University of Leicester

Archaeological Services

An Excavation of an Iron Age Settlement at Hallam Fields, Birstall, Leicestershire

By Gavin Speed

ULAS Report No 2009-080.
©2009

An Excavation of an Iron Age Settlement at Hallam Fields, Birstall, Leicestershire

By Gavin Speed

For: Jelson Ltd

Checked by

Signed: ....**Date**: 01.07.2009
Name: Patrick Clay

Approved by

Signed: ...**Date**: 01.07.2009
Name: Richard Buckley

University of Leicester
Archaeological Services
University Rd., Leicester, LE1 7RH
Tel: (0116) 252 2848 Fax: (0116) 252 2614
Website: http://www.le.ac.uk/ulas/

©2009 ULAS Report Number 2009-080

Contents

List of Figures

List of Tables

An Excavation of an Iron Age Settlement at Hallam Fields, Birstall, Leicestershire

Gavin Speed

Summary

University of Leicester Archaeological Services carried out an archaeological excavation at Hallam Fields, Birstall, Leicestershire (centred on SK 58845 10274) from November 2004 to April 2005. The work was undertaken as part of an archaeological mitigation strategy in advance of proposed mixed-use development.

The excavation revealed evidence for a middle Iron Age enclosed settlement. The site, originally identified as a cropmark, comprised of a large 'D'-shaped enclosure (65m x 50m enclosing c.2500m²) lying adjacent to a smaller 'D'-shaped enclosure (45m x 25m enclosing 915m²). The enclosed settlement was located in the Soar valley, on the edge of the gravel terrace. Within the enclosures were a range of associated settlement features, including roundhouses, sub-enclosures, pit groups and metalworking evidence. Some activity appears to have continued into the late Iron Age. The results add significantly to our understanding of small Iron Age farmsteads in the region, revealing much on how the people of Iron Age Leicestershire lived and utilised the landscape.

Records will be deposited with the Leicestershire County Council under the Accession no. XA25.2001.

Introduction

Background to the project

This report presents the results of an archaeological excavation carried out by University of Leicester Archaeological Services (ULAS) on land at Hallam Fields, Birstall, Leicestershire (centred on SK 58845 10274, Figure 2).

Archaeological work was carried out by ULAS on behalf of Jelson Ltd in advance of a proposed mixed-use development, including residential, business, and community developments. An initial desk-based assessment was prepared in 2000 (Grimley *et al* 2000), which showed the site to lie within an area of moderate archaeological potential, including a cropmark of an enclosure. Further fieldwalking, geophysical survey and evaluation confirmed the presence of archaeological deposits in three areas (below p.8).

The main excavation work was undertaken between November 2004 and April 2005, where, including evaluation and excavation, a total of 2.8ha was stripped and recorded.

Site description, topography, and geology

The site is located within the county of Leicestershire (Figure 1), 6.5km north of Leicester city centre beyond the northern housing limits of Birstall (Figure 2), in the Borough of Charnwood. The application area in total covered 71.51ha, located south of the A46 dual carriageway, divided by the A6 road and bounded to the west by the line of the Great Central Railway. The main development area to the west of the A6 comprised 62.2 hectares and it was these fields, following geophysical survey and fieldwalking, which were subject to the archaeological evaluation (Figure 2, Figure 6).

The western area of the site is situated on a slight hill, *c.*87m above O.D, which slopes down to the west and south-east to around 60m O.D. East to west across the site the geology consists of glacial drift (boulder clay), sand and gravel, river gravel and Mercia mudstone substrata (Geological

Survey of Great Britain Sheet 156, Figure 3). Some colluvial deposits were also present. Within Area 1 (the main excavation area) the natural substratum consisted of sands and gravels.

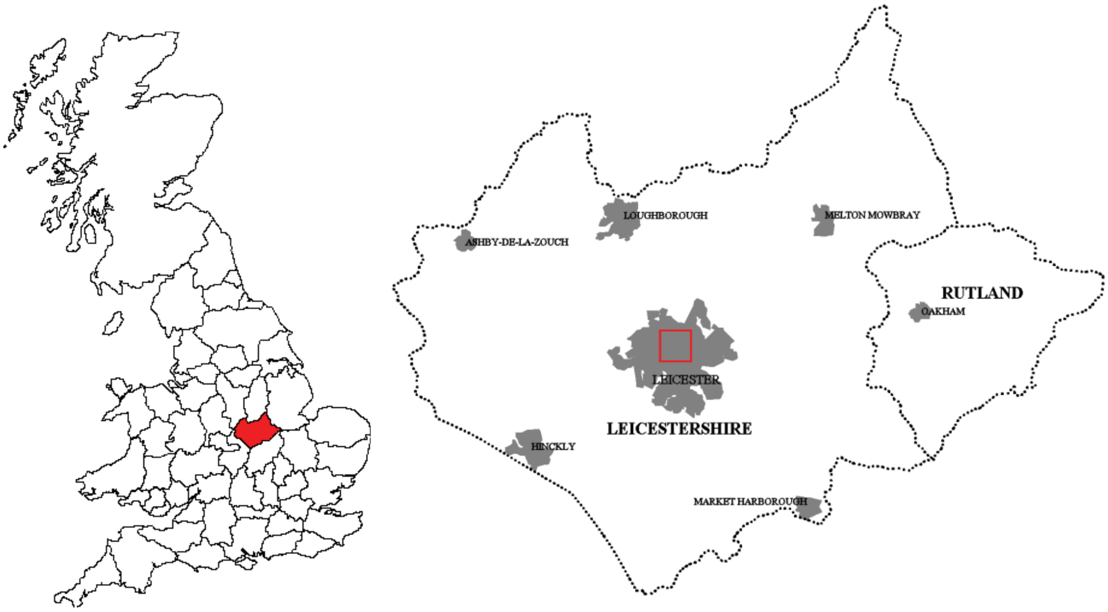


Figure 1: Site location plan within the UK and county of Leicestershire

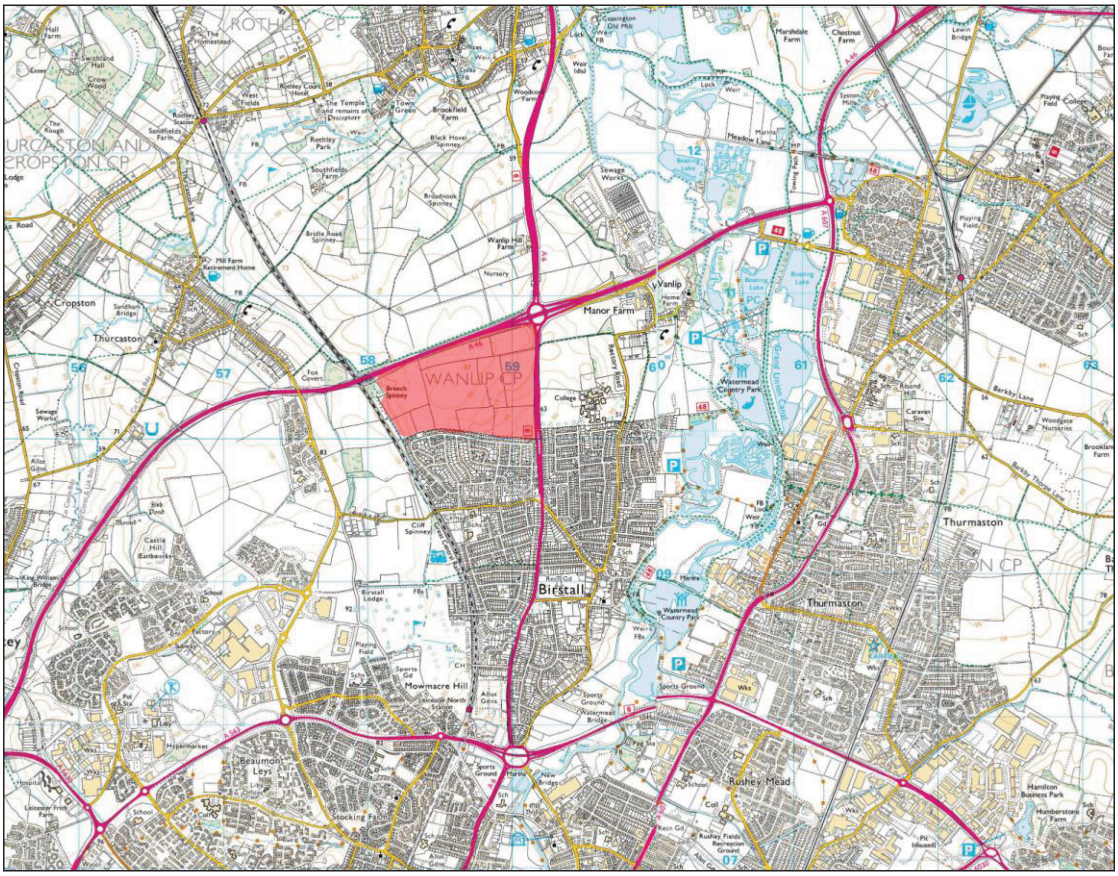


Figure 2 Site location plan (shaded area), 1:25000

Reproduced from Landranger® by permission of Ordnance Survey® on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence number AL 100021187.

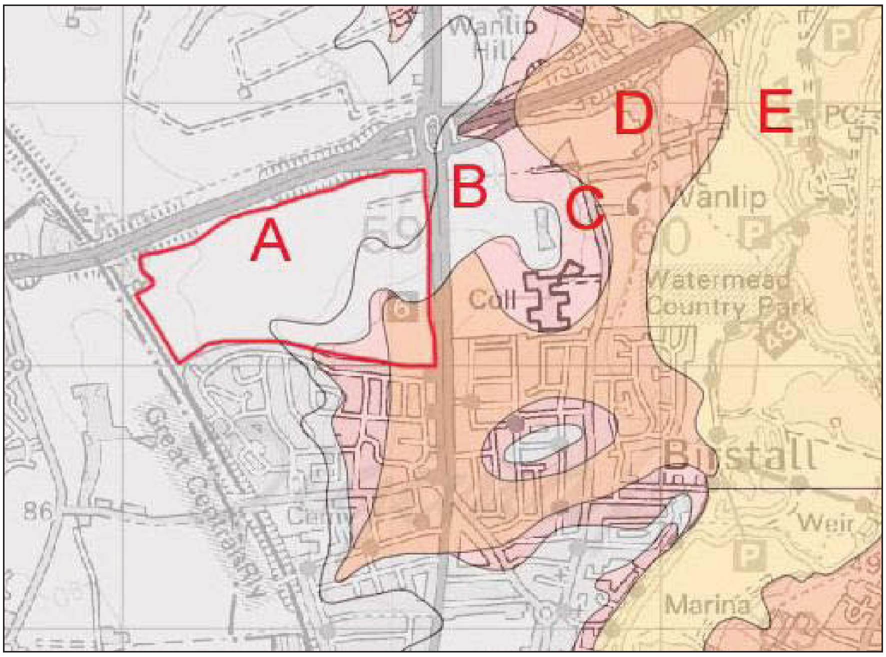


Figure 3: Geology of the local area (map from Geological Map Data ©NERC 2008).

The local geology consists of A = Diamicton (superficial), B = Sand And Gravel. Glaciofluvial Deposits, Mid Pleistocene (GFDMP). Age: Ipswichian – Cromerian, C = Mudstone (Bedrock). Mercia Mudstone Group (MMG). Rhaetian – Scythian, D = Sand And Gravel (Superficial), E = Alluvium (ALV). Flandrian.

Archaeological and Historical Background

Prior to the excavation in 2004 – 2005, the application area had been investigated fully for archaeological potential, firstly by a walkover survey in 1997 and desk-based assessment in 2000 (Grimley et al 2000), which was followed by a fieldwalking survey (Priest 2001) and geophysical survey (Butler 2001) in 2001. Further fieldwalking and geophysical surveys took place in 2003 and 2004 (Speed & Coward 2004; Sabin 2004), and a trial-trench evaluation in 2004 (Speed 2004).

Desk-based assessment

A desk-based assessment was prepared by RPS Consultants (Grimley et al 2000) that included a walkover survey. The land west of the A6 was identified as having some archaeological potential, with eight known sites within the area as well as four areas of medieval ridge and furrow. The assessment identified evidence for Neolithic, Bronze Age, and Iron Age activity in the area. Several flint scatters had been identified during fieldwalking, walkover surveys and watching briefs in this area prior to the 2001/2004 surveys. These include a probable Neolithic scatter south of Breech Spinney and a possible occupation site in the north of the site. A flint scatter from a fieldwalking survey in 1985, included scrapers and cores. Further flint scatters were noted during the walkover survey in 1997. In addition there are several prehistoric flint scatters located to the east and north of the development area. The Leicestershire Historic Environment Record (HER) included an undated cropmark complex with a rectilinear enclosure and other irregular features within the south-east corner of the site. Study of vertical aerial photographs also located another possible cropmark east and south of Breech Spinney. Further prehistoric sites in the vicinity of the development area include a burnt mound discovered during excavations by ULAS at Watermead Country Park (east of the site) in 1996 (Ripper 2004), and an Iron Age farmstead to the north-east at Wanlip, excavated by Leicestershire Archaeological Unit in 1992-1993 (Beamish 1998).

Romano-British activity has also been identified to the north-west of the site and there is a possible villa site to the north-east. Both the villages of Wanlip and Birstall are thought to have their origins during the Anglo-Saxon period and evidence was found for a 5th - 6th century inhumation cemetery during the construction of Longslade School to the east. Fieldwalking of this area produced several sherds of Anglo-Saxon handmade pottery. Two sherds of Anglo-Saxon pottery were also recovered during fieldwalking within the northern part of the site, while further Anglo Saxon occupation has been identified north of the development area. Probable post-medieval ridge and furrow (orientated east–west) has been identified by aerial photographs (Hartley 1989, 45). None of this is visible as earthworks and appears to have been destroyed by modern ploughing.

Figure 4 Aerial photograph showing the cropmarks of Enclosure 1, looking north with the A50 on right of view (taken by Jim Pickering)

Fieldwalking survey

A fieldwalking survey was carried out in 2001 and 2003 by ULAS (Priest 2001, Speed & Coward 2004). The surveys revealed three potential areas of possible prehistoric activity, these being the south-east corner of the area in field 1, the central area of field 9, the central area of field 2. General medium-level spreads of flint were seen in the remaining fields, probably indicating scattered prehistoric activity within the area.

Geophysical survey

A geophysical survey was undertaken by ULAS in 2000 (Butler 2001) and by Stratascan in 2004 (Sabin 2004). The 2000 survey identified two significant areas of enhanced topsoil susceptibility in Fields 1 and 9. A 2.6ha area of fluxgate gradiometer survey targeting the enhanced MS areas revealed a group of magnetic anomalies forming a large sub-rectangular ditched enclosure, further ditches, pits or hearths, and possible ring ditches in Field 1. In Field 9 several possible lengths of ditch and pits were identified. The strongest magnetic anomalies were detected from the putative ditched enclosure in Field 1, suggesting a focus of occupation in this area (Butler 2001). The 2004 survey had more problems with the interpretation of the results from all the surveyed areas due to the low magnitude of the magnetic response. The strongest evidence was located in field 2 due to the sub-circular and curving form of the anomalies (Sabin 2004).

Trial Trench Evaluation

A trial trench evaluation was carried out by ULAS in 2004 (Speed 2004), comprising 84 trenches. Most trenches were 30m in length and 1.6m in width. They were arranged in order to target the areas of archaeological potential based on the desk-based assessment, fieldwalking results, and the geophysical surveys. Archaeological activity was identified within fields 1, 2, and 9; in the remaining fields very little archaeological evidence was identified. No archaeological deposits were identified within fields 3 and 5.

Twenty trenches were excavated in field 1. The trenches were targeted to test the presence and quality of survival of an enclosure previously identified by aerial photographs (Grimley 2000, 13.39, Figure 4) and geophysical survey (Butler 2001). The evaluation of this field confirmed the location of an Iron Age sub-rectangular enclosure that from the pottery recovered dated from the Middle to Late Iron Age. The enclosure was *c*.50m+ in width, and *c*.74m+ in length, with activity covering an area of 3155 square metres (0.31 ha). Trenches around the northern-end revealed the highest density of archaeological features in the evaluation, indicating Iron Age domestic activity within and around the enclosure; truncated remains of a roundhouse drip-gully and numerous small ditches and pits outside the enclosure were also identified.

Thirty-six trenches were excavated in Field 2. Archaeological features were located in nine trenches, all of a mid to late Iron Age date (based on the pottery finds). Eighteen trenches were excavated in Field 9 in order to test the geophysical survey results that indicated potential archaeological deposits. Three trenches revealed archaeological deposits, some appearing to correspond to geophysical anomalies suggesting small enclosures.

Aims and Methodology

Project Aims

The aims of the project were to record archaeological remains to be effected by the proposed development; to established the location, extent, date, and significance of the deposits; and define the quality and state of preservation of these deposits.

Following the desk-based assessment, fieldwalking surveys, geophysical surveys, and trial trench evaluation, the site was identified as having the potential to address a number of research aims, both regional and national, as defined in *The Archaeology of the East Midlands. An Archaeological Resource Assessment and Research Agenda* (Cooper (ed.) 2006; Willis 2006), and more specifically for the Iron Age in *Understanding the British Iron Age: An Agenda for Action* (Haselgrove et al 2001).

- ***The evolution of Iron Age rural settlement***: The development and evolution of Iron Age rural settlements is an on-going research aim (Haselgrove 2001, 30). Phasing the way settlement shifts and changes is key, as well as recording and analysing the distribution of remains on a site. This may help to define areas of domestic activity in contrast to other activity areas (e.g. crop processing) and may also contribute towards understanding of deposition/discard patterns on the site (EH 1997, 52). Comparison with other settlement sites in the region and beyond may show differences in exploited resources and crops grown over time.

- ***Dating.*** The long-lived pottery style of the Scored Ware tradition presents a major problem for Iron Age studies in the East Midlands when attempting to establish chronologies for the period (Elsdon 1992; Marsden 1998, 2000). This problem is coupled with difficulties presented by a flat C14 dating calibration curve for the earlier part of the 1st millennium BC in comparison to a kinked curve towards the end of the 1st millennium (Stuiver *et al* 1993). A successful suite of C14 results from Hallam Fields, Birstall would greatly enhance understanding of the chronology and development of the site and also help to position the site within regional and national chronological frameworks.

- ***Settlement and landscape space.*** The settlement and landscape space can be viewed in how the human body moves within that space, this is an important aspect to consider in Iron Age studies and has been utilised on a number of sites (Haselgrove 2001, 9). Hallam Fields has the potential to illustrate patterns into how private space was being utilised, these can be usefully paralleled to other sites within the region (Speed forthcoming).

- ***The study of Iron Age buildings.*** The evolution of building types forms part of ongoing research into the period and has the potential to examine questions such as the division of internal space and particular use of buildings (e.g. such as workshops/kitchen areas-Clay 1992). The site may help partially towards improving understanding in this area.

- ***Deposition patterns on Iron Age sites.*** Recent research has suggested that not all artefacts found on Iron Age sites are the result of casual refuse disposal but are the product of complex and sophisticated acts involving the deliberate burial of certain artefacts and groups of artefacts („structured deposition'-Hill 1995). Examination of the intra-site depositional patterning of artefacts across the site may provide further evidence to contribute to this debate.

- ***Settlement and land use on the East Midlands Claylands:*** Comparison with sites on different geologies may show differences in agriculture or economy. The agricultural economy of the region in the prehistoric period is poorly understood. This situation is only likely to be improved by consideration of a number of sites within the region of the site (Clay 2002).

- ***The study of settlement patterns in the hinterland of Leicester:*** Leicester was an important tribal centre during the late Iron Age (Clay 1985) and the relationship between Leicester and its surrounding settlements is an ongoing research theme (Willis 2006). The site at Birstall has the potential to provide important comparative information regarding trading patterns, contact, land use and economy during the period and compliment the work at sites of similar age such as Enderby (Clay 1992, Meek 2004), Humberstone (Charles *et al* 2000, Thomas 2008b), Huncote (Shore 2001), Kirby Muxloe (Cooper 1995) and Crown Hills, Leicester (Chapman 2000).

Methodology

Three areas were subject to open-area excavation, targeting areas previously identified as containing substantial archaeological features during the evaluation (Speed 2004). The excavations were carried out within three fields of the development area (Figure 6). Area 1 in the south-east corner of the development contained the most complex archaeological evidence. Areas 2 and 3 were slightly expanded upon following the evaluation.

The open-area excavation was excavated using JCB mechanical diggers equipped with 1.6m wide toothless ditching buckets. The topsoil and overlying layers were removed under full archaeological supervision until either the top of archaeology or natural undisturbed ground was reached, or to a depth of 1.20m. Separate context numbers were assigned to each excavated segment of ditch to preserve the spatial distribution of finds as an aid to further analysis. Discrete pits and post-holes were generally half sectioned, and only fully excavated if they were considered important or contained large groups of finds. All features identified have been tied into the Ordnance Survey national grid, and were recorded with reference to the ULAS recording manual, with features hand excavated, planned to scale and photographed. All written records were entered onto pro-forma ULAS context record sheets, and site indices. These were later digitised into a MS Access database. All work followed the Institute for Archaeologists (IfA) *Standard and Guidance for Archaeological Field Evaluations,* and the *Guidelines and Procedures for Archaeological Work in Leicestershire and Rutland* (Leicestershire County Council).

Where possible linear features (gullies or ditches) were evenly sampled, several sections being excavated at even spaces, each 1.5m in length. A limited programme of phosphate sampling was carried out within Area 1.

Figure 5: Excavation of Enclosure I underway

Over page:

Figure 6: General site plan showing areas 1, 2, 3 and evaluation trenches


N
A46
A6
Field 5
Field 2
Field 7
Field 9
Field 3
Field 1
Area 1
Area 2
Area 3
0
500m

Excavation Results

Area 1

Located in the south-east corner of the development area, a 14 hectare zone was subject to open-area excavation (Figure 9). Evidence was revealed for an extensive Iron Age enclosed settlement, along with some evidence for earlier prehistoric activity.

Four ditched enclosures were identified and recorded within Area 1. The main settlement focus within Area 1 was within a large „D'-shaped Iron Age enclosure (Enclosure I) lying adjacent to a smaller enclosure (Enclosure II), with further smaller enclosures to the north (Enclosure III) and west (Enclosure IV). Within these enclosures was a range of evidence for Iron Age settlement, including two roundhouses, sub-enclosures, pits, and a possible metalworking area. Few of the archaeological deposits were related stratigraphically, therefore making the phasing of activity problematic. The activity can be broadly dated to the mid to late Iron Age, and an interpretation of the dating is discussed fully in the discussion.

Table 1: Summary chronology of activity and land use activity at Hallam Fields, Birstall

Date	Period	Activity
9500 – 4500 BC	Mesolithic	Scatter of worked flint indicates intermittent activity within the area.
4500 – 2500 BC	Neolithic	Residual pottery found within later features indicate some activity within the area.
2500 – 700 BC	Bronze Age	Some pit digging around 2000-1500 BC, collared urns may indicate a burial site, or domestic waste
700 – 450 BC	Early Iron Age	No clear evidence, field boundaries established?
450 – 100 BC	Mid Iron Age	**Main settlement activity.** Small farmstead added into field-system
100 BC - AD 43	Late Iron Age	Farmstead no longer used, but still visible within landscape. Some minor activity, mainly pit digging
AD 43 – 410	Roman	Some early Roman brooches and pottery indicate intermittent activity within the area. Presumably open fields / farmland
1066 - 2005	Medieval – Modern	Ploughed agricultural land until area re-developed for housing in 2005

Figure 7: View showing the topsoil removal by machine looking south-west. The south-east corner of Enclosure I is visible in the centre-foreground,

Figure 8: View showing topsoil removal by machine looking west. The north-east corner of Enclosure I ditch is visible in the foreground.

Over page:

Figure 9: Area 1, with main feature group numbers shown

© ULAS Report No. 2009-080

Early Prehistoric Activity

The earliest activity within the excavation area was indicated by the presence of a Mesolithic worked flint scatter across the site, dated to *c*. 9500 – 4500 BC. Some 151 worked flints were recovered from the excavation, however, a large proportion (83%) were from Middle Iron Age features and are therefore likely to be residual.

Evidence of activity in the Neolithic period is represented by a single Peterborough ware pottery sherd, dated to *c*. 4000 – 2000 BC. This was residual material in an Iron Age feature (from context (672) within Group 14), but does indicate the presence of human activity in the area during this time. Tree-throw pits/hollows were identified and recorded across the site; being especially common between the Iron Age enclosures I and IV (see Figure 43). Only one tree-throw pit contained finds - worked flint from feature [700].

Immediately to the east of enclosure I ditch lay two pits (Group 10 on Figure 9) dating to the Early Bronze Age (*c*. 2000 – 1500 BC). The pits contained 233 sherds of Early Bronze Age pottery and 11 worked flints. There were three pits within the group, [644] / [646] being stratigraphically the earliest, having been cut by [642]/ [690] on the west side and the much later Iron Age / Roman pit [640] on the east side.

The latest feature within the group was pit [640]. It was a different form to the other pits, being sub-rounded, measuring 2m x 1.7m, with steep sides and a flat base. Within the dark reddish-brown sandy-silt fill (641); just one sherd of Bronze Age pottery was recovered, along with sherds of Iron Age and Roman pottery. This can therefore be viewed as a much later feature, unrelated to the earlier two pits containing the Bronze Age pottery.

The two pits containing the Bronze Age pottery ([642] and [644]) were of similar shape and size, being sub-oval and measuring *c*.2.5 x *c*.1.3m. The relationship between them could not be ascertained during excavation; it is entirely possible that they are contemporary features, back-filled at the same time. Both pits contained two fills, the lower fill of each contained within the separate pit-cuts, whilst the secondary fill covered both pits (643). The primary fill of [644] (645) (same as (647)) consisted of a mid-reddish-orange brown sandy-silt and contained 109 sherds of Bronze Age pottery. The primary fill of the other pit [642] (689) / (691), consisted of a dark grey-brown sandy-silt, within which 36 sherds of Bronze Age pottery were recovered. Overlying both of these was (643), a dark reddish-brown sandy-silt, containing 87 sherds of Bronze Age pottery.

The 233 sherds of Bronze Age pottery came from at least nine vessels, probably all Collared Urns. The fragments of rim, collar, upper body and base indicate that these belong to the later end of the Collared Urn tradition (see Marsden below (Section 6.2) for full discussion on form type). Urns are usually found in a more complete state, the sherds here have clearly been heavily truncated by later activity, perhaps from both Iron Age activity (including pit digging as demonstrated by pit [640]), and modern ploughing. This has created a scattered effect of the urn sherds (Figure 10). The majority of the sherds come from pit [644], which was much shallower than [642].

Within pit [642] six worked flints were identified (Figure 10), while from pit [644], four were recovered consisting of concave scrapers, a scraper with straight-edge retouch, and another scraper used an older (slightly patinated) flake support. Such recycling has been seen at other later Bronze Age sites in the area e.g. Willow Farm, Castle Donington and Cossington barrows (Cooper 2008). The technological aspects of the debitage would also fit within a broad Neolithic-Bronze Age date. The stratified flint from context (643) is remarkably fresh and sharp, further suggesting that it is contemporary. The unmodified flakes are of a very similar flint to the core and may well have derived from it. The utilised flake approaches the dimensions of a blade and is of a different, darker flint than the core (see L. Cooper below).

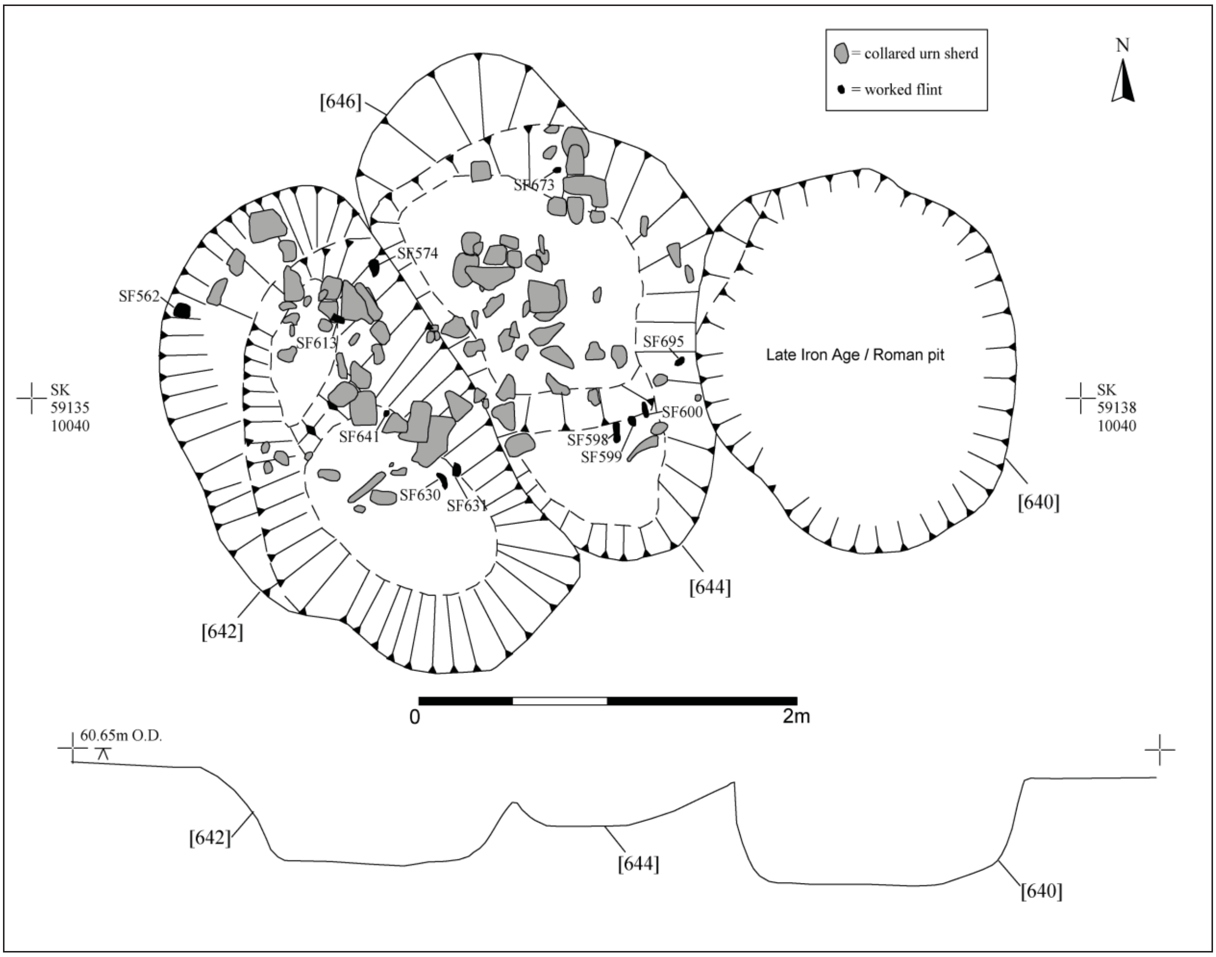


Figure 10: Plan and profile of pits containing Bronze Age Collared Urn sherds and worked flint

Although Collared urns are typically associated with cremations, no cremated bone was recovered. This could simply be due to the poor survival within the acidic sandy soil (very little animal bone was recovered from the excavation as a whole see 6.7 below). It should be noted that at Cossington, 5km north-east, collared urns were not only found with burial contexts, but also with isolated pits (Thomas 2008a). These vessels are also known from domestic deposits on other sites, such as in East Anglia (Gibson 2002: 96), so the possibility that the deposit simply represents domestic waste should not be discounted as these vessels probably had a variety of uses. However, the presence of freshly worked lithics and some vessels coming from sources some distance away in the Trent Valley or Yorkshire Wolds (see Marsden below), suggests that significance was attached to them and an association with burial practices or ritual activity seems likely. Also of note is that the Iron Age enclosure ditch appears to avoid or respect the area of the Bronze Age pits. This could be an indication that there was something physically de-limiting activity in this area- i.e. a barrow covering the pits? However, the enclosure ditch only narrowly avoids the pits and this could be regarded as fortuitous, rather than avoiding a standing monument.

Figure 11: Excavation of the pits containing Bronze Age Collared Urn sherds

Iron Age Settlement

Enclosure I

The largest feature in Area 1 was a „D'-shaped ditch, 168 metres in length and enclosing 2500m². The east and west lengths continued into the edge of the excavation, presumably below the rear gardens of properties running along Harrowgate Drive. There was no evidence for a break in the ditches, and therefore no evidence for an entrance-way. It is possible that the ditch may have been bridged (and not visible archaeologically) or this had been at the southern end beyond the limit of excavation. In the south-west corner, the ditch turned east, heading towards the eastern length. Fifteen sections (*c.*1.5m wide) were excavated every 10 metres along the length of the ditch, or at an intersection with another ditch. The various excavated sections revealed a different character to the ditch along each of its three sides. The letters shown on Figure 12 indicate the illustrated sections along the western (Figure 15), northern (Figure 16) and eastern lengths (Figure 17).

Along the western length the ditch was of two phases, the earliest ([627], [662]) being *c.*0.7m in depth, with steep sides and a semi-pointed base (see Section D on Figure 15, and view on Figure 13). There were two fills, the earliest a thin silty-sand deposit ((632), (663)) below a secondary fill consisting of a grey-brown silty-clay ((633), (664)). The re-cut ditch ([030], [225], [413], [469], [502], [626], and [657]) had a fairly gentle, gradual slope on the interior side, and a slightly steeper slope along the exterior side. It was also slightly shallower at *c.*0.55m - *c.*0.6m in depth, with a width ranging from 1.32m to 1.65m. The earliest ditch was only seen up to the intersection with the internal rectangular enclosure (Enclosure Ib). The remaining areas of the ditch, further along the western, northern and eastern lengths, all contained a single ditch phase, similar in form to the re-cut ditch along the western length.

The sections along the northern length (Figure 16) showed the ditch to be both shallower (*c*.0.3m deep) and narrower (ranging from *c*.0.7m to *c*.1.2m in width) than all other areas. Here it clearly cut an earlier ditch (Enclosure II). Along the eastern length (Figure 17) the ditch was *c*.0.3m to *c*.0.43m deep, and its width ranged from 1m to 1.3m. In all sections excavated there were generally two fills, the earliest a thin deposit, below a much thicker secondary deposit.

In general the ditch was deepest in the south-west, with the northern length being very shallow. This may be due to plough truncation as there is a slight hill slope from north to south, or it may represent genuine differences in depth (deeper ditches needed towards the southern end to aid drainage). Most of the mid-Iron Age pottery was recovered from the larger secondary ditch fill, and there appeared to be little spatial variation in the volume of material recovered from each excavated section. The plant remains contained a moderate amount of cereals, chaff, and seeds with consistent levels throughout the entire length of the ditches (see Figure 81).

The ditch was also subject to radiocarbon sampling, from [657] a calibrated date of 390 – 170 BC and posterior density estimate (at 95% probability) was 380 – 220 BC (from (659) a primary fill); and a calibrated date again of 390 – 170 BC from (661) a secondary fill, with a similar posterior density estimate (at 95% probability) of 360 – 200 BC. From [017] a calibrated date of 410 – 230 BC, and an estimate at (67% probability) was 310 – 210 BC. The dates of course only date the pottery, not the construction of the backfilled ditches. Interestingly two ditch sections also contained sherds of „Belgic type' Late Iron Age pottery (from [469] and [544]) dates from the mid 1st-century BC to the mid 1st-century AD perhaps suggesting continued occupation. A Roman brooch was also recovered from the top of the ditch fill indicating that the ditch may have accumulated with soil over a long period of time following the end of the settlement.

Figure 12: Enclosure I, showing sections excavated

Figure 13: View of Enclosure I, section [627] looking north

Figure 14: View of Enclosure I, section [413] looking north

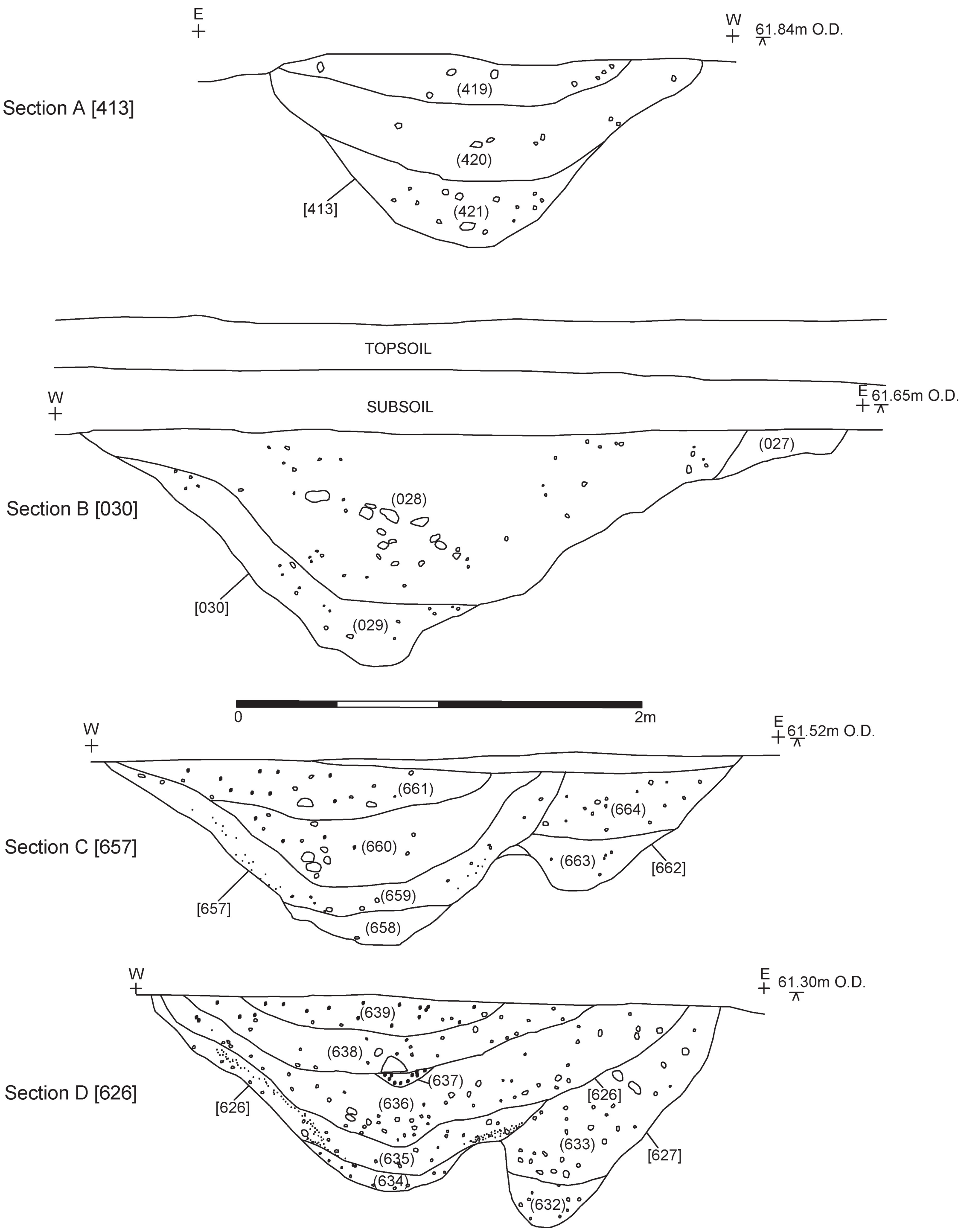


Figure 15: Enclosure I sections, west length

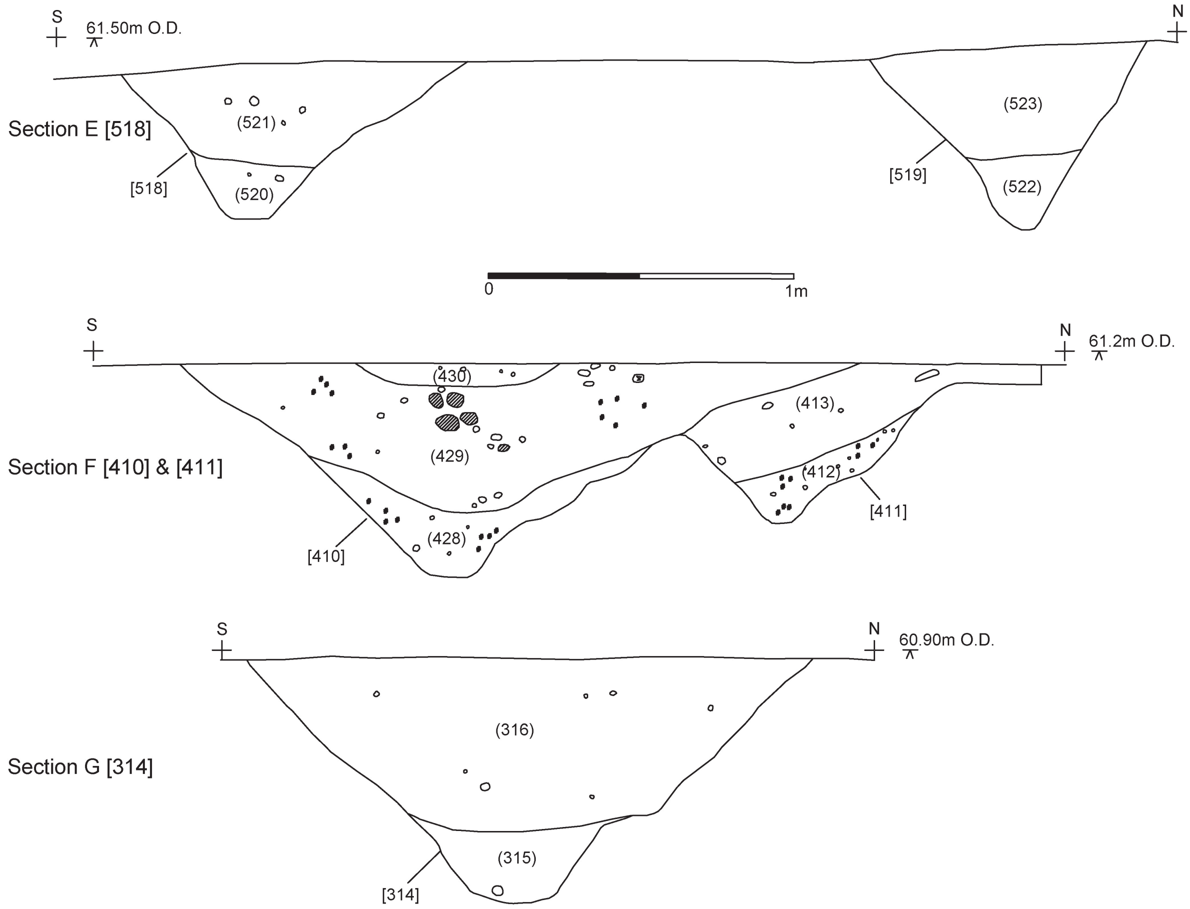


Figure 16: Enclosure I sections, north length

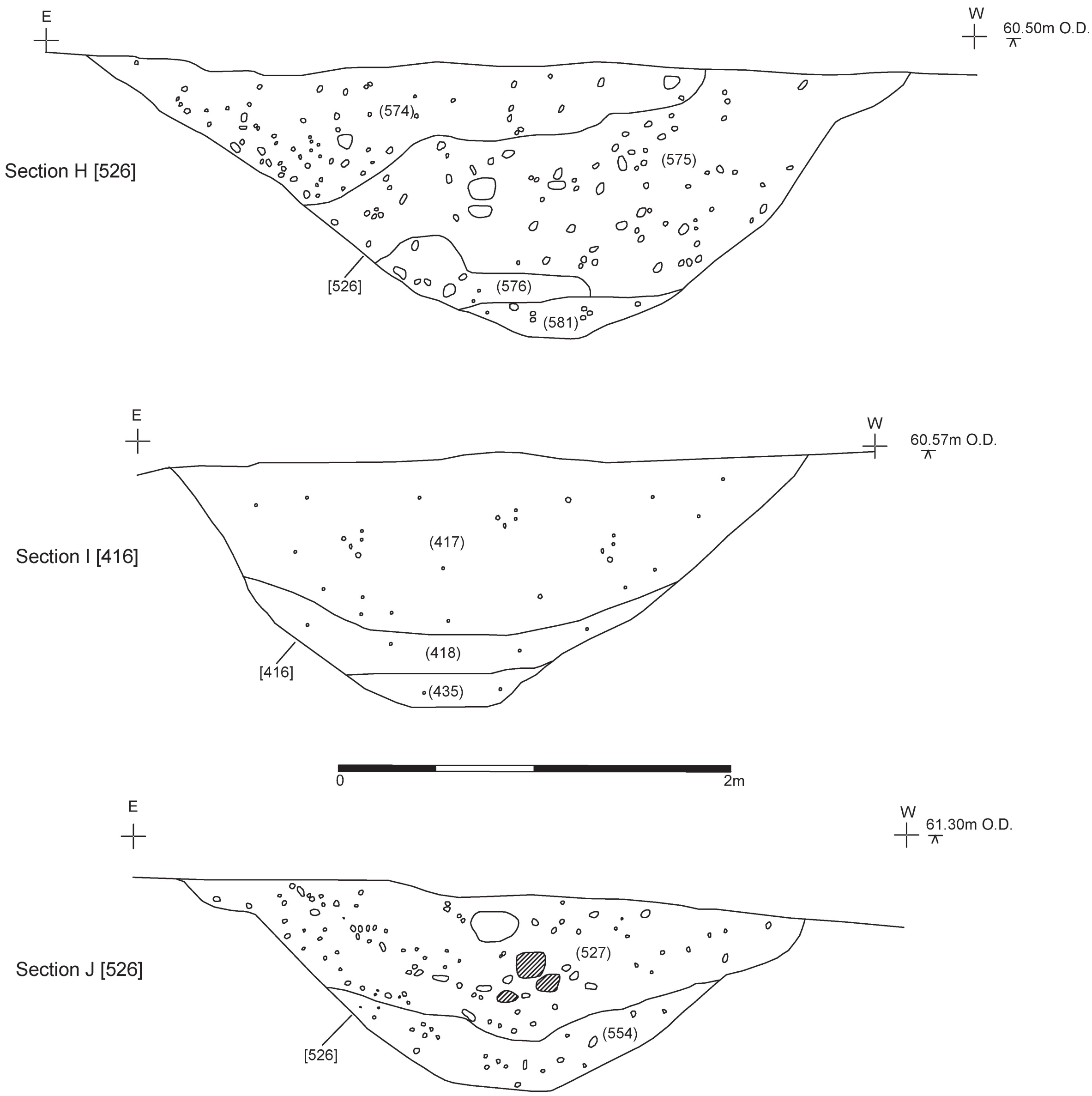


Figure 17: Enclosure I sections, east length

Roundhouse

Placed roughly-centrally within Enclosure I was a two-phase roundhouse, with both phases consisting of three segments of a penannular eaves drip gully.

Outer Gully (Group 1)

The earliest phase penannular gully consisted of three sections 9.7m, 3.55m, and 6.7m each in length, with a gap of *c*.0.65m between them. The gully had a diameter of *c*.13.2m, and enclosed an area of *c*.66.12m². It had concave sides and a generally flat base, although the form did vary slightly along the length of the gully. It ranged in depth from 0.10m to 0.3m. The three sections of the gully contained a single deposit of mid-dark grey-brown sandy-silt, with occasional small sub-rounded stones and small charcoal flecks. There was a notable concentration of pottery at the eastern terminal of the gully [010], including a large ovoid scored vessel (Figure 59).

Inner Gully (Group 2)

The second gully phase again consisted of three sections, of a similar length, at 9m, 3.55m, and 3.74m, with a slightly larger gap of *c*.1.8m – 0.8m between them. The gully had a diameter of *c*.10.75m, and enclosed an area of *c*.66.12m². Like the earlier gully (group 1), this gully had concave sides and a flat base, but with a more consistent form in depth (*c*.0.25m). The three sections of the gully contained a single deposit of mid-grey-brown sandy-silt. There was a low number of mid – late Iron Age pottery sherds recovered from the gully, with a greater concentration of pottery from the western gully terminal [245]. A single stake-hole [283] was recorded positioned adjacent to gully terminal [281]

Figure 18: General view of the roundhouse, looking north

Features within area of curvilinear gully (Group 3)

Within the enclosed space of the gullies were a number of small post-holes, which may indicate evidence for the roundhouse structural beams, or smaller internal structures (Figure 19, Figure 20). There were three distinct groups of post-holes (sub-group 03A, sub-group 03B, and sub-group 03C). Within the gully area were larger pits (sub-group 03D), along with a number of features built immediately along the outside edge of the outer gully (sub-group 03E)

Sub-group 03A consisted of four post-holes ([107], [111], [147], [163]) roughly forming a four-post structure. Post-holes [107] and [147] were the most clearly defined with vertical edges and a flat base. [111] and [163] were less well defined but still had the characteristics of a post-hole. Each post-hole was filled with a similar deposit of mid-grey-brown sandy-silt, containing small to medium sub-rounded stones. The structure may have been re-modelled as two of the post-holes ([147] & [163]) have been cut into earlier post-holes ([149] & [165]).

Sub-group 03B consisted of two post-holes [254] and [256], both sub-circular measuring *c*. 0.25 m². They were highly truncated, with just shallow (0.05m deep) scoops remaining (section K and M on Figure 19). They contained a mid-dark greyish-brown sandy-silt with occasional small to medium sub-angular stones. Post-hole [254] cut an earlier post-hole [247].

Sub-group 03C consisted of five post-holes [158], [160], [162], [232] and [234] situated over 1.5m south of the western gully terminal. Three of the post-holes ([158], [160] and [234]) were all of a similar size, being circular and 0.3m in diameter. At either side of these were two larger post-holes [162] and [232], being sub-circular and 0.55m in diameter.

Sub-group 03D consisted of the remaining features within the roundhouse gully area. These were all much larger than the post-holes, and are likely to represent pits, post-pits, or internal roundhouse activity. Pits [260] and [279] were both sub-rounded, measuring 0.95m diameter. They both had sharp sides and a flat base (see sections J and R on Figure 20). They both contained a single deposit of mid-dark brownish-grey sandy-silt, with occasional small to large sub-rounded stones. These two features may represent evidence for post-pits, perhaps as part of structural features for the roundhouse. There were four other pits within the area [244], [252], [268], [432], all similar in size and form to pits [260] and [279], apart from pit [244] which was twice as deep as any other features within Group 3 (*c*.0.6m in depth) and may represent a storage pit. Sub-group 03E consisted of six post-holes or small pits ([109], [304], [310], [337], [379], and [427]) situated immediately along the outside (north) of the outer gully (Group 01). Features [109], [304], [310] and [379] were all circular, measuring *c*.0.5m diameter, while [337] was much smaller and resembled a post-hole. [427] was larger than all the other features, but was also slightly irregular and hard to define. Taken together these features may represent a series of post-holes used as part of the structure of the roundhouse.

Discussion

The two gullies formed a semi-circle rather than a more common circular form associated with roundhouses. If the function of the gullies was to drain water, then the most logical and practical solution would be to have drainage gullies along the northern side of the building - as there is a natural slope from north to south. The roundhouse was centrally placed within the enclosure; the entrance was orientated to the south-east. A moderate amount of fired clay and daub was recovered from the fills (Figure 75) that may come from the roundhouse walls. The various features within the area of the gully may indicate structural elements to the roundhouse, such as timber beam supports [260] and [279]. There is also evidence for smaller internal structures within the roundhouse, especially the four-posts within sub-group 03A. There was no clear evidence for a hearth; however the soil micromorphology analysis detected enhanced phosphates within pit [147] indicating proximity to a hearth or dumping of sediments from such a source. The Roundhouse was extensively sampled for charred plant remains. The results shown on Figure 81 show remains with generally less than one item per litre (of grain, chaff, and seeds). This could indicate that the area was kept very clean during its use. The analysis of soils filling the gullies indicate it was partly filled by wind-blown sands that were fairly sterile. The upper fill is more humic with small bone and mineralised cess, probably from the house floor.

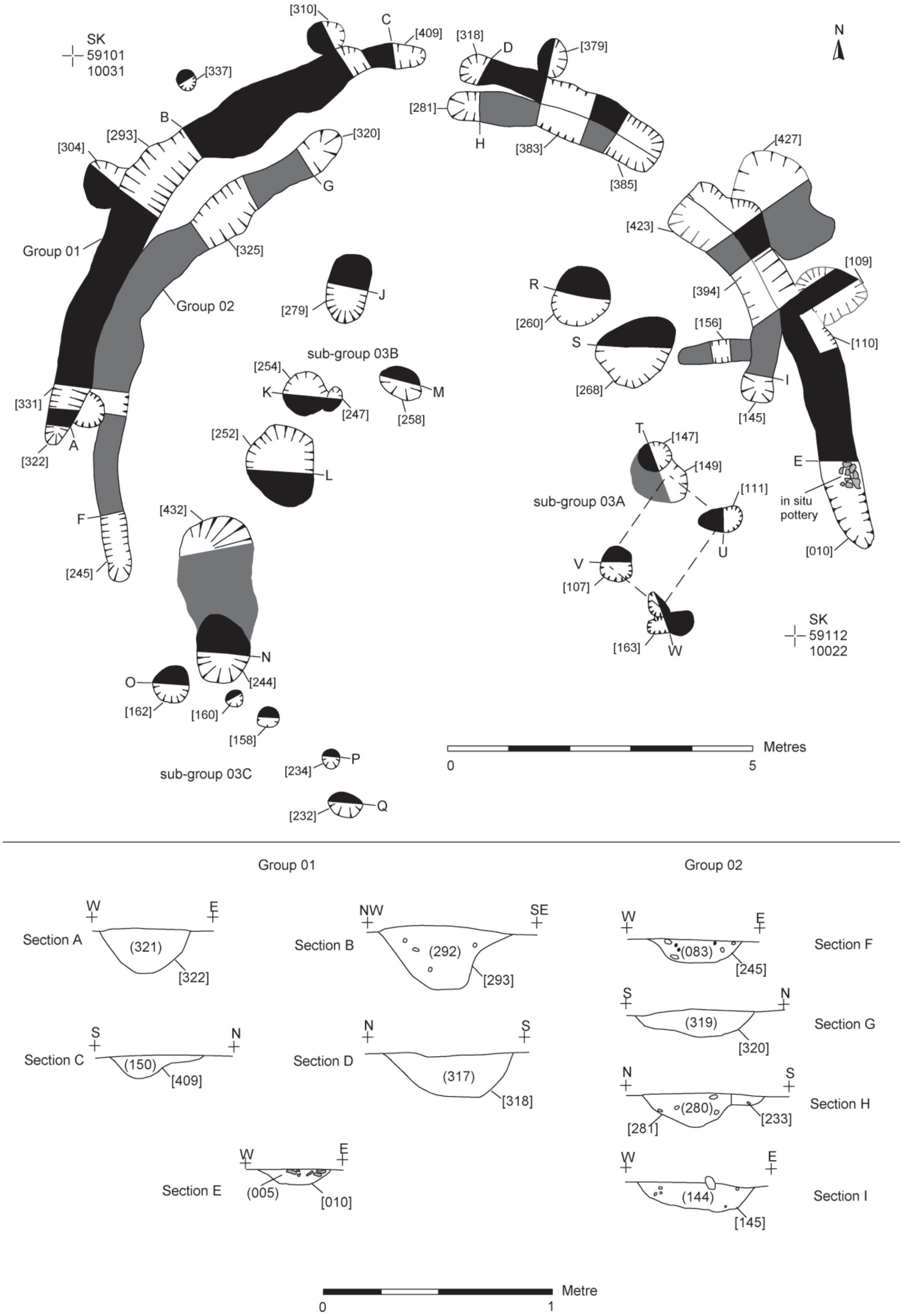


Figure 19: Roundhouse plan and gully sections (Groups 1 -3)

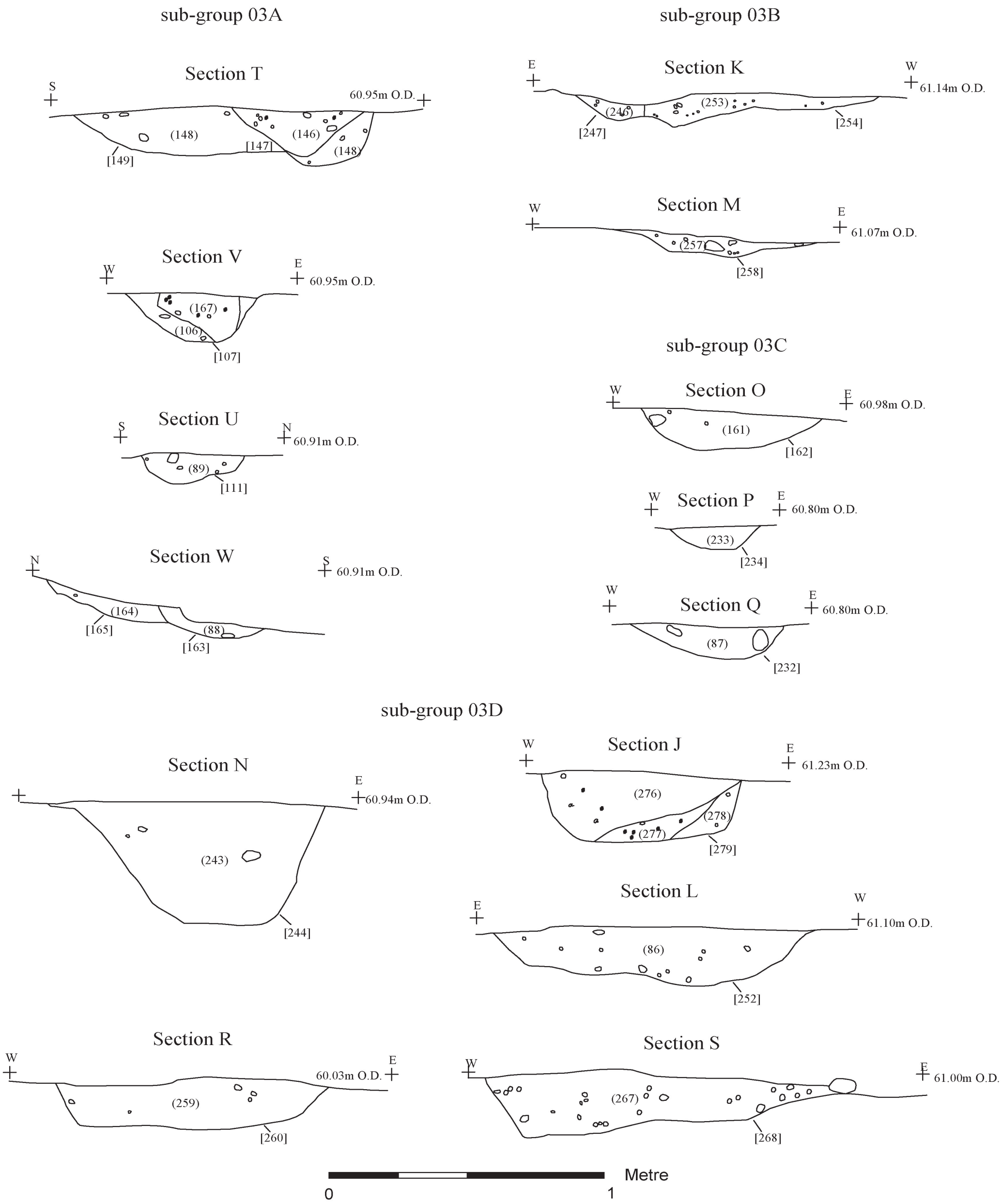


Figure 20: Sections of pits and post-holes within Roundhouse area
(see Figure 19 for plan location)

Sub-Enclosure IB

A rectangular sub-enclosure of 200 sq m was located in the central-west area within enclosure I, The southern ditch ([112], [185], [172]) was 13.7m in length. In the south-east corner of the enclosure a complex sequence of features were recorded. The ditch had two clear phases [172] and [175]. It may have been recut numerous times. A series of pits and post-holes along the southern edge at the corner of the enclosure may represent a fence-line. (175. 177, 119), some of these post-holes have been truncated by the later ditch recuts. The northern ditch [125] was 12.6m in length; in the corner the ditch profile is poorly defined. The eastern ditch was 16.25m in length, with a break in the ditches of 3 metres, representing an entrance way in the south-east corner. Only one feature was located within the enclosure, a pit [121], containing a single sherd of Iron Age pottery.

The enclosure was subject to soil micromorphology analysis, which presented interesting results indicating the function of this sub-enclosure. Samples were taken from the ditch fill and, crucially, from natural sands and gravels within the centre of the enclosure. Interestingly, two of these samples were phosphate enriched (the most enriched of all samples on the site). It is possible that this enrichment could be the result of animal penning, and this would appear to be supported by the fact that many of the samples from the enclosure ditch were also phosphate-enriched. The samples from the ditch also contained evidence for aged amorphous dung residues, and associated phosphate nodular concentrations, probably from animal trample, with the dark clay coatings also being enriched in phosphate. Some dung fragments contained phytoliths and trampling crust fragments, all indicators of stock being locally present, and in fact trampling the ditches themselves. This would account for the poorly defined ditch edges, especially along the northern length. If this does represent animal trampling it is likely that there was no internal bank.

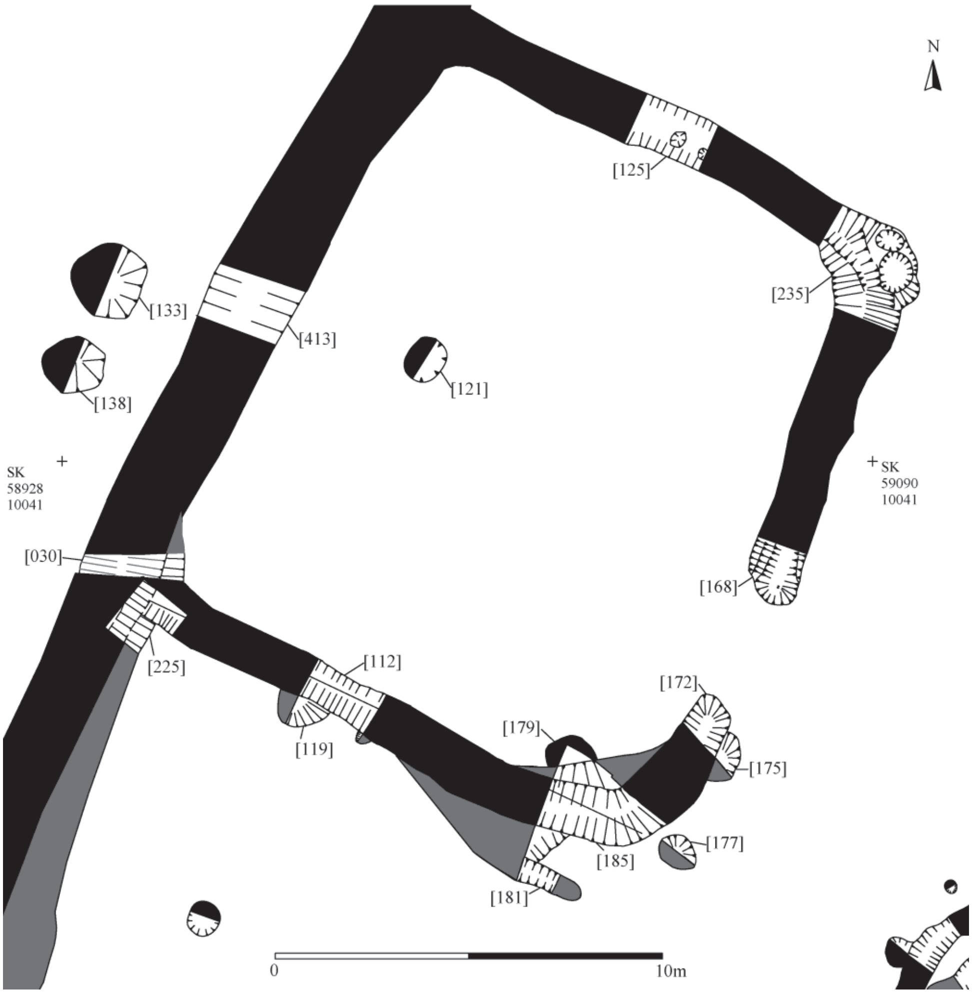


Figure 21: Enclosure IB

Figure 22: View of Enclosure IB, looking north.

Activity in south-west corner of enclosure I

Within the south-west corner of Enclosure I was a curvilinear gully (Group 04), this „enclosed' a number of pits and post-holes (Group 05). The post-holes indicate a possible timber structure; other paired or isolated post-holes surrounding this may also represent further timber structures. Pits are restricted to the immediate area along the edge of the enclosure ditch, avoiding the centrally-enclosed space (see Figure 23).

The curvilinear gully (Group 04) was 14.8m in length, with concave sides and a flat base, and *c*.0.32m in depth (see sections A, B, and D on Figure 25). It contained a mid-brown-grey silty-sand (contexts 078, 327, 329), with a small quantity of small rounded pebbles. This contained 17 sherds of mid-late Iron Age pottery (some scored). Approximately central to the gully (3.45m from the west-end), a large pit [195], measuring 2.6m by 1.9m and 0.85m in depth, cut into the gully. The earliest deposits consisted of two thin layers of charcoal (201 and 202) at the base of the pit, below a mid-brown-grey, friable silty-sandy-clay (196). Within this were rounded pebbles, some fire-cracked, below a mid-dark grey-brown, sandy-clay silt (197), also containing fire-cracked pebbles. These two deposits appear to represent a deliberate back-filling of the pit in two distinct layers. At the top of (197) were a further two deposits (198 and 199), both consisting of a small layer of clay, (199) also containing numerous fire-cracked pebbles. The function of the gully enclosing the south-west corner of Enclosure I is unclear; it is reminiscent of a roundhouse drip-gully but is not semi-circular, being more sub-linear in form. It may therefore represent a fence line or small ditch boundary sectioning off this area of the enclosure. Alternatively, it may have still acted as a drip gully for a possible timber post-made structure within the area as suggested by the large number of pits and post-holes within the area (Group 05). Some may indicate potential timber post-hole structures, whilst others are more likely to be refuse or storage pits.

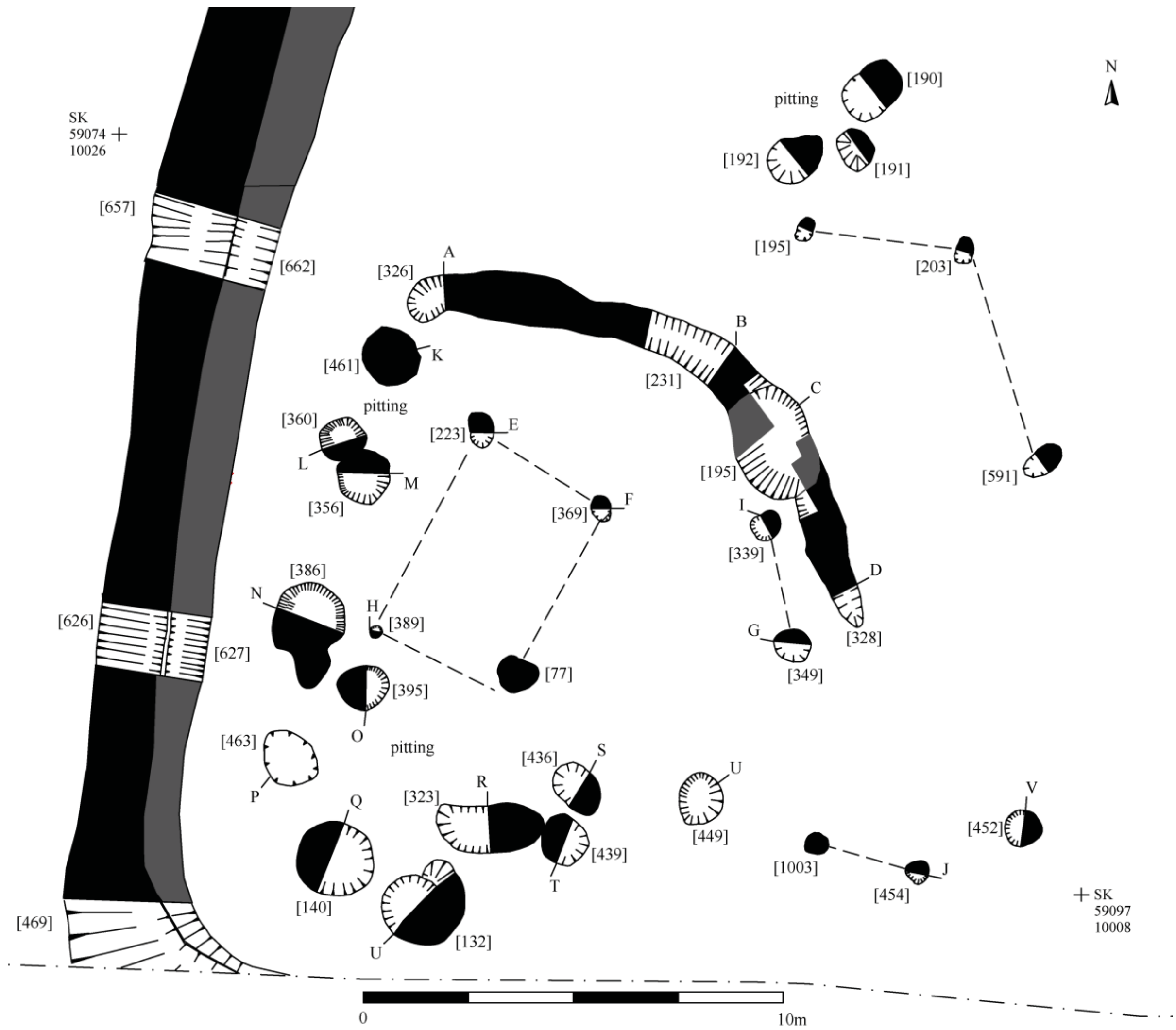


Figure 23: Features in the south-west corner of enclosure I

There are three possible structures present within the south-west corner. Post-holes [077], [223], [369], and [389] represent a possible four-post structure (as indicated by a dashed line on Figure 23). Little of [77] survived plough damage, with nothing more than a shallow scoop surviving over an area of 0.8m². [223] measured 0.8 x 0.5m and had concave sides and a flat base while [369] measured 0.48 x 0.5m and had sharp sides and a flat base. [389] was circular and 0.3m², again with sharp sides and a flattish base. Each post-hole contained a mid-orange-brown silty-sand, and contained no pottery sherds. It is possible that these features are simply small pits, but their form and position in plan does suggest that these may be the surviving remnants of a four-post timber structure.

Post-holes [339] and [349] represent a possible two-post structure, orientated parallel to the east-end of the gully 2.18m apart. Both were circular, *c*.0.8m² and 0.4m deep with sharp sides. [339] contained a single mid orange-brown silty-sand (340), which contained four sherds of mid-late Iron Age pottery. [349] contained a mid grey-brown silty-sand (350), with no pottery, but a substantial amount of large rounded stones 60 – 200mm in size. The rounded stones are probably stone packing; it is interesting to note that this is the only feature containing stone packing within the area.

Post-hole [454] and [1003] may also represent a two-post structure, 1.95m apart. [454] was circular, 0.54m² with concave sides and *c*.0.25m deep. It contained mid pink-brown clay with small rounded stones. [1003], like [77] contained a concentration of pottery within a thin shallow scoop with mid grey-brown silt, presumably the remnants of a post-hole.

The remaining area appears to have been used for pits within the corner of the enclosure, perhaps for refuse disposal or storage. The twelve pits, can be broadly grouped into two distinct types, nine being wide and shallow with concave sides ([140], [356], [360], [386], [395], [439], [449], [452], [461]); the other five are generally much larger and deeper with sharper sides ([132], [323], [386], [436], [464]).

Two features contained much pottery that produced much earlier radiocarbon dates. Pit [449] appeared to cut an earlier feature, (see Figure 23), and the radiocarbon sample produced a posterior density estimate date of 1390 – 840 BC (sample ID 069). Pit [132] produced a posterior density estimate date of 810 – 480 BC (sample ID 071). It is possible that these samples were contaminated, or are actually from late Bronze Age vessels, found residually within mid-Iron Age pits.

Immediately to the north of the gully were three post-holes ([193], [203], [591]), that may form a three-post structure. Just to the north of this were three pits (190], [191], [192]) that contained a few sherds of mid-Iron Age pottery.

Based on finds recovered from this area, it appears that this zone of the enclosure was used for various activities. Food preparation is indicated by fragments of two saddle quernstones (SF 531 and SF 603), from the backfilled gully. Also handles from pottery vessels came from pits [140], and [449], this is sometimes associated with food preparation (P.Marsden pers. comm.). Loom weights, and metalworking waste were also found within this area.

Figure 24: View of features within the south-west corner of Enclosure I, looking south

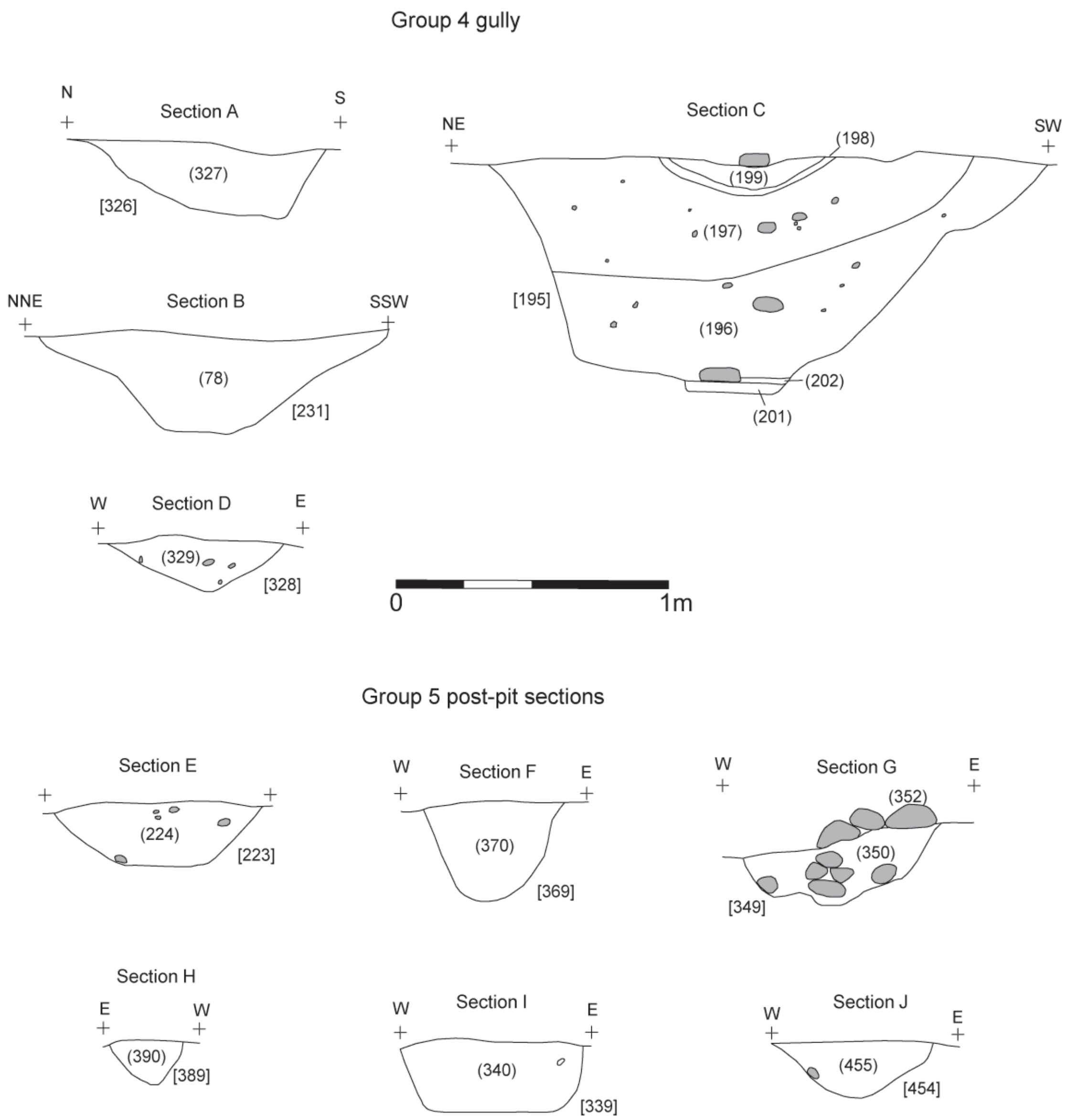


Figure 25: Group 4 gully sections and group 5 post-pit sections (see Figure 23 for plan location)

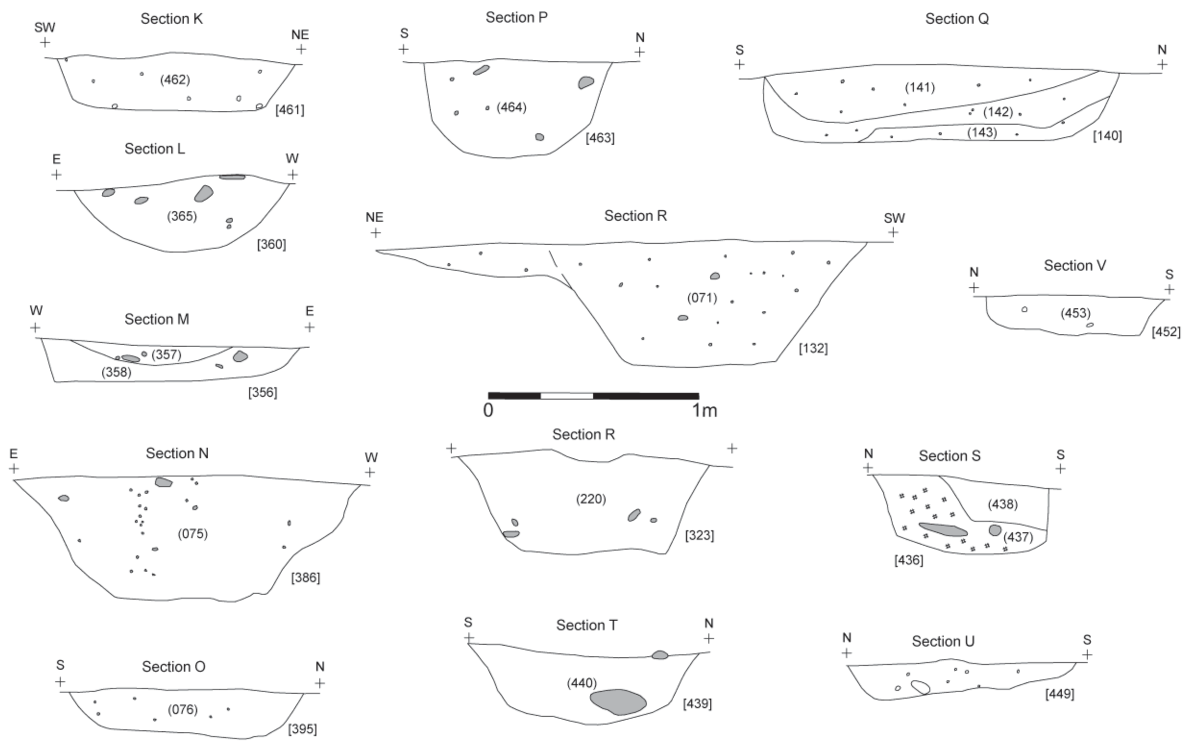


Figure 26: Group 5 pit sections (see Figure 23 for plan location)

Other Features Within Enclosure I

Within the remaining areas of the enclosure were a series of isolated cut features, with grouping focused mainly just to the north and west of the roundhouse. There was a notable absence of any features around the south-east area of the roundhouse, around the entrance to enclosure IB, and in the north area. The pits ranged in size from 0.2m² to 0.5m², and from sub-circular to oval. All of the pits contained a few sherds of mid-Iron Age pottery, and they may have been used for domestic waste disposal.

Of particular note was pit [311] (Figure 12), an isolated pit located to the north of Enclosure Ib. This was ovoid with a shallow linear gully running across its base, within which the natural sands and gravels had been stained a dark red colour suggesting in situ heating. Two heat-affected pebbles were also recovered from the pit which may suggest use as a hearth. It contained a blackish-grey clayey-silt (312), from which 20 sherds of pottery, an iron nail shaft fragment, some charred seeds and grains, and low levels of charcoal were recovered.

Enclosure II

Immediately to the north of Enclosure I was a smaller rectilinear (or „D-shaped') enclosure – Enclosure II. This contained evidence for the truncated remains of a possible roundhouse, a sub-enclosure with metalworking evidence and other settlement activity. Most of the activity was in the southern area of the enclosure; some features were intercutting and so present a complex – multi-phase – element to the settlement, unlike the rest of the area that contained little stratigraphically linked features.

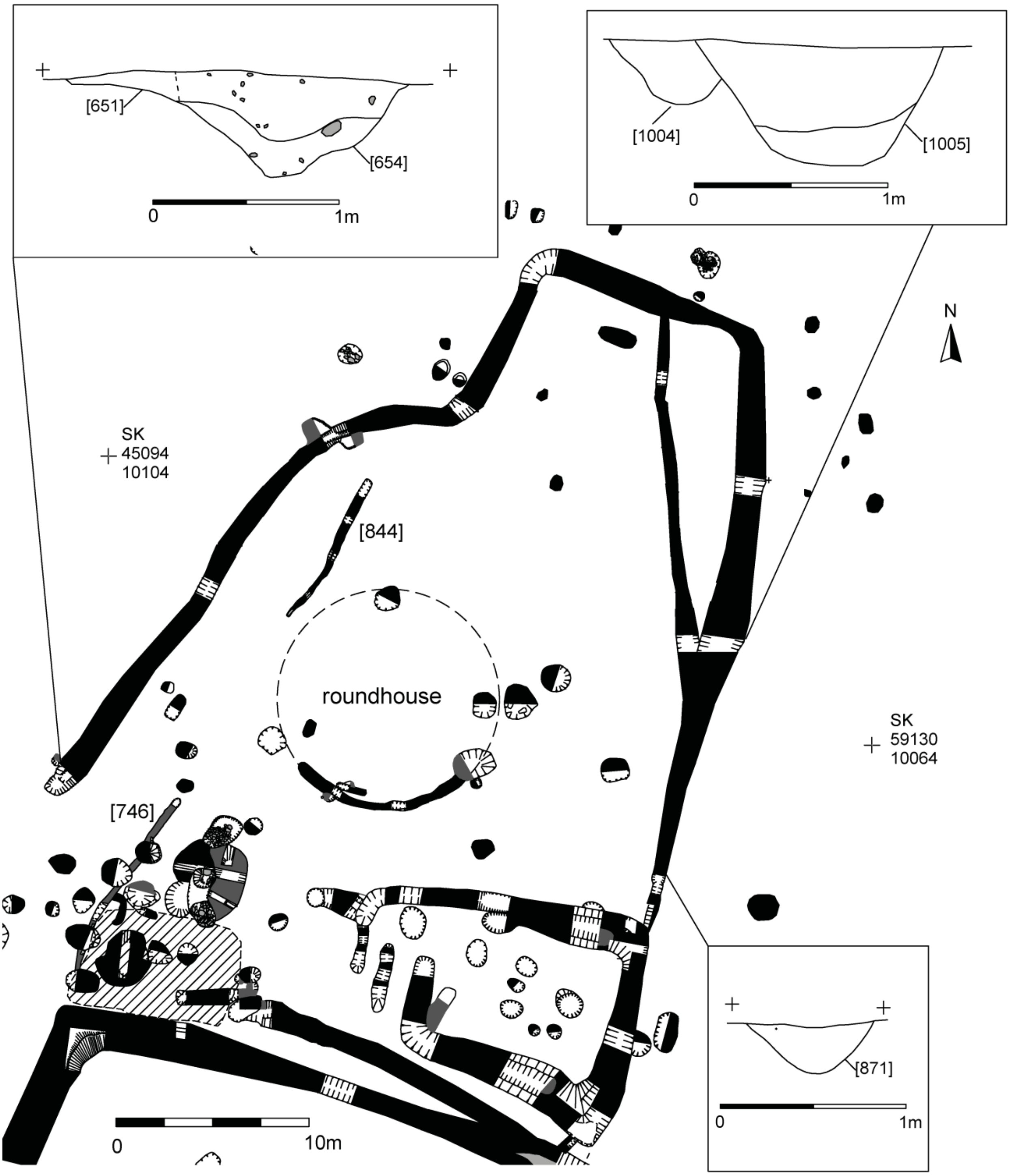


Figure 27: Plan of Enclosure II

The course of the ditch is slightly more irregular than the larger Enclosure I, although it does partly mirror its D-shape in a reverse form. There is little direct relationship with Enclosure I and so the development sequence between the two enclosures is uncertain. Enclosure II was approximately 43 metres long, 28 metres wide at the southern end and 13 metres wide at the northern end. It enclosed an area of 973m², making it around 40% of the size of Enclosure I. The width of the ditch also varied, being generally 0.68m wide along the southern area of the eastern length, before widening to the north to 1.5m, while the western length was 0.95m wide. The ditch was *c*.0.7m deep containing a primary deposit of a mid-yellow-brown silty sand (653), which is likely to represent natural sands and gravels washed into the open ditch when in use. A few sherds of mid-Iron Age pottery were recovered from the deposit. Overlying this was a thicker deposit of mid grey-brown silty-sand, again with mid-Iron Age pottery present. The ditch was much smaller along the eastern length ([871] and [1004]); this was re-cut by a larger ditch [1005], more similar to the profile seen along the northern and western lengths of the enclosure.

Roundhouse

Centrally positioned within Enclosure II was a penannular gully [775], 10m across, which may represent the truncated remains of a roundhouse (Figure 28). The gully was 0.4m wide and 0.15m deep, with a concave profile and contained a single deposit of a friable mid-grey-brown silty-sand (774). Six sherds of mid-Iron Age pottery were recovered from the fill. On the southern (outside) edge of the gully were two post-holes [774] and [779]. These also contained a similar silty-sand deposit. A further gully [796] was identified running parallel to [775], only *c*.2m having survived truncation, and their relationship is unknown. The two gullies may represent two phases to the building, as seen in the roundhouse within Enclosure I. The gully was much shallower at the western end, and it is likely that the recorded end of the gully was not the genuine terminal, and that plough damage has removed any surviving evidence of the ditch further north. There is the possibility that the roundhouse was originally unenclosed, based purely on the orientation of the enclosure ditch which heads towards the roundhouse, and then turns away to the west before continuing further south. Also of note is the linear gully [844] which also appears to angle away from the projected line of the roundhouse (see Figure 28), indicating that, like the enclosure ditch, this was added after the roundhouse.

At its eastern end the gully was cut by a large pit [777]. This, along with pits [679] and [835], was one of the largest within the excavation. They all had vertical sides and a flat base, measuring *c*.1m in diameter and 0.7 – 0.8m in depth. Pits [679] and [777] contained a comparatively large quantity of mid-Iron Age pottery (104 and 84 sherds respectively). Pit [679] also contained a vessel that may be Late Iron Age in date (illustration 18 on Figure 61), and cattle bone showing signs of butchery, along with an extremely degraded pair of horse mandibles (Figure 29). A high volume of charred grain was also recovered from this pit (Figure 81). Pit [835] had a lower number of pottery sherds (14), but did contain a quern stone fragment centrally placed within the pit, within the final deposit.

Pits [679], [777] and [835] had all been dug within the projected line of the roundhouse gully (Figure 28), and taking the similarities of all three pits into account (their large size and large quantities of domestic material including pottery vessels and querns), along with animal bones (a rare occurrence on this site), and food remains (grain) suggest that these features may represent a final symbolic activity within the roundhouse area, signalling „closure' at the end of the building's life. Carbonized food residue from a pottery sherd within [777] provided a radiocarbon date with a calibrated date of 360 – 90 BC, and a posterior density estimate (at 95% probability) of 370 – 180 BC. This is the latest date of all radiocarbon samples taken, and together with the late Iron Age vessel in [679] this may be one of the final stages of activity within the settlement (or after the settlement had ended), perhaps around the late 2nd – early 1st century BC.

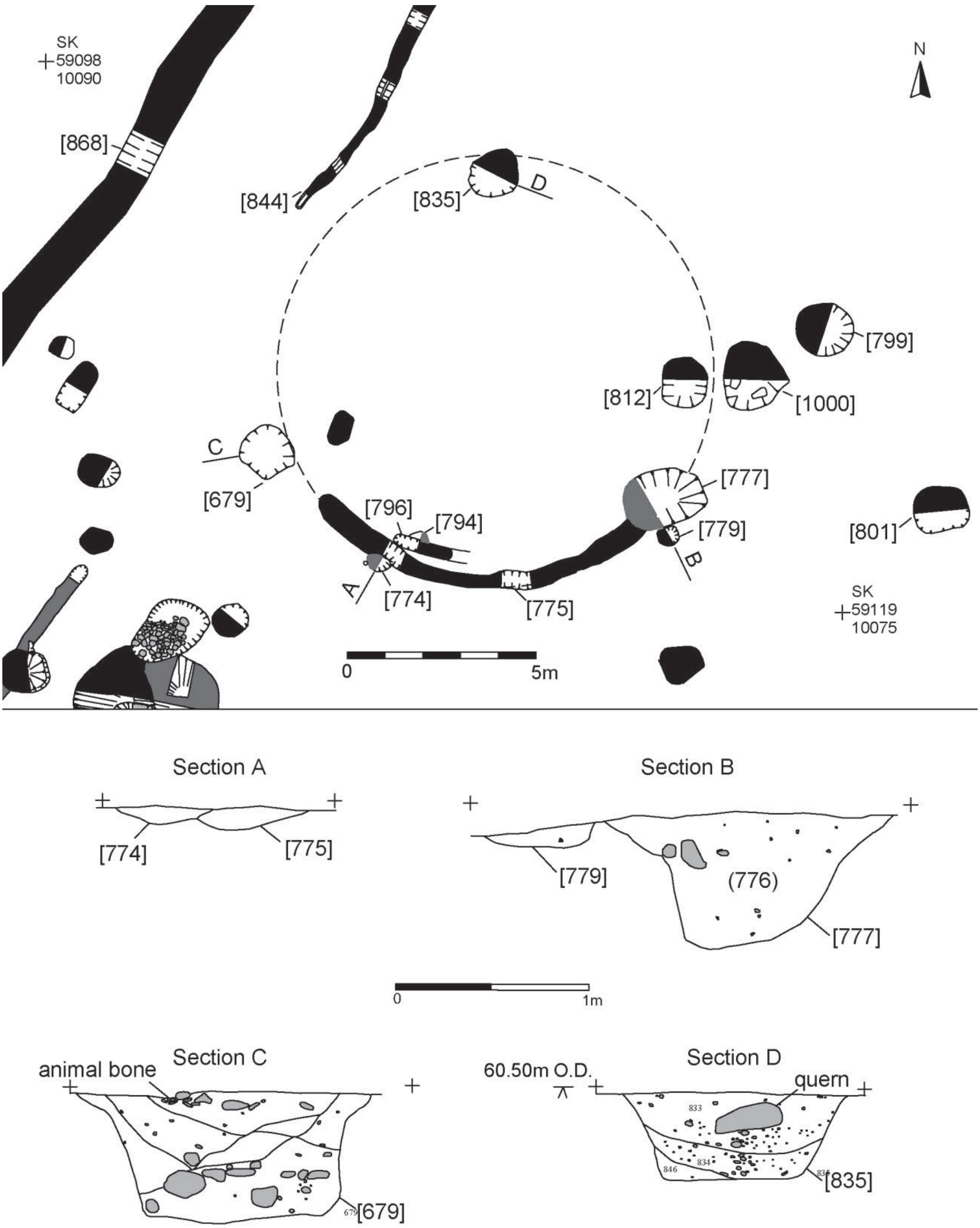


Figure 28: Plan of Roundhouse within Enclosure II

Figure 29: View showing pit [679] under excavation. The pit was positioned on the alignment of the roundhouse and contained cattle bone and horse mandibles (visible in base)

Pits and other features within Enclosure II

A shallow linear feature [746] and [844], in two separate segments, was recorded running parallel with the Enclosure II ditch. The northern segment was 8.5m in length, the southern 11m, and both were 0.4m in width and *c.*0.15m deep. They had concave sides and a flat base, with the mid-grey-brown silty-clay which contained no finds. The gap between them was *c.*11m, it is likely that these are genuine separate linear features with good survival of terminals at either ends. The gully may represent foundation footings for a fence line. It is perhaps significant that the gap between the two gully segments occurs where the roundhouse is situated.

The southern part of the gully [746] was stratigraphically earlier than all the other features within the south-west corner of the enclosure (Figure 30), and contained 12 sherds of mid-Iron Age pottery. The series of intercutting features were the most complex within the excavation. There appears to have been a build up of natural soils within this area (398), which was much like the natural sands and gravels but with some inclusions of dark silts; no finds were recovered from this context. It is possible that this soil represents a levelled midden, or a levelled bank. Cutting into the soil spread (398) were a number of pits, some respecting gully [746], whilst others were dug directly into its fill. It is therefore likely that the earliest phase consisted of a small amount of pit digging within the area defined by the gully. The pits were all circular or sub-circular in form, measuring *c.*1m by 1m, and *c.*0.5m in depth. Of particular interest are three pits ([628], [680], and [758]), which were finds rich and contained large quantities of medium to large rounded stones that cut into some of the earlier pits. Pit [758] was the largest, measuring 2m in length, 1.3m in width, and 0.5m depth; [628] was 1.4m long, 1m wide, and 0.45m deep (Figure 31); [680] was 1m². All three pits contained a single deposit of dark grey-brown clayey-silt with small charcoal flecks throughout. Around 80% of each pit was filled with medium and large rounded and irregular stones, a small amount being fire-cracked. From pit [628] over 250 sherds of pottery, a small saddle quern made on a natural cobble (SF 636), and three worked flints (flakes) were recovered from the fill. The deposit also contained high levels of charred plant remains with evidence for numerous seeds, cereal chaff and grain. Pit [628] contained just three sherds of pottery, along with three fragments of loom weights. Pit [758] also contained three sherds of mid-Iron Age pottery, and high levels of charred plant remains of grain, seeds, and charcoal. The pits within this group contained the largest amount of pottery from the site, accounting for around 14% of the entire assemblage and they may have been used for dumped waste deposits.

An intense episode of pit digging appears to have mainly occurred after gulley [746] went out of use and this may have coincided with the end use of the roundhouse, and indeed the enclosure, as the number of pits within the entrance way would have made access difficult, unless there was further access to the enclosure elsewhere. A late Iron Age „Belgic type' pottery vessel was recovered from pit [814] which lay centrally between the enclosure ditch and gully [746]. A sherd of pottery from the La Tene tradition, also of late Iron Age date came from a pit [787] cutting gully [746]. Taken together it is likely that the pits cutting the gully are from the latest phase of activity on the site, dating to the late Iron Age.

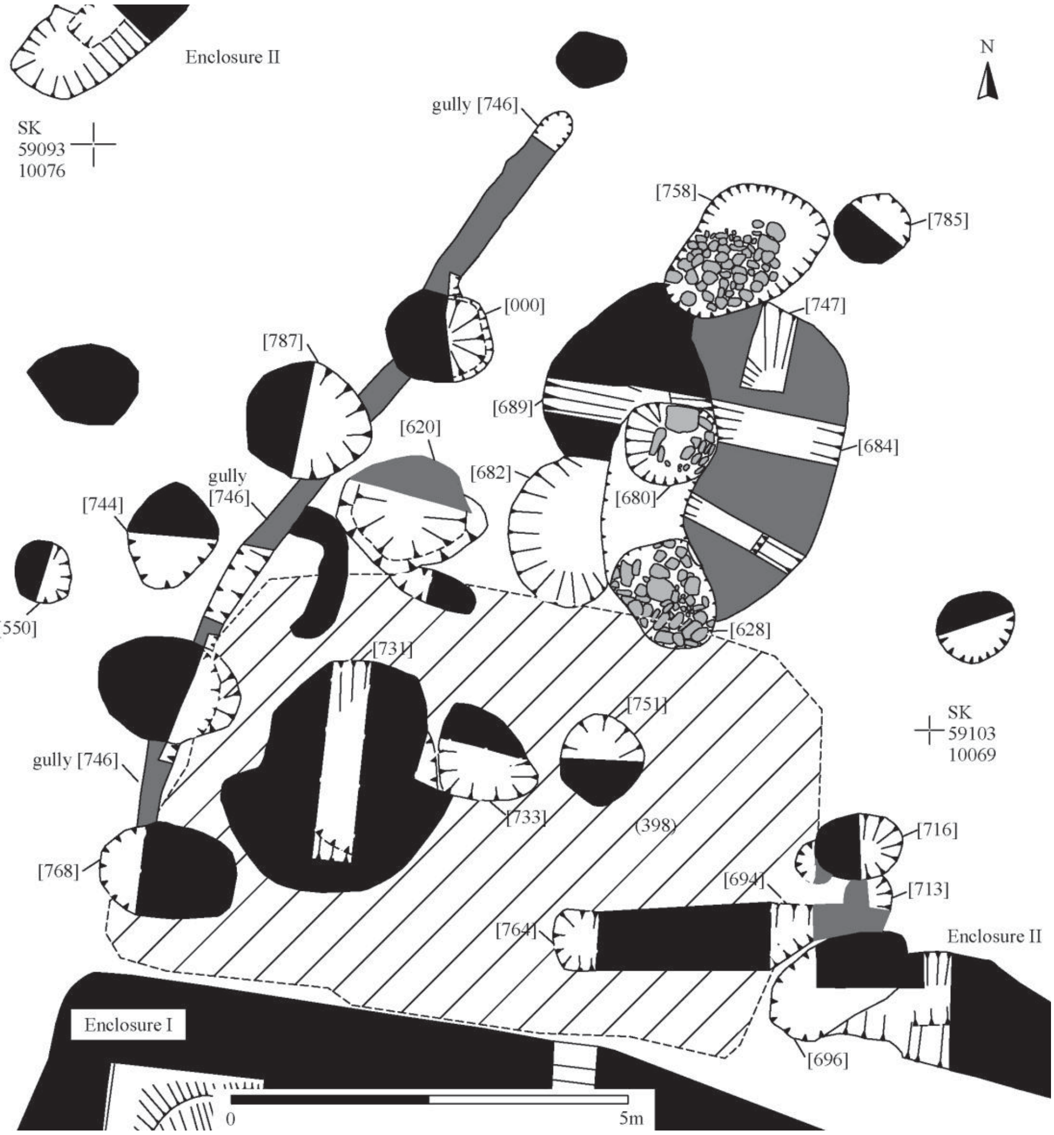


Figure 30: Pits within the south-west corner of Enclosure II

Figure 31: View of pit [628]

Enclosure II B

A small sub-rectangular enclosure was added into the south-east corner of Enclosure II. It was connected to Enclosure II by a narrow gully [870] at its northern end, and another small gully connected it to Enclosure I at the southern end.

The enclosure ditches were *c*.12 metres in length, enclosing an area of *c*.60m². It was *c*.0.65m deep along its northern and eastern extents, with the southern ditch much deeper at *c*.0.94m. At its south and south-east corners in particular the ditch was much wider and the edges less well defined than elsewhere suggesting several re-cuts. The natural ground level sloped from north to south indicating that the ditches had been dug to ease drainage of water. The enclosure was likely to have originally formed a small square –shaped area (phase A on Figure 32), with an entrance to the north-west. The northern side of the ditch had later been extended east, a further three metres, where the new ditch terminal [618] turned sharply south and cut an earlier curvilinear gully [621] (phase B on Figure 32). Of further note is a short north-south orientated gully [595] measuring 3.65m in length and 0.7m in width. This contained a single fill consisting of a firmly compacted dark grey-brown clay-sand, containing pebbles and larger rounded stones. Both [595] and [621] may represent foundation trenches for small fences. The main enclosure ditch fill (478) consisted of a mid-grey-brown silty-clay, firmly compacted. In the south-east corner were further deposits at the base of the ditch (see section B on Figure 33). Three thin deposits consisting of silts and sands (477), (480), (481) that contained small charcoal fragments, probably represent silting of the ditch which was not subsequently cleaned out during occupation of the area. The soil micromorphological analysis (below) showed the soils to contain abundant charcoal, hammerscale and slag.

Within the ditched enclosure were eight pits, some containing metal artefacts, iron slag, and phosphate enrichment - evidence for small-scale metal production. Five large pits, all circular or sub-circular in form were fully excavated (see the sections on Figure 33). The largest pit [397] measured 1.5m wide, and 0.65m deep, with sharp, near vertical edges and contained a mid-orange-brown, loosely compacted silty-clay (095), with some small to large stones, some heat-affected. Along the north edge of the fill were small charcoal flecks indicating patches of burnt ashy soil mixed in with the more general backfill of the silty-clay. Pit [433], was again sub-rounded with almost vertical edges, although of a slightly smaller size measuring 0.56m in depth and 1.02m in width (section I). It contained a single deposit of mid-orange-brown loosely compacted silty-clay (434), with occasional small charcoal flecks along the north-east side. Within this pit was a small copper alloy wire ring or armlet (SF550), along with a largely complete saddle quern (SF552). The remaining three sub-circular pits ,[020], [414], and [524], were all of a similar size and form, measuring *c*.1m in width and *c*.0.35m in depth. Pit [020] (previously investigated during the evaluation, see: Speed 2004, 12) contained two distinct fills (019) and (023). The primary fill (019) consisted of dark grey silt with abundant large charcoal pieces, the soil analysis indicates that this is a charcoal dump probably from a hearth. The secondary fill (023) was a mid to light grey-brown sandy-silt. Pit [414] contained a dark-brown clayey-silt (997), with charcoal flecks and fragments of ash. The second fill consisted of a dark greyish-brown, firmly compacted silt-sand (415) containing a few small stones. Within this deposit was a worn iron knife blade (SF548). Pit [524] contained a single fill (525) which consisted of a friable dark brown-grey, clayey sandy-silt. It also contained fire-cracked stones and around 20% of the soil contained small charcoal flecks, while the soil analysis detected some hammerscale fragments. From pit [524], a damaged head of an iron hammer (SF537) with a large but incomplete circular eye and the base of one striking face or end of square section was found. Spread (620) covered the smaller gullies [595] and [621]; it contained much pottery, animal bone and a perforated oven base, and is likely to represent a dumped midden deposit. Notably it blocks an entrance to enclosure IIB, indicating that the enclosure may have gone out of use by the time of this deposit, or the entrance was via a bridge elsewhere.

The pottery sherds recovered represent a significant amount (12%) of the total site assemblage from a small area, comprising 102 sherds, weighing 2791g from the eight features within the enclosure. The largest number (32 sherds) came from (525) within pit [524], representing two scored vessels and upper body and base sherds from an ovoid vessel (see illustrations in pottery report below, publication numbers 7-9), of mid-Iron Age date. Only ditch [618] (added to the original enclosure in Phase B) provided evidence for late Iron Age material, comprising two late Iron Age pottery sherds of „Belgic type' from [614] and [466] (Figure 32). Similar late Iron Age „Belgic type' pottery was also recovered from (515) (see section C on Figure 33). As this material came from the upper deposits it is probable that the ditch had mostly silted up following the end of occupation of the site, though the later Iron Age material does indicate some further activity within the area.

Evidence for metalworking came from the northern and southern sections of the ditch (sections A and B on Figure 33) and from pits [433] and [524]. Within pit [433] 477g of tap slag forming a furnace bottom was recovered, and within pit [524] 161g of vitrified coal-like fuel was evident. The phosphate sampling results showed some enrichment, although at much lower levels than other areas of the settlement. Even within pit [020], which contained substantial charcoal fragments within its fill, the sample did not have enhanced susceptibility (see MacPhail and Crowther below).

None of the features indicate *in situ* metalworking, however, the presence of waste products, together with associated hearth or furnace linings, potential raw materials and a hammer possibly used in smithing, strongly indicate metalworking activity within the immediate vicinity. The evidence suggests bowl furnaces for smelting, and evidence for the burning of coal, possibly from high temperature craft activities such as metal working.

Within one part of the final upper fill of the enclosure ditch, tap slag (881g) and vitrified sandy clay (22g and 47g) from a possible hearth or furnace lining, was located. This probably represents later activity in the area, after the settlement had gone out of use, and the ditches were fully silted up. The late Iron Age pottery found in some of the upper fills of the ditch may indicate a date for this activity.

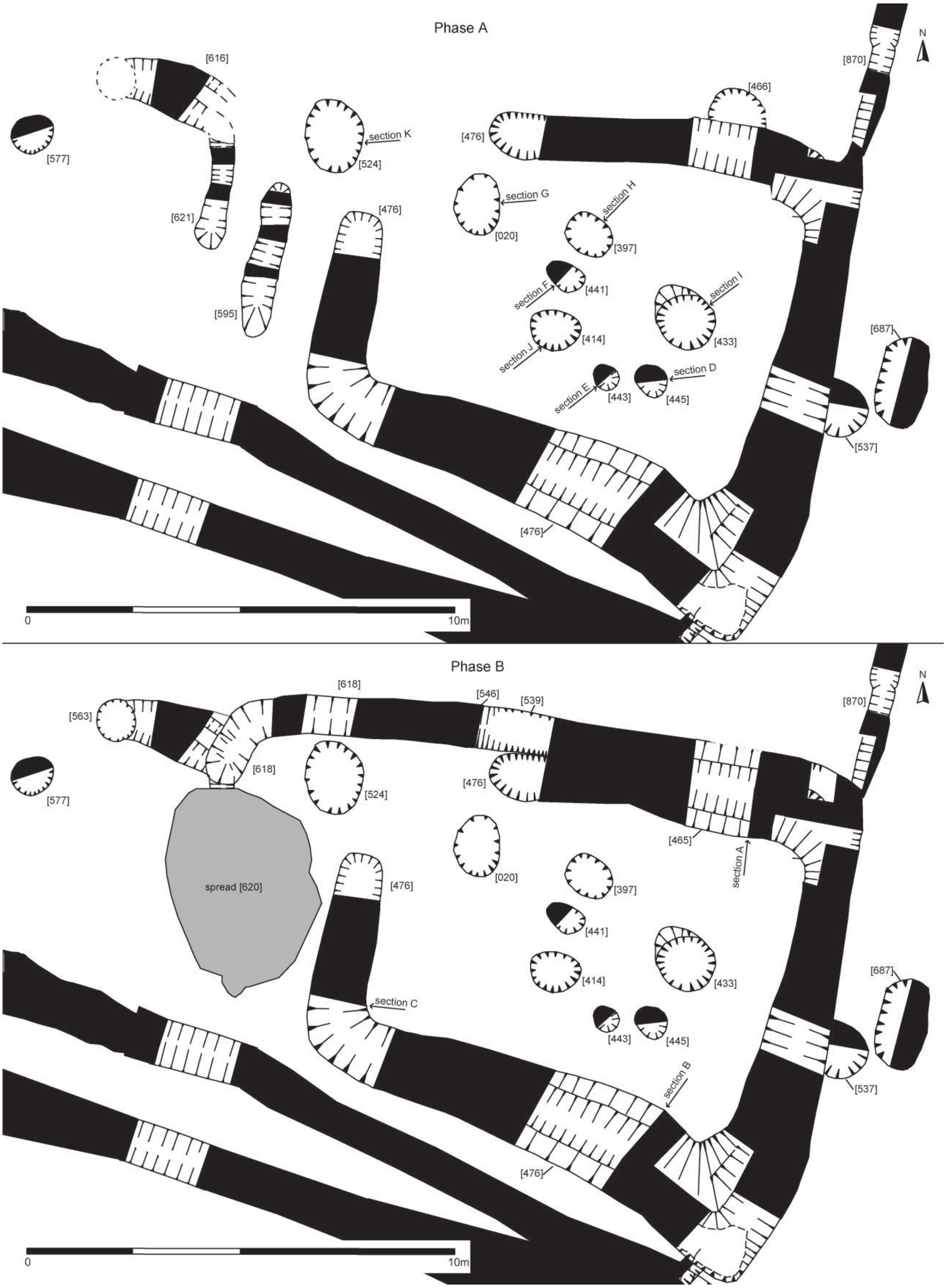


Figure 32: Plan of Enclosure IIB, Phase A, followed by Phase B

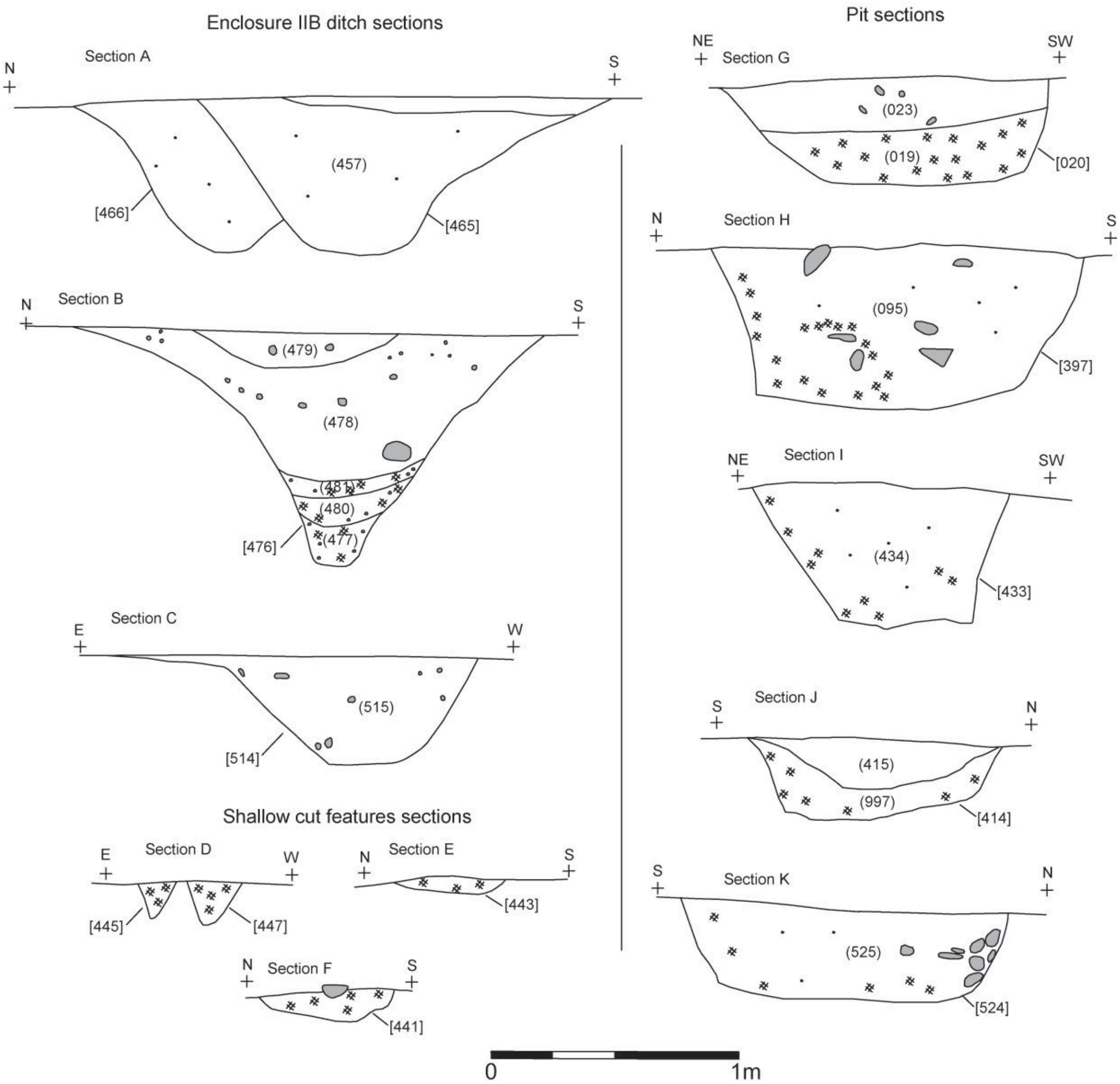


Figure 33: Enclosure IIB ditch and pit sections (# = charcoal)

Figure 34: View of Enclosure IIB and internal features, looking north-west

Pit group to the west of enclosure I & II

A group of 26 features, including many large circular pits, was located at the north-west corner of Enclosure I and south-west corner of Enclosure II (Figure 35). The pits consisted of two distinct types; 13 features ([104], [269], [294], [297], [301], [366], [400], [450], [543], [729], [836], [841], [860]) were all large (*c*.1m diameter) circular pits, with sharp – almost vertical – sides (0.5m deep), and flat bases. The remaining features ([123], [130], [151], [153], [255], [299], [305], [353], [387], [552], [859], [877], and [879]) were generally smaller in both diameter (*c*.0.75m), and depth (*c*.0.3m). A sample of two sections of the larger pits and smaller pits are illustrated in Figure 36.

Only four features contained finds ([104], [151], [552], and [729]). Pit [104] contained 28 sherds of pottery from a single ovoid bowl, forming a complete profile (Figure 36; Figure 59), deposited centrally in the pit, over a primary silt deposit (115), within a silty-sand (105). The remaining three pits each contained just four sherds of pottery.

The variety in two distinct forms of pits may indicate two distinct phases of activity, or differing usage of the area. The lack of intercutting features, however, suggests that this area grew and was added to as pit digging took place. The absence of finds from the majority (85%) of the pits is quite striking, and contrasts sharply with the large volume of material from pits immediately to the east within the corner of Enclosure II. Whilst not forming a regular pit alignment, the pits were arranged in a linear form, on a very similar alignment or orientation (north-west to south-east) to the northern length of the Enclosure I ditch. These could therefore have been dug adjacent to a formal landscape boundary, perhaps an earth bank field boundary immediately to the south (where there is a notable absence of pits, whereas to the north the pits spread out).

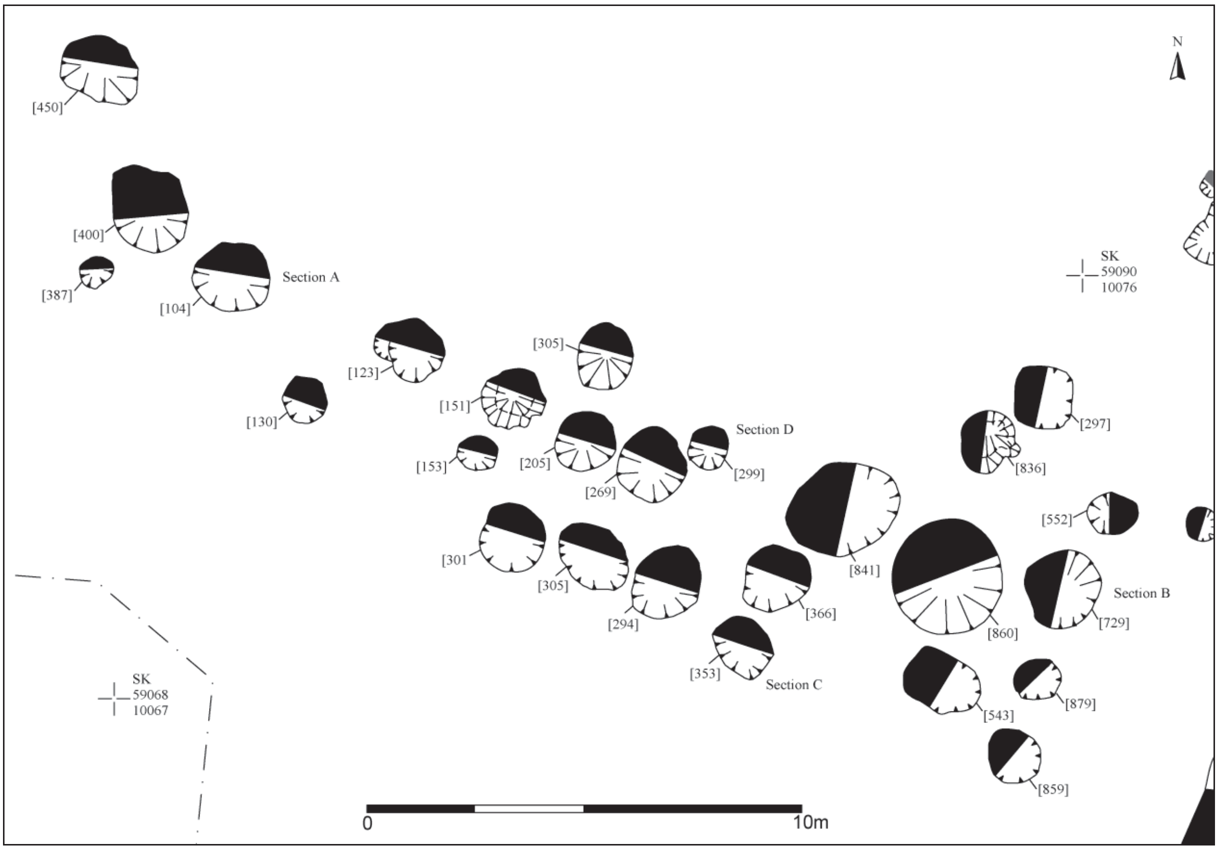


Figure 35: Group 15, a pit alignment or group to the west of Enclosure I and II

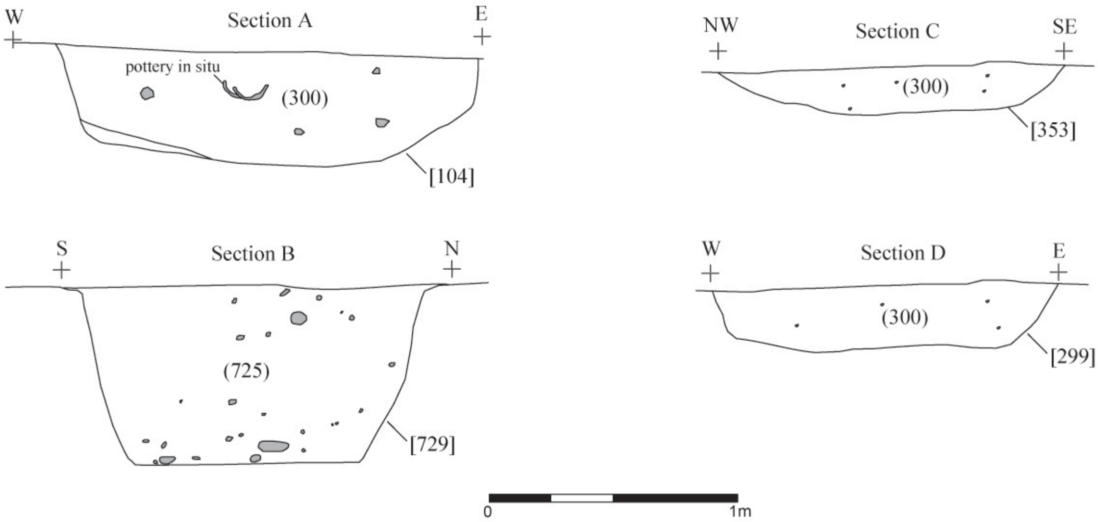


Figure 36: Typical pit sections from Group 15

Figure 37: View of pit group under excavation, looking northeast.

Enclosure III and Surrounding Area

Enclosure III

A small rectangular enclosure – Enclosure III - was located to the north of enclosure II (Figure 39). It measured 12.75m in length and 11m in width, enclosing *c*.100m². The ditch measured 0.72m in width, and 0.30m in depth, much smaller than enclosures I and II. Sections were excavated at the corners of the enclosure ([007] = [722], [726] = [882], [738], [866], [880], [882], [883]), and at the entrance on the south side ([726], [880]). The enclosure ditches had sharp – almost vertical – sides and flat bases. They were filled with a single deposit of medium grey-brown silty-sand (contexts: (006), (723), (727), (739), (867), (881), being more compacted at the base. In the absence of silting this possibly represents a backfill. The only internal feature was a large pit [750] in the south-east corner. It contained a pale mid-grey-brown silty-sand with frequent sub-rounded stones (739).

Little dating evidence was recovered from the enclosure ditch, with less than 10 sherds of mid to late Iron Age pottery from [722], [880], [866] and pit [750], although a concentration of 58 sherds was recovered from the south-east corner of the ditch. The enclosure resembles enclosure IB in terms of the general proportions, absence of internal features and few finds. Phosphate samples taken from the natural sands and gravels within the enclosure and the ditch fill, showed signs of enrichment, although lower than areas within Enclosure I. The magnetic susceptibility samples contained evidence indicating probable animal trampling, suggesting that Enclosure III represents the remains of an animal stock control area.

Close to the enclosure were four shallow pits [720], [740] = [750], [826], [828]. These poorly defined features contained light sandy-silts, and mid-late Iron Age pottery was recovered from [826] and [828]. These features may represent part of a fence line running along the outside of the ditch, although they are not evenly spread, evidence for other small pits may not have survived plough truncation.

Figure 38: View showing Enclosure III being excavated at the north-east and south-east corner, looking south

Pit group

A small group of pits and post-holes (Group 17) *c*.5m south and to the east of enclosure III may represent post-structures, and provides possible evidence for „structured deposition' (Hill 1993).

A large (1 metre diameter, 0.5m deep) round pit [724] was located 10 metres south of Enclosure III, having steep - almost vertical – sides, and a flat base. It contained large rounded stones (730), along with two-thirds of a saddle quern in the base of the pit (SF701, SF702), possibly representing packing stones for a large post. The pit was filled with a dark-brown sandy-silt (725) that contained charcoal flecks, and a large quantity of charred plant remains, consisting of over 50 fragments of both grain and seeds. The pit also contained a substantial amount of pottery (74 sherds). The large quantity of finds may indicate that the pit was used as a refuse dump after the post-pit had gone out of use, or alternatively it may have been a deliberate – structured - deposit. Pit [735] also one metre in diameter and similar in depth, also contained large rounded stones and quern stone fragments. The granite stones were laid horizontally with two stones placed on edge at the sides. This was covered by a dark grey-brown silty-sand (737); containing over 100 sherds of pottery at the top of the pit fill. Many of the sherds were found stacked upon one another on the north side amongst a dump of large pebbles. This deposit, sealing the pit, may indicate structured deposition.

Between the two post-pits were three post-holes. A shallow depression [741], possibly representing the remains of a post-hole, contained a yellow-brown silty-sand with three sherds of mid – late Iron Age pottery. A short gully [781], lay 0.7m to the east, with at either terminal a much deeper, circular shape was evident, suggesting a post-hole at either end, with perhaps a beam-slot between them. Within the mid yellow-brown sandy-silt fill (782) were large angular sandstone fragments, possibly indicating stone packing. Mid – late Iron Age pottery (23 sherds) was recovered from (782).

Close to these features were a further four pits ([405], [408], [707] and [815]) all similar in form and size, being circular (1m to 1.3m diameter) and fairly shallow (0.35m depth). Pit [408] is notable as it contained the highest quantity of charred plant remains from the entire excavation (87 fragments of grain, 32 seeds, and 15 chaff; see Hill below). All other pits contained a small quantity of pottery. Pit [707] consisted of shallow depressions containing yellowish-brown silty-sand (708), within which were large quantities of heat-affected pebbles, especially concentrated on the surface.

The two pits [724] and [735] are remarkably similar in size and contents, and may represent post-pits for a structure. The absence of any further post-pits in the area suggests it may have been a two-post structure; the smaller post-holes [741] and [781] mid-way between the two pits may indicate fence-posts perhaps related to a fence as part of stock control related to activities within enclosure III. The evidence for deliberate deposition of artefacts, „structured deposition' (Hill 1995), associated with these features is discussed below (see Analysis and Discussion).

Pit [807] located 5 metres north of Enclosure II and 4 metres west of Enclosure III (see Figure 39), was sub-circular measuring 1.12 by 0.88m, with vertical sides to a depth of 0.35m. At the base of the feature a thin (0.07m) layer of dark brown-grey silt (809) containing frequent charcoal fragments may suggest a dumped burnt deposit (i.e. not burned *in situ*). Over this lay a large quantity of medium to large pebbles (808), un-burnt clay nodules, charcoal, a broken saddle quern (SF859), and over 100 sherds of pottery, including a complete profile of an ovoid wide-mouthed jar (illustrated in Figure 59). Three worked flints (retouched flakes) were also present within the fill. Environmental analysis showed some evidence for seeds and grain. The carbonised residues on some of the pottery sherds were sufficient for radiocarbon dating, which provided a calibrated date of 400 – 200 BC, and a posterior density estimate of 390 – 340 BC (20%) or 330 – 220 BC (75%).

One metre north of enclosure II, and 5.5 metres south-east of pit [807] was [841], an oval pit with steep almost vertical sides and a relatively flat base. The pit contained a large quantity of pebbles (842) of various sizes, many of which were fire-cracked and stacked three courses high, lying directly on the base forming a flat pile of stones. Over this lay a dark orange-brown, silt-sand-gravel fill (843), this contained large quantities of pottery (at least three vessels) as well as a small quantity of bone. Two of these vessels are probably Late Iron Age in date (Marsden below, illustration 24 and 25 on Figure 61). The pit cut a much smaller and shallower ovoid feature [839], with curving sides and a flat base. Within this lay a small quantity of large pebbles (855) located on the base, the majority were fire cracked pebbles that may suggest the stones represent a dump. There is also the possibility that they represent the remains of a post-pad and the packing for a large post-hole. These were covered by (840), a dark grey-brown, silt-sand, with some small sub-rounded stones, and the occasional charcoal fleck, from which a few large sherds of pottery, including a rim were recovered (Figure 40).

A small (0.52m diameter) sub-circular pit [837], with regular sloping sides, and a flat base was located adjacent to Enclosure II. It contained a single deposit of dark orange-brown silty-sand (838), with occasional charcoal flecks and small to medium sized sub-rounded pebbles, with three sherds of mid to late Iron Age pottery.

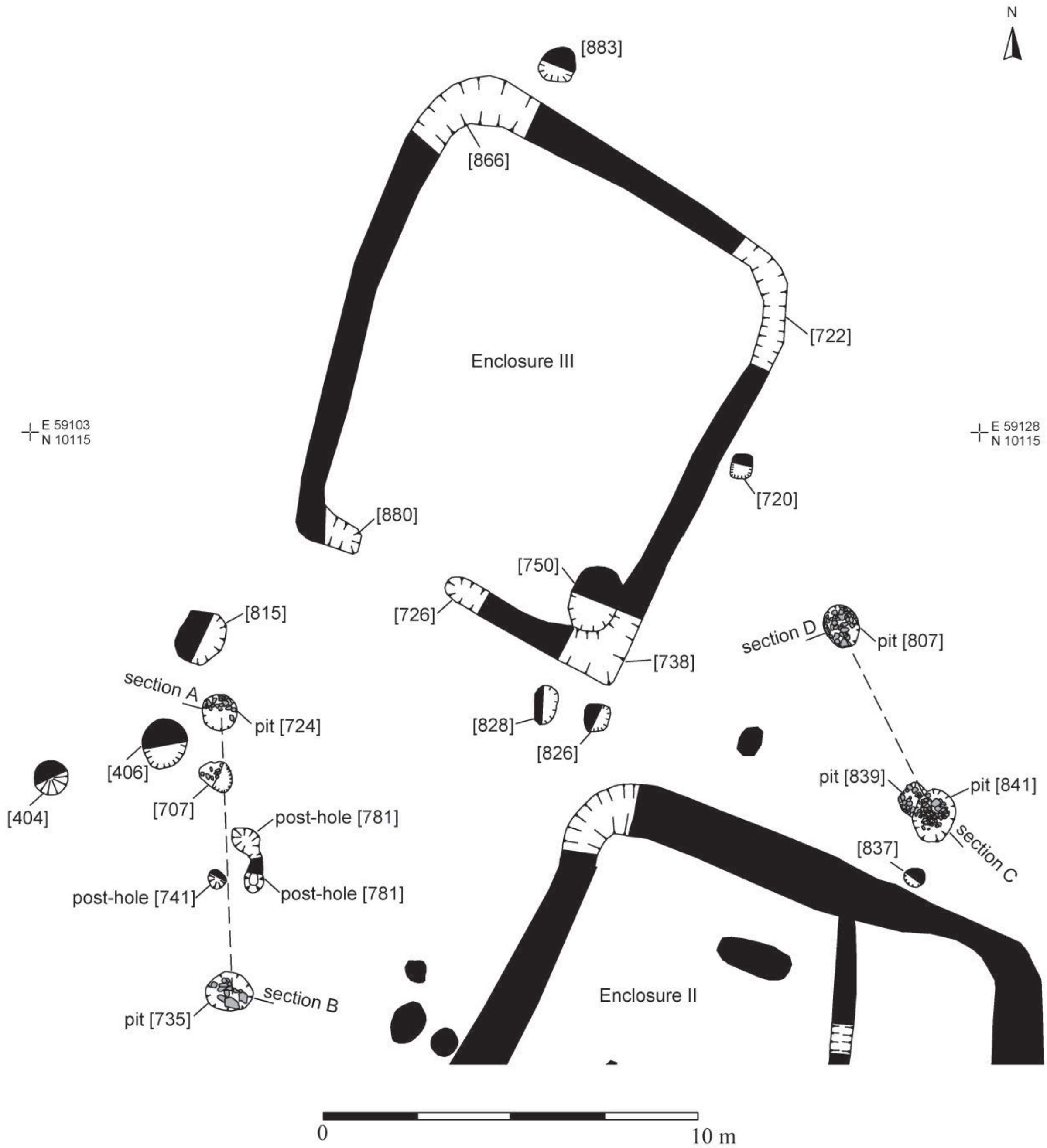


Figure 39: Enclosure III and pit groups

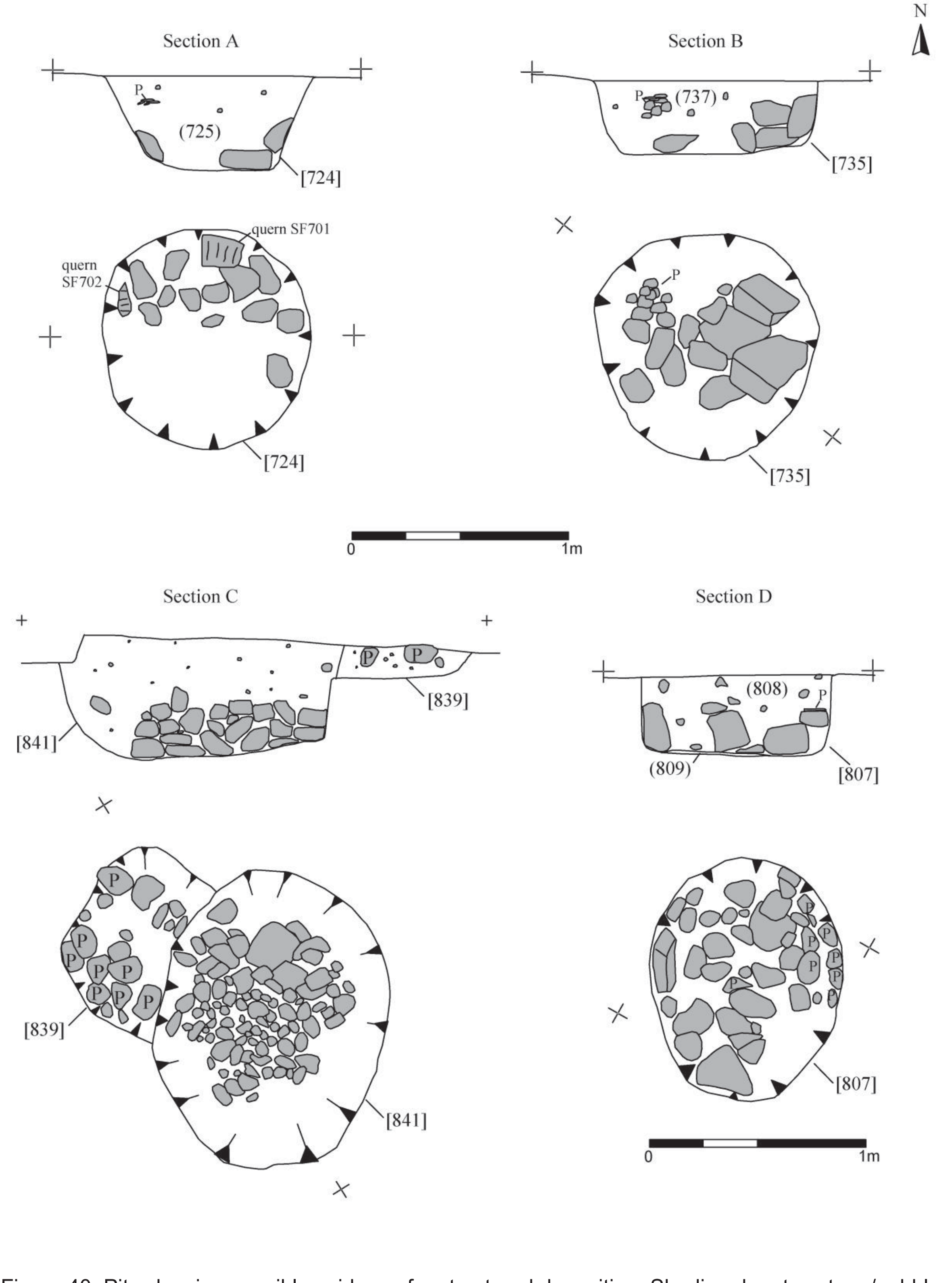


Figure 40: Pits showing possible evidence for structured deposition. Shading denotes stone/pebbles while P indicates pottery sherds

Figure 41: Post-pit [735], note the stacked pottery sherds centre-left

Figure 42: Post-pit [807], again with concentrations of pottery and large pebbles

Further Scattered Pits

A small dispersed group of pits and probable natural features were located around the outside of the north-east corner of Enclosure II (Figure 27). Three un-dated features ([818], [824], and [831]) may be archaeological features, while the remaining features, much more irregular in form, were likely to have been tree-throws pits.

A small post-hole [818] was located adjacent to another [831]. Both were sub-circular with sharp sides and a flat base. [818] contained a mid orange-brown friable sandy-silt (819), whilst [831] contained a dark orange-brown sandy-silt (832); no finds were recovered from either feature. One metre north was a sub-oval pit [824], with concave sides and a sloping base. It contained a dark red-brown sandy-silt (825), with some evidence for small charcoal flecks and root disturbance, again with no finds.

Enclosure IV

Located 70 metres west of Enclosure I was an „L'-shaped ditch: „Enclosure IV'. Close to this possible enclosure were a series of isolated features, some clearly shallow pits containing Iron Age pottery, while others were more ephemeral and appear to indicate tree-throw pits or geological features. Similar features were also identified and recorded mid-way between Enclosures I and IV (Groups 21 & 22, see Figure 43).

Figure 43: Enclosure IV and other features between Enclosures I and IV. TT = tree-throw pit.

The Enclosure IV ditch was orientated north-north-east to south-south-west and ran from the edge of the excavation for 25 metres, at which point it turned west at an approximate right-angle for a further 14 metres. The ditch ([025]/[665]), first identified and excavated during the evaluation (Speed 2005:11), had a concave profile (see Figure 44) and the width ranged from *c.*1m at the southern end, to around 0.75m - 0.85m elsewhere. At the ditch terminal it was just 0.5m wide with little depth [917]. This may indicate a genuine terminal, or alternatively any evidence for the ditch continuing further west may have been lost to plough damage. The ditch contained a thin primary silt (671) consisting of an orange-grey silty-sand, which likely represents natural silts washed into the open ditch, and contained no finds. The ditch was mainly filled by a mid-brown silty-sand (026)/ (666). This was firmly compacted and contained seven sherds of mid-late Iron Age pottery; some heat-affected stones were also recovered from this deposit.

„Within' the L-shaped ditch were three features: [915], [916] and [999], none containing finds. A shallow and sub-circular pit [915], 0.55m in diameter, was located four metres west of the ditch. Sub-rectangular pit [916] located one metre west of the ditch, measured 1m by 0.78m and was 0.3m deep. Pit [999], shallow (0.2m) and slightly irregular in form, was located 10 metres west of the ditch and measured 1m by 0.8m. The area was machine-stripped for a further 25 metres to the west, but no evidence for any archaeological features or tree throws were present. However, the ditch terminal [917] was badly truncated and survived poorly, giving the possibility that any further elements of the ditch may not have survived plough damage.

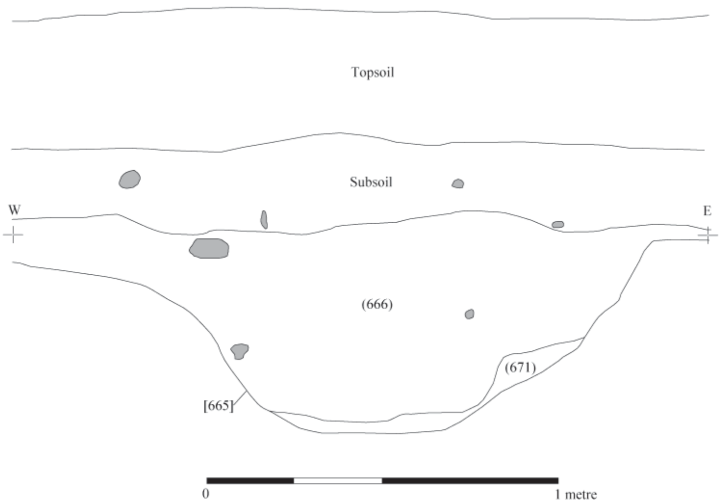


Figure 44: Enclosure IV profile, context [665]

Five metres to the east of Enclosure IV was a small circular feature [705] with two very light brownish-grey sandy-silt fills (91) and (92), containing seven sherds of mid-late Iron Age pottery. Presumably it was left open for some time and slowly filled with surrounding natural silts. One metre to the east of this was a curvilinear feature (31) which is likely to be a tree-throw pit. A further probable tree-throw pit was identified 1.5m east of the ditch.

A series of dispersed isolated features were present between Enclosures I and IV (groups 21 and 22). These formed two clusters; Group 22 close to the edge of excavation to the south and Group 21 to the north, separated by an open area devoid of any archaeological or natural features. The group of features along the north edge of excavation (Group 21) consisted of a mixture of small (Iron Age?) pits and tree-throw pits. Pit [33], located within trench 57 during the evaluation, and contained no dating evidence (Speed 2005, 10). Following the full machine-strip during the excavation two further features were located immediately to the south of [33], ([396] and [998]). Pit [396] was circular measuring 1.15m by 1.3m, while [998] was sub-linear in plan, measuring 1.3m by 0.5m, and with one clear edge and another unclear and irregular edge, may have been a tree-throw pit. Neither feature contained any dating evidence. Pit [701] a roughly circular pit with vertical sides and flat base, contained a dark grey sandy-silt, with frequent burnt stones, loosely compacted (702). Worked flint (including a blade) was present in the light grey-brown sandy-silt fill of feature [700], interpreted as a tree throw pit (Figure 43). The group of features along the southern edge of excavation (Group 22) also consisted of a mixture of small (Iron Age?) pits and tree-throw pits. Two [667] and [669] were located on the southern edge of the excavation, 23 metres east of Enclosure IV. Pit [667] measured 0.89m diameter and 0.4m in depth, while [669] was slightly smaller at 0.65m diameter and 0.2m in depth. Two sherds of Iron Age pottery were recovered from the fill of [667]. Four other features were identified and excavated, all curvilinear with one irregular edge, indicating that they are most likely tree-throw pits.

Late Iron Age and Roman evidence

There is evidence to indicate that some activity continued within the settlement area in the late 1st century BC to early 1st century AD (Figure 45). Finds from this date consisted of some wheel-made „Belgic type' pottery vessels displaying the influence of the Aylesford-Swarling tradition of south-eastern England, and a vessel that belongs to, or is at least influenced by, the La Tène tradition. Most of these finds came from the upper ditch fills of Enclosure I and II, indicating that the enclosures had still not completely silted up. Five vessels came from pits. Two within the south-west corner of Enclosure II are the latest pits in the group cutting all others and a linear gully. One vessel from pit [679] is on the projected line of the roundhouse within Enclosure II. A further pit to the east of Enclosure III [841] contained two vessels of a Late Iron Age date; this pit cut an earlier pit. Given the difficulties in closely dating Iron Age pottery, it is possible that further vessels are also Late Iron Age, however, based on the current interpretations it is probable that activity of this date was limited to occasional and scattered pit digging, indicating continued use of the area but not of the settlement.

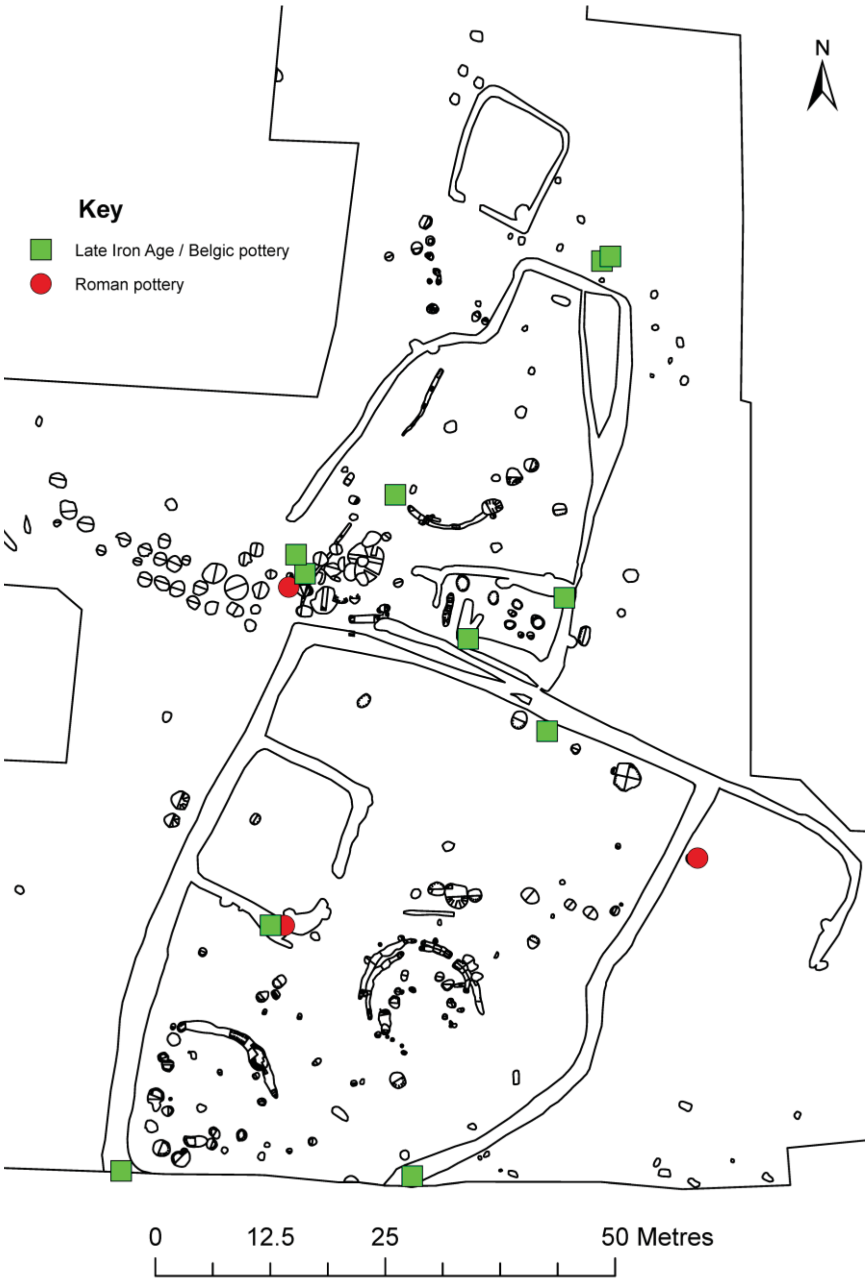


Figure 45: Plan showing the location of Late Iron Age and Roman pottery

The enclosure ditches likely only closely silted up over many years as within the upper fills of the enclosure ditches were five sherds of Roman pottery (three also unstratified), and two early Roman brooches. A Polden Hill type brooch (SF530) was from subsoil recovered during machining within the area of Enclosure III. The second, a variant of a trumpet brooch (SF535), was found directly overlying the upper fill of the ditch of Enclosure I. Both date to the late 1st to early 2nd-century AD. These finds indicate that there was some activity within the former settlement area, the enclosure ditches having been mostly backfilled (or allow to be backfilled) by the late 1st century BC, but still probably existing as a shallow depression in the ground.

Eight sherds of medieval and post-medieval pottery, all from topsoil or subsoil, were recovered during the excavation. Numerous metal objects were found within the subsoil, mainly consisting of unidentifiable iron objects of 19th / 20th century coins. It is likely some of these finds are present as a result of field manuring. Remains of a medieval pond were also located at the far northern limit of the excavation.

Area 2

Area 2 was located on higher ground 240 metres north of, and overlooking, Area 1 (*c*. 75m O.D., whereas Area 1 was around *c*.60m O.D, see Figure 48). The natural subsoil contained much more clay, compared to the sands and gravels in Area 1. Two small open areas (Area 2a and 2b on Figure 47) were investigated, expanding on evaluation trenches that identified archaeological features within this area (Speed 2004, 16). Area 2a measured 48m north to south and 33m east to west, while Area 2b was slightly larger, measuring 50m north to south and 40m east to west, and together the area fully investigated covered 3850m².

The dominant archaeological feature in both areas was a long ditch, in Area 2a running north-west to south-east, before curving round to head north-east to south-west (Figure 47 and Figure 49). This ditch continued into Area 2b right to the far western end of the trench where a terminal was recorded. There was a gap of just 0.5m before the ditch continued on the same alignment out of the excavated area. Two further ditches were connected to this, orientated north-west to south-east and parallel to one another.

The ditch had steep sides and a rounded base, a width varying between 0.55 – 0.7m, and it was only 0.35m deep. It contained a very compacted and sticky mid-grey-brown silty-clay fill. Little dating evidence was recovered from the fill, with just 29 sherds of Iron Age pottery in total from all excavated sections. There appeared to be little variation in the ditch fill, suggesting that the entire ditch was allowed to silt up naturally over time.

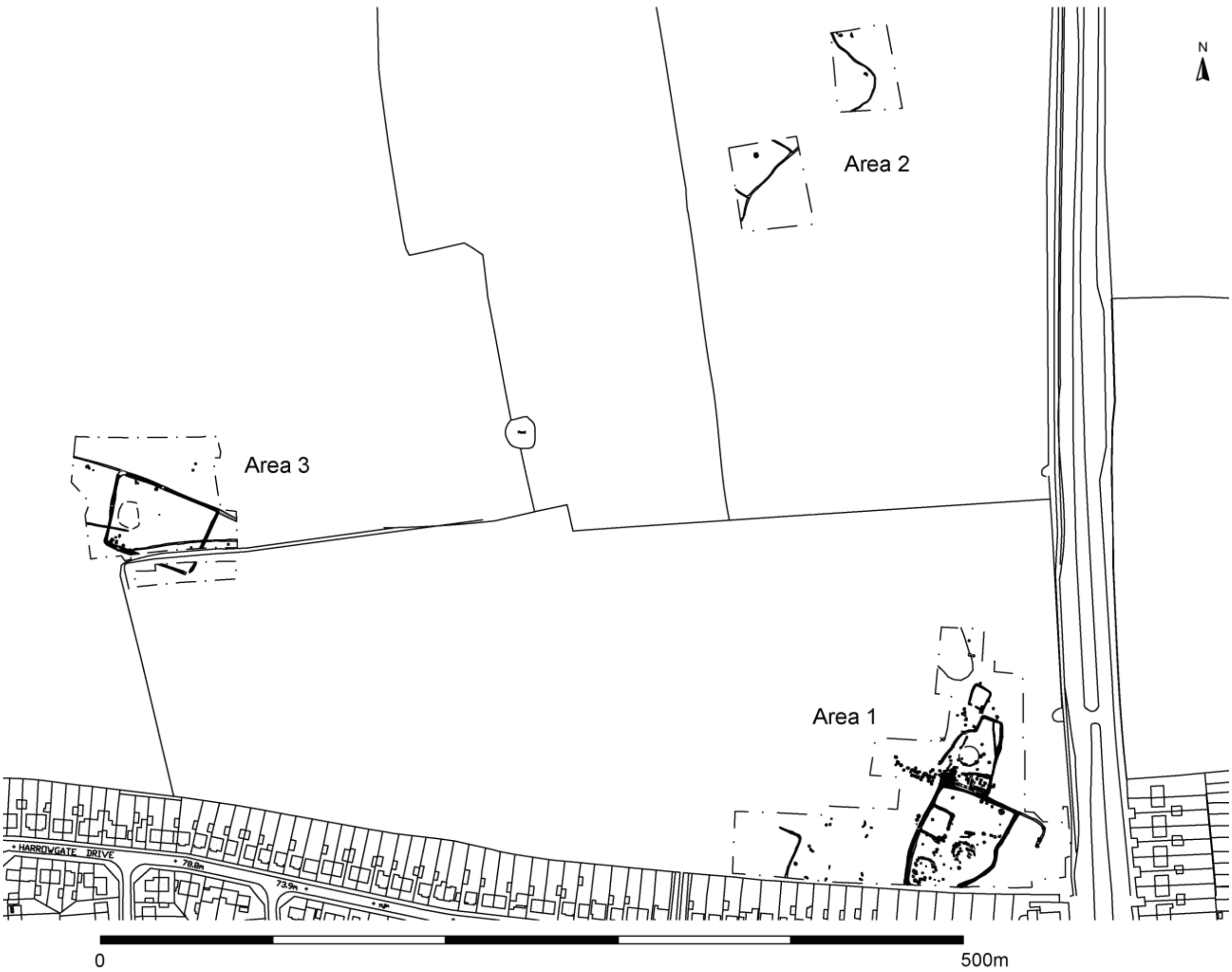


Figure 46: Area 2 (a right; b left) and 3 in relation to Area 1

Other smaller features were located close to the ditch. Within Area 2a three features were located at the north-end of the excavated area, two located 3m to the east of the ditch, and a further feature 3m to the west. All features were irregular in form, and contained no dating evidence and it is likely that they were tree throw pits. Within Area 2b a large feature was identified within the northern area, again its irregular form resembling that of the other tree throw pits.

The lack of any structural evidence, and the few artefacts found within Area 2, indicates that the ditch was likely to have been a field boundary, perhaps related to the settlement within Area 1. The ditches are not as straight and rectilinear as other Iron Age field systems (for example the Late Iron Age examples at Manor Farm, Humberstone, Thomas 2008b). They do indicate that this ridge of land was being fully utilised for land management and farming in the middle Iron Age.

It is worth noting that some archaeological evidence may not have survived plough damage, attested by the shallow depth of the ditch compared to the ditches within Area 1, the lack of subsoil and plough scars present within the natural substratum below the topsoil.

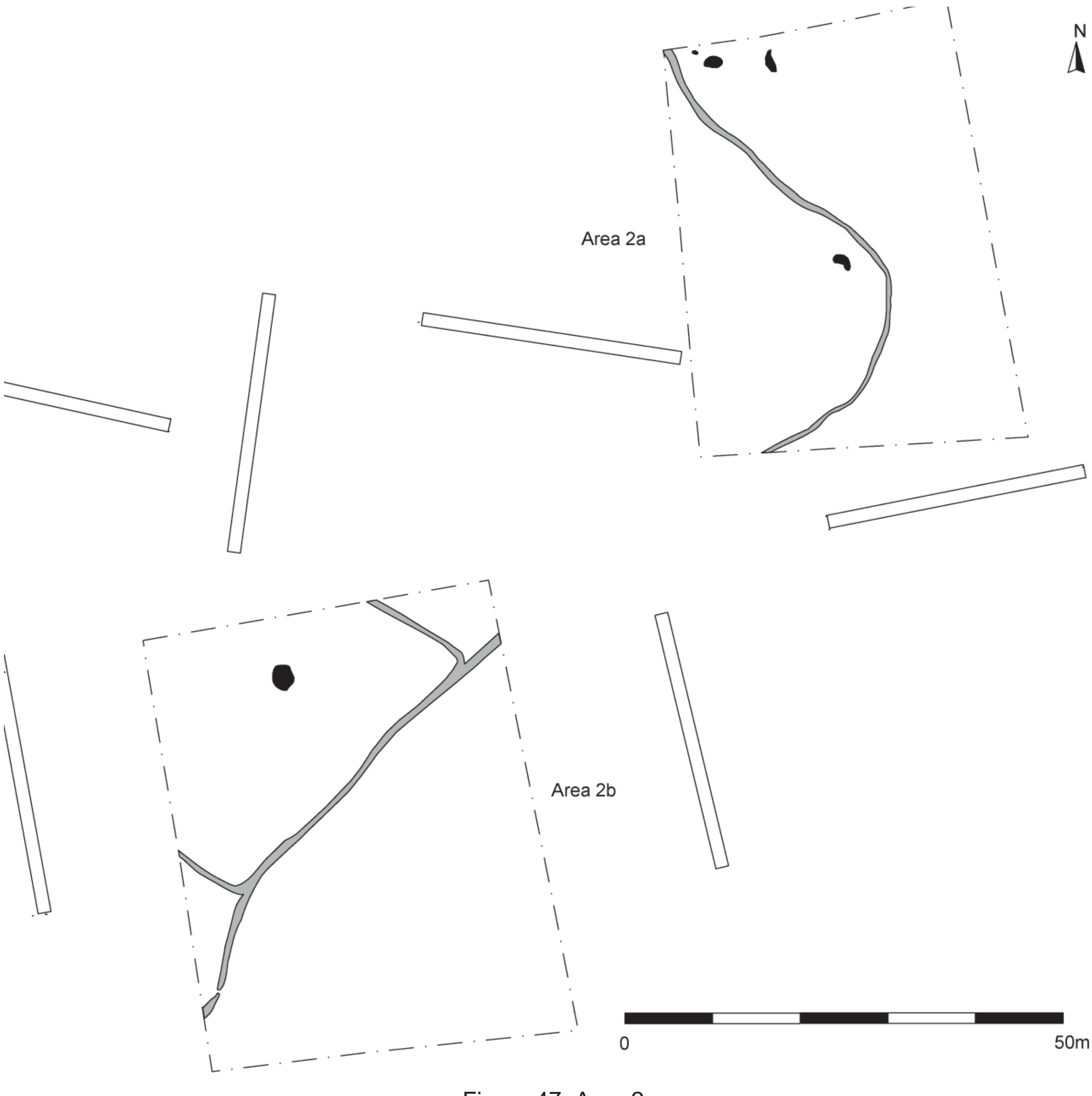


Figure 47: Area 2

Figure 48: Area 2b looking south towards Area 1, just visible in the background

Figure 49: Area 2a, boundary ditch running from central foreground, curving left. Looking north-east

Area 3

Area 3 was located *c*.400 metres north-west of Area 1. Like Area 2 it was situated on higher ground overlooking Area 1 (*c*. 75m O.D., whereas Area 1 was around *c*.60m O.D. see Figure 46). Also like Area 2 the natural subsoil contained much more clay, compared to the sands and gravels in Area 1. A large open-area was investigated, expanding on evaluation trenches that identified archaeological features within this area (Speed 2004: 16). The area was separated by a modern ditched field boundary, the main area to the north measuring *c*.70m north-south and *c*.60m east-west, while the area to the south was 10m north-south and 60m east-west. In total the area fully investigated covered 6460m². The evidence revealed consisted of a large rectangular enclosure added on to a pre-existing field boundary. Numerous other pits and post-holes were located within the enclosure; no structural evidence was found (Figure 50). The presence of a large medieval / post-medieval pond, and the thick clay subsoil created wet and waterlogged conditions during excavation (see Figure 51)

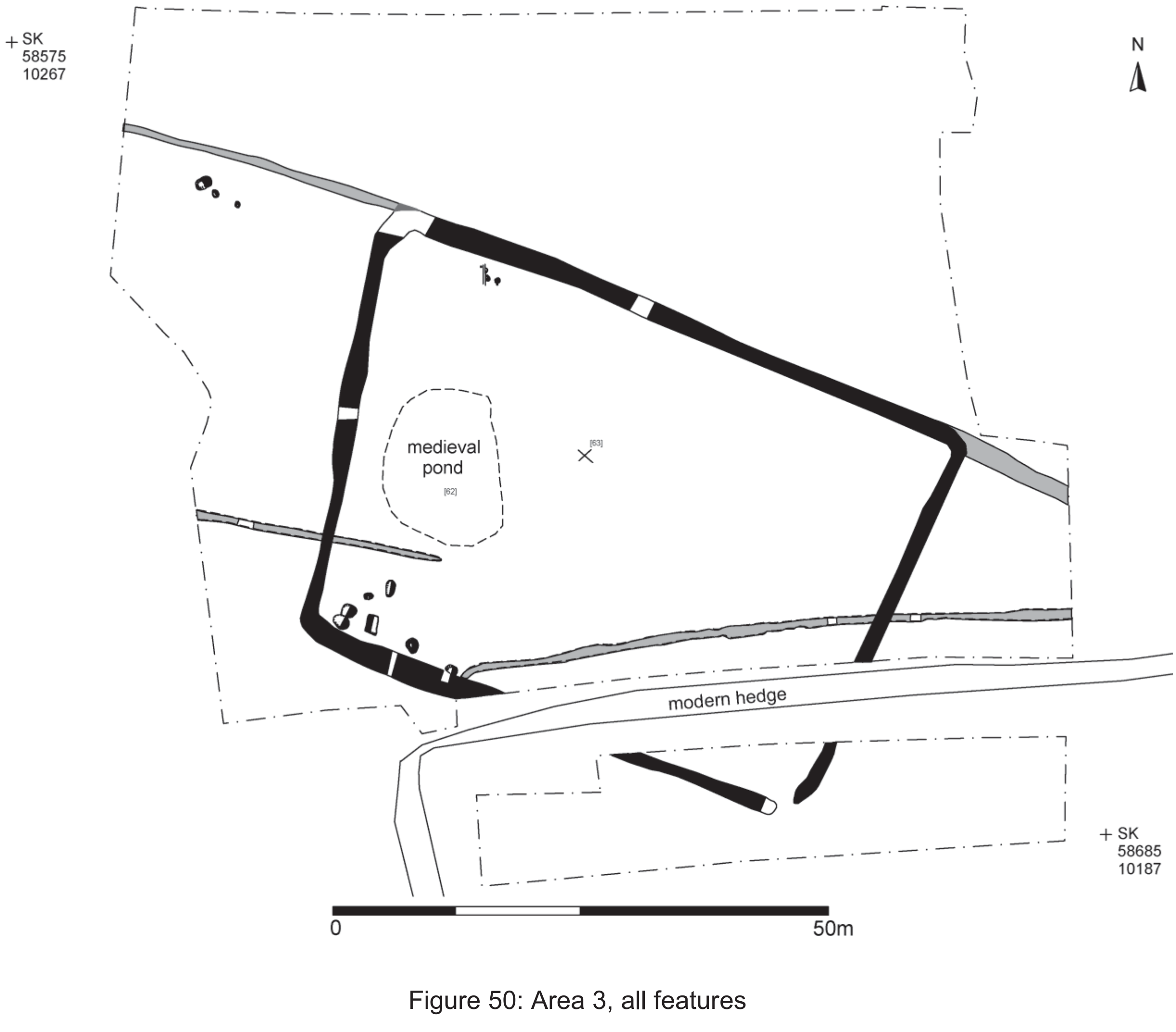


Figure 50: Area 3, all features

Figure 51: Area 3, general working view looking east with excavation, recording, and further machining in progress. The waterlogged conditions are evident from the standing water in the centre of the photo.

The earliest evidence consisted of three linear ditches (phase A, Figure 52). The longest [055], first identified during the evaluation (Speed 2004: 16) was orientated north-west to south-east and visible for a length of 100m into the edge of excavation. The ditch was *c.*0.85m in width and 0.45m in depth, and contained a single deposit of a compacted mid-grey-brown silty-clay, with a few sherds of mid-Iron Age pottery. A further ditch [990] was located 33m south of, and parallel to, [055] for a length of 25m. The ditch was also *c.*0.8m in width and 0.16m in depth, with a similar deposit of a compacted mid-grey-brown silty-clay, with occasional charcoal flecks and small sub-rounded stones. A third ditch [921], orientated just off an east-west alignment, ran for a length of 62m, was of similar dimensions to the other two ditches, and also contained a mid-silty-clay deposit. All three ditches contained pottery dating from the mid to late Iron Age.

A rectangular ditched enclosure [928] was added to [055], (Phase B) cutting the fills of ditches [921] and [990], which must have gone out of use, whereas [055] was still in use and became incorporated into the new enclosure. These ditches were larger measuring *c.*1.55m in width and 0.6m in depth, notably larger along the southern edge, especially in the south-west corner where it measured 2.45m in width and 0.55m in depth, with a later re-cut [967] substantially widening the ditched boundary. The enclosure measured a total of *c.*63m east to west and *c.*43m north to south, enclosing 2245m², with an entrance in the south-east corner where there was a gap of 1.8m between the ditch terminals. The ditch contained a primary silt deposit (979) that contained little dating evidence, other than a few sherds of mid-Iron Age pottery. The secondary fill (980) consisted of a much darker grey silty-clay, with abundant charcoal flecks, throughout. This also contained large quantities of Iron Age pottery sherds, and a single sherd of Roman pottery from the northern part of the ditch, indicating the ditch may have been open for some time before it was fully backfilled.

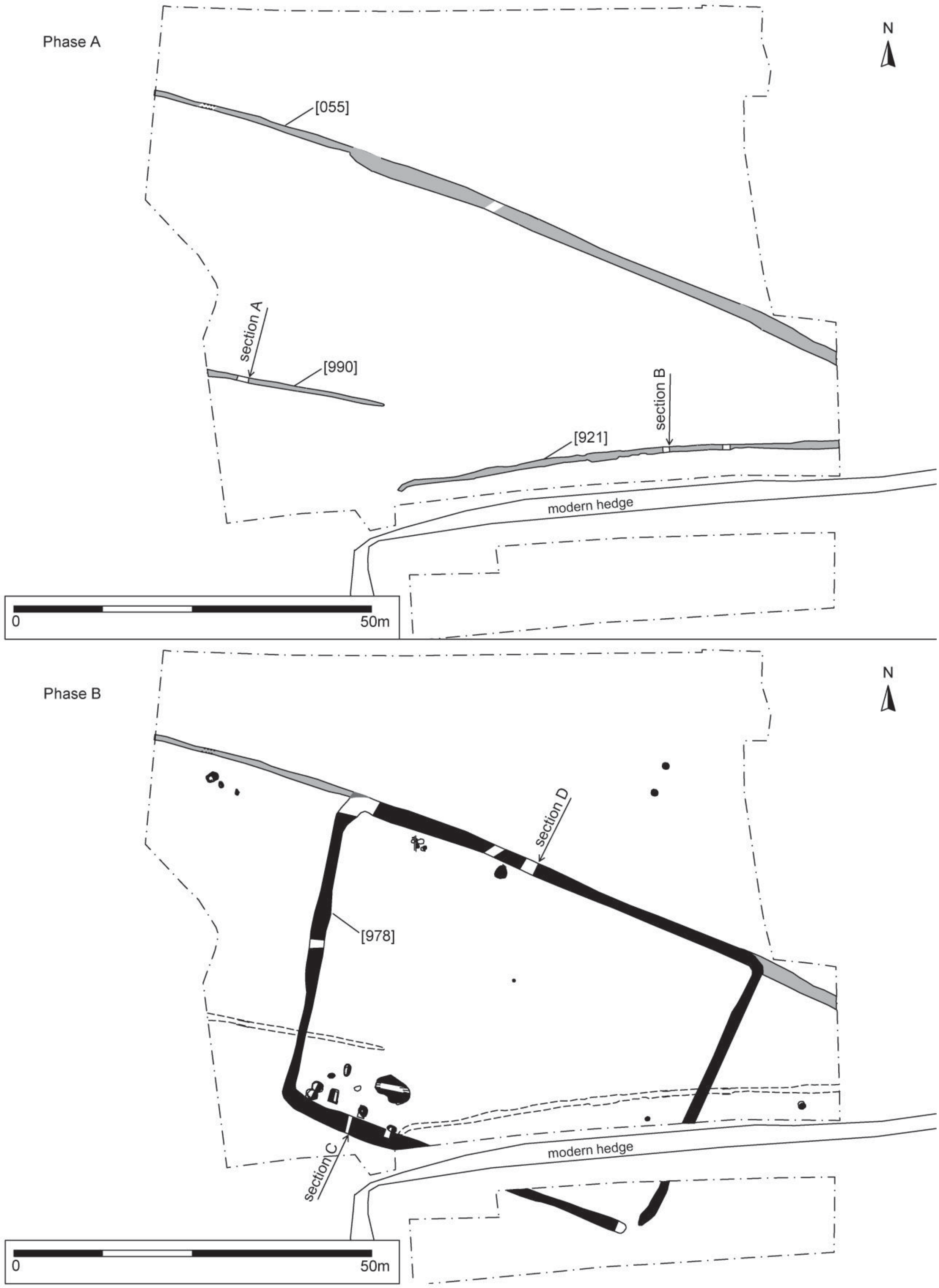


Figure 52: Area 3, Phase A and B

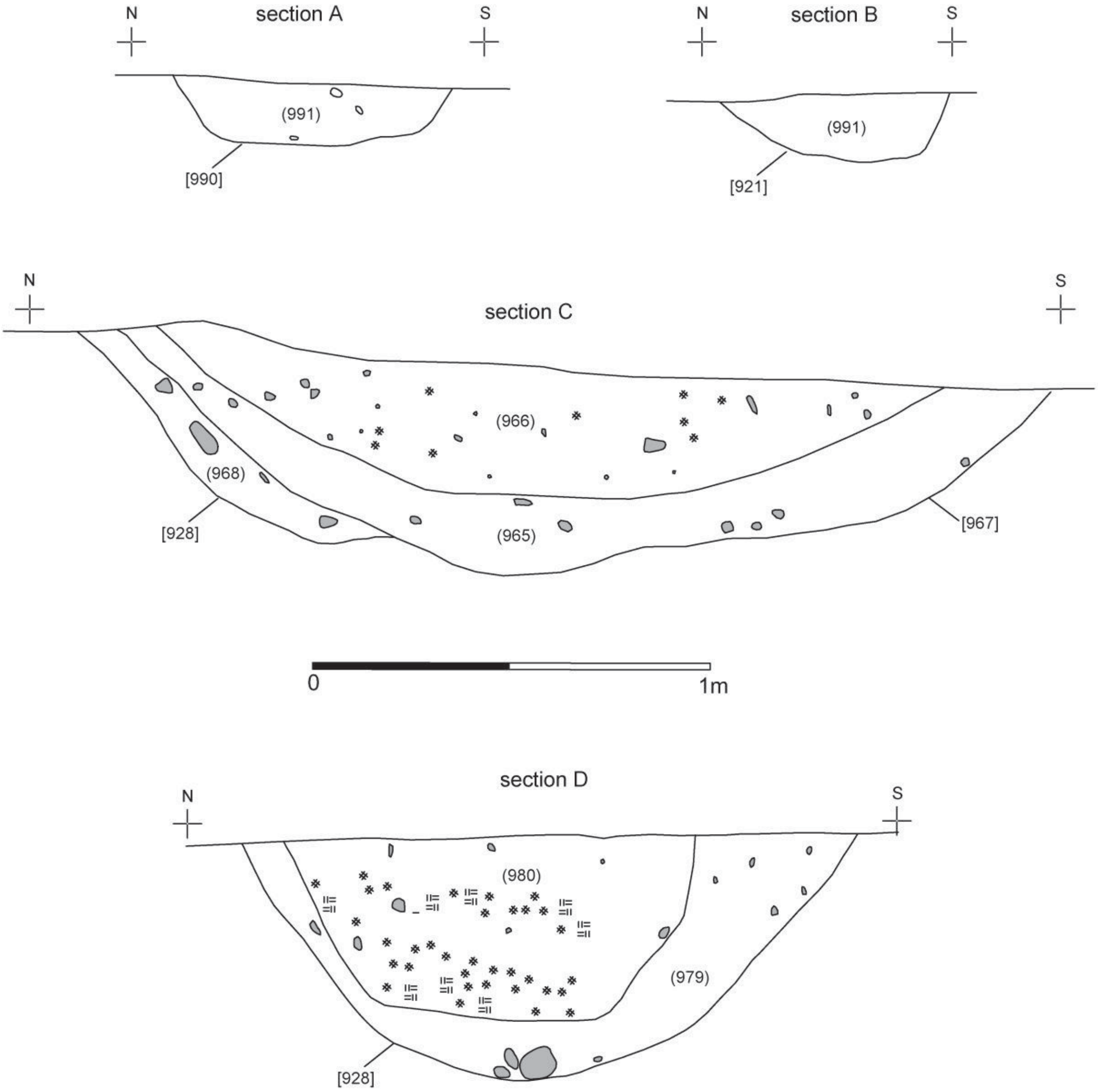


Figure 53: Area 3 enclosure ditch sections

Figure 54: Area 3, showing enclosure ditches [928] and [055], looking north-east

Figure 55: Area 3, in the foreground ditch [055], with the wider ditch [928] being excavated in the background. Looking west towards Area 1, 500m beyond the hedge

Within the south-west corner of the enclosure was a group of undated pits, located close to the ditch. Fire-cracked pebbles and charcoal flecks were present within the pits and the enclosure ditch itself. Pit [934] was different from the other sub-circular or ovoid pits within the area, being sub-rectangular in form, with vertical sides and a flat base, 1.85m in length, 1.2m wide and 0.15m deep. It contained small fire-cracked pebbles and small charcoal fragments throughout within a very dark grey, silt-clay. The excavated sections of the enclosure ditch also contained similar burnt deposits in the lower primary fill. Feature [941] was a large, heavily waterlogged, sub-rectangular feature containing mid grey-brown silty-clay.

Elsewhere, adjacent to ditch [055], were scattered pits, most containing a few sherds of mid to late Iron Age pottery sherds. Within a large pit [988], 15 sherds of Bronze Age pottery were recovered.

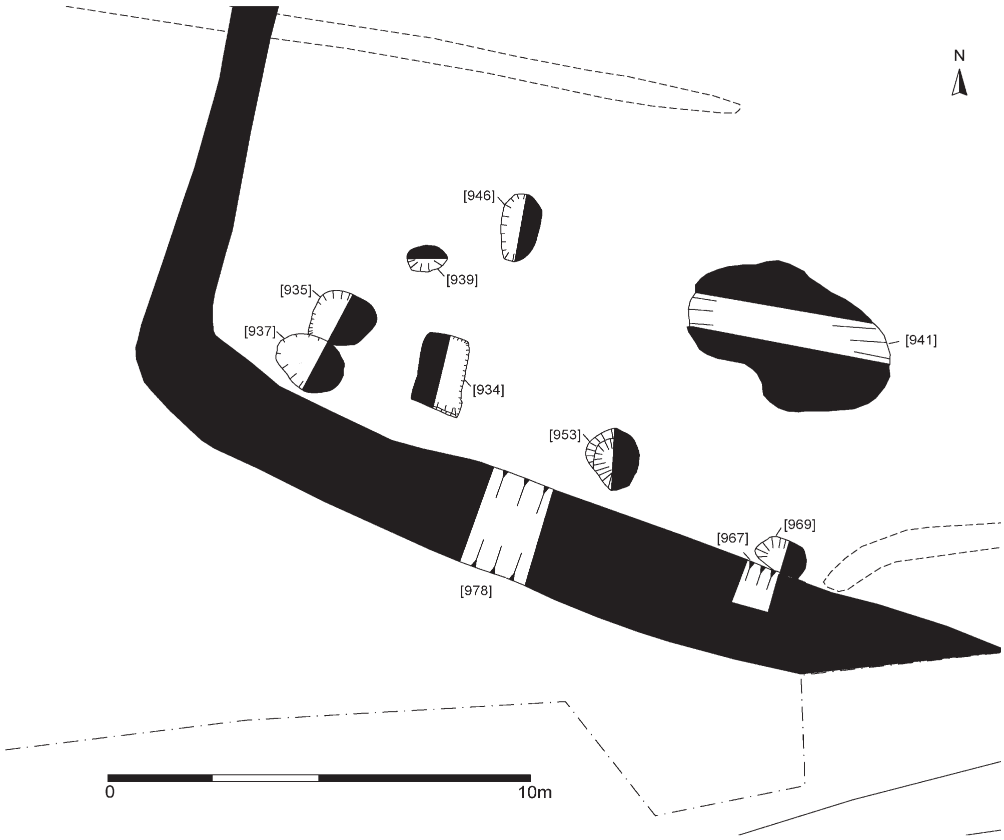


Figure 56: Area 3, pits within the south-west corner of enclosure

The ditch [055] likely represents a major landscape feature, its alignment with the northern edge of Enclosure I in Area 1 suggesting that both areas were tied into the same field system. The earlier phase A ditches may represent livestock management control (droveways?). This was subsequently replaced by a large rectangular ditched enclosure (phase B). The only features within the enclosure were pits located in the corner and edges. However, due to difficult excavation conditions and thin topsoil, it is possible that more discrete archaeological features such as a roundhouse or post-holes may not have survived. The enclosure had a single narrow entrance, facing south-east and downhill towards Area 1. It is quite possible this enclosure was used for livestock, as the lack of larger numbers of pits and few finds from the enclosure ditches, indicate this may not have been a domestic settlement like that seen in Area 1. It is likely that both enclosures were part of the same settlement, this area being part of the managed farmland.

The Neolithic and Bronze Age Pottery Patrick Marsden

Introduction

Bronze Age pottery (317 sherds weighing 3314g) was recovered during the excavations. In addition, nine sherds of Neolithic Peterborough Ware weighing 34g were residual in an Iron Age deposit (672 in Group 14). Most of the Bronze Age pottery is from Group 10 and originates from Collared Urns.

Fabrics

The pottery was examined using a x10 binocular microscope and allocated fabric groups based on the dominant type of inclusion and to a fabric type within each group. This followed established guidelines for fabric analysis (Prehistoric Ceramics Research Group 1997). Fabrics were analysed using the system designed by Dr Ann Woodward to characterise all known Middle Bronze Age pottery in southern England (Ellison 1975). Codes were then allocated to types and groups alphanumerically.

Table 2: The grading system abbreviations

(1) Density of surface (sparse):	1. <5 fragments/cm2 2. 5-10 fragments/cm2 of surface (medium) 3. >10 fragments/cm2 of surface (dense)
(2) Fragment size:	S <0.5 mm diameter (small) M 0.5-1.00 mm diameter (medium) L >1.00mm diameter (large)
(3) Filler type:	Sh shell Fl flint Qu quartz Qt quartzite Ro rock Sa quartz sand Gr grog

A total of five groups was identified with eight fabric types within these groups. The only non-Bronze Age fabric is Fl2 (Peterborough Ware from context 672 in Group 14).

Brief descriptions follow:

Shell
Sh 1 3 M-L Sh ; 3 S Sa
Voids formerly containing shell in sandy fabric.
Sh 2 3 M-L Sh
Voids formerly containing shell.

Grog
Gr 1 1 L Gr ; 3 S Sa ; 3 M-L Sh
Grog in a sandy and shelly fabric.
Gr 2 1 L Gr ; 1 L Qu ; 3 S Sa ; 3 S Sh
Grog and quartz in a sandy and shelly fabric.

Flint
Fl 1 1 L Fl (pebble, poor quality) ; 1 L Qu ; 1 L Ro (different types) ; 3 S Sa ; 3 M-L Sh
Large flint and less common large quartz and rock inclusions in a sandy and shelly fabric.
Fl 2 1 L Fl (probably pebble, up to 4mm) ; 3 S Sa ; 3 M Sh

Large flint inclusions in a sandy and shelly fabric. Peterborough Ware vessel.

Quartz
Qu 1 1 L Qu and Qt ; 3 S Sa ; 3 M-L Sh
Large quartz and quartzite inclusions in a sandy and shelly fabric.

Sandy
Sa 1 3 S Sa

Table 3: Neolithic and Bronze Age fabric group totals – sherd number and weight (g)

Fabric	Sherd no.	Weight (g)
Shell		
Sh 1	89	863
Sh 2	2	22
Flint		
Fl 1	121	1306
Fl 2	9	34
Grog		
G 1	49	701
G 2	1	7
Quartz		
Qu 1	54	408
Sandy		
Sa 1	1	7
TOTAL	326	3348

Discussion of the Fabrics

These generally appear to be characteristic of fabrics associated with Collared Urns, which typically vary considerably in quality from fine to coarse (Gibson 2002, 99). Some of the fabrics, such as those that are grog-tempered, are reasonably fine whilst others, like fabric Fl 1, are much coarser. The inclusions suggest a local source for some of the fabrics. However, it should be noted that types from two Collared Urns, Sh 1 from the fig. 31 no.6 vessel and Gr 1 from another urn, could be of non-local origin according to chemical analysis (see Vince below). This suggests a possible source for the clay and shell temper as the Trent Valley or Yorkshire Wolds. If so this would be a rare example of long-distance ceramic exchange during the earlier part of the Bronze Age and imply that these vessels were of considerable significance to the people who deposited them. Thin-section analysis (*ibid.*) also identified calcined bone in group Gr 2, a fabric represented by a single sherd from a pit in Area 3 (context 989). Fragments of bone are rarely found in Neolithic and Bronze Age vessels, but have been identified in a Food Vessel from Eye Kettleby, Leicestershire (Woodward and Marsden forthcoming). At least one example of a Collared Urn fabric containing what may be cremated human bone is known from Balneaves, Angus (Russell-White et al 1992, 299). Unfortunately the Hallam Fields sherd is not diagnostic of any form so it is not clear what Bronze Age vessel tradition it comes from.

Forms

The pottery is mostly Collared Urns, although a cup is also present (fig.57.no.3). Rim forms are flattened or rounded inturned types.

Decoration

The following abbreviations were used in recording the decoration and show the range of techniques and motifs present:

Technique:
FN fingernail impression
FT fingertip impression
IMP impression of uncertain origin
TC twisted cord
WC whipped cord
CO comb impressions
INC incised

Motifs:
EL encircling lines
FT filled triangle
CO column
DL diagonal lines

The decoration is located on the rim/collar externally, rim lip and just below the collar. Some vessels also display decoration on the internal surface of the rim (Figure 57 no.1 and FSN 7 (not drawn)).

Discussion

A total of 233 sherds of Bronze Age pottery weighing 2937g came from Group 10. Fragments of around eight urns, probably all Collared Urns, were present in contexts 643 and 645 from the fills of two pits (642 and 644). These include rim, collar and upper body fragments as well as a base. The Collared Urns mainly display traits relating to the later end of the Collared Urn tradition, if the modification and extension of the criteria of Longworth (1984) proposed by Burgess (1986) are accepted, broadly corresponding to Longworth's Secondary series.

A considerable number of sherds were recovered from a Collared Urn in context 643 and a number of other contexts (no.6). Further reasonably-sized rim and collar sherds come from two other urns (nos.5 and 7). These three vessels would appear to show a lack of Burgess's early traits, such as internal decoration below the rim. They conform to some of the later criteria by having no decoration under the collar, apart from finger impressions just beneath it, as well as a lack of necks or shoulders (bipartite). However, one vessel (no.7) displays possible whipped cord decoration, which is characteristic of earlier vessels. A thinner-walled Collared Urn (no.2) is also present amongst the Group 10 material. This displays twisted cord decoration in geometric motifs, perhaps suggesting a later date. Three other Collared Urns are represented by more fragmentary rim and collar sherds (nos.1 and 8 and FSN 7 (not drawn)). These all display rather crude impressions of uncertain origin on the outer rim and collar, but it is not clear whether these are whipped cord or not. Otherwise the vessel forms appear to be bipartite, like the other urns. However, all this reflects the problems of applying Longworth's criteria to date Collared Urns and considerable overlap is likely between many of the proposed datable traits. A base (no.4) is probably also from a Collared Urn, although it could be from an urn of the Deverel-Rimbury tradition. Another type of vessel, a cup from Group 10 (no.3), may be of a similar date to the Collared Urns.

Collared Urns have been found locally at Cossington, nearby to the north-east (Allen 2008), as well as at Sproxton (Clay 1981), Shipley Hill (Beamish 1991) and elsewhere in Leicestershire (Powell 1950). However, these offer no close parallels with the Birstall vessels. Collared Urns have typically been found in a more complete state and tend to be associated with cremations. However, the fragmentary nature of the material from Hallam Fields is probably largely due to Iron Age and modern disturbance and it cannot be ruled out that the pit was all that remained of a Bronze Age barrow, although no cremated bone was recovered. It should also be mentioned however that these vessels are known from domestic deposits in East Anglia (Gibson 2002: 96) and this possibility should not be discounted, as such vessels probably had a variety of uses in addition to functioning as cremation urns. However, the flint artefacts from the fills may add weight to the argument that a greater importance was connected to the pits (see Excavation Results above). In addition, the identification of some vessels from Hallam Fields with a possible source as far away as the Trent Valley or Yorkshire Wolds suggests that significance was attached to them and an association with burial practices or ritual activity seems likely.

Table 4: Catalogue of illustrations and featured sherds from Bronze Age pits (Group 10; Fig 57)

Illustration	Featured sherd no.	Description
1	1	Part collar and rim, rounded inturned. Decoration: impressions of unknown origin on rim and collar, opposing fingernail impressions on rim lip and encircling lines of fingernail impressions on rim internally. Abraded externally and internally. Fabric Fl 1. Collared Urn. Context 643 (cuts 642 and 644), SF 573.
2	2	Rim, collar and part of upper body, rounded, slightly inturned rim. Decoration: twisted cord impressions in geometric motif on outside of rim and collar and twisted cord impressions in lines on internal surface of rim. Fabric Gr 1. Collared Urn. Context 643 (cuts 642 and 644), SFs 612 and 618.
3	3	Rim and part of upper body, rounded slightly inturned. Fabric Fl 1. Cup. Context 643 (cuts 642 and 644), SF 620.
4	4	Base and part lower body. Fabric Fl 1. Collared Urn or possible Deverel-Rimbury urn. Contexts 643 and 645 (cuts 642 and 644), SFs 621, 622, 674, 566 and 595.
5	6	Collar and rim, flattened inturned. Decoration: fingernail impressions in filled triangles on collar and rim, impressions (possibly fingertip) just below collar and encircling lines of fingernail impressions on rim lip. Fabric Gr 1. Collared Urn. Context 643 (cuts 642 and 644), SF 632.
Not illustrated	7	Part of collar and rim, possibly rounded inturned. Decoration: impressions of uncertain origin on rim, opposing fingernail impressions on rim lip and encircling lines of fingernail impressions on rim internally. Fabric Sh 2. Collared Urn. Context 643 (cuts 642 and 644), SF633.
6	10	Collar, rim and upper body, rim flattened, slightly expanded internally and inturned. Decoration: abundant fingernail impressions in rough diagonal lines on collar and rim, occasional fingertip impressions just below collar and encircling lines of fingernail impressions on rim lip. Fabric Sh 1. Collared Urn. Context 643, SF 571, sherds from urn also in contexts 611, 645, 689, 690 and 691 (cuts 642 and 644).
7	8	Collar, rim and part upper body, flattened inturned rim. Decoration: fingernail impressions and uncertain impressions (possibly whipped cord) in columns on rim and collar, occasional fingertip impressions just below collar and encircling lines of fingernail impressions on

		rim lip. Fabric Gr 1. Collared Urn. Context 645 (cut 644), SF601.
8	5	Collar and rim, flattened inturned. Decoration: impressions of uncertain origin on collar and rim, impression (possibly fingertip) just below collar and encircling lines of fingernail impressions on rim lip. Fabric Sh 2. Collared Urn. Context 645 (cut 644), SF 589.

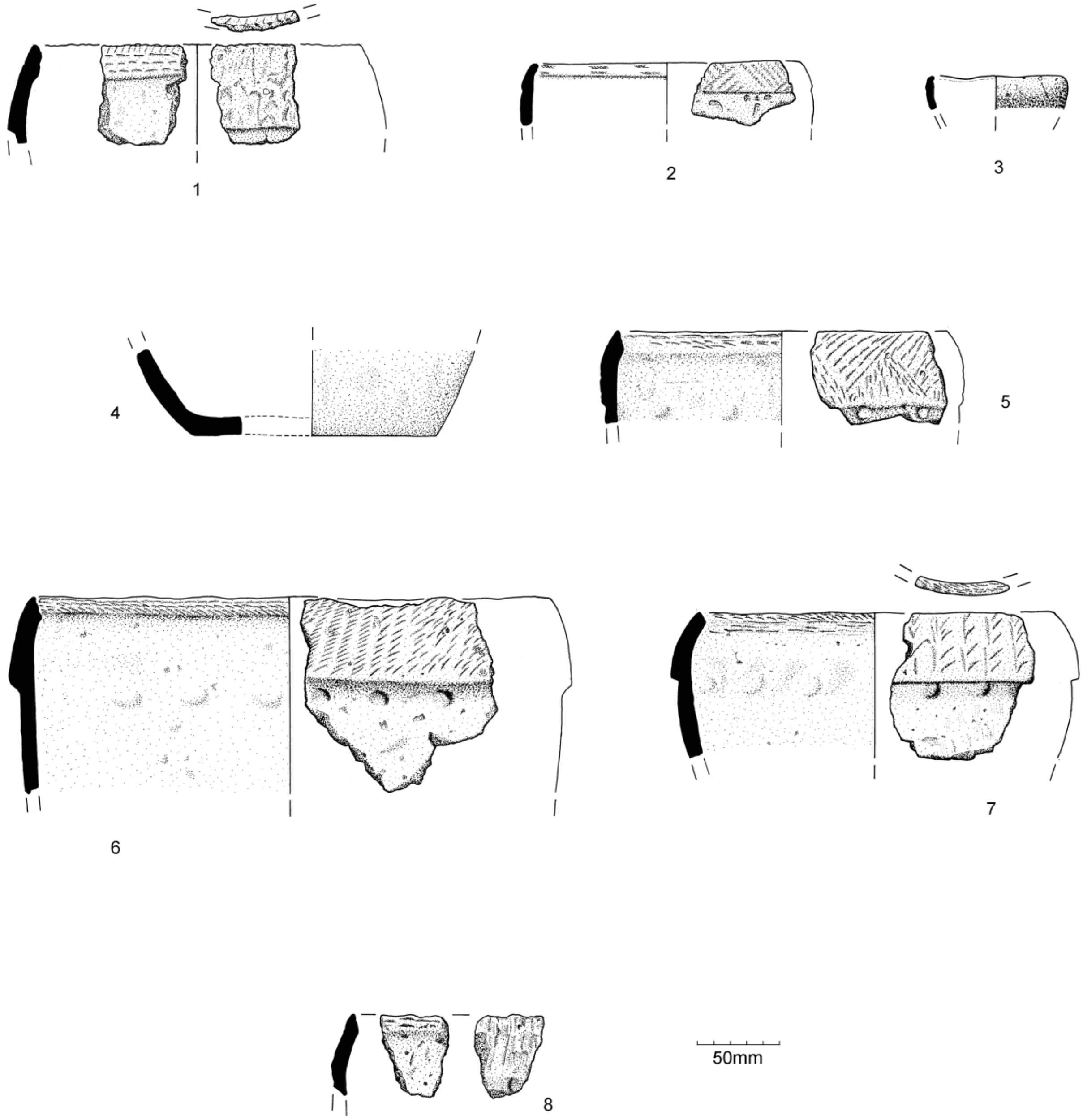


Figure 57: Illustrations of the Bronze Age pottery vessels

The Iron Age Pottery Patrick Marsden

Introduction

A total of 3358 Iron Age sherds was recovered weighing 62,628g. These are of a mid to late Iron Age and late Iron Age date. Most of these were from various groups, mainly pits (1-8, 10-18, 20 and 22) and enclosures (I and I B, II and II B and III; see Table 6).

Methodology

The material was examined and recorded according to the guidelines for the analysis of later prehistoric pottery (Prehistoric Ceramics Research Group 1997). The fabric groups mainly follow the University of Leicester Archaeological Services fabric series for late Bronze Age and Iron Age pottery (see below Fabrics, with the exception of the grog-tempered fabrics G1 - code specific to this site). Forms, decoration and surface treatment were recorded using guidelines for the recording of later prehistoric pottery from the East Midlands (Knight 1998). Codes or abbreviations used mainly follow these guidelines. The information was inputted onto Excel spreadsheets then to ArcGIS.

Fabrics

Sandy	
Q1	*Quartz sand* common to abundant sub-rounded to rounded quartz sand (0.25-1mm).
Quartz	
Q4	*sandy fabric with quartz* common to abundant sub-rounded to rounded quartz sand (0.25-1mm) and rare to sparse sub-angular quartz (0.5-4mm).
Q5	*quartz* rare to moderate sub-angular quartz (0.5-4mm) and rare to sparse sub-rounded to rounded quartz sand (0.25-1mm). Note: Q4 and Q5 similar to R2 and R1 respectively but with the larger inclusions being quartz instead of granitic rock.
Granitic rock	
R1	*granitic rock* rare to moderate sub-angular granitic rock (0.5-4mm) and rare to sparse sub-rounded to rounded quartz sand (0.25-1mm).
R2	*sandy fabric with granitic rock* common to abundant sub-rounded to rounded quartz sand (0.25-1mm) and rare to sparse mostly sub-angular (occasionally angular and sub-rounded) granitic rock inclusions (0.5-4mm).
Shelly	
S1	*shell* moderate to very common shell or platey voids (1-5mm).
S2	*sandy fabric with shell* same as S1 but common to very common sub-rounded to rounded quartz sand (0.25-1mm).
Grog-tempered	
G1	*grog, sand and shell* sparse sub-rounded grog (1-2mm), common sub-rounded to sub-angular quartz sand (0.25-1mm) and sparse voids (formerly shell, 1-3mm).

Table 5: Descriptions of fabrics

Fabric	Sherd no.	Weight (g)
Granitic rock		
R1	101	1434
R2	2832	53855
Sandy		
Q1	300	5969
Quartz		
Q4	7	30

Q5	2	17
Shell		
S1	60	416
S2	54	859
Grog		
G1	2	48
TOTAL	3358	62628

Table 6: Iron Age pottery fabric group totals - sherd number and weight (g)

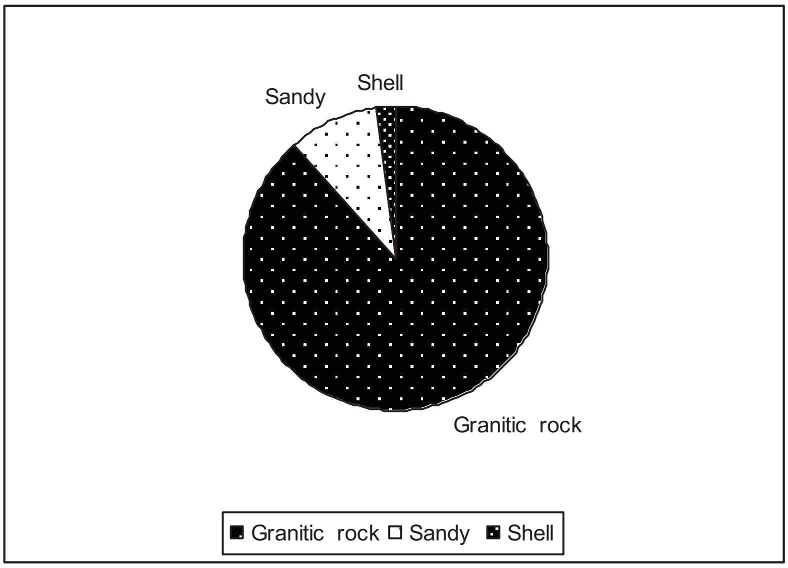


Figure 58: Pie-chart showing fabric group weight percentages
(Quartz and Grog-tempered groups omitted as too small)

The percentages of the main fabrics groups by weight are: Granitic 88.2%, Sandy 9.5% and Shell 2.0% (see Table 6 and Figure 58). The fabric proportions in general are broadly similar to other sites in the Soar Valley, such as Wanlip nearby to the north (Marsden 1998, 46). The rocks in the massively dominant granitic fabrics are likely to be granodiorites from the Mountsorrel area (see also Petrological and Chemical Analysis report by Alan Vince). These outcrops are located only *c*.5 km to the north-west. Thus the granitic pottery production can be described as local, taking place at or near the site itself, perhaps using rocks collected from closer to the Mountsorrel outcrop to the north-west. Another option involves relatively local production around 5km away in the Mountsorrel area itself and the importation of this pottery to the site. Such granitic inclusions are particularly common in Scored Ware fabrics from Leicestershire although they are also recorded in Iron Age pottery elsewhere in the region (Knight *et al* 2003).

The sandy fabric group may also reflect local pottery production. However, at least some of the shell-tempered pottery could be of non-local origin. Chemical analysis was undertaken of two samples from group S1 (see Petrological and Chemical Analysis report). As is the case with the Bronze Age samples (see Discussion of the fabrics above in The Neolithic and Bronze Age Pottery) this indicates that one possible source for the clay and temper is boulder clay derived from erosion of Jurassic clays in the Trent Valley or Yorkshire Wolds. If this is the case, it would represent a rare identified example of non-local ceramic exchange in the Iron Age period.

Forms

Vessel forms are mostly commonly ovoid jars and bowls, with much smaller quantities of ellipsoid, round-shouldered and carinated vessels. These forms are typical of those found amongst Scored ware groups in the East Midlands (Knight 2002, 134-135).

Abbreviations:
OV : ovoid
ELL : ellipsoid
RS : round-shouldered
CAR : carinated

Table 7: Vessel forms abbreviations

Rim forms

Most common rim forms are the plain or simple, usually upright or inturned, types (RD and FD) and everted (EVR and EVF). Variations on these (e.g. RRE, FEE, EVRRE, EVFEE and TD) are also present. Rarer rim forms include the hooked form (HKR, no.19) and GRL.

RD	plain rounded, typically upright or inturned rim (rounded direct)
RRE	rounded, typically upright or inturned rim, rounded externally
RPE	rounded, typically upright or inturned rim, pinched out externally
FD	plain flattened, typically upright or inturned, rim (flattened direct)
FE	flattened, typically upright or inturned, rim, slightly expanded internally and externally
FEE	flattened, typically upright or inturned rim, slightly expanded externally
TD	tapered, typically upright or inturned, rim (tapered direct)
EVR	everted rounded
EVRRE	everted rounded, rounded externally
EVF	everted flattened
EVFE	everted flattened, expanded internally and externally
EVFEE	everted flattened, expanded externally
EVFPE	everted flattened, pinched out externally
EVFRE	everted flattened, rounded externally
HKR	hooked rim with rounded lip
GRL	groove running round centre of lip

Table 8: Rim form abbreviations

Base forms

These are mainly flat (FLT) or flat and pinched out at the circumference (FLP). Only one vessel shows any deviation from this with a slightly domed form (DOM, no.18).

Other form sherds

Two handles are represented, both from Group 5 (nos. 2 and 4), although not enough of the vessel survives to associate this with any vessel form type. Fragments of at least two lids are also present. In addition, part of the base of two possible strainers, both in Q1 fabric, came from Enclosure I, 14 (no. 27) and Enclosure II B, 8.

Scoring

37.6% by weight of the Iron Age pottery is scored. The scoring present consists of deep scoring (SCR), finely scratched lines (SCRA) and light brushing (BRL), these types having been used either exclusively on individual vessels or else in various combinations.

Decoration

This is almost entirely restricted to simple fingertip (FT) or fingernail (FN) impressions on the rim lip of a number of vessels, which is typical of Scored ware pottery. Impressions of uncertain origin are also present on the rim lip of a small number of vessels (e.g.no.20) and incised diagonal lines on the lip of a single vessel in Group 12 (context 710). One vessel displays incised geometric decoration and grooves, which may be of a late Iron Age date (e.g. no.14).

Ceramic styles and affinities

Almost all of the Iron Age pottery belongs to the Scored Ware tradition of the middle to late Iron Age, dating from the 5th or 4th century BC to the 1st century AD. This type of pottery has been described by Elsdon (1992b) and was produced during Knight's earlier La Tène ceramic phase for the East Midlands (Knight 2002, 133-135). The vessel, rim and base forms and scoring represented amongst the Hallam Fields group are all typical of Scored Ware pottery and its broad date range. Parallels for larger middle to late Iron Age Leicestershire assemblages include Elms Farm and Manor Farm, Humberstone, Leicester (Marsden 2000 and forthcoming) and Enderby (Elsdon 1992a). The assemblage from Wanlip, located very close by, also belongs to the middle Iron Age (Marsden 1998), although C14 dating evidence suggests that it could be slightly earlier than the Hallam Fields group and date to *c*. 450-350 BC. The proportion of scoring at Wanlip is 36.6%, a figure which closely matches the 37.6% at Hallam Fields. This may reflect the degree of the utilisation of the scoring technique in this part of Leicestershire in the middle Iron Age. An ovoid scored vessel from Hallam Fields (no.34, Figure 62) is extremely similar to one from Manor Farm, Humberstone (Marsden 2008 fig.16 no.4). This could suggest common use of a pottery maker and trading connections for this ceramic material. A possibility might be that such vessels were manufactured in the Mountsorrel area and then transported to various settlements along the Soar Valley, although this is difficult to prove without further research into clay and inclusion sources.

As well as the less closely datable Scored Ware material, a small number of vessels were found which are probably of a late Iron Age on the basis of their fineness, form and/or surface treatment. These are probably from mainly wheel-made „Belgic type' vessels displaying the influence of the Aylesford-Swarling tradition of south-eastern England (Birchall 1965), with a likely date range of late 1st century BC to mid-1st century AD. They include a round-shouldered or carinated vessel, possibly a bowl, with a small everted rounded rim in an Q1 fabric (no. 33, Figure 62) and a burnished vessel with flattened upright in Fabric R2 (no.31, Figure 62). A small weak-necked bowl or jar with everted rounded rim in R2 fabric (no.32, Figure 62) is also characteristic of this pottery, which may be later, although it is irregular in appearance and somewhat poorly made. Necked bowls in sandy and mixed gritted fabrics are known from the West Bridge area of Leicester (Pollard 1994, Site 2, Phase 1 Fig. 52. 41-43 and 46). Two further examples (not illustrated) include a lid and burnished everted rim (458, Group 11 and 471 Enclosure I respectively). These are in a mixed grog-tempered fabric (G1), which also contains quartz sand and shell. Such mixed fabrics often with only sparse grog has been found in Leicester associated with „Belgic' styles (*ibid.* 1994 114, MG1-2). A further highly burnished body sherd in Q1 fabric from another fine vessel was produced by Group 12 (context 813). In addition to the likely „Belgic type' pottery described above, sherds from another vessel are present, which also came from Group 12 (no.14, Figure 60). This is in fabric Q1 and displays geometric decoration consisting of incised diagonal intersecting lines and horizontal grooves. This decoration is unusual amongst Iron Age pottery in Leicestershire and it is possible this belongs to, or is at least influenced by, the La Tène tradition. A later Iron Age date is suggested, perhaps in the 2nd or 1st century BC. A probable La Tène sherd with curvilinear decoration was also found at Manor Farm, Humberstone (Marsden 2008: fig.17 no.10). If this piece is also of the La Tène tradition it would be significant as finds of Lincolnshire and Northamptonshire La Tène decorated pottery have not previously been made in Leicestershire (Knight 2002, fig.12.5).

Evidence of use

Carbonised residues indicating use for cooking purposes are found on various vessels. Typically this is located externally and on the upper body, in the rim and shoulder areas. Internal residues are also found on some vessels, on both the upper and lower body. Limescale, presumably evidence of boiling, is much rarer and is usually internal.

Mending holes
A single sherd from a scored vessel displays a perforation made after firing, which is a probable mending hole (no.12, Figure 60). Mending holes are rare amongst Scored Wares and this vessel must have had some significance to its owner for it to warrant repair.

Major pottery concentrations

Group 1 (roundhouse in centre of Enclosure I - earliest phase penannular gully) 289 sherds weighing 6394g. C14 date from context 292 of 410-200 cal BC
Most of the pottery from this group came from context 5 (cut [10]) in the eastern terminal of the structure (214 sherds weighing 5499g). This mainly consists of a large ovoid scored vessel (no.1, Figure 59). The significance of the group is discussed below (see Spatial trends and Local and regional context).

Group 5 (pits within south-west corner of Enclosure I) 155 sherds weighing 2232g
This pottery includes a handle from context 69 (no.2, Figure 59). Further ceramics from the group include rim and upper body sherds from context 141 (no.3, Figure 59; Figure 60) and another handle from context 142 (no.4, Figure 59). Both of these came from cut 140. It is noteworthy that the only two handles from the excavations were recovered from this group. This may indicate a specific function, presumably associated with food preparation, in this area of the site.

Group 6 (pits between the roundhouse and the gully in the south-west corner of Enclosure I) 74 sherds weighing 1498g
Two vessels from these pits are illustrated: an ellipsoid scored vessel (no.5, Figure 59) and another with a flattened, slightly in-turned rim (no.6, Figure 59). Both came from context 531 (cut [534]), which produced most of the pottery from the group (32 sherds weighing 1001g).

Group 11 (features within Enclosure IIB). 102 sherds weighing 2791g. C14 date from context 525 of 390-160 cal BC
This group, along with the material from Enclosure II B itself, made up a significant spatial group at the site (see also Spatial trends below). The largest group of pottery was contained in fill 525 (Pit [524], 32 sherds weighing 1142g). Two scored vessels (nos. 7 and 9, Figure 59) and upper body and base sherds from an ovoid vessel (no.8, Figure 59) came from this context. These represent a range of different vessel sizes, perhaps a „vessel set', and this may be an example of deliberate selection of material for deposition, as was suggested at Wanlip (Marsden 1998, 54). Context 615 (Gully [614]) contained 12 sherds weighing 551g from the same ovoid vessel (no.10, Figure 60). In addition, a lid in fabric G1 from context 458 (possible tree-throw 467) is likely to be „Belgic type' and late Iron Age in date (see also Ceramic styles and affinities above).

Group 12 (group of intercutting pits in south-east area of Enclosure II) 494 sherds weighing 8984g
These pits produced the largest group from the site, constituting 14.3% of the Iron Age pottery. The largest amounts came from two pits: 629 (Pit [628]) 279 sherds weighing 4768g and 710 (Pit [709]) 109 sherds weighing 2154g. Three scored vessels from context 629 [628] are illustrated (nos. 11-13, Figure 60), including a sherd from one with a probable mending hole (no.12, Figure 60). Large sherds, including a profile from a scored ovoid jar, were also present in context 748 ([747], no.15, Figure 61). Context 823 [822] contained part of a vessel with impressed decoration executed with a tool of uncertain origin on the rim lip (no.16, Figure 61). This type of decoration is not common amongst Scored Wares, with fingertip impressions more usually found on the rim. Fragments from two other possibly late Iron Age vessels, which have already been mentioned above (Ceramic styles and affinities), also came from Group 12. One is a sherd in a very sandy Q1 fabric, highly burnished internally and externally, from a thin-walled vessel (8130, [814] and possibly „Belgic type'. The other vessel, featuring geometric decoration and possibly belonging to the La Tène tradition, came from a gully fill (745) [746], no.14, Figure 60). Along with scored pottery, a single small sherd of Roman grey ware came from fill (743) of pit [744], although no further Roman pottery was recovered and the sherd may be intrusive.

Group 14 (pits within Enclosure II) 165 sherds weighing 5443g
Most of the pottery from this group was recovered from one pit [679]: 104 sherds weighing 4502g mainly from fills (672) and (674). Two vessels from (672) are illustrated (nos.17 and 18, Figure 61). The ovoid jar (no.18, Figure 61), of which a substantial amount was found, displays a hooked inturned rim form not commonly found amongst Scored Wares and a domed base.

Group 15 (pit spread/alignment to the west of Enclosures I and II) 84 sherds weighing 1203g
Pit 104 contained the complete profile from an ovoid bowl (no.19, Figure 61).

Group 17 (small group of pits and post-holes south-east of Enclosure III) 229 sherds weighing 4442g
Group 17 includes two post pits which contained considerable quantities of ceramics: (725) [724] producing 105 sherds weighing 1775g and (737) [735] 74 sherds weighing 2109g. The vessels from these two features are illustrated (nos.20 and 21, Figure 61). In addition, quern fragments and charred plant remains from the two pits may suggest „structured deposition' (see Excavation results elsewhere). Meanwhile another post-hole [783] contained sherds from a small ovoid jar (no.22, Figure 61).

Group 18 (pits and features around the outside of the north-east corner of Enclosure II) 179 sherds weighing 4525g. C14 date from context 808 of 400-200 cal BC
Most of the pottery in this group originates from two post pits [807] and [841]. Fill 808 [807] contained significant quantities of ceramics (101 sherds weighing 2203g). These include rim and base sherds from a number of vessels and the complete profile of an ovoid wide-mouthed jar (no.23, Figure 61). Saddle quern fragments and pieces of worked flint were also recovered from this fill, perhaps pointing toward deliberate „structured deposition'. Fill 843 [841] produced 70 sherds weighing 1880g. A necked vessel (no.24, Figure 61) and an ovoid bowl (no.25, Figure 61), as well as sherds from various other pots, came from this post pit.

Group 22 (scatter of features between Enclosure I and Enclosure IV) 78 sherds weighing 2322g
All the pottery from Group 22 was from an isolated pit [705], which includes a large rim and upper body sherd from an ovoid scored vessel (no.26, Figure 62).

Enclosure I 403 sherds weighing 6561g. C14 dates from context 17 of 410-230 cal BC, (659) of 390-170 cal BC and (661) of 390-170 cal BC
The pottery was relatively evenly spread over the ditch sections, although a larger concentration occurred in (503) (77 sherds weighing 1112g). Fragments of the base of a possible strainer came from (14) (no.27, Figure 62) and sherds of an ovoid jar in a shell-tempered fabric (S2) from (661) (no.29, Figure 62). Meanwhile (484) produced part of the upper body and rim of an unusually thick-walled vessel, so thick it is reminiscent of tile, in a granitic-tempered fabric (R2) (no.28, Figure 62). In addition, as discussed above (Ceramic styles and affinities), a burnished vessel with an everted rim in a mixed grog-tempered fabric (G1) is likely to be „Belgic type' and later Iron Age (471).

Enclosure I B 117 sherds weighing 3045g
An ovoid vessel came from fill 1 (no.30, Figure 62) with this context also producing two very abraded sherds of Roman oxidised ware. In addition, a late Iron Age „transitional' vessel was recovered from gully (182),[181], (no.31, Figure 62), together with a single sherd of Roman white ware. This Roman pottery from Enclosure I B could be intrusive, especially given its small and abraded nature. It could also represent material that entered the enclosure ditch, which was still open during the subsequent early Roman period.

Enclosure II B 181 sherds weighing 2829g
A base sherd with an incomplete perforation, possibly from a strainer, came from (8). In addition, a probable „Belgic type' necked bowl or jar originates from (515) (no.32, Figure 62). A number of features within the enclosure also produced significant quantities of pottery (see Group 11).

Table 9: Pottery totals shown by groups

Group / Enclosure	Sherd number	Weight (g)	Average sherd weight (g)	EVE total	Group / Enclosure	Sherd number	Weight (g)	Average sherd weight (g)	EVE total
1	289	6394	22.1	0.74	15	84	1203	14.3	0.37
2	43	257	6.0	-	16	6	68	11.3	-
3	15	148	9.9	-	17	229	4442	19.4	1.47
4	51	640	12.5	-	18	78	2322	29.8	1.54
5	155	2232	14.4	0.48	19	-	-	-	-
6	74	1498	20.2	0.28	20	2	66	33.0	-
7	96	1430	14.9	0.07	21	-	-	-	-
8	22	371	16.9	-	22	7	431	61.6	0.13
9	-	-	-	-	Enclosure I	403	6561	16.3	0.74
10	3	28	9.3	-	Enclosure I B	117	3045	26.0	0.45
11	102	2791	27.4	0.66	Enclosure I I	144	2357	16.4	-
12	595	11, 187	18.8	3.28	Enclosure I I B	181	2829	15.6	0.23
13	90	954	10.6	0.10	Enclosure I I I	83	1136	13.7	-
14	165	5443	33.0	0.82	Other areas, ungrouped and unstratified	324	4795	14.8	0.88
					Site Total	3358	62628	18.7	12.24

Spatial trends

Spatial analysis, which was undertaken on the pottery from the site, showed some patterns. Generally there was a noticeable clustering of pottery groups of various sizes around the „middle' of the site, from the pits of Group 12, and from Enclosure II B and the features within it (Group 11). This indicates a focus of deposition and activity in this area around the south of Enclosure II. However, it should also be noted that clustering of larger pottery groups from pit features also occurred in the northern part of the site (Groups 14, 17 and 18) as well as in other areas, such as the south-west of Enclosure I (Group 5). The eastern or „left-hand' concentration in the roundhouse gully (Group 1) within Enclosure I was also clearly shown and is further discussed below (see Local and regional context).

Local and regional context

The Birstall Iron Age pottery is a large assemblage by local and regional standards, with a large number of form sherds surviving and a number of profiles present. The average sherd size for the site is high (average sherd weight of 18.7g) and most contexts contained fresh and unabraded material. The total of 3358 sherds weighing 62,628g compares well with larger assemblages of middle to late Iron Age date from Leicester or its vicinity. Elms Farm, Humberstone produced 6709 sherds weighing 66,579g and the adjacent Manor Farm excavations 5651 sherds weighing 77,047g (Marsden 2000 and forthcoming), while Grove Farm, Enderby yielded 1925 sherds weighing 35,180g (Elsdon 1992a). All of these sites included smaller quantities of probable „Belgic type' pottery in addition to the Scored Wares. Further afield the late Iron Age site at Weekley in Northamptonshire (Jackson and Dix 1986) also produced Scored Wares, Belgic-style wares and La Tène pottery. However, Weekley produced much more significant quantities of the latter two categories than Hallam Fields group and is of a later date.

Larger concentrations of pottery from the excavations came mainly from pits (especially Groups 12, 14, 17 and 18) and the eastern terminal of the roundhouse gully in Enclosure I (Group 1). Some reasonably large groups also came from sections of the enclosure and sub-enclosure ditch fills (I, I B and II B). The substantial quantities of pottery from pits contrasts with many of the larger Leicestershire sites such as Elms Farm and Manor Farm, Humberstone (Marsden 2000 and forthcoming), where larger ceramic deposits were concentrated in the numerous roundhouse gullies found at the sites. However, examples of pits containing ceramics showing „structured deposition' are known from the middle Iron Age site at Wanlip, only *c*.1 km to the north-west (Marsden 1998, 74). At least some of the Hallam Fields pits containing larger assemblages may reflect this tradition. Like at Wanlip, the Hallam Fields pottery groups contain a range of different vessel sizes and it may be that, in at least some cases, „vessel sets' were chosen for special deposition. For instance, Pit [524] in Group 11 (nos.7-9, Figure 59) may be an example of this. However domestic discard is also a possible interpretation of these features and the deposits are not from contexts connected to burial practice, like those from the four post cremation structure, and possibly its vicinity, at Wanlip (Beamish 1998, 40). Unfortunately no other class of material was recovered in significant quantities at Hallam Fields to aid in a functional interpretation, identifying either ritual or domestic deposition. The issue is not helped by the fact that the level of bone preservation at the site was particularly poor. In some features however, other material found with the pottery, such as the quern fragments and charred plant remains in the double post pits of Groups 17 and 18, may be evidence of „structured deposition'.

The concentration of ceramic material in the roundhouse gully terminal (Group 1) can be paralleled elsewhere. Depositions in such locations have been found at a considerable number of sites. Examples have been seen at Elms Farm and Manor Farm, Humberstone (Marsden 2000 and forthcoming), Enderby, Leicestershire (Elsdon 1992a; Marsden and Morris 2004), Gamston, Nottinghamshire (Knight 1992a), Empingham, Rutland (Cooper 2000) and Crick Covert Farm, Northamptonshire (Woodward and Hughes 2007). These finds deposits may reflect „ritualized' house abandonment practice rather than „accidental' deposition (Woodward and Hughes 2007, 201 ; Weobley 2007, 139-141). The „left-hand' location of the concentration in the roundhouse gully terminal from Hallam Fields is similar to those from houses at Manor Farm, Humberstone (Marsden 2008).

Discussion of the radiocarbon dating results

The results of analysis of carbonised residues on a number of sherds estimate that Iron Age activity began 450-220 cal BC (95% probability) and ended 360-130 cal BC (95% probability; see Hamilton *et al* below). The calibrated dates for the samples from the major groups are mostly between *c*.400 and *c*.200 BC (see above Major pottery concentrations). . The middle Iron Age date range produced by the residues on the ceramics from the site roughly corresponds to the first half of the date span of the Scored Ware tradition.

Conclusion

With the considerable number of large sherds and contexts containing substantial proportions of vessels, the Hallam Fields pottery represents a significant regional assemblage of Scored Ware. As discussed above, radiocarbon dating suggests a middle Iron Age date for the majority of the activity at the site. The presence of very small quantities of probable later Iron Age pottery influenced by the Aylesford-Swarling tradition shows broad cultural links and suggests a later date for a few features. The possible La Tène vessel could also indicate broad social ties and date to the later Iron Age. Further possible long-distance trading or cultural links, in this case to the north, may be indicated by shell-tempered pottery.

The clustering of pottery deposits around the „centre' of the excavated area would seem to indicate a focal point of ceramic deposition and activity. Significant quantities of pottery from the site came from pits. While there are other interpretations, it is possible that many of these larger concentrations, in some cases containing a range of vessels, are examples of „structured deposition'. The concentration in the eastern terminal of the roundhouse gully in Enclosure I is probably an example of widespread regional traditions of ritualized house abandonment practice.

Thus the pottery reflects substantial activity and settlement dating to the middle Iron Age, with perhaps a small amount of subsequent activity in the late Iron Age. The abundant ceramics suggest that the area was an attractive location in the middle Iron Age, as was also suggested by the pottery from Wanlip close by to the north-west. The inhabitants of the Hallam Fields area were probably connected to broad cultural networks and deposited ceramics in a deliberate manner, apparently reflecting established traditions.

Catalogue of Illustrations

Figure 59:

1. Rim and body sherds, R2, large ovoid vessel with everted flattened rim, extensive scoring (BRL and some SCR) on external body and internal surface of rim, abrasion on internal and some external surfaces, (5) ,[10], Group 1.

2. Handle, R2, (69), [449], Sf 554, Group 5.

3. Rim and upper body, R2, everted flattened rim, rounded externally, fingertip and nail impressions on rim lip, (141), [140], Group 5.

4. Handle, Q1, (142), [140], Group 5.

5. Rim and body, R2, ellipsoid vessel with rounded upright rim, brushed light scoring (BRL) on upper body, carbonised residue on outside of vessel on rim and below, (531), [534], Group 6.

6. Rim and part of upper body, S1, flattened, slightly inturned rim, carbonised residue on outside of rim, (531),[534], Group 6.

7. Rim and upper body, R2, flattened, slightly expanded, inturned rim, deep mainly horizontal and diagonal scoring (SCR) on body, overfiring evident especially on outer surface, (525), [524], Group 11.

8. Rim and upper body and base, Q1, small ovoid bowl with slightly everted rounded rim and flat pinched-out base, the latter abraded on inside, (525), [524], Group 11.

9. Rim and upper body, R2, everted rounded rim, deep scoring (SCR) and carbonised residue on and below shoulder, some internal abrasion, (525), [524.

Figure 60:

10. Rim and upper body and base, Q1, ovoid vessel with everted rounded rim with external rounding, flat pinched-out base, deep scoring (SCR) on upper body, carbonised residue on outside of upper body below rim and internally on lower body, abrasion on most surfaces, (615); [614], Group 11.

11. Rim and upper body, R2, rounded, and in some places flattened, inturned rim, scored upper body (SCR and SCRA), (629), [628], Group 12.

12. Body sherd with perforation, R2, scored (SCR), (629), [628], Group 12.

13. Rim and upper body, R2, bowl with everted flattened rim with finger impressions on rim lip, very deep (SCR) and scratched (SCRA) scoring on body, (629),[628], Group 12.

14. Decorated upper body sherd or lid, Q1, incised diagonal intersecting lines and horizontal grooves, abraded outer surface, (745), [746], Group 12.

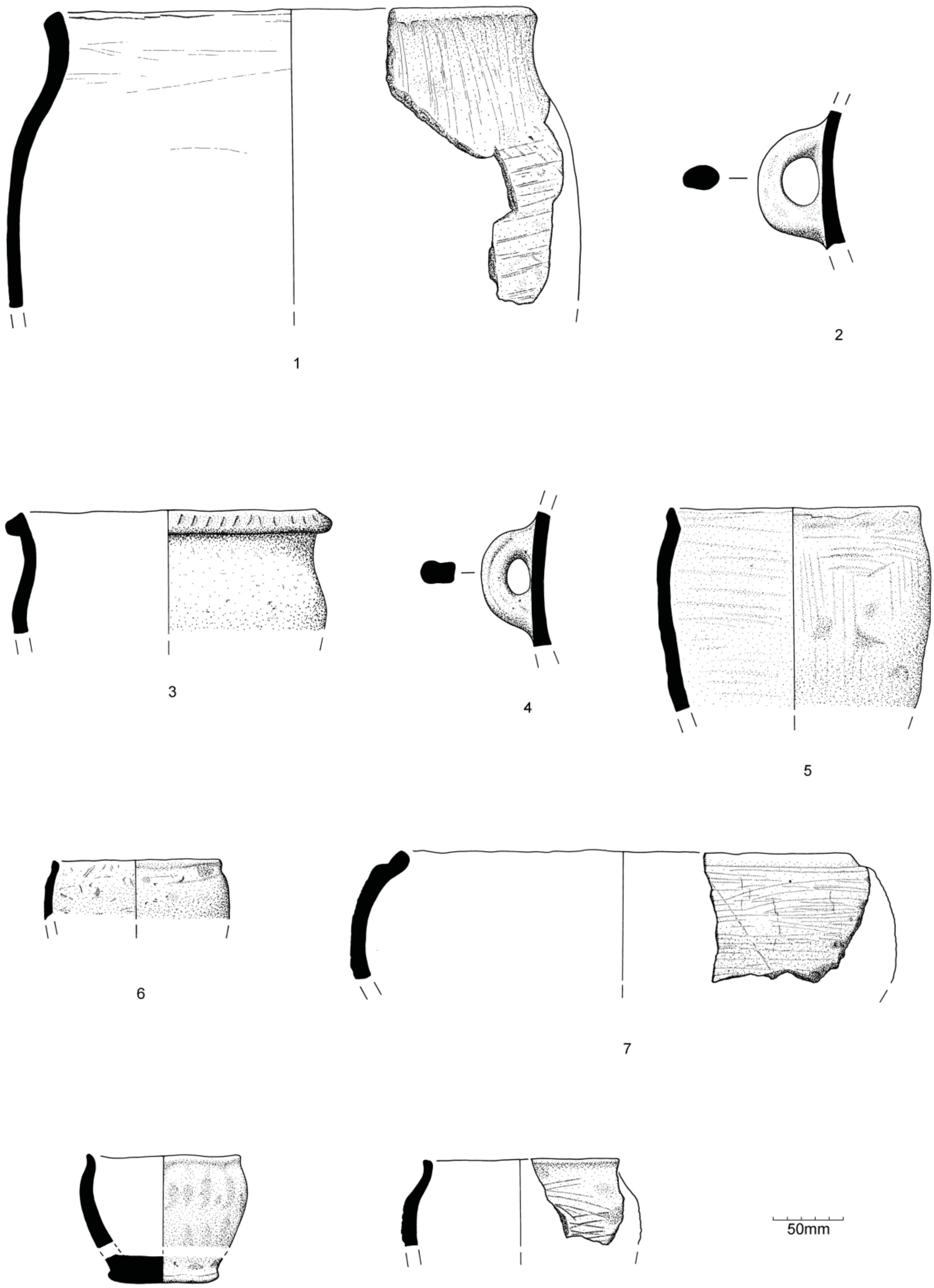


Figure 59: Illustrated Iron Age pottery vessels, nos.1 - 9

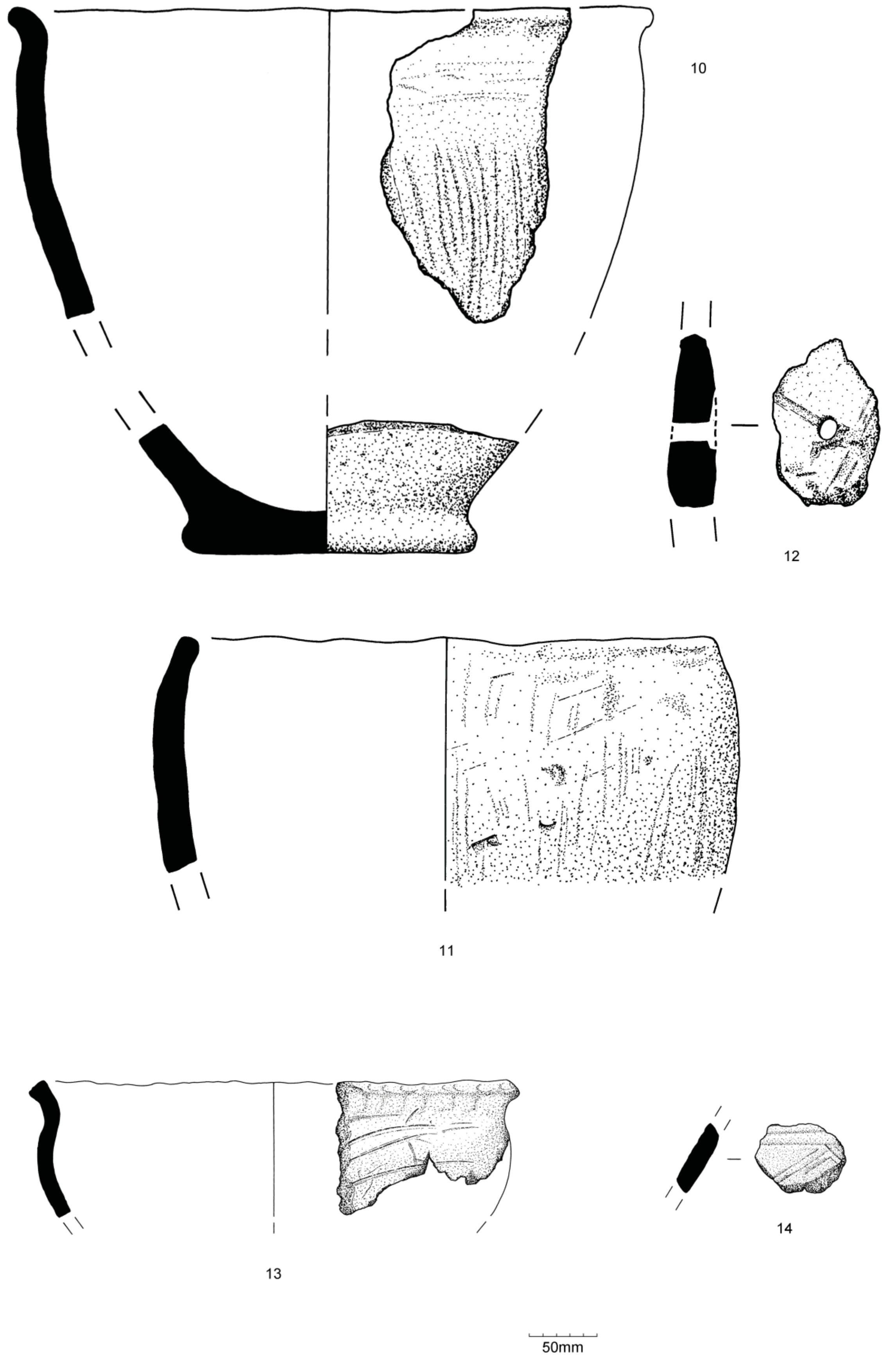


Figure 60: Illustrated Iron Age pottery vessels, nos.10-14

Figure 61:

15. Profile, Q1, ovoid jar with rounded upright rim and flat, slightly pinched-out base, deep (SCR) and scratched (SCRA) scoring on body, abrasion internally and on underside of base, (748),[747], Group 12.

16. Rim and upper body, R2, everted flattened rim with impressions of uncertain origin (possibly a bone or stick) on rim lip, (823), [822], Group 12..

17. Rim and upper body, R2, flattened slightly everted rim form, (672), [679], Group 14.

18. Profile, R2, ovoid jar with hooked and rounded inturned rim and domed base, externally burnished, carbonised residue on outside of vessel below rim, (672), [679], Group 14.

19. Profile, R2, ovoid bowl-jar with everted rounded rim and flat pinched out base, burnishing on internal and external surfaces, carbonised residue on external upper body below rim, (105);[cut 104], Group 15.

20. Rim and upper body, R2, bowl with rounded upright rim, large impressions of uncertain origin on rim lip, light brushed scoring (BRL) on upper body, (725), [724], Group 17.

21. Rim and upper body and base and part lower body, R2, ovoid necked vessel with everted flattened rim and flat pinched-out base, scoring (SCR and SCRA) on external surface, carbonised residue on external neck and shoulder, (737), [735], Group 17.

22. Rim and upper body and base, R2, small ovoid jar with everted rounded rim and flat base, very light brushing (BRL) on external surface and in a few areas internally, carbonised residues on inside and outside of rim and the internal upper body, (784), [783], Group 17.

23. Profile, R2, ovoid wide-mouthed jar with very slightly everted flattened rim and flat pinched-out base, external carbonised residue on upper body and internal lower body, abrasion on inside of vessel in base area, (808), [807], Group 18.

24. Rim and upper body, R2, necked vessel with everted rounded rim, thick carbonised residue on internal upper body and small patches on outside of vessel in rim and neck area, (843),[841], Group 18.

25. Rim and body, R2, ovoid bowl with everted rounded rim, (843), [841], Group 18.

Figure 61: Illustrated Iron Age pottery vessels, nos.15-25

Figure 62*:*

26. Rim and body, R2, ovoid vessel with everted flattened rim with finger and fingernail impressions on lip, few scored (SCR) lines on body, carbonised residue on external and internal upper body and internal surface of rim, (92), [705], Group 22.

27. Part of base, Q1, possible strainer, incomplete perforation, (14), [15], Enclosure I.

28. Rim and upper body, R2, very coarse vessel with flattened outturned rim, (484), [544], Enclosure I.

29. Rim and upper body and base and lower body, S2, ovoid jar with rounded upright rim and flattened pinched-out base, abraded on external surface, (661), [657], Enclosure I.

30. Rim and upper body, Q1, ovoid vessel with rounded inturned rim, light brushing (BRL) on external surface, carbonised residue externally below rim and internally around middle of body, (1), Enclosure IB.

31. Rim and upper body, R2, flattened upright, slightly expanded rim, burnished external and internal surfaces, (182),[181], Enclosure IB..

32. Rim and upper body, R2, bowl or jar with weak neck and everted rounded rim with external rounding, burnished external surface, abrasion on inside of vessel, carbonised residue on internal and external surface, (515), [514], Enclosure IIB.

33. Rim and upper body, Q1, round-shouldered or carinated vessel, possibly a bowl, with small everted rounded rim, carbonised residue in area between rim and shoulder of external body, abraded internally. Area 3, (53), [54].

34. Rim and upper body, R2, ovoid vessel with flattened upright rim, deep scoring (SCR) in approximately horizontal direction, external carbonised residue on rim and below and on internal upper body. Area 1, (96).

35. Profile, Q1, ovoid bowl with everted rounded rim and flat base, Q1, carbonised residue on external surface below rim and internally on middle and lower body. Area 1, (103).

VCP

Two sherds of Stony VCP or Cheshire briquetage weighing 6g were recovered from the enclosure ditch in Area 3 (980). The rock inclusions originally derive from the Lake District, but are found in glacial deposits on the Cheshire Plain in the Nantwich and Middlewich areas (Morris 1985). The VCP vessels were used in the drying and transportation of salt. Other discoveries of Stony VCP have been made at Leicestershire Iron Age enclosures at Enderby and Huncote (Elsdon 1992a; Marsden and Morris 2004), as well as elsewhere in the region at Crick in Northamptonshire (Hughes 1998) and Gamston, Nottinghamshire (Knight 1992b). The small quantities from the site are reflected elsewhere and show that the Cheshire briquetage was at the edge of its distribution.

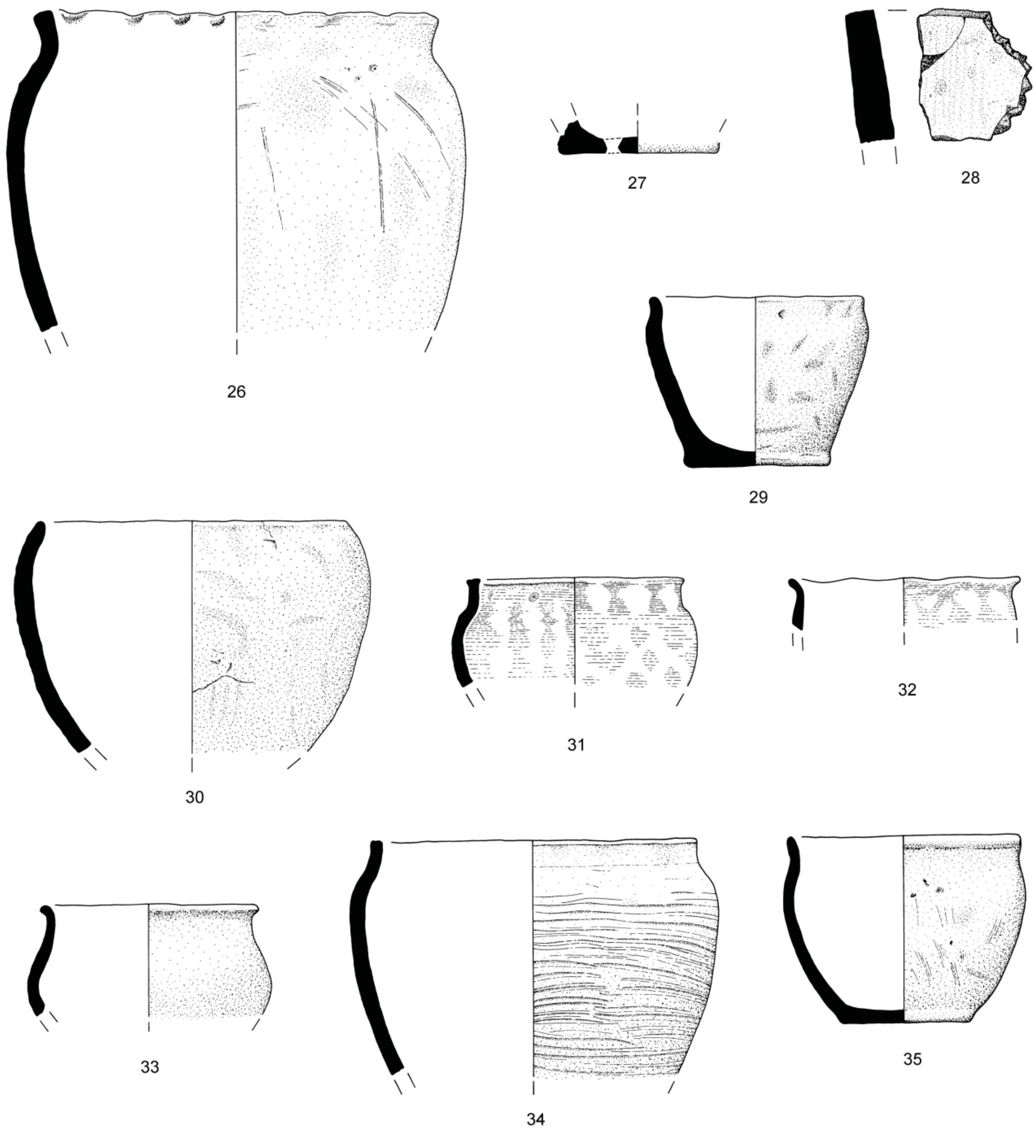


Figure 62: Illustrated Iron Age pottery vessels, nos.26-35

Pottery Petrological and Chemical Analysis Alan Vince

A selection of Iron Age pottery was submitted for thin section analysis. A small number of sherds were also selected for chemical analysis using Inductively-Coupled Plasma Spectroscopy. The following report consists of an analysis of 19 sherds divided visually into 19 fabrics (Table 10).). The chemical analysis also includes Manor Farm, Humberstone. (A6.1999, Thomas 2008b). Note this report has been edited by the author to include only results from Hallam Fields, Birstall.

Table 10: Details of samples from Hallam Fields, Birstall subject to the Petrological and chemical analysis

TSNO	Context	GROUP	Sub-fabric	Action
V4942	645;644	FLINT1	FL1	TS
V4943	645;644	SHELL2	GR1	TS
V4944	643;642;617	RQ4	SA1	TS
V4945	691;608	SHELL2	SH1	TS
V4946	756;757	FLINT3	Q4	TS
V4947	838	AQ1	Q5	TS
V4948	672	FLINT2	FL2	TS
V4949	989	BONE1	GR2	TS
V4950	645;646	FLINT1	QU1	TS
V4951	835	SHELL1	S1	TS
V4952	471	SHELL3	S1	TS
V4953	458	GROG1	G1	TS
V4954	800	GROG1	S2	TS
V4955	468	RQ5	S2	TS
V4956	808	AI1	R2	TS
V4957	843	RQ6	Q1	TS
V4958	776	AI1	R1	TS
V4959	695	AI1	R2	TS
V4960	659	RQ7	R2	TS

Methodology

The sample sherds were examined at x20 magnification and the main inclusion types present were noted. Sub-samples were then taken for thin section and chemical analysis. The thin sections were prepared by Steve Caldwell, University of Manchester, and stained using Dickson's method (Dickson 1965). Offcuts for chemical analysis were sawn from the sample and the outer surfaces mechanically removed. The remaining block was then crushed to a fine powder and analysed using Inductively-Coupled Plasma Spectroscopy (ICP-AES) at Royal Holloway University College, London, under the supervision of Dr J N Walsh. A range of major elements was measured and the values presented as percent oxides (App 3). A range of minor and trace elements were measured and presented as parts per million (App 4). Silica was not measured but an estimate was obtained by subtracting the total measured oxides from 100%.

The data were normalised to aluminium and the normalised data were analysed using the multivariate statistical package, WinSTAT for Excel (2002). Factor Analysis was the main procedure used. In this analysis the original variables (element values) were replaced by a smaller series of Factors which still express the same variation between samples. The contribution of each element to the new factor is shown by a weighting table and in general those elements with strong positive or negative weightings are found to be correlated. The weighting table and plots of one set of factor scores against another can be used to visualise and interpret the structure of the dataset.

Thin Section Analysis

The principal inclusions present in each section were used to attribute the samples to ten groups whilst differences between samples in the same group were used to assign the samples to Petrofabrics. These petrofabrics are correlated with the ULAS fabrics in Table 11.

Results

Acid Igneous Rock

Eight sections contained angular fragments of acid igneous rock as a major inclusion type. These could be divided into three fabric groups on the basis of the texture of quartz inclusions. AI1 contains abundant sub-angular and sparse rounded quartz grains; AI2 contains abundant rounded quartz grains and AI3 contains only rare quartz grains. One sample, AI4, was distinguished from AI1 because of the presence of mudstone. The groundmass consists of optically anisotropic baked clay minerals with abundant angular quartz grains up to 0.1mm.

AI1. Five sections were assigned to this fabric group. The following inclusion types were noted:

- Acid Igneous Rock. Moderate angular fragments of rock up to 2.0mm long composed of zoned plagioclase feldspar, with slight alteration; hornblende; opaques and quartz. In some cases the feldspar grains are zoned. The rocks can be divided into two on the basis of their grain size. In most cases the grains average 1.0mm to 1.5mm across but in few instances they average 0.3mm to 0.5mm across.
- Rounded quartz. Sparse well-rounded grains up to 0.5mm across.
- Angular quartz. Abundant grains up to 0.2mm across.

.

Interpretation

The zoned feldspar in the acid igneous rock, and the low quantity of quartz, suggest that this is Mountsorrel granodiorite. Whether the finer-grained rock is a facies of this granodiorite or another rock from the same Charnwood complex is not known.

The origin of the parent clays of fabric AI1 is not known but it is possible that all fabrics were obtained from a single clay source with a variable texture, such as boulder clay.

Angular Quartz

AQ1. A single sample, V4947, contained coarse angular fragments of quartz. The following inclusion types were noted in thin section:

- Angular quartz. Sparse fragments up to 1.5mm across. These vary from monocrystalline, unstrained to polycrystalline strained and unstrained grains with mosaic quartz developed along crystal boundaries. There are moderate inclusions within the quartz, all probably vesicles. There are too few grains of too small a size to determine their origin.
- Grog. A single angular fragment of light brown grog 1.0mm across containing moderate angular quartz grains up to 0.1mm across. An opaque fragment with similar texture probably has a high organic content.

The groundmass consists of dark brown, slightly variegated, optically anisotropic baked clay minerals with no visible inclusions.

Bone

A single sample, V4949, contained angular fragments of fresh bone as the main inclusion type.

BONE1. The following inclusion types were noted:

- Bone. Moderate angular fragments, often sliver-shaped and up to 3.0mm long and only c.0.3mm wide. Osteons, containing canaliculi and a central Haversian canal are discernable. The lack of staining suggests that the bone is fresh.
- Sandstone. Sparse rounded fragments up to 0.5mm across. The sandstone consists of ill sorted sub-angular quartz grains in a brown cement.

- Grog. Sparse angular fragments differing slightly in colour and texture from the groundmass.
- Quartz. Sparse rounded grains up to 0.3mm across.

The groundmass consists of optically anisotropic baked clay minerals, sparse angular quartz up to 0.1mm across and rare muscovite up to 0.1mm long.

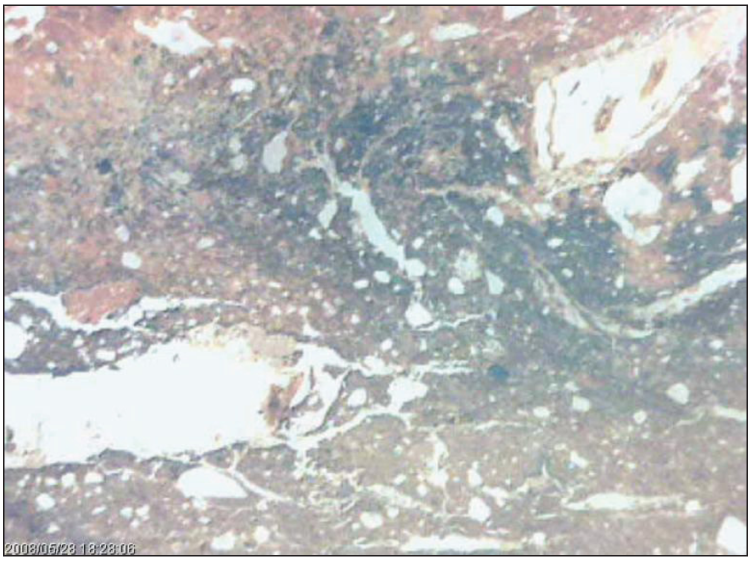


Figure 63: Thin section V4949, showing fresh bone as the main inclusion type

Interpretation
The bone was probably calcined, crushed and added to the potting clay. The remaining inclusions and the character of the groundmass suggest a Triassic source – Mercian mudstone with a slight admixture of Trias-derived sand.

Flint
Four samples contain fresh, angular flint fragments as a major inclusion type (V4942, V4946, V4948 and V4950). All can be grouped into a single fabric.
FLINT1. The following inclusion types were noted in thin section:

- Flint. Moderate angular fragments up to 2.0mm across with no sign of weathering or staining.
- Quartz. Sparse subangular grains up to 0.3mm across.
- Grog. Sparse angular fragments up to 1.0mm across.
- Opaques. Sparse rounded grains up to 0.5mm across.
- Bone. Rare angular, brown-stained fragments up to 1.0mm across.
- Organics. Sparse fragments up to 1.0mm long and 0.2mm wide.

The groundmass consists of optically anisotropic baked clay minerals, sparse angular quartz up to 0.1mm across and rare muscovite up to 0.1mm long.

Interpretation

The flint fragments appear to be added to the fabric, either as calcined flint or debitage. There is no sign of crazing which might be expected with calcined flint.
None of the remaining inclusions clearly indicate a source, but the character of the groundmass is similar to that of the bone-tempered ware and others for which a local Leicestershire source is likely. Therefore, despite the fact that Upper Cretaceous flint is not a major component of local gravels and in those gravels is usually stained and rolled, it is likely that the flint-tempered ware samples were made locally.

Grog

In three samples, angular grog was the one of the principal inclusion types present. These could be divided into two fabric groups. In the first, GROG1, the grog is accompanied by a range of other inclusions, including rounded quartz, but in the second, GROG2, the grog is the main inclusion type and rounded quartz is absent.

It should be noted that in the hand specimen all three were thought by the author to contain leached calcareous inclusions but the character of the inclusions in thin section does not support the theory that they are post-burial infilling of the voids left by leached calcareous inclusions. Furthermore, similar grog inclusions have been noted in several other sections as minor inclusions.

GROG1. Two examples of this fabric were present, V4953 and V4954. The following inclusion types were noted:

- Grog. Abundant angular fragments up to 0.5mm across. These mainly have a slightly lighter colour (light brown) to the oxidized groundmass and stand out against the carbon-rich dark grey core. The fragments contain sparse subangular quartz are have a higher birefringence than the groundmass.
- Quartz. Sparse rounded grains up to 0.3mm across.
- Chert. Rare rounded grains up to 0.5mm across.
- Clay/iron. Sparse dark brown rounded grains up to 1.0mm across.
- Opaques. Rare rounded grains up to 1.0mm across.

The groundmass consists of optically anisotropic baked clay minerals, sparse sub-angular quartz and dark brown clay/iron inclusions up to 0.2mm across.

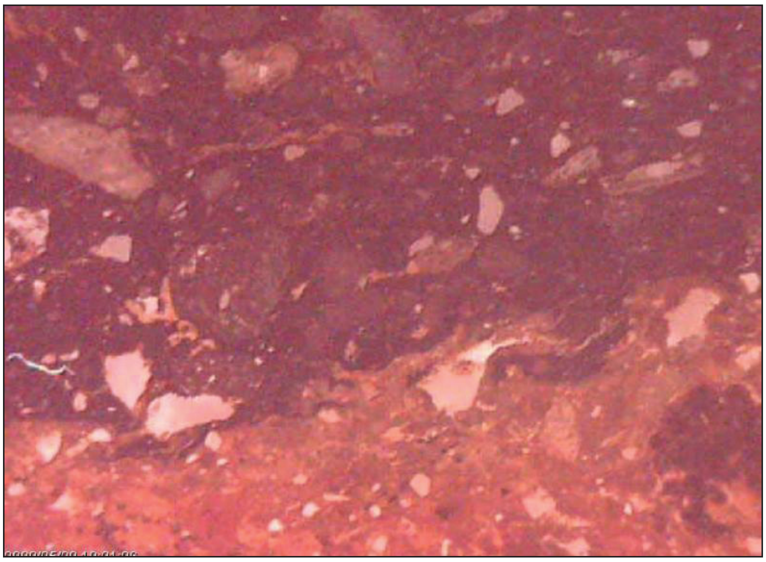


Figure 64: Thin section V4954 (context 800), showing Grog 1 inclusions

Interpretation

The inclusions present in GROG1 indicate the presence of a Trias-derived quartzose sand. In both fabrics, the grog probably has a similar origin to the groundmass and may have been formed by recycling broken vessels made by the same potters, or by firing and crushing some of the potting clay and then adding it to the unfired clay.

Limestone

None present.

Rounded Quartz

Four samples contained rounded quartz sand as their major inclusion. They vary in the frequency and presence/absence of other inclusions and could not be subdivided into fabric groups based on the available evidence (Table 11, Figure 65).

Table 11: Rounded quartz

	Quartz	Chert	Quartz	Clay/iron	Sandstone	Igneous		Flint
V4944	S	R	S	S	R	N	N	N
V4955	S	S	S	M	R	N	M	N
V4957	S	S	A	M	S	N	N	N
V4960	A	S	M	S	S	N	N	S

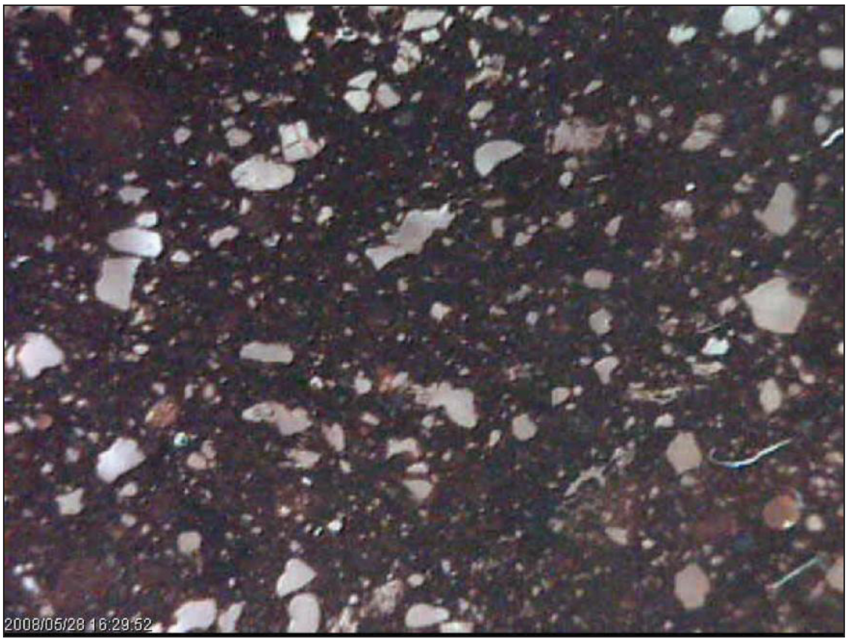


Figure 65: Thin section V4944, showing rounded quartz inclusions

Interpretation

The rounded quartz, chert and sandstone inclusions all originate in a Triassic sand, such as those which outcrop in the Leicester area (but also much more widely). The samples could be divided into those with abundant rounded quartz and the remainder, in which the sand is much less common, but in terms of their origin this division is not important. The rounded clay/iron grains occur in all the samples and are more common in those with less sand, indicating that they were present in the parent clay before tempering. Such iron-rich concretions occur in many clay outcrops and cannot be used to localise production. One section contained angular flint, which may have been deliberately added, as probably in the Flint-tempered ware. There is certainly no sign of either rounding or staining, such as occurs on the rare flint found in Trent valley sands. Finally, one of the samples contains fragments of acid igneous rock. These are probably from the Charnwood inlier and if so indicate a source to the south or east of that outcrop.

Shell

Three samples contain shell fragments as the main inclusion type. In four instances the shell inclusions themselves have been leached and the resulting voids are partially filled with phosphate and clay minerals. The groundmass allows the samples to be divided into two groups, one silty and the other silt-free, and the size and frequency of the shell inclusions allows further subdivision of the silt-free group into two. Shell 1 was not seen at Hallam Fields, Birstall.

SHELL2. Two examples of this group were present, V4943 (Figure 66) and V4945. The following inclusion types were noted:

- Bivalve shell. Sparse voids up to 1.5mm long probably once filled with bivalve shell, but possibly once containing organic inclusions.
- Organics. Sparse voids up to 1.5mm long containing carbonised remains of organic inclusions.

The groundmass consists mainly of opaque black burned clay minerals, seen at the margins of the sherds to be optically anisotropic, and abundant angular quartz up to 0.1mm across and sparse muscovite laths up to 0.1mm long.

SHELL3. A single example of this fabric was present, V4952. The following inclusion types were present:

- Bivalve shell. Abundant voids up to 1.00mm long once containing bivalve shell fragments.
- Rounded quartz. Rare well-rounded grains up to 0.3mm across.

The groundmass consists of optically anisotropic baked clay with no visible inclusions.

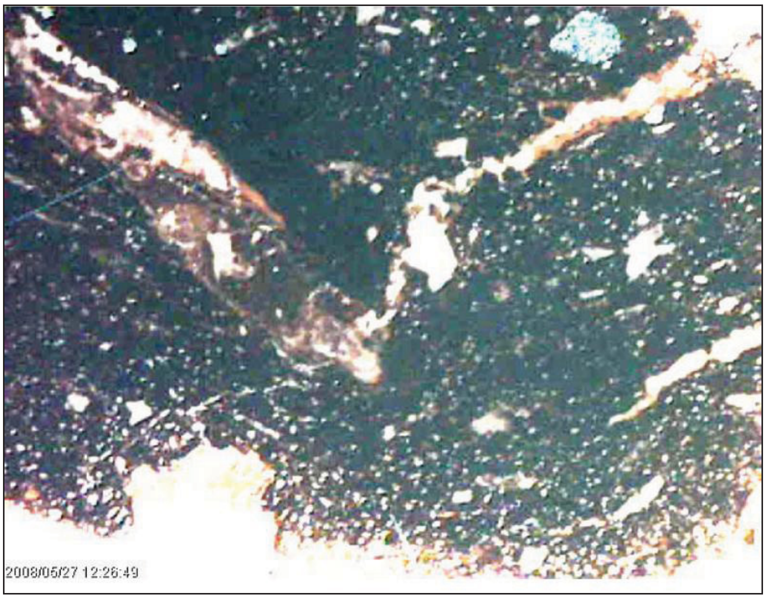


Figure 66: Thin section V4943, showing shell inclusions

Interpretation

Table 12 summarises the characteristics of the three shelly fabrics. The difference between Fabric SHELL2 and the others is much greater, to the extent that it is not even certain that SHELL2 contained any shell! However, even allowing for the difference in preservation, it is fairly clear that SHELL1 and SHELL3 have different sources. SHELL1 and SHELL3 are almost certainly of Jurassic origin and similar shell inclusions occur in Roman and later shelly wares from both Lincolnshire and Cambridgeshire. Where the sources are known, they were made from Middle and Upper Jurassic clays or, in the case of Lincoln shelly wares, Middle Jurassic shell tempering in Lower Jurassic clay.

Table 12: Summary of three shelly fabrics

Fabric	Quartz silt	rounded quartz	bivalve shell	organics	Marl	Mudstone

SHELL1	SPARSE	NONE	MODERATE	NONE	MODERATE	SPARSE
SHELL2	ABUNDANT	NONE	SPARSE	MODERATE	NONE	NONE
SHELL3	NONE	RARE	ABUNDANT	NONE	NONE	NONE

Chemical analysis

Samples of the shell-tempered and limestone-tempered vessels were taken for chemical analysis using Inductively-Coupled Plasma Spectroscopy. This was because it was realised that the inclusions were unlikely to be of local origin and therefore either indicated the use of boulder clay derived from Jurassic deposits in Lincolnshire or Yorkshire or the trading of vessels from Yorkshire, Lincolnshire or further south to the Leicester area.

The analysis was carried out at Royal Holloway College, London, under the supervision of Dr J N Walsh. Each sample was prepared by mechanically removing the surfaces to a depth of 1mm or so, to minimise the effect of post-burial alteration to the chemical composition. The resulting block was crushed to a fine powder and the frequency of a range of major elements was determined and expressed as percent oxides. The frequency of a range of minor elements was measured and expressed as parts per million. The frequency of silica was not measured but was estimated by subtracting the total measured oxides from 100%.

Since the frequency of calcite, phosphorus, silica and strontium could all be affected by tempering and post-burial alteration these elements were omitted from study and the remainder were normalised to aluminium. The normalised data were then examined using the WinSTAT for Excel add-in (2002). The normalised data were analysed using the Factor Analysis program within WinSTAT. In this technique, a large number of variables (in this case element frequencies) are replaced by a smaller number of factors. The contribution of each element to the Factors is given by a weighting table and elements with similar weightings are correlated and therefore may have been subjected to similar processes.

For the six Leicestershire samples four Factors were found. A plot of the first two factor scores indicates that the LST1 sample has a high F1 score but that the remaining samples show no clear patterning. The following results are a combination of samples from the Birstall site and that at Manor Farm, Humberstone (Thomas 2006, 2008b).

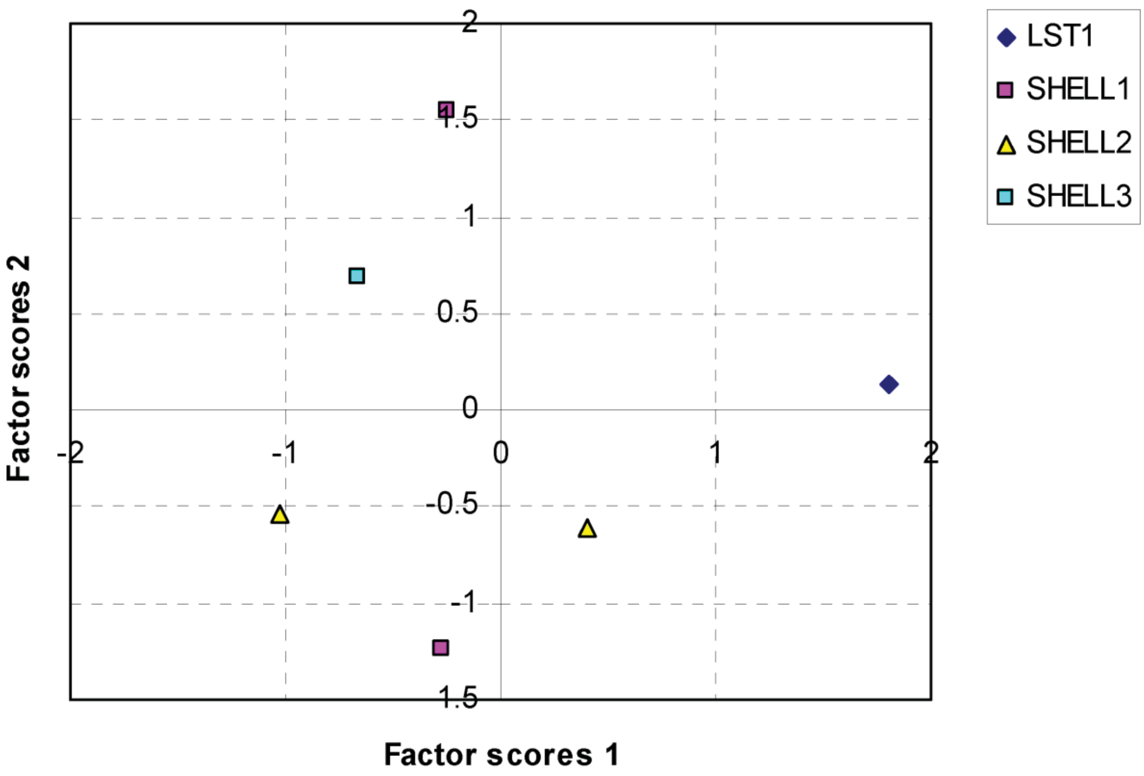


Figure 67: A plot of the Factor 3 against the Factor 4 scores shows that the two SHELL2 samples have high F3 scores.

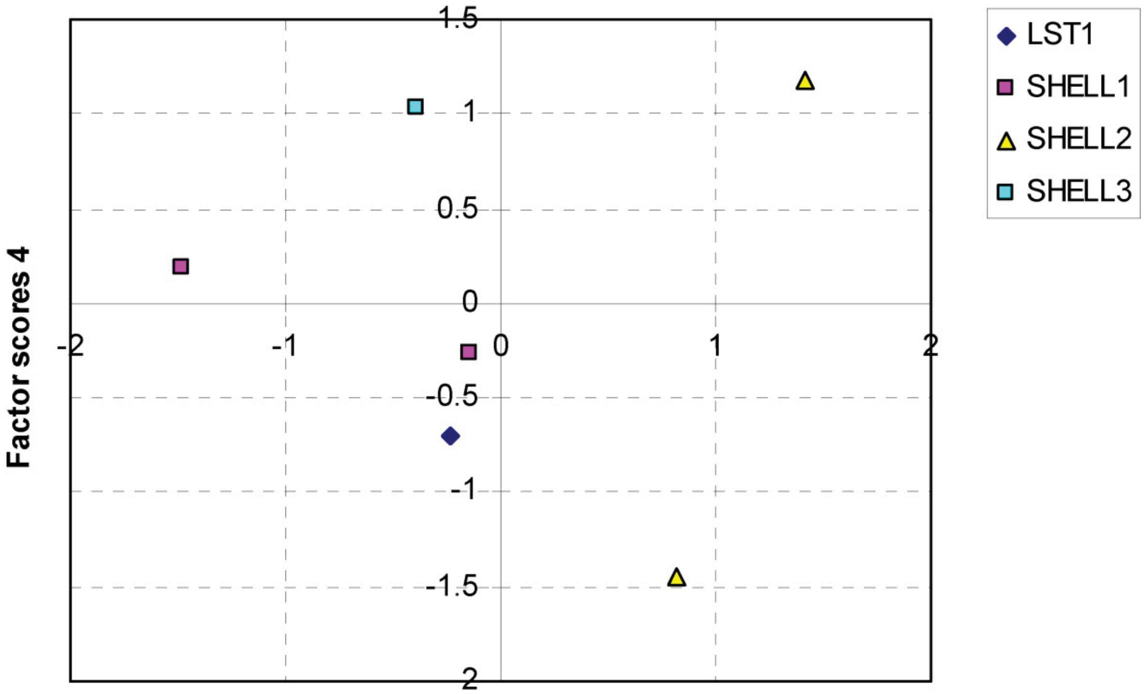


Figure 68: weighting table indicating a high F1 score of the LST1 sample.

The weighting table indicates that the high F1 score of the LST1 sample is due to high weightings for the rare earth elements and for manganese, potassium, and magnesium whilst the high F3 scores of the

SHELL2 samples are due to high copper and chromium weightings and a strong negative weighting for lithium. The ICPS data were then compared with those for a range of shelly wares from Lincolnshire and Cambridgeshire and for Iron Age wares of various fabrics from Leicestershire. Factor analysis of this data separated medieval shell-tempered wares from the Peterborough area and mid-Saxon shell-tempered wares from sites in southern Lincolnshire and Cambridgeshire. Data for these samples were then omitted and the analysis repeated. In this analysis, many of the Iron Age non-shelly fabrics were separated. This analysis also separated the LST1 sample from the remainder, which consisted of the three shelly fabrics, two shelly fabric samples from Thurcaston (Figure 69, IASH) and samples of mid-Saxon Maxey ware, produced from Middle Jurassic clays in central and northern Lincolnshire (Figure 69, MAX). A small number of Early Bronze Age samples from Thurcaston also have similar compositions (Figure 69, EBAGROG, EBASAND, and EBAVESICULAR).

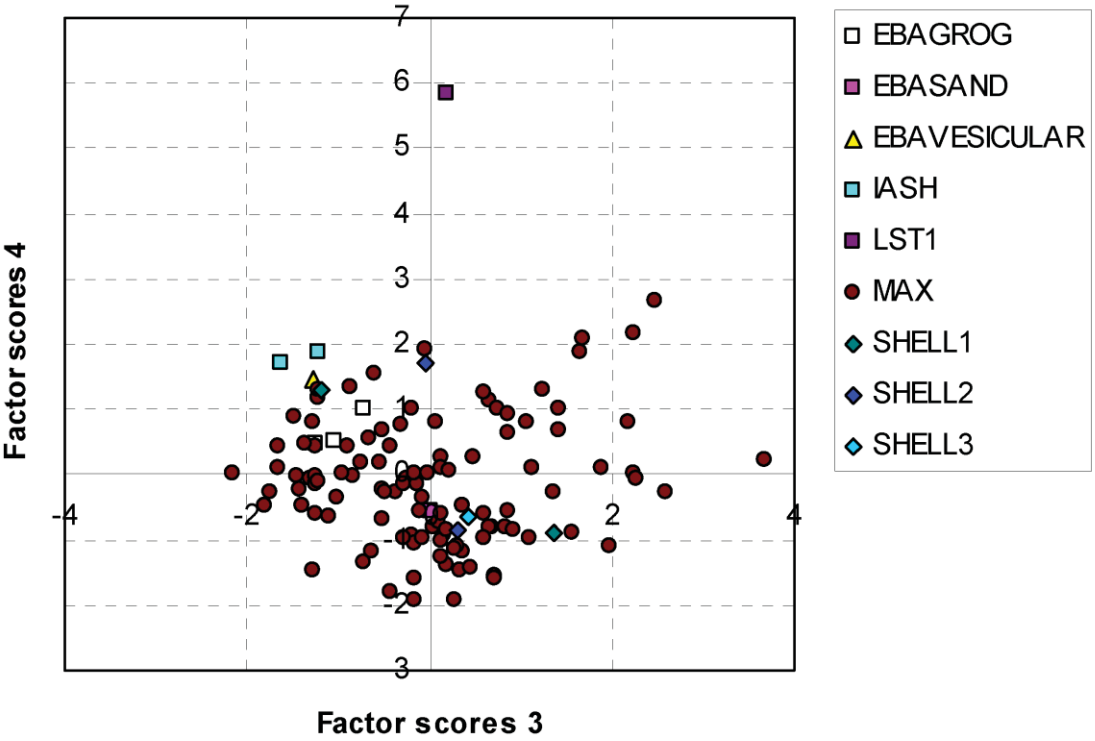


Figure 69: Factor analysis, LST1 sample could not be separated from the remainder.

A further Factor Analysis was carried out omitting the Northern Maxey wares and including Late Saxon Lincoln shelly wares and East Yorkshire Iron Age shelly wares. This analysis found that the Lincoln samples were distinct from the remainder and that the LST1 sample could be separated from the remainder (Figure 70).

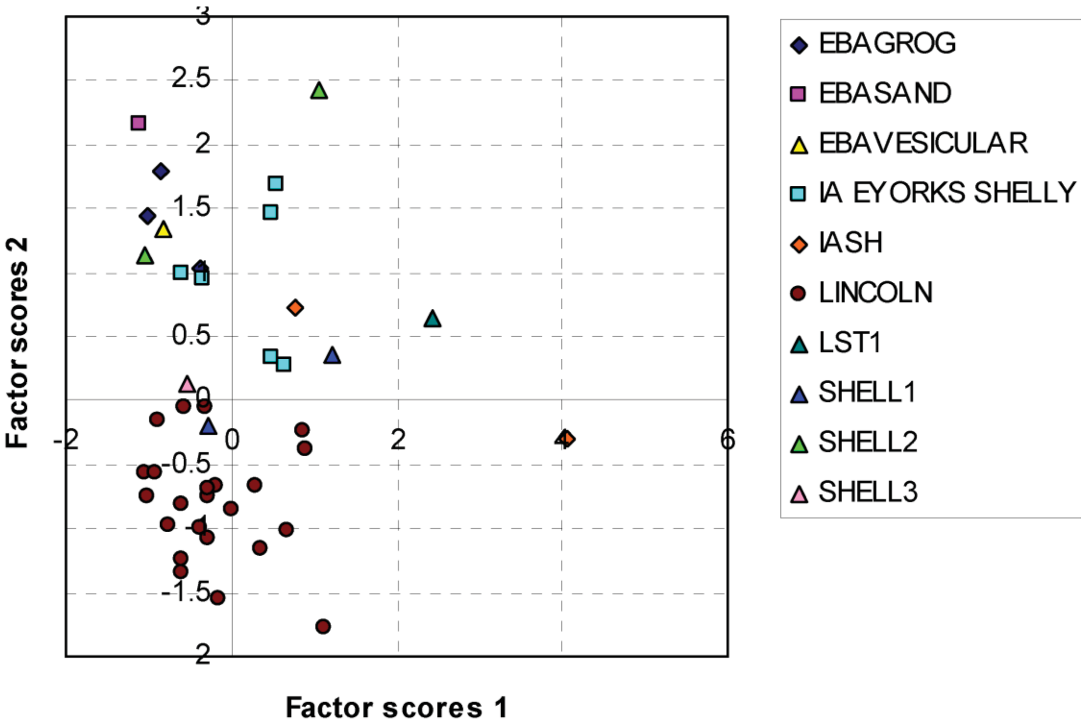


Figure 70: Factor analysis

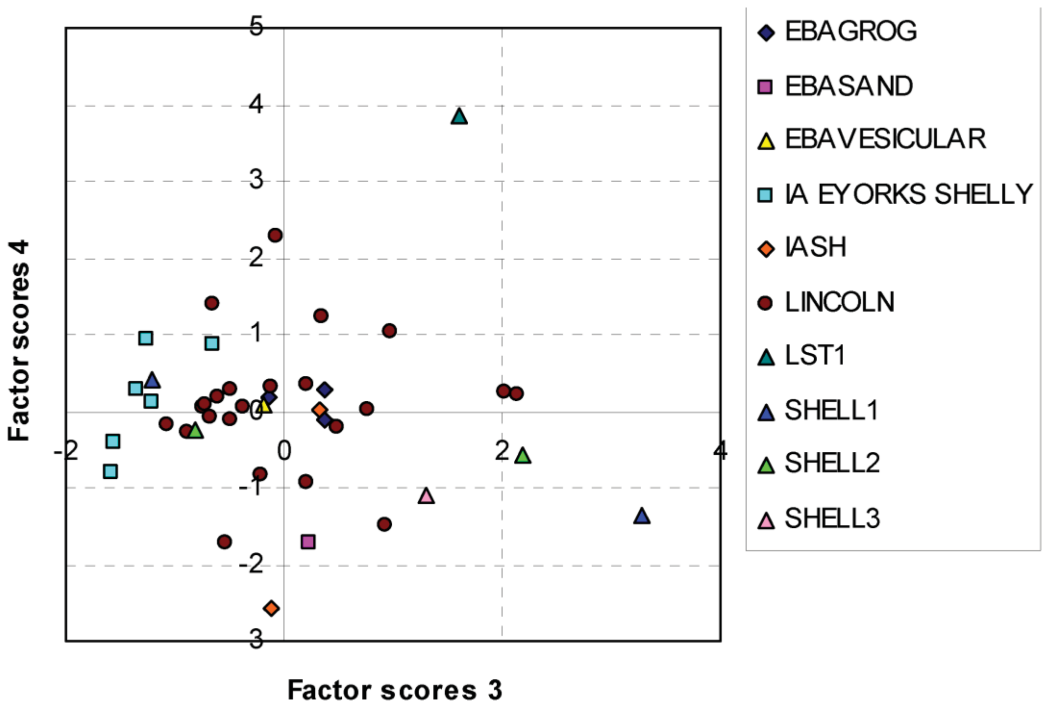


Figure 71: Factor analysis

Conclusion

Thin section analysis confirms the visual identification of numerous fabrics within the submitted samples although there is some variation between the classification developed by eye and that arrived at through thin section analysis. In most cases, the rock and mineral fragments identified in thin section are consistent with an origin in north-east Leicestershire and the pottery might therefore be of local origin. In several cases, however, the inclusion suite present is found over a wide area and thin sections on their own cannot demonstrate the source of the fabric.

In the case of six samples with abundant shell or limestone inclusions chemical analysis was carried out. This analysis demonstrates that five of the samples are similar to shell-tempered wares from East Yorkshire and Lincolnshire, but not with those from Cambridgeshire. However, in most cases, boulder clay derived from the erosion of Jurassic clays in the Trent Valley or the Yorkshire Wolds could be the immediate source of the clay and temper. In one case, LST1, no precise parallel for the chemical composition could be found nor is there a precise parallel for the rock and mineral inclusions in either East Yorkshire or Lincolnshire. However, a Jurassic origin is likely and perhaps in this case the source does lie to the south or south-west of Leicestershire, in which case the vessel would have had to be traded to north-east Leicestershire.

The Lithics Lynden Cooper

Results

Some 151 worked flints were recovered from the excavation. A large proportion (83%) was from Middle Iron Age features and are likely to be residual. However the finds from two Early Bronze Age pit fills probably represent contemporary activity.

Five pieces (3%) displaying bladelet technology can be regarded as Mesolithic. Two blades also may be Mesolithic. The microlith fragment has inverse basal retouch, a feature commonly seen in Honey Hill type assemblages from the Midlands (Saville 1981). These are suspected to chronologically fall between the earliest and latest Mesolithic in the Midlands (Myers 2006).

Taking the remaining flints as a group they can be split into 119 flakes (83%), five pieces of shatter (3%), five cores (3%) and 15 tools (10%). The tools contain few chronologically diagnostic types. There is a possible example of an unfinished Laurel Leaf that would be of Neolithic date. A large fragment of a discoidal scraper is similar in form and flint type to Late Neolithic examples from Eye Kettleby and Rothley.

There are some indications for later Bronze Age activity from the concave scrapers and the scraper with straight-edge retouch. Another scraper used an older (slightly patinated) flake support. Such recycling has been seen at other later Bronze Age sites in the area e.g. Willow Farm, Castle Donington and Cossington barrows (Cooper 2008). The technological aspects of the debitage would also fit within a broad Neolithic-Bronze Age date.

The stratified flint from context (643) is remarkably fresh and sharp, further suggesting that it is contemporary. The unmodified flakes are of a very similar flint as the core and may well have derived from it. The utilised flake approaches the dimensions of a blade and is of a different, darker flint than the core.

Table 13: Details of the lithics

context	lithic type	context		context	lithic type
68	3ry blade	488	2ry flake	710	core
72	3ry flake x2	523	concave scraper, 2ry flake	725	2ry flake
		525	3ry flake	737	2ry flake x2
81	1ry flake	527	retouched flake	739	scraper (crude), 2ry flake x3, 3ry flake x1
83	3ry flake	531	3ry flake x3, 2ry flake	759	3ry flake
84	3ry flake	536	end scraper (crude)	776	2ry flake
87	concave scraper	571	3ry flake	804	scraper
92	3ry blade, shatter, bladelet core	574	bladelet core	808	3ry flake
93	2ry flake	611	2ry flake x1, 3ry flake x4,	813	3ry flake
95	1ry flake	629	3ry flake x3	830	calcined 2ry flake
100	2ry flake	636	3ry flake	843	core frag
122	2ry flake	639	2ry flake , 3ry flake	848	2ry flake x2
144	2ry flake	640	2ry flake	850	2ry flake x2
182	concave scraper	641	3ry flake	858	2ry flake
187	laurel leaf (unfinished?) 3ry flake, straight edged scraper	643	1ry flake x1, 2ry flake x1, 3ry flake x2core	902	2ry flake x5, core
207	3ry flake	645	2ry flake x3, 3ry flake utilised flake	903	Shatter x2, 2ry flake x2, 3ry flake x1
251	3ry flake	652	2ry flake x2	913	scraper (on ancient flake)
270	1ry flake	658	1ry flake, 2ry flake x2	934	2ry flake (patinated)
289	2ry flake	660	2ry flake x4, 3ry flake x1, microlith (frag), retouched flake	975	3ry flake, burnt
295	2ry flake	674	2ry flake	980	2ry flake (patinated)
363	discoidal scraper (frag), 2ry flake	681	Shatter x2	980	3ry flake
364	Shatter x2 2ry flake x3	689	3ry flake	980	calcined shatter
367	2ry flake, 3ry flake	698	3ry flake	989	2ry flake x2
417	2ry flake	700	3ry bladelet x2, 3ry flake x2, burnt shatter	u/s	2ry flake x8, 3ry flake x5, concave scraper, spurred flake
470	2ry flake	701	calcined 2ry flake, core		
478	2ry flake	704	calcined 2ry flake		

The Small Finds: the inhabitants and their activities

Nicholas J Cooper

(with contributions by Siobhan Brocklehurst, Heidi Addison, Graham Morgan, and Gavin Speed)

Summary

The finds assemblage, other than the pottery, provides evidence both for the appearance of the inhabitants of the area, at least during the early Roman period, and for the craft and industrial activities undertaken on the site during the Iron Age, including the manufacture of textiles and the smelting of iron and its subsequent working. The assemblage is similar in many ways to other Iron Age sites both locally and nationally in terms of the limited range of iron objects present and the complete lack of objects relating to dress. What might be regarded as surprising is the absence of worked bone and to an extent copper alloy both of which were represented at Manor Farm, Humberstone (Cooper forthcoming). The lack of bone would appear to be due to acidic soil conditions which similarly affected the animal bone assemblage and was also noted at Beaumont Leys Lane, Leicester (Cooper forthcoming). The absence of any copper alloy is probably chronological, as like iron, finds only start to appear in the latter part of the period which must be due to recycling of scarce resources, and perhaps low levels of usage in the first place, with greater reliance on organic materials and stone. In this respect, and in line with the C14 dating from the site, comparison is more usefully made with the nearby Middle Iron Age site of Wanlip, where there was a complete lack of material culture other than ceramics and stone (Beamish 1998). The occurrence of iron objects in the present assemblage should therefore be regarded as unusual.

Personal Adornment

Two brooches, the commonest form of dress accessory in the early Roman period, were retrieved from poorly stratified contexts and probably do not relate to the main phases of activity on the site. The first (sf530) is a Polden Hill type and the second (sf535) a variant on the trumpet brooch. The Polden Hill method of spring attachment appears in the mid- AD 50s and, as it was the most secure used on Colchester derivative types, such brooches continued to be made into the early 2nd century. They are mainly found in the West Midlands, although a close parallel illustrating the flatter profile of the head and wings comes from Richborough (Bayley and Butcher 2004, 59, fig. 71.208). At Wroxeter they are most commonly found in deposits of *c*. AD 80-120 (Bayley and Butcher 2004, 160). A similar example, dating to the second half of the 1st century AD also comes from Causeway Lane, Leicester (Mackreth 1999, 247 and fig. 117.4). The second brooch is not a typical trumpet brooch due to the lack of central moulding on the bow and otherwise plain appearance. No parallels have been traced, but it presumably dates to the later 1st or early 2nd century AD.

Two other copper alloy objects probably derive from objects of personal adornment, but only one is stratified (sf550) from (434) and thus potentially of Iron Age date. It comprises fragments from a drawn wire ring or armlet with a highly polished surface; a patina produced by continual contact with skin. Iron Age occurrences of such rings or armlets are rare, with single examples from the excavations at Danebury both from late contexts (Jope and Cunliffe 1984, 343 and fig. 7.6 nos. 1.31 and 1.33). The unstratified T-shaped terminal (sf549) from a cylindrical cast object is of uncertain date and function.

Manufacture of Textiles

Evidence for weaving was confined to the occurrence of fired clay and, in one case, stone loom weights, perforated for suspension from the gathered warp threads to create tension. Twenty-nine loom weight fragments, weighing nearly 4.5kg, came from seven contexts across the site mainly in enclosure II (Figure 121), with a notable concentration of five, more complete, triangular examples (sf nos. 706-10) from (681). Where diagnostic fragments occur, they conform to the typical triangular type with perforations across the top angle, or probably through all three angles, as at Danebury, Hampshire. (Cunliffe and Poole 1991, 372 and figs 7.45-48), and Iron Age sites locally, for example from Elms Farm, Humberstone (Brown 2000, 187), Enderby (Clay 1992, 54 fig. 30.7), as well as from those of Roman date at Empingham Site 1 (Cooper 2000, 115). In one case, context (737), a piece of limestone was perforated, perhaps for use as a loom weight.

Household and craft activities

A single iron knife blade (sf548) came from (415) and is the only identified tool likely to have been for general household use, whilst the iron punch (sf532) could have been employed more specifically in carpentry. Due to their value, iron tools are not common finds on sites of this period, only really becoming apparent as site finds in the Late Iron Age, and the knife, judging by the shallow blade, appears to have had a long life. The example is of a form which becomes one of the most common types during the Roman period (Manning 1985 Type 11) and conforms to Type 2b from Danebury (Sellwood 1984, 349 and fig. 7.10 no. 2.28). Only occasional examples of knife blades have come from sites, locally (Cooper forthcoming, Manor Farm, Humberstone, no.11), which makes precise dating difficult, but the indication from the wide range from Danebury, is that they are confined to the later Iron Age deposits (Sellwood 1984, 349). The punch, which has the appearance of a small modern cold chisel, is also paralleled by examples from Danebury (Sellwood 1984, 370 and fig. 7.24 no. 2.186 referred to as a wedge; Cunliffe 1991, 351 and fig 7.15 no. 2.256).

The remainder of the iron objects comprise a hook (sf539) from (102) and a binding clamp or joiner's dog (sf557) from (527), along with a small number of nails. Nails are not common finds on Iron Age sites, in the way they become ubiquitous on Roman sites, presumably because they simply weren't used in carpentry perhaps until the later Iron Age, which is when they appear to start occurring as site finds.

Four fragments of fired clay from a perforated oven base came from (696) and (620). Fragments of similar ovens of Iron Age date are known from Empingham, Rutland, Site 4 (Cooper 2000, 70 and Fig. 33) and Willington, Derbyshire (Elsdon 1979, 209). Their function is uncertain but the low degree of firing would indicate domestic use.

Metalworking

The evidence comprises the waste products of smelting together with associated hearth or furnace linings and potential raw materials, and a hammer possibly used in smithing. The occurrence of nearly 2kg of iron tap slag from (170), (457) (468), (479) and (776), including a hemispherical hearth bottom (sf 540) from a pit fill [433], indicated the use of a bowl furnace for smelting which would be consistent with Iron Age technology. Less dense hearth slag, together with vitrified clay hearth lining, also came from (456), whilst other hearth lining fragments came from (196), (470) and (479). Evidence of fuel ash, together with vitrified „clinker' from the burning of coal from (525) also indicated high temperature craft activities probably related to the working of metal. The 449g of unaltered iron stone came from (237), (312), (456), (457), (479), (688) and (804).

Evidence for subsequent working of iron is also suggested by the occurrence of a fragment of a hammer head (sf537) from a pit [524] in Enclosure II. It is too fragmentary to confirm identification or specific function but it is similar to small Roman metalworking hammers identified by Manning (1985, 8 for example Plate 2.A7 from London). Specifically Iron Age parallels are more unusual and no examples from Danebury are attributed to metal working (Sellwood 1984, 351 and fig. 7.12) although one would appear suitable for the function, (Cunliffe and Poole 1991, 351 and fig. 7.14 no. 2.251) while another comes from Bulberry, Dorset (Megaw and Simpson 1979, fig. 7.21.1).

Catalogue of Finds and Metalworking Waste

Objects of personal adornment or dress

Copper Alloy Brooches

1) Sf530 US subsoil SW corner of Enclosure 1. Head, wings and upper bow of Colchester derivative brooch of Polden Hill type, with partial remains of internal axis bar and spring held within the cylindrical wings. Remains of pierced lug for the external chord on the head, below which a tapered rib extends down the upper bow, flanked by grooves. The wings are decorated with faint vertical mouldings either

side of the bow and a single groove defines each end plate. The top of the head is continuous with the wings rather than being swollen above them. Width of wings: 30mm (Figure 72).

2) Sf535 Found by metal detector in upper fill of the Enclosure I ditch [573] Part of head and upper bow only, of a brooch related to the trumpet type but lacking the central mouldings on the bow and typically heavy appearance. The head flares in the manner of a trumpet type, hiding a damaged semi-cylindrical recess with a central lug presumably for a spring attachment and there are no wings. The top of the head is a flat panel decorated only with two marginal grooves, which continue as the head tapers in a continuous curve to form a very slender bow of circular section. Diameter of bow: 3mm (Figure 72).

Miscellaneous accessories of copper alloy

3) Sf549 US. T-shaped terminal of a hollow-cast object or fitting comprising a tapering cylinder terminating in a solid, winged terminal of rounded section. Max width 19mm. No parallels have been recognised (Figure 72).

4) Sf550 (434). Three joining fragments of a curving or ring or armlet of circular section made from drawn copper alloy wire, with highly polished surface patina suggestive of continual wear close to the skin. Diameter of section: 2mm (Figure 72).

Copper alloy accessory of medieval date

5) Sf551 US. Incomplete, cast, ovoid bar-mount or strap end with terminal lobe separated by a transverse rib. The lobe has a single perforation for attachment and there is evidence for a second perforation at the broken end. Probably used for decoration of a strap such as a belt or horse harness. Width 15mm. Probably medieval in date but there are no close parallels amongst figurative mounts from London for example (Egan and Pritchard 1991, 200 and fig. 126.1084) (not drawn).

Objects Associated with the Manufacture of Textiles

Fired Clay and Stone Loom weights

Table 14: Quantified occurrence of loom weights by context

Cut	Cont	Sfno	Group	Frags	Wght(g)	Description
777	776	705	13	1	592	Incomplete; triangular; one perforation
680	681	706	12	1	289	Undiagnostic
680	681	707	12	1	208	Incomplete triangular; two perforations
680	681	708	12	1	509	Triangular; one perforation
680	681	709	12	1	470	Incomplete triangular
680	681	710	12	2	450	Incomplete triangular; two perforations
195	197	-		7	177	Undiagnostic fragments; two with perforations
	847	-		1	71	Undiagnostic fragment with two perforations.
	833	-		3	158	Incomplete triangular
747	748			10	390	Incomplete triangular ; one perforation
735	737	715		1	1138	Burnt limestone with perforation
Total				**29**	**4452**	

Household and Craft Activities

Iron

6) Sf548 (415). Knife blade with a slightly sloping heel, a triangular blade and broken tang, which has become twisted, or may originally have been looped, as in Manning's Type 11b. Very corroded and modified by whetting but conforming to Manning's Roman Type 11 (Manning 1985, 114 and fig. 28). Length: 115mm (Figure 73).

7) Sf532 enclosure ditch 1. Iron punch made from tapering rod of square section with a rounded head, flattened through hammering and barely wider than the shaft. L: 74mm, width of head 16mm (Figure 73).

Fired Clay Oven fragments

Table 15: Table showing fired clay oven fragments

Cut	Cont	Sfno	Group	Frags	Wght(g)	Description
696	697			3	75	Perforated oven fragment
	620			1	84	Perforated oven fragment

Fasteners and fittings

Iron

8) Sf557 (527). Length of iron rod with curves at both ends. Probably a joiner's dog or some form of clamp or binding or the type recognised at Danebury (Cunliffe and Poole 1991, 353 and fig. 7.14 nos.2.231-239) Length: 68mm, width: 9mm (from x-ray) (not drawn)

9) Sf539 (102) Incomplete object with hook at one end. The hook widens to its base and tapers to the tip. Incomplete length 71mm, width of hook 20mm (not drawn).

10) Sf553: (453). An iron sheet fitting, rectangular with a slightly bulbous mid-section in which four rivets are arranged in a diamond formation, and with a small rectangular perforation at either end. Mineralised wood is preserved on both surfaces suggesting that it may have been a reinforcing mount for a wooden object. Length: 79mm, width: 29mm (Figure 74).

11) Sf534 ditch. Nail shaft fragment (not drawn)

12) Sf536 Metal detector find upper fill of linear feature within enclosure 1. Nail shaft. L: 63mm (not drawn)

13) Sf547 (312) Pit. Nail shaft fragment (not drawn).

14) Sf561 (549). Slender shaft with a small bun-shaped head. L: 35mm. One other shaft fragment (not drawn).

15) Sf703 (772) Pit. Nail shaft fragments (not drawn).

Objects and waste material associated with metalworking

<u>Iron</u>

16) Sf537 Pit within enclosure 2 [524]. Damaged head of a hammer with a large but incomplete circular eye and the base of one striking face or end of square section. External width of socket: 39mm, internal diameter of eye 23mm, section of end 24mm (Figure 74).

Metalworking waste

Table 16: Slag and other debris

Sfno	Context	Wght(g)	Description
542	170	329	Tap slag.
	196	206	Partially vitrified sandy clay. Possible hearth lining.
	197	16	Fuel ash
	456	188	Hearth slag and vitrified clay hearth lining.
555	457	10	Slag
	464	8	Partially burnt coal.
	468	96	Tap slag.
	470	116	Fuel ash. Fayalite slag. Furnace or hearth edge.
	471	3	Vitrified sandy clay.
538	479	881 222 47	Tap slag Vitrified sandy clay; possible hearth or furnace lining. Furnace lining fragment.
	525	161	Vitrified coal-like fuel
540	433	477	Tap slag forming furnace bottom.
704	776	10	Slag
	872	11	Vitrified clay

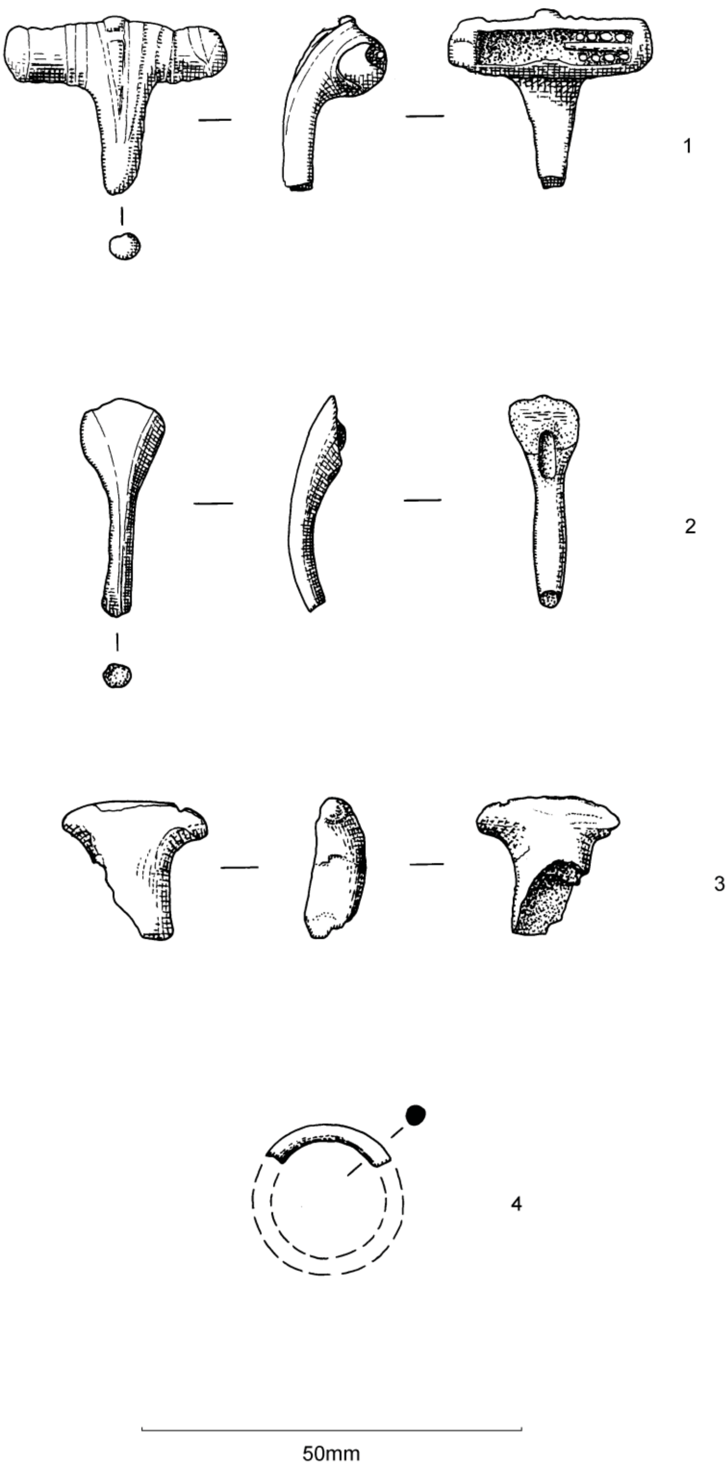


Figure 72: Illustrated small finds 1 – 4.

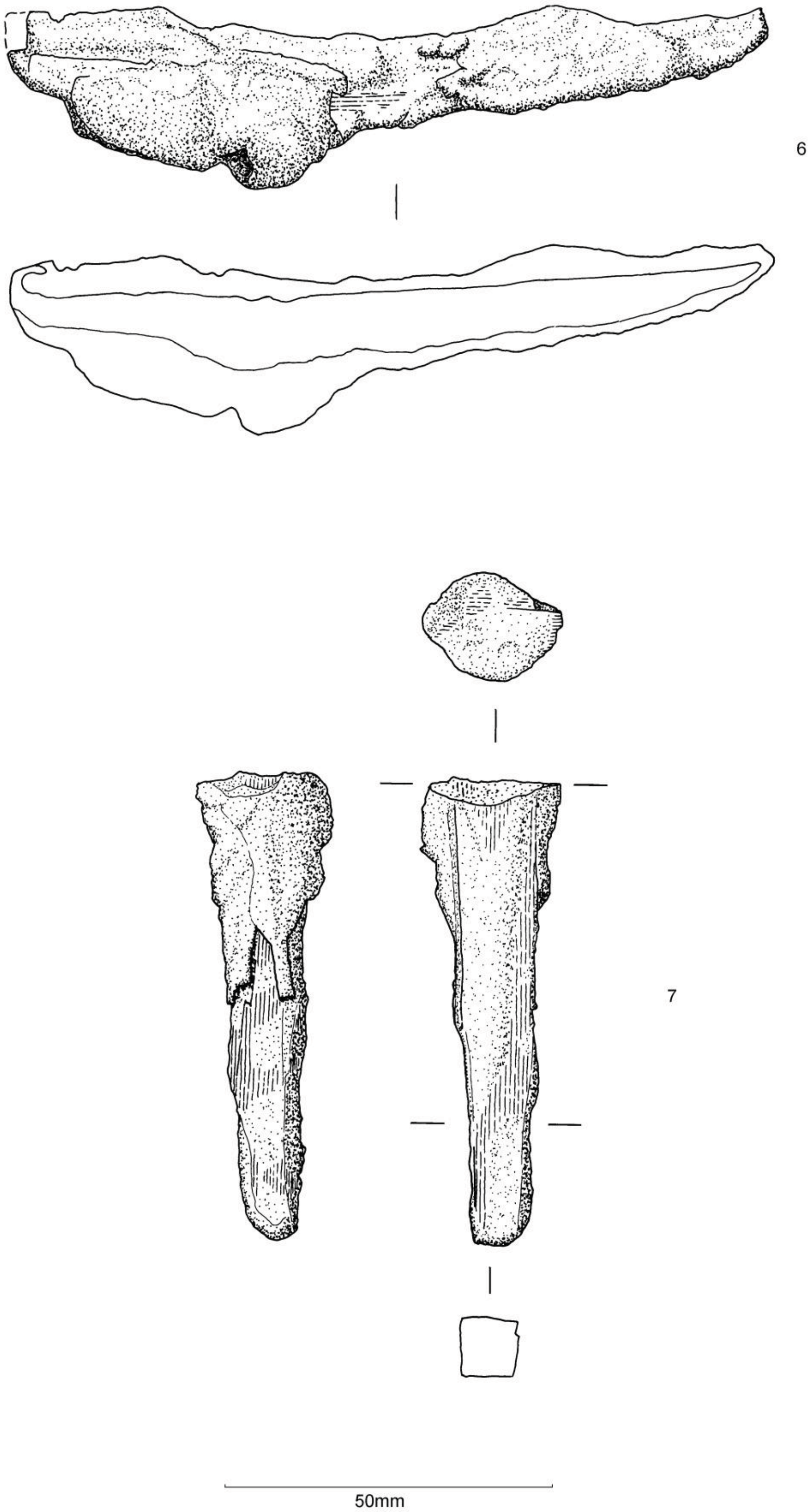


Figure 73: Illustrated small finds 6 and 7

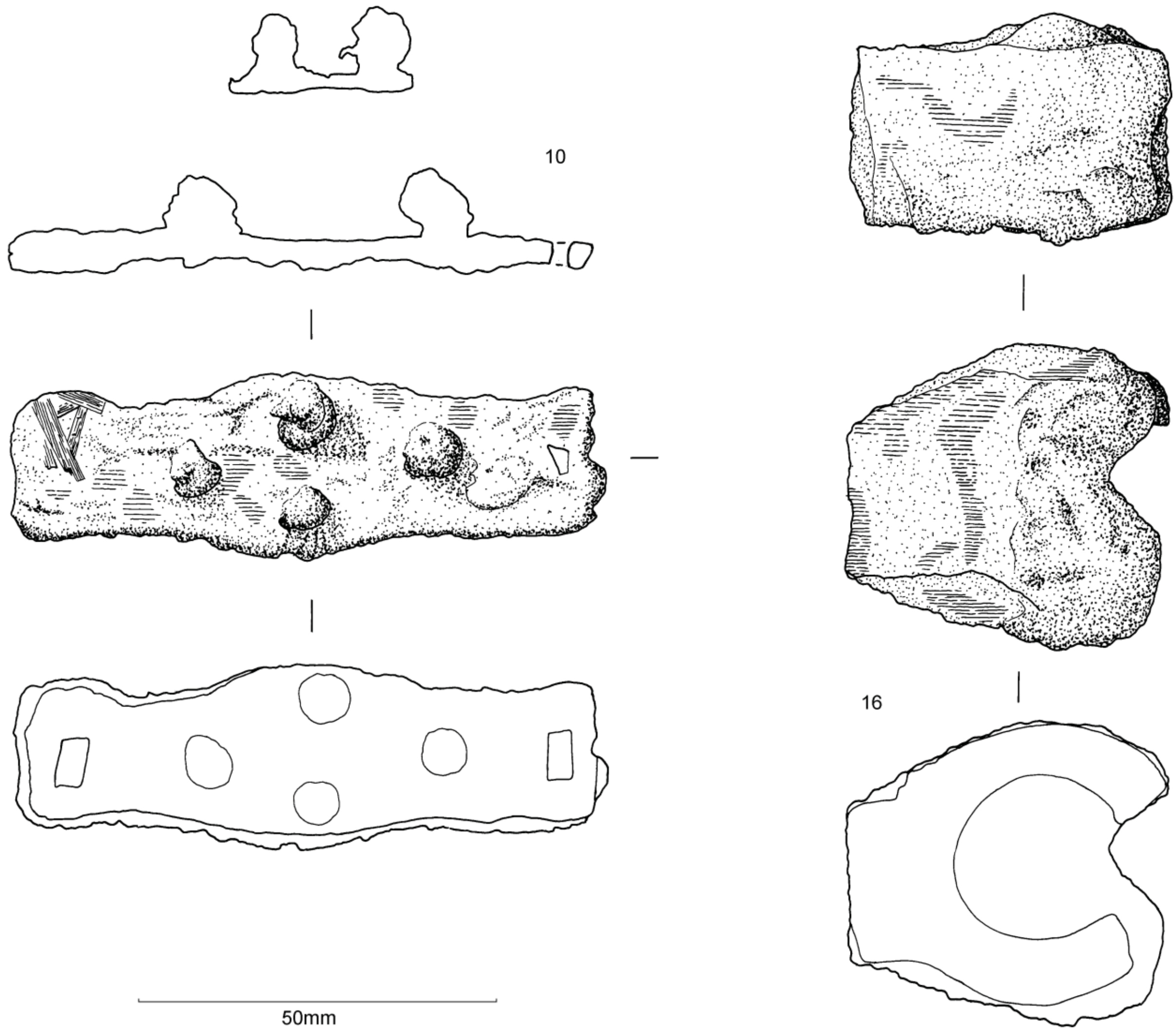


Figure 74: Illustrated small finds 10 and 16

The Fired Clay and Daub

A number of fired clay, daub, and CBM fragments were recovered across the settlement. There were concentrations around both roundhouses, especially the roundhouse within Enclosure I. This is probably remains from the walls of the building. Both concentrations were within the south-west corner of Enclosure I, and within the Enclosure I ditch (see Figure 75).

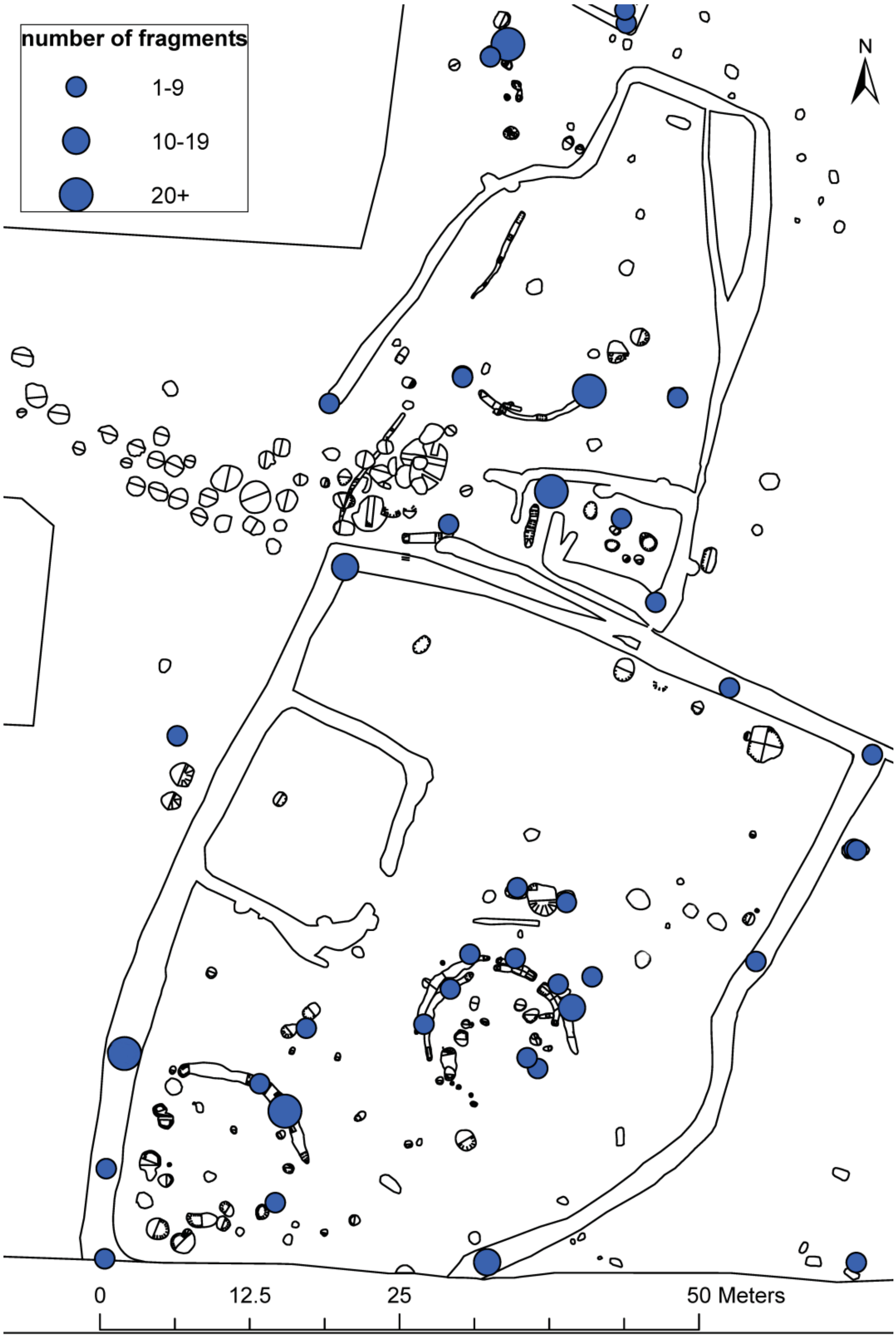


Figure 75: Fired clay and daub fragments.

Table 17 The fired clay and daub

Context	Frags	Weight	Comment
68	2	20	fired clay
69	1	5	small fragment of fired clay
78	2	3	CBM
80	1	7	small fragment of fired clay
81	1	8	fired clay
81	11	10	fired clay
83	1	5	fired clay
88	1	2	fired clay
88	2	5	CBM
90	1	1	small fragment of fired clay
90	9	119	abraded CBM
96	1	34	fired clay
108	5	183	daub
167	1	1	small fragment of fired clay
167	1	6	fired clay
197	10	54	fired clay
197	14	48	fired clay
197	1	36	fired clay, smoothed
197	8	66	CBM
212	1	7	daub
212	2	5	daub
286	2	4	fired clay
292	2	12	fired clay
309	1	1	small fragment of fired clay
325	1	4	CBM
330	4	9	fired clay
364	1	1	small fragment of fired clay
378	2	23	fired clay
380	2	1	CBM
406	1	8	fired clay
426	2	8	fired clay
468	13	50	fired clay
470	1	7	fired clay
472	2	5	fired clay
488	2	28	daub, smoothed & perforated
497	1	7	daub
497	2	62	daub, burnt
503	2	11	daub, slight wattle impressions?
503	8	12	daub, smoothed & perforated
506	4	6	CBM
512	1	3	daub
525	39	118	fired clay
525	3	171	fired clay, smoothed
564	1	5	daub
611	1	13	fired clay
621	1	1	small fragment of fired clay
636	2	17	fired clay
639	2	19	fired clay

646	4	22	fired clay
652	1	1	small fragment of fired clay
659	1	48	fired clay, small perforation
660	41	135	daub, wattle impressions
660	10	73	daub, wattle impressions?
660	11	40	fired clay
661	1	3	fired clay
675	1	3	fired clay
675	4	50	daub, perforation
681	1	7	fired clay, perforation
701	4	18	fired clay
719	7	47	fired clay, kiln lining? From sample 68
725	1	1	fired clay
725	42	417	fired clay
739	1	1	small fragment of fired clay
776	20	77	daub, perforation, loom weight
776	1	5	small fragment of fired clay
802	4	28	CBM
810	3	11	CBM

The Worked Stone John Thomas

(with geological identification by Kay Hawkins)

Introduction

The worked stone assemblage from Hallam Fields (summarised in Table 17) comprises 19 examples, including saddle and rotary querns as well as a possible whetstone and mortar. A further three fragments were examined but thought probably to be unworked.

Table 17: Summary of worked stone by object and stone type

	Quartzitic Sandstone	Micaceous Sandstone	Mountsorrel Granite	Charnwood Agglomerate	Totals
Saddle quern	9	-	2	4	15
Rotary quern	2	-	-	-	2
Other	1	1	-	-	2
Totals	12	1	2	4	19

Lithology

Four different stone types are represented, most of which could have been freely available in the local clays and gravels on which the site was located. Eleven quernstones were made on boulders of quartzitic sandstone, the majority of which were most likely collected locally, while the two rotary querns probably represent imported items. The toughness and resilience of the locally available sandstone cobbles appears to have been very suitable for their use as grinding stones as similar examples have been found on other broadly contemporary sites in the area such as the nearby site at Wanlip (Marsden 1998) to the north of Hallam Fields; Beaumont Leys (Thomas 2008); Humberstone Elms Farm (Roe 2000) and Humberstone Manor Farm (Roe and Thomas 2008). Two querns were also made of Mountsorrel Granite and a further four on igneous rock. Both types could also have been collected locally, however the regularity of form displayed by the four igneous querns might suggest they were imported „ready mades' (see below).

Morphology

Both saddle and rotary quern types are represented here although the assemblage is dominated by saddle querns. Saddle querns can generally be classified as „formed', with evidence of deliberate shaping, or „unformed', with little or no evidence of shaping (Shaffrey 2007, 87). The Hallam Fields saddle querns were predominantly „unformed' examples, utilizing locally available stones or boulders from the clay subsoil. A number of these had evidently been chosen for their relatively „flat' overall shape, requiring little or no modification other than preparing the grinding surface – which generally appears to have been achieved by pecking. Several other sandstone examples however had relatively unwieldy bases that must have once been set in the ground to make them more manageable. One example (SF607) appears to have undergone reworking on its underside, presumably to make it easier to use. Another unstratified example (SF 714) has two worn surfaces, suggesting it has been re-used for similar purposes.

In contrast to the majority of sandstone examples the four saddle querns made on igneous rock (Charnwood agglomerate) have very similar dimensions and appear to have either been deliberately chosen according to size, or manufactured according to a desired outcome („formed' examples). Interestingly, similar examples also on igneous rock, have recently been found on Iron Age settlements at Beaumont Leys (Thomas 2008) and Humberstone, Manor Farm (Roe and Thomas 2008). The similarity in form of these particular querns between the three sites is striking and may indicate something more than casual collection from the local area. It seems a distinct possibility that these objects were imported to the site, most likely from the Charnwood Forest area to the north-west.

Two examples of rotary quern from the site also probably represent imported items (SFs 545 and 712). They are both lower stones from rotary querns of the „Beehive' type, with similarities to Hunsbury type querns as found in abundance at Hunsbury hillfort Northamptonshire (Ingle 1993/4). SF 712 is a particularly fine, complete example. Locally, similar examples have also been found at Earl Shilton (Thomas forthcoming) and Enderby I (Clay 1992, 54 and Fig. 30.5), also both Hunsbury types.

Apart from the querns two other examples of worked stone were recovered. SF558 is a large sandstone boulder with a shallow circular depression worked into the top. This may have functioned as a mortar. The second object (SF711) is a naturally shaped „wedge' of sandstone with two noticeably worn edges that may have been used as a whetstone or hone of some sort.

Context

Almost all of the worked stone was recovered from secure archaeological contexts, with only two unstratified items present (for distribution see Figure 121). There is a slight bias in the distribution of the stratified examples towards the northern part of the site, particularly concentrating on Enclosure II. The majority of querns were recovered from pits or post-holes although a number were also found in gullies and enclosure ditches. Several small groups of querns were recovered from particular features or groups of features, perhaps indicating activity areas. Three saddle quern fragments were found together with heat cracked stones and large quantities of pottery at the base of the ditch in the north-west corner of Enclosure I (503-[502], SF604-6). Within the southern half of Enclosure I two saddle querns were also recovered from a curving gully (78-[231], SF 531 and 603). In other areas querns were deposited in pits alongside burnt stones (SF 607, SF 636 and 859) although they themselves were not burnt, perhaps suggesting deposits of domestic debris. The two rotary querns were both found in pits, one in each of the main enclosures. The possible mortar (SF558) was found in close proximity to Enclosure IIB, which appears to have been a metalworking area. It is possible therefore that the mortar played some part in the metalworking process.

Dating

The site can be broadly dated to the Middle-Late Iron Age based on ceramic finds and radiocarbon dates. The saddle querns are likely to be the earlier of the two types as the use of these generally precedes that of rotary querns. The early-middle Iron Age site at Beaumont Leys was associated with a large assemblage of saddle querns (Thomas 2008) and the Mid-Late Iron Age sites at Elms Farm and Manor Farm, Humberstone also had significantly more saddle querns, with only a few rotary querns finding their way onto the site towards the end of the Iron Age (Roe 2000; Roe and Thomas 2008). This sequence fits the general model for the development of quern technology although it is clear that saddle querns had a fairly long currency. In some cases there is also evidence for the early introduction of rotary querns, for example the earliest examples from Leicestershire were found at the nearby Middle Iron Age site at Wanlip (Marsden 1998). Generally however these are thought to be a later innovation. At Humberstone, Elms Farm/Manor Farm the rotary querns appear in the later phases of occupation, towards the end of the first century BC (Roe 2000; Roe and Thomas 2008). The Enderby example was also associated with later phases of the sites occupation, thought to date to the Late Iron Age.

Discussion

The quality of the worked stone assemblage from Hallam Fields adds significantly to the understanding of Iron Age quern use in Leicestershire, and represents an important group in comparison to other broadly contemporary settlements in the East Midlands. The assemblage is particularly important given the predominance of saddle quern technology, as relatively few excavated Iron Age sites in Leicestershire have produced such evidence in quantity. Only a few contemporary finds, from Breedon-on-the-Hill (Wacher 1964, 132 and 1978, 7), Wanlip (Marsden 1998), Gimbro Farm, Castle Donington (Derrick 1999), and Elms Farm/, Manor Farm, Humberstone (Roe 2000; Roe and Thomas 2008) are available for comparison. The presence of rotary querns in small numbers is also an important element of this assemblage and adds to a growing number of settlements where both saddle and rotary types have been found together. The persistence of saddle quern use into the Later Iron Age at sites such Hallam Fields and Humberstone may suggest a fairly conservative tradition, perhaps partially driven by the local availability of suitable stone. It is probable despite this, that some imports were finding their way to the site as seen in the collection of saddle querns made on igneous rock from the Charnwood area. The two rotary querns are also likely to have been imported items and may indicate that the site acquired wider trade links. The presence of saddle and rotary querns, apparently in use at the same time, might also suggest that each type was used for a different function.

The overall size of the assemblage is comparable with that from Manor Farm, Humberstone and Beaumont Leys both of which were also dominated by saddle querns, utilising variable geologies as raw materials (Thomas 2008b, 2008c). The assemblage contrasts sharply however, with other smaller excavated Iron Age sites from the region which have produced far fewer querns. For example only four pieces were associated with the enclosed settlement at Gimbro Farm, Castle Donington, two from Enderby I (Clay 1992), a single broken fragment from Hinckley (Chapman 2004) and none from the farmsteads at Enderby II and Huncote (Meek *et al* 2004). The larger groups such as this from Hallam Fields, perhaps reflects the longevity and size of the settlement.

Catalogue of illustrated querns

Figure 76:

1) **SF 531** Saddle quern, mostly complete. Grinding surface very smooth, prepared by pecking and concave from end to end. Igneous rock. 250 x 160 x 40mm, 2.2kg. Context: (78) [231]

2) **SF 545** Approximately one quarter of Hunsbury type rotary quern (lower half). Outer surface well prepared/shaped by pecking. Grinding surface very smooth and concave with pronounced „lip' on outer edge. Traces of the central spindle hole survive, as well as several 2-3mm deep gouges on grinding surface. Quartzitic sandstone. 170 x 180 x 70mm, 3.6kg. Context: (79) [192]

Figure 77: Illustrated querns 3 – 4

3) **SF 546** Almost complete saddle quern with a small chunk missing from one end. Made on an irregular, sub-rectangular boulder. Underside is rounded but unworked. Grinding surface is prepared by pecking, very smooth and concave from end to end. Mountsorrel granite. 290 x 190 x 80mm, 7kg. Context: unstrat.

4) **SF 558** Large rounded boulder with circular depression in centre of top surface. This is 70mm diameter x 2-3mm deep and has been pecked out. Possible pestle or pivot stone? Fine grained quartzitic sandstone. 230 x 175 x 90mm, 8kg. Context: (542) [539]

Figure 78:

5) **SF 603** Mostly complete saddle quern, broken at both ends but whole length can be seen from what remains. The piece generally follows the natural shape of the stone but some pecking on the underside indicates minimal preparation of this area. Grinding surface has been prepared by pecking, smooth and concave from end to end. Igneous rock. 320 x 170 x 50mm, 4.5kg. Context: (78) [231]

6) **SF 702** Saddle quern – 2/3 complete with one end now missing. Made on regular elongated rectangular shaped boulder. Grinding surface prepared by pecking, very smooth and concave from end to end. Fine grained quartzitic sandstone. 240 x 200 x 35mm, 5.1kg. Context: (725) [724]

Figure 79**:**

7) **SF 712** Complete lower rotary quern, Hunsbury type. Majority of outer edge prepared by pecking, flat base. Grinding surface also prepared by pecking, now worn smooth with a concave profile with pronounced dishing up to the outer edges. A spindle hole (20mm diameter x 10mm deep) is located slightly off-centre. Quartzitic sandstone. 335mm overall diameter x 100mm thick, 16kg. Context: (833) [835]

8) **SF 714** Saddle quern, broken fragment of large original piece made on irregularly shaped boulder. Upper grinding surface is very smooth with a pronounced concave profile from end to end. Underside has also been worked smooth suggesting re-use. Quartzitic sandstone. 255 x 220 x 60mm, 810kg. Context: unstrat.

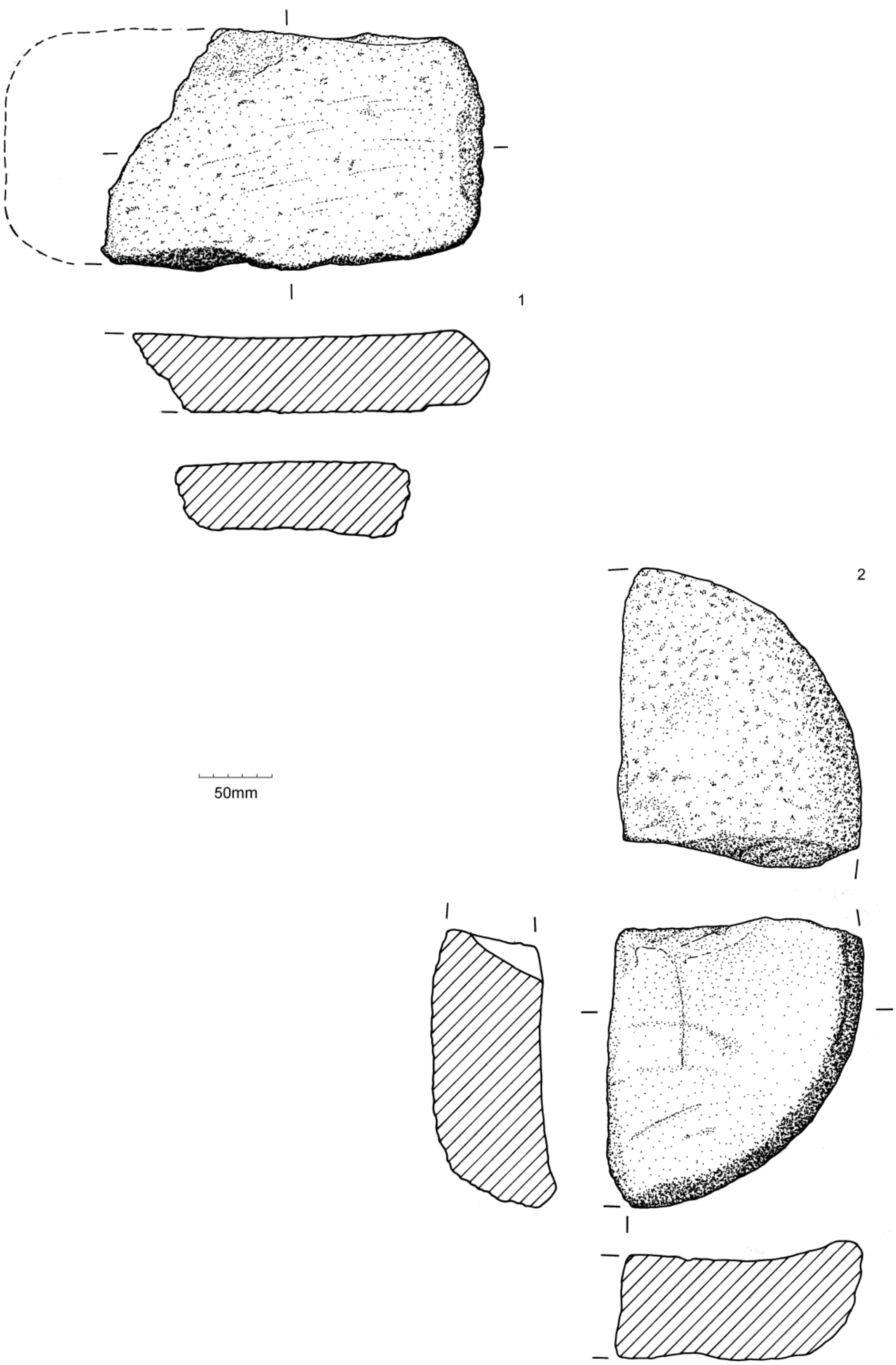


Figure 76: Illustrated querns 1- 2

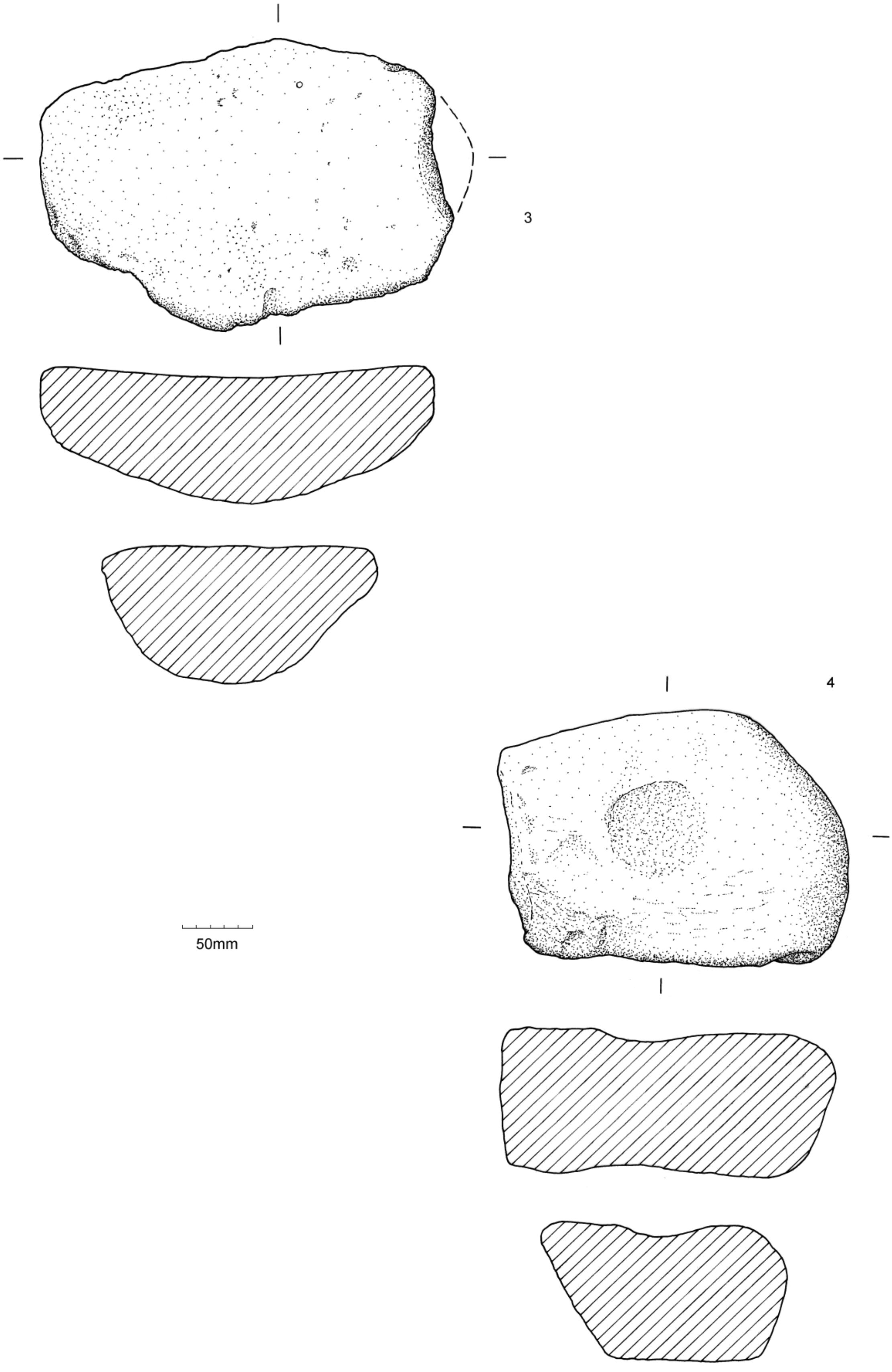


Figure 77: Illustrated querns 3 – 4

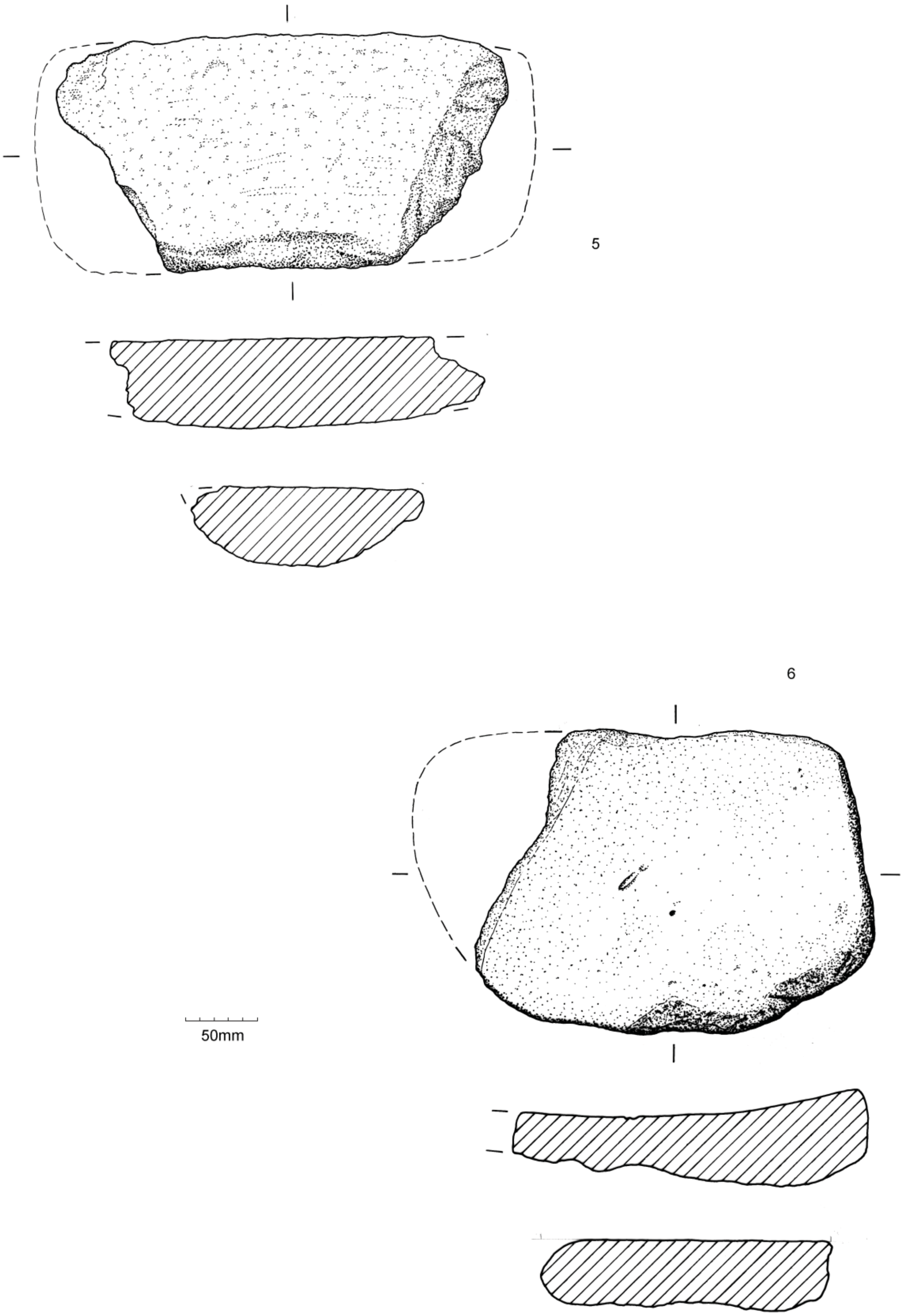


Figure 78: Illustrated querns 5 – 6

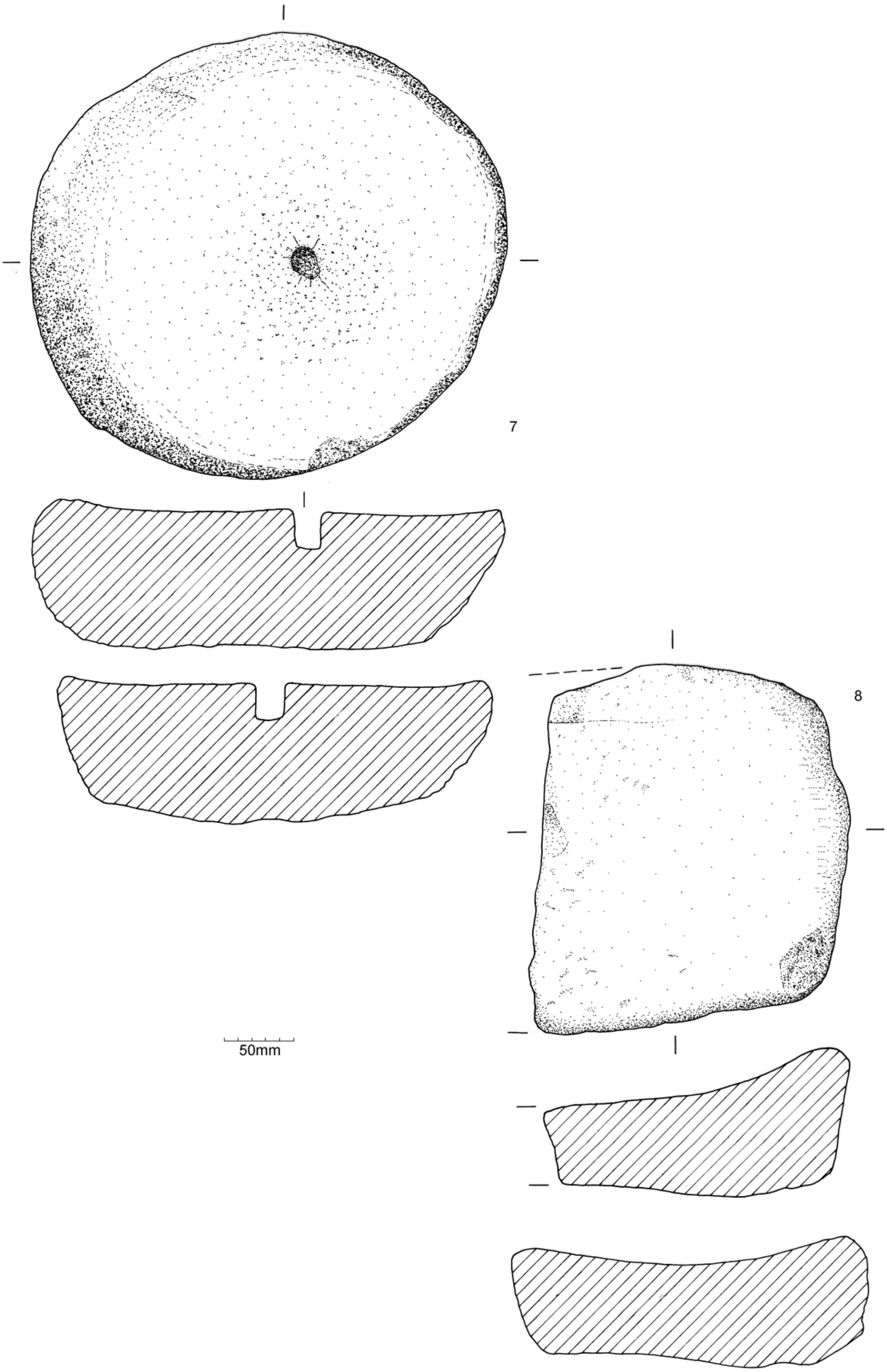


Figure 79 Illustrated querns 7 – 8

The Animal Bone — Jennifer Browning

Introduction and Methods

A very small assemblage of animal bone, comprising 523 fragments, was hand-recovered from enclosures, ring gullies and pits of predominantly middle to late Iron Age date. The wide date range of the parent deposits is typical of sites of the middle to late Iron Age in this region where dating based on the pottery assemblage can seldom be defined more closely. The bone was generally in very poor condition; fragmentary, with common exfoliation, root etching and erosion of the bone surface. All of these factors inhibited identification of species as well as examination for butchery marks, pathologies and other modifications. A small number of fragments were recovered from the bulk environmental samples; however, only a single fish vertebra (Sample 51.1 context 470) was identifiable.

Bones were identified using the skeletal reference collection housed at the School of Archaeology and Ancient History (University of Leicester) and recorded into the ULAS animal bone database. Information on bone element, completeness, species, state of fusion and condition was recorded for each specimen and butchery, burning, pathologies and tooth wear were noted where present. Measurements were taken as appropriate following von den Driesch (1976). Recording of tooth eruption and wear for cattle, sheep and pig followed Grant (1982).

Where fragments were not diagnostic enough to identify to species, they were assigned to one of the following categories based on characteristics such as size and thickness of the cortical surface: „cattle-size’, representing fragments that could conceivably belong to cattle, horse or red deer; „sheep-size’, representing undiagnostic fragments of sheep, pig, roe deer or possibly dog. The remainder were classed as unidentified mammal or bird.

Results

Poor preservation and extensive fragmentation is reflected in the fact that only 14% of the assemblage (*n*=71) was identifiable to species.

Table 18: Number of identified specimens from each Group (hand-recovered)

Group	Cattle	Pig	Sheep/goat	Deer	Dog	Horse	Crane	Lge Mml	Med Mml	Unidentified
Not grouped	16	1	1			2		100	1	65
01									2	18
02	2							2		
04										6
06								2		
07								1	1	
08			2					1		15
11	1							23		
12	1		1					6	5	11
13	1					3		37		2
14	1							4	1	
17						1				
18								28		
32	7		1			2	1	25	12	2
33	5			1				18		14
34	1				1			1		
36	5		3	11				29	10	10
Total	**40**	**1**	**8**	**12**	**1**	**8**	**1**	**277**	**32**	**143**

Cattle

Cattle bones were the most numerous of the recorded species (*n*=40) and occurred widely in deposits across the site, although not in sufficient quantities to allow analysis of skeletal representation. No unfused bones were observed. Tooth wear data was very sparse, although the presence of a heavily worn deciduous fourth premolar indicated the presence of juvenile animals. A degraded mandible with the second and third molar in wear came from an adult animal.

Table 19: Recorded wear on cattle teeth (after Grant 1982)

Context	Group	Group Description	Species	Record	Dp4	p4	m1	m2	m3	Comments
672	13	Round gully area within enc II	Cattle	99	j					
980	32	Enclosure Ditch Rectangular enclosure (area 3)	Cattle	149				g	c	

Butchery marks recorded on cattle and cattle-sized bones indicated that both sharp knives and a heavy implement, such as a cleaver, were used to butcher the carcasses.

Sheep/goat

A small number of sheep/goat bones were recorded (*n*=8), occurring in Group 08 (pits on north edge of Enclosure I), Group 12 (intercutting pits at north-west corner of Enclosure I), Group 32 (enclosure ditch from rectangular enclosure) and Group 36 (features from evaluation trenches in field 2). However, the occurrence of sheep-sized shaft fragments does suggest that their distribution was originally more widespread. Both teeth and limb bones were represented. It was not possible to distinguish between sheep and goat on the basis of this sample. No fusion surfaces had survived and the only available ageing data was a heavily worn deciduous fourth premolar, suggesting the presence of a juvenile animal. A single bone was butchered.

Table 20: Recorded wear on sheep/goat teeth (after Grant 1982)

Context	Group	Group Description	Species	Record	Dp4	p4	m1	m2	m3	Comments
53	36	Features from evaluation trenches (Field 2)	S/G	41	K					

Pig

Pig was represented by only one example, a maxillary fragment from context 975 (ungrouped). This is perhaps unsurprising as pigs were usually slaughtered at a young age and juvenile bones tend to survive less well than adult bones, due to their greater porosity means that they fragment more easily.

Horse

Horse bones (*n*=8) were identified in five contexts across the site. The best preserved bones, a near complete radius and partial tibia, were recovered from context 980, an enclosure ditch in area 3. There was no evidence for young animals, as all the recorded bones were fused. Gnawing was noted on a single element and a phalange had a chop mark, although this may have been modern damage. An extremely degraded pair of horse mandibles, almost certainly from the same individual, was recovered from context 674 (Group 13: Round gully within enclosure II). All permanent teeth were apparently fully erupted and in wear, suggesting that the animal was at least four years old (Getty 1975, 470).

Dog

Dogs are represented by a single canine tooth recovered from an isolated pit in Area 2 (context 993). However, the presence of dogs at the site is further suggested by signs of gnawing noted on a small number of bones (*n*=6).

Wild Animals

Red deer are represented by fragments of antler and a premolar from a single deposit (context 53), in evaluation trenches in Field 2 (Group 36). The antler was shed and had therefore been collected from the woodland floor; it was probably intended for working. The presence of the tooth suggests that deer were also hunted but the low numbers of deer bones suggest that did not contribute significantly to the diet.

There are no small mammal bones or bird bones from small species. Fish were represented by a single vertebra (Sample 21; context 470) within an enclosure ditch in Area 3. A distal tibiotarsus from a crane species (*cf Grus grus*) was also retrieved from an enclosure ditch in Area 3 (context 980).

Pathologies and Burning

Unsurprisingly, given the poor condition of the assemblage, no pathological conditions were observed. Calculus, common on animal dentition, was noted on cattle teeth from the site.

The majority of burnt bones were recovered from Group 36 (evaluation features in field 2) and comprise a mixture of scorched, charred and calcined bones, indicating the presence of fires in the vicinity. Small numbers of calcined bones were also recovered from contexts in Enclosure 1 (355 and 639) and Enclosure II B (446).

Discussion

The animal bone assemblage was extremely small considering the extent of the observed archaeology. This can largely be attributed to poor preservation of bone due to adverse soil conditions. The natural substrata were sands and gravels, which were evidently not conducive to bone survival. There is a consequent bias towards larger species such as cattle and horse and survival of tooth enamel, which is more durable than bone (Reitz and Wing 1999, 184). In addition, juvenile animals are likely to be under-represented as the greater porosity of their bones makes them more susceptible to damage or destruction. Inevitably, therefore, only a fraction of the bone originally deposited is likely to be represented in this report.

The species present are generally typical of a settlement site of this date, dominated by domestic animals. Unfortunately the small size of the assemblage precludes analysis of patterns of rubbish disposal or consideration of husbandry regimes. However, it is interesting to note that most of the animal bone was recovered from Areas 2 and 3, in (apparent) open fields away from the enclosed settlement in the south in Area 1. It is possible that bone survival was better in the deeper and more substantial features associated with the field systems.

Of interest is a bone of crane, which had probably survived due to its robustness. Cranes (*Grus grus)* are large birds of the open wetlands and have been recorded at a small number of British Iron Age sites but more commonly on Roman sites (Yalden and Albarella 2009, 97 and 109, table 5.2). The Birstall specimen was slightly larger than a *Grus grus* used for comparison (see *Introduction*); similarly an example retrieved from medieval contexts at Austin Friars in Leicester was considered larger than a common crane (Thawley 1981, 175). However, archaeological and historical records suggest that common crane (*Grus grus*) is the most likely species for the Birstall bone (Yalden and Albarella 2009, 214), which may be a large male bird. Cranes have traditionally been regarded as edible and were certainly consumed in the Roman period (Yalden and Albarella 2009, 111). They were formerly summer residents in Britain (Serjeantson 1998, 24) and the specimen incorporated into the archaeological deposits at Birstall may represent either a natural mortality or the remains of an unlucky bird which was caught and eaten.

The Charred Plant Remains

Alistair Hill

Introduction

Samples were taken to facilitate the recovery of preserved plant remains. The collection and analysis of archaeobotanical evidence from archaeological sites presents archaeologists with a very distinctive range of data that can be used to interpret the diet, human activity, agriculture and economic systems of past societies, „almost all plant species attested for on archaeological sites have economic implications, either of direct or of indirect nature' (van Zeist 1991:109).

Preservation

The survival and quality of plant material at archaeological sites is mainly determined by the taphonomic conditions present at an excavation site. These conditions include the mode of preservation, the surrounding organic evidence and the local or regional climate. In the case of Hallam Fields, the archaeobotanical remains from the excavations were found to have been preserved through carbonisation. Carbonisation occurs when the botanical material has been subjected to fire, which in most cases preserves a carbonised morphological structure of the material that is not subject to biological decay but is susceptible to mechanical damage (Moffett 1993).

Methods

Using a judgemental sampling strategy, the archaeobotanical samples were taken from discrete datable contexts identified as having the potential to contain charred plant remains. A total of 73 samples from a range of contexts including pits, gullies, ditches and post-holes was processed. The samples ranged in size from 10 to 30 litres and were divided in one to three parts of approximately 10 litres prior to being processed by wet sieving in a York tank with a 0.5mm mesh and flotation into a 0.3mm sieve. The residues were air-dried and the fraction over 4mm sorted for all finds, the fine fractions of residue being reserved for analysis. The analysis of the 106 flotation fractions (flots) was carried out by scanning and 100% sorting each flot using a binocular microscope with magnification settings of between x7 and x40. The carbonised plant remains (except charcoal) were separated from the flots and stored separately as either cereal grain, chaff, weed seeds and nutshells prior to being identified further. The University of Leicester's environmental laboratory's modern seed reference collection and reference manuals (e.g. Anderberg 1994, Berggren 1969, 1981 and Cappers *et al* 2006) were used to identify (subject to the degree of preservation) the morphological characteristics of the archaeobotanical evidence found in each of the samples.

Numerical quantification, by species, of the grains, pulses, fruits, nuts and seeds from each sample was carried out using the following methodology. For cereals, each grain present in the assemblage was counted as one. Where fragments of grain were present an estimate of the number of whole grains this would have represented was made by combining fragments. This method was also used in the counting of the pulses and nuts present in the assemblage. The weed seeds, although generally poorly preserved, in common with the rest of the archaeobotanical assemblage were counted as one unless they could be identified as fragments of a fractured large weed seed (following van der Veen 1992). The results of the analysis, by sample, was recorded using a Microsoft Excel spreadsheet and subsequently each sample was grouped in line with the context groups from the site with totals tabulated to illustrate the distribution of plant remains across the site (Table 1). There were only six groups with over 40 charred/carbonised items were found during the assessment (Table 1) – Groups Enclosures I & II, GP01, GP06, GP12 and GP17.

Table 21: Abundance of charred/carbonised plant remains by context group

Group	Samples	Total Litres	% Contexts + Cereal Grains	Gr	Cf	Se	Nut	Total Items*	Description
Enc. I	8	90	56.8	50	7	31	-	88	Ditched enclosure
Enc. II	9	79	36.9	24	11	30	-	65	Small ditched enclosure, N of enclosure I
GP 01	6	47	65.1	28	2	12	1	43	Gully, enclosure I. Phase A
GP 02	6	47	16.7	1	0	5	-	6	Gully, enclosure I. Phase B
GP 03	5	26	55.6	5	1	3	-	9	Post-holes, within GP 01 & 02
GP 04	1	5	50	2	0	2	-	4	Gully, SW Enc I
GP 05	2	16	6.7	1	2	12	-	15	Pits, within GP 04
GP 06	2	15	30.4	14	1	31	-	46	Pits, between RH and SW in enclosure I
GP 07	1	10	100	1	0	0	-	1	Pits and feature, centre enclosure 1
GP 08	1	10	25	1	0	3	-	4	Pits, along and inside enclosure I
GP 10	6	71	14.3	3	1	17	-	21	Pits
GP 11	1	12	44	11	0	14	-	25	Feature within enclosure II's sub-enclosure
GP 12	8	55	48.7	55	17	41	-	113	Pits, NW corner of enclosure I
GP 13	1	4	90.9	20	0	2	-	22	Round gully area within enclosure II
GP 15	1	5	66.7	2	0	1	-	3	Pits, W of enclosures I & II
GP 17	4	50	49.3	139	55	88	-	282	Pits, NW of enclosure II
GP 18	1	7	100	1	0	0	-	1	Features, N of enclosure II
GP 22	1	5	100	1	0	0	-	1	Feature, hearth
GP 23	6	70	36.4	8	4	10	-	22	Pits, within roundhouse in enclosure I
GP 35	1	14	60	3	0	2	-	5	Ditch fill
Unk.	2	14	80	4	0	1	-	5	Unknown
									*Excludes indet wild plants

The most productive samples/contexts from these groups were tabulated together with other representative samples/contexts from other context groups (GP05, GP10, GP11 and GP13) containing 10 or more charred/carbonised items (Table 22). The archaeobotanical remains recorded were in general terms either grains or seeds unless otherwise stated and the plant names and order follow Stace (1997).
The relative proportions of charred/carbonised grain, chaff and weed seeds found in an archaeobotanical assemblage can provide evidence of the agricultural processes, such as crop processing, associated with a particular archaeological site (Hillman 1981, 1984; Jones 1985). In order to examine this, the ratio of weeds to grains was calculated for these samples with 10 or more items per sample and is shown in Table 23 (Charred plan remains list over page).

Sample No.	57	10	49	53	56	75	27	50	13	54	62	77	67	38	76	
Phase	BA/IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	IA?	
Area	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Group	10	Enc.I	Enc.I	Enc.I	Enc.I	Enc II	01	05	06	11	12	12	13	17	17	
Context	640	166	470	504	639	854	292	449	81	525	629	759	672	406	725	
Feature Type	Pit fill	Burnt pit	Ditch fill	Burnt layer	Ditch fill	Feature fill	Gully fill	Pit fill	Pit fill	Pit fill	Pit fill	Pit fill	Pit fill	Pit fill	Post fill	
Grains																
Triticum cf. dicoccum							1						3	3		Emmer
Triticum spelta L.			1								3	1	1	3	7	Spelt
Triticum cf. spelta						4				4	6			4		Spelt
Triticum sp.			5									4		8	9	Wheat
cf. Triticum			3		2	1			4	1				3	3	Wheat
Hordeum			8		3		2					2		9	2	Barley
cf. Hordeum					2		1				2	1	2	6	5	Barley
Cerealia indet	1		17		2	10	18	1	10	6	20	10	14	51	25	Cereal
Cereal Chaff																
Triticum spelta glume bases		2				4		1	1		7			7	19	Spelt
T.dicoccum/spleta glume bases						6	1				2			7	20	Emmer/Spelt
Culm nodes			2	3			1	1				8		1	1	Cereal stems
Other plants																
Corylus avellana L.							1									Hazelnut
Caryophyllaceae sp(p).								1							16	Pink family
Stellaria sp(p).						1				1	1				3	Stitchwort family
Chenopodium sp(p).	2	2		1	1	1		1	2	3		3			4	Goosefoots
Polygonaceae sp(p).	1						2			1					5	Knotweed family
Persicaria lapathofolia L.					1											Pale Persicaria
Polygonum aviculare L.											1					Knotgrass
Rumex sp(p).	2							1	4		1	2		2	1	Docks
Malva sp.	1															Mallow family
Fabaceae sp(p). small							5	5	6	3	1	2	2	3	3	Small legumes
Vicia sp(p).	1									1						Vetch family
Lathyrus sp.										1						Pea family
Solanum nigrum L.						3										Black Nightshade
Plantago sp.															1	Plantains
Galium aparine L.				5						2						Cleavers
Galium sp(p).														1		Bedstraw family
cf. Galium															1	Bedstraw family
Cyperaceae sp(p).	2															Sedge family
Carex sp(p).		2										5				Sedges
Avena sp.		1	13			5										Oat(wild)
cf. Avena	1		1				1		13		5					Oat(wild)
Bromus hordeaceus/secalinus L										1		2		18	7	Brome grass
large grass							2	1	3					5	12	Large grass
small grass						1			3	1				2	3	Small grass
indet		5	1	3	3			2		1				1		indet.
Totals	11	12	51	12	14	36	35	14	46	26	49	40	22	134	147	
Sample vol.Lts.	7	8	11	4	14	4	12	11	10	12	4	6	4	11	20	
Flot vol.mls	50	40	80	83	40	40	<17	<20	20	56	30	100	30	50	70	
Items/litre	1.6	1.5	4.6	3.0	1.0	9.0	2.9	1.3	4.6	2.2	12.3	6.7	5.5	12.2	7.4	Ave = 8.5
Glume base/grain ratio	n/a	n/a	0.0	n/a	0.0	2.0	1.0	n/a	0.3	0.0	1.0	0.0	0.0	0.7	2.1	
Weed/Grain ratio	10.0	n/a	0.4	n/a	0.2	0.7	0.5	9.0	2.2	1.3	0.3	0.8	0.1	0.4	1.1	

Table 22: Charred plant remains list

Results

Charred plant remains were found in 61 of the 73 samples (from 21 context groups) recovered. However, across the range of samples containing archaeobotanical remains, the numbers of charred/carbonised plant items present per sample varied considerably with 46 of the samples (75%) containing less than 10 items. Of the 15 samples (Table 23) containing 10 or more items of charred/carbonised plant remains, 12 contained evidence of cereals including glume wheat chaff. The most common cereals found at Hallam Fields were spelt wheat (*Triticum spelta*), emmer wheat (*Triticum* cf. *dicoccum*) and barley (*Hordeum*). Oat (*Avena* sp.) was present in 11 of the samples. However, as both the size of the grains and the quantities involved were relatively small it was probable that they were representative of a wild variety growing as a weed in the main crop, but due to the absence of oat chaff this could not be confirmed. A number of samples (27, 50, 13, 54, 77, 38 and 76) across context groups GP01, GP05, GP06, GP11, GP12 and GP17 respectively contained large grass seeds including brome grass (*Bromus hordeaceus* or *secalinus*). Brome grass is a weed commonly associated with cereal crops. However, Jones (1988) also suggests that in past agricultural regimes it may have been grown as part of the cereal crop.

Samples 57 and 54 contained leguminous seeds tentatively identified as vetch (*Vicia* sp.) and pea (Lathyrus sp.) that may be representative of food plants cultivated either for animal fodder or human consumption. The only other possible food plant represented in the assemblage was a fragment of hazelnut shell (*Corylus avellana*) found in sample 27. Hazelnuts were likely to have been gathered as a food supplement from the surrounding environment. However, there is insufficient evidence to suggest any specific type i.e. woodland margin, scrubland or hedgerow.

The majority of samples in the assemblage contained charred/carbonised weed seeds from plant species that are mainly associated with disturbed ground and as such are typical arable weeds. These included goosefoots (*Chenopodium* sp.), stitchwort/chickweeds (*Stellaria* sp.), knotgrasses (*Polygonum* sp.), docks (*Rumex* sp.) and cleaves (*Galium aparine*). Nine of the samples also contained small leguminous weeds that probably are representative of crop weeds.

In addition, 71 out of the 73 samples contained uncharred seeds mainly typical of arable/disturbed land including goosefoots (*Chenopodium* sp.), stitchwort/chickweeds (*Stellaria* sp.), knotgrasses (*Polygonum* sp.), common poppy (*Papaver rhoeas*), fumitories (*Fumaria* sp.) and ivy-leaved speedwell (*Veronica hererifolia*). Amongst the uncharred seeds was evidence of fig (*Ficus carica*) in sample 47 and grape (*Vitis vinifera*) in sample 17 and 66. These „exotics' were probably deposited as a result of modern manure spreading. The porous soil conditions found at Hallam Fields are likely to have been a major contributor to the contamination of the archaeological layers with uncharred material.

Evidence of iron working, in the form of hammerscale/iron droplets was found in 15 of the samples. With the exception of samples 63 and 66 (cremation GP10) all others were in context groups in association with the 2 enclosures (Enclosure I – samples 6,8,9,14,20,27,28,35,49 and 68, Enclosure II – samples 11,13 and 17).

Discussion and Conclusions

Ethnographic studies have illustrated how the processing of cereal crops prior to storage or consumption can change the composition of the assemblage. Using these studies as a guide and the fact that it is generally recognised that „carbonised seed assemblages consist largely of remains of harvested grain crops and their associated impurities' (Van der Veen 1992:81). Archaeologists can now attempt to identify the various stages in crop processing from the composition of carbonised archaeobotanical remains (Hillman, 1981).

In order to attempt to identify the crop processing stages associated with the Hallam Fields site the composition of those samples containing 10 or more charred/carbonised plant items (Table 23) were measured in the following ways:

1. A percentage breakdown in terms of major constituents (grain, chaff, and other plants) was calculated for each sample with >10 charred/carbonised items in order to provide a simple differentiator between samples (Fig.1). As can be seen from Fig.3 samples 27, 38, 49, 56, 62, 67, 75, 76, and 77 comprised of an assemblage where grain was the majority constituent.

2. The seed density per litre of processed sediment was calculated in order to access the distribution of the seeds (see Table 23). The average seed density per litre for the Hallam Fields samples was calculated to = 8.5 and is comparable to the seed density found at other MIA sites in the region - Wanlip and Humberstone (Monckton 2004). The distribution of seeds based on seed density at Hallam Fields shows that context groups Enclosure II, GP12 and GP17 all contained samples with a seed density above the site average. Further analysis on the chronological distribution of seeds, based on seed density, can be carried out when further dating information becomes available.

3. Glume base to grain ratio (see Table 23). This ratio is representative of the number of glume bases of wheat to wheat grains by sample. In those samples where the ratio value is high the crop processing stage interpretation for that sample is that it has originated from the residues associated with fine sieving. A ratio of ca.1 is representative of a complete spikelet. A ratio value of ca.0 represents cleaned grain. The analysis for Hallam Fields indicates that archaeobotanical assemblages in samples 75 and 76 (both associated with Enclosure II) may be interpreted as having originated from the residues associated with fine sieving. Samples 27 and 62 are representative of a complete spikelet and samples 49, 54, 56, 67 and 77 (all in association with the 2 enclosures) are representative of cleaned grain. However, the reliability of any results from a sample assemblage of less than 25 fragments is doubtful.

4. Weed to grain ratio (see Table 23). Calculated to establish a relationship between the numbers of weed seed present in a sample in relation to the grain. For the purposes of this report the numbers of wheat and barley seeds in each sample were combined. Samples that produced a high ratio value are interpreted as being evidence of sieving residue – samples 50 and 57. Low values are representative of cleaned grain – samples 13, 27, 38, 49, 54, 56, 62, 67, 75, 76 and 77

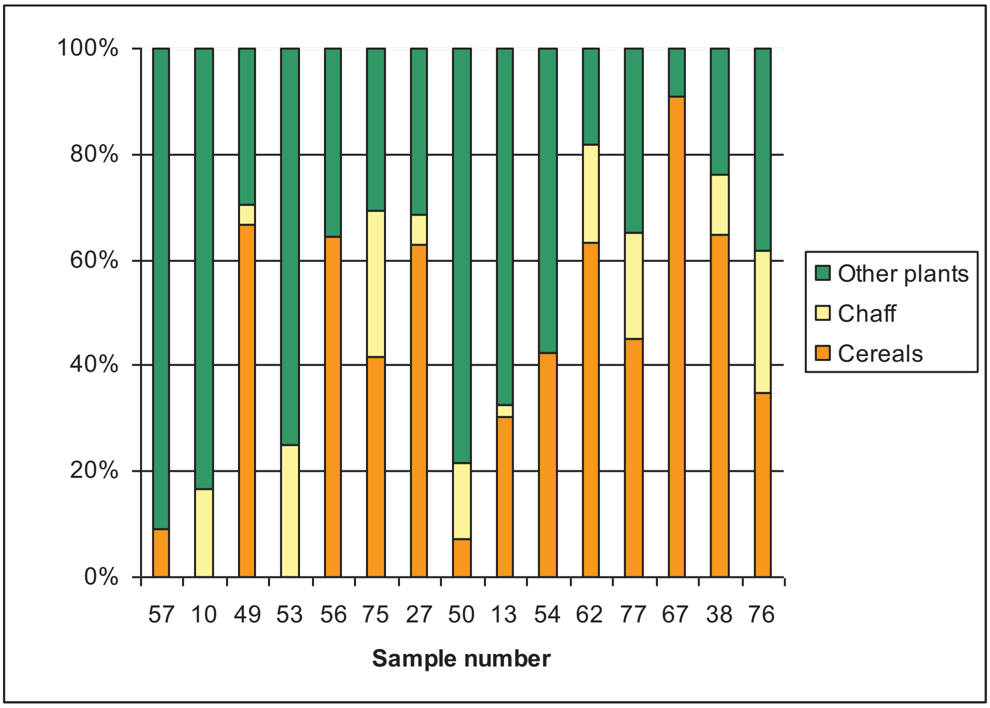


Figure 80: The proportional breakdown by major constituents.

Although chaff was found in 26% of the context samples, the low volume present in the samples would indicate that the glume wheat present in the archaeobotanical assemblage from Hallam Fields was either dehusked away from the settlement or the chaff was used or disposed of by means other than burning. With glume wheats (i.e. emmer and spelt) the grain is firmly secured in the chaff after threshing and requires additional processing in order to remove the grain from the husks preceding its use for food. Prior to dehusking it can be stored or transported in spikelet form with the chaff attached and in archaeological contexts, chaff waste and seeds are present on both consumer and producer sites (Hillman 1981). The grain, low volumes of chaff and the weed seeds present in the Hallam Fields archaeobotanical assemblages would indicate the cleaning and consumption of cereals, in the form of spelt, emmer and barley, on the site. Spelt, emmer and barley are typical cereals of sites of this period and region.

The weeds identified are typical of the soils associated with the site and the surrounding area and could suggest that the cereal varieties found in the assemblage could have been grown in the vicinity. The evidence for cleavers (*Gallium aparine*), an arable weed that germinates in the autumn, suggests that the cereal found in the assemblages was autumn sown. This is supported by the fact that wheat, usually considered as an autumn sown crop, was the most abundant cereal found in the samples analysed.

In conclusion, the charred/carbonised plant remains from the majority of the samples from the various pit, ditch and gully contexts associated with either Enclosure I or II are believed to be representative of domestic waste from the settlement. However, within group 17 and perhaps group 12 (pits associated with Enclosures II and I respectively), may be exceptions to the general depositing of domestic waste. In both context groups, the volume of cereal grain, chaff and weed seeds present would appear to indicate that they were deposited following being burnt together as opposed to general accumulation.

The plant remains also showed very limited evidence for legumes and gathered food.

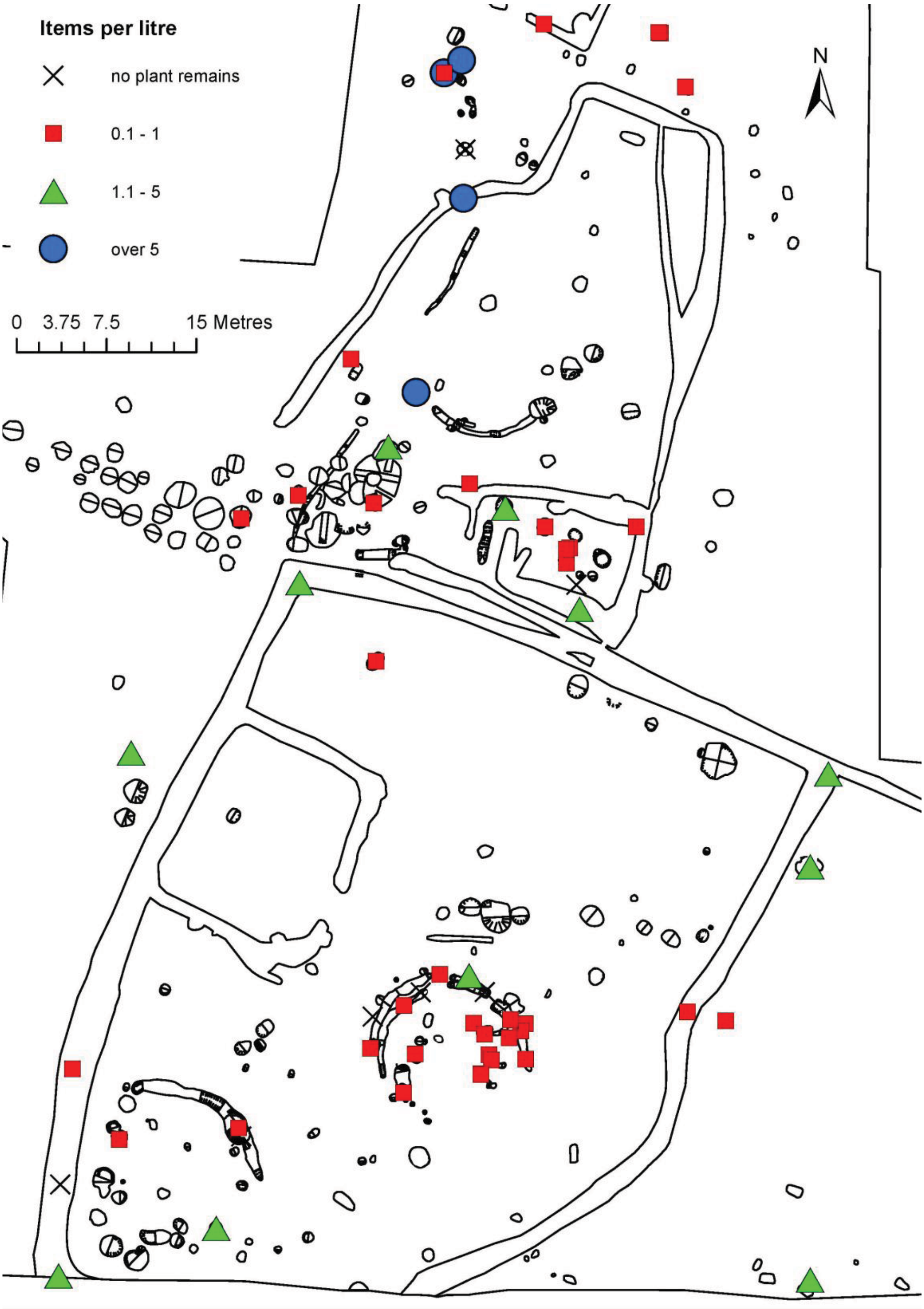


Figure 81: Plot showing charred plant remains by items per litre

Acknowledgements
I am grateful to Gavin Speed, the site director, for the information regarding the site, the staff at ULAS for the detailed processing of the samples and to Angela Monckton, ULAS Environmental Officer, for her assistance with the archaeobotanical identifications and production of this report. The analysis was carried out at the University of Leicester

Sample	Phase	Group	Context	Feature type	Samp. Vol.lts	Gr Ch.	Cf Ch.	Se Ch	Un Se	Chc	Sm Bo	Ch.Totals	Items/litre
10	IA	Enc I	166	Pit	8	0	2	10	+	+	-	12	1.5
45	IA	Enc I	417	Ditch	9	0	0	2	+	+	-	2	0.2
49	IA	Enc I	470	Ditch	11	34	2	15	+	+++	-	51	4.6
53	IA	Enc I	504	Layer	4	0	3	9	+	+++	-	12	3.0
56	IA	Enc I	639	Ditch	14	9	0	5	+	+	-	14	1.0
59	IA	Enc I	657	Ditch	12	7	0	1	++	+	-	8	0.7
61	IA	Enc I	666	Ditch	20	0	0	1	++	+	-	1	0.1
1	IA	Enc I	19	Pit	10	1	0	2	++	+++	-	3	0.3
40	IA	Enc II	442	Pit	8	0	0	1	++	+	-	1	0.1
41	IA	Enc II	415	Pit	10	1	0	2	++	+++	-	3	0.3
43	IA	Enc II	446	Sk/hole	16	2	1	5	++	+++	-	8	0.5
48	IA	Enc II	456	Ditch	8	2	0	2	++	+++	-	4	0.5
51	IA	Enc II	479	Ditch	6	2	0	5	++	+++	+	7	1.2
73	IA	Enc II	727	Gully	12	1	0	6	+	-	-	7	0.6
75	IA	Enc II	854	Feature	4	15	10	11	+	+++	-	36	9.0
27	IA	01	292	Gully	17	22	2	11	+	+	+	35	2.1
35	IA	01	393	Gully	10	1	0	0	++	+	-	1	0.1
37	IA	01	150	Gully	5	2	0	0	++	+	-	2	0.4
47	IA	01	378	P/hole	5	3	0	2	++	+	-	5	1.0
7	IA	02	144	Gully	7	0	0	2	+	+	-	2	0.3
25	IA	02	280	Gully	8	1	0	2	+	+	-	3	0.4
30	IA	02	324	Gully	16	0	0	1	+	+	-	1	0.1
6	IA	03	89	P/hole	4	1	0	0	+	+	-	1	0.3
8	IA	03	146	P/hole	5	1	0	1	+	+	-	2	0.4
11	IA	03	167	P/hole	5	0	1	0	++	+	-	1	0.2
12	IA	03	107	P/hole	5	1	0	2	+	+	-	3	0.6
21	IA	03	257	SmPit	7	2	0	0	+	-	-	2	0.3
14	IA	04	197	Gully	5	2	0	2	+	+	-	4	0.8
32	IA	05	357	Pit	5	0	0	3	++	+	-	3	0.6
50	IA	05	449	Pit	11	1	2	11	+	+	-	14	1.3
13	IA	06	81	Pit	10	14	1	31	+	+	-	46	4.6
17	IA	07	243	Pit	10	1	0	0	+	+	-	1	0.1
26	IA	08	312	Pit	10	1	0	3	+	+	-	4	0.4
57	BA?/IA	10	640	Pit	7	1	0	10	++	+++	-	11	1.6
66	IA	10	690	Crem.	10	1	1	4	+	-	-	6	0.6
70	IA	10	645	Grave	12	1	0	4	++	-	-	5	0.4
54	IA	11	525	Pit	12	11	0	15	+	+++	-	15	1.3
31	IA	12	355	Pit	5	0	0	2	+	-	-	2	0.4
62	IA	12	629	Pit	4	31	9	9	+	+	-	18	4.5
68	IA	12	719	Pit	16	2	0	5	+	+	-	5	0.3
71	IA	12	743	Pit	5	1	0	4	++	+	-	4	0.8
72	IA	12	745	Gully	9	1	0	3	+	+	-	3	0.3
77	IA	12	759	Pit	6	18	8	14	+	+++	-	22	3.7
78	IA	12	808	Post	5	1	0	4	+	+	-	4	0.8
79	IA	12	809	Post	5	1	0	1	+	+++	-	1	0.2
67	IA	13	672	Pit	4	20	0	2	+	+	+	22	5.5
69	IA	15	728	Pit	5	2	0	1	+	+	-	3	0.6
38	IA	17	406	Pit	11	87	15	32	+	++	-	134	12.2
39	IA	17	407	Pit	8	1	0	1	+	+	-	2	0.3
76	IA	17	725	Post	20	51	4	56	++	+	+	111	5.6
81	IA	18	843	Post	7	1	0	0	+	+	-	1	0.1
64	IA	22	702	Pit	5	1	0	0	+	+	-	1	0.2
5	IA	23.0	108.0	Pit	12.0	2.0	0	1.0	+	+	-	3	0.3
9	IA	23	148	Pit	15	0	1	0	+	+	-	1	0.1
19	IA	23	86	Pit	12	2	2	5	+	+	-	9	0.8
20	IA	23	259	Pit	10	4	0	2	+	+++	-	6	0.6
22	IA	23	267	Pit	11	0	0	1	+	+	-	1	0.1
24	IA	23	276	Pit	10	0	1	1	+	+	-	2	0.2
4	IA	35	108	Ditch	14	3	0	2	+	+++	+	5	0.4
29		Un	321	Gully	7	0	0	1	+	-	-	1	0.1
80		Un	856		7	4	0	1	++	-	-	5	0.7

Table 23: List of samples.

Ch = charred, Gr = cereal grain, Cf = chaff fragment, Se = seed, Un Se = uncharred seed, Chc = charcoal, Sm Bo = small bone. Items/litre = number of charred items per litre of sediment. Quantities: + = few, ++ = moderate amount, +++ = abundant.

Soil Micromorphology, Chemistry and Magnetic Susceptibility

Richard. I.MacPhail and John Crowther

Introduction

The Hallam Fields Iron Age settlement site of Birstall, near Leicester was visited (8-02-05) and discussed with Gavin Speed (site director) and Angela Monkton (Environmental officer). A phosphate and magnetic susceptibility survey, and complementary soil studies, were considered. A roundhouse, a juxtaposed small enclosure, an iron-working area/pits, the main settlement enclosure ditch and a rectangular enclosure, which are located on terrace sands and gravels, were examined. An integrated soil micromorphology, and bulk chemical and magnetic susceptibility study was suggested, in order to better understand the settlement and its morphology (Macphail and Crowther 2005).

In the summer of 2007 Drs Crowther (Lampeter) and Macphail (UCL) received a series of (69) bulk and (8) undisturbed monolith samples, respectively, from Angela Monkton of ULAS.

Methods

Sixty-nine bulk samples of natural subsoils and feature (ditch, gully, pit and post-hole) fills were taken from four areas of the excavation:

- Feature group 1 – roundhouse within Late Iron Age enclosure
- Enclosure Ib – rectangular enclosure with no internal features
- Enclosure IIb – enclosure with evidence of metal working
- Enclosure III – rectangular enclosure with no internal features

These were analysed in the hope of gaining additional insight into the character, origin and mode of development of the contexts from which they were taken. Twelve of the samples (identified by prefix „M' in Table 1 and here referred to as the „thin-section samples') were taken to complement eight thin sections investigated by Dr Richard Macphail (see below). Each sample was analysed for: loss-on-ignition (LOI), which provides an estimate of the organic matter concentration; total phosphate (phosphate-P), enrichment of which is associated with inputs of organic materials, e.g. excreta, food wastes and, especially, bone (see reviews by Bethel and Máté 1989; Crowther 1997; Heron 2001); and magnetic susceptibility, which is indicative of burning (Clark 1996; Scollar *et al.* 1990). In the case of the thin-section samples, determinations were also made of the inorganic and organic phosphate fractions (i.e. phosphate-P_i and phosphate-P_o), which were summed to give phosphate-P.

Chemistry and Magnetic susceptibility

Analysis was undertaken on the fine-earth (i.e. < 2 mm) fraction of the samples. LOI (loss-on-ignition) was determined by ignition at 375^{o}C for 16 hr (Ball 1964). Phosphate-P (for all except the thin-section samples) was determined using the method presented by Dick and Tabatabai (1977). Phosphate-P_i and phosphate-P_o (thin-section samples) were determined using a two-stage adaptation of this procedure in which the phosphate concentration of a sample is measured first without oxidation of organic matter (P_i), using 1N HCl as the extractant; and then on the residue following alkaline oxidation with sodium hypobromite (P_o), using 1N H_2SO_4 as the extractant.

In addition to χ (low-frequency mass-specific magnetic susceptibility), determinations were made of χ_{max} (maximum potential magnetic susceptibility) by subjecting a sample to optimum conditions for susceptibility enhancement in the laboratory. χ_{conv} (fractional conversion), which is expressed as a percentage, is a measure of the extent to which the potential susceptibility has been achieved in the original sample, viz: (χ / χ_{max}) x 100 (Tite 1972; Scollar *et al.* 1990). In many respects this is a better indicator of magnetic susceptibility enhancement than raw χ data, particularly in cases where soils have widely differing χ_{max} values (Crowther and Barker 1995; Crowther 2003). A Bartington MS2 meter was used for magnetic susceptibility measurements. χ_{max} was achieved by heating samples at 650°C in reducing, followed by oxidizing conditions. The method used broadly follows that of Tite and Mullins (1971), except that household flour was mixed with the soils and lids placed on the crucibles to create the reducing environment (after Graham and Scollar 1976; Crowther and Barker 1995).

Statistical analysis has been undertaken using SPSS for Windows (version 11.0). In the case of the Pearson correlation (r) analysis, data sets with a skewness of ≥ 1.00 have been $\log_{10}$ transformed to increase parametricity, and the coefficient of determination (r^2, expressed as a percentage) has been used as a measure of the level of explained variance. Statistical significance has been assessed at the 95% confidence level.

Soil micromorphology

The eight undisturbed samples were impregnated with a clear polyester resin-acetone mixture; samples were then topped up with resin, ahead of curing and slabbing for 75-50 mm-size thin section manufacture by Spectrum Petrographics, Vancouver, Washington, USA (Goldberg and Macphail 2006; Murphy 1986) (Figure 88 and Figure 89). Thin sections were further polished with a 1200 grade grit paper and digitally scanned using a flat-bed scanner (Figure 90 and Figure 91). They were then analysed using a petrological microscope under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were described, ascribed soil microfabric types (MFTs) and microfacies types (MFTs), and counted according to established methods (Bullock et al. 1985; Courty 2001; Courty et al. 1989; Goldberg and Macphail 2006; Macphail and Cruise 2001; Stoops 2003). Eleven layers/contexts were identified, and 13 features and characteristics were counted and illustrated (Figure 85 - Figure 104). The site archive contains all digital scans and the photomicrographic archive.

Results

Chemistry and magnetic susceptibility

Details of the samples and the analytical results are presented in Table (LOI, phosphate-P and magnetic susceptibility) and Table (phosphate fractionation); summary statistics comparing samples of natural subsoils and feature fills; and the results of the correlation analysis. Here, a broad overview of the analytical data for each property is presented and the results from each part of the site are then discussed. Key evidence of anthropogenic influence in individual samples is highlighted in Table and the accompanying footnotes.

Individual soil properties and their inter-relationships

LOI (organic matter)

Relatively high LOI values (9.20 and 9.61%) were recorded for the two samples (M7a and 548, respectively) from context 19. These figures reflect their notably high charcoal (and charred wood) content, rather than the presence of high concentrations of soil organic matter. The remaining 67 samples are largely minerogenic, and only four, all from pit and ditch fills, have LOI values ≥ 2.00%. The generally very low organic matter content is likely, in part, to be attributable to active post-depositional decomposition under well-drained conditions – i.e. the feature fills may well have originally been more organic-rich. As would be anticipated, the mean LOI for the samples from the various feature fills (1.85%) is significantly greater ($p < 0.001$) than for the natural subsoils (1.06%; Table and footnote).

Phosphate (phosphate-P, Pi, Po, Pi:P, Po:P)

Phosphate-P (total phosphate) exhibits quite wide variability, with concentrations ranging from 0.433–3.25 mg/g. Such wide variability seems likely to reflect a considerable degree of human influence. Indeed, the mean concentration in the samples from the feature fills (1.24 mg/g) is almost double that of the natural subsoils (0.686 mg/g). However, it should be noted that even the maximum concentration recorded is not exceptionally high. This would suggest that enrichment is largely from organic sources (e.g. animal or human excreta, food residues, etc.), rather than from bone – though the absence of particularly high concentrations could also reflect the naturally limited phosphate retention capacity of sandy soils/fills (and the effects of leaching – see soil micromorphology). In view of the range of phosphate-P concentrations recorded at this site, it seems likely that samples with values ≥ 1.00 mg/g are to some extent „enriched' in phosphate and that values ≥ 2.50 mg/g represent „strong enrichment'. The phosphate-P data in Table 25 have been classified according to these criteria.

Overall, there is a very weak correlation between phosphate-P and LOI (Figure 82). Even when the two anomalous charcoal-rich samples are excluded, the level of explained variance (r2) is only 27.4% (Figure 86). This indicates that little of the recorded variability in phosphate-P is directly attributable to the residual concentration of organic matter present in the samples – i.e. variability in concentrations of phosphate-Pi (derived largely from mineralization of original organic sources) is the key factor underpinning the variability in phosphate-P. This is confirmed by the low variability of phosphate-Po (range, 0.195-0.404 mg/g) compared with phosphate-Pi (range, 0.329-2.07 mg/g) in the 12 thin-section samples (Table). As is commonly the case in natural subsoils and archaeological contexts, most of the phosphate present is in an inorganic form, with phosphate-Pi:P values ranging from 55.3-83.7%. However, these values are generally lower than is often recorded in soils with such low organic matter concentrations, which suggests that significant amounts of phosphate-Pi may have been lost through leaching – presumably as a result of the sandy substrate (see soil micromorphology).

Magnetic susceptibility (χ, χ max and χ conv)

Magnetic susceptibility (χ) exhibits very wide variability (range, 7.8–346 x 10-8 SI). In contrast, the maximum potential susceptibility (χ max) is much less variable (range, 1130–3510 x 10-8 SI), which reflects a reasonably uniform iron content across the site. In these circumstances, a very high proportion of the variability in χ is attributable to variations in the degree of enhancement (χ conv), rather than in χ max, as is shown by the very strong correlation between χ and χ conv (r = 0.960, p < 0.001; Figure 84 Figure 87; and footnotes). In Table 27, χ conv has been used as the basis for categorizing the samples according to degree of enhancement, with values in the ranges 5.00–9.99% and 10.0–19.9% being taken to be indicative of „enhancement' and „strong enhancement', respectively. The critical thresholds of 5.00 and 10.0% equate with χ values of *c*. 90 and 180 x 10-8 SI.

None of the natural samples shows signs of susceptibility enhancement, and only eight of the feature fill samples are enhanced (n = 5) or strongly enhanced (n = 3). Overall, therefore, there is only limited evidence of in situ heating/burning and/or of contexts that include materials derived from locations affected in this way. As would be anticipated, the samples from the feature fills have significantly higher mean χ and χ conv values than those from the natural subsoils (Table). Interestingly, the subsoil samples have a significantly higher mean χ max (2210 x 10-8 SI) than those from the feature fills (1710 x 10-8 SI). This suggests that the sediments that accumulated as ditch, gully, pit and post-hole fills have been somewhat depleted of Fe, either prior to deposition or as a result of post-depositional processes (e.g. mobilization of Fe through localized gleying in damp, more organic-rich and microbially active environments).

Results from the four areas of the site

Feature group 1 – roundhouse within Late Iron Age enclosure

The four samples of natural subsoil from within the roundhouse show no clear signs of phosphate enrichment or magnetic susceptibility enhancement. Eight of the feature fills, including examples of gully, pit and post-hole fills, are enriched in phosphate. However, there are examples of gully and pit fills which are not enriched, and there is no clear spatial pattern in the results. Only one sample (506, context 146) from a pit/post-hole fill has enhanced susceptibility, which is likely to indicate either proximity to a hearth within the roundhouse or the dumping/in-wash of sediments from such a source.

Enclosure Ib – rectangular enclosure with no internal features

In this case samples of natural subsoil were taken from within the enclosure, in the entrance and outside. Of these, two of the samples within the enclosure (522 and 523) show signs of phosphate enrichment. Interestingly, these are the only two samples of subsoil across the whole site that are enriched, and both have quite a low LOI – i.e. the elevated concentrations are not a direct reflection of a higher organic matter content. It is possible that this enrichment could be the result of animal penning, and this would appear to be supported by the fact that many of the samples from the enclosure ditch are also phosphate-enriched, and in two cases (samples 516 and 518) strongly enriched. In fact, these are the only samples across the site that have phosphate-P concentrations of ≥ 2.50 mg/g. This enrichment could be the result of the runoff from the enclosure (assuming that there were no topographic barriers to such flow). On the other hand, the remaining subsoil samples, including those from the entrance area, are not enriched. The evidence in relation to the use of the enclosure is therefore equivocal. Only one sample (516, context 171) from the butt end of the enclosure ditch adjacent to the entrance appears to have been affected by heating/burning.

Enclosure IIb – enclosure with evidence of metal working

Within this enclosure none of the natural subsoils shows signs of phosphate enrichment or magnetic susceptibility enhancement. Many, although not all, of the ditch and pit fills show signs of phosphate enrichment, but none have concentrations as high as in the two the enclosure Ib ditch fills highlighted above. As might be anticipated, there is rather more evidence of heating/burning within this enclosure. While this could well be related to metal working activity, none of the samples has exceptionally high levels of enhancement – as might be associated, for example, with a frequently used hearth area. It seems likely, therefore, that the enhancement observed is the result of the dumping of material that has been affected by burning elsewhere, rather than in situ burning. This is perhaps exemplified by the two samples (M7a and 548) taken from (19) (pit fill), associated with [20]. In this case, both samples contain large amounts of charcoal, yet sample M7a does not have an enhanced susceptibility, whereas sample 548 is strongly enhanced (χ conv, 15.8%). This pattern is more suggestive of dumping than in situ burning. The fact that some contexts from the enclosure ditch fills, notably context 479 (sample M5a) and 456 (sample 538), show signs of enhancement would again seem to indicate the dumping of materials that have been burnt elsewhere.

Enclosure III – rectangular enclosure with no internal features

Many of the ditch fills and the single pit fill show signs of phosphate enrichment, which could possibly be associated be associated with the penning of animals. However, compared with enclosure Ib, the levels of enrichment are generally lower, and none of the natural subsoils sampled shows signs of enrichment. The evidence for animal grazing in this case is therefore even more equivocal. None of the feature fills shows signs of susceptibility enhancement.

Soil Micromorphology

Local soils

According to the Soil Survey of England and Wales, the site is located on typical brown earths (Wick 1 series/Wick 1 soil association, and includes typical brown sands; Newport soil series; Ragg. et al. 1983) formed on glaciofluvial or river terrace drift. The soils are poorly sorted coarse silt, fine to medium sands, with gravel size ironstone, some which is oolitic (but decalcified) in character, consistent with being river terrace drift and having Jurassic geology upstream of the site. Fieldwork identified some patches of reddish loamy sands which were thought to suggest occasional areas of periglacial patterned ground. In addition, the settlement features contain fills that are darker and more loamy compared to the surrounding stripped soils, which are essentially the sandy lower subsoils and parent material of the area. In thin section these lower fills were seen to be clearly clay enriched, through clay translocation, and fragments of lower subsoil Bt horizons are also present in some of the feature fills. Thus, argillic brown earth soils are present within this mapped area of the Wick 1 soil association. Such soils are likely to have been acidic. This, along with the down-profile movement of clay would have produced a „leaching' environment, a characteristic pointed out from the chemistry (see above). The phosphate enrichment found in some subsoils (see above) may have two sources related to clay movement: 1: phosphate can be concentrated in translocated clay in the Bt horizons of natural argillic brown earths (Parfenova et al., 1964); phosphate is also found concentrated in clay coatings associated with stock trampling, as an inferred indicator of faecal inputs (Goldberg and Macphail, 2006, fig 16.5; Macphail and Cruise, 2001; Macphail and Linderholm, 2004)(see below). Leaching seems also to have affected flints within the site; burned flints are calcined (Fig 4) and only one example of rubefied (iron stained) flint was noted. Thus, burned flint would have made little contribution to magnetic susceptibility enhancement.

In addition, feature fills include fragments of humic silty clay (and possible „peat' – see below), which indicates that ponds or wetland/alluvium had been accessed. The nearest sources for the latter are the pelo-alluvial grey soils (clayey alluvium) of the River Soar (Ragg. et al., 1983).

Roundhouse within Iron Age enclosure (Group 1)

Two thin samples were analysed from Context 393 (M3) and Context 321 (M4). In sample M3 (Context 393) the roundhouse gully fill appears to contain a primary, well-sorted (blown?) sand fill, indicating that sand blowing was possibly a feature of these (unstable – see below) soils once they became leached and disturbed (de-vegetated). The upper fill is a more humic occupation topsoil, which contains fine charcoal, fine burned mineral material and a very fine probable coprolitic bone fragment. These are trace indications of domestic use of the house/locality.

Context 321 (M4) is more rich, in terms of anthropogenic inclusions. It is an occupation soil fill, with coarse burned flint and fine charcoal (as M3), but with very abundant clayey aggregates of leached fine bone, leached amorphous (likely once-calcium phosphate) aggregates of cess and individual fine bone fragments (Figure 87, Figure 89, Figure 90). (Bone and presumed calcium phosphate nodules are non-autofluorescent under blue light, and hence the original „apatite' mineralogy is strongly altered/leached.) There is also some layered „cess' with clay and silt, and rare probable iron-phosphate (Fe-P) nodules. As common to many feature-fills at the site, very abundant clay and dusty clay textural pedofeatures are present. Here the house gully fill can be interpreted as being composed of fine humic and sandy soil of probable occupation/house floor origin, in which leached bone and mineralised cess is very abundant. It is probably dumped latrine/toilet waste.

This sample shows phosphate-P enrichment, even whilst the pale colours of the bone and the clayey appearance of the putative cess, indicates quite severe phosphate leaching (as suggested for the site as a whole; see chemistry above). As weathering of the bone and cess has progressed it also became influenced by translocated clay (Fig 6). Dumping of latrine waste was a very common characteristic of the Iron Age settlement of Llanmaes, Gwent, and an important component of the „midden' site of Potterne, Wiltshire (Crowther 2005; Macphail 2001, 2004); Birstall shows a trace example of this activity. The gullies have been strongly affected by burrowing, and if, as Reynolds (1995) suggests, these gullies are in fact burrowed animal runs associated with the line of the walls, the included anthropogenic materials are likely contemporary with the structure.

These roundhouse gully fills provide a complicated signal, and although little clear evidence of hearth debris is present, the weight of evidence infers a domestic use for this structure (Goldberg and Macphail, 2006, 258-263; Macphail et al., 2004).

<u>Enclosure IB – rectangular enclosure with no internal features</u>

The Iron Age ditch of Enclosure Ib (Square Enclosure ditch terminal; Context 170 [over 169]) is a very poorly-sorted coarse silt to coarse stony minerogenic deposit, which contains weathered Ea and Bw and C horizon inclusions (sample M1). There are also common burned flint and trace amounts of fine charcoal and amorphous organic matter concentrations that are Fe-Mn replaced. Very abundant laminated clay void coatings and infills occur, along with very small amounts enigmatic amorphous yellow iron (and phosphate?) fragments and coatings that may represent aged amorphous dung residues, and associated phosphate nodular concentrations (Figs.7-8). (Similar enigmatic amorphous fragments, with associated phytoliths and iron[phosphate?] also occur locally in Context 127 [M2], and in Context 364 [Enclosure III, M 8].)

This is a subsoil-dominated ditch fill containing very high amounts of burned flint, with very small amounts of fine charcoal. It is a highly disturbed, and probably an often muddy fill (slaking produced clay coatings – hence field red colour), which received inputs of phosphate likely associated with dung. It has thus probably been animal trampled, with the dark clay coatings also being enriched in phosphate (see below).

Thin section M2 (Context 127; enclosure ditch) sampled two major layers, separated by a 2 mm thick silty-clay pan that includes fine charcoal (Figure 93 to Figure 95). The lower layer contains both laminae of clay-rich Bt horizon soil and sand-dominated leached Eb horizon material. The upper half of the thin section is composed of fragments of Bt, pan(s) (Figure 96) and topsoil that includes patches of relict amorphous OM/dung(?). Rare traces of burned flint and rare fine charcoal also occur. This lower ditch fill is composed of poorly layered eroded sandy Eb and clayey Bt horizon soil. Local impact/activity, probably in the form of stock trampling, is recorded as a sedimentary pan that includes charcoal and ensuing inputs of „topsoil' that include fragments of amorphous organic matter/dung residues(?), and fragments of trampling crusts.

Putative fragments of part- (Fe-P) mineralised amorphous dung fragments, that contain phytoliths (see Figure 101 to Figure 104), dark reddish coloured clay coatings, pan features and trampling crust fragments, are all indicators of stock being locally present, and in fact trampling the ditches themselves; for example a series of microprobe analyses of similar dark coloured clay coatings and a crust layer found them to be enriched in P at Raunds (Beckman and Smith 1974; Goldberg and Macphail 2006, fig 16.5; Valentin 1983 see reviews in Macphail forthcoming; Macphail et al. 1998). It is therefore consistent to have phosphate enrichment in these ditch fills associated with this enclosure (Table). In the archaeological record, ditch fills elsewhere have similar characteristics in terms of their micromorphology and chemistry, and which in many ways are similar to muddy deposits in hollow-ways and track-ways (Macphail 2003b; Macphail and Crowther 2005, 2006).

Enclosure IIB – enclosure with evidence of metal working

M5 sampled (479) and (478), Iron Age ditch fills of Enclosure IIb – a presumed iron working area. (479) is poorly sorted with very abundant charcoal, and examples of weathered possible hammerscale/„rusty' iron work and possible strongly weathered slag (Figure 97, Figure 98). The fine fabric includes much relict amorphous organic matter and fine charcoal, with phytoliths present. This strongly burrowed, once-humic (possible relict/burned dung) soil fill with its charcoal, „rusty' hammerscale/ironwork and possible weathered slag is possible evidence of iron-working, but weathering of iron-work and iron slag markedly weakens its once normally strong magnetic susceptibility signal (Macphail 2003a).

(478) below is again composed of burrowed sands with coarse burned flint, and „rusty' possible hammerscale/iron-work. There are, however, also likely examples of coarse and fine human coprolite (Figure 99, Figure 100) and fine bone, with the fine fabric containing relict amorphous organic matter with phytoliths; Fe-P nodules (see above) preserve spores(?) and phytoliths (relict dung?). The upper part is characterised by a concentration of textural pedofeatures – clay coatings and pans marking the upper boundary. This lower sandy soil fill has obviously been burrow-mixed with (479) above; middening traces (human coprolites and coprolitic bone) may also have been burrowed-in. The lower fill contains similar indications of stock being once present, as in Enclosure Ib (see above). It can be noted that the junction between the two contexts is marked by a concentration of textural pedofeatures; it is possible that such features could relate to the weathering of possible ash dumped alongside weathered iron-working debris, and the effect of potassium (K) in mobilising clay (Courty and Fedoroff 1982; Slager and Van der Wetering 1977).

Context (525) (M6), a pit fill from Enclosure IIb has a similar character, with many charcoal coarse burned flint, rusty „hammerscale' fragments and ironstone; the last could be interpreted as possible Oolitic(?)ore, but the natural terrace gravels may also naturally include this material. There are also examples of silty clay crust(?) fragments, humic silty and burned peaty clay/dung(?) with 1.2 mm long articulated phytoliths (from wetland?), which contains very fine charcoal and fine burned mineral-rich fine fabric (Figure 101, Figure 102); all are more proxy evidence of stock management. The patches of very abundant reddish clay coatings associated with charcoal may again relate to the mobilisation of clay when ash releases potassium from dumped hearth waste (see above).

A further pit fill ((19), M7) was examined from this enclosure (Figure 86). Context (19) is a sand and coarse charcoal dominated fill that has been very strongly burrowed. It also contains very little burned flint. This is a dump of charcoal where the high %LOI (Table) infers a bulk sample containing much incompletely burned organic matter. The underlying lower „natural' fill is argillic Bt horizon soil-dominated, presumably having fallen in from the local natural argillic brown earth subsoils. The pit fills are affected by marked burrow mixing of coarse burned flint, charcoal and fine charcoal-rich soil, into the lower fill (Figure 86). Again, translocated very dark reddish clay may well originate from (19) releasing potassium as ashes associated with the charcoal dump became weathered.

Although the weathered remains of iron working appear to occur, there is no associated strongly burned soil which would indicate localised iron working, and hence a lack of any strong magnetic susceptibility signal (see above, Table). There is clearly, however, evidence of burned wood and inferred evidence of ashes once being present; this could also help raise phosphate levels. The fills also indicate general middening (coprolitic material) and inclusions best associated with stock management.

Enclosure III – rectangular enclosure with no internal features

The Iron Age ditch of Enclosure III ((364)/(368); M8) has a sandy fill that contains relict evidence of amorphous organic matter content that is iron and manganese stained in places (Figure 103 to Figure 104). There are also very few coarse anthropogenic inclusions (charcoal and burned flint). It is chiefly characterised by very abundant, dark coloured clay coatings and in-fills over dirty silt clay in-fills (in lower half of thin section – see Figure 103). There are fewer dark coatings in the upper half of the upper fill, which is more strongly burrowed. Here, there are rare, but ubiquitous mainly fine (100-750 µm) relict fragments of yellow amorphous organic matter fragments containing phytoliths

The fills appear to be accreting compact sandy soils containing fine amorphous organic matter (relict dung?) and fragments of organic matter containing phytoliths (amorphous dung/peat?), with phases of mixing/disturbance and deposition of dark silty coatings and probable silty crust formation, all followed by dark reddish to black multilaminated clay. The latter is due to later disturbed clay from above being washed into earlier and lower layers. Burrowing by mesofauna, and post-burrowing clay in-wash in the lower half of slide testify to progressive in-fills and probable animal trampling, the inputs of dung encouraging burrowing by mesofauna. As discussed above (Enclosure Ib), the textural pedofeatures are likely to be phosphate-associated clay coatings. These features, and the associated phosphate data, infer that (from this one fill at least) that this is a probable stock area, and that there has been in situ trampling of the ditch by herded animals.

Conclusions

The results have shown there to be very marked variability in phosphate and magnetic susceptibility across the site, with many of the feature fills displaying clear evidence of phosphate enrichment and/or susceptibility enhancement which is likely to reflect the nature, intensity and pattern of human activity. None of the phosphate-P concentrations are exceptionally high (as might be associated with the inclusion of bone-derived phosphate), and it seems likely that the enrichment identified is attributable to organic sources such as animal/human excreta, food waste materials, etc. However, some caution must be exercised in interpreting the phosphate data because of the limited phosphate retention capacity of sandy soils and the likelihood that some of the original phosphate will have leached out of the fills. The magnetic susceptibility data have highlighted a number of fills that contain material that has been affected by heating/burning, though the levels of enhancement observed are not indicative of regular in situ burning, such as might be associated with hearths.

The soil micromorphological study of fewer (8) samples produced results consistent with the bulk analyses. In addition, a soil environment conducive to soil leaching, and actual examples of leached bone and coprolitic material, were identified. In the roundhouse gully fill (Feature Group 1), latrine/toilet waste dumping indicated a domestic use. In the case of Enclosure IIb, no evidence of local strongly burned hearths was found, although weathered, probable iron working materials were recognised. These would likely produce a poor magnetic susceptibility signal. Other material found within the fills of this enclosure also indicated general middening, the probable influence of background stock management (see below) and the implied dumping of ash through its affect on clay movement. Both Enclosures Ib and III have soil micromorphological indications of animal penning and the in situ trampling of ditches by stock. It is possible that animals tracked-in „exotic' pond/wetland sediments into the site.

Acknowledgements

The authors wish to thank Gavin Speed (site director) and Angela Monkton (Environmental Officer) both of University of Leicester Archaeological Services, for their help and collaboration with this study.

Note: Refer to Figure 105 to Figure 110 to see selected results presented spatially, this will aid understanding and interpretation of the results (GS).

Table 24: Loss-on-ignition, phosphate-P and magnetic susceptibility data for the thin-section samplesa (n = 12) and other samples (n = 47).

Sample[a,b]	Ctxt[b]	Description[b]	LOI[c] (%)	Phos-P[d] (mg/g)	□[e] (10^{-8}SI)	□max (10^{-8}SI)	□conv[e] (10^{-8}SI)
Feature group 1 – roundhouse within Late Iron Age enclosure							
M3a	393	Gully fill	1.00	0.728	28.8	1170	2.46
M4a	321	Gully fill	1.26	1.47*	41.8	1580	2.65
500	259	Pit fill	2.12*	1.52*	39.7	1530	2.59
501	86	Pit fill	1.61	1.21*	46.6	1500	3.11
502	243	Pit fill	0.898	0.679	20.5	1320	1.55
503	277	Pit fill	1.36	0.737	27.9	2110	1.32
504	281	Gully terminal fill	1.43	1.09*	38.1	1680	2.27
505	378	Pit/post-hole fill	1.70	1.23*	86.0	1960	4.39
506	146	Pit/post-hole fill	1.42	1.15*	98.5*	1680	5.86*
507	88	Post-hole fill	1.39	1.22*	42.2	1520	2.78
508	90	Gully fill	1.02	0.787	22.9	1500	1.53
509	292	Gully fill	1.76	1.75*	78.0	1700	4.59
510	83	Gully terminal fill	1.16	0.833	26.4	1320	2.00
511		Natural	1.19	0.512	13.4	2730	0.491
512		Natural	1.10	0.609	24.0	1620	1.48
513		Natural	0.846	0.962	14.8	1230	1.20
514		Natural	0.848	0.656	17.0	1950	0.872
Enclosure Ib – rectangular enclosure with no internal features							
M1a	169	Lower fill, ditch terminal	0.830	0.892	15.4	1650	0.933
M1b/top	170	Top fill, ditch terminal	0.963	1.14*	19.6	1840	1.07
M2a	127	Ditch fill	0.698	0.626	11.2	1660	0.675
515	174	Ditch terminal fill	1.29	1.70*	57.0	1420	4.01
516	171	Ditch butt end	1.86	2.57**	92.1*	1410	6.53*
518	127	Ditch fill	1.26	1.35*	39.4	1620	2.43
519	419	Ditch fill	1.69	3.25**	30.6	1570	1.95
521	93	Ditch fill	1.15	1.90*	19.4	1510	1.28
522		Natural within enclosure	0.825	1.11*	11.0	1910	0.576
523		Natural within enclosure	0.690	1.34*	8.7	1440	0.604
524		Natural within enclosure	0.761	0.948	7.8	1640	0.476
525		Natural within enclosure	1.09	0.617	13.0	2730	0.476
526		Natural in enc entrance	1.08	0.648	23.2	1250	1.86
527		Natural in enc entrance	0.793	0.605	14.4	1550	0.929
528		Natural between roundhouse & enclosure	1.11	0.674	22.4	2230	1.00
529		Natural between roundhouse & enclosure	1.20	0.717	26.3	1460	1.80
Enclosure IIb – enclosure with evidence of metal working							
M5a	479	Top ditch fill (burnt layer)	1.63	0.993	171*	1840	9.29*
M5b	478	Top ditch fill (burnt layer)	1.05	0.797	36.7	1460	2.51
M6a	525	Pit fill	1.90	2.47*	346*	2170	15.9**
M7a	19	Charcoal layer in pit fill	9.20**	0.818	93.7	2110	4.44
Below M7		Natural below pit	1.28	0.587	31.3	2870	1.09
530		Natural outside enclosure	1.09	0.615	12.7	2660	0.477

531		Natural outside enclosure	0.970	0.433	16.5	1960	0.842
532		Natural outside enclosure	1.28	0.667	31.1	2820	1.10
533		Natural outside enclosure	1.32	0.630	25.1	2040	1.23
534		Natural inside enclosure	1.30	0.592	17.1	2910	0.588
535		Natural inside enclosure	1.04	0.547	16.5	2140	0.771
536		Natural inside enclosure	0.953	0.482	32.6	1530	2.13
537		Natural inside enclosure	0.973	0.483	17.0	2330	0.730
538	456	Burnt layer of ditch fill	2.96*	1.27*	179*	1770	10.1**
539	479	Burnt layer of ditch fill	1.97	0.963	175	1800	9.72*
540	457	Main context of ditch fill	1.12	0.883	54.6	1750	3.12
541	478	Main context of ditch fill	0.890	0.750	23.1	1820	1.27
542	434	Pit fill	1.19	0.771	39.1	2100	1.86
543	446	Pit fill	3.55*	1.78*	68.1	1850	3.68
544	444	Pit fill	2.27*	0.897	90.9	1940	4.69
545	415	Pit fill	1.62	1.15*	147*	2100	7.00*
546	442	Pit fill	1.31	0.797	60.3	2400	2.51
547	95	Pit fill	1.54	1.05*	82.4	1840	4.48
548	19	Pit fill	9.61**	1.13*	252*	1600	15.8**
549	525	Pit fill	1.83	1.39*	180	1820	9.89
Enclosure III – rectangular enclosure with no internal features							
M8a	364	Ditch fill	1.48	1.46*	34.7	1870	1.86
Below M8	364	Natural below ditch	1.11	0.896	21.4	2530	0.846
550		Natural within enclosure	0.962	0.616	14.8	2230	0.664
551		Natural within enclosure	1.02	0.595	16.5	2500	0.660
552		Natural within enclosure	1.22	0.694	29.3	3180	0.921
553		Natural within enclosure	1.24	0.689	44.7	3510	1.27
554	727	Gully	1.09	0.940	23.8	1130	2.11
555		Natural outside enclosure	1.27	0.606	16.6	2720	0.610
556	723	Ditch fill	1.28	1.08*	30.7	2090	1.47
557	364	Ditch fill	1.28	1.72*	34.1	1470	2.32
558	739	Pit fill	1.20	1.20*	19.0	1660	1.14

[a] **Sample:** Sample numbers prefaced by 'M' (monolith) indicate thin-section samples

[b] **Sample/Context/Description:** Samples highlighted show signs of phosphate enrichment and/or magnetic susceptibility enhancement

[c] **LOI:** Samples highlighted in bold have higher organic matter concentrations: * = 1.00–4.99%, ** 5.00–9.61%

[d] **Phosphate-P:** Figures highlighted in bold show likely phosphate enrichment: * = enriched (1.00–2.49 mg/g), ** = strongly enriched (2.50–4.99 mg/g)

[e] **χ and χ_{conv}:** Figures highlighted in bold show signs of magnetic susceptibility enhancement, based on the χ_{conv} data (see text): * = enhanced (χ_{conv} = 5.00–9.99%), ** = strongly enhanced (χ_{conv} = 10.0–19.9%)

Sample	Ctxt	Description	Phos-P_i (mg/g)	Phos-P_o (mg/g)	Phos-P (mg/g)	Phos-$P_{i:}$P (%)	Phos-$P_{o:}$P (%)
Group 1							
M3a	393	Roundhouse gully fill	0.499	0.229	0.728	68.5	31.5
M4a	321	Roundhouse gully fill	1.14	0.329	1.47	77.6	22.4
Enclosure Ib							
M1a	169	Lower fill, ditch terminal	0.661	0.231	0.892	74.1	25.9
M1b/top	170	Top fill, ditch terminal	0.824	0.313	1.14	72.5	27.5
M2a	127	Ditch fill	0.431	0.195	0.626	68.8	31.2
Encl. IIb							
M5a	479	Top ditch fill (burnt layer)	0.711	0.282	0.993	71.6	28.4
M5b	478	Top ditch fill (burnt layer)	0.538	0.259	0.797	67.5	32.5
M6a	525	Pit fill	2.07	0.404	2.47	83.7	16.3
M7a	19	Charcoal layer in pit fill	0.452	0.366	0.818	55.3	44.7
Below M7		Natural below pit	0.330	0.257	0.587	56.2	43.8
Enclosure III							
M8a	364	Ditch fill	1.10	0.357	1.46	75.5	24.5
Below M8	364	Natural below ditch	0.615	0.281	0.896	68.6	31.4

Table 25: Phosphate fractionation data for the thin-section samples

Table 26: Comparison of summary statistics for samples of ‘natural’ subsoil and of feature fills.

	n	Mean[a]	Minimum	Maximum	Std Dev.
Natural subsoils					
LOI (%)	27	1.06	0.690	1.32	0.181
Phosphate-P_i (mg/g)	2	0.473	0.329	0.615	0.202
Phosphate-P_o (mg/g)	2	0.269	0.257	0.281	0.0170
Phosphate-P (mg/g)	27	0.686	0.433	1.34	0.202
Phosphate-P_i:P (%)	2	62.4	56.2	68.6	8.77
Phosphate-P_o:P (%)	2	37.6	31.4	43.8	8.77
χ (10^{-8} SI)	27	20.0	7.8	44.7	8.48
χ_{max} (10^{-8} SI)	27	2210	1230	3510	620
χ_{conv} (%)	27	0.952	0.476	2.13	0.446
Feature fills					
LOI (%)	42	1.85	0.698	9.61	1.79
Phosphate-P_i (mg/g)	10	0.843	0.431	2.07	0.499
Phosphate-P_o (mg/g)	10	0.300	0.195	0.404	0.0684
Phosphate-P (mg/g)	42	1.24	0.626	3.25	0.548
Phosphate-P_i:P (%)	10	71.5	55.3	83.7	7.49
Phosphate-P_o:P (%)	10	28.5	16.3	44.7	7.49
χ (10^{-8} SI)	42	72.0	11.2	346	70.7
χ_{max} (10^{-8} SI)	42	1710	1130	2400	279
χ_{conv} (%)	42	4.07	0.675	15.9	3.68

NOTES:

[a] Mann-Whitney tests reveal significant differences in the mean values for the two groups of samples for: LOI ($p < 0.001$), phosphate-P ($p < 0.001$), χ ($p < 0.001$), χ_{max} ($p < 0.05$) and χ_{conv} ($p < 0.001$). Tests were not conducted on the phosphate fractionation data because of the small number of samples of natural that were analysed.

Table 27: Pearson's product moment correlation coefficients (r) for relationships between the soil properties analysed b.

	P_i	P_o	P	P_o:P	χ	χmax	χconv
LOI	ns	0.653*	0.361*	ns	0.732**	ns	0.678**
P_i		0.705*	0.988**	-0.885**	ns	ns	ns
P_o			0.802*	ns	0.701*	ns	0.632*
P				-0.804*	0.483**	-0.384*	0.564**
P_o:P					ns	ns	ns
χ[c]						ns	0.960**
χmax							-0.328*

a Statistical significance (*p*) indicated as follows: ** = $p<0.001$, * = $p<0.05$, ns = not significant.

b P_o:P necessarily exhibits a perfect inverse correlation with P_i:P. The correlation coefficients involving P_i:P are therefore identical to those for P_o:P, but with an opposite sign. Data sets for LOI, P_i, P, P_i:P, χ, χ_{max} and χ_{conv} were $\log_{10}$ transformed to increase parametricity.

c In the case of the untransformed data, χ also exhibits a strong correlation with χ_{conv} ($r = 0.982$, $p < 0.001$. The r^2 value (96.4%), expressed as a percentage, provides a measure of the extent to which variance in χ is accounted for by variations in χ_{conv}.

Sample	Context	Sediment fill	Microfacies	SMT	Voids	Roots traces	Hammerscale? Iron-work/	Burned Flint	Charcoal	Amorphous OM	Bone	Cess	Coprolite	Textural Clay coatings	Textural Pans	Amorpho-us Fe(P?)	Broad Burrows
Feature group 1																	
M3a	393	Roundhouse gully fill	C1	1e, 1d	35-40%			f	a	a*	a-1			aaaaa		a*	aaaaa
M4a	321	Roundhouse gully fill	C2	1f	35%	a*		*	a	aa	aaaa	aaaaa		aaaaa		a*	aaaaa
Enclosure Ib																	
M1b/top	170	Top fill, ditch terminal	A1	1a	20%			fff	a*	a*				aaaaa		aa	aaa
M1a	169	Lower fill, ditch terminal															
M2a	127	Ditch fill	B	1b, 1c, 1d	35%			*	a	a				aaaaa	aa		aaa
Enclosure IIb																	
M5a	479	Top ditch fill (burnt layer)	D2	1e, 1h	35%		a-1	*	aaaaa	aaaa				a			aaaaa
M5b	478	Top ditch fill (burnt layer)	D1	1g	30%		a-2	*	a	aaa	a*		a-2	aaaaa	a	a-1	aaaaa
M6a	525	Pit fill	D3	1i, 1e	40%		a-3	*	aaa	aaa				aaaaa	aa		aaaaa
M7a	19	Charcoal layer in pit fill	D4	1i	45%		a?	*	aaaaa					a			aaaaa
Below M7	Natural	Natural below pit	A/ D3	1i, 1b	25%			*	aaa					aaaaa			aa
Enclosure III																	
M8a	364	Ditch fill	A2	1j	25%			*	a	aaaaa				aaaaa		a*	aaaaa

Notes:

* - very few 0-5%, f - few 5-15%, ff - frequent 15-30%, fff - common 30-50%, ffff - dominant 50-70%, fffff - very dominant >70%
a - rare <2% (a*1%; a-1, single occurrence), aa - occasional 2-5%, aaa - many 5-10%, aaaa - abundant 10-20%, aaaaa - very abundant >20%

Table 28: Soil micromorphology - samples and counts.

Table 29: Soil micromorphology (descriptions and preliminary interpretations)

Microfacies type (MFT)/Soil microfabric type (SMT)	Sample No.	Depth (relative depth) Soil Micromorphology (SM)	Preliminary Interpretation and Comments
MFT A/SMT 1a	M 1	(~41 cm) 0-75 mm SM: Homogeneous; *Microstructure*: massive with burrows and channels; 20% voids, fine (0.5 mm) channels and very broad chambers (10 mm); *Coarse Mineral*: C:F (Coarse:Fine, limit at 10 µm), 85:15, very poorly sorted coarse silt, subangular to subrounded fine, medium (common) and coarse sand-size quartz (with feldspar, flint, opaque ironstone); common (burned) angular stone size (max 50+mm) flint, few small stone-size ironstone, ferruginous non-calcareous oolites and ferruginous quartzite, silt- and sandstone; some ironstone fragments characterised by adhering brownish clay (weathered Bw horizon); *Coarse Organic and Anthropogenic*: common burned (calcined) angular flint, flint flakes(?); trace amounts of charcoal (2-300 µm) and humic/amorphous organic matter concentrations (Fe-Mn replaced); occasional fine amorphous OM, with phytoliths; *Fine Fabric*: SMT 1a: speckled pale yellowish brown (PPL), very low interference colours (close porphyric, speckled b-fabric, XPL), yellow (OIL); very thin (Fe-replaced) humic staining and trace amount of amorphous organic matter; *Pedofeatures*: *Textural*: very abundant laminated, limpid to very finely dusty (sorted), dark yellow, orange and blackish moderately well to poorly oriented thick (eg 375 µm) void coatings and infills, associated with occasional very dusty void coatings and intercalations; *Amorphous*: occasional fine to medium (75-500 µm) yellow, amorphous Fe(P?) infills (associated with amorphous OM fragments, see above); ubiquitous Fe (+Mn sometimes) staining/replacement of OM; *Fabric*: many broad (2 mm) burrows. BD (170): 0.963% LOI, 1.14 mg/g phosphate-P, 19.6 x 10^{-8} SI χ, 1.07% χ_{conv} BD (169): 0.830% LOI, 0.892 mg/g phosphate-P, 15.4 x 10^{-8} SI χ, 0.933% χ_{conv}	Iron Age ditch of Enclosure Ib (Square Enclosure ditch terminal); Context 170 (over 169) 170: Very poorly sorted coarse silt to coarse stony minerogenic deposit (weathered Ea and Bw and C horizon inclusions) with common burned flint and trace amounts of fine charcoal and amorphous organic matter concentrations (Fe-Mn replaced); very abundant laminated clay void coatings and infills, with later amorphous yellow iron (and phosphate?) infills; broad burrows. Subsoil-dominated ditch fill containing very high amounts of burned flint, with very small amounts of fine charcoal; highly disturbed, often muddy fill (slaking produced clay coatings – hence field red colour) with inputs of phosphate (BD and amorphous yellow infills/OM fragments) – probably animal trampled (possible amorphous organic matter concentrations are relict dung).
MFT B/SMT 1b, 1c and 1d	M 2	(~34 cm) 0-75 mm SM: heterogeneous (coarsely layered and mixed); *Microstructure*: massive with channel and % voids, fine (0.5 mm) channels and broad chambers (5 mm), with sub-horizontal planar voids/cracks; *Coarse Mineral*: C:F, 75:25 (SMT 1b), 80:20 (SMT 1c) and 90:10 (SMT 1d), very poorly sorted as M1, with frequent coarse (10 mm) rounded quartzite, ironstone and angular flint; (silt pans include mica); *Coarse Organic and Anthropogenic*: very few coarse (8 mm) angular burned flint; trace of sand-size charcoal; fragments of silt pan containing charcoal (see below); rare fine concentrations of (Fe and Fe-Mn stained) OM and fine charcoal; *Fine Fabric*: SMT 1b: layers and fragments of finely speckled reddish brown (PPL), moderate interference colours (close porphyric, speckled and grano-striate b-fabric, XPL), orange (OIL); possible trace of pollen/spores; SMT 1c: yellowish to blackish brown (PPL), very low interference colours, to isotic (close porphyric, speckled b-fabric, XPL), yellowish orange with blackish brown (OIL); as SMT 1a, with patches of fine amorphous OM; SMT 1d: very dusty blackish grey (PPL), low interference colours (as SMT 1a; but trace amount of amorphous OM; *Pedofeatures*: *Textural*: very	Iron Age ditch of Enclosure Ib (Square Enclosure side ditch); Context 127 127: Two major contexts sampled – separated by 2 mm thick upward-fining silt pan (includes fine charcoal); lower layer with laminae of clay-rich Bt horizon (SMT 1b) soil and sand-dominated leached Eb horizon (SMT 1d); upper half of thin section composed of fragments of Bt, pan(s) and (topsoil that includes patches of relict amorphous OM/dung? (SMT 1c); rare traces of burned flint and rare fine charcoal; sub-horizontal planar cracks. Lower ditch fill is composed of poorly layered (planar voids) eroded sandy Eb and clayey Bt horizon soil. Local impact/activity recorded as a sedimentary upward-fining pan that includes charcoal and ensuing inputs of 'topsoil' that include fragments of amorphous organic matter/dung residues(?).

		abundant laminated finely dusty and limpid clay void and grain coatings (SMT 1b – Bt soil); abundant dusty void coatings (SMT 1a – Eb); very abundant laminated clay and dusty/fine silt void infills and coatings and 2 mm upward fining 45 mm wide pan, and associated small pans; *Amorphous*: many Fe and Fe-Mn impregnations of relict OM; *Fabric*: abundant broad burrows in upper 25 mm; Bt and Eb layered soil in lower 50 mm. BD (127): 0.698% LOI, 0.626 mg/g phosphate-P, 11.2 x 10^{-8} SI χ, 0.675% χ_{conv}	
MFT C/SMT 1e over 1d	M 3	(~10 cm) 0-75 mm SM: Generally homogeneous, with two broad upper and lower layers; *Microstructure*: massive with weakly formed poorly developed medium prisms; 35-40% voids, fine to medium (1-2 mm) planar voids, broad (4-5 mm) chamber/channels and complex packing voids; *Coarse Mineral*: poorly sorted, as M1, with rounded coarse stone-size (25 mm) quartzite, with iron stone and cherts; moderately well sorted medium sand in lower fill; *Coarse Organic and Anthropogenic*: few angular stone –size (15 mm) calcined and example of weakly rubefied flint; rare fine charcoal and example of bone (250 µm) – possibly coprolitic (iron stained); *Fine Fabric*: dominant SMT 1d in lower half of thin section (blown-sand?); SMT 1e (in upper half): heavily speckled darkish brown (PPL), very low interference colours (coated grain to close porphyric, speckled b-fabric, XPL), orange (OIL); trace amounts of very fine charcoal and rubefied mineral; *Pedofeatures*: *Textural*: very abundant laminated clay coatings; many very dusty coatings; Amorphous: rare fine patches of yellowish nodular infills and staining (Fe-P?); *Fabric*: very abundant broad burrows. BD (393): 1.00% LOI, 0.728 mg g^{-1} phosphate-P, 28.8 x 10^{-8} SI χ, 2.46% χ_{conv}	Feature Group 1; Iron Age roundhouse gully; Context 393. Context 393: Sands with few burned flint and rare charcoal; composed of a lower sandy fill, above which a loamy fill contains very fine charcoal, traces of fine rubefied mineral matter and an example of sand-size stained (coprolitic) bone; there are rare traces of Fe(P) impregnation/infills; dusty clay and clay coatings are ubiquitous. House gully fill containing primary (blown?) sand fill, and upper more humic occupation topsoil fill, which contains fine charcoal, fine burned mineral material (cf magnetic susceptibility with 170, 127) and a very fine bone – trace indications of domestic use of the house/locality.
MFT C2/SMT 1f	M 4	(~6 cm) 0-75 mm SM: Homogeneous; *Microstructure*: massive, burrowed; 35% voids, fine channels, complex packing voids, vughs and chambers; *Coarse Mineral*: moderately poorly sorted, as M1, with few rounded ironstone gravel (5 mm) and very few (burned) angular flint (15 mm); *Coarse Organic and Anthropogenic*: very few (burned) angular flint, rare fine charcoal; very abundant strongly weathered coprolitic remains: leached bone (max. 4 mm) and amorphous Ca-P (max 10 mm) nodules, with possible plant tissues (bone and phosphate are non-autofluorescent under BL); embedded burned sand; abundant amorphous organic matter traces, with very abundant post-weathering clay and clay coatings; with humic clay as almost totally weathered cess; *Fine Fabric*: SMT 1f: dusty and dotted dark brown (PPL), very low interference colours (close porphyric, speckled b-fabric, XPL), orange (OIL); abundant fine amorphous and many charred organic matter; *Pedofeatures*: *Textural*: very abundant dusty and multilaminated clay void coatings, especially concentrated in weathered cess; fragment examples of bones in layers of clay and dirty silt (floor fragment?); *Depletion*: apparent marked phosphate-depletion of bone and calcium phosphate-cess; *Amorphous*: rare traces of Fe(P) nodules; *Fabric*: BD (321): 1.26% LOI, 1.47 mg/g phosphate-P, 41.8 x 10^{-8} SI χ, 2.65% χ_{conv}	Feature Group 1; Iron Age roundhouse gully; Context 321. Context 321: Occupation soil fill, with coarse burned flint and fine charcoal (as M3), but with very abundant clayey aggregates of leached fine bone, possible leached cess and individual fine bone; some layered with clay and silt; rare probable Fe-P nodules also occur; very abundant clay and dusty clay textural pedofeatures. House gully fill composed of fine humic and sandy soil of probable occupation/house floor origin, in which clayey and leached bone and mineralised cess is very abundant.. Inferred: domestic floor use, with cess disposal/spillage. Strong burrowing of cess-rich fill and later clay inwash.
MFT D2/SMT 1e, 1h	M 5	(~10 cm) 0-75 mm 479: 0-25 mm SM; Moderately heterogeneous (burrow-mixed 1e and 1h); *Microstructure*: as below, 35% voids; *Coarse Mineral*: as below, poorly sorted with gravel-size	Enclosure IIb, Iron Age ditch fill in iron working area; Contexts 479 and 478. Context 479: Poorly sorted with very abundant charcoal, and examples of probable hammerscale and possible strongly weathered slag, very strongly

MFT D1/SMT 1g		cherts and ironstone; *Coarse Organic and Anthropogenic*: abundant charcoal (5 mm), some very strongly burned; examples of burned flint and other mineral grains; possible weathered iron slag (nodule) and coarse (4 mm) 'hammerscale'; *Fine Fabric*: SMT 1h, as SMT 1g, with abundant relict amorphous organic and many fine charred; phytoliths present; *Pedofeatures*: *Textural*: rare dark reddish clay coatings; *Fabric*: very abundant broad burrows. BD (479): 1.63% LOI, 0.993 mg/g phosphate-P, 171 x 10^{-8} SI χ, 9.29% χ_{conv} Semi-horizontal pan feature along boundary which had been previously broadly burrowed. 478: 25-75 mm SM: Mainly homogeneous; *Microstructure*: massive, burrowed; 30% voids, mainly broad chambers; *Coarse Mineral*: C:F, 90:10; moderately poorly sorted coarse silt to medium sand, with very few stone-size ironstone; *Coarse Organic and Anthropogenic*: rare traces of very fine burned bone, very fine coprolitic bone and coprolite (x2)(1 mm); examples of 'hammerscale' (5 mm); rare fine charcoal; very few burned flint (10 mm); many traces of relict amorphous organic matter (dung?); Fe-P(?) nodule/infill, with phytoliths and spores ('weathered' dung?); *Fine Fabric*: SMT 1g: as 1d (Eb horizon) with many relict amorphous organic matter; phytoliths present; *Pedofeatures*: *Textural*: very abundant reddish brown clay void coatings and infills at 25-50 mm depth, below two 1 mm thick semi-horizontal fine silt pans; *Amorphous*: example of weakly-formed Fe-P infill/nodule (phytoliths-rich with spores); *Fabric*: very abundant broad burrows. BD (478): 1.05% LOI, 0.797 mg/g phosphate-P, 36.7 x 10^{-8} SI χ, 2.51% χ_{conv}	burrowed; fine fabric includes much relict amorphous organic matter and fine charcoal, with phytoliths present. Strongly burrowed, once-humic (possible relict/burned dung) soil with charcoal, hammerscale and possible weathered slag evidence of iron-working (contributing to enhanced magnetic susceptibility; weathered ash perhaps contributing to higher phosphate-P here compared to 478, below. Context 478: Burrowed sands with coarse burned flint, hammerscale, likely examples of coarse and fine human coprolite and fine bone, with fine fabric containing relict amorphous organic matter with phytoliths, and Fe-P nodule preserving spores(?) and phytoliths (relict dung?). Upper part characterised by concentration of textural pedofeatures – clay coatings and pans marking the upper boundary. *Sandy soil fill with possible evidence of animal dung (stock enclosure) and middening traces*; overlying dumps from iron-working were possibly ash rich and weathering led to concentration of textural pedofeature formation/inwash/panning along junction with 479 above.
MFT D3, SMT 1i, 1e	M 6	(~12 cm) 0-75 mm SM: Heterogeneous (mainly SMT 1i, with very broad vertical burrow fill of 1e); *Microstructure*: massive and burrowed; 40% voids, fine channels and chambers, and very coarse (10 mm) chambers and burrows; *Coarse Mineral:* very poorly sorted, C:F, 80:20, as M1, with common stone size siltstone (20 mm), ironstone (5 mm) and burned flint (7 mm); see anthropogenic; *Coarse Organic and Anthropogenic:* many fine and coarse (5 mm) charcoal; few ironstone (weathered Oolitic ironstone), rare 'hammerscale' (6 mm; opaque, rusty red in OIL); 2 x silty clay fragments (3 mm; surface crusts?), example of rubefied argillic (Bt) clay (3 mm); humic stained micaceous silty clay with phytoliths (5 mm; wetland?); burned peat/dung with long articulated phytoliths (1.5 mm); *Fine Fabric:* SMT 1i: very dark brown (PPL), extremely low interference colours to isotic (close porphyric, speckled and undifferentiated b-fabric, XPL), abundant fine charred OM and rubefied mineral; *Pedofeatures: Textural*: patches of very abundant reddish brown clay void coatings and infills; occasional dirty silt pans and coatings in very broad burrow fill; *Fabric*: very abundant broad burrows. BD (525): 1.90% LOI, 2.47 mg/g phosphate-P, 346 x 10^{-8} SI χ, 15.9% χ_{conv}	Enclosure IIb, Pit fill (iron working/ore fill), Context 525. Context 525: Poorly sorted sands and: many charcoal coarse burned flint, ironstone and rusty 'hammerscale' fragments, with examples of silty clay crust(?) fragments, humic silty and burned peaty clay/dung? (from wetland?), with very fine charcoal and fine burned mineral-rich fine fabric; patches of very abundant reddish clay coatings associated with charcoal; later very broad burrow, with very dusty, dirty silty coatings. Mixed pit-fill dump of 'occupation' soil from industrial area, containing much charcoal, fine burned soil and rusting 'hammerscale', employing ironstone (Oolitic?)ore? and imports of local? wetland peats and humic silty clay. In situ weathering of ashes (K) mobilised clay. Later burrowing and recent(?) plough soil downwash.
D4/SMT 1i	M 7	(~19 cm) 0-75 mm 0-40 mm SM: Homogeneous; *Microstructure*: massive and burrowed; 45% voids, very broad chambers (7 mm) and complex and simple packing voids; *Coarse Mineral*: C:F, mainly only coarse (mineral and charcoal) with burrow fills of 85:15, silt and sand with very few coarse ironstone and Bt horizon fragments (mixed with burned inclusions; 8 mm); *Coarse Organic and Anthropogenic*: very	Enclosure IIb, Iron Age iron working area, Context 19 pit fill over natural fill of base of pit. Context 19: sand and coarse charcoal dominated; very strongly burrowed, with very little burned flint. Dump of charcoal (hence high %LOI). Natural: argillic Bt horizon soil-dominated, with marked burrow mixing (coarse burned flint, charcoal) of fine charcoal-rich soil;

A and D3/SMT 1b, with 1i		abundant coarse wood charcoal (13 mm) – dominates layer; traces of fine burned flint; *Fine Fabric*: 1i; *Pedofeatures: Fabric*: very abundant broad and very broad burrows. BD (19): 9.20% LOI, 0.818 mg/g phosphate-P, 93.7 x 10^{-8} SI χ, 4.44% χ_{conv} 10 mm thick burrowed boundary. 40-75 mm: SM: heterogeneous; *Microstructure*: massive and burrowed, with fine channels; compact with 25% voids; 2 mm chambers and fine (0.5 mm) channels; *Coarse Mineral*: C:F, 75:25, moderately sorted with few ironstone and examples of gravel-size (6 mm) angular burned flint; *Coarse Organic and Anthropogenic*: very few burned flint, occasional charcoal associated with burrows; *Fine Fabric*: dominant SMT 1b (Bt horizon), with frequent SMT 1i; *Pedofeatures*: *Textural*: very abundant ferriargillans (reddish clay coatings) associated with Bt fabric, with rare very dark blackish and reddish, associated with SMT 1i; *Fabric*: occasional broad burrows. BD (infill from natural): 1.28% LOI, 0.587 mg/g phosphate-P, 31.3 x 10^{-8} SI χ, 1.09% χ_{conv}	some translocated very dark reddish clay. Primary fill of pit composed of Bt horizon soil, with burrow mixed pit fill – burned flint, charcoal; weathering of presumably once-ash rich pit fill led released K (potassium) to mobilise clay.
MFT A2/SMT 1j	M 8	(~20 cm) 0-75 mm SM: Homogeneous; *Microstructure*: massive, burrowed and channels; compact, 25%, fine (0.5-1 mm) channels and chambers; *Coarse Mineral*: C:F, 85:15, moderately sorted coarse silt to medium sand, with few gravel-size ironstone (max 7 mm), and burned flint (6 mm); *Coarse Organic and Anthropogenic*: 2 examples of burned flint, rare charcoal; rare amounts of pale yellowish (humic?) clay with phytoliths (wetland?) – 100-750 µm in size; *Fine Fabric*: SMT 1j: dusty and dotted dark yellowish brown (PPL),very low interference colours (close porphyric, speckled b-fabric, XPL), yellowish orange (OIL); relict humic staining with many fine amorphous organic matter (Fe-Mn staining); *Pedofeatures*: *Textural:* very abundant, very dark red to black, multilaminated, moderately thick (50-250 µm), very finely dusty clay over thin silty/impure, void coatings and infills in lower half of thin section; upper half contains many, mainly thin (50 µm), dark, sometimes blackish and finely dusty; *Amorphous*: rare traces of yellowish (Fe-P?) nodular coatings associated with edges of yellow amorphous OM (see above); Fabric: very abundant broad (1-2.5 mm) burrows, dominant extant burrowed fabric in upper half of slide. BD (364/368): 1.48% LOI, 1.46 mg/g phosphate-P, 34.7 x 10^{-8} SI χ, 1.86% χ_{conv} BD (infill from natural): 1.11% LOI, 0.896 mg/g phosphate-P, 21.4 x 10^{-8} SI χ, 0.846% χ_{conv}	Enclosure III, iron Age ditch, Context 364/368?: Context 364/368?: Sandy fill (containing relict evidence of amorphous organic matter content) with very few coarse anthropogenic inclusions (charcoal and burned flint), chiefly characterised by very abundant, dark coloured clay coatings and infills over dirty silt clay infills (in lower half of thin section), and fewer dark coatings in upper half of strongly burrowed fill; rare, but ubiquitous mainly fine (100-750 µm) relict fragments of yellow amorphous organic matter fragments containing phytoliths; higher phosphate-P (enriched) and LOI than fill of natural below. Accreting compact sandy soil containing fine amorphous organic matter (relict dung?) and fragments of organic matter containing phytoliths (amorphous dung/peat?), with phases of mixing/disturbance and deposition of a) dark silty followed by dark reddish to black multilaminated clay; disturbed clay from above being washed into earlier layers; burrowing by mesofauna, post-burrowing clay inwash in lower half of slide; likely phosphate-associated clay coatings; stock area, and in situ trampling by stock.

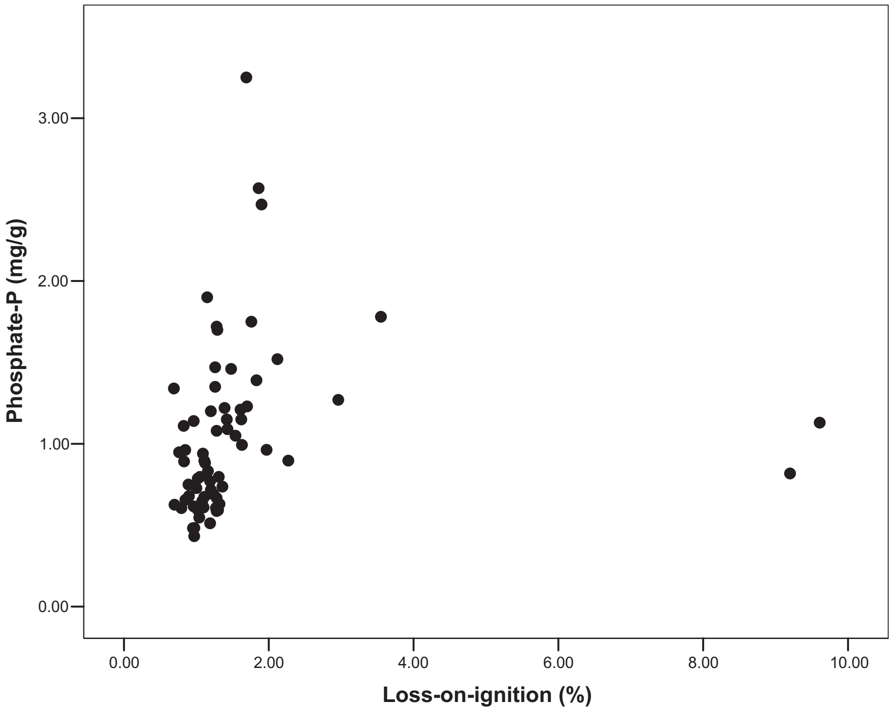


Figure 82: Relationship between phosphate-P and LOI for all samples (n = 69)

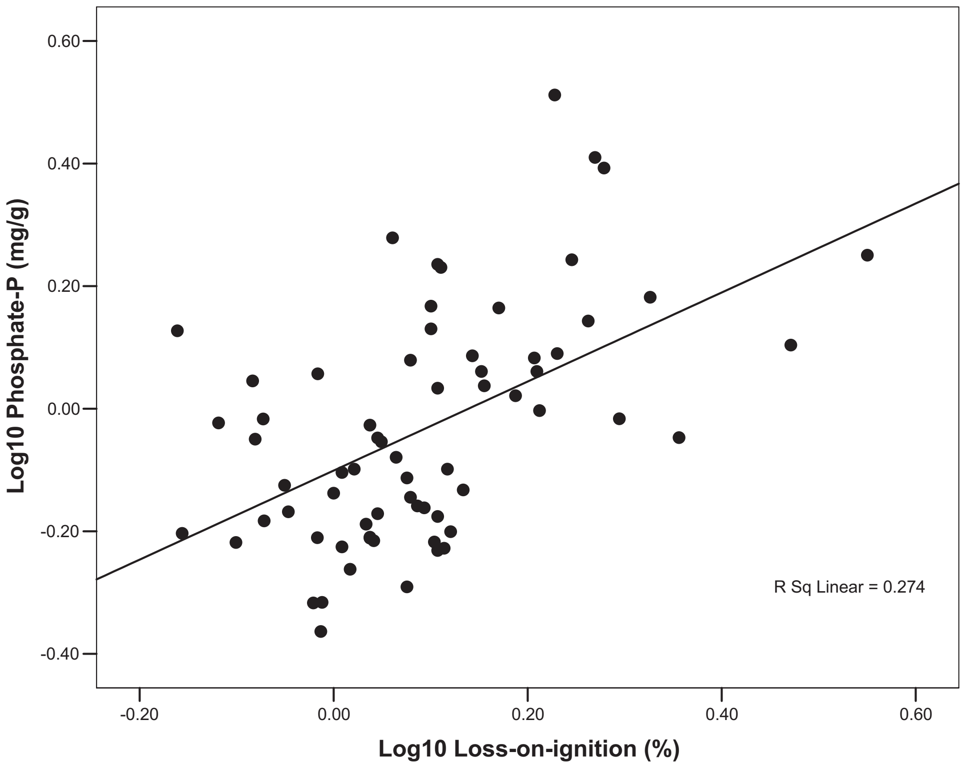


Figure 83: Relationship between phosphate-P and LOI for all samples, excluding the two charcoal-rich samples (n = 67)

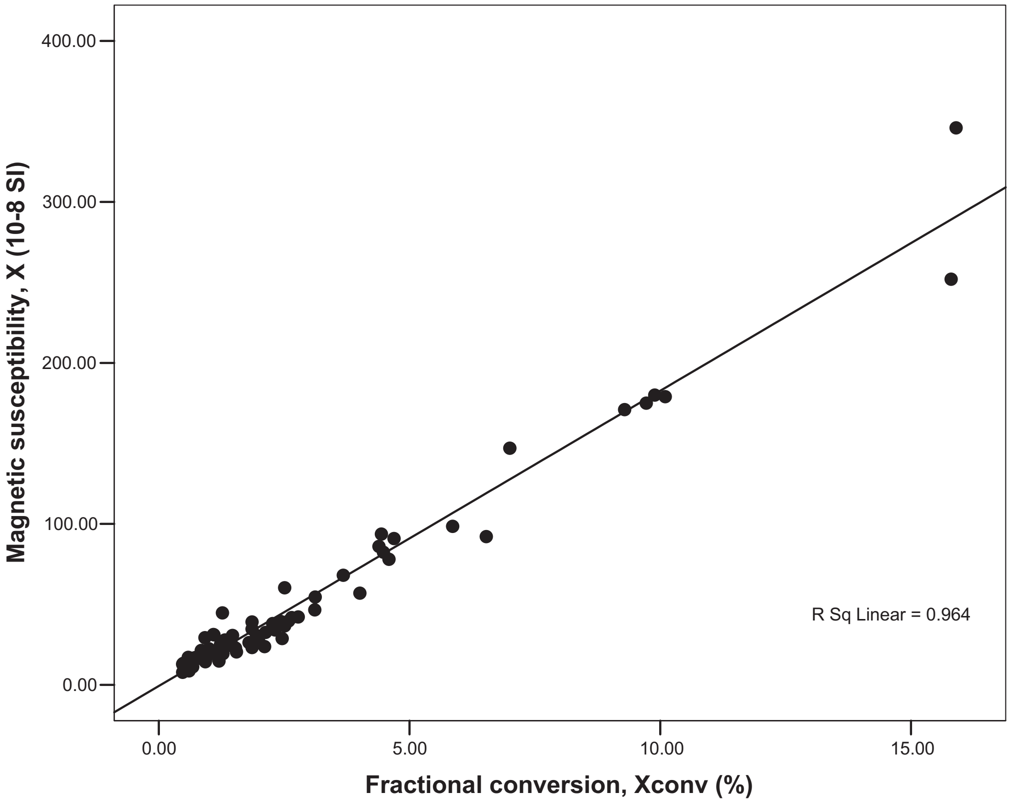


Figure 84: Relationship between χ and χconv for all samples (n = 69)

Figure 85: Enclosure Ib (M1, Context 170); macroscan of sliced impregnated block showing inclusion of coarse burned (calcined) angular flint (BF).

Figure 86: Enclosure IIb (M7, iron-working area); macroscan of sliced impregnated block; note burrow- (Bu) mixing between charcoal-rich Context 19 and underlying Natural; sandy subsoil has been moved upwards while burned flint and charcoal-rich

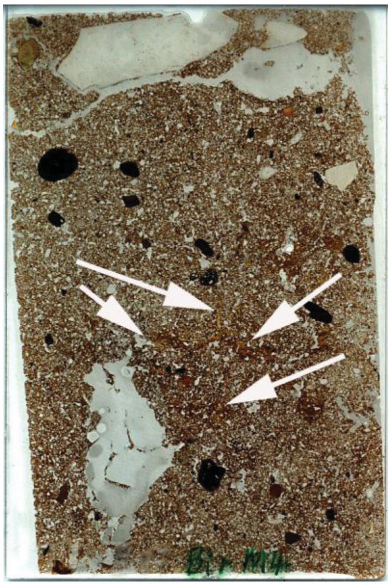


Figure 87: Scan of thin section M4 (Roundhouse gully fill, Context 321); note concentrations of leached bone and cess

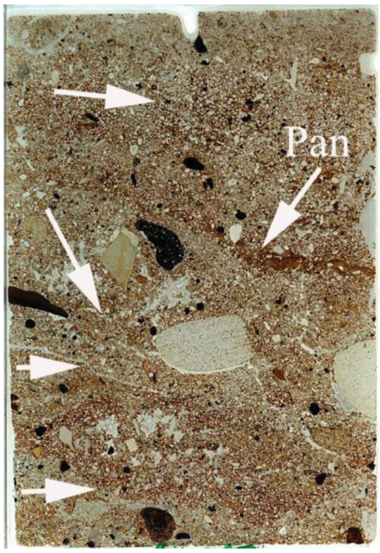


Figure 88: Scan of M2 (Square enclosure Ib, side ditch; Context 127); note layered fill separated by sub-horizontal cracks (arrows), with silt pan (Pan) evidence of slaking and

(arrows). Frame width is ~50 mm.

inwash probably related to stock trampling. Frame width is ~50 mm.

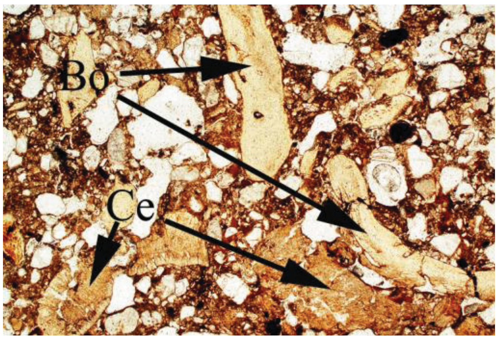


Figure 89: Photomicrograph of M4 (Roundhouse gully fill, Context 321); note leached bone (Bo) and cess (Ce), that presumably were dumped into the gully and relate to domestic occupation. Plane polarised light, frame width is ~4.6 mm.

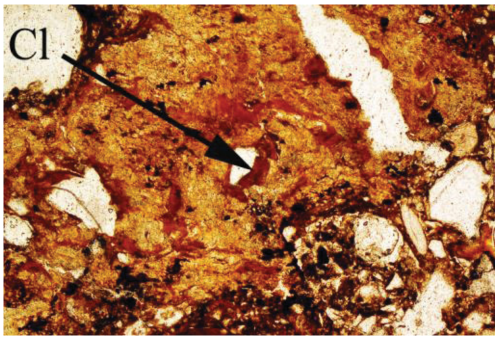


Figure 90: Detail of area in Figure 90, showing inwash of clay (Cl) into weathered cess. Often mineralised cess forms (Ca-P) hydroxyapatite which, like bone, is autofluorescent under blue light. This leached cess is no longer autofluorescent. Frame width is 2.3mm.

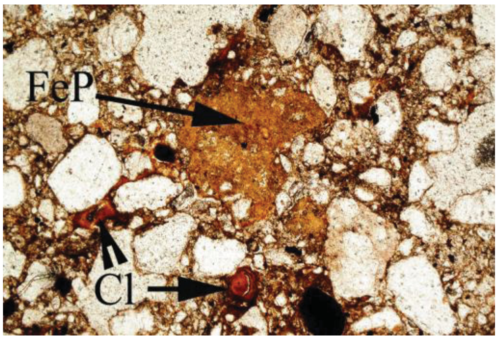


Figure 91: Photomicrograph of M1 (Context 170, Enclosure Ib); dark reddish clay (Cl) void infills and amorphous, probable, iron-phosphate void infills. PPL, frame width is ~2.3 mm.

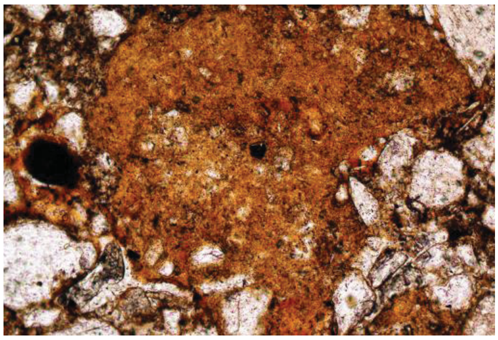


Figure 92: Detail of Figure 91, showing inclusion of brownish amorphous organic, which with included phytoliths may infer the presence of relict dung. Frame width is ~0.92 mm.

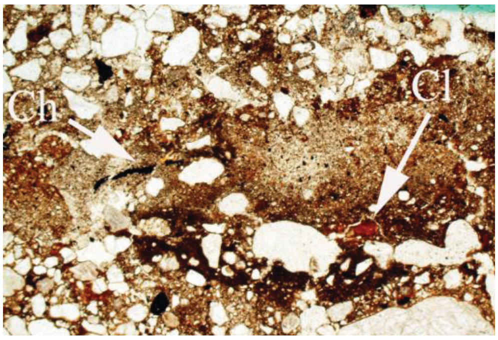


Figure 93: Photomicrograph of M2; dirty clay and silt pan, with included charcoal (Ch) and later clay (Cl) inwash. PPL, frame width is ~4.6 mm.

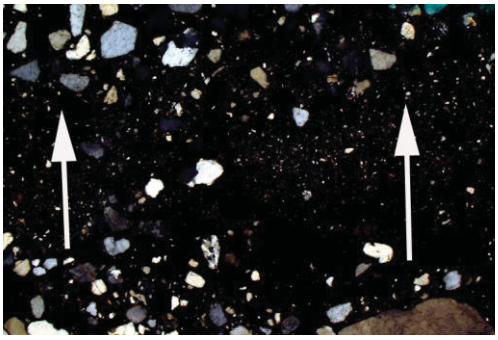


Figure 94: As Figure 93, under crossed polarised light (XPL); note inclusion of silt upwards (arrows).

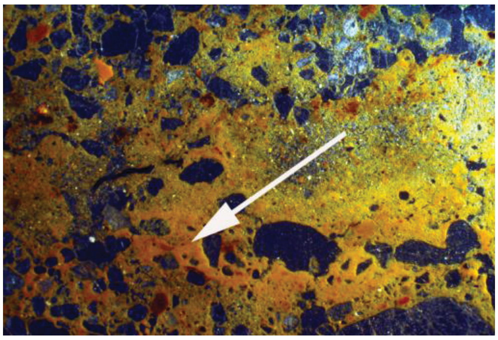


Figure 95: As Figure 93, under oblique incident light (OIL); note dark iron (and P?) stained clay inwash.

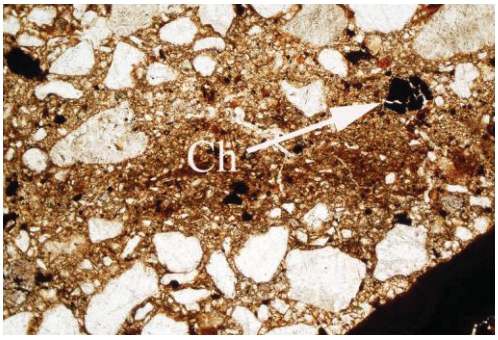


Figure 96: Photomicrograph of crust fragment in M2, dark stained and containing charcoal (Ch) fragments; probably trampled-in by stock. PPL, frame width is ~2.3 mm.

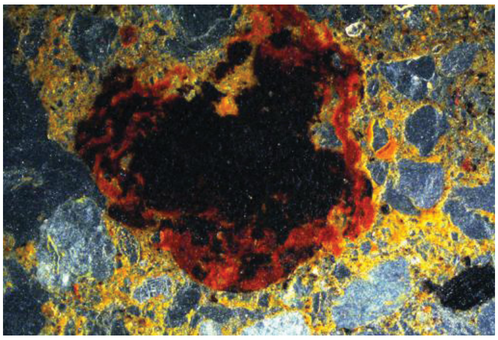


Figure 97: Photomicrograph of M5 (Context 479; Enclosure IIb); possible strongly weathered iron slag fragment. OIL, frame width is ~2.3 mm.

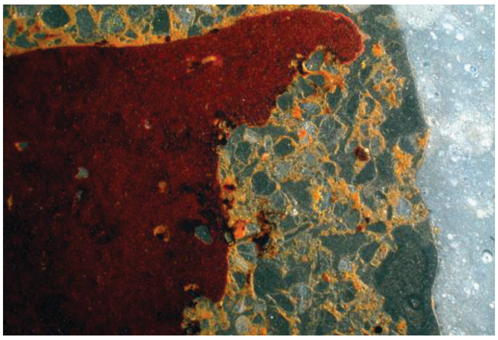


Figure 98: As Figure 97, a possible fragment of 'rusty' iron work (ironstone gravels are rounded and more orange under OIL). OIL, frame width is 4.6 mm.

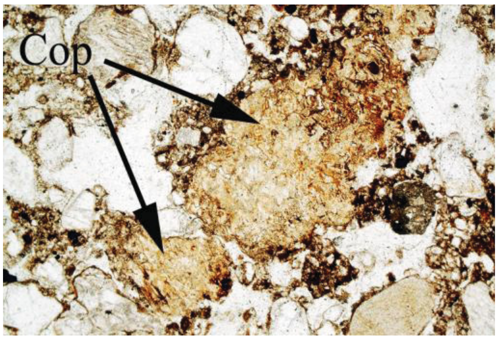


Figure 99: As Fig 13, fragments of probable human coprolite (Cop), which can be highly residual, and indicate general middening in this area. PPL, frame width is ~4.6 mm.

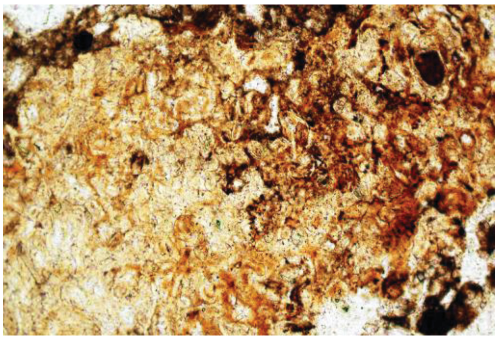


Figure 100: Detail of Figure 99, showing typical iron staining of coprolite – organic matter replacement. PPL, frame width is ~0.92 mm.

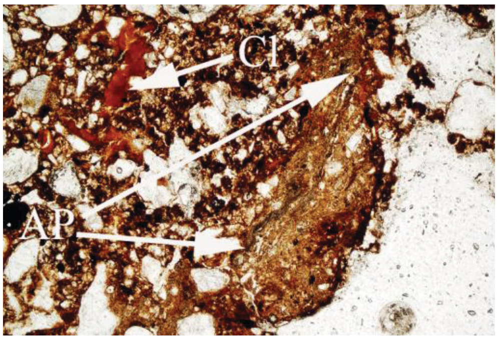


Figure 101: Photomicrograph of M6 (Context 525, Enclosure IIb); large fragment of 'exotic' once-humic silty clay with 1.2 mm long layered articulated phytoliths (AP)(wetland soil/mixed dung fragment?); note ubiquitous clay (Cl) inwash features. PPL, frame width is 2.3mm.

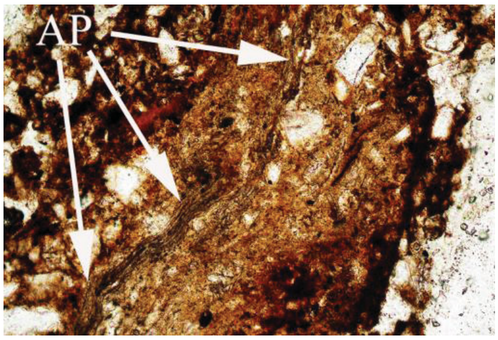


Figure 102: Detail of articulated phytoliths (AP) in 'exotic' once-humic silty clay. PPL, frame width is ~0.92 mm.

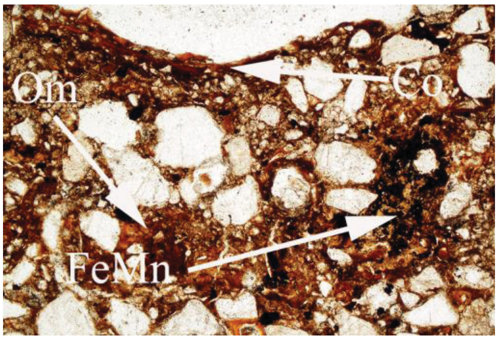


Figure 103: Photomicrograph of M8 (Context 364, Enclosure III); compact soil fill with layered silt and clay void coatings (Co), sealing amorphous organic matter (Om) material that is iron and manganese stained in places (FeMn). PPL, frame width is ~2.3 mm.

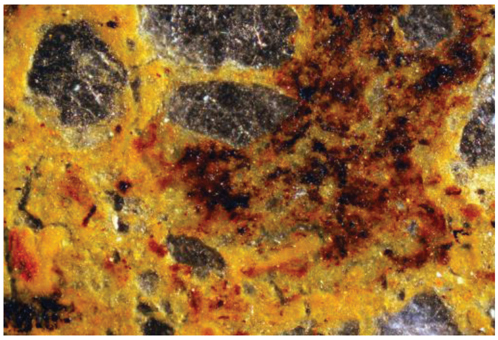


Figure 104: Detail of iron and manganese impregnated relict amorphous organic matter in Figure 103, which has a probable dung origin.

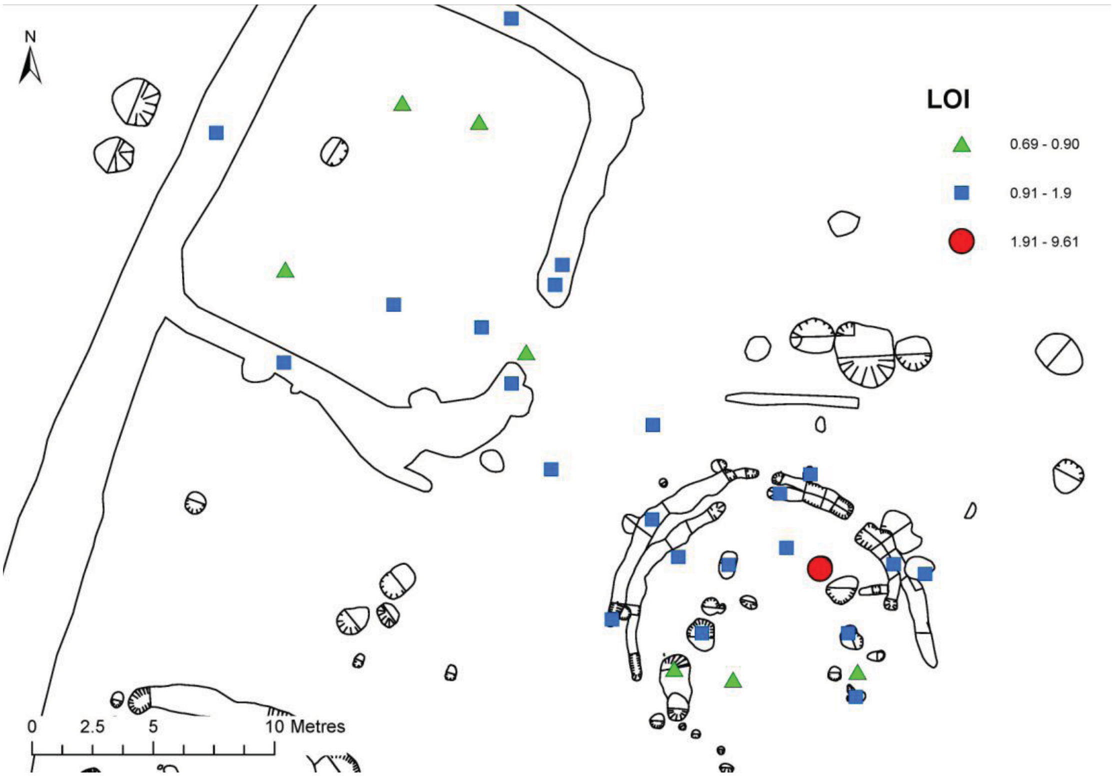


Figure 105: Roundhouse and sub-enclosure showing LOI organic matter as a percentage. Triangles = low organic matter, squares = medium, circles = high organic matter.

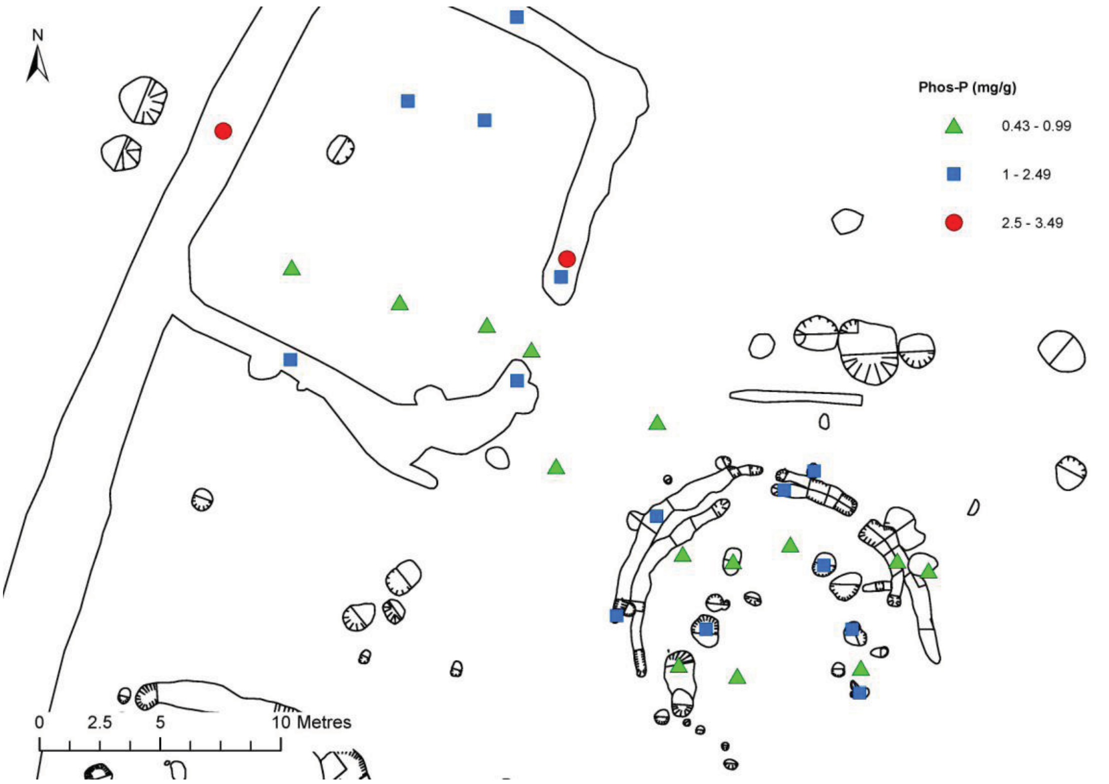


Figure 106: Roundhouse and sub-enclosure showing Phosphate levels. Triangle = below 1 mg/g, not enriched, square = 1 – 2.5 mg/g enriched, circle = over 2.5 mg/g heavily enriched.

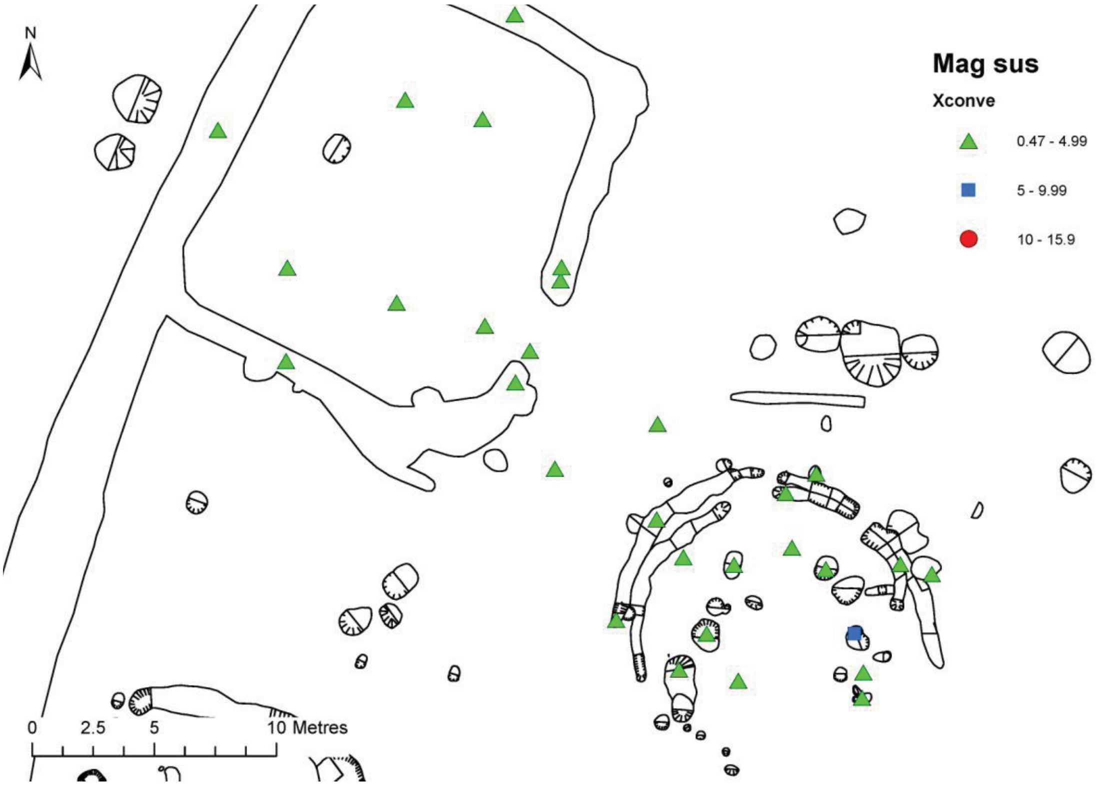


Figure 107: Roundhouse and sub-enclosure showing levels of magnetic susceptibility. All samples have below 5%, and therefore no evidence for enhancement, with the exception of a pit within the roundhouse area (square) with evidence for enhancement, possibly representing evidence of a hearth or dumps from such a source.

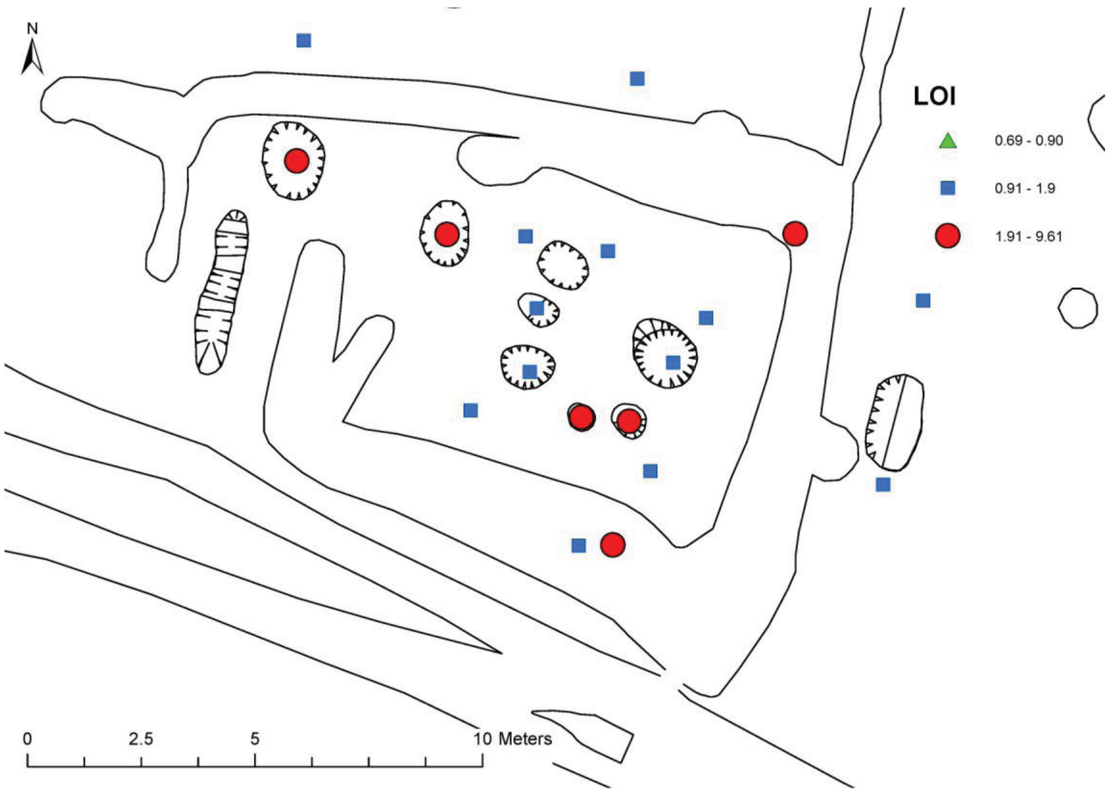


Figure 108: Enclosure IIB showing LOI organic matter as a percentage. Triangles = low organic matter, squares = medium, circles = high organic matter.

Figure 109: Enclosure IIB showing Phosphate levels. Triangle = below 1 mg/g, not enriched, square = 1 – 2.5 mg/g enriched, circle = over 2.5 mg/g heavily enriched.

Figure 110: Enclosure IIB showing levels of magnetic susceptibility as a percentage.

Triangle = samples with no evidence for enhancement, square = evidence for enhancement, circle = high level for enhancement

Radiocarbon dating results Derek Hamilton

(with contributions by Patrick Marsden and Gavin Speed)

Introduction

In 2008, ten samples of carbonized residues adhering to the internal surfaces of pottery sherds recovered from putatively Iron Age features from Hallam Fields, Birstall were submitted to The Angström Laboratory, Tandem Laboratory, Uppsala Universitet, Sweden, for accelerator mass spectrometry (AMS) radiocarbon dating. The samples were prepared following standardised Acid/Alkali/Acid protocols. In the present investigation either the Acid soluble/Alkali insoluble fraction (insoluble) containing mostly the original organics, or the Acid soluble/Alkali soluble fraction (soluble) containing mostly humic acids, a product of the breakdown of the original organics, were dated.

The Tandem Laboratory, Uppsala Universitet maintains a programme of quality assurance procedures, in addition to participation in international inter-comparisons (Scott 2003). These tests indicate no laboratory offsets and demonstrate the validity of the measurement quoted.

The results are given in Table 31, and are quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986). They are conventional radiocarbon ages (Stuiver and Polach 1977).

The calibrations of these results, which relate the radiocarbon measurements directly to the calendrical time scale, are given in Table and in graphical form in Figure 111. All have been calculated using the datasets published by Reimer *et al* (2004) and the computer program OxCal (v4.1) (Bronk Ramsey 1995; 1998; 2001). The calibrated date ranges cited are those for 95% confidence. They are quoted in the form recommended by Mook (1986), with the end points rounded outward to 10 years. The ranges in Table have been calculated according to the maximum intercept method (Stuiver and Reimer 1986); the distributions in Figure 111 are derived from the probability method (Stuiver and Reimer 1993).

General approach

The Bayesian approach to the interpretation of archaeological chronologies has been described by Buck *et al* (1996). It is based on the principle that although the calibrated age ranges of radiocarbon measurements accurately estimate the calendar ages of the samples themselves, it is the dates of archaeological events associated with those samples that are important. Bayesian techniques can provide realistic estimates of the dates of such events by combining absolute dating evidence, such as radiocarbon results, with relative dating evidence, such as stratigraphic relationships between radiocarbon samples. These „posterior density estimates', (which, by convention, are always expressed *in italics*) are not absolute. They are interpretative estimates, which will change as additional data become available or as the existing data are modelled from different perspectives.

The technique used is a form of Markov Chain Monte Carlo sampling, and has been applied using the program OxCal (v4.1). Details of the algorithms employed by this program are available from the on-line manual or in Bronk Ramsey (1995; 1998; 2001). The algorithms used in the models described below can be derived from the structure shown in Figure 111.

Objectives and Sampling

The objectives of the dating programme were to provide estimates for the start, end and duration of Iron Age activity at Hallam Fields. These were to be accomplished by selecting Iron Age pottery sherds with carbonized residues from Iron Age features/contexts.

The taphonomic relationship between a sample and its context is the most hazardous link in this process, since the mechanisms by which a sample came to be in its context are a matter of interpretative decision rather than certain knowledge. All samples consisted of single entities (Ashmore 1999) recovered from post-holes, pits and ditch fills. Because the sherds still had residues adhering to them, were not overly abraded, and had relatively fresh breaks, the interpretation made was that they were deposited within a short period of time after breaking.

The Model and Results

The ten results are graphically presented in Figure 111. With the exception of the two samples retrieved from stratified ditch fills in Enclosure 1 (659: Ua-36715 and 661: UA-36716), there were no stratigraphic relations between the samples.

While the radiocarbon dating of carbonized residues on pottery sherds is particularly useful as the residue is directly related to the use of the pot and most pottery can be comfortably assigned to a broad chronological horizon, it is not necessarily without problems (Hedges *et al* 1992; Nakamura *et al* 2001). All of the pottery submitted as part of this dating programme had been identified as belonging to an Iron Age tradition, however a few results were anomalously early (069: Ua-36710; 071: Ua-36711; 364: Ua-36713). While the result from 069 is from a residue on a plain body sherd, those from 071 and 364 are from residues on scored wares. These latter two results are likely to be earlier than expected because of sample contamination. The contamination could come from many things including leaching of humic acids in the ground or overscraping during sampling into a body matrix containing old carbon. Since 069 is a context with a similar Iron Age pottery assemblage, it is assumed to be Iron Age as well and is likely contaminated as well. These three results have been excluded from all further analysis.

Based upon these results, the model has good overall agreement (A_{model}=85.3%) between the remaining radiocarbon measurements and the observed stratigraphic relationships.

The model estimates that Iron Age activity at Hallam Fields, Birstall began in *450–220 cal BC* (*95% probability*; *start: Hallam Fields (Iron Age)*). The distribution is bimodal at 1-sigma and suggests that the start of Iron Age activity could be either in *410–350 cal BC* (*34% probability*) or *340–270 cal BC* (*34% probability*).

The model estimates that activity ended in *360–130 cal BC* (*95% probability*; *end: Hallam Fields (Iron Age)*) and probably in *290–180 cal BC* (*68% probability*).

The duration of dated Iron Age activity at Hallam Fields, Birstall is estimated at *1–270 years* (*95% probability*; Figure 112), and probably *1–140 years* (*68% probability*).

All seven of the results on residues from Iron Age pottery were subjected to a χ^2 test and were found to not be statistically significantly different [T'=10.6; v=6; T'(5%)=12.6: Ward and Wilson 1978] and so could be the same actual age. This combined with the shape of the estimated duration of activity (Figure 111) suggests that the activity was closer to the *1–140 year* (*68% probability*) estimate.

Simulation models were produced to see if the addition of more radiocarbon dates could resolve the bimodality present in the start estimate at *68% probability*. Unfortunately, even with the addition of a further 10 unstratified samples it is likely that the bimodality will still exist as it is strongly affected by the shape of the calibration curve in this region.

Lab ID	**Sample ID**	**Group**	**Context Info**	**$\delta^{13}C$ (‰)**	**Radiocarbon Age (BP)**	**Calibrated Date (95% confidence)**	***Posterior density estimate (95% probability)***
Ua-36709	17	ENC I	secondary fill enclosure ditch	-24.5	2300 ±40	410–230 cal BC	*400–350 cal BC (28%) or 310–210 cal BC (67%)*
Ua-36710	069	5	pit group in SW corner of Enclosure I	-29.2	2895 ±110	1420–810 cal BC	*1390–840 cal BC*
Ua-36711	071	5	pit group in SW corner of Enclosure I	-23.6	2530 ±65	820–420 cal BC	*810–480 cal BC (90%) or 470–410 cal BC (5%)*
Ua-36712	292	1	first phase of Enclosure I roundhouse	-28.3	2280 ±40	410–200 cal BC	*400–340 cal BC (25%) or 320–200 cal BC (70%)*
Ua-36713	364	ENC III	Enclosure III, N end of settlement	-27.2	3055 ±185	1750–820 cal BC	*1730–1710 cal BC (1%) or 1700–840 cal BC (94%)*
Ua-36714	525	11	pit within metalworking area	-29.8	2195 ±35	390–160 cal BC	*370–200 cal BC*
Ua-36715	659	ENC I	primary fill of ditch [657], Enclosure I	-24.4	2200 ±35	390–170 cal BC	*380–220 cal BC*
Ua-36716	661	ENC I	final fill of ditch [657], Enclosure I	-27.1	2205 ±40	390–170 cal BC	*360–200 cal BC*
Ua-36717	776	13	pit cutting Enclosure II roundhouse	-26.5	2160 ±35	360–90 cal BC	*370–180 cal BC*
Ua-36718	808	18	post-packing from pit within cluster	-27.3	2245 ±40	400–200 cal BC	*390–340 cal BC (20%) or 330–200 cal BC (75%)*

Table 31: Radiocarbon results

(all material from a carbonized food residue, soluble fraction)

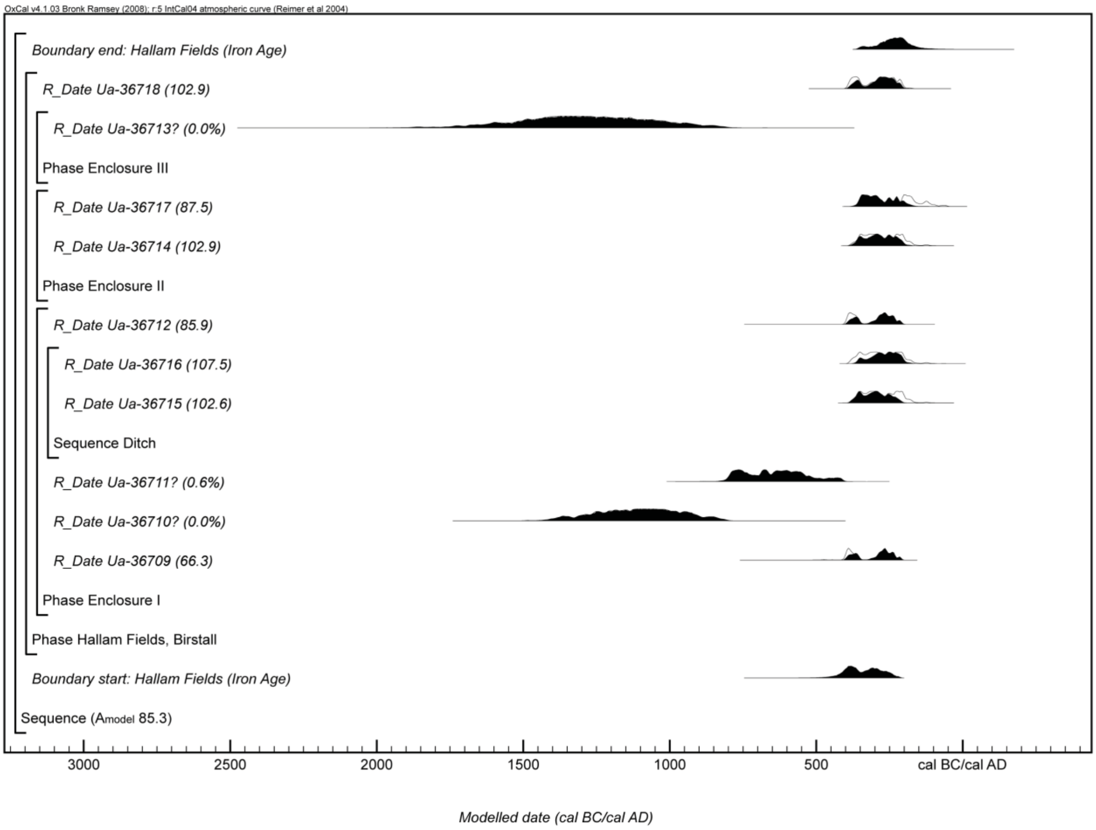


Figure 111: Probability distributions of dates

Note: Distribution represents the relative probability that an event occurs at a particular time. For each of the radiocarbon dates two distributions have been plotted, one in outline, which is the result of simple radiocarbon calibration, and a solid one, which is based on the chronological model used. The large square brackets down the left hand side along with the OxCal keywords define the model exactly.

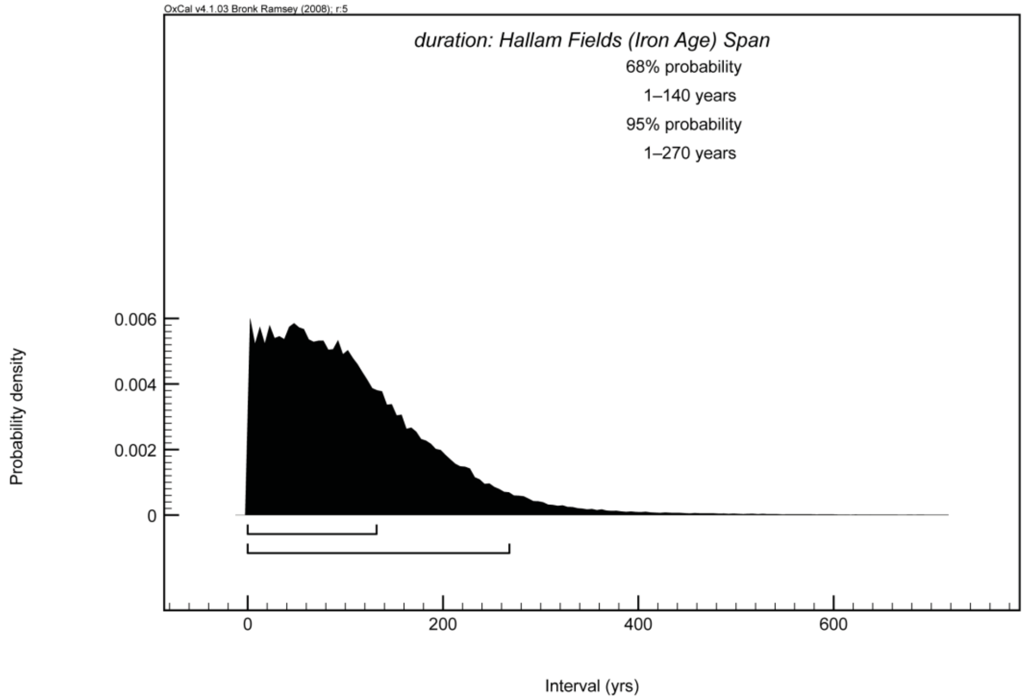


Figure 112: Probability distribution for the span of Iron Age activity (derived from the model in Figure 111)

Analysis and Discussion

The discovery of the Iron Age enclosed settlement at Hallam Fields, Birstall has added significantly to our understanding of small Iron Age settlements in the region. Often only parts of the enclosure settlements are investigated, whereas the example here was subject to controlled and detailed full excavation. The finds recovered, and environmental sampling results, have proved most rewarding, adding much to our understanding of the life of the people living in Birstall in the 5th to 3rd centuries BC.

Most of the archaeological evidence recovered dated to the Iron Age, with some evidence for earlier and later activity, the focus of the analysis and discussion is therefore on the Iron Age settlement.

Leicestershire during the Iron Age

Leicestershire lies within an area of Britain described as part of the territory of the Corieltavi (by Ptolmy in the 2nd century A.D.). They were probably a largely agricultural group, likely to consist of several small tribes (Score forthcoming) covering the area of the modern East Midands, reaching from the river Nene to the river Trent, though the boundary of the tribal territory should be seen as flexible (Cunliffe 1991: 176).

Our knowledge of Iron Age Leicestershire has improved significantly over more recent years since the advent of the Department of the Environment's Planning Policy Guideline Note 16 (PPG16) in 1990. The county has been able to benefit from developer-funded large-scale excavations of partial and entire Iron Age enclosure farmsteads in advance of redevelopment. The Historic Environment Record for Leicestershire and Rutland now has records for around 250 possible occupation areas dating to the first millennium BC. The majority (150) are cropmark sites (Hartley 1989), eight are earthworks, and most of the remainder were identified from fieldwalking surveys such as the Medbourne and Swift Valley surveys (Clay 2002).

The earliest evidence at Leicester dates to the late first century B.C. with activity close to the river Soar, however, some scored ware pottery found could be earlier, indicating a potential mid-Iron Age settlement origins (L. Cooper pers. comm.). By the late Iron Age (early/mid first century A.D.) Leicester had become an important tribal centre, and possibly an *oppidium* or similer defended with earthwork banks and ditches (Cooper 1993, 85), extending for 10-20ha (Clay & Pollard 1994).

Within the hinterland of Leicester are examples of large agglomerated settlements, at Humberstone (Thomas 2008b) and Beaumont Leys (Thomas 2008c). More widely, other large settlements within Leicestershire are known at Lockington (Ripper and Butler 1999), Normanton le Heath (Thorpe et al 1994) and Ratby Bury (Clay 1985). There are also four known hillforts within the county, Breedon on the Hill and Burrough Hill being the largest.

The most common type of settlement in the Iron Age of Leicestershire is the small farmstead (although only around fifteen of these small settlements have been either partially or fully excavated). Notable excavated examples include Enderby (Clay 1992; Meek et al 2004); Hinckley (Chapman 2004); Huncote (Meek et al 2004); Kirby Muxloe (Cooper 1995); Hamilton North (Beamish and Shore 2005); Crown Hills, Leicester (Chapman 2000); and Grimbo Farm, Castle Donington (Derrick 1999). Clay proposes a density of one late Iron Age site per 1.8-2 sq km (Clay 2000,3). The settlement at Birstall thus joins this group of small farmsteads all of which likely consisted of small family or kin groups who may have had trading links with some of the large „agglomerated' settlements within the area.

The Iron Age Landscape

The settlement at Birstall is located within the Soar valley on a broadly flat terrace, on the edge of river sands and gravels. It is 1.5km from the present location of the River Soar to the east, 700m east of a stream that feeds into Rothley Brook (Figure 113). At *c.*60m above O.D the enclosure has been added to part of an established field system that extended onto the slight hill (with clay substrata) to the north (Area 2) and west (Area 3; Figure 114 and Figure 115). It is likely therefore, that the surrounding landscape was substantially cleared of trees and the area utilised for farming prior to the establishment of the settlement.

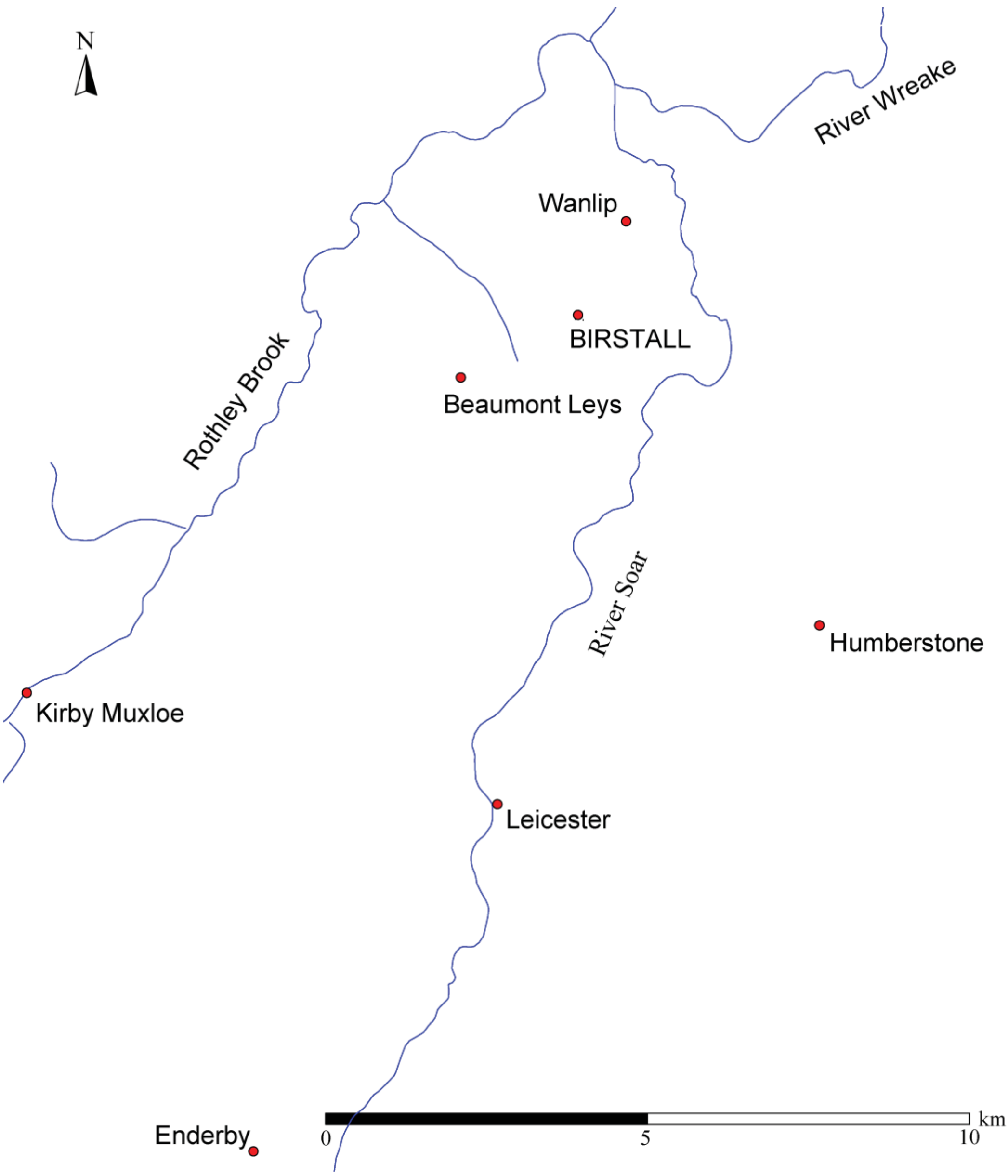
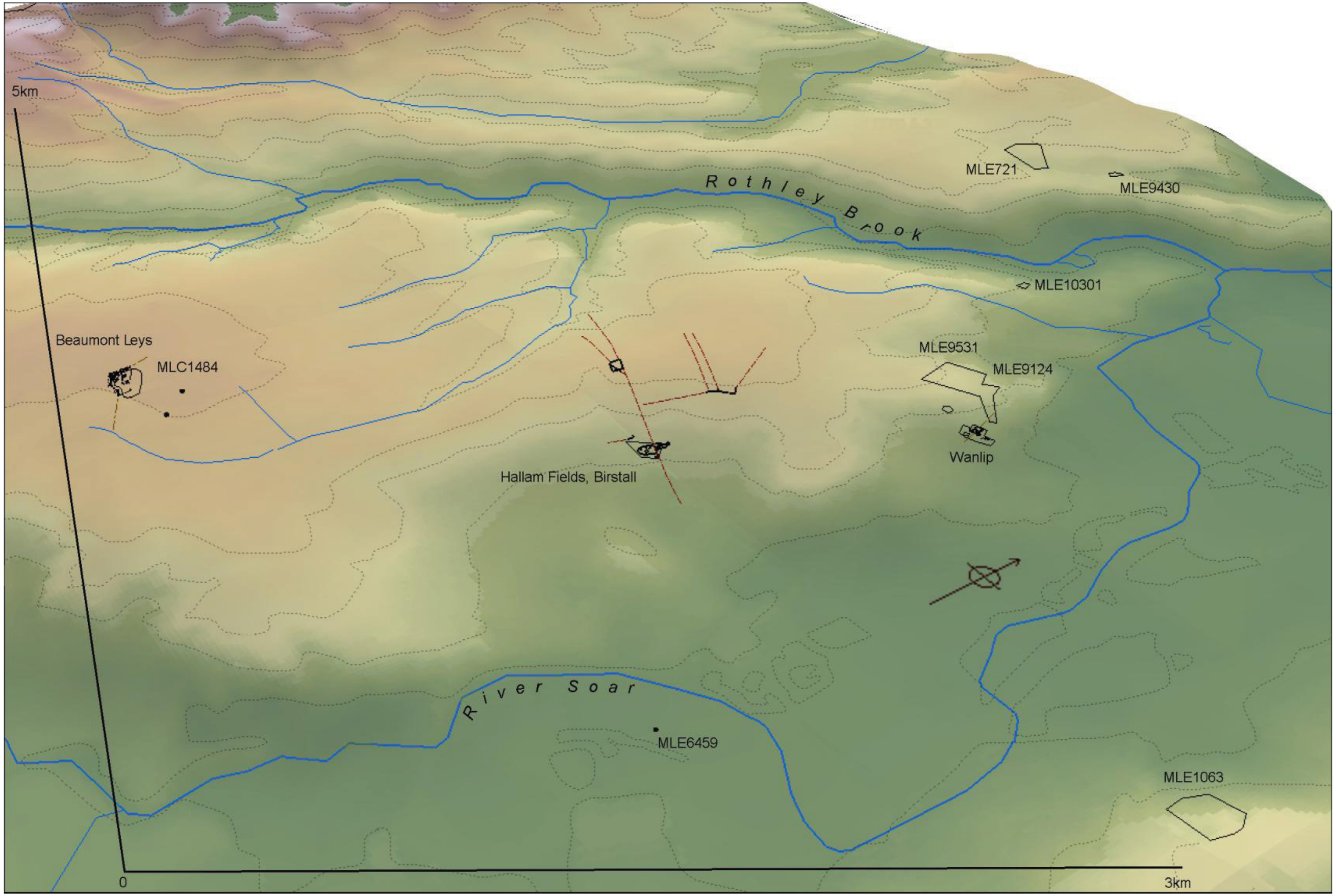


Figure 113: Plan of Birstall and other Iron Age settlements in the surrounding area mentioned in the text

Over page:

Figure 114: Landscape visualisation with 4x enhanced vertical scale, showing Birstall in relation to other Iron Age sites known within the area. Prepared by Matthew Beamish and reproduced using Ordnance Survey Panorama data ©Crown Copyright 2008


5km
Rothley Brook
MLE721
MLE9430
MLE10301
Beaumont Leys
MLC1484
MLE9531
MLE9124
Wanlip
Hallam Fields, Birstall
River Soar
MLE6459
MLE1063
0
3km

Within the immediate vicinity of Birstall lie two other known mid-Iron Age settlements at Wanlip and Beaumont Leys, along with other possible sites recorded within the Historic Environment Records (Figure 114).

The closest known Iron Age settlement to Birstall is at Wanlip (MLE1089), 1km north-east (Beamish 1998). This dates to 450-350 BC, indicating that the two settlements may have been contemporary (or the settlement at Birstall may have begun as the use of the Wanlip site was drawing to an end). The two settlements are quite different, Wanlip being unenclosed (a trait usually associated with early-mid Iron Age settlements), whereas Birstall is enclosed. This raises the possibility that Birstall may have had unenclosed origins; indeed, the „kink' in the enclosure ditch on the east side, close to the roundhouse may indicate that the roundhouse was already upstanding prior to the digging to the enclosure ditch. This shift from unenclosed to enclosed is also seen in the early settlement phases at Manor Farm, Humberstone. There a cluster of unenclosed roundhouses were later partly enclosed by a ditched boundary (Thomas 2008b, 106). Both sites share strikingly similar locations within the landscape (Figure 114).

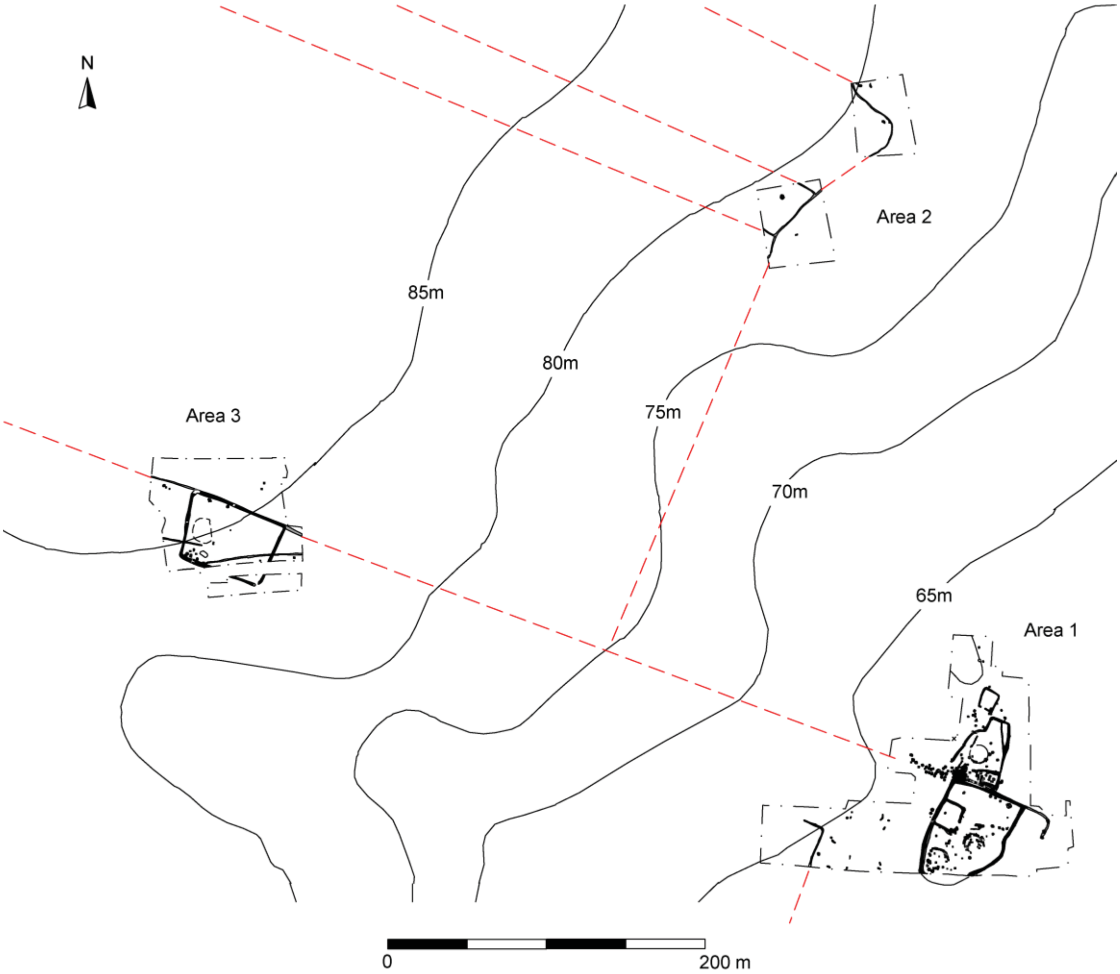


Figure 115: Detail of the topographical landscape at Birstall showing the likely field boundaries

The large agglomerated settlement at Beaumont Leys lays 2 km south-west on higher ground on a clay ridge overlooking the valley (Thomas 2008c, 34). Both sites may have used the same water source – a stream connected to the Rothley Brook. Both settlements have linear boundaries that cross the overall landform at right angles.

Elsewhere within the immediate surrounding area are a number of known Iron Age settlements lying along the River Soar (Thomas 2003) and Wreake (Cater 2006; Clarke 2007). On higher ground overlooking the Wanlip enclosure is further Iron Age settlement evidence (HER refs MLE9531 & 9124), while other settlements are known further north-west, close to the Rothley Brook (MLE10301, MLE721 and MLE9430) and along the River Soar (MLE6459).

It is therefore likely that in the mid to latter half of the first millennium BC the river valleys of the Soar and Wreake were utilised by a series of small farmsteads, including the example at Birstall, together with some emerging larger agglomerated settlements, some tied into a network of field systems and route-ways, on both gravels and clay substrata.

The settlement at Birstall may have had trading links beyond the local area. The pottery evidence indicates wider trading links with the possible later Iron Age La Tene vessel from the East Midlands region (it shows broad cultural contacts with the continent but no suggestion it was made there). The shell-tempered pottery shows at least regional or perhaps cross-regional contact either from the East Midlands (Trent Valley), or from the north of the region (Yorkshire Wolds); the rotary querns may have also been imported.

Settlement Chronology

Establishing a chronology for the Iron Age activity at Hallam Fields, as with other Iron Age sites, is problematic given the difficulties in closely dating the material artefacts (in particular the poorly-dated typologies of Iron Age pottery). The general lack of intercutting features also contributed to difficulties in developing a detailed phased development of the settlement. Despite this a good radiocarbon sequence has enabled an outline chronology of the site development, and is presented as follows.

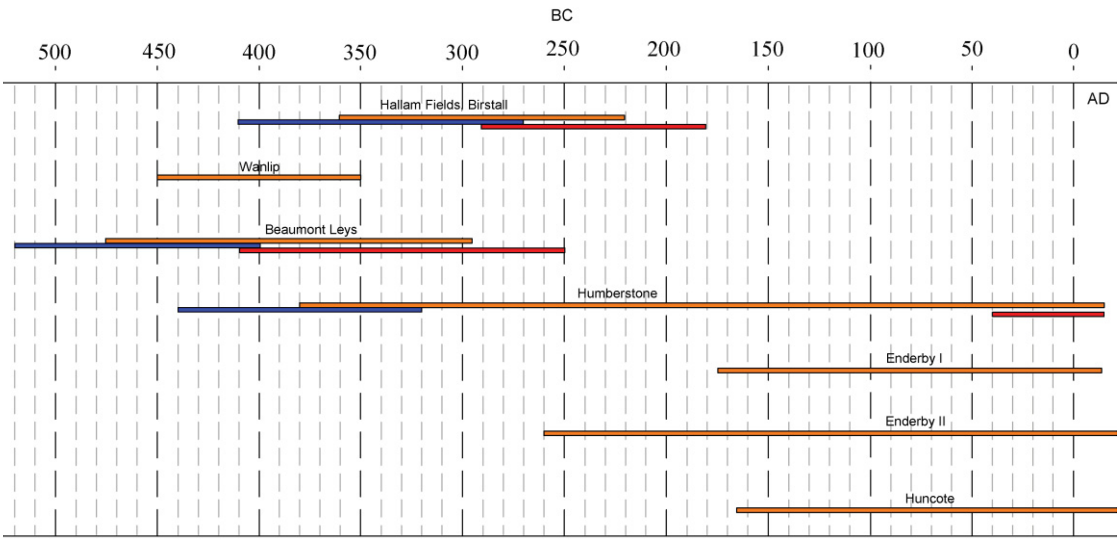


Figure 116: Plan showing the settlement chronology at Hallam Fields in comparison to other settlements located close by. These are dated by a combination of radiocarbon and stratigraphic evidence. The blue line indicates the likely start date, the red line the likely end date. The orange line indicates the possible period of settlement use.

The main settlement activity is dated to the mid-Iron Age (450 – 100 BC). During this period a small farmstead was built on the edge a wider established field system. The archaeological and radiocarbon dating evidence indicates that this settlement may have lasted for *c*.140 years. During this period the main roundhouse was re-built at least once, and it is possible that it may have had unenclosed origins. The earliest date for the settlement is only loosely dated to beginning from 450 to 220 BC; the settlement activity may have ended around 290 to 180 BC. The mid-Iron Age settlement may therefore be broadly contemporary with Wanlip (1km north-east), Beaumont Leys (2 km south-west), and the early phases of Humberstone 4.5km to the south-east.

However there is evidence of some late Iron Age occupation from the site (*c*. 100BC – AD 43). From the area examined this appears to have consisted of only minor activity, mainly pit digging within the central area (along the line of the ditch on the north side of Enclosure I). However the presence of rotary querns and late Iron Age pottery does suggest settlement activity nearby perhaps with the focus having moved elsewhere.

Settlement Size

Of seven similar Iron Age settlements within the region, Enclosure I is of a similar size to the other farmsteads at Enderby, Humberstone (early phases), and Hinckley. Enclosure II is the smallest enclosure in the region. Comparing more widely with 33 other settlements in Northamptonshire (also within the territory of the Corieltavi), Enclosure I is around the average size of 2250m². The evidence suggests that the larger settlements are most often either rectilinear or D-shaped, and the smaller settlements are more likely to be curvilinear in form (Speed 2005 and forthcoming). The exception is Enclosure II which is one of the smallest in the dataset (see Figure 117 and Figure 118).

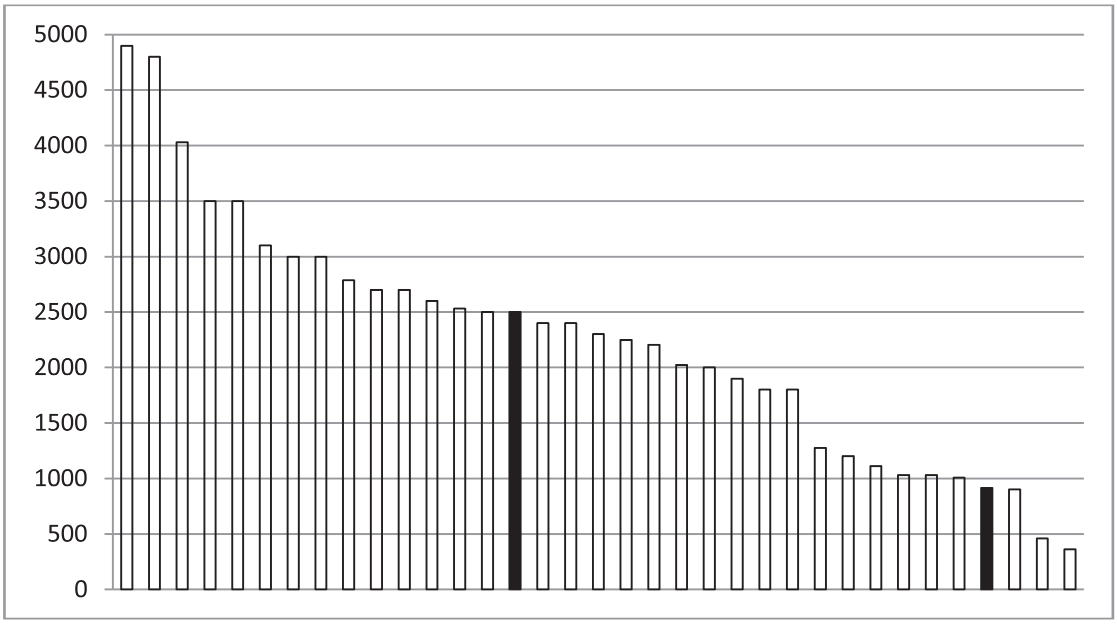


Figure 117: Iron Age enclosed settlements within Leicestershire and Northamptonshire, organised by size, Birstall enclosures shaded (data from Speed 2005).

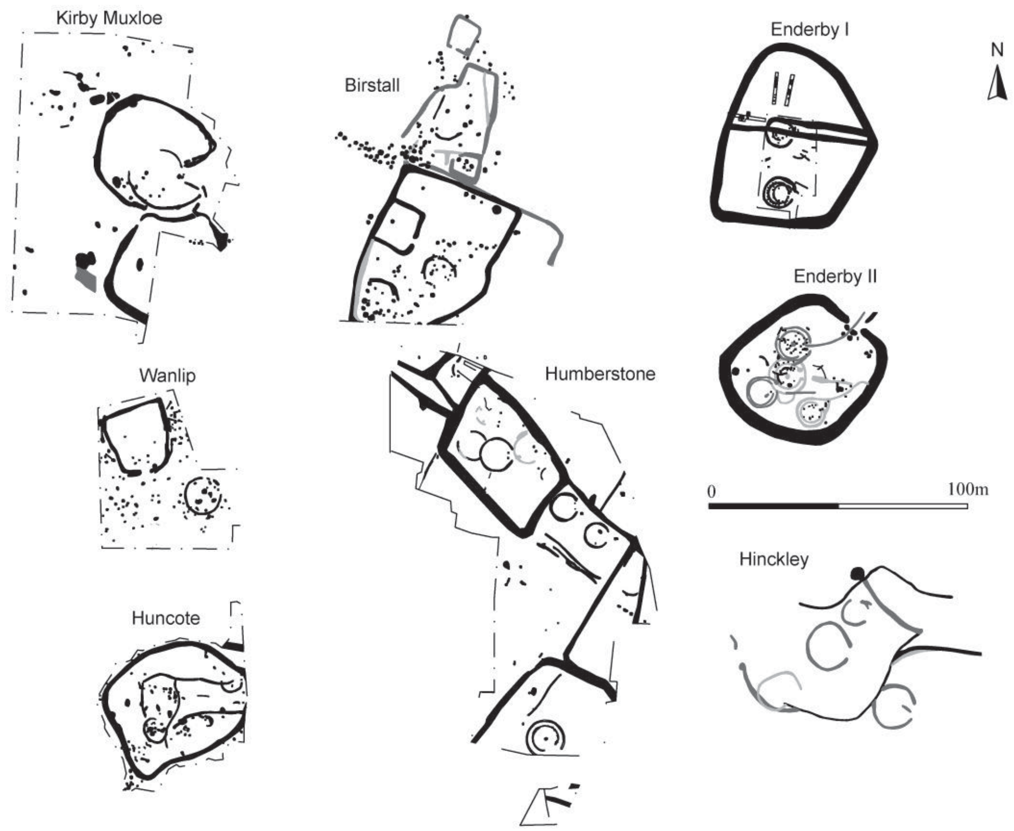


Figure 118: Birstall in comparison to other Iron Age enclosed settlements in the region (from Speed 2005)

Settlement Organisation

Enclosure I contains typical elements of a small Iron Age enclosed settlement, namely a single centrally-placed roundhouse, areas of pits, and some sub-divided areas within the enclosure. Enclosure II resembles the former, although only half the size, it also contains a single centrally-placed roundhouse, more areas of pits, and sub-enclosed space within the enclosure. The remaining enclosures (III, IV, Area 2, and Area 3) contained no clear structural evidence, and it is possible that these represented livestock enclosures. The ground plan of Enclosure I is remarkably similar to numerous other Iron Age enclosed settlements within Britain, suggesting that these settlements may have been arranged to a strict spatial order or template.

From Open To Enclosed

The settlement at Birstall may have had unenclosed origins; Figure 119 shows the settlement to have been focused around ditch boundaries aligned at right angles to one another in a semi-enclosed space. The roundhouses were later fully enclosed by larger re-cut ditches, forming Enclosure I and II. These formed a large „D'-shaped enclosure lying adjacent to a smaller sub-rectilinear enclosure.

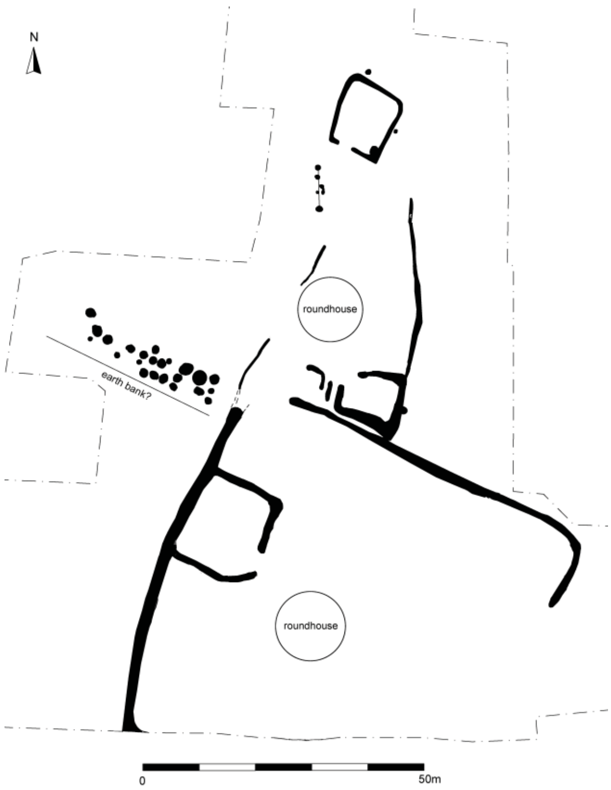


Figure 119: Possible early phase settlement boundaries

In a recent study of Iron Age enclosed settlements within the Leicester hinterland, most within the area were found to be either curvilinear or D-shaped (Speed 2005 and forthcoming), with the exception of rectangular enclosures at the Late Iron Age agglomerated settlement at Humberstone (Thomas 2008b). The earliest sites have the most irregular curvilinear form, as seen at Kirby Muxloe (there a sub-oval enclosure settlement), which dates to the Late Bronze Age/ Early Iron Age (Cooper 1994, 162). The more irregular forms of enclosure or unenclosed settlements are generally perceived as early Iron Age within largely unbounded landscapes. Closer to Birstall are the middle Iron Age settlements at Wanlip and Beaumont Leys that are both unenclosed. At Wanlip the „D'-shaped enclosure had no occupational evidence within it (Beamish 1998) and likely represents a livestock enclosure (much like Enclosure IB and Enclosure III at Birstall). The large agglomerated settlement at Beaumont Leys was unenclosed, although the southern limit of the settlement was bounded by a linear ditched boundary (Thomas 2008c, 5). Further south within the Soar valley is the mid-Iron Age settlement at Hinckley, consisting of an irregularly shaped curvilinear enclosure, with settlement evidence within and outside of the enclosure (Chapman 2004)

Birstall represents an early example of a settlement enclosed by regular ditched boundaries, perhaps within an already established field system (see Figure 115). It is uncertain if the enclosure had an internal bank. Enclosed settlements are more commonly associated with mid to late Iron Age settlements within Iron Age Britain, as seen at other known examples within Leicestershire. For example the two enclosed settlements at Enderby (5km south-west of Leicester) which are both broadly dated to the mid to late Iron Age. Enderby I had unenclosed origins, later enclosed by a large „D' shaped (proto-rectangular?) enclosure (Clay 1992). The examples at Enderby and Birstall indicate that these D-shaped settlements may be part of a more open and organised landscape, perhaps fitting into the corner or edge of field boundaries. This is in contrast to the earlier more irregular enclosures that may not have needed to fit into such an organised landscape. However, despite the presence of some D-shaped enclosures, curvilinear forms were still present, for example the second enclosure at Enderby (oval in form) located 350m south of Enderby I (Meek *et al* 2004:1) and Huncote *c.*9km south-west of Leicester (Meek *el al* 1997:19), which is again curvilinear in form. The more rectilinear enclosure forms are generally associated with later Iron Age settlements. The large agglomerated settlement at Humberstone is the clearest example of this (Thomas 2008b). Located 5 km north-east of Leicester, this forms part of a large settlement with the adjacent site at Elms Farm (Charles *et al* 2000). The settlement is one of the largest discovered and excavated in Leicestershire, containing both open and enclosed elements. Similar examples are seen at Crick (Hughes 1998, Woodward & Hughes 2007) and Courteenhall (Buteux 2005) in Northamptonshire. The rectilinear form reflects the nature of the organised surrounding landscape, as evidence was revealed for an extensive system of rectilinear ditches, indicating large areas of a controlled agricultural landscape.

This shift from unenclosed to enclosed is seen throughtout southern Britain in the mid to late Iron Age. This indicates that by around 300 BC enclosure ditches were beginning to become an important part of settlements and the wider landscape, representing boundaries of properties, settlements, and the wider society. The need for boundaries may reflect increases in population and settlement densities, and the intensification of agriculture, therefore implying much stricter controls on land (Thomas 1997).

Enclosure entrances

The enclosure entrance is unknown for Enclosure I and it is possible it was bridged or lies in the unexcavated gardens of properties on Harrowgate Drive to the south. Enclosure II and Enclosure III entrances both face to the south-west. This is in contrast to other known enclosure entrances in the region (Speed forthcoming), and across central and southern Iron Age Britain (Hill 1995:5) that indicate most enclosure entrances were easterly-orientated.

The predominance of the east-facing enclosure lends itself well to the extensive research that has been undertaken on meanings behind Iron Age roundhouse orientation (Fitzpatrick 1997; Giles and Parker-Pearson 1999; Oswald 1997; Parker-Pearson and Richards 1994; Pope 2007). For example, of the settlements that have earlier unenclosed origins (such as Enderby II and Huncote), the roundhouses are facing east, so when the enclosure ditches were dug, they may have simply mirrored these, in what could have been seen as the „correct way' (or simply the most practical way) to define the settlement boundaries. At other settlements enclosure entrance ways often face out onto pre-existing route-ways or face their neighbours (as seen at Wollaston in Northamptonshire, *Northamptonshire Archaeology* 1995, 3). This may have been the case with Enclosure II and III. The enclosure entrance in Area 3 is located in the south-east corner and faces Enclosure I 500m downhill to the south-east.

Buildings

The roundhouse was the most common building form in Iron Age Britain from the Middle Bronze Age through to the Late Iron Age (Parker-Pearson 1994, 47). The examples at Birstall are represented by an encircling eaves drip gully; but there is little clear evidence for the internal elements of the structure. Enclosure I and II at Birstall each contain one clear roundhouse, perhaps indicating that each enclosure was utilised by a single family unit in each. Both roundhouses are centrally placed within the enclosure. The building diameter of both roundhouses area is around 11m, an average size for Iron Age roundhouses (Haselgrove 1999: 117). The roundhouse within Enclosure I had evidence for numerous post-holes and pits that may have related to structural elements or internal features. The environmental analysis of soils show the living area within the roundhouse was kept clean, with few grain and seed remains. This contrasts with soils filling the gullies, where evidence for latrine / toilet waste was recovered.

There is no evidence for a smaller roundhouse or ancillary building associated with the principal building (as is often seen at other settlements, such as Enderby I and II(Clay 1992,33; Meek *et al* 2004) and Humberstone (Thomas 2008b, 108). However, it is possible that a post-hole structure may have been situated in the south-west corner of the enclosure, defined by a small curvilinear gully. This could have acted as an additional building to the main roundhouse, perhaps indicating a deliberate spatial organisation, separating differing domestic activities.

The study of the orientation of roundhouses has been a central theme in Iron Age studies in Britain for the past twenty years (especially by Fitzpatrick, Oswald, and Parker-Pearson). Essentially the studies have focused on the „fact' that: "The great majority of entrances to Iron Age roundhouses are orientated to the east" (Fitzpatrick 1997, 77). Early research noted that roundhouses faced either in an easterly or south-easterly direction due to practical reasons: the easterly direction provides the best protection from prevailing westerly winds and it provides the best sunlight (Guilbert 1975, 205). Until recently, these explanations have been widely accepted as determining factors for the orientation of roundhouses, however, purely environmental reasons began to be questioned. The reasoning for easterly orientated roundhouses was seen as being not particularly disadvantageous, or advantageous; also if functional reasons were the sole factors in determining the orientation, then we would expect to see more variation in the numerous known examples (Oswald 1997). Studies since have shown some variation in northern and southern Britain and the east – south-east norm (Pope 2007). The preference for this direction, therefore, could also be seen as a reflection of human behaviour. Studies by Wait (1985) and Boast and Evans (1986) linked the potential of ritual to roundhouse orientation by demonstrating that ritual traditions from the Bronze Age had transferred into the domestic sphere in the Iron Age. A cosmological model has been developed by Parker-Pearson and Richards (1994) who began to look at the use of domestic space within the roundhouse. They argued that space could have been "concentrically ordered within the roundhouse, with the main tasks being undertaken in the central „public' area…and other activities, such as sleeping and food storage, located in the more „private' outer area" (Parker-Pearson & Richards 1994: 54).

The roundhouse in Enclosure I is orientated to the south-east, and so can be added to the vast number of roundhouses that are orientated in this direction. Interestingly, the roundhouse in Enclosure II is orientated to the north or north-east (but is truncated), facing away from Enclosure I. Could this be a choice of the inhabitants to face away from the neighbours in Enclosure I? Alternatively Enclosure II and the roundhouse within, could have acted as an ancillary structure to the main settlement space within Enclosure I.

Sub-enclosures

The main enclosures are often internally sub-divided into smaller areas. Sub-enclosures are a common feature of Iron Age enclosure settlements, although the interpretation of their function is varied from animal pens, metalworking areas, granary, ritual area, or even a look-out-tower/entrance gatehouse. This is mainly due to a lack of strong evidence, and the possibility that the function of these sub-enclosures may have altered over time (Knight 2007: 203). Within both Enclosures I and II rectangular sub-enclosures were present and through a programme of phosphate and magnetic susceptibility sampling the function of these sub-enclosures can perhaps be more fully understood.

Two sub-enclosures (Enclosure IB and Enclosure III) were both quite large, containing few internal features. Of crucial importance was the phosphate and soil sampling programme across selected areas of the site. This produced evidence for phosphate enrichment and dung residues within enclosure IB and III, indicating that these enclosures were used for animal penning. The location of Enclosure IB, centrally placed within the enclosed space, close to the roundhouse, may indicate that it was important to house the livestock within and close to the domestic space. The location of the smaller Enclosure III, on the periphery of the enclosure settlement, may indicate a lessening importance for livestock within this enclosure, or perhaps reflects different farming practices. Within both enclosures, the soil analysis together with the archaeological evidence indicates that there had been trampling of the ditch by herded animals, especially within the corners.

The small sub-square Enclosure IIB may have had a variety of functions. It could have initially acted as a livestock enclosure (although only low levels of phosphate enrichment were recovered). Certainly in the latter stages of the settlement use the area appears to have been used for metalworking activity, as evidenced from the numerous metal objects, slag, and weathered iron working residues recovered within the sub-enclosure.

Pit groups

Pits are common throughout all Iron Age settlements, and in some cases their primary function was for the storage of grain, and when no longer needed were allowed to fill, or deliberately backfilled with domestic waste (Cunliffe 1992, 73). On Iron Age sites pits are often found in groups, located in certain areas both within and outside the enclosures.

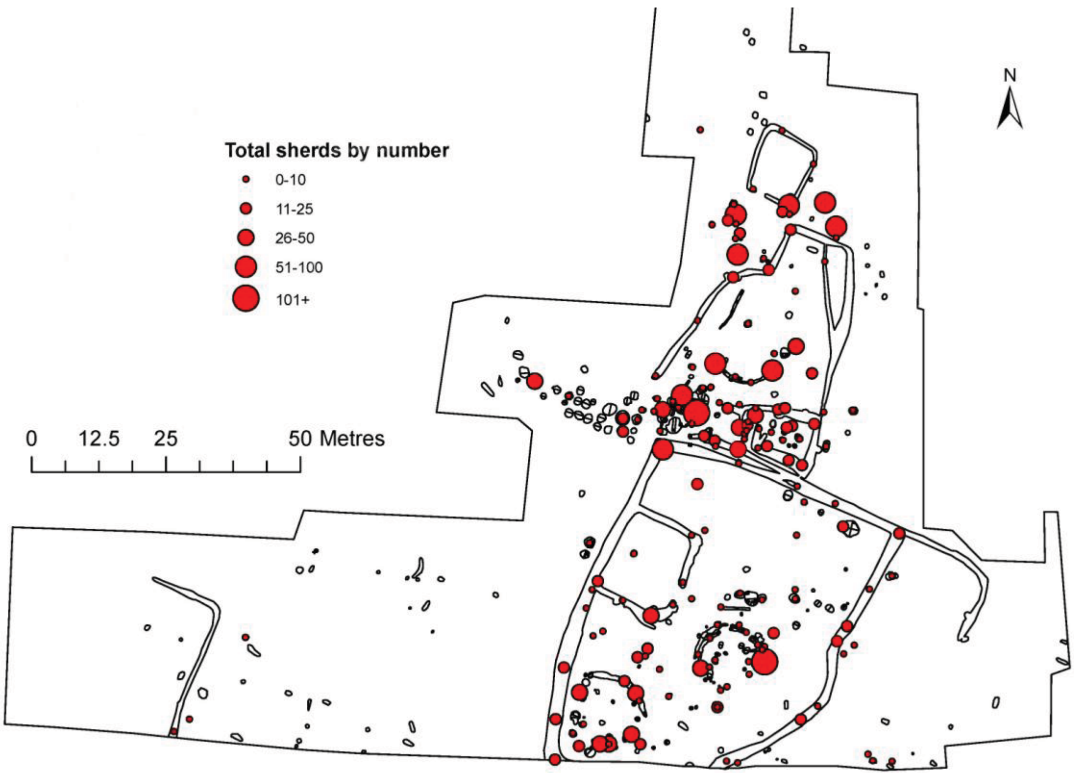


Figure 120: Total number of pottery sherds

Within Enclosure I clear pit groups were seen mainly on the periphery of the domestic space, close to the enclosure ditch (in the south-west corner), or immediately to the north (rear?) of the roundhouse. The absence of pits around the south-east area of the roundhouse (the entrance) may be significant, perhaps to keep the most used and busy areas clear. Similarly areas within enclosure IB and the northern part of enclosure I may have been kept clear for the movement of livestock.

The majority of pits within the settlement were located on the north-west outside corner of Enclosure I where the highest density of pottery was recovered (Figure 120). This area was subject to a dense number of intercutting pits, and the high number of pottery sherds indicates this was a main area for rubbish disposal. In contrast a number of pits grouped in a linear arrangement to the west, and on a similar alignment to the northern edge of Enclosure I, contained very low numbers of pottery. The function of these pits is therefore uncertain; they were certainly not used for ceramic disposal and it is possible that they were used to dispose of material that did not survive in the soils (organics), or the pits were dug to define a boundary (as suggested in Figure 119).

Economy and Agriculture

The settlement at Birstall lay within a mixed arable and pastoral farming landscape. A range of arable plant species and weeds was represented within the charred plant remains. These indicate domestic waste from consumption of cereals such as spelt, emmer, and barley. There is no evidence for the processing of cereal crops (this was indicated in the low levels of chaff). It is therefore likely that glume wheat was dehusked away from the settlement, or the chaff was used or not burned. It is likely that the cereals (especially the wheat) were autumn sown. There were fairly low levels of charred plant remains within the enclosure; generally there was only 1 item per litre sampled, whereas higher quantities of remains were recovered from the enclosure ditches and some pits close to Enclosure II (Figure 81). This indicates that the main household / domestic space - close to the roundhouse and generally within the enclosures - was kept clean of food residues.

There is some evidence for pastoral farming and that some of the livestock were kept within the settlement area. The phosphate analysis indicates livestock were probably kept within sub-enclosure IB, and possibly within Enclosure III. Due to poor soil conditions the animal bones survived poorly, but of those recovered the majority were cattle, along with a small number of sheep or goat, and pig. There was some evidence also for horse bones, mainly from the enclosure ditch in Area 3. Dogs were also present on the settlement, evidenced mainly from gnawing on some of the bones. There was some evidence for wild animals, mainly Red Deer, including an antler from which had probably been collected from a woodland floor (see Browning above).

There is evidence for various household and craft activities within the settlement (Figure 121). Most of the objects associated with these activities were found within either the south-west corner of Enclosure I, or within the southern area of Enclosure II. These activities were located well away from the main roundhouse within Enclosure I, indicating deliberate use of the settlement space for differing activities. Food preparation within the settlement was illustrated by fired clay from a perforated oven base from Area II and 19 quernstones found within Enclosure I and II. This is a relatively high number compared to similar sites in the region (a similar number were recovered from the much larger settlements at Humberstone and Beaumont Leys). Mainly saddle querns were used; though there were two rotary querns also within the assemblage. This indicates a mixture of old and new methods, and the persistence of older methods may be as a result of the availability of local stone, or could also indicate differing functions for each quernstone. However they may also represent different periods of use with the more numerous saddle querns being of mid-Iron Age date while the rotary querns may be late Iron Age or early Roman. The quernstones were generally found in the south-west corner of Enclosure I, or within the southern area of Enclosure II.

The presence of iron tools and fasteners or fittings, including a knife blade and iron punch are not common finds on sites of this period. They indicate both general household use and possible use in carpentry within Enclosure II. Metalworking waste within Enclosure IIB indicates that this enclosure may have been a specialised metalworking area. Some metalworking waste from the south-west corner of Enclosure I may indicate similar activities within this area. Evidence for the manufacturing of textiles, and specifically weaving, was present mainly within Enclosure II where a large number of triangular loom weights were found.

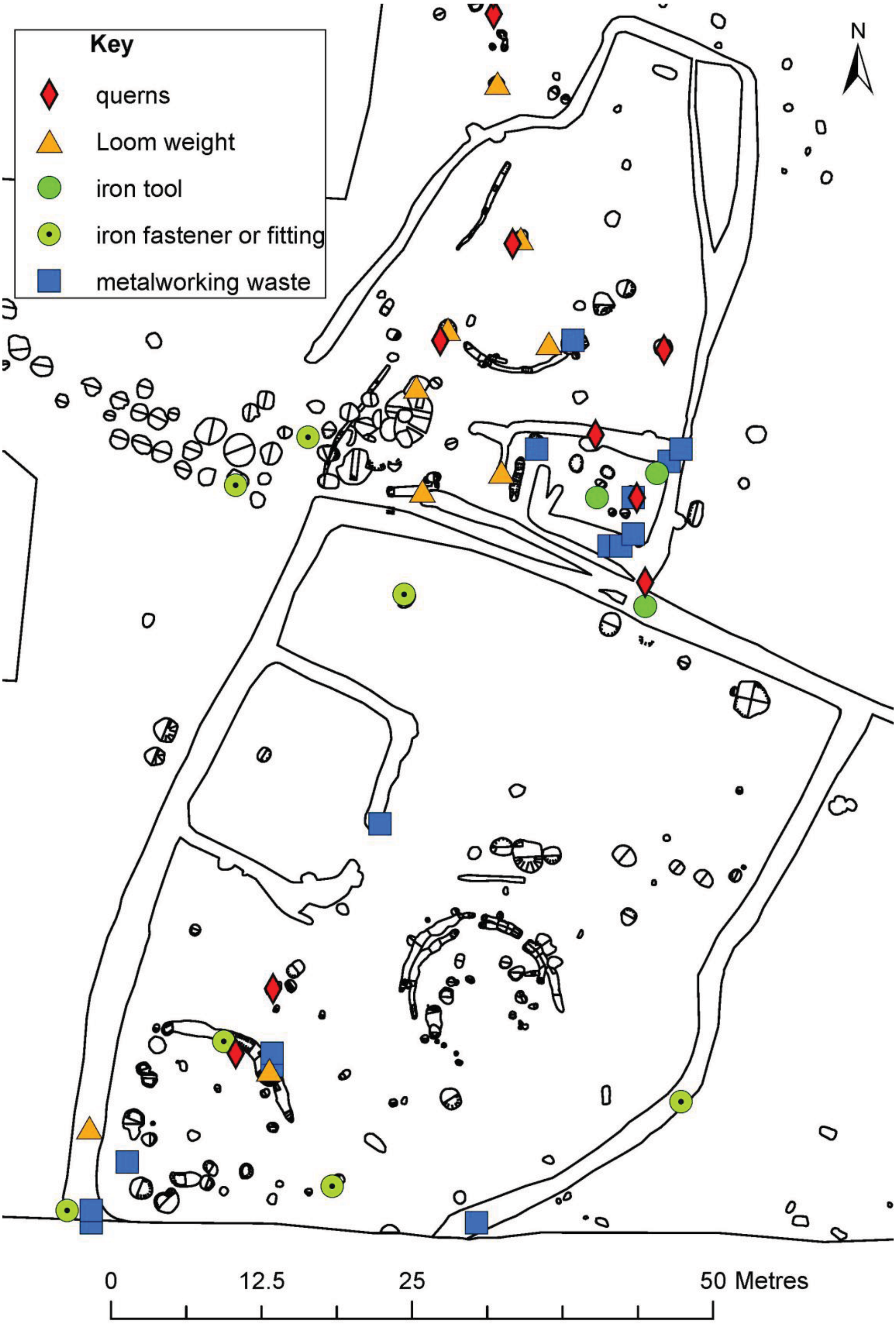


Figure 121: Household and craft activities

Final Activity

Based on the finds and radiocarbon dates the main settlement activity may have ended around 200 BC. Final activity is indicated within the roundhouse areas. The roundhouse gully within Enclosure I had natural silts filling it, but also apparent deliberate backfills. At the eastern and western gully terminal a large quantity of pottery was deposited. This may be an example of widespread Iron Age traditions of ritualized house abandonment practice.

The association of ritual to the roundhouse can also be seen with the roundhouse within Enclosure II. Here the roundhouse had four large pits dug into the projected line of the roundhouse drip gully. This may be entirely coincidental, although each were very similar (large pits containing high numbers of domestic waste), which could therefore indicate a final symbolic activity signalling the „closure' at the end of the building's life.

There is other evidence similar to these pits elsewhere within the area, most clearly the group of pits around the outside of Enclosure III. Again a high volume of pottery was stacked in the pits over large fire-cracked stones.

Examples of this type of „special deposit' are known across (mainly southern) Britain, and into the near-Continent as far as central France (Bradley 2003: 19). The „special deposits' within pits were used to symbolise an important event such as the end of an agricultural cycle, or as a symbol of fertility and rebirth (Barrett 1989 in Fitzpatrick 1997: 80). The examples seen here could indicate a special practice to symbolise the end of the settlement at Hallam Fields.

After the abandonment of the farmstead the ditches slowly silted and any earth banks slowly eroded. Some activity continued within the area in the Late Iron Age, but only isolated pit digging appears to be represented within the area examined. However, as discussed above, the focus of settlement activity may have moved during the Late Iron Age to another area not revealed during these excavations. The presence of querns and late Iron Age pottery does suggest nearby domestic activity during this period.

The ditches surrounding the settlement may have been visible within the landscape for 100-200 years after the abandonment, as in the early Roman period a small amount of pottery and two brooches were found overlying and within the upper most ditch fills, suggesting that final silting of the ditch amy have been taken place at this time.

Conclusion

The excavation at Hallam Fields, Birstall has added significant new information and archaeological understanding on later prehistoric settlement within the region. The settlement may have consisted of a single family or kin group living within an enclosed settlement, undertaking various craft activities and metalworking. The settlement developed adjacent to a linear boundary, set within a wider agricultural and pastoral farming landscape. The site is quite different in size and character to two other near contemporary settlements located close by in similar landscape locations at Wanlip (Beamish 1998) and Beaumont Leys (Thomas 2008c), this difference perhaps reflecting alternative settlement roles.

The detailed excavation methodology, including systematic excavation of ditches and pits, together with targeted environmental sampling of phosphate and soils, has aided understanding and interpretation of the various settlement features. The GIS analysis has also produced rewarding results, indicating clear spatial distributions and usage of the settlement space.

The pottery assemblage contained large numbers of large sherds and substantial proportions of vessels representing a significant regional assemblage of Scored Ware. The radiocarbon dating suggests a middle Iron Age date for the majority of the activity at the site. The presence of very small quantities of probable later Iron Age pottery shows broad cultural links, and suggests a later date for a few features.

Acknowledgements

Many thanks to colleagues at University of Leicester Archaeological Services, in particular John Thomas and Patrick Clay, for advice and support to the author throughout the project, from fieldwalking in 2003, through to post-excavation analysis and report submission in 2009.

This report was compiled from information collected on site by the author, Gavin Speed, along with Steve Baker, Dave Parker, Matthew Parker, Daniel Prior, Alex Beacock, Martin Henson, John Thomas, and James Harvey. The pottery was analysed by Patrick Marsden, the worked flint by Lynden Cooper, and animal bone by Jen Browning. The small finds and metal objects were analysed by Nicholas Cooper, and the worked stone by John Thomas with ids by Kay Hawkins. Alistair Hill analysed the charred plant remains. Thanks to Angela Monckton for advice on all things environmental. Richard Macphail of the Institute of Archaeology, University College London, and Dr J. Crowther of Archaeological Services (UWLAS), University of Wales, Lampeter, undertook the soil micromorphology, chemistry, and magnetic susceptibility analysis. The pottery petrological and chemical analysis was undertaken by Alan Vince. The accelerator mass spectrometry radiocarbon dating was undertaken by The Angström Laboratory, Tandem Laboratory, Uppsala Universitet, Sweden; the Bayesian analysis by Derek Hamilton. The pottery and querns were drawn by Mike Hawkes. The landscape visualisation image was produced by Matthew Beamish. All other illustrations and GIS analysis by the author. Dr. Patrick Clay managed the project. The project was funded by Jelson Ltd.

Archive

A summary of the work appeared in *Transactions of the Leicestershire Archaeological and Historical Society*, volume **80** (2006) pp.229-230. A more detailed article is due for publication in due course. The site was included for analysis by the author for MA research (this is published as an article in Speed forthcoming).

The archive will be deposited with Leicestershire County Council, Heritage Services, under accession number X.A.25.2001.

The archive contains:

- Section and plan drawings on A2 and A3 permatrace sheets. Original illustrations of selected finds
- Digital photos on CD
- Black & white negatives
- Indicies: including context sheets x 1000, context summaries, finds index, sample index, survey data
- Site notes
- 17 Boxes of finds
- CD containing digital CAD files of plans and sections
- CD containing this report
- Unbound copy of this report
-

The report is listed on the Online Access to the Index of Archaeological Investigations (OASIS) held by the Archaeological Data Service at the University of York under ID: universi1-61162. Available at: http://oasis.ac.uk/

I	**OASIS entry summary for universi1-61162**
Project Name	Hallam Fields, Birstall
Summary	The excavation revealed evidence for a mid-Iron Age enclosed settlement. The site, originally identified as a cropmark, comprised of a large „D'-shaped enclosure (65m x 50m enclosing c.2500m²) lying adjacent to a smaller „D'-shaped enclosure (45m x 25m enclosing 915m²). The enclosed settlement was located in the Soar valley, on the edge of the gravel terrace. Within the enclosures were a range of associated settlement features, including roundhouses, sub-enclosures, pit groups and metalworking evidence. The results add significantly to our understanding of small Iron Age farmsteads in the region, revealing much on how the people of Iron Age Leicestershire lived and utilised the landscape.
Project Type	Excavation
Project Manager	Patrick Clay
Project Supervisor	Gavin Speed
Previous/Future work	Previous: desk-based assessment, geophysical survey, fieldswalking, evaluation. No future work.
Current Land Use (2005)	Farmland
Development Type	Mixed use residential and commercial
Reason for Investigation	PPG16
Position in the Planning Process	as a condition
Site Co ordinates	SK 58845 10274 (centered on)

Start/end dates of field work	November 2004 to April 2005
Archive Recipient	Leicestershire County Council, Heritage Services
Study Area	2.8ha open area excavation
Associated project reference codes	Museum accession ID: XA.25.2001 OASIS form ID: universi1-4818

Bibliography

Allen, C., 2008, „The Bronze Age pottery and stone bowl', in J.Thomas, 2008a, 27-37.

Anderberg, A-L., 1994, *Atlas of seeds and small fruits of Northwest-European plant species with morphological descriptions Part 4*. Resedaceae, Umbelliferae. Stockholm, Swedish Museum of Natural History.

Ball, D.F., 1964, „Loss-on-ignition as an estimate of organic matter and organic carbon in non-calcareous soils', *Journal of Soil Science*, **15**, 84-92.

Bayley, J., and Butcher, S., 2004, *Roman Brooches in Britain: A Technological and Typological Study based on the Richborough Collection*. London: Society of Antiquaries of London.

Beamish, M., 1991, *Shipley Hill Archaeological Evaluation*. Leicestershire Archaeological Unit unpublished report.

Beamish, M., 1998, „A middle Iron Age site at Wanlip, Leicestershire'. *Transactions of the Leicestershire Archaeological and Historical Society* **72**, 1-92.

Beamish, M., and Shore, M., 2008, „Taking stock in the late Bronze Age to Early Iron Age Transition: a Crowding-Alley and Settlement site at Hamilton North, Humberstone, Leicester'. *Transactions of the Leicestershire Archaeological and Historical Society* **82**, 39-78.

Beckman, G.G., and Smith, K.J., 1974, „Micromorphological changes in surface soils following wetting, drying and trampling', *in* Rutherford, G.K., (ed.) *Soil Microscopy*. Kingston, Ontario, The Limestone Press, 832-845.

Bethell, P.H., and Máté, I. 1989, „The use of soil phosphate analysis in archaeology: A critique', in Henderson, J., (ed.) *Scientific Analysis in Archaeology*., Volume Monograph No.19: Oxford, Oxford University Committee, 1-29.

Berggren, G., 1969, *Atlas of Seeds and Small Fruits of Northwest-European Plant Species with Morphological Descriptions Part 2 – Cyperaceae*. Stockholm, Swedish Natural Science Research Council.

Berggren, G., 1981, *Atlas of Seeds and Small Fruits of Northwest-European Plant Species with Morphological Descriptions Part 3 – Salicaceae – Cruciferae*. Stockholm, Swedish Museum of Natural History.

Buteux, S., Jones, L., Woodward, A., 2005, *Country Life On The Margins. Iron Age, Roman and Saxon Occupation At Grange Park. Excavations at Courteenhall, Northamptonshire, 1999.* Unpublished draft text, Birmingham University Field Archaeology Unit.

Birchall, A., 1965, „The Aylesford-Swarling culture: the problem of the Belgae reconsidered'. *Proceedings of the Prehistoric Society*, **31**, 241-367.

Bronk Ramsey, C., 1995, „Radiocarbon calibration and analysis of stratigraphy', *Radiocarbon*, **36**, 425–30.

Bronk Ramsey, C., 1998, „Probability and dating', *Radiocarbon*, **40**, 461–74

Bronk Ramsey, C., 2001, „Development of the radiocarbon calibration program', *Radiocarbon*, **43**, 35563.

Brown, K., 2000, „The burnt and fired clay', in B.M. Charles, et al 2000, 113-220.

Buck, C.E., Cavanagh, W.G., and Litton, C.D., 1996, *Bayesian Approach to Interpreting*

Archaeological Data, Chichester.

Bullock, P., Fedoroff, N., Jongerius, A., Stoops, G., and Tursina, T., 1985, *Handbook for Soil Thin Section Description*. Wolverhampton, Waine Research Publications.

Burgess, C.B., 1986, „Urnes of no small variety: collared urns reviewed', *Proceedings of the Prehistoric Society*, **52**, 339-351.

Butler, A., 2001, *A Geophysical Survey at Hallam Fields, Wanlip, Leicestershire*. University of Leicester Archaeological Services unpublished report 2001-049.

Cappers, R.T.J, Bekker, R.M. and Jans, J.E.A. 2006, *Digital seed atlas of the Netherlands. Zuurstukken*. Barkhus Publishing & Groningen University Library.

Cater, D. 2006, „Ashby Folville to Thurcaston natural gas pipeline'. *Transactions of the Leicestershire Archaeological and Historical Society* **80**, 225-28.

Chapman, P., 2004, „Iron Age Settlement and Romano-British Enclosures at Coventry Road, Hinckley, Leicestershire'. *Transactions of the Leicestershire Archaeological and Historical Society* **78**, 35-82.

Chapman, S. 2000, *An Archaeological Excavation of Iron Age and Romano-British Settlement at Leicester General Hospital, Crown Hills, Evington, Leicester.* University of Leicester Archaeological Services unpublished report 2000-041

Charles, B. M., Parkinson, A., Foreman, S. 2000, „A Bronze Age Ditch and Iron Age Settlement at Elms Farm, Humberstone, Leicestershire'. *Transactions of the Leicestershire Archaeological and Historical Society.* **74**, 113-223.

Clark, A., 1996, *Seeing Beneath the Soil: Prospecting Methods in Archaeology* (2nd Edition). London, Batsford.

Clarke, S., 2007, *A607 Rearsby Bypass, Leicestershire*. University of Leicester Archaeological Services unpublished report 2007-057.

Clay, P., 1981, *The Excavation of Two Multi-phase Barrows at Sproxton and Eaton, Leicestershire.* Leicestershire Museums Art Galleries and Records Service Archaeological Report No.2.

Clay, P. 1985, „The Late Iron Age Settlement', in P. Clay and J.E. Mellor *Excavations in Bath Lane, Leicester.* Leicester Museums, Art Galleries and Records Service Archaeological Report 10, Leicester, 29-31.

Clay, P., 1992, „An Iron Age Farmstead at Grove Farm, Enderby, Leicestershire'. *Transactions of the Leicestershire Archaeological and Historical Society* 66, 1-83.

Clay, P. 1992, „Other finds'. In P. Clay 1992, 54.

Clay, P., 2002, *The Prehistory of the East Midlands Claylands*. Leicester Archaeology Monograph 9, Leicester.

Cooper, N.J., 2000a, *The Archaeology of Rutland Water: Excavations at Empingham in the Gwash Valley, Rutland 1967-73 and 1990*. Leicester: Leicester Archaeology Monograph 6, 105-122.

Cooper, N. J., 2000b, „The Iron Age pottery', in N.J.Cooper, 2000a, 67-71.

Cooper, N.J., 2006, (ed.) *The Archaeology of the East Midands. An Archaeological Resource Assessment and Reseach Agenda.* Leicester: Leicester Archaeology Monograph 13.

Cooper, N.J. forthcoming, „The Small Finds', in J. Thomas, forthcoming *Iron Age 'Aggregated' settlements in the environs of Leicester. Excavations at Beaumont Leys and Humberstone.* Leicester Archaeology Monograph.

Cooper, L., 1995, Kirby Muxloe, A46 Leicester Western by-pass. *Transactions of the Leicestershire Archaeological and Historical Society* 68, 162-165.

Cooper, L., 2008, „The worked flint', in J. Thomas 2008a, 74-9.

Courty, M.A., 2001, „Microfacies analysis assisting archaeological stratigraphy', in P. Goldberg, Holliday, V.T., and Ferring, C.R., eds., *Earth Sciences and Archaeology*: New York, Kluwer, 205-239.

Courty, M.A., and Fedoroff, N., 1982, „Micromorphology of a Holocene dwelling', *Proceedings Nordic Archaeometry,* Volume PACT **7**, 257-277.

Courty, M.A., Goldberg, P., and Macphail, R.I., 1989, „Soils and Micromorphology', in *Archaeology*. Cambridge, Cambridge University Press, 344.

Cunliffe, B.W. and Poole, C., 1991, *Danebury: an Iron Age Hillfort in Hampshire Volume 5: The excavations, 1979-88: the Finds*. Council for British Archaeology research report 73.

Crowther, J., 1997, „Soil phosphate surveys: critical approaches to sampling, analysis and interpretation', *Archaeological Prospection*, **4**, 93-102.

Crowther, J., 2003, „Potential magnetic susceptibility and fractional conversion studies of archaeological soils and sediments', *Archaeometry*, **45**, 685-701.

Crowther, J., 2005, *Assessment of the Chemistry and Magnetic Susceptibility of the Soils and Deposits from the Llanmaes Excavation, Vale of Glamorgan, Gwent*. Cardiff, National Museums & Galleries of Wales.

Crowther, J., and Barker, P., 1995, „Magnetic susceptibility: distinguishing anthropogenic effects from the natural', *Archaeological Prospection*, **2**, 207-215.

Derrick, M., 1999, „Castle Donington, Gimbro Farm (SK 440 256)', *Transactions of the Leicestershire Archaeological and Historical Society* **74**, 86.

Dick, W.A., and Tabatabai, M.A., 1977, „An alkaline oxidation method for the determination of total phosphorus in soils'. *Journal of the Soil Science Society of America*, **41**, 511-14.

Dickson, J.A.D., 1965, „A modified staining technique for carbonates in thin section' ,Nature, **205**, 587.

Egan, G., and Pritchard, F., 1991 *Dress Accessories c.1150-c.1450.* Medieval Finds from London 3. London: HMSO.

Ellison, A.B., 1975, *Pottery and Settlements of the later Bronze Age in southern England*, unpublished Ph.D. thesis, University of Cambridge.

Elsdon, S.M., 1979, „Baked clay objects', in H. Wheeler, Excavations at Willington, Derbyshire, *Derbyshire Archaeological Journal* **99**, 197-210.

Elsdon, S.M., 1992a, „The Iron Age pottery', in Clay, P., „An Iron Age farmstead at Grove Farm, Enderby,', *Transactions of the Leicestershire Archaeological and Historical Society*, **66**, 38-52.

Elsdon, S.M., 1992b, „East Midlands Scored Ware', *Transactions of the Leicestershire Archaeological and Historical Society*, **66**, 83-91.

English Heritage. 1997, *Archaeology Division Research Agenda. Draft.* www.english-heritage.org.uk/upload/pdf/archaeology_research.pdf

Fitch, R.K., 2002, *WinSTAT(r).* R. Fitch Software.

Kent, P., 1980 *Eastern England from the Tees to the Wash*. British Regional Geology London, HMSO.

Getty, R., 1975, *Sisson and Grossman's The Anatomy of the Domestic Animals* 5th edition W. B. Saunders Company Philadelphia, London, Toronto. Vol 1, Vol 2.

Gibson, A., 2002, Prehistoric pottery in Britain and Ireland. Stroud: Tempus.

Goldberg, P., and Macphail, R.I., 2006, *Practical and Theoretical Geoarchaeology*. Oxford, Blackwell Publishing.

Grant, A., 1982, „The use of toothwear as a guide to the age of domestic ungulates', in Wilson, B., Grigson, C., and Payne, S., (eds) *Ageing and Sexing Animal Bones from Archaeological Sites* British Archaeology Reports British Series 109, Oxford.

GVA Grimley et al 2000, *Hallam Fields, Birstall, Leicestershire. Environmental Impact Assessment of Housing and Employment Development with Community uses, Structural Landscaping and Infrastructure Improvements Including a Park and Ride Scheme: Material Assets, Cultural and Archaeological Heritage*. Unpublished report.

Hartley, R.F., 1989, „Aerial archaeology in Leicestershire', in Gibson, A. (ed.) *Midlands Prehistory. Some Recent and Current Reseaches Into The Prehistory of Central England.* British Archaeological Reports, British Series 204, 95-105.

Haselgrove, C., 1999, „The Iron Age', in J.Hunter, and I. Ralston, (eds.) *The Archaeology of Britain: An Introduction from the Upper Palaeolithic to the Industrial Revolution.* Routledge, 117-132.

Haselgrove, C., Armit, I., Champion, T., Creighton, J., Gwilt, A., Hill, J.D., Hunter, F., Woodward, A., 2001, *Understanding the British Iron Age: An Agenda for Action. A*

Report for the Iron Age Research Seminar and the Council of the Prehistoric Society. Trust for Wessex Archaeology, Salisbury.

Haselgrove, C., and Moore, T., (eds.) 2007, *The Later Iron Age in Britain and Beyond.* Oxford, Oxbow.

Haselgrove, C., and Pope, R., (eds.) *The Earlier Iron Age in Britain and Beyond.* Oxford, Oxbow.

Hedges, R.E.M., Tiemei, C., and Housley, R.A., 1992, „Results and methods in the radiocarbon dating of pottery', *Radiocarbon*, **34**, 906–15.

Heron, C., 2001, „Geochemical prospecting', in D. Brothwell, and A.M.Pollard, (eds.), *Handbook of Archaeological Sciences*: Chichester, Wiley.

Hill, J.D., 1995, *Ritual And Rubbish In The Iron Age of Wessex: A Study On The Formation Of A Specific Archaeological Record*. Oxford: Tempus Reparatum. British Archaeological Reports British Series 242.

Hillman, G., 1981, „Reconstruction of crop husbandry practises from charred remains of crops', in R. Mercer, *Farming practises in British prehistory*. Edinburgh, Edinburgh University Press, 123-162.

Hillman, G., 1984, „Interpretation of archaeological plant remains: the application of ethnographic models from Turkey', in W. van Zeist & W.A. Casparie (eds.), *Plants and Ancient Man*. Rotterdam, A.A. Balkema, 1-41.

Hughes, G., 1998, *The excavation of an Iron Age Settlement at Covert Farm (DIRFT East), Crick, Northamptonshire* Unpublished BUFAU unpublished post-excavation assessment and updated research design.

Ingle, C., 1994, „The Quernstones from Hunsbury Hillfort, Northamptonshire', *Norhamptonshire Archaeology* **25**, 21-34.

Jackson, D.A., 1975, „An Iron Age site at Twywell, Northamptonshire', *Northamptonshire Archaeology* **10**, 31-93.

Jackson, D.A., & Dix, B., 1986, „Appendix: the Ceramic succession' in „Late Iron Age and Roman settlement at Weekley, Northants', *Northamptonshire Archaeology*, **21**, 41-94 (73-90).

Jarvis, W., 2000, *The Charred Plant Remains from Leicester Lane, Desford, Leicestershire*. University of Leicester Archaeological Services unpublished report 1999.

Jarvis, W., 2001, *The charred remains from Forest Road, Huncote, Leicestershire*. University of Leicester Archaeological Services unpublished report 2001-115.

Jones, M., 1988, „The phytosociology of early arable weed communities with special reference to southern England',in H. Kuster (ed.), *Der Prahistoriche Mensch und seine*. Umwelt. Stuttgart, 43 -51.

Jones, M., 1985, „Archaeobotany beyond subsistence reconstruction', in G.W. Barker and C. Gamble (eds.), *Beyond domestication in Prehistoric Europe*. London, Academic Press Inc. (London) Ltd.,107-127.

Jope, M., and Cunliffe, B.W., 1984, „Other objects of copper alloy', in B.W. Cunliffe 1984 *Danebury: an Iron Age Hillfort in Hampshire Vol 2 The Excavations 1969-78: The Finds*, 346-371.Council for British Archaeology Ressearch Report 52. London.

Knight, D., 1992a, „Excavations of an Iron Age settlement at Gamston, Nottinghamshire', *Transactions of the Thoroton Society of Nottinghamshire* 96, 16-90.

Knight, D., 1992b „Briquetage', in D. Knight, „Excavations of an Iron Age settlement at Gamston, Nottinghamshire', *Transactions of the Thoroton Society of Nottinghamshire* **96**, 16-90.

Knight, D., 1998, *Guidelines for the Recording of Later Prehistoric Pottery from the East Midlands*, Trent and Peak Archaeogical Unit unpublished report.

Knight, D., 2002, „A regional ceramic sequence: pottery of the first millennium BC between the Humber and the Nene', in Woodward, A. and Hill J.D. (eds) *Prehistoric Britain; the Ceramic Basis*, Oxbow books, Oxford, 119-42.

Knight, D., Marsden, P., and Carney, J., 2003, „Local or non-local? Prehistoric granodiorite-tempered pottery in the East Midlands', in A. Gibson, (ed.), *Prehistoric Pottery:*

People, Pattern and Purpose. PCRG Occ Publication 4. Oxford: British Archaeological Reports International Series 1156, 111-125.

Knight, D., 2007, „From open to enclosed: Iron Age landscapes of the Trent Valley', in C. Haselgrove, and T. Moore, (eds.) *The Later Iron Age in Britain and Beyond.* Oxford, Oxbow, 190-215.

Longworth, I. H, 1984, *Collared Urns of the Bronze Age in Great Britain and Ireland.* Cambridge, University Press.

Nakamura, T, Taniguchi, Y, Tsuji, S, and Oda, H, 2001, „Radiocarbon dating of charred residues on the earliest pottery in Japan', *Radiocarbon*, **43**, 1129–38.

Northamptonshire Archaeology 1995, *Archaeological Evaluation: Stage 1. Land south of Hardwater Road, Wollaston.* Northamptonshire County Council, Northamptonshire Archaeology.

Macphail, R.I., 2000, „Soils and microstratigraphy: a soil micromorphological and micro-chemical approach', in A.J. Lawson (ed.) *Potterne 1982-5: Animal Husbandry in Later Prehistoric Wiltshire*. Archaeology Report 17, Wessex Archaeology, Salisbury, 47-70.

Macphail, R.I., 2003a, „Industrial Activities - Some Suggested Microstratigraphic Signatures: ochre, building materials and iron-working', in P.E.J. Wiltshire, and P. Murphy, (eds.) *The Environmental Archaeology of Industry*. Volume AEA Symposia No. 20: Oxford, Oxbow, 94-106.

Macphail, R.I., 2003b, *Scanian Road Profiles (A1316 and A1317): Soil Micromorphology (with reference to chemistry).* Umeå, laboratory for Environmental Archaeology, University of Umeå.

Macphail, R.I., 2004, Llanmaes 2004, *Soil Micromorphology Assessment (2005).* Cardiff, National Museums & Galleries of Wales.

Macphail, R.I., forthcoming, „Soil report on the Raunds Area Project: results from the prehistoric period', in F. Healy, and J. Harding, (eds.) *Raunds Area Project. The Neolithic and Bronze Age landscapes of West Cotton, Stanwick and Irthlingborough, Northamptonshire:* Newcastle: Department of Archaeology, University of Newcastle.

Macphail, R.I., and Crowther, J., 2005, *Stanstead Airport (Long Stay Car Park and Mid Stay car Park - BAACPOO and BAAMPOO): Soil Micromorphology, Chemistry and Magnetic Susceptibility*. Oxford, Oxford Archaeology unpublished report.

Macphail, R.I., and Crowther, J., 2006, *Terminal 5: Soil Micromorphology, Chemistry, Magnetic Susceptibility and Particle Size Analyses*. Oxford, Framework Archaeology unpublished report.

Macphail, R.I., and Cruise, G.M., 2001, „The soil micromorphologist as team player: a multianalytical approach to the study of European microstratigraphy', in P. Goldberg, V. Holliday, and R. Ferring, (eds.) *Earth Science and Archaeology*. New York, Kluwer Academic/Plenum Publishers, 241-267.

Macphail, R.I., Cruise, G.M., Allen, M.J., Linderholm, J., and Reynolds, P., 2004, „Archaeological soil and pollen analysis of experimental floor deposits; with special reference to Butser Ancient Farm, Hampshire, UK'. *Journal of Archaeological Science*, **31**, 175-191.

Macphail, R.I., Cruise, G.M., Mellalieu, S.J., and Niblett, R., 1998, „Micromorphological interpretation of a "Turf-filled" funerary shaft at St. Albans, United Kingdom'. *Geoarchaeology*, **13**, 617-644.

Macphail, R.I., and Linderholm, J., 2004, „Neolithic land use in south-east England: a brief review of the soil evidence', in J. Cotton, and D. Field, (eds.), *Towards a New Stone Age,* Council for British Archaeology Research Report 137, York, 29-37.

Mackreth, D.F., 1999, „The brooches' in A. Connor and R. Buckley *Excavations at Causeway Lane, Leicester*. Leicester Archaeology Monograph 5, 246-253. Leicester.

Manning, W.M., 1985, *Catalogue of the Romano-British Iron Tools, Fittings and Weapons in the British Museum*. London: British Museum Publication.

Marsden, P., 1998, „The Querns', in M. Beamish, 1998, 62-3.

Marsden, P., 1998, „The prehistoric pottery', In M. Beamish, 1998, 44-62.

Marsden, P., 2000, „The prehistoric pottery', in B.E.M. Charles, et al, 2000 113-220.
Marsden, P., 2008, „The Iron Age Pottery', in J. Thomas 2008b.
Marsden, P., and Morris, E., 2004, „The Iron Age and Roman Pottery', in J. Meek, et al 2004, 12-13.
MAP 2, 1991, *The Management Of Archaeological Projects* 2nd edition English Heritage.
Meek, J., Shore, M., and Clay, P., 2004, „Iron Age Enclosures at Enderby and Huncote, Leicestershire'. *Transactions of the Leicestershire Archaeological and Historical Society* **78** 1-34.
Megaw, J.V.S., and Simpson, D.D.A., 1979, *Introduction to British Prehistory*. Leicester: Leicester University Press
Monckton, A., 1998, „The plant remains', in M. Beamish, 1998, 75-82.
Moffett, L., 1993, *Macrofossil Plant Remains from Leicester Shires*. Ancient Monuments Laboratory Report 31/91.
Mook, W.G, 1986, „Business meeting: Recommendations/Resolutions adopted by the Twelfth International Radiocarbon Conference', *Radiocarbon*, **28**, 799.
Morris, E.L., 1985, „Prehistoric Salt Distribution: Two Case Studies from Western Britain', *Bulletin of the Board of Celtic Studies* **32**, 336-379.
Murphy, C.P., 1986, *Thin Section Preparation of Soils and Sediments*. Berkhamsted, A B Academic Publishers.
Myers, A., 2006, „The Mesolithic' in N. Cooper (ed), 2006, 51-68.
Parfenova, E.I., Mochalova, E.F., and Titova, N.A., 1964, „Micromorphology and chemism of humus-clay new-formations in grey forest soils', in A. Jongerius, (ed.) *Soil Micromorphology.* Amsterdam, Elsevier, 201-212.
Pollard, R., 1994, „The Iron Age and Roman Pottery' in P. Clay, and R. Pollard,.*Iron Age and Roman occupation in the West Bridge Area, Leicester Excavations 1962-1971.* Leicestershire Museums Arts and Records Service, 51-114.
Pope, R., 2007, „Ritual and roundhouse: A critique of recent ideas on the use of domestic space in later British prehistory', in C. Haselgrove, and R. Pope, (eds.) 2007, 204-228.
Powell, T.G.E., 1950, „Notes on the Bronze Age in the East Midlands', *Proceedings of the Prehistoric Society*, **16**, 65-77.
Prehistoric Ceramics Research Group 1997, *The Study of Later Prehistoric Pottery: General Policies and Guidelines for Analysis and Publication.* Occasional Papers nos 1 and 2.
Priest, V., 2001, *A Fieldwalking Survey at Hallam Fields, north of Birstall, Wanlip, Leicestershire*, University of Leicester Archaeological Services unpublished report. 2001-033.
Ragg., J.M., Beard, G.R., Hollis, J.M., Jones, R.J.A., Palmer, R.C., Reeve, M.J., and Whitfield, W.A.D., 1983, *Soils of England and Wales*. Sheet 3. Midland and Western England: Southampton, Ordnance Survey.
Reimer, P. J., Baillie, M.G.L., Bard, E., Bayliss, A., Beck, J.W., Bertrand, C.J.H., Blackwell, P.G., Buck, C.E., Burr, G.S., Cutler, K.B., Damon, P.E., Edwards, R.L., Fairbanks, R. G., Friedrich, M., Guilderson, T.P., Hogg, A.G., Hughen, K.A., Kromer, B., McCormac, G., Manning, S., Bronk Ramsey, C., Reimer, R.W., Remmele, S., Southon, J.R., Stuiver, M., Talamo, S., Taylor, F.W., van der Plicht, J., and Weyhenmeyer, C.E., 2004, „IntCal04 Terrestrial radiocarbon age calibration, 0–26 Cal Kyr BP', *Radiocarbon*, **46**, 1029–58.
Reitz, E.J., and Wing, E.S., 1999, *Zooarchaeology* Cambridge Manuals in Archaeology, Cambridge University Press
Reynolds, P., 1995, „The life and death of a post-hole', in E. Shepherd, (ed)., *Interpreting Stratigraphy* **5**: Bawdeswell, 21-25.
RFG/FRG 1993, *Guidelines for the preparation of site archives* (Roman Finds Group and Finds Research Group AD 700-1700 1993).
Ripper, S., 2004, *Bodies, Burnt Mounds and Bridges. A Riverine Landscape at Watermead Country Park, Birstall, Leicestershire.* University of Leicester Archaeological Services unpublished report 2004-048.

Ripper, S., and Butler, A. 1999, „Warren Farm, Lockington', *Transactions of the Leicestershire Archaeological and Historical Society* **73**: 101-104.
Roe, F., 2000, „The Worked Stone', in B. M. Charles, *et al* 2000, 188-9.
Roe, F., and Thomas, J., 2008, „The Worked Stone', in J. Thomas 2008b.
Sabin, D.J., 2004, *Geophysical Survey Report: Hallam Fields, Wanlip, Leicestershire*. Stratascan unpublished report.
Saville, A., 1981, „Mesolithic industries in central England: an exploratory investigaton using microlith typology', *Archaeological Journal*, **138**, 49-71.
Scollar, I., Tabbagh, A., Hesse, A., and Herzog, I., 1990, *Archaeological prospecting and remote sensing*. Cambridge, Cambridge University Press.
Score, V., forthcoming, *Rituals, Hoards and Helmets: A Conquest Period Ritual Site at Hallaton, Leicestershire*. Leicester Archaeology Monograph.
Scott, E.M., (ed), 2003, „The Third International Radiocarbon Intercomparison (TIRI) and the Fourth International Radiocarbon Intercomparison (FIRI) 1990–2002: results, analysis, and conclusions', *Radiocarbon*, **45**, 135–408.
Sellwood, L., 1984, „Objects of Iron', in B.W. Cunliffe 1984 *Danebury: an Iron Age Hillfort in Hampshire Vol 2 The Excavations 1969-78: The Finds*. Council for British Archaeology Research Report 52, London.
Serjeantson, D., 1996, „The animal bones', in S. Needham and T. Spence *Refuse and disposal at Area 16 East Runnymede* Vol. II Runnymede Bridge Research Excavations. British Museum Press.
Serjeantson, D., 1998, „Birds: a Seasonal Resource', *Environmental Archaeology* **3***,* 23-33.
Slager, S., and Van der Wetering, H.T.J., 1977, „Soil formation in archaeological pits and adjacent loess soils in Southern Germany', *Journal of Archaeological Science*, **4**, 259-67.
Shaffrey, R., 2007, „Worked Stone', in L. Webley, J. Timby and M. Wilson *Fairfield Park: Later Prehistoric Settlement in the Eastern Chilterns.* Bedfordshire Archaeology Monograph 7, 86-91.
Shore, M., 2001, „Huncote, Forest Road'. *Transactions of the Leicestershire Archaeological and Historical Society* **72**, 144-5.
Silver, I. A., 1969, „The ageing of domestic animals', in D. Brothwell, and E.S.Higgs, *Science in Archaeology.* London.
Stoops, G., 2003, *Guidelines for Analysis and Description of Soil and Regolith Thin Sections*: Madison, Wisconsin, Soil Science Society of America, Inc.
Speed, G., 2004, *An Archaeological Evaluation at Hallam Fields, North of Birstall, Wanlip, Leicestershire*. University of Leicester Archaeological Services unpublished report 2004-121.
Speed, G., 2005, *An Unwritten Architectural Language? A Comparative Analysis of the Spatial Syntax of Iron Age Enclosure Settlements in Leicestershire and Northamptonshire*. Unpublished M.A. thesis. University of Leicester.
Speed, G., forthcoming, „Everything in its Right Place. An Unwritten Architectural Language of Iron Age Enclosed Settlements in the East Midlands', in M. Sterry & A.Tullett (eds.) *Proceedings Of The Iron Age Research Seminar, Leicester 2008*. Leicester Archaeology Monograph.
Speed, G., & Coward, J., 2004, *Further Geophysical and Fieldwalking Surveys at Hallam Fields, North of Birstall, Wanlip, Leicestershire*. University of Leicester Archaeological Services unpublished report 2004-016.
Stace, C., 1997, *New Flora of the British Isles*. (second edition). Cambridge, CambridgeUniversity Press.
Stuiver, M., and Kra, R.S., 1986, „Editorial comment', *Radiocarbon*, **28**(2B), ii
Stuiver, M., and Polach, H.A., 1977, „Reporting of ^{14}C data', *Radiocarbon*, **19**, 355–63
Stuiver, M., and Reimer, P. J., 1986, „A computer program for radiocarbon age calculation', *Radiocarbon*, **28**, 1022–30.
Stuiver, M., and Reimer, P. J., 1993, „Extended ^{14}C data base and revised CALIB 3.0 ^{14}C age calibration program', *Radiocarbon*, **35**, 215–30.

Thawley, C., 1981, „The mammal, bird and fish bones', in J. E. Mellor and T. Pearce *The Austin Friars, Leicester* Council for British Archaeology Research Report 35.
Thomas, J., 2003, „Archaeological recording during groundworks for the Wanlip to Rothley pipeline', *Transactions of the Leicestershire Archaeological and Historical Society* **77**, 149-52.
Thomas, J., 2008a, *Monument, Memory, and Myth. Use and Re-use of Three Bronze Age Round Barrows at Cossington, Leicestershire*. Leicester Archaeology Monograph 14.
Thomas, J., 2008b, *Excavation of an Iron Age 'Aggregated' Settlement at Manor Farm, Humberstone, Leicester.* University of Leicester Archaeological Services unpublished report 2008-133.
Thomas, J., 2008c, *Excavation of an Iron Age Settlement Adjacent to Beaumont Leys Lane, Beaumout Leys, Leicester.* University of Leicester Archaeological Services unpublished report 2008-114.
Thomas, J., 2008d, „The Quernstones', in J. Thomas, 2008c.
Thomas, J., forthcoming, „The Worked Stone', in Jarvis, W. *Excavations on the Earl Shilton By-Pass.* University of Leicester Archaeological Services unpublished report.
Thomas, R., 1997, „Land, kinship relations and the rise of enclosed settlement in first millennium B.C. Britain'. *Oxford Journal of Archaeology* **16** (2), 211-218.
Thorpe, R., Sharman, J., and Clay, P., 1994, „An Iron Age and Romano-British enclosure at Normanton Le Heath, Leicestershire', *Transactions of the Leicestershire Archaeological and Historical Society* **68**, 1-63.
Tite, M.S., 1972, „The influence of geology on the magnetic susceptibility of soils on archaeological sites', *Archaeometry*, **14**, 229-236.
Tite, M.S., and Mullins, C.E., 1971, „Enhancement of magnetic susceptibility of soils on archaeological sites', *Archaeometry*, **13**, 209-219.
Valentin, C., 1983, *Effects of grazing and trampling around recently drilled water holes on the soil deterioration in the Sahelian zone: Soil Erosion and Conservation* (Soil Conservation Society of America).
Veen, M. van der 1992, *Crop Husbandry Regimes: An Archaeological Study of Farming in northern England 1000BC – AD 500*. Sheffield Archaeological Monographs 3. Sheffield. J.R.Collins.
von den Driesch, A., 1976, *A Guide to the Measurement of Animal Bones from Archaeological Sites.* Cambridge, Mass., Peabody Museum of Archaeology and Ethnology, Bulletin no. 1
Wacher J.S., 1964, „Excavations at Breedon-on-the-Hill, Leicestershire, 1957', *Antiquaries Journal* **54**, 122-142.
Ward, G.K., and Wilson, S.R., 1978. „Procedures for comparing and combining radiocarbon age determinations: a critique', *Archaeometry*, **20**, 19-31.
Webley, L., 2007, „Using and abandoning roundhouses: a reinterpretation of the evidence from late Bronze Age-early Iron Age southern England', *Oxford Journal of Archaeology* **26**(2), 127-144.
Vince, A., 2003, „4.5 Petrological and Chemical Analysis', in M. Hinman (ed.) *A Late Iron Age Farmstead and Romano-British Site at Haddon, Peterborough*, British Archaeological Reports British Series 358, 73-75.
Vince, A., 2007, *Characterisation Studies of Prehistoric and Early Roman Pottery from Melton, East Yorkshire* (OSA04 EX03). AVAC unpublished report 2007/105 Lincoln.
Willis, S., 2006, „The Late Bronze Age and Iron Age'. In N. Cooper (ed.) 2006, 89-136.
Woodward, A., and Hughes, G., 2007, „Deposits and doorways: patterns within the Iron Age settlement at Crick Covert Farm, Northamptonshire', in C. Haselgrove, and R.Pope, (eds.), 2006, 185-203.
Yalden, D.W., and Albarella, U., 2009, *The History of British Birds.* Oxford; Oxford University Press.
Zeist, van W. ,1991, „Economic aspects', in W. van Zeist, K.Wasylikowa, and K-E. Behre (eds.) *Progress in Old World Paleoethnobotany*. Rotterdam, A.A Balkema.

Gavin Speed
Senior Archaeological Supervisor
University of Leicester Archaeological Services
University Road,
Leicester, LE1 7RH

T: 0116 252 2848

F: 0116 252 2614

gs50@leicester.ac.uk

01.07.2009

Contact Details

Richard Buckley or Patrick Clay
University of Leicester Archaeological Services (ULAS)
University of Leicester,
University Road,
Leicester LE1 7RH

T: +44 (0)116 252 2848
F: +44 (0)116 252 2614
E: ulas@le.ac.uk
w: www.le.ac.uk/ulas

THE UNIVERSITY OF THE YEAR 2008/9