



A MEDIEVAL MOATED
SETTLEMENT AND WINDMILL:
EXCAVATIONS AT
BOREHAM AIRFIELD, ESSEX
1996

East Anglian Archaeology
Heritage Conservation
Essex County Council

EAST ANGLIAN ARCHAEOLOGY



Frontispiece:
Computer-aided reconstruction of the moated settlement
Alec Wade

This report is dedicated to Stewart MacNeill who died in August 1999

**A medieval moated
site and windmill:
excavations at
Boreham Airfield,
Essex 1996**

by Rachel Clarke

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Cover photograph:

Aerial photograph of the site taken in 1996 by David Strachan, Essex County Council (see also Plate I)

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Summary

An enclosed settlement of 12th to 13th-century date was excavated in advance of gravel extraction at a former airfield in Boreham, near Chelmsford, Essex. Several timber buildings, interpreted as a house, outbuildings, a granary and an early form of windmill, were recorded within a large rectangular moat. The physical evidence for the windmill is of significance, especially as it was found within the context of a settlement, rather than as an isolated structure. Analysis of the charred grain assemblage, in addition to aiding interpretation of the buildings, has contributed to the understanding of agricultural activities

in and around the settlement. The medieval pottery from the site represents a typical household assemblage, although the presence of some non-local fine wares such as Developed Stamford ware, is rare in Essex.

The relatively short-lived settlement was abandoned in the mid-13th century or later, perhaps following the catastrophic fire indicated by the evidence of the charred grain assemblage. During the later medieval period the site appears to have been absorbed into a park, possibly associated with New Hall, and was covered by Dukes Wood until the construction of the airfield in the 1940s.

Résumé

Un ensemble clos d'habitations datant du 12ème et du 13ème siècle a été mis à jour à Boreham près de Chelmsford, dans l'Essex, sur un ancien terrain d'aviation où l'on s'apprêtait à extraire du gravier. La fouille d'un grand fossé rectangulaire a permis de révéler l'existence de plusieurs bâtiments en bois qui semblent correspondre à une maison avec ses dépendances, à un grenier à blé et à une forme primitive de moulin à vent. Les preuves physiques de la présence d'un moulin à vent sont manifestes, avant tout parce qu'il ne s'agit pas d'une structure isolée mais d'un bâtiment appartenant à un ensemble d'habitations. L'analyse des grains noircis par le feu a non seulement facilité l'interprétation des bâtiments mais a également permis de mieux comprendre les activités agricoles qui se sont déroulées sur le site et aux alentours. La poterie médiévale découverte sur place

correspond tout à fait à ce qui était utilisé habituellement par une famille de l'époque. On trouve toutefois des exemples de faïence étrangère à ces lieux, telle que la faïence fine dénommée Developed Stamford, dont la présence est rare dans la région de l'Essex.

Cet ensemble d'habitations eut une durée de vie relativement courte puisqu'il fut abandonné au milieu du 13ème siècle, ou plus tard, peut-être à cause d'un incident catastrophique dont les traces sont révélées par les grains noircis trouvés sur place. Pendant la période médiévale tardive, il semble que le site ait été intégré à un parc, qui est peut-être associé à New Hall. Il fut ensuite recouvert par la forêt de Dukes Wood jusqu'à la construction de l'aéroport dans les années 1940.

(Traduction: Didier Don)

Zusammenfassung

Auf einem ehemaligen Flugfeld in Boreham bei Chelmsford, Essex, wurde vor Beginn der dortigen Kiesgewinnung eine Siedlung aus dem 12. bis 13. Jahrhundert ausgegraben. Innerhalb einer großen, rechteckigen Grabenanlage wurden mehrere Holzbauten gefunden, die als Wohnhaus, Wirtschaftsgebäude, Kornspeicher und Frühform einer Windmühle interpretiert wurden. Den physischen Belegen für eine Windmühle ist besondere Bedeutung beizumessen, vor allem da die Mühle Teil einer Siedlung und kein isoliertes Bauwerk war. Die Analyse von verkohlten Getreideresten war nicht nur für die Interpretation der Gebäude von Bedeutung, sondern auch für das Verständnis der landwirtschaftlichen Aktivitäten in und um die Siedlung.

Die gefundenen mittelalterlichen Töpferwaren bestehen aus typischem Tafelgeschirr, allerdings ist die Anwesenheit von nicht aus der Gegend stammender Feinware wie etwa »Developed Stamford Ware« für Essex selten.

Die nur relativ kurz bestehende Siedlung wurde Mitte des 13. Jahrhunderts oder etwas später aufgegeben, möglicherweise nach dem verheerenden Feuer, auf das die verkohlten Getreidereste hinweisen. Im Spätmittelalter scheint die Stätte in einen möglicherweise zu New Hall gehörenden Park integriert gewesen zu sein. Vor dem Bau des Flugfelds in den 1940er Jahren war sie vom Dukes Wood bedeckt.

(Übersetzung: Gerlinde Krug)

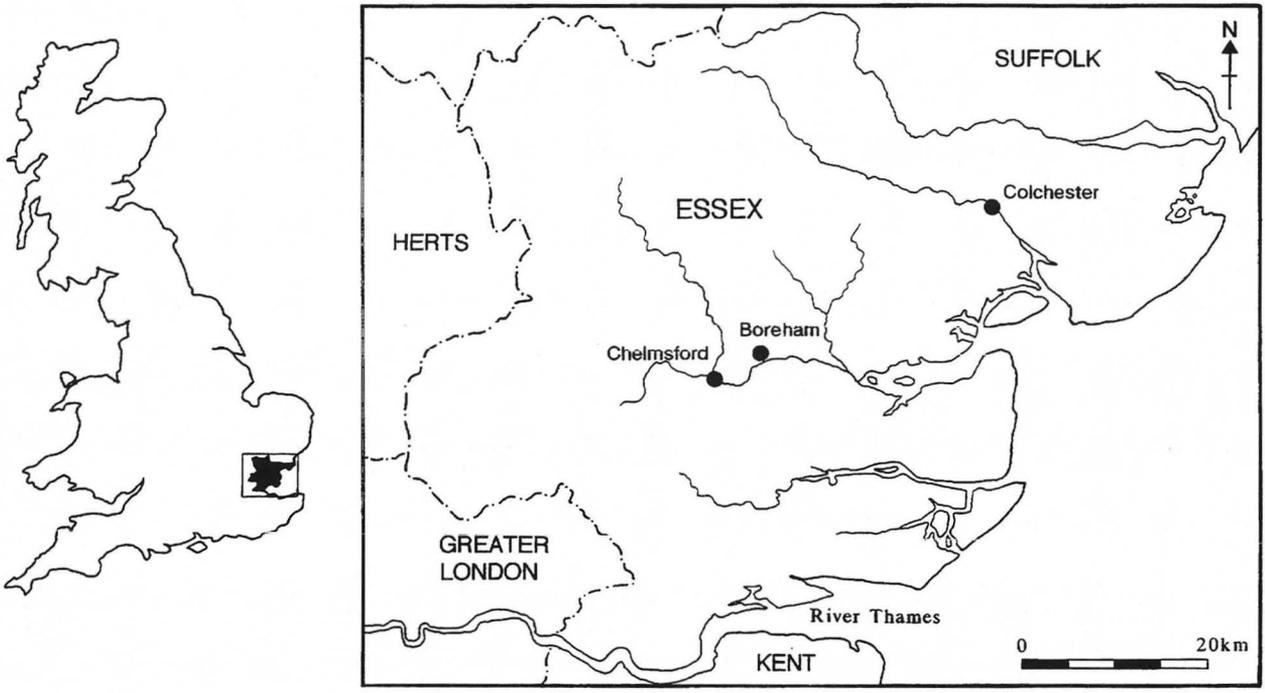


Figure 1 Location maps

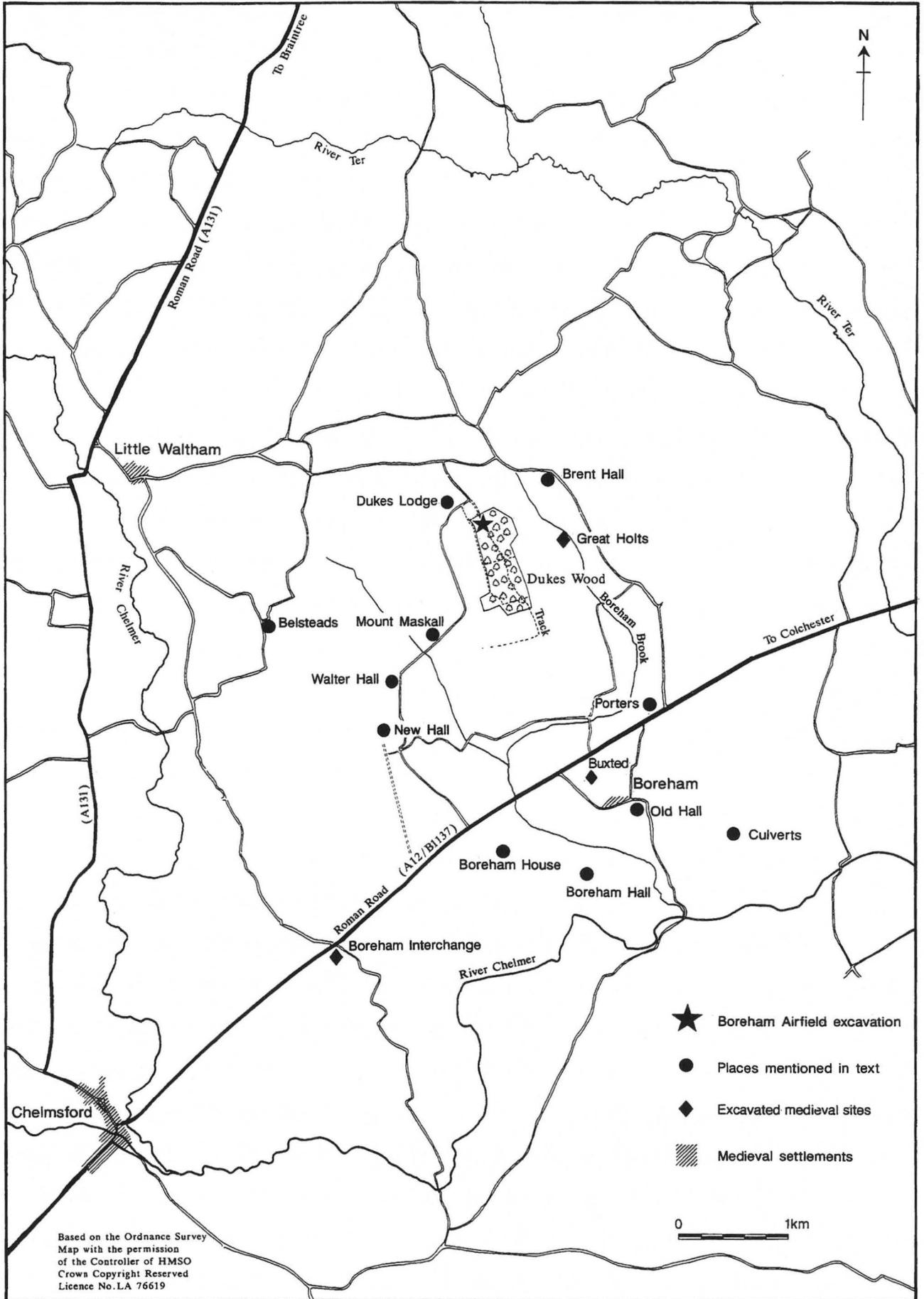


Figure 2 Topographical plan of the site and its environs

Chapter 1. Introduction

The site

(Figs 2–5)

The site at Boreham Airfield, Essex, was first identified as cropmarks, interpreted as enclosures and ring-ditches (Essex Heritage Conservation Record (EHCR) 6140). A black-and-white aerial photograph of the northeast corner of the airfield (CUCAPAO1 48), taken at an oblique angle, shows two large enclosures, a circular ditch and several linear features located between two runways. An enhanced plot of the cropmarks appears on Fig. 4.

In 1990, planning consent for a 320-hectare gravel quarry in the area of the airfield was granted to Pioneer Aggregates (UK) Ltd. An access condition for archaeological work was included in the consent. A 'gentleman's agreement' was made between Pioneer and Essex County Council under which Pioneer would provide funding when necessary, and within reason, for archaeological work within the extraction area.

The northern half of the cropmark site was fieldwalked in October 1994. No significant concentrations of artefacts or other finds were located, although single sherds of Roman and medieval pottery were recovered (Reidy 1995). The relative absence of surface finds probably relates to the removal and redeposition of topsoil during the construction of the airfield in the 1940s. In June 1995 a watching brief adjacent to the cropmark site, which identified two medieval ditches, a small pit and a large indeterminate feature, was maintained on topsoil stripping and the removal of a concrete runway (Germany 1995a).

Subsequently the 0.4m-thick topsoil layer was stripped to the subsoil level over the main cropmark site, encompassing an area of approximately a hectare. A limited evaluation of the exposed features (EHCR 18116) was then undertaken in October 1995. The evaluation identified a late 12th- to early 13th-century settlement comprising two sides of a large enclosure or moat surrounding the remains of at least two timber buildings, several ditches and the foundations of an early form of windmill (Germany 1995b).

An agreement was reached with Pioneer Aggregates to preserve temporarily the majority of the exposed site on an artificial promontory within the working quarry (Plate I and front cover). This allowed extraction of Area 2c of the quarry to continue whilst a rescue excavation was carried out under the supervision of the author during the summer of 1996. Pioneer generously provided initial funding for the site, which was further supplemented by grants from English Heritage, Essex County Council Planning Division and Chelmsford Borough Council, once the full potential of the site was realised. Post-excavation costs were largely met by Pioneer, although this stage of work was also supplemented by a further grant from Essex County Council.

Location, geology and topography

Boreham Airfield is situated in the northwest of the parish of Boreham, partially overlapping the parish boundary into Little Waltham. The site (EHCR 17912) is located between two runways in the northeast corner of the airfield (TL 7450 1210) on the 50m contour line (Figs 2 and 3). Boreham village lies 2km to the south close to the A12, originally a Roman road, which runs through nearby Chelmsford on its course between Colchester and London. The Boreham road lies to the east of the airfield, linking the A12 with the A131, also a Roman road which extends between Braintree and Little Waltham. The airfield is situated in an exposed position on an area of relatively high, flat ground formed between the valleys of the river Chelmer to the south and west, and the river Ter to the north and east.

The underlying geology of this part of Essex is London Clay overlain by the Chelmsford Gravels, sealed by a 2m thick deposit of boulder clay interspersed with pockets of brickearth. Abundant springs rising from natural reservoirs in the glacial gravels below Boreham combine with the rich mixture of boulder clay and brickearth to produce land which is fertile and agriculturally valuable (Adams 1988, 72–3). Although there are no streams or springs in the immediate area of the site, there are two nearby minor tributaries of the river Chelmer. Boreham Brook runs 50m to the east of the airfield, at Great Holts Farm, whilst a spring rises to the west, close to New Hall (Figs 2 and 3).

Historical and archaeological background

Although there is documentary evidence for Boreham, relatively little is available for the earlier medieval period, of which even less is attributable to specific areas within the parish. One of the best sources is the Feet of Fines for Essex, the first volume of which relates to the period 1182–1272 (Kirk 1910). This records in varying detail the names of landowners and tenants as well as brief descriptions of tenements and appurtenances, such as woods, meadows and mills. Although several of the entries refer to Boreham, most date from the later 13th century, and it is not possible to relate these directly to the excavated settlement, which was abandoned around the mid 13th century, because of the lack of geographical information. Fortunately there is a very strong interest in local history in the village, a result of which has been the publication of an invaluable collection of essays and memoirs charting Boreham's past from prehistory to the present day (Burgess and Rance 1988). The background here draws heavily on the extensive research and interpretation undertaken by the various authors and contributors to that collection, in particular Sister Mary Stephen, one of the nuns based at what is now New Hall School, and Eleanor Burgess.

The excavated settlement may have been a small manor, although there appear to be no specific documentary references to link a name or person with it, suggesting that it is more likely to have been part of a larger

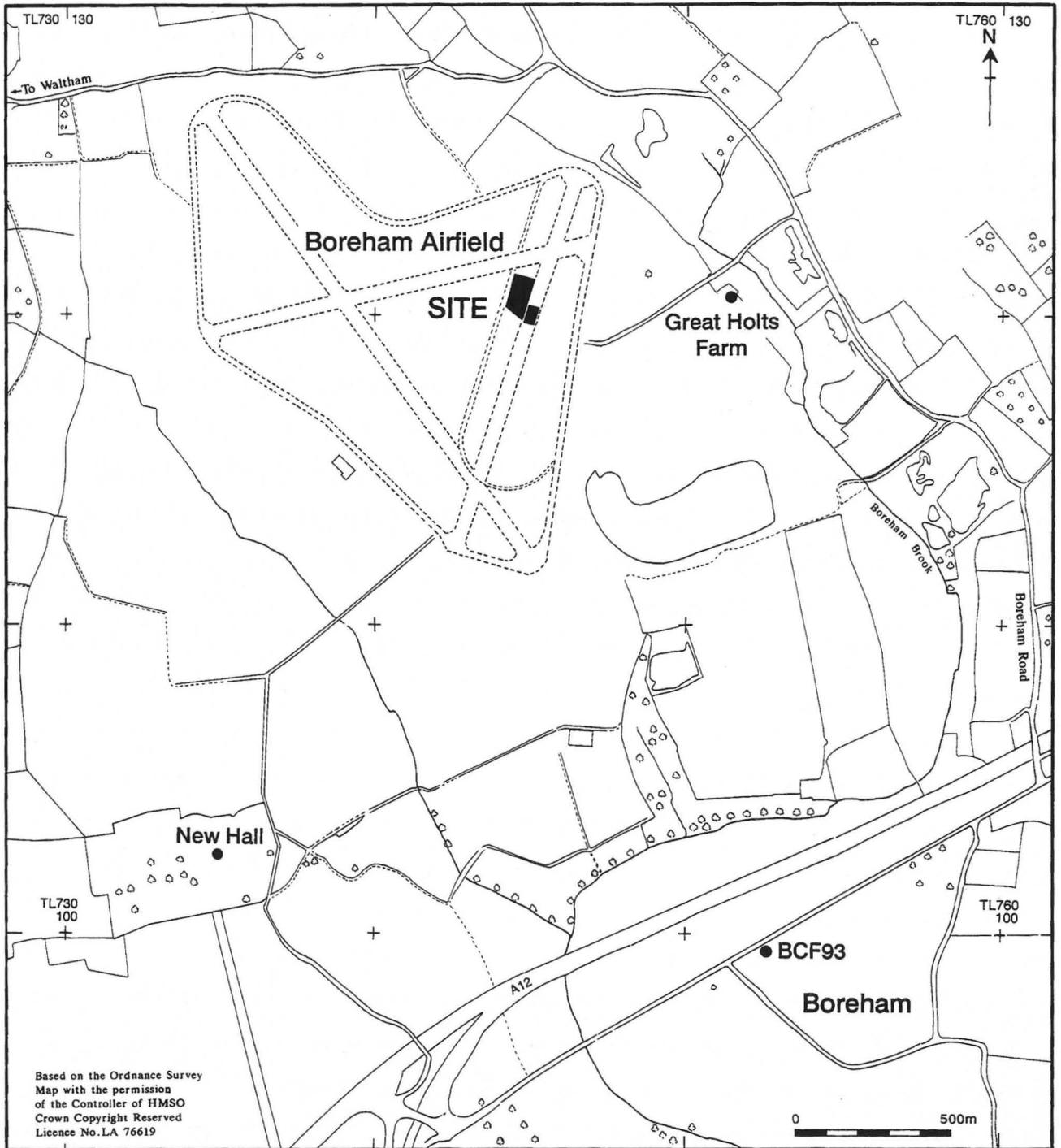


Figure 3 Site location

estate. The Domesday survey of 1086 lists three separate manors within the vill of Boreham, as well as three manors called *Walcfara* (Rumble 1983, 8: 11, 20: 56, 22: 17 and 24: 58; Burgess 1988, 78–84).

In the late 18th century Morant (1768, 11–17) described six manors (Old Hall, Culverts, Walkfares (*Walcfara*), New Hall, Brent Hall and Porters) which were in existence in the 13th century. The location of one of the manors (Walkfares) however, was no longer known by the time Morant was writing. The mystery of this ‘lost’ manor has been explored elsewhere, most notably by Sister

Stephen (1988a, 85–7). One interpretation is that the largest of the three Walkfares may have stretched northwards as far as Little Waltham (Stephen 1988, 85), and if this theory is correct the estate could have encompassed the area of the excavated settlement. It is feasible that the settlement was part of this estate as it was later covered by Dukes Wood, part of New Hall which appears to have superseded Walkfares, perhaps in the 13th century (see below). The Walkfares estate was granted to the Canons of Waltham Abbey in 1062 by Earl Harold, and the canons were one of two overlords in Boreham who were allowed to keep their



Plate I Aerial photograph of the site taken in 1996 (*ref. CP/96/43 TL 744120*)

land following the Norman Conquest (Burgess 1988, 82 and Stephen 1988b, 126). The Domesday survey records the following for this manor (although it should be noted that Rumble (1983, 8: 11) translated *Walcfara* as 'Walter Hall', whilst Burgess (1988, 78) translated it as 'Walkfares'):

The Church has always held WALKFARES for 4 hides less 40 acres.

Then 4 bordars, now 10; then 6 serfs, now 3.

Always 2 ploughs in lordship; 1 men's plough.

Woodland, 30 pigs; meadow, 18 acres.

Now 1 horse; always 5 cattle, 5 pigs, 40 sheep, 2 beehives.

Value 40s. (Burgess 1988, 78)

The site of Walkfares has been suggested by Reaney (1976, 240) as that of the present Walter Hall, located between Mount Maskall and New Hall (Fig. 2). Sister Stephen (1988a, 87), however, suggests that if this is the case then Morant would have known of it when he wrote his history of Essex in the late 18th century. A house in Boreham village is named Walkfares to continue the tradition, although there is no evidence to link it with the site of the 'lost' manor. Sister Stephen (Stephen 1988a) proposes that Benjamin Hoare may have built Boreham House on the site of Walkfares in 1728, having sold New Hall and its gardens and park to John Olmius. If the excavated settlement lay within the Waltham Abbey manor of Walkfares, it is also a possible candidate, especially as the date of the abandonment of the settlement by the mid 13th century could be consistent with the creation of New Hall, which was certainly in existence by 1301. However, the pottery evidence suggests that the settlement was inhabited from the 12th century, which is too late to be attributable to the Walkfares recorded in the Domesday survey, although it is probable that the site was part of this estate. Clearly, the mystery of the 'lost' manor of Walkfares will continue for some time, at least until further documentary research or archaeological evidence comes to light.

There are some documentary references that relate specifically to the Waltham Abbey manor, although these appear to date from the 13th century onwards. There is an entry in volume I of the Feet of Fines (Kirk 1910), from 1237-8, which records 'The Abbot of Waltham, plaintiff' and 'Hervey Ridel, impedient' in reference to '1 messuage 39 acres of land, 3 acres of meadow and 6 acres of wood with appurts. in Boreham and Springfield'. A further two entries appear in the year 1267-8, one of which deals with a dispute over access between land owned by the Abbot of Waltham (plaintiff) and that of John de Wymbisse and his wife Alice. The plaintiff and 'his successors and their men' were granted 'ingress and egress freely with horses and carts at their will to plaintiff's land, and by which their neighbours shall be able to pass to plaintiff's mill in Boreham'. Both these references present evidence specifically relevant to the Waltham Abbey estate, and also provide some idea of what manorial life was like in Boreham in the 13th century.

A translation (T/P 145/3) at the Essex Record Office of two documents (one held at the Public Record Office and one at the British Museum) provides a valuable insight into the manors held by Waltham Abbey in the 13th century. The document held at the British Museum (BM, Cott. MS Tib) is a survey of Waltham Abbey estates, dated 1222, although unfortunately those relating to Boreham are

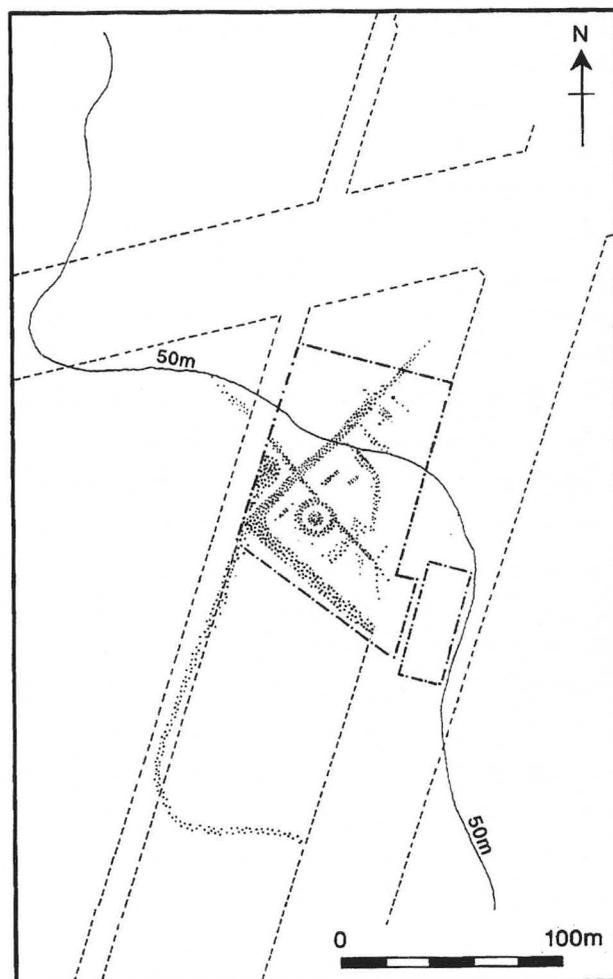


Figure 4 Enhanced cropmark plot showing excavation area

missing along with several others. The second document (PRO, SC 2 173/30) is the court roll for the Waltham Abbey estates held between October 1270 and July 1271, which records several entries relating to Boreham. According to the court roll for January, three men (Nicholas Young, Robert the baker and William Reinbard) were accused of grinding corn 'elsewhere than the lord's mill', for which they were pardoned. However, the three men were again brought in front of the court in the following April, along with another three, and although they were again 'pardoned by Nicholas the clerk by concession of the miller', they were each fined between 6d and 12d for their transgression.

The earliest record of the name 'New Hall' (Nova Aula) dates from 1301 (Reaney 1933, 239). This suggests that 'the canons built a new hall on the property in the 12th or 13th century' which either rivaled the Old Hall of Boreham or 'was just a new hall, an older one existing nearby' (Stephen 1988a, 86). This again could be related to the excavated settlement, if the new one was built in the 13th century, or the site may have at least been part of the estate of the old hall, presumably Walkfares. New Hall (Fig. 2) was never used as a monastery; instead it served as the summer residence for 'my lord Abbat' as well as supplying an income for the abbey at Waltham (Stephen 1988b, 126). Although the name New Hall was well established, references to Walkfares continue from the Tudor period

onwards, although it is likely that these refer to one of the other two (smaller) manors called Walkfares recorded in the Domesday survey (Stephen 1988a).

Cartographic evidence (Chapman and André survey of 1777, Tithe Award Map of 1838 and early editions of Ordnance Survey maps) indicates that in the post-medieval period Dukes Wood covered the eastern part of the airfield site, where the excavated settlement was located (Fig. 2). The precise date of the creation of the wood, which appears to be a deliberate plantation, and Dukes Lodge to the immediate northwest, is not known, although they are both mentioned by Reaney (1976, 240) in his discussion of the origins of Boreham. He suggests that 'Duke's Lodge and Wood' were probably associated with John *le Duk*, from a reference dated 1311 in the Feet of Fines for Essex (1899–1928) and two later references to *Dukspark(e)* dated 1396 and 1509 in the Catalogue of Ancient Deeds (Reaney 1976, 240). Later references include a deed of the 'manors of Bewliew alias Newe Hall' (ERO D/DB/T472) dated 1622, which lists 'Dukes Park' as well as two others, 'Great Park and Redd Deere Park'. A large number of parks (at least 160) are recorded in Essex between 1086 and 1530, with the heyday of emparking occurring between 1250 and 1330. Parks had a perimeter fence to retain deer and protect private land, and usually contained at least some woodland (Rackham 1980, 105). Dukes Wood and Lodge were clearly of some antiquity and were probably associated with the creation of New Hall, possibly in the later 13th century.

The combined documentary and cartographic evidence suggests that the excavated settlement may have been part of an earlier manor, perhaps even the Waltham Abbey estate of Walkfares. Archaeological evidence indicates that the settlement was abandoned in the mid 13th century or later, perhaps as a result of a catastrophic fire, which could relate to the historical evidence for the creation of New Hall and the parks associated with it. New Hall later became a palace for Henry VIII, who acquired it from Thomas Boleyn in 1517 and renamed it 'Beaulieu' or beautiful place, and was subsequently occupied by his daughter Mary (Helen 1988, 118). Many different people inhabited the hall over the subsequent centuries and in the early 18th century Beaulieu or New Hall passed into the ownership of Benjamin Hoare, although by then it was in a fairly ruinous state, who later built Boreham House (Stephen 1988a, 87). The hall was sold to John Olmius, who in 1737 destroyed much of the Tudor palace and rebuilt it in a more Georgian style. In 1799 New Hall became home to a community of English nuns, and the present school was established (Stephen 1988b, 123–4).

In 1856, Dukes Wood was the scene of the murder by poachers of William Hales, gamekeeper to Sir John Tyrell of Boreham House. A large stone, which was removed during the building of the airfield, marked the site of the murder (Smith 1988, 116–7; Jones 1988). Dukes Wood was entirely destroyed by explosives and bulldozers during the construction of Boreham Airfield, which was begun in 1943 by the 861st Engineer Aviation Battalion of the US Army (Jones 1988, 45). The airfield ceased to operate after 1945, although it was temporarily used as a racetrack for cars and motorcycles, and was later bought by the Ford Motor Company as a centre for vehicle development in the 1950s (Jones 1988, 59). Although large parts of the local area have been quarried in recent years, arable farming still continues within and around the airfield.

A number of medieval sites have been excavated in recent years in the locality of Boreham Airfield, and these have to some extent supplemented the cartographic and documentary evidence. An isolated post-built structure of 10th to 13th-century date was located 0.5km to the east of the airfield site, at Great Holts Farm (Germany forthcoming), and evidence of early medieval tofts was uncovered in Boreham village (Fig. 3, BCF93) to the south (Foreman 1997). Slightly further away to the southwest, on the border between Boreham and Springfield parishes, a 13th to 14th-century farmstead was identified close to the A12 Interchange (Lavender 1999). Evidence of earlier human activity was also found at Great Holts Farm, including Bronze Age ring-ditches and a Roman farmstead and field system (Germany forthcoming). Despite the apparent Saxon origin of its name, excavations in and around the village of Boreham have so far failed to produce conclusive evidence of occupation during this period.

Excavation methodology

The physical limits of the evaluation area were defined by the remnants of an airfield runway to the east and by a Ford Motor Sports concrete test track to the west. These boundaries no longer existed when the main phase of excavation commenced, when the site was surrounded by the quarry on its north, east and west sides. The southern limit of the site approximately corresponded with the edge of the second stage of the gravel extraction programme, although this was extended slightly to include the southern arm of the large enclosure ditch or moat identified during the evaluation (Germany 1995b). Few features had been visible in the northern part of the evaluation, approximately 0.3ha, and after negotiations with Pioneer this area was released for quarrying whilst funding was sought for the main excavation. During the final stages of the project, however, the excavation area was extended eastwards to include the strip which was adjacent to the main site and had been the subject of a watching brief in 1995 (Germany 1995a), giving a total excavation area of 0.89ha.

Although some initial funding was secured, this did not allow full investigation of all the exposed archaeological features and the resulting pressure of time and resources led to a highly selective excavation strategy. The archaeology, although not stratigraphically complex, was spatially concentrated and included a wide variety of inter-related and largely contemporary features. Five key areas located in plan by the evaluation were identified for further investigation. These comprised two areas of building remains, a large circular feature, a small network of ditches to the north of the site, and an area of poorly defined features to the northwest of the enclosure.

Generally between 10% and 40% of ditches and gullies and up to 100% of slots or wall trenches were excavated, and although most features were investigated, time did not permit sampling of some of the more peripheral ditches. Post-holes and pits were investigated by means of a 50% sample, although in some of the buildings, 100% was excavated whilst a few of the larger pits were only sampled to a maximum of 25%. The two ponds to the west of the moat, which had been partially investigated during the evaluation, were planned but not further excavated in detail during the excavation. The moat, which originally may

have surrounded the settlement partially or wholly on at least three sides, was investigated during the evaluation by a machine-cut section across its southwestern arm (Germany 1995b). Unfortunately the financial circumstances prevented further excavation of the moat during the main phase of the project. However, weathering during the interval between the two phases of investigation had greatly enhanced the clarity of the moat section, which was subsequently cleaned and redrawn and additional finds collected for analysis.

Over 100 environmental samples for bulk sieving were taken from a broad range of features across the site to allow the recovery of charred plant remains and other small remains or artefacts. A metal-detecting survey of both *in situ* deposits and spoil heaps was also conducted, involving members of the South East Essex Metal Detecting Society, to further enhance data collection on the site.

The site had been exposed for nearly eight months by the time the excavation commenced, resulting in virulent, and in places quite dense, weed growth, especially along the lines of the moat and ditches. The weeds had to be removed by hand to minimise disturbance of the archaeological deposits, which in the areas of the buildings were extremely shallow. Time did not permit full clearance

of the weeds, which would have been preferable, and efforts were concentrated on exposing the five key areas intended for further investigation. Once this was complete, the combination of weathering of the features over the preceding months and the hoeing of select areas of the site revealed that the archaeology was more extensive than was recorded during the evaluation. As well as the identification of additional features, the building plans were further defined and found to be more complex than previously thought, and as a result further funding was sought to allow a more complete investigation of the site. The excavation ran intermittently for approximately ten weeks in the summer and autumn of 1996, with a six-week break in July and August while the additional funding was sought. A further small break was necessitated in September to complete a fieldwalking and geophysical survey to the south and east of the site, in advance of stage 3 of the quarry extraction programme. During the last two weeks of October, trial-trenching of the survey area and machine-stripping of the former runway to the immediate east of the site was undertaken to identify any associated settlement or activity and to rapidly investigate the features identified during the watching brief in 1995 (Germany 1995a).

Chapter 2. The Excavation

Introduction

The lack of pronounced phasing has necessitated a spatial approach to the site description, which has been divided into four areas, also demarcated on Figs 5 to 21. Specific groups or types of feature are referred to in terms of their interpretation and consist of subtitles such as 'moat', 'windmill' and 'granary', all of which are further discussed in Chapter 4.

The site comprises part of a rectangular moated enclosure, orientated northeast to southwest, containing a group of domestic buildings, a windmill, granary, internal ditches and a pond. The area within the moat is divided into three areas, with a fourth outside the moated enclosure where several features, comprising ponds, ditches and a number of poorly defined pits, were located. Each of the four areas is described numerically, with the description focussing on significant elements, such as buildings. The text is accompanied by figures organised on the same basis, beginning with an overall site plan, followed by a sequence of area plans, detailed plans and selected sections.

Dating is based entirely on the pottery evidence, which although very sparse in some areas, including the buildings, has been used in conjunction with the stratigraphic evidence to suggest a relatively short site chronology spanning the 12th to mid 13th centuries. For ease of reference, the medieval pottery report is also arranged around the four site areas. In almost all cases the pottery is derived from the fills of features. The pottery from the building features only provides an indication of *terminus post quem* for when the structural elements such as posts had decayed or been removed, and does not directly relate to the life or use of the buildings.

The four site areas comprise (Fig. 5):

Area 1: the group of buildings, sub-enclosure ditches and associated features in the northern part of the moated enclosure

Area 2: the granary, windmill and associated features in the southwestern part of the moated enclosure. The moat was recorded in detail in the south of Area 2, and is described in this section

Area 3: the ditches, pond and other features located in the southeastern corner of the moated enclosure

Area 4: the ponds, ditches and other features located outside the moated enclosure in the northwestern part of the site.

The descriptions of individual contexts, especially fills, are kept fairly brief unless there is something unusual or pertinent which warrants more detail. Further information can be found in the full report, part of the site archive, housed at Chelmsford and Essex Museum under the site codes BOAF 95 and BOAF 96.

The majority of features were relatively shallow and were generally cut into natural clay with no evidence of internal floors or external surfaces surviving. The deposits encountered in features across the site were generally quite similar in colour and composition, comprising mixtures of

silt and clay with varying amounts of charcoal, gravel and sand. These variations are at least partially determined by the changes in the surface geology in the immediate vicinity of the features and by the method of deposition, whether the result of deliberate backfilling or natural silting. Many features contained fills that were pale grey in colour and sometimes appeared almost blue-grey or even silvery-grey on the surface in contrast to the orange-brown of the natural clay. The deposits in features around the granary and windmill in Area 2 were noticeably different to deposits in other areas of the site due to their dark colour resulting from the increased percentages of charcoal and other charred debris.

Several of the larger features, including the moat, ponds and some of the ditches around the granary, were partially masked by slumped deposits of orange-brown (natural) clay and mixed topsoil remnants which created difficulties in defining their full extent. These uppermost deposits probably relate to a phase of site levelling, perhaps following the abandonment of the settlement or conceivably as recently as during the construction of the airfield. The presence of often quite large fragments of partially decayed wood, both roots and branches, in the upper fills of the moat indicates that these deposits may relate to the latter phase of levelling of the site, which was covered with trees until the construction of the airfield. Further modern disturbance was found along the eastern edge of the main part of the site where the remains of lighting cables associated with the main airfield runway were recorded, although partial investigation indicated that despite this some features had survived.

Area 1

(Fig. 6)

This area comprises the complex of buildings, sub-enclosure ditches and associated features in the northern part of the moated enclosure.

Buildings 98, 117 and 118

(Figs 6–9, Plates II–IV)

Towards the centre of the excavation area were the remains of a group of related rectangular post-in-trench structures (98, 117 and 118) aligned northeast to southwest with the westernmost arm of the moat. Although a large proportion of the building features was investigated, time did not permit full excavation of all of them.

Building 98

(Figs 6–9, Plates II–IV)

The external measurements of the most clearly defined building (98) were approximately 15m by 7m, with the annexe (117) providing an additional length of nearly 6m to the southwest. The ground plan of building 98 comprised four lengths of foundation trench (480, 541, 659 and 728) forming a rectangle with a 1m-wide doorway in the southeast wall 728 and an internal half-partition 479. Three

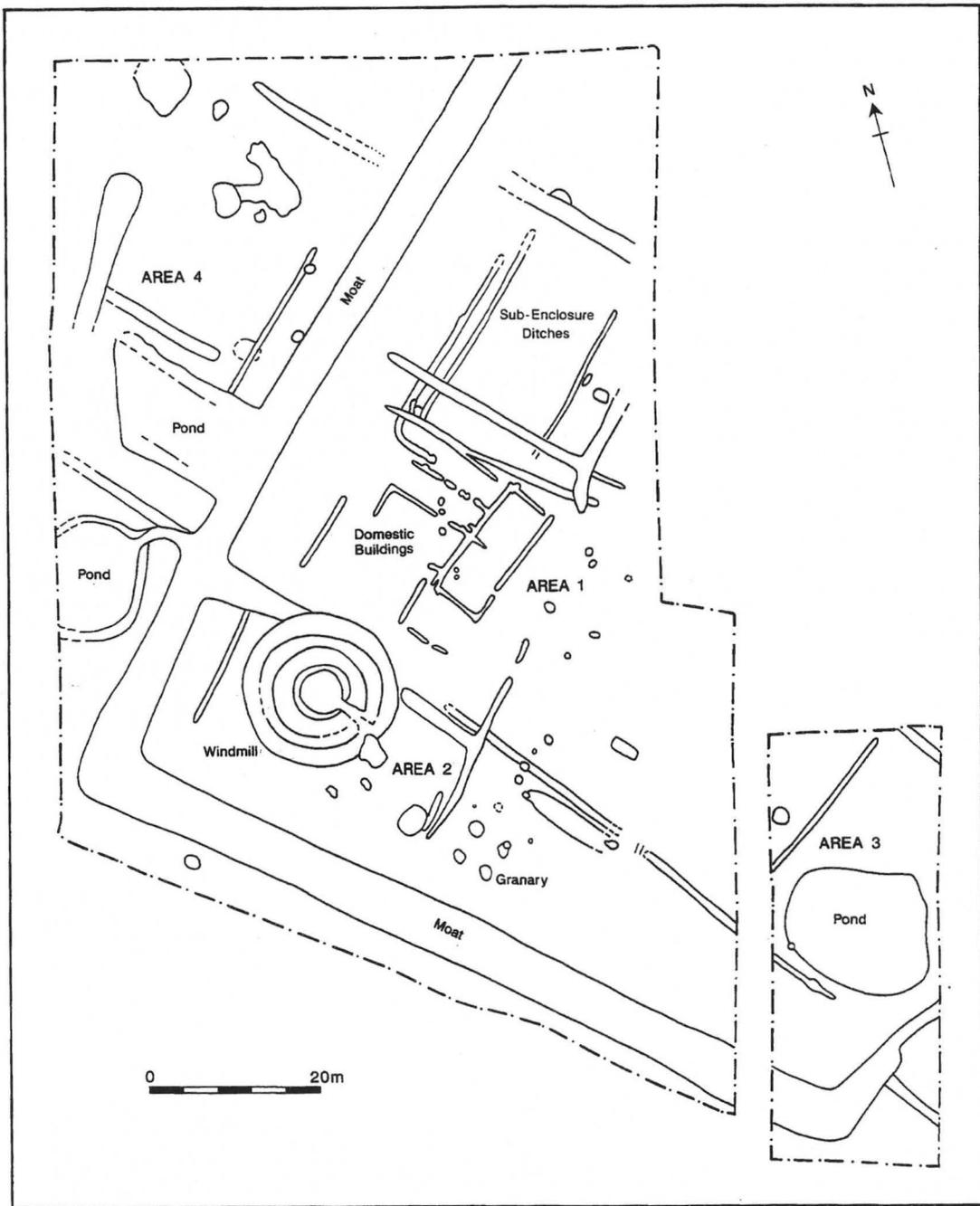


Figure 5 Site plan showing Areas 1-4. Scale 1:800

of the lengths of foundation trench were physically contiguous, and it is likely that all four may have originally joined, but the northeast foundation trench 541 was extremely shallow and was not visible at the point where it would have met 728 (Figs 7-8, Plate III).

The foundation trenches were on average 0.7m wide with maximum depths of 0.3m on the longer southeast and northwest walls, and c. 0.4m wide and 0.2m deep on the less substantial northeast and southwest walls. The foundation trenches divide in the southwest corner of

trench 659, which may relate to the addition of foundation trenches for outbuildings 118 to the west. The internal partition 479 comprised a narrow and very shallow linear slot with a rounded terminal, extending for 2m from the northwest wall foundation 659. The bases of several small irregularly spaced stake-holes and one post-setting remained along its length. These conceivably supported less substantial uprights than those in the external walls, and would probably not have needed to be load-bearing. The partition spanned only half the width of the building,

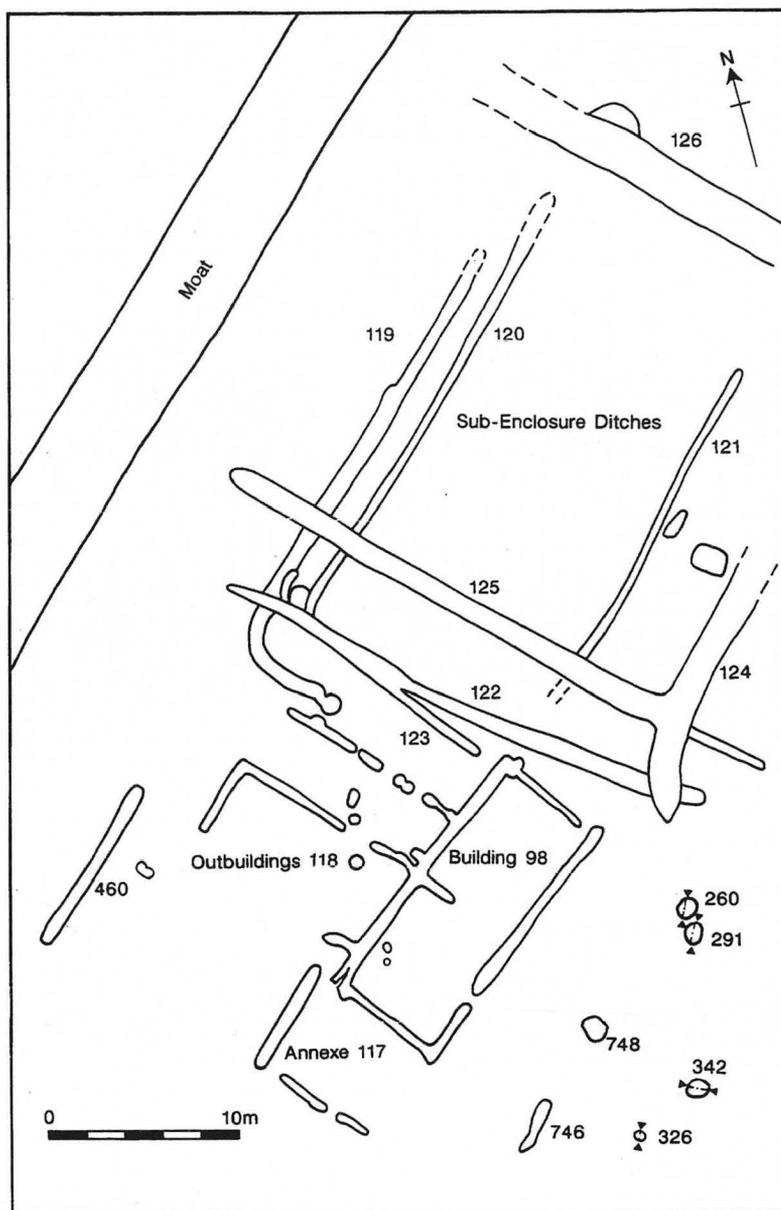


Figure 6 Area 1: buildings and ditches. Scale 1:400

presumably to allow access from the first room (with the main external doorway) into the second room.

The remnants of over forty post-settings were initially visible on the surface as uniform grey silty deposits surrounded by the mixed but predominantly clay backfill of the foundation trenches. The excavated post-holes were closely spaced, ovoid and quite small (long axis 0.4m on average) although the corner post-holes were larger (0.7m average). The profiles comprised fairly steep sides and flat or irregular concave bases, with depths varying between 50 and 250mm. Following excavation of the foundation trenches, some evidence of additional post-holes was found in the form of ovoid depressions along the base of the trench cuts. It is likely that further remains would have been uncovered if the entire lengths of the trenches had been excavated. The lack of closely matching opposing

pairs of post-settings between the foundation trenches may also indicate that several were missed during the excavation.

No external surfaces, internal floors or features such as hearths survived, and these may have been removed as recently as during levelling for the airfield. Two post-holes 611 and 613 (Fig. 7) were identified in the southwest corner of building 98 although no dating evidence was found to suggest whether they were contemporary with the building. Some evidence of structural repair was indicated by the insertion of at least two successive posts in the north corner of the building, the latest of which, post-hole 459, contained the only relatively large pottery assemblage excavated from the building, suggesting that the pottery could have been used as packing.

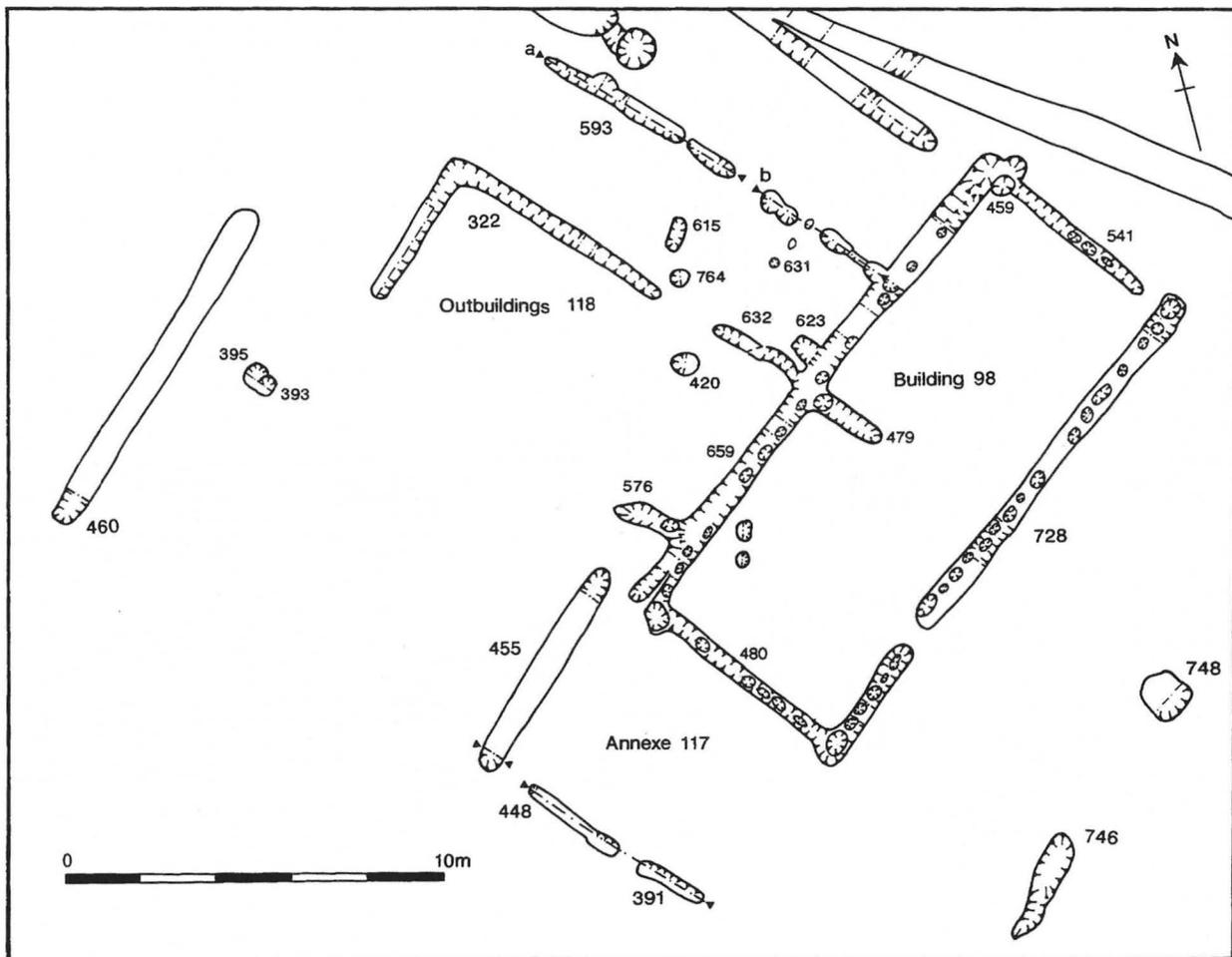


Figure 7 Area 1: buildings. Scale 1:200

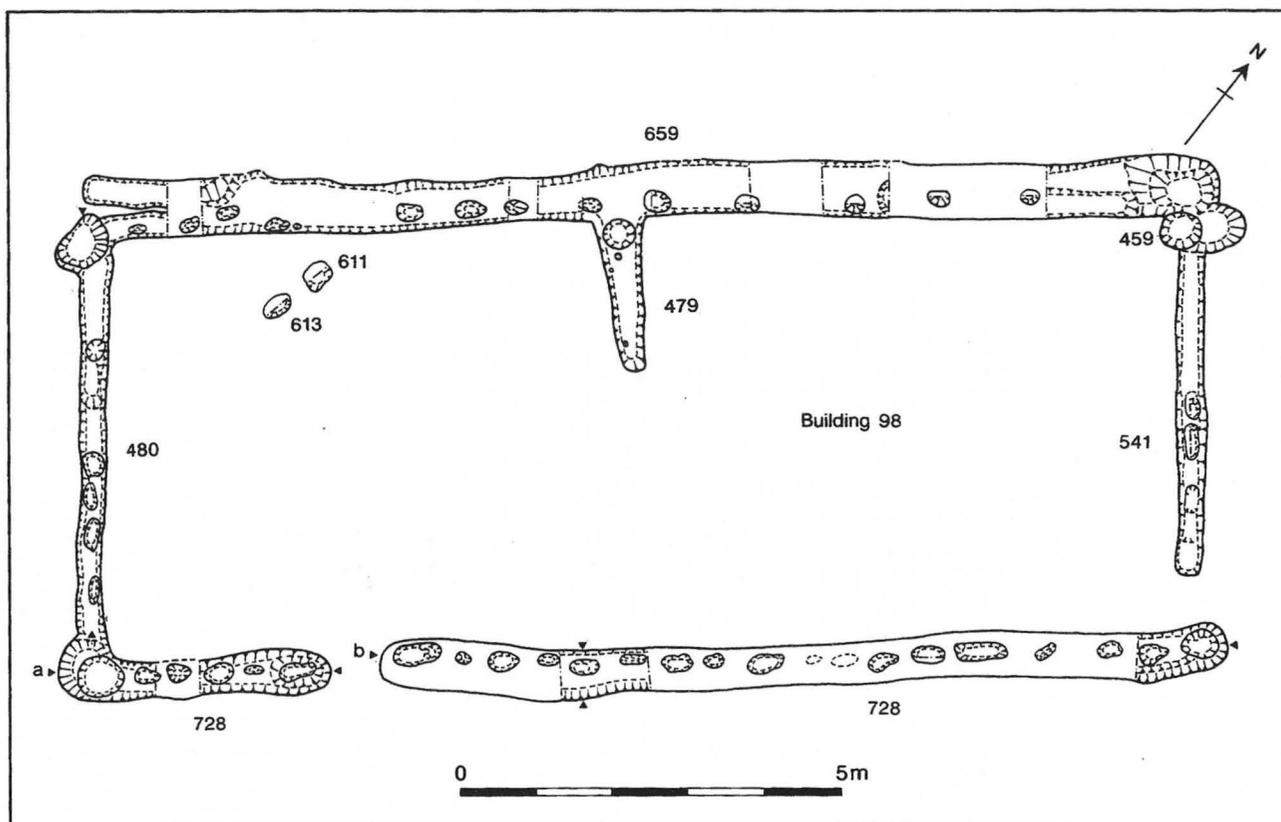


Figure 8 Area 1: detail of building 98. Scale 1:100



Plate II Building 98: excavated post-holes. View: southwest

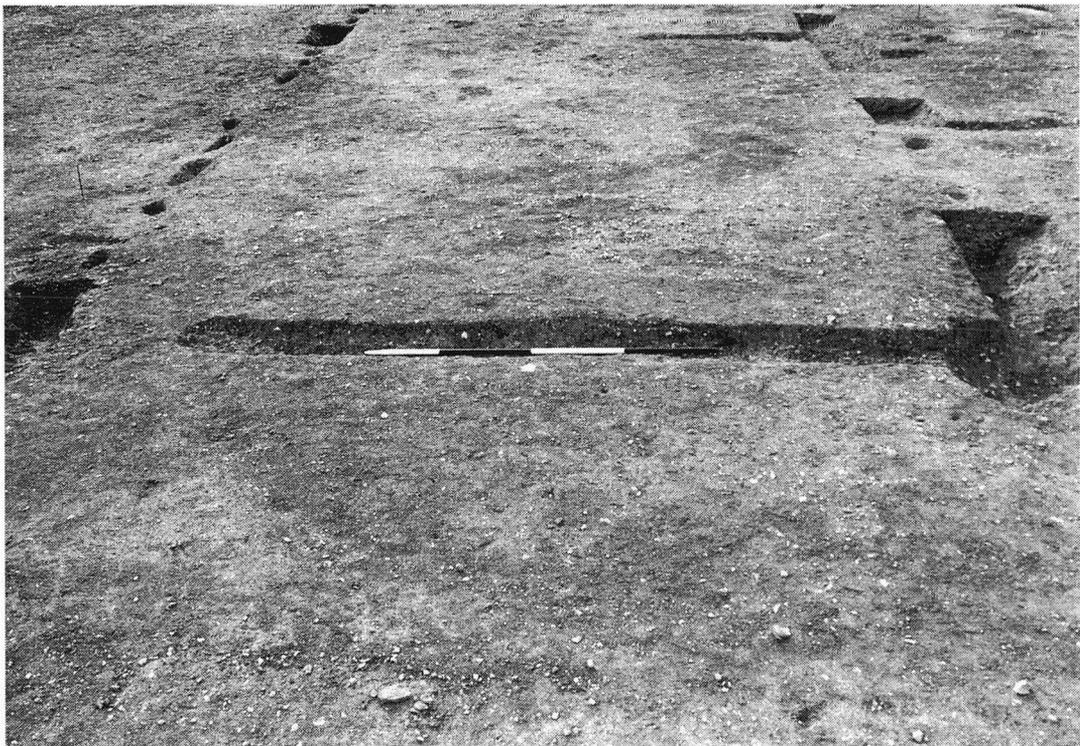


Plate III Building 98: partially excavated foundation trenches with northeast wall 541 in foreground. View: southwest



Plate IV Building 98:detail of foundation trench of northwest wall 659, with windmill pit 200 in the background. View:southwest

Generally, the pottery from building 98 is unreliable as dating evidence, as the sherds are small and abraded, and prehistoric and Roman material is also present in the assemblage. However, the relatively large group of pottery from post-hole 459, a possible repair, tentatively suggests a 12th-century date. Small fragments of baked clay were also retrieved, the majority of which is from structural daub, either wall or floor daub, although little detail and no obvious surface treatments are present. Other finds comprise several iron nails, possibly from a decorative mount, from foundation trench 659 in the north corner of building 98.

Annexe 117 (Figs 6, 7 and 9)

The annexe attached to the southwest of the main structure comprised two lengths of short, shallow linear trenches 391 and 448 aligned with the southwest end of building 98, and a wider and deeper trench 455 running at right angles. No evidence for a southeast wall was found, suggesting that unlike the main building, this structure was open-sided. A 0.7m-wide gap between 391 and 448 may have been an entrance although as this building was apparently open-ended, the need for additional access is unlikely. Three post-settings survived on either side of the gap, two (387 and 388) at the end of slot 391 and one relatively large and deep cut (430) at the end of slot 448. The fills of these post-holes were generally similar to those in the main building apart from the increased charcoal content and

greater absence of finds. Like building 98, there may have been additional post-holes along the lengths of the annexe foundations, which may not have survived or were not identified during excavation.

Trench 455 although of similar proportions to the wall foundations of building 98, was slightly deeper and contained relatively more domestic debris in the form of oyster shells and pottery, albeit still in small quantities. This feature probably formed the foundation for the northwest wall of the annexe, although no post-settings were visible and time permitted only the terminals to be excavated. The few sherds of pottery that were retrieved from the annexe features indicate a 12th-century date similar to that for the pottery from the main building 98.

Outbuildings 118 (Figs 6, 7 and 9)

To the northwest of, and attached to, building 98 were the remains of at least two less substantial structures, interpreted as outbuildings. Several linear slots and post-holes survived and in plan it appears that the southeastern wall of the outbuildings was incorporated into the northwestern wall of building 98. The foundations of the outbuildings were generally much shallower with more gravelly fills than those encountered in the main building. However, features in the more northerly and westerly parts of the site were on the whole shallower than other features and this may be a result of levelling during the construction of the airfield. The natural surface geology was also much more gravelly in this area, perhaps accounting for the difference in backfill deposits.

The foundations for the southernmost structure comprise an L-shaped slot (322), measuring c.11m by 5.5m externally, and two short lengths of slot (576 and 632) connected at right angles to the northwest wall of building 98. The L-shaped slot 322 was 0.4m wide and extremely shallow, with an average depth of 40mm, although some deeper parts were recorded in the base of the cut. These are probably the remains of post-settings that were not distinguishable on the surface. A short length of slightly curving slot (576) was recorded protruding for 1.5m from the west corner of building 98 to form a partial foundation for a southwest wall for this outbuilding, which appears to have been largely open on this side. A similar slot (632) was also attached to the west wall of 98, opposite internal partition 478. The 1.5m wide gap existing between foundations 632 and 322 was probably an entrance between the two outbuildings.

The second outbuilding was a similar length (10.5m) to the first, with which it shared a wall (322 and 632), but at 4m wide was slightly narrower. The northeast wall 593 comprised a length of intermittent post-holes and short

KEY TO SECTIONS

	Decayed timber		Brickearth and clay
	Charcoal		Baked clay
	Clay		Bone
	Pot		Root
	Oyster shells		Flint

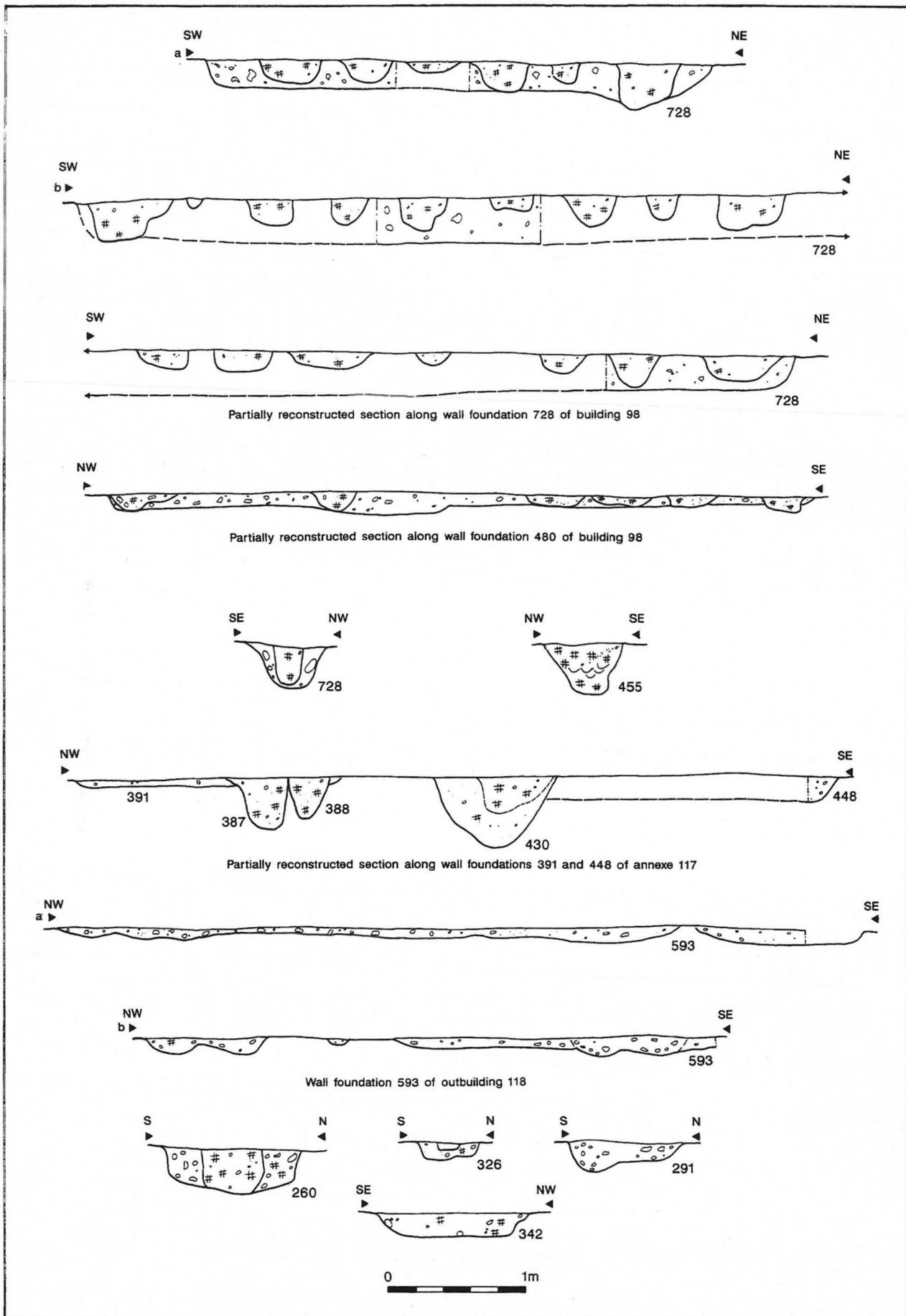


Figure 9 Area 1: selected sections of buildings and associated features. Scale 1:40

lengths of foundation trench, extending northwestwards from, and integrated into the northwest wall of building 98. No evidence for a northwest wall for this outbuilding was found, indicating that this end was not enclosed, although this could be a result of the poor survival of any very shallow foundations.

Three post-holes (420, 615 and 764), and a square feature (623) were recorded inside the outbuildings, which although undated are probably related to the structures, although their purposes are unknown. A short line of undated stake-holes, of which 585 and 621 were excavated, extended for 1m at right angles from wall 593 and may be the remains of an internal partition, perhaps for a stall.

Although no stratigraphic evidence for phasing was identified, the rather limited pottery evidence suggests that the outbuildings may be slightly later additions to the main building and annexe, perhaps dating to the early to mid 13th century. This tentative date indicates that these structures may be contemporary with the granary and associated features to the south, and the latest ditches in the sequence to the north. Very few other finds were retrieved from the outbuilding foundations other than a copper-alloy sheet mount, possibly part of a decorative mount from a casket, from slot 632 (Fig. 22; No. 4).

Associated features

(Figs 6, 7 and 9)

A linear feature (460) with rounded terminals, very similar to the building foundation trenches such as 455, with which it is aligned, was located to the west of the outbuildings. This feature was 9m long and 0.8m wide, quite shallow with a rounded profile and very mixed fill. No post-settings were visible and it is not certain whether this feature had a structural purpose or not. The similar orientation, and proximity, to the building group suggests that it was associated. If 460 was structural in origin, it may have been a free-standing barrier or division, perhaps denoting a yard area adjacent to the buildings.

Located to the southeast of 460 and to the southwest of the outbuildings 118 were two intercutting post-holes, 393 and 395. The purpose of these features is not known as they do not appear to be directly associated with any of the buildings and may have been situated in a relatively open area, perhaps a yard, between the windmill and buildings. A possible explanation is that they represent a freestanding post, which was replaced at least once, perhaps for tethering animals.

To the southeast of building 98 was a group of various-sized post-holes (260, 291, 326, 342 and 748), two of which (260 and 748) were on the same alignment as the buildings. The purpose of these features is not known although it is conceivable that they may in part have formed the foundations for a gate or fence, especially as they appear to continue the alignment of a boundary feature (ditch 85 and feature 746) in Area 2 to the southwest.

Very few datable finds were retrieved from these features, although the pottery excavated from post-holes 291 and 393 is probably contemporary with that from the outbuildings 118, rather than building 98 or annexe 117.

Sub-enclosure ditches to the north of the buildings

(Figs 6, 10 and 11)

Two phases were identified for a complex of ditches occupying the majority of the northeast part of the site. The ditches comprise several linear features orientated

northeast to southwest (119, 120, 121 and 124) and northwest to southeast (122, 123, 125 and 126). The majority of the ditches were quite narrow with shallow, rounded profiles and ranging in length from 4m to 28m, although most exceeded 20m.

Earliest phase

Ditches 119, 120 and 123

The earliest features in the sequence are parallel ditches 119 and 120, aligned northeast to southwest on a similar axis to that of building 98. Ditch 119 was 0.6m wide with relatively steep sides, compared with the majority of linear features in this area, surviving to a depth of 0.45m. At its southwestern end, ditch 119 turned almost 90° in a southeasterly direction for 5m before terminating approximately 10m away from building 98. Some evidence of partial recutting (405) of this ditch was found although the range and date of pottery from both phases of ditch was similar. The slightly narrower and shallower ditch 120 also appeared to turn, but its course was masked by later ditch 122. It is possible that 120 continued as ditch 123, which extended to the northwest corner of building 98. The northeastern extents of ditches 119 and 120 were extremely difficult to trace due to the mixed surface geology and remnant topsoil in this part of the site. Some associated activity in the form of a short length of gully (651) and a shallow pit or scoop (616), neither of which contained datable material, was located at the southwestern extents of ditches 119 and 120. Gully 651 cut ditch 119 and was in turn cut by ditch 122, whilst feature 616 appears to have been cut by ditch 120, which was also cut by ditch 122. A wide and shallow post-hole (265) was located close to the southern terminal of ditch 119, between which was a narrow gully or slot 281. It is possible that there was a gatepost here.

Few finds were retrieved from the ditches, comprising variable quantities of pottery and daub, some charred plant remains and possibly the only fragment from a millstone found on the site. The pottery evidence, including sherds of the unusual Developed Stamford ware of a similar type to that found in the windmill foundations, suggests a 12th-century date for infilling. This date is similar to that suggested for building 98 and the annexe 117, perhaps indicating a slightly earlier phase of the settlement, predating the 13th century. The parallel ditches could be the remains of a narrow track or path leading to the building area, although the need for a 'dog-leg' in its course is unexplained. A possible explanation is that the path was positioned to circumvent an area to the east, such as a paddock or perhaps a building, of which no trace has survived.

Gullies 121 and 453

Gully 121, located to the southeast of, and on the same orientation as, ditches 119 and 120, appears to continue the alignment of the northwest wall of the building 98. This gully, and a short length of gully (453) to the southeast, were cut by later ditches, which may suggest that they are contemporary with the earliest phase ditches 119 and 120. The shallow nature of gullies 121 and 453 indicates that they may have been slots or drip-gullies, perhaps related to a type of structure of which no other trace has survived. An oval cut (685), located to the southeast of gully 121 and cut into a pit (710), contained reddened clay, charcoal and

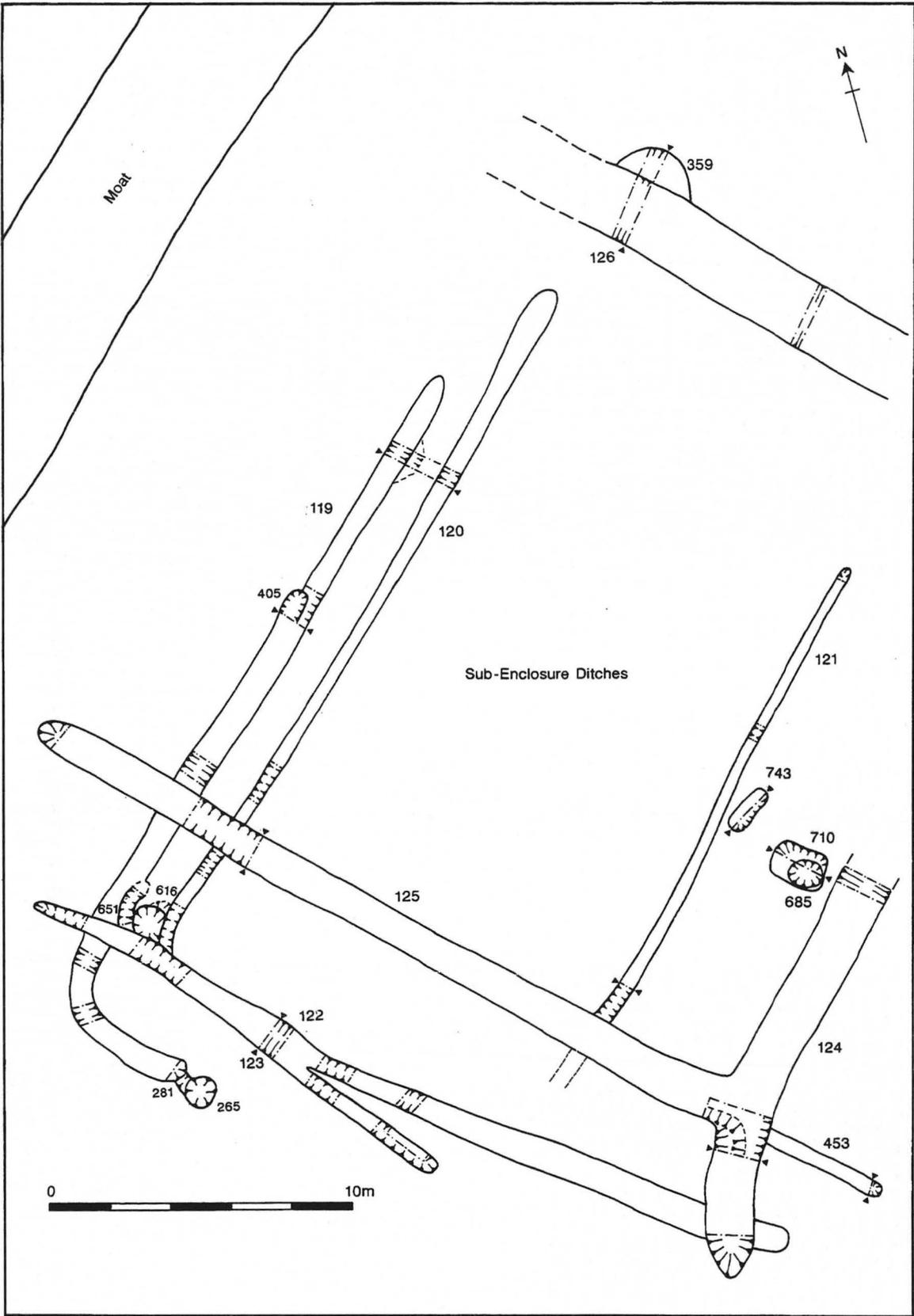


Figure 10 Area 1: sub-enclosure ditches. Scale 1:200

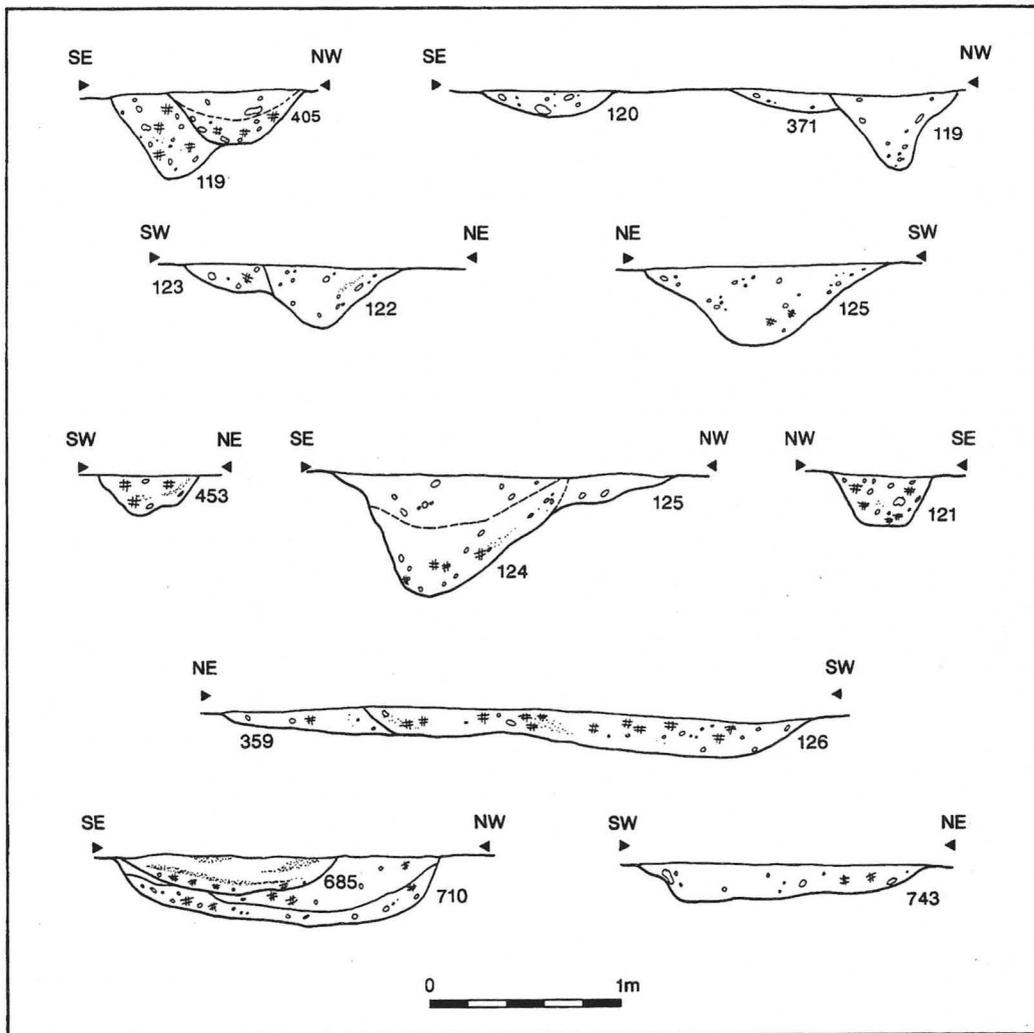


Figure 11 Area 1: selected sections across sub-enclosure ditches. Scale 1:40

daub, and is interpreted as a possible hearth. The presence of this feature and a post-hole or small pit (743) located 3m to the east of gully 121 may further indicate that a building was once located in this area.

No closely datable finds were retrieved from these features, although the presence of cross-fitting sherds in gully 453 and ditch 122, both of which were cut by ditch 124, suggests that these features may have been infilled at the same time, perhaps in the late 12th to early 13th century.

Ditch 122

Ditch 122, orientated northwest to southeast, was located to the immediate northeast of the buildings. Although the pottery from 122 is of a similar date to that from other ditches in this phase, this ditch cut ditches 119 and 120, indicating that these features were no longer in use. The pottery evidence suggests that only a short time elapsed between the silting of ditches 119 and 120 and the cutting of ditch 122. The specific function of ditch 122 is not obvious, although it is likely to have been for drainage, or perhaps to delineate a different area of the settlement, such as a paddock or garden, from the buildings to the south.

Latest phase

Ditches 124, 125 and 126

Ditches 124 and 126 were of a similar width (up to c. 2m) and may be related, although 124 was deeper than 126, with a more irregular profile. The pottery dates are quite similar, however, and the two ditches could conceivably join if their courses are projected beyond the limit of excavation to the east. Ditch 124 cut ditches 122, 453, and possibly 125 and appears to be one of the latest ditches in this sequence. This is largely supported by the pottery evidence, which suggests the ditch was infilled during the mid 13th century or later. The relationship between ditch 125 and ditch 124, with which it connected at right angles, is uncertain. Ditch 124 was recorded as the latest ditch although the pottery from both ditches was similar in type and date. In plan the two ditches appear to join, perhaps forming a large three-sided enclosure with ditch 126, surrounding a paddock or perhaps even a building of which little trace survives.

Area 2

(Fig 12)

This area comprises the granary, windmill and associated ditches in the south and west of the moated enclosure. The moat was recorded in detail in the south of Area 2, and its course around other sides of the settlement is also described here.

Ditches and associated features

(Figs 12–14)

Some evidence for phasing was found in the ditch sequence around the granary and windmill features in Area 2. A similar sequence and date range, although less well-defined, can be identified for the ditches and features in this area to that found in the ditches in Area 1. The earliest activity dates from the 12th century, followed in the early to mid 13th century by some spatial reorganisation, with the cutting of new ditches and construction of buildings. The post-holes, pits and especially the ditches in this area contained the largest quantities of artefactual and environmental evidence for the entire settlement. This evidence contrasts with that from the buildings and ditches in Area 1, and is related to deliberate levelling and backfilling of features in Area 2 prior to the abandonment of the site in the mid 13th century.

Ditch 97

(Figs 12–14)

Ditch 97, the earliest in the sequence, was located to the north of the granary and orientated northwest to southeast. The ditch was at least 25m long and 1m wide with an irregular profile and a single pale silty fill. Ditch 104, to the northwest of the moat (Figs 12 and 20), is on a similar alignment to 97 and had a very similar fill, which may suggest that the two ditches are related. Although ditch 443 continues the alignment of ditch 97 into Area 3 to the southeast (Figs 13 and 18), it is unlikely to be related. Ditch 443 was much shallower than 97 and contained a well-dated pottery assemblage, contemporary with that from later ditch 85 and the granary post-pits (see below). The relationship between ditches 97 and 443 is not known due to an area of modern disturbance traversing the eastern edge of the site. However, the presence of a narrow undated gully 401 cut into natural between the two ditches suggests that 97 and 443 were unrelated.

Ditch 97 contained few finds, of which none is closely datable. The pottery indicates a broad date range of 10th to 13th century for infilling, although the fill of recut 367 contained early to mid 13th-century pottery, similar to that found in the latest ditches in the granary area. A slightly unusual feature of ditch 97 was the presence of two cow lower mandibles, apparently deliberately placed towards the base of the cut. It is conceivable that ditches 97, 104 and perhaps ditch 164, which is cut by the windmill ring-ditch, are part of a remnant field system or land division preceding the main phase of the enclosed settlement.

Contemporary features

(Figs 13 and 14)

Other features possibly contemporary with ditch 97, and perhaps relating to small-scale activity predating the main occupation phase, comprise two pits (415 and 689), a post-hole (214) and a short length of gully (116).

Post-hole 214 on the northeast side of ditch 97 and pit 415 on the southwest side both contained pottery dating to the 12th century, although 214 is located within a group of larger post-holes dating to the 13th century. Feature 116, a 5m-long shallow linear cut with rounded terminals located between the windmill and granary, did not contain closely datable pottery (12th to 14th century), although its stratigraphic relationship below pit 649 may indicate that 116 relates to the slightly earlier phase of the settlement. The similarity of this feature, in terms of its shape and pale fill, with the building foundations in Area 1 suggests that it may have been part of a structure, although no other associated remains were evident in the immediate vicinity to suggest a building here. Pit 689, an isolated feature to the north of ditch 97 similarly produced a small quantity of pottery only broadly datable to the 10th to 13th centuries. The purpose of 689 is unknown although its steep sides and generally sterile pale silty fill indicate that it may originally have been for storage, or perhaps to hold water, rather than for rubbish disposal.

These features have common characteristics in that they all have very similar silty fills containing small amounts of predominantly shell-tempered pottery and few other associated finds. This perhaps suggests that they silted up gradually over a period of time, which is in contrast to the later features in Area 2 which predominantly contain disuse deposits relating to the final phase of the settlement.

Ditch 338

(Figs 13 and 14)

Ditch 338 ran approximately 1m to the south of, and parallel with, ditch 97 on a similar alignment to (later) ditch 127 to the northwest. Although the full extent of 338 is not known as redeposited natural clay and modern disturbance masked its surface, it was approximately 14m long and 2m wide with a concave and slightly irregular profile. A 7m-wide gap between the terminals of 127 and 338 may have been to allow access to the granary area. Both ditches were fairly rich in finds, although the pottery evidence from 338 suggests that this ditch was infilled around 1200, perhaps a slightly earlier date than is indicated for the majority of features in this area, including ditch 127 (see below).

The relative abundance of finds, including quite large pottery sherds, oyster shells, daub and a varied but fragmentary animal bone assemblage, is suggestive of deliberate infilling of this feature with domestic rubbish. Although several successive fills were identified in the ditch terminal, which was 0.7m deep, the pottery evidence suggests that they probably represent a single depositional episode. The additional presence of charred grain and weed seeds in the distinctively dark fills of 338 may indicate that it was filled with the charred debris from an accidental fire, perhaps from the adjacent granary. Lying along the surface of the uppermost fill was a slightly slumped layer of redeposited orange-brown natural clay, which was also encountered overlying several of the larger features on the site such as the ponds and the moat and could be the remnants of capping or levelling material.

Ditch 338, like the other ditches encountered on the site, probably had a dual function as a boundary feature and drainage ditch in the predominantly clay soil which is prone to flooding during the winter months.

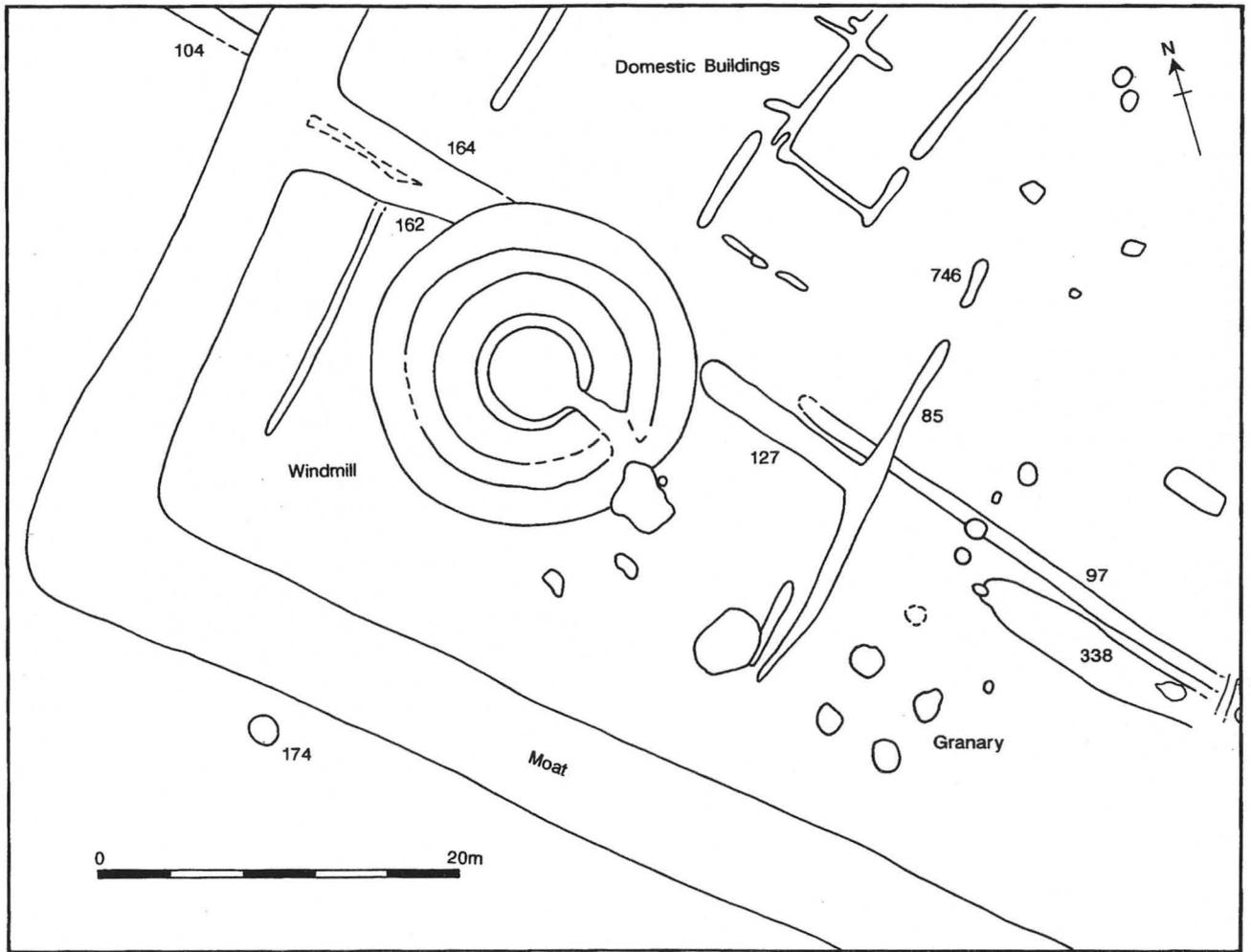


Figure 12 Area 2: windmill and granary. Scale 1:400

Ditches 127 and 85 (Figs 13 and 14)

Two intersecting ditches (127 and 85), forming a T-shape, were located between the windmill and granary. Ditch 127 (recut 114), orientated northwest to southeast, was approximately 12m long and 1.8m wide with a 1m-deep, fairly steep-sided profile. The rounded terminal of ditch 127 was located at the edge of the windmill ring-ditch 43 and is likely to be contemporary with the windmill or perhaps slightly later. Ditch 85, orientated northeast to southwest, was 22m long, slightly narrower and shallower than 127 with a flatter base and tapering terminals.

The location and shape of ditches 127 and 85 suggests that they were boundary divisions between the different areas occupied by the windmill and granary. Ditch 85 was recorded as cutting ditch 127, although the pottery evidence suggests that both ditches were backfilled at the same time especially as sherds from the same vessels were present in both ditches. A small length of gully (746 in Fig. 12) to the northeast of, and on the same orientation as, ditch 85 contained a very similar pottery assemblage and is probably a continuation of this boundary into Area 1. Ditch 97 had clearly gone out of use by the time ditch 85 was cut and infilled, probably in the early to mid 13th century, perhaps suggesting some internal reorganisation of this part of the settlement. This activity may also be

contemporary with the enlargement of the central building complex and realignment of ditches in Area 1 to the north.

Ditches 127 and 85 contained the largest pottery and finds assemblages from the site, the unabraded nature of which indicates a brief period of deliberate backfilling with occupation and building debris. The presence of cross-fitting sherds from the same vessel in ditch 85 and in granary post-hole 206 suggests that many of the features in this area were backfilled at the same time, probably in the early to mid 13th century. The fills of these ditches, like the granary post-holes, were rich in charred plant remains. Samples were composed largely of wheat grains and other cereals and crop plants, with little or no evidence of chaff, which indicates that semi-cleaned crops were stored on the site, probably in the nearby granary (see Charred plant macrofossils, p.56).

The granary (Figs 12–14)

Southeast of ditch 85 and to the southwest of ditches 127 and 338 were four large steep-sided, flat-based roughly oval post-pits (206, 234, 245 and 258), forming a 5m square. Dimensions across the long axis of the individual post-pits ranged between 1.4m and 1.6m, with maximum depths of 0.7m. The large size and close spatial positioning of the post-pits indicate that they are the foundations for a

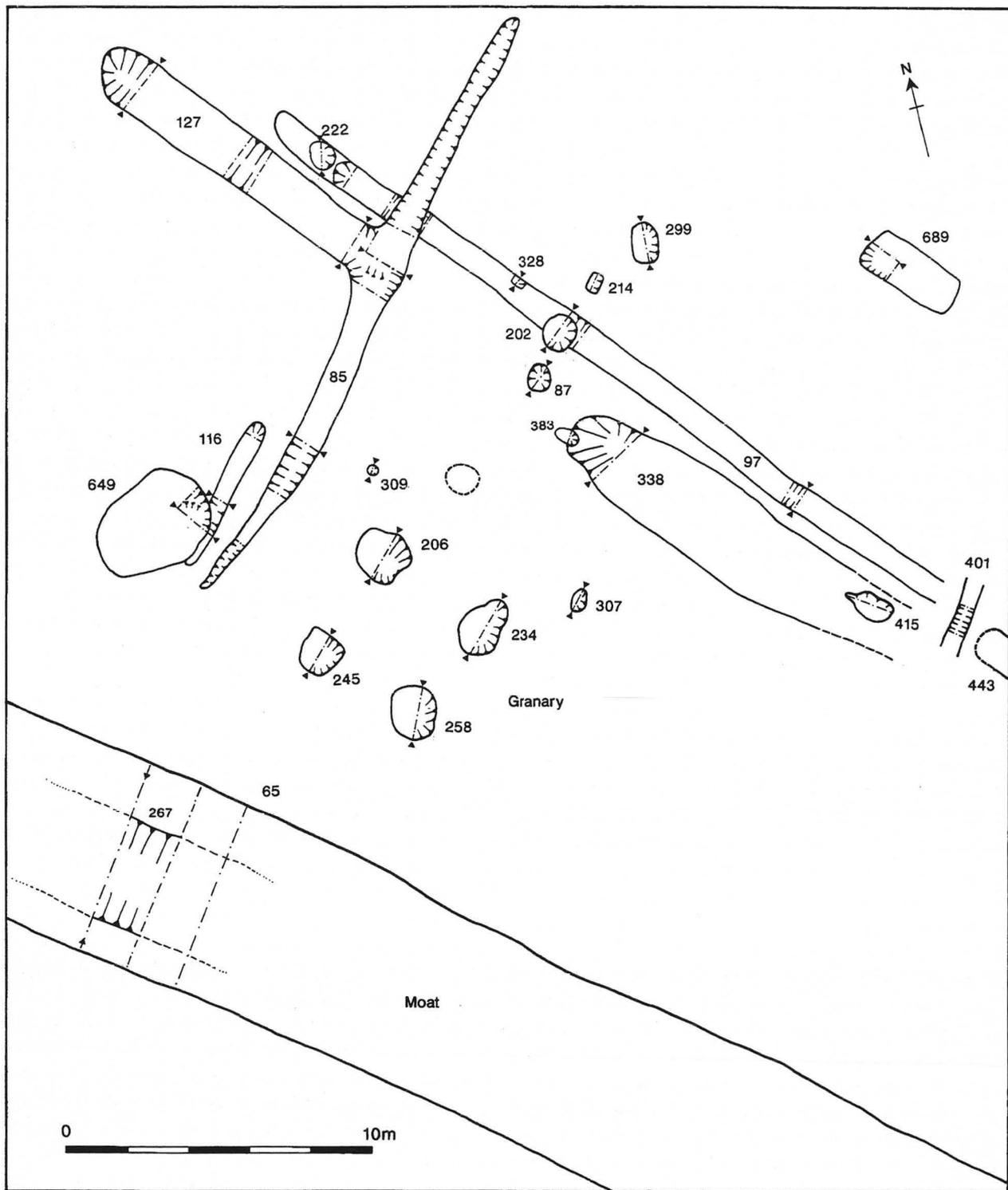


Figure 13 Area 2: detail of granary and associated features. Scale 1:200

large square structure, most likely a raised store or granary. No comparable features were found nearby to indicate that these post-pits were part of a larger structure, perhaps extending southeastwards. Virulent weed growth and intermittent swathes of redeposited natural clay masked this part of the site however, and it is conceivable that features were missed despite repeated cleaning.

The fills of the post-pits were very mixed, with patches of redeposited clay containing abundant fragments of charcoal and charred cereal and plant remains. Most of the post-pits contained quite large finds assemblages representative of domestic debris, comprising pottery sherds, oyster shell, daub, animal bone and quern stone fragments. A bone-handled, scale-tang knife was found in

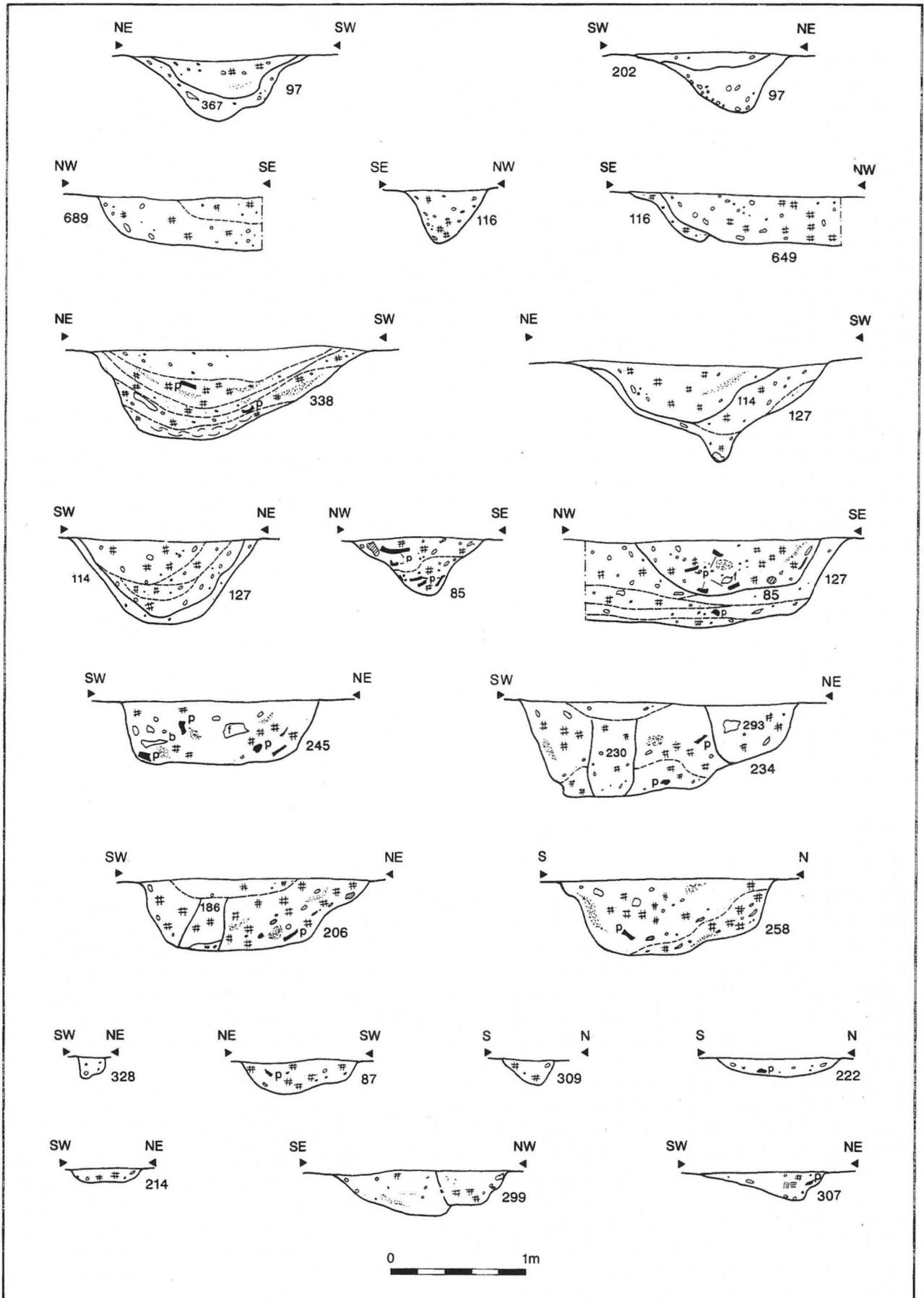


Figure 14 Area 2: selected sections of ditches and post-holes. Scale 1:40

post-pit 258 which is particularly unusual because of its apparently early date, as comparable finds have been associated with 14th rather than 13th century contexts (see Iron No. 2, p. 33).

Post-pit 245, forming the southwest corner of the structure, contained a relatively large group of pottery, over 2kg from its single fill, and finds include a large fragment of a cooking pot. Such a large deposit from a structural foundation and the absence of a post-pipe in this feature indicates that the pottery was deposited after the building had been dismantled. The pottery from the two identified post-pipes (186 in post-pit 206 and 230 in post-pit 234) was generally similar to that from the post-pits, and sherds from the same vessel were found in post-pit 258 and post-pipe 230. Cross-fitting sherds were also identified between two of the post-pits (245 and 206) and also between post-pit 206 and ditch 85 to the immediate northwest. This indicates that these features were all infilled at the same time, probably in the early to mid 13th century. Post-pit 234 was cut on its northeast edge by a smaller undated post-hole (293), which may suggest a repair to the building whilst it was extant or activity following its demise.

Associated post-holes

(Figs 13 and 14)

A group of post-holes (87, 202, 214, 299, 307, 309, 328 and 383) of variable size and shape were located in proximity to the granary. Four of these (87, 202, 214 and 299), and an unexcavated post-hole, could be related as they form an approximate northeast to southwest alignment to the northeast of the granary. The disparate nature of these post-holes, which vary in shape from rectangular to circular, and from 0.4m to 1.2m wide and between 0.10m and 0.32m deep, may however suggest that they are not related. Very little dating evidence was retrieved from this group although the majority of the diagnostic pottery found indicates a 13th-century date. The pottery from 214, however, could date to as early as the 12th century, perhaps making it contemporary with ditch 97 (see above). Post-hole 202, which cut ditch 97, did not produce dating evidence, although the post-pipe 223 (not illustrated) contained pottery of 13th-century date.

Ditch 97 was also cut by post-holes 222 and 328, of which 222 contained pottery datable to the early to mid 13th century and 328 contained no datable finds. The stratigraphic relationship of post-hole 328 with ditch 97, however, indicates that it may be contemporary with the other post-holes in this group. A small, undated post-hole (383) was also recorded to the northeast of the granary, cutting the terminal of ditch 338, which was probably backfilled around 1200. Two further post-holes (307 and 309) were located close to the northeast and northwest corners of the granary respectively, although it is not certain whether they are related and neither produced closely datable pottery. A large shallow pit (649) was recorded to the northwest of the granary, cutting linear feature 116, neither of which contained closely datable pottery. The function of this pit is not known, although its proximity to the windmill and granary and its relatively sterile fill may indicate it was used for storage. An isolated pit (174) was located outside the enclosed settlement, to the west of Area 2 (Fig. 12). A single pottery sherd of 10th to 13th-century date was retrieved from 174, which although not closely datable does indicate the presence of

contemporary activity outside the main enclosed settlement.

Large amounts of pottery sherds, oyster shells, animal bone, quernstone fragments and pieces of structural daub were retrieved from the features around the granary area. This evidence is markedly different to that from the buildings in Area 1, where very few finds were present. The densest concentration of charred macrofossils from the site was also recovered from the granary and surrounding features. Wheat grains were abundant in the sample assemblage, with small amounts of chaff, although oats, barley and rye were also present. Pulse seeds including peas/vetches and field beans were also frequent, as were seeds from larger weed species. The presence of hazel nutshell fragments and other tree/shrub macrofossils including a fragmentary hawthorn stone and bramble pip probably indicate that the sampled deposits also included some domestic human waste (see Charred plant macrofossils, p.57). The evidence taken as a whole strongly suggests that domestic rubbish from the buildings in Area 1 was discarded in the ditches and other features related to the granary in the adjacent working area (Area 2).

The environmental samples from the site as a whole appear to represent semi-cleaned prime grain, indicating that storage and processing of cereals, especially wheat, was a major activity of the settlement. The survival of this particular type of evidence is solely as a result of charring, and the samples from this area help to support the interpretation of the granary, which appears to have been destroyed by a catastrophic fire (see Charred plant macrofossils, p.60).

The moat

(Figs 12, 13 and 17)

To the southeast of the granary a 5m-wide and 1.4m-deep machine-cut section was excavated across the large enclosure ditch or moat 65 which surrounded the settlement. The full profile of the original ditch cut was not excavated for health and safety reasons, although in plan it appeared to be at least 6m wide and in section in excess of 1.4m deep. A central recut (267), with a rounded profile, was fully exposed in the section and found to be approximately 4m wide and 1.4m deep, indicating that the moat was cleared out at some point during the settlement's occupation.

The deposits within the original ditch were noticeably different from those in the recut. The earliest fills comprised thick deposits of orange-brown clay and silt, similar in character to the natural subsoil, which contained very few finds and are probably the result of natural slumping and silting processes. The majority of fills within the recut were generally more silty and similar in colour and character to the latest fills of the ring-ditch around the windmill. The uppermost fills were loose and contained frequent wood and root remnants, as well as fragments of charcoal and lenses of daub. These deposits appear to be tipped in from the northeast edge of the cut, at a point where the moat passes close to the granary and associated features. Small quantities of pottery were retrieved from the fills of the recut, which are not closely datable but indicate an early to mid 13th-century date for infilling, perhaps contemporary with the backfilling of features in the granary area. The presence of wood, however, may indicate a more recent date for the latest infilling, perhaps even relating to the construction of the airfield.



Plate V Working shot of windmill, showing darker burnt deposits in ring-ditch to north and ditch 127 to east.
View: southwest

The moat survived around the northwestern and southeastern sides of the settlement, narrowing to form a partial causeway in the southern corner (Area 3) of the site. The moat probably once surrounded the settlement on all sides, although two and three-sided moats are also known (see Chapter 4). At its widest point, on the southern arm, the moat ditch was approximately 6m across, narrowing to 5m on the northwestern arm, where it became increasingly difficult to trace on the surface. No evidence of a bank was found, although any surviving earthworks may have been levelled into the moat, perhaps as recently as during the construction of the airfield.

The windmill and associated features (Figs 12 and 15–17, Plates V–VIII)

Pit 200

A circular pit (200), with a diameter of 5m, was identified in the southwest corner of the site, surrounded by a wide ring-ditch (43) with a diameter of 18m (Plate V). The central pit 200 was fully excavated with each deposit drawn in plan and section to ensure that all evidence relating to the foundations of the windmill was recorded. The pit was approximately 1m deep with quite steep upper sides and a concave base. A fairly complex sequence of deposits was recorded, largely consisting of mixed redeposited orange-brown clays and grey-brown silts in bands of various thicknesses with few inclusions or finds. Some of the deposits towards the base of the pit (412, 406, 385, 384, 381 and 375) were noticeably darker in colour, the latter of which (375) was confined within cut/depression 376 (Plate VI, Figs 16a and 17). Deposit 375 contained larger quantities of finds than most of the fills of 200, including pottery, bone and an iron nail. This deposit could be a dump of more organic material or perhaps 376 marks the position of the earliest phase of post-foundation in the pit.

One of the uppermost contexts (199) comprised a 1m-wide roughly circular spread of nodular unmortared flints, filling a slight depression (215) in clay layer 235 towards the centre of the pit (Plate VII, Fig. 16b). The dimensions and characteristics of 199 indicate that it may have been a pad for a substantial post, probably to replace the original post (possibly represented by 376) which may have rotted away or needed replacing. Placed on top and towards the centre of the flints was a large fragment of coarse ware jug (198) laid on its side with its handle uppermost (Plates VII and VIII, Fig. 26, No. 24). This find was notable because the pottery sherds retrieved from the other deposits in pit 200 were generally small and fragmented. It seems unlikely that the jug had a ritual significance, as it does not display the usual characteristics (see Medieval pottery, p.48), although it may relate to the disuse of the pit, perhaps when the site was abandoned. Residue analysis of the jug suggests that it may have contained beer made from barley, evidence which could point to some form of 'termination ceremony'. Overlying the jug and flint pad was the final fill of the pit, a thick layer of clay (197) similar in colour and type to 235 and largely comprised of redeposited natural clay.

Finds from the different deposits within pit 200 comprise pottery, daub, shell, slag and animal bone, all of which were in small quantities. A sherd of unusual pottery, the handle from a Developed Stamford ware jug (Fig. 26, No. 23) was retrieved from clay fill 235. This pottery is relatively rare in Essex and is paralleled by an example from the 1963 Stamford School kiln, dated archaeometrically to 1200±20 years (see Medieval pottery, p.48). Further sherds of this type of pottery, which on stylistic grounds is likely to date to the early 13th century, were found in ditch 119 in Area 1 to the northwest of the buildings.

Channel 277, linking the pit and the ring-ditch, contained the same sequence of clay fills as that in the

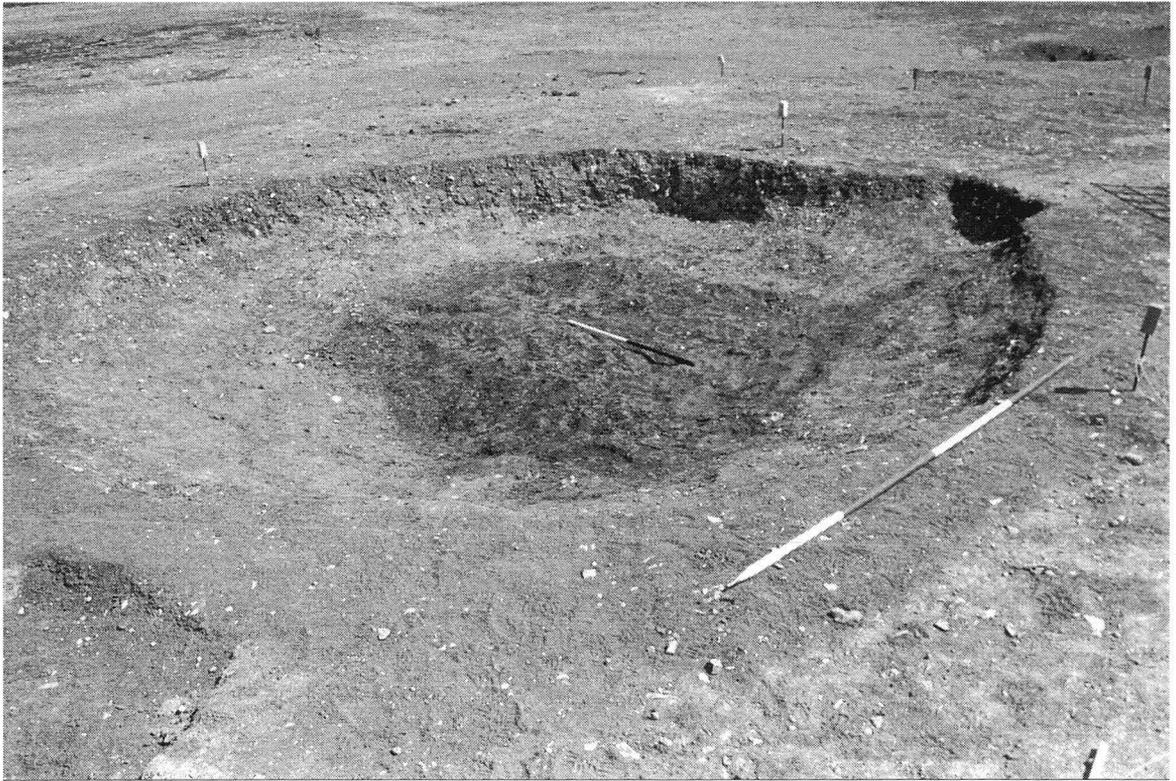


Plate VI Windmill pit 200, partially excavated, showing darker deposits towards the base of the cut



Plate VII Windmill pit 200, partially excavated, showing jug 198 on flint pad 199. View: northwest

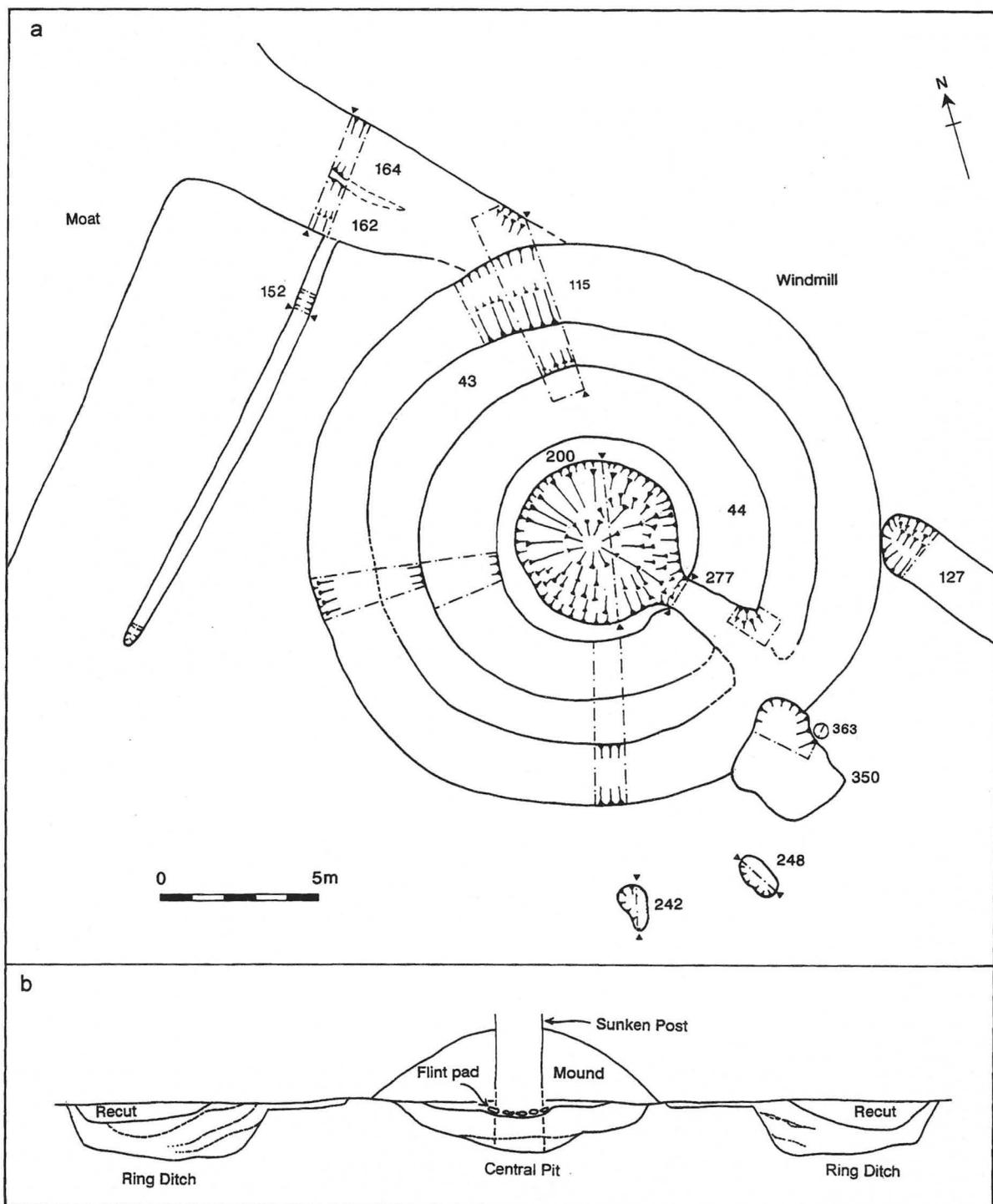


Figure 15 Area 2: detail of windmill (a) and schematic section across windmill foundations (b) indicating the conjectured position of a mound and sunken post. Scale (a) 1:200

upper part of the pit. The pottery from 277 was also similar to that from the pit, indicating that both features were infilled at the same time, probably in the early 13th century.

Ring-ditch 43

Around pit 200 was a circular ditch (43) originally 4m wide, but recut to a width varying between 2 and 3m, with a maximum depth of 0.7m. The fills of the ditch were similar to those encountered in the central pit, comprising mostly clay and silt deposits with few finds and inclusions. The full depth of the original ditch was in excess of 1m, and the base, which was only exposed in one of the

excavated sections, was quite undulating (a projection of this is shown on the illustrated section, Fig. 17). The sides of the original cut were not properly established due to the similarity between the primary fills, which are probably the result of slumping and silting, and the natural clay into which the ditch was cut. Very few finds were retrieved from the primary fills, the majority of which comprise small sherds of pottery, the latest of which dates to c. 1200.

The fills of the shallow recut (115) were distinguishable from those of the original cut because of the increased charcoal content and often dark grey colour, especially around the northern half of the ditch. These deposits did

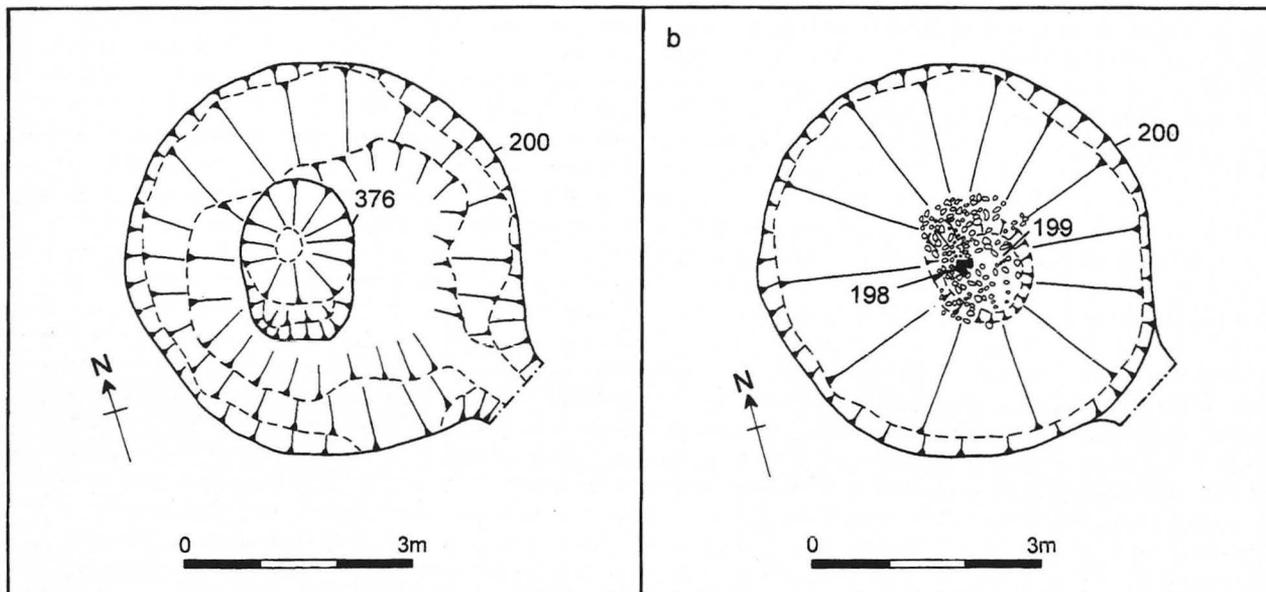


Figure 16 Central windmill pit 200: detail of cut 376 (a) and later post-pad 199, with the position of jug 198 indicated (b)



Plate VIII Detail of jug 198

not contain the abundance of finds found in the ditches around the granary, and could be material derived from a levelled-in mound, perhaps tentatively suggested by the tip-lines evident in the section (Fig.17). The pottery assemblage, although slightly larger, was similar in date to that from the primary ditch deposits although some slightly later pottery was also present. The similarity of the pottery dates could indicate that this feature was relatively short-lived, although if the latest fills derive from a central mound much of the pottery is likely to be residual.

Feature 44, a 2.5m-wide band of mixed very pale grey silty clay within a shallow cut or depression, formed an inner ring between the outer ditch recut and the central pit. This feature appeared to overlay the upper fills of the primary ring-ditch cut and its function is unknown although it could be the remnants of some form of circular walkway.

These features taken as a whole are interpreted as the remains of a sunken-post mill, perhaps constructed around 1200 or slightly later. The central pit 200 would have housed the massive timber post, with the upcast from the ring-ditch 43 perhaps banked up to form a mound around the post for additional support. A second phase of construction/use may be indicated by the presence of the flint post-pad 199 in the upper part of the central pit, and the recutting of the ring-ditch, although the pottery evidence was very similar from all the deposits. Relatively few charred plant remains were retrieved from the central pit or ring-ditch deposits, comprising some cereal and weed seeds with no evidence of chaff. This could represent either wind-blown debris derived from elsewhere on the site, or the incidental introduction of seeds along with other remains during periods of rebuilding or disuse.

Associated features

Two irregular post-holes (242 and 248) were located to the south of the windmill. No datable finds were retrieved to indicate whether they were contemporary with the windmill although their location perhaps indicates that they were related. It is conceivable that posts were located around the windmill to act as anchors for the tail pole to be lashed to, and 242 and 248 could be the remains of these. A shallow subrectangular pit (350) and a small undated post-hole (363) were also located next to the windmill. Pit 350 cut the southeastern edge of the windmill ring-ditch and is possibly one of the latest features on the site, although no direct dating evidence was retrieved. The irregular shape of this pit may suggest that it is a demolition feature, perhaps removing a small structure, of which post-hole 363 may be the partial remains, such as a bridge across the ring-ditch.

The windmill ring-ditch cut two undated ditches (162 and 164) on its northern edge. These ditches may also have been cut by the moat, although this relationship was not investigated. Ditch 104 to the west of the moat, and ditch 97 to the east of the windmill, were perhaps associated with these ditches, which probably predate the main phase of

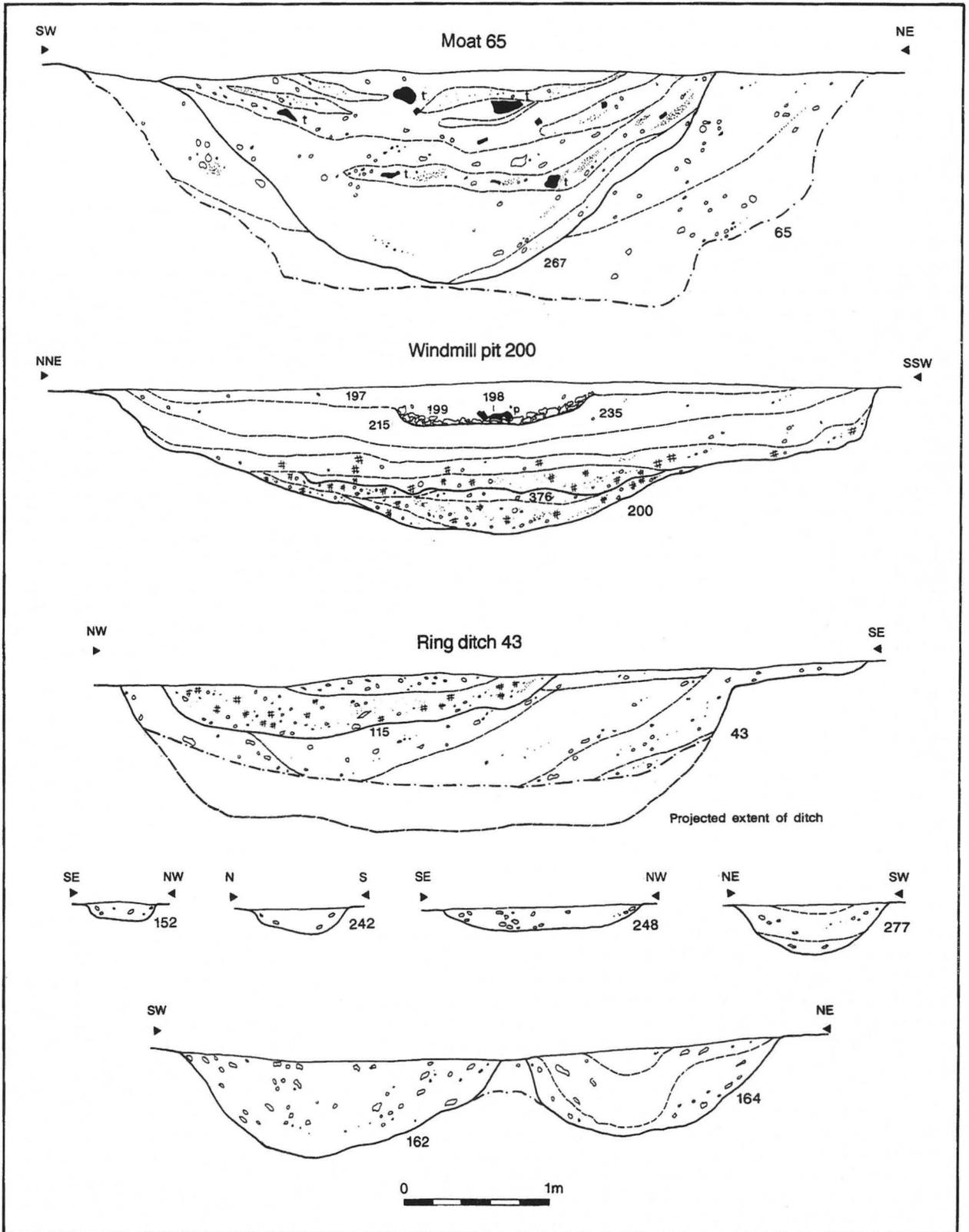


Figure 17 Area 2: selected sections across windmill features and the moat. Scale 1:40

the settlement. Ditch 162 was recorded as cutting gully 152, although this relationship was not certain. The gully was a 14m-long narrow, linear cut, orientated northeast to southwest between the northwestern arm of the moat and the windmill. No datable finds were retrieved, although an environmental sample taken from the single mixed clay silt fill of 152 was found to contain an assemblage of charred cereal remains similar to that from features in the granary area. The proximity of this feature to the ring-ditch perhaps suggests that it predated the windmill, which would have needed a wide berth around the ditch for manoeuvring the tail pole.

Area 3

(Figs 18 and 19)

The area to the southeast of the granary was relatively clear of features, suggesting that this was a peripheral part of the settlement. However, disturbance related to the airfield and the presence of large clay spoilheaps left by the quarry workings could easily have masked any archaeology, resulting in a slightly false impression of the distribution of features in this area. Most of the 50m x 20m strip to the southeast of the main site, which was previously below a concrete runway, was taken up by a large roughly oval pond with a few other features comprising several ditches and a pit. The relative scarcity of features in this area compared with Areas 1 and 2 further indicates that this was not a main focus of the site. The southeast corner of the moat was identified narrowing to form a possible causeway, suggesting an entrance into the settlement at this point, although too little was exposed to prove this or demonstrate whether the moat extended any further northwards.

Ditch 443/1037 and ditch 1038

(Figs 18 and 19)

Ditch 443 was 27m long in total, extending southeastwards from the granary and associated features in Area 2 on a northwest to southeast alignment, continuing into the former runway strip as 1037 where it narrowed to form an irregular, tapering terminal. Although ditch 443 was only 0.9m wide and 0.2m deep at its most substantial point, a relatively large finds assemblage was retrieved from its mixed fill, including pottery sherds similar in type and date to those from the ditches surrounding the granary in Area 2. The presence of cross-fitting sherds between ditch 85 in Area 2 and ditch 443 further suggests that these were contemporary features, probably backfilled in the early to mid 13th century. The relative abundance of baked clay, mostly structural daub, in the backfill of 443 indicates that the deposit may largely derive from a nearby building. No building remains were evident in the immediate vicinity of this ditch, although two post-holes (1034 and 1018) were recorded cutting the terminal 1037. It is quite possible that debris from demolished buildings such as the granary to the northwest was spread over a wide area, becoming incorporated into the fills of features like ditch 443.

A very similar narrow ditch (1038), aligned northeast to southwest, was exposed for 25m running at right angles to ditch 443/1037, with which it may have joined but the intersection was masked by recent airfield disturbance. Very few finds were retrieved from this shallow feature, of which the pottery was too small and abraded to indicate a

reliable date or suggest whether the two ditches were contemporary. These ditches are probably part of a series of internal linear boundary divisions similar to those around the granary, perhaps in this case delineating the area of pond 1032. The assemblages of charred plant remains retrieved from ditches 443/1037 and 1038 were superficially similar to those from the granary area in that they contained a moderately high density of wheat-predominant charred cereals with some chaff, pulses and leguminous weeds and other seeds (see Charred plant macrofossils, p.56). However, the process of charring and deposition appears to differ between samples from the two areas, as the cereal grains retrieved from 443/1037 and 1038 were poorly preserved, severely puffed and chaff was less common. This suggests that the charred material derived from the deliberate burning of processing waste and/or spoiled grain on bonfires, which was subsequently deposited in features. Comparable evidence was found in the ditches to the north of the buildings in Area 1, which are in a similarly peripheral location within the settlement.

Features 1029, 1035 and 1012

(Fig. 18)

Two ditches 1029 and 1035 orientated northwest to southeast, were recorded in the extreme northeast and southeast corners of Area 3 respectively, neither of which were completely investigated. Ditch 1029 was 0.5m wide with a band of redeposited orange clay slumped centrally along its exposed length, on either side of which a pale grey silty clay fill was visible. The location and orientation of this ditch indicates that it was part of an internal network of linear subdivisions which in this area included ditches 443/1037 and 1038. Ditch 1035 was located outside the moated enclosure, and possibly predates it although time did not permit this relationship to be further explored. If ditch 1035 predates the moat, it may relate to a pre-existing field boundary, perhaps contemporary with ditches 104 and 164, which appear to be cut by the moat on its northwestern arm.

An isolated circular pit (1012) was located to the northwest of ditch 1038, the very rooty fills and irregular profile of which (Fig. 19) suggests that it could be the remains of a tree-hole. The lack of similar features on the site, which is surprising when considering the extensive coverage by Dukes Wood in the post-medieval period, may however indicate that this feature was archaeological rather than natural in origin. The small amounts of medieval pottery and daub retrieved from the fills of 1018 were generally abraded, not closely datable and probably residual.

Pond 1032

(Fig. 18)

The dominant feature in this area was a large irregular cut (1032) which was not fully excavated due to problems of unstable sides, weather conditions and time limitations, but was found to be 15m wide and over 1m deep. The earliest exposed fills were sterile silty clays, characteristic of natural silting. These were overlain by more mixed silty clay deposits which contained frequent flecks and fragments of charcoal, pieces of daub, and occasional sherds of pottery and pieces of animal bone. Thin patches of redeposited natural clay overlay the uppermost fill, a similar sequence to that identified for the other large

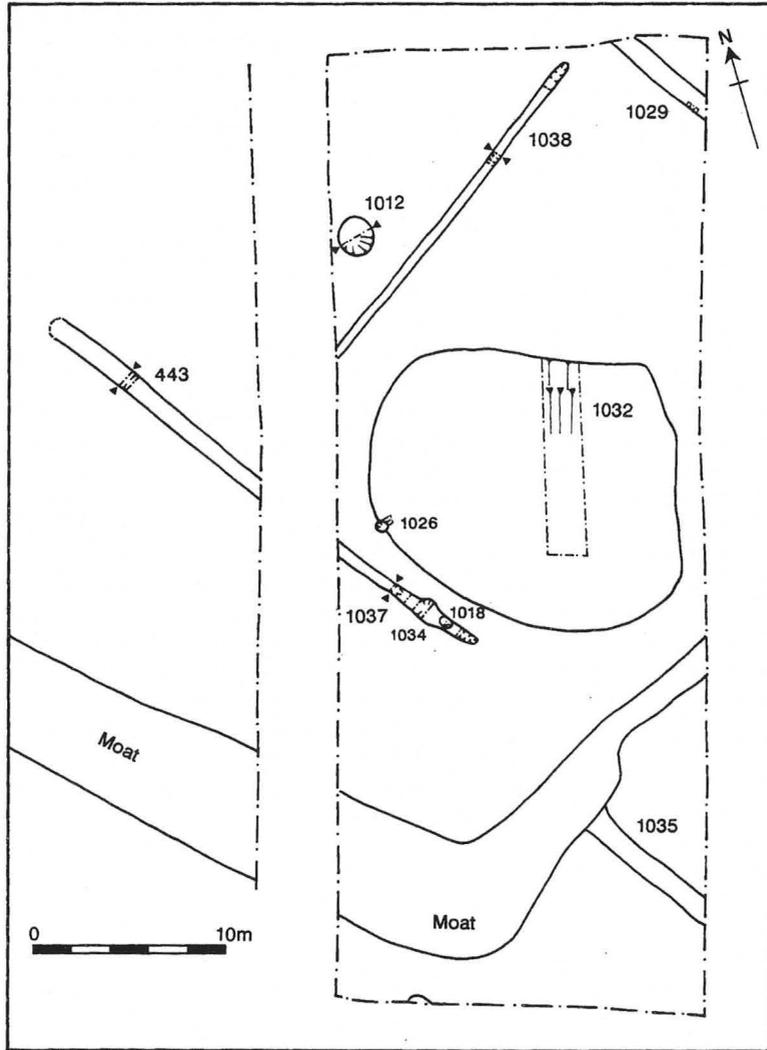


Figure 18 Area 3: pond and related features. Scale 1:400

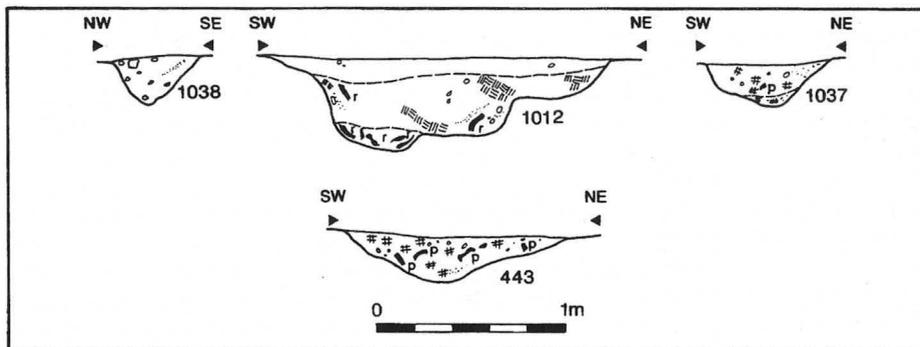


Figure 19 Area 3: selected sections. Scale 1:40

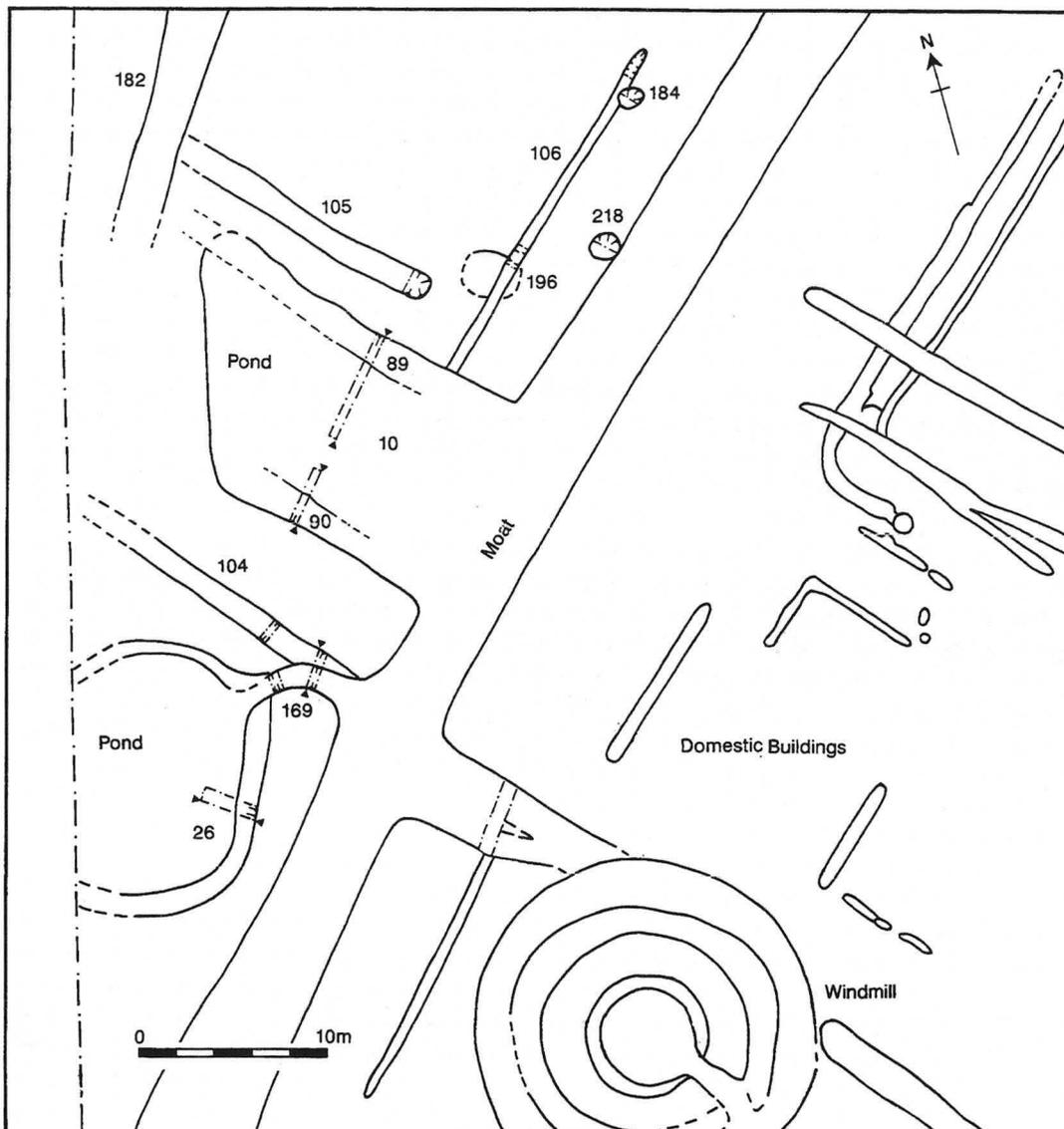


Figure 20 Area 4: ponds and related features. Scale 1:400

features on site including the ponds to the northwest of the moat and the moat itself. A small circular post-hole (1026) cut the upper fill of the pond on its western edge. The fill of the post-hole and the pottery retrieved from it was almost indistinguishable from that of the pond, and it does not appear to be clearly associated with any other post-holes in the vicinity.

The dimensions of 1032 suggest that it was a pond, with the primary clay fills representing natural silting, followed by deliberate backfilling and levelling indicated by the mixed upper fills. The redeposited natural clay could be remnant capping, but may have been deposited as recently as during the construction of the airfield in the 1940s. Small quantities of pottery datable to *c.*1200 were retrieved, and a sherd of Roman pottery was also present. Some charred cereal remains were recovered from the pond and the post-hole but these were in minute quantities compared with that from the granary area.

Area 4

(Figs 20 and 21)

Two large ponds and several ill-defined and generally undated features, comprising a group of ditches and three pits or large post-holes, were located in the northwest corner of the site outside the main enclosed settlement.

Ditches 181, 182 and 105

(Figs 5 and 20)

An area of disturbed, mixed subsoil with shallow patches of burnt rooty material was located at the northwestern extent of the site (Fig.5), and is interpreted as burnt-out tree remnants. Two ditches (105 and 181) were located on the northeastern and southwestern sides of the disturbed area, both orientated northwest to southeast, at right angles to the moat. Both ditches were approximately 15m long although the full extents were extremely difficult to define due to the leached appearance of the fills and the mixed geology in this part of the site. The most southerly of the

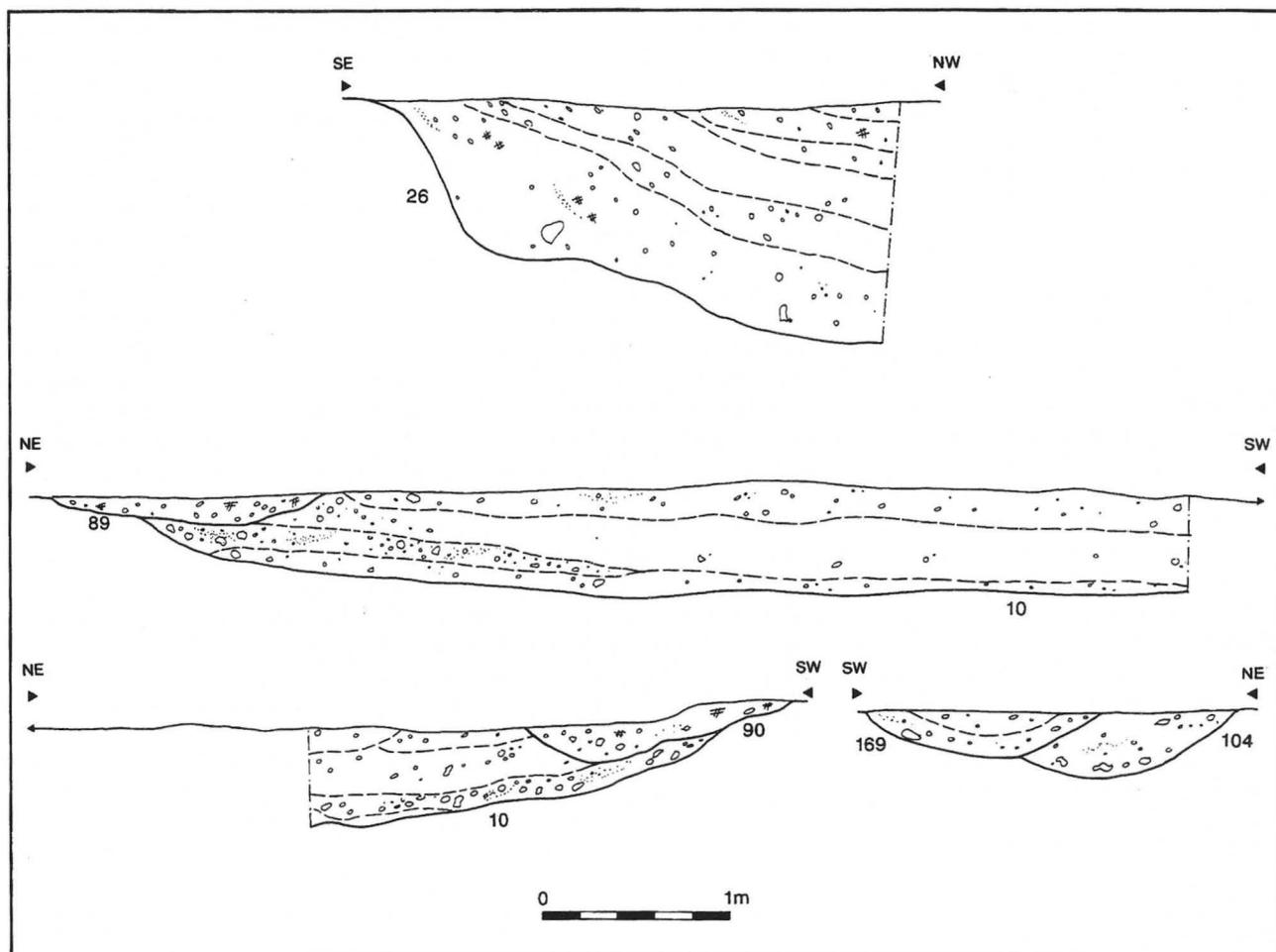


Figure 21 Area 4: selected sections. Scale 1:40

two ditches (105), located close to pond 10, was investigated, although no finds were retrieved. Ditch 181, located approximately 25m to the northeast of 105 was not excavated (Fig.5, unnumbered). To the immediate west of ditch 105 was another similar ditch (182) orientated at right angles to, and possibly cutting, 105 although this relationship was not investigated.

Ditch 106 and features 184, 196 and 218

(Fig. 20)

A 20m-long and 0.4m-wide undated ditch (106) was located between the moat and the terminal of ditch 105. This ditch was apparently cut by a feature (89) relating to pond 10 to the south and may predate the main phase of the settlement. Two pits or large post-holes (184 and 196) were stratigraphically related to ditch 106, although neither contained datable finds. An unrelated and undated pit (218), located close to the northwestern edge of the moat, was also recorded.

The presence of these post-holes and/or pits indicates peripheral small-scale activity, of unknown date but possibly contemporary with the main settlement phase. In general the orientation of the ditches and gullies in this part of the site is comparable to that of the ditches within the enclosure, suggesting that there may have been fields or paddocks related to the settlement in this area.

Ponds 10 and 26

(Figs 20 and 21)

Two large features (10 and 26), interpreted as ponds, were also located to the west of the moat. The most northerly of the ponds (10) was an irregular rectangle, 18m long by 12m wide, protruding from the northwestern edge of the moat. The cut was relatively shallow, at 0.55m, in proportion to the overall dimensions, with gently sloping sides and a broad, flat base. A sequence of sterile sandy and gravelly fills was exposed at the base of the cut, overlain by a thick silty deposit, which contained a single sherd of 12th-century pottery. A dump of burnt material containing small quantities of daub, charcoal, wood and bone was recorded overlying the silty fill towards the northeastern edge of the pond. This is probably a disuse deposit similar to those found in the upper fills of the moat section in Area 2, and the pond in Area 3. The uppermost fill was a slumped deposit of orange brown clay similar to that found overlying the majority of larger features on the site, including the moat. The relationship between the moat and pond 10 was masked by redeposited natural clay and slumped topsoil and was not investigated by excavation, although it is feasible that they were interrelated.

Two shallow undated ditches (89 and 90) were recorded in section cutting the upper fills of 10 along its northeastern and southwestern edges. The ditches were not distinguishable on the surface of the pond and their full extent, relationship with the moat, or function are unknown.

Pond 26 to the south of 10 was slightly different from 10 in that it was subcircular in shape, twice as deep, with steep sides and a gently sloping base, and its relationship to the moat was much more clearly defined on the surface. The sequence of fills in 26 and its associated channel (169) produced a distinctive pattern resulting from the thick primary deposit of clay which in plan appeared as a thin orange brown band surrounding the contrasting grey of the silty clay upper fills. This could indicate that the pond was recut at some point, although the apparent differences could simply be a result of different types of deposition, whether from slumping, silting or deliberate infilling. Very few finds were retrieved, consisting of a sherd of Late Iron Age pottery from the primary fill and a sherd of 12th to

13th-century pottery from the uppermost fill, neither of which provide a reliable date. The small curving channel 169, linking the pond with the moat, produced no datable finds, although its relationship with the moat indicates that these features were contemporary.

The channel cut an undated ditch (104), which appears on the cropmark plot to continue northwestwards from the edge of the excavation for a further c.50m before disappearing close to one of the airfield runways (Fig.4). Ditch 104 was of similar proportions to other ditches on the site such as 97, 164 and 1025 all of which could be part of a remnant field system on a slightly different orientation from, and predating, the main moated settlement.

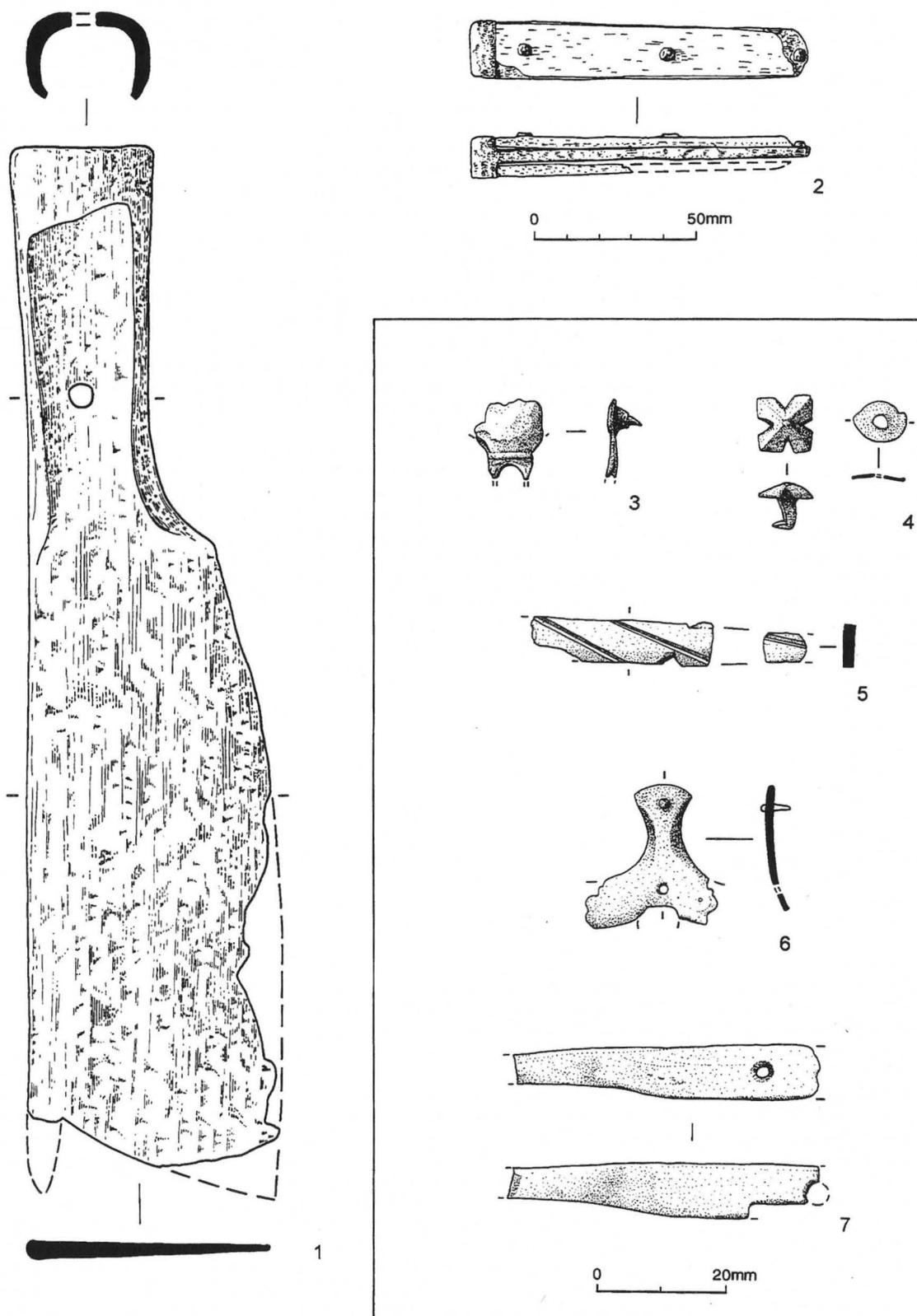


Figure 22 Copper alloy, iron and stone objects. Scale 1:2 (Nos 1-2), scale 1:1 (Nos 3-7)

Chapter 3. The Finds

Copper alloy

by H. Major
(Fig. 22)

All the medieval copper alloy objects are listed below, bar an unidentifiable scrap from context 375 (windmill pit 200, Area 2). All are decorative elements, some of them gilded. The gilding in itself is not an indicator of a high status site; harness pendants in particular are frequently gilded. Some of the pieces may, however, have derived from casket fittings, which Margeson (1993, 75) notes are found in 12th and 13th-century contexts on castle and manorial sites. Unfortunately, none of the pieces from this site are complete enough to be certain of their identification.

The copper alloy was cleaned by L. Window, conservator at Southend Museum.

1. (Fig.22.3) Fragment of the stud from a gilded harness pendant. It was probably in the form of a scallop, as an example from Castle Acre Castle, Norfolk (Goodall 1981, fig. 69.4). In poor condition. SF2 (e). Context 41, ditch 127, Area 2.
2. (Fig.22.4) Gilded quatrefoil stud with back washer. Probably a mount from a belt or horse harness. SF10. Context 249, ditch 85, Area 2.
3. (Fig.22.5) Strip fragment in three pieces, decorated with diagonal lines; the metal is grey, with a smooth dark brown patina (identified as a copper alloy by L. Window). This is possibly part of a casket mount, which often have engraved diagonal lines giving a twisted effect (cf. Margeson 1993, 75, no. 458). Such strips are frequently gilded, although no trace remains on this example. SF14. Context 595, windmill ring-ditch 43, Area 2.
4. (Fig.22.6) Sheet mount with two rivet holes, one with the rivet remaining in it. The original shape is uncertain, and the surface is in poor condition. This is possibly part of a decorative mount, possibly from a casket. SF15. Context 631, outbuilding 118, Area 1.
5. (Not illustrated) Gilded bar fragment with D-shaped section. It may have had a shaped terminal, although the surface is in too poor condition to be certain, and may be part of a casket mount. L 62mm, section c. 5 x 3mm. SF3. Context 257, granary post-hole 258 in Area 2.

Lead

by H. Major
(Not illustrated)

Three small pieces of lead came from medieval contexts, with a further two from unstratified contexts also probably medieval. All were waste, either solidified puddles or off-cuts.

Iron

by H. Major
(Fig. 22)

There was a small amount of medieval ironwork from the site, generally in fair condition. As well as the material catalogued below, there was a single blade fragment, a few unidentifiable fragments and twenty nails, eight consisting of the shaft only. Of the remainder, two were general purpose nails with round or rectangular heads and two were horseshoe nails, one a fiddle-key nail and the other with a T-shaped head. A group of eight nails from context 660

(building 98, Area 1), all incomplete, had domed heads. Seven were very similar, with head diameters of c. 11mm, the eighth nail being slightly larger. It is likely that the nails were attached to an object when discarded, and they probably had a quasi-decorative function, perhaps as box nails, or for attaching some kind of decorative fitting.

Selected items were X-rayed by A-M Bojko, conservator at the Colchester and Essex Museum.

1. (Fig.22.1) Socketed billhook. The edge of the blade is damaged. There was probably a spike at the end of the back, now broken off. The socket is partly open, and there is a single rivet hole. The basic form of the billhook has remained little changed from Roman times (cf. Manning 1985, 58, type 2) to the present day (cf. Salaman 1975, 74–5), and while this tool cannot be closely dated, a medieval date is as likely as not. L 320mm. Context 166, surface find from moat 65.
2. (Fig.22.2) Knife handle; iron scale tang with plain bone handle plates and iron rivets. The bone plates are detached, broken, and incomplete. The end plate appears to be integral with the tang, which is an unusual feature. SF2. Context 257, granary post-hole 258, Area 2.

This is a very early example of a scale tang knife, which are extremely rare in 13th-century contexts. There are two examples from Winchester, although one may be later (Goodall 1990, 852 nos 2815–16) and a few from elsewhere. The earliest stratified scale tang knife from London is from a mid 14th-century context (Cowgill *et al.* 1987, 26).

3. (Not illustrated). Small T-clamp, with a broken rectangular sectioned shaft, broken. Head is 39 x 8mm. Context 161, Ditch 162 in Area 2.
4. (Not illustrated). Leatherworking awl with a variable section, round to square. It is damaged, and in two pieces, with one end broken. Sites producing similar awls from Saxon and medieval contexts include Redcastle Furze, Thetford (Andrews 1995, 90). This is a large example of its type, with an original length greater than 230mm. SF18. Context 706, ditch 85, Area 2.

Stone

by H. Major
(Fig. 22)

Lava querns

(Not illustrated)

Ten fragments of lava quern or millstone were found, none of any size. The grinding surfaces are all pecked; apart from that, there are only two fragments with other features present. One is a lower stone, with part of the central hole, and the other an upper stone fragment, broken across what is probably a non-perforating handle hole: both pieces are from context 66, an upper fill in moat 65. There are no measurable diameters within the group, and it is difficult to say whether the fragments are from querns or mechanically-driven stones. Thicknesses range from 22mm to over 51mm, within the acceptable range for querns, and while the thickest stone may be from a millstone, it seems likely that the thinner stones are from hand-turned querns, particularly the fragment with the possible handle hole. The largest piece of lava was re-used, having been deliberately shaped into a rough oval c. 120 x 110mm and 27mm thick, perhaps for use as a post-pad

(context 251, ditch 85). The distribution of the lava seems significant, as all except one piece is from the immediate area of the windmill and granary (the exception, ironically, is the thickest piece, the best candidate for a millstone).

There is thus little useful information which can be gained from the lava from this site, except to suggest that hand-querns, as well as the mechanical mill, were in use, and they were probably located in the granary. They need not have been used for the production of flour, as querns were used to grind other materials as well, such as malt for brewing. The lack of clear evidence for millstones is most likely to imply that the millstones from the windmill were not broken or discarded on the site. Certainly, if they were still whole when the windmill went out of use, they could have been used at another mill rather than discarded.

Other stone objects

1. (Fig.22.7) Grey schist whetstone, with variable square section. It has been worn very thin, and has broken at the thinnest point. The end is pierced; this is probably not the original suspension hole, as the end has broken across a hole pierced at right angles to the surviving hole. L 47mm. SF1. Context 250, ditch 85 in Area 2.
Schist was the most common type of stone used for whetstones in medieval Essex, usually Norwegian ragstone, which was imported into England from the Late Saxon period onwards. This example was not identified petrologically.
2. (Not illustrated). Medium grained sandstone. Fragment with some wear, probably utilised as a sharpening stone. Wt. 58g. Context 414, pit 415, Area 3.
3. (Not illustrated). Limestone slab fragment, possibly used as a flagstone. 28mm thick. Context 197, upper fill of windmill pit 200, Area 2.

Baked clay

by H. Major
(Not illustrated)

There was a total of 663 pieces of baked clay, weighing 6,058g, from the excavations. A further 948 fragments, weighing 1,401g, were recovered from the soil samples. There were no contexts containing large amounts of baked clay, the largest being 706 (ditch 85 in Area 2) with 822g. Five fabrics were present, distinguished by the nature of their temper. Over half of the assemblage by weight was in a fabric with sparse to moderate vegetable temper, sparse sand, and sometimes mottled in colour. Just over 30% was in a fabric with sparse to moderate vegetable temper, and fairly sparse chalk fragments. The other three fabrics, all present in minor amounts, contained no chalk, and were respectively heavily vegetable-tempered, sandy and with few visible inclusions. The range of fabrics present on the site is a reflection of the rather mixed drift geology of the area. Chalky daub is typical of sites on the boulder clay (*cf.* a site at Stebbingford, Felsted; Major 1996, 155), whereas the baked clay with few inclusions is probably unadulterated brickearth.

Most of the baked clay appears to be from structural daub, either wall or floor daub, although there are no definite wattle impressions, and few details present. The largest fragment, from 706, is in a chalky fabric, and is probably from the edge of a door or window. There was also part of an object in context 706, too incomplete to be identifiable, but possibly part of a rectangular sectioned bar. Medieval fired clay objects are relatively rare, but occur occasionally in Essex. The medieval farm at Stebbingford, Felsted, for example, produced two fragments of blocks of unknown purpose (Major 1996, 155).

Prehistoric pottery

by N. Brown
(Not illustrated)

The excavation produced eleven small very abraded sherds of pottery (from contexts 31, 476, 644, 1001 and 1004), in flint- or sand-tempered fabrics, none of which is closely datable. This material is considered to be residual.

Late Iron Age and Roman pottery

by T.S. Martin
(Not illustrated)

A total of twenty-four very small abraded sherds (74g) of Late pre-Roman Iron Age and early Roman pottery was recovered from eighteen contexts. The features comprise post-holes (475, 507 and 519) and a foundation trench (659) in building 98, post-hole 260, pit 710 and several ditches (119, 124, 126 and 453) in Area 1, ditches 41, 97 and 127 in Area 2, ditches 1006 and 1029 and pond 1032 in Area 3, and pond 27 in Area 4. The pottery was classified using the Chelmsford typology published by Going (1987, 2–54), whose fabric numbers appear in bold after the Essex CC mnemonic codes. The pottery was quantified by sherd count and weight in grams (g) by fabric. The following five fabrics were recorded in varying amounts:

BSW	-	Black-surfaced (5 sherds; 18g)
GRF	39	Fine grey wares (2 sherds; 3g)
GROG	53	Grog-tempered ware (12 sherds; 30g)
GRS	47	Sandy Grey ware (1 sherd; 1 g)
LIME	52	?Lime- or chalk-tempered ware (4 sherds; 22g)

Only four contexts produced more than one sherd and in all cases the condition of the pottery was generally poor and badly abraded. There were no diagnostic sherds from which to identify vessel forms and only one possible rim sherd. Only six contexts produced Late Iron Age and early Roman pottery without associated later material; features 27, 126, 97, 475, 659 and 1029. Even where Late Iron Age and early Roman pottery was recovered from contexts without later pottery, the condition of the assemblages was poor and rarely above one sherd in size. Consequently, close dating of feature fills is not possible and as a whole is of little value for dating.

Discussion

Although this group would fit into an early to mid 1st century date range without any difficulty on fabric grounds, the condition of the sherds and the presence of medieval pottery in most of the contexts indicates that the bulk, if not all, of the pottery is in fact residual.

Early Saxon pottery

by S. Tyler
(Not illustrated)

Two sherds of Early Saxon pottery with no diagnostic features to help with dating were recovered from two medieval features, ring-ditch 43 in Area 2 and ditch 1037 in Area 3. The presence of organic tempering suggests the 6th century, although it is difficult to be precise and the pottery could have been in use anywhere within a date

range of c. AD 450–700. Hamerow's (1993) discussion of the dating significance of organic and sandy fabrics, with respect to the pottery from the Early Saxon settlement at Mucking, suggests that a mixed assemblage of both fabrics is indicative of the period AD 450–550. However, it is difficult to apply this with any certainty to two small sherds recovered as residual finds in later contexts.

1. Body sherd. Abraded. Medium hard dark brown fabric with common small quartz-sand and sparse organic temper. Wt. 4g. Context 21, windmill ring-ditch 43, Area 2.
2. Body sherd. Medium hard fabric with abundant small to medium quartz-sand temper. Wt. 3g. Context 1022, ditch 1037, Area 3.

Medieval Pottery

by H. Walker, with Residue Analysis by J. Evans (Figs 23–26)

Summary

A total of 3,985 sherds weighing 33kg was excavated (including surface finds and unstratified pottery). Coarse wares form the main component of this assemblage, comprising medieval coarse wares including Hedingham coarse ware, followed by approximately equal amounts of shell-and-sand-tempered ware and early medieval ware. There are several less common variants of the main coarse ware fabrics. Very few fine wares are present, but as well as locally made Hedingham fine ware and Mill Green ware, there are examples of Developed Stamford ware and ?Coarse London-type ware. Vessel types consist almost entirely of cooking pots of varying sizes; much less common are bowls, with even fewer coarse ware jugs. Sherds from possible storage jar(s) and possible curfews are also present. The pottery record indicates that occupation lasted from the ?mid 12th century to the mid 13th century or later, with the windmill dating to the earlier 13th century. The greatest quantity of pottery comes from the granary area and there appears to have been backfilling and levelling of these features. The assemblage provided little evidence as to the function of the site. Residue analysis undertaken on sherds from five vessels indicated the presence of porridge, barley ale and a stew or broth. The pottery from some other rural sites in Essex is briefly compared.

Method

The pottery has been recorded using Cunningham's typology (Cunningham 1985, 1–16) and her fabric numbers and rim codes (Table 1) are quoted in this report. The more developed cooking pot rims (B2–E5A) have been dated using Drury's typology at Rivenhall (Drury 1993, 81–4), and all cooking pot rim codes are described below and given their suggested date range. The pottery has been written up by area and is summarised by tables, giving sherd count and total weight of pottery within each context in stratigraphic order (Tables 2–9). The presence of prehistoric, Roman and Saxon pottery is also noted on the tables as a check for residuality, since it follows that if pottery from earlier periods has found its way into a context, then the medieval pottery present may also be residual (Vince 1991, 265). Contexts not containing diagnostic or features sherds are not discussed individually. The term cross-fit is used for joining sherds between different fills and different features. Sherds belonging to the same vessel but not actually joining are also called

cross-fits. Percentages quoted are calculated by weight. Sherds from five vessels were sent for residue analysis (see p.53) these were selected on the grounds that the vessels or the visible residue were untypical and did not represent the usual household pottery or associated activities. This was in order to find evidence of specialised function.

Code	Description	Suggested date range
A1A	simple everted rims	from 10th/11th century
B1	thickened rims	from 10th/11th century
B1A	thickened, everted rims	from 10th/11th century
C1	beaded rims	from 12th century
C3	beaded rims with internal thickening	from 12th century
B2	simple slightly developed everted rims	c.1200
B4	developed, with pointed rims and internal thickening or beading	c.1200
D2	everted, curved-over rim	first half of 13th century
H2	squared rim with sloping top above a short neck	early to mid 13th century
H1	flat-topped above a short upright neck	throughout the 13th century
E5A	horizontal flanged rim	late 13th to 14th century

Table 1 Cooking pot rim typology

The fabrics

Fabrics described in previous medieval pottery reports published in *Essex Archaeology and History* are not detailed again here, and only their date range and published references are given.

Fabric 11B Developed Stamford ware: (<0.5% of total). Made at Stamford in Lincolnshire, this is a very fine wheel-thrown white ware described by Kilmurry (1980) and Mahany *et al.* (1982). Developed Stamford ware is a later type of Stamford ware produced from the early/mid 12th century to c.1250, and is distinguished by the use of a copper-green glaze. It is found in London from c.1150 (Vince and Jenner 1991, 96) and occurs sparsely in late 12th and early 13th-century contexts in the capital (Vince 1985, 47).

Forms: the base of a jug was excavated from the sub-enclosure ditches (No.3) and a thumbled jug handle was found in the windmill pit (No.23). They may or may not be part of the same vessel.

Fabric 12A Early medieval shell-tempered ware: (1.5% of total). Date range 10th to 13th century described by Drury (1993, 78), see also Walker (1996, 127) for further discussion of dating of shelly wares. Not common.

Forms: bowls with beaded rims; a jug with a collared rim (No.1); single examples of cooking pots with undeveloped everted rims and beaded rims — rim forms A1A, B1A, C1 and C3. None of the later types occur. Decoration: one sherd shows burnished decoration.

Fabric 12B Early medieval shell-with-sand-tempered ware: (23.5% of total). Date range and references as for Fabric 12A. This is one of the most abundant wares on site.

Forms: cooking pots with beaded rims, C1 and, C3, (No. 6) are common, and one beaded rim is also thumbled. Also common are the more developed B2 (No. 7) and B4 rims. There are few examples of undeveloped thickened rims — types B1 (No.15), B1A, and examples of 13th-century type H2 (No. 18) and H1 rims.

Fragments from several ?bowls are present but in some cases the sherds are so fragmented it is not definite that they are bowls. Rims are either beaded, thickened, everted, or flanged. There are no large bowls. Three rims were complete enough to measure diameter and these measure 260mm, 280mm and 320mm. A partially complete socketed or spouted bowl is illustrated (No.13).

Other forms comprise a sherd with intersecting applied strips from either a curfew or a storage jar, and a sherd from the ?neck of a jug, both are from the vicinity of the granary, Area 2.

Decoration: cooking pot No. 13 shows an incised wavy line on the inside of the flange and two sherds show thumbled applied strips.

Fabric 12C Early medieval sand-with-shell-tempered ware: (<0.5% of total). Dominant sand tempering with only sparse, usually superficial shell. This does not make up a significant component of the assemblage.

Forms: cooking pots only with single examples of B2 and B4 rims. Decoration: one sherd shows horizontal striations.

Fabric 12f Shell-with-flint-tempered ware: (<1% of total). This is any fabric with a mixture of shell, flint and sand tempering. The flint inclusions have to be obvious in hand specimen, rather than under the microscope, to be classified as this fabric type, as many of the coarse wares contain small amounts of flint. This is a minor component of the assemblage and nearly all comes from ditch 443 in Area 3.

Forms comprise a small H2 cooking pot rim; no sherds are decorated.

Fabric 13 Early medieval ware: (21.5% of total). Extreme date range 10th to 13th-century. Described by Drury (1993, 80), but see also Walker (1996, 27) for a further discussion of dating. This is one of the most abundant wares on site.

Forms: nearly all rim fragments are from cooking pots. These occur in almost the whole range of rim types comprising A1A, B1, B1A, C1, C3, B2, B4, H2 and H1 rims, although the beaded rims are commonest followed by the more developed B2 and B4 rims. Two of the beaded rims (C1) and one of the thickened rims (B1A) are also thumbled. There are only single examples of the typologically earliest and latest rims (rim forms A1A and H1 respectively).

Other forms comprise a possible bowl rim (No.14), and two sherds, probably from cooking pots, have been perforated (No. 21). Two possible curfew fragments are also present.

Decoration: ?bowl No.14 shows pricked decoration on the rim. Other types of decoration comprise wavy line combing, incised horizontal lines, and thumbled, applied strips. One sherd from cleaning over the windmill ring-ditch in Area 2 is glazed.

Fabric 13f Early medieval flinty ware: (<0.1% of total). The same as Fabric 13 but with the addition of flint tempering. As with Fabric 12f, the flint has to be obvious in hand specimen. This is a minor component of the assemblage. Most examples came from the granary ditches in Area 2.

Forms: one bowl fragment with a horizontal flanged rim, and single examples of cooking pots with C1, H2 and H1 rims. There are no examples of decoration.

Fabric 13st Early medieval Stansted ware: (<0.5% of total). A few early medieval sherds are similar to those found at Stansted (Walker forthcoming a) having the same dense sands, orange surfaces and tendency to abrade.

Forms: two beaded cooking pot rims (C1). Decoration: none.

Fabric 13T Transitional sandy ware: (4% of total), previously known as early medieval-transitional, but changed to be consistent with Cotter (2000). Date range 12th to 13th-century. Described by Walker (1996, 128) and Cotter (2000). This is not common, but makes up a relatively large component of the assemblage because two partially complete vessels were found. These comprise part of a rounded jug (No. 24) and the sides of a vessel found in one of the granary ditches in Area 2 which is either part of a cooking pot or a jug.

Fabric 20 Medieval coarse ware: (26% of total). Date range, 12th to 14th-century, described by Drury (1993, 81-6). This is the most common fabric to be found on site, accounting for over a quarter of the total.

Forms: cooking pots are very common and occur in a wide range of rim types comprising several examples of B2, B4 (No.17), D2 (No.5), H2 and H1 (No.19) rims. There are also single examples of early type B1A, C1 and C3 rims, and an example of a rim with a horizontal flange (E5A), the latter is the most developed type of rim in Drury's typology and is datable to the late 13th to 14th centuries. Examples of B4 rims followed by H2 rims are the commonest.

Two possible bowl rims were found, No.4, and a horizontal flanged bowl rim from granary ditch 127.

Decoration: relatively common in this ware. ?Bowl No.4 shows incised lines on the rim and body, and B4 cooking pot No. 17 shows wavy line combing above the shoulder. Two other B4 cooking pots show wavy line combing, but on the rim, not on the body (cf. Drury 1993, fig.39. 48-51). Other types of decoration and surface treatment include horizontal incised lines or striations, rilling and thumbled applied strips. One sherd shows burnished decoration.

Fabric 20C Mill Green coarse ware: (<0.1% of total). A type of medieval coarse ware generally dated to the mid 13th to mid 14th century (see under 'Fabric 35' for published references). Only two body sherds were identified as this ware, both from Area 1.

Fabric 20D Hedingham coarse ware: (18.5% of total). Mid 12th to mid 14th-century, described by Walker (1996, 128). The main difference between Hedingham coarse ware and other medieval coarse wares is that it has a finer matrix so that surfaces appear quite smooth (and micaceous), often with white quartz inclusions poking through the surface. As it was not practical to look at every sherd under the microscope, it is these characteristics that have been used to identify Hedingham coarse ware. This ware accounts for a large portion of the total.

Forms: cooking pots are the commonest type, and rim forms comprise examples of B2 (No.16), B4, D2 (No.22), H2 and H1 (No. 20) rims. None of the 12th-century type less developed rims occur in this ware. As with Fabric 20, B4 rims, followed by H2 rims are the commonest type.

There are several thick-walled sherds with a coarser tempering than usual showing intersecting applied strips, these may be from storage jars (No. 12).

Other forms comprise fragments from jugs, a jug or one-handle jar rim is illustrated (Nos 9, ?10), and a small horizontal flanged rim bowl or possible cooking pot.

Decoration: most decorated sherds come from the granary ditches. The types of decoration are similar to those of other coarse wares. As already mentioned the possible storage jar sherds show intersecting applied strips, and vertical thumbled applied strips are found on some of the cooking pots (No.16), and on vessel No.10. The two handles present show thumbing at the edges (No. 9). Examples of straight and wavy line combing occur, and vessel No.11 shows a line of pricked decoration perhaps made with the end of a comb. A cooking pot rim and a couple of base sherds show splashes of green glaze on their external surfaces.

Fabric 20f Medieval coarse ware with flint tempering: (<0.5% of total). A type of medieval coarse ware with sparse but clearly visible inclusions of flint as well as sand. As with Fabrics 12f and 13f the flint has to be obvious in hand specimen to be classified as flint-tempered. A minor ware, forms comprise one cooking pot with an H2 rim, and one body sherd is decorated with incised horizontal lines.

Fabric 20ox Oxidised medieval coarse ware: (1.5% of total). Colour varies from a very bright to a dull orange, sometimes with a darker core. There is nothing distinctive about the fabric, but it has been sub-divided as it appears to be deliberately oxidised. These vessels are not products of the Mill Green or medieval Harlow industries which also produced oxidised coarse wares. This is a minor ware difficult to distinguish from oxidised Hedingham coarse ware.

Forms: single examples of cooking pots with B2 and B4 rims and two examples of H2 cooking pot rims. In addition there is a bowl or cooking pot fragment with a curved over rim. The strap handle from a jug is also present.

Decoration: one sherd shows incised horizontal lines.

Fabric 20z: (<0.1% of total). This is a variant of medieval coarse ware not seen at other sites, but as there are only a few sherds and just one rim, all the examples of this ware may belong to the same vessel, especially as almost all sherds come from the granary ditches in Area 2. It is pale grey, thick-walled and tempered with fine, densely packed sub-angular sands. Forms comprise one large H1 cooking pot rim 300mm in diameter. A body sherd is decorated with a thumbled applied strip.

Fabric 21 Sandy orange wares: (<0.5% of total). Date range 13th to 16th-century. Described by Cunningham (1982, 359 and 1985, 1). Very much a minor ware distributed sparsely throughout the site. No rims or handles are present but all sherds are probably from jugs. Most sherds have a plain lead glaze, and decoration comprises, a sherd showing combing through a coating of cream slip, and the rilled neck of a jug showing a coating of cream slip.

Fabric 21f Sandy orange ware with flint: (<0.1% of total). Only three sherds of this were noted, all belong to the same vessel from Area 3. The sherds are undecorated and have a plain splash glaze.

Fabric 22 Hedingham fine ware: (<0.5% of total). Date range mid 12th to 13th-century. Described by Drury (1993, 86-89), Walker (1996, 129-30) and Cotter (2000). Only eight sherds of this ware are present including one jug rim. The remainder are body sherds although these too are most likely from jugs. Several of the sherds have a buff fabric rather than the more typical creamy orange colour. Glaze is either plain or pale green. Only two sherds are decorated, one shows incised horizontal grooves and one shows a partial red slip-coating.

Fabric 35 Mill Green ware: (<0.1% of total). Mill Green ware is dated from the mid 13th to mid 14th centuries and is described by Pearce (*et al.* 1982) and Meddens and Redknapp (1992, 11-43). (See also Walker 1995 (114) and Walker 1996 (130) for discussions of its dating in Essex.). Only two sherds were positively identified as Mill Green fine ware, both are from the granary post-holes in Area 2.

<i>Building</i>	<i>Feature</i>	<i>Fill</i>	<i>shell-tempered ware</i>	<i>shell-and-sand</i>	<i>early medieval ware</i>	<i>medieval coarse ware</i>	<i>Mill Green coarse ware</i>	<i>Wt (g)</i>
Building 98	foundation tr. 717	716				1		6
	foundation tr. 541	540		1				7
	post-hole 611	610			1			7
	post-hole 446	444			1			4
	post-hole 446	353		1				7
	post-hole 519	518			1			1 R
	post-hole 511	510			1			2
	post-hole 507	506			2			6 R
	post-hole 561	560	1					6
	post-hole 457	456		4				6
Annexe 117	post-hole 459	458	5	42		3		258
	foundation tr. 455	454	8		2			47
	post-hole 409	408	9					17
	post-hole 583	582		1				1
	post-hole 387	386		1				1
Outbldng 118	post-hole 635	634				2		1
	slot 632	631				2		14
Associated features	post-hole 393	392			1	1	1	21
	linear feature 460	461			2			7
	post-hole 260	259	5	2	9			106 R
	post-hole 291	290	1		3		1	20
	post-hole 342	341		1				12
	post-hole 748	747		1		1		5
Total			29	54	23	10	2	562

R = Roman pottery present

Table 2 Pottery from Area 1: buildings 98, 117 and 118 and associated features

Fabric 35B Mill Green-type ware: (<0.1% of total). A small abraded sherd from Area 4 was classified as Mill Green-type ware.

Fabric 36C Coarse London-type ware: (<0.5% of total). This is an early variant of London-type ware and is described by Pearce (*et al.* 1985, 3) and Vince and Jenner (1991, 83–4). It has a glazed red-firing fabric tempered principally with abundant coarse rounded quartz sands and fragments of fresh water shell and other calcareous inclusions. It is principally a late 12th-century ware dating from c.1140 to c.1200 (Jacqui Pearce pers. comm.). Two highly decorated and glazed fragments from a tripod pitcher have been tentatively identified as Coarse London-type ware (Nos 8a and b).

Area 1: buildings 98, 117 and 118 (Table 2)

Very little pottery was excavated from the buildings and associated features, a total of 118 sherds weighing 562g. Shell-and-sand-tempered ware is most common, and shell-tempered ware is also frequent, followed by examples of early medieval ware and medieval coarse ware. Many of the features produced only one or two sherds, and average sherd size is only 5g. In addition many of the sherds, especially in building 98, are small and abraded to the extent that some are unidentifiable. Three contexts also produced Roman pottery, and foundation trench 644 and post-hole 509 of building 98 produced prehistoric and Late Iron Age/Roman pottery only. These are all indicators of high residuality.

Building 98

Two of the foundation trenches of building 98 (541 and 717) produced single sherds of shell-and-sand-tempered ware and medieval coarse ware. However, the sherd of medieval coarse ware is so abraded that it is almost unidentifiable and could be Roman. In addition, the sherd of shell-and-sand-tempered ware is from the same vessel found in later post-hole 459 and may therefore be intrusive.

Diagnostic sherds from the post-holes within the foundation trenches comprise a shell-tempered ware, thickened, everted cooking pot rim (from post-hole 561) and a shell-and-sand-tempered ware beaded cooking pot rim (from post-hole 457). A relatively large group was excavated from post-hole 459, including the base and sides of a shell-and-sand-tempered ware cooking pot and sherds of medieval coarse ware. The presence of a beaded cooking pot rim and sherds of medieval coarse ware suggest a 12th-century date for deposition, but as there is high residuality, the pottery cannot reliably date the building.

Annexe 117

The earliest pottery came from features 409 and 455. Pottery from post-hole 409 consists entirely of shell-tempered ware. Featured sherds comprise a simple everted cooking pot rim, perhaps dating from the 11th century or even earlier, and a sherd with a burnished surface, which is unusual on medieval pottery and could also indicate an early date.

The pottery from foundation trench 455 also comprises mainly shell-tempered ware. Sherds of interest include a thumbled and carinated sherd of unknown form (too fragmented to illustrate) and two unusual inturned rim sherds, one perhaps from a jug (Fig.23, No. 1), and the other from a cooking pot (Fig.23, No.2). The collared rim of No. 1 is reminiscent of 12th-century St Neots-type ware jugs (Hurst 1976, fig.7.18.5). In addition, this feature also produced a more familiar thumbled, thickened, everted cooking pot rim in early medieval ware, most likely dating to the 12th century.

Little pottery was excavated from the post-holes within the foundation trenches (387, 583, 635), comprising tiny sherds of shell-and-sand-tempered ware and medieval coarse ware, none is closely datable. The latest datable pottery from the annexe is that from foundation trench 455 and suggests a 12th-century date for deposition, contemporary with that from building 98.

1. ?Jug rim: shell-tempered ware; red-brown external surface, darker internal surface. Fill 454 (foundation trench 455)
2. Cooking pot rim: shell-tempered ware; reduced surfaces, reddish core. Fill 454 (foundation trench 455)

Outbuildings 118

Foundation slot 632 produced fragments from two medieval coarse ware cooking pot rims of types D2 and E5A. The former type is datable to the first half of the 13th century, while rim-form E5A is generally dated to the late 13th to 14th centuries, making it one of the most recent finds on site. However, the coarseness of the fabric suggests it is more likely to have an earlier date.

Associated features

Two features, post-hole 393 and linear feature 460, to the south and west of the outbuildings, produced pottery, comprising body sherds of early medieval ware and medieval coarse ware. Post-hole 393 also produced a small fire-blackened sherd of what appears to be Mill Green coarse ware, dating from the mid 13th century.

A small quantity of pottery was excavated from several post-holes to the east of the building 98. These features appear to be aligned with the building, but it is not certain whether the post-holes represent the remains of another building. Adjacent post-holes 260 and 291 are similar in that both produced early medieval ware and shelly wares including a shell-tempered ware bowl fragment with a squared, beaded rim from post-hole 260. However post-hole 291 produced another sherd of Mill Green coarse ware, dating from the mid 13th century or later. The remaining post-holes 342 and 748 produced sherds of shell-tempered ware including a B4 cooking pot rim datable to c.1200 (from post-hole 342), and a single sherd of medieval coarse ware.

Discussion of buildings

The evidence from foundation trench 632 indicates that the outbuildings are later than main building 98 and annexe 117. The dearth of pottery from the building features indicates that the buildings were not dismantled and levelled as at Stansted Airport and Gutteridge Hall, where large amounts of pottery were found in building post-holes and slots (Walker forthcoming a and b). Here, the evidence indicates that the pottery is more likely to be residual. The only exception to this is post-hole 459, which produced a relatively large group of pottery. However this feature is

likely to be the remains of a repair or rebuild, and so it is likely to post-date the original structure.

Area 1: sub-enclosure ditches to the north of the buildings

(Fig. 23, Table 3)

A total of 858 sherds weighing 5.6kg was excavated, constituting approximately 17% of the site total, and is the second largest group recovered. The average sherd size is 6.5g, with the majority of the pottery coming from a series of intercutting ditches which are aligned with the buildings to the south. The least pottery occurs in the earliest ditch 120 and most occurs in the latest ditch 124. A small quantity of fine wares are present comprising sandy orange ware, Hedingham fine ware and Developed Stamford ware but coarse wares make up the main component of the assemblage. There seems to be no particular pattern to the distribution and density of pottery, with sherds occurring in the majority of excavated ditch sections, although no pottery was recovered from ditch 121.

Ditch 120 (618/156/682)

This is the earliest ditch that produced pottery. The only featured material comprises sherds from a reduced shell-tempered cooking pot with a beaded rim. This may be from the same vessel as was found in later ditch 122 (fill 569), but the sherds are too fragmented to be certain. The presence of medieval coarse ware and Hedingham coarse ware in ditch 120 indicates the pottery is no earlier than mid 12th-century.

Ditch 119 (369/405 (recuts 403 and 418)/597/295)

This ditch ran parallel to ditch 120 and produced a larger pottery group, including the base and sides of a Developed Stamford ware jug from ditch section 597 (Fig. 23, No. 3). It is almost certainly from the same vessel as the fragment found in later ditch 122 (section 494), although the sherds do not join. There are also two definite cross-fits between ditches 119 and 122. Although these ditches are stratigraphically related, the ditch sections containing the cross-fits are physically isolated. This suggests that the pottery may have been disturbed and somehow redeposited when the later ditch was infilled, or that both ditches were backfilled with material from the same origin. In addition, there is a cross-fit between ditch section 405 (fill 404) of ditch 119 and its ?recut 403 (fill 402).

Other vessels in ditch 119 comprise cooking pots with beaded rims (sub-forms C1, C3) in shell-and-sand-tempered ware, early medieval ware and medieval coarse ware, and an example of the more developed B2 cooking pot rim. There is also part of an unusual small bowl or cooking pot showing incised line decoration (Fig. 23, No. 4). The Developed Stamford ware and the B2 cooking pot rim indicate a late 12th to early 13th-century date for the infilling of this ditch.

Ditches 403 and 418 were single fill recuts of ditch 119, and produced a similar range of pottery. In addition to cooking pots, there is a thickened, everted bowl rim in shell-and-sand-tempered ware and an early medieval ware thumbled fragment which may be from a curfew or a continuously thumbled base.

3. Base of jug: Developed Stamford ware; off-white fabric with pale orange patches on the external surface; patchy yellowy green glaze extending to underside of base; consistent in size and shape with published Developed Stamford ware jugs from the 1963 Stamford

Pottery from the annexe

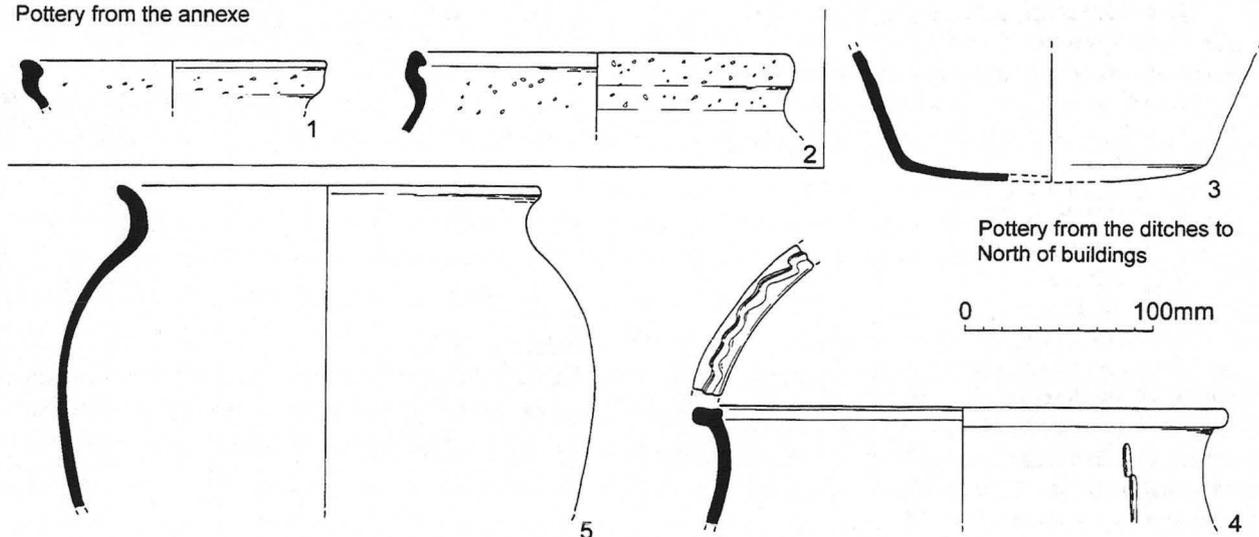


Figure 23 Medieval pottery from Area 1. Scale 1:4

School kiln dated archaeometrically to 1200±20 years (cf. Mahany et al. 1982, fig.73.17). Fill 596 (ditch 119, section 597) and fill 493 (ditch 122, section 494)

4. Rim of small bowl or cooking pot: medieval coarse ware; showing incised wavy lines on rim and vertical line on body, made with a blunt tool; dark grey surfaces, paler core; coarse fabric borderline early medieval ware. Fill 368 (ditch 119, section 369)

Ditch 122 (494/499/427) and gully 453

Ditch 122 ran at right angles to, and cut, ditches 119 and 120. Again the assemblage is similar to that of the previous ditches. One of the cooking pots (in Fabric 12B, sub-form C1, from fill 426) shows extreme abrasion at the basal angle, and an encrusted external deposit on the sides. Residue analysis suggests the vessel contained a cereal porridge (see p. 53). As well as the cross-fits mentioned above, there is a cross-fit between ditch 122 (ditch section 499, upper fill 569) and gully 453 (single fill 452), indicating that these features may have been backfilled at the same time. There is also an internal cross-fit between the primary and secondary fills of ditch section 494 (fills 501 and 493).

Ditch 125 (158/425/637)

Little pottery was recovered from ditch 125 which ran to the north of, and parallel to, ditch 122. There is a higher proportion of medieval coarse wares to early medieval ware, with shelly wares entirely absent. Finds include a sherd of sandy orange ware but this is small and abraded. The only featured sherd is the strap handle from a Hedingham coarse ware jug. It is abraded and oxidised to an orange colour.

Ditch 124 (189/742/422)

This ditch is at right angles to ditch 125 and possibly cuts it. There is one internal cross-fit between fills 451 and 421 of ditch section 422. Fine wares comprise examples of Hedingham ware and sandy orange ware. They occurred only in the second fill of ditch terminal 189 (fill 187) which produced the largest single group of pottery in the sub-enclosure ditches. Of interest is an abraded Hedingham ware jug rim showing splashes of plain lead

glaze. It is undecorated and therefore not closely datable, but the rim has a typical Hedingham ware shape as found on jugs with ring-and-dot stamps (Drury 1993, fig.43.130). There is also a slip-coated sherd of sandy orange ware showing straight line combing under a plain lead glaze, in the manner of Mill Green ware. If this is a Mill Green copy, then its date range is mid 13th to mid 14th-century.

There is a high proportion of medieval coarse ware including Hedingham coarse ware in ditch 124, (especially in fill 187 of the terminal), although shell-and-sand-tempered ware and early medieval ware are still common. The later type cooking pot rims not seen in the earlier ditches occur here, with several examples of B4, D2 and H2 rims. One quite large fragment of a D2-type rim is illustrated (Fig. 23, No. 5). However, there are some inconsistencies between excavated sections, as ditch section 742 at the northern end of the ditch produced pottery which appears to be earlier than that from the rest of ditch 124. In this section medieval coarse ware occurs only in the top fill (739), and there are no developed D2 and H2 cooking pot rims. Of interest in 742 are examples of early medieval ware cooking pot rims that are very similar to Stansted ware. One is thumbbed and beaded while the other has the typical elongated beaded rim of Stansted ware (cf. Walker forthcoming a, no. 60). Apart from cooking pots, the only other coarse ware vessel found in this ditch is a possible bowl rim from the primary fill of ditch terminal 189 (fill 188). It is of shell-and-sand-tempered ware and shows an everted flanged rim.

5. Cooking pot rim: medieval coarse ware; brittle, pale blue-grey fabric; horizontal striations on external surface; fire-blackening on sides; distinct horizontal break line below shoulder accompanied by thinning of vessel walls suggests vessel was made in sections and then joined. Fills 421, 451 (ditch 124, section 422)

Ditch 126 (340/750)

Ditch 126 was situated to the north of the sub-enclosure and is not stratigraphically related to other ditches. The presence of B4 cooking pot rims in ditch section 340, and a high proportion of medieval coarse ware, including oxidised medieval coarse ware, indicates it may be

Feature	Sec.	Fill	Devpd Stamford ware	shell- tempered ware	shell- and- sand	shell- with- flint	early med. ware	early med flinty	early med Stansted ware	med coarse ware	Hed. coarse ware	oxid med coarse ware	sandy orange ware	Hed. fine ware	Wt (g)
Ditch	618	617		13											51
120	156	155								1					4
	682	681					1				5				26
Ditch	405	405					3								12
119	405	404		1	18		27			11					444
	295	294		3			1								15
	597	596	14		57		1								226
	369	368								4					63 R
	403	402			43		86			26					902
	418	417		2	8		8								58
Ditch	494	501			1		2			2					66
122	494	493	2				1			1					14
	494	563			1										5
	499	498			1		4								37
	499	569		9											42
	427	426		2	44		13								430
Gully 453 -		452		1			2								21 R
Ditch	158	157								1					2
125	425	424					3								6
	425	423								1	1	1			28
	637	636									1	1	1		84
Ditch	189	188			2					5		1			55
124	189	187			15		13	1		88	45	4	2	2	1367
	742	741			2		11								75
	742	740			2		1		9						94
	742	739			3		13			4	3				89 R
	422	451			2		7			20	1				220
	422	421		3	3		13			13	1				213
Ditch	340	339			18	2	16			74	1	14			920 R
126	750	749					1								2
Pit 359	-	358			1		3			7		1			45
Pit 710	-	708					1								6 LIA
Hearth 685	-	683					1								4
Total			16	34	221	2	232	1	9	258	58	22	3	2	5626

LIA = Late Iron Age pottery present R = Roman pottery present

Table 3 Pottery from Area 1: sub-enclosure ditches and related features to the north of building complex

contemporary with ditches 124 and 125, although earlier pottery is also present and there are no examples of D2 and H2 rims. Of intrinsic interest is an early medieval ware thickened, everted cooking pot rim, showing the remains of a small hole in the neck made during (not after) manufacture (see No. 21 in Area 2 for a second example). There is also a burnished sherd of medieval coarse ware, an unusual method of surface treatment, but already encountered on a shell-tempered ware sherd from annexe 117 in Area 1.

Other features

Pit 359 was cut by ditch 126 and produced similar pottery. Several cross-fits between the two indicate mixing of fills. Intercutting pit 710 and hearth 685, adjacent to ditch 124, produced only single sherds of early medieval ware which are not closely datable.

Discussion of sub-enclosure ditches

The pottery evidence suggests that there may be two episodes of pottery deposition in the sub-enclosure. Ditches 119, 120, 122 and gully 453 are dated by the Developed Stamford ware and B2 cooking pot rim to the late 12th/early 13th century. Ditches 124, 125 and 126 are

Group	Feature	Fill	shell-tempered ware	shell-and-sand	sand-with-shell	early med ware	Med. coarse ware	Hed. coarse ware	oxidised med coarse ware	sandy orange ware	Hed. fine ware	Mill Green fine ware	Wt (g)
Granary	post-pit 234	233	1	12	1	10	3	4	3				229
	post-pit 234	232		3		1	2						55
	post-pipe 230	229		1		3	1						61
	post-pit 206	205		21		16	11			1			213
	post-pit 206	204		14		17	13						272
	post-pipe 186	185		5		10	27	4					356
	post-pit 245	246	3	68		35	85	11					2172
	post-pit 258	257		4	2	7	14	2					170
Assoc.	post-hole 87	88		10			9						123
post-holes	post-hole 704	703		3		3	24	1					175
	post-hole 299	298		2		2	1	1		1		1	41
	post-pipe 297	296				7	2					1	77
	post-pipe 223	190		6		2	10	1			1		113
	post-hole 214	213				6							33
	post-hole 222	221		2		2	3	2					23
	post-hole 307	306		10			11						122
	post-hole 307	305		3			1						26
	post-hole 320	319						1					7
Total			4	164	3	121	217	27	3	2	1	2	4268

Table 4 Pottery from Area 2: granary post-pits and associated post-holes

dated by the Mill Green-style sandy orange ware and the D2 and H2 cooking pot rims to the mid 13th century or later. It is tempting to suggest that the earliest ditches were contemporary with building 98 and annexe 117 and the later ditches were contemporary with the outbuildings 118. However it is unlikely that there was a long interval of time between these suggested episodes, especially as the Developed Stamford ware in the earlier episode could easily be early 13th-century and the pottery in the later episode could easily be mid 13th-century.

Area 2: the granary (Table 4)

A total of 544 sherds weighing 4.3kg was excavated with an average sherd size of 8g.

The granary (post-pit 206/post-pipe 186; post-pit 234/post-pipe 230; post-pit 245; post-pit 258)

Quite a large amount of pottery was excavated from the four large post-pits, and as would be expected all produced similar pottery. Cross-fits between some of the post-pits themselves, between post-pits 245 and 206 (fills 246 and 205) and between post-pit 258 and post-pipe 230 (fills 257 and 229) show that these features were contemporary and confirms that they were all part of the same structure. There are also external cross-fits between the granary features and adjacent ditch 85, indicating both were infilled at the same time.

These cross-fits are between: granary post-pit 206 (fill 205) and ditch section 252 (top fill 249) of ditch 85; between granary post-pit 245 (fill 246) and ditch sections 252 (top fill 249) and 707 (primary fill 720) of ditch 85.

There is only one example of fine ware, a body sherd of sandy orange ware, probably from the shoulder of a jug found in the primary fill of post-pit 206, which cross-fits with ditch 85.

The remaining pottery is all coarse ware, comprising mainly shell-and-sand-tempered ware, early medieval ware and medieval coarse ware. Coarse ware vessels comprise a shell-and-sand-tempered ware bowl fragment with a beaded rim (from the top fill of post-pit 234) and various cooking pot rims of sub-forms B1A, C1, C3, B2, B4 and H2. In addition, there are some thick-walled Hedingham coarse ware sherds showing thumb applied strips that may be from a storage jar (Nos 12a, b, see under ditch 85).

Post-pit 245 produced a relatively large group of pottery of over 2kg from single fill 246 and finds include a large fragment of cooking pot. Such a large deposit from a building feature would indicate the pottery was deposited after the building had been dismantled. The presence of B4 and H2 rims in the post-pits suggest an early to mid 13th-century date for deposition.

Post-holes adjacent to the granary (features 87/704 (post-pipe 223), 214, 222, 299 (post-pipe 297), 307, 320)

Much less pottery was recovered from the smaller post-holes located near to the granary. Out of four post-holes forming a line to the north of the granary, two produced a small quantity of pottery (post-holes 87/704 and 299). No external cross-fits were noted to indicate whether these features were part of the same structure. Finds from post-hole 87/704 comprise mainly shell-and-sand-tempered ware and medieval coarse. The latest pottery is an H2 cooking pot rim in medieval coarse

ware, suggesting an early to mid 13th-century date. Post-hole 299 and its post-pipe 297 produced single sherds of Mill Green fine ware, although probably not from the same vessel. That from post-hole 299 shows a white slip-painted stripe under a mottled green glaze, while that from post-pipe 297 shows a white slip-coating under a mottled green glaze. The latter is more typical of Mill Green ware. Also excavated from post-hole 299 was a sherd of sandy orange ware showing streaks of glaze, it is tempered with red sands and is similar to medieval Harlow ware (see Walker 1991, 109 for a description of this ware). Coarse wares from 299/297 comprise mainly early medieval ware and medieval coarse ware, and forms comprise an early medieval ware cooking pot with an H2 rim. The presence of Mill Green ware provides a date of mid 13th to mid 14th-century, although the absence of later type cooking pot rims would suggest a mid 13th-century date is more likely.

Pottery from post-pipe 223, in (aceramic) post-hole 202 to the north of 87/704, includes a sherd of Hedingham fine ware showing a buff fabric and a two-tone clear-and-pale green glaze, and examples of B4 and H1 cooking pot rims, indicating a 13th-century date. This post-hole cut ditch 97, the recut of which was probably filled during the early to mid 13th century (see below).

Post-hole 214 to the north of 223/202 produced sherds of early medieval ware including a beaded cooking pot rim, and could date from as early as the 12th century, thus predating the other post-holes in this group.

Two unrelated post-holes (222 and 307) were also located in the granary area. Both fills of post-hole 307 produced sherds of shell-and-sand-tempered ware and medieval coarse ware. Cross-fits between these fills (305, 306) are likely to be a result of inter-context contamination. Featured sherds comprise a medieval coarse ware B4 cooking pot rim with combed decoration on the rim datable to c.1200. Post-hole 222 located to the north of the terminal of recut ditch 97 produced unfeatured body sherds of shell-and-sand-tempered ware, early medieval ware, medieval coarse ware and Hedingham coarse ware.

Discussion of the granary post-pits and post-holes

The large amount of pottery in the granary, and the presence of cross-fits between the granary post-pits (and with ditch 85, discussed below), suggest the pottery was dumped along with other debris following the dismantling and levelling of buildings when this area of the site went out of use. This evidence is in contrast to that from the main buildings and the sub-enclosure in Area 1, where there is a much smaller amount of pottery and less horizontal spreading. See 'Discussion of ditch sequence' (p.47) for discussion of function.

Little can be said about the post-holes adjacent to the granary although all could be contemporary with the granary with the exception of post-hole 214 which could be earlier. The Mill Green ware in post-hole 299/297 shows this feature cannot be earlier than mid 13th-century

Area 2: the ditches and other features associated with the granary

(Figs 24 and 25, Tables 5 and 6)

This group of features produced by far the largest amount of pottery from the excavation, a total of 1,681 sherds weighing over 15kg and constituting 46% of the total. Average sherd size is 9g. Most of the pottery comes from

a series of ditches around the granary, some of which are related stratigraphically. The pottery is similar to that already encountered. Coarse wares are the major component, with medieval coarse ware and Hedingham coarse ware the most frequent, followed by early medieval ware and shell-and-sand-tempered ware. Only a few sherds of fine ware/glazed wares are present comprising Hedingham fine ware, sandy orange ware and ?Coarse London-type ware, all but one of these sherds occurred in ditch 85.

Ditch 97 (208/347, ?recut 367/687/ and 228 ?terminal of recut)

This is stratigraphically the earliest ditch, cut by ditch 85 and post-hole 328. Very little pottery was excavated from the ditch and was entirely absent in ditch section 687. The primary fill (346) of ditch section 347 produced only two very small undiagnostic sherds of ?Late Iron Age pottery which are likely to be residual. The upper fill (361) of this ditch section produced unfeatured body sherds of shell-and-sand-tempered ware and early medieval ware. The only pottery to be found in ditch section 208 was a large fragment of shell-tempered ware base showing a carbonised residue at its centre. These sherds could date anywhere between the 10th and 13th centuries.

A possible recut was identified for ditch 97 (contexts 228, 367 and 680). Very little pottery was found in the recut and was entirely absent in 680. The fill of 367 produced a single sherd of shell-and-sand-tempered ware, while 228 produced a Hedingham coarse ware cooking pot rim of sub-form H2. As the latter ditch section is the terminal of the recut and is not cut at this point by later features, there is no reason to suppose that the sherd does not originate from the recut. This tentatively indicates that the ditch recut was infilled during or after the early to mid 13th century.

Pit 689

Pit 689 to the north of, and aligned with, ditch 97 produced two sherds of shell-tempered ware and a medieval coarse ware sagging base and could be contemporary with the recut of ditch 97.

Ditch 338

This ditch ran parallel to ditch 97, to the northeast of the granary. All the pottery was excavated from the terminal of the ditch. No fine wares or glazed wares are present. Shell-and-sand-tempered ware is most common, followed by medieval coarse ware and then early medieval ware. No external cross-fits are noted. Middle fill 334 produced the largest assemblage, a modest 511g, but with a high average sherd size of 21g. There are cross-fits between this fill and middle fills 333 and 335 indicating they were all part of the same depositional event. Forms comprise large fragments from two shell-and-sand-tempered ware cooking pots of sub-form C3 and B2; both are illustrated (Fig. 24, Nos 6-7). The only other cooking pot from this ditch was a Hedingham coarse ware B4 rim from 5th fill 333. No other forms or featured sherds are present in this ditch. The presence of B2 and B4 cooking pot rims suggests a date of c.1200 and the preponderance of shell-and-sand-tempered ware over medieval coarse ware, may indicate a late 12th rather than early 13th-century date.

Pottery from ditch 338

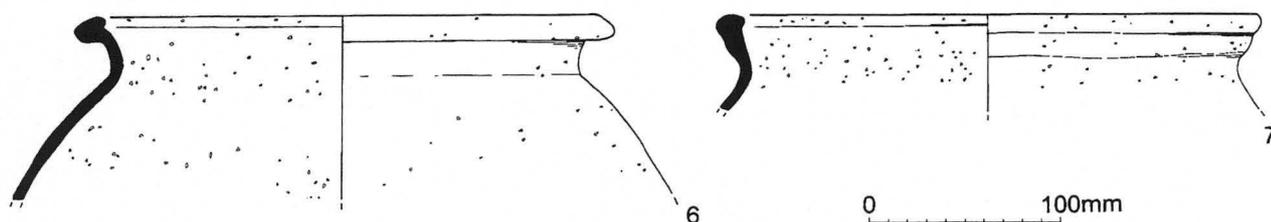


Figure 24 Medieval pottery from ditch 338 in Area 2. Scale 1:4

6. Cooking pot rim: shell-and-sand-tempered ware; red-brown fabric with grey core; external surface fire-blackened; patch of fire-blackening internally below shoulder suggests the vessel was made in sections. Fill 334 (ditch 338)
7. Cooking pot rim: shell-and-sand-tempered ware; orange-brown with grey core where vessel walls are at their thickest; external fire-blackening around rim. Fill 334 (ditch 338)

Ditch 127 (57/ recut 114/ 500/256)

This ditch ran parallel to ditch 97, and was cut by ditch 85. The majority of sections excavated across this ditch produced relatively large amounts of pottery, although the only pottery found in ditch terminal 57 was from its recut 114. Ditch section 256 produced the largest group but as this was cut by ditch section 252 of ditch 85, there may have been contamination from the later feature, and several cross-fits between these two sections would seem to confirm that the fills have become mixed. Cross-fits between ditches 127 and 85 are:

fill 249 of ditch section 252 (ditch 85) and fills 255, 251, 253 of section 256 (ditch 127); fill 356 of section 357 (ditch 85) and fill 253 of section 256 (ditch 127).

Pottery of interest from ditch section 256 is therefore included in the later ditch group (see ditch 85 below).

The latest pottery from ditch section 500 which is uncontaminated comprises a medieval coarse ware cooking pot rim of sub-form H2 from primary fill 495, providing an early to mid 13th-century date. Other forms in this feature comprise a cooking pot with a thickened everted rim, and two cooking pot fragments with B2 rims. There is also a possible bowl fragment in medieval coarse ware with a horizontal flanged rim. Ditch section 114, which is a recut of ditch section 57, actually produced a higher proportion of early medieval fabrics to medieval coarse wares, than did ditch 500, but the presence of B4-type cooking pot rims suggests a similar, or slightly earlier date to the pottery from ditch 500. A shell-and-sand-tempered ware bowl rim of sub-form B2 was also found in ditch section 114.

Ditch 85 (252/ 345/ 357/ 643/707)

This is stratigraphically the latest in the ditch sequence and produced the largest quantity of pottery, a total of 11kg. It ran at right angles to, and cut the ditch 97. There are several cross-fits between the various sections excavated through the ditch, which are as follows:

between 643 (single fill 642) and section 707 (middle fill 706);

between section 707 (middle fill 706) and section 252 (top fill 249);

between section 345 (top fill 343) and section 357 (single fill 356).

These horizontal cross-fits indicate that all of the ditch was infilled at the same time. There are also external cross-fits between earlier ditch 127, and the granary post-holes (detailed above), and between ditch 443 in Area 3, as follows:

between upper fill 249 of section 252 (ditch 85) and fill 413 of ditch 443;

between middle fill 706 of section 707 (ditch 85) and fill 570 of ditch 443.

Of the ditch sections that have more than one fill, there is no discernible difference in the date of the pottery, apart from the fact that shell-tempered ware occurs only in the primary fills. Table 6 also shows a relatively high proportion of shell-and-sand-tempered ware and early medieval ware in ditch section 252 and this is probably because it cut an earlier ditch and the fills have become mixed. By far the largest quantity came from the middle fill of ditch section 707 (fill 706) with 4.3 kg of pottery and a high average sherd size of 14.5g. Internal cross-fits between all three fills of section 707 would indicate they are contemporary. As the evidence indicates the pottery from ditch 85 was deposited contemporaneously, the pottery has been treated as a single group. Sherds of interest are illustrated or described below (Fig. 25, Nos 8–21).

The fine wares/glazed wares from ditch 85: very little belongs to this category and comprises the following:

8a, b Highly decorated body sherds; probably Coarse London-type ware (Jacqui Pearce pers. comm.); thick-grey core, paler margins and orange-brown surfaces; moderate coarse sand-tempering, sparse brown ?iron oxide; applied decoration accompanied by remains of circular depressions; covered with pricked decoration made with the end of a comb rather than rouletted; olive-green ?iron reduced glaze; ?from a tripod pitcher; not a typical Coarse London-type ware product but shows similarities to animal designs on later highly decorated style London-type ware jugs (cf. Pearce *et al.* 1985, fig.57.227-8). Fill 343 (ditch section 345), fill 356 (ditch section 357)

Not illus. Body sherd from the shoulder of a jug: sandy orange ware; unglazed, slightly rilled and shows a partial cream slip-coating; rather coarse fabric borderline with early medieval ware; cross-fits with granary post-pit 206 (primary fill 205). Fill 249 (ditch section 252)

Not illus. Hedingham fine ware sherds: a total of four body sherds are present, all in a buff version of the fabric which could indicate a later 12th-century date (Cotter 2000; Walker forthcoming a). One sherd is decorated with incised horizontal lines under a partial pale green glaze. Another fragment shows a partial red slip-coating and traces of decomposed pale green glaze. Fill 356 (ditch section 357), fill 343 (ditch section 345) and surface finds 86

Buff-coloured Hedingham coarse wares from ditch 85: a number of featured sherds in a coarse pale-buff coloured version of Hedingham coarse ware were recovered, including sherds of possible storage jar seen in the granary

Pottery from granary ditch 85

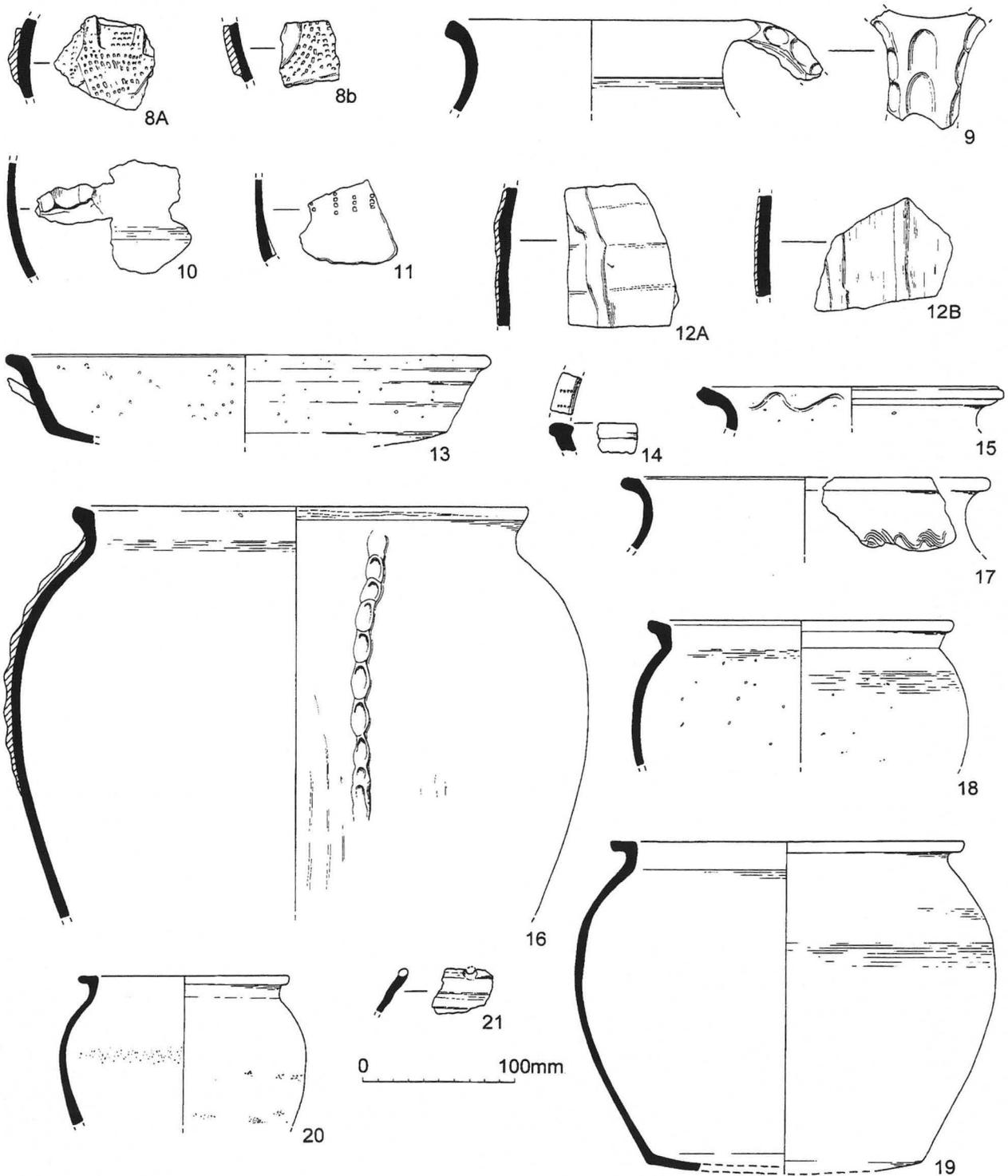


Figure 25 Medieval pottery from ditch 85 in Area 2. Scale 1:40

post-pits *etc.*, and sherds from other vessels in earlier contaminated ditch section 256. The sherds are too fragmented to assign a specific vessel type and it was also impossible to determine which, if any of the sherds, belong to the same vessel(s).

9. Jug or one-handed storage-jar rim: Hedingham coarse ware; thumbing down centre of handle and along edges of handle. Fill 249 (ditch section 252)

10. Body of vessel: Hedingham coarse ware; perhaps part of vessel No. 9; applied thumbing which has broken away from the body and may have been much wider. Fill 251 (ditch section 256)

11. Base sherd: Hedingham coarse ware; pricked decoration made with the end of a comb; internal vessel wall of uneven thickness as if thumbed; extraneous strip of clay around inside of base. Fill 251 (ditch section 256)

12. Sherds from a ?storage jar: Hedingham coarse ware; very flat profile a, b. indicates they come from a large vessel such as a storage jar; applied strips. Fill 249 (ditch section 252) and fill 246 (granary post-pit 245)

<i>Fabric No.</i>	<i>Rim form C1</i>	<i>B1</i>	<i>B2</i>	<i>B4</i>	<i>D2</i>	<i>H2</i>	<i>H1</i>
12B	fill 249	fill 356 (No. 15)	fill 249, 343	fill 249		fills 356, 706 (No.18)	fill 249
12C				fill 249			
13	fill 249		fill 249	fill 343			
13f						fill 356	
20				fills 249, 356, 642 (No.17)		fill 356	fill 706 (No.19)
20D			fills 356, 642, 706 (No.16)	fills 249, 706	fill 706	fills 249, 356, 706, 343	fill 249, 706 (No.20)

Table 5 Cooking pot rims in ditch 85 by fabric and rim form

Coarse ware bowls from ditch 85: the remains of only four bowls or possible bowls were recovered, all in early medieval fabrics.

13. Shallow bowl: shell-and-sand-tempered ware; showing remains of socket or spout; red-brown; slightly laminated fracture and some of surface around basal angle has flaked off; fire-blackened externally except in area of spout/socket; inside of base also fire-blackened; knife trimming above basal angle. The sockets on socketed bowls were for the insertion of a wooden handle, to enable the user to stand well away from the fire. If this is from a spouted bowl then this implies it held something fairly liquid, and residue analysis suggests the bowl contained a meat/cereal stew (see p. 53). Shell-tempered vessels are suitable for heating as they are resistant to thermal shock, i.e. they are less likely to crack when removed from the fire and placed on a cool surface. Fills 720, 705 (ditch section 707)
14. Rim from bowl or cooking pot: early medieval ware; pricked decoration on rim; usual red-brown fabric but with tempered with glossy, sub-rounded amber coloured quartz sand; fire-blackened externally and over top of rim. Fill 249 (ditch section 252)
- Not** Flanged everted bowl rim: shell-and-sand-tempered ware; too **illus.** fragmented to measure diameter. Fill 356 (ditch section 357)
- Not** Horizontal flanged rim from bowl: flinty early medieval ware; **illus.** diameter 360mm. Fill 343 (ditch section 345)

Coarse ware jugs from ditch 85: even fewer jugs than bowls were recovered, comprising an early medieval ware strap handle from surface find context 86, and a sherd from the neck of a ?jug in shell-and-sand-tempered ware from fill 356 of ditch section 357.

Cooking pots from ditch 85: as usual on medieval sites, cooking pots are by far the most common form and several rim-forms in a variety of fabrics are present, these are shown in Table 5.

15. Cooking pot rim: shell-and-sand-tempered ware; grey core red-brown internal surface; externally fire-blackened; most of shell leached out, only vesicles remain; faint incised wavy line decoration on inside of rim. Fill 253 (ditch section 256), fill 356 (ditch section 357)
16. Large cooking pot: Hedingham coarse ware; honey-buff surfaces (but not of same type as Nos 9–12); indistinct pale grey core; internal thumb marks and definite horizontal break line at the shoulder indicate the vessel was made in sections; thumbed, applied strip; vertical striations, probably the result of knife trimming; fire-blackening over bottom half. Fill 706 (ditch section 707), fill 642 (ditch section 643)
17. Cooking pot rim: medieval coarse ware; brown-grey; decorated with wavy line combing. Fill 249 (ditch section 252)
18. Small cooking pot: shell-and-sand-tempered ware; red-brown with indistinct darker core; external fire-blackening extending over top of rim. Fill 706 (ditch section 707)
19. Cooking pot: medieval coarse ware; grey surfaces, buff outer margin; red inner margin and grey core where vessel walls are at their thickest; external surface is mottled with blotches of brown;

external fire-blackening up to shoulder; iron stain on internal surface, probably post-depositional; some spalling on sides; thinning of vessel walls around middle of vessel and internal thumb marks suggest the vessel was made in sections. Fill 706 (ditch section 707)

20. Small cooking pot: Hedingham coarse ware; grey, finely potted but no evidence of throwing lines; knife-trimmed; considerable thinning of wall at girth and shoulder of vessel; internal band of fire-blackening corresponding to where the vessel walls are at their thinnest; patches of fire-blackening externally; residue analysis did not produce results. Fill 255, 251, 253 (ditch section 256) and fill 249 (ditch section 252)

Not Sagging base: Hedingham coarse ware; most likely from a cooking **illus.** pot; sides and underside heavily spalled perhaps indicating intense heating although there are no signs of fire-blackening or other traces of use. Fill 249 (ditch section 252) and fill 251 (ditch section 256)

Other featured coarse ware sherds from ditch 85:

21. Sherd with perforation through neck: early medieval ware; grey fabric borderline with medieval coarse ware; difficult to determine whether hole was made during or after manufacture; it could be for suspension but if the vessel had a lid or was sealed, the hole may have been to let off steam; no traces of use. Fill 249 (ditch section 252)

Not Large fragments from sides of vessel: transitional sandy ware; **illus.** thick-walled brown-grey surfaces, thick reddish brown core; external surface pitted exposing core; vessel has a 'shoulder' and is most likely from a cooking pot or perhaps a jug; internal horizontal striations suggest a wheel or turntable was involved in manufacture; row of internal thumb marks about half way down the vessel suggest the vessel was made in sections; no traces of use. Fill 705 and 706 (ditch section 707)

Gully 746

Gully 746 is to the north of, and on the same alignment as, ditch 85. Medieval coarse ware and Hedingham coarse ware are the main fabrics and there are smaller amounts of shell-and-sand-tempered ware and early medieval ware. Forms comprise B4 and H2 cooking pot rims and of some interest is the profile of a very small cooking pot with a curved over rim (rim form D2) (Fig. 26, No.22). Cooking pots this small are unusual and may indicate some kind of specialist use, although there are no obvious residues or wear marks on this pot. This feature may be contemporary with ditch 85.

22. Small cooking pot: Hedingham coarse ware; pale grey fabric; horizontal break-lines above the base and below the neck indicate the vessel was coil-built although the evenness of the walls suggest a turntable was used; knife trimming around the base; some blackening around the base and inside of neck but it is difficult to determine whether this is a sign of use or due to firing conditions. Fill 745 (gully 746)

Feature	Exc. Sec.	Fill	shell-tempered ware	shell-and-sand	sand-with-shell	early med. ware	early med. flinty ware	Transitional sandy ware	med. coarse ware	Hed. coarse ware	med coarse flinty	Oxid. med coarse ware	20z	sandy orange ware	Hed. fine ware	coarse London -type	Wt (g)
Ditch 97	208	207	1														84
	347	361		2		1											16
	367	360		1													15
	228	227								1							10
P-H 328	-	327				1											2
Pit 689	-	688	2						2								24
Ditch 338	-	337		8		1			1								104
	-	336		2					1								14
	-	335		18		1			16								321
	-	334		15		3			6								511
	-	333		6		1				1							83
	-	332		6		4											68
	-	331							2								6
Ditch 127	256	255		3		3			11	13		3					184
	256	300		2					2	1							58
	256	251	1	5		7			12	44							476
	256	253		25		30	2		46	25							1061
	500	495				1			3								51
	500	490		17		16			10	2							381
	114	41	1	12		68			3	6							507
	114	84	3	13		16			4	2							190
Ditch 85	252	249		51	1	71	7		88	88	5		6	1			2923
	357	356		55		69	2		97	30					1	2	1540
	643	642		4		5			13	10							299
	707	720	1	36	5	4			5	8							420
	707	706		36		36		15	81	112		15					4292
	707	705		1		7		2	13	4							257
	345	344	2	6					2								72
	345	343		29		33	4		37	9				1	1		912
Gully 746	-	745		8		3	1		10	15							264
Gully 116	663	662							1								6
	647	646	1	8		1			2								80
Pit 649	-	648	1						4								26
Total			13	369	6	382	16	17	472	371	5	18	6	1	2	3	15257

R = Roman pottery present

Table 6 Pottery from Area 2: the ditches and other features associated with the granary

Gully 116 (663, 647) and pit 649

Very little pottery was found in gully 116, which ran parallel to the southern arm of ditch 85, or from later pit 649. The assemblage comprises a small quantity of unfeatured sherds of shelly wares, medieval coarse ware and one sherd of early medieval ware. It is not possible to closely date this assemblage closely, although it is most likely to date to the 12th to 13th centuries, or ascertain whether these features are contemporary with other features in the area.

Discussion of the ditch sequence

The dating of this ditch sequence is not as clear cut as that of the sub-enclosure ditches to the north of the buildings. The absence of medieval coarse ware in the stratigraphically earliest ditch 97 suggests this ditch was infilled before the later ditches, although with such small amounts of pottery this is difficult to prove. In addition, it is possible that the fill of ditch 338 could be contemporary with the filling of the first cut of ditch 97. The pottery retrieved from the recut of ditch 97 and later ditch 127 are both dated by H2-type cooking pot rims to the early to mid 13th century. Dating of the pottery in the latest ditch 85 is

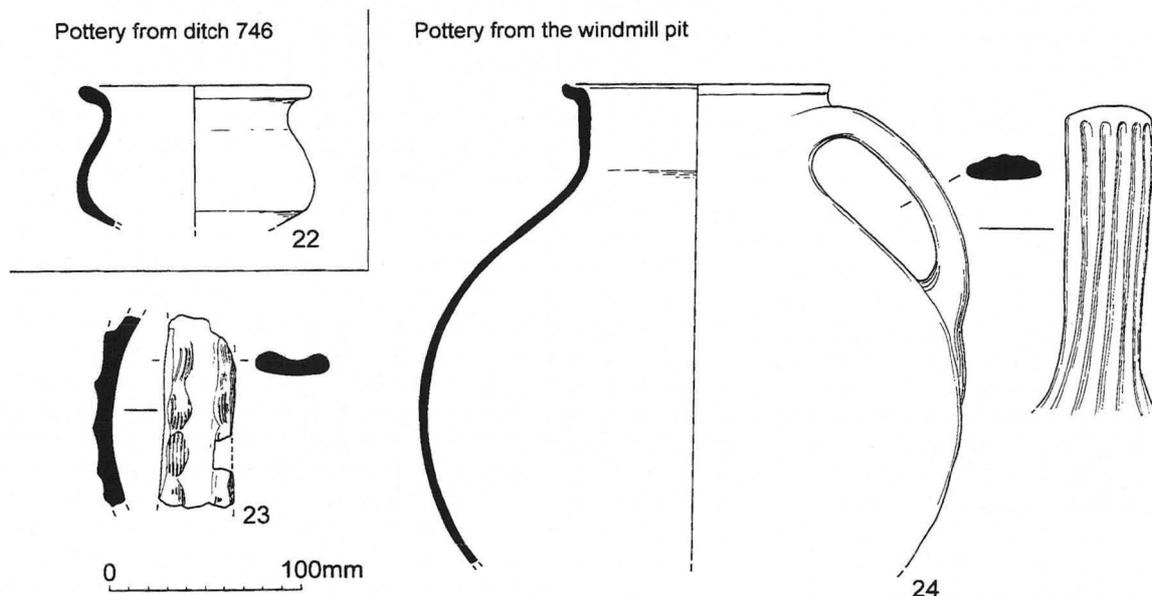


Figure 26 Medieval pottery from the granary and windmill in Area 2. Scale 1:4

more problematic. It was the only ditch to produce fine ware sherds, albeit in small quantities. The most closely datable is the ?Coarse London-type ware belonging to the period c.1140 to 1200. The buff Hedingham fine ware sherds are probably contemporary, and although normally dating from the 13th century, the sherd of sandy orange ware is borderline with early medieval ware and could also be 12th-century. The fine wares are therefore earlier than the pottery from the preceding ditches and earlier than the cooking pot rims in this ditch. Table 5 shows that although 12th-century-type beaded cooking pot rims are present in this ditch, by far the majority are developed 13th-century-type cooking pot rims including several examples of D2, H2 and H1 rims. The H1 rim is typologically the latest, current throughout the 13th century, although the presence of D2 and H2 rims indicates a date in the early to mid 13th century is most likely. This means that the pottery from ditch 85 is of the same date or slightly later than the two preceding ditches.

Like the sub-enclosure ditches, the smallest quantities of pottery occur in the earliest ditches and the largest in the latest ditch, when the pottery was most likely deposited in the ditches after this area of the site went out of use (see discussion of the granary, above). There are two likely explanations for the fine wares in the latest ditch being earlier than the accompanying coarse wares. The first is that the pottery was old when discarded, perhaps 'curated' if they were treasured items, and the second that fine wares were redeposited from elsewhere when the area was cleared and backfilled, *i.e.* they are residual. As the size of the fine ware sherds is small in comparison to the coarse ware sherds, the latter explanation is perhaps more likely.

In spite of the large numbers of vessels, little can be said about function. In common with nearly all medieval sites, the preponderance of cooking pots over all other forms is typical, although here the absence of other types of vessel is quite marked. There is only one stratified sherd from a coarse ware jug, and very few definite bowls; for example ?bowl No.4 could just as easily be a cooking pot. The only possible associations with milling are the storage

jar fragments which could have been used for storing flour or grain.

Area 2: the windmill pit

(Fig. 26, Table 7)

A total of 182 sherds weighing 1,582g was excavated and average sherd size is 9g. The pottery is from a quite deep stratigraphic sequence, but Table 7 shows no obvious differences between the pottery from the latest deposits and that from the earliest. For example, there is no decrease or increase in the amounts of a particular ware present, although with such small amounts of pottery involved, it is difficult to identify trends. One vertical cross-fit was noted, between deposits 235 and 198. No horizontal cross-fits between other features or areas were found.

The primary fills of pit 200 produced very little pottery, but finds do include Hedingham coarse ware and forms comprise a B4 cooking pot rim and a thickened, everted jug rim in this ware. A larger group of pottery was excavated from later pit/depression 376, although paradoxically, this produced much larger quantities of early medieval fabrics (Fabrics 12B and 13) than did the earlier fills in pit 200, especially from primary fill 375 where finds include a thumbbed, beaded cooking pot rim. Subsequent fills also produced beaded cooking pot rims, but fill 348, the second fill of cut/depression 376, also produced single examples of the more developed B2 and B4 cooking pot rims. Fill 32 produced a possible bowl fragment in shell-and-sand-tempered ware with a flat-topped thickened everted rim. Top fills 33 and 237 produced only medieval coarse ware and Hedingham coarse ware, and forms comprise a D2 cooking pot rim in medieval coarse ware.

Rather more interesting pottery was recovered from the latest deposits and features within pit 200, especially cut/depressions 378 and 215. The pottery comprises the handle from a Developed Stamford ware jug (Fig. 26, No. 23) and a large fragment of coarse ware jug (Fig. 26, No. 24). The only other diagnostic sherd from these features is a B2 cooking pot rim in shell-and-sand-tempered ware.

Feature	Fill/ context	Devpd ware	Stamford shell- and-sand	sand-with- shell	Early med. ware	Transitional sandy ware	Med. coarse ware	Hed. coarse ware	oxidised med coarse	Wt (g)
Pit 200	433							1		15
	385		1					5		20
	384		1		1			1		18
Pit 376	375		16		16		19	1		295
	38		1		3					23
	348		7	2	5		1	4	1	172
	36						3			2
	32		1							8
	33						1			11
	237						4	1		53
Feature 378	236		2	1	1		11	2		124
	235	3	3			1		3		156
Feature 215	198					44				600
Redeposited clay	197		4				1	3		30
Pit 376	25				2					2
Gully 696	695		1				1	1	2	53
Total		3	37	3	28	45	41	22	3	1582

Table 7 Pottery from Area 2: the windmill pit and associated gully

23. Jug handle: Developed Stamford ware; very fine white fabric with salmon-pink margins; laminated fracture; lustrous mottled green glaze which has flaked off in places; thumb edges to handle showing combed decoration; handle is chipped and abraded, more so on one side than the other; paralleled by an example from the 1963 Stamford School kiln dated archaeometrically to 1200±20 years (Kilmurry 1980, fig.12.2); a date of early 13th-century for the pottery from this kiln is suggested on the basis of style (Kilmurry 1980, table 1). Fill 235 (cut/depression 378)
24. The rim, handle and part of the body of a rounded jug (Plate VIII): transitional sandy ware; dark grey external surface; brown-grey internal surface, red margins and grey core; somewhat thin-walled for this ware; almost certainly coil-built as there are no throwing lines but neither are there any horizontal break lines to suggest the vessel was made in sections; slight striations on the outside suggests the surface has been wiped during manufacture using a cloth or the potter's hand; very sparse large quartz inclusions, one has fallen out leaving a hole in the pot about 8mm across, this may have been the original reason for discard; ribbed handle; patches of spalling below handle suggest the vessel has been heated but there is no evidence of fire-blackening or sooting; residue analysis indicates the jug may have contained beer made from barley; cross-fits with sherd from context 235. Fill Context 198 (cut/depression 215)

Also included in this section is gully 277=696 linking the outer ring-ditch with the windmill pit. This produced a small quantity of sherds of predominantly medieval coarse ware. Finds include a small bowl or cooking pot rim of rim form D2 and an H2 cooking pot rim in shell-and-sand-tempered ware.

There is no evidence to suspect that the fills of the windmill pit were infilled at different times. The closely dated Developed Stamford ware, spanning the years 1180 to 1220 but more likely on stylistic grounds to be early 13th-century, helps to confirm the dating of the B2, B4 and D2 cooking pot rims. These, according to Drury's 1993 typology, would all have been current during the early years of the 13th century.

The large fragment of jug is also of interest, especially as the other pottery from pit 200 consists of small fragmented sherds. It appears to have been deliberately placed at the top of the infilled pit, (after the windmill was dismantled), in a sideways position with the handle uppermost, suggesting this is a ritual deposition. Jugs were the preferred vessel for such deposits in the medieval period (Merrifield 1987, 188), but a whole vessel was normally used, and there is no evidence that this vessel was complete when deposited. In addition, ritual vessels were usually buried in an inverted position. However, it is possible that it is a medieval 'termination deposit' known in pre-Roman and Roman sites for marking the end of use of a site or building (Merrifield 1987, 49-50). Residue analysis suggests that the jug may have contained a barley beer, which may or may not have been part of the ritual (see p. 53).

A total of three jug fragments were found in the windmill foundations, proportionately more than in the other areas of the site. Datable material in gully 696 comprises the early to mid 13th-century H2-type cooking pot rim, although as it is in shell-and-sand-tempered ware, an earlier 13th-century date might be expected, and it may well be contemporary with the pottery in the windmill pit.

Area 2: ring-ditch 43 around the windmill (Table 8)

Only seventy sherds weighing 650g were excavated, with an average sherd size of 9g.

Ring-ditch 43 (668)

Ditch 43 produced a single abraded sherd of shell-tempered ware from its primary fill 54 and sherds of early medieval ware including a B1 cooking pot from

subsequent fill 22. Similar early material was excavated from fills 665 and 667 of ditch section 668, where finds comprise unfeathered sherds of shell-and-sand-tempered ware and early medieval ware. However context 666, stratified between these two fills, produced typologically later pottery comprising various medieval coarse wares including a B2 cooking pot rim in oxidised medieval coarse ware. This indicates a date of c.1200, which is comparable in date to the pottery from the windmill pit.

Ring-ditch 351/311/633/115

This is a recut of ring-ditch 43. Ditch section 351 did not produce pottery, but both fills of ditch section 633 and the single fill of ditch section 115 produced small amounts of unfeathered early medieval fabrics, including shell-tempered ware, which are probably residual. The presence of a sherd of Late Iron Age pottery in fill 595 and Saxon and Roman sherds in ditch section 115 also indicates high residuality.

Ditch section 311 actually produced later pottery than section 633 (from top fill 310). It is similar to that of earlier ditch fill 666 (although these contexts were not directly stratigraphically related), in that various medieval coarse wares are present and early medieval fabrics are absent, although the quantities involved are somewhat larger. Here forms comprise a Hedingham coarse ware H2 cooking pot rim, and large fragments from the body of a second Hedingham coarse ware cooking pot showing signs of intense heating. There is spalling on the sides of the vessel and towards the base and the internal surface has turned black and then red towards the base. Residue analysis of this vessel (below, p. 53) suggests it produced a meat/cereal stew. This would not account for the intense heating. As environmental evidence suggests an accidental granary fire followed by levelling of the site, it is possible that this vessel was burnt in the fire (rather than heated on a hearth). Vessels from other areas such as the granary show similar signs of intense heat (for example in context 249).

Feature 44/313

This feature produced only a small quantity of unfeathered body sherds of early medieval ware and medieval coarse ware (see Table 8) which are not closely datable.

Discussion of windmill area

Assuming the pottery (apart from jug No. 24) in the post socket was in with the packing for the windmill post, then it was most likely erected sometime in the earlier 13th century. Jug No.24 is not a closely datable type, but could easily have been current with the pottery within the windmill pit. Therefore, if jug No. 24 was placed at the top of the windmill pit after the post had been removed, this suggests that the windmill was a short-lived structure.

The pottery from the sections across ring-ditch 43 appears to have slightly disparate dates, but the latest pottery is probably contemporary with that from the windmill pit. The pottery from recut ring-ditch section 311 may be of the same date or slightly later than the original ditch. The small quantity of pottery and the lack of horizontal cross-fits shows there was no large scale dumping of pottery and subsequent levelling, as there was in the area of the granary.

Area 3

(Table 9)

A total of 415 sherds weighing 4.4 kg was excavated with an average sherd size of 11g.

Ditch 443

A relatively large assemblage of approximately 3.5kg was excavated from the fills of ditch 443, which continued as ditch 1037 to the east in the former runway strip. Several cross-fits between this ditch and the fills of ditch 85 in Area 2 indicate they were infilled at the same time. This is confirmed by a very similar assemblage, where forms consist almost entirely of cooking pots with C1, B2, B4, H2 and H1 rims. Other forms comprise fragments from Hedingham coarse ware jugs, including a fragment of flat-topped, thickened, everted jug rim showing the beginnings of a pulled spout, and a strap handle with thumb edges, possibly from the same vessel. Also found

<i>Feature</i>	<i>Sec.</i>	<i>Fill</i>	<i>shell-tempered ware</i>	<i>shell-and-sand</i>	<i>early med. ware</i>	<i>med coarse ware</i>	<i>Hed. coarse ware</i>	<i>med coarse flinty</i>	<i>oxidised med coarse</i>	<i>Wt (g)</i>
Ditch 43	-	54	1							1
	-	22			2					26
	668	667		3	3					22
	668	666				1	1		2	63
	668	665		1	7					130
Recut of ditch 43	115	21		1	3					9 R S
	633	595	1	4	1					26 LIA
	633	594	1	1						13
	311	310				5	24	1		327
Feature 44		23			2					10 R
Feature 313		312			2	3				23
Total			3	10	20	9	25	1	2	650

LIA = Late Iron Age, R = Roman, S = Saxon pottery present

Table 8 Pottery from Area 2: the windmill ring-ditch 43 and associated features

Feature Exc. Sec	fill/ context	shell- tempered ware	shell- and- sand shell	sand- with- shell	shell- with- flint	early med. ware	Transitional sandy ware	early med Stansted	Med. coarse ware	Hed. coarse ware	med coarse flinty	oxidised med coarse	20z sandy orange with flint	Wt (g)	
Ditch 443	442		7			8			56	8			3	1087	
	318		1		3	15			9	14				497	
	413		6	1	8		1		10	20	4		1	640	
	570		15			21	7		9	7			1	669	
	304		7			9		2	14	25			1	528	
Post- hole 58	59					2			2					38	
Pit 415	414	1	21			10			1					315	
Ditch 401	398								1					3	
Modern F428	396					3			1	4		1		66	
Eastern strip															
Ditch 1037	1016 1021 1024	1014 1019 1022	15 1 1			2 1 1			1 1 1	1 1 1				158 101 27 S	
Ditch 1038	1006 1013	1004 1007				4 1			2 2	4 2				28 R 21	
Pit 1012	1009 1008					1 1								1 6	
Pond 1032	1030 1027						1		2 4				1	37 64 R	
Post- hole 1026	1025		6			2			8	5	4		1	130	
Total		1	82	2	11	79	8	2	123	88	8	1	7	3	4416

R = Roman pottery present S = Saxon pottery present

Table 9 Pottery from Area 3 and the eastern strip

was a sherd of ?storage jar in buff Hedingham coarse ware, perhaps from the same vessel as No.12 in ditch 85. There is also an external cross-fit between ditch fill 442 of this ditch and runway disturbance 428 (fill 396), see below.

Other features

A number of other features produced small amounts of pottery and are shown on Table 9. Only those contexts with featured sherds are discussed further.

Pit 415 was stratified below feature 428, and produced a modest 315g of pottery excavated from single fill 414. Apart from one small sherd of medieval coarse ware, the assemblage is composed of shelly wares (Fabrics 12A and B) and early medieval ware and could be as early as 12th-century. Forms comprise:

a shell-and-sand-tempered ware sherd with intersecting applied strips, from either a curfew or a storage jar;

a beaded rim in shell-and-sand-tempered ware from either a bowl or a cooking pot;

an early medieval ware cooking pot fragment showing a beaded rim with internal thickening (sub-form C3).

Feature 428 (?modern airfield/runway disturbance) produced later pottery than that from pit 415, including

cooking pots with B4 and H2 cooking pot rims. However, this probably represents disturbed material redeposited from other features (such as ditch 443, which shares cross-fits), during the construction of the airfield.

Eastern strip

A small amount of pottery was excavated from the eastern strip, part of Area 3 formerly below an airfield runway. The majority of the pottery came from two similarly proportioned ditches (1037 and 1038) which ran at right angles to each other and adjacent to pond 1032. A pit and a post-hole investigated in this area also produced pottery.

Ditch 1037 (1016/1021 and 1024)

This is the eastern continuation of ditch 443, from which it is separated by a narrow strip of remaining concrete runway. Most of the pottery came from the top fill of the terminal. There were no cross-fits between the ditch sections and it is possible that not all of the ditch was infilled at the same time. The terminal of the ditch (1016) produced early pottery comprising early medieval ware and shell-and-sand-tempered ware, including a beaded cooking pot rim, datable to the 12th century. All other fills

however, produced sherds of medieval coarse ware including Hedingham coarse ware, and examples of B2 and B4 cooking pot rims in ditch section 1021 provide a date of c.1200 for infilling of the rest of the ditch. However a sherd of Saxon pottery in ditch section 1024 indicates that residuality may be a factor.

Ditch 1038 (1006 and 1013) and ditch 1029

Very little pottery was found in these ditches. No forms were found but the presence of Hedingham coarse ware precludes a date before the mid 12th century. However, all the pottery is abraded and a sherd of Roman pottery was found in one of the fills, both indicators of high residuality. A third ditch, ditch 1029 to the north of the pond, produced only a small sherd of abraded Roman pottery from single fill 1028.

Pit 1012

Single, abraded sherds of shell-and-sand-tempered ware and early medieval ware were excavated from the fills of this pit which was adjacent to ditch 1038, and like that from the ditch could easily be residual.

Pond 1032

All featured sherds came from top fill 1027, these and comprise two sherds of flinty sandy orange ware showing a rather primitive splashed olive green glaze, a base sherd of Fabric 20z and two B2-type cooking pot rims. These indicate a date of c.1200, although a sherd of Roman pottery in fill 1027 indicates residuality.

Post-hole 1026

This post-hole cut the upper fill of pond 1032 and produced a range of wares similar to that from ditch 1037 including a sherd of flinty sandy orange ware from the same vessel as that from pond 1032, suggesting some intercontext contamination. No forms of diagnostic sherds are present.

Discussion of pottery from Area 3 and the eastern strip

The cross-fits between ditch 443 and granary ditch 85 suggests both features were open at the same time and that ditch 443 may form part of the same ditch sequence in spite of being several metres distant.

The lack of pottery from features in the eastern strip suggests there was little activity on this part of the site. Because of the small amounts of pottery, and presence of residual Roman and Saxon sherds, these features cannot be

dated with any accuracy. However the latest pottery excavated from the eastern strip dates to c.1200.

Area 4: The moat and ponds

(Table 10)

A very small amount of pottery, a total of thirty sherds weighing 182g, was excavated. The lower fills of pond 26 (31 and 35) produced sherds of prehistoric and Late Iron Age pottery, which are small and abraded and are likely to be residual. The only medieval pottery is a sherd of transitional sandy ware datable to the 12th to 13th century from top fill 28.

Pond 10, an irregularly-shaped feature to the north of pond 26, produced an early medieval ware beaded cooking pot rim of probable 12th-century date. Early medieval pottery was also excavated from post-hole 174, to the south of the moat, and finds include another beaded cooking pot rim, this time in shell-and-sand-tempered ware.

Little pottery was recovered from moat 65 itself, which may indicate that the moat was scoured out at regular intervals, and most finds are from the top fills, except for fill 78 towards the bottom of the moat, which produced a small sherd of shell-and-sand-tempered ware. The upper fills produced a similar mixture of early medieval and medieval coarse wares as found in the other features on site. These include sherds of Fabric 20z (fine, dense sands) but these are thinner walled than the examples found in the granary area and are unlikely to be from the same vessel(s). Forms comprise; an early medieval ware beaded cooking pot rim from moat fill 67, and an oxidised medieval coarse ware H2 cooking pot rim from fill 289. The latter is the latest datable pottery found in the moat and indicates an early to mid 13th-century date for the latest infilling.

Pottery from the north-west corner

Very little pottery came from this area, a total of five sherds weighing 28g from three contexts, and does not merit a table. Layer 165 produced a small fine ware sherd, one surface is missing and the surviving surface is smooth and unglazed. It has been classified as Mill Green-type ware and could be medieval or post-medieval in date. A tiny sherd of shell-tempered ware was excavated from the single fill of gully 106, section 178 (fill 179). Remnant sub-soil 264 produced two abraded sherds from the base of an early medieval ware vessel and an abraded, unfeatured sherd of Mill Green-type ware (not part of the same vessel

Feature/group no	Fill	Fabrics						Wt (g)
		12B	13	13T	20	20ox	20z	
Pond 26	28			1				6
Pond 10	13		1					11
Post-hole 174	173	1	2					25
Moat 65	78	1						4
Moat recut 267	66	1	1		8		2	60
Moat recut 267	67		5		1			16
Moat recut 267	282				1	1		19
Moat recut 267	330	1			3			41
Total		4	9	1	13	1	2	182

Table 10 Pottery from Area 4: the moat and associated features

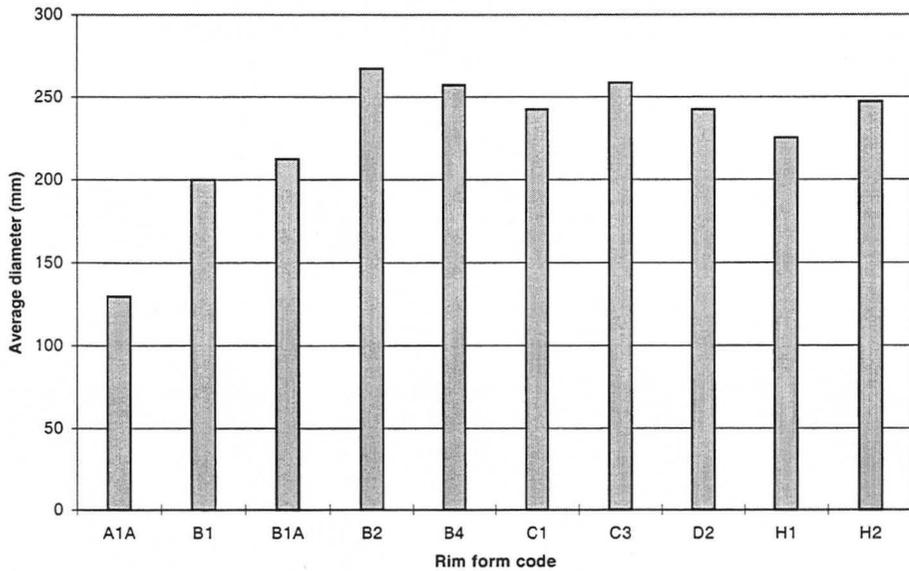


Chart 1 Average diameter of all cooking pot rim types

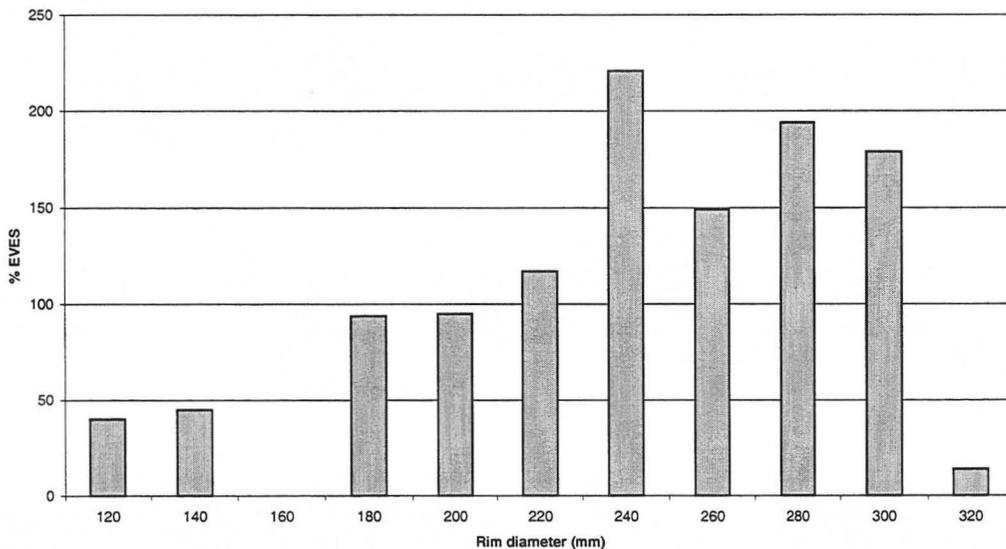


Chart 2 Frequency of cooking pot rim diameters by estimated vessel equivalent (EVES)

as the sherd in context 165). The dearth of pottery suggests there was little medieval activity in this part of the site.

Comparison of cooking pots

As there were a large number of cooking pots from this fairly short-lived site, with all areas producing similar pottery, it was worth attempting some statistical analysis and treating all the cooking pots as one large group.

Chart 1 shows the average diameter of all cooking pot rim types. It shows little correlation between size and rim type except that cooking pots with the early type everted and thickened rims (rim forms A1A, B1 and B1A) tend to

be smaller. The largest rims were found on types datable to the 12th century to c.1200 (rim forms C1, C3, B2 and B4) with rim type B2 the largest. The 13th-century rim types (D2, H1, H2) are very slightly smaller.

Chart 2 shows the frequency of cooking pot rim diameters by estimated vessel equivalent (EVES), which is calculated by measuring the percentage of rim present of each vessel and then adding together all these percentages. The graph shows that there is a wide variation in size of vessel, ranging from 120mm to 320mm. Rim diameters of 240mm are the most frequent followed by 280mm and then 300mm. There are only a few cooking pots smaller than 180mm.

Residue analysis

by J. Evans

Introduction

The sherds from five vessels were microscopically inspected but no adhering organic residues were discernable. The front and rear surfaces were investigated by X-ray fluorescence spectroscopy but little or no difference were detected between the faces with the exception of sample 4 which showed slightly higher levels of calcium on the inner face.

The outer surfaces of the sherds were carefully abraded to remove any surface contamination. The sherds were then pulverised and subjected to the following analytical scheme.

Procedure

The sample was extracted, sequentially, with hexane, chloroform and 2-propanol. Each extract was evaporated to dryness. Any residues so obtained were examined by infrared spectroscopy (IR). These extracts, where sufficient, were then investigated by thin-layer chromatography (TLC). This technique is especially useful for the hexane (oils and fats) and chloroform (resins) extracts, as it enables major constituents to be detected. For example, fats and oils are composed partially of triglycerides that are usually unique to a particular fat or oil.

In the next stage the extracts were subjected to gas (GLC) and high-performance liquid (HPLC) chromatographies. Procedure depended upon the nature of the extract. For instance, the hexane residues were hydrolysed and any free acids methylated prior to GLC. Thus it was possible to identify the fatty acids present. This information, when coupled with that from the TLC, enabled any oils present to be identified with reasonable certainty.

After completion of the extraction procedure the sample was divided. One part was refluxed with 6M hydrochloric acid to release amino acids from any proteinaceous material present. The second part was refluxed with alcoholic potassium hydroxide to decompose any 'dried' oils present. Any resulting products from these procedures were then subjected to appropriate chromatographic investigation.

Results

- Sample 1.** A complex mixture containing a range of fatty acids almost equally divided between the saturated and unsaturated types, cholesterol and traces of protein. Such a mixture suggests a meat/cereal stew. Context 310, in windmill ring-ditch recut 115, Area 2.
- Sample 2.** Similar to sample 1 but no cholesterol detected. A porridge? Context 426, in ditch 122, Area 1
- Sample 3.** Similar to sample 1. Context 705, ditch 85, Area 2
- Sample 4.** Data suggests a fermented product possibly barley beer. This sample contained some calcium oxalate usually thought to indicate a beer product. Context 198, in windmill pit 200, Area 2
- Sample 5.** Little material detected thus either the pot was not used for cooking but possibly dry storage or the burning process associated with it may have 'cleansed' the pot. Context 249, ditch 85, Area 2.

Discussion of pottery from all areas

Some evidence of phasing was found in the buildings and enclosure ditches to the north of the buildings, where building 98 and the annexe 117 produced 12th-century pottery (albeit probably residual) and the external building features such as outbuildings 118 produced pottery dating well into the 13th century. Similarly, the stratigraphically earliest enclosure ditches produced pottery dating to 1180–1220 or later, whilst the stratigraphically latest ditches produced pottery dating to the mid 13th century or later (although it has to be said that the extreme ends of these date ranges meet). There is also evidence in the area of the granary that some features may be 12th century but the majority are mid 13th century or later, and may represent backfilling of this area. Further evidence of 12th-century occupation is provided by the ?Coarse London-type ware vessel which although residual in its context, is dated to 1140 to 1200. There are also several early type 11th to 12th-century simple, thickened or beaded cooking pot rims (rim forms A1, B1, B1A, C1, C3), although excavations at Stansted Airport show that these rim types were still current in the 13th century (Walker forthcoming a). Some of the Hedingham fine ware could also belong to the mid to late 12th century. It would seem therefore that occupation had begun by the mid to late 12th century or perhaps a little earlier. The latest pottery comprises the sherds of Mill Green ware (both fine and coarse) from the granary post-holes and the external building features. These date from the mid 13th to the mid 14th centuries, although a date nearer the mid 13th century is more likely because of the dearth of later types of pottery.

There is little evidence from the pottery to confirm that the site incorporated a windmill, although this is not unexpected as only a few specialised vessels were produced in the earlier medieval period. It is conceivable that the storage jar(s) were used to contain grain or flour, but a medieval illustration in the Luttrell Psalter shows sacks being used for this purpose. It also has to be said that the storage jar(s) were found amongst ordinary household wares. Wide, shallow cylindrical bowls are thought to have been used as measures for flour (Blinkhorn 1998–1999, 44–5), and these are entirely absent from the Boreham Airfield excavation. However, the author has never encountered this form and it is possible that such bowls were not produced in this area of the country. Perhaps measuring bowls made out of other more perishable materials, such as wood, were used.

A number of pottery assemblages from rural sites have been published or await publication, namely Chignall St James (Walker 1992); Stebbingford, Felsted (Walker 1996); Stansted Airport (Walker forthcoming a); Gutteridge Hall, near Weeley (Walker forthcoming b) and Boreham Interchange (Walker 1999). All produced superficially similar assemblages dating mainly to the 12th to 13th centuries and comprise mainly coarse ware cooking pots, with smaller amounts of other coarse ware forms, and fine ware jugs, in Hedingham fine ware, sandy orange ware and smaller amounts of Mill Green fine ware. One form present at some of these sites (*i.e.* Gutteridge Hall, Stebbingford and Stansted) are large wide bowls sometimes with a hole below the rim or just above the base. This form is absent at Boreham Airfield. Such bowls were probably used for dairying (McCarthy and Brooks 1988, 109–10), so it would appear that this particular activity did not take place at Boreham airfield. Not surprisingly it was

the nearest site that produced the most similar pottery, the A12 Interchange site, Boreham, situated about 2km to the south, at the edge of the Chelmer valley. Both sites have a similar ratio of fabrics and very few forms other than cooking pots, although like Boreham Airfield sherds from storage jar(s) were found. At both sites, there are no large wide bowls but several small bowls including a socketed bowl. The ordinariness of this assemblage implies that all the usual household processes were being undertaken (apart from dairying). (For a general discussion of pottery vessels and their uses see McCarthy and Brooks 1988, 102–22.)

The pottery indicates that the windmill was built in the earlier 13th century, but as 12th-century pottery is also present there may have been settlement before the windmill was built. The pottery evidence also indicates that the windmill was a short-lived structure perhaps going out of use in the earlier 13th century. As there is little evidence of pottery much beyond the mid 13th century, occupation may have ended not long after the demise of the windmill. The large fragment of jug placed at the top of the windmill pit is something of an oddity, but as discussed above, may have ritual connotations.

It is difficult to compare the different areas of the site because the quantity of pottery from each one varies so much. For example most bowls were found in the granary area, but this is where most of the pottery was found, so it is difficult to examine the different areas for differences in function. However out of the ten jug fragments found, three come from the windmill pit, a feature that produced only 5% of the pottery. It is likely that the whole site went out of use at the same time as all the main areas produced pottery that could have been current in the mid 13th century. The granary area is something of a puzzle as it is the only area to show definite evidence of dismantling of structures and backfilling, perhaps as a consequence of the fire suggested by the environmental evidence. If this was a granary, it is perhaps odd that domestic household wares were found here, although this area is not far from the main buildings, and may have been used for the disposal of household rubbish. The interpretation of the granary is also to some extent supported by the environmental evidence, which indicates that storage and processing of wheat was the main activity on the site.

The most unusual aspect of this assemblage is the presence of the non-local fine wares of Developed Stamford ware and ?Coarse London-type ware. Developed Stamford ware is rare in Essex, and its presence here may be due to direct links with Lincolnshire rather than the result of trade, although it is interesting to note that it also occurs at Rivenhall (Kilmurry 1993, 90) situated further along the London to Colchester Road. However if this road was a trade route for Developed Stamford ware, more finds would be expected along its route, especially at the major towns of Chelmsford and Colchester. (For other Stamford ware finds spots in Essex see Kilmurry (1980, fig. 32); note that it is more frequent in East Anglia and Hertfordshire). As Developed Stamford ware is found in London, albeit in small quantities, it is possible that it was re-exported from the capital.

London-type ware is scattered sparsely but widely throughout Essex, although it is more common in towns. Out of the rural sites mentioned above, it only occurs at Stansted. However, the author has only encountered Coarse London-type ware at Horndon-on-the-Hill in south

Essex where it may have arrived via the river Thames. Without an obvious trade route, the Coarse London-type ware vessel may indicate direct links with London, and is doubly unusual because of the design. It has to be remembered however, that its identification as Coarse London-type ware was not definite.

To sum up, this represents a typical household assemblage dating from perhaps the mid 12th to mid 13th centuries or later, although there is no evidence that dairying was carried out. The only odd features are the presence of ?Coarse London-type ware and Developed Stamford ware indicating that the occupants had access to pottery not available at the local outlets, although the proximity of the London-Colchester road may in part explain this. The presence of the large fragment of jug at the top of the windmill pit (Plate VIII) may be ritual, while the large amounts of household pottery in the granary area can be explained by disposal of rubbish from nearby domestic buildings.

Faunal remains

by A. Wade

The assemblage consisted of 1,568 pieces of animal, bird and fish bone weighing 4.429 kg. Only 12% of the sample could be identified to species level by number of pieces (186) and 65% by weight (2.874 kg). This low identification is due to the generally fragmented and poor condition of the assemblage and the enhanced collection of small and unidentifiable bone fragments from wet sieved contexts.

The domestic species identified in the assemblage were cattle, pig, sheep or goat, dog, chicken, cat, horse and duck. A number of wild species were also represented in the assemblage including hare, pheasant, roe deer, vole, frog, fallow deer and mole. Table 11 shows the composition of the assemblage by species, number of pieces and weight in grams.

Cattle was the most numerous species in the identified bone assemblage (33%) followed by pig (25%) and sheep or goat (20%). The Minimum Number of Individual animals represented by the assemblage (based upon the most numerous skeletal and dental elements with reference to maturity, side of body *etc.*) is shown for all identified species by Table 12. In most cases this figure is derived from dental indicators which have a higher survival factor than other bone types.

The unidentified material included bird and fish bone which, due to condition or a lack of diagnostic elements, could not be identified to species level with certainty. It may include swan (context 190, post-hole 192 in Area 2). Other large bird bone also of heron or swan size was present in post-pipe 185 (in granary post-hole 206) and 318 (unstratified finds from Area 2).

Seventeen pieces of bone had cut marks upon them (1.1% of the assemblage). Only one piece was associated with working, a fragment of roe deer antler from context 706 (ditch 85 in Area 2). A second piece of antler (without cut marks) was also found in granary post-hole 246. In neither case was it possible to tell whether the antler was shed or not.

Analysis of the remaining cut bone in accordance with the type of cut mark and associated butchering activity revealed only one recognisable element. This was a

<i>Taxon</i>	<i>Species Totals</i>	<i>% of Identified Species (by Number)</i>
Identified Bone		
Cat	1 @ 0.5g	0.54%
Cattle	63 @ 2015g	33.87%
Chicken	3 @ 7g	1.60%
Dog	10 @ 36g	5.38%
Duck	1 @ 8g	0.54%
Fallow deer	1 @ 38g	0.54%
Frog	1 @ 0.5g	0.54%
Goat	1 @ 4g	0.54%
Hare	9 @ 13g	4.84%
Horse	1 @ 2g	0.54%
Mole	1 @ 0.5g	0.54%
Pheasant	6 @ 6g	3.23%
Pig	47 @ 572.5g	25.27%
Roe deer	3 @ 42g	1.60%
Sheep/goat	37 @ 128.5g	19.89%
Vole	1 @ 0.5g	0.54%
Identified Total	186 @ 2874g	100.00%
Unidentified Bone		
Bird indet.	51 @ 33.5g	
Fish indet.	49 @ 1.5g	
Large sized mammal	95 @ 702g	
Medium sized mammal	105 @ 192.5	
Rodent	1 @ 0.5g	
Small sized mammal	38 @ 9.5g	
Unidentified	1043 @ 616g	
Unidentified Total	1382 @ 1555.5g	
Grand Total	1568 @ 4429g	

Table 11 Distribution of animal species by number of pieces and weight (g)

<i>Taxon</i>	<i>MNI</i>
Cat	1
Cattle	3
Chicken	1
Dog	2
Duck	1
Fallow deer	1
Frog	1
Goat	1
Hare	1
Horse	1
Mole	1
Pheasant	1
Pig	5
Roe deer	1
Sheep/goat	2

Table 12 Minimum Number of Individuals represented by the animal bone

fragment of cattle pelvis from context 648 (pit 649 in Area 2) which was the result of dismemberment (Binford 1981, code PS-7).

Dogs are a major cause of bone destruction on any site where they are present. Their actions will have modified the assemblage in certain ways. They prefer to gnaw the less dense bones, avoiding mandibles and teeth altogether. Many of the bones of the smaller species may have been destroyed completely, thus removing them from the bone record. The presence of dog-gnawed bone thus implies a certain degree of residuality within an assemblage. Forty-eight pieces of bone displayed evidence of dog gnawing (3% of the assemblage).

Most of the bone was recovered from the ditches and post-holes associated with the granary in Area 2. By weight the granary features contained 85% of the medieval material including the largest deposits of both gnawed (87% by number of pieces) and cut bone (94%).

Conclusion

Despite the poor condition and fragmented nature of the assemblage a wide range of both wild and domestic species was identified. These included cattle, pig, sheep or goat, dog, chicken, cat, horse and duck. Wild species identified were hare, pheasant, roe deer, vole, frog, fallow deer and mole. It is possible that the unidentified bird bone may also have included swan.

The low quantity of identifiable bone prevents any statistically reliable assessment of local economy or diet, except to note the wide variety of species in the assemblage. That being said, it may be significant that pig figures so prominently in the bone record of the site. It is the second most numerous species (after cattle) and the largest species by the minimum number of individuals calculation (five individuals as opposed to three cattle or two sheep and goat). Estimation of age at death based upon the tooth wear of the small number of pig mandibles in the assemblage indicates both mature and immature animals.

By far the most prolific area of the site for animal bone was Area 2, particularly the ditches around the granary and to a lesser extent the granary post-holes themselves. This area also produced the greatest diversity of species and the largest quantities of both cut and dog-gnawed bone.

The local environment is well represented by the diversity of species in the assemblage. Both roe deer and fallow deer were widespread in the Middle Ages and generally encountered in scrub, undisturbed pasture or woodland. Pheasant and hare prefer pasture and farmland whilst the additional presence of frog, duck and obviously fish bone indicates a nearby aquatic environment. This was perhaps supplied by the ponds and moat within the excavation area or even by neglected drainage ditches. In the immediate vicinity of the site can be found the species characteristic of developed settlements such as dog, cat and vermin (although not conclusive, a possible identification was made of black rat amongst the unidentifiable small mammal bone from the granary).

Charred plant macrofossils and other remains

by V. Fryer and P. Murphy

Introduction

Ninety eight samples were collected from contexts in all areas of the site. Botanical remains from some watermill sites have been investigated (e.g. Campbell forthcoming; Colledge 1992; Thomas and Greig 1992), but this site appears to be the first windmill complex to have been sampled for charred plant remains. Windmills must have been a commonplace feature in the medieval landscape, but in the absence of archaeobotanical study little is known of their mode of operation. Full analysis of all samples was therefore recommended. The aims of the study were:

1. to determine the range of crops processed at the site, and their relative importance;
2. to provide information on local farming systems;
3. to establish the types of on-site crop processing activities represented, from assemblage composition;
4. to investigate the spatial distribution of activities.

Methods

The bulk samples (2–25 litres) were floated by the excavation team in a bulk sieving/flotation tank, collecting the flots in a 500 micron mesh sieve. The dried flots, or sub-samples of them, were sorted under a binocular microscope at low power (x 10). Identifications were made by comparison with modern reference material at higher magnifications, as necessary. Nomenclature follows Stace (1997). Preservation of the material was solely by charring. Modern contaminants including seeds/fruits, fibrous roots, animal droppings, stem and twig fragments, fungal sclerotia, arthropods and chaff were common throughout. The plant macrofossils and other remains identified are listed on Tables 13–17, in which counts of cereal grains refer to whole grains or embryo ends.

Crops and weeds

(Figs 27–30, Tables 13–17)

Crop plants

Grains, chaff and seeds of cereals and other food plants were recovered from sixty-eight samples. Preservation was generally poor to moderate; many of the grains had become puffed and distorted during charring. Food plant remains were especially common from the granary and associated features in Area 2, the peripheral areas of the sub-enclosure ditches in Area 1, and Area 3 (see below for discussion), but elsewhere were rare.

Grains of wheats (*Triticum* spp.) were generally poorly preserved, but short-grained, rounded hexaploid forms appeared to predominate. Chaff was not common but hexaploid-type rachis nodes (*T. aestivum/compactum* (bread wheat-type) with attached internode fragments but no glume bases were present in twenty-one samples, and tetraploid-type rachis nodes (*T. turgidum/durum* (rivet-type) with attached glume bases and swellings below the glume inserts, in three samples. Preservation of barley grains (*Hordeum* sp.) was very poor and it was not possible to ascertain whether a six- or two-row species was represented. Barley chaff comprised abraded rachis nodes. Floret bases of *Avena sativa* (cultivated oat) with characteristic broad basal abscission scars were present in two samples, but indeterminate grains of wild or cultivated

oats predominated. Awn fragments were not recovered. Rye (*Secale cereale*) was represented by sharply keeled grains with truncated apices and elongated embryos, and by rachis nodes with indistinct definition of rachis segments.

In terms of frequency, grains and/or chaff of wheats were present in forty-eight samples (47%), oats in twenty-eight (27%), rye in eighteen (17%), and barley in fourteen (14%), but numerically wheats were consistently the main crop represented. In Figure 27 the proportions of indeterminate cereal grains, wheat grains and other crop grains/seeds for samples containing >30 crop seeds or grains are shown. In almost all samples indeterminate and wheat grains predominated, and this proportion applied across all areas of the site. Storage and processing of wheats was plainly the main activity.

Specific identification of the wheats was problematic, for many grains were badly deformed. So far as could be determined, hexaploid-type (bread wheat-type) grains predominated, and the ratio of identifiable bread-type wheat rachis nodes: rivet-type rachis nodes was 7:1. The presence of rivet-type wheat in medieval samples from Britain was first pointed out by Moffett (1991), and since then the number of records has steadily increased. In Essex, rivet-type wheat has also been reported from a 13th-century site at Round Wood, Stansted, where it was almost as frequent as hexaploid wheat: *T. turgidum/durum* nodes were present in seven samples out of forty-seven, *T. aestivum*-type in eleven (Murphy 1990). The evidence from Boreham suggests that bread-type wheat was the main crop.

Cotyledon fragments of indeterminate large Fabaceae (pulses) occurred in twenty-three samples (22%), but were not abundant. No testa fragments with hila were noted, so identification of whole seeds and cotyledons had to be based on overall seed size and form. Large, sub-rectangular seeds, thought to be probably of *Vicia faba* (field bean) were noted in five samples and smaller more rounded seeds of *Pisum/Vicia* type (pea or large vetch) in two.

A high frequency of pulse seeds was also noted in 13th-century contexts at the Round Wood site, Stansted Airport (Murphy 1990). The productivity of medieval agriculture was limited by the restricted supplies of manure available, and consequent soil nitrogen depletion (Bolton 1980, 34). Historically, pulses were important in rotations, due to the nitrogen-fixing activity of *Rhizobium* spp. in root nodules, and they were also grown in the Middle Ages as mixed crops, such as 'bolymong' — oats with peas and vetches (Ernle 1919, 93). The low numbers of pulse seeds in the present samples suggests they represent contaminants growing in wheat as 'volunteers' from a previous leguminous crop rather than an intentionally mixed cropping system.

Wild flora

Seeds and/or fruits of weed species were noted in fifty-four samples (52%). Fruits and seeds of *Anthemis cotula* (stinking mayweed) and *Vicia/Lathyrus* sp. (vetch/vetchling) were predominant. Other segetal weeds included *Bromus* sp. (brome), *Centaurea* sp. (cornflower), indeterminate large grasses and *Rumex* sp. (dock).

Taken at face value, this implies that the main cultivated areas were on heavy clay soils (for *A. cotula* is a weed confined to soils of that type: Kay 1971); and that soil nitrogen depletion may have encouraged the growth of

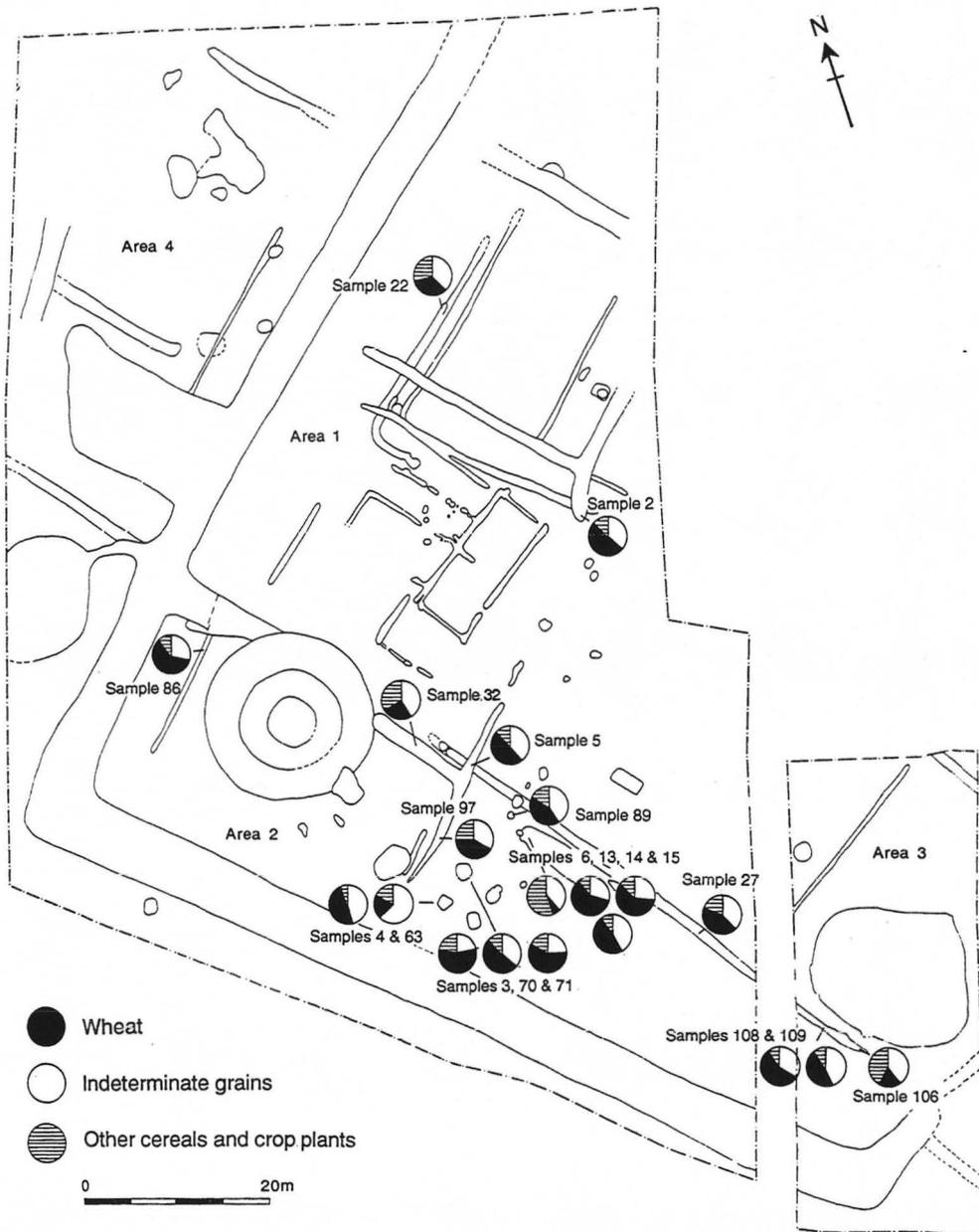


Figure 27 Proportions of wheat grains, intermediate cereal grains and other crop grains/seeds in samples containing >30 grains/seeds

leguminous weeds. However, the seed assemblage may have been biased by crop cleaning. Vetches are large-seeded and some, perhaps most, of the *A. cotula* fruits were originally present as intact capitula ('seed heads'). Crop-cleaning by winnowing and sieving would have removed small weed seeds effectively, but separation of larger items from grain would have been more difficult, so that large weed contaminants could be over-represented in the samples.

Seeds/fruits of wetland species included *Carex* sp. (sedge), *Eleocharis* sp. (spike rush), *Montia fontana* (blinks) and possibly *Ranunculus flammula* (lesser spearwort). These could indicate that cultivation extended onto poorly-drained ground, but alternatively these damp-ground species may have reached the site with other products, such as hay or thatching materials.

Nutshell fragments of *Corylus avellana* (hazel) were recovered from twenty-four samples. Other tree/shrub macrofossils included a fragmentary stone of *Crataegus monogyna* (hawthorn) and fruitstones of *Rubus* sect *Glandulosus* (bramble). These probably represent food wastes, and indicate that the samples were not composed exclusively of crop storage and processing residues, but included some domestic wastes.

Other macrofossils

Charcoal fragments were present in all samples at varying densities. Other plant macrofossils included fragments of charred root, rhizome or stem and indeterminate buds, bulb fragments, catkins, culm nodes, inflorescence fragments, seeds, thorns and twigs. Fragments of black porous 'cokey' material, black tarry droplets and siliceous globules are probably residues from the combustion of organic

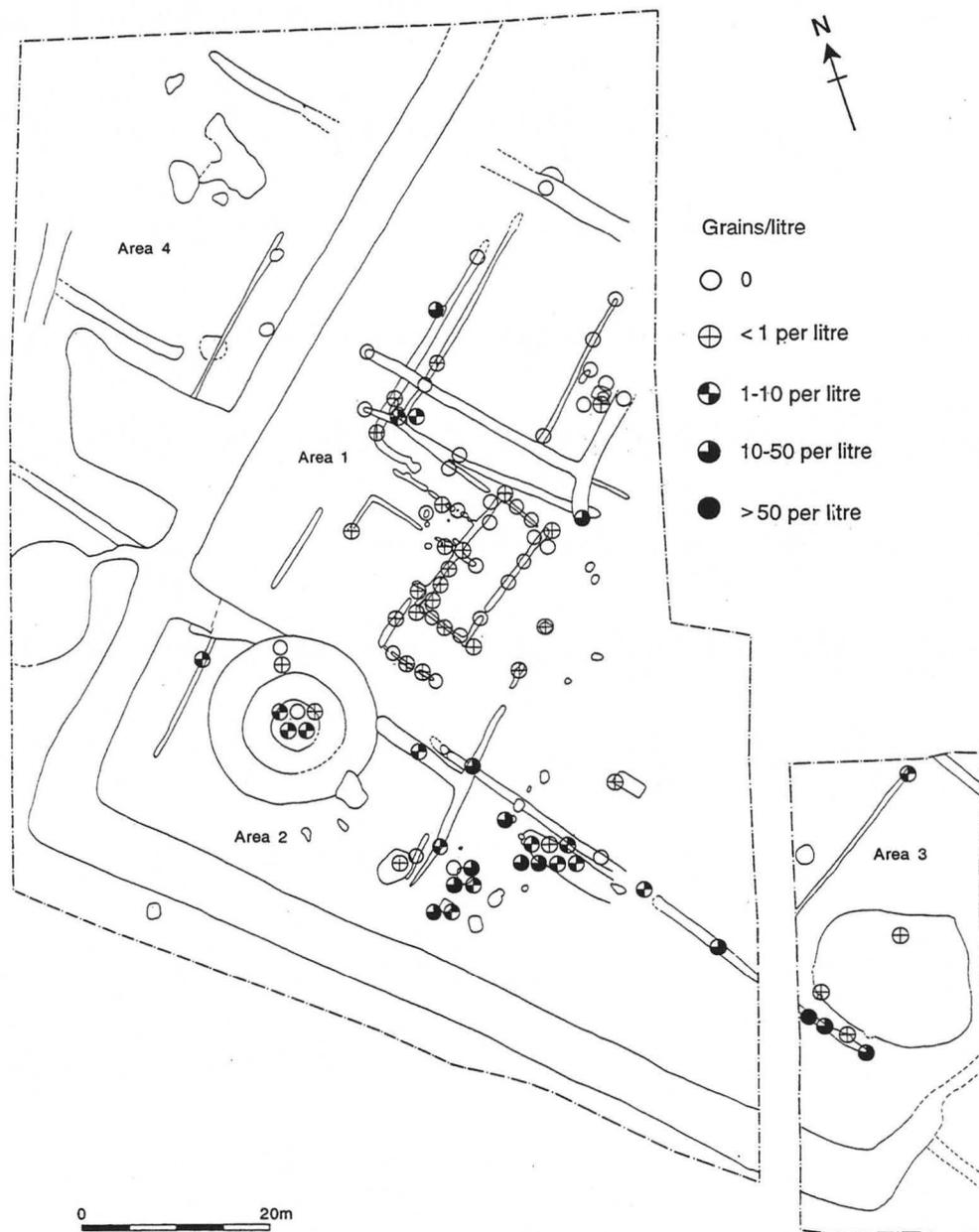


Figure 28 Plot showing density of grains per litre of soil

materials, including cereals and grass/straw, at very high temperatures. Other food wastes from the samples included the marine molluscs, bone fragments, fish bone and egg shell. Land and freshwater mollusc shells were only recovered from sample 106 from a ditch terminal in Area 3. Only two species (*Discus rotundatus* and *Anisus leucostoma*) were recorded.

Also present in the samples were burnt or fired clay and possible daub fragments, pot, small mammal/amphibian bones, mineralised concretions and a small fragment of volcanic lava, probably from a millstone.

Sample composition

(Figs 27–30, Tables 13–17)

Densities (numbers of items per litre of soil) for grains and pulse seeds, weed seeds and chaff, (principally wheat rachis nodes), are shown in Figs 28–30. A high proportion

of samples included >10 grains per litre, but very few produced comparable numbers of chaff fragments (sample 70 was an exception, containing abundant wheat rachis nodes). Weed seed densities were variable, and may not be meaningful, if it is accepted that *A. cotula* was originally represented mainly by intact capitula, which subsequently disintegrated during charring, in the soil, or during sample processing.

Grain-dominated samples of this type could have been produced in at least two ways. First, they could represent the charring of semi-cleaned crop products, either due to poor temperature control during grain drying or in catastrophic granary fires. Secondly, they could be derived from batches of cereals or cereal waste charred at an earlier stage of processing, but in well-aerated conditions, so that only the densest elements (grains, pulse seeds, large weed

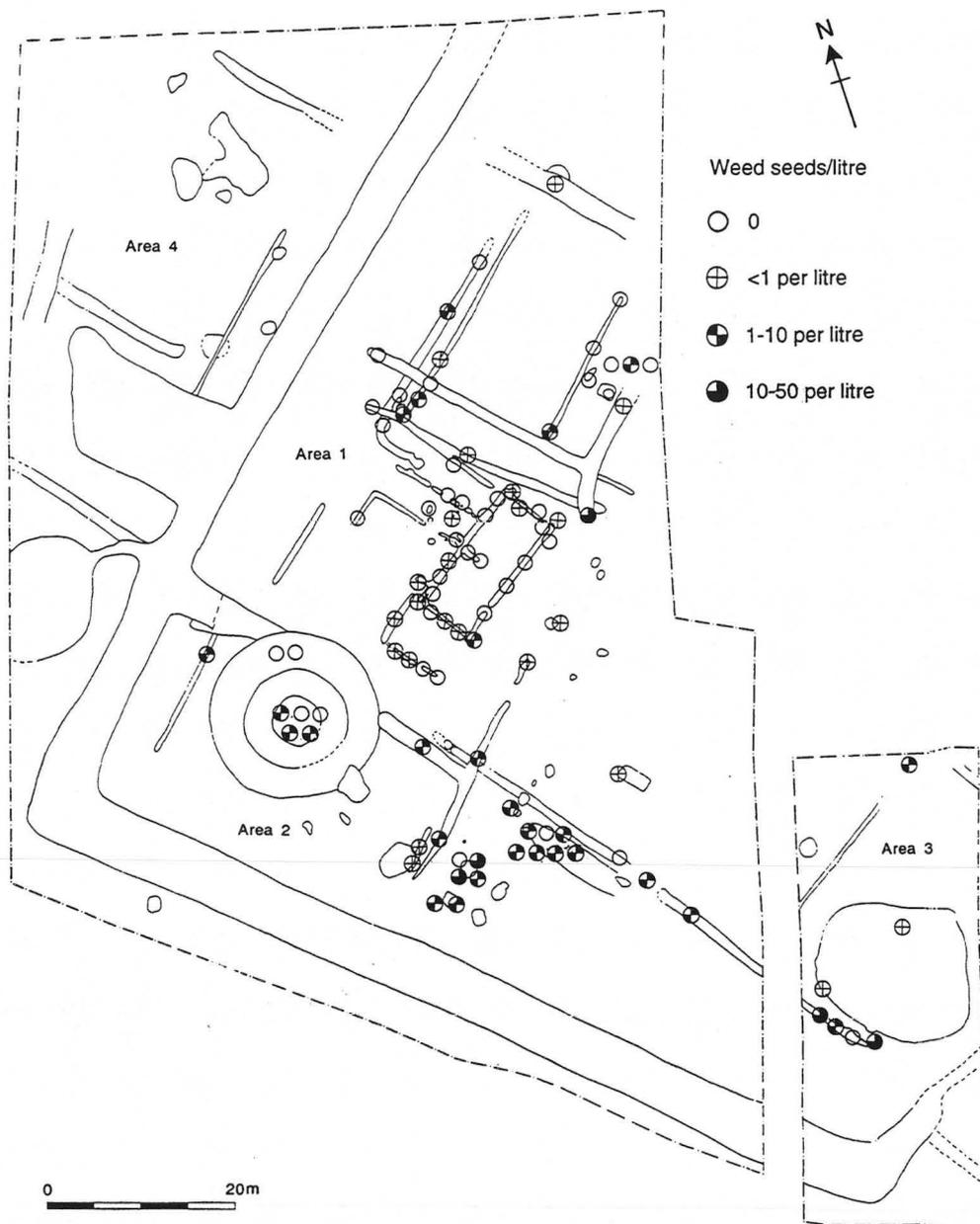


Figure 29 Plot showing density of weed seeds per litre of soil

seeds and some wheat rachis nodes) survived in a recognisable form.

Distinguishing between these two possibilities is difficult. However, the state of preservation of grains and the presence or absence of less dense chaff elements provide clues. Grains in samples from the granary area (Table 15) were slightly less puffed and distorted than those from peripheral contexts and chaff was slightly more abundant, which implies slow charring, following burial under smouldering debris in an accidental fire, rather than rapid combustion in a bonfire.

The samples from the peripheral areas of the sub-enclosure in Area 1 and Area 3 (Figs 27–30) contained a moderately high density of charred macrofossils. The assemblages were similar to those from the granary area in that they contained cereals (wheat was again predominant), some chaff, pulses and leguminous weeds and other seeds

of the larger weed species, but the processes of charring and deposition appear to have differed. The cereal grains from these samples were poorly preserved and severely puffed. Indeterminate grains were abundant. Chaff was less common, including the robust wheat rachis nodes; and the more delicate chaff elements, for example rachis internodes, were virtually absent. It would appear that this material was derived from the deliberate burning of processing waste and/or spoiled grain on bonfires.

It is therefore suggested that, despite the apparent similarity of sample composition across the site, there were at least two different processes producing charred material: slow charring in relatively oxygen-deficient conditions, and rapid charring in well-aerated fires.

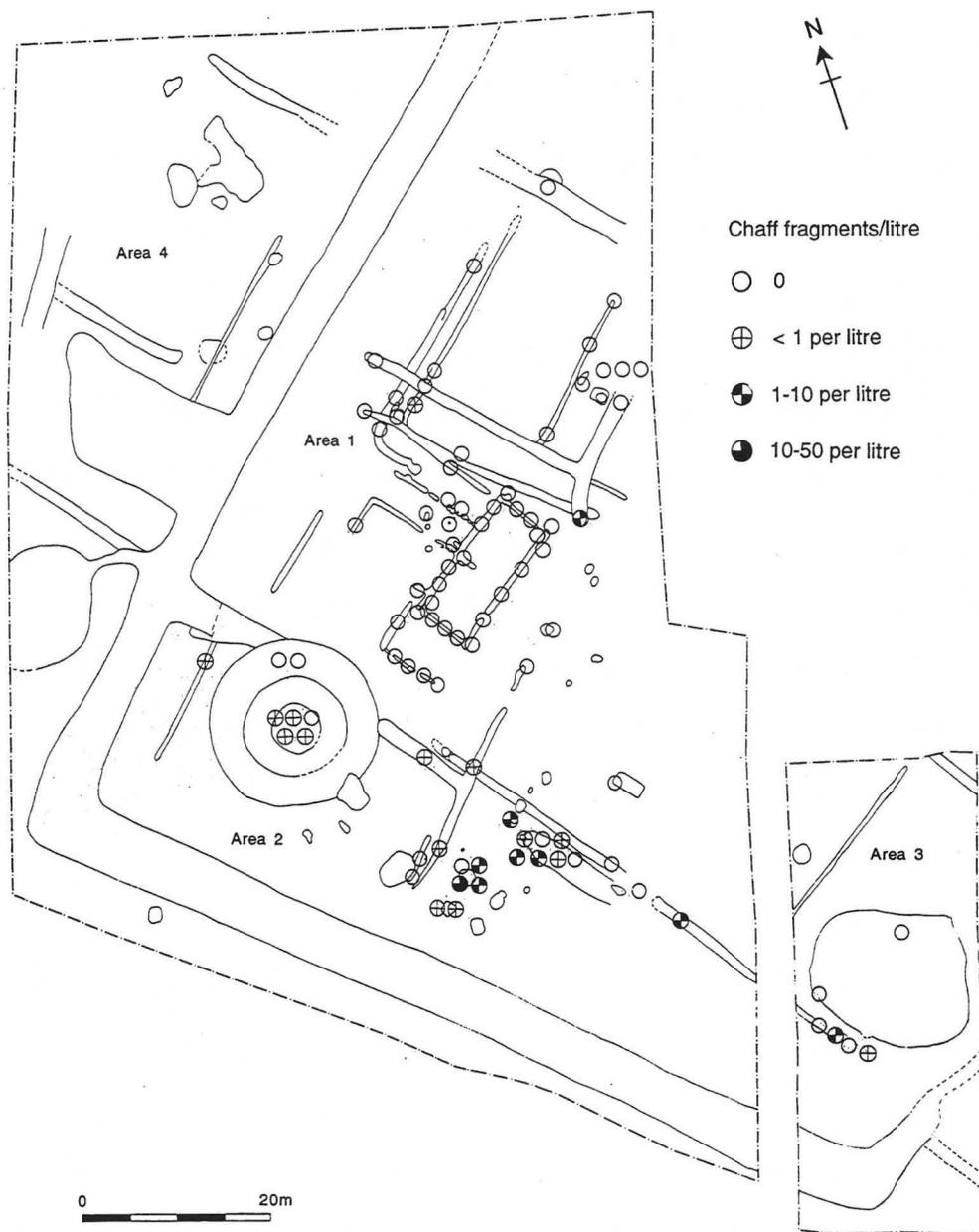


Figure 30 Plot showing density of chaff fragments per litre of soil

Spatial distribution of macrofossils and taphonomy

The densest concentration of plant macrofossils on the site was from the granary area (Figs 27–30). Wheat grains were abundant in most samples but oats, barley and rye were also noted. Chaff elements were rare with the exception of the dense and compact wheat rachis nodes which, because of their size, would have been difficult to separate from the grain, except by hand-sorting. Pulse seeds including peas/vetches and field beans were also frequent, as were seeds from the larger weed species, suggesting that the samples represent semi-cleaned prime grain. Samples from this area are interpreted as charred debris from a granary fire.

Samples from peripheral areas of the site (the sub-enclosure in Area 1, and Area 3) produced assemblages which, it is argued, contained charred material from

bonfires, on which cereal waste had been intentionally burnt.

The area of the building and ancillary domestic structures in Area 1 appear to have been kept scrupulously clean. With the exception of charcoal fragments, all macrofossils were present at extremely low densities and because of the obvious fire risk, it is very unlikely that any of the material was burnt *in situ*, except in confined hearths. The same consideration would have applied to the mill itself, a potentially highly flammable structure. Charred macrofossils were rare in contexts associated with the mill; the charred plant material present could represent either wind-blown debris derived from elsewhere on the site, or deposition after the mill went out of use.

Sample No.	17	20	23	26	28	29	30	31	33	36	37	38	39	40	55	56	59	65	66	67	72	75	84	98	102	103	
Context No.	386	390	408	429	454	432	474	484	482	444	456	458	476	550	602	604	588	620	631	634	640	644	540	729	745	747	
Cereals and other food plants																											
<i>Avena</i> sp. (grains)				1																							
Cereal indet. (grains)	2	×fg	×fg				2		×fg	1	×fg			1	1	1			2	1	1	1		×fg	2	1	
Large Fabaceae indet.			lcty				3cty																				
<i>Hordeum</i> sp. (rachis node)																						lpm					
<i>Triticum</i> sp. (grains)				lcf	1		1	1				1	1				1		lcf						1+lcf	1	
<i>Vicia faba</i> L.													lcf														
Herbs																											
<i>Anthemis cotula</i> L.						1	1									1											1
<i>Bromus</i> sp.			lcf																						1		
<i>Chenopodium album</i> L.												1															
Chenopodiaceae indet.												2															
Poaceae indet.			1				1																				
Large Poaceae indet.					1																						
<i>Polygonum aviculare</i> L.																							1				
<i>Vicia/Lathyrus</i> sp.			1+lcty	2fgcf			3							1				lcty		1+lcty		1		2+lcty			
Trees/shrubs																											
<i>Corylus avellana</i> L.			1																								
Other plant macrofossils																											
Charcoal <2mm	××	××	×××	××	×××		×××	×	××	×××	××	××	×××	×	×	××	××	××	××	×	×	×	××	××	×××	××	
Charcoal >2mm		×	××	×	×××	×	××	×	××	××		××	×	×	×		×		×						×	××	
Charred root/rhizome/stem																											
Indet. buds											1																
Indet. inflorescence frags.																											
Indet. seeds			1								1																
Indet. thorns													1														
Other																											
Bone			×																								
Black porous 'cokey' material										×									×				×		×		
Sample volume (litres)	5	5	10	10	15	2	5	3	5	5	5	10	5	5	5	5	5	2	5	5	10	10	5	10	5	5	
Volume of flot (litres)	<0.1	<0.1	0.2	<0.1	0.2	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
% of flot sorted	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

Key to Tables 13-17

- × = 0 - 10 specimens cty = cotyledon
- ×× = 10 - 100 specimens pmc = possible modern contaminant
- ××× = 100 + specimens b = burnt
- fg = fragment tf = testa fragments
- sil = siliqua fragments

Table 13 Charred plant macrofossils and other remains from the buildings in Area 1

Sample No.	2	22	50	54	61	62	78	83	87	96	99	101
Context No.	187	402	426	596	616	617	650	681	684	711	741	339
Cereals and other food plants												
<i>Avena</i> sp. (grains)	17+5cf	8		1cf	1+15cf	2cf						
<i>A. sativa</i> L. (florete bases)		1										
Cereal indet. (grains)	71+××fg	26+×fg			16+×fg	10	2+×fg	1	1			
Large Fabaceae indet.	4cty	6+5cty			2+2cty			1cty	1cty			
<i>Hordeum</i> sp. (grains)	4cf	1cf										
<i>Secale cereale</i> L. (grains)		2cf			2cf	3cf						
(rachis nodes)	3cf											
<i>Triticum</i> sp. (grains)	94	29			1+4cf	3						
(rachis nodes)	1					1						
(rachis internodes)	1cf											
<i>T. aestivum/compactum</i> type												
(rachis nodes)	15											
<i>T. turgidum/durum</i> type												
(rachis nodes)	1cf											
Herbs												
<i>Anthemis cotula</i> L.	32	6			2				2+1fg			1
Asteraceae indet.									3			
<i>Atriplex</i> sp.									1			
<i>Bromus</i> sp.		3										
<i>Centaurea</i> sp.	3											
<i>Chenopodium album</i> L.	1								1cf			
<i>C. ficifolium</i> Sm.	1											
Chenopodiaceae indet.		2										
<i>Fallopia convolvulus</i>												
(L.)A.Love									1			
<i>Galium aparine</i> L.										1		
<i>Lychnis flos-cuculi</i> L.									2			
<i>Medicago/Trifolium/Lotus</i> sp.	1cf					1cf						
Poaceae indet.	1	1cf							14			
Large Poaceae indet.	1				3				1			
<i>Polygonum aviculare</i> L.			1									
Polygonaceae indet.	2					1			1			
Ranunculus sp.									1			
<i>Rumex</i> sp.		11				1		1	2			
<i>R. acetosella</i> L.	1	6										
<i>Sherardia arvensis</i> L.									1			
<i>Sinapis</i> sp.									1cf			
<i>Tripleurospermum inodorum</i>												
(L.)Schultz-Bip	1											
<i>Viburnum</i> sp.										2+1cf		
<i>Vicia/Lathyrus</i> sp.	15+21cty	7+5cty			1	2+1cty			1cty	1cf	1	
<i>V. cracca</i> L.	1cf											
<i>Viola</i> sp.	1cf											
Trees/shrubs												
<i>Corylus avellana</i> L.	1	11				1			4			
<i>Rubus</i> sect. <i>Glandulosus</i>												
Wimmer & Grab										2		
Other plant macrofossils												
Charcoal <2mm	×××	×××	××	×	××	××	××	×	×	×××	××	×
Charcoal >2mm	××	×××	××	××	×	××	×	×	××	×××	×	×
Charred root/rhizome/stem	×	×						×	×	××		×
Indet. bud	1											
Indet. culm node	1	1				1						
Indet. seeds	1	1							4	1		
Indet. thorn		1										
Indet. twigs	×									×		
Other												
Black porous 'cokey' material	×	×			×							
Eggshell	×b											
Fish bone	×											
Mineralised concretions								×				
Siliceous globules	×											
Small mammal/amphibian bone	×											
Sample volume (litres)	5	10	5	5	4	8	5	5	5	10	5	5
Volume of flot (litres)	0.3	1.7	<0.1	<0.1	0.2	0.3	0.1	<0.1	0.1	0.8	<0.1	0.1
% flot sorted	100	50	100	100	100	50	100	100	100	25	100	100

Table 14 Charred plant macrofossils and other remains from the sub-enclosure in Area 2

Sample No.	1	3	4	5	6	11	12	13	14	15	16	32	63	70	71	74	76	77	89	97	
Context No.	185	205	246	343	336	331	332	334	337	335	333	490	246	204	205	642	646	648	703	706	
Cereals and other food plants																					
<i>Avena sp. (grains)</i>		24	2	9cf	16			5	4+4cf	1cf		8	2+4cf	9	9				20+9cf	8	
<i>A. sativa L. (florete bases)</i>												1cf									
Cereal indet. (grains)		30+xxfg	38+xxf	54+xxf	20		4+xf	15+xf	30	23+xf	2	12+xxf	51+xf	49+xxf	19+xxfg		xf	5	56+xxfg	15	
(rachis internodes)		1		2					1						3						
(basal rachis nodes)									1					2	1					2	
(detached embryos)										1											
Large Fabaceae indet.		1cty	1+3cty	3+2cty	1+2cty				1+1cty	5cty		1+2cty	5+7cty	5fg	6cty				11cty	1+2cty	
<i>Hordeum sp. (grains)</i>		1			10		1		1cf					1	1cf						
(rachis nodes)														2cf							
<i>Hordeum/Secale cereale</i>																					
(rachis nodes)		1cf										2		5						1	
<i>Pisum/Vicia sp</i>		1+2cty												2+1cty							
<i>Secale cereale L. (grains)</i>		3		4cf	1cf		1		4+2cf					2cf	1					1cf	
(rachis nodes)								1cf						5cf							
<i>Triticum sp. (grains)</i>		80	42	73	4	1cf	12		64	27		7	18	75	44				1cf	60	20
(rachis nodes)								34						15fg	1cf						
(rachis internodes)		1						2	1			1cf		10							
<i>T. aestivum/compactum type</i>																					
(rachis nodes)		18	1		1		2	2	2+1cf	6		3	3cf	100	43					22	3
<i>T. turgidum/durum type</i>																					
(rachis nodes)																				2cf	
<i>Vicia faba L.</i>		2cfcty												1+4cty							3cty
Herbs																					
<i>Anthemis cotula L.</i>		84	9	11			5	3	2	5	1cf	15	1	152	80	1		1		43	
Asteraceae indet.																	1				
<i>Atriplex sp.</i>												2+1cf		1							
<i>Bromus sp.</i>		1cf		1cf	1		1		4cf	1		2	1								
<i>Centaurea sp.</i>		1						1cf												1	
<i>Chelidonium majus L.</i>																				1cf	
<i>Chenopodium album L.</i>									1						1	1					
Chenopodiaceae indet.		1								2				1							
<i>Euphorbia sp.</i>		1cf																			
<i>Fallopia convolvulus (L.) A. Love</i>														1tf							
<i>Galium aparine L.</i>												1fg									
Linaceae indet.		1cf																			
<i>Lithospermum arvense L.</i>																				1fg	
<i>Medicago/Trifolium/Lotus sp.</i>							1cf														
Poaceae indet.		1	1					1		1					2					1	
Large Poaceae indet.		1			1+1cf				1	1		7			1	1				1	
<i>Polygonum aviculare L.</i>													1+1tf	1	1	1					
Polygonaceae indet.										4			1	2						1	
<i>Ranunculus acris/repens/bulbosus</i>									1+1cf					1						1	
<i>Raphanus raphanistrum L.</i>										1sil										2cf	
<i>Rhinanthus minor L.</i>														2cf						3	

Table 15 Charred plant macrofossils and other remains from the granary and associated features in Area 2 (cont'd over)

Sample No.	1	3	4	5	6	11	12	13	14	15	16	32	63	70	71	74	76	77	89	97	
Context No.	185	205	246	343	336	331	332	334	337	335	333	490	246	204	205	642	646	648	703	706	
<i>Rumex sp.</i>		2		6	8		2	1	1	1	1	2	3		1					1	
<i>R. acetosella L.</i>												1			1cf						
<i>Sherardia arvensis L.</i>												1cf									
<i>Tripleurospermum inodorum (L.)Schultz-Bip</i>														1							
<i>Veronica sp.</i>																				1cffg	
<i>Vicia/Lathyrus sp.</i>		14+15cty	1	2+3cty	2		5cty	11+19cty	11+20cty	11+6ct	1cty	5cty	5+4cty	5+6cty	7+5cty	1+2cty				17+21cty	7+6cty
<i>V. cracca L.</i>								2cf													
Trees/shrubs																					
<i>Corylus avellana L.</i>	1	2	2	9	2		1	5	1	7	2cf	1	5	3							13
<i>Crataegus monogyna Jacq.</i>									2cffg												
<i>Rubus sect. Glandulosus Wimmer & Grab</i>		1													5						
Wetland plants																					
<i>Carex sp.</i>								1								1					2
<i>Eleocharis sp.</i>		2+1cf						1				1		1+1cf							
<i>Montia fontana L.</i>		1cf																			
<i>Ranunculus flammula L.</i>												1cf									
Other plant macrofossils																					
Charcoal <2mm	×	xxx	xxx	xxx	xxx	xx	xx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Charcoal >2mm		xx	×	xx	xxx	×	×	×	xx	×	xxx	xxx	xxx	xx	xx	xxx	xx	xx	xx	xx	xxx
Charred root/rhizome/stem		×	×		×			×	×	×	×	×	×	×	×		×		xx		
Indet. buds		1						1	2			1	1		1					4	
Indet. small bulb frags.														1							
Indet. catkin					1																
Indet. culm nodes		1								3		1		5	7					6	
Indet. inflorescence frags.				×					×					×	×					×	
Indet. seeds		4		2				1	1	4		2		2	2					4	1
Indet. thorns											1			2						1	1
Other																					
Black porous 'cokey' material		×	×	×									×	×	×	×		×	xx	×	
Black tarry drops		×		×																×	
Bone		×	xb	×	×				xb	×	×										
Burnt/fired clay																					×
?Daub		×																			×
Eggshell													×	×							×
Fish bone			×	×	×			×		×			×	×						xx	
Marine molluscs					xxx																
Siliceous globules			×									×		×							×
Small mammal/amphibian bone					×				xb												xpmc
Sample volume (litres)	10	10	5	10	10	10	5	5	5	10	5	15	20	10	10	10	10	10	10	10	10
Volume of flot (litres)	<0.1	0.4	0.1	0.1	0.2	<0.1	0.1	0.1	0.2	0.2	0.8	0.5	0.3	0.2	0.2	<0.1	0.1	<0.1	<0.1	0.4	0.2
% flot sorted	100	50	100	100	100	100	100	100	100	100	25	50	100	100	100	100	100	100	100	100	50

Table 15 (cont'd) Charred plant macrofossils and other remains from the granary and associated features in Area 2

Sample No.	8	9	18	19	24	53	64	86
Context No.	375	375	384	385	405	594	595	151
Cereals and other food plants								
<i>Avena sp. (grains)</i>	2	2+3cf	6					1+1cf
Cereal indet. (grains) (sprout frags.)	4+×fg	10+××fg	2	×fg	×fg	×fg	1	13
Large Fabaceae indet.			1					5cty
<i>Hordeum sp. (rachis nodes)</i>		2cf						
<i>Hordeum/Secale cereale (rachis nodes)</i>	1		1					
<i>Triticum sp. (grains)</i> (rachis internodes)	4	10	5		1		1	28
<i>T. aestivum/compactum type (rachis nodes)</i>		1cf						
<i>T. turgidum/durum type (glume base)</i>		6	5	1				2
			1cf					
Herbs								
<i>Agrostemma githago L.</i>		1	1					
<i>Anthemis cotula L.</i>	11	12	24					
<i>Bromus sp.</i>		3+2cf	2					
<i>Centaurea sp.</i>		2						
Chenopodiaceae indet.		3						
<i>Galium aparine L.</i>			1+1cf					
<i>Medicago/Trifolium/Lotus sp.</i>			1cf					
Poaceae indet.		1						1
Large Poaceae indet.		1	5+1cf					
Polygonaceae indet.		1	1					
<i>Ranunculus acris/repens/bulbosus</i>		1						
<i>Rumex sp.</i>	1	2						
<i>R. acetosella L.</i>		1						
<i>Sherardia arvensis L.</i>	1							
<i>Vicia/Lathyrus sp.</i>	1cty	10+6cty	1cf+1cty					23+20cty
Trees/shrubs								
<i>Corylus avellana L.</i>	2		1					1
Wetland plants								
<i>Montia fontana L.</i>	1cf							
Other plant macrofossils								
Charcoal <2mm	×××	×××	×××	××	××	××	××	×××
Charcoal >2mm	×	××	×	×		××	×	××
Charred root/rhizome/stem	×	×	×	×		×	×	×
Indet. buds		2						
Indet. seeds	1	2	2					
Other								
Black porous 'cokey' material	×	×	×	×	×			×
Bone	×		×					
Fish bone	×	×		×				
Lava ?millstone frags.		1						
Siliceous globules	×	××	××					
Small mammal/amphibian bone		×pmc		×pmc				
Sample volume (litres)	10	15	12	12	5	15	10	5
Volume of flot (litres)	0.1	0.2	0.1	<0.1	<0.1	0.4	0.1	0.1
% flot sorted	100	100	100	100	100	50	100	100

Table 16 Charred plant macrofossils and other remains from the windmill and associated features in Area 2

Conclusions

In summary, wheat (including both hexaploid and tetraploid species) was the predominant crop at this site, and was the main cereal intended for milling. Oats were also frequent, but in most cases it was not possible to determine whether a crop or weed oat species was represented. Rye and barley were rare, and the grains and chaff fragments present are best interpreted as contaminants of the wheat. Cereal production appears to have been concentrated on heavy clay soils, and the occurrence of seeds of wetland plants may suggest that marginal damp soils were also being utilised. The relative abundance of leguminous weed seeds may indicate that the

soil was nitrogen-depleted, whilst the presence of vetches/peas and beans suggests that a crop rotation system involving cereals and pulses was employed to ameliorate this problem.

The mill area and domestic buildings were kept clean and any fire risk was kept to a minimum but the granary appears to have been destroyed by a catastrophic fire. Charred debris from this event became incorporated into the granary post-holes, and was dispersed into the fills of adjacent features. The peripheral areas of the site appear to have been used for the safe disposal of cereal processing debris on bonfires.

Sample No.	25	27	88	105	106	107	108	109	110	111	92
Context No.	414	442	688	1004	1014	1017	1022	1023	1025	1029	701
Area	3	3	3	3	3	3	3	3	3	3	4
Cereals and other food plants											
<i>Avena sp. (grains)</i>		18		5	1+1cf		12+1cf	11			
Cereal indet. (grains)	4+×fg	70+××fg	2+×fg	8	32+××fg	×fg	49+××fg	55+××fg	2+×fg	2	
(detached embryos)		×									
Large Fabaceae indet.		10+13cty		1cty	3						
<i>Hordeum sp. (grains)</i>	1cf		2cf		29		1				
<i>Secale cereale L. (grains)</i>			1		2cf		1cf	1cf			
(rachis nodes)		2cf									
<i>Hordeum/Secale cereale (rachis nodes)</i>					2						
<i>Triticum sp. (grains)</i>	1	74	1	1cf	15	1	88	58	1	1cf	1
(rachis nodes)		3									
(rachis internodes)								3			
<i>T. aestivum/compactum type (rachis nodes)</i>		18		3				3			
<i>Vicia faba</i>		2cfcty									
Herbs											
<i>Anthemis cotula L.</i>	1	27		4	23+3cf		14	7			
<i>Atriplex sp.</i>		3									
<i>Bromus sp.</i>	1				2			1cf			
<i>Centaurea sp.</i>	1cf										
<i>Chenopodium album L.</i>					1		1				
<i>Chenopodium ficifolium Sm.</i>		6cf									
Chenopodiaceae indet.	1				1						
Fabaceae indet.	5cty										
<i>Fallopia convolvulus (L.)A.Love</i>		1									
<i>Lapsana communis L.</i>					1						
<i>Lithospermum arvense L.</i>		1									
Poaceae indet.		1					1				
Large Poaceae indet.	2	3	1		3		2	2			
<i>Polygonum aviculare L.</i>		1									
Polygonaceae indet.					1		1fg				
<i>Rumex sp.</i>	2	1		1	16		2	3			
<i>R. acetosella L.</i>					2						
<i>Valerianella dentata (L.)Pollich</i>					1cf						
<i>Vicia/Lathyrus sp.</i>		10+5cty	2+3cty	4+2cty	3+3cty		12+28cty	6+11cty	1cty	1cfcty	
Trees/shrubs											
<i>Corylus avellana L.</i>		6		1cf							
Wetland plants											
<i>Eleocharis sp.</i>		1					1cf				
Other plant macrofossils											
Charcoal <2mm	×××	×××	×××	××	××	×	××	×××	××	××	××
Charcoal >2mm	××	××	××	×			××				×××
Charred root/rhizome/stem	×	×			×	×					×
Indet. seeds		3			7						
Indet. thorns		2									
Molluscs											
Woodland/shade loving species											
<i>Discus rotundatus</i>		3			×						
Fresh water species											
<i>Anisus leucostoma</i>		2			×						
Other											
Black porous 'cokey' material		××					×	×	×	×	
Black tarry drops		×						×	×		
Bone					×b		×b				
Fish bone	×	×									
?Pot									×		
Siliceous globules		×									
Small mammal/amphibian bone		×	×								
Sample volume (litres)	15	25	10	5	5	5	5	5	5	5	4
Volume of flot (litres)	0.5	0.3	<0.1	0.3	0.2	<0.1	0.3	<0.1	<0.1	0.1	0.7
%flot sorted	25	50	100	100	100	100	50	100	100	100	50

Table 17 Charred plant macrofossils and other remains from features in Areas 3 and 4

Chapter 4. Discussion

Introduction

One of the most significant aspects of the excavation is that it represents a 'snapshot' of a 12th to 13th-century rural settlement that has been largely unaffected by later development. Important evidence for many aspects of medieval rural life in mid-Essex was found, much of which will contribute to wider regional and national research themes. The project objectives have been addressed in terms of understanding the layout of the settlement, and the main features enclosed by the moat, as well as the evidence for medieval farming techniques and reasons for the abandonment of the site.

The study of moated settlements is an important area of national research promoted by the Medieval Settlement Research Group (MSRG), who have issued a policy statement setting out a research and management framework for medieval rural settlement sites (MSRG 1997). At a regional level, few plans of medieval rural domestic buildings have been identified and this is highlighted as an area for further research. The site evidence also helps fill several of the 'gaps in knowledge' identified for the medieval period, especially in terms of understanding the evolution of the medieval house and farmstead, and settlement diversity (Wade 2000, 24–5).

The early development of windmills in England is the subject of some debate between archaeologists and historians, and the evidence from this excavation should contribute to this area of research. The charred grain assemblage is the first known from a windmill site in the Eastern Counties, providing evidence for the type of cereals being processed on site, as well as indicating that the granary was destroyed in a catastrophic fire. Medieval agrarian economy is highlighted as a 'gap in knowledge' for the region, and few sites producing substantial assemblages of charred plant remains have been excavated (Murphy 2000, 25). The assemblage from this site produced information about farming practices, including what types of soils were being utilised, what crops were grown and whether a crop rotation system was employed.

The pottery, although representing a fairly typical medieval household assemblage, did have some unusual features, including the presence of non-local fine wares, and the absence of vessels associated with dairying. Residue analysis of a small sample of vessels has provided additional information about the types of foods being prepared and consumed on site, evidence that is further enhanced by the fragmentary but varied animal bone assemblage.

The chronology and layout of the settlement

(Fig. 31 and frontispiece)

The absence of pronounced phasing on the site combined with the dating from the relatively small pottery assemblage suggests that the settlement was inhabited for a relatively short period, probably from the 12th to the mid

13th century or later. The spatial positioning and consistent orientations of the buildings, internal ditches and enclosing moat imply that the settlement was systematically planned, although features outside the moated enclosure were also present. The settlement features are all on a similar northeast-southwest or northwest-southeast alignment, mirroring that of the surviving arms of the enclosing moat ditch. Distinct areas of activity are detectable within the settlement, with different aspects such as the windmill, granary, domestic buildings and ponds demarcated by ditches. In addition to acting as boundaries, the ditches probably also provided an internal drainage system for the predominantly clay soil of the site which would have been prone to flooding in the winter months.

Chronology

(Fig. 31)

Pre-12th century

The earliest activity on the site is represented by features possibly pre-dating the main phase of the settlement, which are generally undated or contained pottery only broadly datable to the 10th to 13th centuries. Ditches 104 and 1035, located in the southern half of the site, may be part of a pre-existing field system which was superseded by the moated settlement. Some of the pits, post-holes and other features in Area 2 and the ill-defined features to the northwest of the enclosure in Area 4 may also belong to this phase, although too little dating evidence was found to substantiate this. It is also feasible that ditch 97 may belong to this period, although it was recut during the main phase of the settlement.

12th century

It is not certain when the moat was constructed as, although small quantities of early to mid 13th-century pottery were retrieved from the ditch fills, these relate to the moat's disuse rather than creation. The layout of features within the enclosure certainly implies that the settlement and moat were constructed at the same time, perhaps during the 12th century.

Small quantities of 12th-century pottery were recovered from the post-holes and trenches of building 98 and annexe 117 in Area 1, suggesting that these are the earliest structures on the site. The small quantity and sherd size indicates that the pottery is residual, and this contrasts with the evidence from the granary area to the south where large amounts of pottery were recovered.

Immediately to the north and east of 98 and 117 was a complex of ditches, the earliest of which appear to be contemporary with the buildings and include a possible ditched pathway. The ditches in this area may have delineated a paddock, garden or perhaps even another building for which no trace survives, other than possible eaves-drip gullies. Several features including ditches, post-holes and a pit, possibly contemporary with, or slightly earlier than 98 and 117, were located in Area 2 to the south. The pottery from these features was generally

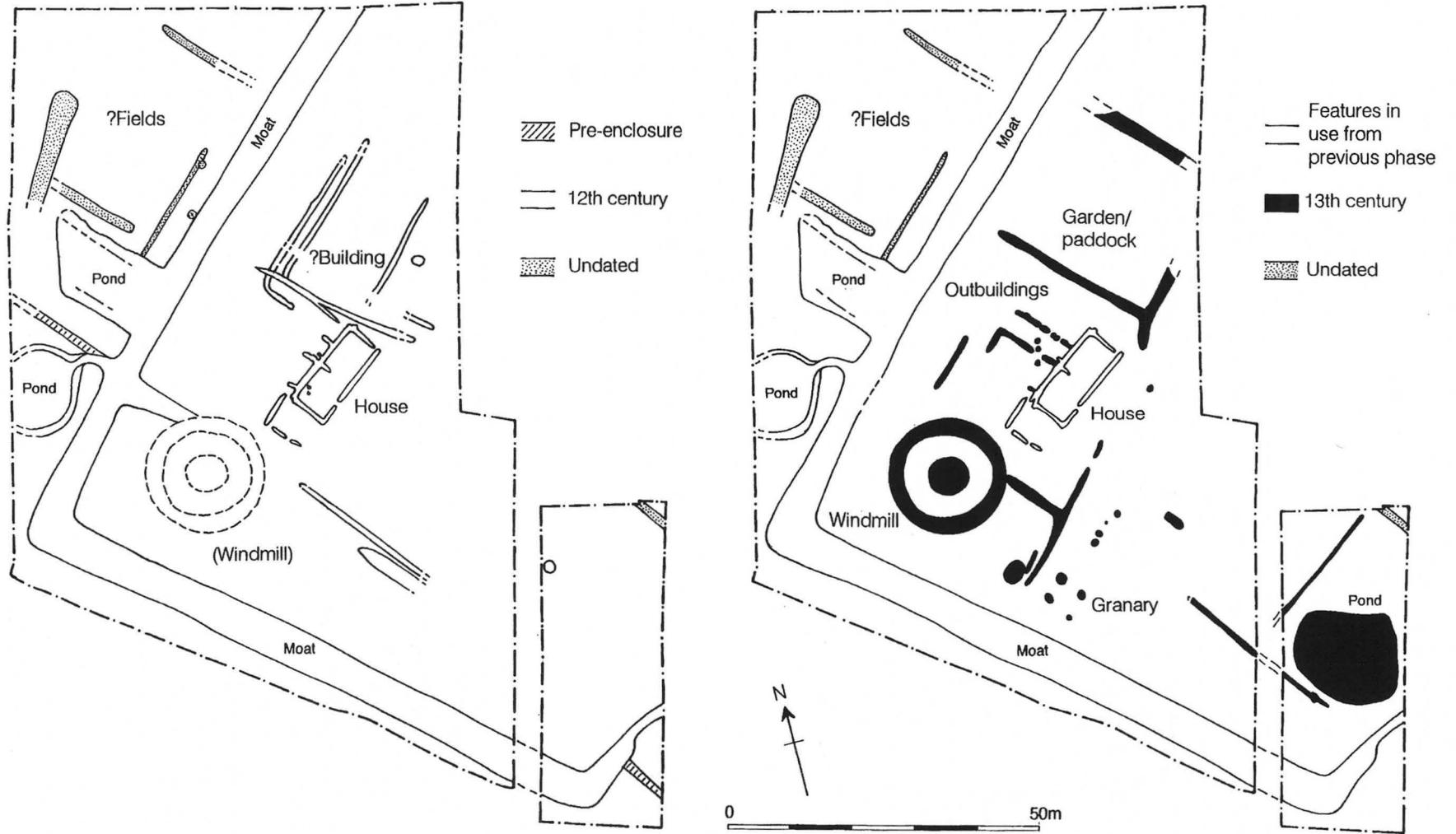


Figure 31 Simplified phase plan of settlement

undiagnostic and often only broadly datable to the 10th to 13th centuries. However, some of the features such as ditch 97, ditch 338 and gully 116 were cut by later features, indicating that they belong to this slightly earlier phase of the settlement, perhaps dating to the 12th century or earlier. The three ponds, at least one of which was connected to the moat, and the group of poorly defined features in Area 4, may also belong to this phase although very little dating evidence was recovered to demonstrate this. The majority of the latter features were located outside the moat and may relate to fields or paddocks associated with, or perhaps predating, the settlement.

13th century

In the early to mid 13th century, there appears to have been some internal reorganisation and expansion within the settlement. In Area 1 outbuildings 118 were added onto the northwestern side of building 98 and several ditches were excavated on new alignments to the north and east. In Areas 2 and 3 to the south and east, the granary and associated ditches were probably constructed and the moat cleaned out by, or during, this period. The windmill was probably erected at the beginning of this phase, or at the end of the last (Fig. 31). Much larger quantities of pottery and other finds were retrieved from the fills of the later features in Areas 2 and 3 than were found in the buildings and ditches in Area 1. The majority of the pottery probably dates to a final period of activity before buildings in this part of the site were destroyed or dismantled. The presence of cross-fitting sherds in the granary post-holes and the surrounding ditches certainly indicates that the majority of features in this area were infilled at the same time. The relatively precise date range of the pottery, from the early to mid 13th century, implies that these features were only in use for a relatively short period prior to abandonment of the site.

Layout

The moat and ponds (Fig. 31)

The full plan of the moat was not established by the archaeological investigation, and the limited available documentary and cartographic sources provide little, if any, additional information. During the post-medieval period, the entire site was covered by Dukes Wood and maps of the area (Chapman and André 1777, the title award map of 1841 and OS map of 1874) give no indication of surviving earthworks within the wood. After the wood was destroyed in the 1940s, the majority of the eastern half of the moat lay beneath a concrete airfield runway. Consequently the full extent of the site was not visible on the black and white aerial photograph taken in 1996 (CUCAP AO1 48), upon which Fig. 4 is based. The northeastern arm, if it ever existed, a portion of the northwestern arm and most of the southeastern arm, had been quarried by the time of the excavation (Fig. 1; Plate I), and so a complete reconstruction of the moat is not possible. However, it appears that most of the elements of a settlement appear to have survived in the excavation area. The length of the fully surviving southwestern moat arm was 100m, and the partially destroyed northwestern arm was approximately 80m, which together can provide some idea of the original size of the moat. If the enclosure was rectangular as seems likely, the measurable dimensions

indicate that the size of the 'island' was around a hectare, thus providing a large living and working area.

A moated site is defined as 'an area of ground, often occupied by a dwelling or associated structure, bounded by a wide ditch, which in most cases was intended to be filled with water' (Taylor 1978, 5). The distribution of moats shows a marked preference for lowland England where the underlying geology is clay. Essex has a relatively dense concentration of moats, the majority of which appear to lie to the northwest of the A12 (Hedges 1978, 65). The main period of moat construction in England was between 1150 and 1500 with a suggested 'innovatory' phase, when relatively small numbers of moats were being established, between 1150 and 1200. From 1200 to around 1325 there appears to have been a phase of rapid expansion of moated sites throughout England, which is probably linked to increased seignorial prosperity from demesne farming during this period. This was followed by a hiatus when fewer new sites were created, or existing sites were expanded or remodelled (Le Patourel and Roberts 1978, 46).

Moats are a frequent feature of the Essex countryside and the most common form is the simple rectangular plan (Hedges 1978, 65). The excavated example appears to be of this type. Within the country, however, there are rare instances of three or even two-sided moats, which could be the result of alterations to the plan during construction, or for reasons of economy. A possible causeway across the moat was recorded in plan only in Area 3, the strip below a former runway to the east of the main site. Causeways were a common means of access to the island or platform although in some cases these features may date from after the abandonment of the site (Taylor 1978, 8–10). The presence of a large pond immediately inside the moat at this point may indicate that the causeway was not the main access into the site, or that the pond was a later addition.

The primary cut of the moat was 6m across at its widest point, which is the suggested maximum 'normal' width (Taylor 1978, 8), although at the point of investigation the ditch was recut to a narrower 4m. The exposed depth of the ditch at 1.4m is consistent with most excavated moats, which in general have a shallow U-shaped profile and are rarely more than 2m deep (Le Patourel 1978, 37). The moat excavated at Gutteridge Hall, Weeley (Wade forthcoming), although much modified, was recorded as being 4.9m wide and 1.2m deep with a similar U-shaped profile and a sequence of fills indicative of gradual silting. Although the moat at Boreham was infilled and no longer wet, it would certainly have been water-filled when in use, aiding drainage of the site as well as providing security. The underlying geology of this part of Essex is London clay overlain by glacial gravels containing natural reservoirs, from which abundant springs rise. The extraction of large tracts of the surrounding boulder clay and gravel subsoil in recent years has significantly altered the water table in the area of the site, although following heavy rainfall most of the excavated features did retain water. It is likely that water for the moat and ponds was derived largely from surface drainage and rainfall with some perhaps originating from underground springs.

The three ponds and the moat would have provided water for both domestic and animal use, as well as habitats for fish and perhaps aquatic birds; fish, swan/heron, duck and frog were represented in the bone assemblage from the site. One of the ponds was connected to the moat by a small

channel, similar to that recorded at the 14th-century moated site at Brome in Suffolk. Here two subcircular ponds were located within the enclosed settlement and were contiguous with the moat, the western arm of which was formed by an existing stream (Le Patourel 1978, 43, West 1970, 89–121). The water would also have been convenient for fire-fighting, and clay excavated during the construction of the moat was probably used for floor and wall daub (Hedges 1978, 65) for the various buildings within the enclosure.

A low internal bank may have existed along the inner edge of the moat, perhaps the result of periodic cleaning out of the ditch, although no remnants of this appeared to have survived modern levelling of the site. Alternatively, an internal fence or hedge may have been erected (Le Patourel 1978, 37) as a safety precaution, although again no evidence for this was found on the site.

Multiple moats are known to have existed, and the large curving ditch shown on the cropmark plot (Fig. 4) to the south of the settlement was initially interpreted as a second, huge enclosure (Germany 1995b). Although not fully investigated, a rapid recording of the quarry face to the immediate west of the site revealed the ditch to be of probable geological origin. The exposed fill was a compacted pale grey gravel unlike any of the ditch fills encountered on the site, although without excavation it is not possible to ascertain whether this was an archaeological feature or not.

Buildings 98, 117 and 118 (Figs 31 and 32)

The remains of several buildings, interpreted as a dwelling, outhouses and a granary, in addition to a post mill (see below) were identified within the settlement. A discussion of comparative excavated medieval Essex buildings has been carried out elsewhere (Medlycott 1996, 176–7) and will only be dealt with briefly here. Dyer (1986, 30) indicates that in the West Midlands a number of buildings, usually consisting of 'a house and barn and often one or two other buildings for food processing and agriculture' were generally contained in peasant messuages. Although this relates to the period 1350–1500, it provides a basis for understanding the settlement layout of earlier medieval sites such as Boreham.

The main building 98, annexe 117 and outbuildings 118 all had post-in-trench foundations (Plates II–IV). Building 98 measured 15m by 7m externally, divided by an internal partition into two equal-sized rectangular bays. The annexe 117 to the southwest was a similar size to the individual bays, although this structure was open on the southeast side, suggesting that it may have had a different function. The internal areas of the buildings imply a level of consistency in the layout, perhaps derived from the 5.03m (16 ft) Anglo-Saxon rod or English perch (Ferne 1991, 2; Huggins 1991, 6). Research into Anglo-Saxon building measurements entered into a database suggests that the average width of structures was 5m and lengths 10m, although there was more variation in the lengths (up to 4.5m) than in the widths. The post-in-trench, comprising a continuous trench into which closely-spaced upright posts were set (Rahtz 1986, 84) and plank-in-trench design is believed to have developed after the Anglo-Saxons had settled in England. This new technique allowed larger buildings to be constructed than had previously been possible with the post-built structures, with greater

variations in width and length afforded by the increased strength of the walls (Marshall and Marshall 1991, 36). Hurst (1989, 115) suggests that the width of houses with unsupported roofs ranged between 3m and 6m, which is the approximate limit which could be spanned without a central row of posts or aisles. The internal distance between the post-settings across the width of building 98 was generally just under 6m, although the full width in plan, including the foundation trenches, was nearer 7m. Houses wider than 6m are believed to belong to a higher social scale, probably because the materials to span a greater width were not generally available (Hurst 1989, 114–5).

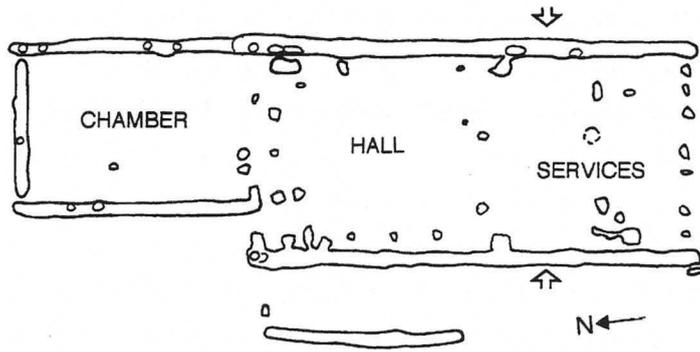
The outbuildings adjoining building 98, which are probably of a slightly later date, do not appear to conform to the same measurements as those for the main building and annexe. The foundations were less substantial than those of the main building and it is likely that these structures may have had specific functions that required a different arrangement and use of space, such as stalls for horses and other animals.

There is very little artefactual evidence from the group of buildings to indicate function or provide further interpretation. Pottery was scarce and where present was generally in an abraded condition. Other finds comprise a group of iron nails possibly from a casket fitting from building 98, and a copper-alloy sheet mount, also perhaps from a casket, retrieved from outbuildings 118. Although these finds are not diagnostic in themselves, they do not negate the interpretation of the structures as domestic and ancillary buildings. The relative absence of finds from the buildings, in contrast to the evidence from the working area around the granary, suggests that the domestic area was kept clean. No separate kitchen was identified; the only hearth was found within a complex of ditches to the northeast of the buildings, although it is quite possible that there was a building of insubstantial construction located here.

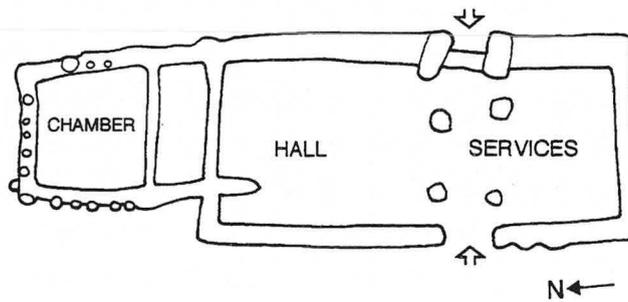
The buildings do not appear to conform to the majority of other rural medieval buildings excavated recently in Essex. At the A12 Boreham Interchange site, a group of 13th-century structures was recorded which were of post-hole and/or slot construction, with internal hearths and surrounded by a series of drip gullies (Lavender 1999). Similar evidence was found at the Stansted sites, notably Round Wood, where the remains of four large buildings including two of aisled-construction dating from the second half of the 13th century were investigated (Havis and Brooks, forthcoming). The building remains excavated at Stebbingford near Felsted were not as well defined as those at the other recently excavated sites, although the excavator has identified a house, byre, kitchen and cellar. The buildings were grouped closely together to form a small farm dating from the mid 12th to mid 14th century and the foundations again comprised a combination of slots and post-holes (Medlycott 1996, 176–7). The only possible post-in-trench type foundations found recently were in apparent isolation at Chignall St James, although this building was rather insubstantial with only two parallel walls surviving (Brooks 1992, 42–5). The evidence suggests, not surprisingly, that there was a degree of variation in building design and construction throughout Essex in the medieval period.

On a national scale, several building plans have been published which are similar in size and shape to those at Boreham, and appear to conform to the later medieval

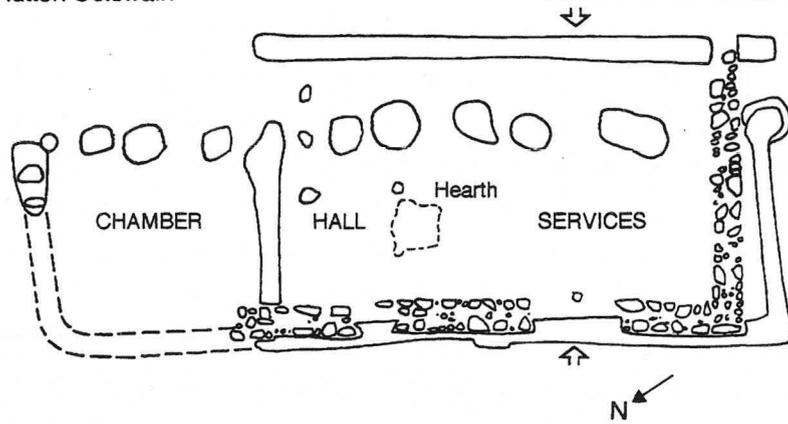
Monkton



Bishops Waltham



Hutton Colswain



Boreham

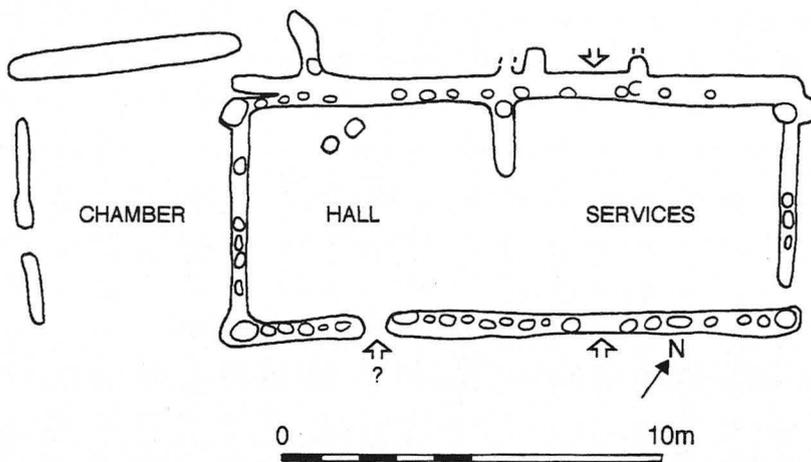


Figure 32 Comparative buildings of the late medieval domestic plan (after Gardiner 2000)

domestic plan, comprising a hall, services, chamber and cross-entry. New research suggests that this plan did not emerge from the longhouse as previously thought, and was not directly linked to developments in building technology (Gardiner 2000, 159). Three types of 12th-century building based on the domestic plan have been identified, which differed in size and layout depending on such factors as the wealth of the owner. The first type is the unaisled hall with chamber and services. Examples were found at Monkton, Kent and Bishops Waltham, Hampshire, and two less well-defined buildings at Brome, Suffolk and Ashwell, Hertfordshire. The second type is similar but with the inclusion of one or two aisles, illustrated by a building excavated at Hutton Colswain, North Yorkshire. The third type is more modest in size, with less well-defined end walls and interior spaces, examples of which were found at Monkton (Gardiner 2000, 170–4).

The combined plan of building 98 and annexe 117 is very similar in size, shape and layout to examples of the first type of domestic plan, the unaisled hall (Fig. 32). If the domestic plan is applied, the annexe would be a chamber attached to the main building, which was subdivided by a central partition or screen into a hall (closest to the chamber) and services (furthest from the chamber). The main difference between the Boreham plan and those at Monkton and Bishops Waltham is the location of the entrance and, to a lesser degree, the shape of the chamber. The entrance, or cross-entry, in the domestic plan is positioned near the low end of the hall where the services were located, whilst the entrance into the Boreham building is at the high end, straight into the hall. The chambers at Monkton and Bishops Waltham are both slightly smaller in width than the main building, whilst at Boreham the annexe or chamber is the same width and appears to be open-sided. It is possible that this side wall foundation did not survive or was not recognised during excavation; for the purposes of the reconstruction (frontispiece) a wall has been added. Clearly the Boreham buildings conform in general to the domestic building plan, but there appear to be some variations when compared with specific examples. Dating of the building at Bishops Waltham is not certain, although an 11th or early 12th-century date is suggested, and Monkton Building III dates from the period 1125–75, which is perhaps comparable to the pottery dates from the Boreham building.

The variations and diversity between early examples of the later medieval domestic plan 'suggests that it is unlikely that it sprang from a single source or even a single social class' (Gardiner 2000, 178). The plan appears to have evolved from the sub-division of functional space, and the amalgamation of separate structures into a single building. By the mid 13th century, the period of experimental building plans was largely at an end, and a standard plan was established which remained largely unchanged for medieval rural houses for the next 250 years. The domestic plan could be 'adopted in the houses of middling peasants and those of the gentry' reflecting 'a remarkable consensus about the organization of social space' (Gardiner 2000, 179).

The granary (Fig. 31)

The only other structure identifiable in plan was of a noticeably different type to that of the buildings in Area 1. This comprised a 5m square structure of four posts, surrounded by a series of ditches and located to the southeast of the windmill in Area 2. The post-holes were comparatively large (1.5m to 1.8m wide and up to 0.8m deep), with two surviving post-pipes to indicate that these were the original cuts rather than post-removal cuts as found at Round Wood, Stansted (Havis and Brooks forthcoming). The close internal spacing and substantial size of the post-holes indicates that they are unlikely to be the foundations of a domestic building, but are likely to have been the remains of a raised structure such as a granary. Granaries were raised several feet off the ground to allow air to circulate, which prevented mould and decay, and to deter mice and other vermin from reaching the precious crop.

The abundance of charred plant remains retrieved from the granary post-holes and surrounding ditches certainly indicates that storage and processing of cereals, especially wheat, was a major activity of the settlement. The samples from this area of the site are interpreted as debris from an accidental granary fire (see Plant macrofossils p.65). A similar conclusion was reached for building 440, an apparently isolated and much larger structure of 10th to 13th-century date which was excavated at Great Holts Farm, to the east of Boreham Airfield (Murphy forthcoming).

Although four-post raised granaries are a recognised feature of Iron Age settlements in southern England, such as at Topsham, Devon (Jarvis and Maxfield 1975, 215), there appears to be very little comparable evidence for the medieval period, certainly in Essex. A large nine-post structure excavated at Wicken Bonhunt in northwest Essex, however, is interpreted as a granary or hayloft and dates from the Middle Saxon period (Wade 1980, 97). Most medieval buildings excavated recently in Essex which are interpreted as granaries, such as Building 1 at the A12 Boreham Interchange site (Lavender 1999, 38), are also much larger than the Boreham example, comprising two or more bays.

Before the 18th century, most farms would probably not have needed a separate granary since yields were relatively small and could be stored within the house or other buildings, in large bins, chests or wooden hutches. Of 248 Essex inventories published by Francis Steer for the period 1635–1749, only six mention garners or granaries, and these were not necessarily separate buildings. Only two out of hundreds of farm buildings and houses illustrated on the Walkers' estate maps of Essex, made between 1586 and 1616, are identifiable as granaries. Both appear on maps dated to the early 1600s; one is depicted as a small building with a tiled roof and a high plinth and the other is shown standing on brick piers (McCann 1996, 3–4).

Raised granaries are well documented for the post-medieval period, especially in the southeastern half of England, and a proportion of these buildings still survive in modern farmyards, albeit fulfilling a different use. Granaries of this type were often timber-framed, square, single-storey boxes raised on nine or more staddle stones, with a thatched roof or covered with tiles or slates. The internal floor was divided by low timber partitions, between which the grain could be stored loose or kept in

chests or sacks. The wall, floor and roof materials were generally tight-fitting to contain the grain and keep out the mice, rats and other vermin. A removable platform or set of steps was attached, leading to a well-made door, whilst the foundations, as well as the floorboards and joists, needed to be strong and closely-spaced to take the heavy weight of the grain (Brunskill 1987, 89–90).

A 16th-century raised timber granary survives at Colville Hall, White Roding, Essex. It measures approximately 6m by 4.5m in plan and is mounted on brick piers, which have been much altered or rebuilt. Other examples from Essex are identified at Church Farm, Kelvedon, and Navestock Hall, Navestock, the former dating from the 16th century and the latter to about 1500. The Colville Hall granary comprises horizontal oak boards half lapped together, whilst those at Navestock Hall and Church Farm have vertical boards, suggesting that there was a degree of variation in design. A small timber granary, originally from Tadlow, Cambridgeshire, and now re-erected in Wandlebury Country Park, was of a similar construction to the latter two, and has been tree-ring dated to 1415–25. This granary is now raised off the ground on staddle stones, although before its relocation it stood on brick piers, which were not original (McCann 1996, 4).

Staddle stones, the distinctive mushroom-shaped supports for raising granaries off the ground, are a more common feature after the 18th century, although there is some documentary evidence for them in Gloucester in the 14th century (Dyer 1984, 42–5). The arrival of the brown rat in Britain in the 18th century necessitated a rapid response. Existing timber-framed granaries were infilled with brickwork and the whole structures were raised higher on staddle stones or masonry piers of sufficient height to deter the rats (McCann 1996, 11).

Although the available evidence indicates that freestanding raised granaries were not a common feature in the medieval or early post-medieval period, it is possible that such buildings would have occurred on sites with a specialized function such as milling. Several of the early timber granaries that still survive are found in Essex, and these can give some indication of what medieval granaries may have looked like. The principle would have been the same, to raise the structure off the ground to keep the grain aerated and dry, and deter vermin. It is conceivable that the brick piers or stone saddles of the post-medieval period were preceded in the medieval period by timber posts. This method of construction would be especially likely in counties like Essex, particularly in rural locations, where building stone and to a lesser degree brick, was not readily available but wood was plentiful. The 5m-square plan afforded by the four post-holes at Boreham is very similar to the c. 6m by 4.5m building plan of the 16th-century granary at Colville Hall, suggesting that the interpretation as a granary is feasible.

An alternative, but related, interpretation is that the post-holes were the foundations for a rick stand. Granaries are used specifically for the storage of threshed cereals, barns for unthreshed cereal crops and rick stands for unthreshed cereal crops and pulses. An account, dating from 1620, of the construction of a rick stand describes four 3ft-long (c. 0.9m) pieces of wood or stone, which were placed upright in a square at equal distances. On top of each post four wide flat boards were placed, followed by layers of wood to form a platform on which the crop was stored, preserved from moisture and vermin (Markham 1620,

80–2). An account of rick stands or ‘hovels’ in the Midlands records: ‘Where timber is plentiful they set four, or six, or more Posts into the Ground ... upon which they make a Floor, or lay Pieces to support the Stack’ (Mortimer 1707, 109). Rick stands were used for the storage of different crops, including wheat, barley, oats, peas and beans and were located on the farm rather than out in the fields. The top of the stack would be very well thatched with straw, whilst the area underneath could be used to store tools or other equipment (Kalm 1892, 266). Initially the rick stands were simple improvisations, which developed into more substantial, semi-permanent structures and eventually permanent buildings (McCann 1996, 9).

Although these descriptions relate to post-medieval rick stands, it is quite possible that similar structures were in use in the medieval period. The four post-holes from Boreham are certainly reminiscent of the descriptions of rick stand construction from the 17th and 18th century, and this could be a plausible interpretation for this structure. However, the interpretation as a granary, which in archaeological terms could leave very similar remains, is also possible as the same principle of raising the grain off the ground applies. The charred grain assemblage from the granary post-holes and surrounding features was predominantly made up of wheat, although oats, barley and rye were also noted. Peas/vetches and beans were present, although chaff elements were rare with the exception of wheat rachis nodes, which because of their size are difficult to separate from the grain. This suggests that the samples represent semi-cleaned prime grain and may support the interpretation of the four-post structure as a granary, although the range of other crops present is similar to that described above for rick stands.

Large amounts of domestic rubbish were recovered from the features around the granary, including a large fragment of cooking pot from one of the post-holes and fragments of quernstone. This suggests that domestic debris was discarded here from the other areas, probably the buildings in Area 1 to the northwest.

The windmill

(Figs 31 and 33, Plates V–VIII)

Background and technology

The unusual feature, composed of a large pit surrounded by a *ring-ditch*, located in the southwest corner of the settlement is interpreted as the foundation of a sunken-post mill. This was the earliest form of windmill design in Western Europe, deriving its name from the method of construction, which comprised a single large post deeply embedded in the ground, on top of which the mill superstructure was attached. There is a wealth of literature relating to the invention and early technological development of windmills, of which the most commonly referenced for this chapter are: Farries 1981; Hills 1996; Holt 1988; and Kealey 1987. The following summary draws heavily upon these works, and individual citations are only included where there are alternative theories or specific references or points to be made.

Traditionally the windmill was believed to have had a continental or even Asian origin, based upon the Persian horizontal mill. In recent years this has been revised and it is now believed that the post mill could be a European innovation and was ‘equally likely to have been invented in England, most plausibly in East Anglia’ (Holt 1988, 20).

The date of the invention of the post mill has not been established with any certainty, as the majority of the evidence is based upon often unreliable or ambiguous documentary sources. Kealey (1987) cites 1137 as the earliest reference to a windmill, and speculates from the documentary evidence that there were fifty-six windmills in existence in England before 1200. Of these, a post mill is documented in 1169 in Wigston Magna, Leicestershire as having had two previous owners, and a windmill at Weedley in Yorkshire was recorded in 1185 as yielding a profit of eight shillings (Hills 1996, 36).

Such examples imply that windmills had already been in existence for some years, although it is not until the 1190s that there is a profusion of references (a further twenty). The documentary evidence suggests that knowledge of the new technology had begun to spread rapidly through eastern England before 1200, with an apparent concentration in East Anglia. A similar picture was developing for the northwestern continental seaboard, although far fewer references have been identified for European windmills compared with those cited for England. There are approximately sixty documented references to windmills in Essex in the period 1200–1350, the earliest of which is at Henham in 1202, indicating a wide and early adoption of the new technology in the county (Farries 1981, 88).

The impetus for the invention of the windmill can at least in part be explained in geographical and topographical terms, and this is illustrated by evidence from the Domesday survey of 1086. The survey indicates a 'disproportionately low number of mills compared with their population' for Devon and Cornwall, and parts of ten other counties including Suffolk, Norfolk and Essex (Darby *et al.* 1952–67). The mills listed in the Domesday survey particularly refer to watermills, and the small numbers in certain parts of the country could reflect the lack of local usable watercourses. Although horsemills are known in England by 1183, it is likely that most flour was milled, if watermills were unavailable, using handmills. The need for an alternative source of power in the drier counties must have been the stimulus for the development of windmill technology, especially during the 12th century, a period of population increase and the settlement of more marginal land.

Early mills were probably small, light and rather cramped, with walls of clapboard or wicker and high-pitched roofs (Kealey 1987, 18). There are numerous medieval illustrations of windmills, from illuminated manuscripts to graffiti in churches, although none reliably date from the 12th century when the post mill first appeared. Most illustrations date from the 13th century or later (Fig. 33), and display obvious similarities with existing post mills, such as the early 17th-century mill at Bourn in Cambridgeshire. Although no medieval post mill superstructures have survived, an idea of their appearance can be suggested. On the front of the mill would have been four sails which turned a horizontal wind shaft, entering the mill cabin through the gable, where a large break wheel was attached. This connected with and turned a lantern pinion wheel, which in turn was geared to a vertical power shaft that rotated the millstones. A long tail pole was attached to the base of the mill body, passing through the fixed ladder leading to the doorway at the rear of the mill, and extending almost to the ground. The tail pole acted as a lever, to lift and turn the whole mill body into the wind,

and the steps which moved with the body provided extra support against the force of the wind.

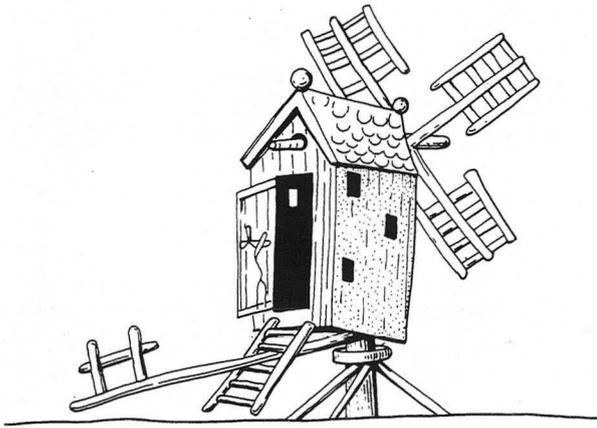
The windmill was essentially based on the application of existing watermill technology to an alternative source of power (Holt 1988, 137). The position of the stones and the location of the mill axle, at the top of the structure in windmills rather than at the base as found in vertical watermills, necessitated in effect an inversion of the drive mechanism, but otherwise very little mechanical adaptation was required. Although the initial diffusion of this technology may have been rapid and fairly widespread, evidence from the first half of the 13th century indicates that windmills were not adopted in any great numbers for some time. Holt suggests that during the early development of the windmill there 'was much trial and error in their construction as numerous deficiencies were corrected', with many instances of individual experimentation in design and technological innovation (Holt 1988, 138).

Problems involving the construction of the mill body and its foundations were probably encountered, especially in relation to size and stability. Documentary evidence relating to the construction and maintenance of windmills gives some indication of the massive investment involved. Occasionally references are made to the size of sails and timbers, including the central post, as well as the cost of digging foundations or raising mounds, and these contribute significantly to the understanding of early mill technology (Holt 1988, 141). It is in the area of the design and development of post mill foundations that archaeology can perhaps most fruitfully provide evidence.

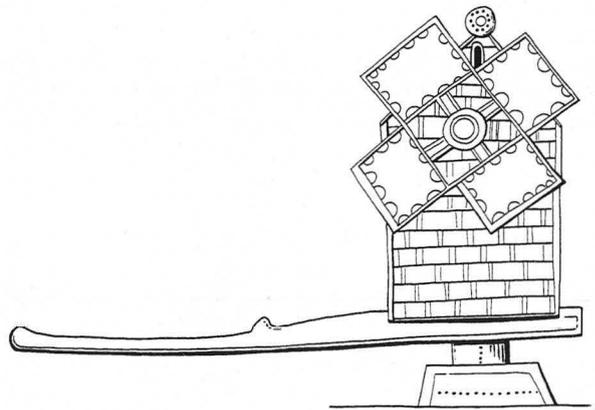
Archaeological evidence

Primarily it has been the visible remains of windmills, namely the mound, which has attracted investigation by antiquarians and archaeologists in the past, often under the misconception that they were burial mounds. In recent years the excavations of windmill bases such as Great Linford, Buckinghamshire (Zeepvat 1980, Mynard and Zeepvat 1992) and Strixton, Northamptonshire (Hall 1973), have provided useful evidence for the design and evolution of early post mill substructures. Aerial photography has also contributed to the numbers of known post mill sites by the identification of the characteristic 'hot cross bun' cropmarks produced by the mounds and buried foundations, such as at Mucking, Essex (Jones 1980, 42).

Although the superstructures of most post mills were probably very similar, there was a degree of variety in their foundations, which initially appear to have been quite crude. The earliest designs probably involved the massive post, onto which the mill body was attached, being deeply embedded in the ground, probably in a pit, and surrounded by a large mound or perhaps several timber braces for support and stability. Evidence for this type of foundation has been found at Rillington in Yorkshire where a large stone-lined pit was recorded covered by a substantial mound of clay and soil (Huddleston 1955, 17 and 20–2). At Chadwell St Mary in Essex a pit and mound were excavated in the early part of the 20th century by the Morant club in the belief that it was an eroded tumulus (Christy and Reader 1914). Two different types of foundation were identified for the post mill at Strixton in Northants (Hall 1973, 110). The earliest type dates from the early 13th century and comprises the remains of four post-holes which probably originally surrounded a central



A 14th-C mill (Bodley MS 264, after Buckland 1922, 4 and Jarvis 1981, 9)



A 13th-C mill (Aristotle's *Physica*, after Jarvis 1981, 13)

Figure 33 Examples of post mills from medieval illustrations

timber. In the 14th century, these were replaced by the more familiar cross tree or trestle foundation. The new design comprised large horizontal beams laid cross-wise with the main post inserted at the intersection, with quarter-bars for additional strength and stability.

The more stable substructure afforded by the cross trees appears to have been widely adopted in Britain, and is the type most commonly portrayed in contemporary illustrations (Fig. 33). Further advancements and variations were made to this design, including the burial of the foundations below ground or beneath a mound, although rotting of the buried timbers limited the life span of these mills. Some mills were elevated on top of mounds, or set on raised brick or stone piers above ground, which by the post-medieval period were encased by a roundhouse for protection against the elements. Although there is a logical typology of foundation designs, the limited dating evidence suggests that the various forms coexisted for long periods of time in different parts of the country (Holt 1988, 142).

The Boreham evidence

The proposed mill base within the moated settlement is not identical to any of the previously described examples, although it displays similarities with the more primitive foundations found at Rillington (Yorks) and Chadwell St Mary (Essex). The Boreham example assumes that a massive timber post was embedded in the 5m-wide central pit, which was then backfilled with rammed earth and clay. This design necessitated that the mill body was constructed fairly low to the ground, perhaps limiting the size of the sails and the height of the mill and surrounding buildings. Similar examples of this type of sunken-post mill, where no quarter bars or cross trees were utilised, have been recorded still standing in Sweden (Roberts 1995, 30–1). No positive earthworks survived on the site, so if there had been a mound, which is likely on grounds of stability, it was probably levelled during the construction of the airfield or eroded by modern ploughing. An alternative theory could be that the design was more like that of a pivot mill (Vincent Pargeter, pers. comm.). This type is also based on a central post, although the weight of the mill

body is partially borne by an above-ground trestle or stack, most likely constructed of timber logs, for which no archaeological trace has survived.

The ring-ditch surrounding the pit was continuous except for a narrow drainage channel interconnecting with the pit on its southeastern side. The upcast from the ditch may have been compacted around the post to form a mound as has been found at other excavated sites including the 15th-century mill at Bridgewater Without, Somerset (Fowler 1972, 9). Where ditches have been recorded on excavated post mill sites, such as at Honey Hill, Peterborough (Pearce 1966, 97) and Great Linford, Bucks (Mynard and Zeevat 1992, 105) most have tended to be C-shaped with a causeway allowing access. The causeway design may have been a slightly later development, although there has not been enough excavation to substantiate this. Ditches, as well as providing mound material, were probably partly designed for drainage as well as safety, to prevent damage to or from livestock. Between the mill foundation in the central pit and the ring-ditch was a gap wide enough to allow access to the sails which would have been individually adjusted as necessary. Two previously unknown 12th to 13th-century windmill sites have been identified incidentally as part of the Essex Cropmark Enclosures Project. No evidence of cross trees were shown on aerial photographs of the cropmarks and it was believed that the ring-ditches were prehistoric in origin. Only the ring-ditches, which were both causewayed, have been excavated so far, and so the type of windmill foundation is as yet unknown (Brown and Germany forthcoming).

Around the southern and eastern edge of the ring-ditch were several ovoid post-holes, only two of which were excavated, but which may originally have radiated around the whole windmill. More conclusive, similar evidence was found at Lampport, Northants where the ring of post-holes were interpreted as footholds to aid traction when turning the mill (Posnasky 1956, 66). It is possible that the post-holes at Boreham contained posts to which the tail pole could be secured once the mill body had been rotated, rather than footholds as at Lampport.

There appear to have been two phases of foundation within the central pit. The earliest probably involved the placing of the timber post directly into the base of the pit, the remains of which may be represented by the roughly circular patch of dark silty clay shown in Plate VI. This deposit and two other similar patches were noticeably different from the relatively clean orange clay which formed the majority of the fills encountered in the pit, and could represent the remains of timber foundations. The preservation of the buried timbers of the early sunken post design must have been paramount, and it seems that certain types of clay may have been used for this purpose. At Chadwell St Mary the presence of 'marsh mud' was remarked upon by the excavators who suggested that it was incorporated to prevent or slow the process of rotting of the foundation timbers (Christy and Reader 1914, 223). Similar evidence has been found at other sites, such as Aughton near Liverpool and Butcombe, North Somerset, where the foundation trenches were lined with clay to prolong the life of the cross trees (Farries 1981, 95). Stability must have been a problem with this early design; necessitating consolidation of the foundations at regular intervals and the propping-up of fallen mills such as documented at Wyke in Suffolk in 1322 (Holt 1988, 141).

Towards the top of the infilled pit were the remains of what appeared to be a second phase of construction, represented by a post-pad comprising a roughly circular patch of flints (Plate VII; Fig. 16b). If there were problems of stability with the previous design, then this subsequent development must have been intended to address these, although it is difficult to imagine how. The position of the post-pad, if that is what it is, suggests that the post was not as deeply set, necessitating additional above-ground supports which have not survived archaeologically. The outer ring-ditch also appears to have been recut at some point, perhaps concurrently with the new foundation. The rather scant pottery evidence from the windmill and ditch suggests an early 13th-century date, with no identifiable phasing to distinguish periods of construction or disuse.

The presence of an almost whole jug, apparently deliberately placed on top of the flint post-pad is of interest (Plate VIII). The jug clearly would have been crushed to tiny fragments if it had been located beneath the massive weight of the windmill, suggesting that it was placed after the removal of the central post. Evidence of termination ceremonies, usually comprising groups of pots containing animal burials or food remains, has been found on various sites, mostly of Iron Age or Roman date (Merrifield 1987, 49). These are interpreted as probably signifying a period of change, a crisis, or the abandonment of a site. Residue analysis indicates that the jug may have contained beer made from barley, and could conceivably represent a final ceremony marking the demolition or demise of the windmill, when the settlement was abandoned sometime in the early to mid 13th century.

Problems of interpretation

The evidence from Boreham is not entirely consistent with that from the majority of excavated windmill sites, and is clearly open to interpretation. A possible alternative interpretation is that the circular feature was a dovecote similar to that found at Stratton in Bedfordshire (Bedfordshire C.C. 1996, 3). At this site a central pit, originally designed to catch the valuable guano, was surrounded by the remains of a circular hollow cob wall

containing the nesting boxes. Although the two features appear superficially similar in plan, the dovecote is much smaller in diameter (10m) and was not surrounded by a large ditch as found at Boreham. Two medieval dovecotes excavated at a 13th to mid/late 14th-century moated site at Bradwell Bury, Milton Keynes were also circular in shape, comprising stone-built foundations with diameters of 6m (Mynard 1994, 23). No structural foundations were evident at Boreham to indicate the presence of walls around the pit, and very little daub or other structural material was recovered from the fills of the pit or ring-ditch. There appears to be even less evidence to support interpretation as a dovecote than there is to suggest that it is a windmill.

The absence of cross trees in the central pit can be explained against the background of independent and regionalised technical development in the early years following the inception of the windmill, and is not an isolated example. The only possible piece of millstone from the site was found in a ditch to the northwest of the buildings in Area 1. The apparent absence of this specific type of evidence could be because such valuable items were salvaged for use elsewhere, or that any discarded fragments were not uncovered in the parts of features sampled during the excavation.

The location of the windmill, within an enclosed settlement, is also an unusual occurrence, as the majority appear to be isolated at the outskirts of villages, on areas of high ground. This disparity could in part be a result of past excavation strategies that have tended to concentrate on the visible remains of windmills, namely the mound, with little emphasis on locating any associated buildings or features. At Witton in Norfolk, however, a circular cropmark with two causeways was investigated in 1962, and found to contain late medieval pottery. This was interpreted as the remains of a mill mound, and although this is a later windmill, the diameter of the ring-ditch, at 18.2m, is very similar to that of the Boreham ring-ditch. The Witton ring-ditch is clearly shown on a cropmark plot (cropmark 7025) and is surrounded by several subrectangular enclosures, with a road, now no longer evident on the ground, leading to the site (Lawson 1983, 90–2). Although it is not possible to demonstrate that the enclosures are contemporary with the windmill, the layout is very reminiscent of the Boreham site, especially when the cropmarks are compared.

Any contemporary buildings located in proximity to the windmill must have had relatively low rooflines to avoid interference with the prevailing wind. The topographical location of the Boreham windmill, on an area of relative high ground formed between the wide valleys of the rivers Ter and Chelmer, is consistent with the windmill interpretation, as is the lack of usable watercourses nearby.

The most compelling evidence for a windmill on the site is the abundance of charred macrofossils, which to date appears to be the largest, and perhaps only, charred assemblage from a windmill site in the Eastern Counties. The densest concentration of charred macrofossils was recovered from the four-post structure, interpreted as a small raised granary to the immediate east of the windmill, and the features surrounding it. Wheat grains were abundant in the sample assemblage with small amounts of chaff, although oats, barley and rye were also present. The samples from the site as a whole appear to represent semi-cleaned prime grain, indicating that storage and

processing of cereals, especially wheat, was a major activity of the settlement. The survival of this particular type of evidence is solely because of charring, and the samples from this area are interpreted as debris from an accidental granary fire (see Charred macrofossils p.65). Evidence from the more peripheral areas of the settlement and the domestic buildings in Area 1 indicate that processing waste was disposed of in a controlled fashion on bonfires, presumably to keep the risk of fire to a minimum.

The pottery evidence from the site did not indicate any specialist milling-related vessels, which perhaps is not surprising, although the absence of dairying vessels was noted. The wide shallow bowls interpreted as dairying vessels were present at similar rural medieval sites in Essex, including Stebbingford (Walker 1996, 127–150), Stansted (Walker forthcoming a), and Gutteridge Hall (Walker forthcoming b). The apparent absence of this pottery may indicate that dairying was not undertaken on the site.

Taken as a whole, the evidence does conceivably indicate the presence of an early form of post mill, constructed around the turn of the 13th century. The mill was located in the southwest corner of a moated settlement and although other small-scale farming activities were probably undertaken, milling appears to have been the primary occupation of the inhabitants.

Settlement status and function

(Fig. 2)

It seems possible that the settlement was associated with the Waltham Abbey manor of Walkfares, which was granted to the canons in 1062 by Earl Harold. At the time of the Domesday survey in 1086 there were six manors recorded in Boreham, including three *Walcfara* (Walkfares), the largest of which was the Waltham Abbey manor (Burgess 1988, 82; Stephen 1988b, 126). The precise location of this manor is not known, although it may have extended into the north of the parish, as far as Little Waltham. Sometime in the 13th century this Walkfares appears to have been replaced by New Hall, which in the Tudor period became a palace for Henry VIII, who rebuilt the hall and renamed it 'Beaulieu' or beautiful place (Helen 1988, 118). Dukes Wood, which is shown covering the excavated site (Fig. 2) on maps dating from the 18th century onwards, was probably created as part of the New Hall estate. The precise date of the creation of Dukes Wood, and Dukes Lodge to the immediate northwest, is not known although it is certainly referred to as part of the New Hall estate in later medieval and post-medieval documents. Reaney (1976, 240) suggests that the wood and lodge were associated with John *le Duk*, the earliest reference for whom dates to 1311. The documentary references, combined with the archaeological evidence, suggest that after the settlement was abandoned in the mid 13th century, a large park or wood was created in its place to provide hunting grounds for the occupants of New Hall (see Chapter 1 above).

It is not possible to discern whether the excavated post mill was owned or managed by a lord or a freeman. The inhabitants of the settlement clearly had financial resources given the presence not only of the mill, but also of the associated buildings, the fishponds and the enclosing moat.

Moats were initially constructed by all seignorial sections of medieval society, and often surrounded 'manor-houses' which operated as a centralised base for a landed estate. Freeman also constructed moats, perhaps to serve as messuages attached to freehold properties or estates that did not possess true manorial rights. This was probably especially true during the 13th century when moat construction began to gradually filter down to the increasingly prosperous upper levels of the peasantry, the lesser knights and freemen (Le Patourel and Roberts 1978, 48).

The presence of the windmill has some implications for the interpretation of the settlement as a whole, especially in terms of status and function. Windmills, like watermills were subject to seigneurial control, and lords were legally entitled to force their tenants to use the manorial mill. However because wind, unlike water, was free the opportunity for independent enterprise was realised, and documentary evidence suggests that during the 13th century a large number of mills were not directly controlled by the manor (Holt 1988). A proportion of the remaining mills was leased to millers, although the lord would reserve all profits for himself. Windmills were less expensive and easier to construct than watermills, although they still represented a significant initial investment, and subsequently incurred high maintenance costs (Langdon 1991, 436).

The documentary evidence for mills in Boreham is unfortunately lacking for the 12th and early 13th centuries, and the sources that do exist are too unspecific to be related to the excavated evidence. There is a reference to a windmill in Boreham before 1309 (Reaney 1933, 100), although this is likely to refer to the mill situated close to the village. A translation of the court rolls of 1271 (ERO T/P 145/3) recorded that 'everyone in the vill has gone elsewhere than the lords mill' to grind their corn, indicating that there were independent mills in Boreham by the late 13th century. Although this is a tantalising reference, it is too late for the excavated windmill, and does not specify whether the mill was wind or water-powered.

Archaeological evidence

Although the pottery, and to some extent the animal bone, assemblage for the site appears to be typical for a medieval rural settlement in Essex, the environmental evidence indicates that the cleaning and processing of cereals was the main occupation. The pottery is representative of a household assemblage, similar to that found at Stebbingford (Walker 1996, 127–150), Stansted Airport (Walker forthcoming a) and the Boreham Interchange (Walker 1999). However, unlike at the other sites, there is no evidence that dairying was carried out at this site. The most unusual aspect of the pottery assemblage is the presence of the non-local fine wares of Developed Stamford ware and ?Coarse London-type ware. Developed Stamford ware is rare in Essex, and its presence may indicate that the occupants had access to pottery not available at the local outlets. The finds assemblage from the site as a whole was not remarkable and there is little to suggest that this was a high status site. No coins were recovered and very few metal objects, although those found include an early example of a scale tang knife, a bill hook and several copper alloy objects which may derive from horse harnesses, belt fittings or casket mounts.

Very few sites of this type, which combine features such as the moat, buildings and windmill, have been excavated in Essex and so few comparisons can be made. High-status moated sites have been investigated in recent decades, such as King John's Hunting Lodge, Writtle (Rahtz 1969) and Southchurch Hall, Southend-on-Sea (Jackson 1987), which provide a useful background against which to view the evidence from Boreham. The hunting lodge, or palace as it was known, at Writtle was built in 1211, and was surrounded by a substantial rectangular moat with fishponds, sustained by a nearby brook. In addition to the great hall, of double square and probably aisled construction, evidence of other buildings including a kitchen, chapel and gatehouse was found. At Southchurch Hall a timber-framed house dating from 1300 still stands within the moat which was constructed in the late 12th century. Timber defences including a bridge and revetment were also built at this time, and the upcast from the moat was used to raise the level of the enclosed island on which the original hall was erected. Both of these sites continued to be occupied, with evidence of rebuilding, improvements and repairs, for several centuries. However, a period of decline was noted at Southchurch Hall from the end of the 15th until the 17th century and King John's Hunting Lodge at Writtle was abandoned in the 16th century. It is conceivable that if the occupation at the Boreham moated site had continued, although clearly of a different social and economic status, it may also have benefited from improvements and additions to its buildings and associated features.

At Gutteridge Hall, Weeley (Wade forthcoming), a sequence of buildings and moat construction, including a 12th or 13th-century timber-framed building interpreted as a kitchen, was revealed during a rescue excavation. The hall and its surroundings expanded during subsequent centuries and the site appears to have been abandoned in the 15th or 16th century. This site may have been of slightly higher status than the Boreham settlement since medieval tiles and bricks were found, although the two perhaps belonged to a more similar social level compared with that of Writtle and Southchurch.

Evidence for the contemporary landscape and medieval farming techniques

(Fig. 2)

The settlement lies on the 50m contour line, on an area of relative high ground between the rivers Ter and Chelmer. The construction of the airfield during the war has altered much of the immediate landscape of the site by ground levelling and the removal of Dukes Wood (Jones 1988, 49). In recent years the programme of gravel extraction and reinstatement has continued the process of change.

The site appears to have a peripheral location within the parish of Boreham, lying close to the boundary with Little Waltham and some distance from Boreham village. Modern OS maps of the area suggest that the site was somewhat isolated and inaccessible, although 19th-century editions show that there were several nearby paths and tracks. Perhaps more significantly, a narrow road which still exists ran from the Waltham road, past Dukes Lodge and continued down towards Mount Maskall and New Hall (Fig. 2). The road describes a distinct 'dog-leg' before passing the lodge, and a path running through Dukes Wood

to the immediate south appears to continue what may have been the original alignment of the road. The shape of the road and surrounding field boundaries suggests that the wood may have originally been much larger, extending north and westwards at least as far as Dukes Lodge. The path, which runs down the length of the wood, passes to the immediate north of the site and it is possible that it was once a main means of access to the medieval settlement. A further access point may have been via a track joining with the Boreham road, next to Great Holts Farm to the east of the airfield. If this was the case, the settlement was not as isolated as might seem, and was probably easily reached from both Boreham and Little Waltham.

Preliminary results of further work in the form of fieldwalking, geophysical survey, trial trenching and watching brief of Phase 3 of the extraction programme indicate very little contemporary activity to the south and east of the settlement (Clarke forthcoming). A small gully, and a pit were the only identifiable features of comparable date and both of these were located within a few metres of the southwestern arm of the moat. Over a 100m to the southeast of the settlement, two parallel ditches were recorded which correspond with part of the western boundary of Dukes Wood shown on the 1874 OS map of the site. Unfortunately, the only dating evidence from these features was surface finds of pottery sherds with a broad date range of 10th to 13th-century, which may indicate that a pre-existing field boundary was re-used to demarcate the wood. The remaining features in this area were two large undated ponds and several small pits or post-holes, some of which contained Middle Iron Age pottery. A wide ditch was superficially investigated to the south of the moat and found to contain large but abraded sherds of Late Iron Age or early Roman pottery with no later associated material. Although the pottery could be residual, this ditch may conceivably be part of the field system attached to the Roman farmstead discovered at Great Holts Farm to the east of the site (Germany forthcoming). The area to the east of the site, like those to the west and north, had been quarried before any further investigation could take place and so a complete contextual picture of the moat and its immediate surroundings is not possible.

The animal bone and charred plant remains from the site provide some evidence for the local environment and farming techniques, as well as some indication of settlement diet and economy. Very little is known of the agrarian economies of rural medieval sites, and from eastern England only two other sites have produced informative assemblages of charred crop remains; Round Wood, Stansted (Murphy 1990) and Parson Drove, Cambridgeshire (unpublished).

The predominant crop represented in the samples from Boreham was wheat (including both hexaploid and tetraploid species), which was the main cereal intended for milling. Oats were also frequent but in most cases, it was not possible to determine whether a crop or weed oat species was represented. Rye and barley were rare, and the grains and chaff fragments present are probably contaminants of the wheat. The evidence suggests that cereal production was concentrated on heavy clay soils, probably the Boulder Clay which forms the subsoil at Boreham. The occurrence of seeds of wetland plants may suggest that marginal damp soils were also being utilised, although it is possible that these species reached the site with other products, such as hay or thatching materials. The

relative abundance of leguminous weed seeds may indicate that the soil was nitrogen-depleted, whilst the presence of vetches/peas and beans suggests that a crop rotation system involving cereals and pulses was employed to ameliorate this problem.

Nutshell fragments of hazel were also recovered in addition to other tree/shrub macrofossils including a fragmentary hawthorn stone and bramble fruitstones. These probably represent food waste, and indicate that the samples were not composed exclusively of crop storage and processing residues, but included some domestic waste.

Although the animal bone assemblage was in poor condition and of a fragmented nature a number of both wild and domestic species was identified. These included cattle, pig, sheep or goat, dog, chicken, cat, horse and duck. Wild species included hare, pheasant, roe and fallow deer, vole, frog, mole, and an unidentified bird bone, which may derive from a swan. The relatively large numbers of pig bones is of interest, and suggests that these were a significant part of the settlement's economy and diet.

The local environment is well represented by the diversity of species in the assemblage. Both roe deer and fallow deer were widespread in the medieval period and were generally encountered in scrub, undisturbed pasture or woodland. Pheasant and hare prefer pasture and farmland whilst the additional presence of frog, duck and obviously fish bone indicates a nearby aquatic environment. This was perhaps supplied by the ponds and moat present on the site or even by neglected drainage ditches. In the immediate vicinity of the site species characteristic of developed settlements such as dog, cat and

vermin were found, including a tentative identification of black rat from the granary.

The abandonment of the settlement

The rapid infilling of many of the features within the settlement, especially in the granary and windmill area, with quantities of domestic rubbish and crop remains, suggests an abrupt end to the site, probably in the mid 13th century or later. The buildings were clearly abandoned or, in the case of the granary, destroyed, and pits and ditches filled in. The buildings and other features were not replaced, indicating that occupation had ceased on the site. The abundance of carbonised cereal remains in the granary post-holes and nearby ditches indicates a 'catastrophic granary fire' which may have heralded the demise of the settlement and led to its abandonment. The rather primitive post mill may have been unsuccessful and too costly to maintain, or perhaps uncompetitive if other mills were being constructed nearby, and this may have provided further impetus for abandoning the settlement. There may also have been underlying economic or social reasons for the demise of the settlement, perhaps related to the creation of New Hall and its associated estate. The first references to Dukes Wood (*DukesPark(e)*), which is shown covering the site on maps from the 18th century onwards, occur in the 14th century (Reaney 1976). The date of the creation of this wood could correlate with the abandonment of the settlement in the mid 13th century or later, but whether it was destroyed deliberately or accidentally may never be known.

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