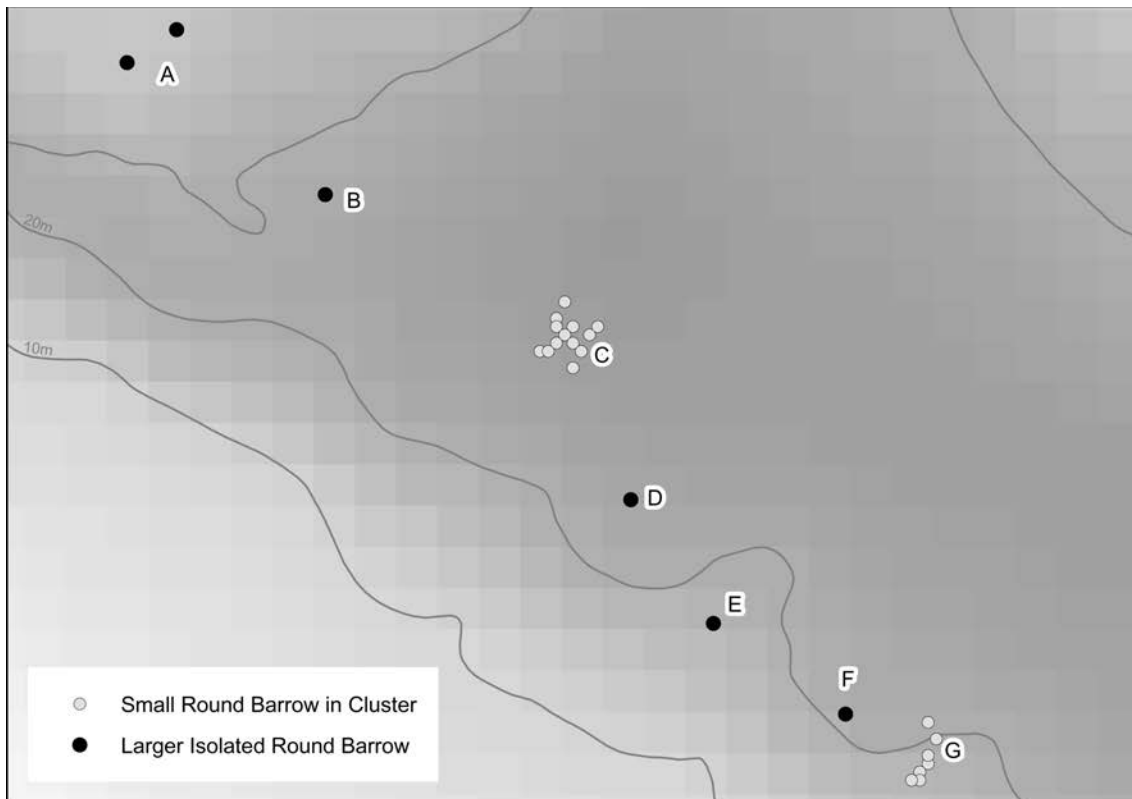


Figure 2.14 Distribution of round barrows and viewshed from C at Brightlingsea

and six monuments and groups of fifteen or more monuments. However, this distinction may be artificial as there are examples from excavation of many more ring-

ditches being excavated than were identified on the aerial photographs (for example, St Osyth; Germany 2007).

Clusters with three or four apparent round barrows appear to be more common in the north-west of the county. In an area between Great Chesterford and Audley End in the Cam Valley and the village of Chrishall 7.5km to the west, are nine groups of up to six ring-ditches in any one cluster. These clusters would suggest that the features are unlikely to be windmills or hengiform monuments, but they are still distinctly smaller groups than elsewhere. While this still does not automatically mean that they are Bronze Age round barrows it seems a sensible interpretation. Caution should be applied however; at Broomfield Plantation Quarry, Alresford, three ring-ditches identified on aerial photographs were excavated. While there was little dating evidence there was an indication that the site was Saxon. The site could have been casually used in the prehistoric period, but the three ring-ditches were broadly contemporary and there was no evidence for a larger cemetery (Bedwin 1986, 80).

The larger clusters of round barrows in the east of the county are mainly concentrated in the river valleys, with only a few more than 500m away from water courses. This would suggest that rivers played an important role in the location of burials and visibility outside the clusters was not as important here. However, only three of the nine smaller clusters in the north-west are within the river valleys. The others appear to be on higher ground overlooking rivers and in some cases just below the brow of hills. This could have made the sites more visible elsewhere in the landscape and may have had an effect on the location of other monuments; this will be considered in the Uttlesford study area (below).

These observations might highlight a regional difference, and this is investigated in the three case studies below.

IV. Case studies

Three areas (lower Chelmer and Blackwater valleys, north-west Uttlesford and Tendring) have been chosen as they represent a wide range of geology, topography and site types across Essex. All of the areas have varying levels of cropmark formations, but all have identified prehistoric ceremonial monuments. Figure 2.3 shows the location of the areas and of the main sites mentioned in the text.

Chelmer and Blackwater river valleys

The Chelmer and Blackwater valleys have been a major focus of archaeological investigations for many years with both survey work and excavation (*e.g.* Hedges and Buckley 1987; Brown 1997; Wallis and Waughman 1998). Some areas with dense cropmark complexes were under threat from development during the 1980s, so sites such as the Springfield cursus near Chelmsford (Buckley *et al.* 2001), Chigborough Farm and Slough House Farm near Maldon (Wallis and Waughman 1998), have been excavated. Within a 2km corridor along these river valleys from Chelmsford to Maldon (Chelmer) and from Maldon to Coggleshall (Blackwater), the NMP recorded 491 'prehistoric' monuments ranging from high numbers of possible round barrows (157) to simple enclosures (126) and trackways (52). There is also one cursus monument, four mortuary enclosures and long enclosures and a causewayed enclosure, as well as scattered prehistoric settlement evidence. These river valleys offer one of the highest cropmark concentrations in the county; is there a

good reason for this other than the valley offering suitable conditions for producing cropmarks?

Figure 2.15 shows the distribution of sites in the two valleys covered by the study area. There is a change in the nature of the monuments along the river valleys. To the east of Chelmsford there is a complex of major prehistoric monuments including the Springfield Cursus, a mortuary enclosure and many round barrows, but there is very little evidence for settlement. Several of the cropmarks have been excavated prior to development within Chelmsford. Moving east towards Maldon there are fewer major monuments, but an increase in the number of possible settlement enclosures and clusters of round barrows.

The River Chelmer drains the boulder clay plateau that dominates the geology in the north-west of the county, and moves through the glacial gravels towards the Blackwater estuary; the Blackwater Valley is very similar in nature. Both valleys provided routes linking the coast and the boulder clay plateau (Brown 2001, 92). The Springfield cursus and other monuments lie at a major geographical boundary where the clay plateau meets the gravels. There are concentrations of important sites along both rivers, implying that this area was a focus for activity for long periods of history. Some of the monuments to the east of Chelmsford have been investigated individually (Brown and Lavender 1994; Brown 2001; Buckley *et al.* 2001) and the Neolithic period of the Chelmer Valley was addressed by Brown (1997), so the discussion below concentrates mainly on other aspects of the prehistoric landscape, starting with the causewayed enclosure and cursus monument.

Within this landscape lay the Neolithic causewayed enclosure at Springfield Lyons (EHER 5788, Figs 2.4 and 2.10). This site was built at a location that may have had a significance to those who built it and, although is located on the edge of a spur of land, the site appears to face downhill towards the river valley. Viewshed analysis demonstrates that a semi-circular panorama, which includes the Springfield cursus and the River Chelmer, was also visible (Brown 2001, 93–4). The location may have been chosen for this view and this might imply that the land was fairly clear of woodland at the time, which might differ from evidence further down the valley. Although the environmental evidence suggests a reliance on woodland for fuel at the cursus site (Buckley *et al.* 2001, 149), the woodland cover may have been denser during the earlier stages of construction at the causewayed enclosure, as implied by the predominance of oak charcoal with narrow annual rings. The woodland may then have been gradually cleared as activity and demand for wood in the vicinity increased.

The causewayed enclosure consisted of a single circuit, constructed with deep pit-like ditches (Brown 2001, 95) and this could imply that a large amount of bank material was upstanding, which may have made the monument more visible on the horizon as the vegetation was cleared. Although there is little evidence for the activities that occurred at the causewayed enclosure there was an obvious importance within the landscape. This leads to the question of how this monument related to the others in the area.

The cursus monument lies within 250m of the modern River Chelmer, in the valley bottom, defined by the 20m contour (Fig. 2.10). This means that it is the lowest of all the major monuments in the area, along with the possible

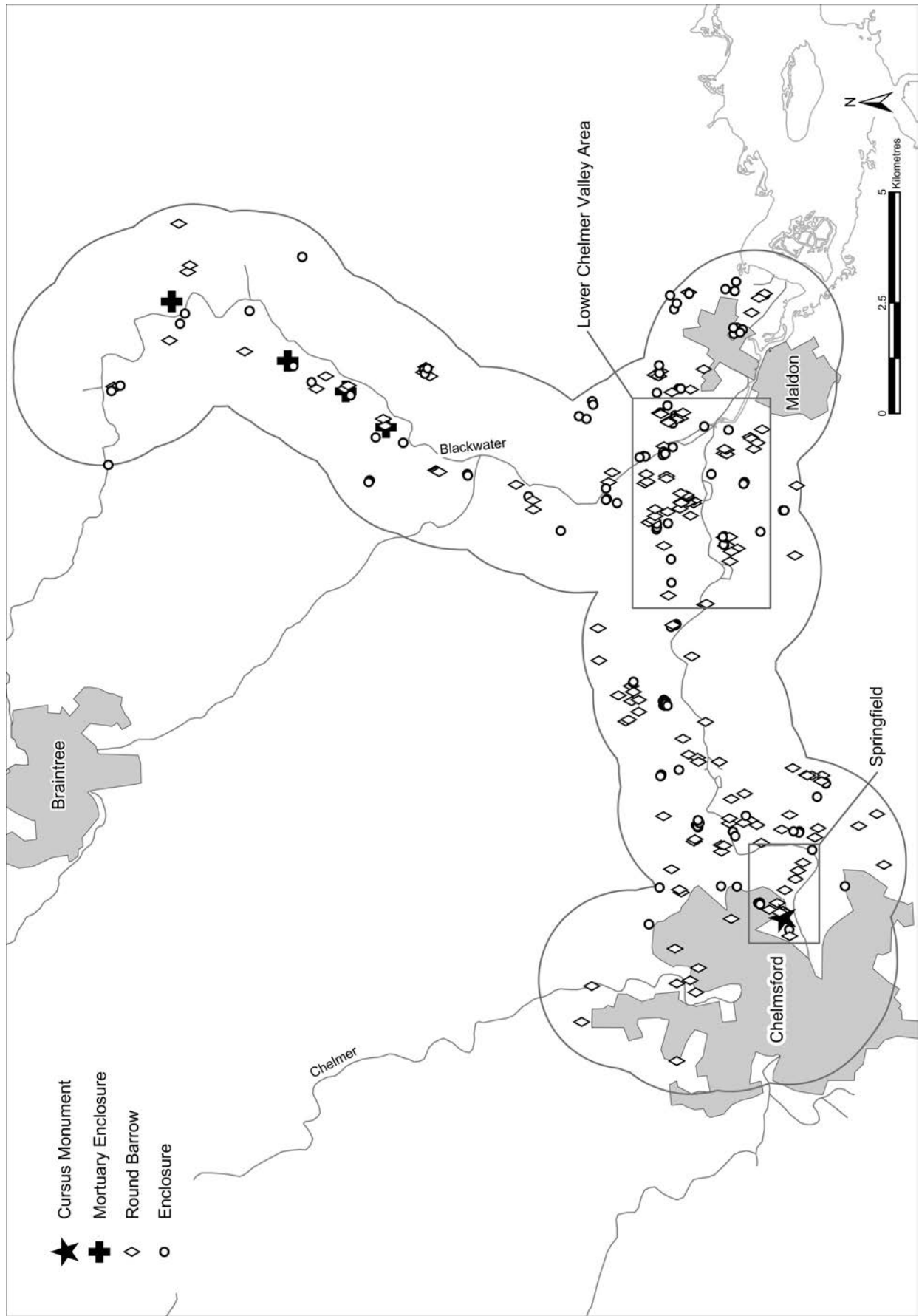


Figure 2.15 Distribution of mapped prehistoric cropmark sites within the Chelmer and Blackwater study area, with the location of the lower Chelmer Valley area

mortuary enclosure that is *c.*350m to the north-east. Unlike some other cursus monuments, the entire interior would have been visible from anywhere along its length (Buckley *et al.* 2001, 155); however, other elements within the landscape may not have been visible.

Although the construction of the causewayed enclosure was earlier than the cursus, the two monuments were broadly contemporary. This means that both these major monuments would have been visible elements within the landscape at the same time. It has been argued that cursus monuments fix part of a routeway by enclosing it (Last 1999, 87) and Buckley *et al.* (2001, 153–154) suggest that the Springfield cursus route had some significance before it was formalised and may well have incorporated particular elements of importance that were enclosed with a physical barrier formed by the ditch, which contain movement and controlled access. However, it is suggested that the movement along the monument may not have been direct, but that points of importance may have been visited ‘en route’ towards the eastern end (Buckley *et al.* 2001, 155). As the Chelmer Valley was a routeway from inland to the sea it seems that the cursus was fixing a small part of this route; it is also true that the cursus reflects and is influenced by, the local topography. The cursus appears to begin to ‘cut off’ a broad meander in the Chelmer river and this is a common feature of this site type. Brown (1997) suggests that during the winter the cursus could have had water in proximity on three sides. This is significant, as the location must have been chosen carefully enough that the monument was surrounded by water but was not flooded. It would appear that the causewayed enclosure was not visible from the cursus, but could be seen from the mortuary enclosure that was aligned with the cursus. The visibility from the cursus monument was restricted in other directions too. For example, although the visibility down the valley to the east from a small ring-ditch aligned with the cursus was very good, it would only have been possible to see a few hundred metres to the west; this puts the emphasis on the view towards the mortuary enclosure. This could suggest that while the cursus was a formalisation of a route or path, it was actually leading towards another significant place in the landscape. This place could have been the increased activity at the east end of the cursus, which included the substantial post holes that were excavated; these are thought to represent a timber circle *c.*26m in diameter (Buckley *et al.* 2001, 113). The activities associated with the cursus appear to be very different to those at the causewayed enclosure, as there is evidence linking the disposal of the dead with the cursus and there is no evidence for this at the Springfield Lyons causewayed enclosure. Both monuments were used until the later Neolithic, when they were abandoned.

Even abandoned monuments would still have been prominent features in the landscape for a time and there is no evidence that either monument was altered or destroyed immediately. However, other monuments became increasingly more important. A circular, late Bronze Age settlement enclosure, 60m across, was then constructed at Springfield Lyons (Fig. 2.10), partially over the Neolithic causewayed enclosure (Buckley and Hedges 1987a). An occupation site at Great Baddow (EHER 5752) 1.5km to the south-east, on the opposite side of the valley, had striking similarities to the Springfield Lyons settlement site. Both circular sites overlook the valley

(Brown and Lavender 1994, 10) and the monuments within it. It would appear, with current cropmark site distribution, that the occupation sites were located on either side of the valley and the monuments associated with the dead were located on the valley bottom.

Within 500m of the cursus there are seven possible ring-ditches, interpreted as round barrows as well as the mortuary enclosure. One of these barrows is aligned with the cursus and another is within the cursus ditches, which produced evidence of a Neolithic date (Buckley *et al.* 2001, 114). This demonstrated the importance of the area for the location of round barrows. Interestingly they are not spatially clustered and do not appear to continue to ‘cut off’ the Chelmer meander as the earlier monuments do; instead the round barrows are almost perpendicular to the eastern cursus terminal. Unlike other parts of the county, there are no visible large round barrow cemeteries; the monuments in this area appear to be relatively small-scale in a dispersed linear pattern, which is common along much of this valley.

The landscape appears to have been evolving continuously here, and there are several linear features immediately surrounding the cursus. Many of them respect the cursus ditch, while others actually cross the cursus and probably date from a later period, well after the cursus ditches had been filled. It has been suggested that once the cursus went out of use the ditches silted up quite rapidly due to the loose gravelly nature of the subsoil (Buckley *et al.* 2001, 115). This could mean that the area may have held a different significance once the physical evidence of the larger monuments was lost and the area was utilised to suit a specific purpose rather than to respect an earlier period.

The lower Chelmer Valley

The cropmark layer produced by the NMP has been pieced together through the examination of many aerial photographs and is often interpreted as an entire cropmark landscape. It can often be problematic to interpret cropmarks from individual periods and, without any excavated evidence, dating is based on morphological analysis and comparison. A combination of aerial survey, ground survey and excavation contributes to a greater sense of understanding regarding the development of the Historic Environment. Complex cropmark sites are often examined as a whole to enable the Historic Environment to be characterised and interpreted, while individual features are examined and placed chronologically to explain how complexes were established and how they might have developed. The excavation evidence at Ardleigh demonstrated how the round barrow cemetery grew and how the complex relationships between individual barrows may have developed and influenced the location of others (Brown 1999, 162–72); likewise at other cemeteries such as Brightlingsea, as discussed earlier in this chapter.

The following examination of the cropmark landscape will attempt to explore how this landscape developed and changed over time, how clusters of monuments developed and how individual monuments may have influenced others. It will particularly examine the relationship between monuments that are not directly connected and how visibility and topography might have affected the location of monuments. This work is based on the excavation evidence where possible and will draw



Figure 2.16 Aerial photograph of the Langford Hall cropmark enclosure and ring-ditches (copyright Essex County Council)

conclusions from sites elsewhere in the county (such as Ardleigh and Brightlingsea). It is just one possible interpretation of how the monuments within the landscape, that are now visible only as cropmarks, developed.

An area to the west of Maldon (Fig. 2.15), covering approximately 12 square km, shows that an interesting array of monuments are visible as cropmarks and appear to influence the positioning of other archaeological features, with extensive activity from all periods. Geologically this area is largely Pleistocene terrace gravels associated with the rivers. The soils that developed make this an area with good potential for the development of cropmarks. Most of the cropmarks are between 5–30m OD with approximately sixty (34%) sites below the 10m OD contour. There is evidence for landscape organisation with extensive linear features, some of which may represent prehistoric settlement activity but are difficult to classify. There is evidence in several places for settlement incorporating monuments associated with the dead, for example the enclosure at Langford Hall near Maldon (EHER 7870) (Fig. 2.16). The lower part of the Blackwater Valley appears very similar to the lower Chelmer Valley, with some of the possible round barrows being ‘enclosed’ by settlement activity, while the larger monuments such as mortuary enclosures and long enclosures are further up the valley (Fig. 2.7) away from the confluence of the two rivers and the estuary.

There are 176 prehistoric monuments within this area, with a high concentration of smaller monuments. The vast majority of these are ring-ditches thought to represent ploughed out round barrows, enclosures or trackways. The morphology of some of these sites is very similar, and clusters of monuments can be identified.

There are no major Neolithic or Bronze Age monuments, unlike further up the Chelmer Valley (Wallis and Waughman 1998, 218). Often round barrows were built in close context with earlier and bigger monuments, but this is not the case in the lower Chelmer Valley. It may be that the meaning of the landscape was different in this area because it was not settled in the same way. It could be suggested that by the time this area was settled permanently the larger monuments, such as causewayed enclosures, cursus monuments and henges, had gone out of use and hence are absent from the cropmark record in the area. As is often the case, occupation evidence for the Neolithic and early Bronze Age is sparse (Wallis and Waughman 1998, 220); however, the evidence for Bronze Age burial is more apparent. The Chelmer and Blackwater valleys have some of the densest concentrations of ring-ditches in Essex (Priddy 1981, 99) and this small area is no exception, with fifty-six sites interpreted as round barrows. All the round barrows within this area are relatively small, measuring 5–23m in diameter with an average of 12m. The visible evidence suggests that the

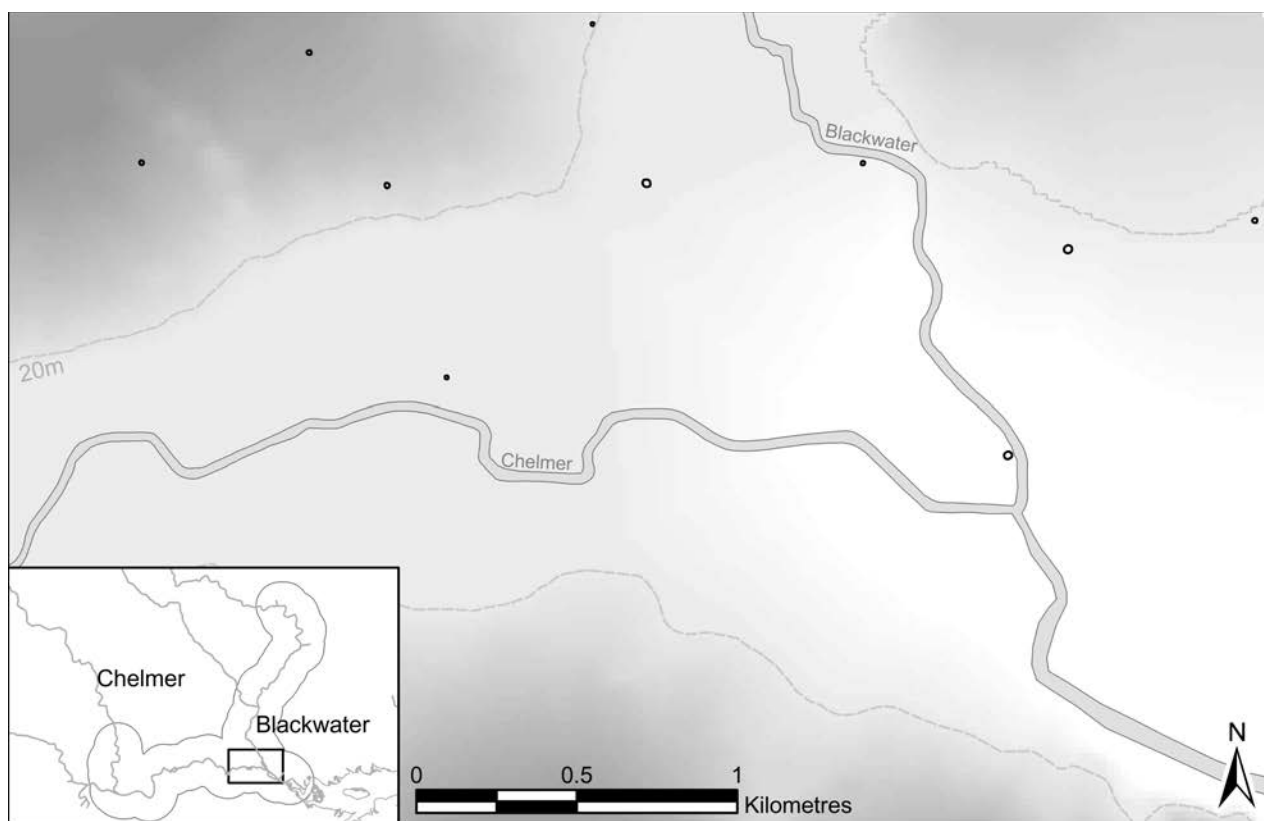


Figure 2.17 Possible first phase of proposed monument development, based on the relationship between cropmarks and their surrounding landscape, with single isolated monuments constructed first in small woodland clearances. Inset showing location of the lower Chelmer Valley area

monuments are constructed of between one and three circuits of ditches or pits.

Evidence from the Stumble, an intertidal site to the east of this area, suggests that there was small scattered settlement in successive woodland clearances during the Neolithic (Wallis and Waughman 1998, 218) and it seems likely that dry land sites within the study area were very similar. It is suggested that there would have been woodland regeneration at the abandoned sites, which would ensure that very little evidence was left to become visible on aerial photographs. However, recent excavations at Langford Hall of several ring-ditches found that two were of late Neolithic date (Roy and Heppell forthcoming). It is suggested here that single, fairly isolated round barrows were the first to be constructed. Certain monuments were located along the river valley in close proximity to the river (today some of the ring-ditches visible are within 200m of the modern canalised river), while others were built on higher ground overlooking the rivers (Fig. 2.17). While the vegetation might not have enabled visibility between round barrows, it is possible that the earliest monuments were placed in the woodland clearances that may have been used for earlier activities or seasonal settlement. It would seem likely that the chosen site for burial monuments was in a landscape strewn with the visible presence of 'known history' (Garwood 1991, 17), of which we can now only see a small part.

The visibility of sites is highly restricted within the area and using line of sight (LOS) analysis it can be suggested that even without the complication of vegetation very few of these initial sites were visible to

each other, despite the local topography being relatively flat (this does not take into account the issue of reciprocity where one point can be seen from another but not *vice versa* (Wheatley and Gillings 2002, 210–11)). Viewshed analysis confirms that only three of the initial twelve sites were intervisible. This would suggest that visibility was not the main concern for the location.

Garwood (1991, 15) notes that barrow sites can be associated with a concept of descent that can take several forms; two of which are the siting of barrows beside earlier monuments and the elaboration of existing mound structures. Using Garwood's conclusions regarding these spatial associations within the development of round barrow groups and experience elsewhere in Essex, it is suggested that once single monuments were established, some would have been chosen to be the 'core' groups, perhaps because of an ancestral link or simply because of the location. Existing mounds might have been made more elaborate, while secondary 'pairs' were constructed. Again there is evidence for this at Langford Hall where the original ditch of one of the excavated ring-ditches had been re-cut and was enlarged with an outer ring (Roy and Heppell forthcoming).

Within the study area, based on their size, morphology and spatial relationship, several 'pairs' of round barrows seem to have been constructed (Fig. 2.18) and these would appear to be slightly smaller than the original isolated mounds. At least five new sets of pairs are visible while there are two examples of a second mound being added in proximity to an original, while at A the original barrow may have had a ditch added and the barrow made more elaborate. Several of the pairs of round barrows would

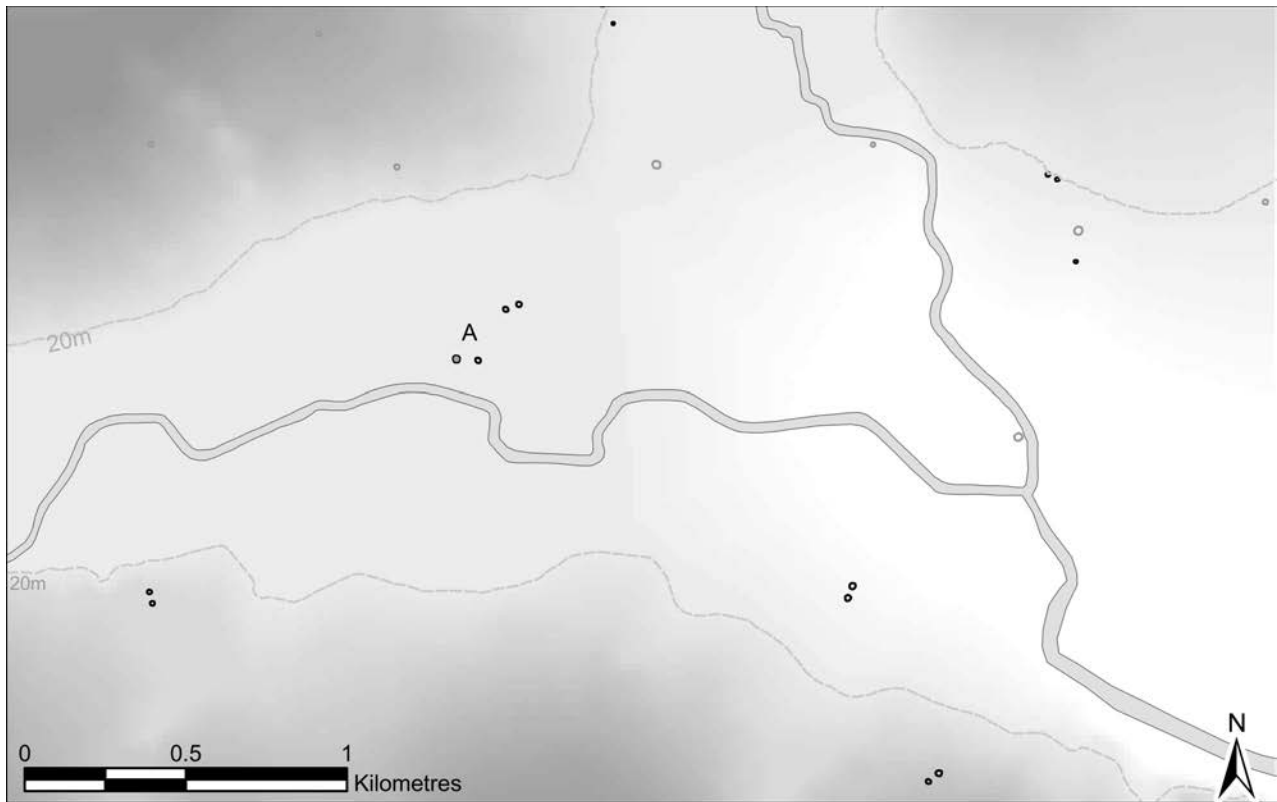


Figure 2.18 Possible second phase of proposed monument development (earlier phase in grey), with either secondary monuments constructed to make 'pairs' of ring-ditches or pairs of new monuments constructed within the surrounding landscape. Four of the five new pairs would have been visible from the monuments at A

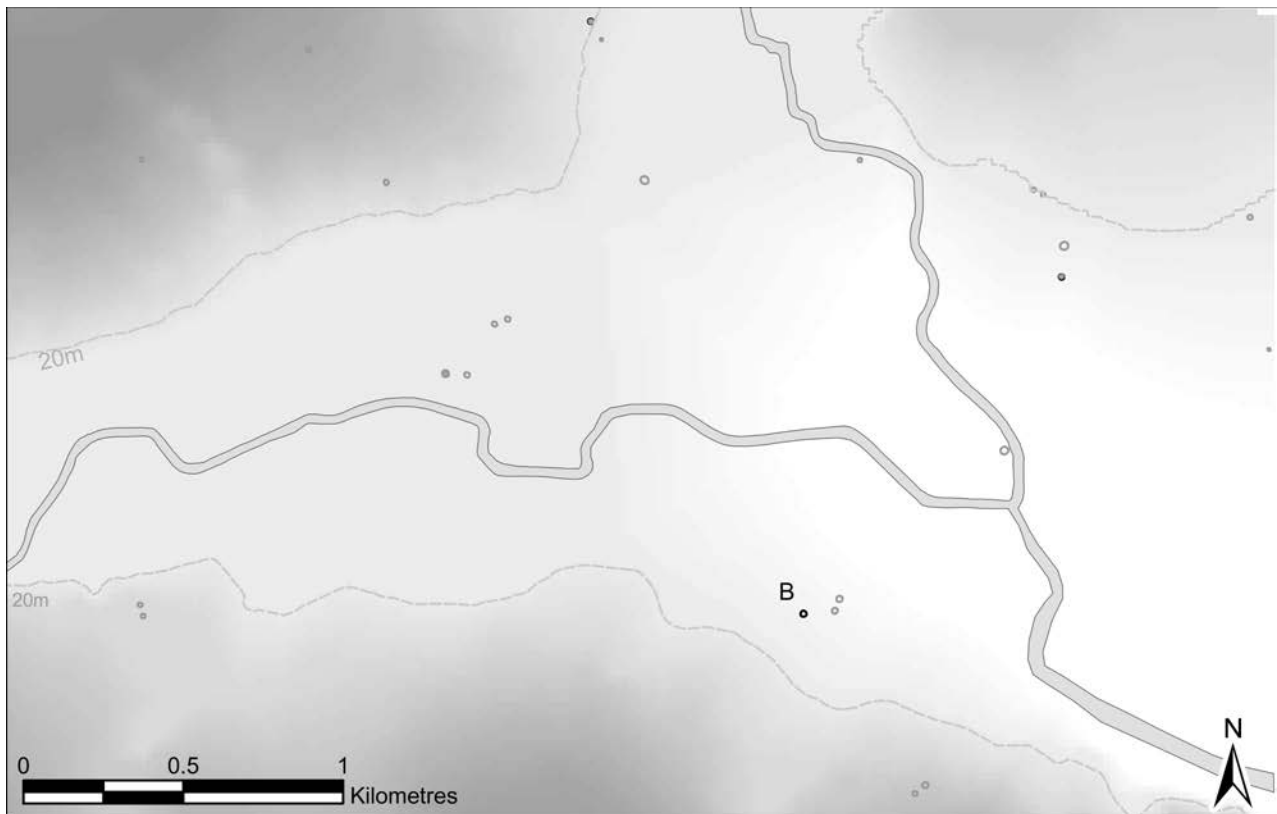


Figure 2.19 Possible third phase of proposed monument development (earlier phases in grey), with single isolated monuments constructed away from the pairs of ring-ditches, such as monument B, while others are made more elaborate with added outer ditches

have been visible from A, which may imply that this barrow was important, especially as it was made more elaborate.

If the construction of pairs of monuments with a direct association with one another was becoming more typical, it would also appear that intervisibility from one central site was important. It could be that landscape clearance was becoming more common so enabling increased visibility. Certainly by the late Bronze Age environmental data at Chigborough Farm and Slough House Farm, to the east of this area, consistently point to an open landscape where grassland was heavily grazed (Wallis and Waughman 1998, 220). Environmental evidence at Loft's Farm, 3km east of this area, also supports the theory that land clearance increased during the Bronze Age (Brown 1988).

Next in sequence could have been the monuments of a similar size to the monument pairs, that are located slightly further away from the original groups. For example, one of these monuments is approximately 100m from the original pairs (B, Fig. 2.19), while at other established monuments further rings were added to make the sites more elaborate, following on from the site at A in Figure 2.18. This may have been closely followed by the construction of dispersed groups of similar size mounds found away from earlier monuments. Often these monuments are 150–250m from each other and other potentially earlier monuments (Fig. 2.20). There could be a number of reasons why these barrows were being constructed away from earlier monuments, including the desire to be 'individual' while still maintaining a link to ancestry and therefore a claim to the land. Though some of the monuments are still quite dispersed, clusters of monuments are beginning to form.

Based on the evidence found at Loft's Farm, Brown (1988, 295) has suggested that a pastoral economy probably existed at this time in the lower Blackwater, and given the proximity and similar topographic and geological nature, the Chelmer Valley. This type of economy would have necessitated the clearance of trees and scrubland, possibly increasing visibility, though sites in the river valley would still have had a relatively restricted view towards sites further away from the rivers. The sites on the higher ground appear to have a good all round view of both the sites located on the valley floor and the sites on the opposing side of the river. It could be suggested that at this time a greater degree of landscape organisation was taking place and it is quite likely that some of the linear cropmarks visible are associated with this period of monument building but, at present, are too fragmentary to understand from the aerial photographic evidence alone.

It would seem likely that the smaller or perhaps partial round barrows were the last in the sequence of this monument type (Fig. 2.21). These were the most numerous type. In several instances there appear to be pairs of these smaller barrows (some measuring less than 10m in diameter) located in close proximity to the larger and possibly earlier ones. These pairs have been placed later in the sequence because of their smaller diameter compared with the other barrow pairs. At Ardleigh the very small ring-ditches, some only 3m in diameter, infilled the space between the larger groups (Brown 1999, 164). Garwood suggests that sections of the community might have manipulated burial practices to their advantage

(1991, 17). By relating new burials with older ones a clearer association with both the land and ancestors could be established and an expression to be part of a living landscape continued.

There is little doubt that there was settlement in this landscape from the Mesolithic, but there is little aerial photographic evidence until the later Bronze Age when the occupation of the river terraces was widespread (Wallis and Waughman 1998, 220); a picture supported by the cropmark evidence. Within the study area there are several non-burial related cropmark complexes that are probably prehistoric (Fig. 2.22). Three enclosures are of particular interest in relation to the ritual landscape. Enclosure C, at Langford (EHER 7870) (Figures 2.17 and 2.22) is 130m by 130m, with several features, including a trackway leading from it. Excavation at this site suggested that the trackway was Iron Age. The enclosure appears to have been built around an earlier round barrow, with the west ditch of the enclosure clearly diverting around to avoid the monument. This ring-ditch is 22m in diameter, which is too large to be a roundhouse (it would be the largest roundhouse in Essex to-date) and has therefore been interpreted as an earlier round barrow. The ditch essentially encloses the round barrow while cutting between the larger monument and a smaller one, fully incorporating it within the later enclosure.

There would appear to be a desire to incorporate earlier monuments that may have given the occupants an identity and connection to the past, much the same as building the smaller mounds in close proximity did. Bradley suggests that it is no coincidence that round barrows were selected for reuse in this way as they are often approximately the same size as houses built during the middle Bronze Age and this link can be found in areas such as Cranbourne Chase, Dorset (Bradley 1998, 157). There could be a similar link in the lower Chelmer Valley; there is evidence for lots of round barrows in the area and some of the largest appear to be similar in size to some roundhouses built during the period; they are interpreted as round barrows rather than roundhouses because of their location and spatial associations. Bradley goes on to suggest that the two landscapes of domestic and ritual in Cranbourne Chase are closely linked (1998, 158). Within the lower Chelmer Valley this link between burial mounds and apparent occupation enclosures occurs elsewhere. Enclosure D (EHER 7963) (Fig. 2.22) shows where a later enclosure again incorporates a round barrow. The north side of the enclosure has been diverted around the earlier monument. Again the larger round barrow appears to hold a greater significance and the smaller ones, while not removed, are not incorporated within the main enclosure.

A third site at Woodham Walter (E, Fig. 2.22; EHER 7859) also incorporates burial and domestic landscapes and has been partially excavated (Hedges and Buckley 1987). While this site also integrates a round barrow, various phases of enclosure construction would have, at different times, made the round barrow both internal and external to the main enclosure, implying that the importance of the monument changed during the period that the mound was extant. Unlike the other enclosures elsewhere in the valley, its construction ensured the destruction of at least one of the smaller mounds. It may have been important, within this landscape, that all three examples of settlement were visible to each other, so the enclosures were incorporating the immediate round

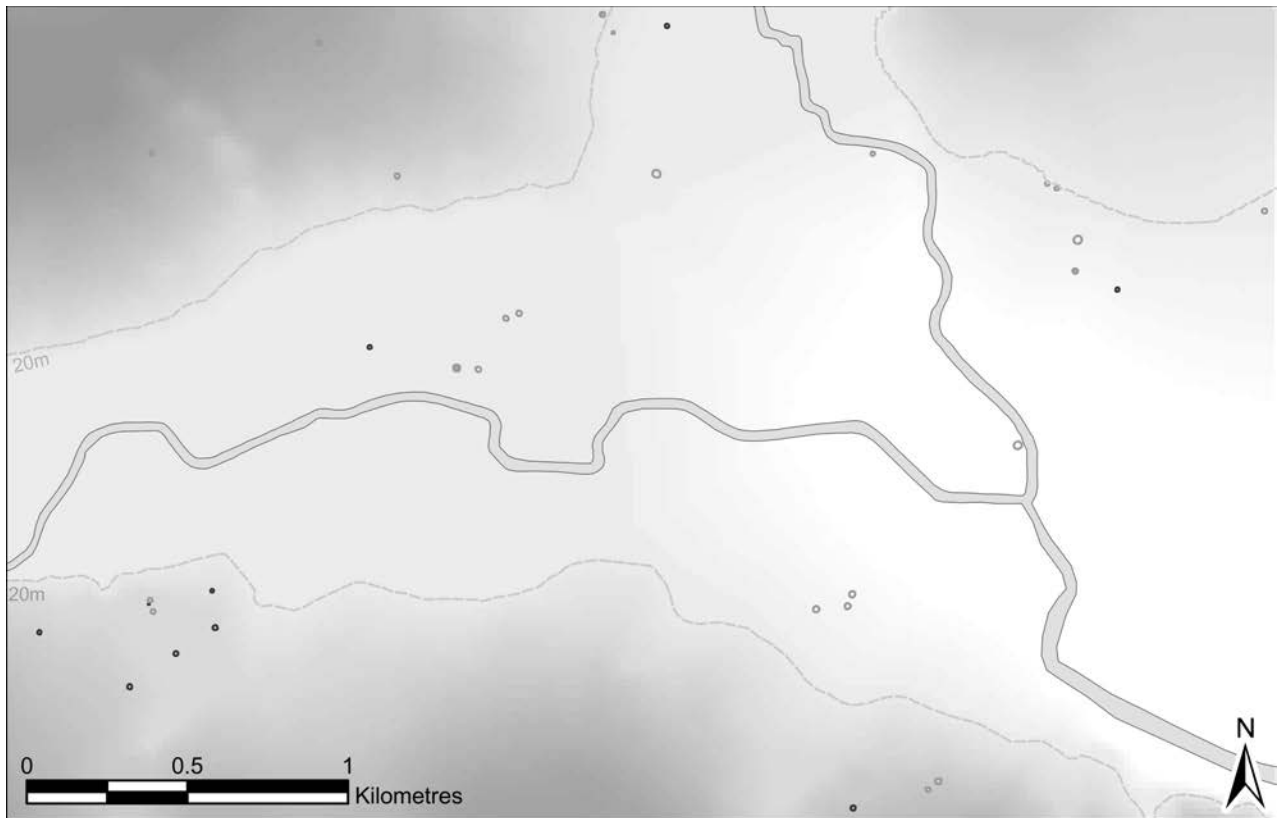


Figure 2.20 Possible fourth phase of proposed monument development (earlier phases in grey), with several dispersed monuments constructed up to 250m away from the earlier monuments

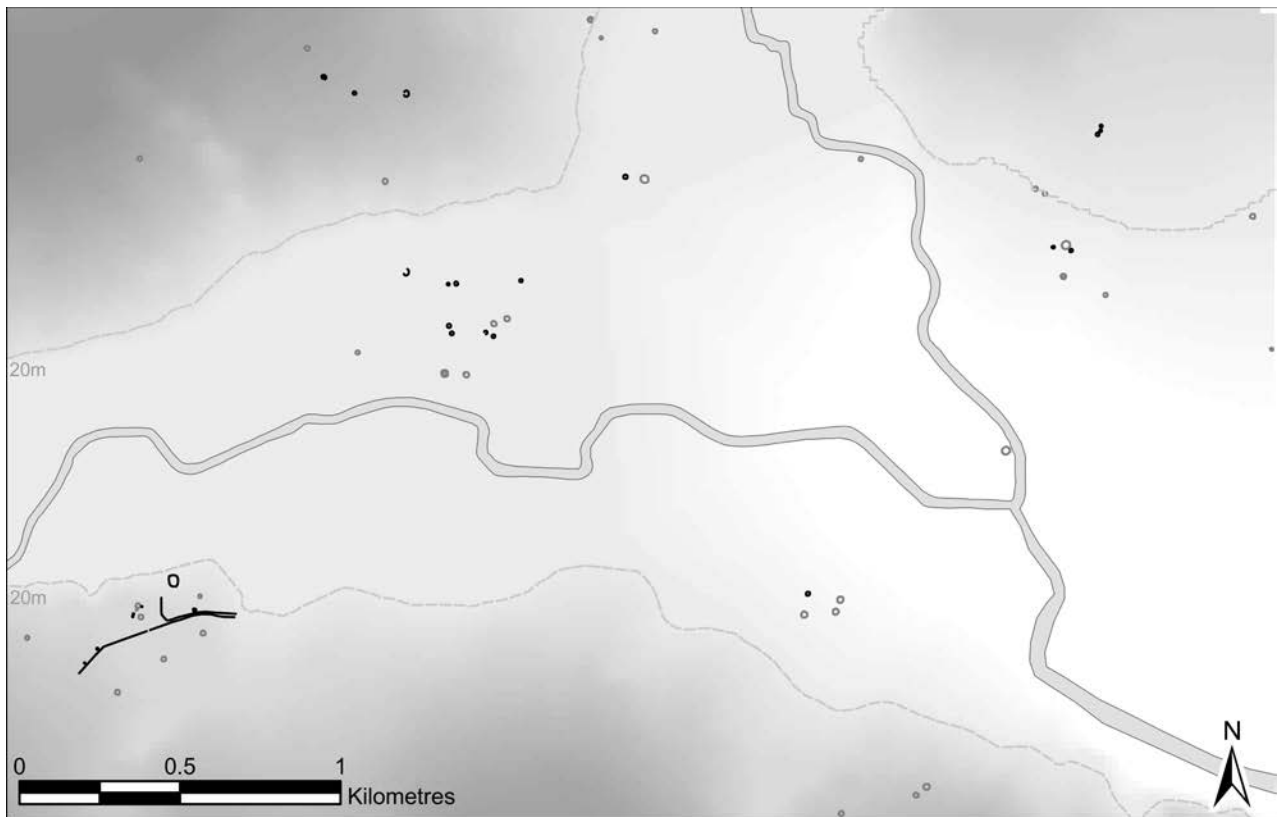


Figure 2.21 Possible fifth phase of proposed monument development (earlier phases in grey), with smaller partial round barrows constructed. In some instances these are constructed in pairs in proximity to other monuments. Other elements may also have been constructed, including linear features and small settlement enclosures

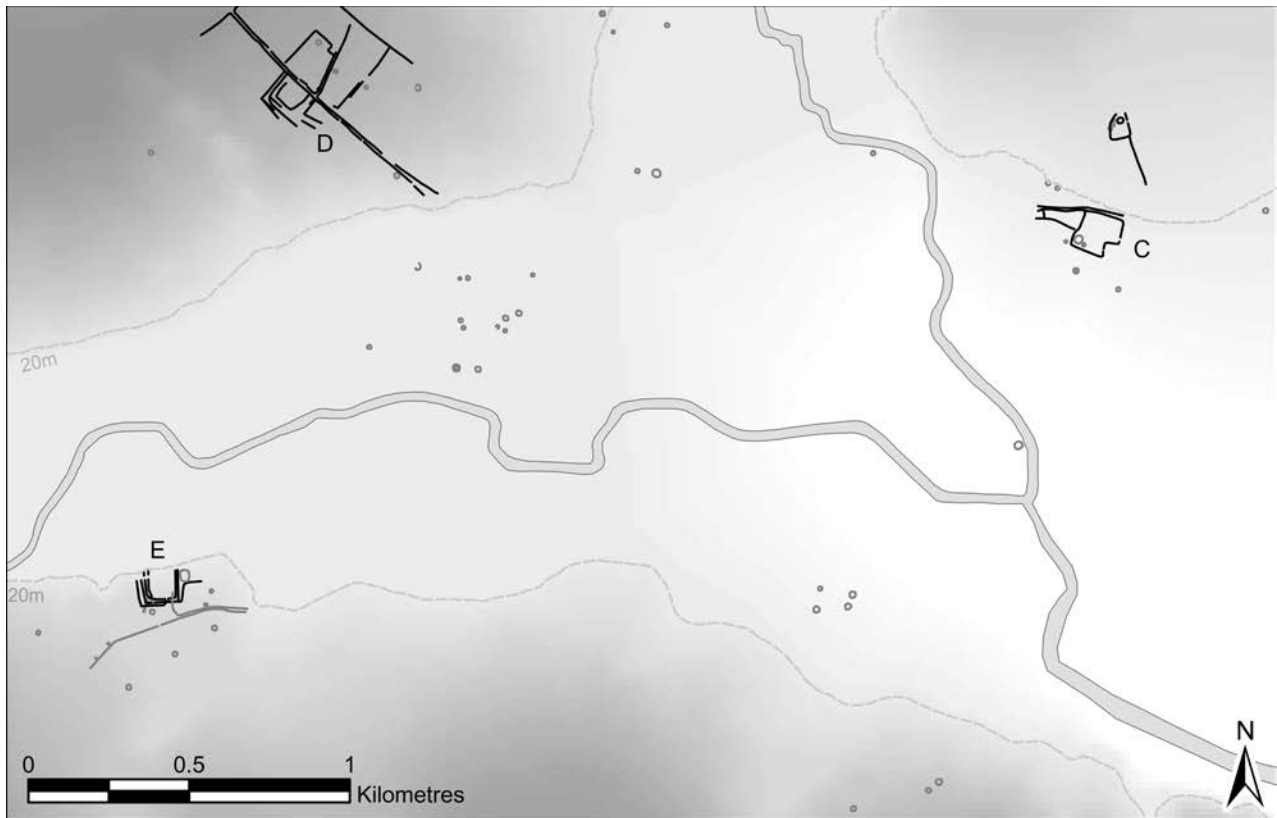


Figure 2.22 Possible sixth phase of proposed monument development (earlier phases in grey), with the development of settlement in the area alongside the burial monuments. Of particular interest are the extensive settlements at C, D, and E

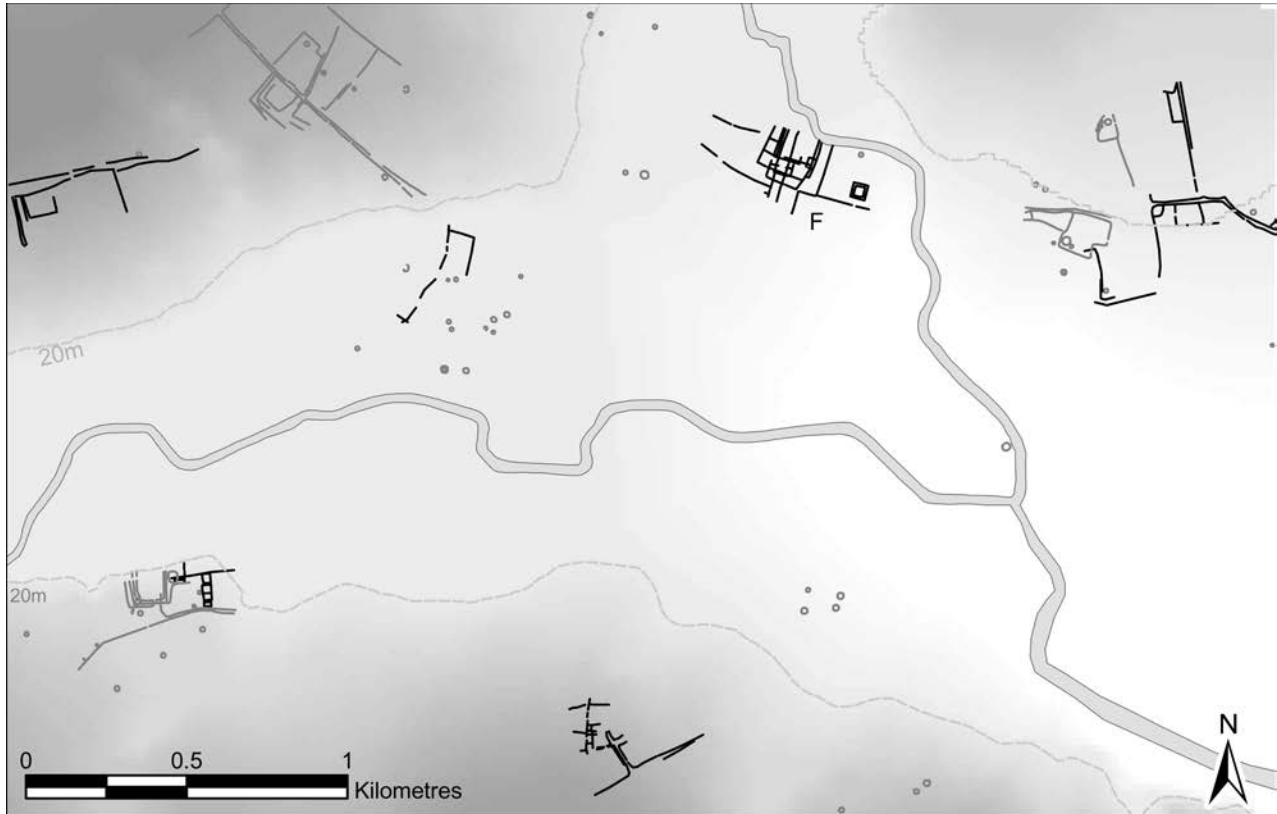


Figure 2.23 Possible seventh phase of cropmark development (earlier phases in grey), with aspects of the Roman landscape, including the Roman settlement at Langford (F)

barrows, while the others would have been visible outside the enclosure. All these examples show basics of 'binding' two elements of life together. It shows the importance of lineage, which was also represented within the sequence of initial barrow clusters.

The final stage in this prehistoric landscape would appear to be the elements of development clearly away from this perceived burial landscape (Fig. 2.23). These are areas of settlement not as closely associated with existing monuments and round barrows; this does not mean that there are no round barrows close to the developments. Cropmark complex F (EHER 7872) has been constructed away from other monuments in the area, but still is close to several small round barrows. The site appears to be very regular in its layout and is thought to be Roman; it is discussed further in Chapter 3. This leads to two questions: why are the areas of occupation and burial in different locations and why are certain round barrows enclosed? This may be more to do with location than the actual monuments. The round barrows in the lower part of the river valley may have been affected by sea level changes. While it is not being suggested that these lower level sites were ever completely inundated or waterlogged, they may have been within more marginal areas of land. Therefore the occupation sites developed on slightly higher ground and consequently these lower sites

were never chosen to be enclosed or settled. There is evidence for this shift elsewhere around the coast (Wilkinson and Murphy 1995, 132) and this might also explain why later settlement areas are in different locations, as the river valleys may have made suitable locations once sea levels had dropped.

North-west Uttlesford

The second case study area, approximately 12km by 12km, (Fig. 2.3) lies within parts of the boulder clay plateau and the upper chalklands. The area is traditionally seen as being poor for visible archaeology on aerial photographs, due to the very specific conditions needed for cropmarks to form on clay soils, and the relatively small number of cropmarks in the area reflects this. Although the upper reaches of several rivers are located in the area, none are as major as the Stour, Chelmer or Blackwater rivers. The River Cam and River Stort drain the boulder clay plateau to the north and south of the area and the Cam drains through the upper chalk valleys. The river valleys in the study area, especially that of the Cam, have relatively steep sides and some of the highest points in Essex are found in the area.

The cropmark landscape in this area is quite different from that found elsewhere in the county. For example, there are no high concentrations of linear features and

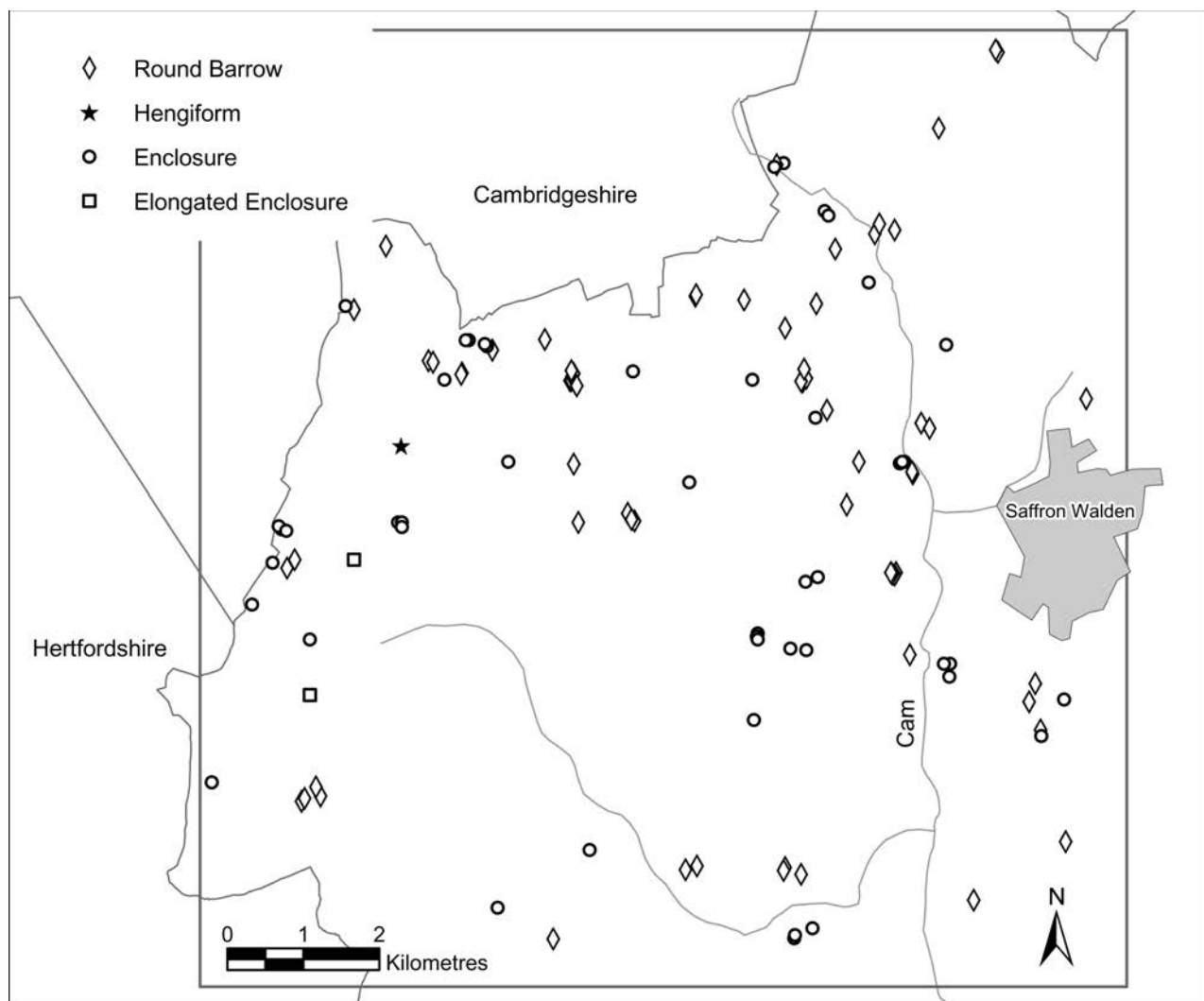


Figure 2.24 Distribution of possible prehistoric ceremonial cropmark sites within north-west Uttlesford, mapped during the NMP

trackways and the prehistoric sites that are visible on the aerial photographs appear more isolated. This could be purely a geological influence, and the air traffic control zone around Stansted Airport, and other flying restrictions outside the zone, means that the aerial photographic coverage is not as extensive as elsewhere. Despite this, there are still a significant number of sites mapped and the evidence summarised below indicates a different relationship between sites, rivers and topography.

Within the area there are 155 sites assigned to the prehistoric period (Fig. 2.24). Surprisingly, unlike the other study areas there are almost as many enclosures (fifty) as there are round barrows (sixty-six). Of the total number of sites, only forty-eight are within 500m of the main rivers. While the vast majority of these are round barrows, this number is not as high as other river valleys and only rises to sixty-five sites in total within 1km of the rivers. The majority of sites are on higher ground away from the valley bottom. It is possible that this might improve the visibility between sites and demonstrates that it may have been influenced by traditions now outside the county boundary. Of course it is always possible that the sites that are identified from the aerial photographs are not a true representation of what was present and that the area is not so different from other parts of Essex.

Some cropmark sites in the study area are distributed in small groups, while others appear to be isolated. One of the largest concentrations is on the Essex/Cambridgeshire border on the west edge of the area. This cluster of sites is a relatively high concentration compared with elsewhere in the area and also has some of the largest monuments. There are three elongated cropmark enclosures, which may be of importance within the context of prehistoric ceremonial landscapes (although one lies outside the Essex border and is not marked on Fig. 2.24), and it is suggested that these monuments were perhaps among the first major monuments within this landscape. There is a narrow cursus-like monument (EHER 19716) with rounded terminals located just below one of the highest points in the area (A, Fig. 2.11), a square ended elongated enclosure (B, Fig. 2.11; this is the site just over the county border in Cambridgeshire) on an equally high point and a further shorter elongated monument (EHER 19719) with curved corners (C, Fig. 2.11). It is assumed that these monuments were broadly contemporary because of morphological similarities.

There are parallels elsewhere in the country to these sets of monuments. At Holywood, Dumfries there are two large cursus monuments within a few hundred metres, one with a square ends and the other with rounded ones. In this case it has been suggested that the differences in morphology might represent chronological differences (Thomas 1999b, 107). The interpretation of the elongated cropmarks within the study area as cursus monuments or ploughed-out long barrows cannot be definite, but it does seem possible and there are similarities with other sites in the East Anglian region. Enclosure A on Fig. 2.11, which is over 250m long, has a small pit-like macula or possible ring-ditch at its south-east end. This is very similar to the cursus monument at Bures in the Stour Valley (EHER 9194), which has both a circular pit approximately 5m in diameter and a ring-ditch approximately 10m in diameter along its length (Brown *et al.* 2002, 15). This site also has parallels with the timber ring at the east end of the Springfield cursus (Buckley *et al.* 2001, 113).

None of these monuments appears complete on any of the available photographs, although there is the possibility that the southern example (A) still has visible shallow ditches on the ground at the north-west end, where the monument continues into woodland (information from a site visit). Measuring the actual length of the monuments from the mapping is not feasible, but enough information can be gained to assume the size and visual impact of the original monuments.

The monuments are between 1.5–2.5km from each other and do not appear to have a connection to each other, as one is not visible from the others. However, both the larger elongated enclosures (A and B) have incomplete ends towards higher ground. The monuments would need to be a further 50–70m longer to crest the hill, making them more visible. This extra length needed is still considerable, but in the case of enclosure B it is feasible as the end of this enclosure is masked, rather than having a clear terminal; so it may well have been longer.

If these monuments are contemporary, the lack of an obvious connection is unusual. Elsewhere in the county there are strong links between the prehistoric monuments, although this may have more to do with the higher concentrations of monuments than in this instance, which makes the connections easier to understand. There is the distinct possibility that the monuments were not built to be inter-visible and other factors influenced the construction, such as the location, topography or water courses. Both the elongated monuments could have been located closely to a number of stream sources, but it is difficult to be certain as there are a number of drainage channels and field drains that could have altered the natural course of local streams. The monuments certainly do not appear to be ‘cutting off’ any water courses like elsewhere in the county. Last (1999, 94) argued that cursus monuments were constructed by relatively mobile Neolithic communities, within an existing landscape of routes and pathways and that cursus monuments were formalising this; at the Springfield cursus this interpretation could be easily applied because of the association with the river. In this landscape it is more difficult to understand how these monuments may have formalised routes, but this does not mean this is not the case. Monuments in the Thames Valley appear to have been sited to incorporate the most dramatic change in topography (Barclay and Hey 1999, 71) and it could be argued that this is the case here, as the monuments are located in one of the hilliest parts in the county west of the Cam.

There is a lack of evidence in the river valleys of this part of Essex for non-domestic prehistoric monuments, even on the chalk geology and this could imply that it is a true representation of the location of monuments. Away from the few larger monuments there is a spread of possible round barrows, often in tight clusters of two to four sites. Ring-ditches in other areas are found in the valley bottoms, but not in this study area. A significant number of sites are located along the Cam Valley between the 80–100m contours. It might be expected that sites at the same level may be inter-visible but this does not seem to be the case, although the few sites that are lower down the valley are visible. Further away from the river the round barrows are located on higher ground (between 120–140m), just below the highest ridges; again this would imply that inter-visibility was not a major concern, or that the sites were designed to be seen from a specific

direction. Only two sites are located on a ridge and they do not appear to have a line of sight (LOS) between them either, which seems significant because it would seem that this was intentional.

It is probable that these monuments had been upstanding for some time when surrounding settlement enclosures were established, but there does not appear to be the same level of integration between 'domestic' and burial landscapes as is found elsewhere. None of these monuments are closely associated with other large sites. Even the round barrows have little evidence of being incorporated into later landscapes and settlement. This may be due to a number of factors, but a major consideration should be how little of the archaeological resource is visible on boulder clay. Evidence from recent fieldwork at Stansted Airport is a salutary reminder that although little is visible on aerial photographs, there are substantial archaeological remains from the Mesolithic through to medieval (Havis and Brooks 2004) and this area should perhaps form a focus of further aerial reconnaissance in the future.

Tendring

Tendring, the third case study area, is a relatively flat peninsula made up of gravel terraces and has been subject to significant coastal change and sea level rise. Some of the most extensive cropmark complexes anywhere in the county can be found here, due to suitability of the well drained soils and underlying geology for cropmark formation. The archaeological remains in the area are also under threat from gravel extraction and consequently several of the cropmark complexes have been excavated. While this gravel plateau occupies much of the peninsula, it is dissected by a series of streams, which flow in very steep-sided valleys, some approaching ravine-like proportions (Brown 1999). It has been suggested that due to many centuries of agricultural activity the contours on the sides of these valleys have been softened and would have been rather steeper in the prehistoric period (Brown 1999, 1). This topography, along with good, well drained soils has ensured the peninsula has been occupied for many centuries. The cropmark landscape is rich in linear ditches, which are often interpreted as field boundaries, from many periods and it would appear that the landscape has often been reorganised.

To the north of this area is the Stour Valley, which has a dense concentration of prehistoric ceremonial monuments and there is potential that the Tendring area was influenced by the monument construction that was occurring in the Stour Valley. This landscape presents an ideal setting to assess the extent to which the ceremonial landscape is incorporated into everyday domestic activities, as there are many areas of concentrated activity, although at some sites it is still the burial evidence that dominates the archaeological record (such as the site at Ardleigh). There appear to be very few isolated sites; this is not to say that there are no more sites or new information to be found from future aerial reconnaissance.

Within the Tendring study area (Fig. 2.25), c. 15km by 15km, nearly 700 prehistoric monuments were mapped by the NMP. This is a very similar density of monuments to that of the Chelmer and Blackwater study area. The majority of visible sites are located on the sands and gravels, which is not surprising; but is this a true representation of site density? The area has been flown

regularly over many years and there are sites visible on the London clays. When the geology is considered alongside the topography it can be seen that the sands and gravels are higher and it could be that the gravel locations were chosen for a specific reason as they were better drained and drier with more easily worked soils.

Evidence from around the Essex coast suggests that ground water and sea levels rose during the later Neolithic (Wilkinson and Murphy 1995, 71). During the Mesolithic and earlier Neolithic there is a consistent record of dryland sites around the coast and in the present day estuaries, in contrast to the later Neolithic, which is characterised by increasing evidence for woodland (Wilkinson and Murphy 1995, 217). This is matched by a decline in the record of settlement, which suggested there was a relocation of habitation to the higher ground inland and it would appear that this continued into the Bronze Age. The early Bronze Age settlement evidence is also limited and certainly by 2000 BC the sea level is thought to have been within the present day tidal zone and that only specialised activity was occurring near the coast, such as the formation of burnt flint mounds that have been dated to the early Bronze Age (Wilkinson and Murphy 1995, 217).

The Brightlingsea area has a considerable number of prehistoric monuments. This area is on higher ground and with higher sea levels Brightlingsea could have been an island or surrounded by salt marsh; the location of the prehistoric sites reflects this. There is a wide range of sites from round barrow clusters to enclosures and the vast majority of sites are on or above the 20m contour. There is a dense cluster of round barrows c.1.5km east of the Brightlingsea island (A, Fig. 2.25); these monuments are below the 10m contour. Although they are classified as Bronze Age and contemporary with others in the area, this should perhaps be questioned as the evidence suggests that their locality would have been wet at that time.

As the plateau is dissected by a number of streams and water courses, many sites are in close proximity to them. Out of a total 672 sites, 497 (74%) are within 1km of water courses and of these, 218 (44%) are interpreted as round barrows. While this pattern is similar to elsewhere in the county it would appear that the sites in some areas are concentrated away from the river valleys, while in others the sites follow the valleys. This would suggest that even though the topography and geology are different from other parts of the county, the factors influencing the location of sites is very similar to the Chelmer/Blackwater, but quite different from north-west Uttlesford.

The Tendring study area does have some major Neolithic monuments, such as the St Osyth causewayed enclosure, several long enclosures and mortuary enclosures, but in some parts of the study area they appear to be very dispersed across the landscape. Consequently, sub-area 1 (Fig. 2.25) will focus on an area with a high concentration of both prehistoric ceremonial and domestic sites at the confluence of two water courses. Then sub-area 2 (Fig. 2.25) will concentrate on an area with both large and small ritual monuments near St Osyth, that includes both a causewayed enclosure and a possible cursus monument.

Sub-area 1

Like the Chelmer and Blackwater study area, the following is an interpretation of landscape development

based on morphology and excavated evidence, and is just one possible interpretation of how the landscape developed in the prehistoric period based on the available information.

This small area is located 2km south-east of the excavated site at Ardleigh. The excavations at Ardleigh found fragmentary evidence of Neolithic settlement (Brown 1999, 162) so while it is highly likely that there is settlement within this area it is not immediately recognisable in the cropmark record. Using Garwood's spatial model (1991, 16), also used in the Chelmer/Blackwater study area, and evidence from Ardleigh, the earliest monuments are assumed to be the larger ring-ditches which are likely to have been round barrows (Fig. 2.26). One monument of particular interest is a possible henge, with an external diameter of nearly 40m and opposing entrances (EHER 2460; G, Fig. 2.26). As previously discussed there are currently no henge-type monuments conclusively identified in Essex from aerial photographs alone and there is very little excavation evidence for this monument type in the county. While this cropmark site is currently classified as a possible henge, because of its morphology, the site is also comparable to the windmill site at Little Bentley. However, unlike the site

at Little Bentley the location and orientation in relation to the river is very similar to henge monuments found elsewhere in the country. The entrances of the site are not completely opposing, but are aligned SE–NW, in line with the flow of the river. Although the area is relatively flat, the entrances face downhill. The site has a relatively small internal diameter (20m) and has very wide ditches, which can be associated with henge monuments. However, other morphological factors should be considered, including the very square cut ditch terminals at the entrances and the very regular circular platform that are often more associated with windmills (Harding and Lee 1987, 18). This could be a re-used site and there are other examples where a windmill has been constructed on the site on an earlier prehistoric barrow (for example, at the mid-term car park at Stansted; Framework Archaeology 2004), but without further investigation it would be difficult to state conclusively. However, this site has interesting associations with other cropmarks which will be addressed later.

Three other large ring-ditches are also visible; two are complete (EHER 2460 and 2580), while one has an apparent entrance (EHER 2499). These three sites could be intervisible due to the relatively flat location of the

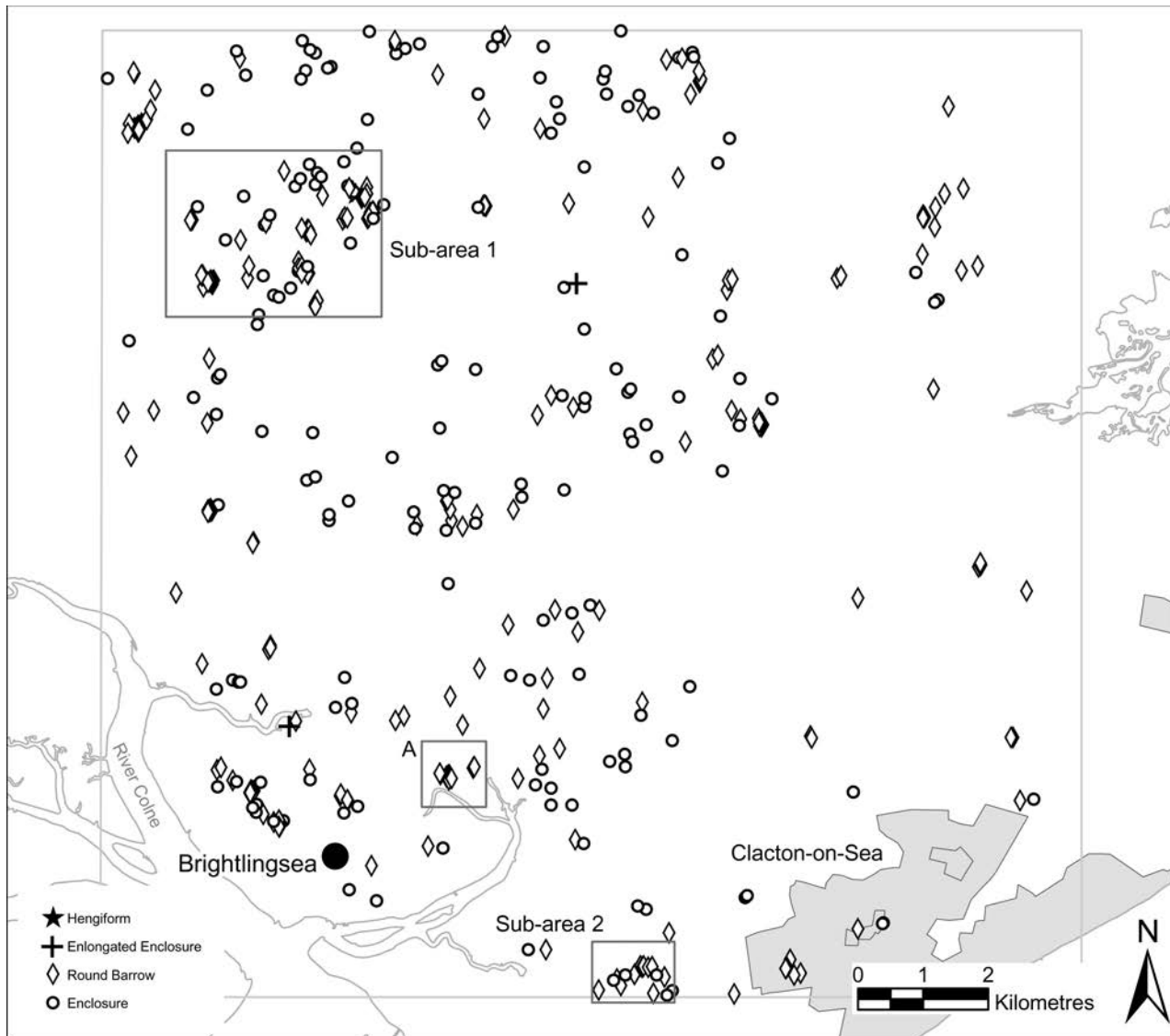


Figure 2.25 Distribution of mapped prehistoric sites, visible as cropmarks, within the Tendring study area and the location of the sub-areas and of the cluster of round barrows (A) which are below the 10m OD contour

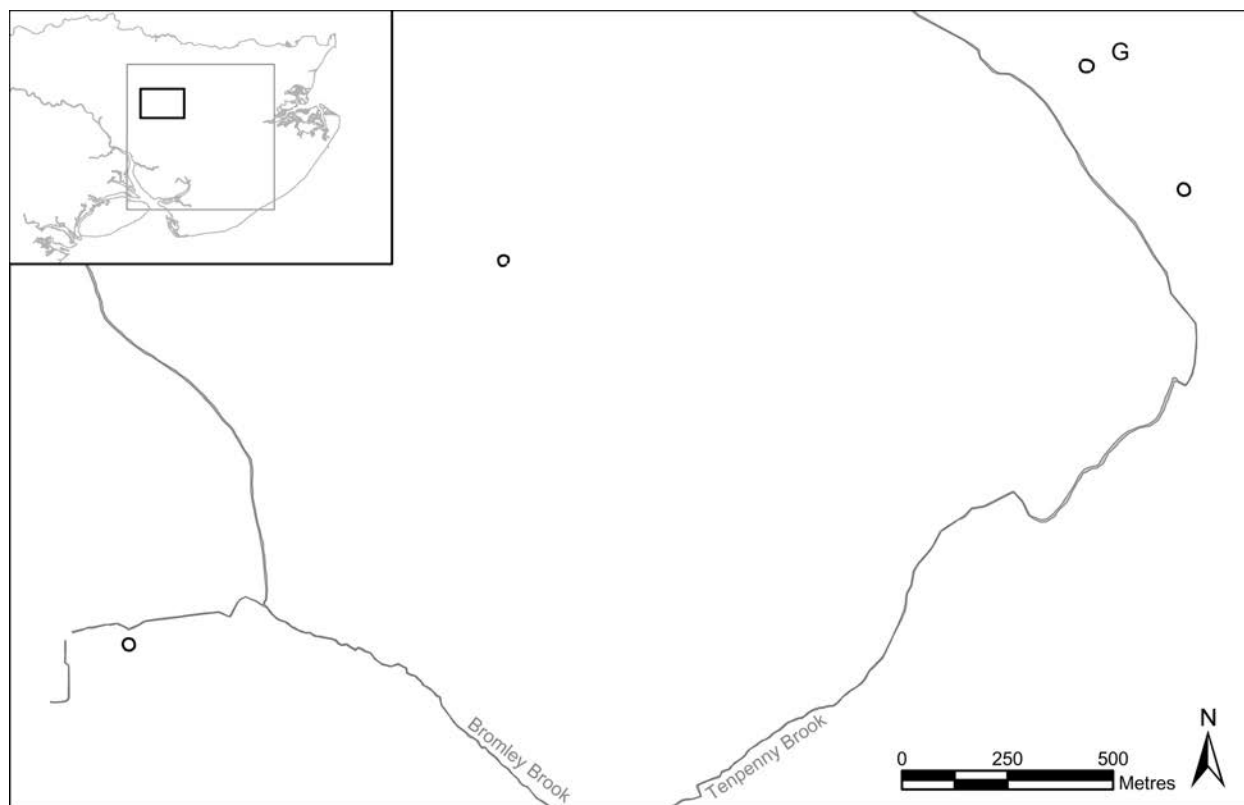


Figure 2.26 Possible first phase of monument development in sub-area 1 of the Tendring study area, with some larger ring-ditches, thought to be round barrows, and a possible henge monument (G). The inset shows the location of sub-area 1

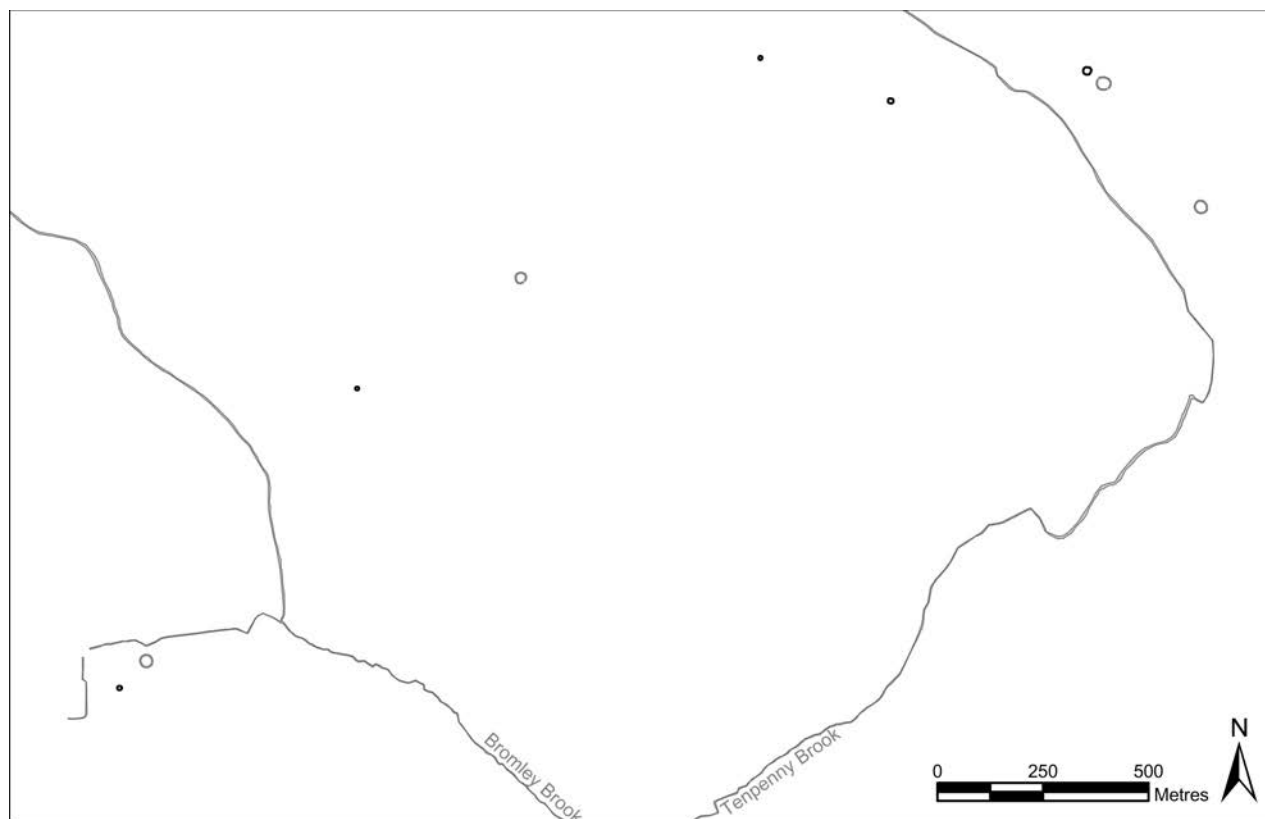


Figure 2.27 Possible second phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area, with single isolated barrows constructed that are smaller than the initial ring-ditches constructed

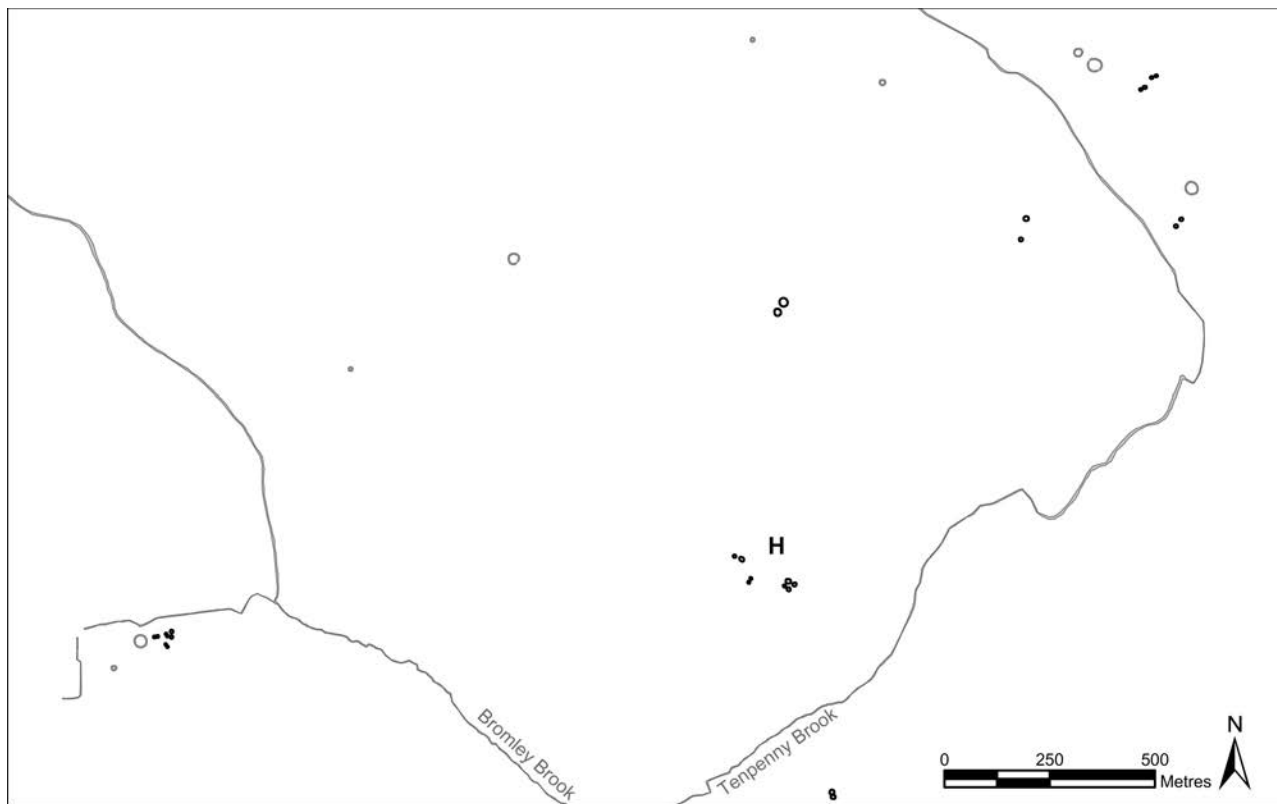


Figure 2.28 Possible third phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area, with smaller 'pairs' of ring-ditches constructed. In at least one case these pairs of ring-ditches are away from the larger monuments (H), but possibly associated with linear features in later phases

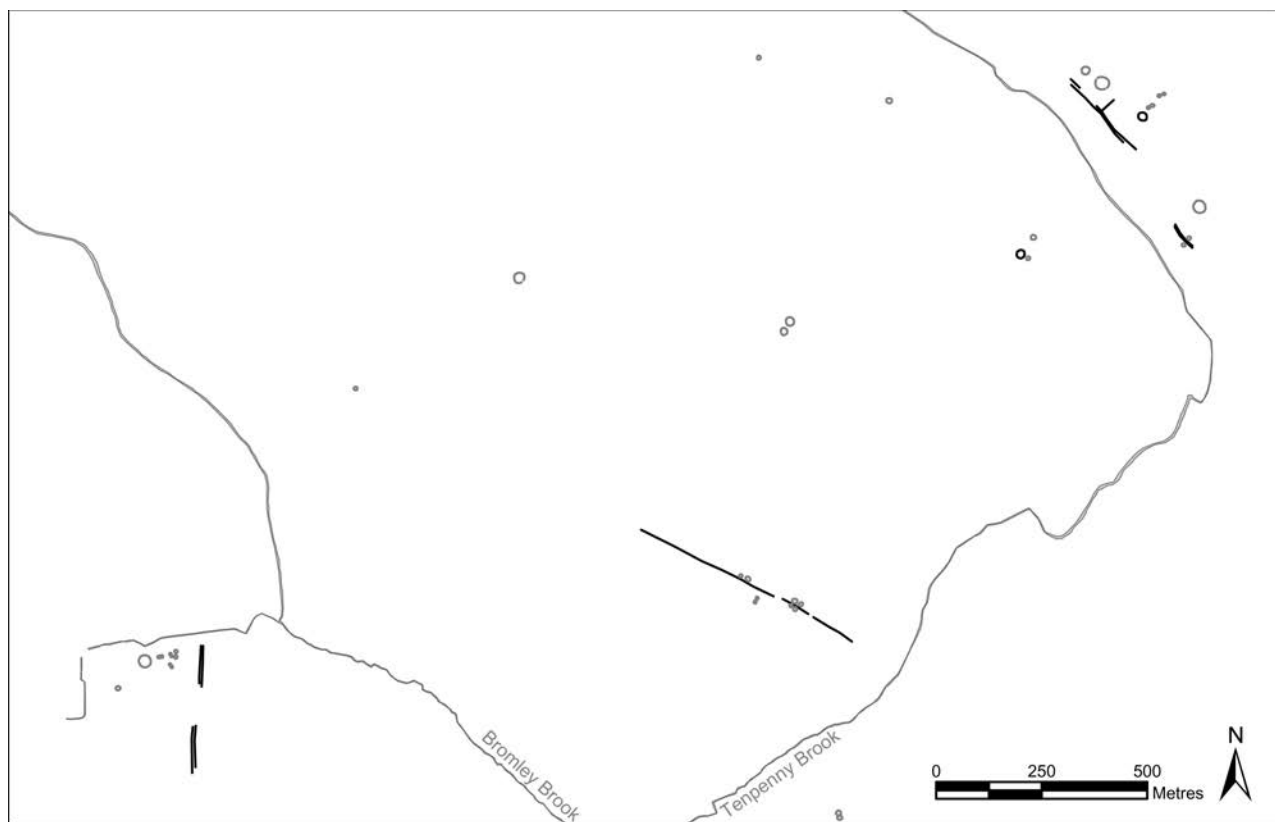


Figure 2.29 Possible fourth phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area, where linear features associated with the earlier 'pairs' of ring-ditches may have been constructed and single ring-ditches may have been created in association with certain pairs of monuments

topography. However, in the Chelmer study area intervisibility of early sites did not seem important and the local environmental evidence suggested that forest regeneration was occurring so the sites may not have been intervisible; this might be similar in this sub-area.

Figure 2.27 suggests the second phase of development involved the construction of single isolated barrows, which are considerably smaller than the monuments that were constructed in the first phase. This may have been followed by the construction of 'pairs' of monuments (Fig. 2.28). These are considerably smaller than earlier barrows with an internal diameter of 6–8m; there are at least thirteen sets of these closely set pairs. In at least one case (H) the pairs of smaller sites do not appear to be in close proximity to the larger earlier monuments. In at least three locations the pairs of monuments seem to be associated with linear ditches in later phases (compare Fig. 2.28 with Fig. 2.29). This suggests that the existing barrows were used to define the course of the linear ditches or used as markers.

It is suggested that isolated larger barrows, associated with the pairs and several linear ditches many have been constructed next in sequence (Fig. 2.29), where the linear ditches used the earlier round barrow pairs as markers to delineate a route.

Sequencing cropmarks is very difficult, but certain associations can be suggested. A number of the groups have rows of smaller round barrows (Fig. 2.30). These linear alignments are only short, with a maximum of four small monuments, but have very close spacing and it is assumed that the barrows were constructed consecutively under the principle of 'ordered adjacency' (Garwood 1991, 15) and a relationship with the past was being established and maintained. Such linear sequences did not appear to be present in the Chelmer Valley.

In two examples on Figure 2.30 (I and J) the associations are curvilinear. There are not enough monuments to be able to establish how large an area they might enclose or if they were enclosing a known space or surrounding an earlier monument as there are no visible signs of activity within the curve. The linear sequences have had additions made to them (Fig. 2.31) and these monuments are smaller, but have a close association to the earlier ones, although there appears to be a pattern within the smaller monuments. In one case it is possible that the earlier monument was not as visible so the newer monument (K) was constructed almost over the earlier ditches; though this is not common or could be an example of 'infilling', where smaller partial ditches were constructed in proximity to earlier monuments as was found at Ardleigh.

The groups of barrows may then have been added to without the same spatial patterns and associations (Fig. 2.32). In two areas the round barrow clusters have a distinct linear element, but they are surrounded by apparently random monuments without such clear spatial associations (L and M, Fig. 2.32). In some cases these monuments are larger (8m+) or incomplete. Again there was excavated evidence at Ardleigh for the partial ring-ditches being later (Brown 1999, 164). This might represent changing attitudes to ancestry; similar changes in practice and location of monuments are also seen in the Chelmer Valley.

More formal permanent settlement enclosures may also have been constructed at this time, although there is

not much evidence for settlement near the round barrow groups. This is unlike the Chelmer Valley where some of the larger round barrows were deliberately incorporated into settlement enclosures. While some of the barrow cemeteries have a large number of individual monuments, none of the clusters are as extensive as Ardleigh or as dense as the Brightlingsea examples. However, they still represent high concentrations of burial monuments.

The landscape has many linear field boundaries and enclosures, although many seem to be later, perhaps part of the medieval landscape. Two examples (N (EHER 2499) and O (EHER 2446) Fig. 2.33) appear to either over-run the earlier round barrows or in the case of O over-run several of the smaller monuments but incorporate a larger barrow as part of the boundary rather than destroy it; this could mean that the linear ditch follows an earlier boundary marked by the barrows. A short boundary ditch at P also appears to curve around to avoid a barrow and Q shows that the field boundaries on either side of the main group curve to avoid the round barrows. This must mean that the round barrows were still extant when the field boundaries were constructed.

Finally there is a sequence of field boundaries and enclosures which appear to be of a similar nature (curved corners with apparent gaps in the ditches). It is not known how these enclosures relate to the other monuments but it would seem that they deliberately avoid the cluster of small round barrows (R, Fig. 2.34), while the henge-type monument and further larger round barrow appear to have been built over by this field system. It could be that the henge-type monument was no longer visible when the field boundaries were constructed. However, the size of the henge ditches would suggest the monument was fairly substantial and would have taken a considerable effort to destroy in order to construct further boundaries; it would appear there was a respect for the earlier round barrows. It might therefore be sensible to suggest that the monument is not a henge, but a later windmill that was constructed over the earlier field system and enclosure.

The intervisibility in this area has not been addressed; this is because the low-lying topography would allow the vast majority of sites to be visible if the vegetation was sufficiently clear. Consequently, intervisibility may not have been such a major influence in the location of monuments as elsewhere in the county. It may also be possible that the vegetation in the area was actually used for screening the monuments rather than the location chosen. Elsewhere in Tendring there are fewer Bronze Age barrow cemeteries, but some larger prehistoric monuments for example, the causewayed enclosure and possible cursus monument at St Osyth.

Sub-area 2

The cropmark landscape at St Osyth is quite extensive and is a good example of an area being successively used for both ceremonial and domestic purposes in close proximity (Fig. 2.35). The area was a focus for early activity with evidence for Neolithic flint knapping in the vicinity and Mildenhall pottery in the causewayed enclosure ditches (Germany 2007). While it is not clear if all of the circuits of the causewayed enclosure were in use at the same time, it can be assumed that it was one of the earliest large monuments in this landscape, although radiocarbon dates have shown that activity occurred within the causewayed enclosure over a period of 40 years or less. There is a

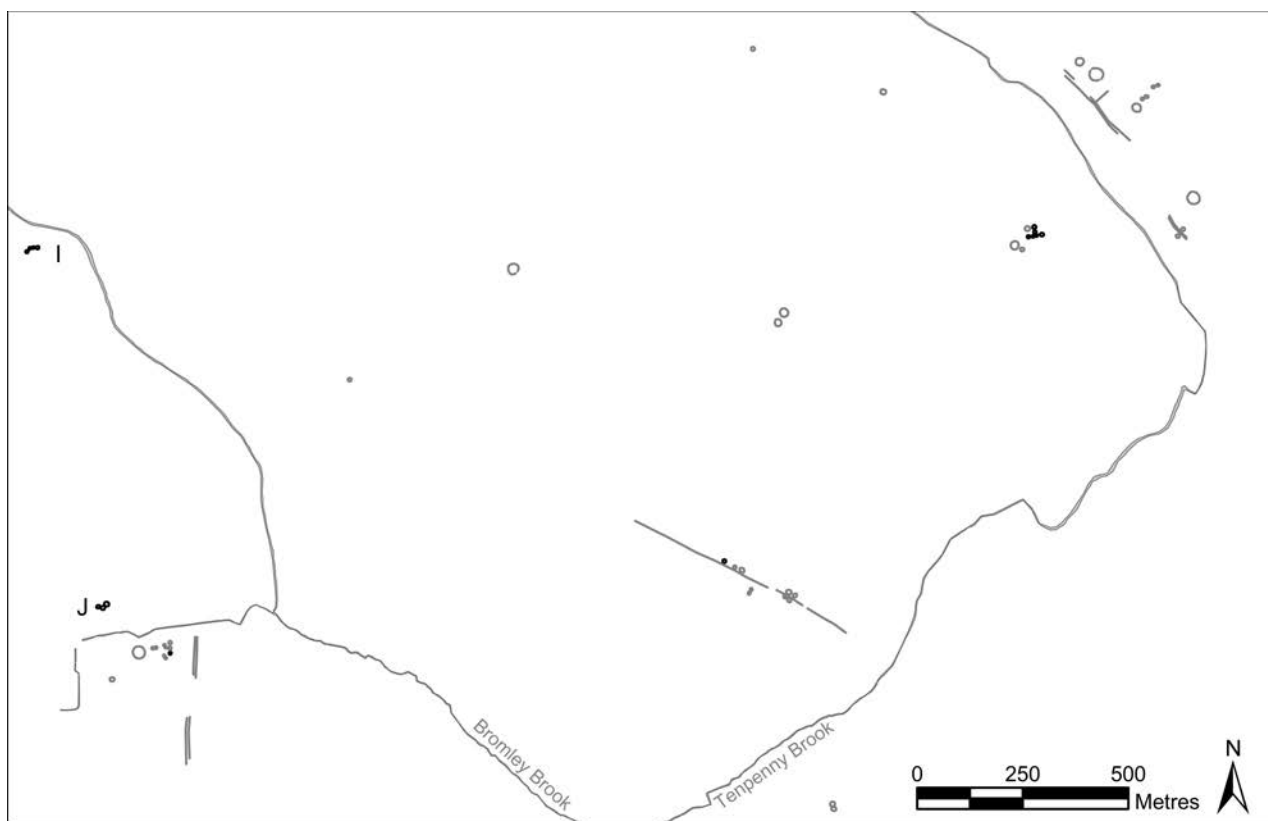


Figure 2.30 Possible fifth phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area, with smaller ring-ditches forming short lines of monuments. In two examples (I and J), the linear associations are visibly curved

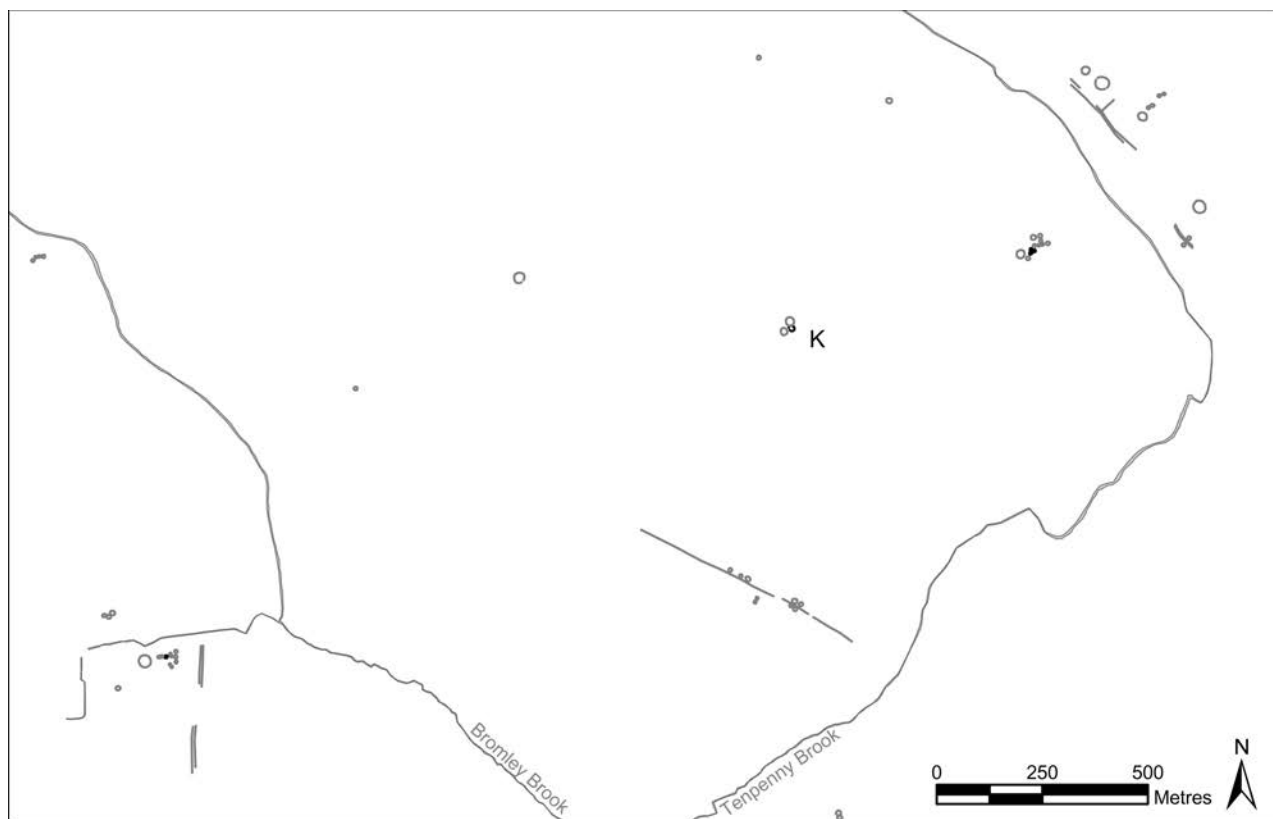


Figure 2.31 Possible sixth phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area, with the linear associations established in the fifth phases added to. It is also possible that new ring-ditches were constructed in proximity to older monuments (K)

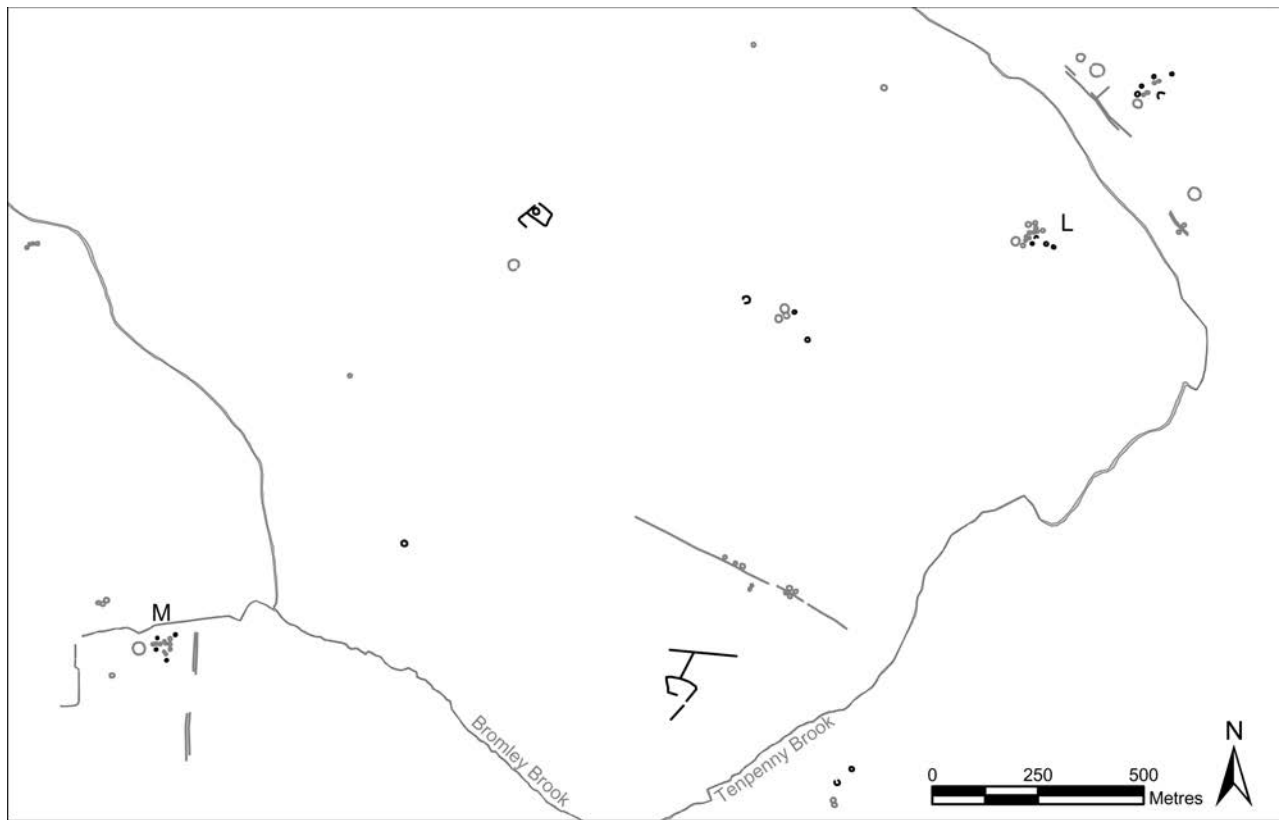


Figure 2.32 Possible seventh phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area. Round barrow clusters may have developed, but without such clear spatial association (L and M)

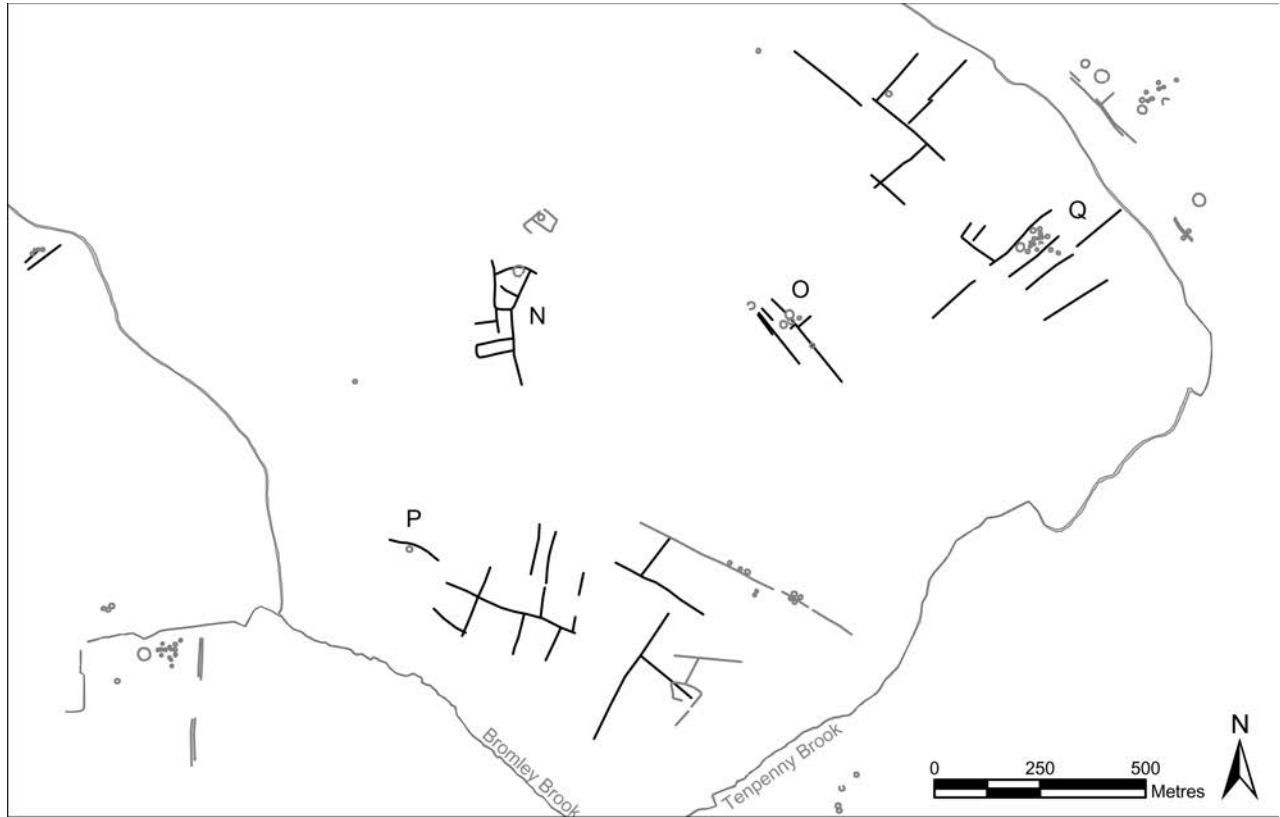


Figure 2.33 Possible eighth phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area, where linear ditches may have been constructed and in two cases (N and O) these ditches overrun earlier features, although elsewhere the ditches curve around presumably earlier ring-ditches (P and Q)

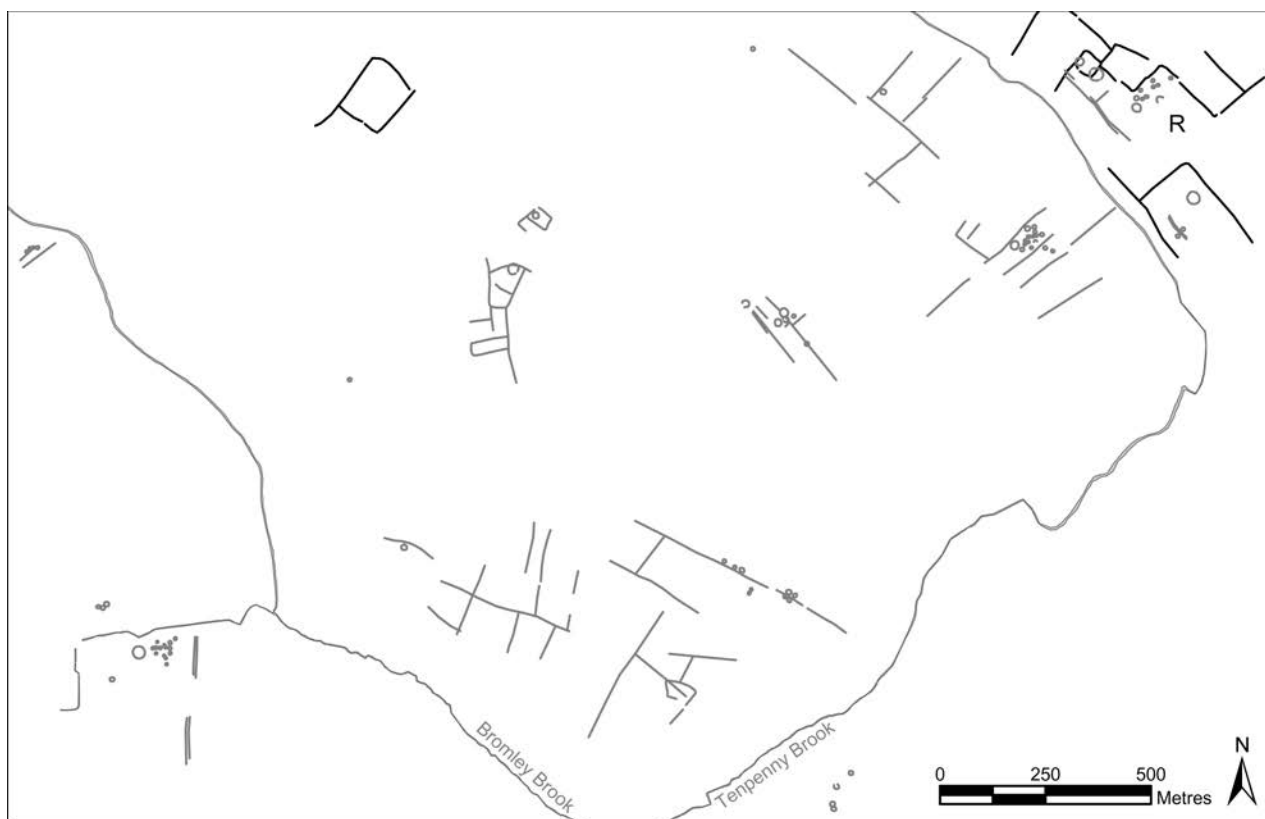


Figure 2.34 Possible ninth phase of monument development (earlier phases in grey) in sub-area 1 of the Tendring study area, with field boundaries and enclosures constructed. These features appear to avoid the cluster of ring-ditches (R), which may mean the barrows were still extant

possible cursus monument to the south-east, which is thought to have succeeded the causewayed enclosure; it appears to ‘cut off’ the low promontory of land on which both monuments are located. The monuments would have to have been approached and passed by to reach the spur of land to the west. This could be significant if the water table was higher when the monuments were in use as they could have been surrounded on at least two sides by wetter land and the land to the west of the monuments may not have been easily accessible. Sherds of late Neolithic/early Bronze Age pottery in the latest deposits of some of the interrupted ditches imply that the causewayed enclosure was still present as an earthwork when the cursus would have been built (Germany 2007, 108). Germany also suggests that if the construction of the St Osyth cursus, like other monuments, is a formalisation of a long-established path through the landscape it is possible that the path was strongly associated with the causewayed enclosure.

The round barrows were later than the bigger monuments and none of the excavated evidence would suggest that the causewayed enclosure was still visible as an earthwork after the late Neolithic/early Bronze Age (Germany 2007, 109). At least one ring-ditch is aligned with the possible cursus monument, which is similar to the Springfield cursus. As it is not known if either the cursus or causewayed enclosure would have been visible in the landscape when the Bronze Age round barrow cemetery was in use, it could be suggested that this single isolated ring-ditch is earlier than the ring-ditches excavated and is perhaps contemporary with the possible cursus

monument. Germany (2007, 114) has suggested that the middle Bronze Age barrows were configured around existing routeways and monuments and there was a path that ran between two groups of round barrows towards an earlier pond barrow (that was dated to the early Bronze Age). While the cursus and its associated ring-ditch are not directly aligned with this possible routeway it is feasible that the path suggested through the cemetery is a continuation or addition to the route formalised by the earlier cursus monument and its associated ring-ditch.

Viewshed analysis shows that at the southernmost point of the cursus monument the ring-ditch would have been visible along with most of the causewayed enclosure, and this visibility changes very little towards the north end of the cursus monument and from the ring-ditch. The causewayed enclosure is never completely visible from either the cursus or the ring-ditch. The visibility is limited to the south and west of the monuments, and St Osyth Creek to the north would not have been visible. However, from a location alongside St Osyth Creek to the north of the cropmark complex, it may have been possible to view the causewayed enclosure.

From the excavated evidence at St Osyth, it can be seen that this area has more ring-ditches than were visible on the aerial photographs, as many were excavated and found to be part of an extensive Iron Age settlement actually constructed over the causewayed enclosure (see Chapter 3). This Iron Age village may have been an attempt to claim an association with an ancestral culture. Alternatively the causewayed enclosure may well have been abandoned for so long that the physical evidence on



Figure 2.35 Cropmarks of the causewayed enclosure, possible cursus monument, possible henge monument, round barrows, roundhouses and trackways at St Osyth

the ground was no longer visible and the locating of the Iron Age settlement was merely making use of a suitable location. Re-use of location can also be found at both Orsett and Springfield Lyons causewayed enclosures, where similar alternative interpretations are possible, though at Springfield Lyons a substantial stretch of the Bronze Age enclosure bank must have been visible, as it forms a clear boundary to part of the Saxon cemetery.

V. Conclusions

Essex has a wide diversity of prehistoric sites, ranging from small, but often clustered, compact round barrow cemeteries to extensive cropmark landscapes like that found at Springfield. Excavated sites like Ardleigh, Springfield Lyons and Orsett, give a good insight into prehistoric ceremonial monuments, but many others lack any investigation and their interpretation is based on morphology alone. This is particularly true with many of the small burial sites and newly found sites, such as the Uttlesford elongated enclosures (Fig. 2.11).

While cropmark sites can be subject to the many biases of aerial photographic recording the monuments should be viewed in context and alongside other available information (for example, local geology or other fieldwork carried out in the area), and this can help eliminate some of the anomalies that occur (particularly gaps in the cropmark record that can sometimes be

interpreted as a lack of archaeology rather than a gap in the available resources for mapping or modern land use). With the benefit of the MORPH2 database, comparisons of distribution, site type and morphology can be made across the county, which allows a more comprehensive understanding of the data which was highlighted in the three study areas within this chapter.

These study areas demonstrate both the differences and similarities of prehistoric monuments across the county; in particular the wide range of large monuments that are located in two of the three areas, showing that similar practices were occurring even in areas of different topography and geological conditions. It was also shown that the practices that were occurring in these areas continued for an extensive amount of time, and that while changes in monument construction occurred sites were re-used and locations remained important.

This re-use of the prehistoric landscape is common in many areas of Essex and the cropmark evidence shows that the locations for ceremonial monuments were then often used in later periods for settlement. This has led to the assumption that there was not the same level of ceremonial activity in later prehistory. However, it could simply be that the ritual activity was not as easily distinguishable from the domestic and there was still the same level of symbolism in activities performed, but these activities were not carried out at large monuments that we can now easily identify, and this will be investigated further in Chapter 3.

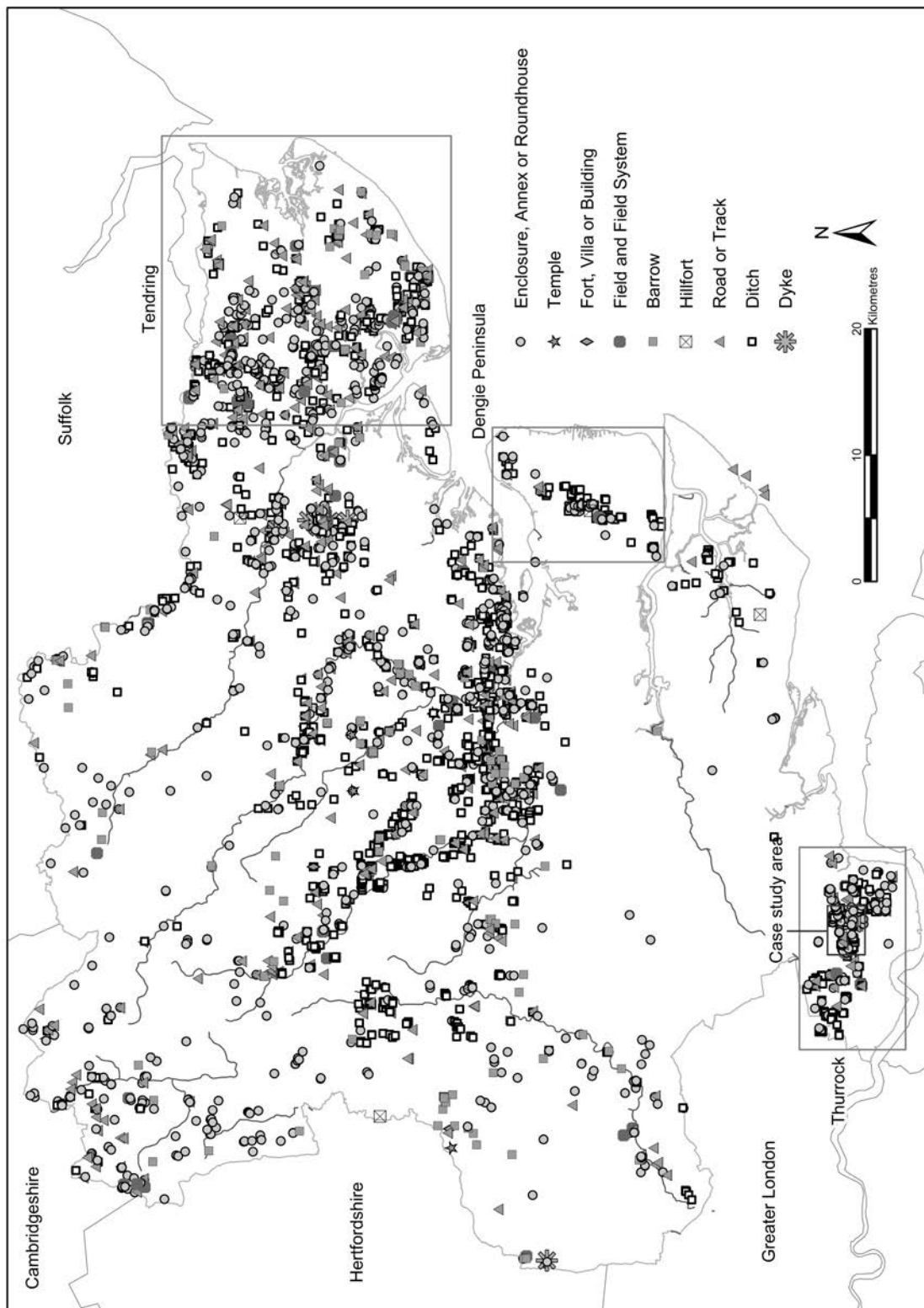


Figure 3.1 Distribution of sites listed in Table 3.1 and areas mentioned in the text

Chapter 3. Prehistoric and Roman Settlement in Essex

by Helen Saunders

I. Introduction

The evidence for prehistoric and Roman settlement and landscape organisation within Essex is extensive (Holgate 1996; Brown 1996; Bradley 1996; Sealey 1996). This chapter explores the contribution that aerial photography can make to this subject, bearing in mind the inevitable bias towards enclosed sites. However, considering the lengthy timeframe (over three and a half millennia) some light can be shed on continuity and distribution of settlement from the aerial photograph evidence that has been mapped.

Prehistoric settlement, especially from the earlier periods, has sometimes been overshadowed by the large ceremonial monuments of the period. However, recent work in Essex has highlighted the density of prehistoric settlement, with major investigations, such as those carried out at Stansted Airport and St Osyth, increasing our understanding, as well as demonstrating that frequently the cropmark record alone only indicates a small proportion of the archaeological remains (Havis and Brooks 2004; Germany 2007). There is a perceived differentiation between the Neolithic and Iron Age, with a transition from non-domestic to domestic landscapes. This is due to the visible archaeology changing from large ceremonial monuments of the Neolithic and extensive barrow cemeteries of the Bronze Age, to one more dominated by changes in agricultural practice and visible landscape organisation. While this is perhaps an over simplification it does highlight a new emphasis on land division, with houses becoming more substantial (Parker Pearson 1999, 86). These changes occurred as settlement became more permanent and therefore increasingly visible in the archaeological record, as larger tracts of the landscape were utilised and certain areas were more intensely used for concentrated settlement.

As discussed it becomes increasingly more difficult through the Bronze Age to distinguish ceremonial activity from the cropmark record alone and it is only through excavation that religious and ceremonial activity can be detected within settlements, and by the Iron Age, excavation suggests that ritual activity was often brought within the confines of the settlement. For example, at Danebury (Cunliffe 1984) there is evidence of human burial alongside domestic rubbish within pits and at the Airport Catering Site (ACS) at Stansted a shrine was identified at the centre of a late Iron Age settlement (Havis and Brooks 2004). This change in relationship between the ritual and domestic worlds of the later prehistoric period is not one that can be identified in the cropmark evidence alone, as the burials and shrines within settlements cannot be confidently interpreted without further investigation. It can be argued that the way in which settlements were constructed was as significant (or even more so) as the construction of major monuments for

the belief and religious structure that existed; it is just more difficult for us to detect or understand. It would seem that there are underlying sets of rules for the building, the location and the orientation of settlement within the prehistoric period and construction was not random (Parker Pearson 1999, 85). Like ceremonial sites, settlement sites would have been chosen for a number of reasons including ancestral links, environmental factors and previous activity in the area. There is also the question of whether the settlement evidence is a true representation of settlement patterns or is it simply that settlement becomes more visible in certain areas because the population was more sedentary and a particular type of settlement was favoured?

Settlement in the Roman period is perhaps more readily recognisable. Elsewhere in the country Roman military sites, such as temporary camps and forts, can dominate the archaeological record for this period. In Essex, however, there are very few military sites. Instead the aerial photographic evidence identifies settlement sites, particularly those of higher status which were often more substantial structures, stretches of Roman road and several temples.

This chapter will examine a wide range of time periods and levels of visible evidence, dealt with in chronological order, including both widescale investigations of landscape organisation and small scale individual sites. The cropmark evidence for Essex for this period will be examined first, with the types and distribution of sites investigated. Patterns in morphology and the locations of cropmark sites could be crucial to their function, so where possible this will also be included. NMP evidence, supported by data from other sources, such as excavation, to assess the date and function of cropmark sites will be used.

Finally an area in south Essex with a dense cropmark landscape of enclosures, trackways, pits and possible roundhouses will be looked at in more detail to examine how land use changed over time.

II. Distribution of sites

Unlike the monuments examined in Chapter 2, which often have a clear morphology that has been archaeologically investigated, it is more difficult to establish a date for many settlement sites, except where a distinct morphology is seen, for example, hillforts and villas. However, for other sites, which share a similar morphology, a range of functions and dates may be applicable. For example, a simple rectilinear enclosure could have many functions and be a range of possible dates. A range of site types have been selected from the MORPH2 database to represent possible settlement and land organisation from the prehistoric and Roman periods.

<i>Site Type</i>	<i>Total</i>	<i>Neolithic</i>	<i>Bronze Age</i>	<i>Iron Age</i>	<i>Roman</i>	<i>Unknown Prehistoric</i>	<i>Unknown</i>
Enclosure annex	78	-	-	5	5	66	2
Barrow	136	4	1	-	4	102	25
Ditch	1249	-	2	7	17	112	1111
Dyke	10	-	-	8	-	1	1
Enclosure	1165	2	6	37	17	800	303
Field	16	-	-	-	1	12	3
Field system	42	-	-	-	3	29	10
Fort	2	-	-	-	2	-	-
Hillfort	4	-	-	4	-	-	-
Roundhouse	56	-	2	8	2	44	-
Road	39	-	-	-	29	5	5
Settlement	22	1	2	-	1	18	-
Square barrow	7	-	-	1	3	3	-
Temple	6	-	-	-	4	2	-
Trackway	477	-	-	8	7	258	204
Villa	2	-	-	-	2	-	-
Total	3311	7	13	78	97	1452	1664

Table 3.1 Settlement site types and cropmark features that may indicate settlement by period

Sites that have the MORPH2 period classification of ‘unknown’ have also been included, as many of these sites are not datable when viewed in isolation, but may be better understood when examined and compared to known sites. Table 3.1 represents site types that will be examined in this chapter. Each site type has been extracted from the MORPH2 database and broken down into periods.

Some of these sites are period specific; for example, hillforts have been assigned to the Iron Age unless there is specific dating evidence to the contrary. Likewise villas and forts are classified as Roman. Although the term ‘fort’ could be applied to sites from other periods, in this context it is taken to imply a typical Roman structure.

‘Barrow’ and ‘square barrow’ monuments have been included because several of the cropmark sites have been dated through excavation and it was felt that if a dated burial was in close proximity to other site types a link and therefore a date might be established.

Figure 3.1 shows the distribution of these sites across the county. River valleys show a clear concentration of sites, though the existence of aerial photographic evidence elsewhere is mainly dependant on the geology (Chapter 1). There do not appear to be many distinguishing patterns for the distribution of these sites across the county and no one type of site is located in one particular area. Partly due to the effects of geology and reconnaissance, the same areas show concentrations of sites. Tendring, the Dengie peninsula and Thurrock all have a wide variety of cropmark sites visible, making widespread cropmark complexes from various periods.

III. Cropmark evidence

The following section aims to examine general distributions and factors influencing the location of sites that cannot easily be attributed to a specific period, for example, enclosures or trackways. Period specific sites such as hillforts will be discussed in more detail later in the chapter.

Enclosures

Many of the mapped enclosures have been interpreted as settlements. This is not to say that all the enclosures are settlement sites, many of them could have been related to animal husbandry or stock control, but are therefore still relevant to land organisation and settlement patterns.

The interpretation terms used in MORPH2 are ‘enclosure’, which simply describes the form, ‘settlement’ and ‘annex’ which, while implying a form, also adds a function to the interpretation. A total of 1165 mapped sites have been interpreted as enclosures, with 68% considered to be of an ‘unknown prehistoric’ origin. Only seventy-eight annexes and twenty-two settlements were identified from all the periods. While the term ‘enclosure’ is non-descriptive, its definition is straightforward with features, normally ditches, forming an enclosed space. A site with only two or three sides could still be interpreted as an enclosure, depending on the confidence of the interpreter.

The term ‘annex’ is often applied to a smaller enclosure that adjoins a larger one and there are many examples of this within the Essex NMP. Figure 3.2 shows two examples of enclosures with annexes, at Orsett Heath (EHER 14572) and 700m south of Saffron Walden (EHER 19839). It is often assumed that the annex was used for animal pens or storage away from the main living enclosure, so these conjoined sites could be fundamental when trying to identify settlement activity.

The twenty-two sites assigned the interpretation of ‘settlement’ usually have further available information that allows a more accurate interpretation to be given. For example, the large circular enclosure at Lawford House, Tendring (EHER 3; Fig. 3.3) is an excavated site (Erith 1971), which can be dated to the Neolithic and had evidence for domestic activity and was therefore given a ‘settlement’ interpretation. Some sites have been classed as ‘settlement’ even though they have not been excavated; this was often because of supporting evidence like detectable internal activity, such as an apparent roundhouses or find spots recorded in the vicinity.

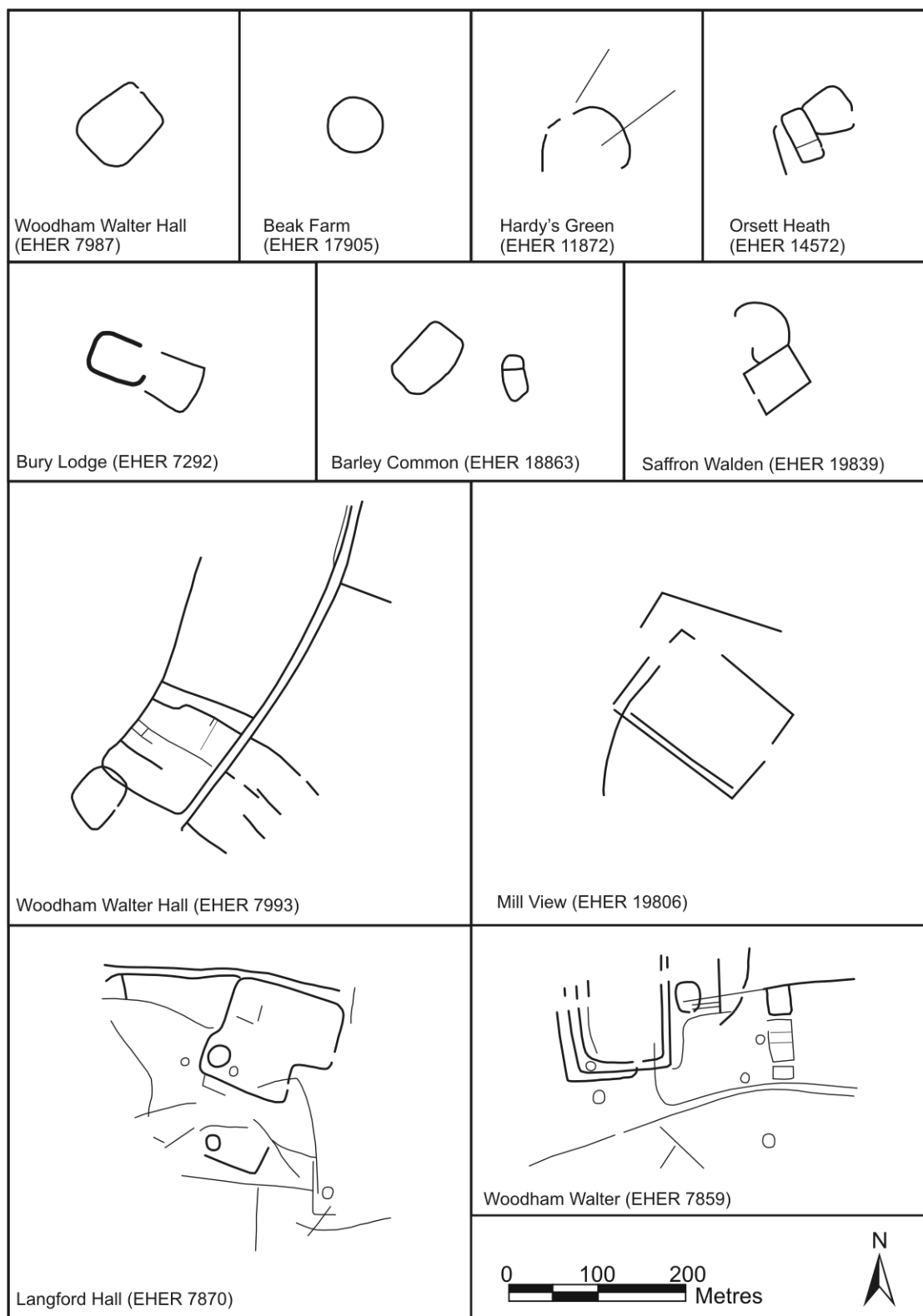


Figure 3.2 Examples of possible prehistoric enclosures and known prehistoric settlement enclosures visible as cropmarks

While enclosures are one of the most numerous site types mapped by the NMP, they are one of the most difficult classes of monument to date and this is reflected in the periods assigned. Nearly 70% (884) of the enclosures are classed as of an 'unknown prehistoric' date, while only 0.85% (11) sites are identified as either specifically Neolithic or Bronze Age. On morphological grounds, many sites appear to be of prehistoric date;

however, without further datable evidence, a more specific classification cannot be given.

The distribution of enclosures closely follows the general cropmark distribution of site types from all periods, with significantly fewer sites in the south of the county. As such, the area of the Tendring peninsula has the highest concentration of sites (nearly 20%) in approximately 10% of Essex land area. This distribution of sites



Figure 3.3 Aerial photograph of Lawford Ring, Tendring (copyright Essex County Council CP/95/13/06)

may be the result of good cropmark development, responsive geology and an active flying programme, rather than an actual higher percentage of sites in the area. Other areas such as the Chelmer and Blackwater valleys and Thurrock also have high concentrations of sites. The Dengie peninsula also has a smaller, but still significant number of these potential settlement sites. There does not appear to be any correlation between the size and location of sites. Rivers and topography do have an influence on location. Of the 1265 enclosure, settlement and annex sites, 487 (38%) are within 500m of a river or water course, while this rises to 809 (64%) sites that are within 1km of a river. This may reflect the geology and consequent cropmark formation, although as was found with many ceremonial monuments (Chapter 2) it is possible that this distribution of settlement is because the rivers were used as routes to move across the landscape (Brown 2001, 92).

Many details were recorded regarding the sites, such as size and shape, as well as topographical information. Aspect was one such characteristic, but was fairly arbitrary because individual interpreters had to make the decision as to what constitutes a hill or a slope relative to the surrounding landscape (a guide agreed for Essex was that a slope was defined by contours closer than 200m). A total of 871 sites have what is described as an 'all round aspect', although this is not surprising given the general undulating topography of Essex. Most of these are located in the district of Tendring and only a handful of sites located here have a more specific aspect attributed to them, which is solely down to local topography.

Of the enclosure sites recorded, 287 have entrances that are sufficiently well defined to allow the entrance aspect to be established and Table 3.2 shows the entrance orientation of these enclosures. What can be detected in many locations is entrances often face towards the river; this is particularly evident along the higher stretches of the Chelmer and Blackwater rivers. Here sites on the north side of the river have entrances facing south and vice versa for sites on the south side.

Not surprisingly, the south and east are the most common orientations for the entrance, although all cardinal points are represented. While there are no distinct patterns, except that many entrances of sites along the rivers face towards the valley, it is noted that in the lower Blackwater many of the site entrances have a westerly orientation while further up the valley the predominance is reversed, with many of the site entrances facing east. This suggests that there were external factors influencing the

<i>Cardinal Point</i>	<i>Total Number of Sites</i>	<i>Percentage %</i>
East	52	18.2
North-east	27	9.4
North	25	8.7
North-west	29	10.1
West	37	12.8
South-west	25	8.7
South	40	13.9
South-east	52	18.2

Table 3.2 Orientation of enclosure entrances

entrance orientation, such as a perceived external threat or prevailing weather conditions.

Figure 3.2 shows a range of shapes and sizes of enclosures mapped, ranging from almost perfectly circular (EHER 17905) to large rectangular enclosures (EHER 19806). Of these sites, 52% are either polygonal or rectangular, with more specific shape descriptions such as square or circular forming a much lower percentage (4.7% and 4.2% respectively). The actual description of shape (*e.g.* circular, sub-circular, square or rectangular) is dependent on the interpreter as there appear to be very similar shaped sites described as either rectangular or polygonal and the terms are often interchangeable. The enclosures range in size with a maximum of 290m by 235m, but they average 45.5m by 36m. It might be assumed that the bigger sites were more communal with several groups of people occupying them, whereas the smaller enclosures may represent single farming units.

Figure 3.2 also shows more complex enclosure sites, some of which have been excavated. These sites include a combination of enclosures, annex and trackways. The site at Woodham Walter (EHER 7859) has been excavated and confirmed as a multi-phase, multi-period settlement site (Buckley and Hedges 1987b) and it would seem likely that the other more complex sites are also settlements from the prehistoric period.

Langford Hall (EHER 7870) has also been partially excavated prior to the construction of an agricultural reservoir (Fig. 3.2). During the middle Iron Age, a large enclosure was laid out and the trackway to the north was constructed. Other ditches were added to the enclosure to form an extensive system of field boundaries surrounding the enclosure (Roy and Heppell forthcoming). However, activity at this site pre-dating the middle Iron Age enclosure was also recorded. Two ring-ditches, one dated to the late Neolithic and the second to the late Neolithic–early Bronze Age were identified, together with associated cremations. It has been noted at other sites that Bronze Age round barrows may have been used as territorial markers in later prehistory and are commonly incorporated into later boundaries (Atkinson and Preston 2001, 70). This site, along with Woodham Walter, 2.7km to the south-west, demonstrates that many areas of the county, particularly the lower Chelmer and Blackwater valleys, were the focus for both burial and settlement activity and many settlement enclosures are linked to earlier burial monuments.

Ditches

The most numerous single site category in this chapter is ‘ditch’; of the 1249 identified, 88% are assigned the ‘unknown’ period class. The term ‘ditch’ is not interpretive and normally refers to a single ditch not associated with other features and not easily assigned to more descriptive terms such as field boundary.

It may be useful to consider some of these sites as part of wider landscape patterns. Of the total number of sites, 664 (53%) are within 100m of another classified ditch and perhaps more importantly, 269 (22%) are within 100m of enclosures. While it may not be possible to date or assign a more specific function to many of these ditches, they will be included as they significantly contribute to the cropmark landscape.

Dykes

The course of ten dykes were mapped for the NMP; eight of these are located to the south-west of Colchester. While the NMP mapped the cropmarks visible on the aerial photographs there are still extensive earthworks visible today in the area and they form the largest group of features of their kind and period in Britain (Crummy 1997, 13). While there is evidence that the dykes were used for stock management their primary use was as defensive structures. The sections of dykes mapped were visible only as cropmarks where the structures have been levelled. The actual earthworks are covered by trees and were not clearly visible so consequently their full extent could not be mapped. These features are clearly important Iron Age–early Roman structures and have been fully discussed elsewhere (for example Crummy 1997) and the NMP did not aid their interpretation further, but did place the features into an extensive cropmark landscape.

Trackways

Trackways are a prominent feature in the cropmark record and normally consist of two or more parallel ditches running across the landscape. Figure 3.2 illustrates two examples, one 600m north of Woodham Mortimer (EHER 7993) and the other at Langford Hall (EHER 7870), where trackways either lead up to the enclosure or have a series of conjoined enclosures along the route of the trackway. The ditches were presumably designed for drainage purposes as well as demarcation, keeping a central area drier to aid movement along its length. Excavations at Slough House Farm, Heybridge (EHER 7905) suggest that the ditches were deepest in the dampest areas (Wallis and Waughman 1998, 41). Trackways can be from many different periods, are often long-lived and are almost impossible to date on morphological grounds alone, unless there is a close association with other features that can be dated. They are usually dated from their association with known or excavated sites and there is often evidence of them linking sites over some distance.

There are several excavated examples of trackways. The trackway at Ardleigh was dated from the early Roman Period, but its basic framework was created by major features of the Bronze Age landscape (Brown 1999, 181). Excavated trackways elsewhere include several at Stansted, though these were not visible on the aerial photographs due to the geology of the area and the very shallow nature of the ditches. The Social Club Site (SCS) at Stansted was dated from the middle to late Iron Age and the trackway appeared to be associated with an area of settlement leading to an open area, which was possibly pasture or scrubland (Havis and Brooks 2004, 30), but the trackway had gone out of use by the Roman period. The evidence for the trackway was simply two parallel ditches, morphologically similar to many other trackways visible on the aerial photographs that may be of a different date.

At Slough House Farm the trackway cut across Iron Age features and was dated to the Roman period. The trackway showed evidence of a cobbled surface (Wallis and Waughman 1998, 41), which may illustrate a degree of maintenance, or may simply be an artefact of survival due to slumping into a permanently damp area.

Unfortunately the level of information about other trackways is not as high, but links with other sites nearby may aid the interpretation. MORPH2 records 477 lengths of trackway ranging between 15–1300m, but they average

172m in length. A total of 298 (62%) are within 500m of an enclosure. This figure may be higher as the distance to nearby features was calculated from the record point created by GIS rather than the closest point of the trackway feature.

Field systems

A total of sixteen sites are interpreted as paddocks and fields (there is little morphological difference between paddocks and fields) and forty-two as field systems. The term 'field system' was applied to sites with two or more conjoined enclosures. The locations of these site types are evenly spread across the county.

Assigning specific dates is difficult. These fifty-eight sites have been assigned dates based on the available evidence and the proximity to other monuments (such as those found in Table 3.1). There were over 350 other prehistoric cropmarks within 500m of these fifty-eight field systems and paddocks and it would therefore seem likely that these sites were, in some cases, created and in use at the same time as the other prehistoric monuments.

IV. Settlement evidence

The following section looks at the cropmark evidence chronologically, from the Neolithic through to the Roman period.

Early settlement evidence

Although the earliest period for which there is easily identifiable surface evidence of settlement in Essex is Mesolithic through extensive lithic scatters (Jacobi 1996, 12), the first period for which aerial photographs can currently make a contribution is the Neolithic.

EHER records for the Neolithic are few, with most of the evidence relating to major ceremonial monuments discussed in Chapter 2. Only one site, at Lawford (EHER 3; Hedges 1980, 26) has, so far, been shown to be a settlement (Fig. 3.3); excavation recorded evidence of domestic activity in the form of a dwelling in the centre of the enclosure (Erith 1971). This site highlights an emerging pattern of circular settlement sites in the south of the county that continues through to the Bronze Age and is discussed later in this chapter. Bradley (1998) suggests that there is increasing evidence for similarities in size and shape between house plans and some ritual monuments during certain parts of the Bronze Age. It is possible that this occurs in the Neolithic too, where some ceremonial monuments had a similar morphology to the domestic structures, as demonstrated at Lawford, which morphologically resembles a henge (a circular enclosure 25m in diameter, with two opposing entrances, Fig. 3.3) and it is only the excavation evidence that provided an alternative interpretation. This also highlights the possibility that some of the sites identified as ceremonial monuments, such as the many ring-ditches thought to be round barrows, were actually domestic structures.

A further cropmark site (EHER 1801), located in Thurrock, 1km south-west of the Orsett causewayed enclosure, is thought to be the remains of a possible Neolithic settlement, which will be discussed in context in the case study later in the Chapter.

Over sixty sites have similar morphology to that of Lawford, but none have other datable evidence such as

find spots or have been excavated, so it is not possible to classify them as settlement sites.

Of the cropmark sites identified as Neolithic within the NMP MORPH2 database, four are barrows, two are enclosures and one is a settlement site. The barrows have been identified as Neolithic due to their close proximity to known Neolithic monuments and excavation evidence (for example, the round barrow within the ditches of the Springfield cursus).

Much of the Neolithic evidence in the EHER comes from excavated sites and find spots. A recent example is Chigborough Farm, Heybridge (EHER 7868) where an extensive cropmark complex was excavated prior to gravel extraction, with several Neolithic structures and pits identified as buildings and domestic activity (Wallis and Waughman 1998, 63–65). Although the site at Chigborough was identified through good cropmark evidence the Neolithic features were not individually recognised. Many of the features at Chigborough were small pits and post-holes, of which only 2.8% were visible on the photographs (Saunders 2005) and these may represent successive short-lived occupation sites (Wallis and Waughman 1998, 102).

The major multi-period settlement at the Stumble (EHER 13658), consists of five to six hectares of intertidal mudflats within the Blackwater estuary, and includes a small Neolithic open settlement site (Wilkinson and Murphy 1995, 76), now exposed through coastal erosion. Although the wooden structures that were found have been dated to the Iron Age, it is likely that there were wooden structures of Neolithic date as well.

These sites along the Blackwater show that the area was occupied in the Neolithic period by scattered settlements in woodland clearings (Wallis and Waughman 1998, 218). It can be assumed that the many cropmarks in this area contain Neolithic settlement evidence that has not been identified due to the absence of large Neolithic monuments nearby and a lack of typical site morphology.

The Bronze Age

Knowledge of Bronze Age activity has increased in recent years both in regard to settlement and burial, through the use of aerial photography and extensive fieldwork. For example, the sites of Springfield Lyons (EHER 5788) and Great Baddow (EHER 5752) (Fig. 3.4) are substantial enough to produce good cropmarks, both sites have been excavated and the visible cropmarks were plotted as part of the NMP. The site at Springfield Lyons formed a circular cropmark 60m in diameter with four or more causewayed entrances. The site was constructed and used in a single phase and when excavated was confirmed to be of Bronze Age date. However, the internal circular structures that were identified through the excavation were not visible on the aerial photographs, which meant that the potential for an incorrect interpretation was high as the site could have been interpreted as a henge monument. These large circular sites are an emerging class of settlement in the Bronze Age, with several similar sites identified across south Essex.

Twelve large circular sites, all with a similar morphology have been identified (Fig. 3.4), including the sites of Springfield Lyons and Great Baddow. These sites are larger than 45m in diameter, and although there are other smaller circular sites visible in the record, these larger sites have the most similar morphology to the

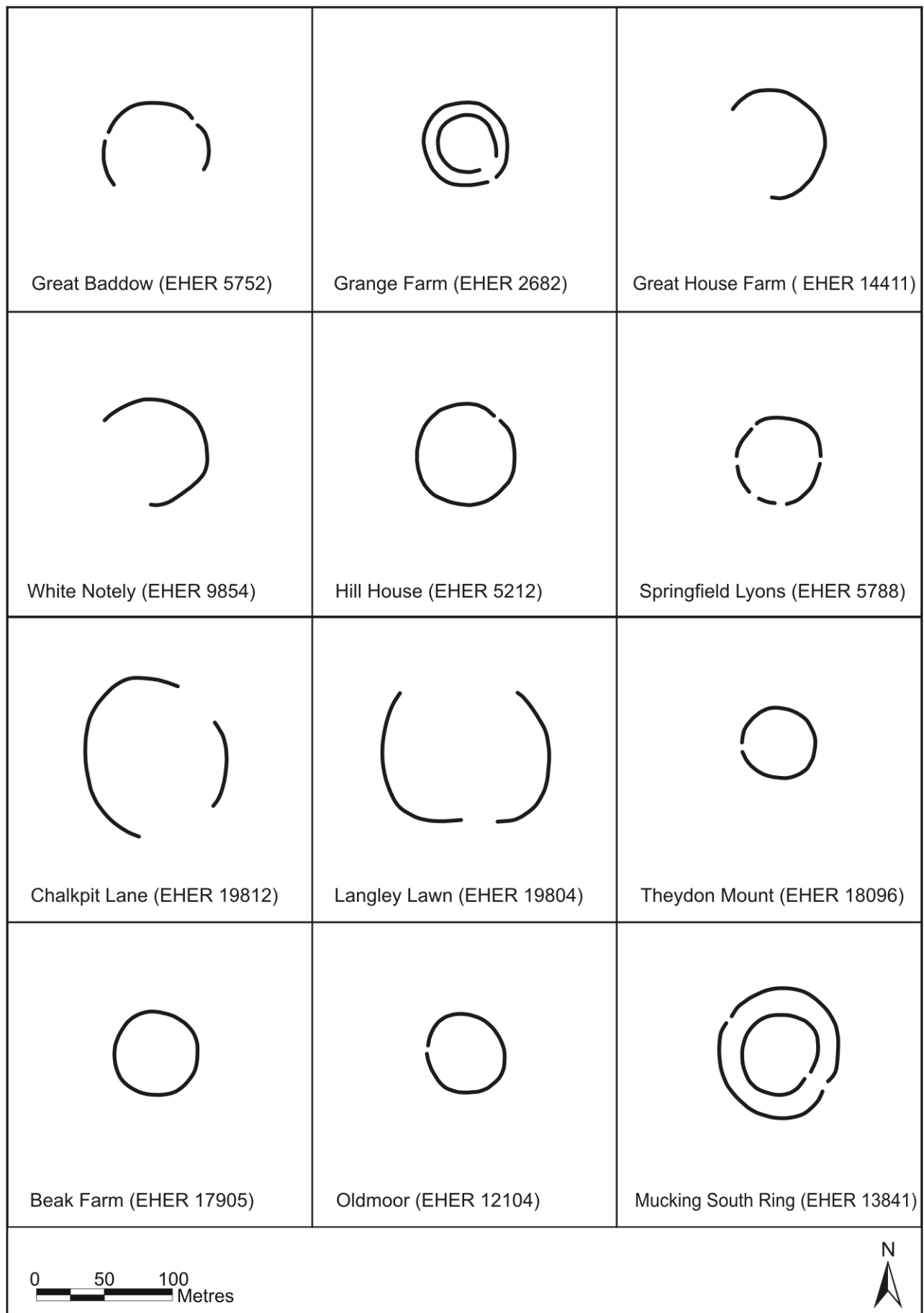


Figure 3.4 Comparative plans of mapped circular enclosures visible as cropmarks

excavated examples. The twelve possible settlement enclosures are not all complete circular ditches with entrances, but are complete enough to be considered. There is insufficient evidence to date all these sites to the Bronze Age, but they should be examined as there is an emerging pattern of later Bronze Age circular enclosures, especially in the lower Thames Valley (Buckley and Hedges 1987a, 36), including two sites in Thurrock (EHER 5212 and EHER 13841).

Both Springfield Lyons and the two enclosures in Thurrock occupy strategic positions at the 30m contour overlooking the Chelmer Valley and the Thames respectively. By looking at the location, morphology and surrounding sites it may be possible to assign more cropmarks to this settlement category.

Seven of the twelve sites are within 1km of a river and have commanding views over the river valleys, which could potentially be significant because it places these unknown sites within a similar topographic location to the sites that have been excavated and identified as Bronze Age settlements. For example, the circular site that is 55m in diameter, located 1km north-east of Abridge (EHER 18096), is located above the River Roding and would have been highly visible from the river valley. Likewise another circular enclosure, 100m south of White Notely (EHER 9854) is located within 350m of the River Brain. Several of them are within complex cropmark landscapes and it is possible that other features are associated with them. For example, a circular site, 60m in diameter (EHER 5212, Fig. 3.4), located to the west of Orsett, has been built over by later enclosures and has many features in proximity, some of which may be contemporary with the circular enclosure.

Of the circular enclosures that are not within 1km of a river, most appear still to be in fairly commanding positions, *i.e.* they are located in a higher position than surrounding sites in the landscape. This could be significant whatever period the sites date from, because they are constructed in either easily defensible locations or in places where flooding or adverse weather conditions would not have affected the site as much. One double-ditched enclosure (EHER 2682, Fig. 3.4) is located 1km from the excavated Neolithic circular enclosure at Lawford. Of further interest in the area is another double-ditched circular enclosure 1.5km to the north (EHER 2765), measuring 50m in diameter. Although this site has been classified as an 'unknown prehistoric' barrow, it is similar in morphology to the larger monument in the south and could be a further example of these possible Bronze Age circular settlement sites.

The larger circular sites may be of higher status than other surrounding settlement, as suggested for Springfield Lyons, where Bronze Age mould assemblages have been recorded (Buckley and Hedges 1987a, 12) and because of this they are more substantial and therefore more visible in the cropmark record.

Environmental evidence from the south of the county shows that during the early Bronze Age there was a progressive decline of woodland and a possible increase in the use of the heavier clays (Wilkinson 1988, 129). This may help explain the lack of further evidence for settlement during this period, as the heavier clays are less responsive to cropmark formation. Other evidence may also support this, as the assemblages at Stansted imply

increased early Bronze Age activity (Havis and Brooks 2004, 39), but the heavier clays mean the sites have yet to be recorded from the air. Elsewhere in the county, at Howell's Farm near Heybridge (EHER 7972) a small rectilinear building 8m by 2.8m was excavated (Wallis and Waughman 1998, 109) and dated to the later Neolithic–Bronze Age, but the structure was not evident on the aerial photographs, because it was formed by a series of post-holes. This occurs in other areas like Stansted Airport where post-built structures were evident when excavated (Havis and Brooks 2004, 13–23) but no cropmarks were formed at all.

Settlement may be inferred from other aerial photographic evidence. For example, it might be possible to look at enclosure sites that are in proximity to clusters of round barrows. No Bronze Age settlement is known within the area of the Ardleigh round barrow cemetery, but the urns found there are thought to have come from a domestic context (Brown 1999, 173) and it is suggested that the settlement was within an open area that was influenced by the linear ditches and round barrow cemetery (Brown 1999, 177).

Elsewhere round barrows have potential links to surrounding cropmarks. Over 100 clusters of circular enclosures were mapped in Essex and it is likely that many of these are round barrow cemeteries (as discussed in Chapter 2). Over 1000 possible settlement and land organisation site types (including trackways, enclosures and ditches) are within 500m of these clusters of potential round barrows. Many of these are located within a complex cropmark landscape and the vast majority are 'unknown' ditches, but they must be considered in conjunction with earlier monuments. Round barrows and enclosure systems are often found in proximity and the cropmarks at St Osyth are a very good example of this (see Fig. 2.35).

The landscape at Lodge Farm, St Osyth (EHER 2790) developed around the causewayed enclosure, with evidence of numerous round barrows scattered nearby. It is possible that while the causewayed enclosure was in use, open or seasonal settlement was established, which has left very little evidence. During the Bronze Age the round barrows were constructed with settlement in the vicinity. Within this area there is a high concentration of pits possibly highlighting the location of this settlement. Other enclosures in the area are varied, both in size and morphology and are, as yet, undated, although many have been classified as 'unknown prehistoric' for NMP purposes. As has been noted elsewhere, the Bronze Age in Essex has not produced a definitive morphology for settlement structures and so it is possible that some of the enclosures in this area are Bronze Age and the people living in them constructed the round barrows.

Another area of particular interest for concentrations of prehistoric settlement evidence is the Dengie peninsula. A large number of sites sit along a sand and gravel ridge and they make up a complex cropmark landscape that is fairly isolated from other areas of the county. One of these complexes incorporates several landscape elements, including ring-ditches, thought to represent ploughed-out round barrow clusters, linear field boundaries and potential settlement enclosures. Figure 3.5 shows the cropmark complex (EHER 12104), located to the north of Southminster, which includes one of the twelve large circular enclosures (A, Fig. 3.5) that were discussed



Figure 3.5 Cropmark complex north of Southminster, with a possible Bronze Age settlement enclosure (A), round barrow cemetery (B) and a later rectangular enclosure (C)

earlier in the chapter. This large circular feature could be a Bronze Age settlement enclosure. It is 60m in diameter, with at least one entrance and possible internal features. The ditch of this particular enclosure is not as substantial as other sites such as Springfield Lyons, but it is located in a very prominent position in the landscape, overlooking the surrounding area, the local river, and is surrounded on three sides by the curve of Asheldham Brook. While the area is generally flat, the site is located on a local high point between the 20–30m contours.

There is a round barrow cemetery, with at least thirteen visible ring-ditches (B, Fig. 3.5), with the largest group consisting of a cluster of approximately seven visible barrows, all varying in size. There is also a rectangular enclosure (C, Fig. 3.5), which is presumed to be later than the circular one to the north; this enclosure measures 70m by 50m and incorporates, within its perimeter, at least one ring-ditch with a central pit. This ring-ditch may well be a ploughed out round barrow rather than the remains of a round house, as the central pit is thought to be a burial. There are also other internal features including a smaller enclosure in the south-east corner. Attached to enclosure C are several linear features of an unknown date. It could be suggested these are land organisation features attached to a well developed settlement site and the association with the round barrows might suggest a late Bronze Age or early Iron Age date.

This inclusion of earlier round barrows within a presumed later settlement is fairly common. In the area around Maldon there are at least two large settlement

enclosures that have been constructed either close to or including one or more earlier round barrows (Langford Hall (EHER 7870, Fig. 3.2) discussed above and Ulting Grove (EHER 7963)). As mentioned in Chapter 2 this might highlight an importance attached to a site or the significance placed on ancestry. The transition between the Bronze Age and early Iron Age is not clear cut, with many older traditions continuing while new ones developed. However, settlement in the Iron Age becomes increasingly more visible.

The Iron Age

The archaeological evidence for the early Iron Age is sparse and sometimes enigmatic, but becomes more recognisable and prolific in the middle and later Iron Age. Many later Iron Age sites show increasing influence from the continent before the Roman invasion and in places Iron Age sites were reused and redeveloped in the Roman period.

The Iron Age signifies a period where settlement becomes more apparent (though maybe not as identifiable and datable cropmarks) as the period progresses and at least at first glance ritual and religion does not manifest itself in large monuments in the landscape. This, along with a lack of burial evidence and a decline in the hoarding of objects, has made the domestic aspects of the period more dominant. However there is increasing evidence for shrines within excavated settlement sites, which shows that ceremonial and religious practice was still an important aspect of everyday life in this period.

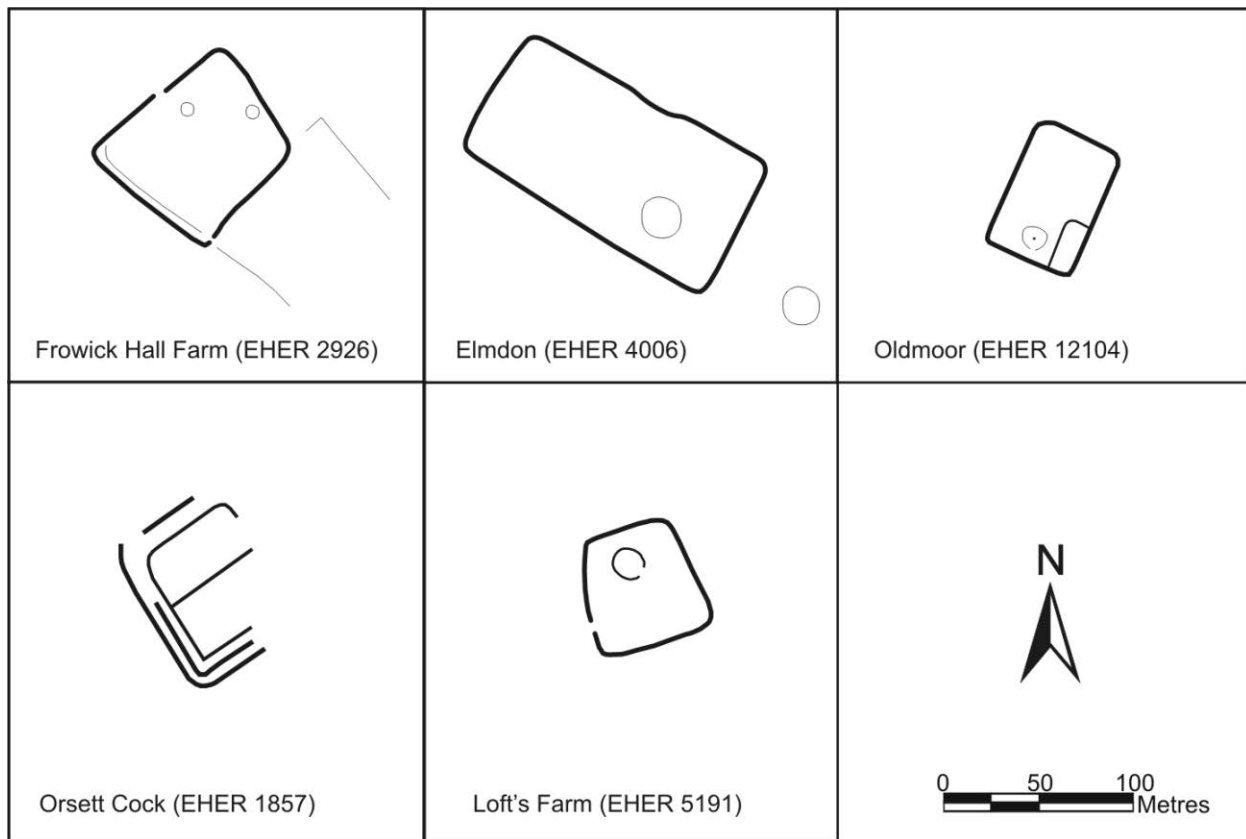


Figure 3.6 Mapped Iron Age enclosures visible as cropmarks

While the number of Iron Age sites recorded in the NMP is not high, with only eighty-seven out of 10,711 (0.81%) sites classed as Iron Age, the number of Iron Age records in the EHER is considerably higher with over 740 records. Within MORPH2, records were only given a single period date and if the site was multi-period or the date was questionable then an 'unknown prehistoric' date was given. It is likely that some of the 'unknown prehistoric' sites within the database could be Iron Age. Several of the EHER sites have been investigated or excavated, with the ACS and CIS sites at Stansted among the most extensively excavated Iron Age sites in Essex (Havis and Brooks 2004). These types of sites may help to establish a date for similar sites that have yet to be fully investigated, but are visible in the cropmark record.

Iron Age sites mapped through the NMP are located across the county, but there are still concentrations in the main cropmark areas such as the Blackwater Valley, around Colchester and Thurrock. A selection of the settlement enclosures are shown in Figure 3.6. Four of the sites have evidence for roundhouses within them (EHER 2926, 4006, 12104 and 5191), which aids the interpretation of these sites as Iron Age settlement enclosures. Several Iron Age cropmark settlement sites have been either partially or fully excavated, which has enabled an accurate date to be assigned; these include Orsett Cock (Carter 1998) (EHER 1857, Fig. 3.6), Ardleigh (Brown 1999), Woodham Walter (Buckley and Hedges 1987b) (EHER 7859, Fig. 3.2) and Mucking (Clarke 1993). Most comprise one or more roundhouses set within an enclosure, such as the site near Frowick Hall Farm, Tendring (EHER 2926, Figs 3.6 and 3.7), which shows as a cropmark enclosure with at least two internal ring-

ditches that could be roundhouse gullies and a possible entrance in the northern boundary. From the aerial photograph it is also possible to identify linear boundary features, other enclosures and possible pit features. This enclosure is a good example of the morphology of a typical Iron Age settlement enclosure; however, not all Iron Age sites were enclosed. While enclosed farmsteads with a single dwelling might appear the most dominant settlement type in Britain (Haselgrove 1999, 117), this might not be the case in Essex, where only nineteen of the

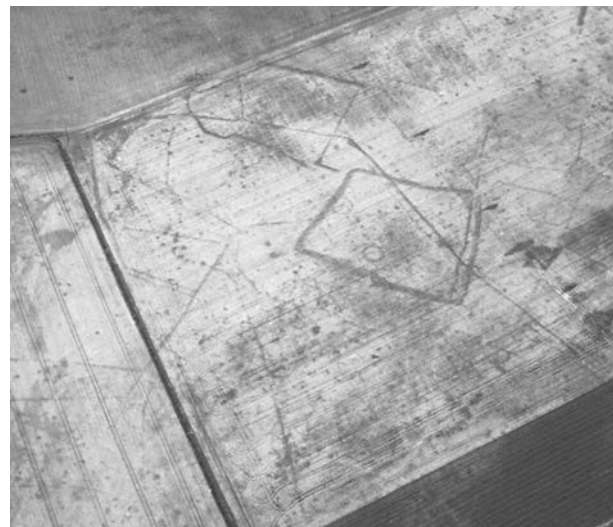


Figure 3.7 Aerial photograph of an Iron Age settlement enclosure, with internal roundhouses, surrounded by pits and linear features visible as a cropmark near St Osyth (copyright Essex County Council CP\96\31\15)

eighty-seven identified Iron Age sites have an enclosure with internal structural features. Most of those enclosures that do have internal features have a very similar morphology, comprising either a rectilinear or polygonal shape, with one or more ditches. Some, however, do show modification where, for example, at least one external ditch was added at a later date.

Aggregated settlements were also common, particularly in the later Iron Age, and there are examples in Essex, including the middle to late Iron Age settlement at Little Waltham (EHER 6185), which although not visible on aerial photographs is located in a valley where other evidence for settlement was mapped. These aggregated settlements can cause problems in judging the size of the community that lived at the site at any one time. For example, at Little Waltham up to thirteen individual roundhouses or partial roundhouses were excavated, but it is not known how many were in use at any one time and what proportion were actually residential dwellings (Drury 1978, 125).

As has been established, the cropmarks around Essex are in concentrations along river valleys and on geology more suitable for the production of cropmarks. Several of the Iron Age settlement sites are located either on, or in proximity to, earlier monuments. One of the best examples of this is at Orsett, where an early Iron Age settlement was visible on the aerial photographs, within the confines of the south central area of the Neolithic causewayed enclosure. These cropmarks were excavated (Hedges and Buckley 1978), and the enclosure is shown in Figure 3.8. Most of the evidence for the early settlement at Orsett is in the form of rubbish pits, although there is an indication that there was continuous unenclosed settlement through the 6th to 5th centuries BC.

It is probable that the significance of the Orsett causewayed enclosure became less over time as the ditches were filled as a result of natural processes and continuous settlement activity nearby, but there is evidence that the land division became increasingly important. The rectangular enclosure of the Iron Age settlement is 45m across with internal features evident and both early and middle Iron Age pottery was recovered, comparable to that excavated at Little Waltham. It has been suggested that this move from an early unenclosed settlement to a later enclosed one, in the middle Iron Age, might have occurred as population changes increased pressure on land and resources (Haselgrove 1999, 129) and will be discussed in more detail later. This middle Iron Age enclosure is of fairly typical morphology for this period, with reasonably substantial ditches, a possible entrance to the south-west and internal features. Although it is among the smaller Iron Age enclosures, other examples around the country may be comparable. In the later Iron Age there may have been a complete movement away from the causewayed enclosure site to Orsett Cock, located 720m to the north and to Mucking, 2km to the east; substantial Iron Age settlements have been excavated at both these sites (these are discussed further in the case study, Section V).

The causewayed enclosure at St Osyth also had aerial photographic and excavated evidence for settlement within the confines of the earlier monument (Fig. 3.8), although the evidence on the aerial photographs was limited as the geology of the area made it very difficult to differentiate between the archaeological and natural

cropmark features and very few of the roundhouses were visible.

Unlike the settlement site at Orsett, St Osyth had evidence for continued activity from the Neolithic through to the Iron Age with some of this evidence visible on the aerial photographs. Nevertheless this site highlights the problems of interpreting cropmark ring-ditches, as there were several evident on photographs and all were interpreted as Bronze Age round barrows in the database. Over twenty ring-ditches were excavated, and some were indeed early to middle Bronze Age round barrows, including a pond barrow with two cremations. However, a number of the ring-ditches across the site were found to be roundhouses, particularly in an area to the east of the trackway where they were surrounded by an enclosure (D, Fig. 3.8). In this area only one ring-ditch, interpreted as a round barrow, was visible on the aerial photography and was mapped. During the excavation in this area several more roundhouses were found that had not been visible on the photography, even in hindsight. The size of these roundhouses varied from 6m to 13.6m with east facing entrances (Germany 2007). Many pits were also visible between the roundhouses and the excavation evidence shows that many of them were the post-hole foundations for timber granaries. This demonstrates that the settlement was well developed based on arable and pastoral farming. Consequently, there are probably contemporary field systems in the vicinity, but these have not been attributed to the period due to a lack of dating evidence.

It has been suggested that the St Osyth causewayed enclosure had lost its significance by the Iron Age as the village overlaid its ditches with an apparent disregard for the earlier monument. The excavation also showed that natural erosion of the sides of the causewayed enclosure ditches was rapid and quite substantial. The earliest Iron Age settlement was small, unenclosed and was initially located within the confines of the causewayed enclosure ditches, but as the site developed and changed over time it encroached on the remains of the earlier monument. What makes the settlement at St Osyth very distinct, apart from the longevity of use, is the location within the cropmark landscape and the significance of the surrounding monuments. The aerial photographs show a large number of cropmarks that could be Iron Age, including a trackway associated with the village that was identified as middle Iron Age and stretches over 1.2km. A cross-road of this trackway and another was excavated and it split the roundhouses into two distinct groups on either side, showing that routes from the village to other areas were important.

The two other recognised causewayed enclosures in Essex (Springfield Lyons (EHER 5788) and Matching Green (EHER 17064)) do not have similar Iron Age settlement evidence, although at Springfield Lyons the excavation evidence suggests a Roman settlement nearby and there was a Saxon cemetery (Tyler and Major 2005); neither was visible on the aerial photographs. This begs the question as to why some sites were re-used in the Iron Age while others were not and is there any other evidence for settlement, whether dated to the Iron Age or not at other monuments? Were the earlier monuments influencing the location of settlement or were the earlier sites simply located on prime land that was reused long after the ditches of the ritual monuments had been in filled and were no longer visible? More than 600 sites fall within

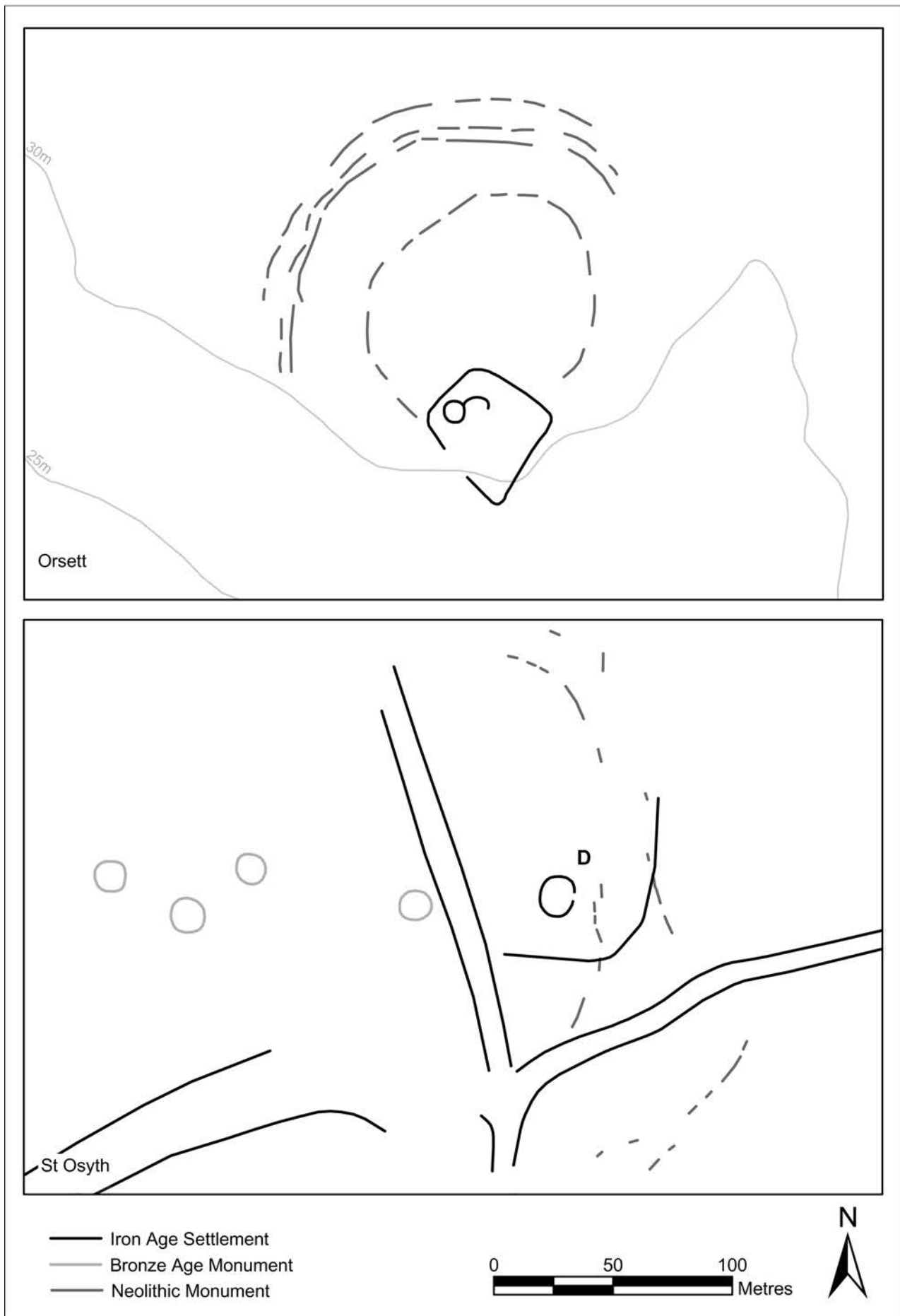


Figure 3.8 Orsett and St Osyth causewayed enclosures and associated Iron Age settlement. When excavated St Osyth revealed many more roundhouses than were visible on the aerial photographs; only one was mapped (D)

200m of an earlier prehistoric ritual monument. Not all of these later sites will have origins in the Iron Age, but it seems likely that some have.

There does not appear to be any evidence for other Neolithic sites being the focus for later settlement. For example, of the twenty-one long and mortuary enclosures identified in Chapter 2, none has significant evidence for either contemporary or later settlement in proximity. All of them do have possible activity like 'unknown' ditches, possible tracks and occasional enclosures, but there is no evidence for a mass of roundhouses in the form of ring-ditches such as was found at St Osyth and Orsett causewayed enclosure.

Later activity often does not respect the earlier mortuary enclosure. For example, the long mortuary enclosure at Frame Farm (EHER 8782) does have later activity in the form of a possible trackway and adjoining enclosure that appear to cut across the earlier monument. This may be because the trackway is much later and the mortuary enclosure no longer had any surface remains, rather than the trackway builders demolishing part of an earlier enclosure. Again at Dedham (EHER 2736) along the Stour Valley, the boundary ditches in the vicinity of the Neolithic long enclosure could be Iron Age, but the cropmarks do not represent good evidence for settlement and reuse of the site, and there is little respect for the earlier monuments.

Later settlement sites are often associated with presumed round barrows and several seem to incorporate and respect the earlier barrows; a good example of this is the cropmark site at Woodham Walter (EHER 7859, Fig. 3.2). Within the vicinity of the Iron Age enclosures, which have been dated through excavation, are nine round barrows. The development of the round barrow clusters was discussed in Chapter 2 and will not be looked at further here. The enclosure would have been part of an increasingly populated and organised landscape. The evidence suggests that there was open settlement before the construction of any enclosures (Buckley and Hedges 1987b, 44) and a small sub-rectangular enclosure 30m by 35m was constructed in the middle Iron Age, although there is only limited evidence that this was a settlement enclosure. The small site is comparable to several others, including two sites at Ulting Hall and Beeleigh Grange Farm (EHER 7960 and 7964) that are within 1.5km, which, while both are bigger in size, are rectilinear with curved corners. There are over 100 sites that have a similar morphology to the middle Iron Age enclosure and they are scattered over the entire county.

The next phase of settlement at Woodham Walter was a rectilinear enclosure to the west of the original, where three concentric ditches were constructed, enclosing an area 90m wide, over three phases of development. One of these phases respects an earlier round barrow; this implies it must have still been extant when the enclosure was constructed. At least one phase of construction was built over an earlier interned entrance. This site at Woodham Walter appears to be isolated from other possible settlement and there are no EHER records for sites or find spots in the vicinity, but when the site is viewed in conjunction with the topography it is very close to the modern River Blackwater (no more than 300m at the closest point) and the possible communities on the opposite side.

The multi-ditched enclosure at Woodham Walter is not unique; the site at Orsett Cock (EHER 1857) was very similar (Fig. 3.6). Orsett Cock was slightly smaller than the site at Woodham Walter, at only 65m across, and it had a conjoining double-ditched annex. It was first recognised as a cropmark in 1946 and excavation has shown that the first phase of development was during the middle Iron Age. Within the interior were structures very similar to those at Little Waltham. Unlike Woodham Walter, Orsett Cock lies within a landscape of dense cropmarks, many of which have been excavated (Carter 1998). There are many ditches, trackways and enclosures within a short distance. One of these, 250m north (EHER 5191; Fig. 3.6), is a site very similar to the first middle Iron Age enclosure at Woodham Walter (rectangular with rounded corners) and it is likely that the Orsett Cock farmstead was a focus for local activity and many of the features surrounding it are contemporary. For example, to the north of the enclosure is a linear feature, possibly a trackway that is on a very similar orientation to that of the enclosure.

Although only 700m apart, both the Orsett Cock enclosure and the one within the Orsett causewayed enclosure are very different at first glance. This highlights the morphological diversity of Iron Age settlement enclosures. Both these enclosures are rectangular with curved corners, but Orsett Cock developed into a substantial triple-ditched enclosure, whereas the settlement at the causewayed enclosure had only one surrounding ditch.

Using the morphological descriptions, fourteen other sites have a very similar form i.e. they are rectilinear with two or more ditches and some have internal structural features. They are distributed all over the county, but nine of the fourteen are within 1km of a river and the sites that are not are only a few metres outside the 1km buffer created in the GIS. This suggests that potentially the location of this site type was strongly influenced by local topography and the river system. Again, while it is not being suggested that they are all Iron Age enclosures it would seem likely that at least some are, as it appears to be quite a distinct morphological site type.

Looking at the fourteen sites individually, all are a variation on a theme (a selection is shown on Fig. 3.9). One difference is the size, with sites varying from 40m to 100m in length and 35m to 100m wide, but the biggest variation is with the number of entrances visible and the corner type. Nine of these enclosures have definite angled corners, the remaining five have curved. The two known sites at Woodham Walter and Orsett Cock both have curved corners and though this may not be completely telling, it could be an indication of date. Many of the identified Roman sites, for example, temples and villas all have angled corners. The enclosures with more angled corners could be later Iron Age or possibly early Roman. A site at Hadleigh (EHER 9536, Fig. 3.9), has a substantial double ditch, with suggested internal divisions and internal dimensions of 50m by 50m, although it is not completely regular. The site has been scheduled as a Roman fort, but recent fieldwalking found little evidence to support this interpretation and unlike other forts there are no apparent entrances or other Roman activity like roads in the vicinity. There is a sizeable ring-ditch to the south and the location of the enclosure overlooking the river could have been chosen for its defensive position in either the Iron Age or the Roman period.

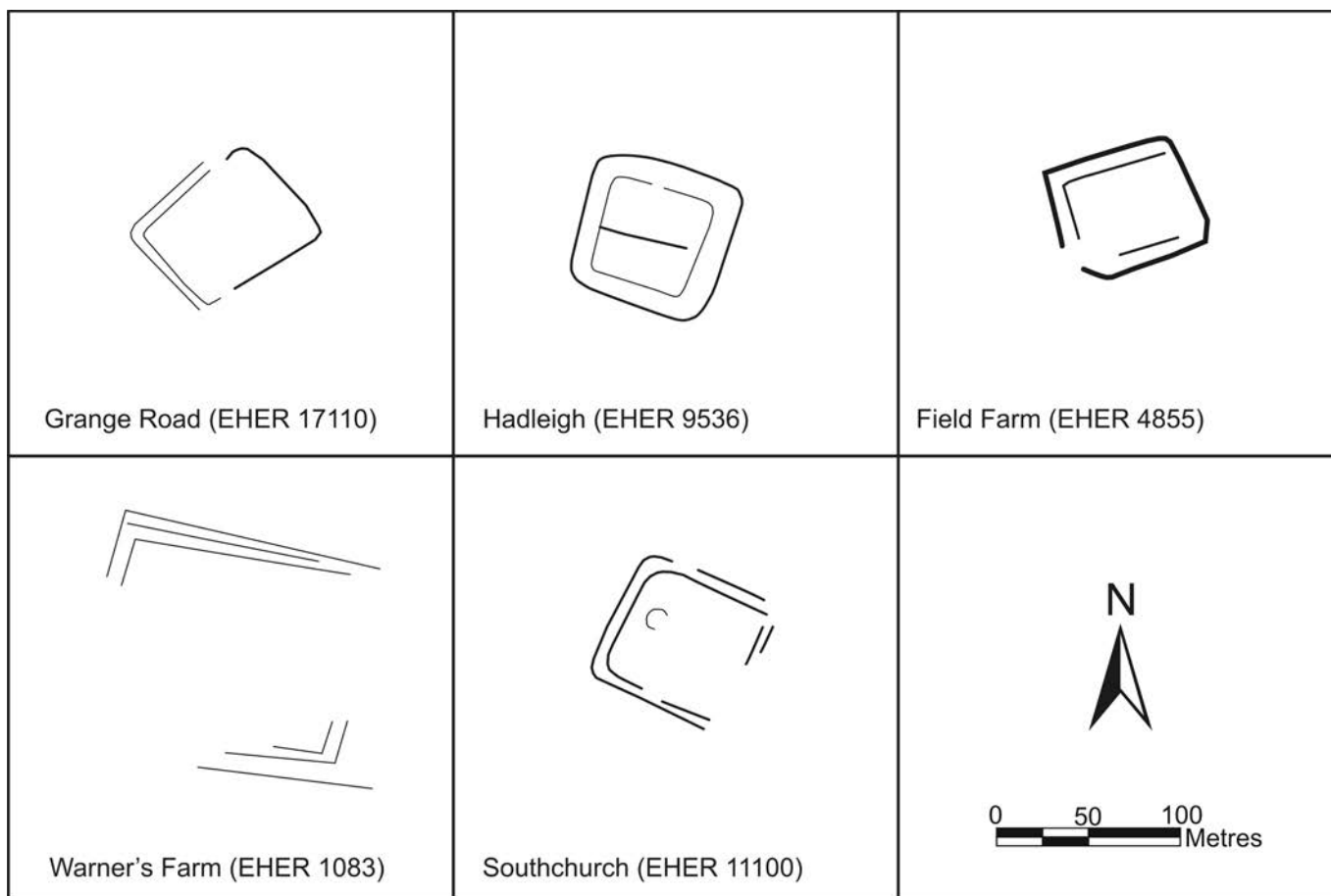


Figure 3.9 Comparative plans of a selection of rectilinear enclosures visible as cropmarks on aerial photographs that could represent Iron Age settlement

Ten kilometres to the east of Hadleigh is a slightly bigger enclosure at Southchurch (EHER 11100, Fig. 3.9) (65m by 65m), which is located 2km north of the Thames estuary. The Southchurch enclosure is similar to the Hadleigh site, with a substantial double ditch, curved corners and a possible entrance to the south. The main difference between these two sites is the distance between the ditches. At this site the two ditches are quite close with a maximum distance of 4m, whereas the Hadleigh enclosure has a distance of up to 10m between them. An internal ring-ditch has a diameter of 11m and strongly suggests a settlement, which may be of Iron Age date; it is possible that there are other ring-ditches within the enclosure that are not visible on the aerial photographs. A linear feature attached to the north side of the enclosure could imply the existence of an annex or stock enclosure, though it is not completely clear from the aerial photographs.

At Warner's Farm, Great Waltham (EHER 1083) there is a multi-ditched enclosure consisting of at least three ditches that are fairly regular and evenly spaced (Fig. 3.9). The internal dimensions of over 90m by 110m make this enclosure one of the biggest in the group. While not complete, it is possible to tell that the corners were angular. The geology makes the details difficult to identify on the aerial photographs, but there are possible internal features including pits (not marked on Fig. 3.9). The location is very similar to that of Woodham Walter, as it is no more than 400m from the River Chelmer and only a few metres from a natural spring. The enclosure faces directly

towards the river and it could have had entrances facing towards the valley, although there is no aerial photographic evidence for this. While there is not enough information conclusively to identify this as an Iron Age settlement it would seem likely with the available evidence.

Based on the evidence from all these sites it would seem that there are several morphological types for Iron Age settlement and this is not surprising as traditions change over many centuries. The evidence in Essex highlights the vast array of varying settlement types and the excavation and cropmark evidence reinforces Sealey's view (1996) that Iron Age settlement morphology is characterised by its diversity. It also implies that the type of settlement was chosen to fit different aspects, such as the local topography, environment or even external elements such as population level and political stability.

Hillforts

Hillforts are a typical Iron Age site type, though many may have origins in the Late Bronze Age (Haselgrove 1999, 113) and the Essex sites may be no exception. It has also been suggested that many hillforts were not permanently settled but were used as a temporary refuge for livestock and people (Sealey 1996, 47). However, the community that built and had access to the hillforts must have lived nearby, so it may be possible to identify structures within the landscapes that surround the hillforts. While four hillforts were mapped (Fig. 3.10 illustrates three of the mapped sites), twelve are actually recorded in Essex, but

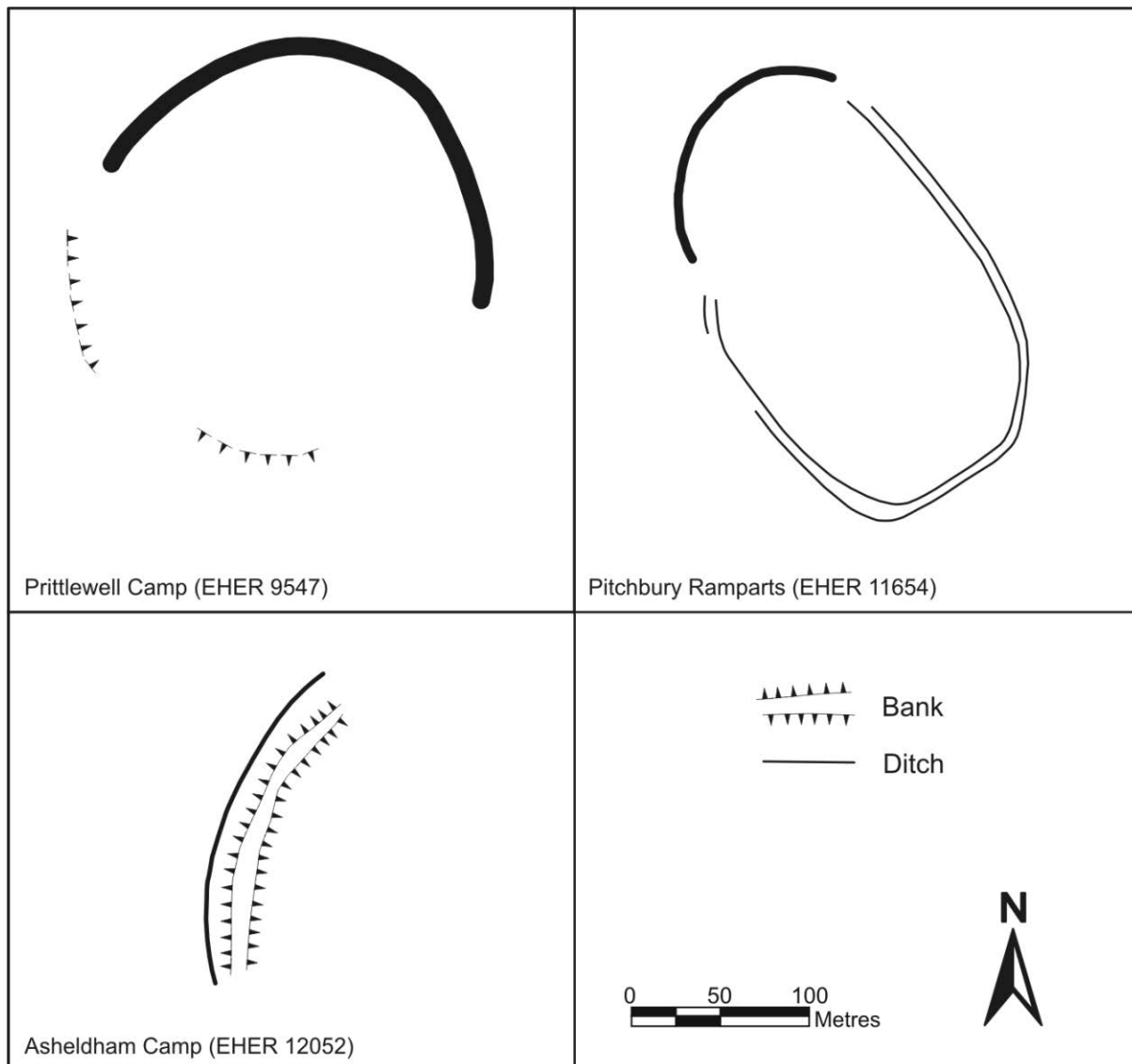


Figure 3.10 Three examples of mapped Iron Age hillforts found in Essex, showing only the evidence visible on the aerial photographs

the rest are obscured from the air by dense tree cover and so were not mapped. Most hillforts are located in the south of the county, with only four north of the Chelmer and Blackwater rivers.

Of the four sites that have been mapped, no specific new information was added from the aerial photographs, but the mapping has placed them into a landscape context. It is also possible that placing the non-mapped sites into the cropmark landscape may aid the interpretation of some of the latter, as the societies that built and used the hillforts would also have been managing and using the surrounding land.

Two sites, Wallbury Camp (EHER 16) and Pitchbury Ramparts (EHER 11654; Fig. 3.10) have a double rampart and ditch, which could be mapped. The remaining two sites, Prittlewell Camp (EHER 9547) and Asheldham Camp (EHER 12052), only have a single ditch and bank, which is not completely visible. Morphology is often used to date hillforts, with sites normally assigned an early to late Iron Age date. Investigations at other hillforts have found Roman activity, but often the settlements within the hillfort were destroyed during the early Roman period, as was found to be the case at South Cadbury where there was

evidence of clearance of the hilltop and destruction deposits in the south-west gateway (Barrett *et al.* 2000, 6). It is entirely feasible that a similar thing happened in Essex with a movement away from the use of hillforts in the early Roman period. Evidence from Asheldham Camp does suggest that the site was abandoned by the late Iron Age (Bedwin 1991, 26).

The four mapped sites are all located in prominent positions within the local area. Due to the low topography of Essex the sites range between 15–60m OD (Morris and Buckley 1978, 22–3), but they are all located in dominant locations relative to the surrounding area and in strategically important areas, particularly in relation to rivers, estuaries and coastlines (Bedwin 1991, 26). For example, Pitchbury Ramparts is only 50m OD, but it is still in a prominent position within the local topography, overlooking the River Colne and located on one of the highest points in the area. Two of the non-mapped sites, Loughton Camp and Ambresbury Banks (EHER 24 and 130) were located in prominent positions and would have made use of a good network of hilltop viewpoints in the surrounding landscape.

While many of the hillforts around the country are found on substantial and dominant hills, such as Danebury in Hampshire and Maiden Castle in Dorset, the hillforts in Essex are less dramatic, but no less important. While the Essex sites are grouped together as one site-type, there may be evidence to suggest different uses. For example, the two hillfort sites in Epping Forest, Ambresbury Banks and Loughton Camp, appear to have had no permanent settlement within the interior (Morris and Buckley 1978), whereas Asheldham Camp does have evidence for permanent settlement (Bedwin 1991). However, as with many of the terms used within the project, 'hillfort' identifies sites within Essex that are comparable in many ways to those around the country.

There are over forty other cropmark sites within a 1km radius of the four mapped sites, many of which could be connected or associated with hillfort activity. The vast majority of these are either unknown ditches or enclosures and these sites should be looked at in the context of major activity at the hillforts. Domestic activity is presumed to have occurred internally at the hillforts, but it is very unclear in a lot of cases and the aerial photographs have not contributed further information. Any information regarding domestic structures within the interior of sites may have been lost as many of the sites have been cultivated, such as Pitchbury Ramparts, but it can be assumed from evidence at other sites outside the county that domestic activity and landscape organisation did occur in and around the monuments.

In some areas of the country hillforts were control foci from which other linear systems radiated (Cunliffe 1990, 38). 50% of the sites that are located within 2km of the Essex hillforts are ditches of unknown date, along with scattered enclosures and trackways. The vast majority of the evidence for settlement around hillforts is at Asheldham Camp, although this site also has the most evidence for settlement within the camp. Currently it is not possible to establish whether all the settlement outside the fort is contemporary, but there is evidence that the camp was abandoned after 150 BC, which may mean that the surrounding sites were in use after this. However, excavation indicated that there was a Roman farmstead and land organisation in the area, so there may have been continuous settlement surrounding the hillfort, and the local settlement was simply expanded and developed when the hillfort went out of use.

The main problem with establishing where the permanent settlement surrounding the hillforts was located is the lack of cropmark evidence. The Essex hillforts are located mainly in the south of the county on the London Clay, where there are few cropmarks. While it may be that many of the hillfort sites were used as a refuge in times of trouble, there must have been a catchment area from which the population came to the closest hillfort. Only a catchment of 2km was examined here and it is likely that much larger distances should be studied.

Lincolnshire has similar evidence to Essex, and of the six possible defended hillforts that were mapped as part of the county's NMP, only very few have boundaries in close proximity (Boutwood 1998, 35). Lincolnshire also has numerous and extensive multiple ditched boundaries in close proximity to many of its prehistoric settlements (Boutwood 1998, 32) and it has been suggested that these were part of a larger network of land division (Pickering 1979). Essex does not appear to have these extensive

boundaries that could have been used to divide great expanses of land and may have even predated the hillforts. It is possible that they have been lost by more recent field organisation or hidden by field boundaries that still exist and follow the layout that was established in the Iron Age, though evidence for this is lacking. When the 1st edition OS maps of the 1880s are examined in conjunction with the cropmark plots, it is still difficult to detect land organisation patterns that might be associated with the sites and this is perhaps beyond the scope of this chapter.

Burial and religion

Distinct classes of monument relating to Iron Age ritual are lacking in the cropmark record, compared to earlier periods of prehistory, although a number of Romano-British temples have been shown to have late Iron Age precursors. There is a wide range of ritual sites from circular 'temples' such as Harlow (EHER 107), to extensive burial enclosures such as Stanway near Colchester (EHER 12552). There is evidence at Ivy Chimneys (EHER 8195) (Turner 1999), Harlow, Great Chesterford (EHER 7311) and elsewhere for the reuse of earlier Iron Age shrines in the Roman period. Unfortunately this evidence is often only found through excavation as it is only the Roman sites that are visible and recognisable on the aerial photographs. This is very much the case at Great Chesterford where the temple enclosures and some central details were visible as cropmarks, but when the site was excavated in 1978 an Iron Age shrine was discovered underneath (M. Medlycott pers. comm.).

The evidence for burial is scarce in the early to middle Iron Age and the aerial photographic evidence has contributed very little, as dating any cropmarks is very difficult. Cremation burial, which was common in the Bronze Age became less so in the early Iron Age, but then was gradually re-established in the later Iron Age, although cremation in the Iron Age may not have become widespread until the early Roman period (Sealey 1996, 58). There is some aerial photographic evidence for square barrows although they are not common, with only seven examples recorded, of which four may be Iron Age in date. Three of the sites were considered to be 'unknown prehistoric' (EHER 2716, 11668 and 16444), but there is nothing to suggest that they could not be Iron Age. At least one of these square barrows sits within a cropmark landscape of linear features, possible trackways and rectangular enclosures, which might suggest an Iron Age date (EHER 11668). There is a little evidence for inhumation throughout the period, including the small inhumation cemeteries at Mucking (Going 1993) and Ardale (Wilkinson 1988, 37-8). Individual Iron Age burials have also been found including a warrior burial at Kelvedon (Sealey 2007). This isolated grave was excavated and various metal weapons were found, but importantly, because the site was an isolated burial, it would be unlikely that there was any identifiable evidence on the aerial photographs. It would seem likely that while there will be further discoveries like the inhumation cemeteries and warrior burials it is unlikely that they will be solely identified from aerial reconnaissance.

At Maldon Hall Farm near Maldon, a small rectangular ditched enclosure measuring 23.5m by 15m was excavated in 1989 (Lavender 1991, 203). The site was visible on aerial photographs and was mapped as part of the NMP. It was found to be a late Iron Age cemetery



Figure 3.11 Aerial photograph of Sparrow's End, a multi-ditched enclosure near Saffron Walden (copyright Essex County Council CP\96\60\03)

enclosure, with some evidence for late Bronze Age–early Iron Age activity. The cemetery was thought to represent a fairly small family group and no associated settlement has been identified.

While cremation burials are found across the county (with over eighty recorded in the EHER), this was the first excavated example with an enclosure ditch in Essex (Lavender 1991, 208). Whimster (1981) identified fifteen possible Iron Age cemetery enclosures in Essex. On morphological grounds alone the NMP has mapped sixteen possible sites. All the NMP sites have a very similar morphology to the excavated example. They are smaller than 30m long and between 10–25m wide. One of these enclosures has a possible entrance, which might exclude it as an Iron Age burial enclosure, as the Maldon Hall example did not have any evidence for an entrance.

Two sites with similar morphology to Maldon Hall Farm are located near St Osyth (EHER 2970 and 2981). One is located 400m from the Iron Age settlement at Lodge Farm and is on one of the highest points in the area. It is away from the main concentration of settlement cropmarks and is not close to any of the visible trackways that lead into the village that was excavated, but on morphological grounds an Iron Age burial enclosure could be suggested. The second enclosure is 1.6km south-west of the Lodge Farm settlement, but is in close proximity to at least two visible round barrows.

However, caution should prevail, as for most cropmarks identification can be difficult. The excavations at Slough House Farm show that morphological classification is not always accurate. An excavated enclosure was found to be 27m by 12m, but was of late Neolithic/early Bronze Age date (Wallis and Waughman 1998, 9) despite being morphologically similar to Maldon Hall and near the Iron Age nucleated settlement.

The site at Sparrow's End (EHER 154, Fig. 3.11) is also of interest when discussing religion and burial

practices. The site, near Saffron Walden, is a multi-ditched square enclosure, where the innermost enclosure has a substantial ditch and what appears to be a south facing entrance, with a central pit. The site has similarities with the Stanway warrior burial enclosure near Colchester, although these are not multi-ditches.

Due to this similarity it is thought that the site might represent an Iron Age burial enclosure. The site is unique in the north-west of the county and no fieldwork has been carried out, so it is not currently possible to date the site further at this time, but it does suggest that there may have been extensive activity during the Iron Age in this area.

The Roman period

The geographical location of Essex ensured that there was contact with the Roman world long before the invasion and consequently there is evidence of the Romans quite early. Conversely there is little evidence of sweeping change immediately following the Roman conquest, with many settlements changing very little. This means that the distinction between the Iron Age and Roman periods, particularly in the cropmark record, is difficult.

It is likely that in the early Roman period the Iron Age way of life continued. There is evidence of enclosures (some multi-ditched), with internal features like timber houses, stock pens, granaries and kilns found throughout Essex (Kemble 2001, 89). Such enclosures have been found at Orsett and Boreham, albeit through excavation rather than the cropmark record.

As the period progressed there was an increase in the Romanisation of the county, with a growth in the size of towns like Kelvedon, Great Chesterford, Colchester and Chelmsford. While the evidence for the Roman period is good in the towns it is often found through excavation prior to development rather than through the aerial photography, which is of limited use. The one exception is the Roman town of Great Chesterford where aerial

photography has aided the understanding of the site, due to the development of the medieval village away from the Roman area and the remains of the Roman town producing very good cropmark evidence (Medlycott forthcoming).

Overall 127 sites have been identified through the NMP as Roman and many of these are already known sites that have been investigated through excavation or appear to have a typically Roman morphology; for example, the villa at Chignall St James (EHER 1040) and the temple at Harlow (EHER 17). Other sites classified as Roman include one inhumation identified at Mucking (EHER 13843). This site would not have been confidently interpreted as an inhumation if not for the excavation results, as it was simply a macula feature.

Villas and farmsteads

Villa sites are specific to the Roman period, although the number mapped is limited. Only three were identified during the course of the NMP (Fig. 3.12) and are located at Harlow (EHER 3600), Chignall St James (EHER 1040) and Fordham (EHER 11952), despite over sixty possible sites being recorded in the EHER. The discrepancy is because the EHER records material evidence, such as Roman tile that was re-used as building material in churches; it is assumed that Roman building material in an area implies a Roman site close by. Of the sites mapped, only Chignall St James (C, Fig. 3.12) shows a typical cropmark of an aisled courtyard villa; an area to the south has been excavated (Clarke 1998), though not the villa building itself, which is a Scheduled Monument.

The other cropmark sites have not been confirmed as villas, though at Harlow (B, Fig. 3.12) while the cropmark evidence of a villa is not clear, the results of other fieldwork in the vicinity indicate that there was a building of high status in the area. Fieldwalking found Roman tile and pottery, while a gradiometer survey identified an extensive complex of ditches, boundaries and possible structures (Wardill 1997). So while the cropmarks alone do not present a convincing case, from the other evidence it would seem likely that this site is a villa. The third site, at Fordham (A, Fig. 3.12) is a well developed cropmark complex, which shows a possible courtyard and aisled sections within the building. There is no fieldwork evidence for this site, but the basic morphology and surrounding evidence suggests a Roman structure.

These three sites are located on ridges overlooking rivers. Although this is a very small number of sites, they are surrounded by at least nineteen other cropmarks within 500m, including tracks, annexes and enclosures, as well as a possible barrow, implying an intensively used and extensively organised landscape.

Sites from the early Roman period at Stansted show little significant change from the late Iron Age period and it would be unlikely that this transitional period is actually visible within the cropmark record. The mid-term car park site had continual use from the Iron Age through to the Late Roman period and consisted of rectangular enclosures and possible small groups of roundhouses (Framework Archaeology 2004, 30). Again while this site was not detectable on the aerial photographs, the detailed morphology of the site can aid the identification of similar sites elsewhere.

Smaller farmsteads are often difficult to date and interpret especially from cropmarks, but it is likely that

they were more common in the Essex landscape than the higher status villas. By using excavated examples, other morphologically similar sites may be identified. Within Essex there are numerous sites ranging from small isolated enclosures to larger, higher status farmsteads. A small enclosed farmstead with a series of paddocks and enclosures, in use throughout the Roman period, was identified at Strood Hall (EHER 19455) during excavations in advance of the new A120 road development (Timby *et al.* 2007, 81–3). Although there are no clear aerial photographs of this site it was located along a known Roman road and this may be important for the identification of other small farmstead sites along known Roman routes, which will be examined later in the chapter.

Continuity and/or re-use is a common theme for sites of all kinds. Major Roman sites such as the villa at Chignall St James have evidence for this; a substantial Iron Age settlement enclosure (EHER 1042) was located 200m to the south of the villa site. The site developed during the late Iron Age and through the Roman period (Clarke 1998). Smaller enclosures were also continually used and a site at Coleman's Farm, east of Witham (EHER 45900) is one example where evidence for Iron Age occupation was established through excavation, which confirmed that the settlement enclosures were modified and extended throughout the late Iron Age and Roman periods (FAU 2003). A geophysical survey showed that there were extensive enclosures across the site that had been altered and enlarged; these alterations could then be dated through the excavation evidence (Saunders and Clarke 2004). This often means that Roman occupation sites are located in complex cropmark landscapes and it is very difficult to establish the date of many enclosures, even if they are in proximity to more obvious Roman monuments. The NMP in Lincolnshire revealed that many enclosures associated with Roman villas or rural settlement were not always rectilinear and/or double-ditched (Winton 1998, 53), which may have been expected with Roman sites. It is likely that sites in Essex are similar and this can make it more difficult to identify sites.

There are some distinct Roman structures that can be identified as there are similarities to known or excavated sites. Figure 3.13 shows a selection of Roman sites within Essex. The sites range from extensive trackways and field systems (Ardleigh, EHER 3502) to basic farmsteads (Woodham Walter, EHER 7859). The cropmark sites of Chigborough (EHER 7868), Great Holts (EHER 14127) and Mucking (EHER 13843) all had extensive evidence of Roman occupation, but the sites were used over a long period of time leading to a more complex cropmark picture, representing more than one phase of use. For example, there is evidence at Chigborough for Roman mixed farming with stock keeping (Wallis and Waughman 1998, 226), but the cropmark evidence was difficult to interpret as the actual cropmark was a fairly simple series of linear ditches and intersecting enclosures, with no identifiable structures or indication of date from the cropmarks. Without the excavation, although a Roman date may have been indicated for some features, the full extent or nature of the site would not have been known or fully understood.

Great Holts, near Boreham, was visible as a cropmark with a range of droveways, enclosures, fields and

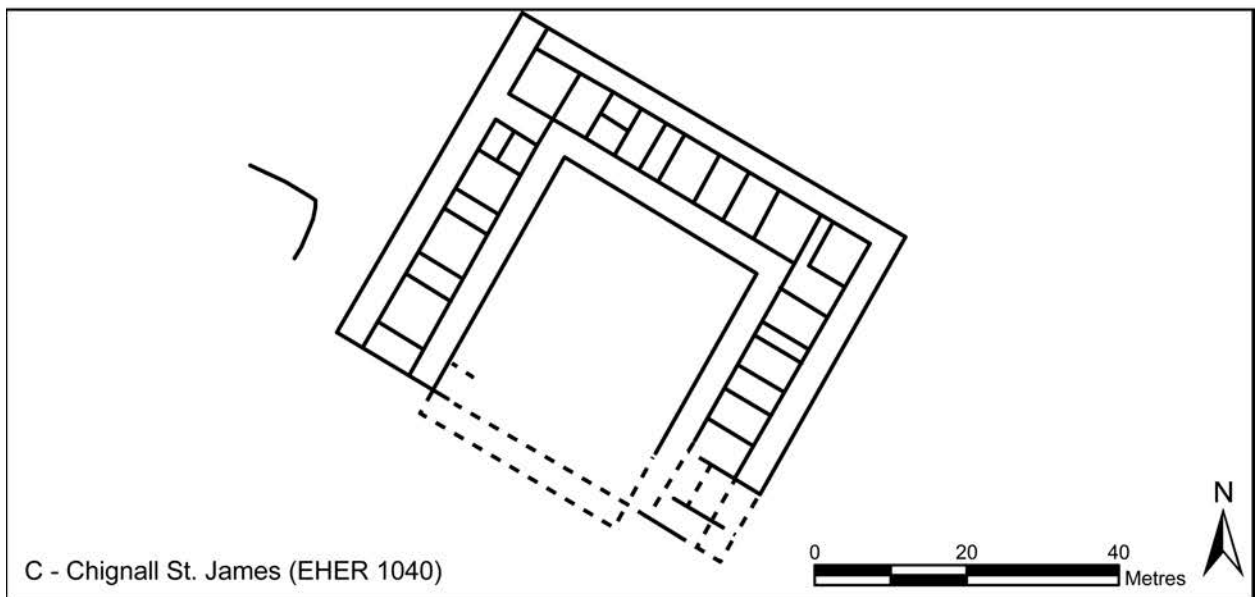
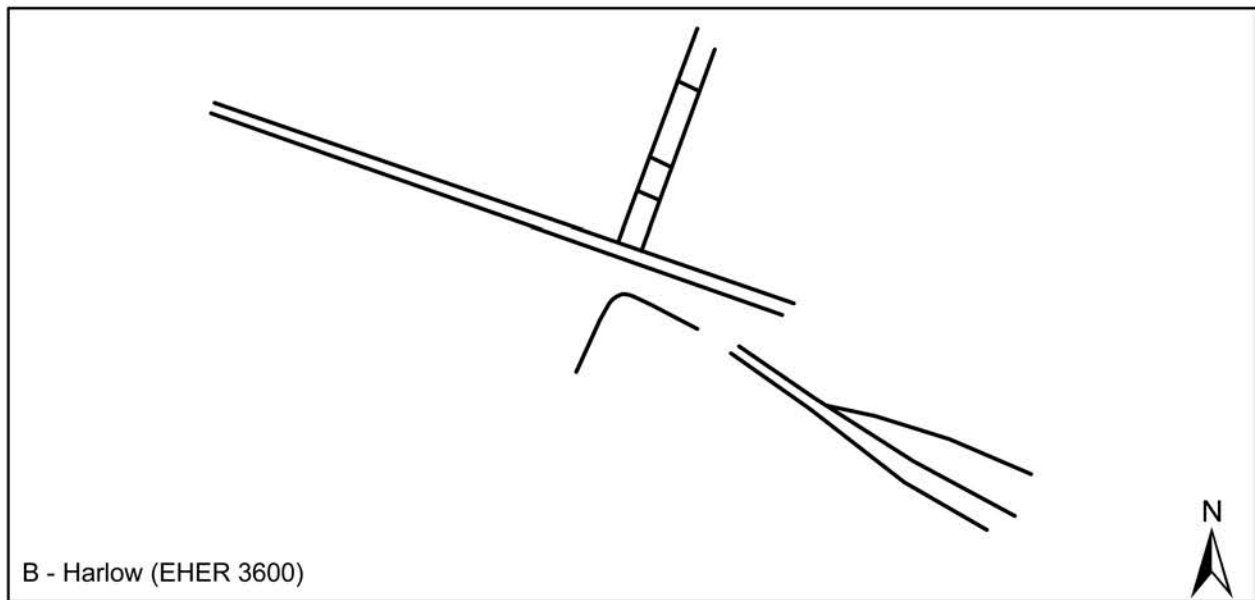
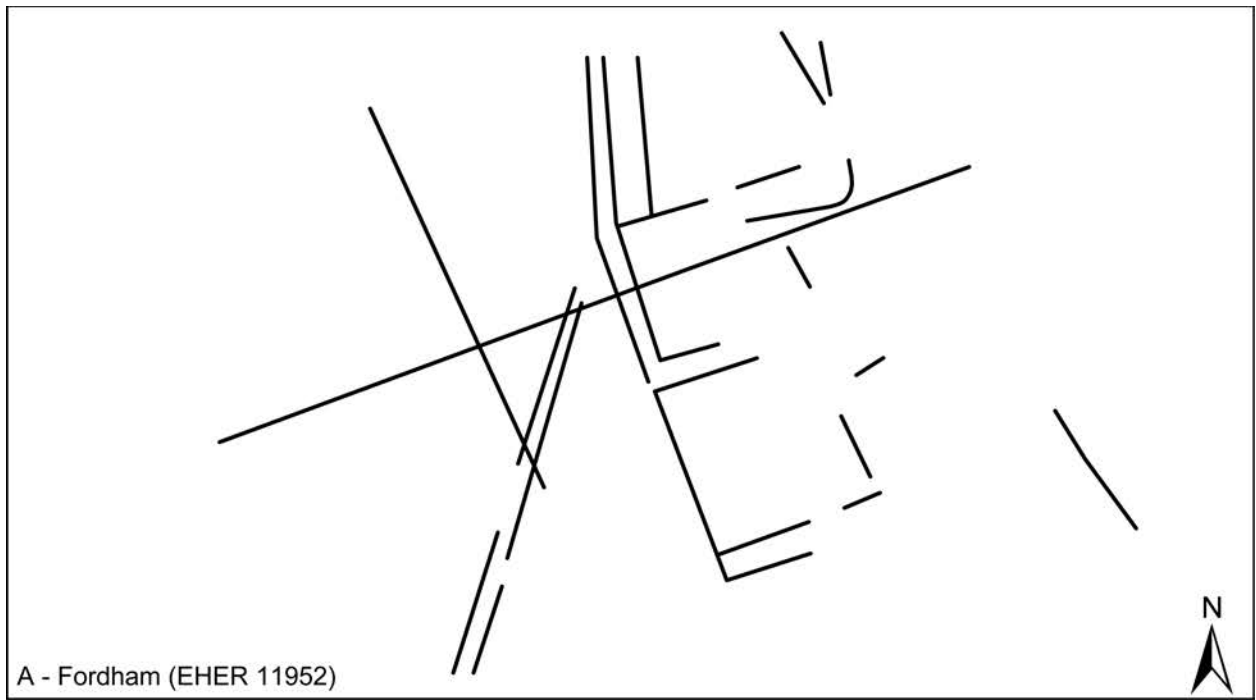


Figure 3.12 Cropmark plots of identified Roman villa sites



Figure 3.13 Cropmark evidence for Roman settlement types in Essex

buildings and, like the site at Strood Hall, was set back from a Roman road. Importantly, this site was part of a planned landscape (Germany 2003, 217), which will be discussed below.

Of the sites shown on Figure 3.13, only the Mucking cropmark has a typical Roman morphology with a double ditched rectilinear enclosure. Excavation identified internal subdivisions that had not been visible on the aerial photography; even so the enclosure shape made the site identifiable as possibly Roman. All the enclosures shown on Figure 3.13 had evidence of previous activity in the vicinity, although the Roman settlement sites were not always an adaptation of earlier activity. At Great Holts, it was demonstrated that the earlier settlement was located elsewhere. Other sites differed from this and often the cropmark complex was a conglomeration of many phases of development such as at Ardleigh and Mucking. Away from these known sites identification can be difficult. It is thought that the Roman landscape was extensively organised and there must be some evidence of this. It is possible that in some areas remnants of the Roman landscape still exist within the modern landscape (Rippon 1991), and there are indications that some mapped sites that could have Roman origins have been interpreted as post-medieval field boundaries, which again highlights the need to look at the primary morphological data, rather than previous interpretations.

Land division was a common practice in Roman Britain with land parcelled up into accurately measured plots. The plots were laid out to set dimensions, which accounts for why Roman sites frequently have right angled corners and equal sized enclosures. The farmstead at Great Holts was found to be laid out to fixed dimensions (Germany 2003, 20) and it is possible that some of the sites identified as possibly Roman could be similar. The site at Langford near Maldon (E, Fig. 3.14 and 3.15) consistently measures 27, 135 and 104pM (pM — *pes monetatis* or Roman foot and is equivalent to 0.295m) across the enclosures, with only a few areas outside these dimensions. At Hill Farm (C, Fig. 3.14), the site is divided into plots of 304pM by 608pM showing that the enclosures or fields were twice as long as wide. Again at Lexden Lodge (A, Fig. 3.14), outside Colchester, consistent measurements can be shown of 101 and 135pM across the site. Of these three sites, two have similar dimensions (Langford and Lexden Lodge), with only a discrepancy of 3pM (less than one metre), which is within the accepted margin of error for aerial photographic plotting at the scale used for NMP.

The site at Orsett (F, Fig. 3.14) demonstrates this consistency in a different way and its dimensions are quite different from the other sites. This is the only illustrated site to consist of a single large enclosure, with overall dimensions of 810pM by 640pM. On the aerial photographs it is possible to distinguish sections of internal divisions (one ditch is visible across the width of the enclosure and two are visible down the length). The distance from the external to the internal ditch shows that if a further two ditches were present then the length of the enclosure would be divided into four equal blocks (shown on Fig. 3.14).

While these enclosures may have deliberately divided up land, none of these land parcels appear to be as large as the suggested size for a Roman land holding, which was traditionally approximately five hectares (12.5 acres,

Crummy 1997, 55). There may be a number of reasons for this, including the fact that the cropmarks may not reveal the full extent of the site with only the core of the complex visible. It is also possible that the extent of the original plot is now bounded by modern features. Lexden Lodge is a possible example of this, as the cropmark is surrounded by a river to the south and a road and field boundaries to the north that could encapsulate a suitable sized area for a Roman farmstead. Alternatively the sites identified could be lower status farmsteads that may not have held such large tracts of land.

While these sites fit into the Roman classification, other less regular sites could also be Roman in date. The excavated site at Strood Hall on the A120 (Timby *et al.* 2007) was found to be a multi-phased late Iron Age–Roman occupation site. While the site fits the morphology with multi-enclosures, droveways and linear features, it does not exhibit the same repetition of consistent dimensions that many other sites do. This may be due to the continuity of occupation on the site from the Iron Age. The enclosures at Strood Hall were added to over time, which may account for the lack of standard dimensions, and this will be the case elsewhere.

There are over 4000 Roman records in the EHER, ranging from find spots of coins to pottery spreads and villa sites. Mapping the location of both the EHER records and the cropmarks and then comparing where the sites correspond may indicate the date of some cropmark sites. Cropmarks that were located within 100m of an EHER record are examined, with morphology and location then considered. Over 500 cropmark sites were found to be within 100m of an EHER Roman record. After removing modern or known non-Roman sites the remaining sites showed concentrations along the known Roman roads and smaller clusters elsewhere. Some of the sites were known to have Roman activity on them, such as a collection of sites along the north shore of the Blackwater estuary that included Chigborough and Loft's Farms.

Smaller, less well known sites were also highlighted by this comparison. In north-west Essex, to the west of Audley End, smaller clusters of cropmark sites appeared to be in the vicinity of Roman find spots, including at least one enclosure, 900m north-east of Clanverend Farm (EHER 0253), that had been interpreted as 'unknown prehistoric' in date in the NMP database. The cropmark site could be multi-period, as intersecting and overlapping enclosures and ditches are visible; so a Roman date for at least part of the site would not be unrealistic, and it could also show continuity from the Iron Age. It is less than 2.5km east of the large multi-ditched square enclosure at Sparrow's End (EHER 154, Fig. 3.11) that has similarities to the religious sites at Stanway near Colchester. Although the Sparrow's End enclosure would not have been visible from the settlement, it is possible that the main route to and from the settlement would have passed the monument, which would have dominated the surrounding landscape. There are other sites in the area that are consistent with Roman settlement, with evidence for various pottery scatters and at least one cemetery, but have no cropmarks visible.

Elsewhere in Essex there were very similar results. Just to the north of St Osyth there is a dense cropmark landscape with a series of enclosures, trackways and apparent interconnecting field systems (EHER 2937 and 2971), which have been classified as 'unknown

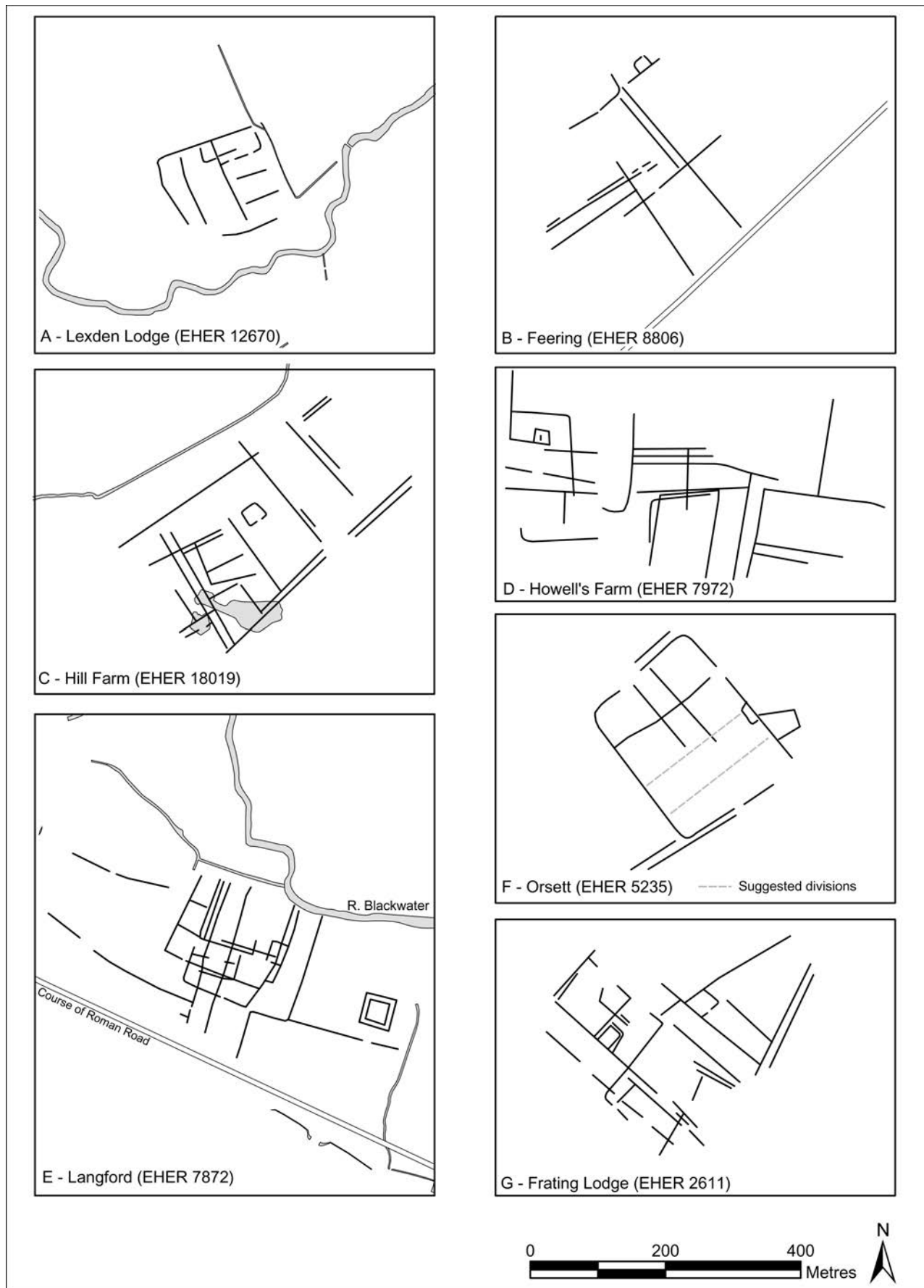


Figure 3.14 Cropmark evidence for possible Roman settlements in Essex



Figure 3.15 Aerial photograph of the cropmarks of a possible Roman settlement near Langford. While the main ditches and pits are visible, the possible temple enclosure is not clearly visible (copyright Essex County Council SWC8-2)

prehistoric' within MORPH2. This is a reasonable assumption when considering that the site is only 1.5km north-west of the prehistoric ritual and Iron Age settlement site at Lodge Farm near St Osyth (EHER 2970), which was discussed earlier in the chapter. However, find spots in the area suggest Roman occupation, as tile, building material and pottery have been found. In an area 1km by 1.5km, over twenty Roman sites are recorded on the EHER (including two putative villas) and these cover a complex cropmark landscape (Fig. 3.16), including long stretches of trackways that could represent Roman roads (Fig. 3.17). Some of the cropmarks fit the model of the multi-ditched sites, with droveways and central enclosures, shown on Figure 3.14, so it seems sensible to give them a Roman settlement interpretation.

While no structures have been found to confirm the location of the villas, finds in the area include *tegula* and mosaic tile. The cropmark sites are located upslope about 320m from the location of the finds. It would be unlikely that the villas would have been visible from the location of the cropmark, despite the fact that the area is relatively flat. However, the Colne estuary and any activities along the estuary would have been highly visible, which may be significant in the location of the site. It is well known that industries associated with the coast were carried out during the Roman period, such as salt production or oyster collection and although there is little evidence for coastal exploitation so far in this immediate area it could be that this coastal location was important. The cropmarks above

the villa sites appear to be connected with a trackway that stretches over 1.3km (Figs 3.16 and 3.17), with an associated shorter section of over 600m also running north-south. Both these trackways appear to be heading towards the Roman road 3.5km to the north-west suggesting a major laying out of the landscape.

While higher concentrations of possible Roman sites found by aerial photography are located in the Tendring area and around Heybridge and Thurrock, this is more a consequence of suitable geology for the development of cropmarks than a true indication of the distribution of sites. This makes assessing general patterns of settlement very problematic as there is good evidence elsewhere for Roman settlement where there are no cropmarks. Going (1988) observes Roman settlement evidence around Great Dunmow in abundance and that the spacing of villas is systematic with 2–3km intervals along the slopes of the Chelmer Valley. Going (1988, 86) suggests that this is evidence of an ordered landscape. However, on a large scale the NMP is unable to aid this discussion because so few mapped sites are recognised as Roman. On a more local scale, the NMP has highlighted many possible Roman sites, but again the biases affecting the formation of cropmarks make it very difficult to detect patterns of occupation across the different geology. However, topographically broad patterns can be detected along the river valleys where settlement appears to be located above the valley bottom. For example, in the Braintree area the limited numbers of sites mapped are located between the 50–60m contours or above.

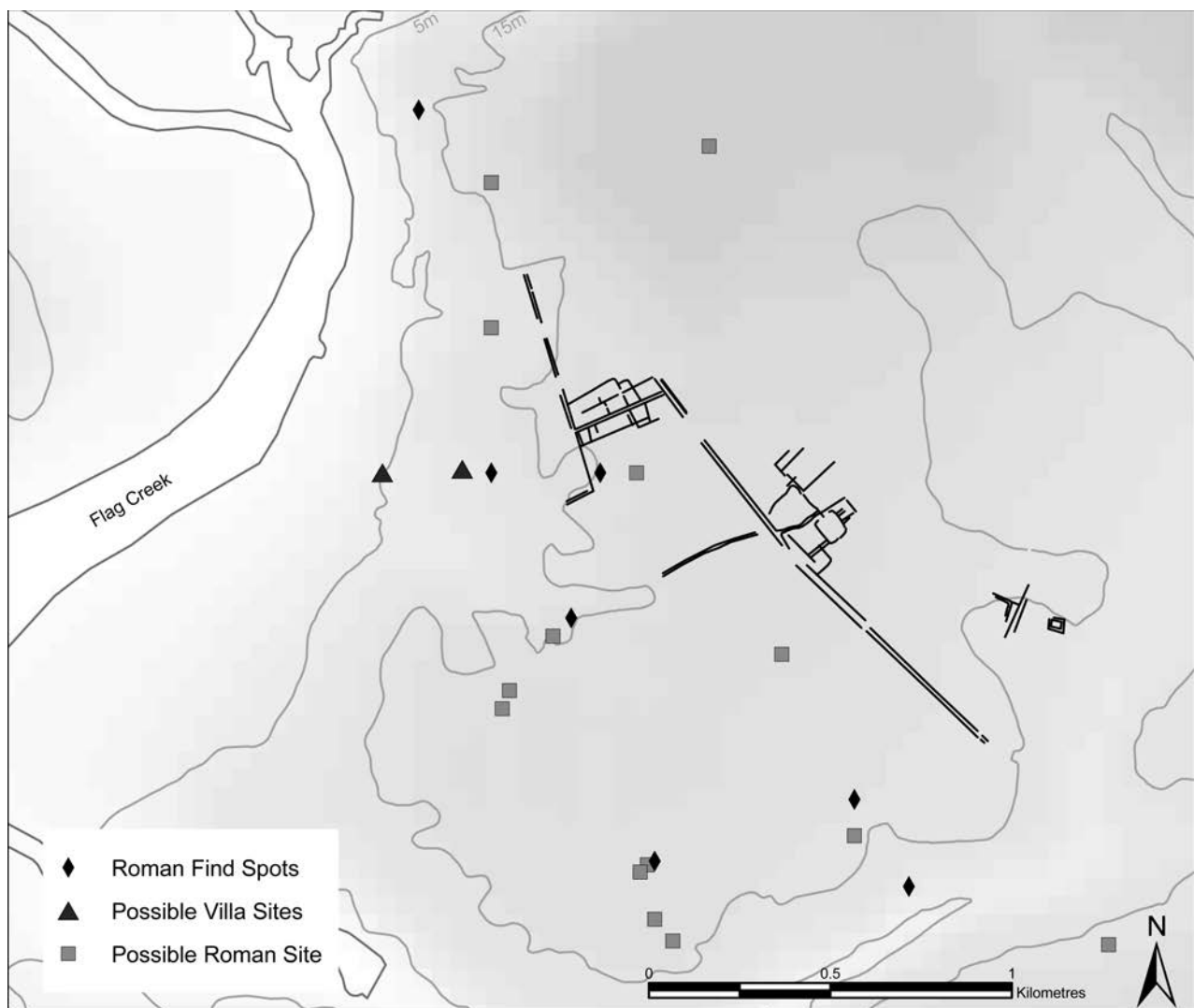


Figure 3.16 The Roman cropmark landscape near St Osyth and location of find spots and EHER records

There is an indication of differences between the north-west of the county and elsewhere. At present all of the settlement indicated by linear features and enclosures similar to those in Figure 3.14 are located in the east and south of the county. This type of site has, so far, not been identified in the north-west on the higher ground. The closest similar site is at Folly Farm, Great Dunmow which has similarities with sites at Chigborough Farm and Langford (Figs 3.13 and 3.14). This still leaves a large expanse of north-west Essex without evidence of this site type despite the presence of cropmark enclosures, linear ditches and large numbers of Roman sites identified in the EHER. While in some areas of north-west Essex boulder clay is the dominant geology, there are still cropmarks so it may be topographic constraints that ensured that the land was not suitable for the type of site that divided the land so evenly. The flatter areas in the east and south of the county within broad river valleys, along which the main routeways were established, might have been more suitable and desirable for this layout of site. Whereas the higher undulating ground in the north-west may not have been as suitable. Alternatively, the type of settlement site could have been influenced from outside the county. Both in earlier prehistory and the historic period these regional differences were present, with evidence that there was

influence from across the modern border from Cambridgeshire and Hertfordshire, and this may be applicable here.

Comparing information from other sources, including the EHER and cropmarks, can only give an indication of possible date for a cropmark plot, as with morphological analysis there will always be sites that are not the date that the evidence suggests.

Roads

The Roman road network across Essex is complex and extensive and stretches are still visible in many places through cropmarks (Fig. 3.17), earthworks, green lanes and modern roads. Many of the recorded routes are heading towards known Roman towns such as Colchester, Chelmsford and Great Chesterford. Twenty-nine stretches of Roman road were identified as part of the NMP both as cropmarks and soilmarks of varying lengths from 90m to 4.3km, although many of these lengths were not continuous. The EHER has over 250 Roman road records and this does not include the sections of Roman road that are under modern roads such as the A120 into Braintree.

Over 2675 NMP sites are within 1km of the Roman roads on the EHER. This excludes sites for which it was possible definitely to assign a non-Roman date, such as



Figure 3.17 Aerial photograph of a section of possible Roman road visible as a cropmark north of St Osyth (copyright Essex County Council CP\96\31\16)

anti-aircraft batteries, airfields and known prehistoric sites such as mortuary enclosures and cursus monuments, but all of the records for ‘ditches’ and ‘field boundaries’ were included, even if they were classified as medieval. This was to ensure that all possible clusters of sites in the vicinity of the Roman roads were considered in order to reassess the validity of the initial interpretation. A high proportion of the sites are classified as ‘unknown’ ditches, whereas others are trackways, enclosures or round barrows. It is likely that some of the round barrows are from the Roman period, but these sites cannot be easily dated. The clusters of linear systems and enclosures could be Roman and when the sites are examined they are often visible as intersecting linear ditches, some with enclosures. Over 400 of these monument types are enclosures and nearly 300 are rectilinear. Of these sites, only eighteen are classified as Roman, seven enclosures — two temples and three square barrows — among them.

The hardest site types to classify from any period are simple ditches and field systems. The proximity of ditches and field boundaries to Roman roads could indicate settlements similar to those in Figures 3.13 and 3.14.

Around fifty enclosures were found to have a similar morphology to excavated Roman settlements. Figure 3.14 shows examples of these sites, all with a similar morphology; small fields close to a central or main enclosure with larger fields surrounding them, some also have drove roads adjacent (EHER 5235 and 18019). All are located in proximity to a main Roman road; some have a water course nearby. The site at Langford (EHER 7872, Figs 3.14 and 3.15) is enclosed by the road on the south side and the River Blackwater on the north-east. It is possible that the river has meandered, as it would appear that some of the cropmark has been lost, although the cropmark is located on a sand and gravel terrace which may be raised above the actual river.

The roads into the main towns such as Colchester, Chelmsford, Braintree and Great Dunmow have the highest concentrations of sites of this kind. An example is Folly Farm near Great Dunmow (EHER 13089), which is close to both a Roman road and town. This site is located in a mainly boulder clay area, but part is visible in the form of cropmarks where it lies on an area of gravels. It is an extensive cropmark consisting of possible enclosures and

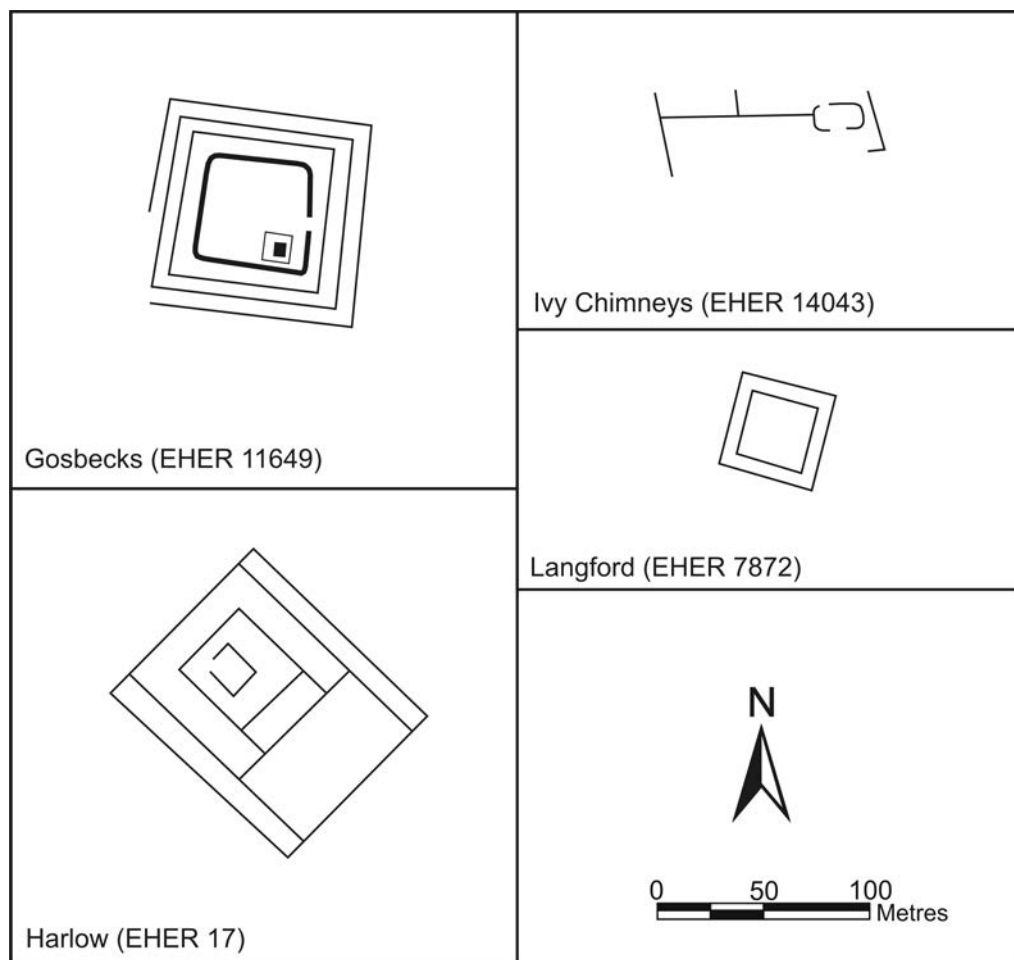


Figure 3.18 Examples of the aerial photographic evidence for Roman temples

other lengths of ditch. Metal detecting suggests the site was used from the late Iron Age to the Roman period. Great Dunmow was a typical small Roman town made up of artisans and farmers (Wickenden 1988); the Folly Farm site may therefore be a Roman farmstead just outside the town, on the road to the west.

The town of Witham is on a major route between Chelmsford and Colchester at a junction of a route that leads to Braintree, with smaller side roads that lead to the Rivenhall villa (EHER 19117) and Great Totham respectively. The NMP cropmark density in this area is quite low with only ten sites in an area 10km by 5km. The density of sites increases greatly when the EHER records are included. The main densities are around the town centres of Witham and Kelvedon with a third cluster around the Rivenhall villa.

In addition to the sites along the main Roman roads, further Roman sites have been identified along the smaller routes. Recent research completed around Cressing and Braintree shows evidence of the preferred location of Roman sites. Evidence from substantial excavated sites and circumstantial evidence from find spots demonstrates that settlement was very carefully located. In the Brain Valley a distance of between 2–2.8km (1½–2 Roman miles) has been observed between sites (Hope 2004) and it has also been noted that more substantial sites are located at the crest of the valley slope; this is evident in several areas and may help identify further Roman settlement in the cropmark record.

Temples and religious activity

Roman temples have a distinct ground plan, often visible on aerial photographs; although most of our understanding of this monument type comes from excavation. Four temple sites classified as Roman were mapped (Fig. 3.18). Of these the best known is the Roman temple at Harlow (EHER 17), which has been excavated (France and Gobel 1985, 23).

Most are located near major towns. For example, at Harlow the town grew up to the east of the temple and precinct with burials located on the approach from the town to the temple precinct (Medlycott 1999a). This site developed on the site of an earlier Iron Age temple. Similarly, the temple at Gosbecks was built over existing Iron Age linear features associated with a farmstead, as well as being within 100m of a Roman theatre (Crummy 1997, 103). The temple precinct at Gosbecks is clearly visible as a cropmark, with a broad ditch surrounded by a double portico; the small temple building is located in the south-east corner of the enclosure (Hawkes and Crummy 1995, 102).

Both the Harlow and Gosbecks temples are relatively close to rivers. In the case of Harlow it was located less than 400m from the River Stort and was specifically located and built on a small hill that overlooked the river. This is similar to Gosbecks, although the river here is only a minor tributary of the Colne and it may not have been specifically visible from the site.

The possible temple site at Langford (EHER 7872) is morphologically similar to other temple sites with a double ditch, measuring 45m by 45m (Fig. 3.18); it is situated within the boundaries of the presumed Roman farmstead discussed above. It is located in the middle of a plateau between the River Blackwater and the Roman road (Fig. 3.14) and would have been clearly visible from both the road and river as the ground is relatively flat.

Unlike temples, other religious monuments or burials from the Roman period are harder to locate and identify with any certainty from the aerial photographs. There is excavated evidence for shrines, with examples from Great Dunmow (Going 1988, 90) and Stansted (Havis and Brooks 2004, 104) and there are an increasing number of cemeteries being found through excavation. However, there are only four burials or inhumations identified by the NMP. Three of these sites are square barrows that are associated with other Roman sites and the fourth is an excavated inhumation at Mucking that could be identified on the aerial photographs as a macula.

In Roman towns the usual practice was to bury the dead outside the town boundaries. For example, the cemeteries at Chelmsford appear to have lined the Roman road south from the main town. Four separate cemeteries are known at Kelvedon (Wickenden 1996, 83), spaced along the routes out of town. At Great Chesterford the Roman cemeteries surround the town on the main roads; some of these burials are visible on recent aerial photographs that have been taken since the NMP mapping was completed. The nature of burials means that they are particularly difficult to identify as they appear as simple maculae which could easily be identified as pits or geological formations.

While extra mural cemeteries reflect urban burial practices, rural settlements would have had their own smaller ones, located near the occupation site. Excavation at Stansted found a small cemetery close to the areas of occupation (Havis and Brooks 2004, 189) and the farmstead at Strood Hall had its own cemetery enclosure attached to the main settlement site (Timby *et al.* 2007, 81).

There are examples of both round and square barrows from the Roman period. Three barrows near Great Dunmow were considered to be Roman, due to the recovery of possible Roman grave goods from the vicinity (EHER 1277) during the 1930s. There is good evidence for the Roman use of barrows; the monuments at this site include both square and circular examples in close proximity. Only a few further barrow sites have been identified in the EHER and very few sites are still extant, with Plumberow Mount (EHER 13580), Mersea Mount (EHER 1) and, most well known, the Bartlow Hills (though no longer in Essex) among them. There is nothing specific that can be identified on a ploughed-out round barrow to suggest that it is Roman. Over 1000 ring-ditches thought to be round barrows were recorded by the NMP, but nearly 200 of these are within 200m of a Roman find spot or Roman site. Many of these are located around the areas already highlighted as important in the Roman period such as Great Chesterford, Chelmsford and Witham and some of them may be of Roman date, but without further work they cannot be conclusively dated.

The rest of this chapter will look at a case study examining an area where continuity through the prehistoric and Roman periods is recognisable within the cropmark record.

V. Case study: prehistoric and Roman settlement in the Mucking and Orsett area

The area around Mucking and Orsett, in south Essex, has been chosen for this study because of the mixture of cropmarks, fieldwork and landscape in a concentrated area of around 6km by 3km, the location of which is shown on Figure 3.1.

The geology of the study area comprises chalk outcrops overlain in part by boulder clay, which has enabled a wide array of cropmarks to show. Development of industry, housing, infrastructure and quarries has ensured that much fieldwork and excavation has been carried out over many years. From this work it has become apparent that the area is rich in archaeological sites from the Palaeolithic and later prehistoric, as well as the Roman, Saxon and medieval periods; over 150 sites are recorded in the EHER in the study area alone.

Figure 3.19 shows the NMP cropmark plot for this area. The nature and distribution of the cropmarks poses many questions, such as the relationship between the cropmark complexes, and how the landscape developed and evolved. Why are there so many sites in the area with such a variation in morphology? Were the sites located due to a special significance of the area? Are the gaps between the cropmarks genuine or related to modern development and poor cropmark formation?

South Essex generally has fewer cropmarks than elsewhere in the county, with the exception of the extensive cropmark complexes in Thurrock such as Mucking and Orsett. It is commonly accepted that the lack of cropmark evidence for settlement does not mean that settlement did not occur in the area, but that other factors such as geology and modern urban development affect the distribution. The area does have large urban areas and these developments could easily have masked archaeological features. When the geology is considered, the largest visible cropmark complex to the south-east of the modern town of Orsett (G, Fig. 3.19) within the study area is actually situated on clay, which implies that the geology may not have affected the cropmark development in this area as much as other parts of the county, although numerous other sites in the area are located on the sands and gravels, including the complexes at Mucking, Orsett Cock and the Orsett causewayed enclosure.

It is possible that the sites on the clays are on thinner soils as topographically these cropmarks are on the highest plateau in the area. The former river valleys have very limited cropmark evidence, but these areas may have deeper soils.

Modern development is another major influencing factor and Figure 3.19 shows the cropmarks in the context of the modern landscape and in some cases cut through cropmark complexes, such as Grey Goose Farm (Fig. 3.19). It is certainly the case that the town of Thurrock is built on a large area of sands and gravels, which may have been settled in the prehistoric period, but has now been encompassed by the town. The causewayed enclosure at Orsett (E, Fig. 3.19) lies to the south of the main cropmark complex, and has a considerable amount of modern development surrounding it. However, this does not account for all the gaps surrounding the monument as the site is located on the type of geology/soils on which cropmarks are readily developed. This could indicate that there are natural gaps in the organised landscape around



Figure 3.19 Cropmark plot of sites in Thurrock, with the Orsett causewayed enclosure (E), Grey Goose Farm (F) and a cropmark complex to the east of the modern town of Orsett (G)

such monuments. It is certainly the case that the majority of find spots recorded in the EHER are relatively close to the cropmark sites.

While sites may not have been long-lived, many would have remained visible in the landscape (Bradley 1998, 71). This is surely the case in Thurrock with the earliest substantial monument being the Neolithic causewayed enclosure, which would have been highly visible within the landscape (Fig. 3.20). There is limited evidence for contemporary settlement, although there is an irregular enclosure at Orsett Heath (EHER 1801), 1km south-west of the causewayed enclosure, which is unparalleled within Essex (H, Fig. 3.20). This could possibly be of a Neolithic date as a flint scatter and Neolithic arrowheads were found nearby. Internal divisions are visible within the enclosure, along with possible roundhouses. It is the only possible Neolithic settlement identified within the study area and one of only two identified on the NMP within Essex, the other site being at Lawford in Tendring (discussed in Chapter 2).

Of the Bronze Age mapped sites, 91% are classified as round barrows, while the remaining sites are part of the Mucking South Ring complex. Excavation has shown that the settlement evidence at the rings is late Bronze Age (Jones and Jones 1975; Jones and Bond 1980). Over twenty round barrows are plotted, but they are scattered across the study area. From the evidence of excavations in the area it would seem likely that there are many more round barrows that have yet to be recorded.

One site of particular interest to the study of Bronze Age settlement in the area is a large circular enclosure (EHER 5212), 150m west of the town of Orsett, which is over 60m in diameter and is under 1.5km from the causewayed enclosure (I, Fig. 3.20). Although there is no specific dating evidence, it is similar to the Springfield Lyons style of settlement enclosure, and there are traces of roundhouses within its interior. Of interest are the presumed round barrows to the south and west of the site (J and K, Fig. 3.20). These may have been visible, along with another large sub-circular enclosure. The causewayed enclosure and the round barrows to the east do not appear to have been visible from I. This may imply that the focus of occupation during the Bronze Age moved away from areas that were important in earlier periods.

The sites at Mucking (the North and South Rings) consist of a circular enclosure (outside illustrated area on Fig. 3.20) and a larger double ditched concentric enclosure that are less than 1km apart. The evidence at North Ring suggests a pastoral element is predominant in the area (Bond, D 1988a, 52) and both the enclosures at the North and South Rings have evidence for central settlement structures, which were identified on the aerial photographs. The circular site of Mucking South Ring (Fig. 3.20) has been dated to the late Bronze Age and it has been suggested that it was a defensive settlement. Both the single ditched North Ring and the double ditched South Rings at Mucking are circular; it is possible that the Neolithic causewayed enclosure, less than 2km to the west, provided a precedent.

The inner circuit of ditches of the Neolithic causewayed enclosure is approximately 80m in diameter, while South Mucking is approximately 78m in diameter. Both monuments also overlook the River Thames. However, neither site would have been visible from the other, with both sites facing downslope toward the river.

The influence could, however, have come from further afield. Circular enclosures were known from the Bronze Age such as at Springfield Lyons and Great Baddow. Late Bronze Age material was found at South Mucking during excavation so the site may have been drawing on Bronze Age settlement traditions. When the second ditch was added, the site may have become more defensive, which may have been needed because the site is close to the river. As the site was double ditched it was potentially very visible from the river.

Evidence for Iron Age settlement is abundant and varied, ranging from sub-circular settlement enclosures to square and rectangular enclosures with internal divisions and roundhouses (Fig. 3.21). No unenclosed Iron Age settlement was identified through the NMP in this area, although they have been identified through excavation at the Orsett causewayed enclosure site. This type of settlement could have been abundant over much of Essex, but the evidence is hard to identify through aerial survey.

Twelve individual enclosures and cropmark complexes have been identified as possibly Iron Age in date (Fig. 3.21). Some of the cropmark sites have been excavated, while others were identified through morphology alone.

There could well have been other activity in the area during the early Iron Age, but within the cropmark record these sites appear to be very isolated. It is possible that they were constructed within a wooded landscape that became increasingly cleared as more of the landscape was utilised and organised. There also seems to be a change from the circular traditions found at Mucking to a more typical Iron Age morphology. Several rectangular or sub-rectangular enclosures were constructed across the study area, some of which have been excavated, including the multi-ditched enclosure at Orsett Cock (Carter, G 1998) (Figs 3.6 and 3.21) and the settlement enclosure within the causewayed enclosure (Hedges and Buckley 1978) (Fig. 3.8 and P on Fig. 3.21).

An Iron Age sub-rectangular settlement, c.45m across, was located within the ditches of the Orsett causewayed enclosure (EHER 5158). There is evidence that early Iron Age unenclosed settlement was focused on the causewayed enclosure; this settlement would have caused the shallow ditches of the causewayed enclosure to completely fill up (Hedges and Buckley 1978, 253). It is possible that the site was chosen because the earlier monument still had significance in Iron Age life, even though it would have no longer have been visible when the middle Iron Age enclosure was constructed.

However, this does not mean that the place and history of the landscape was not still extremely significant. In the same way as the Neolithic ritual monuments were sited in significant locations within the landscape already saturated with meaning, there is no reason why Iron Age settlements were not located in certain places for the same reason. A link to the past may have given a settlement more legitimacy and possibly increased the power of the occupants, with traditions passed down the generations. It is possible that the settlement was continuously occupied and the area was enclosed when external circumstances changed. Re-use of the area defined by the causewayed enclosure ditches during the Iron Age is also known at St Osyth (Germany 2007). Further afield, in Bedfordshire the Cardington causewayed enclosure is overlain by an extensive Iron Age–Romano British settlement (Oswald

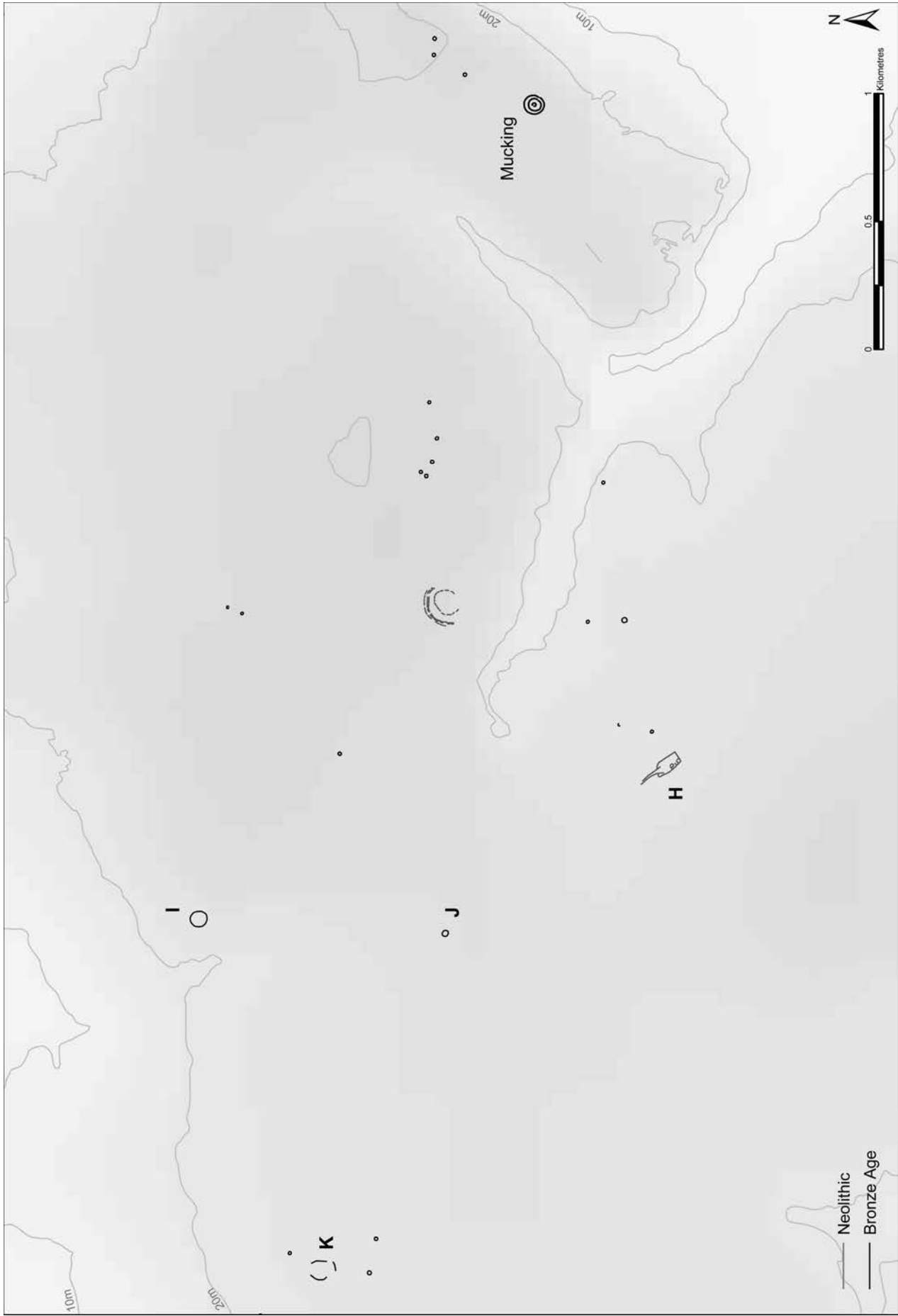


Figure 3.20 Neolithic and Bronze Age cropmarks in Thurrock (same area as Figure 3.19), including a possible Neolithic settlement (H), round barrows (K) and a possible Bronze Age circular settlement enclosure (I)

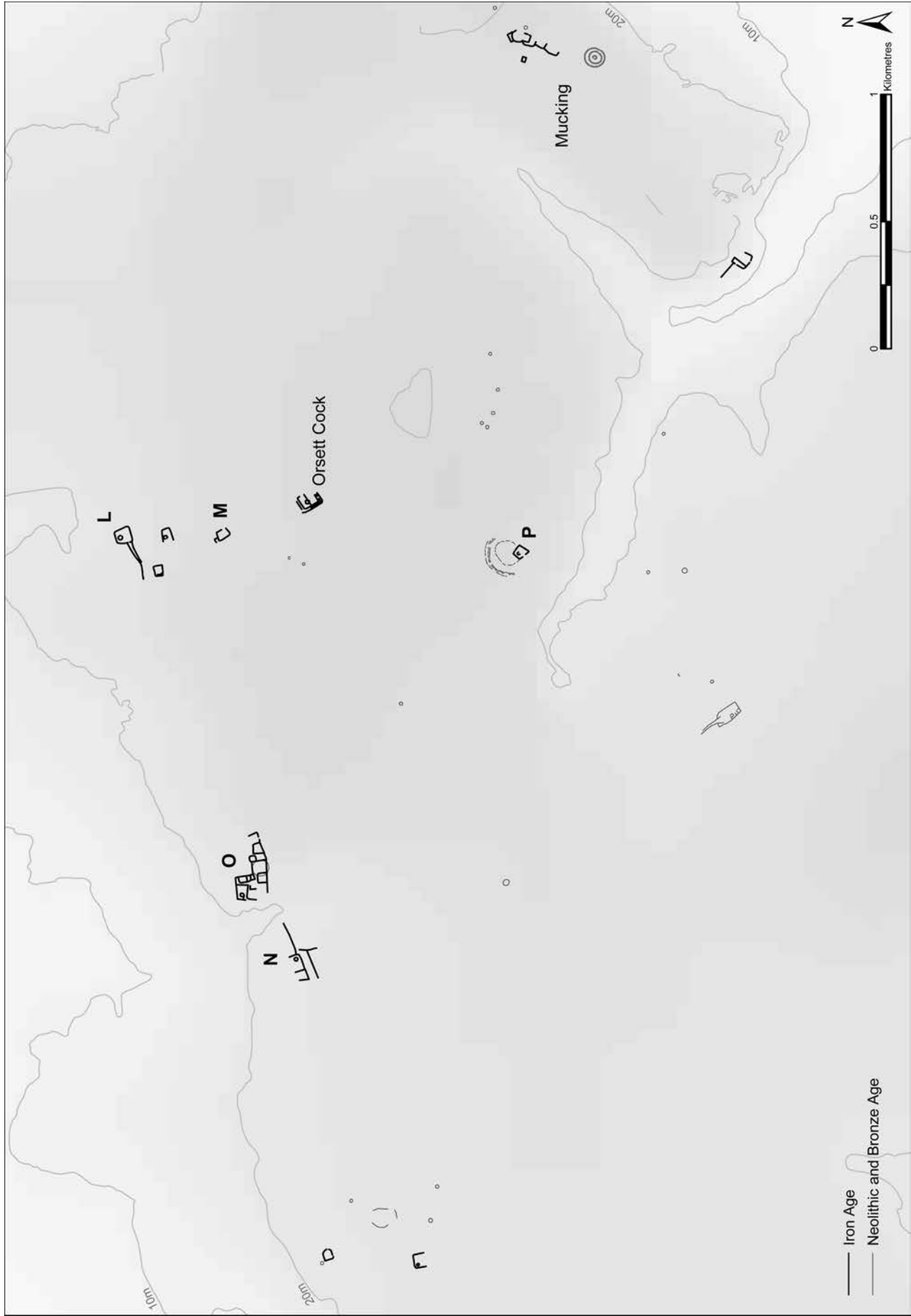


Figure 3.21 Iron Age cropmarks in Thurrock (same area as Figure 3.19), with presumed Iron Age sites (L and M), conjoined enclosures (N and O) and the excavated settlement within the Orsett causewayed enclosure (P)



Figure 3.22 Roman cropmarks in Thurrock (same area as Figure 3.19), showing major landscape division (Q, R and S), with a trackway (T) possibly marked by earlier round barrows

et al. 2001, 142). A similar point can also be observed elsewhere, for example, on the Scottish Islands where there are several examples of Iron Age brochs and other structures being placed over Neolithic chambered tombs (Parker Pearson *et al.* 1996). While the brochs of the Scottish Highlands are a long way from Essex, there is no reason to doubt that the practice of reuse of space and monuments occurred throughout the Iron Age all over the country. Alternatively, the settlement may have been constructed at this location because it is on the edge of the sands and gravels where the soils would be easier to work, but is also a good defensive position overlooking the river. There is not, as yet, much evidence for landscape organisation surrounding the site, with no visible links to other sites or trackways.

Most sites thought to be Iron Age settlements are rarely located near possible round barrows. It may simply be that settlement enclosures close to round barrows are not identified as such, alternatively the desired location for a round barrow and settlements could be different or influenced by other factors.

The middle to late Iron Age sites identified on Figure 3.21 have a similar morphology and size to many other Iron Age sites, both in the study area and elsewhere. Notably, 800m north of the causewayed enclosure is the site of Orsett Cock; a triple ditched enclosed farmstead that was excavated ahead of a road development (Carter, G 1998). This site appears very isolated in the landscape with no apparently associated features identified.

While Orsett Cock is located quite centrally within the cropmark landscape of the study area, the number of sites that are visible from it is very limited. It would appear that the Iron Age sites were located so they were not visible to neighbouring sites in the area. It therefore seems that intervisibility was not considered as important as the actual location, local resources, and territory or was for defensive purposes. The number of ditches at Orsett Cock was increased over time, with an outer ditch constructed in the later Iron Age, which ensured the site was heavily defensible, possibly in response to an external threat (Carter, G 1998).

At least two further sites (L and M (EHER 5191) Fig. 3.21) 700m to the north of Orsett Cock are probably Iron Age. One of these is a single ditched enclosure, 65m in diameter with internal evidence for a roundhouse, but unusually for Essex it has a well defined funnel leading towards the main entrance (L, Fig. 3.21). This may imply that the surrounding landscape was perhaps pastoral and the defined track was used to manage livestock. This large enclosure has two smaller possible farmstead enclosures within 100m. These may not be independent enclosures as they are much smaller and may have functioned as a corral or paddocks associated with the larger site.

Elsewhere in the study area are more sites thought to be Iron Age, for example, two cropmark complexes of conjoined enclosures, located to the west of the town of Orsett (N and O (EHER 5261 and 5212), Fig. 3.21), which have similarities to sites found in Lincolnshire (Winton 1998, 47) and elsewhere. While there is no definitive dating evidence it seems likely, on morphological grounds, that the enclosures are late Iron Age–early Roman, as they are apparently a different type of settlement to the simple enclosures discussed above. There is evidence elsewhere that Iron Age traditions continued into the Roman period and these sites show

what could have been an initial simple enclosure that developed over time, with smaller annexes and enclosures added as the site expanded. It is only presumed that sites N and O are linked as there is no hard evidence. The two cropmark complexes have a similar morphology and are close together, but as has been the case elsewhere there are no discernable tracks to join them. While these conjoined enclosures may be late Iron Age or early Roman they appear to fit well into a wider landscape with other cropmarks presumed to be Roman.

Figure 3.22 shows the Roman cropmarks within the area, which are quite extensive and while there is not enough evidence to sequence the Roman landscape, there are still a number of interesting aspects to the cropmark complexes. There is widespread landscape division with one main area of cropmarks (Q, Fig. 3.22) and smaller areas to the south (R, Fig. 3.22) and west (S, Fig. 3.22). Like many of the Roman sites discussed, it would appear that these linear ditches were surveyed and laid out. While these field systems do not display the same consistent measurements as is seen at possible farmsteads like Langford and Great Holts, the field boundaries appear regular with straight lines and right-angled corners.

Due to the extensive nature of the Roman features they must have been visible from elsewhere in the landscape, even if the entire extent of the features could not be seen. There is evidence of considerable woodland clearance at this time and this would have made features more visible; however, it is unlikely that from the main complex at Q, the other surrounding complexes could be seen. Some of the surrounding sites such as the earlier round barrows may have been visible and it appears that many of them were respected and not built over. In one case it is possible that up to three earlier round barrows were used as markers for a trackway (T, Fig. 3.22). However, if the trackway is Roman, is it possible that the round barrows are also Roman, as cemeteries were often located along roads leading to settlement areas (such as was found at Great Chesterford). The track and round barrows are in close proximity to a possible Roman enclosure and field system (R, Fig. 3.22), but there is no other evidence to suggest a date for any of the features.

Elsewhere in the study area other earlier monuments appear to be respected. For example, despite the extensive nature of the linear boundaries they were not apparently constructed over the causewayed enclosure, even though they extend very close to the monument. No Roman features were found at the monument during the excavation (Hedges and Buckley 1978, 254). It is possible that the area was simply used for pastoral purposes, as there was little evidence for early ploughing.

Figure 3.23 illustrates area Q from Figure 3.22, which is the largest area of coherent field systems and also incorporates at least four of the sites thought to be Iron Age (U–X, Fig. 3.23). If so these sites have been assimilated rather than built over, which leads to the possibility that the earlier sites still had substantial ditches during the Roman period. The main cropmark complex appears to be located on a plateau of relatively flat land, which was presumably well drained. Although there is no evidence of springs or water sources there must have been either a local water source or wells were dug to feed this large settlement

Due to the large area covered (Q, Fig. 3.22) by a coherent field and enclosure system (up to 1200m by

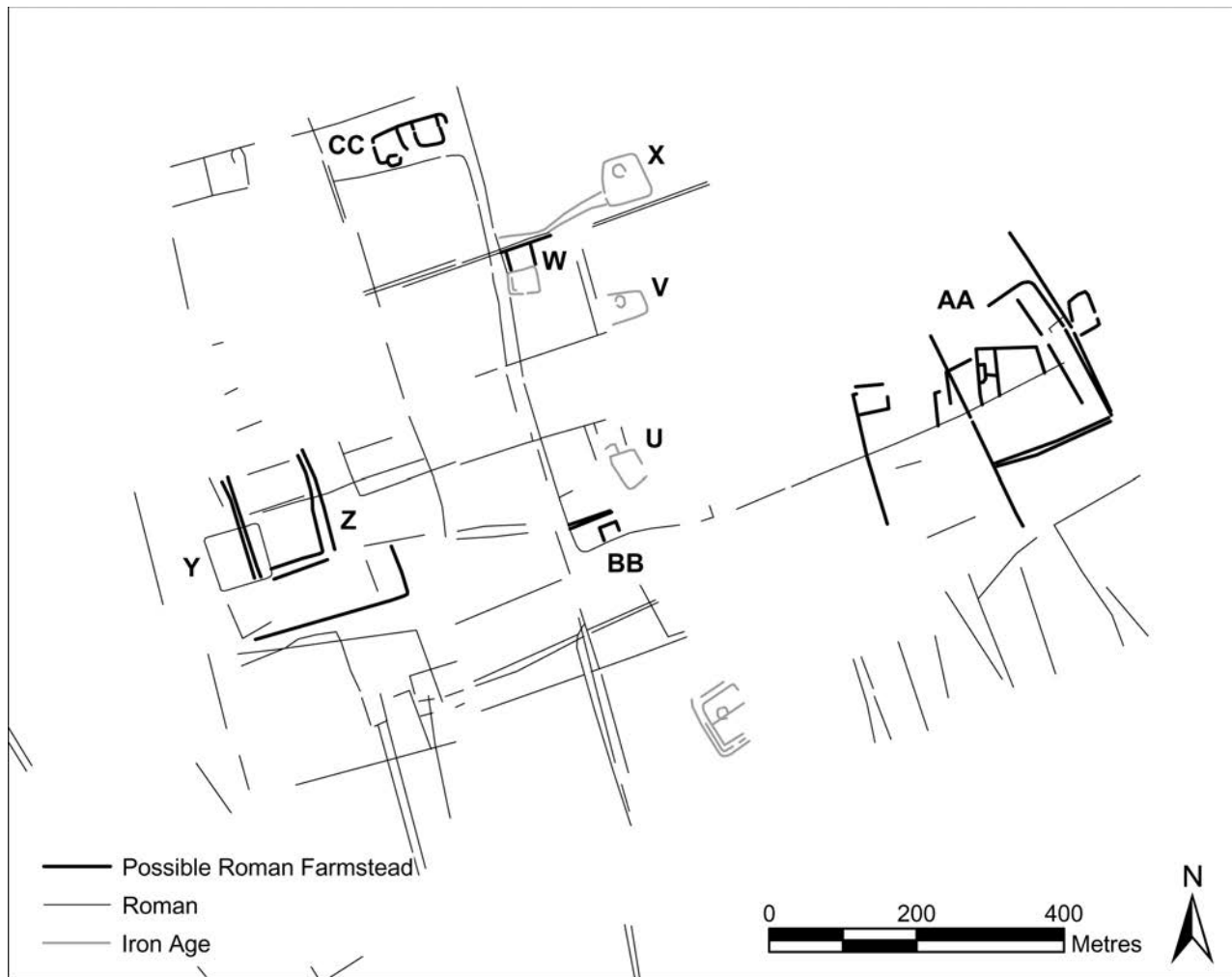


Figure 3.23 Details of Roman cropmark complex (Q in Figure 3.22) showing that several possible Iron Age enclosures were incorporated into the Roman landscape (U-X), some enclosures have an increase in the number of pits visible (Y, though pits not marked), larger enclosure complexes which may represent independent farmsteads (Z and AA), with smaller enclosures (BB) and conjoined enclosures (CC) making up the cropmark landscape

1000m visible as cropmarks), it seems unlikely that the complex represents a single farmstead or villa, but it is very strong evidence for landscape organisation of perhaps a small hamlet. This area is suitable location for a hamlet, as it is less than 6km from the River Thames crossing and only 3km from the Mucking marshes, which would have been an important amenity that could have been easily exploited. Elsewhere in Essex, the coast and marshes were used for the collection of oysters and production of salt throughout history (Chapter 5, Sections III and V). The linear features fit well into the modern landscape (best seen on Fig. 3.19). Several of the linear ditches align very well with existing features and it seems likely that some of the modern boundaries may be 'echoes' of the Roman linear system. This is very apparent on the earlier maps and a pattern can be recognised well beyond the extent of the cropmarks, implying possible continuity in the use of this area of land. It has been highlighted elsewhere (for example Wallis and Waughman 1998, 231) that it is not always possible to infer landscape continuity simply because features are on a similar alignment because there is often evidence of abandonment between periods, however, it can still be

argued that landscapes can be laid out on a similar orientation over many generations and while there may be a period of abandonment a suitable landscape layout can be re-used.

In addition to the fields and enclosures, extensive areas of pits are also visible, such as Grey Goose Farm (S, Fig. 3.22). During the excavation here (EHER 5237), many different kinds of pits of varied size and shape were found. Many of them proved to be of Roman and Iron Age origin and were typical of rural settlement. Others were hollows interpreted as multi-purpose working areas, Saxon hut sites and periglacial features (Toller and Wilkinson 1976). Recent study of the use of aerial photographs has shown that while they are very good at highlighting areas of linear ditched features, often small or more discrete features are either not visible or difficult to differentiate from periglacial features (Saunders 2005). In some cases, on certain sites, only a limited number of pits were detected on the aerial photographs, but hundreds were found when the site was excavated, such as the St Osyth causewayed enclosure (Saunders 2005). This should be borne in mind when looking at these sites as many more pits are likely to be present than are actually represented on the plots.

Enclosures containing pits are more likely to be settlements. Some enclosures on Figure 3.23 appear to have an increased concentration of pits within their interior, including the double-ditched enclosure at the centre of the main complex (Y, Fig. 3.23, although the pits are not marked). These pits appear similar in nature to those at Grey Goose Farm and are probably a combination of periglacial features, later Saxon pits and a wide range of both Iron Age and Roman settlement pit features. It may be that this cropmark complex could be classified as a small hamlet with two or three farms. There appears to be a central trackway running north-to-south, with further smaller tracks leading off, with apparent paddocks or fields to either side (Fig. 3.23). The side tracks appear to lead towards two larger enclosure complexes (Z and AA), one to either side of this main road. The double ditched enclosure to the west of the track (Z, Fig. 3.23) appears to have a third outer ditch surrounding it and in both of these larger enclosures are concentrations of pits.

Even on a small 'hamlet' site there may have been gradations of wealth and there are examples of this found elsewhere, such as Gloucestershire (Hingley 1989, 80) and it is possible that the double enclosure at AA is a larger farmstead, set 300m back from the central north-south road which may demonstrate a higher level of wealth. Farmsteads and villas are often set back from the road in Essex, such as at Strood Hall (Timby *et al.* 2007). It might be that this is the main focus for the settlement, with often smaller enclosures located alongside the road. The first of these smaller sites is located at the corner of what could be a crossroads (BB, Fig. 3.23), with a small paddock and settlement enclosure. It is possible that the Iron Age enclosure, which is also located in the paddock (U, Fig. 3.23) could be the original settlement and as it fell out of use the enclosure attached to the road was developed. This pattern occurs again 350m north up the central road (W, Fig. 3.23); there is a possible Iron Age enclosure alongside what is interpreted as a Roman settlement enclosure, which is attached to the track, with a possible earlier enclosure (V) located outside the surrounding paddock boundary. A further 150m north is a slightly larger complex of three conjoined enclosures (CC, Fig. 3.23) that is located against the road, but is again within a larger system of paddocks.

There is some evidence of re-development, as the enclosures were re-built over time, but this is hardly surprising as the site was probably in use throughout the Roman period and beyond. Some of the trackway ditches and enclosures show that they were realigned or re-cut.

The combination in this area of good geology, well formed cropmarks, careful aerial reconnaissance and mapping, development pressure, gravel quarrying and subsequent excavation have made it an ideal area to look at the development of the landscape and settlement patterns during the prehistoric and Roman periods. Modern development pressures will continue and more work will be carried out in the area. The cropmarks highlight an area of dense occupation in the past, and illustrate that many sites and locations were reused and redeveloped over many centuries. In the Saxon period many of these locations were used again for some of the densest Saxon settlement known in the British Isles, and this will be examined in Chapter 4.

Elsewhere in Essex it was apparent that the Romans extensively reorganised the landscape. In this study area it

can be seen that some elements of this organisation have probably continued into the modern period.

VI. Conclusions

Settlement evidence is abundant in Essex from many periods, with examples of both enclosures and structures. While cropmarks of apparent settlement are heavily biased towards lighter and more easily worked soils and river valleys, it is known from excavation that there is still dense occupation in certain other areas. Excavation at sites such as Stansted (Havis and Brooks 2004) and Strood Hall (Timby *et al.* 2007) have shown complex settlement development over time with changes in morphology, which is particularly evident at Stansted. This has led to a movement away from the assumption that the heavier clays were not settled. There is evidence of cropmarks on the boulder clays, highlighting areas of settlement despite the problems of cropmark development. This should be an area for future work, with the clays continuing to be targeted with aerial reconnaissance in dry years in which good cropmark development might be anticipated. Distributions of mapped sites in Essex show that the cropmarks are not evenly distributed on the boulder clays and this may simply be due to a lack of coverage, rather than a true representation, and these gaps are where reconnaissance should be targeted. In Northamptonshire a similar pattern was found (A. Deegan pers. comm.), with enclosure shape and function changing depending on geology and location, and this may be the case in Essex.

Dating of cropmarks on morphological grounds alone is problematic, but the role of morphology has been crucial in the study of settlement in this context. Early settlement appears to be fairly widespread with no consistent site types. However, the Iron Age and Roman periods have shown that there was more predictability in the size and shape of enclosures, though still with variations. Settlement from these periods is more visible in the cropmark record and using the evidence from excavated sites, particularly of Roman date, has enabled the interpretation of some previously unrecognised cropmark sites.

As would be expected, enclosed settlement sites are more common in the aerial photographic record and have appeared regularly, although often as isolated sites with virtually no associated features. These isolated sites were often the most difficult to date, unless they had a clear morphology. As fieldwork continues and more sites are investigated and excavated these isolated sites may be dated.

It does need to be acknowledged that not all aspects of settlement are always recognised, which can lead to the incorrect identification, for example, the lack of pits and the fact that ring-ditches were identified as round barrows rather than roundhouses on the Lodge Farm site near St Osyth. This problem of small features that are difficult to detect is not exclusive to Essex, as the site at Maxey, Cambridgeshire demonstrates (R. Palmer pers. comm.). No pits were highlighted on the cropmark plot, but over 650 were excavated, the highest concentration of Neolithic pits in East Anglia. This shows that while the NMP is excellent in identifying large scale features, it is just an indication of settlement activity and by no means completely reveals the full extent of the site or features.

Landscape organisation has proved much more difficult to identify with confidence. Again evidence from the Roman period has proved useful to highlight areas where there was extensive landscape organisation. Evidence from earlier periods was more problematic to detect with the NMP evidence, despite knowing that it does exist in some small areas of the county. What the

NMP has been particularly good at highlighting is the reuse of sites and location. Of particular interest is the reuse of major Neolithic monuments for extensive Iron Age settlement.

Chapter 4. Saxon, Medieval and Post-medieval Landscapes

by Helen Saunders

I. Introduction

The landscape of the medieval period provides the foundation for that of today's countryside and is evident in the boundaries, highways and pattern of settlement (Hunter 1999, 112). Much of the medieval landscape goes unremarked, such as the sunken winding roads, species-rich hedgerows and field patterns. There are some elements that have gone out of use, such as abandoned moated sites, field boundaries and water management schemes, but they can be traced through the aerial photographic evidence and the NMP, ensuring that a more complete picture of medieval influence on the landscape can be viewed and understood. The very nature of settlement in the medieval period is more substantial and permanent than that of the prehistoric period, indeed many houses and buildings are still in use today and the sites that do not remain can leave substantial evidence visible on the aerial photographs.

The medieval period saw the establishment of the existing parish system, with most villages and towns also being established. Some flourished while others remained small, but all have influenced how the landscape developed. Important medieval towns such as Colchester, Maldon, Chipping Ongar, Pleshey and Castle Hedingham all exist in today's landscape and have had an influence on the surrounding land and the NMP can aid the understanding of this development and influence. Settlement and landscape organisation is more visible for the later periods and development from the medieval period produces a firm basis for the landscape seen today. Roads, field systems, moats, priories, castles and ringworks were all built during the medieval period and are represented in both the cropmark record and as extant earthwork sites.

The medieval period has been an area of much research. John Hunter (1995; 1999) and Tom Williamson (1986; 1988; 2003) are among the very prolific writers and researchers who have focused on the period from various points of view. These have varied from landscape history within East Anglia to the development of the Essex landscape. Given the previous authoritative and extensive studies of the Essex medieval landscape, this chapter will focus on what the NMP can bring to the subject.

Two geographically distinct areas of the county and the way in which the medieval period has influenced today's landscape will be explored, following an examination of individual cropmark types, their distribution and morphology. Many researchers have highlighted how different areas of Essex have varying field and settlement patterns, and the NMP can aid a study that compares and contrasts these areas.

An extensive period of history is covered in this chapter; approximately AD 500–AD 1700; Saxon to post-medieval. Significant political, technological, demographic and

religious changes occurred during this period and this is reflected in the changes seen in the landscape.

It is known that there was progressive woodland clearance in Essex during the Roman period and there is little evidence of large-scale woodland regeneration in post-Roman times (Murphy 1996, 177), although there may have been localised regeneration as certain tracts of land were abandoned. As the population increased it is likely that the amount of land used for agricultural purposes also increased. It is likely that the reverse was true during times of population decrease due to climate change and The Black Death.

Saxon sites have proved to be particularly problematic to identify as fieldwalking has not proved a successful methodology in highlighting some sites (Medlycott and Germany 1994). One method that may help identification is metal detecting and with the aid of the Portable Antiquities Scheme (PAS) it may become possible to compare Saxon find spots and nearby cropmarks. Very few cropmarks have been attributed to the Saxon period, as remains are either not substantial enough to be visible on the aerial photographs or do not have a specific morphology so are problematic to recognise, but, as in other chapters, associations and known sites, along with EHER records may aid interpretation.

The early maps, particularly the 1st edition OS of the 1880s, the Chapman and Andre map of 1777 and the Tithes survey maps of the 1840s are important sources of information. Both the OS and Chapman and Andre maps have been used to help identify the function of sites, such as abandoned moated sites, which appear as rectilinear enclosures on aerial photographs. Many aspects of the medieval period are still difficult to identify and date, but unlike earlier periods examined in this volume there is much historical evidence, which increased as time progressed. Despite this the site types found are still subject to many biases and interpretation problems.

II. Biases

The biases of geology, land use and photographic cover are the same for this period as others and are discussed elsewhere (Chapter 1). This means that only a proportion of the total number of medieval sites in Essex have been recorded. Many medieval sites still exist as settlement today and it is only the 'failed' or altered sites that are recorded in the NMP. This could impact on the discussion regarding the period, to a greater extent than for the earlier periods, as by considering only the NMP evidence a full picture of the period cannot be drawn. In addition, important medieval sites such as manor houses and towns are still occupied so are not within the scope of the NMP, even though they are significant to the history of the period.

III. The archaeology of the medieval and post-medieval period

A total of 3901 features, classified as early medieval (to 1086), late medieval (1086–1540), post-medieval (1540–1900) or unknown medieval (where the date is unknown or doubtful), have been mapped over the course of the NMP. Table 4.1 shows the number of sites and relative classification to each medieval period. The period assigned to each feature related to the degree of confidence of the interpreter, based on a known monument type, recognisable morphology or previous fieldwork. Very specific periods are normally assigned to those sites that have other evidence such as fieldwalking or excavation and this is particularly applicable to features of a Saxon date. Often more specific time scales are difficult to assign. For example, field boundaries could be classified as either post-medieval or unknown medieval. Many sites were given a post-medieval classification, where documentary sources were available to help date features, such as duck decoys and oyster pits (both post-medieval in origin), which appear on early maps. Other sites that do not have documentary sources and no clear morphology or date were given an unknown medieval classification; the extensive field boundaries and ditches are a good example of this.

The term ‘early medieval’ is used for neutrality and consistency within the MORPH2 database across the whole country. However, Saxon is a more appropriate and relevant term for sites of this period in Essex and will be used in this report.

<i>Period</i>	<i>No of sites</i>	<i>Percentage of total</i>
Early medieval	24	0.6
Late medieval	279	7.2
Post-medieval	1032	26.5
Unknown medieval	2566	65.7

Table 4.1 The number of mapped sites assigned to each period in MORPH2

<i>Site Type</i>	<i>Total</i>	<i>EM</i>	<i>LM</i>	<i>PM</i>	<i>UM</i>
Abbey	3	-	3	-	-
Ditch	59	-	7	14	38
Drainage system	35	-	1	24	10
Enclosure	112	-	7	46	59
Extraction pit	168	-	2	102	64
Field system	16	-	-	1	15
Field boundary	2386	-	26	457	1093
Field	20	-	-	2	18
Moat	180	-	109	8	63
Mill and mill mound	53	-	12	15	26
Motte	9	-	8	-	1
Pond	149	-	40	31	78
Ringwork	4	-	3	1	-
Trackway	110	-	3	14	93
Water channel	69	-	4	55	10

Table 4.2 The number of key mapped sites assigned to each interpretation and period (only key site types discussed in the text have been included on this table for clarity)

A wide range of mapped sites have been classified as medieval ranging from ruined churches and abbeys, moats, drainage systems and dams to enclosures and field boundaries. Table 4.2 shows a selection of these site types. Not all site types are listed as there are over seventy-five categories, some with only a very small number of examples. For instance, there is only one maze recorded in Essex and only one deer park recognised from the aerial photographs.

From this table it is possible to see that the vast majority of recorded sites are field boundaries of unknown medieval origin (*i.e.* either medieval or post-medieval in origin). Field boundaries are very hard to date, as they are often identified from an association within an existing field system.

Other sites such as moats make up 39% of the late medieval sites. Moats are easier to place within a more specific period as it is known from documentary and cartographic sources that the majority of moats were built before 1540. Likewise, fish ponds are often associated with abbeys and priories, which again, were most prosperous in the late medieval period and went out of use at the Reformation.

While there is still a bias in the NMP record towards ditched features visible as cropmarks for this period, there are an increased number of earthworks that have been mapped when compared to earlier periods. Sites include extant motte and baileys (for example, at Pleshey) and mill mounds. However, cropmarks are still the dominant feature form, with over 3200 of the sites visible as cropmarks and only 690 (17.7%) recorded as either earthworks or a combination of earthworks and cropmarks. Mapping earthworks can be problematic as sites are often tree covered, even in winter, and cannot be easily identified or mapped from aerial photography. Consequently, the number of moats, for example, recorded as part of the NMP is only a fraction of the number of sites that actually exist in the county; this will be discussed in more detail later.

IV. Distributions

Sites from the medieval period are generally more widespread across the county than from earlier periods (Fig. 4.1). The distribution of the sites mapped from visible archaeology on the aerial photographs is related to geological and land use biases already discussed. Due to the type of medieval sites mapped, some river valleys have a high concentration of medieval sites, particularly the upper Chelmer and Ter river valleys. There are several areas of water management, such as water meadows and water channels, which date from the medieval period and which by definition will be found in the vicinity of a river. These types of sites are particularly common in central Essex, which accounts for the site distribution pattern.

Elsewhere there is a slight increase in the number of sites found across the south of the county on the London Clays, although the distributions here are distorted by the high levels of urban development. In the north of the county there is an area of higher ground found on the boulder clay, while the number of cropmarks is generally lower on the clay soils there is still a wide range of medieval sites mapped. On the higher ground there is a distribution of sites and, unlike the prehistoric period where sites tended to be located in the river valleys, there is evidence of medieval sites located away from the valleys. Again this could be related to the type of site mapped, as many are moated sites and these did not necessarily follow the river valleys, which will be discussed later.

V. Cropmark and earthwork evidence

While the remainder of the chapter will look at individual monument types, their landscape and relationship to other sites, the evidence for the Saxon period is very limited and so it is appropriate to look at this period as a whole, as often the type of site found is very specific to the period such as sunken-featured houses, whereas in later periods the types of features mapped could be from a wide time span.

Saxon

The archaeology from this period is difficult to locate (Rippon 1996, 117) due to little datable material surviving. It is not until the 9th century that pottery survival becomes more common and therefore sites become more easily datable. This transition from the Roman to the Saxon period is difficult to trace from the aerial photographic evidence alone. Even using the excavated evidence the relationship between the existing population and the incoming Saxons is not always clear.

Aerial photographic survey has had limited success in tracing the Saxon period; a trait that is shared with fieldwalking as a survey technique. Excavation has proved slightly more successful in identifying Saxon sites with some major excavations, such as Springfield Lyons (Tyler and Major 2005), Great Chesterford (Evison 1994) and Mucking (Hamerow 1993). While the cropmarks at Mucking were visible on the aerial photographs, only five features were identified as Saxon due to the extensive and complex nature of the site. Despite these problems there are over 600 records in the EHER with a Saxon date, including finds or features, excavated inhumations and settlement. Many of these sites are not visible on the aerial

photographs but it is interesting that the sites have a wide distribution across the county showing that while the aerial photographic evidence is not extensive, there is increasing evidence from other sources.

The circular cropmark at Springfield Lyons (EHER 5788) was first excavated in the 1980s and was found to be a Bronze Age settlement enclosure (discussed in Chapter 3), which was visible in its entirety on the aerial photographs (Buckley and Hedges 1987a). However, the extensive Saxon features found on the site when excavated were unexpected and, even with hindsight, were not visible on the available photographs. Experience at Springfield Lyons has shown that due to the nature of the buildings the remnants are often very shallow pits and ditches which are not conducive to good cropmark production and they rarely have a distinctive morphology. The site consisted of an early Saxon mixed cemetery and a late Saxon settlement of timber houses, that lay to the south of the Bronze Age ditch (Tyler and Major 2005, 2).

Springfield Lyons was one of several recently excavated sites that were found to have Saxon settlement evidence on large multi-period sites. Elms Farm, Slough House Farm, Rook Hall and Chigborough Farm, all located just outside Heybridge in the east of the county had Saxon settlement evidence, including structures and hearths demonstrating domestic occupation. At Slough House Farm two wells were also found (Wallis and Waughman 1998, 44). While some small features at these sites may have been visible on the aerial photographs, none were interpreted as Saxon through the NMP.

Sites in the west of the county, such as at Stansted, have very little physical evidence for Saxon occupation, with only limited features and a small amount of abraded pottery (Havis and Brooks 2004, 346). However, the environmental evidence does suggest that the area was being actively used for mixed agriculture during the Saxon period (Wiltshire and Murphy 2004, 354). Consequently, there must have been domestic and occupation sites in the area, but they are simply not visible on the aerial photographs or have yet to be identified and are difficult to detect through excavation because of the ephemeral evidence that remains.

Twenty-five features were identified as Saxon within the NMP and the vast majority were either inhumations or barrows, many of which had been excavated, which confirmed the interpretation. Six sunken-featured houses were visible as maculae and were mapped.

The main concentration of these sites was in Thurrock, around Mucking and Grey Goose Farm; this was also an important area for prehistoric and Roman occupation (Chapter 3) and it appears that this area was continually occupied into the Saxon period. The Mucking cropmarks were exceptionally complex and were made more so by the geological conditions which produced 'pit'-like cropmarks. Interpretation of the extensive site at Mucking was also made more difficult by the vast changes to the settlement layout that occurred; the earlier circular hillfort was overbuilt by Roman settlement enclosures which, in turn, were overbuilt by the Saxon sunken-featured houses, cemeteries and pits (Hamerow 1993), ensuring that there were problems with interpreting individual features. The task was aided by the excavation, but this does not entirely solve the interpretation problem, because of the large volume of features. The cropmarks gave a good indication of the importance of the site and the level of activity in the



Figure 4.1 Distribution of medieval sites mapped during the NMP

area, but the excavation showed that in one area the cropmark features were the remains of a Roman cemetery; elsewhere similar cropmarks were found to be Saxon sunken-featured houses in huge numbers (Jones and Jones 1975, 134).

Only 1.8km to the west was another concentration of sites that, while initially identified as five closely grouped ring-ditches with entrances on the aerial photographs, were dated as Saxon when three of them were partially excavated (Hedges and Buckley 1978, 255). The Saxon burials at Orsett were the first in Essex to have the enclosing ring-ditches confirmed through excavation (Hedges and Buckley 1985, 17). Although they are smaller in diameter than some other round barrows, only 8–9m, identifying them as Saxon from the cropmarks alone would have been very difficult. There is no evidence from either the aerial photographs or the excavation that the burials formed part of a larger cemetery, but it is one of only a few confirmed Saxon barrow groups in the county (Hedges and Buckley 1985, 21). There is little or no evidence for settlement in the immediate vicinity, but it is thought, based on the evidence from nearby Mucking and Springfield Lyons, that the settlement would not be far from the burials. There is evidence from north-west Kent that this close proximity was not always the case, however, with cemeteries and settlement sites sometimes sited some distance apart (Tyler 1996, 110).

Elsewhere, just south of Alresford, is a small concentration of Saxon sites that have been excavated. Four small ring-ditches, similar in size to those at Orsett, formed an isolated burial group (Bedwin 1986). The discovery of this small group of Saxon round barrows again raises the question regarding the dating of many other round barrows in the county. It is known that many periods used the round barrow for burial purposes and from the cropmark of a ring-ditch they are exceptionally hard to date. It is known that earlier barrows were re-used and had secondary satellite burials placed within them, demonstrating the importance of this type of monument. Close to the Alresford group are a series of linear ditches that have been assigned a late Saxon to medieval date. Like the other sites with Saxon burials, it is likely that there was some settlement and agricultural activity in the area and it is possible that these ditches were associated with this occupation activity. The round barrows were situated above the 20m contour, less than 500m from Alresford Creek, and are located on one of the higher areas in this low-lying part of the county. It is possible that this apparently dominant position was chosen specifically to be highly visible and prominent and the other cropmarks in the area are linked, though without other dating evidence it is difficult to make a definite connection.

It has been found that often Saxon activity is difficult to detect even through fieldwalking (Medlycott and Germany 1994), but other finds recorded within the EHER may indicate possible Saxon activity, particularly when in proximity to undated cropmarks. Ten cropmark sites were found to be within 100m of a Saxon metalwork find spot. At one location two Saxon finds (a brooch and a hasp) were found 80m apart and are within 25–35m of a cropmark provisionally interpreted as a trackway of medieval or possibly post-medieval origin. While the find spots are not conclusive evidence for dating adjacent cropmarks, they do at least raise the possibility of a Saxon date.

Elsewhere, a single find spot of a square-headed Saxon brooch was found within 50–60m of a group of three round barrows, that average 11m in diameter. Square-headed brooches are often found as grave goods and were mostly worn by women (Hines 1997, 280–86). The round barrows were classified as Bronze Age in the MORPH2 database and are closely linked to a set of linear ditches and enclosures considered to be Roman. This is not to say that the round barrows were not later than the surrounding cropmarks or even that the find may represent a re-use of the site. This re-use of earlier monuments is known from other sites and could be seen as a simple opportunistic re-use of already cleared land. There is known continuity on sites close by, such as Slough House Farm (Wallis and Waughman 1998, 44).

Enclosures and settlement

The remainder of this section will be a thematic approach to the types of sites that were recorded and attributed to the medieval and post-medieval periods within the mapping project. This will then be followed by two case studies that examine how the development of medieval sites affected the landscape in two geographically diverse areas of the county.

A selection of settlement sites from around Essex dating to the medieval period have been excavated, including Duckend and Roundwood near Stansted (Havis and Brooks 2004), Great Holts (Germany 2003) and Boreham Interchange (Lavender 1999). Most of these consist of a relatively small single building or a small group of buildings. For example, the site at Roundwood comprised of four buildings, all closely spaced, partially enclosed by a series of ditches (Havis and Brooks 2004, 544).

One of the most extensively excavated medieval sites is Stebbingford, which was investigated in advance of the new A120 trunk road. The site was first located on aerial photographs that showed a number of linear ditches which, when mapped, were interpreted as field boundaries. However, when excavated the site was found to have been a late 12th- to 14th-century farmstead, with associated fields and trackway (Medlycott 1996, 110), the excavation plan of which can be found on Figure 4.2. The farm at Stebbingford was part of a landscape that was made up of small villages and market towns, with isolated farms and farming hamlets, of which Stebbingford was one (Medlycott 1996, 174). It is quite likely that some of these isolated farmsteads have been mapped as field boundaries or enclosures, but not recognised.

Over 100 features have simply been classed as ‘enclosures’ from the medieval and post-medieval period, of various sizes and geographical distributions, several examples of which can be found on Figure 4.2. They have been given a medieval date because of their location, relationship to a surrounding field system or other available information. There does not appear to be any set size or morphological characteristic to single out these medieval sites, unlike Roman field systems or prehistoric ceremonial monuments, which often conform to set morphological criteria. As illustrated on Figure 4.2, medieval sites range from rectilinear (EHER 6823, 2649, 19190 and 11948) to circular (EHER 14121) or can have a mix of enclosure morphology (EHER 19709), while some are double ditched (EHER 17101 and 5170).

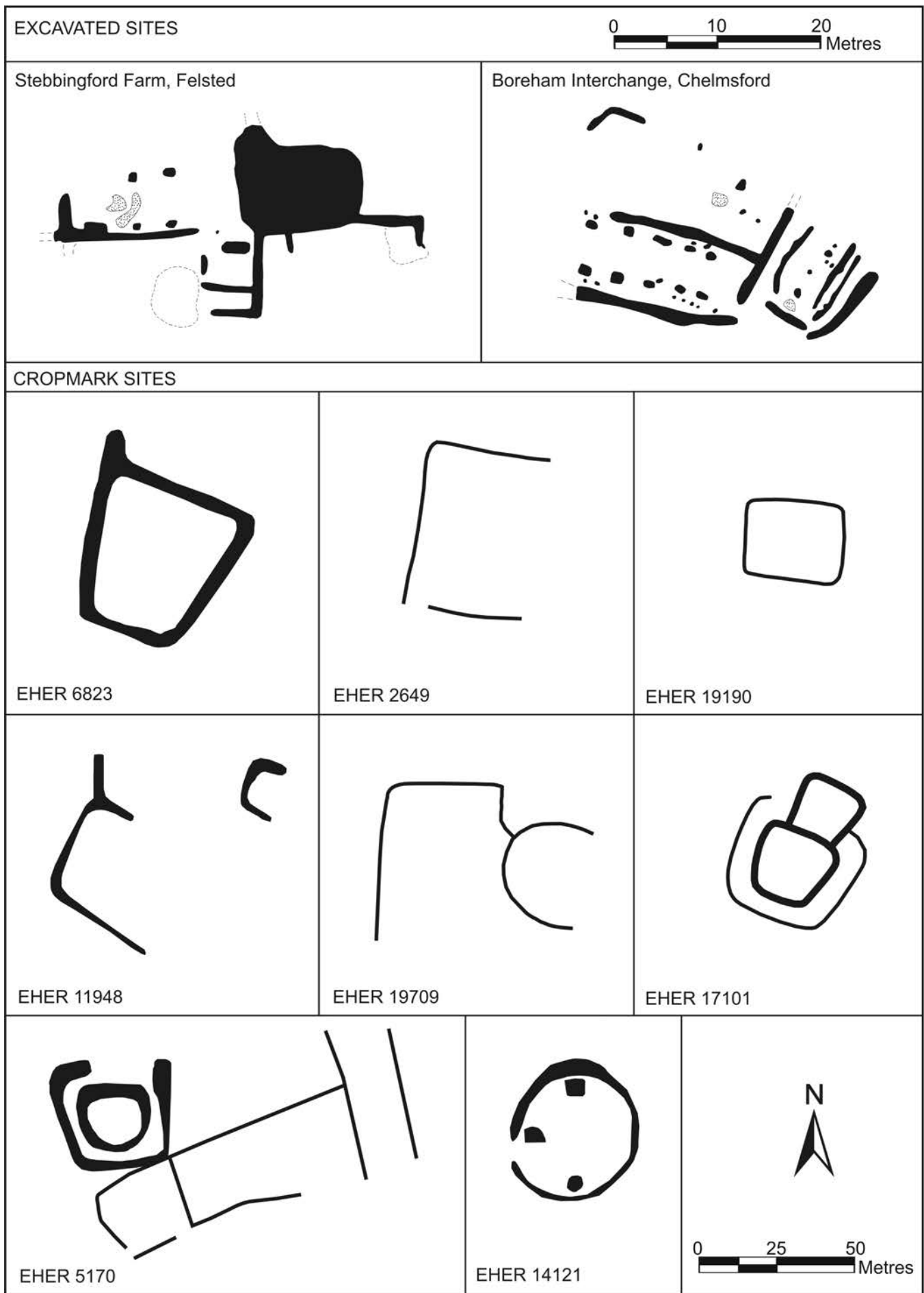


Figure 4.2 Excavated and cropmark examples of medieval settlement enclosures



Figure 4.3 Aerial photograph of a water-filled moat at Starling's Green (EHER 3903)
(copyright Essex County Council BW/07/02/03)

As was demonstrated at both Roundwood and Stebbingford, isolated farmsteads were often a collection of more than one structure. Consequently, clusters of enclosures may indicate farmsteads and associated buildings. There are over 330 sites clustered within 40m of each other; 195 of these are rectilinear enclosures with an average size of 45m by 34m. However, the most substantial building at Roundwood measured just 16m by 11m, a second building was 14m by 9.5m and a further one in the complex was 18m by 7m (Medlycott 1996, 176) and at the Boreham Interchange site (Fig. 4.2) the most substantial building was 13m by 6m. Using these measurements as an indication of size of medieval farmstead buildings, fifty-seven mapped sites are identified as less than 20m in length and rectilinear. These are distributed across the county and may well be evidence for some of the many isolated farmsteads presumed to exist during the medieval period. However, it is possible that some of the larger enclosures are also examples of medieval farmsteads and it is the surrounding ditch enclosures that are identified rather than the actual farm buildings.

Fortunately, in the medieval period there are many other types of site that are more identifiable such as moats, ringworks, abbeys and priories, which either still exist or are well documented. This has ensured that a wide selection of settlement and landscape organisation has been mapped over the course of the project.

Moated sites

Moats are not only one of the most prolific site types in Essex, they are also common and widespread over much of England and Wales, though are more dominant in the south and east of the country. In 1978 the number of sites recorded in the country was over 5000 (Hunter 1999, 127–8) and this figure will now be considerably higher.

By definition a moat is an area enclosed by a wide ditch filled, or intended to be filled by water (Taylor 1978, 5) and a classic example of a water-filled ditched moat enclosure at Starling's Green (EHER 3903) can be seen in Figure 4.3. The southern arm was in-filled during road improvements. There is documentary evidence for the moat dated 1332–3, although no trace of a building has been found on the platform; this is common with moated sites in Essex. The ditch was designed to enclose a wide variety of structures from manor houses to windmills (Le Patourel 1978a, 37), although there are many examples where no trace of buildings has been found (Le Patourel 1978a, 40). From the aerial photographs moated sites that show as cropmarks can be confused with several other types of site, such as fish ponds and early water management schemes, and while ringworks are superficially similar to moats from the aerial photographs (particularly ploughed-out ones), other characteristics of ringworks can normally identify them successfully.

A wide range of sizes, shapes and functions have been recorded from the many known moated sites, and they were constructed over a long period. Moated sites began



Figure 4.4 Aerial photograph of a moated site visible as a cropmark at Battles Wood (EHER 3875)
(copyright Essex County Council BW/07/02/05)

appearing in the late 12th century and the construction of such sites peaked in the mid 13th–mid 14th centuries, although they were still being constructed into the 16th century (Le Patourel 1978b, 27). It is thought they first appeared as defensive structures, later changing to a statement of status, with moats representing wealth and position. As Essex has no building stone it would have been difficult to have built stone defensive structures, so it would seem logical to make use of natural resources, topography and natural characteristics of the clay geology, which would enable ditches to become water-filled, to complete a visually impressive defensive site. In Essex, only a few are large enough to enclose more than the house, gardens and out-buildings. During the 13th century, when manorial establishments became larger and more complex, some moated sites may have been adapted to increase their size, while others may have been abandoned in preference for other nearby sites. The size of moats in Essex varies considerably, with the largest mapped site 225m by 225m and the smallest identified and mapped only 18m by 18m.

Essex has one of the highest concentrations of moated sites in England (Wade 1997, 52) and this number is still increasing. Between 1978 and 2005 the number of known or suspected moated sites increased from around 500 to over 900 and again as more survey work (both land based and aerial reconnaissance) is carried out, this number is rising further. Figure 4.4 shows the site near Battles Wood, Berden (EHER 3875) recorded during the 2007

reconnaissance season. While this site had been recorded previously, the cropmark morphology had left the interpretation a little ambiguous. However, this recent aerial photograph shows the cropmark morphology clearly and therefore an interpretation of a moated site is given with more confidence. Furthermore, it is probable that more sites like the Battles Wood moat will be recorded on the clay geology. This type of geology is not as conducive to cropmark development; a number of factors are needed for any cropmark response, so it is less common for sites to be visible very clearly or at all. However, when cropmark development is good then previously unidentified moated sites can be found, which is one reason why the aerial reconnaissance programme continues over the clay geologies.

Despite the high number of moated sites in Essex, the number mapped was very limited with only 180 out of over 900 (19.75%) included. The main reason for this was the lack of good photography of the extant sites and the tree cover; unless the extent of the ditches was visible they could not be mapped and often the tree cover prevented this. Only the moat ditches were mapped on the occupied sites, not the buildings. Structures, whether houses or out-buildings were only mapped if they were ruins and this was not common. This makes discussion of distributions difficult as the NMP only included a small proportion of the known sites. For this reason both mapped and non-mapped sites will be considered for much of the discussion

The vast majority of mapped moats were visible as earthworks (73%); often the ditches were still water-filled (Fig. 4.5) and, in many cases, still had houses within the enclosure. A further 26% were seen in the form of cropmarks, while the rest were visible as a combination of cropmarks and earthworks. This occurred when the majority of the earthwork survived while a proportion of the ditch had been filled and, as a consequence, was visible as a cropmark.

The cropmark moated sites can be considered as failed settlements. Some of the cropmark sites may have been abandoned for longer than the earthwork sites; alternatively, cropmark sites could have been located on good fertile land that was needed for agriculture, so the remains of the earthwork were ploughed away. It is also possible that some of the cropmark sites may not be medieval moated sites but are cropmarks of wide ditched enclosures of varying dates. Examples of moats found in Essex can be seen in Figure 4.5.

While the mapped sites are found all over the county, they are particularly common in north-west Essex in the upper Roding Valley, upper Can Valley and north Uttlesford, although the sites are not always found along the river valleys. There is a loose correlation between the highest concentrations of moated sites and the well-wooded areas of AD 1086 (Hunter 1999, 128). On a countywide level there is a strong distinction between the east and the west and the vast majority of the sites are found on the boulder clays of the west. There was no necessity to be close to a water source; the moats themselves were often used as the water source for the occupation site, with the ditches filled through rainfall and surface run-off. This was found to be the case for a group of sites in the Blackwater region where the majority of moats were supplied only by surface drainage (Hedges 1978, 65). This is not to say that moated sites never utilised rivers as the site at Clavering demonstrates (EHER 113). It is thought that this large moated site used a complex system of water channels and dams to fill the large ditches, the remnants of which can still be seen as earthworks.

It has been suggested that circular moats might have been earlier than the rectangular ones (Hedges 1978, 65) and while this may be the case, there has been no NMP evidence to support or disprove this theory. There are certainly fewer circular moats in Essex (both mapped and non-mapped) and only fourteen mapped moated sites had a curvilinear shape.

However, the rectilinear moats are not all simple rectangles, as there are some moated sites with more than one ditch or 'arm'. Examples of irregular moats that have been mapped can be found on Figure 4.5. Ardleigh Wick (EHER 2364, J, Fig. 4.5), has more arms than a simple rectangular enclosure. Maidens Tye (EHER 979) is more complex (H, Fig. 4.5), with a long arm enclosing an area which may have been used for stock or an orchard; this has been partially excavated (Sellers 1966). Results suggest that the site was occupied from 1150 through to c.1800. There are numerous examples of two moats in close proximity to each other. Two examples (G and F, Fig. 4.5) can be found at Little Bardfield (EHER 1573 and 1566), where two moats are less than 120m from one another and Ratcliff's Farm (EHER 3100) where the two enclosures are only 30m away.

Many of the sites mapped also appear incomplete with only seventy-five of 180 (41%) of sites considered

'complete'. Incomplete sites occur where either the ditches are masked by tree cover so could not be mapped in their entirety or, more likely, where the ditch was never completed, it is also possible that, like the moat at Starling's Green (Fig. 4.3) where the southern arm was in-filled during road construction, that some sites have been altered with sections in-filled at a later date. Sites described as 'incomplete' include those where the moat is no longer complete (or never was) and these sites are described as 'linear features' in the database. This makes using size and morphology information very difficult, although there are only twenty-six mapped sites like this.

While there is not one particular aspect that is more common, the entrances to the moats do appear more likely to face a southern direction. Of the fifty-one sites that have identifiable entrances nearly 55% of them are southerly facing. While the southerly-facing sites are spread over the whole county there does appear to be a concentration of northerly facing entrances where there is the highest concentration of sites overall; in the upper Roding and Can valleys.

Several sites have been excavated around the county, including King John's Hunting Lodge near Writtle, which was excavated in 1955–57. This site was found to date from the early 13th century and is one of the oldest moats known (Rahtz 1969, 18). More recently an excavation at Boreham was carried out on a windmill and moated settlement site, identified on aerial photographs, prior to mineral extraction (Clarke 2003). The site had been under tree cover after being abandoned and then was partially destroyed when a Second World War airfield was constructed. Consequently only a small proportion of the site remained, between the runways, but it did highlight that some sites can still be found by aerial photography even where modern development has taken place.

This site was also important at a regional level as few plans of rural medieval domestic settlement sites had been identified (Clarke 2003, 67). The excavation added considerably to the information that had been visible on the aerial photographs, as it identified the plans of structures to show the types of buildings found within the moat. Interestingly the majority of buildings that were found on the site did not conform to other building plans recently excavated in Essex (Clarke 2003, 70). It was suggested that the site was abandoned rapidly in the mid 13th century and there may have been underlying social and economic reasons for this, but there was a major granary fire that may have made the continued occupation of the site uneconomic.

The site appears to have been peripheral to other settlement in the area and is considered to be isolated, but is now out of its original landscape context as it is surrounded by the airfield and has extensive gravel extraction occurring in the vicinity. With the exception of the early map evidence there is very little indication of the size of the site and the landscape in which it was originally located.

There are other areas with prolific moats, complex field systems and other medieval sites and these will be looked at more closely in the case studies. The upper Roding Valley has been identified as having a high concentration of medieval sites, including moats, and along with an area north of the Blackwater estuary, will be used in the case studies to examine evidence of landscape development in the medieval period. How moats fitted

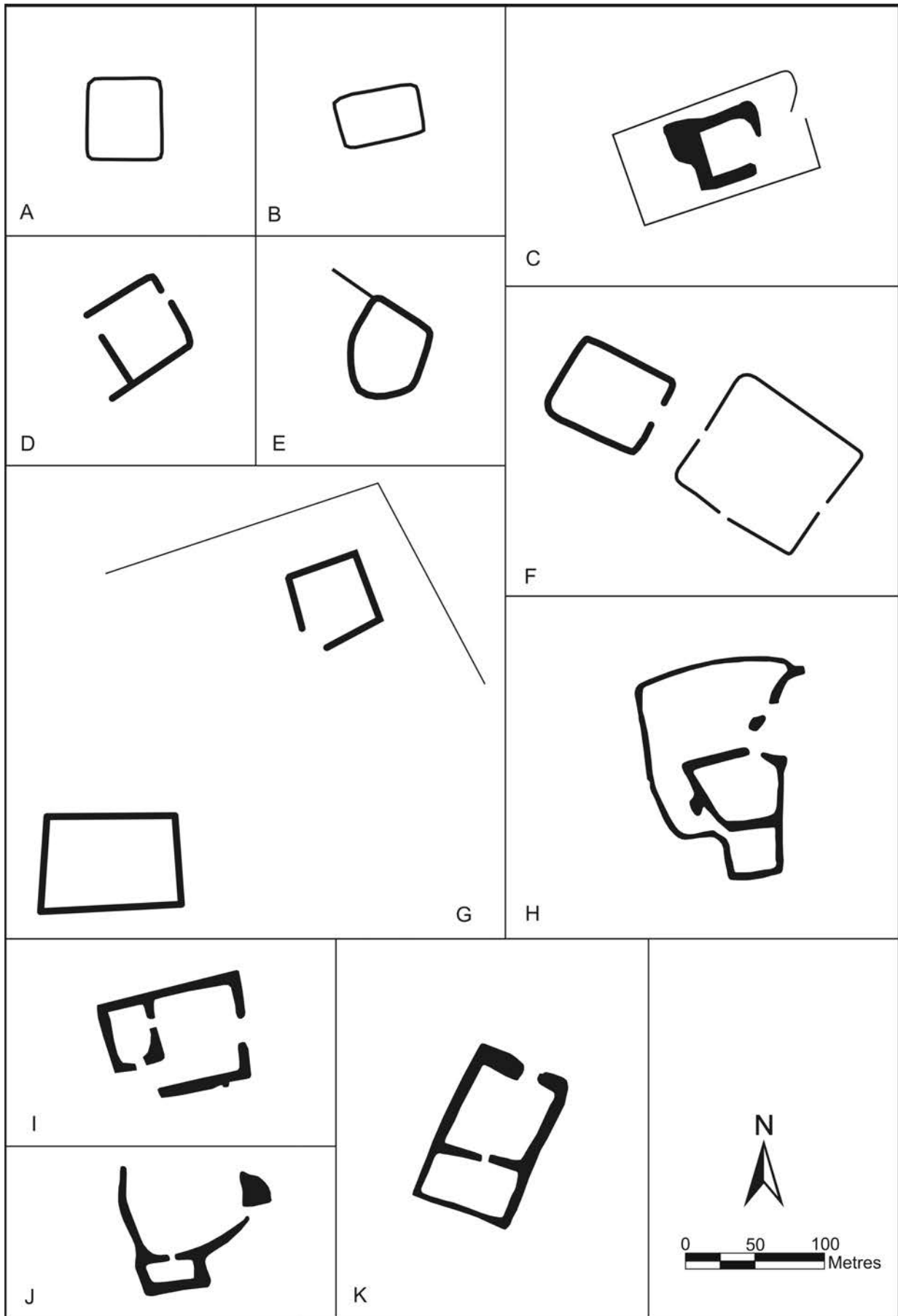


Figure 4.5 Examples of mapped moated sites found in Essex and identified from the aerial photographic evidence



Figure 4.6 Aerial photograph of Pleshey (EHER 1126) (copyright Essex County Council CP\05\05\07)

into the medieval landscape and how they may have influenced the surrounding land use will be appraised. It is apparent that the areas with the highest concentrations of moated sites often have a high concentration of field boundary loss along with other important medieval sites such as mottes and churches and much of the landscape organisation seen today would have occurred when moats and moat building were at their peak; this will be examined later in the chapter (Section VI).

Motte and bailey sites and ringworks

Other site types which may have influenced landscape development include motte and baileys and ringworks, all of which were important elements in the landscape. Some of the earthworks were quite large and have consequently survived. The distribution of this type of site is mainly in the west of the county on the higher ground of the boulder clay plateau. As with moats, this site type may have been associated with clay soils that could retain water and it is likely that many of the ditches surrounding mottes were water-filled; the site at Pleshey (EHER 1126) still retains water in part of the surrounding ditch.

Seventeen motte and bailey and ringwork sites were mapped; the vast majority are extant earthworks. The best known site is Pleshey (Fig. 4.6), a large motte and bailey earthwork and associated town enclosure, and one of the best preserved earthworks of its type in the country (Eddy and Petchey 1983, 74). Excavations have been carried out at the site on numerous occasions including by Christy (1923) and Williams (1977). The soils surrounding the site are not particularly conducive to cropmark formation and the NMP could add little to the existing information. The field patterns surrounding Pleshey follow the curve of the town enclosure and so were probably laid out

following the establishment of the town in the 12th century (Medlycott 1999b).

On a smaller scale is the motte at Mount Bures (EHER 9161, Fig. 4.7) in the Stour Valley, which is approximately 50m in diameter with a ditch surrounding it. While the site now appears isolated with little evidence of a bailey, it is thought that the west side of the bailey can be traced along the fence of the churchyard to the south, which can be identified on the aerial photographs.

Other relatively small sites include The Rookery (EHER 3854), a circular site of over 55m in diameter in Uttlesford. Again this site is isolated within a field system still evident today, but NMP mapped several linear features in the vicinity, which may be associated with the site. Unfortunately, this ringwork was largely destroyed by ploughing, but would have been a substantial earthwork when constructed.

Field boundaries

Field boundaries are the most common site type recorded by NMP, constituting *c.*31% of all sites recorded. While single and small clusters are located across the entire county, there are some areas with very high concentrations of field boundary loss, such as the area around the Rodings. This represents an increase in agricultural intensification that benefits from several smaller fields merged to create a larger, more efficient field system and the general distribution shows that this practice is widespread across the county.

The mapping of field boundary loss can contribute to the study of field form and layout. In many areas there was a deliberate organisation of landscapes in a regular pattern with the use of straight lines and right angles in some areas. There also appears to be a certain amount of



Figure 4.7 Aerial photograph of the motte at Mount Bures (EHER 9161) (copyright Essex County Council CP/07/06/02)

continuity through time (as shown in Thurrock, Chapter 3, and elsewhere). The aspects of a planned landscape have been examined and much debated by Rodwell (1978), Rackham (1986), Williamson (1986) and Rippon (1991), and a history and morphology of East Anglian field systems has just been published (Martin and Satchell 2008), but is beyond the scope of the NMP, particularly as the loss of field boundaries that were visible on the OS 1st edition maps from the 1880s was not included as part of the NMP mapping. However, some assumptions regarding dating and other factors can be made using the NMP evidence. The dating of field systems by morphology alone is very problematic, as was demonstrated by Fleming, who showed that field systems on Dartmoor, which were previously thought to be medieval, were in fact prehistoric (Fleming 1987). Closer to home, Rodwell had suggested a Roman date for the landscape in south Essex, but this has since been shown to be, more plausibly, of a possible Saxon date (Wilkinson 1988; Rippon 1991). This said, there may be some clues to dating in the morphology of the fields, as a reversed 'S' profile and smaller strip fields are suggested medieval forms (Rippon 1991), while the gridded rectilinear field systems of south-east Essex can be attributed to either the Roman or Saxon periods, with current thought favouring a mid-Saxon date.

The mapped field boundaries should not be viewed in isolation, but combined with other sources, particularly the historic mapping and the Historic Landscape Characterisation (HLC), which would ensure it is not only partial field systems that are examined. Orientation of field systems was seen as a guide to date, so generally

boundaries that conform to the present day established field patterns were considered to be of unknown medieval or post-medieval origin unless there was other dating evidence to the contrary. Field boundaries that were on a different orientation or crossed modern roads and other features, thought to be older, probably had either a prehistoric origin or were from a different period of landscape development.

The development and layout of field boundaries varies across the county, changing with topography, geology, settlement patterns and historic influences. These different patterns of fieldscape have been assessed in more specific characterisation projects, such as the Essex Historic Landscape Characterisation project (HLC) and will be discussed in detail in a forthcoming report (Bennett *et al.* forthcoming). However, general trends include, in the north-west of the county on the chalk ridge, the only examples of the classic Midland 'three field system' (Williamson 2003). This gives way to irregular field systems, found on much of the boulder clay, a central belt of former common fields, and to the south and east of the county there are extensive areas of co-axial fields. These co-axial fields vary from 'sinuous rectilinear' to 'sinuous irregular' and 'rectilinear' systems, which merge with the 'Dengie-form' rectilinear co-axial fields (Bennett *et al.* forthcoming). While the HLC shows these areas and general trends, the NMP demonstrates patterns on a more local scale and has mapped the evidence used in the HLC project.

Figure 4.8 shows some examples of the types of field systems found in Essex. The first type (A) is an example of co-axial 'Dengie-form', which is widespread over much



Figure 4.8 Examples of field systems, using OS 1st edition maps, modern mapping and mapping the cropmarks of field boundary loss

of south Essex. The NMP mapped elements of ‘Dengie-form’, but few examples of a complete field system. There are many reasons for this; many areas of ‘Dengie-form’ are found on the London clays that are not conducive for cropmark development and, in conjunction, many areas of ‘Dengie-form’ have not suffered from extensive field boundary loss. This means in many areas the Dengie field systems are still present in almost complete form today and this can be seen in a broad swathe on the HLC mapping. Consequently, the example in Figure 4.8 is taken from an extract of the OS 1st edition mapping from the 1880s. It shows a strong rectilinear pattern of field boundaries that may well have ancient (Saxon or older) origins (Hunter 1999, 22–3).

Irregular fields (B) can be found over much of Essex and the example in Figure 4.8 is located to the south-east of Takeley, an area which consists of twisting lanes, of medieval origin, that are often sunken and irregular (Bennett *et al.* forthcoming). This example demonstrates a possible twisting trackway through the field systems, which at some point has been abandoned and ploughed, along with the rest of the boundaries. It seems likely from this evidence that the whole structure of this field system was abandoned at the same time, including the trackway, rather than the trackway going out of use and then the field boundaries being grubbed up at a later date.

A few kilometres to the north is an example of a strip field system (C), a type more common around the Saffron Walden and Great Chesterford area, this cropmark complex shows a possible trackway with narrow fields perpendicular to it. This form of field system may have been influenced by the local topography, as the upper reaches of the river Roding run parallel to the track, 200m to the east.

The fourth example of fields (D) is a combination of irregular (with no fixed pattern or apparent lay out) and a sinuous co-axial. This example is found in the upper Can Valley near Mashbury and is strongly influenced by the river and local topography, as the sinuous field pattern follows the bends in the river, while the irregular fields are further from the water course.

The establishment of manors, parish churches and estates in the late Saxon–medieval period (Hunter 2003, 7–8), led to the delineation of many major boundaries. At a more local scale, the establishment of estates and development of individual settlement would also have affected the formation of field systems. The final example (E) on Figure 4.8 shows a mixture of field systems divided into three distinct areas by twisting roads and green lanes. The focus is the circular medieval moated site of Great Garnetts (EHER 893) which is surrounded by large irregular fields. It has been suggested that the moat had an outer court or bailey on the west side (RCHM 1921), although the OS did not agree, marking the possible ditch as a curvilinear field boundary. Either way the field boundary pattern is influenced by the circular moat and surrounding structures. A possible green lane separates the large irregular fields from an area of apparent strip fields, some of which have been lost. A further small track separates this from an area of small irregular fields, the boundaries of which have been lost and are now only visible on the aerial photographs.

This moated enclosure demonstrates how a substantial site can affect the development of the surrounding landscape. This is the case with many medieval sites; as

the population increased there was consequent pressure on land as ownership and management changed. This was never more apparent than with the church and the influence churches and abbeys had on the landscape will be discussed briefly in context with the surrounding field and landscape patterns.

Abbeys and priories

While only four abbeys or priories were mapped, there is evidence of over fifty possible sites within Essex, which range from monastic churches that have been retained as the parish church to sites that have been replaced by private houses that still retain elements of the earlier monastic buildings, such as Audley End near Saffron Walden. The monastic site of Walden Abbey (EHER 401) was located on the site of the current house. Monastic institutions were often large land owners; consequently, many of the bigger monastic sites had considerable influence over the development of local landscape. One of the best examples of this in Essex is Leez Priory, to the south-west of Braintree (EHER 5956). While the actual priory was demolished after the dissolution, the site still remains important.

Leez Priory originally consisted of a sizeable church with tower and a cloister, both of which were destroyed and elements incorporated into the present day house, but many significant features still exist around the priory. It had a large collection of fish ponds (EHER 937), many of which remain extant today, and were an important part of monastic life, supplying a major source of food. A line of ponds stretches for over 3km in a ‘V’ shape around a low lying spur of land, making the best use of local topography and a water source. They lie along the old course of the river Ter and it has been suggested that they served a dual purpose as both fish ponds and mill ponds.

The location for the priory was selected, at least in part, for the water source and local topography. The priory does appear to have had some influence in the local field systems as the small fields that radiate from the ponds follow the curve of the land. The irregular nature of the field patterns around the priory were considered to be of medieval origin (Bennett *et al.* forthcoming), so it is highly likely that the development of the priory strongly influenced the landscape we see today in the area and the NMP mapping helps to place these features into context. Many other monastic sites have the remnants of fish ponds, including Coggeshall (EHER 8650) and Waltham Abbey (EHER 84).

Waltham Abbey (EHER 18021) had an extensive water management system associated with the monastic site (Medlycott 1999c), including water courses for supplying mills and small fish ponds (Fig. 4.9). This site again used the local topography and water courses to ensure both water supplies to the abbey itself and to work the mills and fish ponds. The NMP mapped parts of the cloister, the walls associated with the abbey area and the later moat located within the abbey gardens (EHER 3671) along with the water management schemes, fish ponds and field boundaries. Figure 4.9 shows some of the aspects of this system. Worked carried out at Waltham Abbey has shown that the monastic sewer system was flushed out by a head of water provided by the Cornmill stream, although this sewer system is not visible on the available aerial photographs. Cornmill stream also provided the water for the fish ponds, with the water flowing in an east–west

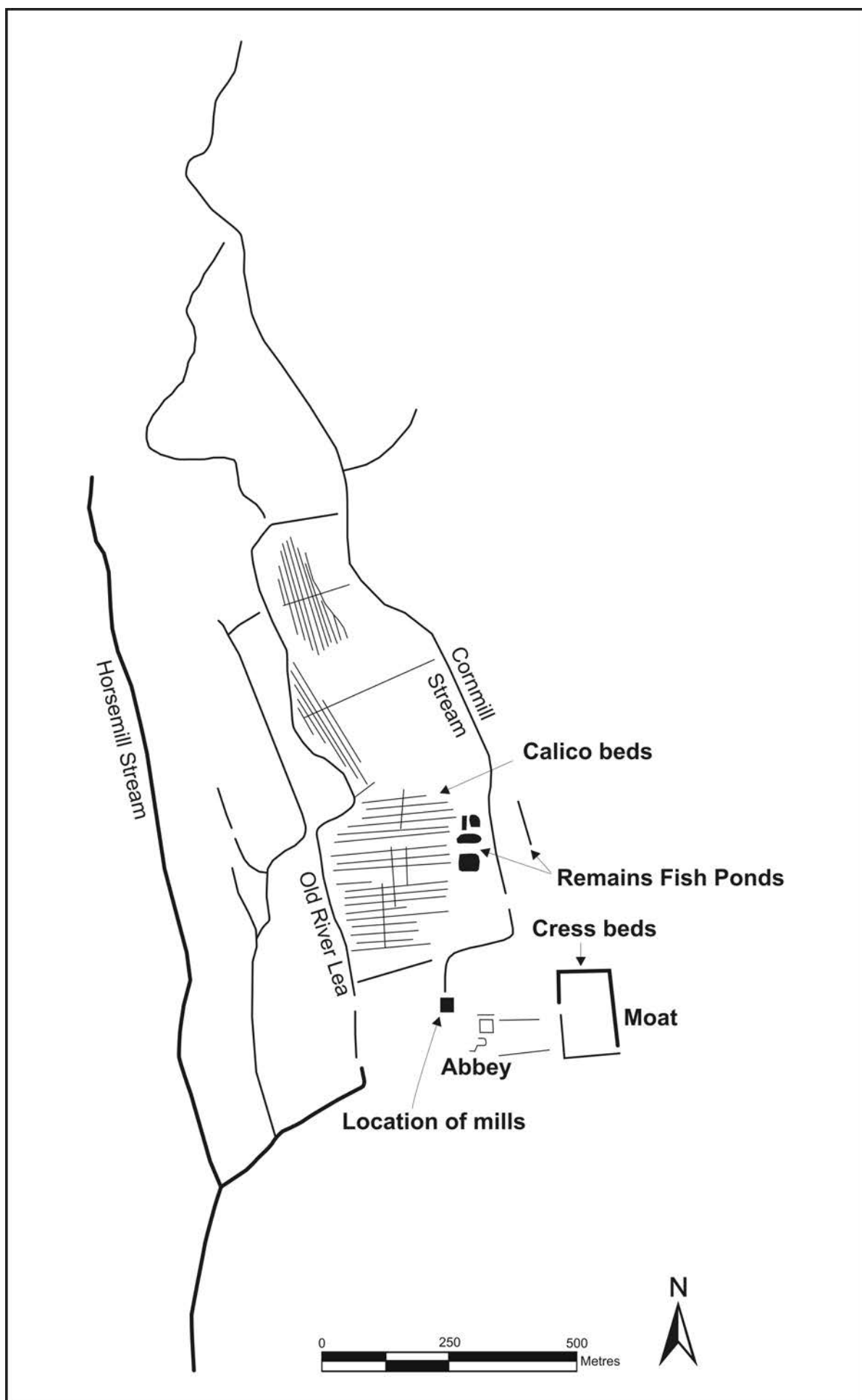


Figure 4.9 Parch marks of the abbey buildings and water features at Waltham Abbey, as mapped by the NMP

direction through the ponds (Fig. 4.9). While the NMP evidence might be limited it does place some of the structures in a context that can be compared to historic maps and other sources. It is likely that, like Leez Priory, the abbey greatly influenced the surrounding lands and there is certainly evidence on the OS 1st edition maps that points towards small irregular fields (some with the field boundary loss mapped by the NMP) to the north of the abbey.

The precinct wall (EHER 97) was observed (Huggins 1988) and traced for its entire circuit, including the influence it had on the road system of the modern town. The precinct was an important part of a monastic site and often substantial evidence remains, forming an important aspect of the immediate landscape at most monastic sites (Aston 2000, 101). The layout and size of the precinct would have depended on the wealth of the house and they ranged considerably in size (Aston 2000, 102). While the entire precinct cannot be traced at all sites, elements are visible at other sites such as Coggeshall, where it is thought that the river might have formed part of the boundary; a common feature on many sites such as Tintern (Aston 2000, 110).

Other aspects of Coggeshall Abbey (EHER 8650) were also mapped, particularly the outline of the church. The church was also mapped at Tilty Abbey (EHER 19056); at both sites the foundations are visible as parch marks on several aerial photographs. Both sites demonstrate that the monastic complexes had an influence on the surrounding features and remain important today, but the extent to which the surrounding settlement was influenced remains debatable. Sites like Tilty only have small villages associated with them, whereas Waltham Abbey and Coggeshall had other influences after the Dissolution. For example, the cloth trade was still prosperous in the 16th–17th centuries in Coggeshall (Medlycott 1999d, 12), which ensured that the town grew. Elsewhere, with no other trades, the towns and villages that had developed around abbeys and priories either remained small or disappeared completely, thus reducing any further influence the monastic sites may have had in the landscape. Consequently it is often only through the aerial photographs and the NMP that the remains of features are seen and mapped.

Water management

Over 130 water management features were mapped, ranging from water channels and drainage ditches to dams and water meadows. The vast majority of these features are located on the upper reaches of the rivers Chelmer, Blackwater and Colne. Other more isolated sites are found along the smaller tributaries of these rivers. Many of the sites have been dated to the post-medieval period, but some sites, such as the dams associated with the fish ponds at Leez Priory have a late medieval date.

While the NMP mapped several water features associated with the abbey at Waltham, the use of the water system continued after the abbey went out of use and was altered to suit purpose. At one time there were two mills in one building, with two separate mill streams located to the west of the church (Fig. 4.9) operating at one time and a map of 1767 (ERO D/DU 567/2) shows both the location of the mills and makes reference to 'Callico grounds'; these calico beds are clearly visible on the aerial photographs as slight earthworks and have therefore been

mapped. Figure 4.9 therefore shows the water management system from the abbey through to the 1950s when the moat was used for watercress beds.

As discussed, abbeys and priories were often located to make the best use of local water sources and many of the drainage systems and water channels are associated with abbey and priory sites, such as Coggeshall, which used the River Blackwater as a boundary. The abbey also had fish ponds and water channels associated with the Blackwater, which can still be seen today as low-level earthworks.

Water meadows are found in several areas of the county, including low-level earthworks at Skegg's Farm (EHER 14057), which is associated with the river Wid and an area of linear earthworks at Roydell's Farm (EHER 14160) that are visible on the aerial photographs as a series of channels and ditches. Historically, farming practices have been the biggest threat to the once extensive areas of water meadow. During the 19th century, water meadows began to fall into disuse (Cook and Williamson 1999, 193) and due to ploughing, large areas of water meadow have been lost. The NMP gives an indication of how widespread they would once have been as the features were often mapped from the RAF vertical photograph collections from the 1940s and early 1950s, before the features were destroyed by ploughing. Today flood-risk management also poses a threat as the areas of water meadow were designed to be flooded, but flood alleviation schemes are often designed to prevent this flooding and alterations and building work can destroy the earthworks.

While the NMP mapped these water management systems, in many cases they are not visible in their entirety because of tree cover or modern buildings. This is particularly the case at Clavering Castle (EHER 113) near Newport, Uttlesford where a recent topographic survey has influenced the interpretation of the extensive earthworks which form a complex series of water channels that are thought to be part of the settlement water source, fish ponds and mill streams associated with the major ringwork of Clavering Castle (Heppell and Saunders forthcoming). Unfortunately, these earthworks were not mapped because of the tree cover.

Other mapped sites

Amongst the mapped sites associated with settlement and landscape organisation are other site types such as the formal garden features in parkland belonging to Barrington Hall, north of Hatfield Broad Oak (EHER 16237). The low-level earthwork features consist of an avenue and two large concentric circular enclosures over 100m in diameter. These features do not appear on any of the early OS maps, but they are clearly visible on the Chapman and Andre map from 1777. The earthworks link a lake in front of the house with the circular feature, via an avenue that runs almost the full length of the park. The avenue and one of the large enclosures were tree-lined and it appears that some of the trees still exist, outlining the edge of the features today.

Although these are the only formal garden features recorded by the NMP in the county, other large houses have features within the associated parkland. For example, at Audley End, near Saffron Walden there are a small number of linear features that appear to show a continuation of a path, from an existing Ha Ha, which leads from the house towards a temple in the grounds. Again at Langleys House, near Great Waltham there is

evidence of linear features and boundaries within the deer park, which would have been part of the formal arrangement of the park. Formal gardens form an important part of the historic environment and while they may be more recent features than other mapped archaeological remains, they demonstrate how landscape organisation and landscaping changed, are often associated with important listed buildings and form part of the registered Park and Garden recorded within the EHER.

One of the more unusual features mapped is Saffron Walden maze (EHER 450), which is the only recorded example in Essex. The maze consists of a series of concentric circles surrounded by a low bank. A post-medieval date was given as the first reference to the site was 1699, but its origins are thought to be much earlier and it is located within the historic town of Saffron Walden.

VI. Case studies

The locations of the two case studies can be found on Figure 4.10.

Upper Roding Valley

The first area identified as of particular interest for medieval landscape development is located between two major valleys, the Roding in the west and the Chelmer in the east (Fig. 4.10) and covers an area of approximately 5.5km by 7.5km. The area has a huge variety of archaeological and historical sites ranging from listed buildings to abandoned moated earthwork sites and cropmark complexes.

The area is part of the boulder clay plateau, with a combination of rolling hills, valley topography and gentle boulder clay slopes (Bennett *et al.* forthcoming), leading in many areas to the development of heavy damp clay soils that are difficult to work, but contribute to certain settlement types being established, such as the high concentration of moated sites.

Most sites are located away from the river valleys on gentle undulating slopes. Of the fifty-seven mapped medieval sites within the area only seven are within 100m of a river, including the motte at Great Canfield and the moated site at New Hall (EHER 4332). When all medieval sites are considered, including the listed buildings, only twenty-three of 393 (5.8%) are within 100m of rivers. Many of the sites are located between the 75m and 90m contours.

There are a number of reasons for this distribution, including the type of settlement pattern found, which is mainly dispersed, comprising of church and hall complexes, isolated farmsteads and scattered roadside settlement.

The area is a combination of three or more character zones as defined by the HLC and while general similarities exist, for example a pattern of dispersed settlement and moated sites, there are some differences. For example, in the Barnston area, field sizes are noticeably smaller. This is particularly evident near the moated site of Great Garnetts, which has already been discussed (see 'Field boundaries' above). There are also a high number of twisting lanes connecting numerous small hamlets that still exist today and this has been significant for landscape development.

This area has been chosen because of the number and variety of features recorded within the NMP, the distribution of which can be seen on Figure 4.11. The area has not been extensively examined by other researchers and large numbers of prehistoric features have not been recorded in the vicinity. This is not to suggest that there was no prehistoric settlement, simply that the features have yet to be recorded or interpreted as such. While there is currently no prehistoric or Saxon NMP evidence, there are EHER records for these periods, even though they are limited. One Saxon site is recorded in the area, with Saxon pottery located alongside earthworks (EHER 1110) that are no longer visible, but the pottery was found near a 12th-century church and other medieval buildings. While the church was not contemporary with the Saxon site it does demonstrate, firstly, that there was Saxon occupation in the area and that, secondly, there is evidence for continuity of settlement between the Saxon period and the medieval in the High Easter area.

One of the most noticeable features within the landscape is the Roman road, the course of which runs north-east to south-west across the study area, and along this route the settlement of High Roding evolved and the modern B184 still runs. This is a significant route that has survived and is in stark contrast to the other routes in the area, which are very winding. There is still roadside settlement along the route and presumably there was Roman settlement along it as well, although this has not been detected on the aerial photographs at present.

The vast majority of sites mapped in the area are field boundaries. Of the total ninety-five sites in the area, forty-six (51%) are field boundaries, while eighteen are ditches (and possibly should be included as field boundaries) and ten are moats. The remaining site types range from windmills and enclosures to ponds and a motte and bailey. Many of these site types are classic examples from the medieval period and have been discussed in the preceding text.

Mapped sites from the medieval period need to be considered alongside buildings and structures that still exist today, as they are also part of the medieval landscape and need to be included in a landscape study if it is to be comprehensive. The EHER lists over 390 medieval sites within this area and of these 221 are listed buildings, which are still extremely important as many of them are early examples and would have been contemporary with some of the NMP cropmark features discussed here.

The listed buildings range from churches to barns and houses within moated sites. Some of the earliest buildings include the Barnston parish church, where the earliest sections date from the mid 12th century and St Mary's church, Canfield, which has elements from the early 12th century. Several of the medieval houses in the area date from the late 13th century, including the aisled hall house at Foxleys (EHER 37231) and Sallets Farmhouse (EHER 37731). Also of interest is the earthwork motte and bailey at Great Canfield (EHER 4299), which survives and is visible on the aerial photography. The site consists of a large mound surrounded by a moat and a horseshoe-shaped bailey. Although the site is not as large as nearby Pleshey, the two sites were of a similar date (12th century). This motte and bailey is placed within a meander of the river Can. The river would have been a constant water supply and would have acted as a further defence line. The placement of the site appears also to have influenced the

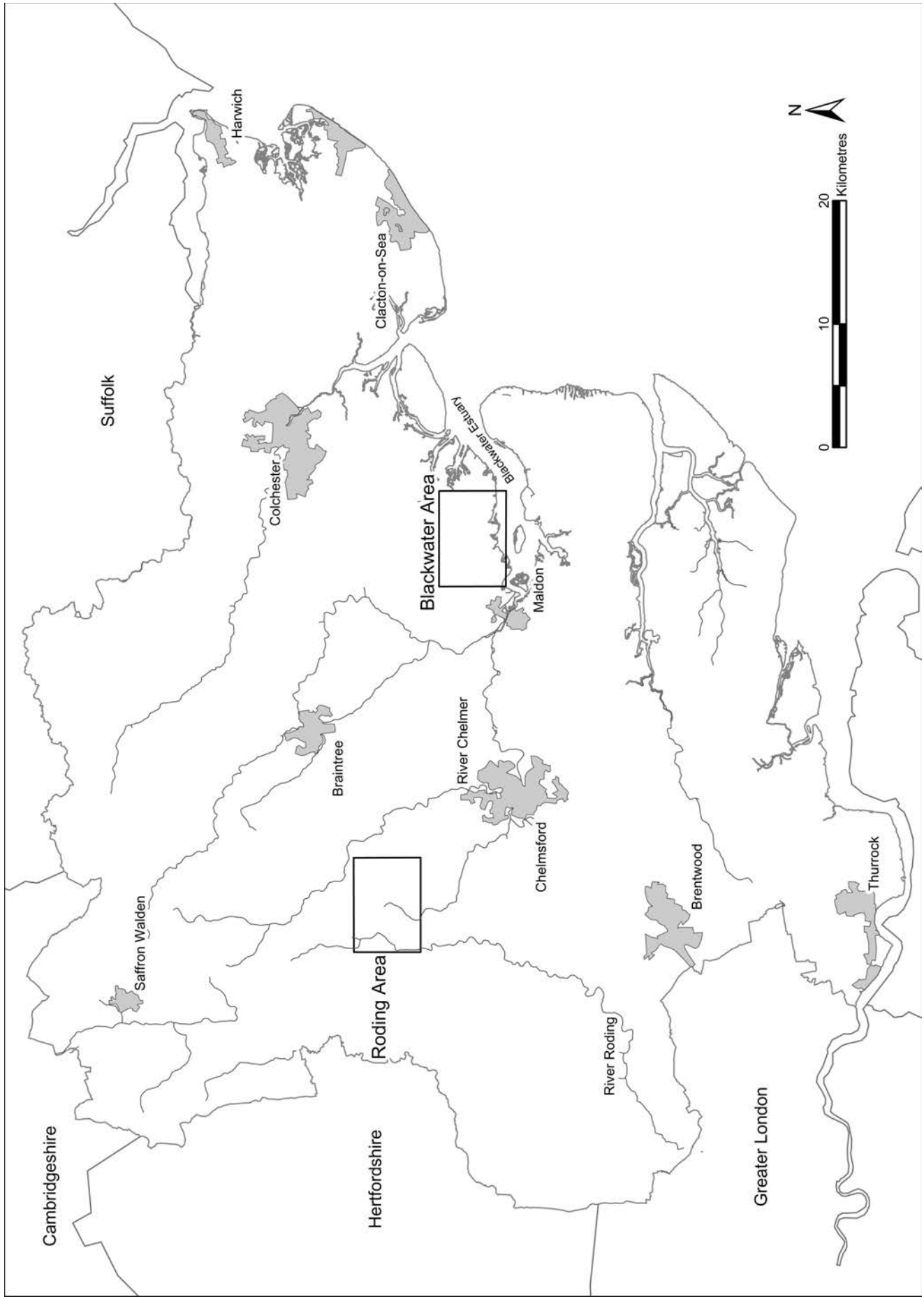


Figure 4.10 Location of Chapter 4 study areas

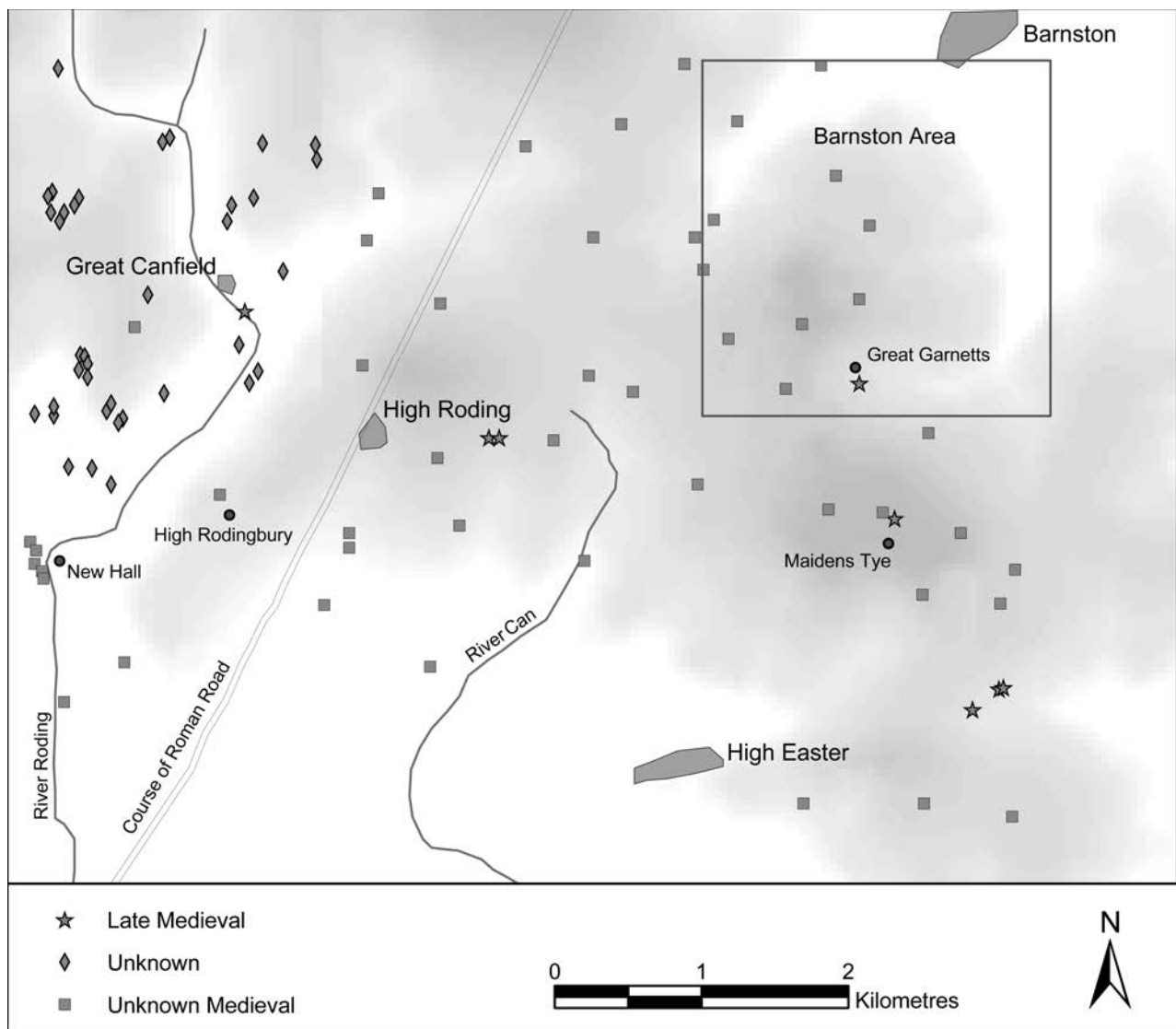


Figure 4.11 Distribution of mapped medieval sites in the Roding area, with places mentioned in the text and significant areas of modern settlement

development of the road network, which curves around the outer area of the motte and bailey, following the river.

The distribution of early medieval settlement evidence (based on the listed buildings) is fairly dispersed. High Roding and High Easter have the highest concentrations of early listed buildings and therefore settlement, with a smaller number of buildings scattered around the area. Disappointingly, very few of these earlier listed buildings can be associated with the mapped NMP data. One of the two exceptions is a moated site at New Hall (EHER 4332). Here a complex of an early 16th-century house, a moat and chapel site exist. Aerial photographic analysis revealed a second double-ditched enclosure, 60m by 40m, to the north of the existing moat, which was visible only as a soil mark, in contrast to the water-filled main moat around the existing house. It could be suggested that this demonstrates settlement continuity and the site to the north may represent an earlier site, which was abandoned when a newer house was established. Alternatively the north enclosure could have been part of the same complex and used as a stock enclosure or orchard, and was later abandoned.

This moated site is located 600m north of the road and is not close to a village setting, but does have four other moats within 1.5km, which means this small area has quite a high concentration of moated sites. Two of the five sites are very close to the river (within 20–30m) and they appear to use the river as a source of water.

Although the moated site to the south at Aythorpe (EHER 4346) is still occupied, the listed buildings are of a later date than those located at New Hall. However, the nearby parish church has 13th-century origins so it could reasonably be suggested that the moated site was occupied earlier than the late 16th-century manor house might suggest.

The moated site at High Rodingbury (EHER 4335) also has an early 13th-century church nearby. This could suggest that there was a tendency for sites to remain occupied when located close to other important sites in the area such as a church. A small deserted moat (EHER 4344) nearby lies immediately north of the road 760m south-east of New Hall, and was still extant and water filled at the time of the OS 1st edition map, on which it is referred to as 'Boswells'. From the map evidence the site was not occupied, meaning it was abandoned before the

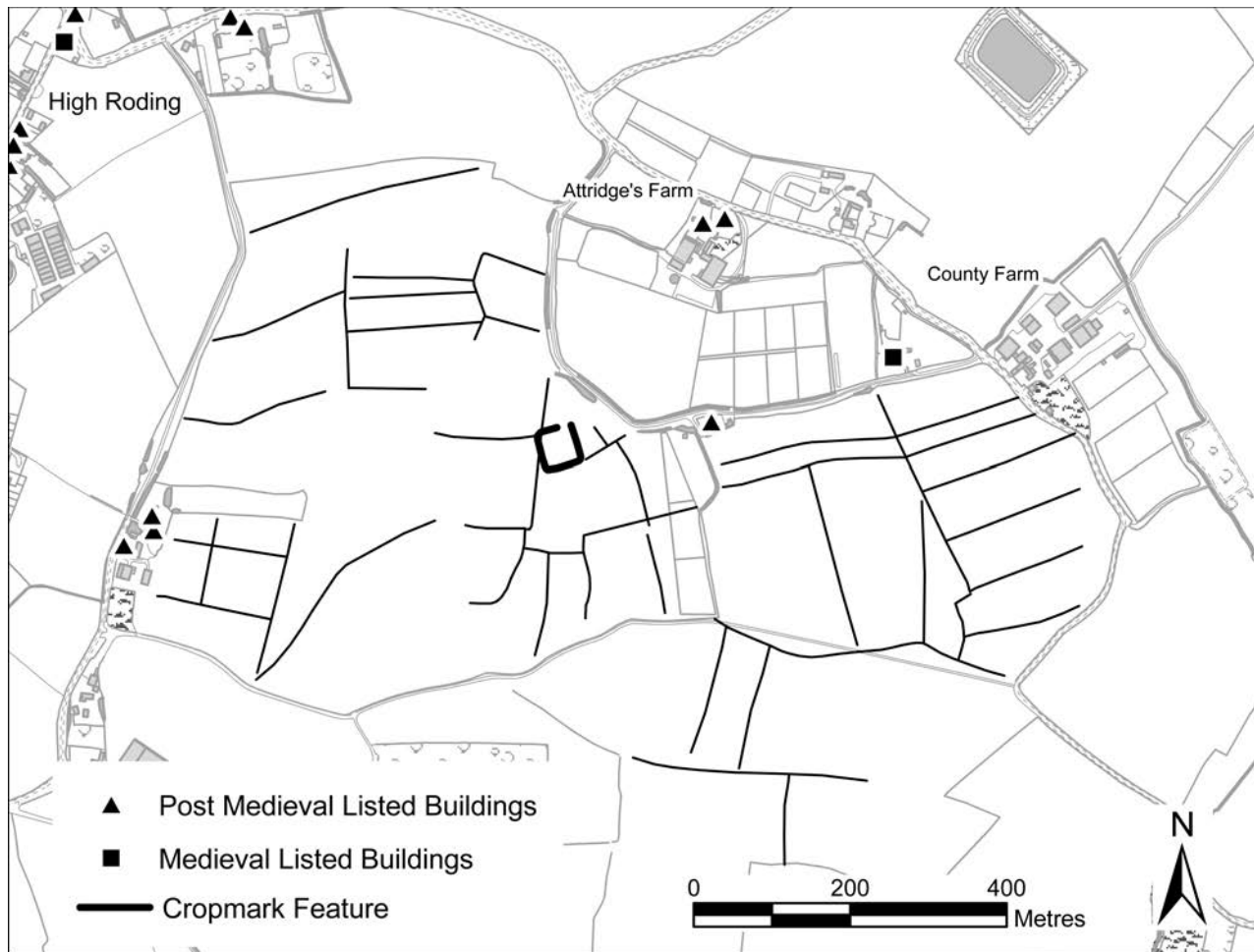


Figure 4.12 Cropmarks of Hubbard's moat and surrounding field boundary loss mapped through the NMP in association with the roads, settlements and farms still in existence today in the modern landscape

1880s. However, the Tithe map of 1841 shows the site to be water-filled with numerous buildings, presumed to be a farm. Alternatively, as the moat to the north-west is called 'New Hall' it is possible that the smaller site was abandoned and replaced by the larger site. However, as the moated site at New Hall has an early medieval listed building it may be that they were simply separate sites, of which only one now remains occupied.

Within this area there is very little field boundary loss on the NMP. The moats appear to be located in a very similar landscape today to when they were constructed. There has been little development of either roads or settlement and the field systems and patterns appear similar to those on OS 1st edition maps. This implies that the area not only had a high concentration of moats, but also had relatively large fields, in contrast to the north of the study area where individual fields appear to be small.

Elsewhere in the study area there is evidence of substantial field boundary loss, along with both abandoned and still settled moated sites. This is demonstrated at an abandoned moated site called 'Hubbards' (EHER 1052), which is a small enclosure 42m by 42m set back from the road (Fig. 4.12). This site is set in the heart of the field boundary loss in this area and the NMP reveals a combination of small irregular fields and narrow strip fields. These narrow strip fields follow along the meander of the river and may represent enclosed meadow pasture; a common feature of Essex river valleys.

There is no indication as to why the moat was abandoned, but the location is relatively isolated with only small farms now located in the area. Some of the field boundaries are on a slightly different orientation so it may be that the land was utilised after the moat was abandoned and further field patterns were established.

There is an indication of later settlement located near 'Hubbards' as there is a post-medieval listed building 160m away and a further earlier medieval building 400m away, which could suggest that while two of the three isolated settlements survived, the moat was abandoned.

Elsewhere in the study area there is a similar settlement pattern of abandoned moated sites. The moated enclosure of Maidens Tye (EHER 979, H, Fig. 4.5), was abandoned sometime before 1800, but the excavated evidence shows that the site was occupied from around 1150, with finds that can be compared to those from Pleshey. There is no evidence to suggest a reason for abandonment, but again other sites nearby including the Crops (EHER 1003), remained occupied after Maidens Tye was abandoned. The complex of the Crops has a relatively large moated enclosure 70m by 35m, with evidence of a 13th-century house.

The road patterns around Maidens Tye show it to be completely enclosed by twisting lanes, with a reasonably regular pattern of fields surrounding the site, many of which have been lost. This might suggest that the influence of all the early sites such as Maidens Tye was

enough to affect the development of the road and boundary system in the vicinity, though due to modern changes and the way in which the landscape has evolved, it is sometimes difficult to assess if the field systems of the area are linked to the surrounding settlement.

It has been suggested that much of the landscape field patterns have origins in the Saxon period (Bennett *et al.* forthcoming). The evidence from outside the study area, in High Ongar, supports this, as a boundary of an estate recorded in 1062 is still visible on a modern map (Medlycott 2004). This suggests that many of the other major boundaries that make up the basic shape of the landscape division may also be ancient and that activity in the medieval period simply divided the landscape still further with regular, sinuous or irregular fields of varying sizes. Bassett (1997) demonstrates that the eight parishes known as the Rodings were established from a single land unit formed during the early Saxon period and known as the 'Hroðingas'. This highlights the possibility that the boundaries formed by the single land unit still exist today in the parish and field boundaries.

The NMP has contributed particularly in this area to the study of landscape formation, as the mapping of linear ditches has filled in gaps where field boundary loss has taken place and has highlighted areas of landscape where the greatest amount of hedgerow destruction has occurred. This is particularly important in areas where the boundaries are not visible on the 1st edition OS maps, and the NMP has gone a long way to producing a fuller picture, which would not have been possible otherwise with other forms of fieldwork. It has also helped place both existing and abandoned sites into a landscape context, of which they would have been a part when constructed.

The Blackwater estuary

The second study area is located on the north shore of the Blackwater estuary (Figs 4.10 and 4.13) between Little Totham and Tollesbury; other settlement in the area includes Goldhanger, Tolleshunt Major and Tolleshunt D'Arcy.

During the Saxon period this area formed a single large estate which is now reflected in the place names of Tolleshunt and Tollesbury (Bennett *et al.* forthcoming; Hunter 1999, 68) and by 1066, the four future Tolleshunt parishes contained twelve manors and four smallholdings.

Geographically and topographically the area is quite different from the Rodings. The geology consists of London Clay overlain with head deposits and sands and gravels. Consequently, the area has been subjected to extensive quarrying, although the main areas of gravel extraction lie just outside the study area to the west. Topographically, the area is relatively low-lying, with coastal marshland to the south in the medieval period. The land slopes up towards a ridge in the north of the area, but within the study area the land is gently undulating, bordering on flat at the coast.

The area has seen much archaeological activity from the prehistoric period onwards. The major excavation at Chigborough Farm, which is a key site in the area, included evidence of settlement from the later Neolithic/early Bronze Age (Wallis and Waughman 1998, 63). This excavation also showed evidence from the Saxon period, which consisted of a substantial 'boat'-shaped building and related structures. Importantly for this study there was also evidence from the 12th–14th centuries in the form of

a small ditched enclosure with traces of what is thought to be ridge and furrow (Wallis and Waughman 1998, 98), although there is currently no extant ridge and furrow identified from either fieldwork or the aerial photographs in the immediate vicinity. This shows that there was agricultural and domestic activity occurring in the area, with some sites no longer surviving, and there was also evidence for activity in the post-medieval period, comprising a substantial building and field boundaries.

Historically the area had mainly dispersed settlement comprising isolated manors, farms, moated sites and hamlets bordering small greens. The only nucleated settlement of any size today is Tollesbury (Bennett *et al.* forthcoming). This settlement pattern can certainly be seen in the landscape today, with a network of twisting roads, small lanes, villages and individual farms mainly sited away from the small hamlets. This pattern was well established by the time of the 1st edition OS maps and it has been suggested that the basic field systems were laid out during the Saxon period.

Unlike the Roding area, there is quite extensive evidence for the prehistoric period, both in the form of cropmarks and through excavation, with at least ninety sites recorded in MORPH2. These range from ring-ditches thought to be round barrows, enclosures, roundhouses and trackways. One interesting aspect of this area is the limited evidence from the Saxon period. While none of the cropmark evidence is attributed to the Saxon period, nine Saxon sites have been identified through excavation. These include some examples of sunken-featured houses at Rook Hall (EHER 12757, 7918) and fish traps at Collins Creek (EHER 13815), which are discussed further in Chapter 5.

The medieval and post-medieval cropmark record in this area (Fig. 4.13) is not as extensive as in the Roding area. This is mainly because no large connecting areas of field boundary loss have been mapped, but only fragments of former field boundaries. The corollary of this is the field patterns appear fairly intact in the area, although some fields around Tolleshunt Major have lost their smaller internal divisions, but maintained their overall pattern. Where this loss has occurred it was not apparently visible on the aerial photographs. When the cropmarks are overlain on the OS 1st edition map it can be seen that there are only a few locations where the cropmarks fill in the gaps in the field systems, showing that not all the field boundary loss has been mapped. The field boundary loss does not appear to be associated with any particular area, hamlet or farm.

The NMP sites are distributed over the entire area and this includes four mapped moats. While the main concentration of moats is in the east of the county, this area has nine recorded moats, all of which appear still to have settlement or occupation at the site, though some houses are no longer located within the actual moat. This demonstrates continuity at many of the sites that may have been used for habitation for the best part of 1000 years. At Loft's Farm (EHER 7904) to the west of the study area a moated site was excavated and dated to *c.* 1300 and was thought to be a precursor to the modern farm (Wallis and Waughman 1998, 230). It is likely that many of the moats within the study area are of a similar date. This dating for moated sites links with other buildings within the area, though there are fewer early listed buildings here than in the Roding Valley. Of the medieval listed buildings only

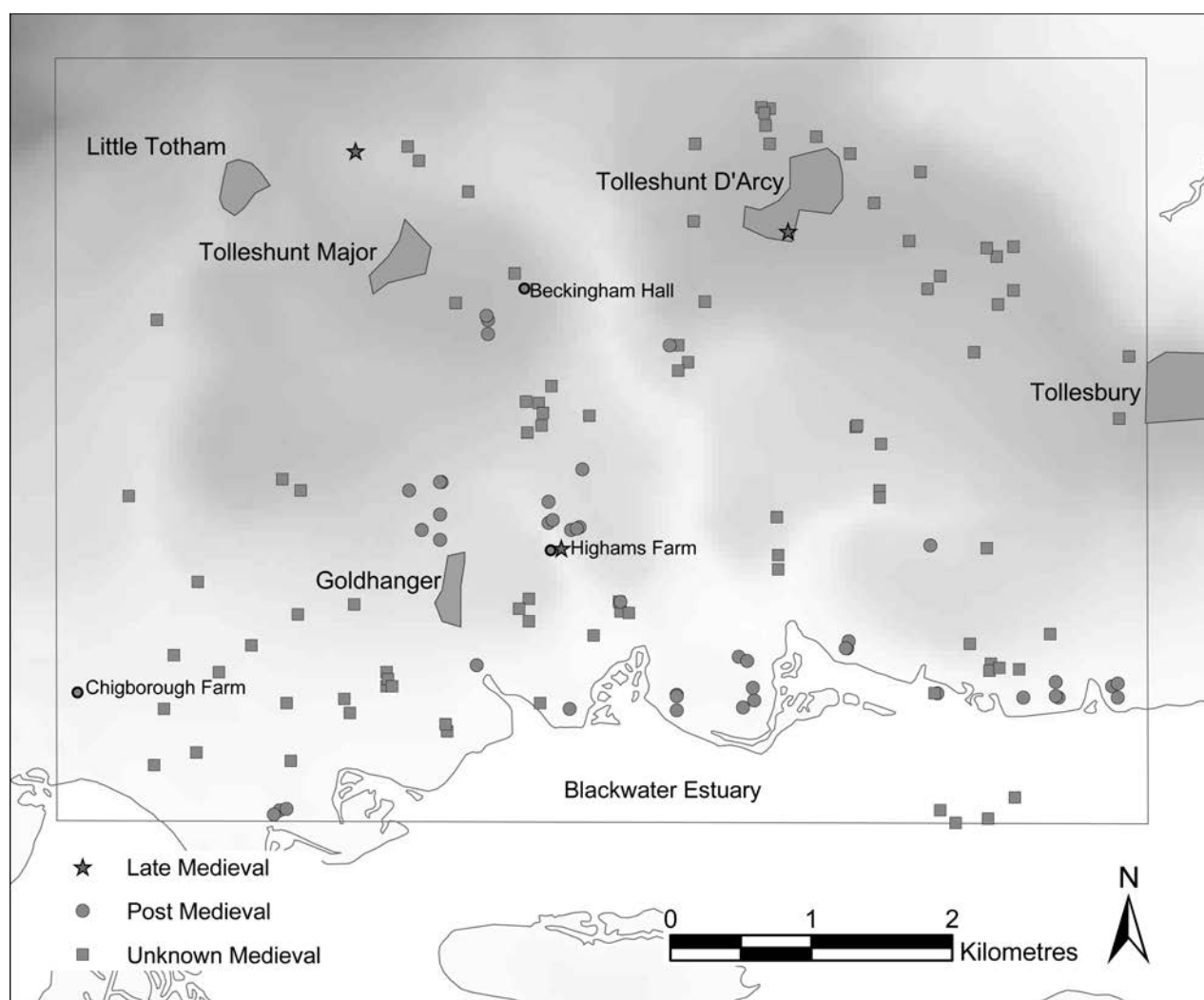


Figure 4.13 Distribution of mapped medieval sites in the Blackwater study area, with places mentioned in the text and significant areas of modern settlement

one dates to the early 14th century, although two of the four parish churches have early 12th-century elements.

Again these early listed buildings are well distributed across the area, but interestingly many of the post-medieval buildings are located away from the earlier ones. The post-medieval buildings form many of the small villages that still exist today. It would seem likely that some of the cropmarks represent occupation that had been abandoned at some point and what remains are the listed buildings of the settlement that survived.

Highams Farm (EHER 39215), east of Goldhanger, is a good example of this. The timber-framed house dates from c.1400 and was altered in the late 16th and 19th centuries, showing that it has probably been continuously occupied since its construction. The farm is located over 500m away from the road (a location which was also seen at similar sites in the Roding area) and over 500m east of Goldhanger, making the location relatively isolated. However, between the current farm and the road is a cropmark complex (EHER 12119) that fits very well within the field systems that can be seen today. Figure 4.14 shows the cropmarks, marked A, in the context of the surrounding boundaries.

It would appear there are some prehistoric features, as there is a curvilinear enclosure and annex (B) which may underlie the field boundaries (A). However, the visible

linear ditches form a regular rectilinear field system with a track running from the road towards the present farm. This may represent an area of earlier occupation which was then abandoned in favour of the present day farm, or simply the vestiges of a former field system associated with the farm. However, the church of St Peter in Goldhanger has evidence suggesting an 11th-century origin so it is likely that there would have been occupation to support the development of a church and the features represented by the cropmarks have obviously been constructed at a similar time to the roads and surviving field boundaries to form a coherent landscape.

About 500m to the south-east of Highams Farm is another cropmark complex (C), consisting of several linear ditches and a rectangular enclosure (D) (EHER 12117). A second sub-rectilinear enclosure (E) lies to the south-east (EHER 16394; Fig. 4.14). These enclosures have been classified as 'unknown prehistoric'. The morphology and orientation of the second enclosure (E) supports this classification, but it could be suggested that the first enclosure (D) has a similar morphology to many moats in the area. For example, the moated site at Tolleshunt D'Arcy (EHER 11419) is 75m by 50m and the moat at Moor's Farm (EHER 8230) measures 90m by 60m. Enclosure D, north of Joyce's Farm, is 80m by 60m and has a substantial ditch with a possible entrance to the



Figure 4.14 Cropmarks at Joyce's Farm and Highams Farm, Blackwater, with field boundaries (A and C), possible prehistoric enclosures (B and E) and a possible moat (D)

north. While this morphology could suggest an 'unknown prehistoric' date, the site fits well within the landscape. The second smaller site (E) is on a completely different orientation to the visible field boundaries, while the larger enclosure lies within the middle of a regular rectangular field system, which has been cut by the trackway that leads to Joyce's Farm to the south, but it appears that the track diverts around enclosure D, which may mean that it was extant and still had substantial ditches when the track was built.

Several of these field boundaries are marked on the OS 1st edition map, though any traces of a possible moated site have been lost. Two linear ditches that cut across the enclosure appear to be on a similar orientation to the second smaller enclosure. This suggests that linear ditches of different dates have been mapped and when the mapped elements are separated chronologically, the site does fit into an apparent medieval landscape.

There is some evidence for some moated sites having been abandoned in favour of larger, unrestricted sites nearby (for example, at Beckingham Hall (EHER 16456), where the majority of the hall buildings are outside the moated area) and this could have happened at this location. As the farm expanded or new buildings were desired, the moated site may not have been large enough to develop and was therefore abandoned in favour of the non-moated site to the south at the site of the current Joyce's Farm, or the moat was abandoned simply because

they went out of fashion. This is similar to the moated site at Loft's Farm, which is presumed to have been abandoned in favour of the present day farm (Wallis and Waughman 1998, 229), as there was no evidence for any major events, such as a fire, to cause the abandonment of the site.

VII. Conclusions

The two areas examined have many similarities with regard to the nature of settlement and field patterns, but they also have major differences in the character of the archaeological remains. Both areas have moated sites of a very similar nature and morphology and there is little distinction in the size or shape of the moated sites in the two areas. However, the Blackwater area has fewer identified moated sites, although all of them are still occupied. The Roding area has a very high density of moated sites, one of the highest in the county, and many of the sites still have listed buildings within the moated enclosure, although the Roding area has a large number of abandoned sites. This shows an element of settlement continuity in both areas and there is evidence for long-term occupation in many of the villages that were established in the Saxon period.

Both areas have also used the topography and geology of the region to greatest advantage. While moated sites are found on the sands and gravels, the site type is best suited

to clay geologies, which explains the location of many of the moated sites. Some of the sites within the Roding area have also been located in proximity to the rivers, making best use of the sources of water both for supply, in the case of the moats, and for defensive purposes, as seen at Great Canfield.

Both areas have also demonstrated how the landscape seen today has developed and been influenced by medieval and earlier settlement. Field systems can be traced back, in some cases, to the late Saxon period (for example, it is likely that some of the Rodings parish boundaries are the vestiges of an earlier single land unit) and it is likely that some of the mapped boundaries were laid out in a coherent manner at a similar time, even when the field systems appear irregular.

However, there are some fundamental differences between the two areas. The field boundary loss in the Roding Valley is very high; some of the densest in the county, and, in places only the larger field patterns are still visible, as the internal divisions have been grubbed out. Much of this loss has been mapped, and without the NMP the full extent would not have been as immediately obvious and visible in geographical terms, as even the early maps do not show the full extent of the boundaries.

The NMP mapping also demonstrates that the field patterns in the two areas are quite different. In the Roding area the fields are quite small and irregular systems and are much smaller than is usual in the Barnston area. By contrast, the Blackwater area has more regular field systems of rectilinear form.

The types of sites are different to a certain extent as well, as the Roding area has large-scale sites such as the Great Canfield motte and bailey, along with the high density of moats. Moated sites are the only earthworks in the Blackwater area, and all of the moated sites remain occupied, in contrast to the Roding area where there are a number of abandoned sites. This may relate to the number of moated sites an area can sustain. The Blackwater area has half the number of listed buildings compared to the Roding area (108 for Blackwater, 221 for Roding) and this could imply a less dense settlement pattern generally in the Blackwater area, or that the evidence for the settlement has only survived in certain villages and on individual farms.

The Blackwater does, however, have more areas of cropmark complexes evident and this may be a symptom of the geological biases rather than a true depiction of the actual archaeological evidence. The total medieval cropmark landscape is more extensive and widespread in the Roding area because the field boundary loss is widespread and covers a large area, but the Blackwater area has a wider range of site types.

It is apparent from this that the NMP mapping aided the understanding of the medieval settlement and landscape in the Roding area more than the Blackwater, simply because more medieval sites have been mapped so far. This is important as it demonstrates that reconnaissance on the boulder clays can lead to new sites being identified and consequently aid landscape interpretation.

Chapter 5. Fish, Fowl and Salt: Economy of the Essex Coast

by Caroline Ingle

I. Introduction

Essex has an extensive indented and almost entirely low-lying coastline which has long been an important economic resource for the county for subsistence and commercial activities. The coastline is constantly subject to change from both man-made and natural processes. Changing sea levels, agricultural, infrastructure, housing and commercial development have all had significant impacts on coastal environments. The rate of change as a result of human intervention has risen dramatically in the last century, in particular since the 1950s, resulting in accelerated marshland loss as a consequence of reclamation, dredging and other coastal development. This has had consequences for both the discovery and destruction of archaeological remains.

Surveys in recent years (including Gilman *et al.* 1995; Wilkinson and Murphy 1995; Buckley 2000) have indicated the wealth of archaeological remains in this part of the county, and recognised the potential contribution of aerial photography in locating and recording many aspects of this resource (Strachan 1995b; 1995c). Whilst many coastal activities have left little or no trace, others have produced substantial structures that have been recorded by aerial photography. The features recorded by the Essex Mapping Project show a considerable geographic and chronological spread, although evidence from early prehistoric periods is absent, in part at least a consequence of the adjustments in relative land and sea level following the end of the last glacial period. This chapter looks at the evidence for those aspects of the coastal economy in Essex, namely salt manufacture, oyster cultivation, wildfowling and coastal fishing, which are represented by some 300 sites mapped as part of the project.

II. The changing coastline

Survival and visibility of archaeological features are inevitably influenced by the effects of various coastal processes. An appreciation of these is essential in understanding the context of surviving features, in their influence on the types of activities carried out in coastal and intertidal areas, and the effects of changing dynamics of the estuaries on preservation, exposure or erosion of physical remains. The key factors have been post-glacial sea level change and coastal reclamation, which together have impacted on the alignment of the coast and interface between terrestrial and marine environments. However, the subsequent use of the embanked areas is also relevant; conversion to freshwater grazing marshes might have little impact on other activities and archaeological remains, whereas conversion to arable with consequent drainage and levelling of ground could affect both other aspects of

the coastal economy and the survival of earlier archaeological remains.

The immediate post-glacial coastline lay much further east than its current position and many prehistoric coastal sites now lie submerged below low water (Wilkinson and Murphy 1995, fig. 128). A number of Neolithic and Bronze Age sites are being exposed in the intertidal zone, and these have been the subject of survey and excavation (Wilkinson and Murphy 1995), and subsequent monitoring (Heppell and Brown 2001 and 2002; Heppell forthcoming) but few features are visible from the air, sea level at that time being some 5m or more below present high water mark. Sea levels rose gradually through the later prehistoric period, with the estuaries reaching roughly their present form in the Iron Age (Wilkinson and Murphy 1995, 219). Minor fluctuations followed: a slight fall in the mid Roman period was followed by marine transgression in the later Roman period (3rd/4th centuries BC) followed by falling sea levels into the Saxon period and a rise again into the medieval period (Buckley 1980; Wilkinson and Murphy 1995, 220–1; Rippon 2001). Gradual rise is continuing as a result of the post-glacial isostatic adjustment (Strachan 1995c, 42).

Salt marshes developed along much of the low-lying Essex coast from a combination of river and tidal action leading to the accretion of mud and silt, which built up to a stage where they were inundated by only the highest tides. This allowed the growth of salt water vegetation and subsequent drying out, which provided good pasture, particularly valued for sheep (Smith 1970, 28). These salt marshes were used as grazing marshes from at least the Roman period (Sealey 1995, 76–7). Subsequent changes have been brought about through the deliberate embanking (inning) and reclamation of salt marshes. Embankment was a means to protect grazing marshes from inundation and resulted in the creation of freshwater marshes and improved quality of pasture (Gramolt 1960). When drained, the fertile alluvial soils could be reclaimed for arable farming, but this necessitated higher investment costs and resulted in drying and settling of land which would render it more susceptible to flooding.

The process of inning of the Essex coast is attested by the lengths of redundant sea walls recorded by aerial survey, not all of which have been identified on historic maps (Strachan 1995c, 46), as well as from documentary records. The history of such inning of marshes, using mainly documentary and cartographic sources, has been discussed in some detail by several authors, notably Hilda Grieve in *The Great Tide* (1959) and Gramolt in an unpublished PhD thesis (1960). Along the east coast of the county sea walls now run almost continuously between Shoeburyness and Manningtree, a distance of some 300 miles, the only significant stretches of absence being at Clacton and Walton, the south shore of Mersea Island and along part of the south shore of the Stour estuary. Whilst

not a focus of study for this chapter, appreciation of the process of loss and gains from the sea is important for understanding the context of the other features discussed here and so a brief historic outline follows.

In the Severn estuary, embankment is attested from as early as the later Roman period (Rippon 2000, 65), but for Essex, whilst some evidence for localised drying out of the marshes has been recorded along the Crouch near Hullbridge, this may have resulted from marine regression rather than deliberate embankment and localised drainage (Wilkinson and Murphy 1995, 220).

Documentary sources point to the increased use of the coastal marshes in the Saxon period, and there are indications that sea defences existed in some areas. Thirsk (2000) for example suggests that expansion in the 8th to 11th centuries of the estates of St Paul's Cathedral on the river estuaries and marshes of Essex in order to increase its flocks (demonstrated by Saxon charters) may have been possible only with embankment. Thompson (1946) cites the reference in the Anglo-Saxon Chronicle to the breaking of the River Lee's banks in 894, as first written evidence for sea walls. However, the Domesday assessment of marshland and many other medieval sources do not indicate whether marshes were embanked (freshwater) or unreclaimed (salt) marshes, the practice of distinguishing between saltmarsh and freshwater marsh apparently only becoming common practice during the 16th century (Medlycott 2000). A further distinction needs to be made between the rather loose application of the term 'reclamation', whether merely embankment against flooding to produce improved freshwater pasture, or the improvement and drainage of former marsh for cultivation.

Sea walls were certainly in use along the Thames from at least the mid 12th century, indicated by a clause in the Magna Carta which limits the liability of owners to maintain those banks 'in defence' at the time of Henry II (1154–1189) (Thompson 1946). Sea defences are documented on marshes in Wennington by 1189 (Rippon 2001, 201–2), and at Tilbury and Rainham by the end of the 12th century (Thompson 1946). Legal disputes also contain references to walls. In AD 1201 the Abbot of Stratford was in dispute over a dyke in Little Thurrock that had been damaged (Grieve 1959), whilst a Fine, also of 1201, refers to ten acres of fresh marsh next to the wall in East Tilbury (Thompson 1946). Charter Rolls suggest that some walls on Foulness were in place by 1271 (Medlycott 2000; Heppell and Brown 2001) and Crump suggests an 11th–12th-century date of construction (Crump 1990, 31). Private written agreements for the maintenance of walls, survive, for example, at West Thurrock as early as 1322 (Grieve 1959, 20), and East Tilbury from 1328–9, a Master Richard de Gloucester having left money in his will for repair of Thameside walls within the manor of South Hall (Thompson 1946). For Wallasea Island, placenames suggest early embankment, the island's name in 1229, Walfliet or Waleflet, being thought to derive from the sea walls (Heppell notes Reaney 1935, 25). Elsewhere documents indicate continued use of unenclosed salt marsh. The indications are that sea walls were certainly appearing in increasing numbers from this time around parts of the coast and that many monastic houses were amongst the landowners actively engaged in reclamation. In the 13th century, bailiff accounts for Langenhoe marshes record expenditure on bridges and hurdles and

raised causeways to enable sheep to escape from flooding (Smith 1970, 25; Rippon 2000, 71). At Beaumont-cum-Moze, trial trenching of a length of old sea defence wall in 1955 indicated that this was in use by the 12th century (EHER 7408).

Until the 13th century, responsibility for sea defence had resided with local landowners, although embodied in the principle of the 'law of the marsh', which recognised that neglect by individuals could seriously impact on others. By the end of the 13th century, practice was formalised and responsibility for supervision of defences was placed in the hands of the King's Justices and other dignitaries, in the form of Commissions of Walls and Ditches who were specially appointed (by the King in Chancery) with the power to enforce the maintenance of adequate sea defences and drainage systems. An Act of 1532 ('A Generale Acte concernynge Commissions of Sewers to be directed in all partes of the Realme'), codified existing practice into a fixed constitution and procedures, and provided the basis for local Courts of Sewers to oversee tidal defences for the next 300 years (Grieve 1959; Medlycott 2000). Numerous commissions for specified stretches of coast, many in response to storm damage, were directed to various locations in Essex, most initially concerned with the upper Thames, although also with regard to the Dengie and Rochford Hundreds in the middle of the 14th century (Grieve 1959; Rippon 2000, 201).

Additionally documentary sources attest to the increasing number of sea walls in existence in the medieval period. Bailiffs accounts of the manor of Southchurch note 154 perches of wall constructed in 1437 and a further 80 in 1438 (Smith 1970; Medlycott 2000) whilst early 15th century accounts for Foulness record the making of hurdles and construction of sea walls (Grieve 1959, 12). A portion of medieval sea wall on Foulness has been excavated, revealing a buried timber framework dated to the late 15th century (Medlycott 2000). Each of the thirteen marshes on the island was separately embanked (Smith 1980, map 3) (thus limiting flooding in the event of a breach), and many of these internal (counter) walls remain. Tentative reconstruction using placename evidence of the pattern of medieval marsh enclosure on Wallasea (Heppell 2004) indicates a similar pattern there. The complex of former sea walls mapped north of Landemere Wharf, Beaumont-cum-Moze may reflect more than one phase of reclamation and loss, prior to the mid 18th century, by which time the edge of the marsh lay to the east as depicted on the Chapman and Andre 1777 map (Fig. 5.1). The former sea walls are also clear on Old Hall Marshes, where the system of creeks has not been replaced by regular drainage channels. Lease agreements often contained clauses setting out responsibilities for maintenance and repair *e.g.* one of 1546 relating to Wallasea between Sir Richard Wentworth and Henry Baker of Canewdon includes Grapnells Marsh, and covenants for the upkeep of walls were included in leases of 1564 and 1576 for marshland at West Thurrock and Purfleet (Grieve 1959). Other areas remained unembanked. In 1473 the manor of Paglesham included 100 acres of salt marsh beside the Roach estuary whilst 2000 acres of salt marsh are recorded (together with 3000 acres of fresh marsh) in the manors of Great and Little Wakering in 1570 (Rippon 2001, 203, quoting Morant 1768, 311).

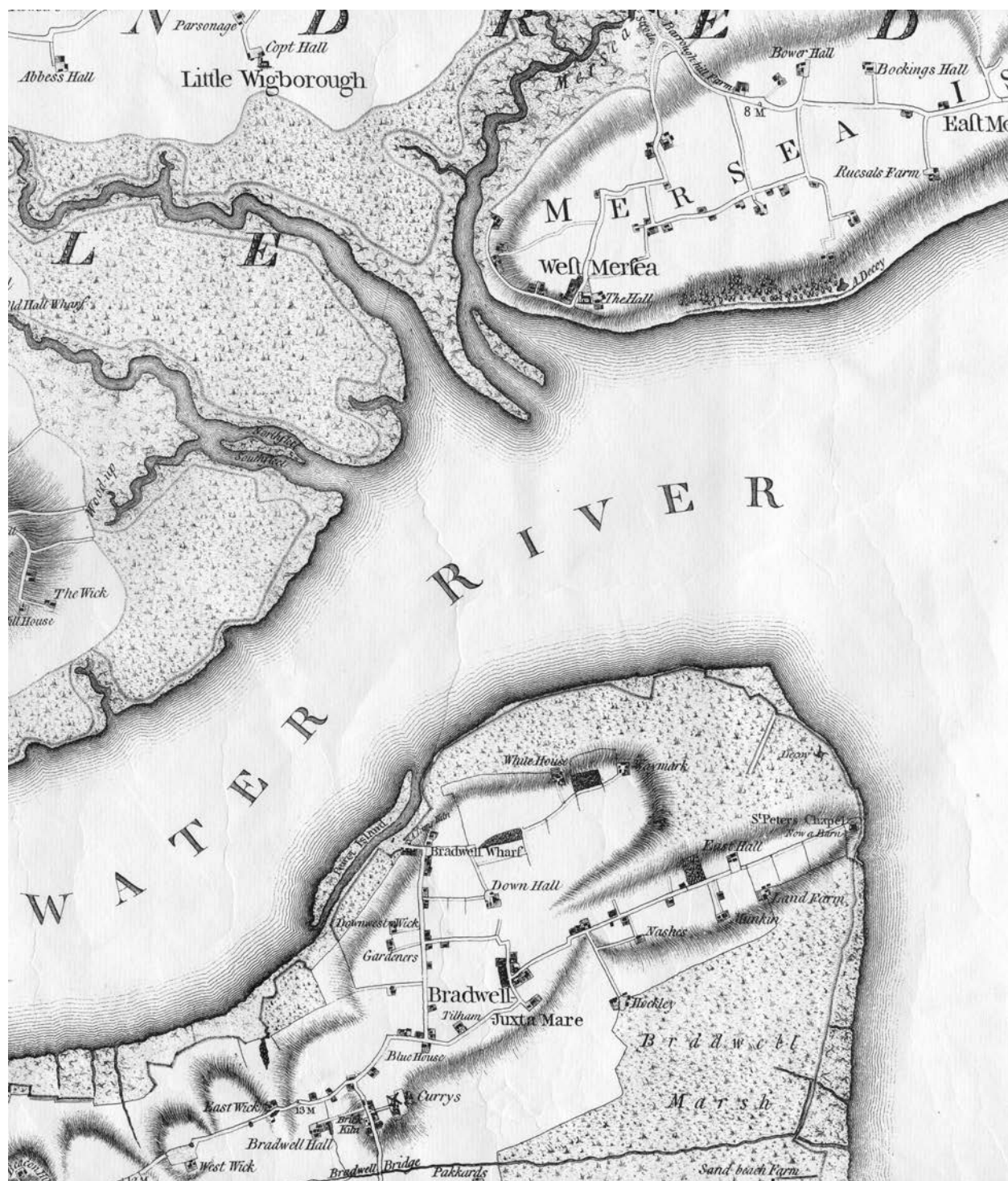


Figure 5.1 Extract from the Chapman and Andre 'Map of Essex' published in 1777, showing the extent of marshes at the mouth of the Blackwater and part of the Dengie peninsula. Much of the latter has since been reclaimed, whilst the geography of the marshes and channels to the west of Mersea Island have altered considerably since the late 18th century, following embankment of the Feldy marshes

There is evidence for an increase in the amount of reclamation in the 16th century, which Gramolt suggests is related to the price revolution of this century, together with an increased demand for agricultural and, in particular, marshland products, including cheese. Activity may also have been a response to the damage by storms in the 1560s. William Camden described the effects of regular inundations of the 16th century, noting of the Crouch that the islands (particularly referring to Wallasea

and Foulness) 'by occasional of inundation's, grown to be moreish and fenne' (Grieve 1959, 15). Camden also recorded that Canvey (described by Norden in 1594 as 'low merrishe grounds' (Grieve 1959, 24)) was then unwalled and 'so lowlying, that often it is all overflowne except for the higher hillocks, on which there is a safe retreat for the sheep' (Camden 1637 441, quoted in Rippon 2001, 204). Embankment of Canvey Island was carried out after 1622 and the neighbouring Hadleigh marshes

only appear to have been reclaimed in the 16th century (Rippon 2000, 70).

Throughout the medieval period, the main value of embanked saltings lay in their rich pasture for dairy produce, particularly sheep, and grazing dominated the use of embanked marsh into the 17th century (Reeves and Williamson 2000). However, by the end of the 16th century sheep were largely being replaced by cattle, particularly their fattening for the London market. Reclaimed marsh had been used for arable from the medieval period, although it appears only to have happened on a relatively small scale. For example, large areas of former salt marsh in East and West Ham appear to have been embanked and certain areas at least were cultivated by the early 14th century, with a reference in 1421 to 101 acres of arable land which was part of a 145 acre marsh (Rippon 2001, 201). Conversion was costly, requiring better drainage and levelling of ground, and it took several years before cereal crops could be grown, but it could offer higher returns, particularly in areas in greater proximity to London, and further areas were converted to arable in the 17th century. For example by 1700 one third of Foulness had been converted to arable, mostly wheat, and most of the marshes were under cultivation by 1784. In the north-east of the county, parts of Foulton Marsh were producing corn and rapeseed in 1629 (Gramolt 1960, 318) and at least some farms on the eastern Dengie peninsula had significant acreages under arable. Elsewhere, whether by the dictates of landowners or the result of other factors, the percentage of marshes in cultivation remained relatively low, and the Chapman and Andre Map of Essex published in 1777 shows significant extents of enclosed marsh around much of the Essex coast (Fig. 5.1).

A combination of economic demands and technological developments led to a return to an increasing reclamation of enclosed freshwater marsh for arable cultivation in the four decades spanning 1900. High grain prices at the time of the Napoleonic wars, the increasing use of hollow or underdraining, and improvements in the techniques combined to ensure that greater profits could be gained from cultivation. Much previously unploughed marshland was converted to arable at this time, in turn encouraging maintenance of the existing sea defences and enclosure of new areas. The Tithe Award shows a significant increase in the area of land under cultivation, including areas along the Crouch and south-east Essex, but along the Blackwater and in north-east Essex, although some areas were converted to arable, pasture still predominated. Reclamation was also encouraged by Improvement societies, for example, the Society for the Encouragement of Arts, Manufactures and Commerce which offered annual prizes for successful schemes. There are numerous references to areas being enclosed and reclaimed at this time, including Rushley Island (near Foulness) in 1781, and 110 acres in Tillingham and Dengie in 1788 (Grieve 1959, 32). The sea walls had reached their maximum extent by the late 19th century but it was from the mid 20th century that extensive and permanent conversion to arable took place (Medlycott 2000).

It is against this background that the recorded archaeological features need to be assessed.

III. Salt manufacture

Numerous salt-working sites have been recorded across the county, both from aerial survey and from many years of ground-based investigations (Fig. 5.2). Salt production in Essex is attested from the later prehistoric period, for example from the middle Bronze Age at Fenn Creek near Woodham Ferrers (Wilkinson and Murphy 1995, 157–60), and from a number of late Bronze Age sites including Mucking (Murphy and Brown 1999, 15). The great majority of the evidence for salt manufacture in the county dates from the Iron Age and early Roman period, recorded by aerial and ground-based survey (Fawn *et al.* 1990) in the form of ‘red hills’, roughly circular mounds of reddened earth, comprising debris from the salt manufacturing process. Several examples of probable medieval salterns have also been recorded by the project, although small in numbers compared to the red hills.

Late Iron Age–Roman

Distribution

The red hills are distributed along much of the Essex coastline (Fig. 5.2; Fawn *et al.* 1990, map 1), with particular concentrations along the north shore of the Blackwater, to the north of Mersea, a number of clusters around Hamford Water, the southern end of the Dengie peninsula, south bank of the Crouch, Roach and associated creeks amongst the islands of this south-east corner of the county, and along Canvey. Their presence on the Blackwater is not surprising given that this river is noted as one of the most saline in England (Fitch 1905; Petchey 1991). Along the Blackwater they occur in much higher numbers along the north shore, a distribution which also reflects the greater concentration of known contemporary settlements in these areas. Surprisingly few are recorded along the Thames estuary, the main group being those on Canvey Island which at that date may have been linked to the mainland, and thence by road to Chelmsford (Medlycott 2000). The focus of activity on Canvey appears to have been at Leigh Beck where a probable settlement/wharf, salt-working complex, shell middens and large fish processing site have been recorded (Mackley and Faulkner 1993; Wilkinson and Murphy 1995).

A significant proportion of the red hill sites lie close to the present 5m contour (Fig. 5.3), although extending further seaward than this in the south-east, on the southern part of Dengie, and into Foulness. The known concentrations are in the areas which in subsequent periods also had the most extensive areas of marshes, and which therefore offered ready access to salt water through gentle inundations. At that date it is likely that many of these sites lay at the heads of tidal creeks. They are situated on areas that were formerly marsh, although many lie on land that has been reclaimed, and are now under arable cultivation. Reclamation and ploughing has reduced the majority of former earthworks to irregular spreads of red earth, and this is the form in which most are visible from the air (Fig. 5.4), although some examples can be seen eroding from the salt marsh (*e.g.* Rolls Farm, in the Blackwater estuary), and some survive as mounds in particular around the Salcott channel.

These sites used a method of production developed in the later prehistoric period whereby tidal sea water was led

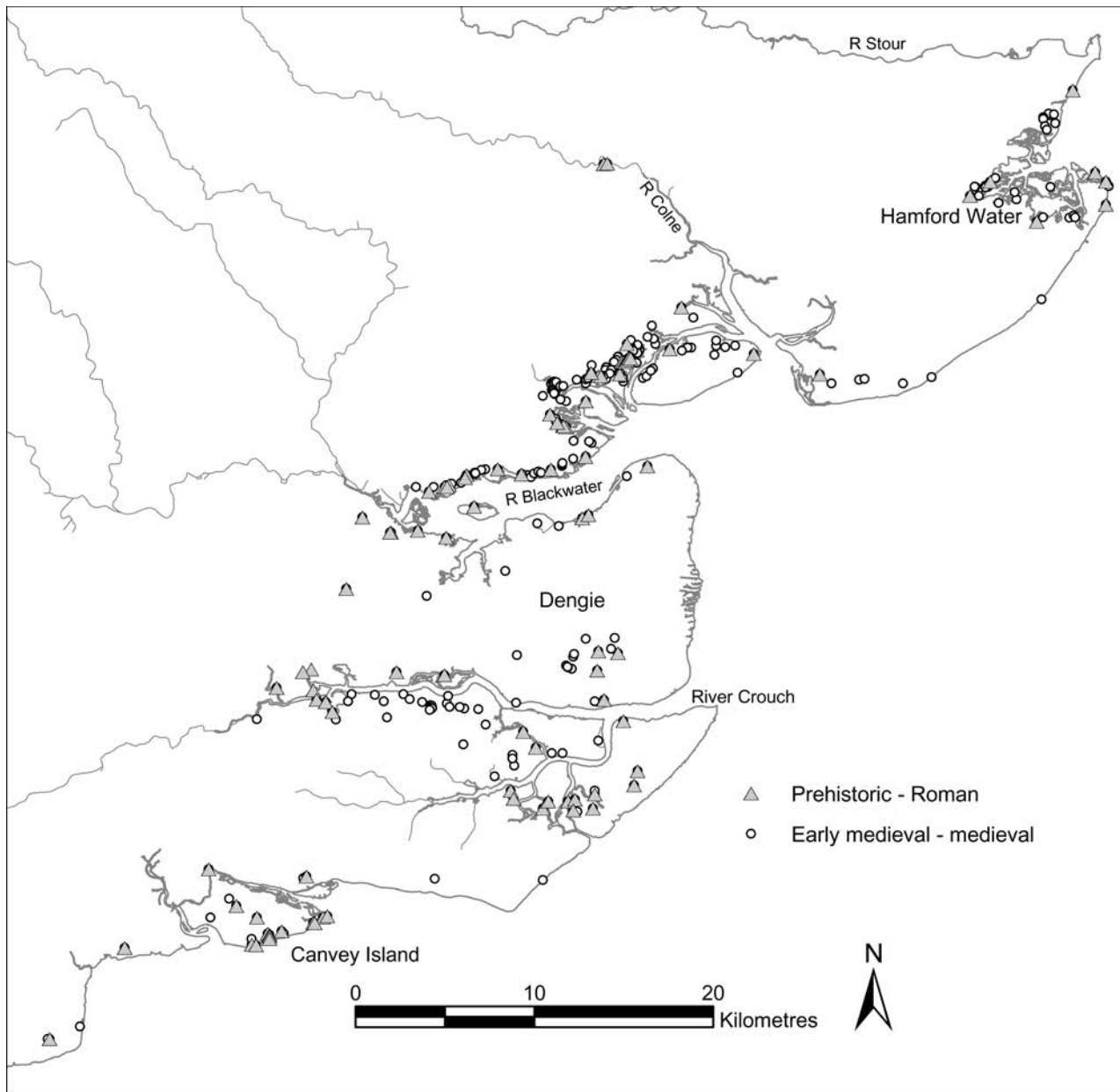


Figure 5.2 Distribution of recorded salterns in Essex, from NMP and EHER

to production sites through creeks and channels and the water held in shallow clay-lined tanks to allow sediment to settle before the brine was transferred to briquetage troughs to be heated to drive off the water. Salt evaporation tanks have been recorded at Southminster (Couchman 1977, 84). The process required access to tidal waters, in a location above the level of highest tides, and so the sites are generally located alongside tidal creeks (Rippon 2001, 43–5). There appears to have been some development of technique from the use of round-bottomed troughs over open hearths in the Bronze and early Iron Ages, to heating indirectly in oven-like structures in the late Iron Age and Roman period (Rippon 2001, 43–5).

Dating

Excavated examples of red hills (although this remains a relatively small percentage of the total) have been shown to be of late Iron Age to Roman date, and it is generally assumed that all of the red hills only saw active use for salt

manufacture during this period, though they did not necessarily all see continuous use. Sealey argues that the red hills operation was in recession as early as the end of the 1st century AD and that few of these sites were still in production by 200 AD (Sealey 1995; Fawn *et al.* 1990). Some may have remained in use for longer, for example at Chigborough, on the Blackwater, production still seems to have continued into the 3rd or possibly 4th century (Wallis and Waughman 1998, 164). On many red hills, pottery of this date is suggested to relate to later use of the mounds (Rippon 2001, 98).

The distribution also appears to relate to the known foci of late Iron Age and early Roman settlements (Going 1996). Links with particular settlements and urban centres have been suggested but there is little in the distribution to point to particular associations, although inevitably certain groups are located close to Iron Age/Romano-British settlements. For example, extensive late Iron Age–Roman settlement is known along the gravel terraces on

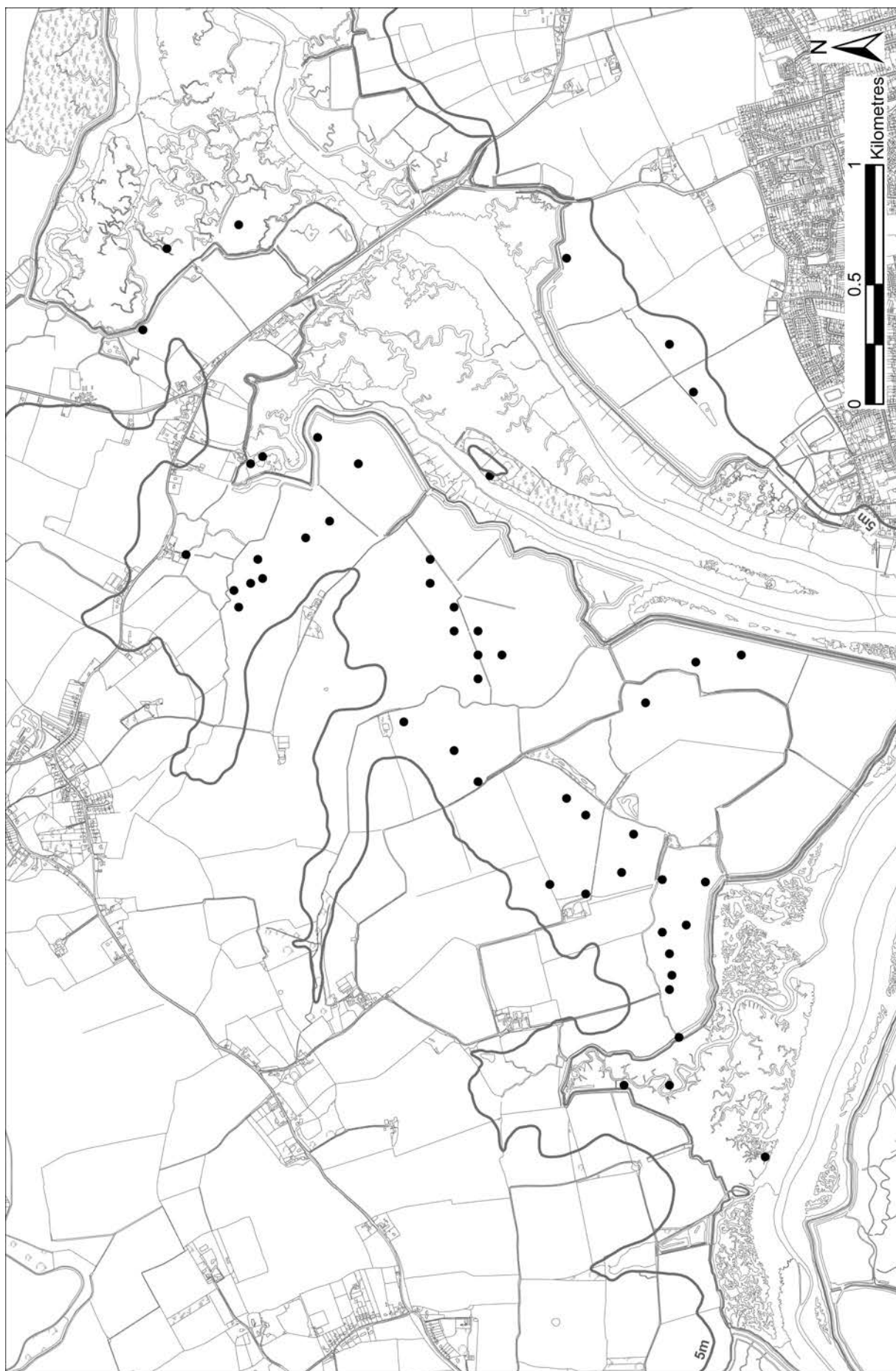


Figure 5.3 Distribution of red hills in the Peldon area. These are recorded as spreads of red soil on ploughed fields (Figure 5.4); others are eroding from the salt marsh



Figure 5.4 The red hills around Peldon showing as soil marks (EHER 16291–16297) (copyright Essex County Council CP\00\32\8)

the north side of the Blackwater estuary and it is possible that the town at Heybridge exerted considerable demand. The presence of the town at Colchester may have stimulated production in the Mersea area, which has one of the densest recorded concentrations of red hills, perhaps supplied along the road that was built from Colchester to Mersea during the Roman period (Medlycott 2000). Fawn (Fawn et al. 1990) has suggested that control of the salt trade was in the hands of the owners of the large villa estates, and if that were the case some of the red hills in this area could have been in the control of the villa at West Mersea, excavated in 1898 (Medlycott 2000). There is a small cluster of red hills on the former marsh to the south-east of Little Oakley Roman villa, contemporary with part of the occupation of the villa, and which Barford (2002) suggests were probably operated from it as part of the resources of the villa estate. However, there is as yet no known comparable associated settlement for the group of red hills at the western end of Hamford Water. These may also have served the town at Colchester, with some indications of a road heading in this direction towards Little Oakley villa but possibly also branching towards Hamford Water (Going 1996, fig. 1). It is not yet clear to what extent all of these sites were in simultaneous use but it is likely that some indicate movement of a single production centre to a new site.

Gaps in distribution

Caution is required in accepting the known distribution as an accurate reflection of the original since subsequent enclosure and reclamation is also likely to have affected the visible pattern. The recently recorded concentration of sites south-east of Sampson's Farm, Peldon (Strachan 1995a), follows a distinct linear pattern which might be thought to indicate coastal edge (Fig. 5.3). However they also follow the line just landward of the edge of the salt marsh as depicted on the Chapman and Andre map of Essex (1777), and may therefore have been protected from erosion by the sea, and there is a need to identify cause and effect. There is a significant gap in sites on the north-east coast of the Dengie, but this is an area which saw some early conversion of reclaimed marsh to arable, for example Gramolt (1960) noted that a third of Eastlands Farm, Bradwell, was under arable by the end of the 17th century. This longer period of cultivation may have led to greater erosion of buried features than in areas only more recently converted to arable. As is clear from the eroded remains of the Saxon shore fort at Bradwell, there has also been some loss of coastline since the Roman period and red hills in this area may also have been lost to the sea through erosion. Elsewhere, salterns may be buried under later alluvium.

Decline

Even taking into account the movement of production centres, and sites that may have been lost, the number of red hills indicates an industry of considerable scale at its peak, but one which shows little visible sign of continuing into the late Roman period. It has been suggested that this may have been a consequence of changing processing techniques which altered the nature of the evidence, one which no longer involved the use of large quantities of briquetage resulting in red hills. There is some indication of the introduction of a new technique which involved evaporation in tanks over flues, perhaps using lead pans, which would have left few physical traces. Similarly, in the absence of the red earth, levelling of mounds on reclaimed land would result in little trace. However, there seems to have been more general abandonment of these coastal areas at this time — few other finds of this date are known — and it would be expected that at least some remains of lead pans would have come to light (Rippon 2001, 107).

The demise of the red hills coincides with a more general abandonment of marshes along the Thames in the mid 3rd century, albeit with some exceptions including settlement on Canvey which continued to the 4th century (Wilkinson and Murphy 1995, 220). This may simply reflect a general decline in the region's economy at this time. Alternatively, it may result from a relocation of sites following changes in relative sea level, both a regression leading to sea levels as low as 2–3m below present by the mid 3rd century, followed by a transgression in the 4th century (Devoy 1979; Wilkinson and Murphy 1995, 221). If regression did lead to sites being relocated to seaward, these could have either been destroyed or buried during the subsequent transgression. Burial is certainly a possibility, *e.g.* an example at Canvey recorded after exposure by a winter storm in the winter of 1977–8 was overlain by 60cm of alluvial silt (Eddy 1980, 61), in which case additional sites may remain to be discovered.

Sealey has noted a resumption of activity at a number of red hills in the late Roman period in the 3rd and 4th centuries, but suggests that this reflects their use as sheep refuges rather than for salt production, and that by this date at least some of the Essex marshes supported a large sheep population (Sealey 1995; Going 1996). Rippon (2001, 105) discussed a number of factors which could have contributed to the demise of the red hills, including environmental changes, changes in technology, use of marshes for other purposes, changes in central policy to state control of the industry or competition from inland sources, though was able to reach no firm conclusion. None has yet been proved and it is perhaps most likely that a combination of factors was operating.

Medieval

There is a general assumption that manufacture would have continued into the post-Roman period. Few sites which can be attributed to salt manufacture of post-Roman date have been identified from aerial photographs (Fig. 5.2), but this merely reflects a dearth of evidence from other survey techniques. The Saxon period saw reoccupation of coastal areas (Reeves and Williamson 2000), possibly during a period of minor regression. If sites were moved to seaward as a consequence, it is possible that they were subject to burial or erosion following the subsequent rise in levels (during the 10th or

11th centuries) which may also have prompted the building of sea walls to protect economically valuable areas. However, Rippon (2001, 34–5) argues that Saxon reoccupation need not indicate falling sea levels.

Documentary and placename evidence points to considerable levels of production into the medieval period. The Domesday survey lists salt pans and salthouses at over forty locations along the coast, including south of the Stour at Lawford, Bradfield, Wrabness and Ramsey; around Hamford Water, Great Oakley, Moze and Beaumont; on the Tendring peninsula at Great Bentley, Thorrington and Elmstead; and along the Blackwater at Totham, Heybridge, Tollesbury, Langenhoe, Tolleshunt (which had twelve salthouses in 1066, reduced to five in 1085), Goldhanger, Salcott and Peldon (Page and Round 1903; Rumble 1983). Most of these are in locations used for earlier production. The main exception is the south bank of the Stour estuary, an area where, on present evidence, salt manufacture was not taking place during the Iron Age/Roman periods. Placename evidence from later sources also suggest manufacture, though with only limited indication of the date at which salt production was active, *e.g.* the Tithe Survey, including Salthouse and Salthouse Field at Wrabness (ERO D/CT 413).

A small number of earthwork complexes interpreted as medieval salt-working sites have been mapped, the majority in the Hullbridge area, near Woodham Ferrers (EHER 13522, 13498, 13563 (Fig. 5.5), 13497) with one example near Tollesbury (EHER 16286). These are all visible on aerial photography as earthwork complexes comprising both mounds and tanks, although EHER 13522 was levelled in the 1980s (Barker 2003, 8). All were located on areas of marsh that when surveyed by Chapman and Andre (Map of Essex published 1777), had been enclosed for grazing. The Hullbridge complexes were the subject of field survey in 1913 and 2002 (Christy and Dalton 1925, Emmison 1976; Barker 2003, figs 10, 14). Documents indicate production here from at least 1332, and manufacture continued here into the 16th century, although Emmison suggests that by this time the industry may have been in decline given a reference to wasted saltcotes in a 1582 survey of the manor of Woodham Ferrers (Emmison 1976). The Tollesbury site (EHER 16826) has been the subject of field survey and trial-trenching in 1995 but whilst acknowledging the broad similarities of the site to other medieval salt-working sites, conclusive interpretation as a saltern could not be made (Brown and Pattison 1995; Garwood 1995; Strachan AP interp.). Also on Tollesbury, EHER 11535 records a mound which has been suggested to be a possible red hill, although recorded as being early medieval in date.

The Morant Club also investigated a site at Goldhanger Farm, Tolleshunt D'Arcy (EHER 12062), comprising a mound and at least three 'tank-like' depressions enclosed by low banks which were also concluded to be of similar date to those at Hockley (Reader 1925, 53). Christy and Dalton (1925) also refer to similar mounds at Langenhoe, Heybridge and Northey Island. A large group of mounds known as Borough Hills was recorded at Mill Beach, near Heybridge in 1789. Based on their similarity to the Tolleshunt D'Arcy (EHER 12062) and Langenhoe mounds the Morant Club concluded that these too were medieval in origin, and that



Figure 5.5 The medieval saltern complex at Morris Farm, Stow Maries in 1950 (RAF/58/577/5382 held by the National Monuments Record)

the heaps of earth were the result of excavation of marsh clay to make tanks for salt manufacture (Christy and Dalton 1925; Barford 1988, 6; Fawn *et al.* 1990, 2). At the time of the Morant Club's deliberations in 1925 almost all of the Borough Hills had been destroyed (Fawn 1996, 6–7).

The EHER also records a number of other possible saltworking sites. At Beaumont Quay, trenching in 1955 recorded remains of flues and lead (EHER 7406) which may have been from lead pans related to salt manufacture, and which would accord with Domesday evidence for production in this area. As already noted, early medieval finds have been recovered from a number of red hills, *e.g.* Burnham on Crouch (EHER 11315), Tollesbury (EHER 11535), Goldhanger (EHER 13644) and Canvey Island (EHER 9962, although these are not generally thought to indicate salt-working at that date.

It has been suggested that the importance of the salt industry was linked to the grazing of the marshes, being required for the preservation of dairy products including the sheep's cheese for which the Essex marshes became renowned in the medieval period. Conversely, it is thought that embankment and reclamation of marshes to improve grazing led to the decline of the salt industry, probably as supplies of salt from alternative sources increased. By the middle of the 14th century, the production of coastal salt in England appears to have been in decline, though it clearly continued in some locations. There were a number of severe storms in the 11th to 12th centuries which might

have had a direct impact on the industry as well as prompting embankment and resulting indirect effects with loss of tidal salt marsh. One of the Hullbridge salterns, Morris Farm, Stow Maries (EHER 13563) was in an area reported in 1638 as having been 'inned and gayned' by Sir Thomas Gardiner, although the same return also recorded 300 acres of salt marsh in the area between Clementsgreen Creek and Woodham Fenn (Gramolt 1960). At Morris Farm, it would appear that it was reclamation in the 17th century that brought an end to salt production in this area (Barker 2003, 31). Since it was surveyed in 1913 (Christy and Dalton 1925), part of the Hockley complex has again been lost to the sea, as indicated by the mapped line of a former sea wall (EHER 16150) now in Clementsgreen Creek beyond the present embankment.

Two possible salt-works of post-medieval date were noted by Henry Laver, one at East Hall, Paglesham on marsh named Salt Pan Marsh, where evidence of salt manufacture ascribed to the Elizabethan period was noted during conversion of the marsh in 1820 (Benham 1977). The second was excavated in 1892 inside the sea walls at Bounds Farm, near Goldhanger on the Blackwater, which the excavator stated to be not later than Jacobean. Finds from these sites included shallow brick tanks, furnace flue, and pieces of lead thought to be from evaporating tanks (Benham 1977). Sessions records of 1651 note the presence of a salter and salthouse at Goldhanger. A salter's tenement and croft is recorded in a 1598 rental of Great Wakering Hall (ERO D/Dke M1). Saltworks are referred

to in a number of 16th-century wills, including that of John Creek (1547), a salt boiler of Hockley, William Shetelwoode (1605) saltman of Fambridge, Edward Bird (1608) a salt weller of Stow Maries, and Thomas Stammer who in 1571 left two saltcotes in Woodham Ferrers (Emmison 1976). There is documentary evidence for construction of a saltcote at North Fambridge shortly before 1629, and Harrison notes in his 1587 volume *Description of England*, that salt was a major product in Essex (Barford 1988, 7). Place names point to salt production at various locations, including Salt Acre Marsh, East Mersea and Saltcote Marsh, Burnham, Salt Field and Salt Pasture in Roydon (Soudah 1987). Post-medieval brick buildings surveyed on Old Hall Marshes (EHER 11506) have been suggested to be a saltcote.

A further change of technique has been postulated as a cause of the general dearth of evidence for medieval and post-medieval Essex salt-works, when the open pan methods were replaced by a process known as sleetching, which involved extraction of salt from silt and sand saturated by sea water (Rippon 2001, 45). It is a process documented in Lincolnshire by the Lincolnshire NMP project (Grady 1998), which has mapped extensive complexes of mounds representing medieval and post-medieval salterns which used the technique. The process needs access to salt-impregnated sediment (rather than tidal creeks) and salterns using this method tend to occur on unreclaimed marsh. The sandwashing salt industry in Lincolnshire is thought to have begun in the early medieval period, and continued into the post-medieval period. There was some eastward migration of sites with progressively younger sites located further to seaward as relative sea levels fell (Grady 1998, 86), and the industry appeared to suffer a decline in or before the 17th century. It is possible that the absence of evidence in Essex relates in part to its sinking coastline; sites may have been either buried during submergence by post-Saxon rising sea levels, or the evidence has been lost as a result of subsequent embankment and reclamation. However, it is not clear to what extent the sleetching method was adopted in Essex, and certainly the recorded examples do not appear to have employed this technique, with differences in the form of visible earthworks associated with salt manufacture (Fig. 5.5; Rippon 2001, fig. 79). The large pans recorded at Hullbridge are thought to be indicative of solar evaporation process, relying on natural evaporation of sea water from large tanks to obtain a concentrated brine and perhaps operating on only a seasonal basis.

The decline in salt manufacture in the county was particularly marked from the mid 17th century, both in consequence of increasing reclamation and after rock salt was discovered in Cheshire, offering a cheaper means of extraction. Some manufacture continued in Essex to modern times, most notably at Maldon.

IV. Fish weirs

One of the most obvious of coastal activities, fishing, is also one of the most elusive to document, but there remains a partial snapshot, recorded by aerial survey in the form of a number of fish weirs, concentrated in the Blackwater estuary (Fig. 5.6) though with one probable example off Colne Point at the mouth of the Colne. They are visible in the form of long lines of posts on the

mudflats of the estuary and in some cases now below low water mark. The recorded timber alignments range in length from 170m to in excess of 1660m. The posts generally form distinctive V-shaped alignments, depending on their location relative to the river and estuary, the apex either pointing out to sea or downstream (Fig. 5.7).

Some of the sites appear to show more than one phase, with overlapping alignments, as at Sales Point (EHER 2055) or West Mersea (EHER 9973). Two weirs on the south bank of the Blackwater, off Bradwell Waterside (EHER 9971) and Pewet Island (EHER 9972; Fig. 5.7) have their longer side parallel to the bank, and the trap ends now lie below mean low water mark. This alignment is also seen in the remaining part of EHER 9974 on The Nass south-east of the tip of Old Hall Marshes although this weir is on the mudflats that still lie between high and low water. In the weirs off West Mersea (EHER 9973; Fig. 5.7), Mersea Flats (EHER 9970; Fig. 5.7; Gilman et al. 1995, plate 3) and Sales Point, Bradwell (EHER 2055; Fig. 5.7) the 'V' points out to sea, the trap in each of these three lying below the present low-water mark.

Amongst the Essex examples, the group of features at Collins Creek (EHER 13185) is the most complex, comprising a number of separate structures (Strachan 1998a, fig. 12; Gilman et al. 1995, plate 1). Within these the longest alignments of posts run parallel to the shore, with additional lines running at $c.60^\circ$ to these towards dry land and forming the closing 'V' of the structure. The placing of these reflects the direction of strongest tide and ebb flow at this part of the estuary, along the length of the river. The entire complex covers an area of some 2250m east to west and 700m north to south. Field survey in 1993 recovered fragments of wooden panelling and basketry which may have been used for the trap (Hall and Clarke 2000, 130). Strachan (1998) suggests that there are up to five separate fish weirs in the complex, though not necessarily all contemporary, and it is possible that some of the post alignments relate to other features, perhaps to sea defences.

With the exception of EHER 9975 off Colne Point, and so strictly within the Colne rather than the Blackwater, analysis of archive photography and targeted aerial reconnaissance has identified only one site beyond the Blackwater estuary, an example at Holbrook Bay on the Suffolk side of the River Stour. Until the discovery of the Collins Creek example in the mid 1980s, physical remains of weirs had not been recorded in the county, although the existence of fisheries was known from documentary sources. During the 1990s, aerial reconnaissance targeted at the intertidal mud flats during equinoctial low tides to locate additional features has provided a detailed low-level record of these structures (Strachan 1995c, 42, 44).

In terms of overall structure the Essex weirs are comparable to coastal examples from the Severn estuary (Godbold and Turner 1994; Strachan 1998a, 274), North Kent (Collard 1902), including Whitstable (Hall and Clarke 2000, 135) and the Isle of Wight (Strachan 1998, 274). They were also used in rivers and one example was recorded in an excavation on the River Trent at Colwick, Notts which comprised a double row of posts supporting wattle hurdles, dating from the 11th to late 12th century (Losco-Bradley and Salisbury 1988).

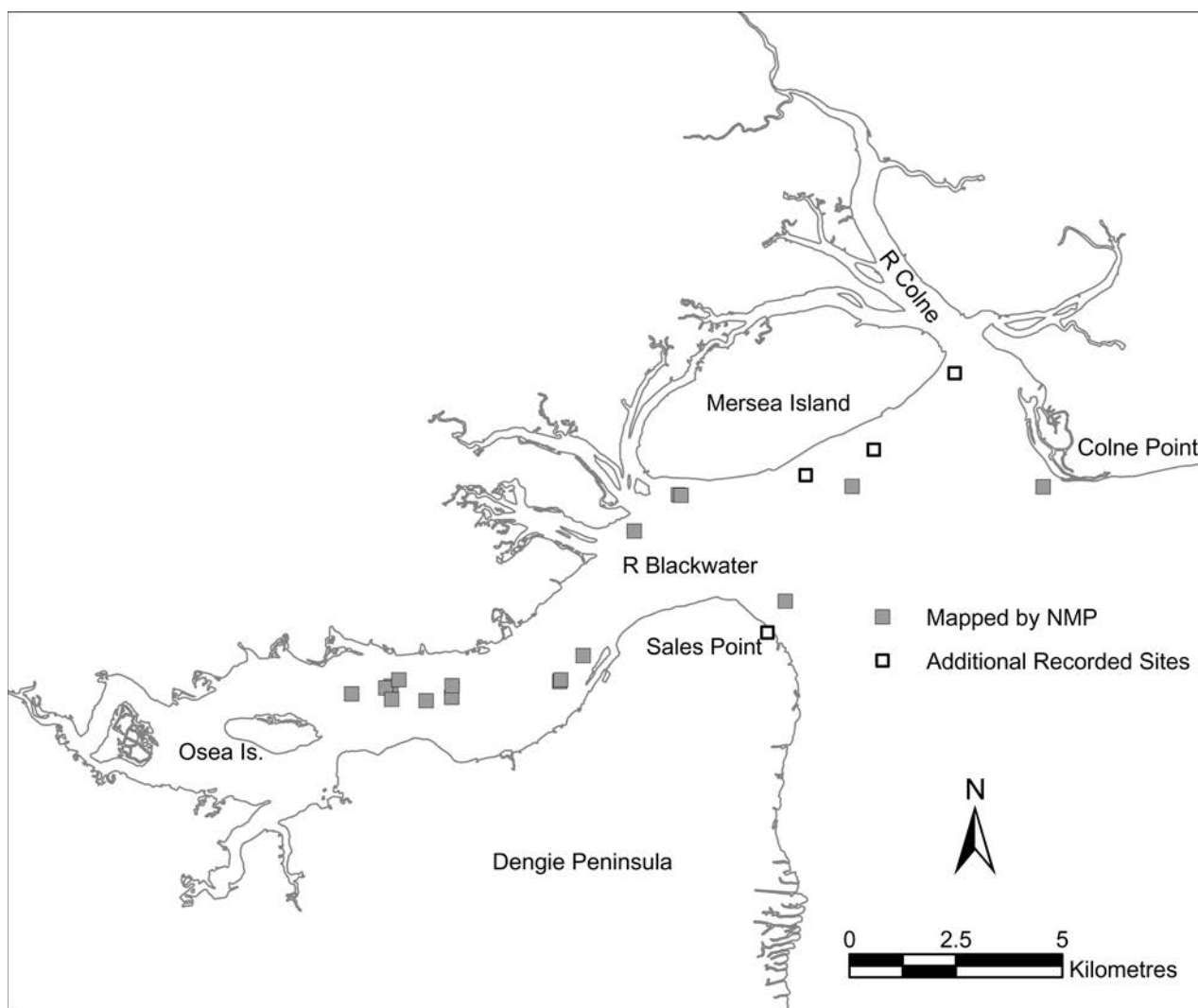


Figure 5.6 The distribution of recorded fish weirs in Essex

Typology

Several types of permanent fishing structure are known from survey and historical documentation, including fish weirs and kiddles. Fish weirs which comprise permanent stationary structures, comprising walls of wattle hurdles between timber posts, laid out in a V-shape, at the point of which was a trap, often in the form of a wicker basket. The walls of the trap channelled fish to the trap on the ebb tide and layout of the posts relative to dry land thus depends on the location, and hence the direction of the tide. Wattle panels were also laid along the edge of the upright timbers as a walkway to enable easier access for maintenance and collection of the catch, and such hurdles have been recorded at Sales Point (EHER 2055: Strachan 1998). Kiddles (or kettles) were coastal fishing traps operating on the same principle, using a similar V-shaped (or square) layout of stakes pointing out to sea supporting a net of approximately 120 yards in length and 3 or 4 feet wide, in what has been described as a fixed seine net.

Historical documents often distinguish between different types of structures, and that the two sorts of structure existed is clear from wills which list weirs and kiddles separately. However there does seem to be some overlap or confusion in the use of the two terms amongst recent authors, and perhaps historically. Medieval

documents refer to two types of weirs, the *haecweras*, or hedge weirs which used stakes and wattles (occasionally stone walls) and *cytwer*, basket weirs, though Rippon (2001, 221) states that *haecweras* were later known as kiddles. Crump and Wallis (1992) refer to the Mersea and Sales Point structures as kiddles, although wattle hurdles have been recorded from the Sales Point structure and all of the Essex post structures are now generally considered to be weirs.

Dating

In addition to Collins Creek, others have also been the subject of ground survey (The Nass, Sales Point) which recorded the remains of wattle hurdling, including the remains of a basket at Sales Point. Timbers recovered from these three sites (Sales Point, the Nass and Collins Creek) all indicated dates of construction in the early medieval period. Samples from Collins Creek gave radiocarbon dates between the 7th and 10th centuries, whilst samples from The Nass show a more restricted date range, mid 7th to mid 9th century, with a similar date range (mid 7th to late 9th century) for timbers from Sales Point (Strachan 1998). This is supported by their location with regard to low water mark, and the evidence for a marine regression in the Roman period before relative sea levels rose again to

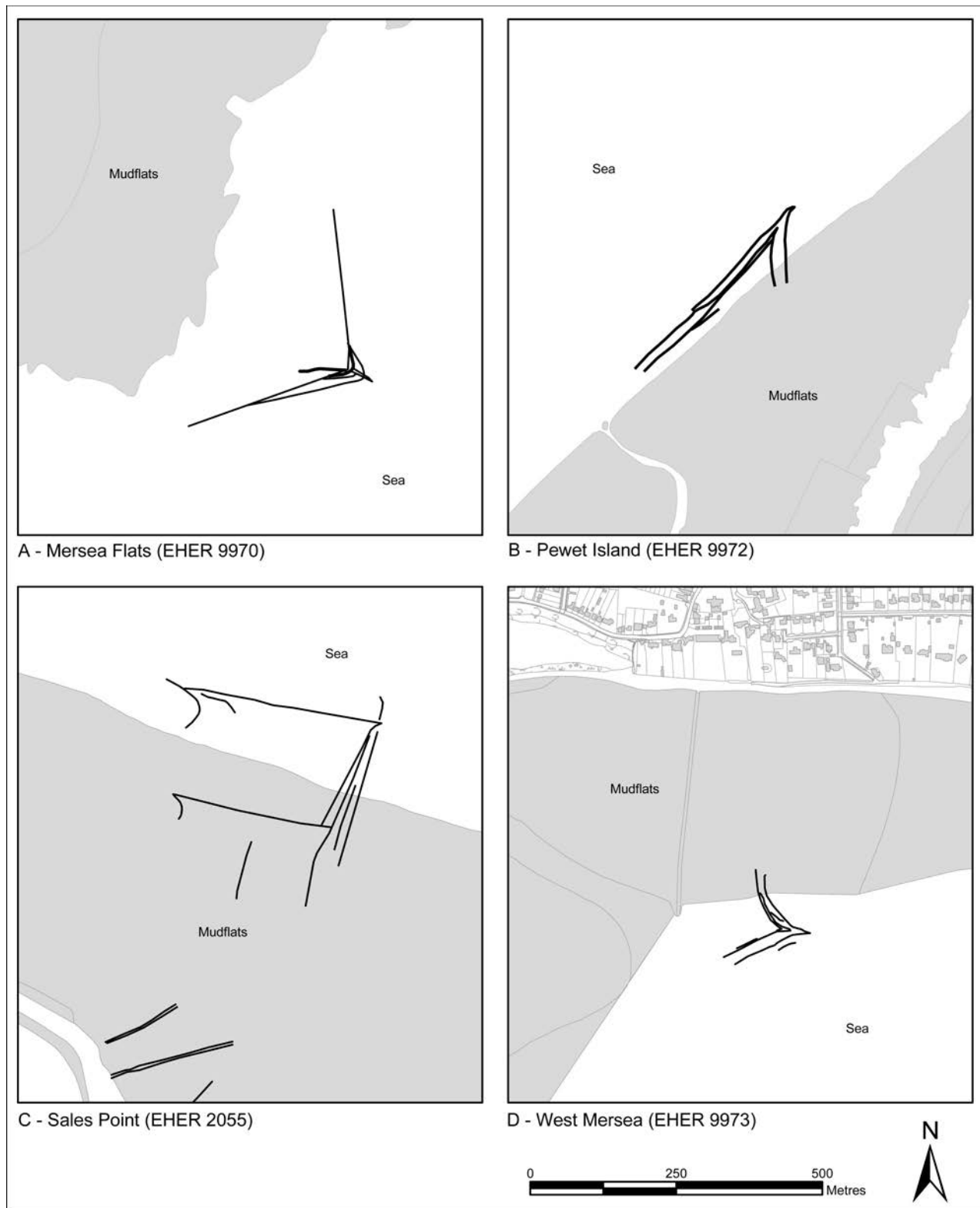


Figure 5.7 Comparative plans of four of the fish weirs in the Blackwater estuary

their present level. Reconstruction of individual weirs may reflect in part the need to adapt to variations in mean low tide heights and abandonment of these weirs may relate to generally rising sea levels during the later Saxon/medieval period. Certainly by the 13th century sea levels were rising, rendering the coastal marshes more vulnerable to flooding in the storms and abnormal tides.

There is some indication for the use of fish traps in the prehistoric period and Brown and Murphy suggest that a line of posts recorded across a palaeochannel at the Stumble (and dated to 2380 ± 70 BP) may be a simple Iron Age fish trap, and represent the earliest known example of this method of fishing in the county (Murphy and Brown 1999, 16). It is likely that such fishing practices continued into later periods.

Fish weirs are documented from at least the medieval period. The more extensive use of large weirs is possibly part of a general expansion of the fishing industry documented in the medieval period and may relate to the need for supplies for 'fish days' as decreed by the church (Bond, CJ 1988, 70). However, Bond also adds a note of caution in stating that it is not clear to what extent there is simply increased documentation of an activity rather than expansion of the industry itself (Bond, CJ 1988, 70). Excavated fish bones at sites in for example Colchester do indicate an increasing consumption of fish (Ayers 1997) and by the 13th century fishing (and fish farming) were carried out on a large scale in England. The peak of construction and use of weirs appears to have been in the 12th to 14th centuries (English Heritage n.d., MPP class description). Ecclesiastical ownership is demonstrated for many fisheries in Domesday, although the weirs were only one element of this industry. Strachan (1998, 281) suggests that many of the Essex weirs may have been in monastic ownership, *e.g.* the Sales Point weir may have belonged to the nearby monastery recorded by Bede as having been established as Ythancester (usually equated with the Saxon Shore Fort of Othona known at Bradwell-on-Sea) by St Cedd in the 650s AD. The Manor of West Mersea, comprising West Mersea and portions of Langenhoe and Fingringhoe, was an important royal estate in the Saxon period (Crummy 1982). It was granted by Edward the Confessor to the Benedictine abbey of St Ouen in the early 11th century. The Domesday survey records a fishery as part of the manor, and also records four fisheries for East Mersea, but it is not clear whether these included coastal fish weirs of the type in use in the mid Saxon period. If associated with nearby monastic sites, the weir off Colne Point may have belonged to St Osyth Priory. The absence of dated medieval weirs does not preclude their use at this date, and documentary evidence points to the contrary, for example in 1337, bailiffs at Colchester leased two fishing weirs (Cooper 1994). The cost of such enterprises is one reason why only large landowners, such as monastic foundations, would have the necessary resources for construction and maintenance. Hall and Clarke (2000) estimate over 10,000 posts in the alignments at Collins Creek, a significant undertaking both in construction and maintenance.

Similar ecclesiastical connections (if not origins) are noted for some of the Severn estuary weirs where charters record the granting of estates which include a fish weir to Evesham Abbey in 706, to St Peter's Church, Worcester in *c.* 690, whilst a 10th-century charter of estate in Tidenham, Glos, owned by Bath Abbey, lists a total of sixty-four basket weirs on the Severn. Between 956 and *c.* 1060 Bath Abbey had a total of 104 fisheries, though not all seem to have been substantial weirs (Bond, CJ 1988, 78). The Domesday survey also recorded one on the Bury St Edmunds Abbey estate at Southwold, with some of the Somerset coast granted to Dunster Priory in the late 11th century (English Heritage n.d., MPP class description).

Documentary sources point to other examples within Essex in the medieval and post-medieval period but in many cases it is not absolutely clear from the terminology what type of structure is being described, whether weirs, kiddles or some other form of fishing. Domesday lists numerous fisheries, though not all need be weirs or kiddles. Many of them were in ecclesiastical ownership including fisheries along the Thames at Little Thurrock,

Waltham Holy Cross, Mucking, Barking, Vange, Chadwell, and on the Dengie at Tillingham and Bradwell and the Blackwater at *e.g.* Tollesbury, West Mersea. Although Domesday does not provide details of the nature of the fishing structure in use, there is a coincidence between many places mentioned and the location of timber structures identified as fish weirs in the estuary. Other fisheries are recorded in the Domesday survey at Fobbing, West Thurrock, Chingford, Leyton, Grays, Walthamstow and Ilford on the Thames and at, for example, Great Oakley, Old Hall, Mistley, Little Oakley, East Mersea, Osea, and Latchingdon further up the coast. Amongst the many examples on the inner Thames, there appears to have been a significant reduction in the number of fisheries over the twenty-year period between 1066 and 1086 (Rumble 1983).

There is little evidence as yet for continued use of the recorded Blackwater weirs into the later medieval period. If remaining in use, it is to be expected that they would be subject to repair and replacement, as appears to have been the case up to the 10th century, and in that case it is surprising that no dates beyond the 10th century have been obtained from sampled timbers, particularly given the Domesday evidence for fisheries. Equally clearly, fish weirs were in use along other parts of the coast in later centuries and into the post-medieval period, particularly in the south-east of the county. At Harwich, fish weirs are documented in several hundred years of manor court rolls from 1296, the sites being let by the lord of the manor at Harwich and Dovercourt. Many lay on the Suffolk side of the Stour, as was the case of the Andrews shoal off the south-east tip of Landguard. The weirs held by the Andrews family for several generations in the medieval period are described as zig-zag fences leading to a trap (Hughes 1939, 11–12), and Weaver (1975, 7) describes these as weirs of wattle held in place by oak stakes, which would indicate substantial features rather than kiddles. In the south of the county, the reeve's accounts for 1390–1 (of the Manor of Burnham) deal with the rents from fish weirs and oyster layings (Quaife 1966–70).

In 1560, John Ellyot of St Osyth left a weir called Peter in Westness (identified as the headland called Westmarsh Point opposite St Osyth Stone Point, and the location which marked the furthest extent of Colchester's oyster fishing rights), and in 1574 Richard Lin of Burnham left his half of two weirs (called Peter and Mary), whilst Thomas Maddock of Harwich left his weir called Peter to his wife in 1586 (Emmison 1976, 72), though the reason for the selection of names is unknown, they could possibly be a reference to St Peter as the 'fisher of men'. On the Dengie, 1669 deeds of Tillingham Grange Farm, lists twenty kettles at sea (ERO D/DAC 363). Both weirs and kiddles are recorded as part of what must have been an extensive and important inshore fishery on the Maplin and Foulness Sands and one which continued throughout the post-medieval period. A document of 1424 records rents from fifty-seven weirs, eighteen kiddles and ten fisheries 'cum hamis at cordis' (*i.e.* with lines) (Crump and Wallis 1992, 39). By this date much of Foulness had already been embanked, suggesting location of the intertidal zone in much the same area as at present (Crump and Wallis 1992). In 1580 John Cryppes described the boundaries and adjoining owners of his various named kiddles (including Barnflete, Crouch, South, Kedellmans and Le-Tepe Keddles) in Foulness whilst Christy describes

their use in the early 1920s (Christy 1922). Targeted aerial survey has not yet located any remains of weirs on the mudflats adjacent to the island (Crump and Wallis 1992).

Fishing certainly came into conflict with other coastal activities, and there may have been deliberate removal of many structures. Fish weirs (and to an extent kiddles) were extensive (and substantial) fixed structures that could cause hazards for other users of the water, especially shipping, leading to potential disputes (Losco-Bradley and Salisbury 1988 344; Hughes 1939). It was an issue referred to in 1215 in the Magna Carta, in which Article 33 stated that all fish-weirs shall be removed from the Thames, the Medway, and throughout the whole of England, except on the sea coast in order to facilitate navigation along the river. This could explain the demise of some of the recorded Essex weirs. Weirs were also constructed in the River Colne in the 13th century, and twenty-three were documented there in 1285, one of a several sources of obstruction which led to a number of legal disputes in the medieval period. In 1362, Lionel of Bradenham was ordered to remove twenty-eight weirs and three enclosures as even small boats could hardly reach the Hythe. A charter of 1462 laid down a requirement for a bailiff's licence to construct weirs or kiddles, although it is not clear to what extent this was a measure to protect the fishery rather than to maintain navigation (Cooper 1994, 237–41). There are other accounts of weirs causing problems for navigation, including the record of a 16th-century case tried in the Admiralty Courts after a ship struck a weir at Harwich (Hughes 1939). Fish weirs consisting of 'wattle fences held in place by oak stakes marked by withies' existed in Harwich harbour where they were a danger to shipping (Weaver 1975, 7) and oak piles here still presented a problem in the 19th century for contractors dredging the harbour, and dredging of the channel for shipping may have removed other weirs from this river (Weaver 1975).

It is clear that the recorded distribution is only part of the original extent of the industry, and the concentration in the Blackwater is a reflection of survival and visibility. Aerial reconnaissance has focussed on other areas of the coast thought likely to have been suitable for the use of fish weirs but no evidence has yet come to light, with the exception of the single Stour example. The appearance of features in the Blackwater estuary could be a result of particular dynamics within the estuary which have resulted in the uncovering of buried features. Others could exist elsewhere along the coast under silt and sand. Additional timber post alignments have been recorded on mud flats from ground survey, but again these have been predominantly in the Blackwater estuary south of Mersea Island. Equally it is clear that some at least have been removed as hazards to navigation, as has been the case in the Harwich harbour, and is likely to have occurred in the Thames. Dredging of deeper channels will also have had an effect on the dynamics of the intertidal zone, as has embankment and reclamation, often resulting in loss as muds and silts are no longer replenished.

V. Oyster cultivation

Another important aspect of the fishing industry was the collection (and later husbandry) of shellfish, in particular oysters. From earlier periods the evidence comes from finds on excavated sites, which indicate that oysters were

for centuries an important part of the diet. Rippon (2001, 100) notes a marked increase in consumption from the start of the Roman period (as evidenced for example by the size of shell dumps in London). There is limited evidence before the medieval period that oysters were farmed, rather than collected from natural breeding grounds in estuaries and coastal waters, although Murphy and Brown (1999) suggest that at North Shoebury there was possible evidence for management of oyster beds (cf Murphy 1995, 145). At Heybridge, Maldon, excavation revealed little evidence for coastal exploitation in the form of oyster remains from late Iron Age and Roman deposits, despite its location at the head of the Blackwater estuary, although these were being harvested from the estuary in the Roman period and excavations at Colchester have yielded vast amounts of oyster shell (Atkinson and Preston 1998, 108; 1999). Regardless of how they were produced, clearly oysters were procured in substantial numbers and traded over long distances during the Roman period (Rippon 2001, 100).

The most conspicuous physical remains of the industry as recorded from aerial photography, are the numerous pits cut into the salt marsh to overwinter young oysters, and whose distribution (Fig. 5.8) and numbers testify to the geographical extent and importance of this resource to the economy. To date much of the study of this industry has focused on the social historical aspects, in particular the activities of the companies established in the 19th century. The NMP survey provides the opportunity to examine the physical evidence, to assess the extent to which it is possible to trace the development of careful oyster husbandry.

Oyster pits have been recorded along much of the Essex coast and its many creeks and estuaries (Fig. 5.8). There are a number of clear concentrations in the Crouch/Roach, Tollesbury/East Mersea, and at Brightlingsea with smaller foci on the west side of the Colne. There are also occasional examples around Hamford Water and along the Thames. The pits exhibit some variation in size, and also in the manner in which they are laid out on the salt marsh. They are generally rectangular, approximately 1m deep, between 1.5 and 3m in length, and 0.75m to 1m wide: however, in practice these were dug to any convenient size (Benham 1993, 25), and with a few exceptions variation in size is seen within individual groups of pits. Occasional examples occur singly (perhaps an accident of survival) but the majority are in groups of three or more. Group size is easier to define where pits exhibit a very regular layout, as is the case at the west end of Cobmarsh Island. In other areas, the pits have a much more random arrangement, as on the end of Feldy Marshes and Tollesbury (Fig. 5.9), which may result from different ownership, or merely selection of suitable stretches of marsh between creeks — Benham (1993) suggests that they were dug haphazardly on any convenient bit of salting. Some of the pits have been investigated on the ground, *e.g.* as part of an ongoing programme of coastal monitoring in the greater Thames estuary (Heppell and Brown 2001), which has also recorded other elements of these structures, including the remains of sluices, channels and metes, and the posts marking the boundaries of individual layings.

Collection and husbandry

Oysters grow naturally at many locations along the Essex coast, with some areas offering particularly rich breeding

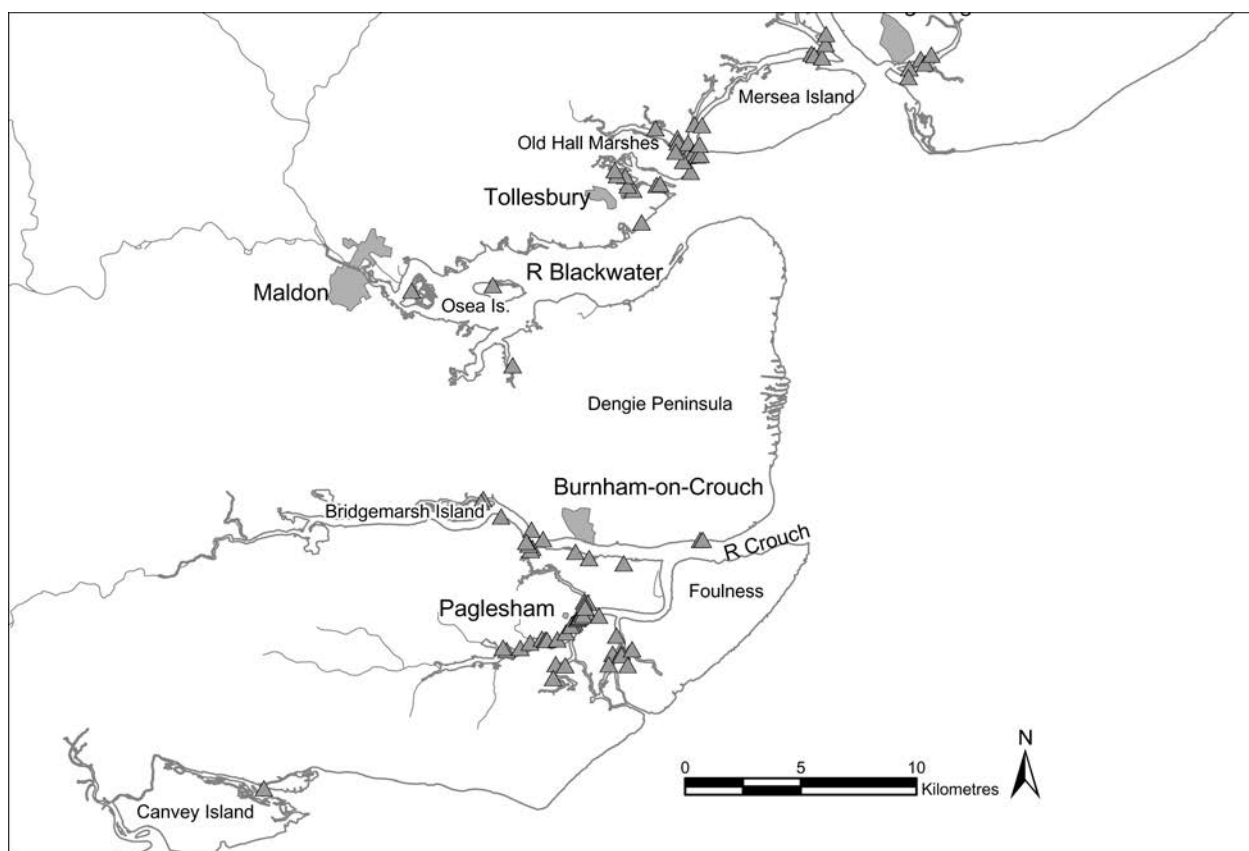


Figure 5.8 The distribution of oyster pits recorded by NMP

grounds. They grow naturally near the coast or on banks offshore given the right temperature conditions and a firm sea bottom, and can grow particularly well in estuaries, where the inflow of fresh water creates good conditions for the plankton on which they feed. The best locations have long been recognised to be on the east coast, in particular around Colchester and Whitstable, Kent. The oysters take several years to grow from spat (young oysters newly attached to the bed) and fluctuations in spat production are related to known physical conditions of tide and weather as well as dependent on the size of the breeding stock (Eyton 1858).

Dredging from their native habitat, relying on natural regeneration, was the simplest form of collection and one that was most likely practised for many centuries. Documentary references to fisheries may, at least in some cases, include oysters as well as fish, although the distinction is not clear in many early sources. Rights over fisheries were established from an early date, though as for earlier periods much of this may have been collection rather than organised farming. There is documentary evidence for the collection of shellfish on a commercial scale from at least the end of the 10th century (Bond, CJ 1988, 79). In the medieval period oysters were a relatively common food and archaeological evidence points to expansion of consumption from at least the 12th century (Rippon 2001, 225). The manor of West Mersea included oyster grounds when granted by Edward the Confessor to the Priory of St Ouen in 1046 (Benham 1993, 72). Colchester claimed ownership of the Colne from an early date, its rights to the river fishery originating sometime before a charter granted by Richard I in 1189 which indicates an origin of at least 1100, confirming an existing

fishery. The vagueness of the charter with regards to the seaward boundary was the root cause of numerous disputes of ownership in subsequent centuries. A nineteen-mile stretch of the River Crouch west from Ray Sand was held by the manor of Burnham under a grant from the Crown made before 1272 (Benham 1993, 47). It is clear from rent returns of the late 14th century that this fishery encompassed both fish and oysters, with leases being granted to dredge (Cooper 1994). Cooper suggests that oysters were less valuable than fish in the Middle Ages, although there are records of Colchester oysters, together with mussels being taken to Great Yarmouth in 1413. Further, there were prohibitions in 1362 on the dredging of oysters out of season from the Colne, and a greater frequency in the 15th century of presentments of burgesses for taking oysters out of season point to rising importance of the industry (Cooper 1994, 35–6).

Writing in 1554, the Venetian ambassador to London noted the immense supply of oysters (Neild 1995, 37) and the industry played a vital role in providing cheap and abundant food for the poor. During the 16th century, increasing numbers of oyster dredgers in the Colne led to overfishing there and was clearly becoming a general issue. Control over collection and exploitation was initially aimed at restricting the levels of collection to avoid over-exploitation of natural breeding grounds in the creeks, estuaries and shallow waters offshore and so ensure levels of stock were maintained. The crisis point for the industry may have arrived in the early 17th century. Price rises in the early 1600s were ascribed to overdredging and excessive exportation, in particular to Holland. Ultimately the problem was referred to the Admiralty Court, as they held jurisdiction over all matters

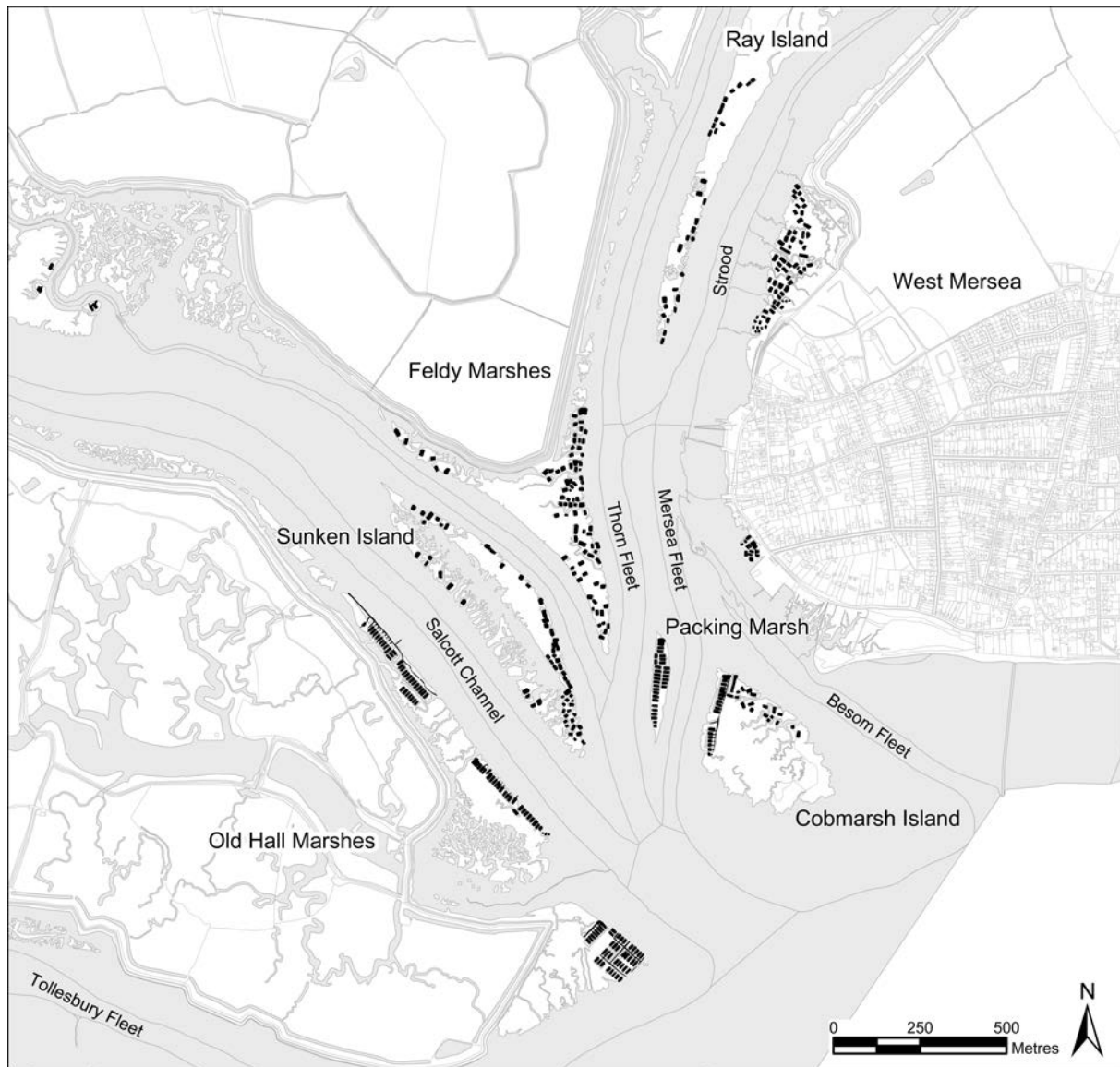


Figure 5.9 Oyster pits in the mouth of the Salcott and Strood channels near West Mersea

relating to the sea and coastal fisheries. A government inquiry in 1638 into the shortage of oysters found problems both in the death of brood and spat which had been removed from prime spatting grounds to private layings, too much indiscriminate dredging of young and old oysters with marketing of oysters that were too small, and also the demands of the export trader, leaving a deficit for the home market. Various measures to ensure conservation included close season for dredging during the breeding period, licenses for dredging, and a requirement to return immature oysters. This indicates that by this time as well as being dredged for direct sale, oysters were being husbanded on private layings (Neild 1995, 35).

It appears to have been these scarcities of the 16th and 17th centuries, resulting from over-exploitation, that led to the widespread development of specialist husbandry which appears to have largely replaced the practice of controlled gathering for direct sale. Immature oysters (the spat or young brood) were dredged from natural breeding grounds and removed to specially prepared layings in creeks. Here they could be grown for several years until

reaching a suitable size for sale. It is likely that the system using pits to overwinter stock also developed at an early stage as part of this process. Whilst some rivers or stretches were to remain common ground until quite late, private layings for oyster husbandry developed in many areas, with tenants of oyster farms cultivating their own layings, replenished from common ground (Benham 1993). In addition to countering overfishing, this also offered the potential to control supply. The Mersea creeks were granted to the London Charterhouse by Charles II in 1667, and it is thought that by this time many of the layings must have already been laid out and leased. More widely, oyster byelaws enacted in 1697 by the Company of Free Fishermen restricted fishing at certain times and places, enforcing penalties for encroaching on layings and prohibiting dredging in waters which did not naturally restock. These regulations covered an area defined by London Bridge, Harwich and the North Foreland (Benham 1993, 1).

Layings could include both the channel itself and its edges, and they were prepared by laying down culch (broken shell) to provide a firm base on which the oysters

could develop. Layings were generally measured by their length, and they could be marked by withies and signboards (Benham 1993). At Tollesbury and West Mersea, the layings covered the full width of the creek, but in the Crouch and Roach and at Brightlingsea, layings were single sided with an unmarked boundary down the centre of the channel. The oysters required nurturing for several years until they were full grown, and to protect them over the winter they would be removed to pits cut into the salt marsh to be overwintered. Here the pits would receive a regular topping up during high tide. The pits would also serve for storage of mature oysters pending sale. This would also enable layings to be cleaned and maintained, with the removal of debris, cleaning and laying down of new culch. In the 17th century, green bearded oysters acquired particular favour, and whilst natural greening occurred in some beds, oysters were placed in special pits to result in this greening (Page and Round 1907), a practice noted by Morant (1748) and one that continued into the 19th century. Once established the basic techniques of cultivation changed little over the period of use. Small scale localised production was more common in the 17th and 18th centuries, with larger companies, such as those established in the Roach and Colne, evolving in response to the great demands of the 19th century.

The Essex estuaries

The Essex examples clearly concentrate in a number of distinct clusters around the main estuaries of the county, particularly the Roach/Crouch, Colne and Blackwater which will be considered separately below

Crouch and Roach

Groups of oyster pits, generally no more than thirty in each cluster are scattered along the River Crouch west of Burnham, on either side of Althorne Creek on the north side of Bridgemarsh Island, at Creeksea, the mouth of Lion Creek and on the south bank of the river opposite the village of Burnham. Separate groups can be recognised within these clusters, identified by differences in alignment of the pits, and variations in regularity of layout. Whilst in part this may be explained by efficient use of the available space on marshes dissected by creeks, it may also indicate varied ownership as well as perhaps differing dates of construction and use.

Within the pits along the north side of Althorne Creek near Bridgemarsh Farm (EHER 16107) are at least three separate groups, comprising a single line of nine pits with their long axis perpendicular to the creek, a group of eleven pits in three parallel rows with long axes along the line of the bank, and a more irregular cluster of seven, of varied alignment and size. Similarly on the opposing, south bank (EHER 16106), whilst most of the pits fall within a single line, long axes perpendicular to the flow, several groups can be discerned, although one group has a less regular layout. Most of the other clusters along the Crouch show similar layouts, with identifiable ordered and regular groups of generally between two and fifteen pits. Few show what appear to be totally random orientation, although this is true of seven pits at the head of Lion Creek (EHER 61110), part of a larger more orderly group. It is possible that these seven are slightly older than the others, their more rounded outline perhaps indicating abandonment and erosion. None of the pits sited in EHER

61110 appear on the OS 1st edition 6-inch sheet (Sheet 62) although the largely regular group of pits on the opposite side of the river are depicted on the map. Few oyster pits have been recorded along the Crouch east of Burnham. This is, however a part of the estuary which has seen significant coastline change since the medieval period as a result of extensive embankment and reclamation of the Dengie marshes. Although no sign was visible on aerial photographs, historically oyster cultivation extended further upstream from Bridgemarsh Island. Records of Blue House Farm, Fambridge, in 1775 show that Charles Long, in addition to meadow and pasture, owned and farmed 105 acres of salt marsh and nine acres of oyster ground (Pattison and Barker 2000), although no pits have been recorded in this area. Similarly, cultivation is recorded in the manor of Woodham Ferrers, where the manor had oyster layings in the 16th century (Emmison and Hull 1951).

A greater concentration occurs in the River Roach at Paglesham, in particular along the north side of Paglesham Reach and both banks of Paglesham Pool where they are cut in an almost continuous swathe along the salt marsh outside the sea wall (EHER 14849, 14945, 14934). Most exhibit a regular arrangement, again generally in groups of no more than 15, individual pits varying in length between approximately one and three metres. Almost all of these are depicted on the OS 1st edition 6-inch map (Sheet 71), with the exception of one group on the west side of Paglesham Pool, part of EHER 14934. Further clusters, more widely spaced, occur along the north side of Paglesham Reach as far west as Bartonhall Creek. Only one site has been recorded on the south side of the Roach itself, EHER 14944, opposite the mouth of Paglesham Pool. Private layings are documented from Paglesham Reach from the late 16th century (Benham 1993, 57, and 62–3 map of layings).

Further foci of activity are however located amongst the islands south of the Roach, in the Middleway and its associated creeks. Groups of pits are recorded on the east side of Potton Island (EHER 14943), and New England Island (EHER 14941, 14942). These are for the most part very regularly laid out, with up to twenty-two pits in each group, though variations in layout and orderliness amongst the pits in EHER 14941 may indicate more than one owner. On the east end of Havengore Island is a smaller group of seven pits (EHER 14940), which exhibit a greater variation in size than normal, up to a maximum of 5m in length and 2m in breadth. Other pits occur singly or in pairs along the west side of the Middleway or in small groups as in Barlinghall Creek (EHER 14862). Oyster layings are attested in The Middleway, Shelford Creek and New England Creek from at least the 17th century. The legend 'Here is a leave of oysters' on a 1614 map of New England Island and creeks (ERO T/M 353) occurs next to the group of oyster pits on the northern end of New England Island (EHER 14942). Field survey of this area in 2000 recorded a number of 'metes', or posts in this area which mark the outer limits of oyster layings (Heppell and Brown 2001). The River Roach and Paglesham Creek were ideally suited for oyster cultivation whilst the creeks associated with the Roach have an added benefit that a connection via the Broomhill to the Thames at Havengore meant that the tide flowed and ebbed from two directions, thus minimising the amount of scour in the channel (Benham 1993, 57).

It is possible that Crouch oysters were once more highly prized than those of other parts of Essex. Norden, writing in 1594 acclaimed the 'Walfflete oysters' as the best in England and whilst there is some confusion as to the exact location and extent of Walfflete as used by various authors, it is the former name for the Crouch estuary (and from which Wallasea derived its name). Norden thought the location to be the northern extent of the estuary along the south-east side of the Dengie, and at that date the river followed a different course, through the Ray Sand channel which ran across what is now the south-east corner of the present Dengie peninsula, and it is likely that some former areas of oyster layings have been lost as a result of continued reclamation of the Dengie in the 17th and later centuries. The extent of oyster cultivation on private layings on the Roach and Crouch, especially between Paglesham and Wallasea is attested in wills of the late 16th and early 17th centuries. The will of William Thornton (1558) refers to oysters and brood on the laynes of Clam Fleet Marsh 'to be taken at all such reasonable times according to the custom of the county'. William Coake (1583) left his part of the lease of Cocks Hall Layne, Thomas Cocke (1591) left his house with oyster laynes and all the oysters on it, Thomas Saster of Great Wakering left one oyster layne in 1595, with other laynes bequeathed by John Seaborowe of Little Wakering in 1580, and John Ladd of Little Wakering who left two laynes in the manor of Burnham in 1591 (Emmison 1976).

The oyster industry thrived in the Crouch in the 18th century, the fishery being leased to groups of companies of local oyster merchants from early in the century (Page and Round 1907). In 1780, a group of five of these merchants established the Burnham Oyster Co. and by 1800 the company employed ten boats and thirty to forty men. The value of the cultivation was such that it merited the construction of a watchtower placed to enable views over the fattening grounds three miles downstream and over all of the layings to the north shore of Cliff Reach (Benham 1993). Layings are recorded in the sale particulars of 1848 which lists layings in the River Crouch in the parishes of Hockley, Stambridge, Althorne and Paglesham (ERO D/DJe/E38).

The distribution of pits may reflect the location of private grounds, which as has been seen were recorded from at least the late 16th century. However, until 1867 the river downstream of Paglesham, where few pits have been recorded, was common ground. The south side of the river also remained common ground, although it is not clear whether this relates to manorial ownership, or is a reflection of different local conditions. The lower reaches of the River Roach were enclosed by Act of Parliament in 1864, which gave exclusive rights to cultivate oysters in certain parts of the Roach in the parishes of Foulness, Great Wakering, Paglesham, Great Stambridge and Canewdon to the Roach River Company. The company began operations in 1867, and by the early 20th century the company employed some 140 men and fifty pits had been dug in the salt marsh. It is possible that these include many of those to the east of Paglesham, although some could have belonged to the separate fishery that was established at Paglesham in 1874 covering parts of the Roach in the parish of Paglesham (Page and Round 1907).

On Wallasea, the oyster industry was primarily focused on the west and east parts of the island, round Lower Barns and Paglesham Pool. An 18th-century sale

catalogue relating to Pool Marsh Farm refers to layings presumably in Paglesham Pool. The northern side of the island was only suitable for a limited number of layings, although a map of 1740 (ERO D/Dmy 15M50/96) shows some layings along the northern shore and there were also oyster layings owned by Ferry Farm in the early 19th century. By 1898, a group of large rectangular pits had been cut into the marsh between Gardeness and Overland Points (Heppell 2002). Posts shown close to the pits could represent division of the area into tenancies — these pits are still visible on the marshes together with a number of abandoned vessels that may have been associated with the industry (Heppell 2002, 34–5).

Blackwater

The Blackwater was a natural source of oysters and for much of its history remained common ground, and it is this which probably explains the absence of oyster pits along much of its length. Much of the river that had been common ground until the 19th century, was granted in 1868 as a 'several' (private) fishery, covering c.350 acres in the bed of the river below low water, to the Fish and Oyster Breeding Company Ltd, subsequently taken over by the Tollesbury and Mersea (Blackwater) Oyster Fishery Company. Relatively few oyster pits have been located along the inner Blackwater estuary west of Tollesbury, the main group along this stretch being the group along the west side of Northey Island (EHER 16412). Some early oyster layings are recorded along this part of the river, for example a marriage settlement of 1752 named one of the lesser creeks near Ramsey, on the south side of the Blackwater, as 'Oyster Laying Creek' (ERO D/DE T 2/40). This contrasts with Tollesbury and West Mersea, where the creeks were under manorial control and intensive activity took place and private layings existed from an early date. The numerous creeks and marshes around Tollesbury Fleet, Old Hall Marshes, the Salcott channel and the Strood, West Mersea are packed with surviving pits (Fig. 5.9).

The marshes east of Tollesbury, at the head of Tollesbury and Woodrolfe creeks, are dissected by numerous small creeks between which pits (EHER 16718) occur both in small regular groups and in random orientations, within which few groupings of more than five are discernible. The majority of the pits are small, 1–1.5m in length, and none are depicted on the OS 1st edition 6-inch map. Downstream there are a few surviving examples on Great and Little Cob islands although others may have been lost to erosion. On the Chapman and Andre map (1777) these are shown as a single island, although Great and Little Cob are separate on the OS 2nd edition 6-inch map (sheet 46). None have been recorded on the north side of Tollesbury Fleet, south of Old Hall Marshes, but there is a particular concentration between Old Hall Marshes, West Mersea and Feldy Marshes on marshes and islands of the outer Salcott, Thorn and Strood channels, where both disordered and highly ordered clusters of pits occur (Fig. 5.9). The three groups on the east side of Old Hall Marshes (Fig. 5.9: EHER 9987, 16714 and 16705) are very regularly laid out, mostly in parallel lines, and in the southernmost (EHER 16705) linking channels between the pits are still clearly visible. They are not on the OS 1st edition but were clearly dug shortly after as they are depicted as belonging to the Blackwater Oyster Company on an 1890 map (ERO D/B

3/3/578/20) of the Blackwater and its tributaries. The company had layings in the Salcott channel as well as fattening grounds off the Nass (the easternmost point of Tollesbury Wick). Of equal regularity are the clusters on Packing Marsh (EHER 9997) and the west end of Cobmarsh Island (EHER 9988), shown on the same 1890 map, the former belonging to the Company, but those on Cobmarsh being largely private pits. It also shows the location of private layings along the Strood channel, and private pits east of the Strood channel. A fairly regular pattern is discernible amongst some of the pits on Ray Island (EHER 16236) and the east side of the Strood channel (EHER 2232). However most of these and the sites on Feldy Marshes (EHER 16704), Sunken Island (EHER 16704) and the rest of Cobmarsh Island (EHER 16705) are more dispersed and random in orientation.

Of all the recorded pits between Tollesbury and Mersea, only one small group, on the western tip of Mersea is shown on the 1881 OS 1st edition 6-inch map sheet 46. Whilst there were oyster grounds at West Mersea from at least the 11th century, little is known of their history. The area between Mersea and the mainland is one that has seen significant geographical change in recent centuries. Layings in Thorn Fleet and the Ray channel are known to date from the late 18th century, as these channels were not in existence before that time. Only a single channel, Pyefleet, is shown on the Chapman and Andre map, with an extensive area of marsh to the west encompassing what is now Feldy Marshes and Sunken Island. Cobmarsh Island, then joined with Packing Marsh Island, lay between these marshes and West Mersea. In 1708 the island was leased to oyster fisheries for an annual rent of £2 and two double barrels of Pyefleet oysters (Gramolt 1960, 306). After embankment of the Feldy marshes in the late 18th century, tidal scour directed by the new sea walls scoured out the two channels, Thorn Fleet and Ray channel (Benham 1993). Layings only came into existence here in the late 19th century when they were awarded to the Tollesbury and Mersea Company. It is in these areas, on Feldy Marshes and Ray Island, where the pits show disordered and rather haphazard arrangements.

Some of the late 18th-century evidence comes from the records of a Protection Association started in 1789, which operated until 1829 and whose membership collectively owned over 100 layings (Benham 1993, 74–5). In 1807 the Mersea layings comprised seventeen in the Fleet above and below the Causeway (said to be a walkway connecting the north end of Packing Marsh Island with West Mersea), seventeen in Salcott Fleet, seven in ‘Little Ditch’ and five in Tollesbury Creek. References in the Association’s records to marshes at Salcott are thought to relate to shore pits (Benham 1993, 75). Buzzen Creek (now Besom Fleet) is first mentioned in 1824 when the records of the Association list one laying and one marsh. A group of thirteen pits (EHER 16749) has been recorded on the east side of the Fleet at the end of Mersea Island. Not all of the pits need relate to husbandry of the oysters as they could also be used to collect oysters ready for sale. This was the case by the 19th century in Mersea, which by then was working almost entirely for Whitstable in Kent. The most accessible pits were used to collect fully grown oysters for sale, whilst immature and brood oysters would be gathered into more distant pits for overwintering (Benham 1993).

Colne

The Colne fishery has also been claimed as the oldest established oyster fishery in Britain (Page and Round 1907). Relatively few oyster pits have been recorded in the Colne, and like the Blackwater this may in part relate to its long status as common ground. Two main concentrations of pits are recorded, on the west side of the Colne in the creeks north of Mersea Island, and at Brightlingsea.

On the west side of the Colne estuary sites have only been recorded on Pewit Island (EHER 16806, 11209) in the Pyefleet channel, Rat Island (EHER 16948) in the Geedon channel and on the tip of the Geedon saltings (EHER 16947). All generally show a moderate degree of regularity, within which subgroups appear to be fairly small. None appear on the OS 2nd edition 6-inch map. Pewit Island lies within the parish of Langenhoe, one of the riverside settlements which challenged Colchester’s claims to the river, in this case as early as 1362 (Cooper 1994).

Despite Colchester’s claim to the river, many manorial lords disputed these rights. It appears to have remained common ground until the early 17th century, but from the 1650s, private layings seem to have appeared, or at least increased in number and references to oyster layings begin to appear in wills (Emmison 1976). From 1683, the fisheries were leased out by the Corporation rather than worked directly and it is from the 18th century that systematic oyster cultivation on roughly modern lines began in the Colne (Page and Round 1907). There is documentary evidence for use of private layings and overwintering pits at an early date, although these do not always equate to recorded pits. Although none was visible on available air photography, for example, documents refer to the rent of oyster pits from the Lord of the Manor at Wivenhoe in 1563 (ERO D/DU 65/72; ERO D/DA A3). Wivenhoe was also well known for oysters in the 18th century and a group of oyster pits is depicted on a 1791 map of Wivenhoe and Elmstead (ERO D/Det/P8), which shows a small cluster of pits on the east bank of the Colne opposite the mouth of the Roman river. These appear to have been destroyed by later development of the riverside. There are other references to pits in the 18th century, for example, Defoe in 1722 described oysters being taken from Colchester waters and laid in beds or pits on the shore to be fattened before sale (Page and Round 1907). Morant (1768, 186) noted that in the west side of the channel at Rowhedge oysters were preserved in proper pits or reservoirs to be conveyed from there to Colchester or further afield.

In the 1880s, the layings in the Geedon creeks, together with those of Tollesbury north and south channels were formed into the Colchester Native Oyster Fishery Co Ltd, although this had only a short existence until 1908 (Benham 1993, 70–1). None of the mapped pits around the Geedon creeks appear on the OS 1st edition 6-inch map (Sheet 46), and it is likely that they relate to this company rather than to earlier private exploitation.

A much denser concentration of pits occurs along Brightlingsea Creek south of the town of Brightlingsea, and includes entire coverage of Cindery Island in the middle of the channel (Fig. 5.10; EHER 16949, 16950, 16951, 17022). Those on the south shore have the most regular arrangement, in terms of both their size and layout, although these are less ordered and not as densely packed as the examples on Old Hall Marshes. Some component



Figure 5.10 Oyster pits along the Brightlingsea Channel and Cindery Island (copyright Essex County Council BW/95/7/5)

groups of up to ten can be suggested, although the overall even distribution of pits makes such identification difficult. On Cindery Island and the north side of the channel more disordered arrangements prevail. Only some of these pits are depicted on the OS 1st edition 1881 map (Sheet 47), namely a small group east of Stone Point on the south shore, and those on the north shore (EHER 16949, 17022), which suggests that the Cindery Island pits date from the end of the 19th century at the earliest. The associated layings are shown on an early 20th-century map reproduced by Benham (1993, 38–9). The OS 1st edition map also shows a group on the marsh adjacent to what is now the western promenade at Brightlingsea, in an area now occupied largely by landing stages. It is likely that expansion of the town compelled removal of oyster cultivation to other parts of the creek.

Like the Colne itself, cultivation appears to have expanded considerably in Brightlingsea from the mid 17th century, including the use of pits for producing green bearded oysters. In the 1650s, the new lord George Thompson, initially prohibited pits on the saltings but, perhaps recognising the profits to be made, later reversed this decision, going on first to charge rent for pits. From the 1670s, he granted layings in Brightlingsea Creek (then known as Borefleet) as copyholds (Cooper 1994). It has been suggested that the change was made in agreement with all the commoners, something which would explain

the division of the channel into numerous small layings, which were described as innumerable in mid 19th-century directories, and in 1863 were estimated to number around a hundred (Benham 1993, 84). This would fit with the appearance of the pits in this area, with only small possible sub-groups. It is surprising that more do not appear on the 2nd edition OS sheets. Most would appear to date from some time in the late 19th century, and native cultivation ended at Brightlingsea sometime shortly after. By the early 1900s, the creek had been restocked with re-laid foreign oysters which were cleared in winter (Benham 1993, 84), and thus presumably did not have the same requirements for pits.

The peak of production was in the late 19th century, with the decline from the 1880s resulting from typhoid caught from oysters grown in contaminated water, and the destruction of stocks by slipper limpets introduced from the USA.

Thames

Few pits have been recorded along the Thames. The main site lies on the south side of Two Tree Island, in Hadleigh Ray (EHER 14737), comprising eighteen pits in at least three groups. The largest group, ten pits, is regularly laid out in a line parallel to the sea wall, the pits all with long axes perpendicular to the wall. The others show a less ordered arrangement.

There are records of oyster layings at Southend (Southchurch) dating back to 1381, although cultivation appears to have died out during the succeeding centuries. It seems to have started again very early in the 18th century when the quality of potential fattening grounds at Southchurch was once more recognised, in an area which could also benefit from its proximity to London (Morant 1768, 296; Pollitt 1947, 28–9). Initially oysters were laid on the foreshore, but by mid century they were being laid on specially prepared beds (Pollitt 1947 31). Pits seem not to have been a particular feature of cultivation here, Morant observing that these areas did not have the ‘conveniency of pits seen around Colchester and Maldon’ so losses were more likely in severe weather (Morant 1768). Grounds at Milton, near Prittlewell were also used with oysters being brought in from Dorset and Sussex (Page and Round 1907). Other parts of the Thames were also favoured for oyster production, with a significant industry in the 18th century. Leigh and Hadleigh also possessed natural and artificial layings. The 1799 OS drawings for the 1st edition 1-inch sheets show Oyster Creek at the east end of Canvey Islands leading to Hadleigh Ray.

Trade in the areas seems to have peaked in the 1850s, when it benefited from rail transport to London, with 467 tons of oysters despatched there in 1855. Almost all of the layings had been abandoned by 1872, the peak of production on other parts of the coast (Benham 1993). In part this was probably a consequence of pollution from the developing resort of Southend and the growth of London.

Tendring and Stour

In the north-east of the county, the only probable oyster pits recognised are on Hamford Water (EHER 17238), a small group consisting of three pits on Kirkby Creek. The absence of pits from Hamford water is not surprising because, although offering large expanses of salt marsh and self-sown oysters of good quality that offered scope for cultivation, it was felt that the muddy nature of the substrate would make this an expensive operation. The area appears to have remained common ground until the 19th century when some attempt at cultivation was made by the Burnham Oyster Company. The operation was shortlived and, following a grant of 190 acres in 1882, operations had ceased (Benham 1993, 83). Similarly, the lack of pits in the Stour is also thought to reflect genuine distribution as this river does not appear to have had an organised fishery, the river remaining common ground. Oysters were caught near Harwich in the mid 18th century, but not cultivated along the estuary (Page and Round 1907). Weaver (1975, 7) notes a reference to oyster beds in Harwich harbour from which oysters were dredged for fattening in the Colne. Oyster lays or pits existed in the creeks between the Ray and Dovercourt and were advertised for rent in 1750 (Benham 1993, 80) but it is likely that these have been destroyed by reclamation in the area, including development of Parkeston. In 1800, there were oyster beds in the harbour at Harwich although most of the dredging was done by men of Brightlingsea who took the spat to fatten in the Colne and so it is not likely that there were associated pits (Weaver 1975, 104).

Mapping the industry

Clearly there was considerable exploitation from the medieval period, but it appears that it was only after the

crisis in the early 17th century resulting from overfishing that oyster ‘farming’ developed. To some extent this seems to have been limited by the continued status of some waters as common ground. Similarly the use of pits, if not introduced, seems to have increased at this period, although the most significant increases appear to relate to the major expansion of the industry in the mid 19th century, when much common ground was enclosed by Act of Parliament and became private fisheries controlled by a relatively small number of Companies. The expansion of the industry at this time was no doubt helped by a number of factors including rising population and the expansion of the railways which offered rapid transport. It was followed by a significant decline later in the 19th century, in part a result of declining brood and spat on the offshore breeding grounds despite measures for their protection, including provisions for enclosure of the seabed (Neild 1995). Pollution from sewage that rendered oysters as potential health hazards also played a part.

Care in interpretation is needed, as pits were also dug into the salt marsh for other purposes. Lines of roughly rectangular pits just seaward of the sea walls following the line of these embankments are visible at a number of locations around the coast. Whilst showing some similarities to the oyster pits, their location and layout suggests that they are more likely to be borrow pits for construction or, more probably, maintenance of the sea walls. They include EHER 14551 on East Tilbury Marshes on the Thames, EHER 14981, 14980, and 16036 on the Dengie peninsula, and EHER 17367 near Little Oakley. Pits cut into the marsh might also be used for fish; a line of tidal ponds is depicted on the present OS 1:10,000 map sheets at Stow Creek, North Fambridge. Pits at Bradwell on the Blackwater, initially interpreted as oyster pits, are depicted as fish pits on the Tithe map (ERO D/CT 46B and D/SD 131). Fish pits are also recorded at Mundon where they are shown on a map of *c.*1800 (ERO D/DW P10) as irregular pits in the salt marsh adjacent to Lawling Creek. Further examples are indicated by field names on the Goldhanger Tithe map; two of the fields are named Nether and Further Fish Pit Marsh (Fawn 1996).

It is tempting to suggest that the more disordered and smaller pits are possibly the earliest. However, available dating evidence indicates otherwise, with many of the pits of the end of the 19th century or later often in very irregular arrangements such as those on the marshes east of Tollesbury. However, few of the recorded pits have yet been assigned a reasonably certain date. Indeed, if the 1st edition OS map (Sheet 46) is an accurate record of the pits in existence at that date, then a significant proportion must have been dug at or after the end of the 19th century. Similarly the distribution of pits is only a partial indicator of the extent of the cultivation as they were not a universal element of the oyster industry at all times or in all areas.

VI. Wildfowling

During the post-medieval period, another resource which had long been used as a source of food also saw exploitation on a greatly increased scale, namely wildfowl. The use of decoy ponds to catch wildfowl was an activity that became shrouded in secrecy during its practice and one that has received relatively little attention. The Essex Mapping Project has recorded a significant number of duck decoys in the county, though

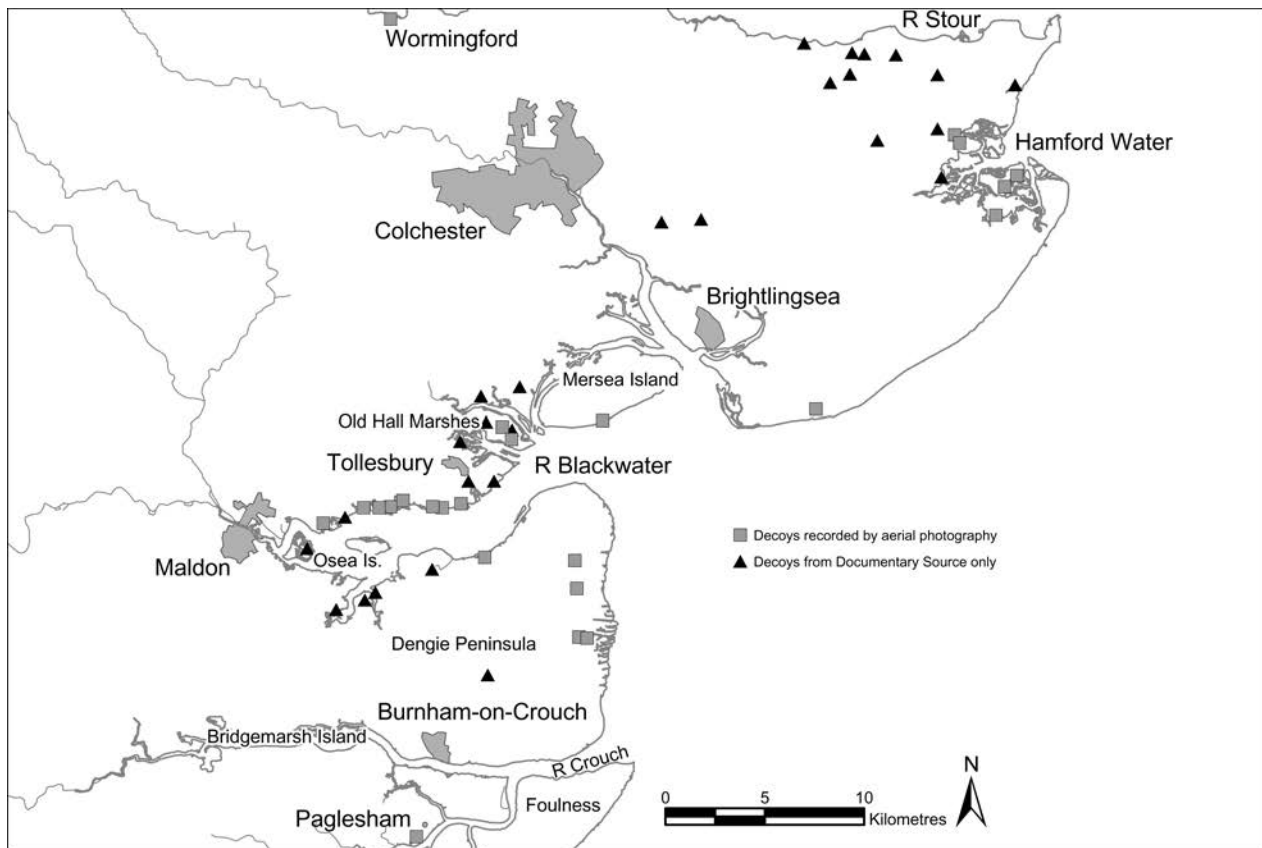


Figure 5.11 Distribution of duck decoys in Essex, including examples recorded by NMP and additional sites known from documentary evidence (the map excludes some further possible examples indicated in documentary sources for which there is no firm information on location)

none are now in operation and few survive in recognisable form, except from the air.

Almost all of the mapped decoys are located on marshland, or former marshland, around the coast (Fig. 5.11) and to a large extent the distribution reflects the location of the coastal marshes. The abundance of decoys in Essex is attributed to the long coastline with wide tidal estuaries bounded by mudflats and marshes which provided extensive feeding grounds, particularly prior to conversion of so much reclaimed land to agriculture. Some decoys survived as earthwork features into the 1950s, and RAF photography of the 1940s and early 1950s has proved a particularly valuable source of information. Others are visible as cropmarks on reclaimed and cultivated areas.

Twenty-four decoys have been mapped in Essex from aerial survey, of which twenty are shown in Figure 5.12. They are particularly concentrated along the north shore of the Blackwater estuary, the Dengie peninsula, and around Hamford Water whilst more isolated examples have been recorded at Paglesham, Mersea, Clacton and Wormingford. The density of sites along the Blackwater, where nine decoys are visible on aerial photography along a 7km stretch (Figs 5.11, 5.13), is particularly marked, although the focus here is not necessarily entirely a reflection of original distribution. Documentary and cartographic sources can add to this total, although the exact number that once existed in the county remains unclear. The majority of the twenty-four decoys plotted from aerial sources have been destroyed mainly by conversion of land to arable use or modification to form

reservoirs. Two almost complete extant examples survive on Old Hall Marshes.

The majority of the Essex decoys share general characteristics of shape, variously described as spiralling (resembling depictions of a spiral galaxy) or star-shaped (Fig. 5.12). In plan, these comprise a central pond, usually roughly circular, with between five and ten pipes which taper away from the pond, curving gently in a clockwise direction. Many of the Essex decoys have six or eight pipes. The former include Marshhouse on the Dengie (EHER 37), Joyce's Farm on the Blackwater (also known as Solley's or Wigeon Pond (EHER 12120)) and Beaumont-cum-Moze at Hamford Water (EHER 17372), although at the latter only one pipe was visible on available aerial photographs. Eight-pipe decoys with roughly circular ponds include Glebe Farm (EHER 2075) and Tillingham (EHER 16004) on the Dengie, and Rolls Farm 2 (EHER 12106), Goldhanger 2 (EHER 16387) and Skinners Wick (EHER 12122) on the Blackwater. Within the general spiral form, some minor variations do occur, both in the shape of the central pond, the number of pipes and the degree and direction in which these curve. Tillingham (EHER 16004) has a more rectangular pond and only seven spiralling arms, though may originally have had eight. A few of the eight-pipe ponds have larger, elongate central ponds, in particular Old Hall 1 (EHER 11560) and Left Decoy (EHER 12105), both near Tollesbury. Two of the mapped decoys have relatively small, square ponds with four relatively long pipes, at Bradwell Wick (EHER 12172) and Old Hall 2 (EHER 16282).

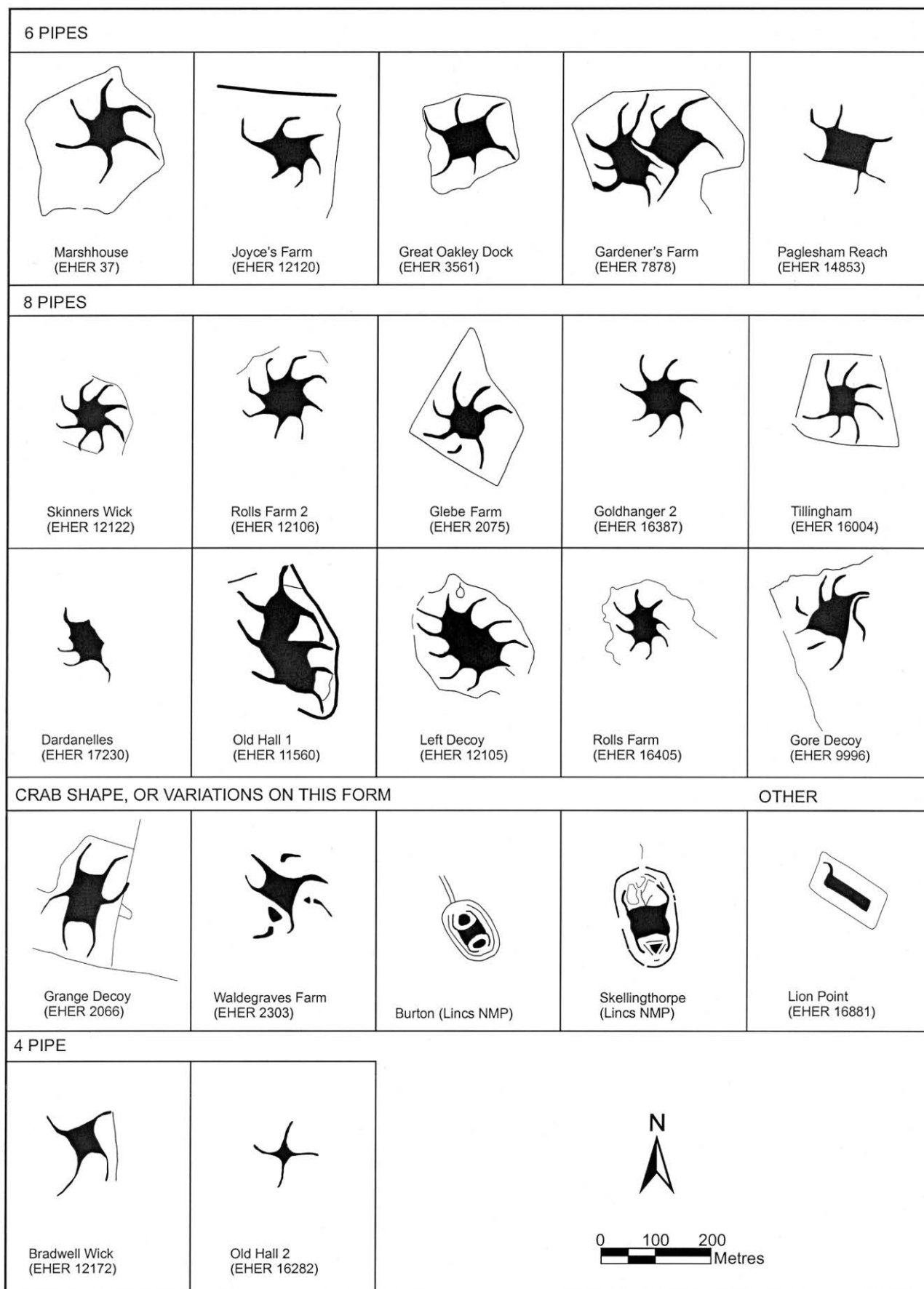


Figure 5.12 Comparative plans of mapped Essex decoys, with two examples of decoys mapped by Lincolnshire NMP



Figure 5.13 RAF aerial photograph taken in 1946 recording three duck decoys along a stretch of the north shore of the River Blackwater. From left to right: Rolls Farm (EHER 16405), Rolls Farm 2 (EHER 12105) and Left Decoy (EHER 12105). (RAF 106G-UK-1707-3387 held by National Monuments Record)

There are few of a form often described as ‘crab-shaped’, which are more common in other counties, in particular Gloucestershire (*e.g.* Berkeley New Decoy), Somerset (*e.g.* Sedgemoor), Yorkshire (*e.g.* Watton) (Payne-Gallwey 1886) and Lincolnshire (*e.g.* Burton, recorded by the Lincolnshire NMP project). These decoys have a rectangular pond, with a pipe extending from each

corner parallel with the long side of the pond, but on each short side the pipes curve slightly towards each other in a form resembling ‘mermaids purses’. Occasionally there are additional pipes from the centre of the short sides as at Compton Dundon, Somerset. Two Essex decoys do have a distinctively rectangular pond. Great Oakley Dock (EHER 3561: Fig. 5.12) has six spiralling pipes extending

from each of the corners and the centre of the long sides and in this respect resembles the other spiral decoys. Paglesham Reach (EHER 14853; Fig. 5.12), has an unusual arrangement of six pipes extending from the corners, with two pairs attached to diagonally opposed corners. Essex Grange Decoy (EHER 2066; Figs 5.12, 5.14) most resembles the crab-shaped decoys, having a rectangular pond from which two of the six pipes curve anticlockwise, although this has pipes from each corner and the centre of the long sides. EHER 2303 bears some similarity, and may have been modified from an earlier star-shaped decoy as indicated by the remains of detached pipes recorded around the pond.

History of decoying

The art of decoying wildfowl in order to facilitate catches has been practised since at least the medieval period, although the techniques have changed. The use of decoys in England is documented from the 13th century (Glegg 1943, 191), and for example, there are records of the theft of some 600 wildfowl from the Abbot's Decoy at Crowland Monastery in the early 14th century (Payne-Gallwey 1886). At this time decoying appears to have involved use of either natural or manmade bodies of water to attract ducks which were then driven into nets by an advancing line of men and boats. The main catches were in the summer months and the depletion in the wildfowl populations engendered by wholesale removal of fowl (particularly of young birds) prompted legal action. An Act of 1534 prohibited the taking of fowl between 31 May and 31 August each year. Nonetheless this technique of driving ducks continued in use into later centuries, for example there is a record of up to 4,000 birds being caught during a single drive in Deeping Fen, Lincs, in 1676 (Harting 1888). Some of these ponds also appear to have made use of pipes (Payne-Gallwey 1886, 5) although these were larger than for the later decoys, fewer in number and were probably not as curved. A new method of using ponds to entice ducks along narrowing channels into nets appears to have developed during the 16th century, probably on the continent, and to have been later introduced to England from Holland. Most authors acknowledge the earliest reliable reference to a pipe decoy to be that of John Evelyn writing of the decoy constructed by Charles II in St James' Park, although Payne-Gallwey also quotes a reference to a 'koye' which he suggests may document construction of a pipe decoy in the first quarter of the 17th century (Payne-Gallwey 1886). It is possible that arrival of Dutch expertise for the draining and embankment of marshes in the 17th century was accompanied by expertise for construction of decoys.

These new decoys, the pipe decoys, exhibited considerable variation in form, but shared a number of key characteristics in which they differed from the earlier driving ponds. The ponds tended to be relatively small, the central pond of between 0.4 and 1.5ha in area and a depth of only *c.* 1m, with a number pipes or channels curving and narrowing away from the pond up to *c.* 65m in length. In use these were lined with screens of reed or wicker, enabling the decoyman to remain concealed, the aim being to entice the wildfowl into netting at the narrow end of the pipe for capture (Fig. 5.14). The direction of the pipes was dictated by prevailing winds, as ducks will only take off into the wind. A supply of slow flowing water was required to maintain freshness and prevent freezing in

winter. The success of a decoy depended on its quiet situation to attract the wildfowl and the whole decoy was often sited within an enclosure of natural or specially planted woodland, which afforded shelter from the wind, and seclusion. Some of the most successful decoys had catches of several thousand ducks per year, a considerable financial return, which helps explain their popularity.

In the post-medieval period some decoys were built, or at least used, for driving as well as enticement, notably for catching pochard. These wildfowl (also known as dunbirds) could not be caught by enticement in the same way, the technique used being to drive the ducks to flight at which point they would be captured in nets strung from poles. Accordingly the pipes were not necessary and whilst some pipe decoys were also used to catch pochard, some were particularly designed or modified for the purpose. Conversely some pochard ponds might also later be converted to pipe decoys. Some decoys were specifically constructed as teal ponds, although these tended simply to be small pipe decoys.

Essex decoys

The Essex decoys collectively appear to span the known period of use in Britain as a whole. However, individually many of the decoys are as yet poorly documented with regard to date of construction and use. Early maps often show decoys in representational rather than truly depictive style and so contribute little to the discussion. A combination of cartographic and documentary sources can elucidate the development of decoying in Essex to some extent, although the use of similar terminology for both decoys used for driving and enticing, necessitates caution when assessing development of particular types. Also the scale and accuracy of some of the early county maps in particular presents some difficulty in equating these to either mapped or documented decoys in the county. Further ponds could be used for different catches and methods during their lifetime, not necessarily with significant modifications to their design.

17th century

Essex appears to have been amongst the earliest parts of the country to adopt the use of the new form of decoys, and this may relate at least in part to the process of inning. As noted above this period saw an increase in the rate of embankment and reclamation of marshes mainly for pasture, providing conditions that were particularly suited to the decoys. It provided land that was free from regular flooding but at the same time benefited from the almost ideal conditions that grazing marshes could offer for the operation of decoys — close to the estuaries to attract wildfowl, whilst remaining relatively remote, and undisturbed by agricultural or other activities. The county's close association with Holland at this time may also have facilitated their development here.

A number of the pipe decoys plotted may originate in the 17th century, although there are some difficulties of equating individual ponds with documentary references, for example where there was more than one in the same parish, and clearly in some instances decoys were replaced by new ponds in the same locality. Thus although there is a reference to 'Decoy Marsh' Tollesbury in 1663 (ERO D/DA T416), which relates to a decoy on Old Hall Marshes (Gramolt 1960), it is probable that this refers to neither of the two ponds (EHER 11560, 16282) recorded



Figure 5.14 Grange decoy, Dengie. This photograph, taken in 1957, shows the screens and nets of the working decoy in place (copyright CUCAP VB83)

on these marshes surviving as water-filled earthwork features. In addition to these two (cartographic evidence points to at least one more, perhaps two, decoys on Old Hall Marshes at one time. One is indicated on a map of 1827, the other on the Tithe Map (Barker 2000, figs 3, 5), the use of the field name element 'old decoy' suggesting that both were out of use (and possibly infilled) in the early 19th century. They could both have been constructed quite early, as inning of Old Hall Marshes appears to have been well advanced by the end of the 16th century, including twenty acres reclaimed in *c.*1598 by Thomas Gardiner (Barker 2000). A map in Morant (1768) shows a decoy east of Old Hall (but probably west of EHER 11560) at a location where none was visible on aerial photography. This and the location of another infilled pond are indicated by placenames on a map of 1827 (Barker 2000). No decoys are depicted on Old Hall Marshes on the 1799 OS drawings or on the 1840 Tithe Map, suggesting that the two mapped ponds were constructed sometime in the mid

to late 19th century, replacing earlier decoys on these marshes.

Two decoys are recorded on adjacent fields east of Grange Farm, Tillingham, on the Dengie peninsula. One (EHER 16004: Fig. 5.12), a decoy with a square pond and seven spiralling pipes, is visible on aerial photography only as a cropmark feature. To the west, Grange Decoy (EHER 2066: Figs 5.12, 5.14) is a more crab-shaped example which remained visible as an extant waterfilled earthwork on vertical photographs of 1953 (CUCAP LZ92) and would have replaced EHER 16004. A sale particular of Tillingham Grange Farm made in 1669 (ERO D/Dac 363) refers to a decoy on the farm, and it is possible that this can be equated to EHER 16004. However, neither pond is shown on the 1777 Chapman and Andre map, though whether this indicates that the decoy remained as a pond but was simply not in active use, or that the 1669 document refers to a third pond, is not clear. EHER 16004 is likely to be the pond referred to in a faculty made by the

Rev Bate Dudley in 1816 for filling in of the 'Grange decoy' (ERO T/B 201/15). It may only have been partial infilling at that date as this decoy appears as a pipeless pond, labelled Old Decoy on the 1838 Tithe Map (ERO D/CT 361B), which also shows a second pond (EHER 2066) in the field to the west, then named Decoy Marsh.

Old Mose Hall Decoy (EHER 17372) could also be of 17th-century date. It appears on a map of 1688 as a six-pipe pond although Gramolt (1960) suggests (though does not indicate why) that the pond may have been added to the map at a later (unspecified) date. Some areas of marsh at Beaumont-cum-Moze had been embanked by 1617 and enclosure of another 300 acres is recorded in 1688 (Gramolt 1960). The land on which the decoy is situated is not depicted as marsh on the Chapman and Andre 1777 map, but is shown on a map of 1780 (ERO D/DBm P3) to the north of Arnold's Wood as a four-pipe pond, resembling that on Old Hall marshes. When listed by Payne-Gallwey (1886) it was a six-pipe pond.

Similar dates and a range of forms have been noted for the earliest decoy ponds in other counties. Some resemble the Essex spiral decoys, for example Westbury, Somerset (recorded as having been in existence before 1635), Borough Fen, Northants (an eight-pipe pond, first referred to in 1670) and Boarstall, Bucks (constructed between 1691 and 1697). Others are crab-shaped, including a four-pipe example at Skellingthorpe, Lincs, (built near the end of the 17th century, with a surviving lease dated 1693) and three six-pipe decoys in Somerset, Aller Moor (built in 1676), Nyland (for which there are leases from 1678) and Compton Dundon (built in 1695)

18th century

The Reverend T. Cox, in his 1720 *Magna Britannica*, stated of Essex that 'by the sea-side there are divers decoys which bring in great profit to the owners in the winter seasons' (Glegg 1943, 202). Many of the Essex decoys appear to have been built during the 18th century, including several of those on the Blackwater, around Hamford Water and Dengie. Most of these have six or eight pipes and include some of the larger ponds. This century saw continued embankment of marshes and by the last quarter of the century, sea walls around much of the Essex coast had attained roughly their present position. Many decoys are depicted on maps of this date including Bowen (1749), Morant (1768) and Chapman and Andre's Map of Essex (1777), and the OS drawings of the late 1790s for the OS 1st edition map sheets in the Essex Record Office. However, again caution is needed in using cartographic sources for dating evidence. Not all the decoys that are documented to have been in existence by the 1770s century are depicted on the Chapman and Andre map, adding another element of doubt in ascertaining dates. It is not possible to be certain whether this indicates that ponds had gone out of use, or even that they were not mapped as a result of secrecy on the part of the owners to protect their interests.

One of the earliest, Steeple Decoy, was built in 1713 at a cost of £176 11s 4d and enlarged eight years later in 1721 at a further cost of £130 3s 0d (Payne-Gallwey 1886, 80–81). Unfortunately, although this is the only decoy in Essex for which at present there seems to be a definite date of construction, no trace has been found on the ground and its form is unknown, though its location is shown in Morant (1768). Many of the marshes along this part of the

south shore of the Blackwater were reclaimed at an early date, with documented examples of inning at Mundon in 1527 (Gramolt 1960, 77). The area may have included another fairly early decoy at Latchingdon which appears on the 1749 Bowen map. West Wick (EHER 12172), also on the south side of the Blackwater, near Bradwell, visible on aerial photographs as an extant earthwork feature, is at the location of one of the decoys depicted in Morant (1768), but is not shown on the Tithe Map (ERO D/CT 46B) although its location was preserved in the field name Decoy Marsh. The four-pipe pond recorded resembles the 19th-century teal pond on Old Hall Marshes and it is possible that EHER 12172 had been built in the same location as an earlier decoy.

Several of the decoys on the north side of the Blackwater were also constructed during the course of the century. Left or Bohun's Hall Decoy (EHER 12105), an unusually large decoy with nine spiralling pipes on the north side of the Blackwater was in existence by 1738 (Gramolt 1960) and is one that does appear on the Chapman and Andre map, and on the 1799 OS drawings.

Several of the eight-pipe spiral decoys date from this period. The westernmost of the two adjacent ponds within a single area of woodland at Gardener's Farm (EHER 7878; Fig. 5.12) decoy was in use in the mid 18th century. Christy (Glegg 1942, 217) claims that there was a decoy here by 1735, worked at that time by John Coope who was drowned in the high tide of that year, and this may be the pond indicated in this general location on the 1768 Morant map. Only a single pond is shown on the Chapman and Andre map 1777. Large catches are recorded for the decoy in the late 18th century when the pond belonged to Thomas Lee. Arthur Young in his *Agriculture of the County of Essex* (published 1807) noted that a catch of one wagon load and two carts of pochard were caught in one haul, and at this date the decoy may not have been a pipe decoy (Glegg 1942, 217). By the 1840s, the easternmost pond had been constructed, and is the only one shown on the Tithe survey which records a five-pipe pond here set in a wooded area and covering four acres, together with a decoy house and garden (ERO D/CT 150). Both ponds are shown on the 1881 OS 2nd edition map (Sheet 14). The eight-pipe pond at Rolls Farm 2 (EHER 12106; Fig. 5.12) appears on the Chapman and Andre map whilst that at Goldhanger 2 (EHER 16387; Fig. 5.12) was described as recently made in 1783. This may also be the pond indicated by the legend 'decoy' on the 1781 Carrington Bowles New Pocket Map of Essex. The spiralling eight-pipe ponds at Skinners Wick (EHER 12122; Fig. 5.12) and Rolls Farm (EHER 16405; Fig. 5.12) had been built by the end of the century, when they were depicted on the 1799 OS drawings. Gore Decoy (EHER 9996; Fig. 5.12), may also have had eight pipes, two of which were later abandoned, visible on aerial photographs as detached from the main pond. The decoy appears to be one shown on the 1749 Bowen map and is depicted on the Tithe Map (ERO D/CT 364B) as a four-pipe square pond. Further east, Waldegraves Farm, Mersea (EHER 2303; Fig. 5.12), was in existence by 1777 and underwent some modification during its lifetime with a reduction in the number of pipes from as many as seven to four, and its final form bears some similarity to the crab shaped decoys, although it is less regular. It was in use until at least the mid 19th century, when there is a record of a decoy here in a lease of 1844 (ERO D/Det T147).

On the Dengie, the seven-pipe Glebe Farm (EHER 2075; Fig. 5.12) now infilled but recorded as a cropmark by aerial survey in 1992 (Murphy and Brown 1999, fig. 15) was described as ‘newly dug’ in 1792 (Gramolt 1960). On the Tithe map (ERO D/CT 46B) it is shown as a rectangular pond with six spiralling pipes, with a decoy house. The same map shows the name ‘decoy marsh’ south-east of Sandbeach Farm which may indicate location of a further, earlier, decoy for which no other evidence has been recorded. Henry Bate Dudley occupied Glebe Farm from 1781 when it was poorly drained, and embarked on a programme of reclamation (one which gained him a silver medal from the Society of Arts) with the co-operation of other landowners which enabled the construction of straight walls (Gramolt 1960) and which would have provided suitable land for construction of the decoy. Earlier sea walls to the north, west and south of the decoy have been recorded by the NMP Project. There is conflicting information on date for Marshhouse Decoy (EHER 37) on the Dengie, although a late 18th-century date may be the more reliable. Payne-Gallwey claimed it to be at least 200 years old, dating from the time of marshland reclamation in this area, which would place its construction in the later 17th century. According to Fitch (Christy 1890), it was built at the end of the 18th century as part of a reclamation scheme for 300 acres by the Rev Dudley, and Christy noted that tenants were listed from 1795. This would accord with its absence from the Chapman and Andre map, and its depiction on the 1825 Greenwood and 1840 Tithe maps, where it is shown as a seven-pipe pond, although only six pipes were evident on aerial photography.

The two ponds on Horsey Island may both be 18th-century examples. The Dardanelles (EHER 17230; Fig. 5.12) may be the pond shown on an 1804 map of Harwich harbour and neighbouring waters (in Hughes 1939), and the area is labelled ‘Old Decoy Marsh’ on the 1840s’ Tithe Survey. Only five pipes are evident on aerial photographs though the shape of the pond suggests that it may have had seven or possibly eight. It is probably the pond replaced by New Decoy (EHER 17229) sometime before 1774 when it was mapped by Chapman and Andre. New Decoy is an irregular pond from which only two pipes are visible, although it is not clear whether the pond originally had further pipes. Horsey is known to have contained at least some freshwater marsh by 1665 (ERO D/DB T1135) and there are records of sea walls being breached and repaired in 1691 (ERO D/DMn 10).

Two of the six-pipe decoys that appear to have been built at this time have, unusually for the Essex decoys, a very regular rectangular pond. Paglesham Reach (EHER 14853; Fig. 5.12; Strachan 1995c, fig. 2), the only decoy recorded by NMP on the Crouch, might be presumed to date from at least the mid 1700s if Payne-Gallwey is accurate in his information that it was disused from some time in the 1780s. However it is not shown on the Chapman and Andre map. Great Oakley (EHER 3561; Fig. 5.12) on the west side of Hamford Water was described as ‘recently made’ in 1755 (Gramolt 1960) and is shown on the Tithe Survey, which also records a decoy house with garden (ERO D/CT 258B).

Other decoys probably in existence at this time are Peters Point (EHER 17236), south of Hamford Water, the area being marked as Decoy Marsh on a map of 1800, though there is no evidence for the decoy on the Tithe map.

Brooklands, a little way inland to the west of Hamford Water, appears to have been in use in 1787 on the basis of the condition in a lease requiring that the pond is not disturbed (Gramolt 1960). The Tithe map records the placename Decoy Field at Brooklands (ERO D/CT 258B) although nothing is now visible from the air. Gramolt also lists a decoy documented in use between 1739 and 1760 at Beaumont Hall referred to in a lease of a farm on the Essex Estates of Guys Hospital (ERO D/DGh E10). Here, the place names Duck Pond Field and Decoy Marsh are shown on an estate plan of 1780 (ERO D/DBm P3) although no pond is shown on this map. In addition to looking after the decoy, the tenant had responsibility for maintaining the sea walls and bank defending the fleet from the sea (ERO D/DGh/E10). It is possible that a breach in the sea wall led to the demise of this particular pond.

Comparable morphology and dates are found amongst ponds from elsewhere in East Anglia and further afield. Examples include the six-pipe Friskney Decoy, Lincs, which was in existence by 1774; Iken Decoy, Suffolk, shown on a map of 1753 (Suffolk HER IKN 011 – SSF12150) and Chillesford, Suffolk, in existence by at least 1783, although the exact date of construction is unknown (Suffolk HER CHF 007 – SSF9118). The eight-pipe decoy at Lakenheath, Suffolk (LKH 124 – SSF9146) was constructed *c.*1736.

19th century

Construction continued into the 19th century in a few instances. Along the Blackwater, Joyce’s Farm or Solley’s Decoy (EHER 12120; Fig. 5.12), a six-pipe star shaped pond, may be of this late date, on the basis of its absence from the Chapman and Andre map, early OS and a map of 1815, or the 1840 Tithe Survey, although this is uncertain as it could be that shown in Morant in this vicinity. There had been some reclamation of Joyce’s and Harveys marshes in 1598 by Sir Thomas Gardiner, although these marshes were embanked in more than one phase (Benham 1977), and a lease of 1837 suggests that by this time some of the reclaimed saltmarsh at Joyce’s Farm had reverted and once again been reclaimed (Gramolt 1960). It is possible that the decoy dates from after this second phase of reclamation although in that case the decoy may have been quite short lived as it went out of use around 1866. Grange Decoy (EHER 2066) is probably also of 19th-century origin.

The smaller of the four-pipe decoys on Old Hall Marshes (EHER 16282; Fig. 5.12), appears to date from at least the mid 19th century as it is not shown on the 1840 Tithe map. It has been described as a teal pond and was short lived, being abandoned by 1888 (Barker 2000). The mapped pond at Bradwell Wick (EHER 12172, Fig. 5.12) may also have been built at this time. Comparable examples are also of relatively late date, *e.g.* Didlington Park, Norfolk, thought to have been built *c.* 1850 (Norfolk NHER32741) for both duck and teal, Ashby, Lincs, built in 1833 (Payne-Gallwey 1886) and one at Escrick, Yorks, dating from about 1830. Similarly, at the time of the Tithe survey, Gore Decoy was also of this form. Not all the ponds of this form were of late date and as has been noted above, EHER 17372 at Old Mose Hall appears as a four-pipe pond on a 1780 estate map (ERO D/DBm P3), though two more pipes were added (Payne-Gallwey 1886).

Lion Point (EHER 16881: Fig. 5.12) constructed in 1860 as a pochard pond appears never to have been used. Its intended use explains the uncharacteristic shape. Two other decoys west of Hamford Water, still marked as such on the current OS map, may also have been pochard ponds, one at Abbots Hall, the other south-east of Copt Hall. That at Abbots Hall was in the 20th century, acclaimed as a good pond for flighting for shooting of ducks. Wormingford Mere was also used as a decoy in the 19th century, and marked as such on the Tithe Survey. A single pipe has been recorded and this may be an example where an existing lake was adapted for the purpose.

Evolving design?

It is clear from the foregoing that attempts to look at changes in form over the 250 or more years of decoy use in the county are hampered by the vagaries of assigning specific dates of construction. In part this is a consequence of the secrecy with which their construction and operation was surrounded, in order to protect catches. Aerial survey has helped fill in some of the gaps of location and form.

In Essex the characteristic six- to eight-pipe starfish ponds appear to predominate during the middle to later 18th century, though some were built in the preceding century. The majority have roughly circular ponds and comparable examples from other counties show a similar range of dates though, as for Essex, absence of firm dates limits the extent to which comparisons can be made. Two of the earlier 18th-century decoys (Great Oakley Dock, and South Hall, Paglesham) in the county resemble the crab-shaped ponds, though so does the later pond at Tillingham Grange which was probably built in the early 19th century. In counties where this form is common they show a wide spread of dates from the late 17th (*e.g.* Cheddar) to the early 19th century (Walton Moor). The small four-pipe ponds do seem to be generally of later date, most of the dated examples having been built in the early 19th century.

Various 19th-century authors propounded theories on the optimum design of decoys. Payne-Gallwey (1886), concluded that three-, four- or five-pipe ponds were the best, stating that a five-pipe decoy would give sufficient option for potential wind directions, and suggesting that too large a number gave insufficient return on the expense and effort involved in construction. However, many of the Essex examples have six or more, and it may be that at the date at which he was writing catches were reduced from those of the heyday of decoys. Some records survive and, whilst too few in number to be sure about how representative they were, do show the highest catches to be in the 18th and first half of the 19th centuries, falling thereafter.

As has been noted above, a number of the ponds clearly underwent at least one phase of modification, which may have been in response to the introduction of new designs to an area, to adapt to falling catches or to attract and trap different types of wildfowl. Some adaptations might result in little change to the general morphology, for example the eight-pipe Left Decoy (EHER 12105) was also equipped with nets and poles to catch pochard (Payne-Gallwey 1886). One of the Goldhanger decoys (EHER 7878) was worked until *c.*1870, although by this time it was used for pochard rather than decoying with pipes, and it continued to be used as a flight pond into the 20th century.

On present evidence there seems to be little indication of a sequence of development in form throughout their period of use. Form may relate more to their general geographical location, whether coastal or inland, and intended catches. It is noticeable that the star-shaped Essex ponds are situated on the coastal marshes, the crab-shaped decoys of Lincolnshire and Somerset having more inland locations. However, the relationship does not always hold true, with star-shaped decoys found away from coastal areas as at Hale, Lancs; Borough Fen, Northants; and Lakenheath, Suffolk. Some similarities of design may be attributable to the influence of a number of well known decoying families, notably the Skeltons, who worked, over several generations, in many counties (including Essex) from the end of the 18th century (Payne-Gallwey 1886). It is George Skelton who is attributed with the introduction of the small, specifically constructed pipe decoys to Norfolk, prior to which pipes had been generally attached to larger bodies of water (Payne-Gallwey 1886).

Gaps in the record

With the exception of Wormingford, all of the mapped decoys recorded from aerial photography are in coastal locations, although documentary and cartographic sources also point to a significant number that once existed further inland. They include a group in the north-east of Tendring listed by various authors including Payne-Gallwey (1886) and Glegg (1942), for example Jacques Hall, Old Jacques Hall, Pond Hall, Wix, Wrabness and Roydon Hall. With the exception of Roydon Hall, depicted as a four-pipe star-shaped pond on 1799 drawings for the OS 1st edition 6-inch map in the ERO, there is currently little evidence for the form of these. A decoy at Salt House, Wrabness is shown on the OS 1st edition map (Sheet 20, 1881) as an elongated pond marked as a decoy but with no pipes evident, and it is not clear whether these were ever present. This map also depicts Decoy Wood east of Bluehouse Farm, the site of Jacques Hall decoy, and although no pond is shown, the size and shape of the wood would fit better with a crab-shaped form than the spiral decoys seen along the coast. Some of these Stour decoys were in use in the 18th century, for example Pond Hall, for which Thomas Hickeringill advertised for a decoyman in 1754 (Christy 1890). This could also be that shown on the Bowen map (1749), north of Pond Hall, and now occupied by a reservoir in Pond Hall Wood. Roydon Hall is shown on the Chapman and Andre map (1777) and Gramolt (1960) notes an 1810 lease for the decoy at Roydon Hall (ERO D/DFg/T13). The location of Old Jacques Hall, Bradfield, is indicated on the Tithe survey (ERO D/CT 44) by the placename Decoy Pond Pyghtle, and is also now the site of a reservoir. Writing in 1886, Payne-Gallwey noted that he was unable to obtain as many details of these decoys as for other ponds around the coast. In Southminster, on the Dengie, a decoy at New Moor Farm is recorded as having six pipes (Gramolt 1960).

Two decoys are documented east of Wivenhoe, at Villa Farm (Glegg 1944, 220), noted by Payne-Gallwey to be an overgrown pool, and Frating Hall (EHER 2439), although it is possible that these were not pipe decoys, and may have been fish ponds. Documentary and placename sources also suggest the existence of other decoys in inland Essex parishes for which no supporting evidence has been

located. A map of Pond Park Farm, *c.* 1775 (ERO D/DZI 9) shows the field name 'Decoy Field'. Glegg (1944, 223) notes a house called Decoy Cottage in the vicinity of the pond which was thought to lie between Pond Park Farm and Leighs Priory. There are two references to a decoy at Boreham in the 17th century, the first a document relating to the sale of land in Great Leighs, Little Baddow, Terling and Boreham including land fenced in called the Decoy (ERO D/DHt/T325/1), the second (ERO D/DHt/T34/10) referring to 'The Decoy' at Boreham. A plan of Audley End House *c.* 1750 (ERO D/Dby/P1) also indicates a duck decoy (Gramolt 1960).

There were also a number of other decoys along coastal areas for which no additional evidence has yet been located *e.g.* Mell House, Tollesbury (Gramolt 1960), Dovercourt, and Northey Island in the Blackwater (ERO D/CT 227), the latter possibly lost after flooding at the end of the 19th century resulted in the loss of 300 acres of reclaimed marsh.

Demise of the decoys

Whilst some Essex decoys were abandoned at an early date (for example South Hall, Paglesham, disused from 1786), many were worked into the 19th century, although dates of abandonment can be as elusive as dates of construction. One of the key sources is Payne-Gallwey (1886), although by the time of his research a large proportion had already been disused for several decades and he provided estimates as to when this occurred. Several factors led to their decline, including the conflicting demands of agriculture, industrial and transport development (including construction of the railways), increase in shooting and the rise in imports from Holland (Harting 1888), which disturbed the quiet conditions on which successful operation relied. The impacts of reclamation for arable farming were being felt in the 18th century and there were attempts to counter them. For example, restrictions against tenants ploughing reclaimed marshes became common lease clauses in the course of the 18th century, seemingly in part a wish to retain traditional methods, which presumably included decoying (Gramolt 1960). The abandonment of the decoys coincides with one of the main periods in the intensification of arable conversion of the Essex marshes, in the mid 19th century, when the introduction of underdraining and steam ploughs facilitated improvement of marshland. It was at this time that large tracts between Tollesbury and Heybridge, one of the main areas of decoy use, were reclaimed. The potential effect of shooting on catches led several proprietors and occupiers of decoys on or around the Blackwater to found an association with the object of prosecuting gunners and puntsmen who disturbed wildfowl in or near the decoys (Glegg 1942, 102). Other owners found shooting to be more profitable: Goldhanger (EHER 16387) decoy was in use in the early 19th century, but had been abandoned by 1852 when its value (5s per acre) was the same as that of adjoining marshland but the shooting was worth £10 (ERO D/DBs T68) (Gramolt 1960). Some pipe decoys remained in use as flight ponds for the shooting of wildfowl. It is possible that the construction of the Manningtree to Harwich Branch line in 1854 contributed to the demise of the Stour decoys. This was the fate of Lakenheath Decoy, Suffolk, once one of the most successful decoys but which was abandoned after the Brandon to Ely railway line was built

(Payne-Gallwey 1886, 167), and others similarly affected included Coatham in the Tees estuary (Heaton 2001).

By the time that Payne-Gallwey was writing in the 1880s, only a small proportion of the decoys in the country remained in operation, and only three were in use in Essex, Old Hall, Grange and Marshhouse. One, at Old Hall (EHER 11560), was abandoned some time around the turn of the century. Two decoys on the Dengie were worked into the 20th century, Marshhouse (EHER 37) until 1915 and Grange Decoy until the middle of the century; oblique aerial photography from 1953 shows it still in use, with netting along the pipes and shutter fencing (Strachan 1995c).

A significant number of the Essex decoys, particularly along the north side of the Blackwater, survived as clearly defined earthworks into the middle of the 20th century, and some, including those on Old Hall Marshes, are still extant. A number are now scheduled monuments, including Gore (EHER 9996), Lion Point (EHER 16881), Marshhouse Farm (EHER 37), Old Hall Marshes (EHER 11560, 16282), and West Mersea (EHER 2303). Yet no trace remains of many others, even in these parts of the county, despite their having ceased working at about much the same time, and the main reason for the difference in visibility appears to relate largely to their topographical location and history of subsequent land use. The decoys mapped from aerial photography are almost exclusively on reclaimed marshes, whilst the Stour decoys on inland locations have not been identified by this survey technique.

VII. Discussion

Aerial photography has afforded a wealth of evidence for the coastal economy between the late Iron Age and post-medieval periods, but provides a picture that is patchy both geographically and chronologically. A significant number of these sites have now been either lost or are surviving in only a degraded condition. Key to understanding both the development and decline of all these industries, and the extent to which they are visible, is the evolution of the coastal landscape.

Whilst relative sea level adjustments provide a background to this, the main modifications to the coastal geomorphology have come about through centuries of embankment and reclamation. It has not been a continuous process of gain, and significant losses have also occurred, particularly through the effects of periodic storms. Barking Abbey pleaded in 1377 (and again in 1380) that it was too poor to fulfil feudal obligations following severe losses through inundation by the Thames, whilst St Osyth Priory petitioned in 1382 for endowments, pleading poverty as a result of inundation (Grieve 1959, 12–13) which resulted in the construction of sea walls along new lines reducing the capacity of the marsh from 1000 to 600 sheep (Taster 1907). In 1688, the tenancy of Marshall's Farm, West Thurrock was noted as void because it had become salt marsh. As late as 1897, 500 acres at Langenhoe had to be abandoned and 300 acres at Northey Island reverted to saltings as a consequence of floods, whilst this storm also breached the sea walls at Fambridge and these were subsequently reconstructed further to landward. Nonetheless, embankment has added thousands of hectares of dry land to the county, with an estimated 42% of the intertidal area

which existed 2000 years ago having been reclaimed (Cottle et al. 2002, 1). However, it has also impacted on depositional environments of the estuaries and the rates of erosion by the rivers. The reduction in width of the estuarine channels has resulted in higher flow velocities and increased bed scour, resulting in continuing erosion of the remaining salt marsh. Whilst the Colne has suffered less from erosion than other estuaries, this is occurring in the mouth of the estuary and Cobmarsh Island is eroding at a rate of 2–3m per year (Medlycott 2000). In the Blackwater, historically bordered by extensive mudflats and salt marsh, now largely reclaimed, the lower inter-tidal mudflats have receded by up to 500m in the period between 1838 to 1978. It is this less dramatic but persistent coastal squeeze and loss of salt marsh, particularly evident in the last century, which is resulting in exposure (and loss) of prehistoric sites and later features at many locations around the coast (including the Neolithic site at the Stumble) (Wilkinson and Murphy 1995). In recent years, as a measure to regenerate salt marsh as a form of sea defence, some reclaimed areas have been deliberately opened to the sea to allow flooding and development of marsh, e.g. Tollesbury where a stretch of sea wall was breached in 1995 (Strachan 1998a, 93). At the present scale these are likely to have only localised impacts, but more extensive regeneration of marsh could have a greater impact on the archaeological resource, and one that has yet to be assessed.

Many of these reclaimed marshes remained pasture into the 19th century, for various reasons both economic and social. The high investment in time and resources required for drainage and levelling of freshwater marsh for conversion to arable discouraged such enterprise whilst their value remained high for grazing and dairy produce. The number of 'wick' placenames on former marshes indicates their continued use for sheep pasture through the medieval period (Rippon 2001, 238), and grazing for sheep and cattle persisted on a large proportion of marshes through much of the post-medieval period. The pattern of landholding might also have mitigated against conversion. Fragmented patterns of landholding resulting from traditional intercommoning meant that tracts of marshland could be complex territorial holdings, held as detached portions of inland parishes, itself an indication of the value (Rippon 2000, 71; Thirsk 2000) and, in addition to their particular value for grazing, individual holdings may have been too small for reclamation to be economically viable. Some of the earliest records for cultivation on reclaimed marsh are from the inner Thames, in particular west of Corringham (Rippon 2001). It was the 19th and particularly the 20th centuries which saw a dramatic increase in the conversion of grazing marshes to arable; English Nature have estimated a 73% loss of coastal grazing marshes between 1935 and 1989 (Buckley 2000, 7).

Whilst it is difficult to isolate cause and effect of these factors on coastal activities, the history of embanking, reclamation and conversion to arable can help to explain some of the distributions seen amongst the features under consideration, but also points to aspects that need further research.

For the salt industry whilst there is apparently a fairly comprehensive record for the late Iron Age–Roman period, this is not necessarily the case. A significant proportion of the known red hills have been identified

from ground-based survey carried out over many years, in large part by the Red Hills Exploration Committee (Fawn et al. 1990). The differences in soil have little if any effect on crop growth and, from the air, they are most readily identified as soil marks appearing as irregularly shaped, dark red maculae with indistinct edges. The majority of archive photographs consulted for the Project were monochrome prints and for areas where these are the sole source of evidence, confidence in identifying irregular marks as the remains of red hills rather than the consequence of agricultural or other, undefined activities is low. Mapping in conjunction with ongoing aerial survey has demonstrated the value of targeted aerial survey, in this case using colour photography carried out as soon as possible after ploughing before spreads of red soil are obscured by growing crops. The most comprehensive record of the distribution of sites is probably around Peldon, the subject of targeted aerial survey immediately after the autumn ploughing. This increased by forty the number of known sites in this locality (Strachan 1996a, plate 1; Green 1999, fig. 12), a significant proportion of the recorded total of almost 400 in the county. It suggests that there are many more sites to be found in similar targeted programmes and it is anticipated that further survey will add to the extensive record of red hills in the county. It is also not yet entirely clear to what extent the known distribution relates to the pattern of embankment, or whether it does more represent the location of the late prehistoric coastline. There is as yet insufficient dating evidence to assess the extent to which sites may have been relocated in response to changing sea levels, although if moved because of falling levels in the early Roman period, some may be buried under later alluvium. Marine transgression during the 3rd century AD seems to have resulted in abandonment rather than relocation of manufacturing sites to landward.

If salt manufacture continued into the later Roman period, similar siting criteria may have dictated the relocation of working sites further to seaward as sea levels fell into the Saxon period, and their subsequent loss in coastline modification, including further rise in sea levels, over subsequent centuries. Changes in technology, whilst affecting the nature of the archaeological remains that might be found, does not seem a reasonable explanation for the almost complete absence of evidence. The limited physical evidence of medieval and post-medieval salt manufacture is difficult to explain, given the number of documentary references to salterns. By the time of Domesday the coastline would have been much the same as that of the present day. Following levelling by ploughing, in the absence of red earth these would be less easily recognised than their late Iron Age/Roman red hill counterparts. Saltmaking at this date is also indicated at a number of areas where earlier evidence has not been found, in particular along the Stour, where the marshes were less extensive. Whilst this may be a genuine absence of salt production at an earlier date, the possibility of manufacture here in earlier periods should not be ignored.

Aerial survey is providing a valuable glimpse of the fishing industry but for only the Saxon period and of one type of structure, at present almost entirely contained within the Blackwater estuary. Fishing was almost certainly taking place on a large scale elsewhere in the county. Fisheries are certainly known in the other Essex estuaries from the medieval period, and the use of similar

fish weirs is documented. Either the techniques employed did not use the large substantial structures seen in the Blackwater estuary at earlier periods, or the changing geography of the coastline (or human intervention) has destroyed or obscured the evidence. The Blackwater has in recent decades experienced considerable rates of erosion, and this could be one factor determining the present exposure and visibility of weirs here. Although caution is needed in interpreting documentary sources in which the terms may not always have been consistently applied, they do indicate that weirs as well as kiddles were used at other locations, notably Foulness, although a programme of aerial reconnaissance has so far not located evidence for these. Their location on a more exposed coastline, on which severe storms (including the 1953 storm surge) would have more impact may be one explanation. Significant changes to the Maplin Sands are documented, for example, and opposite Havengore Island and the southern end of Foulness Island, the Maplin Sands grew between 1820 and 1940, but have undergone subsequent erosion (Medlycott 2000) and there is no reason to suppose that similar drastic modifications have not occurred at other locations over the centuries.

It is the dramatic loss of salt marshes in Essex since the mid 20th century that has contributed to the loss of many oyster pits especially in the channels between West Mersea and Old Hall Marshes. Assessment of RAF vertical photography of the 1940s and 1950s, taken before the significant salt marsh loss, has enabled recording of numerous groups of oyster pits. However, identification of details of these pits, including connecting water channels, depends on targeted low-level oblique photography and ground survey. Such details will help in identifying the discrete groups and, for example, the scale of operations by individual oystermen or companies. Further information is needed to build up any picture of changes in technique and design. Dating evidence is likely to prove difficult to locate, but dating of timbers from sluices may give some indication. Whilst many of the pits are known to originate in the heyday of the industry in the 19th century, it is not yet known how early these were in use.

The construction of the coastal decoys appears more directly related to the local pattern of reclamation, embankment for grazing marsh providing almost ideal conditions for their operation. They are also the ones, again a consequence of the land use of the marshes, which survived longer as earthworks and which are more visible on aerial photography. This is in contrast to the Stour examples which, although located within 1.5km of the estuary and (as far as can be established on present evidence) in use over a similar timescale, more rapidly disappeared, as early as the late 19th century. Some appear to have been adapted to serve as farm reservoirs with subsequent modifications obscuring their origins. There is at present insufficient information about their morphology to assess the extent to which this reflected their different topographical location. One of the Stour examples, Roydon was of the spiral form which dominates the coastal decoys. Even less is yet known about the other documented inland examples. More

details of form and date (for Essex and amongst comparable examples in other counties beyond Essex) is needed for any more detailed study of development in design. The abandonment of the decoys was in large part a consequence of the intensive reclamation for arable cultivation from the 19th century.

A detailed picture of the pattern of reclamation of the numerous Essex marshes is only just emerging, from surveys of extant remains of former sea walls in conjunction with documentary and placename evidence. Recent surveys at locations around the Essex coast are elucidating the history of more areas, e.g. Old Hall Marshes (Barker 2000) and Wallasea (Heppell 2004). Few stretches of sea wall have been the subject of excavation to establish a date of construction and much more work remains to be done to unravel the detail and hence the context within which the other documented activities took place. Moreover the different classes cannot be studied entirely in isolation. Not all of the activities discussed above were mutually compatible and the deliberate removal of structures also took place, as the interests of different activities clashed, for example fish weirs that provided hazards to navigation. It has been suggested that oyster cultivation played a part in limiting reclamation of the marshes, and if not embankment, then conversion to arable conflicted with the needs of the decoys. In addition to understanding of the coastal history, many of these questions cannot be addressed without more detailed dating. Other aspects of the coastal economy remain to be investigated in depth, using aerial survey and other techniques, not least the transport and infrastructure elements. Although the marshes may have been relatively inaccessible from land, this was offset by a ready means of transport by water, including the many creeks and inlets. For the islands of the south-east corner of Essex, in the 19th century even road transport made use of an intertidal route, along the Broomway, a sea road, part of which has been recorded from aerial photographs. This ran for about ten miles along the Maplin Sands from Shoebury to Fisherman's Head on Foulness, roughly half a mile from the shore, with side routes offering access to several points on the islands it passes. It dates from as early as 1595 when it appears on the John Norden map of Essex (Christy 1922), and is depicted on subsequent maps including the Chapman and Andre.

Anyone using aerial survey is well aware of the biases in terrestrial survey, particularly the relationship between soil types and development of cropmarks. A different set of factors applies to coastal survey, one more dependent on the long-term history of land use and coastal evolution, and the need for different priorities in planning reconnaissance flights, for example their timing relative to low tides (Strachan 1995c, 42). Nonetheless, it has a valuable role in both recording new features, for example, the location of wharves and wrecks, and in the continued monitoring of sites. Analysis of aerial photographs taken over the past 60 years has enabled recording of many features now no longer visible, whilst also monitoring impacts on the resource, and helping to direct targeted aerial reconnaissance and ground based survey.

Chapter 6. The Military Landscape of Essex during the Second World War

by Caroline Ingle

I. Introduction

During the course of the Second World War, military features appeared in the English landscape on an unprecedented scale. According to one estimate (Foot 2000), in the region of one fifth of the land surface of the United Kingdom was under military control by 1944. This encompassed a vast range of activities and structures, for both defence and offence as well as training, detention of prisoners and provision of medical facilities. These were all built over a relatively short period of time in response to rapidly changing situations and imposed on the existing rural and urban landscapes in accordance with military demands. It is no surprise that this period of conflict had a significant impact on the landscape, though one that in many areas is perhaps less readily visible than might be expected from these figures.

The county's location has for many centuries afforded Essex a strategic importance in the defence of the country. During the First World War, artillery emplacements were constructed at various localities along the coast and the county was also home to thirty-one landing grounds over the course of that war (Doyle 1997). At the end of that conflict many of these features were deliberately removed, as being unnecessary (and costly) to maintain. With the approach of the Second World War, Essex's strategic importance was highlighted once more, given its location close to the continent, and its gentle topography which offered the invader relatively easy access to London and on to the industrial centres of the Midlands. This prompted development of a wide range of defensive measures to meet the much greater threat of invasion and attack from the air. As the war progressed, construction focused more on the need to prepare for, and mount, offensive air and land operations. Winston Churchill's description of Malta as an unsinkable aircraft carrier has also been applied to Britain, and more specifically East Anglia in the second half of the war, as airfields proliferated in the region (Bowyer 1990, 14).

The scale of construction and the number of wartime sites and structures across the county is immediately evident from aerial photographs, but it was an impact that to a large extent was ephemeral. The majority of features have long been removed, some before the end of the war and many more shortly after the cessation of hostilities. Surviving documentation appears to be limited and whilst it is likely that almost all were documented at the time of construction, records have become dispersed, inaccessible, destroyed or remain as yet unrecognised. The NMP assessment of both contemporary wartime and later aerial photography provides a record of these changing landscapes, whilst later sources reinforce the degree to which they have disappeared, and highlight the need to develop policies for appropriate conservation of remaining elements of this military landscape.

History of research

The early 1990s saw increasing realisation that there was little accessible record of Britain's Second World War defences, either in the form of location maps, an understanding of their historical context or information on their current survival (Nash 1998a; English Heritage 2000). Moreover, that this resource was becoming increasingly vulnerable without sufficient information on which to base conservation policy. Since then a number of programmes co-ordinated by English Heritage, the Council for British Archaeology (CBA) and local authorities have been redressing the situation.

In 1994 English Heritage, as part of the Monuments Protection Programme, commissioned a programme of documentary research on eleven classes of 20th-century military monuments. Using the wealth of archive material in the Public Record Office this survey was carried out by Colin Dobinson. The results of this analysis, to determine the original distribution and typology of the monuments were presented in a series of CBA reports, *Twentieth Century Fortifications in England*, from 1996 onwards (Dobinson 1996a–d; 2000a–d), and are currently being published by English Heritage in the 'Monuments of War' series (Dobinson 2000e; 2001). The use of aerial photography, in particular through the National Mapping Programme (NMP), is providing another valuable strand in this research, and there has been an increasing focus on Second World War military remains in the more recent NMP projects, e.g. Suffolk Coastal NMP, part of a Rapid Coastal Zone Assessment Survey of Suffolk.

It remains a substantial task to investigate these sites in the field. Survey has been carried out by volunteers as part of the CBA Defence of Britain Project, and in specific programmes initiated by local authorities, for example, by Saunders and Smith (2001) in Kent (in a survey which looked at selected defence elements) and by Nash in Hertfordshire (The Pillbox Project 1992, F. Nash pers. comm.) and Essex (Nash 1998a, and subsequent articles). The World War II Defences in Essex Project (WWII Defences Survey) being carried out by Fred Nash has been in progress since 1993, largely concurrent with the Essex National Mapping Programme project. The two initiatives are complementary, and together provide a more detailed picture of the county's military activity at this period. The WWII Defences Survey, still in progress, is aimed at covering the entire county, through a series of geographic or monument class based thematic projects. It has drawn on fieldwork, documentary evidence, aerial photography and personal recollection of local residents (Nash 1998a). Documentary sources have included the fortuitously surviving 'Wartime Contraventions 1968' which has proved to be a valuable document for Essex. The precise reason for compiling the document is not yet known but it appears to list most of the defence sites constructed on private property during the war. It provides a useful index

but needs to be linked to other sources, especially aerial photographs, to record, for example, the detail of extent, location and direction of anti-tank ditches.

The Essex Mapping Project has recorded a total of 505 sites attributed to the Second World War. Use of RAF and USAAF vertical photography from the 1940s and 1950s has enabled the recording of numerous features which were destroyed and removed shortly after the war to return land to its former use. Apart from the airfields, the majority of the features mapped by NMP relate to defence, including anti-landing ditches, anti-tank ditches and gun emplacements. The remit of the Essex NMP, excluding as it did roofed buildings, inevitably excluded certain classes of structures (including pillboxes), although where observed these were noted and added to the Essex Historic Environment Record (EHER). The decision not to attempt to include all features also reflected the need to avoid duplication between this and the continuing WWII Defences Survey, which also makes use of the aerial photographic evidence. Together these initiatives are providing important baseline data on features and an assessment of their survival and current state.

The numerous and varied structures of this military landscape which have been recorded by the mapping project can be grouped into three main categories:

- anti-invasion measures including anti-tank defence, anti-landing ditches and pillboxes
- defence against air attack including anti-aircraft batteries, decoys
- airfields — offering a defensive and offensive role.

This chapter does not attempt to be a comprehensive review of the county during the Second World War, but will focus on some of the key elements of this landscape recorded as part of the Essex Mapping Project in the context of the progress of the war and the technical developments that resulted. These rarely operated in isolation and need to be seen in the context of larger defensive programmes within a strategic plan, and this chapter will draw particularly on the results of the WWII Defences Survey, and the research by Dobinson, to put features into their broader context.

II. Anti-invasion measures

In the lead-up to the war and in the early years of conflict, in particular following the retreat from Dunkirk, one of the key priorities for Britain was defence against invasion, the preparations for which have been detailed by Dobinson (1996b). A programme of defensive measures was developed and implemented early in the war to counter invasion and subsequent movement of enemy vehicles and troops through the country in the event that a landing was successful. Construction of the system began in May 1940 after the German advance into the Low Countries, when it was accepted that existing coastal defences might not be able to prevent a German landing, and the system of defence lines was largely completed by autumn of that year (Nash 1998a, 8). A key objective was to defend the approach to London from anticipated invasion along the east coast. Initially based on the protection of airfields, potential landing places, ports and communications infrastructure, the programme was extended from July 1940 to create a series of stop-lines across the country,

with particular use of pillboxes, together with defended nodal points and beach defences (Dobinson 1996b). The first line of defence was along the coast, supported by defended lines across much of the country (English Heritage 2000; Dobinson 1996b). Over Britain as a whole, hundreds of miles of stop-lines (Foot (1998) suggests that the total may be in the thousands) were constructed, aimed at preventing penetration by troops and, particularly, armoured vehicles in the event of invasion. A range of other measures was implemented in a number of programmes of defence, many aspects of which are being recorded in Essex by the WWII Defences Survey, including pillboxes, anti-tank obstacles, scaffolding on beaches, artillery positions, roadblocks and measures to destroy key bridges and infrastructure links (Nash 1998a). The nature and distribution of the defensive measures employed changed in response to revisions of policy and changes in the perceived threat. After an early focus on a series of heavily defended stop-lines, there was a change in approach over the winter of 1940–41 to a greater emphasis on defence in depth, based more on nodal points, strong points based on towns and villages (Foot 2004, 3). The maximum extent of defences had been reached by mid 1942, by which time the threat of invasion was diminishing.

The stop-lines

The main elements of the anti-invasion measures recorded by NMP are the lengths of anti-tank ditches, one of the most obvious features on wartime and immediately post-war aerial photography, together with the supporting pillboxes which also formed an essential element of the stop-lines (Fig. 6.1). Many kilometres of ditches cross parts of Essex in zig-zagging lines, with stretches recorded in the west of the county south of Nazeing, between Chelmsford and Southend, and around the southern side of Colchester. Fortification of Essex, begun in the late spring of 1940, intensified further during the summer as the response to an appraisal of the likely invasion threat, which was first assessed in 1939 (Dobinson 1996b). Essex lay within Eastern Command (which initially extended down the eastern part of the country from what was then Huntingdonshire to the south coast but was later restricted to that part of the area north of the Thames (Dobinson 1996b)), which was the most densely defended Command for various reasons including proximity to the continent, presence of port facilities and airfields, and the extent of land offering suitable invasion landing grounds and coastal approaches. Most of the anti-tank ditches in Essex were part of three of the stop-lines established in England, the General Headquarters (GHQ) Line, the Eastern Command Line, and an outer London line, designated as Line A, but now often referred to as the Outer London Defence Ring.

A length of ditch, recorded to the south and south-west of Colchester, ran westwards from Old Heath, south-east of the town to Shrub End where it turned north before terminating at the southern end of the Iron Age earthwork of the Lexden Dyke at Bluebottle Grove (Nash 1997, map p.4). As mapped, it appears to be an isolated section of defence, but in fact this ditch forms only a short part of a defensive line, the Eastern Command Line, which almost exclusively used existing natural features, including the River Colne itself south of Colchester, in place of a manmade ditch (Fig. 6.1). Construction of the heavily

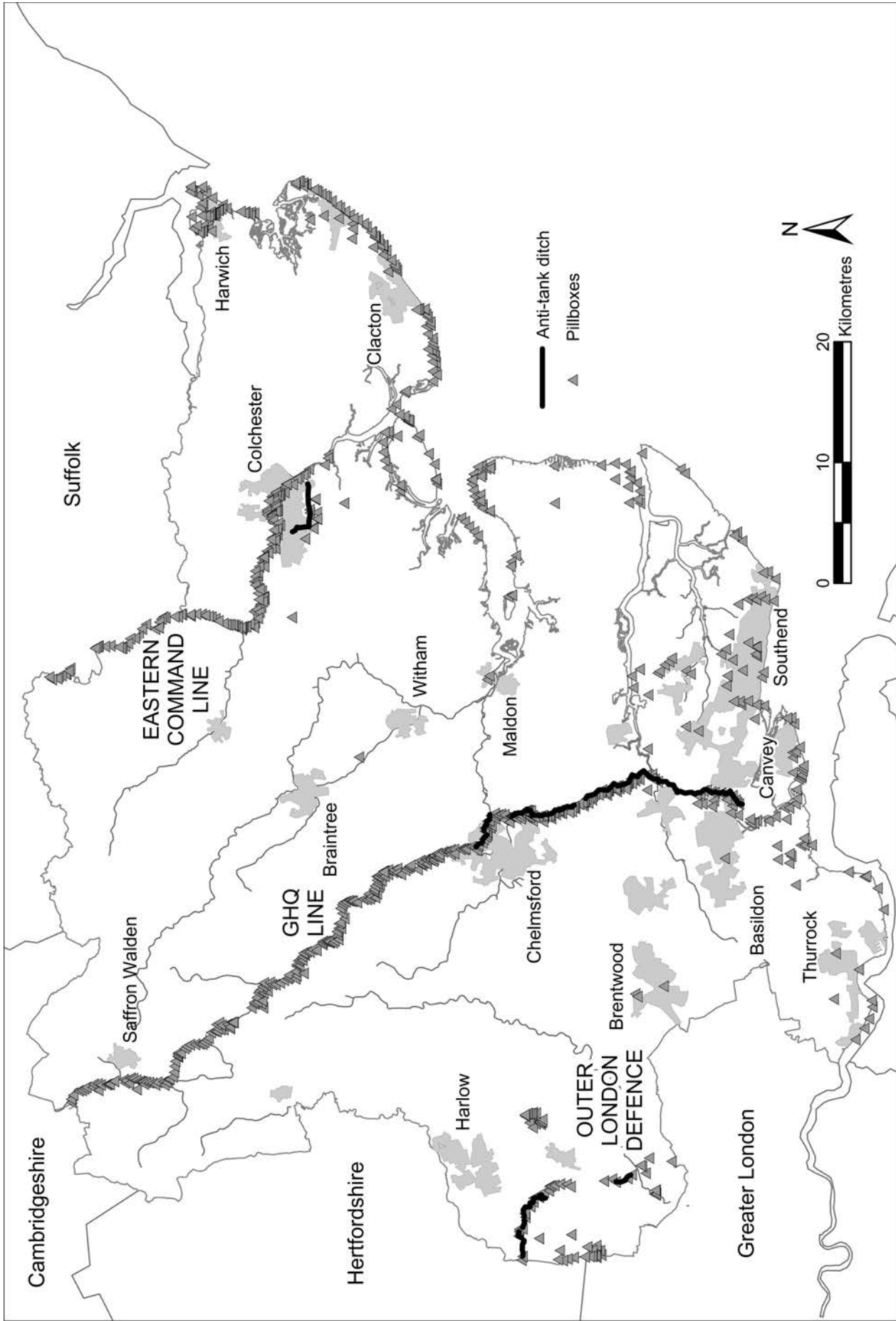


Figure 6.1 The framework of the main Essex stop-lines, illustrated by the recorded pillboxes and lengths of anti-tank ditches

fortified Eastern Command Line was underway by July 1940. It followed the Colne from its mouth at Mersea Island around the northern side of Colchester. In the gap between the anti-tank ditch at Shrub End and the Colne to the north, the Iron Age Lexden Dyke was incorporated into the defences fully to encircle the town. In addition to the mapped elements, the WWII Defences Project has recorded over 120 defensive sites on the EHER in the nine-and-a-half mile circuit around Colchester, including roadblocks, pillboxes and other gun emplacements (F. Nash pers. comm.; Nash 1998a; EHER). Elsewhere along the line, what were regarded as particularly significant stretches were afforded added protection, for example at Chappel viaduct where access through the viaduct arches was barred by 5ft square concrete cubes at each opening, with additional concrete obstacles in the shallow river (Nash 1998a, 17 and fig. 6).

The longest lengths of anti-tank ditch recorded in the county (Fig. 6.2), forming part of the GHQ Line, ran south from the River Chelmer near Lawnside Farm, Chelmsford, to Bowers Marsh and Holehaven Creek on the River Thames. The northernmost section of this, now within the outskirts of Chelmsford, comprises two relatively short lengths, the ditch being interrupted where it incorporates part of the main railway line (north of what is now Dukes Industrial Estate), and the River Chelmer between Cuton Hall and Sandford Mill east of Chelmsford. South from here the ditch zig-zags in an almost continuous line, broken where it crosses roads, and west of Howe Green where the Sandon Brook is incorporated as part of the defensive line. The route generally seeks the advantage of open, often slightly higher, ground which afforded wide fields of fire (Nash 1998a, 20). Beyond its southern terminal on the edge of Pitsea, the defensive line follows a drainage ditch across Bowers Marsh.

No artificial ditch was deemed necessary north of Chelmsford, and instead the defensive line exploited existing watercourses, but the route of the stop-line from Springfield to the county boundary can be traced as a line of pillboxes. In places these were enhanced, as for example between Newport and Tilty, where streams and drainage ditches had to be deepened and widened to form a suitable barrier, although the line also incorporated the River Chelmer near Chelmsford and the Cam towards the county boundary. Beyond Essex, this stop-line continued northwards to Yorkshire via the Wash.

The third line of anti-tank ditch mapped formed part of the Outer London Defence Ring which ran through the western side of the county (Nash 1998a, fig. 7) and ran from Nazeing marshes to Bumbles Green, turning south to Copped Hall where it split and entered Epping Forest on two parallel lines, its route apparent on aerial photographs as an alignment of felled trees (EHER 10350). Further lengths of ditch have been mapped through what is now residential housing on the eastern edge of Loughton as far south as the railway line. This line was the outermost of three circuits of defences protecting London, which together included over 1000 pillboxes. The Essex section was well defended from regularly spaced large octagonal pillboxes, each with a central anti-aircraft machine gun well (Nash 1998a).

As noted already, wherever possible the stop-lines made use of, or enhanced, existing natural obstacles, notably rivers and streams, and only where these were not

available was a wholly artificial ditch constructed. All of these anti-tank ditches follow a somewhat irregular zig-zag route, the individual straight stretches generally in the region of 0.5km in length, the maximum recorded being 0.9km, and in places as little as 100m. Some of the most regular lengths are along the GHQ Line between Sandon and Runwell south of Chelmsford. To the south of Colchester, whilst the ditch generally conforms to this pattern there is little change in direction between the separate stretches. This would certainly accord with orders for the London area in July 1940, which Dobinson (1996b, 141) suggests were typical, and which specified that the Outer London line should follow an irregular zig-zag with *c.*800yd (731m) between changes of course. Any recommended specifications were clearly adapted to maximise benefits of terrain and existing structures. This resulted in many shorter stretches, for example at Sandon, where short lengths were necessary to skirt existing settlement and the river, and at North Benfleet. The zig-zagging course of the ditches also enabled them to use the topography to best effect in order to provide wide fields of fire for the associated pillbox firing points.

Specifications for the size and profile of ditches were also issued and amended during the course of their use, resulting in a number of variations of size even if recommendations were fully implemented in the field. Tests by the British Army demonstrated a V-shaped ditch preferably *c.*9ft deep and 18ft wide at the surface with a 3ft rampart either side to be the best and also cheapest obstacle to tanks. However, Foot notes that the anti-tank ditches were constructed from June 1940 and that most had been dug by May 1941 when specifications for approved dimensions were circulated (Foot 1998, 4–5). Nonetheless, the Essex ditches do seem to comply with the recommendations. Although nationally documentary records are less informative for anti-tank ditches than other aspects of defence (Foot 1998), Essex does have the benefit of the Wartime Contraventions document in which most of the stretches of ditch in the county are listed (F. Nash pers. comm.). From these it appears that almost all of the lengths of anti-tank ditches built in the county (probably as much as 95%) can be seen on 1940s aerial photographs (F. Nash pers. comm.), although there are unfortunately relatively few available photographs from the earliest years of the war, precluding tracking phases of construction of individual lengths from this source. Some lengths of ditch, even on photographs as early as 1946, are visible only as soil marks having already been infilled. Breaks in the ditches where they crossed roads were covered by a range of barriers and other defences. For example, where the GHQ line crossed the A127 it was defended by a concrete and steel cable barrier across the road (Nash 1998a, 20).

Coastal defence

Additionally the coastal defences were also considered to be a stop-line with anti-invasion measures along the flat coastline aimed at defence against both seaborne and airborne approaches. Aerial photographs record further stretches of anti-tank ditch serving specific sites, for example at the New Ranges, Shoeburyness. In the north-east of the county, Harwich offered one of the few natural harbours north of the Thames and was particularly strongly defended. To prevent it being taken from the landward side there was an almost continuous chain of

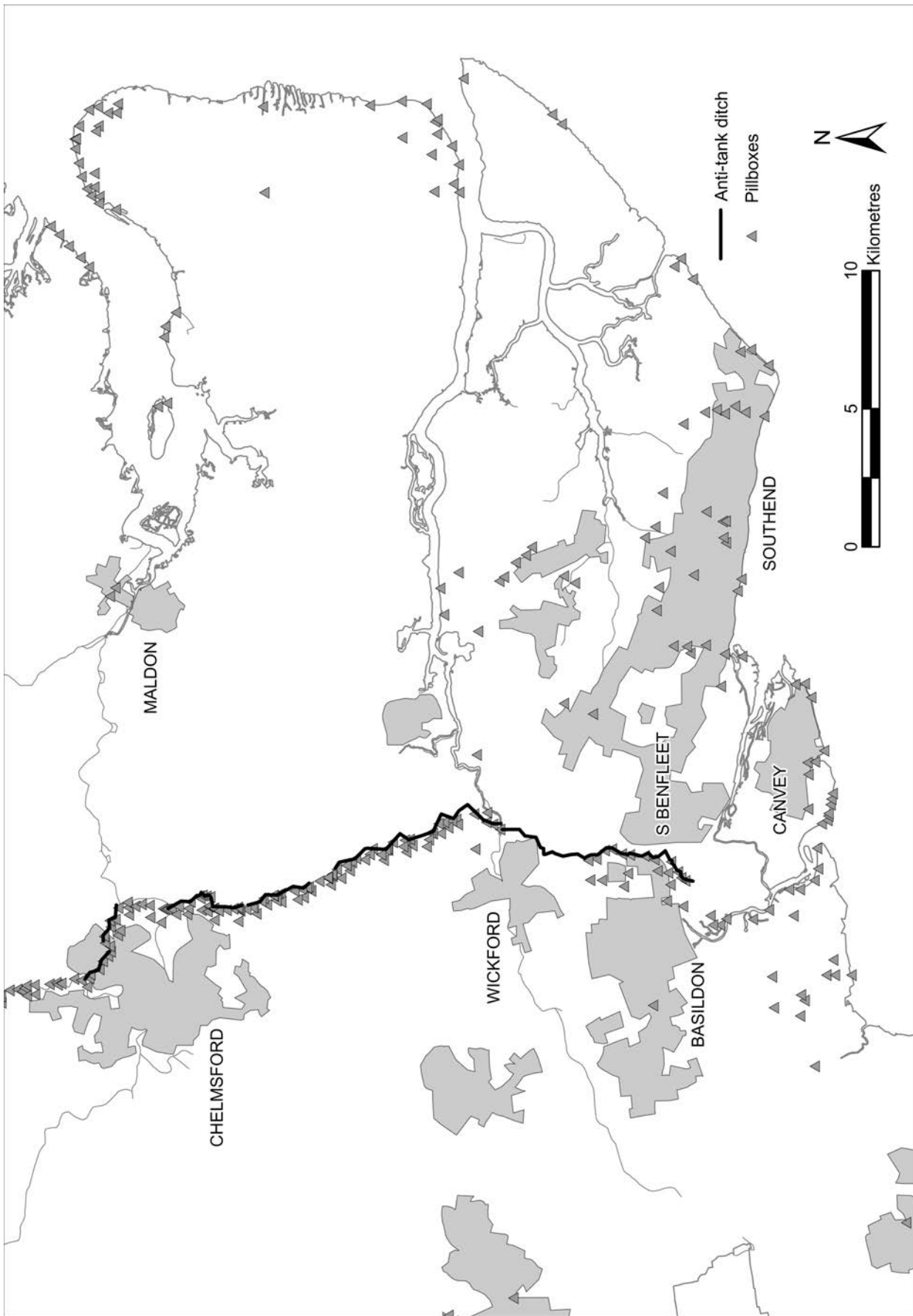


Figure 6.2 The GHQ line along its southern extent between Chelmsford and the Thames

over 800 concrete blocks paralleled by anti-tank ditches to the west of the town. This defence, the Stanier Line, ran from Dovercourt to Parkeston and comprised anti-tank obstacles being supplemented by pillboxes, roadblocks and barbed wire. The infilled ditch is visible as a slight depression on the end of Parkeston Golf Course (Nash 1996, 5). A range of other defensive elements are visible on contemporary aerial (and ground) photographs, notably lines of concrete blocks along many stretches of flat open coast, and lines of scaffolding which are evident along some stretches of beach, in particular near Clacton (Nash 1998a, plate 12). At Frinton, concrete blocks between the houses along the seafront effectively provided an anti-tank barrier 1.5 miles long, supported by pillboxes, observation posts and a 6" gun battery (Nash 1998a, 14).

Infantry and artillery pillboxes were also key elements of the stop-lines, providing defence in depth. Where artificial ditches were not employed, the routes of the three main stop-lines have been traced through the distribution of pillboxes and road barriers (Nash 1998a). Although beyond the scope of this particular NMP project, numerous examples of pillboxes have been recorded from aerial photographs and many survive in the field. Nash has estimated that within the county the four major stop-lines consisted of some 1500 defensive fortifications (Nash 1998a, 9). Stop-lines were one element of defence, supported by other elements to disrupt potential enemy advance through the countryside. Foot (2004, 2) has described the stop-lines as 'a prepared battlefield, with its crossing points of road and railway plugged by concrete and steel blocks, and its defences based on infantry fieldworks, including pillboxes, section posts, and slit trenches, with anti-tank gun emplacements to be manned by the Royal Artillery at the most vulnerable crossing points'. Preparations were also made for the cratering of roads and demolition of bridges to disrupt the movement of enemy vehicles in the event of invasion. One example in Essex is the mining chamber in the bridge at Audley End (Nash 1998a, 19). Existing natural obstacles were supplemented and enhanced.

Whilst numerous pillboxes still stand in the countryside (and within Essex they remain some of the most obvious, and frequently surviving Second World War features), few traces of the anti-tank ditches are now visible above ground, although a length of earthworks remains (EHER 10350), albeit reduced in size, in Epping Forest between the Epping and Theydon Bois Road. Here the ditch has been largely infilled, surviving as a boggy depression, the bank on the west side standing to a height of 5–6 feet above the base of the ditch (Gilman and Nash 1995, photo p.20). Many structures were subsequently removed, some as early as 1943, as they proved obstructive to other aspects of the war effort (not least agriculture) and redundant features offered a source of materials which could be reused.

Defence in depth

In practice, the stop-lines were themselves one element of defence in depth. From early 1941, greater emphasis was placed on the use of nodal points and defences at towns, and many lengths of stop-line became redundant from 1942 (Foot 1998, 6). Additional features include gun emplacements, such as spigot mortars and road barriers, often formed from lengths of railway line. Nationally, the

CBA Defence of Britain project (Foot 2000), has recorded some 14,000 anti-invasion defences, over half of which are pillboxes. Whilst these features are being recorded in Essex by the WWII Defences Survey (Nash 1995; 1996; 1997; 1998a) and many can be seen on aerial photographs, they were not included in the remit of the Essex Mapping Project and so will not be considered further here.

Anti-airborne invasion measures

Land-based invasion was far from the only concern; measures were also needed against the threat of the possible airborne landing of troops, through obstruction (by various means) of fields identified as potential landing grounds. The low-lying topography of Essex, particularly along the coast, presented many such vulnerable locations, and many fields were criss-crossed with ditches to prevent their use by enemy aircraft. This was one of the main methods used to break up large flat fields but although often referred to as anti-glider or anti-landing (the term that will be used here) ditches, one of their main aims was to prevent the turn-around and take-off of powered aircraft.

Several groups of anti-landing ditches have been mapped in the county, notably concentrated in flat reclaimed marshland along the Essex coast, which in the 1940s was covered with a cross-hatched patterning of ditches. In the north-east of the county, these measures were used north of Hamford Water at Little Oakley (EHER 17373), and along the east side of the River Colne north of Brightlingsea (EHER 16946). The main areas where ditches were employed within Essex was along the Thames, particularly on the marshes between Thurrock and Canvey Island, on Tilbury marshes (EHER 14571, 4559, 14558, 14560), landward of the oil depots at Thames Haven and Shellhaven (EHER 14763) (Fig. 6.3), Fobbing Marshes (EHER 14762), Vange Marshes (EHER 14752), Pitsea Marsh (EHER 14751), Canvey Island (EHER 14732, 18283, 7165), and north of Benfleet Creek (EHER 18280). They each comprise straight ditches set out in interrupted cross-hatch patterns, dividing large fields into smaller components, the individual ditches generally between 100 and 150m long, although varying from this according to the size and shape of the field to be obstructed. Spoil from the ditch was deposited in mounds either side of the ditch. The pattern of the mounds varied, most commonly as lines of regularly spaced single mounds either side of the ditch, although the two lines were offset to provide greatest obstruction (Fobbing Marshes EHER 14762; Tilbury; Tilbury Marshes EHER 14571 EHER 14560 EHER 14559; Canvey Island EHER 14732; Great Oakley EHER 17373; Hainault, Greater London). There are other examples where the lines of mounds on either side run in parallel including Brightlingsea (EHER 16946), Colchester (EHER 16484) and Rainham Marshes (Greater London), and others where the mounds were grouped in pairs, as at Corringham and Thames Haven (EHER 14763) although in some cases no earth mounds were visible on available aerial photography. On Canvey Island, some of these obstructions (EHER 18283) show the usual overall cross-hatched layout, but the component lengths were dug as interrupted ditches, and this form is also seen at Woodford Bridge, Greater London although here there are also mounds to each side of the ditches.



Figure 6.3 Anti-landing ditches on the Thames marshes to the south of Corringham, around the industrial sites at Shellhaven and Thames Haven. A number of bomb craters are also visible. North to the top of photograph. (CPE-UK-1923-4024 held at the National Monuments Record)

The majority of the aerial photographs from which these were recorded date from 1942 and later, some time after all of the ditches had been completed, and cannot be used to chart the detailed history of construction, most of these features having been dug in late 1940–41. At Hainault, anti-landing ditches (visible on aerial photographs of 1946) crossed the First World War landing ground which had served briefly as an emergency landing ground for RAF Hornchurch during 1940–41 (Doyle 1997, 40) before RAF Fairlop was opened to the west. Similarly anti-aircraft ditches were dug over the former landing ground at Little Clacton, a site which also presented a suitable landing area and which was later considered as the site for an American Eighth Air Force bomber airfield in 1942, but after initial survey the plans were not pursued, partly because East Anglian airfield construction projects were behind schedule (Doyle 1997, 45).

Few inland areas appear to have been obstructed with anti-landing ditches. The main concentrations are on the edge of London along the River Roding at Buckhurst Hill, although other examples have been mapped on open ground just over the border in what is now Greater London, at Woodford Bridge and Hainault. At the latter

they in part cover a First World War landing ground. A small area of anti-landing ditches has also been recorded south of Colchester at Layer de la Haye (EHER 16484), comprising lengths of ditches with symmetrically paired mounds on either side. It is not clear why there is this single isolated example here, and in the past the cropmarks of rectilinear ditches have been identified as the remains of planned Roman field division (Crummy 1979, 81 and fig. 35), although 1940s aerial photographs make identity as anti-landing ditches unmistakable.

Suggestions for obstruction using improvised obstacles had been put forward in late April 1940, using both above ground works, and trenching (Dobinson 1996b) and work continued until late 1941. From the outbreak of war they had been used in areas around London and operational airfields, but orders issued by the War Office in May 1940 required the programme of obstruction to be expanded to encompass potential landing grounds within five miles of the coast. It also included the hinterlands of munitions factories and other vulnerable targets (Dobinson 1996b, 134). This is the case in Essex where the main concentrations relate to industrial (along the middle Thames including Shellhaven and at Great Oakley, north of the explosives factory on Bramble

Island) and urban areas close to the coast (Colchester and Harwich). Like other actions, they were the subject of guidance notes which identified priorities and specifications for obstructions. War Office orders required that open areas with a straight length in one direction of 500 yards or more within five miles of the coast, an airfield or vulnerable point, should be blocked against enemy aircraft landing. Where ditches were used, guidelines advocated ideally a 150-yard grid with trenches 4ft wide and 3ft 6in deep flanked by a continuous line of their spoil (Dobinson 1996b, 134). However, in practice, details of layout were influenced by local circumstances and the need to incorporate existing field ditches.

In all the Essex examples the earth was piled into mounds spaced along each side of the ditch, although as has been noted above a number of layouts were used across the county for these spoil heaps, and presumably depended on the contractors employed in their construction. There are considerable expanses of the Essex coast where they were not employed, including along the Dengie, although here the only main vulnerable site was the airfield at Bradwell. Part of the reason may be the conflict between the needs of defence and the interests of agriculture. Whilst ditches were considered the most secure method of obstruction, they were also the most obstructive to agriculture, causing damage to farmland, and because of this, blocking by obstacles became the preferred method (Foot 2004, 3). These were also labour intensive and many other forms of blocking were advocated and employed a variety of obstacles, including old cars, sections of concrete pipe, or wooden and concrete posts, arranged across the open space, scaffolding and barbed wire, stakes or felled trees. It is perhaps not surprising that the majority of the ditches recorded in Essex are on enclosed grazing marshes, where they would have had less impact on agricultural activities than on arable land. Further investigation is required to assess the extent to which other types of obstacles were used along the coast or elsewhere in the county.

III. Defence against aerial attack

Given its proximity to London on the route for enemy aircraft from the continent, it is not surprising that Essex saw the construction of a large number of anti-aircraft batteries during the course of the war, and these are readily identifiable on contemporary aerial photography. The majority of batteries recorded by NMP are heavy anti-aircraft batteries. Within the county the main distributions (Fig. 6.4) lie along the coast, with particular clusters along the estuarine Thames, the Dengie peninsula and around Hamford Water. Further batteries were located around Colchester and Chelmsford, and on the east side of London within the western edge of the county. These are of several different types, exhibiting differences in both form and layout of the emplacements (Fig. 6.5), and the date at which they were constructed and in use. The most obvious differences lay in the number of gun emplacements at each battery, with four-gun batteries being most common in the county, their emplacements arranged in a shallow arc, although six-gun and eight-gun examples have also been recorded. Many of the coastal batteries show four- or eight-gun emplacements arranged in a line and were less permanent sites, being constructed

late in the war as part of the 'Diver' deployment, and these Diver sites will be discussed separately (see below).

1939–mid 1944

As well as addressing the threat of invading troops, defence measures were needed to counter aerial bombardment from aircraft and, later, unmanned rockets. A strategy for air defence in the event of war was drawn up three years before the outbreak of hostilities and set out in the 'Ideal Scheme' of 1936, which consisted of three key elements: radar, fighter aircraft, and anti-aircraft batteries (light and heavy). Anti-aircraft artillery had first been used in Britain during the First World War, but after 1918 provision had been drastically reduced. Some of these positions, particularly along the coast, were re-equipped, modified or added to for use during the Second World War. However, to a large extent the strategic demands and changes in technology necessitated new sites for artillery. Rearmament began in the mid 1930s, with early plans envisaging defences for London and the Thames and Medway as well as major ports and cities across the country. The six years of war saw the implementation of a number of programmes which led to changes in the number and deployment of anti-aircraft batteries. Inevitably technology, design, location and layouts were changed and adapted to meet changing policy and new threats.

As the war progressed, strategic requirements changed and policy for deployment was altered accordingly. During the early stages of the war, anti-aircraft defence was organised into nucleated Gun Defended Areas (GDAs) around the major cities across the country and some of the more vulnerable airfields (Dobinson *et al.* 1997, fig. 3). The rate at which plans were put into action was to some extent restricted by the supply of both manpower and materials, and not all of the planned anti-aircraft sites were in existence by 1940 (Dobinson 1996a; 2001). The time required to implement plans meant that strategy could be revised before all proposed sites had been completed. The programme of GDAs continued to expand into 1941, a phase which also saw the emplacement of armament on the Maunsell sea forts, in the Thames estuary, and an increase in the number of airfields defended. The focussed GDA approach was modified from 1941 to counter the increasingly widely targeted German bombing and a more dispersed layout resulted. It is likely that this had little impact in Essex with regard to heavy anti-aircraft batteries, most of which at that time were probably located around the edge of London and along the Thames. With the rise in attacks on coastal towns from spring 1942, some redeployment probably occurred, although much of this may have been of light anti-aircraft batteries.

Specifications

In theory, batteries were constructed according to one of a number of standard designs for heavy anti-aircraft batteries, the first of which were drawn up two years before the outbreak of the war, as part of a more comprehensive programme of air defence strategy. Formal specifications for both 3.7" and 4.5" gun batteries were issued in 1938 and February 1939 (Nash 1998b, 3; Dobinson 2001, fig. 7). Reconnaissance of sites was underway in 1938 and construction began in the same year. The main requirement was for four-gun batteries although selection of sites was to be made to allow room

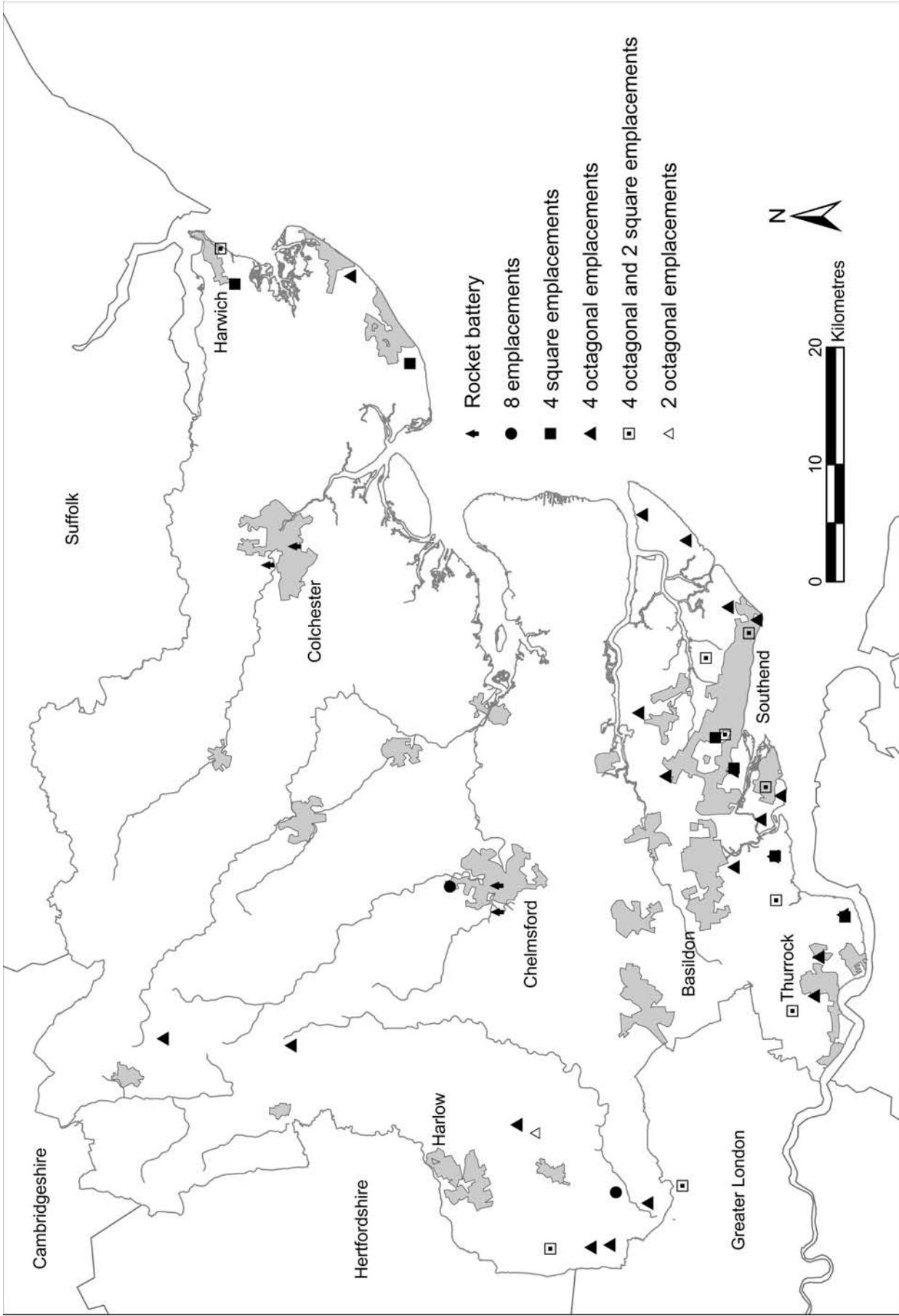


Figure 6.4 Distribution of recorded heavy anti-aircraft batteries in Essex, from NMP and Survey of Second World War Defences (Excludes Diver sites — see Figure 6.8)

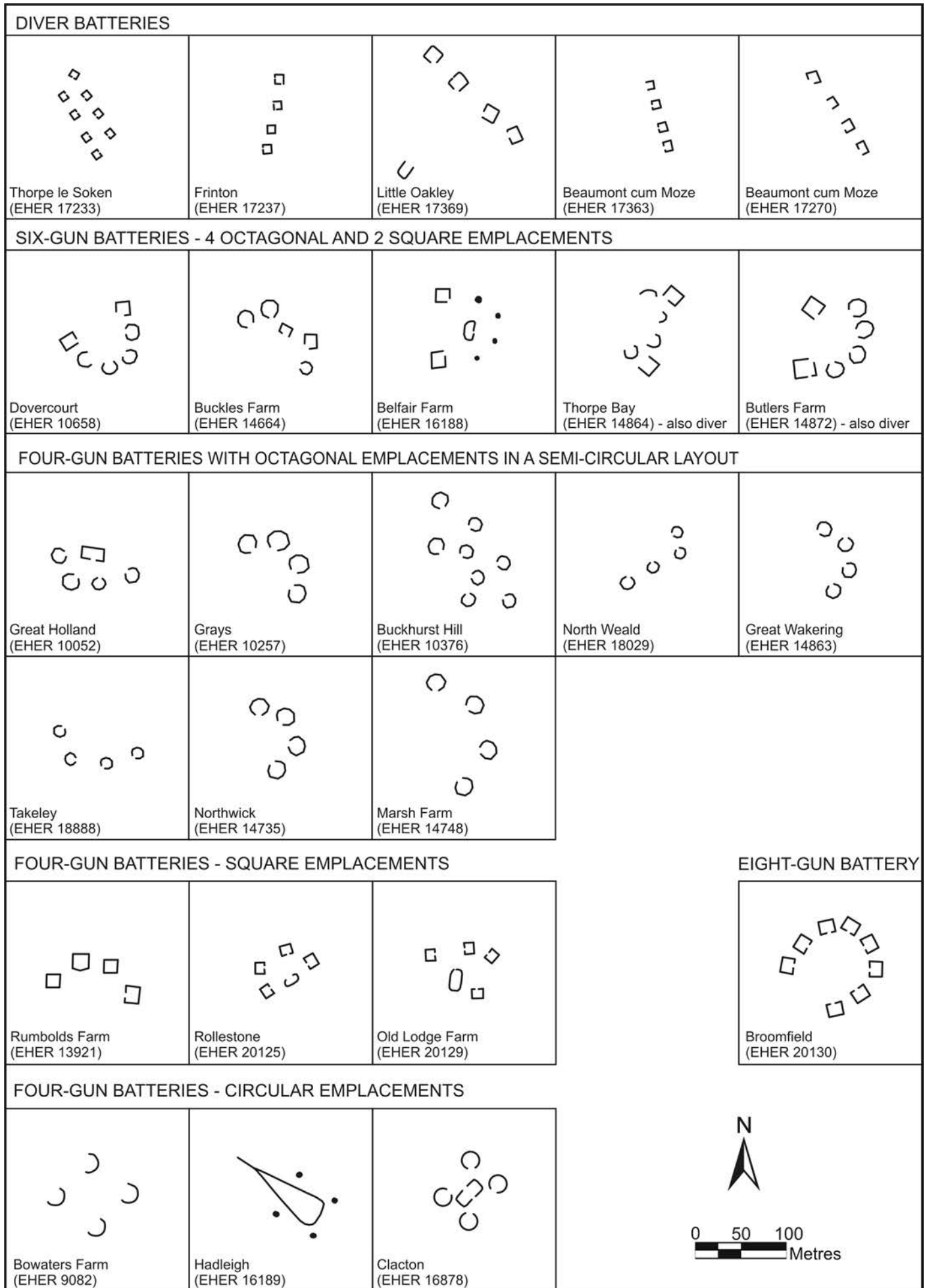


Figure 6.5 Comparative plans of selected anti-aircraft batteries. Some of these features were visible as earthworks, while other emplacements had upstanding walls

for expansion through the addition of further emplacements.

The standard 1939 designs specified a four-gun battery, with octagonal gun emplacements set behind earthen banks, sited 50 yards from each other in a shallow arc *c.* 130 feet across crossing the line of fire and with the two flanking gun positions set back behind the middle two. The octagonal gun pits each comprised a central holdfast set in a concrete slab and surrounded by ammunition lockers in recesses. Behind the arc were grouped the Command Post (generally rectangular with protective earth banks), gun stores and magazines, all linked by roadways. The battery also included associated domestic sites, which by the end of the war had in many cases become substantial camps.

Various armament was used during the course of the war. The 3.7" gun had been introduced in the 1930s to replace the 3", and together with the higher firing 4.5" was the main armament type used throughout the war, although some batteries retained 3" guns at least during the early war years. The 3.7" could be either fixed or mobile, the 4.5" were always designed to be static (Nash 1998b), but both used the same design of emplacements. Whilst some early sites were temporary with earthwork gun pits and tented accommodation, these were generally replaced by more permanent structures and static guns that became standard. Later in the war, in response to demand for a weapon capable of firing shells to counter higher flying aircraft, a 5.25" naval gun was also introduced (Nash 1998b, 9).

The specification underwent numerous revisions and adjustments, such that Dobinson (1996a) notes that at least seven formal designs for 3.7" and 4.5" batteries had been issued by the Directorate of Fortifications and Works by the end of the war and others were certainly improvised in the field. Gun pits were not consistently octagonal, but could be square, circular, rectangular or even irregular and combinations of these might occur at a single site. Provision for eight-gun batteries was set out in November 1942. Other local factors, including available armament and manning could affect the precise layout of batteries.

Considerable variation is exhibited by the Essex batteries (Fig. 6.5), and whilst the majority of these conform to the standard designs, this is not uniformly the case. Examples of four-, six- and eight-gun batteries are recorded, though each group shows variations in layout. To some extent, these may relate to the Command within which they were located, the Essex batteries falling variously within a number of defined Gun Defended Areas: Clacton, Chelmsford and Colchester; Foulness; Harwich; London Inner Artillery Zone (IAZ); Thames and Medway. The distributions and variations in layout also reflect the responses over the first few years of the war to changing threats. The main morphological distinctions between the batteries are in the shape of the concrete emplacements (whether octagonal, square or circular), number of gun emplacements (four, six or eight) and the arrangement of these (whether in a shallow arc, straight line or diamond pattern).

Four-gun batteries

Octagonal emplacements

Many of the heavy anti-aircraft batteries along the Thames and in the west of the county conform to the 1939

specification (Figs 6.5, 6.6). They comprised four octagonal emplacements, laid out in an arc, the convex side facing the expected line of attack, with a central command post behind the guns, and a domestic hatted site set several hundred yards further back. Sites along the Thames include EHER 10052, 10257, 10376, 14735, 14748, 14863, 14867, 16189, 18029, 18484, 18888 and 9082 (Fig. 6.6), most of which lie within the Foulness, London Inner Artillery Zone and Thames and Medway GDAs.

Some of these are known to have been built prior to the outbreak of the war, although for most documentation at present appears to be limited. Dobinson noted that although details of manning and armament were kept during the war, this information was rarely synthesised into a national roster, although there is one such record for 1942, the entries in which are summarised by Dobinson (1996a, 357–8 and gazetteer). Consequently the status of sites in the middle of that year are currently better known than in previous or subsequent war years, although it is also clear that 1943 saw a general increase in the number of guns (Dobinson 1996a, 379). For example, the four-gun battery at Marsh Farm, Vange (EHER 14748) was constructed in 1938 and is documented as being armed with four 3.7" guns in 1940, although listed as unarmed in 1942 (Dobinson 1996a). Buckhurst Hill (EHER 10376) was also of early construction, originally armed with 3" guns although these were replaced by 3.7" armament in the spring of 1940, and the site was still manned in 1943. At Bowaters Farm (EHER 9082) the four octagonal emplacements housed four 4.5" guns from 1940 to 1944, when this battery was replaced by a second, four-gun 5.25" battery to the east, and similarly Sandpit Hill (EHER 16189), armed with four 4.5" guns, was operational from 1940 (EHER entry; Nash 1998b, 57).

The four-gun battery of this type at Little Clacton (EHER 10052) appears to be of later construction, perhaps as late as early 1942 as it does not appear on photographs taken in 1940 and 1941, and the first reference noted by Dobinson (1996a) is in May 1942. The date of construction of other sites is less clear. Two batteries, EHER 14735 (Northwick, Canvey Island) and EHER 18029 (North Weald) are listed as being unarmed in 1942, and it is possible that they had been in use earlier in the war and that their armament had been (temporarily or otherwise) redeployed. The gun batteries at Wimbish (EHER 18484) and at Takeley (EHER 18888) are both placed to defend airfields (Debden and Stansted respectively) and the latter is most likely to have been built in 1942 when the airfield was constructed.

Similar four-gun batteries have been recorded in adjacent counties. Across the Thames in Kent are Cobham Lodge Lane (Kent HER TQ66NE 59), first documented in February 1940, Erith and Great Farthingoe (part of the anti-aircraft defence of Dover, Kent HER TR24SE 90). In Suffolk, sites of this form mapped by the Suffolk Coastal NMP show a range of construction dates. Shotley (SLY 087 – MXS 19621) and Trimley (TYY 024 – MXS 19857), were in existence by 1942 when they were both listed as having four 3" guns (Dobinson 1996a, 368). Pakefield Park, Lowestoft (LWT 122 – MXS 19162) is visible under construction on aerial photographs from early 1943, but Felistowe (FEX 110 – MXS 19237) appears to have been built as late as spring 1944.



Figure 6.6 Heavy anti-aircraft battery at Bowaters Farm, Thurrock (EHER 9082). A four-gun battery with octagonal emplacements and adjacent four-gun 5.25" battery with circular emplacements which replaced the original battery in 1944. (V.82-RAF-713-pt IV-0668 held at the National Monuments Record)

Not all of the four-gun sites employed the arc layout. Unusually, at Jaywick (EHER 16878) the octagonal emplacements are in a square layout around the central command post. Manning and armament at the battery is documented from May 1942 when the battery was listed as being equipped with four 3.7" guns (Dobinson 1996a, 342).

Square emplacements

Around Chelmsford and Colchester, although exhibiting a similar layout of gun positions, a number of batteries have square emplacements (Fig. 6.5): EHER 13921, 20125, 20129, 10641, 16477 (albeit the latter exhibit a less regular layout than many examples). No early dates are known for any of these, the earliest references listed by Dobinson (1996a) being in 1942: May 1942 for Rolleston Farm, Chelmsford (EHER 20125), and Fridaywood Farm, Colchester (EHER 16477); December 1943 for Rumbolds Farm, Chelmsford (EHER 13921) and Writtle (EHER 20125). The battery at Bradwell Wick (EHER 10641) was clearly built after January 1941 as it does not appear on an aerial photograph of that date, though nothing further is currently known of its history. These also fall within a different Gun Defended Area,

Clacton, Chelmsford and Colchester, although octagonal emplacements were also used in this GDA, for example, Little Holland (EHER 10052).

There is also one battery where four square emplacements are arranged in a straight line, Little Oakley (EHER 17369) within the Harwich GDA, and in a layout is more typical of the Diver deployments established at the end of the war (see below). Again, there is a reference to the site in 1942 (Dobinson 1996a), although at this date it was listed as unarmed.

One of the sites at Chelmsford (Broomfield, EHER 20130) consists of eight emplacements, all square (Fig. 6.5; Nash 1998b, photo opposite p.47), in a horseshoe layout. The two most southerly emplacements are slightly larger than the others and Nash suggests that these are of the type DFW 55483 developed during the summer and autumn of 1943 for use by 3.7" guns equipped with the No. 11 Machine Fuze Setter as existing emplacement types were too cramped internally (Dobinson 1996a). Further eight-gun batteries have also been recorded at Loughton Hall (EHER 10356); although from the available photography the types of emplacement are not clear, and at Lippitts Hill (EHER 10356).



Figure 6.7 Heavy anti-aircraft battery at Dovercourt, Harwich (EHER 10658) (RAF-58-84-5044 held at the National Monuments Record)

The later batteries around Colchester and Chelmsford were probably part of the deployment in response to the so-called Baedeker raids on historic cities which began in April 1942. Within Essex, Colchester and Chelmsford were identified as potential targets and anti-aircraft defences were accordingly strengthened. Two batteries, EHER 20129 at Chelmsford and 16477 at Colchester were in existence by at least May 1942. These and three other sites around Chelmsford, in place by December 1943, all have square gun emplacements.

Six-gun batteries

Modifications to existing layouts are also indicated at a number of sites which, in their final form, comprise an arc of four octagonal emplacements with an additional square emplacement at each end of the arc (Figs 6.5, 6.7). Although fewer in number, the general distribution is similar to that of batteries with four octagonal emplacements, located along the Thames and coast. These include the batteries at Dovercourt (EHER 10658; Fig. 6.7), Buckles Farm, South Ockendon (EHER 14664),

Belfair Farm, Leigh-on-Sea (16188), Thorpe Bay, Southend (EHER 14864), Breaches, Waltham Abbey (EHER 10373), Furtherwick, Canvey Island (EHER 14734) and Butlers Farm, Sutton (EHER 14872). At Leigh-on-Sea (EHER 16188), aerial photography shows that these two square emplacements were added to the existing site after February 1943 (although no post-1942 armament is listed in Dobinson 1996a). Dovercourt is recorded as having four 3.7" guns in May 1942 and it is possible that the square emplacements were added after that date, the site being listed as in use in 1943. Aerial photography of 1946 clearly shows the six emplacements but it is not clear when these were added. By March 1943, the site also included a rocket battery. The history of EHER 14664 is more elusive as the site was unarmed in May 1942 (Dobinson 1996a), but no other manning and armament records for the site are listed.

Butlers Farm (EHER 14872) is listed as being armed with four 3.7" weapons in 1940 and 1942, and is recorded as being manned in 1943, although no record of armament is given at that date (Dobinson 1996a). Breaches, Waltham

Abbey (EHER 10373) was in existence by 1940 (then listed as unarmed), armed with four 3.7" guns in June 1942 and was manned in December 1943, but although the additional emplacements are seen on 1947 aerial photographs it is not clear when they were added. On available evidence it is likely that the sites were expanded in 1943 or as late as 1944. The six-gun position at Landguard, Suffolk (HER FEX 110 – MXS19954), seems to have a similar history, being listed from 1940 and recorded as having four 3.7" guns in mid 1942 (Dobinson 1996a, 368). Here too the additional square emplacements are at the ends of the original arc.

The battery at Thorpe Bay, Southend (EHER 14864), is recorded from at least April 1940 when it was documented as being armed with four 3" guns. This site underwent at least two phases of modification, including relocation of the battery. An aerial photograph taken in July 1940 shows four gun positions at the original site, and four octagonal emplacements then under construction some 45m to the south-east (EHER 14864). The 3" weapons had been replaced by 3.7" armament by May 1942 but it is not known when the additional two square emplacements were built. However, in contrast to other sites, the additional emplacements were built forward of the existing arc. This same layout is seen at the battery at Green Street Green, Kent, originally a four-gun battery using 3.7" armament but later rearmed with 4.5" guns and provided with two additional emplacements (Kent HER TQ57SE 146).

The addition of square emplacements almost certainly reflects the introduction of new technology. In particular, during summer and autumn 1943, a new form of square emplacement for 3.7" guns equipped with a new fuze setter was evolved as existing emplacements were too cramped. Dating the phases of construction of the Essex sites remains elusive and more precise dates of construction and modification are needed to clarify the context of the additions. For several of these (including EHER 10658, 16188, 10373 and 14734) no post-1942 armament is listed in Dobinson (1996a). In early 1943 when Air Defence Great Britain set out clear standards for layouts and structures of gun parks and domestic sites eight variants of 3.7" four-gun sites were listed. Some of these dealt with details of domestic sites for provision also of mixed batteries but they also included sites expanded to six-gun positions using supplementary Home Guard manning. It is possible that this is the case for at least some of what in Essex became six-gun batteries in the middle years of the war. Alternatively, some of the additional armament may relate to developments late in the war to counter V1 rockets (see below). Whilst numerous batteries were set up on new sites as part of the Diver deployment, this programme also used existing anti-aircraft batteries in suitable locations, many of the distinctive characteristics of Diver being operational rather than in their physical form (Dobinson 1996a). The site at Weltham Green, Kent (Kent HER TQ86NW 1063) is documented as having been enlarged in 1944 and used in Diver operations. Two of the Essex batteries at which six gun positions are recorded were also in use as part of the Diver programme, Thorpe Bay (EHER 14864) and Butlers Farm (EHER 14872).

5.25" batteries

Also in 1944, a small number of the Essex batteries were rebuilt on adjacent sites with circular emplacements for use by the new 5.25" weapons (Figs 6.5, 6.6). The first 5.25" guns were brought into operation in June 1942 as part of the London IAZ, but plans for wider introduction were slower than planned, and many were only built in 1944–5. They had different supporting equipment requirements than the 3.7 and 4.5" guns, hence the need for new sites. At Sandpit Hill, Hadleigh (EHER 16189), and Bowaters Farm (EHER 9082; Fig. 6.6), the four new circular emplacements were set in a square layout with a central command post; the new battery situated a few hundred metres to the east of the original battery. At Buckhurst Hill (EHER 10376), a second arc for the new armament was added immediately to the east of the original. The battery at Bowaters Farm (EHER 9082) continued in use after the end of the war. Across the Thames a further example can be seen at Iwade, Kent where the existing 4.5" guns were replaced in November 1944 in a new semicircular layout outside the original (Kent HER TQ96NW 80).

Diver batteries

The anti-aircraft batteries in Essex include sites of very distinctive layout, sited in coastal areas (Fig. 6.8), and a group which can be more certainly dated from the aerial photography, appearing only on photographs from 1944. These were all part of the final major change in deployment of anti-aircraft batteries, known as Diver, undertaken from mid 1944 to counter the threat of V1 rockets. Many existing anti-aircraft battery sites, selected to counter bombing raids on centres of population, were not suitably sited for firing at weapons which would explode where they were brought down and the Diver programme involved significant movement and construction of batteries.

The Diver deployment as a whole went through a number of major phases, necessitated by changes in launch sites (and hence trajectories) of the V1 rockets as the Allies advanced across the continent. It began in the summer of 1944, originally focussed on the Weald (Kentish Gun Belt) and south-east coast (Coastal Gun Belt), using mainly mobile gun sites. As the flying bombs began to approach from a more easterly direction, new sites were added in the inner Thames estuary (Diver Box) from July 1944 and subsequently along the Essex and Suffolk coast (Diver Strip) in September 1944, ultimately extending as far north as Lincolnshire (Diver Fringe) from October 1944 (Dobinson 1996d).

Essex saw considerable numbers of these Diver batteries constructed at this time (Fig. 6.8). The Essex sites fall within the Diver Box (the longest lasting of the deployments) and Strip deployment areas. The majority of these were built along the coast, and have a distinctive layout contrasting with the earlier sites. These Diver sites are generally four- or eight-gun batteries, with emplacements arranged in single or parallel straight lines (Fig. 6.5). Within the county there are two main concentrations — between Shoeburyness and Bradwell-on-Sea, and between Clacton and Harwich, with a few examples along the Thames.

Most of the eight-gun emplacements occur along the eastern side of the Dengie peninsula, (EHER 16017, 14978, 14977, 16014) in the Diver Box, although there is

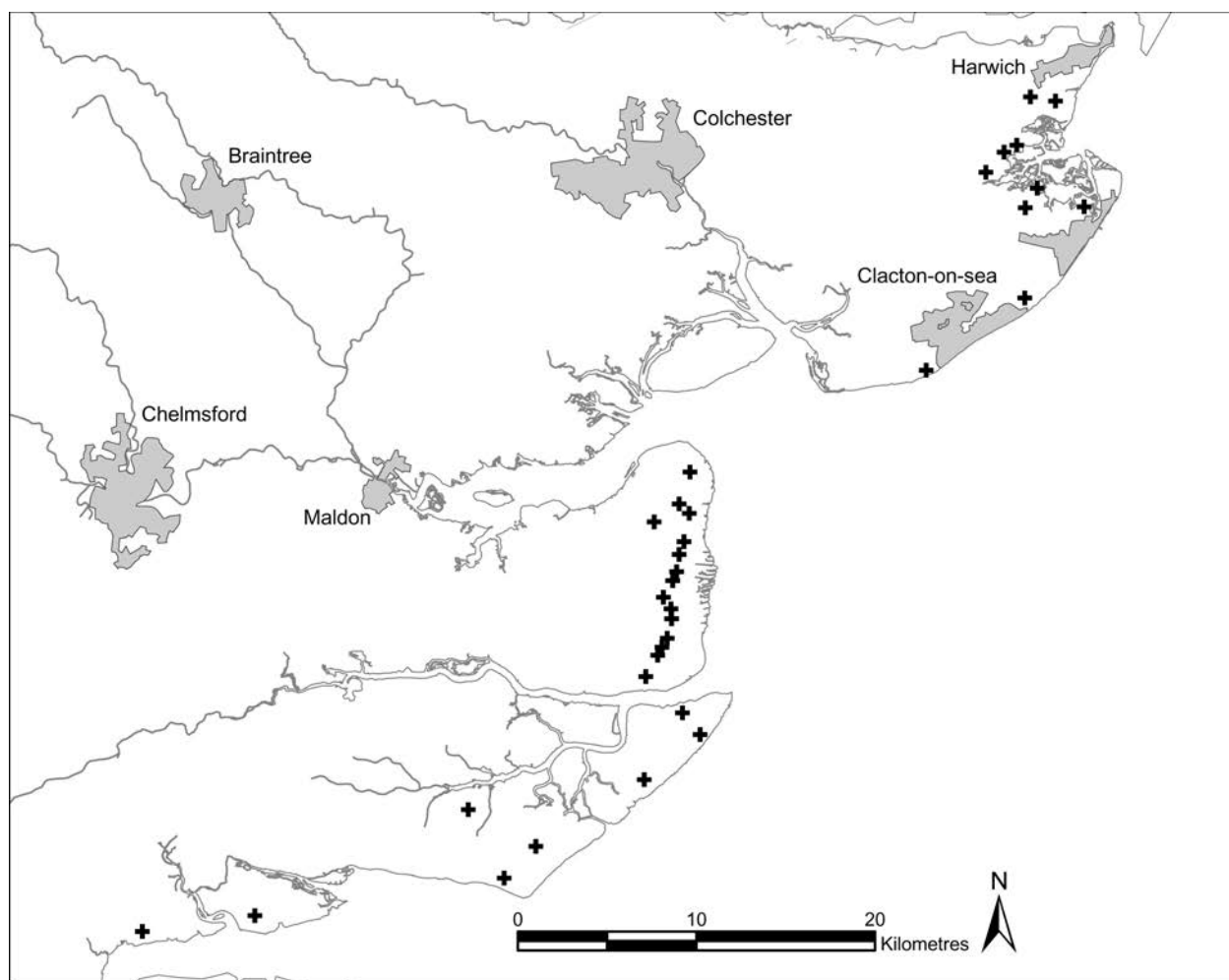


Figure 6.8 Distribution of Diver anti-aircraft batteries in Essex. The majority of these were newly constructed as part of the Diver deployment, but this also included a number of existing batteries in the Southend area

one recorded example at Hamford Water (EHER 17233) in the Diver Strip. EHER 17270 is listed (Dobinson 1996d) as having eight guns although only four were visible on available air photography. Almost without exception the gun emplacements are laid out in a straight line, either a single line on the four-gun sites or two parallel lines of four emplacements on the eight-gun batteries (Fig. 6.5). However, at two sites on the Dengie (EHER 16015 and 16013), the four-gun positions are laid out in a shallow arc, the flanking positions forward of the central two (Fig. 6.9).

At EHER 16980, on the coast near Jaywick, several groups of emplacements have been recorded along a short stretch of ground, comprising a range of layouts. There appear to be at least two groups of six guns (four forward and two in a second line behind), a battery of four in a more usual arc layout and others which may be in pairs of four. It is not clear exactly what was used on this site, but it probably includes a number of light anti-aircraft positions, although it has been noted that no manning was listed in November 1944 (Dobinson 1996d).

As already noted, the Diver deployment also used existing heavy anti-aircraft batteries. Sites which became part of Diver included the four-gun batteries at EHER 9082 and 14863 (which had been unarmed in 1942), and six-gun positions at EHER 14864 and 14872. It is possible that these two were enlarged when brought into a Diver role in order to be able to use the new guns. At New

Burwood, Foulness (EHER 20137) continued use for Diver saw the construction of a new site for the battery. These eight-gun Diver positions (in parallel rows of four) lie some 150 yards east of the four octagonal emplacements. New batteries also appear to have been built on or near existing sites near Rochford at EHER 20119 and 20120. Dobinson (1996d, 69) suggests that comparatively few batteries within the Box were built to a diagnostic Diver specification and that sites newly established for the Diver deployment were equipped with eight guns. However, there are several examples of eight-gun batteries within the Essex part of the Box that appear to be equipped with only four emplacements.

As was the case for the permanent anti-aircraft batteries established earlier in the war, a number of orders for site layouts were issued by AA Command. Specifications for the Coastal Gun Belt in the earlier phases included largely eight-gun sites in a bow layout — the concave side facing the line of approach, although a line was acceptable where local topography dictated. In practice many of the sites within Diver Box were of existing permanent GDA positions and few were purpose-built to Diver specifications (Dobinson 1996a), and sites within the Diver Strip often had fewer guns, most commonly four, although they could have two, six or eight. Although initially the guidance stated that these should be placed in a line forming a right-angle with the primary bearing, it realised that the low angles of fire



Figure 6.9 Diver batteries as part of the Diver Box deployment on the Dengie, which includes two four-gun batteries with a bow layout (EHER 16013 and 16015) and an eight-gun battery (EHER 16014), although the layout of the fourth site (EHER 16017) is less clear. Arrow highlights other, earlier cropmark enclosures. (RAF 106G/UK/593/4062 held at the National Monuments Record)

required could be made safer by siting the flanking of the four guns slightly proud of the central two, forming a shallow bow. The orders to adopt this layout were issued on 23 September as guns began to move to the east coast, and Dobinson (1996d) notes that all four-gun Strip sites should have conformed to this arrangement. In Essex the Diver Strip sites still show a straight line arrangement, although two Essex examples of the bow layout actually occur in the Diver Box (EHER 16013 and 16015).

Dobinson (1996d, 93) states that most of the later specification plans for four-gun sites in the Fringe show the weapons simply arranged in a straight line.

The Essex situation seems to be in marked contrast to that in Suffolk where the majority of batteries identified as Diver sites (which are within the Diver Strip) mapped by the Suffolk Coastal NMP do have a bow layout, including Bawdsey (BAW 085 – MXS 19225, 19114), Hollesley (HLY 053 – MXS 19061), Gedgrave (GED 027 – MXS

20171, GED 026–MXS20170) and Aldeburgh (ADB 068 – MXS 19744). Fewer Suffolk Diver batteries have emplacements in a straight line, though some of this layout do occur, including the eight-gun site at Felixstowe (FEX 142 – MXS 19326) where the emplacements are arranged in two parallel rows of four). Other examples are seen in one of two four-gun batteries at Leiston (LCS 094 – MXS 19502, the second battery at this site having a bow layout) and four-gun positions at Westleton (WLN 037 – MXS 19486, WLN 032 – MXS 19461) and Dunwich (DUN 040 – MXS 19460; DUN 040 – MXS 19437).

With such a pace of change in deployment, inevitably some planned sites may never have been built and it seems clear that some were moved relatively small distances during their lifetime. Dobinson (1996a) noted that of the 163 sites reconnoitred for the Diver Strip, only thirty-nine were built in the period October 1944 to February 1945. At some of the documented locations, no evidence has been found on the contemporary or near-contemporary photographs that the sites were constructed. Conversely some of the mapped sites do not appear on the lists (Fig. 6.6; Dobinson 1996d, figs 23, 28). Although some instances may be accounted for by errors and vagaries in NGRs, and their conversion from Military Grid References, it appears that the plans were not always translated into features on the ground.

The timescale for response and adaptation also ensured that although these used similar guns to the earlier HAAs (many actually from HAAs) they were less substantial structures than earlier emplacements and so have left a less permanent record in the landscape. Of many, little trace is visible from the air by the late 1950s or 1960s.

Other anti-aircraft measures

The heavy anti-aircraft batteries were only part of the programme of defence against air attack, which was also supported by extensive use of light anti-aircraft and rocket batteries, searchlight batteries and decoy sites, a number of which have been mapped by the NMP project, and others have been recorded by the WWII Defences Survey. The light anti-aircraft batteries made use of a variety of weapons from standard machine guns to the Bofors gun, the latter capable of being used as either a mobile or a static weapon. In consequence, these batteries tended to be less substantial than HAAs, and in many cases will have comprised little more than a blockwork wall, earthworks or sandbags (Lowry 1995). A number of earthwork features, at least some of which are interpreted as anti-aircraft batteries, have been recorded along the Thames. Some are likely to be light anti-aircraft batteries. Many of these cluster around the key industrial sites including oil facilities at Thames Haven, Shellhaven and Canvey Island, and explosives factories at Pitsea and Waltham Abbey. To the west of Shellhaven, they include EHER 14764 comprising four gun emplacements, EHER 14765, also having four emplacements though in a more unusual diamond-shaped layout and EHER 14766, which has three emplacements in a single line adjacent to the railway line. There are several small gun sites east of the oil depot on the west side of Canvey Island, including EHER 14731.

A number of rocket batteries were also established in Essex. These were generally mounted in large groups, but the mounting bases were relatively insubstantial and leave

little trace on the ground (Lowry 1995). One was established in 1942 as a training site at Writtle, Chelmsford, and was moved to its operational site at the Chelmsford Recreation Ground (EHER 20128) in August 1942, where it used sixty-four twin rocket projectors, visible on 1947 aerial photographs as rows of surface marks separated by paths, with associated huts to the north (Nash 1998b). Two sites are documented at Colchester, including that at Abbey Field which is also clearly visible on 1946 aerial photographs. Searchlight batteries which formed such an important element of the work of the anti-aircraft batteries, have been plotted at a number of locations. They include EHER 18890 at Wimbish, EHER 19714 near Wendons Ambo, and probably EHER 14867 at Shoeburyness, which, comprises three circular earthwork features.

A programme of construction of bombing decoys was implemented in 1942 in response to the 'Baedeker' raids. Civil decoys, known as Temporary Starfish sites included Little Baddow (EHER 20305) and Great Bromley (EHER 20307) for the defence of Chelmsford and Colchester (Nash 2002). The Starfish were the largest and most complex types of decoy, intended to replicate the results of successful raids on urban areas, using various fire types, though the temporary sites had only basket fires. Traces of the Colchester decoy are visible on 1946 aerial photographs, as linear features and other faint soil marks interpreted as the remains of fires and fire break trenches, together with an associated night shelter. Decoys were also built to divert bombers from key industrial targets. Plans were implemented for Thames Haven and Shellhaven oil depots, with the construction of 'QF' oil decoys at Stanford le Hope and Fobbing respectively intended to simulate oil fires to draw aircraft away from the genuine installations. At Stanford le Hope ill-defined features, which are visible on aerial photographs of 1946, almost certainly relate to the decoy (Nash 2002). The oil companies, who held responsibility for manning of these sites were concerned that the decoy fires would draw bombing raids to the actual oil depots, and it appears that these two were largely unmanned even if technically operational (Nash 2002). No trace of the Fobbing decoy itself is now visible on aerial photographs, but the night shelter and possible oil storage bays still exist and have been recommended for scheduling (Nash 2002, 24).

IV. Airfields

Perhaps the most conspicuous military feature of the Second World War remaining in the landscape of Essex is the airfields, many of which were constructed during the course of the war, in particular from 1942. Twenty-five wartime airfields have been recorded by NMP, twenty-one of these lying wholly within the county, with a further two examples spanning the county boundary with Hertfordshire and Cambridgeshire. A further two, which at the time of use were within Essex, as a consequence of boundary changes now lie wholly within Greater London (Fig. 6.10) The majority of the airfields are situated within the central and northern parts of the county (eighteen on the glacial till plateau) with only two in the south-east (Bradwell Bay (EHER 16047) and Rochford (Southend, EHER 14870)). Only three were active service airfields in the summer of 1939.

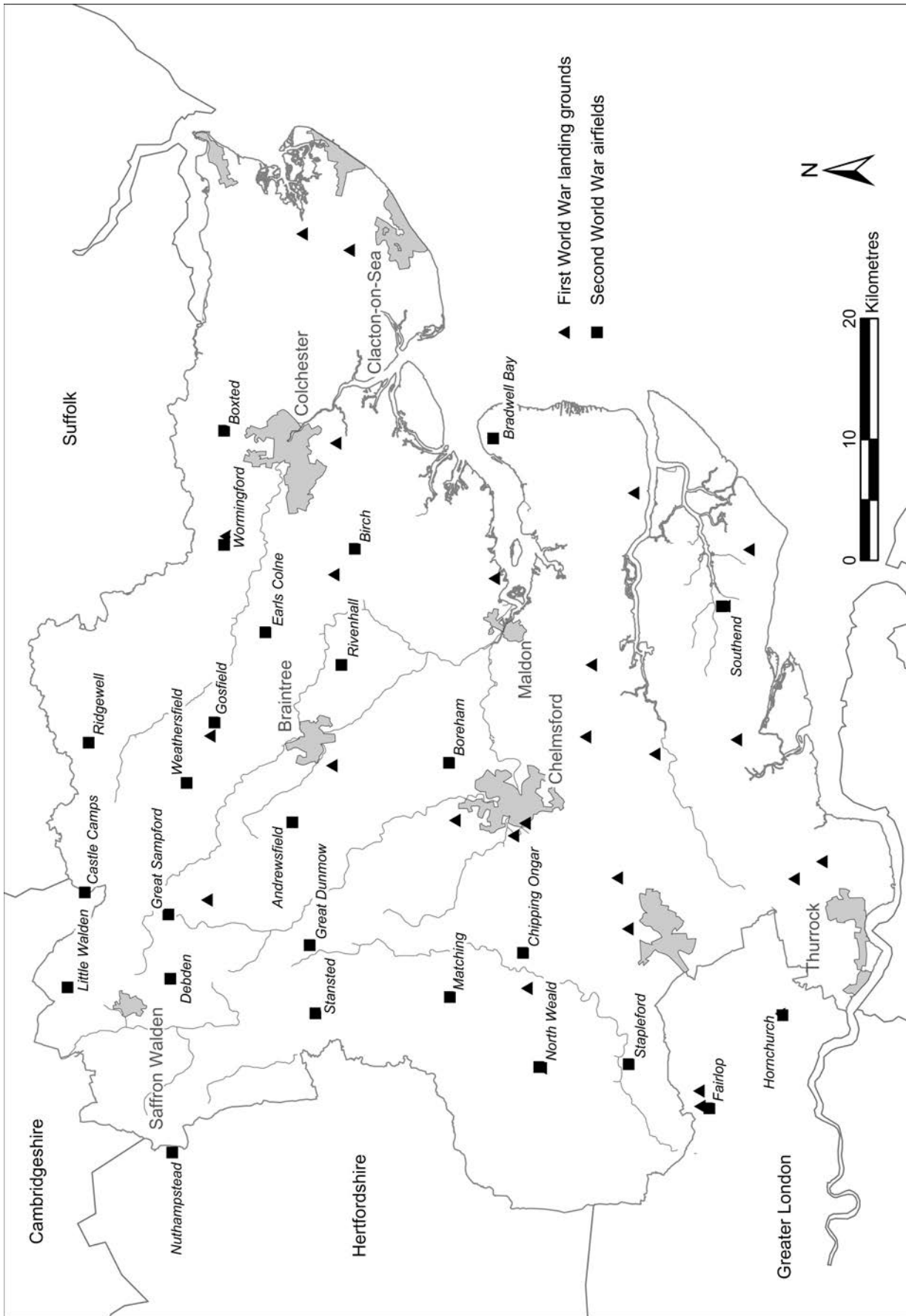


Figure 6.10 Distribution of Second World War airfields and First World War landing grounds in Essex. The Second World War airfields are named to enable the plans of Figure 6.11 to be located

The mapped airfields conform to a restricted number of general plan types, as defined by the layout of the landing field itself (Fig. 6.11). The majority (19) share a range of characteristics, most notably three intersecting concrete runways and linking perimeter track with hardstandings for dispersal of aircraft, which provide the distinctive footprint in the landscape. Two-thirds of these have only loop dispersals, but although this is the dominant type at Boxted, Ridgewell and Earls Colne, these three also have a smaller number of circular standings. Castle Camps has only circular standings, whilst Fairlop was provided with a combination of protected pens and open hardstandings. Two stations, Debden and North Weald, had only two concrete runways whilst four (Stapleford Tawney, Hornchurch (now Greater London), and Rochford (Southend, EHER 14870) and Great Sampford) were never equipped with concrete runways. Each of these six fields was provided with a combination of protected pens and open standings, including a few of the loop type at Debden.

Background

Britain had been home to perhaps a surprisingly large number of military airfields during the First World War, a total of 301 across the country by November 1918 (Dobinson 2000c, 15), thirty-one within the county of Essex (Doyle 1997; Fig. 6.10). Few were required after the end of hostilities and the vast majority were returned to agricultural use from 1918. Many of the First World War landing grounds were little more than fields which afforded a sufficiently large clear landing space. Few had permanent buildings and little trace of these remains, although survey in recent years has recorded airfield buildings at a number of localities, most notably at Stow Maries, the most completely preserved example of a First World War Flight Station in the county.

The Royal Air Force (RAF) was consolidated and gradually expanded during the 1920s and early 1930s, establishing the service primarily as one for the defence of Britain in the event of war (a programme of development outlined more fully by Dobinson (2000c, chapter 2). The period until the mid 1930s saw development of a number of military stations and the establishment of civil airfields, but total numbers remained small. In Essex, they comprised two RAF stations at North Weald (opened 1927) and Sutton's Farm (opened 1928), and civilian airfields at Maylands (whose operation later moved to Stapleford Tawney) and Rochford (renamed Southend Airport in 1934).

The increasing threat of war following the collapse of the Geneva Conference (more correctly League of Nations Disarmament Conference 1934) highlighted the need for improvements in the country's defences. Expansion of the RAF was announced in 1934 and in the next five years a programme of expansion was implemented through a number of schemes with the construction of new airfields (under Scheme C; Dobinson 2000c, fig. 7) and modifications to existing ones as well as the establishment of new squadrons, and reorganisation of the air services (Dobinson 2000c, chapter 4). In 1936, Air Defence of Great Britain had been divided into four commands, Bomber, Coastal, Training and Fighter. Tactical planning included the establishment of satellite airfields (under Scheme F) for full stations, to enable dispersal of aircraft and help minimise the effects of air attacks. These required landing grounds but not the associated buildings of the airfields, and civil

aerodromes offered a ready source of suitable sites (Dobinson 2000c 107; fig. 9).

From the outbreak of hostilities a new programme of airfield construction was initiated, and by the end of the war this had raised the national total of airfields from the 1939 figure of around 150 to 740 (Lake 2000a). Dobinson (2000c, 175) has outlined three main phases of development:

- Consolidation (September 1939–Summer 1940). A period which saw completion of permanent airfields and satellites as set out in the expansion schemes and the requisitioning of civil airfields from the outbreak of war in 1939.
- Defence (June 1940–1941) during the Battle of Britain and the Blitz which primarily saw a programme of new construction, particularly of fighter stations after the retreat from Dunkirk when the threat of invasion increased. As the demands for airfield capacity grew, provision of satellite fields proved impractical, and in addition to acquisition of new sites the satellite landing grounds were also converted to full operational status. A network of decoy airfields to draw away air attacks was also created.
- Offence (late 1941–1944) this phase saw rapid expansion in the number of bomber airfields in response to plans for larger and more sustained offensives. The demand for airfields, and the pace of construction, was raised again by the entry of the United States into the war in 1942 (Bowyer 1990, 19). The American Eighth Air Force, comprising both Bomber and Fighter Commands, was established in Britain in 1942, and commenced flying operations in August of that year (Dobinson 2000c, 175). In August 1943, they were joined by the Ninth Air Force (to which many of the Eighth Air Force Units were transferred), and the Ninth became the American's major tactical air force, preparing the way for the invasion of Europe. East Anglia and Essex, situated close to Germany and with favourable gentle topography offered suitable sites for airfields and these counties have a particular concentration of bomber airfields, most noticeably for the USAAF (Dobinson 2000c, figs 18 and 19).
- The result was a significant civil engineering enterprise, requiring considerable resources of manpower and raw materials. It had been envisaged that the biggest difficulty would be in site acquisition, but practical issues of location proved more challenging than legal aspects, in endeavouring to minimise levels of engineering work in adjusting the landscape to service requirements, including runways and immense drainage systems (Higham 1998). During the height of airfield construction between 1942 and the end of 1943, it was estimated that some 60,000 men were engaged on the work, which was given top priority (Smith 1996, 43) and at the peak of construction during 1942 a new airfield being started in the country on average every three days (Freeman 1978, 8). All of the construction work was under the general direction of the Air Ministry Directorate General (more generally known as 'Works and Bricks'), though carried out by both civilian contractors and military units from both US and British forces.

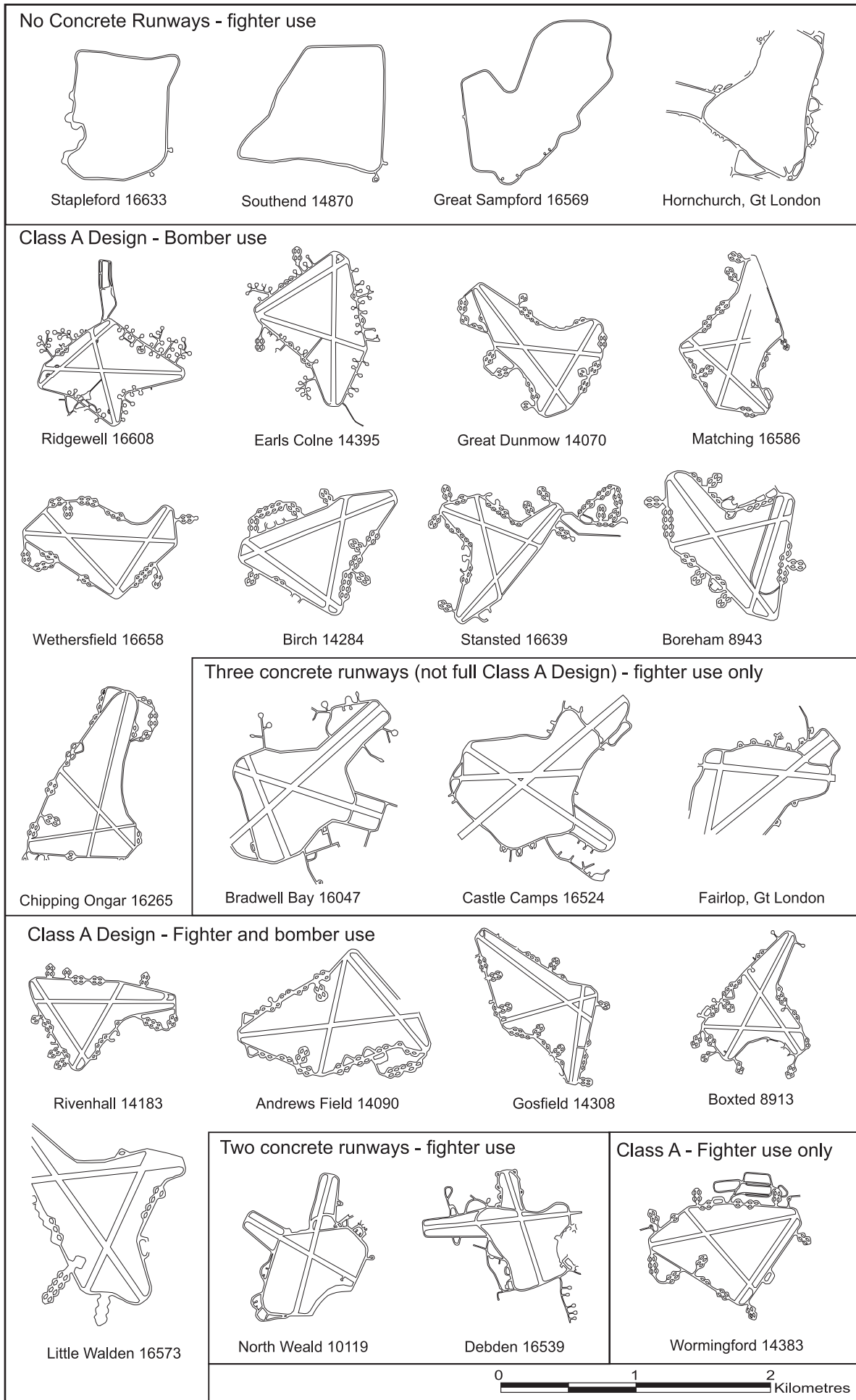


Figure 6.11 Comparative plans of selected Second World War airfields in Essex

Specifications

Like other military features airfield design was the subject of various plans and orders which specified layout of the landing field, its associated structures and architectural specifications for buildings. Peacetime and wartime demands differed considerably and the layout of many sites reflects the changing policy. Pre-expansion airfield design tended to be site specific, but expansion of the RAF in the mid 1930s prompted a need for standardisation in both layout and building design (Higham 1998).

Landing field

Most pre-war airfields, including those built during the expansion period, had grassed landing and take-off strips which had the advantage of enabling aircraft to take-off or land in any direction (fixed runways added issues of dealing with cross winds). Although they generally provided an adequate surface for the level of pre-war activity, operations could be significantly affected by poor weather conditions, a factor that became much more significant in wartime. Further, technological developments were resulting in heavier, faster aircraft requiring longer take-off and landing runs, and producing greater wear on grass strips. The limitations of grass strips were recognised some years before the outbreak of war, poor winter weather conditions highlighting the issue (Dobinson 2000c, 154–5; Smith 1996, 46) although the Air Ministry concluded in autumn 1937 that solid runways would not generally be required and various other measures for assisting take off of bombers were investigated (Dobinson 2000c, chapter 6). For new airfields, a key factor in deciding to use concrete was the problem that the timetable for expansion did not allow for the time required to establish and consolidate a suitable grass surface. From March 1939, the Air Ministry granted approval for permanent runways at a number of stations, with the specification that these should be 50 yards wide and 800 yards long for fighter and coastal stations, 1000 yards long for bomber stations, and concrete was the preferred choice. Nonetheless, at the outbreak of war in September 1939, only nine RAF stations had concrete runways, with all forty-three fighter aerodromes in 1940 being grass (Higham 1998). Only from December 1940 were concrete runways and dispersals introduced as standard and many existing fields were also upgraded (Dobinson 2000c, 204–5). In the meantime, some airfields adopted temporary measures to provide firmer hardstandings with the use of coke and ashes from local gasworks (Bowyer 1990); whilst at some airfields steel matting was used to provide a firm all weather surface for runways.

Over the course of the war the Air Ministry issued various instructions on the layout of airfields and their component structures. Opinion on the preferred number of runways was divided, but in late 1941 it was ruled that stations should be interchangeable between Commands, and where possible should be built with three runways (Higham 1998). By 1942, when most new airfields were designed for bombers, the Class A layout specified that airfields should have three intersecting concrete runways, the main one of at least 2000 yards aligned to the prevailing wind as far as geographical circumstances allowed, and the others of 1400 yards (the minimum acceptable being one of 1600 yards and two of 1100 yards (Higham 1998)). The width of runways and perimeter

track were also standardised. These remained the standard specifications until the end of the war.

Dispersal

In peacetime, aircraft had been stored in hangars, but during wartime operations these aircraft were dispersed to hardstandings around the airfield, hangars only being used for maintenance and repair. Apart from reducing the level of resources needed to provide hangars for increased numbers of aircraft on fields, dispersal helped minimise the risk of damage from attack and enabled aircraft to be more readily prepared for action and the dispersal principle was implemented as early as 1938 (Dobinson 2000c, 165). The need for both dispersal and ready access to the flying ground dictated the perimeter track and layout of hardstandings. Initial requirements were for sixteen standings, though subsequent decisions from the Air Ministry (in May 1939) called for thirty-six on operational fighter stations, with five of every twelve to be located outside the perimeter track, and by 1942 requirement for dispersals had been increased to fifty (Dobinson 2000c, 210). The earliest examples tended to be in the form of E-shaped pens, the standing protected by an earthen bank, a design later developed to be a protected pen with the incorporation of an integral shelter. They could also be used in combination with other more open hardstandings. Bomber Command developed a number of types. In 1940, requirements were for standings for twenty-four aircraft, grouped in eight clutches of three, each standing being a circular 'frying pan' type (125ft or 38.1m in diameter) attached to the perimeter by short lengths of track, although other less well defined types were also used. Changes in recommendations of number, layout and location around the airfield followed as airfields were required to accommodate increased numbers of aircraft, to thirty, thirty-six and ultimately to fifty. The circular standings proved less satisfactory for heavier bomber aircraft and a new loop (or spectacle) design, attached to both sides of the perimeter track, was introduced facilitating manoeuvring between standings and perimeter tracks. These were generally sited in groups of four (Dobinson 2000c, 211–13).

Services

Services and installations were dictated by the intended function, and were not part of the Class A specification (Freeman 1978, 8). The airfield specifications also dictated the layout of associated technical and domestic buildings, and one of the most characteristic differences between wartime and pre-war period airfields was in the dispersed location of these structures. On pre-war airfields, including the expansion sites, technical and domestic buildings were clustered conveniently together on one side of the airfield (those on the expansion period airfields, especially the domestic sites, also being of high architectural quality) (Dobinson 2000c, chapter 5). As with the aircraft, wartime dispersal of these structures aimed to minimise the impact of potential air attacks, and domestic and technical sites, as well as bomb stores, were dispersed over considerable areas, where possible concealed in woodland (Thorpe 1996, 8, plan of Little Walden).

Essex airfields

To a large extent the form and layout of the Essex airfields reflect their date of construction and operational use, and can be grouped according to Dobinson's three phases.

Consolidation

Four Essex airfields were not given concrete runways (Fig. 6.11): Stapleford Tawney (EHER 16633), Hornchurch (Greater London), Rochford (Southend) (EHER 14870) and Great Sampford (EHER 16569). At all four, dispersals were in the form of a combination of protected pens and open hardstandings. They are all of relatively early date, and with the exception of Hornchurch, were, initially at least, established as satellite airfields. These four airfields remained fighter bases throughout the war, mainly in the hands of the RAF, although for a period Great Sampford was used by a US Fighter Group.

Hornchurch and Rochford had their origins in the First World War, although neither saw continuous use between the wars. Established as a Landing Ground in 1915, Hornchurch (then known as Sutton's Farm) became a Home Defence Station and remained in the hands of the RAF until 1919. Much of the site had been demolished by 1922 when the site was reassessed for use as a permanent service airfield. It reopened in 1928, being renamed RAF Hornchurch in 1929 (Doyle 1997, 72), and operated throughout the Second World War as a fighter station, using only grass landing strips, in the defence of London. Rochford (Southend, EHER 14870) had seen use by both the Royal Flying Corps and the Royal Naval Air Service between 1914 and 1918, but reverted to farmland in 1920. Subsequently purchased by the Southend Corporation, it opened as Southend (or Rochford) Airport in 1935 (Doyle 1997, 60). In common with other commercial airfields, it was requisitioned by the RAF at the outbreak of war initially to serve as a satellite airfield to RAF Hornchurch, becoming an independent fighter station, RAF Southend, in October 1940 (Smith 1996, 230). The airfield was enlarged with the addition of the perimeter track but retained grass landing strips throughout its military use (Doyle 1997, 60). Also recorded from 1940s aerial photographs are three Pickett Hamilton Forts (retractable pillboxes, EHER 20714) emplaced on the grass between the runways (and still surviving), and pillboxes around the perimeter which afforded added defence (Nash 2004 15). Stapleford Tawney (EHER 16633) was also a civilian airfield at the outbreak of war, when it was requisitioned to serve as a satellite airfield to North Weald, coming into operation in March 1940 after addition of a perimeter track and dispersals. Under the control of the Army Co-operation Command, it became a satellite for Sawbridgeworth, Herts, transferred back to the RAF and was used in the build-up for the invasion of Europe (Smith 1996, 250). The third of these satellite fields, Great Sampford, was of wartime construction, built from late 1941 and opening in April 1942 as a small landing ground to serve as a satellite for the fighter station at Debden. Two Sommerfield metal tracking runways (1600 and 1050 yards long) were built to provide a weather-proof runway (Smith 1996, 152). It had a relatively short active life, which effectively ended when the American Eighth Air Force took over Debden in September 1942, although it remained in military use and late in the war was used as a practice landing field for glider pilots (Smith 1996, 156–7).

The two other airfields which pre-dated the outbreak of the war (North Weald Bassett, later renamed as RAF North Weald, and Debden) each have two intersecting concrete runways (Fig. 6.11). North Weald Bassett (EHER 10119) had been in operation in 1916 as a night landing ground, later becoming a Home Defence Fighter Station but was closed in 1919. Following its selection in 1922 for development as a permanent station, most of the First World War buildings were demolished and a new layout established, the airfield being reopened in 1927 as RAF North Weald. Further improvements followed before the outbreak of war, including the replacement of the original four grass runways with two permanent runways, an unusual feature at a fighter station at that period (Smith 1996, 189). The station remained the base for fighter squadrons over the course of the war, mainly using Hurricanes and Spitfires. Debden is the sole example of a pre-war Expansion period (Scheme C) airfield in the county, opened in 1937 and used during the war by fighters of both RAF and USAAF fighter groups for three fighter squadrons. Its original grass runways were replaced by concrete during 1940 (Smith 1996, 104). At Debden, mapping records both loop and circular dispersals later added to the perimeter, to supplement its initial twenty-eight protected pens, whilst North Weald had a similar complement of protected pens to which circular dispersals were added.

Defence: 1940–41

Three airfields within the county (Fairlop, Castle Camps and Bradwell Bay) as mapped in their latest phase appear generally to conform to what became the Class A design (Fig. 6.11), in that they have three concrete runways, perimeter track and dispersals, though they do not fully meet the later specification on the length of all runways. At each, one or more of the subsidiary runways is shorter than the 1280m (1400 yards) required by the Class A layout: 1000m at Castle Camps and Fairlop, 900m at Bradwell Bay (where the length of the main runway is also less than the later recommendation of 1830m). Further, not all were provided with concrete runways from the outset, although these had been added by late 1941. All three served as fighter stations throughout the war.

Fairlop (then in Essex, now in Greater London) was the first airfield in the county to be provided with three concrete runways. It lay adjacent to the sites of two First World War landing grounds, Hainault Farm to the north, and Fairlop to the east, the latter also serving during the Second World War as an RAF emergency landing ground for RAF Hornchurch during 1940–41 until RAF Fairlop was opened. The new Fairlop site, purchased in the late 1930s for a City of London Airport was requisitioned at the start of the war, and after a year under construction was declared operational in September 1941 (Smith 1996, 128). Castle Camps (EHER 16524) which straddles the Essex–Cambridgeshire border) was built as a satellite to Debden, opening in mid 1940 with a grassed landing field. Extended in 1941 with the addition of concrete runways and perimeter track, Castle Camps became an independent fighter station. Bradwell Bay had been used as a grass airfield from 1936, as a refuelling and rearming base by fighters using the air-to-ground firing ranges on Dengie Flats. Construction at Bradwell Bay began in 1941, the station was ready for operations by January 1942 and it was subsequently used at various

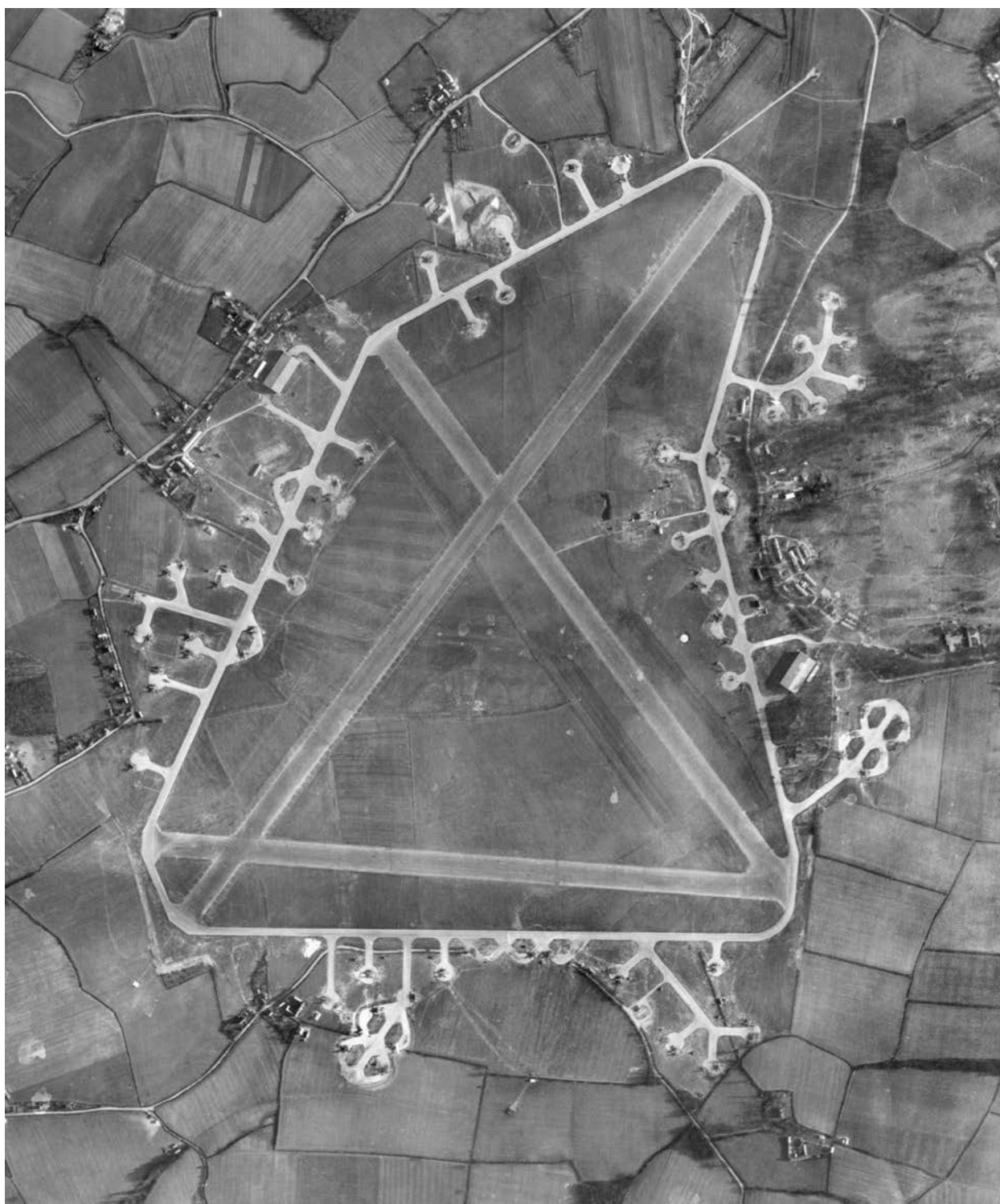


Figure 6.12 Earls Colne Airfield in 1944: a class A design, but equipped with predominantly circular standings (US 7PH GP LOC 186 5048 held at the National Monuments Record)

times by both the RAF and USAAF. All three were provided with a combination of protected pens and open, generally circular, hardstandings.

Offence: the Class A airfields

East Anglia had been one of the areas earmarked as a location for medium and light bomber bases under the Expansion Scheme, and with the developments in bombing offensives and the entry of the United States into the war, this programme of construction gained pace. A total of fifteen airfields built in the county from 1941

conform to the Air Ministry's Class A design: Earls Colne (Fig. 6.12), Ridgewell, Wormingford, Little Walden, Andrews Field, Gosfield, Rivenhall, Boxted, Great Dunmow, Stansted, Birch, Boreham, Wethersfield, Matching and Chipping Ongar. The earliest two, Ridgewell (EHER 16608) and Earls Colne (EHER 14395, the first heavy bomber base in the county, built by local contractors CW French) were completed in 1942 (Smith 1996, 117). Both were allocated for use by the US Eighth Air Force, but first occupied by the RAF. Earls Colne transferred to US control in May 1943 when B-17s of the

94th Bomb Group arrived and remained in US use until the end of the war. Ridgewell was the only Essex airfield to be used solely as a heavy bomber station, by both the RAF and USAAF (Smith 1996, 202).

The remaining thirteen were all built between 1942 and 1944; eight of them were built by US Engineer battalions, who first arrived in the county in July 1942 (Freeman 1978). The majority were in operational use by the end of 1943, including Andrews Field (the first to be completed), Gosfield, Boxted, Great Dunmow and Stansted. Poor winter weather caused delays at some sites, for example Little Walden, which was not operational until 1944 despite work commencing in summer 1942. Rivenhall, Matching and Birch were all completed by spring 1944. Wethersfield, although started in December 1941 was subject to a number of construction delays and the partially completed airfield was used as a satellite to Ridgewell during 1942, before being completed as a Class A airfield and handed over to the US Ninth Air Force in 1943.

All conform to the prescribed runway length and the required 60 degree angle between runways, but the shape of the resulting 'A' formed by the runways shows considerable variation reflecting the restrictions of the site geography to accommodate these. In practice the need to adjust to local circumstances, changes in policy and the need to respond to particular threats or situations meant that whilst essentially of standard design, each demonstrates variations necessary to adapt to the local landscape — both natural and manmade elements. The latter would have been particularly challenging amongst the dispersed hamlets and greens of central Essex. Gosfield is a rather elongated airfield located on a low ridge between the valley of the Colne to the NNE and a stream valley to the south-west, whilst needing to steer the perimeter track around the many farmsteads and hamlets that surround it. Chipping Ongar is similarly narrow, sited on a low hill with its layout constrained by Fyfield and Willingale to the north and Norton Mandeville to the south.

The majority of this group have almost exclusively loop dispersals, linked to the perimeter track, and most of these fields attained the higher recommended complement of fifty: Matching, Wethersfield, Birch, Boreham (Fig. 6.13), Great Dunmow, Stansted, Gosfield, Rivenhall and Andrews Field. The two earliest Class A fields have the earlier design, with circular hardstandings. These were used exclusively at Ridgewell, but at Earls Colne an original complement of thirty-six hardstandings was increased to the later recommended fifty through the addition of loop types. Wethersfield, although one of the earliest fields to be started was not completed until 1943 and was provided with loop dispersals. The standings at Boxted, built 1942–3, are predominantly of the loop type (forty-five have been recorded) but it also has some circular standings. Although first occupied by a Bomber Group, it was used by US Fighter Groups from late 1943, and when additional dispersals were required the circular type may have proved adequate and more economical (in terms of resources) than the larger loop types.

Earls Colne and Ridgewell are the only two Essex bomber stations equipped almost exclusively with frying pan dispersals (Figs 6.11, 6.12), a feature which reflects their date of construction in 1942. Earls Colne was originally laid out with thirty-six pan standings, but an

additional sixteen of loop type were added after the airfield was allocated for USAAF use in June 1942. Early stations elsewhere in the region show a similar form: Foulsham, Norfolk, opened in May 1942 equipped for two bomber squadrons, and Gransden Lodge, Cambs, opened in early 1942 initially for fighter use, also have only frying pan hardstandings. Metfield, Suffolk, completed in mid 1943, has a combination of both frying pan and spectacle loops, and was used variously by both fighter and bomber groups (Bowyer 1990).

Few airfields had a single operational function (whether as fighter or bomber station) or occupying unit for the duration of their operational use, and in practice this could change frequently. The operational histories of the Essex airfields have been documented by a number of authors, in particular Bowyer (1990) and Barrymore-Halfpenny (1984) in the *Action Stations* series, Smith (1996), and Freeman (1978). The allocation of stations was revised to meet requirements of new flying units coming to the UK, or as a consequence of units not being ready when expected. A number of stations initially allocated to the US Eighth Air Force, including Ridgewell, were first occupied by RAF as the build-up of the American Air Force in Britain was slower than anticipated and US groups were not ready to take over stations when first completed. Delays in construction could also necessitate amendment of plans, as happened at Wethersfield. Later in the war, the RAF had temporarily to vacate Wethersfield when the concrete runways began breaking up in the bad weather of 1945, the squadron temporarily occupying Gosfield whilst repairs were carried out (Smith 1996, 140).

The airfield layouts, designed to be able accommodate all sorts of units, give little indication of the operational history of their use. At many stations occupancy changed between the RAF and USAAF and individual stations could variously be occupied by Fighter or Bomber Groups. At different times Matching and Great Dunmow were used by both US and RAF Bomb Groups, Boxted, Rivenhall and Little Walden by American fighters and bombers, whilst Andrews Field saw use by US bombers and RAF fighters. To a large extent, the fighter airfields have a simpler layout, with fewer hardstandings, as is the case at Bradwell Bay and Debden. However Wormingford, built as a standard Class A bomber station for US use with fifty spectacle loop hardstandings, only ever saw use as a fighter station, proving to be surplus to the requirements of the US Eighth Air Force on completion. Birch was virtually unused after its completion in spring 1944. Earmarked for a Fighter Group of the US Eighth Air Force, it passed to the control of the Ninth Air Force and finally experienced its only operational use in March 1945 for the departure of the 6th Airborne Division Dakotas and Horsa gliders. It appears that the exigencies of war precluded much by way of adaptation to suit specific squadron needs and, following initial construction, relatively little structural modification was made to the airfields, the occupying units having to adapt to available facilities as best they could. The main exception appears to be the increase in number of hardstandings at some airfields, though even here Freeman (1978, 10) notes that by 1943 US Eighth Air Force bomb squadrons were assigned double the number of aircraft originally envisaged, and in the absence of additional provision at airfields some juggling was required to fit them on.



Figure 6.13 Boreham Airfield 1944: class A design with loop standings (US 7PH GP LOC 186 5013 held at the National Monuments Record)

Other features

The landing field and dispersals formed only one element of an operational station which also included underground aviation stores, ammunition storage (dispersed to a remote area, preferably in woodland), domestic accommodation and technical sites. Whilst detailed mapping of these buildings lay outside the remit of the Essex mapping project, they form an essential and integral part of the airfields, and their locations are being recorded for the EHER.

Airfield defences

Air defence of the airfields was provided by various means, including light and heavy anti-aircraft batteries, and the earliest established airfields were also provided with decoy sites aimed at deflecting airborne attacks. Features of a decoy site at Bulphan (EHER 16682), mapped from aerial photography, include a probable dummy runway. The night shelters for the personnel still survive. This site operated as both a daytime ('K') and nighttime ('Q') decoy for RAF Hornchurch. The K sites incorporated grassed 'runways', defence positions and

plywood aircraft, whilst the Qs relied on simulated lighting, obstruction and recognition lights plus moving headlamps to simulate ground activity. Further decoys are recorded for North Weald, which had two decoys, Nazeing (EHER 10107, operated as a K and Q site) and Blackmore (EHER 20302, designed for night operation only), although the latter also later operated as a decoy for the US base at Chipping Ongar. Night shelters survive at Nazeing and those at Blackmore are visible on 1940s aerial photographs, although there is no trace on the ground (Nash 2002). A decoy for Debden airfield at Stamborne (EHER 20304) also served Ridgewell.

V. Impact on the landscape

As with other military sites, though perhaps to a greater extent given the amount of land required, the interests of the military and agriculture were in conflict. Individually airfields covered an area approximately 1 mile wide and 1.5 miles long, covering some 600 acres or more, suggesting a total of 13,500 acres given over to airfields in the county (Thorpe 1996, 6). It is estimated that each

airfield required in the order of 400,000 cubic yards of soil to be excavated, with the addition of 175,000 cubic yards of concrete, 32,000 square yards of tarmac and several miles of services (Freeman 1978, 8). It has been estimated that in 1942 each airfield required 603,000 square yards of surfacing. Construction required not only the acquisition of land, but considerable modification to it, most notably the removal of field boundaries and trees and in many cases closing of public roads. More than 12,000 trees were felled on the estate at Easton Lodge to create Great Dunmow airfield (Freeman 1978, 108). Matching airfield was considered for selection as one of the Very Heavy Bomber Airfields for which runways of 3000 yards were needed (although in the event these aircraft were not used in Europe), but the plans to extend the length of the runways were abandoned, at least in part because of agricultural objections (Smith 1996, 180–1).

The physical impact on the Essex landscape might have been greater had other planned airfields been progressed. A significant number of other sites were considered, and in some instances planning reached quite an advanced stage. Sites at Bulphan, Little Clacton, Maldon and Weeley were considered and surveyed. Cold Norton (Stow Maries), Beaumont, Southminster and High Roding all reached the stage of being allocated USAAF station numbers (Smith 1996, 41). Work was started on a proposed bomber station at Ingatestone, again for use by the Eighth Air Force, but the need to complete other airfields intervened and plans were abandoned. The land, formerly the First World War Shenfield landing ground was allocated in August 1942. Acquisition notices were served, and work in the Thoby Priory area started, including the removal of Thoby Wood north of Shenfield, but in December 1942 the work was postponed indefinitely in order to complete work already in progress on other airfields at which construction had been slowed by bad autumn weather (Doyle 1997, 63). The fortuitous survival of structures of the First World War airfield at Stow Maries is even more remarkable given that it was surveyed twice for reuse in the Second World War, once before the war when it was decided instead to upgrade Rochford, and then in 1942 as a possible bomber station for the US Eighth Air Force, when it was allocated the number 163 and name RAF Cold Norton (Doyle 1997, 70).

VI. The surviving military landscape

The evidence recorded as part of this, and other projects, highlights the extent of military activity in the county during the Second World War, and the vast number of structures that were built as part of that conflict. Many of these military features have long since disappeared — and are continuing to disappear — from the Essex countryside, a result of deliberate removal, destruction during the course of other activities or neglect and natural erosion. At the end of the war, general government policy was for rapid, and economic, disposal of redundant structures, in particular those that had an impact on public safety or agricultural production, with clearance under the direction of the Ministry of Works. However, the level of survival varies considerably across the county and, in particular, between the different types of structures. Concrete pillboxes often remain, being relatively small and difficult to remove, and Foot (2004, 22) notes that

stop-lines, some of the earliest defences to be abandoned, show some of the best rates of survival. Roadblocks, for obvious reasons, were an early casualty, whilst other roadside structures have been removed by road improvement schemes.

Anti-invasion defences

Many of the anti-invasion defences had become redundant by the middle years of the war after the threat of invasion passed and numerous structures were demolished in the later stages of the war when no longer needed. Some were, by definition, obstructions to movement, others occupied valuable agricultural land, and others offered a useful source of otherwise scarce raw materials that could be reused. The War Office initiated formal assessment of features to determine whether they should be cleared or left based on a judgement of the gain, in materials or alternative land use, against the necessary expenditure for removal. For many the gain was merited and from autumn 1944 large numbers of defensive works across the country were cleared by both civilian and military workforces. War Department Land Agents supplied lists of all military works for the purpose, documentation which, as far as is known, survives only in Essex (as the Wartime Contraventions document 1968; Foot 2004, 21). Home Forces approved the removal of beach scaffolding between the Severn and the Wash to release supplies of steel and later beach clearance was a priority for restoring recreational use. Although the scaffolding itself was removed during the war, the remains of their bases survive on the foreshore at Great Wakering (EHER 10821), possibly the best example now extant in the country (Nash 2004, 21; photo in Nash 2001, 4). Occasionally, concrete blocks or other obstacles remain where they are on land not required for farming, as for example, around Harwich, and beneath Chappel viaduct (Nash 1998a, 17). At Frinton, a group is preserved where they have been incorporated *in situ* into a raised path behind a row of beach huts (Nash 1995).

The majority of the anti-tank and some anti-landing ditches were infilled during the later years of the war, even as early as late 1942, having to a large extent become redundant not long after they had been built, as policy changed to defence in depth. They were disruptive to agriculture and, being earthen structures, readily filled in to restore valuable agricultural land (Foot 1998, 6). Little remains in evidence on the ground although a short length of ditch, now reduced to a shallow depression, remains visible in Epping Forest (Nash 1998a, 26). A better preserved set of anti-landing ditches survives in Suffolk at Sutton Heath, Sutton Hoo (Dobinson 1996b, plates 4 and 5) and on Weather Heath, near Elveden (ERL 083 – MSF 14799). Aerial photographs suggest that many of the anti-landing ditches in Essex remained extant until the 1950s. Located on grazing marshes they offered less of an obstacle to agriculture, though they were infilled when these marshes were reclaimed for arable cultivation. The appearance of cropmarks of medieval and earlier sites also indicates that they probably had little impact on earlier archaeological features beyond the ditches. At Fairlop, the anti-landing ditches are evident as cropmarks overlying cropmarks of a probable medieval moated site (Strachan and Ingle 1999, 3–4).

Nash noted that over half of the recorded defensive features had been destroyed (1998a), anti-tank barriers not

surprisingly showing a high loss to survival ratio. Others features remained where the effort of removal outweighed the benefit, and amongst the range of features, pillboxes show the greatest level of survival, whether as derelict structures or having been reused for some other purpose. Many are situated closed to field boundaries where their impact on agriculture is minimal, outweighing the effort of removal.

Nonetheless, features do remain and a recent English Heritage project (Foot 2004) looking at defensive structures has identified a number of areas across the country which, despite losses, retain survival of a range of features which collectively are of national importance and merit protection. Four lie within Essex at Hartford End, Chelmsford, Audley End, Wakes Colne and Canewdon, and each contain features representative of different aspects of the defence strategy. These include the defences of the former RAF radar station at Canewdon (now scheduled), a range of surviving structures protecting a vital point on the Eastern Command Line at Wakes Colne where road and rail routes meet, a section of the GHQ Line preserving a range of pillboxes within a relatively little-changed field pattern at Hartford End, and a second section of the GHQ Line at Audley End which incorporates roadblocks as well as bridges with mining chambers.

Anti-aircraft batteries

Similarly many of these lay on agricultural land, but they presented a range of structures and survival of the component features is mixed. Field survey of known heavy anti-aircraft batteries (Nash 1998b) has concluded that in Essex none survive fully intact and relatively few to any great degree of completeness. The best preserved, at Lippitts Hill, retains two emplacements, command post, on-site magazine and a number of associated huts, as well as a later anti-nuclear Operations Room. The four square emplacements at Little Oakley (EHER 17369) all remain to some degree, as do the octagonal emplacements at Vange (EHER 14748), Furtherwick (EHER 14734) and Butlers Farm (EHER 14872). Vange (14748) is also thought to retain the Command Post, and there are a number of contemporary huts, including the 1938 operations room, the only extant example in Essex (Nash 1998b, 49–50). The 5.25" battery at Bowaters Farm is already scheduled, a second well preserved example being that at Hadleigh, which also retains one of only two known remaining gun stores, on-site magazines and post-war operations room. A number of anti-aircraft gun sites have now been scheduled: Lippitts Hill, Butlers Farm, Hadleigh, Northwick and Furtherwick. On the low cliffs of north-east Essex it is coastal erosion which is denuding the resource, and pillboxes and casemates have been lost at, for example, East Mersea. Others have been entirely swept away, including the eight-gun battery at Broomfield, Chelmsford (EHER 20130). The domestic hut sites associated with these batteries have almost entirely been removed. Although comparable ground survey of the Diver sites has yet to be completed, survival of these more ephemeral batteries appears to be limited, with little if anything remaining evident above ground.

Amongst some of the most ephemeral sites were the bombing decoys, of which there were at least sixteen in the county. The key elements of these sites would have been cleared once they no longer had a valid function, and

some have disappeared completely. For others the only indications on the ground are the command bunkers or night shelters, several of which have now been given Scheduled Monument status (Nazeing, East Mersea, Spinnels Farm and Kirby le Soken).

Airfields

Individually, during the Second World War the airfields were the most extensive sites, and given their size and distinctive layout, remain the most readily visible features in the Essex landscape, in particular from the air. After the end of the war the selection of airfields for retention was limited by practical considerations. Their location and layout were often unsuitable for peacetime operations. Many airfields were located in rural settings with limited infrastructure and scope for expansion could be limited once land could no longer be requisitioned. Further, the complex scatter of dispersed buildings presented challenges for reuse. A number of airfields remained for several years in military hands, including on 'Care and Maintenance' basis (Earls Colne), Technical Training Command (Andrews Field, Chipping Ongar), RAF police (Debden until 1975) or storage (Little Walden). The majority of airfields were abandoned within a few years of the end of the war, Bosted and Castle Camps being amongst the earliest, in 1946, and gradually disposed of by the Air Ministry. Surplus stations were offered for sale to previous land owners at minimal cost in return for lost production, or sold by auction, the fate of many buildings which were bought for their scrap metal.

The expanses of concrete runways, tracks and hardstandings structures, offered a significant resource for major programmes of road construction. Several Essex airfields provided the source for hardcore along various stretches of the A12 through the county, amongst them Earls Colne at Kelvedon, Chipping Ongar and Great Dunmow at Brentwood, and Wormingford for the A12 Stanway bypass. Mineral extraction has added to the loss at a number of fields including Boreham (EHER 8943). Some sections of perimeter track and narrowed runways have been retained as part of the public road network reinstating pre-war routes, e.g. parts of the perimeter tracks at Andrews Field and Earls Colne, and parts of one of the runways at Birch, Little Walden, and Matching. At Bosted, Park Lane, cut in the north of the site, has been reinstated; Lodge Lane in the south remains truncated. Dispersal sites offered no such advantage and presented obstacles to agriculture, so it is little surprise that most have been removed. Fourteen of the dispersals survive at Boreham, together with the three runways and perimeter track, one hangar, control tower and operations block, but quarrying is encroaching from the east and has removed the bomb stores (Thorpe 1996, 26). Many airfields have largely reverted to agriculture with the removal of the concrete, including Great Dunmow, where all the dispersals were removed although parts of the runways and perimeter track survive. At others the return to agricultural use has been more complete, including Great Sampford, which Smith (1996, 157) notes as one of the most difficult Essex airfields to locate, the main clue being the absence of trees and hedges over a flat landing area. Dispersed sites (including domestic sites) were some of the first structures to be removed post-war, and many appear only as concrete bases even on 1960s aerial photographs.

Survival has on the whole been better at those stations established as permanent bases in the interwar period, and which tended not to have the same degree of dispersal as the wartime-built airfields. A thematic listing survey by English Heritage noted good survival of wartime elements at Debden and North Weald, both fighter stations and both established pre-war. Much of the flying field at Debden remains intact, and the site has the best surviving example of a 1930s operations block. North Weald, despite modifications for jet aircraft use in the 1950s, has some of the most complete survival of fighter pens on a key aviation site, in addition to retaining significant proportions of the airfield defence and almost half of the original frying pan dispersals (Lake 2000b). A number of elements at Debden, North Weald and Little Walden stations have now been afforded statutory protection through listing.

Of the bomber airfields, the best levels of survival are probably those at Little Walden (EHER 16573), Matching (EHER 16586) and Rivenhall (EHER 14183). At the former two, this is mainly in terms of the main technical site. Part of the perimeter and runways can be traced in field boundaries and a section of public road, but the dispersed sites have all been removed. At Rivenhall, the east–west runway and parts of the subsidiary runways remain, together with much of the perimeter and twelve loop dispersals on the west side. In addition, the two T2 hangars and one of the dispersed sites, are also extant, the latter potentially of particular value given the rarity of survival (Thorpe 1996, 48). The control tower at Earls Colne has been converted to a private dwelling.

At both Stansted and Southend, elements of the military airfields have been lost during development of the airfields as civil airports. At Stansted, as part of the programme of archaeological investigation in advance of redevelopment, assessment of the survival of the dispersed sites of the Second World War airfield and how construction of these affected underlying archaeological sites was carried out (Havis and Brooks 2004, 510–513). In many areas whilst huts had been removed, the hardstandings survived and could be used to confirm numbers and layouts of buildings. By the mid 1980s, some dispersed sites had already been destroyed by the construction of the M11, some had been lost to earlier landscaping work on the airport, and for the majority it was only the hardstandings which remained.

The impact on earlier landscapes

Whilst the visibility of military features in the landscape has receded in its impact on the landscape, what of their effect on earlier archaeological features? The plethora of defensive and offensive sites and structures involved in many cases significant earth moving (as evidenced by contemporary aerial photography), most notably the airfields. However, post-war aerial survey is clearly showing that the impact on earlier buried features is in many cases more limited than might be thought. Construction of airfields was not necessarily destructive across the whole area of the airfield, although this will have depended to a large extent on the original site topography and the need for levelling operations. Aerial survey demonstrates that whilst features may have been lost beneath the runways themselves, cropmark features are clearly visible between and abutting runways. Examples can be seen at Little Walden, Boreham, Great

Sampford, Bradwell and North Weald. At Bradwell (Fig. 6.14) in addition to fairly recent field boundaries, the cropmarks of earlier, probably prehistoric, field systems, rectilinear enclosures and ring ditches have been recorded (Fig. 6.9). Cropmarks of enclosures are visible on post-war photography between the runways at Boreham and Little Walden airfields. Most of the airfields were constructed in the north of the county, on the boulder clays which are anyway patchy in their potential for development of cropmarks, and it is not unduly surprising that few features should be visible on the former airfields.

Similarly, anti-landing ditches and anti-tank ditches have caused damage along the line of the ditch but have had little effect beyond their immediate route. Cropmarks of a circular enclosure (possibly a medieval woodland boundary) and field system are visible between the cross-hatched lines of anti-landing ditches at Colchester (EHER 16484). The anti-tank ditch of the GHQ Line cuts through the Bronze Age enclosure at Springfield Lyons, Chelmsford, (Chapter 3) where it was recorded in the excavation.

VII. Discussion

NMP, together with the WWII Defences Survey and other national surveys, has highlighted both the vast number of Second World War military sites that existed in the county, and the extent to which these have been and are being lost. Together the surveys are facilitating identification of surviving sites which merit scheduling as well as helping to define policy for conservation and recording though the planning process and other programmes. They highlight the need for better assessment of remaining elements, particular areas where groups of features survive in close proximity as more complete relics of the mid 20th-century military landscape. Detailed ground survey by the WWII Defences Survey points to the degree of loss, but has also demonstrated the survival of more elements than expected (Nash 1998a). For example, many of the fifty pillboxes around Rochford (Southend) airfield still stand, and despite the development of the airport for commercial use it is thought that two of the Pickett-Hamilton forts between the runways are also extant. A number of sites have now been afforded statutory protection as Scheduled Monuments, including a number of anti-aircraft batteries (e.g. Lippitts Hill, Sutton, EHER 10374), anti-invasion defences at Chappel Viaduct (EHER 10996–9, 20000–8), and bombing decoys at Kirby le Soken (EHER 20310) and Spinnels Farm, Wrabness (EHER 20309). The addition of sites to the EHER is ensuring proper consideration of these 20th-century sites during the planning process. Other classes of features, outside the remit of NMP and not yet covered by other surveys, remain to be comprehensively assessed, including radar and light anti-aircraft batteries, and aerial photography still has a valuable role to play.

The NMP survey has also made it clear that reliance cannot be placed on any single source, although they might each seem to be comprehensive, in particular the contemporary photography of the 1940s and military archive records. Further work is needed to relate physical and aerial photographic evidence to the documentary records. Dobinson's survey of archives of wartime records and reports has made available a valuable record but there are a number of apparent discrepancies between features

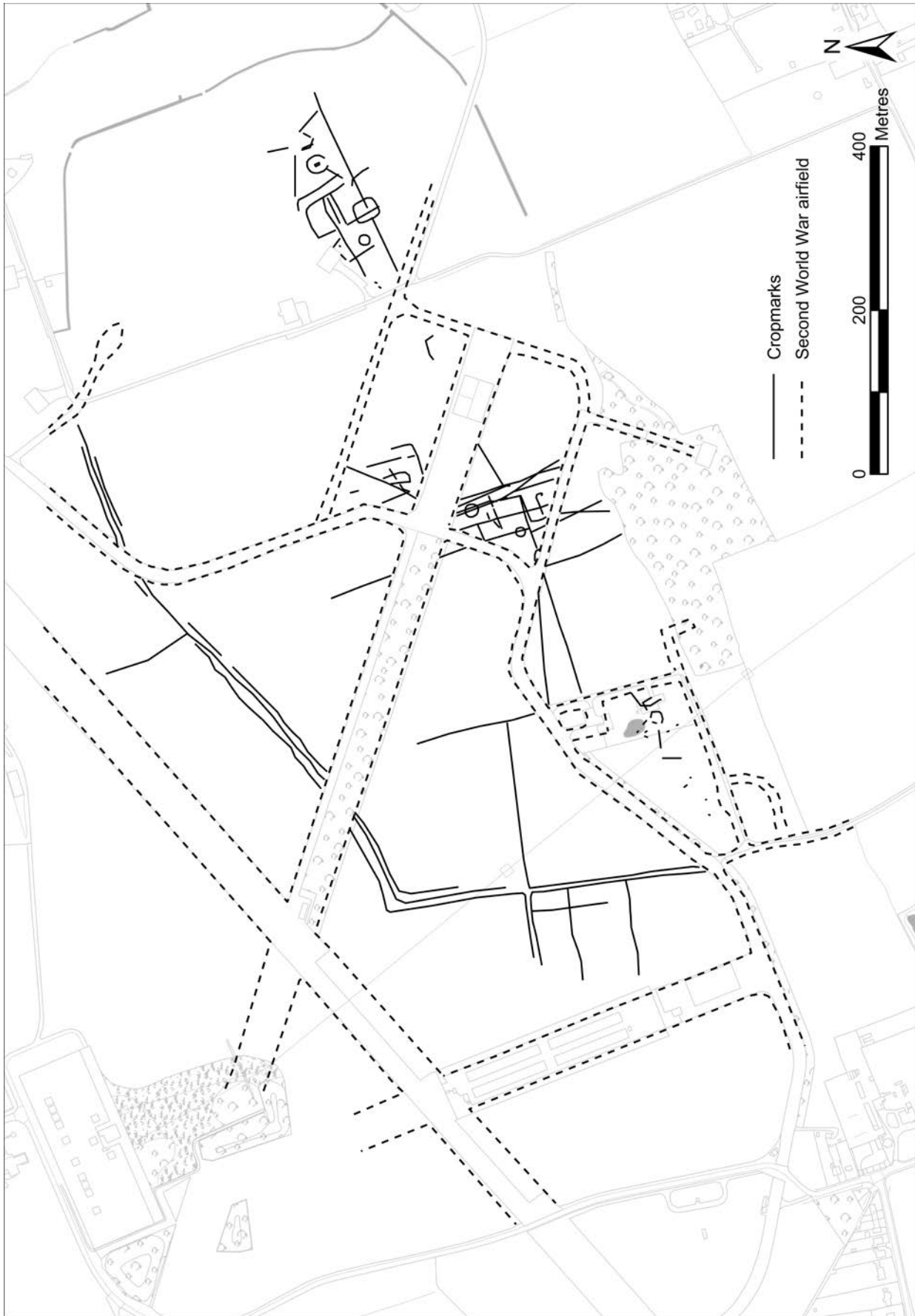


Figure 6.14 NMP extract for part of Bradwell airfield, showing the cropmarks of earlier features which survive between the runways and perimeter tracks

listed from these sources and those recorded as part of NMP and other surveys. This was a period where situations and plans could change rapidly, and not all of the plans were necessarily implemented in their entirety. Only by comparison of field, aerial survey and documentary evidence (including, where available, first-hand knowledge) is it possible to trace the actual events and complement the existing surveys. As has been noted above, this particularly seems to be the case for the Diver sites, a period when deployments were amended several times over a short period such that implementation on the ground does not appear to have kept pace with policy. It may also reflect the very temporary nature of many of these emplacements, and there may be instances whereby a site in use for only a few weeks does not appear in any of the 'windows' that the available photography provides. Survey and recording of the Diver sites has begun, although at the time of writing the great majority await investigation.

This is also the case for some of the permanent heavy anti-aircraft batteries. For example, wartime documents record a battery at St Osyth (C2 Clacton) which was listed as unarmed and vacant in May and June 1942 (Dobinson 1996a, 342), but examination of aerial photography from 1940, 1941 and 1946 has located no trace of a battery at (or around) the location given, and Nash found no sign of the battery on the ground when the area was visited as part of the WWII Defences Survey (Nash 1998b, 22). Similarly Jotmans Hall, South Benfleet (EHER 20132), and North Benfleet (EHER 20131) listed as heavy anti-aircraft batteries in the Thames and Medway area, unmanned 1940 and unarmed in 1942 (Dobinson 1996a, 469–71) have not yet been traced on aerial photographs or on the ground. Conversely, what appears to be a heavy anti-aircraft battery with four square emplacements at Bradwell Wick (EHER 10641), visible on a 1945 aerial photograph and built some time after January 1941, is not listed (Dobinson 1996a).

It is clear from the mapping that many sites have been modified during their period of use, but even those sites where some documentation is known the full history of construction, use and modification has yet to be elucidated. As would be expected from the specifications issued, to a large extent the design of the batteries appears

to relate to date of construction, but further fieldwork is required to follow up on the aerial and documentary assessments. More detailed investigation of these sites is needed to ascertain the full history of construction and use and local oral history still has a valuable role in helping to clarify the operational history of many of these sites. For many areas and classes of monuments in Essex this is being carried out by the WWII Defences Survey project, and continuation of this survey will be important for continued development of conservation policy.

The use of aerial photography has inevitably focused on certain elements of these military sites, and the results of the NMP project need to be fully integrated with other surveys to encompass all of the component features, and to assess management priorities. This is particularly the case for the airfields, for which this study has concentrated on the flying field, but which also encompassed a complex of dispersed domestic and technical sites in the surrounding countryside. It is essential to consider all of these sites at a more holistic level, to enhance the Historic Landscape Assessment for this period, to identify the extent to which wider elements of historic landscape survive and to ensure that appropriate components of the better preserved landscapes are conserved. For anti-invasion defences, this approach has been undertaken by the English Heritage study of Defence Areas (Foot 2004) to assess coherent groups of anti-invasion defence works that survive well in landscapes which remain largely unchanged since these features were built. A similar approach encompassing other aspects of the 20th-century military history of Essex is also required as continuing survey programmes add to the understanding of the recent military history of the county and the extent to which this is still visible in the modern landscape. This approach has already begun to some extent through the studies by Nash of the stop-lines (Nash 1998a) and Thorpe's (1996) assessment of airfields. Essex clearly had a key role for Britain in both defensive and offensive phases of the Second World War, one which it might be thought, given its recent occurrence, would already be fully documented, but for which, as the NMP and other surveys have shown, the detail remains to be elucidated and recorded to provide a sound basis for conservation and management.

Chapter 7. Conclusions

Caroline Ingle and Helen Saunders

I. Aerial reconnaissance and the NMP

The contribution of aerial survey and interpretation to a number of research objectives is recognised in the regional research agenda (Brown and Glazebrook 2000). These specifically have been aimed at defining, characterising and analysing the resource to enhance our understanding and underpin sustainable management. Particular themes include understanding of the distribution of particular types of Neolithic sites, the relationship of Bronze Age sites to their wider landscape, identification and investigation of areas of co-axial field planning and historic landscape management. It is in these areas, as well as a range of other activities, that the NMP and aerial survey can make considerable contributions to both current and future research.

The systematic recording and plotting of sites has been one of the most valuable aspects of NMP. The results from this project have become an integral part of the EHER and are available to all users whether for management, development control or research purposes. During the course of the Essex NMP, data has been contributing to a range of other projects in addition to the analyses presented in this volume. Of particular importance are the Historic Environment Characterisation Projects being undertaken across Essex to support the new planning system for which NMP has become an integral part. The continuing Historic Settlement Assessments now incorporates aerial photography and the NMP, as an essential element, which has contributed considerable information and is an aid to interpretation. Other initiatives relating to the historic environment have used NMP data and it has proved to be a vital tool for research and interpretation within these projects. Similar future projects will continue to rely on the NMP as an essential data source for the wide range and varying historic environment that exists within Essex.

Urban expansion is a continued threat to the archaeological resource of Essex and the NMP provides an important dataset for aiding planning recommendations regarding the archaeological implications. This is particularly relevant to the identified growth areas such as the M11 corridor, the Thames Gateway and the Haven Gateway, which are all rich in archaeological deposits. The NMP will play an important role in the future historic environment characterisation and management of these areas. It is important that an up-to-date and accurate NMP dataset is available to ensure that correct planning and management policies are established in these areas.

Aerial photographic interpretation

Whilst recognising the wealth of the archaeological resource that survives as buried features revealing themselves through cropmarks, the difficulties of adding date and interpretation to enable these to be better classified and managed is also acknowledged.

At a county level, projects have pivoted on the analysis of specific cropmark classes. The Essex Cropmark Enclosures Project (Brown and Germany 2002) focused

on circular enclosures to determine date and function of this class of monuments. This involved the trial trenching of four circular enclosures that had been interpreted, on the basis of their morphology, as Neolithic henges or hengiform monuments. The site at Little Bentley, hitherto regarded as one of the best examples of a cropmark henge in eastern England, proved to be the site of an early medieval windmill, as did the feature at Great Bentley. The third, Belchamp St Paul, was dated to the Bronze Age and only one of the four, Rivenhall, was confirmed as being Neolithic in origin. It highlights again the need for caution in interpretation, the value in a morphological database that facilitates analysis by other researchers, and the value of a consistent set of data for all cropmark sites against which more detailed morphological and location comparison can be made. Priddy and Buckley (1987, 72) noted the possibility that some of these circular enclosures could be windmills and highlighted the need for documentary and cartographic research to help identify post-prehistoric examples.

Landscape management

Brown and Murphy (1997, 12) have noted the wealth of cropmark evidence, much of it regionally distinctive, for the Neolithic and Bronze Age. However they noted that a significant proportion of excavation has taken place on areas placed under threat from gravel extraction, but that in other areas few such sites and complexes have been examined. NMP, in plotting to consistent standards, enables comparison between some of these well investigated areas and sites elsewhere in the county. For example, the excavated enclosures at Woodham Walter and Orsett Cock gave a clear morphology for Iron Age settlement enclosures; given this typology other multi-ditched enclosures have been examined and a more specific date and function suggested for some sites (Chapter 3). North-east Essex and south-east Suffolk were particularly identified as an area to combine existing data with new survey work. In recent years this approach has been taken in the Stour Valley Project (Brown *et al.* 2002). It is an area where synthesis of cropmark data from the valley as a whole is an identified regional research aim (Brown and Murphy 2000, 12).

The Stour Valley Project, a survey of a single landscape region, was funded by English Heritage as part of the implementation of the Monuments at Risk Survey, with the aim of developing a strategy for long-term management of the area. The area straddles the county boundary with Suffolk and while it is under limited threat from development it has been intensively cultivated for many decades. NMP mapping had recorded a range of prehistoric features, including a number of monument complexes comprising ring-ditch cemeteries, mortuary enclosures, long barrows and two cursus monuments. The first phase of the project, analysis of the cropmarks in their landscape context using the cropmark plots and digital terrain modelling has provided a firmer basis for developing understanding and management of the

cropmarks in the valley. The next stage will be to incorporate other datasets including current management regimes, land use and, in the longer term, it is intended to carry out targeted survey and excavation to improve understanding of the date and function of these monuments. This combined use of cropmark plots and GIS based resources has been adopted within this volume to aid interpretation of prehistoric landscapes in several areas of the county, including the lower Blackwater Valley and Orsett (Chapters 2 and 3).

II. Planned landscapes

NMP has been valuable in studying former field patterns, particularly in areas which have suffered heavy losses since the Second World War, a consequence of changing farming practices, especially increasing field size to facilitate use of machinery. The NMP cropmark evidence contributes information on some of the elements of these systems and offers the potential to look at wider landscapes and associated field systems. Evidence for the nature of the agrarian economy has been identified in the regional research framework as a high priority (Bryant 2000, 16), including evidence such as trackways, fields, field boundaries, enclosures and drove routes. The field systems of East Anglia are distinctive and over most of the county differ from those of the open field system in the Midlands. A number of co-axial field systems have been identified in various parts of the region (Bryant 2000, 15) and various dates have been suggested for their origin, in some places as early as the Bronze Age. Identification of the various field systems and their dating will be crucial to understanding the development of the agrarian economy of the county.

Coastal

The importance of identifying and understanding the coastal archaeological resource is a recognised national priority (Brown *et al.* 2000, 47). Essex lies on an eroding coastline, vulnerable to rising sea-level, and the understanding of its archaeological potential and rates of loss is essential for developing longer term management strategies. The value of the coastal zone has long been known in the county and is demonstrated by the Hullbridge Survey (Wilkinson and Murphy 1995). More recently, adding to results of NMP, which has recorded large numbers of features along the coast (Chapter 5), are a number of coastal surveys of the Greater Thames estuary (GTE) as part of the European-funded Planarch project (Heppell forthcoming). The GTE survey is following up on the Hullbridge survey, monitoring known sites to look at rates of loss and new exposures, while adding new detail including evidence for dating. Another aspect of this is coastal transport; many wrecks lie within creeks and continued aerial survey is recording these sites while demonstrating just how much has been lost (and is being lost) to coastal erosion along with the loss of the coastal marshes.

The active aerial reconnaissance programme that Essex has conducted proved to be particularly important in this zone. During the 1990s, targeted survey was conducted in the coastal zone at very low tides, and led to the recording, for the first time, of fish weirs and other timber structures (Strachan 1995c, 228; Strachan 1996a 250–1). Mapping these sites, particularly the fish weirs,

made it possible for them to be scheduled and therefore appropriately managed. The areas in which these sites are located are dynamic so the timing of the aerial photography is crucial, as shifting sands and other coastal processes may mean that these sites are not always easily visible.

20th-century military

The regional research agenda highlighted a number of research topics for 20th-century military features (Gilman *et al.* 2000, 36). At that time a key priority was for extensive survey projects to add to the understanding of the resource. The NMP helped achieve this, in conjunction with the WWII Defences Survey (Nash 2001; Gilman and Nash 1995), an ongoing ground and desk-based survey, which has covered a number of categories of military features or geographical areas within the county. Vertical photography, of the 1940s in particular, has proved particularly valuable in recording structures that were of necessity ephemeral, and rapidly removed after the end of the war. Many of these were poorly documented at the time and more than half a century later leave little trace for recording from current aerial photography. Results of both NMP and ground-based survey are crucial to understanding military history of the county during this period (Chapter 6).

Historic Landscape Characterisation (HLC)

This desk-based assessment has produced a map of landscape history (Bennett *et al.* forthcoming) and is generating information of value for the development of countryside and heritage management policies and strategies at regional and local level. It will be a useful exercise to look at the distribution of NMP data in relation to the HLC categories, in order to assess any correlation between the types of information recorded and landscape history. Research conducted in Devon has recently shown that HLC data can indeed be used as an indicator of cropmark potential and archaeological resources, with certain types of cropmark sites more likely to be visible within certain character zones (A Young pers. comm.).

III. The future

The mapping project has contributed enormously to both our knowledge of the extent of archaeological features and the potential for recording them from the air in a range of landscape types. Continuing discoveries of new sites as a result of aerial survey highlights the need for future programmes of reconnaissance and mapping in order to continue to develop carefully focused survey. There remains scope for more detailed analysis of the results to look at the relationships between physical characteristics, nature of archaeology and the type of information that can be expected from aerial reconnaissance, so as to better target limited resources and help direct research to other techniques as appropriate. The identification of red hills has been one successful example; these are only visible as red areas in the plough soil and need to be recorded using colour photography. Despite the high numbers of sites recorded in the field (and to some extent from the air) before the mid 1990s, a single targeted flight in 1995 added over forty new red hills. Repeated survey at a suitable time of year has ensured that the number of recorded sites is continuing to increase, which in

consequence has changed our understanding of early salt production in the county (Chapter 5). It is likely that information regarding other site types will increase with the continuing aerial photographic reconnaissance programmes and this information should be included on an updated NMP to ensure that the information is available for use. In addition to this, other reconnaissance techniques should be addressed that will complement the NMP data. Surveys using technology such as LIDAR have demonstrated that there can be an increase in the level of information recorded, even on known sites, particularly on tree-covered monuments, which has been a specific issue with many earthwork sites in Essex (such as moats). LIDAR survey results used alongside other aerial photographic sources (particularly those online) could greatly increase the level of data the NMP initially created, leading to a more comprehensive historic environment management tool.

IV. Conclusions

The particular value of the NMP project is in its comprehensive analysis of photographic collections, providing evidence that can be used as a basis or element for future research. It offers a means for systematic analysis of a vast number of archaeological features recorded as cropmarks and earthworks, which will lead to a more sound basis for interpretation and hypothesis that can be tested by future research programmes, including the results of excavation.

Over the last 50 years the recording of cropmark sites has radically altered our understanding of the extent and complexity of archaeological landscapes in many parts of the country. Climate change, with the potential for hotter, drier summers, also offers scope for the continuing usefulness of regular flying programmes in the future. Many sites continue to be discovered on an annual basis and it is important to continue reconnaissance, not only to record new sites, but as a valuable contribution towards monitoring and management of the archaeological resource.

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Index

Illustrations are denoted by page numbers in *italics*. Places are in Essex unless indicated otherwise.

- abbeys/priories 92, 104–6, *105*, 127
 Abbots Hall, duck decoy 143
 airfields/landing grounds
 background 165
 description 168–71, *169*, *171*
 distribution 163–5, *164*
 First World War 153, *164*, 166, 168
 landscape impact 171–2
 specifications *166*, *167*
 survival 173–4, *175*
 Aldeburgh (Suffolk), military defences 163
 Aller Moor (Som), duck decoy 141
 Alresford
 cropmarks 13
 ring-ditches 95
 see also Broomfield Plantation Quarry
 Althorne Creek, oyster cultivation 131, 132
 Ambresbury Banks, hillfort 69, 70
 Andrews family 127
 Andrews Field, airfield *166*, 169, 170, 173
 annexes, prehistoric–Roman 55, 58, 59
 anti-aircraft batteries 154
 airfields 171
 distribution *155*
 Diver batteries 160–3, *161*, *162*
 recording 176
 specifications 154–60, *156*, *158*, *159*
 survival 173
 anti-tank ditches 148–50, *149*, *151*, 152
 archaeological features, nature of 4
 Ardale, cemetery 70
 Ardleigh
 ditches 49
 landscape 13
 ring-ditches and round barrows 31–2, 36, 40
 settlement: Neolithic 46; Iron Age 64; Roman *72*, *74*, *75*
 survey 2, 5
 trackway 59, 72
 Ardleigh Wick, moated site 99
 Ashby (Lincs), duck decoy 142
 Asheldham Camp, hillfort 69, 69, 70
 Audley End, military defences 152, 173
 Audley End House 104, 106, 144
 Aythorpe, moated site 109

 Bagshot Hills and South Essex Hills, landscape region *12*, 13–14
 Baker, Henry 116
 Barking, fishery 127
 Barking Abbey 144
 Barley Common, enclosure 57
 Barlinghall Creek, oyster cultivation 131
 Barnflete, fish weir 127
 Barnston
 church 107
 field sizes 107, 114
 Barrington Hall, garden features 106
 barrows *see* long barrows; ring-ditches and round barrows; square barrows
 Bartlow Hills (Cams), ring-ditches and round barrows 31, 81
 Bath Abbey (Som) 127
 Battles Wood, moated site 98, 98
 Bawdsey (Suffolk), military defences 162
 Beak Farm, enclosure 57, 61
 Beaumont-cum-Moze
 airfield (planned) 172
 duck decoys 136, 141, 142
 military defences *156*
 salt manufacture 122, 123
 sea defences 116, 141
 Beckingham Hall, moated site 113
 Bede 127
 Beeleigh Grange Farm, enclosure 67

 Belchamp St Paul (Clare Downs Farm), henge 29, 30, 177
 Belfair Farm, military defences *156*, 159
 Benfleet Creek, military defences 152
 Bennybeg (Perth & Kinross), cursus 22
 Bergholt, heath 13
 Berkeley (Glos), duck decoy 138
 Besom Fleet (Buzzen Creek), oyster cultivation 133
 Birch, airfield *166*, 169, 170, 173
 Bird, Edward 124
 Blackmore, bombing decoy 171
 Blackwater Oyster Company 132–3
 Blackwater Valley
 cropmarks 5
 duck decoys 136, *136*, *138*, 141, 142, 144
 erosion 145, 146
 fish weirs 124, *125*, *126*, 127, 128, 145–6
 oyster cultivation 128, 132–3, 135
 salt manufacture 118, 119–21, *119*, 122, 123
 salt marshes 116, *117*, 118, 145
 sites, prehistoric: case study 34–6, 35, 37–8, 38, 39, 40, *41–2*;
 distribution 15, *16*; mortuary
 enclosures/long enclosures 24, 25–6, 26; settlement 58, 59, 60, 64
 sites, Saxon–post-medieval *108*, 111–13, *112*, 113–14, *113*
 survey 2
 topography 10
 water management scheme 106
 Blue House Farm, oyster cultivation 131
 Bluebottle Grove, anti-tank ditch 148
 Boarstall (Bucks), duck decoy 141
 Bohun's Hall Decoy *see* Left Decoy
 Boreham
 airfield 99, *166*, 169, 170, *171*, 173, 174
 duck decoy 144
 enclosure 71, 95, 96, 97
 henge 30
 moated site 99
 Borough Fen (Northants), duck decoy 141, 143
 Borough Hills, salt manufacture 122–3
 Boswells, moated site 109–10
 Bounds Farm, salt manufacture 123
 Bowaters Farm, military defences *156*, 157, *158*, 160, 173
 Bowen, E., map 141, 143
 Bowers Marsh, military defences 150
 Boxted
 airfield 165, *166*, 169, 170, 173
 heath 13
 Bradfield, salt manufacture 122
 Bradwell Bay, airfield 163
 defences 154
 landscape impact *174*, *175*
 plan *166*, 168–9, 170
 Bradwell on Sea
 coastline 121
 fish weir 127
 monastery 127
 oyster cultivation 135
 Bradwell Waterside, fish weir 124
 Bradwell Wick
 duck decoy 136, *137*, 142
 military defences 158, 176
 Brain Valley, Roman settlement 80
 Braintree
 Roman roads 79
 Roman settlement 77, 80
 Bramble Island, explosives factory 153–4
 Breaches, military defences 159–60
 brick-making 13
 Bridgemarsh Farm, oyster cultivation 131
 Bridgemarsh Island, oyster cultivation 131
 Brightlingsea
 military defences 152
 oyster cultivation 128, 131, 133–4, *134*
 prehistoric monuments 32, 33, 36, 45, 49
 Brightwell (Suffolk), round barrows 31
 Broadwell (Oxon), causewayed enclosure 18

- Brooklands, duck decoy 142
 Broomfield, military defences 156, 158, 173
 Broomfield Plantation Quarry, ring-ditches 34
 Broomhill, River 131
 Broomway 146
 Buckhurst Hill, military defences 153, 156, 157, 160
 Buckles Farm, military defences 156, 159
 buildings, listed 107–9, 111–12, 114
 Bulphan
 airfield (planned) 172
 bombing decoy 171
 Bumbles Green, military defences 150
 Bures, cursus monument 44
 Burford (Oxon), causewayed enclosure 28
 burials
 Iron Age 70–1, 71
 Roman 81
 Saxon 93, 95
 see also cemeteries; mortuary enclosures/long enclosures; ring-ditches and round barrows; square barrows
 Burnham on Crouch
 oyster cultivation 129, 132
 salt manufacture 123, 124
 Burnham Oyster Co. 132, 135
 burnt mounds 45
 Burton (Lincs), duck decoy 137, 138
 Bury Lodge, enclosure 57
 Bury St Edmunds Abbey (Suffolk) 127
 Butlers Farm, military defences 156, 159, 160, 173
 Buzzen Creek *see* Besom Fleet

 Cairnpapple (W Loth), henge 28
 calico beds 105, 106
 Cam Valley 10, 34, 43, 44, 150
 Cambridge University Collection of Aerial Photographs 1–2
 Camden, William 117
 Can Valley 99, 104
 Canewdon
 military defences 173
 oyster cultivation 132
 Canvey Island
 coastline 117
 military defences 152, 157, 159, 163
 oyster cultivation 135
 salt manufacture 118, 119, 122, 123
 Cardington (Beds), causewayed enclosure 83
 Carrington Bowles New Pocket Map 141
 Castle Camps, airfield 165, 166, 168, 173
 Castle Hedingham, medieval town 91
 causewayed enclosures
 Chelmer and Blackwater river valleys 34, 36, 37
 description and discussion 18–22, 20, 21
 settlement associated with 62, 65–7, 66
 case studies 81–3, 82, 83–7, 85
 Tendring 45, 49–53, 53
 cemeteries
 earlier prehistoric 31–4, 32, 33, 36–40, 49
 Iron Age 70–1, 71
 Roman 81
 Saxon 93
 Chadwell St Mary
 fishery 127
 mortuary enclosure 25
 chalk dipslope, landscape region 12, 14
 Chalkpit Lane, enclosure 61
 Chapman and Andre, map by 91
 Broomway 146
 coastline 116, 117, 118, 122
 duck decoys 141, 142, 143
 garden features 106
 heaths 13
 Chappel viaduct, military defences 150, 172, 174
 Charles II 130, 139
 Cheddar (Som), duck decoy 143
 Chelmer Valley
 cropmarks 5
 military defences 150
 sites, prehistoric 15, 18, 27, 58, 59, 62
 case study 34–43, 35, 37, 38, 39, 41–2
 sites, Roman 77
 sites, medieval–post-medieval 93
 survey 2
 topography 10
 water management schemes 106
 Chelmsford
 cemeteries/burials, Roman 81
 cropmarks 5
 military defences: anti-aircraft 154, 157, 158, 159, 173; bombing decoy 163; stop-line 150, 174
 roads, Roman 79
 town, Roman 71
 Chigborough, salt manufacture 119
 Chigborough Farm, multi-period site 34, 40, 60, 72, 74, 93, 111
 Chignall St James, villa 72, 73
 Chillesford (Suffolk), duck decoy 142
 Chingford (G London), fishery 127
 Chipping Ongar
 airfield 166, 169, 170, 171, 173
 medieval town 91
 Chrishall, ring-ditches 34
 Christy, M. 141
 churches 92, 107, 112
 Cindery Island, oyster cultivation 133–4, 134
 Clack, Edward 2
 Clacton
 duck decoy 136
 military defences 152, 156, 157, 158
 Clam Fleet Marsh, oyster cultivation 132
 Clanverend Farm, enclosure 75
 Clare Downs Farm *see* Belchamp St Paul
 Clavering Castle 99, 106
 Clementsgreen Creek, sea wall 123
 Cliff Reach, oyster cultivation 132
 Coake, William 132
 coastal marshland 115–18, 117, 144–5, 146
 landscape region 10–13, 12
 coastline 115, 178
 changing 115–18, 117
 discussion 144–6
 inter-tidal sites 2
 military defences 150–2, 160–3
 see also fish weirs; oyster cultivation; salt manufacture; wildfowling
 Coatham (N Yorks), duck decoy 144
 Cobham Lodge Lane (Kent), military defences 157
 Cobmarsh Island
 erosion 145
 oyster cultivation 128, 133
 Cocke, Thomas 132
 Cocks Hall Layne, oyster cultivation 132
 Coggeshall Abbey 104, 106
 Colchester
 bailiffs 127
 cropmarks 5
 heaths 13
 military defences: anti-aircraft 152, 154, 157, 158, 159, 163; stop-lines 148–50, 174
 oyster cultivation 128, 129, 133
 roads, Roman 79
 settlement: Iron Age 64; Roman 71, 121; medieval 91
 see also Lexden
 Colchester Native Oyster Fishery Company Ltd 133
 Cold Norton, airfield (planned) 172
 Coleman's Farm
 enclosure, Iron Age–Roman 72
 henge 29, 30
 long enclosures 24, 26
 Collins Creek, fish traps/weirs 111, 124, 125, 127
 Colne Point, fish weir 124, 125
 Colne Valley
 erosion 145
 fish weirs 124, 125, 127, 128
 military defences 148–50, 152
 oyster cultivation 128, 129, 131, 133–4, 134
 topography 10
 water management schemes 106
 Colwick (Notts), fish weir 124
 commons 14
 Company of Free Fishermen 130
 Compton Dundon (Som), duck decoy 138, 141
 Coope, John 141

- Copt Hall, duck decoy 143
 Corringham, military defences 152, 153
 Council for British Archaeology 147
 Cox, Revd T. 141
 Cranbourne Chase (Dorset), round barrows 40
 Creek, John 124
 Creeksea, oyster cultivation 131
 Cressing, settlement, Roman 80
 Crockleford, cropmarks 13
 Cromps, moated site 110
 cropmarks, distribution 5, 6
 Crouch, River
 duck decoy 142
 fish weir 127
 oyster cultivation 128, 129, 131–2
 salt manufacture 118, 119
 sea defences 116, 117, 118
 topography 10
 Crowland Abbey (Lincs) 139
 Cryppes, John 127
 Cudmore Grove, pillbox 13
 cursus monuments 18, 26–8, 27, 28
 Chelmer and Blackwater river valleys 34–6, 35, 37
 north-west Uttlesford 44
 Tendring 49, 52, 53
- dams 92, 106
 Danebury (Hants), hillfort 55, 70
 Dardanelles, duck decoy 137, 142
 Debden, airfield 165, 166, 168, 170, 171, 173, 174
 Decoy Marsh, duck decoy 141
 decoy sites, bombing 163, 171, 173, 174
 Dedham
 cropmarks 25, 67
 heath 13
 Deeping Fen (Lincs), decoying 139
 deer parks 92, 107
 Defence of Britain Project 147
 Defoe, Daniel 133
 Dengie peninsular
 cropmarks 5, 10
 duck decoys 136, 136, 140–1, 140, 142, 143, 144
 field systems 13, 102–4, 103
 fish weirs 127
 military defences 154, 160–1, 162
 oyster cultivation 135
 salt manufacture 118, 119, 121
 sea defences/marshes 116, 117, 118
 sites, prehistoric 15–17, 16, 17, 58, 62
 Didlington Park (Norfolk), duck decoy 142
 dissected boulder clay plateau, landscape region 12, 14
 ditches
 prehistoric–Roman 54, 56, 59
 Roman 79, 80, 87
 medieval–post-medieval 92
 post-medieval, anti-landing 152–4, 153
 see also anti-tank ditches
 Donyland, cropmarks 13
 Dovercourt
 duck decoy 144
 fish weir 127
 military defences 156, 159, 159
 drainage systems 92
 duck decoys
 dating 92
 description and discussion 135–44, 136, 137, 138, 140, 146
 distribution 8, 10
 recording 2
 Duckend, settlement site 95
 Dudley, Revd Henry Bate 141, 142
 Dunster Priory (Som) 127
 Dunwich (Suffolk), military defences 163
 dykes, Iron Age–early Roman 54, 56, 59
- Earls Colne, airfield 165, 166, 169–70, 169, 173, 174
 earthworks, distribution 7, 8
 East Hall, salt manufacture 123
 East Ham (G London), salt marsh 118
 East Mersea
 fisheries 127
 military defences 13, 173
 oyster cultivation 128
 salt manufacture 124
 East Tilbury
 oyster cultivation 135
 sea defences 116
 Eastlands Farm, land reclamation 121
 Edward the Confessor 127, 129
 Ellyot, John 127
 Elmdon, enclosure 64
 Elms Farm, Saxon settlement 93
 Elmstead
 oyster cultivation 133
 ring-ditches 13, 31, 32
 salt manufacture 122
 embanking 115–16
 enclosures, prehistoric
 burial 70–1, 71
 Chelmer and Blackwater river valleys 34, 35, 36, 37, 37, 40
 north-west Uttlesford 43, 44
 settlement 54, 56–9, 57, 58
 Neolithic 60, 83, 84; Bronze Age 60–3, 61, 63, 83, 84; Iron Age
 64–8, 64, 68, 83–7, 85, 88, 89
 Tendring 45, 46, 49
 see also causewayed enclosures; cursus monuments; hengiform
 monuments; hillforts; mortuary enclosures/long enclosures
 enclosures, Roman 72–8, 74, 76, 79–80, 87–9, 88
 enclosures, medieval–post-medieval 92, 95–7, 96, 101, 101
 Blackwater estuary 111, 112–13, 113
 Upper Roding Valley 107, 109
 English Heritage 1, 2, 3, 147
 Environment Agency 2
 Epping Forest
 common 14
 military defences 150, 152, 172
 Erith (Kent), military defences 157
 Escrick (Yorks), duck decoy 142
 Essex County Council, Historic Environment Branch 1
 Essex County Sites and Monuments Record 1, 2
 Essex Cropmark Enclosures Project 2, 177
 Essex Historic Environment Record 2
 Essex Historic Landscape Characterisation 102, 177, 178
 Essex Mapping Project
 aerial survey 1, 177
 background and methodology 1–2
 archaeological scope 3; geographical extent 2–3; methodology 3;
 results/outputs 3; sources 2
 biases 3–5
 discussion 8, 177–9
 distribution of mapped features: cropmarks 5, 6; earthworks 7, 8
 future projects 178–9
 research priorities 5
 Evelyn, John 139
 Evesham Abbey (Worcs) 127
 Eynesbury (Cams), cursus 22
- Fairlop (G London), airfield 153, 165, 166, 168, 172
 Fambridge
 salt manufacture 124
 sea walls 144
 see also Blue House Farm; North Fambridge
 farmsteads
 Roman 72–5, 74, 80, 87–9, 88
 medieval 95–7, 96
 Farrands, Richard 2
 Feering
 long enclosure 24, 25, 26, 26
 settlement, Roman 76
 Feldy Marshes, oyster cultivation 128, 133
 Felixstowe (Suffolk), military defences 157, 163
 Fenn Creek, salt manufacture 118
 Ferry Farm, oyster cultivation 132
 Field Farm, enclosure 68
 field systems 178
 prehistoric 54, 56, 60; Tendring 49, 52
 Roman 72, 75, 87
 medieval–post-medieval 92, 95, 101–4, 103, 114
 Blackwater estuary 111, 112–13, 113; chalk dip slope 14; Upper
 Roding Valley 110–11, 110
 Fingringhoe, manor 127

- Fish and Oyster Breeding Company Ltd 132
 fish ponds 92, 97, 104, 105, 106
 fish weirs/traps
 description and discussion 124–8, 125, 125, 126, 145–6
 recording 3, 4, 178
 Saxon 111
 fishing, coastal 115, 145
 Fitch, E.A. 142
 Fobbing
 fishery 127
 military defences 152, 163
 Folly Farm, cropmarks 78, 79–80
 Fordham, villa 72, 73
 forts, Roman 54, 55, 56; *see also* Maunsell sea forts
 Foulness
 access 5
 fish weirs 127–8, 146
 military defences 157, 161
 oyster cultivation 132
 salt manufacture 118
 sea defences 116, 117, 118
 Foulsham (Norfolk), airfield 170
 Foulton Marsh, cultivation 118
 Foxleys, hall house 107
 Frame Farm, long enclosure 67
 Frating Hall, duck decoy 143
 Frating Lodge, Roman settlement 76
 Freston (Suffolk), causewayed enclosure 28
 Fridaywood Farm, military defences 158
 Frinton, military defences 152, 156, 172
 Friskney Decoy (Lincs) 142
 Frowick Hall Farm, enclosure 64, 64
 Furtherwick, military defences 159, 173
 future programmes 178–9
- garden features 106–7
 Gardener's Farm, duck decoy 137, 141
 Gardiner, Sir Thomas 123, 140, 142
 Gedgrave (Suffolk), military defences 162–3
 Geedon channel, oyster cultivation 133
 geology 8–10, 9
 Glebe Farm, duck decoy 136, 137, 142
 Goldhanger
 church 112
 duck decoy 136, 137, 141, 143, 144
 oyster cultivation 135
 salt manufacture 122, 123
 Gore Decoy 137, 141, 142, 144
 Gosbecks, temple 80, 80
 Gosfield, airfield 166, 169, 170
 Grange Decoy 137, 139, 140–1, 140, 142, 144
 Grange Farm
 duck decoy 140–1
 enclosure 61, 62
 Grange Road, enclosure 68
 Gransden Lodge (Cambs), airfield 170
 Grapnells Marsh, sea walls 116
 Grays
 fishery 127
 military defences 156
 Great Baddow, enclosure 36, 60, 61, 83
 Great Bentley
 cropmark site 29, 30
 salt manufacture 122
 windmill 177
 Great Bromley, military defences 163
 Great Canfield
 church 107
 motte 107, 114
 Great Chesterford
 cemeteries/burials, Roman 81
 cropmarks 5, 71–2
 field system 14, 103, 104
 settlement, Saxon 93
 temple 70
 Great Cob Island, oyster cultivation 132
 Great Dunmow
 airfield 166, 169, 170, 172, 173
 barrows 81
 roads, Roman 79
 settlement, Roman 77, 80
 shrine 81
 Great Farthingoe (Kent), military defences 157
 Great Garnetts, field system 103, 104, 107
 Great Holland, military defences 156
 Great Holts, settlement
 Roman 72, 74, 75, 87
 medieval 95
 Great House Farm, enclosure 61
 Great Oakley
 duck decoy 137, 138–9, 142, 143
 fishery 127
 military defences 152, 153
 salt manufacture 122
 Great Sampford, airfield 165, 166, 168, 173, 174
 Great Stambridge, oyster cultivation 132
 Great Totham, road 80
 Great Wakering
 military defences 156, 172
 oyster cultivation 132
 salt marsh 116
 Great Wakering Hall, salt manufacture 123
 Green Street Green (Kent), military defences 160
 Greenwood, J. and C., map by 142
 Grey Goose Farm 81, 82, 88, 89
 Gun Defended Areas 154, 157, 158
 gun emplacements *see* anti-aircraft batteries
- Hadleigh
 enclosure 67–8, 68
 marshes 117–18
 military defences (Sandpit Hill) 156, 157, 160, 173
 oyster cultivation 135
 Hadleigh Ray, oyster cultivation 134
 Haigh, John 3
 Hainault (G London), military defences 152, 153
 Hale (Lancs), duck decoy 143
 Hall Farm, enclosure 29, 30
 Hambledon Hill (Dorset), causewayed enclosure 23
 Hamford Water
 duck decoys 136, 136, 141, 142
 military defences 8, 154, 161
 oyster cultivation 128, 135
 salt manufacture 118, 119, 121, 122
 Hardy's Green, enclosure 57
 Harlow
 cursus monument 26
 temple 70, 72, 80, 80
 villa 72, 73
 Harrison, W. 124
 Hartford End, military defences 173
 Harwich
 fish weirs 127, 128
 military defences 150–2, 154, 157, 158, 159, 172
 oyster cultivation 135
 Havengore Island, oyster cultivation 131
 heaths 13
 hengiform monuments
 Chelmer Valley 37
 description and discussion 28–30, 29
 misinterpretation of 60
 north-west Uttlesford 43
 Tendring 46, 46, 47, 53
 Hertfordshire, National Mapping Programme 1
 Heybridge
 oyster cultivation 128
 salt manufacture/consumption 121, 122
 Hickinggill, Thomas 143
 High Easter, settlement evidence 107, 109, 109
 High Ongar, fields 111
 High Roding
 airfield (planned) 172
 road, Roman 107
 settlement, medieval 109, 109
 High Rodingbury, moated site 109
 Highams Farm, settlement 112–13, 113
 Hill Farm, settlement, Roman 75, 76
 Hill House, enclosure 61, 62
 hillforts 54, 56, 68–70, 69
 Historic Settlements Assessments 177

- Hockley
 oyster cultivation 132
 salt manufacture 122, 123, 124
- Holbrook Bay, fish weir 124
- Holehaven Creek, military defences 150
- Hollesley (Suffolk), military defences 162
- Holywood (Dumfries), cursus monuments 44
- Hornchurch (G London), airfield 153, 166, 168, 171
- Horse Island, duck decoys 142
- Howell's Farm
 buildings, prehistoric 62
 settlement, Roman 76
- Hubbards, moated site 110, 110
- Hullbridge
 embankment 116
 Hullbridge Survey 178
 salt manufacture 122, 123, 123, 124
- Hutton Moor (N Yorks), henge 29
- Iken Decoy (Suffolk) 142
- Ilford, fishery 127
- Ingatestone, military site 172
- Ivy Chimneys, temple 70, 80
- Iwade (Kent), military defences 160
- Jacques Hall, duck decoy 143
- Jaywick, military defences 158, 161
- Jotmans Hall, military defences 176
- Joyce's Farm
 cropmarks 112–13, 113
 duck decoy 136, 137, 142
- Kedellmans, fish weir 127
- Kelvedon
 burial 70
 cemeteries, Roman 81
 long enclosure 24, 26
 settlement, Roman 71, 80
- Kent, National Mapping Programme 1
- King John's Hunting Lodge, moated site 99
- Kirby le Soken, bombing decoy 173, 174
- Kirkby Creek, oyster cultivation 135
- Ladd, John 132
- Lakenheath (Suffolk), duck decoy 142, 143, 144
- land use 4–5
- Landemere Wharf, sea defences 116
- Landguard (Suffolk)
 fish weir 127
 military defences 160
- landing grounds *see* airfields/landing grounds
- landscape management 177–8
- landscape regions 10–14, 12
- Langdon Hills 14
- Langenhoe
 manor 127
 marshes 116, 144
 oyster cultivation 133
 salt manufacture 122
- Langford
 cropmarks 37, 37, 38, 40, 57, 59, 63
 settlement, Roman 75, 76, 77, 79, 87
 temple 80, 81
 trackway 59
- Langley, field system 14
- Langley Lawn, enclosure 61
- Langleys House, garden features 106
- Latchingdon
 duck decoy 141
 fishery 127
- Lawford
 enclosure 56, 58, 60, 83
 salt manufacture 122
- Lawling Creek, oyster cultivation 135
- Lawnside Farm, military defences 150
- Layer de la Haye
 cropmarks 13
 military defences 153
- Lee, River 116
- Lee, Thomas 141
- Leez Priory 104, 106
- Left Decoy (Bohun's Hall Decoy) 136, 137, 138, 141, 143
- Leigh Beck, Iron Age–Roman site 118
- Leigh-on-Sea, oyster cultivation 135; *see also* Belfair Farm
- Leiston (Suffolk), military defences 163
- Lexden, cropmarks 13
- Lexden Dyke, military defences 148, 150
- Lexden Lodge, settlement, Roman 75, 76
- Leyton (G London), fishery 127
- LIDAR 5, 179
- Lin, Richard 127
- Lincolnshire
 duck decoys 137, 138, 139, 141, 143
 enclosures, Roman 72
 long enclosures 25
 National Mapping Programme 1, 5
 salt manufacture 124
- Lion Creek, oyster cultivation 131
- Lion Point, duck decoy 137, 143, 144
- Lionel of Bradenham 128
- Lippitts Hill, military defences 158, 173, 174
- Little Baddow, military defences 162
- Little Bardfield, moated site 99
- Little Bentley, windmill site 46, 177; *see also* Hall Farm
- Little Bromley, ring-ditches/round barrows 32
- Little Clacton
 airfield (planned) 172
 military defences 153, 157
- Little Cob Island, oyster cultivation 132
- Little Holland, military defences 158
- Little Oakley
 fishery 127
 military defences 152, 156, 158, 173
 oyster cultivation 135
 villa 121
- Little Thurrock
 fishery 127
 sea defences 116
- Little Wakering
 oyster cultivation 132
 salt marsh 116
- Little Walden, airfield 166, 167, 169, 170, 173, 174
- Little Waltham, enclosure 65
- Lodge Farm, burial enclosure 71, 77, 89
- Lodgewood, round barrows 32
- Loft's Farm
 enclosure 40, 64
 moated site 111, 113
 round barrows 32
- London
 Charterhouse 130
 St James's Park 139
 St Paul's Cathedral 116
- London Claylands, landscape region 12, 13
- Long, Charles 131
- long barrows *see* mortuary enclosures/long enclosures
- long enclosures *see* cursus monuments; mortuary enclosures/long enclosures
- Long Melford (Suffolk), long enclosure 25
- Longford (Oxon), causewayed enclosure 18
- Loughton Camp, hillfort 69, 70
- Loughton Hall, military defences 158
- Lower Barns, oyster cultivation 132
- Lowestoft (Suffolk), military defences 157
- McMaster, Ida 2
- Maddock, Thomas 127
- Maiden Castle (Dorset), hillfort 70
- Maidens Tye, moated site 99, 110–11
- Maldon
 airfield (planned) 172
 salt manufacture 124
 town, medieval 91
- Maldon Hall Farm, cemetery 70–1
- Maplin Sands
 coastline 146
 fishery 127
- Mar dyke 10
- Marsh Farm, military defences 156, 157
- Marshall's Farm, salt marsh 144

- Marshhouse, duck decoy 136, 137, 142, 144
Mashbury, field system 103, 104
Matching, airfield 166, 169, 170, 172, 173, 174
Matching Green, causewayed enclosure 18, 20, 65
Maunsell sea forts 154
Maxey (Cambs), cropmarks 89
Maylands, airfield 165
maze 92, 107
Mell House, duck decoy 144
Mersea Island
 barrow 81
 duck decoys 136, 141
 fish weirs 124, 125, 125, 126
 map 1777 117
 oyster cultivation 133
 salt manufacture 121
 see also East Mersea; West Mersea
Metfield (Suffolk), airfield 170
Middleway, oyster cultivation 131
Mile End, cropmarks 13
Milfield North (Northumb), henge 28
military sites 147
 aerial attack defences 154
 1939–mid 1944 154–61, 155–6, 158, 159; Diver batteries
 160–3, 161, 162; miscellaneous 163
 airfields 163–71, 164, 166, 169, 171
 anti-invasion measures 148
 anti-airborne measures 152–4, 153; coastal defence 150–2;
 defence in depth 152; stop-lines 148–50, 149, 151, 152
 discussion 174–6, 178
 distribution 8
 landscape impact 171–2, 174, 175
 recording 2, 3
 research history 147–8
 survival 13, 172
 airfields 173–4, 175; anti-aircraft batteries 173; anti-aircraft
 defences 172–3
Mill Beach, salt manufacture 122–3
Mill View, enclosure 57
mills 104, 106; *see also* windmills
Milton, oyster cultivation 135
Mistley, fishery 127
moated sites
 Blackwater estuary 111, 112–13, 113
 description and discussion 97–101, 97, 98, 100, 113–14
 distribution and geology 5, 8
 field system, effect on 104
 recording 92
 Upper Roding Valley 107, 109–11, 110
Moor's Farm, moated site 112
Morant, P. 131, 133, 135, 140, 141
Morant Club 122–3
Morris Farm, salt manufacture 123, 123
mortuary enclosures/long enclosures 22–6, 23, 24, 25, 26, 27
 Chelmer and Blackwater river valleys 34–6, 35, 37
 north-west Uttlesford 43, 44
 Orsett 20–2, 21
 and settlement, Iron Age 67
 Tendring 45, 46
mottes (and baileys) 92, 101, 101, 102, 107
Mount Bures
 elongated enclosure 25, 25
 motte 101, 102
Moverons Pit, round barrows 32
Mucking 5, 13
 burials, Roman 72, 81
 cemetery, Iron Age 70
 fishery 127
 North Ring, enclosure 83
 salt manufacture 118
 settlement: case study 81–9, 82, 84–6; Iron Age 64, 65; Roman
 72, 74, 75; Saxon 93–5
 South Ring, enclosure 61, 83
Mundon
 fish pits 135
 inning 141
The Nass
 fish weir 124, 125
 oyster cultivation 133
National Mapping Programme 1
National Monuments Record 2
Nazeing marshes, military defences 150, 171, 173
New Burwood, military defences 161
New Decoy 142
New England Creek/Island, oyster cultivation 131
New Hall, moated site 107, 109–10
New Moor Farm, duck decoy 143
Norden, John 117, 132, 146
North Benfleet, military defences 150, 176
North Fambridge
 oyster cultivation 135
 salt manufacture 124
North Shoebury, oyster cultivation 128
North Weald
 airfield 165, 166, 168, 171, 174
 military defences 156, 157
Northey Island
 duck decoy 144
 oyster cultivation 132
 salt manufacture 122
 salt marshes 144
Northwick, military defences 156, 157, 173
Nyland (Som), duck decoy 141
Old Hall, fishery 127
Old Hall Marshes
 duck decoys 136, 137, 139–40, 142, 144
 fish weir 124
 oyster cultivation 132, 133
 salt manufacture 124
 sea defences 116, 146
Old Heath, anti-tank ditch 148
Old Jacques Hall, duck decoy 143
Old Lodge Farm, military defences 156
Old Mose Hall Decoy 141, 142
Oldmoor, enclosure 61, 64
Online Aerial Reconnaissance Project 5
Orsett
 burials, Saxon 95
 causewayed enclosure 18–22, 20, 21, 53, 81, 82, 83, 85
 enclosures, settlement, Iron Age–Roman 65, 66, 67, 71, 75, 76, 85, 87
 mortuary enclosure 20–2, 21
 settlement case study, prehistoric–Roman 81–9, 82, 84–6
Orsett Cock, Iron Age enclosure 64, 64, 65, 67, 83, 87, 177
Orsett Heath, enclosures 25, 56, 57, 83
Osea, fishery 127
oyster cultivation
 dating 77, 92
 description and discussion 128–35, 129, 130, 146
 distribution 8, 10
 recording 2, 3
Packing Marsh Island, oyster cultivation 133
Paglesham
 duck decoys 136, 144
 oyster cultivation 129, 131, 132
 salt manufacture 123
 salt marsh 116
Paglesham Pool, oyster cultivation 131, 132
Paglesham Reach, duck decoy 137, 139, 142
Parkeston
 military defences 152
 oyster cultivation 135
Payne-Gellwey, R. 139, 141, 142, 143, 144
Peldon
 red hills 120, 121, 121
 salt manufacture 122, 145
Peters Point, duck decoy 142
Pewet Island, fish weir 124, 126
Pewit Island, oyster cultivation 133
photographic sources 2
pillboxes
 airfields 168
 erosion 13
 recording 3, 148
 on stop-lines 149, 150, 151, 152
 survival 172, 173, 174
pillow mounds 23
Pitchbury Ramparts, hillfort 69, 69, 70

- pits, Roman 88–9
Pitsea Marsh, military defences 152, 163
Pleshey
 motte and bailey 92, 101, 101, 107
 town, medieval 91
Plumberow Mount, barrow 81
Pond Hall, duck decoy 143
Pond Park Farm, duck decoy 144
Pool Marsh Farm, oyster cultivation 132
Potton Island, oyster cultivation 131
pories *see* abbeys/pories
Prittlewell Camp, hillfort 69, 69
Purfleet, sea defences 116
Pyefleet, oyster cultivation 133
- Rainham Marshes (G London)
 military defences 152
 sea defences 116
Ramsey
 oyster cultivation 132
 salt manufacture 122
Rat Island, oyster cultivation 133
Ratcliff's Farm, moated site 99
Ray channel, oyster cultivation 133
Ray Island, oyster cultivation 133
reconnaissance programmes 4
red hills
 description and discussion 118–22, 119, 120, 121, 145
 erosion 13
 recording 2, 178–9
Red Hills Exploration Committee 145
Richard I 129
Richard de Gloucester 116
ridge and furrow 111
Ridgewell, airfield 165, 166, 169, 170, 171
ring-ditches and round barrows
 prehistoric 30–4, 32, 33
 Chelmer and Blackwater valleys 34, 35, 36, 37–43, 37;
 distribution 54, 56; as markers 59, 87; north-west Uttlesford
 43, 44–5; settlement sites, association with 62–3, 63, 67;
 Tendring 45, 46–9, 46, 47–8, 52, 53; Thurrock 83, 84
 Saxon 95
ringworks 92, 97, 101, 106
Rivenhall
 airfield 166, 169, 170, 174
 long enclosure 22, 24, 25, 26, 177
 villa 80
 see also Coleman's Farm
Roach, River 10, 116, 118, 128, 131–2
Roach River Co. 132
roadblocks 150, 152, 172, 173
roads
 Roman 55, 56, 78–80, 79, 107
 medieval 92, 110–11
 see also trackways
Robin Hood's Ball (Wilts), causewayed enclosure 18
Rochford
 airfield 163, 165, 168, 172
 military defences 161, 174
 sea defences 116
Roding Valley
 cropmarks 5, 107–11, 108, 109, 110, 113–14
 field boundaries 101
 military defences 153
 moated sites 99
 topography 10
Rollestone Farm, military defences 156, 158
Rolls Farm
 duck decoys 136, 137, 138, 141
 salt manufacture 118
Rook Hall, Saxon settlement 93, 111
The Rookery, motte 101
round barrows *see* ring-ditches and round barrows
roundhouses 56, 64, 65, 83, 87
Roundwood, farmstead 95, 97
Rowhedge, oyster cultivation 133
Royal Air Force photographs 2, 4
Roydell's Farm, water meadows 106
Roydon, salt manufacture 124
Roydon Hall, duck decoy 143, 146
- Rumbolds Farm, military defences 156, 158
Rushley Island, land reclamation 118
- Saffron Walden
 enclosure 56, 57
 field systems 103, 104
 maze 107
St Osyth
 causewayed enclosure 18, 20, 22, 45, 49–53, 53
 cursus 27, 49, 52, 53
 enclosure, Iron Age 64, 65, 66, 67, 83
 military defences 176
 priory 127, 144
 ring-ditches/round barrows 32, 52, 53, 62
 road, Roman 79
 settlement: prehistoric 55, 62; Roman 75–7, 78
Salcott
 oyster cultivation 130, 132, 133
 salt manufacture 118, 122
Sales Point, fish weir 124, 125, 125, 126, 127
Salisbury Plain Training Area 1
Sallets Farmhouse, hall house 107
Salmonsbury (Glos), causewayed enclosure 22
Salt Acre Marsh, salt manufacture 124
Salt Field, salt manufacture 124
Salt House, duck decoy 143
salt manufacture 118, 145, 178–9
 Iron Age–Roman 77, 118–22, 119, 120, 121
 medieval 122–4, 123
 post-medieval 123–4
Salt Pan Marsh, salt manufacture 123
Salt Pasture, salt manufacture 124
Saltcote Marsh, salt manufacture 124
Sandbeach Farm, duck decoy 142
Sandon, military defences 150
Sandon Brook 150
Sandpit Hill, military defences 157, 160
sands and gravels, landscape region 12, 13
Saster, Thomas 132
Sawbridgeworth (Herts), airfield 168
sea defences 10, 115–18, 123, 144–5, 146
Seaborowe, John 132
searchlights 163
Sedgemoor (Som), duck decoy 138
Severn estuary, fisheries 127
Shelford Creek, oyster cultivation 131
Shellhaven, military defences 152, 153, 153, 163
Shenfield, airfield 172
Shetelwoode, William 124
Shoeburyness, military defences 150, 163
Shotley (Suffolk), military defences 157
shrines
 Iron Age 55, 63, 70
 Roman 81
 see also temples
Shrub End, anti-tank ditch 148, 150
Skegg's Farm, water meadows 106
Skellingthorpe (Lincs), duck decoy 137, 141
Skelton family 143
 George 143
Skinners Wick, duck decoy 136, 137, 141
Slough House Farm
 cropmarks 5, 34, 71
 landscape clearance 40
 mortuary enclosure 22
 settlement, Saxon 93, 95
 trackway 59
Society for the Encouragement of Arts, Manufactures and Commerce 118
soils 4–5, 10
Solley's, duck decoy 136, 142
South Benfleet, military defences 176
South Cadbury (Som), hillfort 69
South fish weir 127
South Hall
 duck decoy 143, 144
 sea defences 116
South Ockendon, mortuary enclosure 25; *see also* Buckles Farm
Southchurch
 enclosure 68, 68
 oyster cultivation 135

- sea defences 116
- Southend
 - airfield 5, 165, 166, 168, 174
 - military defences 8
 - oyster cultivation 135
 - see also* Rochford; Thorpe Bay
- Southminster
 - airfield (planned) 172
 - duck decoy 143
 - salt manufacture 119
 - settlement, prehistoric 62–3, 63
- Southmore Grove (Glos), causewayed enclosure 18
- Southwold (Suffolk), fish weir 127
- Sparrow's End, enclosure 71, 71, 75
- Spinnels Farm, bombing decoy 173, 174
- Springfield
 - cursus 15, 26, 27, 27, 34–6, 44
 - mortuary enclosure 27, 34–6
 - ring-ditch 31
- Springfield Lyons
 - causewayed enclosure 18, 20, 22, 23, 27, 34, 36, 53, 65
 - settlement, Bronze Age 36, 60, 61, 62, 83
 - settlement, Saxon 93
- square barrows 56, 70, 79, 81
- Stamborne, bombing decoy 171
- Stambridge, oyster cultivation 132
- Stammer, Thomas 124
- Stanford le Hope, military defences 163
- Stansted
 - airfield (WWII) 166, 169, 170, 174
 - cemetery, Roman 81
 - excavations 2, 14, 45, 55
 - flying restrictions 44
 - settlement: Iron Age–Roman 64, 72, 89; Saxon 93
 - shrine 81
 - structures, prehistoric 62
 - trackways 59
 - windmill 46
- Stanway
 - burial enclosure 70
 - cropmarks 13
- Stapleford Tawney (G London), airfield 165, 166, 168
- Starling's Green, moated site 97, 97, 98
- Stebbingford, medieval farmstead 95, 96, 97
- Steeple Decoy 141
- Stort, River 10, 43
- Stour Valley
 - cropmarks 5
 - duck decoys 143, 144, 146
 - elongated enclosures 25
 - fish weirs 124, 127
 - oyster cultivation 135
 - prehistoric sites 15, 45
 - salt manufacture 122, 145
 - topography 10
- Stour Valley Project 15, 177–8
- Stow Creek, oyster cultivation 135
- Stow Maries
 - airfield 165, 172
 - salt manufacture 123, 123, 124
- Stratford Langthorne Abbey (G London) 116
- Stratford St Mary (Suffolk), round barrows 31
- Strood, oyster cultivation 130, 132, 133
- Strood Hall
 - cemetery, Roman 81
 - farmstead 72, 75, 89
- Stumble
 - fish trap 13, 126
 - settlement, Neolithic 38, 60, 145
- Sturric Farm, enclosure 29, 30
- Sunken Island, oyster cultivation 133
- sunken-featured houses, Saxon 93, 95, 111
- Sutton *see* Butlers Farm
- Sutton Heath (Suffolk), military defences 172
- Sutton Hoo (Suffolk), military defences 172
- Sutton's Farm, airfield 165, 168
- Takeley
 - field system 103, 104
 - military defences 156, 157
- temples 54
 - Iron Age 70, 80
 - Roman 55, 72, 79, 80–1, 80
- Tendring
 - cropmarks 5
 - duck decoys 143
 - enclosures, settlement 57–8, 58, 64
 - oyster cultivation 135
 - prehistoric sites 16, 17–18, 45–53, 46, 47–8, 50–2
 - round barrows 32
 - salt manufacture 122
 - soils 13
- Ter Valley 93
- Thames Haven, military defences 152, 153, 163
- Thames Valley
 - fisheries 127, 128
 - marshland 144, 145
 - military defences: anti-aircraft batteries 154, 157, 159, 160; anti-landing ditches 152, 153, 153; anti-tank ditches 150
 - National Mapping Programme 1
 - oyster cultivation 128, 134–5
 - salt manufacture 118, 122
 - settlement, Bronze Age 62
- Theydon Mount, enclosure 61, 62
- Thompson, George 134
- Thorn channel, oyster cultivation 130, 132, 133
- Thornborough (N Yorks), henges 29
- Thornton, William 132
- Thorpe Bay, military defences 156, 159, 160
- Thorpe le Soken, military defences 156
- Thorrington, salt manufacture 122
- Thurrock
 - cropmarks 2, 5
 - distribution of prehistoric sites 15, 16
 - mortuary enclosures/long enclosures 25
 - settlement evidence, prehistoric–Roman 58, 60, 62, 64
 - case study 81–9, 82, 84–6, 88
 - settlement, Saxon 93
- Tilbury Marshes
 - military defences 152
 - sea defences 116
- Tillingham
 - duck decoy 136, 137, 140–1, 143
 - fish weir 127
 - land reclamation 118
- Tillingham Grange Farm, fish weirs 127
- Tilty Abbey 106
- timber circles 36, 44
- Tithe Maps 91, 141, 142, 143
- Tollesbury
 - duck decoys 139–40, 144
 - fishery 127
 - oyster cultivation 128, 131, 132, 133
 - salt manufacture 122, 123
 - salt marshes 145
 - settlement, medieval 111
- Tollesbury and Mersea (Blackwater) Oyster Fishery Company 132, 133
- Tolleshunt D'Arcy
 - moated site 112
 - salt manufacture 122
- Tolleshunt Major
 - field systems 111
 - salt manufacture 122
 - settlement, medieval 111
- topography 10, 11
- Totham, salt manufacture 122
- trackways
 - prehistoric: Chelmer and Blackwater river valleys 34, 37, 40; north-west Uttlesford 44; Tendring 53
 - prehistoric–Roman 54, 56, 59–60, 72, 77
 - Thurrock 86, 87, 89
 - medieval–post-medieval 92, 107
- Trent Valley, National Mapping Programme 1
- Trimley (Suffolk), military defences 157
- Two Tree Island, oyster cultivation 134
- Ulting Grove, enclosure 63
- Ulting Hall, enclosure 67
- Uttlesford
 - moated sites 99

- prehistoric sites 18, 27, 28, 43–5, 43
- Vange
 fishery 127
 military defences 152, 156, 157, 173
- Villa Farm, duck decoy 143
- villas 56, 72, 73, 77, 89, 121
 distribution 54
- Wakes Colne, military defences 173
- Waldegraves Farm, duck decoy 137, 139, 141
- Walden Abbey 104
- Walfleete, location 132
- Wallasea Island
 oyster cultivation 132
 sea defences 116, 117, 146
- Wallbury Camp, hillfort 69
- Waltham Abbey
 features 104–6, 105
 military defences 159–60, 163
- Waltham Holy Cross, fishery 127
- Walthamstow, fishery 127
- Walton Moor (Som), duck decoy 143
- Walton-on-the-Naze, erosion 13
- Warner's Farm, enclosure 68, 68
- water management schemes 97, 104–6, 105
- water meadows 5, 93, 106
- Watton (Yorks), duck decoy 138
- Weather Heath (Suffolk), military defences 172
- Weeley, airfield (planned) 172
- Weltham Green (Kent), military defences 160
- Wendons Ambo, military defences 163
- Wennington, sea defences 116
- Wentworth, Sir Richard 116
- West Ham (G London), salt marsh 118
- West Mersea
 duck decoy 144
 fish weir 124, 126, 127
 oyster cultivation 129, 131, 132, 133
 villa 121
- West Thurrock
 fishery 127
 sea defences 116
- West Wick, duck decoy 141
- Westbury (Som), duck decoy 141
- Westbury (Wilts), round barrow 31
- Westleton (Suffolk), military defences 163
- Westmarsh Point, fish weir 127
- Wethersfield, airfield 166, 169, 170
- White Colne, cemetery 32
- White Notely, enclosure 61, 62
- Whitmore, cropmarks 13
- Whitstable (Kent), oyster cultivation 129, 133
- Wid, river 106
- Widgeon Pond, duck decoy 136
- wildfowling 115, 135–44, 136, 137, 138, 140, 146
- Wimbish, military defences 157, 163
- Windmill Hill (Wilts), causewayed enclosure 18
- windmills 29, 30, 46, 49, 92, 177
- Witham
 Roman burial 81
 Roman settlement 80
- Wivenhoe
 cropmarks 13
 oyster cultivation 133
- Wix, duck decoy 143
- Woodford Bridge (G London), military defences 152, 153
- Woodham Ferrers
 oyster cultivation 131
 salt manufacture 122, 124
- Woodham Mortimer, trackway 59
- Woodham Walter
 settlement, prehistoric 40, 57, 59, 64, 67, 177
 settlement, Roman 72, 74
- Woodham Walter Hall, enclosure 57
- woodland 5
 woodland clearance 38, 40, 91
- Woodrolfe Creek, oyster cultivation 132
- Worcester (Worcs), St Peter 127
- World War II Defences Survey 147, 148, 174, 176, 178
- Wormingford
 airfield 166, 169, 170, 173
 duck decoy 136, 143
- Wormingford Mere, duck decoy 143
- Wrabness
 duck decoy 143
 salt manufacture 122
see also Spinnels Farm
- wreck sites 178
- Writtle, military defences 158, 163
- Yorkshire Dales, National Mapping Programme 1
- Young, Arthur 141

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