An archaeological excavation at the Chelmsford park and ride phase II site, Sandon, Essex June-July 2006

report prepared by Ben Holloway and Howard Brooks

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1 Summary

Excavation of an 0.8 hectare site to the north of the Chelmsford Park and Ride site at Sandon uncovered evidence of activity in the Late Bronze Age. This took the form of an area of post holes, which may include elements of domestic structures. Finds of spindle whorls and oven debris suggest a domestic occupation and a local economy which must have included an element of pastoral farming. In addition to the settlement occupation, two groups of cremation burials suggest a cemetery area separated from the domestic focus. C14 dating of the cremations suggests they are contemporary with the pottery-dated domestic activity. A series of later field ditches suggest that the site was later converted to pastoral farming (still in the LBA), and later pits show that there was some undefined activity here in the Middle Iron Age.

2 Introduction (Fig 1)

2.1 This is the archive report on an archaeological excavation carried out by the Colchester Archaeological Trust (CAT) on land to the north of the Chelmsford park and ride site at Sandon, Chelmsford, Essex. The work was commissioned by Equity Estates on behalf of Essex County Council.

2.2 The excavation work was done in advance of ground works associated with the extension of the park and ride site.

2.3 The archaeological work was carried out according to a brief written by Pat Connell of the Essex County Council Historic Environment Management (HEM) team.

2.3 Site work took place between the 29th June and 28th July 2006.

2.4 The excavation site lies in Sandon Parish, Chelmsford, Essex and is centred at NGR TL 746 056. The existing park and ride site lies to the immediate south of the excavation with arable farmland to the north and west. The A12 Chelmsford bypass lies to the east and the A414 Maldon road lies to the south.

2.5 This report mirrors standards and practices contained in Colchester Borough Council's *Guidelines on the preparation and transfer of archaeological archives to Colchester Museums* (CM 2003), the Institute of Field Archaeologists' *Standard and guidance for archaeological excavation* (IFA 1999) and *Standard and guidance for the collection, documentation, conservation and research of archaeological materials* (IFA 2001). The guidance contained in the documents *Management of archaeological projects* (MAP 2), and *Research and archaeology: a framework for the Eastern Counties 1. Resource assessment* (EAA **3**), *Research and archaeology: a framework for the Eastern Counties 2. Research agenda and strategy* (EAA **8**), and *Standards for field archaeology in the East of England* (EAA **14**) was also followed.

3 Archaeological background (Fig 1)

Sandon lies in the Chelmer Valley, east of the Roman and modern town of Chelmsford. The excavation site is at the highest point of a slight slope to the south of the River Chelmer. The local landscape contains archaeological sites of many periods, but particularly those of Neolithic and Bronze Age date (including the excavated Springfield Lyons site).

Significant cropmark complex includes enclosures, trackways, ring ditches, pits and field boundaries (EHER nos 5770, 5754, 8895 and 19891). A recent paper (Brown 2001) has drawn attention to the importance of the Springfield Lyons enclosure and its effect on the Neolithic and Bronze Age landscape, which includes the area of the present site and the Great Baddow enclosure at Manor Farm (Brown & Lavender 1994).

Evaluation work carried out by CAT in September 2005 (CAT Report 343) identified an area of extensive prehistoric activity to the north of the Sandon Park and Ride site. This activity took the form of an un-urned cremation burial and concentrations of pits and post holes in the north west of the site. Pottery recovered from this evaluation work indicated mid- to late-Bronze Age settlement activity.

4 Aim

The aim of the excavation was to preserve by record any archaeological remains that would be damaged or removed by groundworks associated with the extension of the existing park and ride carpark to the south of the excavation area.

5 Results (Figs 2-9)

Figure 2 gives a plan of the excavated features. In total, an area of 0.8ha was stripped under archaeological supervision to a depth of between 0.6m and 0.7m. This took place in two stages. First, redeposited topsoil (L1) and the original topsoil (L2) were removed to expose the subsoil horizon (L3). No archaeological features were visible at this level. Second, L3 was then removed to expose the natural glacial sands and gravels (L4), at which level the archaeological cut features could be clearly seen.

A total of 216 archaeological features were excavated. These consisted of eighty post holes, sixty-four pits, thirty-two cremation burials, fourteen ditches or gullies, and two empty ceramic vessels which are described as 'placed deposits'. there were also twenty-four 'natural' features, both pit-shaped and ditch-shaped. Features were most heavily concentrated in the northern and particularly the north-western parts of the site.

Post holes and structures

The largest group of features were post holes, which were concentrated in the north-west corner of the site. Although there were one or two elsewhere in the site, it is worth noting that they were absent from the areas where the cremation burials were found (below). This suggests that the post hole phase may be contemporary with the cremation phase. Pottery from the post holes is consistently late Bronze Age (1000-800 BC)

The problem with concentrations of post holes is isolating structures in them. On a prehistoric site such as this, it is legitimate to look for signs of commonly-found structures: round-houses, fences, four-posters and two-posters. On figure 2, a limited number of structures have been indicated. There were probably more structures here, but identification can never be certain.

The structures identified include a potential round house. The strength of this interpretation is that a large number of post holes are involved in this structure (F107. F123, F194, F200, F182, F177, F202, F159, F137, F104, F85, F100, F99, F120, F111). There is also fired clay identified as possible kiln furniture from a pit within the post circle (F214) and oven fragments from another feature within the circle (F172). Both these finds could be from structures inside a building, which may not necessarily be entirely 'domestic' in character.

A weakness of this identification is the lack of an obvious porch structure, but there is a potential gap in the post circle between F107 and F111. It may be noteworthy that both the placed deposits fall just outside the post circle.

Other suggested post-built structures are a fence (F46, F38, F37, F39, F42), which, if this identification is correct, may be connected with ditch F56 and the movement of stock. Another possible fence, to the east of the post-circle, is defined by F116-119, F66, F67, F89, F90, F95.

A four-poster is suggested by the grouping of F199, F154, F174 and F189 which defines a box of approximately 4.5m on each side. This may be a quite large for a four-poster, but is not entirely too big. It would be interpreted, as usual, as an above-ground grain store. Two separate two-post structures are suggested by the parings of F31 and F43, and F24 and F25.

Ditches

A number of ditches suggest a phase when the site was split up into various land parcels. There is some stratification between the ditches and other features. First, the short ditch F109 appears to be the earliest, because it is cut by one component

of three ditches whose position relative to each other suggests they are contemporary. These are two east-west ditches, (F77 and F129) and the north-south ditch F59 which passes by the east terminal of ditch F77 and ends a few metres short of ditch F129 in such a way as to suggest a field gate. If this interpretation is correct, then we have parts of four separate fields here, with the field gate giving access between those fields to the east and west of F59.

A later phase of field ditch is a rather more sinuous ditch F36/F56 which cuts across F59, and curves south to end approximately 10 metres north of ditch F129. Perhaps this later ditch is a stock funnel to encourage stock being driven from the west to pass through this particular point and move into the field to the east.

In terms of the relationship between the post holes group and the ditches, this later ditch cuts post hole F180. A small but perhaps significant amount of later pottery (Middle Iron Age) comes from this ditch.

Cremation burials.

There were two discrete groups of cremation burials, thirty-two in total, eighteen in Cremation Group 1 and fourteen in Cremation Group 2. As noted above, these are located away from the post holes. This may not be significant, but it does not contradict the idea that the cremations are contemporary with post holes (which is suggested by the pottery dating from the post holes (LBA) and the radiocarbon dates from the cremations). Five cremations were radiocarbon dated (F19, F27 and F130 in Group 1, and F151 and F164 in Group 2). The mid point of the radiocarbon dates came out at between 970 BC and 890 BC in Group 1 and 900 BC and 830 BC in Group 2. It is clearly statistically possible that they are all closely contemporary, but it is a more attractive interpretation to suggest that the two groups are separated in date by two or three decades, and do represent separate areas of burial. The attempt to sex or age any of the cremated human remains was hampered by the small size of the individual fragments. As for relationships between cremations and the ditches, it appears that Group 2 is placed against the field boundary ditch F129> Is this significant? Ditch F129 cuts through both of the cremation groups, so it must be later than them. One suggestion may be that the ditches are all later than the cremations, but perhaps north-south ditch F59 reflects some earlier notion of a division between burial areas to the east and post holes, oven debris and other clutter to the west. In other words it may be a division between 'the land of the living' and 'the land of the dead'.

Placed deposits

Features 71 and 69 each contained the larger part of a Late Bronze Age vessel. Only recently, there would have been no hesitation in naming these as burials. Unfortunately, there were no human bones in the pots, so the term 'burial' seems inappropriate. As they have undoubtedly been deliberately placed in specially dug holes they are interpreted as ritual deposits, the meaning of which is not clear to us. It may be significant that they were located among the post-hole group.

Pits

Pits were spread across the whole site. They add to the stratification of the site in that pits F214 and F215 cut ditch F77, and pit F190 cuts ditch F56. This suggests that the pitting phase comes late in the site sequence, with pits cutting field ditches which themselves overly earlier post holes (associated with the cremations). The pits are probably to be associated with the latest pottery on the site – Middle Iron Age.

6 Finds

6.1 The finds from the excavation consisted of pottery, lithics, burnt flints, animal bone and fragments of structural clay. The majority of this recovered material is from the fills of post-holes and ditches concentrated in the western half of the excavation site. In addition to the general finds a number of small finds were recovered, these consists of fragments of daub loom weights structural clay and fragments of

metallurgical slag. Cremated bone was also recovered from twenty-seven pit features. A complete finds list is held in the archive.

6.2 Small finds (Fig 10).

by Nina Crummy

Ceramic and stone objects

This ceramic items consist of a spindlewhorl fragment, a fired clay disc, part of a curved ceramic rod and a fired clay fragment, The latter is probably part of a perforated slab of the type used in kilns to support vessels during firing over the period spanning the Late Bronze Age to Iron Age transition. The ceramic rod fragment may also be kiln furniture.

The stone objects include a well-adapted hand-size rubbing-stone and an irregular fragment that may also have been used for rubbing or sharpening. A more ambiguous piece is a perforated fragment of a much larger object, but the size and position of the hole militate against identification of this piece as a stone loomweight. The final piece is a building block with some fairly well worked faces and other more irregular ones, the latter presumably being hidden in use and the former exposed.

Fig. 10, 1. SF 5. (161) F158. Posthole. Bun-shaped ceramic spindlewhorl fragment, in a sandy clay fabric with many small grits, fired both internally and externally to grey. Diameter approximately 60 mm; diameter of spindle hole 18 mm.

Fig. 10, 2. SF 4. (168) F187. Pit. Small thick ceramic disc, perhaps used as a plug or stopper. The fabric is a sandy clay with many small grits, fired externally to red. Diameter 34 mm, thickness 20 mm.

Fig. 10, 3. SF 8. (187) F214. Pit. Short curved circular-section ceramic rod, possibly used as kiln furniture. The ends are abraded, but one appears to be original and the other broken. The inner curve is too great and too irregular for this to be a spindlewhorl. The fabric is a sandy clay with many small grits; it has fired externally from orange to grey. The face of the probable original terminal is orange, that of the probable broken one grey. Length 42 mm, maximum diameter 22 mm.

(48) L3. Subsoil removal, ?with residual material. Fragment of a thin fired-clay slab, maximum dimensions of 74 by 39 mm, 17 mm thick. The fabric is a sandy clay with very occasional fine grit, fired externally orange-brown and internally orange.

Fig. 10, 4. SF 2. (202) F159. Pit. Flat rubbing-stone made from a split waterworn sandstone pebble. It has been adapted to fit well in the hand, being more or less lozenge-shaped but with one end on the long axis blunted so that it seats into the palm and the base of the thumb, an increase in section thickness towards the opposite end, rounded edges on the upper surface, and a lengthened rounded edge at the thickened end to accommodate the grip of the index and middle fingers. The underside is worn smooth from use. It is spalled twice on one side. Wear suggests that after the first flake was removed the stone continued to be used, and the lack of wear and staining suggests that the second, deeper, flake broke away recently. Length 97 mm, maximum width 73 mm.

SF 7. (179) F182. Pit. Amorphous fragment of conglomerate with small pieces of flint grit in a grey-cream matrix. Several of the faces are smooth and the edges between faces are crisp, if irregular, and have not been rolled, suggesting that the fragment was used as a rubbing stone. Maximum dimensions 47 by 41 by 34 mm.

Fig. 10, 5. SF 3. (201) F132. Pit. Fragment of waterworn quartzite with one flat face and one curved one. There is a narrow perforation just above the junction of the two faces, and wear around the edge of the hole suggests use rather than the void left by a fossil. Maximum dimensions 47 by 51 by 26 mm;

internal diameter of perforation 6.5 mm. The piece is too small to give much indication of the form, size and use of the complete object from which it derives, but the size and angle of the hole, which lies parallel to the flat face, militates against it being part of a pebble hammer or stone loomweight.

SF 6. (189) F212. Pit. Large irregular block of gritstone/ironstone, almost certainly used as building stone. It has one roughly square flat face (180 by 125-175 mm), two abutting flat areas on adjacent faces, and three irregular faces, one with a large notch cut into it. Maximum dimensions 198 by 180 by 155 mm).

Metallurgical debris

This fragment provides a date later than the Bronze Age for ditch F129, and may be as late as post-medieval.

(166) F129. Ditch. Fragment of vesicular iron slag. Weight 267g.

Structural clay

Most of the fragments of structural clay are very small and abraded and only a few grammes were present in each context. In these cases they can be interpreted as having been scraped up from the ground surface when the features were backfilled. Very few of these fragments retain any original surface or trace of wattle voids, but one fragment from posthole F55 retains a clear wattle void 13 mm in diameter, indicating the use of small branches. A few small pieces from posthole F173 and pit F205 are seriously heat-affected, and in places the heat has been sufficiently intense to vitrify the clay. The burnt hut C11 at Little Waltham, Essex, also produced evidence of vitrification from intense heat, but the Sandon fragments cannot be tied back to a particular structure and might equally well derive from an oven or kiln (Drury 1978, 114).

The only feature producing a substantial quantity of structural clay was pit F172. All are consistent in colour and texture and can be presumed to derive from a single structure, although they represent only a tiny part of the original material that would have been used to construct even a small oven, let alone the walls of a roundhouse. Context (162) within the feature produced over 1 kg of fragments, including a small fragment from an angular void made by split timber and another with a void from a stake or wattle at least 40 mm in diameter. These features are again paralleled at Little Waltham, where upright voids in the structural daub came from branches or saplings ranging from 20 to 40 mm in diameter and there was also evidence for the use of split timber (*ibid.*). Context (194) produced 3 kg of fragments, several quite substantial. One of these retains part of an original surface with two convex areas meeting at a well defined groove, and another, weighing 1.024 kg, is wholly internal and has parts of two wattle voids. Both voids are narrow, maximum surviving diameter 8 mm, and one tapers to an irregular snapped, rather than cut, blunt end. They do not lie either parallel or at right angles to each other, indicating random interweaving of wattles within a thick framework. A smaller fragment has a wattle void at least 15 mm in diameter. The use of riven timber and the thickness of the framework implied by the wattle voids are arguably evidence that the material from F172 comes from a substantial structure, probably a roundhouse.

The available dating evidence points to almost all the structural clay being of Middle or Late Bronze Age date, the exception being the small quantity from ditch F129, as that feature also contained a large piece of iron slag, possibly as late as post-medieval in date.

6.3 Prehistoric pottery

by N J Lavender

The excavation produced a total of 1439 sherds (12,165g) of prehistoric pottery from 100 contexts. The pottery was recorded using a system developed for prehistoric pottery in Essex and used, with revisions, since 1985 (Brown 1988a. Details in

archive). The assemblage has been quantified by fabric, sherd count, weight and where possible, vessel class (after Barrett 1980). The fabrics present in the Sandon assemblage are:

Fabric	**%sherds.**	**% weight (g)**
B Flint, S-M 2.	11	8
C Flint, S-M with occasional L 2.	45	52
D Flint, S-L 2 poorly sorted.	33	35
E Flint and sand, S-M 2.	5	3
F Sand, S-M 2-3 with addition of occasional L flint.	0.5	0.2
G Sand, S 3	0.3	<0.1
H Sand S 2	0.5	1
I Sand S-M 2-3	0.2	0.2
M Grog, often with some sand or flint and occasional small rounded or subangular voids	0.2	0.5
P Largely temperless. May have sparse, very fine sand, occasional M-L flint or sparse irregular voids	0.3	<0.1
Z Indeterminate	4	0.4

(Where size of inclusions is represented by: S = less than 1mm diameter, M = 1-2mm diameter, L= more than 2mm diameter, and density of inclusions by: 1 = less than 6 per cm^2 2 = 6-10 per cm^2, 3 = more than 10 per $cm^{2)}$.

Almost the entire assemblage (94% by sherd count, 98% by weight) comprises flint-tempered fabrics, which are not closely dateable by fabric alone. Twenty three sherds (approximately 1.5% by weight) are sand-tempered.

Preservation and Condition

The condition of the pottery is variable. Several contexts produced large unabraded sherds (particularly the two main placed deposits), but there is some very heavily abraded material. There is also a fairly high proportion of burnt sherds, once again, often mixed with pottery in better condition. There do not seem to be any notable effects of adverse soil conditions. Generally, most of the pottery seems likely to have been recovered from its original contexts. Preliminary examination of the pottery suggests that there are joins between sherds from different contexts which, given the apparent absence of major disturbance, may have implications for deliberate deposition. The average sherd weight within the total assemblage is 8.4g. That of the flint-tempered component, 8.8g.

Date

The bulk of the assemblage, on the basis of the relatively small quantity of diagnostic sherds, is of Late Bronze Age date and consists almost exclusively of undecorated sherds. This material represents vessels belonging to an LBA plain ware assemblage (Barrett 1980) of *c* 1,000 – 800BC. The little decoration that does occur is limited to fingertip impressions on shoulders and occasionally the top of the rim, similar to the earlier material at Springfield Lyons. The radiocarbon dates for the cremation burials, averaging at *c.* 1000bc suggests that, despite their lack of pottery, they are broadly contemporary.

There appears to be no pottery that can be ascribed to a later, decorated, assemblage, or to the Early Iron Age.

A small number of sherds (including the 23 sand-tempered sherds noted above) are of Middle Iron Age date.

The Late Bronze Age Pottery

Description and Affinities

Sherds from two vessels, identified as deliberately placed deposits, comprise 41% of the total weight of the assemblage, but only 8.5% of the total sherd count. This calculates as an average sherd weight of 41g for these two vessels and reduces that of the remainder of the assemblage to 5.4g. Given that the assemblage contains

very few diagnostic pieces and that sherds are generally quite small, the recognition of forms has been possible in only a few cases.

The identified forms fall into the range of vessels common on other LBA sites in and around the Chelmer Valley, as well as further afield in south eastern England.

Jars

Form A: Jar; round-bodied with short upright or flared rim.

Form A jars are mainly represented by the 46 sherds comprising one of the two placed deposits (weighing 3043g, approximately 25% of the total assemblage weight). These jars can be paralleled in most LBA assemblages, a good local example being from segment 4009 at Springfield Lyons (Brown in prep), but they occur at Lofts Farm (Brown1988a), Broads Green (Brown 1988b), Broomfield (Brown 1995) and the Boreham Interchange (Brown 1999). Runneymede (Longley 1980) and Mucking North Ring (Barrett and Bond 1988).

One possible Form A jar, from pit 8, has a row of fingertip impressions on its exterior, but the exact position cannot be identified with any certainty.

Form E: Jar; slack shouldered with upright or slightly out-turned rim

Seventy seven sherds (1006g) of a Form E jar were recovered from context F69. The vessel is plain and externally wiped with a thick flat base and thin walls.

These jars are usually a common element of LBA assemblages and have been found locally at Springfield Lyons (Brown in prep.) Manor Farm, Great Baddow (Brown 1994) and the Boreham Interchange (Brown 1999). Further afield in Essex, they have been recovered from Mucking North Ring (Barrett and Bond 1988) and Broads Green (Brown 1988b) and elsewhere in south east England at Carshalton (Adkins and Needham 1985) and Petters Sports Field (O'Connell 1986).

It seems likely that these vessels, along with Forms B, C, D and F, which are all common at Springfield Lyons and elsewhere, would have been correspondingly numerous at Sandon. However, whilst body sherds from jars are widespread, further identification has not been possible.

Bowls

Form H: bowl; round-bodied, open.

Round-bodied bowls are certainly represented at Sandon, and a few sherds seem most likely to be from Form H vessels. However, the absence of diagnostic sherds prevents most of the material being assigned to any particular form.

Form K: bowl; tripartite, angular shoulder with flared or upright rim.

A number of sharply carinated sherds, probably from Form K bowls were recovered. These bowls presage those of the local EIA Darmsden-Linton style (Cunliffe 1968), but at Springfield Lyons (Brown in prep), a number of plain examples were recovered from the lower ditch fills, suggesting a date of around 1000BC.

Table 1: Distribution of prehistoric pottery by feature type

	sherd	**weight**	**% sherd**	**% weight**
Ditches	168	1062	11.6	8.7
Pits	812	5469	56.5	45
Postholes	202	1066	14	8.7
Cremation pits	20	68	1.4	0.6
Placed deposits	178	4267	12.4	35
Other	59	233	4.1	2
Total	**1439**	**12165**	**100**	**100**

Almost all of the pottery was recovered from features in the northern, mostly the north western, part of the site. Only four sherds were produced by ditch F129, at the

southern end of the site, which was excavated in seven places, and some of these were quite heavily abraded. This ditch, running from east-west, cuts through the cremation groups and is likely to be later and its pottery residual.

The ditches in the northwest part of the site were more productive; yielding a total of 177 sherds (1,250g), representing roughly 10% of the total assemblage. Most of this material (135 sherds, 860g) came from ditch 56.

Pits, unsurprisingly, produced the largest individual assemblages, a total of 812 sherds (5,469g) from 39 contexts, comprising 56% of the site assemblage (45% by weight). There is a particular concentration of pottery in pits 214, 215 and segment 3 of ditch 77, which they cut (179 sherds, 1,490g).

The quantity of pottery recovered from post holes is rather high, 202 sherds from 36 features. Unfortunately no post pipes were identified during the excavation and it cannot be said when this pottery was deposited. At the Boreham Interchange (Lavender 1999) there were a number of distinct placed deposits within the post pipes, clearly made after the removal of the timber. This was particularly obvious in posthole 554 of the shrine structure, where a complete hook-rimmed jar had been laid on its side in the pipe. In other cases, however, sherds had been carefully stacked. With the absence of clearly defined post pipes at Sandon, a direct comparison is impossible, but the high incidence of pottery in the post holes suggests that a similar pattern of deposition during a 'ceremonial' dismantling of the site took place.

Manufacture and Function

Evidence of manufacturing techniques is sparse, though there are signs of coil-building, and bases have generally been joined to the bodies by finger-pinching. A number of the vessels have been finger wiped on the exterior. Some may have been vegetable wiped. All of these features are paralleled at Springfield Lyons and the Boreham Interchange.

All of the raw materials for the manufacture of pottery (clay and flint) are available locally, and there are no sherds from obviously imported vessels.

Prehistoric pottery discussion

The pottery is contemporary with the earlier material at Springfield Lyons (Brown 1987, and in prep) and Great Baddow (Brown 1994). The assemblage may represent a smaller range of forms than either of these two sites, but this is more likely to be a result of the scarcity of diagnostic sherds. Although the evidence is slight, there are indications, such as the high proportion of pottery recovered from postholes and the presence of contemporary cremation burials, that the site was 'ceremonial' in nature like the Boreham Interchange. If this is so, then it is possible that much of the pottery comes from placed deposits made during the dismantling of the site, rather than the period of its use. At the Boreham interchange the pottery from the placed deposits in the internal features was generally later than that from the enclosure ditch and appears to mark the end of the site's active life. This is very probably the case at Sandon as well.

The Middle Iron Age Pottery

A very small quantity of Middle Iron Age pottery was recovered during the excavations. The 23 sand-tempered sherds are all undiagnostic, but some are large (up to 14g) and unabraded. Diagnostic sherds do occur in flint-tempered fabrics, including fragments of a pedestal base from 48.

6.4 The flints (Fig 11)

by Hazel Martingell

A total of fifteen worked flints were studied. There were nine flakes (seven waste flakes and two larger flakes), two blades, one retouched blade, one axe thinning flake, and one core scraper.

These artefacts, though few in number, are products of good quality flint knapping. The earliest artefacts are the retouched blades, which should be early

Neolithic in date. The axe thinning flake of cream coloured flint is also Neolithic. The raw material could have been sourced from Lincolnshire where flint of this type can be readily found. The core scraper (F177, finds no 104) is a good example of this particular type of artefact. Most are Neolithic in date, but they may occur in later contexts.

Many prehistoric sites of importance have been identified and some excavated in the Chelmer Valley (Brown and Lavender, 1994). The Sandon Park and Ride site is one of these. It is situated on a low shoulder of land on the southern side of the valley. The worked flint artefacts suggest that crop cultivation was the main activity in the area during the Neolithic.

List of illustrated pieces (Fig 11).

Finds no	*Context*	*description*
66	unstratified	tertiary flake, rolled
73	unstratified	secondary flake with minimal retouch
104	F177 (post-hole)	Neolithic core scraper
107	F122 (post-hole)	Neolithic axe-thinning flake
165	F174 (pit)	Neolithic tertiary blade, retouched
186	F209 (pit)	Neolithic tertiary blade, punch struck

6.5 Human Remains

by Francesca Boghi (Norfolk Archaeological Unit).

Thirty-three pits containing charcoal and pyre related debris were excavated. Cremated bone was found in twenty-nine features (a total of 2,333g), whilst no bone remains were found in four features. The analysis of the cremated bone followed the guidelines drafted by McKinley (2004). The bone from ten features was classified as probably human (human?), based on its texture, as the small quantity of bone present made it impossible to identify any of the fragments. All the other features were found to contain fully cremated human bone. Three features included fully cremated animal bone (fish, sheep/goat and cattle) alongside cremated human remains indicating that part or whole animal carcasses had been placed on the pyre with the deceased. The inclusion of cremated animal bone is common and the animal remains generally represent pyre goods, food, amulets, pets, indicators of status, or remnants of funeral feasts (McKinley, 2000: 416). A summary of each feature is given in a table in the archive.

Table 2 ***Bone fragmentation***

	2mm (%)	**5mm (%)**	**10mm (%)**	**max. fragment size (mm)**	**Total weight (g)**
COUNT(n)	*29*	*29*	*29*	29	29
MIN	0	0	0	9	1
MAX	53	100	100	47	822
AVG	21.4	47.4	29.1	22.4	79.8

The amount of bone found in the majority of features (79.3%) was small (< 100g). Six features contained a medium (100-999g) amount of bone. The quantity of cremated bone per feature varied considerably from 1g to 822g (F151) with an average weight of 79.8g (Table 2). This amount of bone falls within the size range (57 – 3000g) for archaeological cremations (McKinley 2000, 408-409), though it is incomplete in comparison to that of a modern cremation (1000 – 3600g) (McKinley 2000, 404). The very small quantity of bone found in the rest of the Sandon Park and Ride features probably reflects preservation factors as a poor preservation is common in unurned cremation burials.

The average maximum fragment size (22.4mm) was quite small and ranged from 9mm to 47mm (tables in the archive). The bone was on average very finely fragmented as only 29.1 percent of bone fragments were over 10mm in size in comparison to an average of 50% of bone fragments over 10mm in archaeological

cremations (McKinley 1994, 340). It is however very difficult to establish whether preservation factors were augmented by deliberate crushing.

The bone presented extensive fissuring and cracking as well as some warping, a pattern typically found in cremated fresh bone. The predominantly buff white colour found across the whole assemblage indicates that a temperature in excess of 600° was reached during the cremation process, resulting in the fully oxidisation of bone (Shipman *et al*, 1984).

It was possible to identify some skeletal elements in 19 features (65.5%) (tables in the archive). Bone elements from at least three skeletal areas were identified in seven features. Fragments were considered identifiable when they could be attributed to a specific bone element rather than to a generic skeletal area. Identifiable bone was separated, quantified and classified into four skeletal areas: skull, axial skeleton, upper limb and lower limbs. On average only 11.7% of bone fragments could be identified. This figure is low with respect to the portion of an archaeological cremation that is normally identifiable (20-50%) (McKinley 1989, 68). With respect to the relative representation of skeletal areas, elements from the skull were best represented, followed by the lower limbs and upper limb fragments. Axial skeleton fragments were the least represented (tables in the archive). Preservation factors are likely to more harshly affect the axial skeleton, which has a lower proportion of the more durable cortical bone. The collection of the cremated remains at the pyre site appears to have been meticulous enough to include bone elements from at least three skeletal areas in seven features.

No multiple burials were identified in this sample, as there was no evidence for duplication of bone elements or discrepancies of age at death in any of the features.

The estimation of precise age at death was difficult as most ageing features were unavailable. All the individuals could only be generically classified as probably adults (>20 years) from a generic assessment of bone size, texture and cortical thickness.

None of the morphological criteria for sex determination in skeletal material as in Buikstra and Ubelaker (1994) were available in this sample. Most of the metric criteria for sexing cremated material devised by Gejvall (1969) were either absent or insufficiently complete. Therefore, all the human remains this sample were classified as Indeterminate.

A few pathological changes were observed in this sample. These consisted of four instances of non-specific infection affecting the periosteum. Periostitis (i.e. infection of the periosteum) can occur secondary to soft tissue lesions with bacterial infection, repeated minor trauma, leg ulcers, varicose veins or through blood-stream spread.

Conclusion

The main characteristic of this assemblage was its very finely fragmented bone. This was the result of a very efficient cremation process probably contributed to by preservation factors, which can more heavily affect unurned cremated bone. The average small fragment size often combined with a small assemblage size resulted in a low bone identification rate. This affected both the quantity and the quality of the information that could be derived from this assemblage.

Acknowledgements

Thanks to Julie Curl (NAU Archaeology) for the identification of the animal bone.

6.6 An assessment of the charred plant macrofossils and other remains

by Val Fryer

Introduction and method statement

Excavations revealed a number of un-urned cremations of Late Bronze Age date. In addition to these, two contemporary cremations within urns were recorded along with a small number of associated features. Samples for the retrieval of the cremated bone and the plant macrofossil assemblages were taken from across the excavated area, and thirty nine were submitted for assessment.

The samples were processed by manual water flotation/washover, and the flots were collected in a 500 micron mesh sieve. The dried flots were scanned under a binocular microscope at magnifications up to x 16, and the plant macrofossils and other remains noted are listed on Tables 1 and 2. Nomenclature within the tables follows Stace (1997). All plant remains were charred. Modern contaminants were rare, but did include a small number of fibrous roots and occasional seeds.

The non-floating residues were collected in a 1mm mesh sieve and sorted when dry. The cremated bone fragments and any artefacts/ecofacts were removed for further specialist analysis.

Results

Plant macrofossils

With the exception of charcoal/charred wood fragments, which were common or abundant within most of the assemblages, plant macrofossils were exceedingly scarce. Preservation of the few recorded cereals and seeds was generally good.

Barley (*Hordeum* sp.) and wheat (*Triticum* sp.) grains, along with other indeterminate cereals, were recorded mostly as single specimens from five of the cremation deposits, from both cremation urns and from post-hole F55 and pit F173. Most of the wheat grains were of an elongated 'drop' form typical of spelt (*T. spelta*), and spelt glume bases were recorded in samples 11 (F124), 34 (F71) and 35 (F69).

Seeds and tubers, mostly of segetal weeds or grassland herbs, occurred at a very low density within eighteen of the assemblages studied. Taxa noted included onion couch (*Arrhenatherum* sp.), brome (*Bromus* sp.), fat hen (*Chenopodium album*), sheep's sorrel (*Rumex acetosella*) and vetch/vetchling (*Vicia/Lathyrus* sp.). Seeds of blinks (*Montia fontana*), a plant commonly found in damp grassland, were noted within samples 2 (F19), 3 (F28) and 33 (F27). A single small fragment of hazel (*Corylus avellana*) nutshell was noted within sample 8 (F10).

Charcoal/charred wood fragments occurred throughout. Fragment size was generally very small (<2mm), with a high density of the material appearing rounded or abraded. Only rarely were fragments larger than 2mm present in any quantity, and in most of these instances the material had a very flaked appearance, possibly a result of the combustion of predominantly ring-porous woods, including oak (*Quercus* sp.), at very high temperatures.

Other materials

Fragments of black porous and tarry material were present within many of the assemblages studied. Although some were probable residues of the combustion of plant materials at very high temperatures, others were possibly products of the burning of body tissue and/or associated materials during the cremation processes. Minute fragments of burnt bone were present within most of the samples. The small pieces of coal are almost certainly modern contaminants, some of which may be derived from the use of steam ploughs on the land in the recent past.

Discussion

Although the assemblages appear limited, their interpretation is far from straightforward. The abrasion noted within some of the charcoal/charred wood assemblages might be the result of either prolonged exposure of the material prior to burial or subsequent disturbance. Either of the latter could have introduced materials such as the cereals, chaff and weed seeds. Wood certainly appears to have been the principal material utilised for the pyres, and although some of the other remains may be present as dried plant material used to kindle the fires, others may be relicts of material burnt *in situ* beneath the pyres. There is no indication that any materials were deliberately placed as offerings to the deceased.

It is unclear whether the occurrence of grains and chaff within both of the urned cremations is coincidental, or whether it is possibly related to the status of those buried within the vessels. However, it should be noted that the density of material in question is very low (5 specimens or less in each instance).

The assemblages from the non-cremation deposits are also primarily composed of charcoal, although three of the four samples also contain minute burnt bone fragments. It is assumed that the latter, along with an unknown proportion of the

charred plant remains, are derived from scattered or disturbed pyre debris/cremation deposits.

Conclusions and recommendations for further work

In summary, the assemblages are primarily composed of charcoal/charred wood fragments. Other remains are rare and it is generally unclear how or why this material became incorporated within the cremation deposits.

As plant remains other than charcoal fragments are so scarce, further quantification is not required. However, it may be possible to extract small quantities of material suitable for charcoal identification. This may give indications about the local environment and resource availability, and may also identify material suitable for C14 dating. However, it should be stressed that the condition of the charcoal in many of the assemblages is quite poor. The grains and seeds are not suitable for dating purposes, as their contemporaneity with the deposits cannot be proved.

Table 3: plant macrofossils and other remains

Sample No.	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Context	**F134**	**F135**	**F130**	**F126**	**F131**	**F142**	**F143**	**F148**	**F144**
Finds No.	**108**	**109**	**112**	**121**	**122**	**123**	**125**	**127**	**130**
Herbs									
Plantago lanceolata L.						xcf			
Rumex acetosella L.				x					
Other plant macrofossils									
Charcoal <2mm	xxxx	xxxx	xxxx	xxxx	xx	xx	xxxx	xxxx	xxx
Charcoal >2mm	x	xx	x	xx	xx	xx	xxxx	xxx	xx
Charred root/stem				x					
Other materials									
Black porous 'cokey' material	x	x		x		x	x	xx	
Black tarry material				x		x	x	xx	x
Bone	xb		xxb	xb			xxb		xb
Burnt stone							x		
Small coal frags.		x			x				
Vitrified material	x								
Sample volume (litres)	**8**	**16**	**22**	**16**	**9**	**9**	**48**	**48**	**10**
Volume of flot (litres)	**<0.1**	**<0.1**	**0.2**	**<0.1**	**<0.1**	**<0.1**	**0.9**	**0.3**	**<0.1**
% flot sorted	**100%**	**100%**	**50%**	**100%**	**100%**	**100%**	**12.50%**	**50%**	**100%**

Key to table

x = 1–10 specimens xx = 10–50 specimens xxx = 50–100 specimens xxxx = 100+ specimens
cf = compare b = burnt ph = post-hole

7 Discussion (Figs 2, 12)

Neolithic
The earliest dated material is a small group of Neolithic flints which were found in later contexts. There were no contemporary site features.

Late Bronze Age
The main phase of activity on this site is dated to the Late Bronze Age by pottery of the period 1,000 BC to 800 BC, and by supportive radiocarbon dates (centering in the 10th century BC).

Activity in this period was as follows. There were two groups of cremation burials (Groups 1 and 2) which may be contemporary with each other, or may be slightly separated in date. Contemporary with the burials was a large cluster of post holes in the north-western part of the site. This cluster must contain structures, which are not easily untangled. The positions of one post circle, two fences, one four-poster and two two-poster structures are suggested on Fig 12, but none of these can be definitely regarded as conclusive. Nevertheless, the post holes share the location of the bulk of the pottery and other finds such as fragments from clay ovens and a possible kiln, and a spindlewhorl which suggests weaving. This means that whatever the form of any domestic activity here, it was definitely located in the post hole grouping.

The lack of overlap between the post holes and the cremations suggests that a certain part of the site was reserved for burial, and no other activity took place there. There may be one exception to this – the fact that two of the possible two-poster structures are located near the Cremation Group 1.

A distinctly different phase of activity, still Late Bronze Age (or possibly Early Iron Age) followed the post hole and cremation phase. This involved field ditches being laid out across the site. As these cut through the post holes and cremations, they must herald a complete change in land use. It would be normal to interpret this as a change to pastoral farming, with the land being allowed to revert to grass, and a system of hedges and ditches used to control stock. The form of the ditches, with one being a possible stock funnel, does not contradict this interpretation. Other details such as a field gate are also apparent in this ditch phase.

Middle Iron Age
A small group of MIA pottery suggests some form of activity in that period. It may be possible that elements of the ditch system (above) are of that date, but it seems more likely that the pits which cut the field ditches are the principal activity here. Quite what they mean is difficult to say, but pits would usually suggest an element of domestic occupation. Although there are one or two post holes which may be related to this MIA activity, it is difficult to be more specific.

8 Archive deposition

The finds and the paper and digital archive are held by the Colchester Archaeological Trust at 12 Lexden Road, Colchester, Essex CO3 3NF, but both will be permanently deposited in Chelmsford museum under accession code 2005.127

9 Acknowledgements

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11 Glossary

CBM	Ceramic Building Material
CM	Colchester Museums
context	specific location on an archaeological site, especially one where finds are made
feature	an identifiable thing like a pit, a wall, a drain, a floor
medieval	period from AD 1066 to *c* AD 1500
modern	period from the 20th century onwards to the present
NGR	National Grid Reference
natural	geological deposit undisturbed by human activity
prehistory	the years BC
post-med	post-medieval, the period from *c* 1500 to *c* 1900
residual	an early find in a later context (eg a Roman coin in a Victorian pit).
Roman	the period from AD 43 to AD 410 approximately
U/S	unstratified, ie no context

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Appendix: Radiocarbon dates

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RADIOCARBON DATING CERTIFICATE

16 January 2007

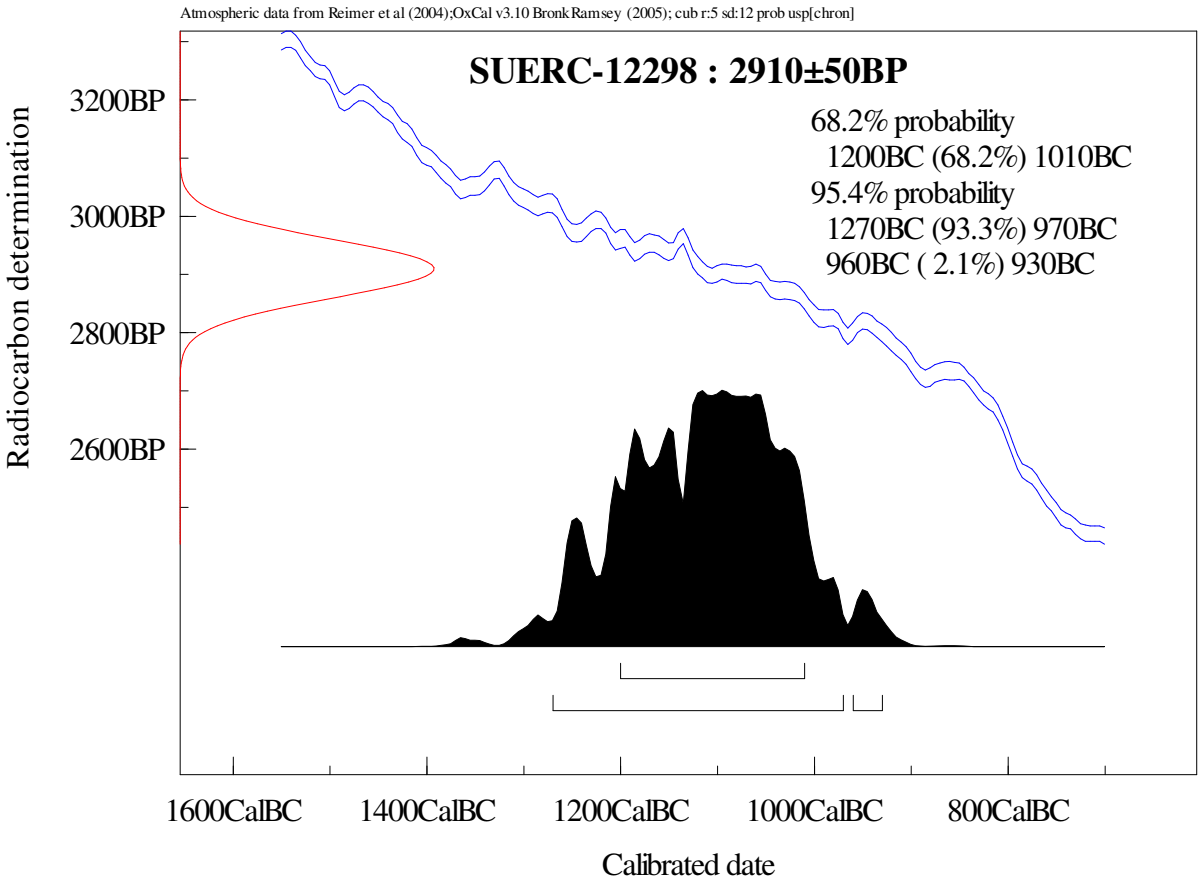
Laboratory Code	SUERC-12298 (GU-14674)
Submitter	Ben Holloway Colchester Archaeological Trust, 12 Lexden Road Colchester, Essex CO3 3NF
Site Reference	Sandon Park and Ride Phase II
Sample Reference	SDPR06 F19
Material	Cremated Bone : Human
$\delta^{13}C$ relative to VPDB	-22.4 ‰
Radiocarbon Age BP	2910 ± 50

N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot



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RADIOCARBON DATING CERTIFICATE

16 January 2007

Laboratory Code	SUERC-12299 (GU-14675)
Submitter	Ben Holloway Colchester Archaeological Trust, 12 Lexden Road Colchester, Essex CO3 3NF
Site Reference	Sandon Park and Ride Phase II
Sample Reference	SDPR06 F27
Material	Cremated Bone : Human
$\delta^{13}C$ relative to VPDB	-19.7 ‰
Radiocarbon Age BP	2850 ± 35

N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
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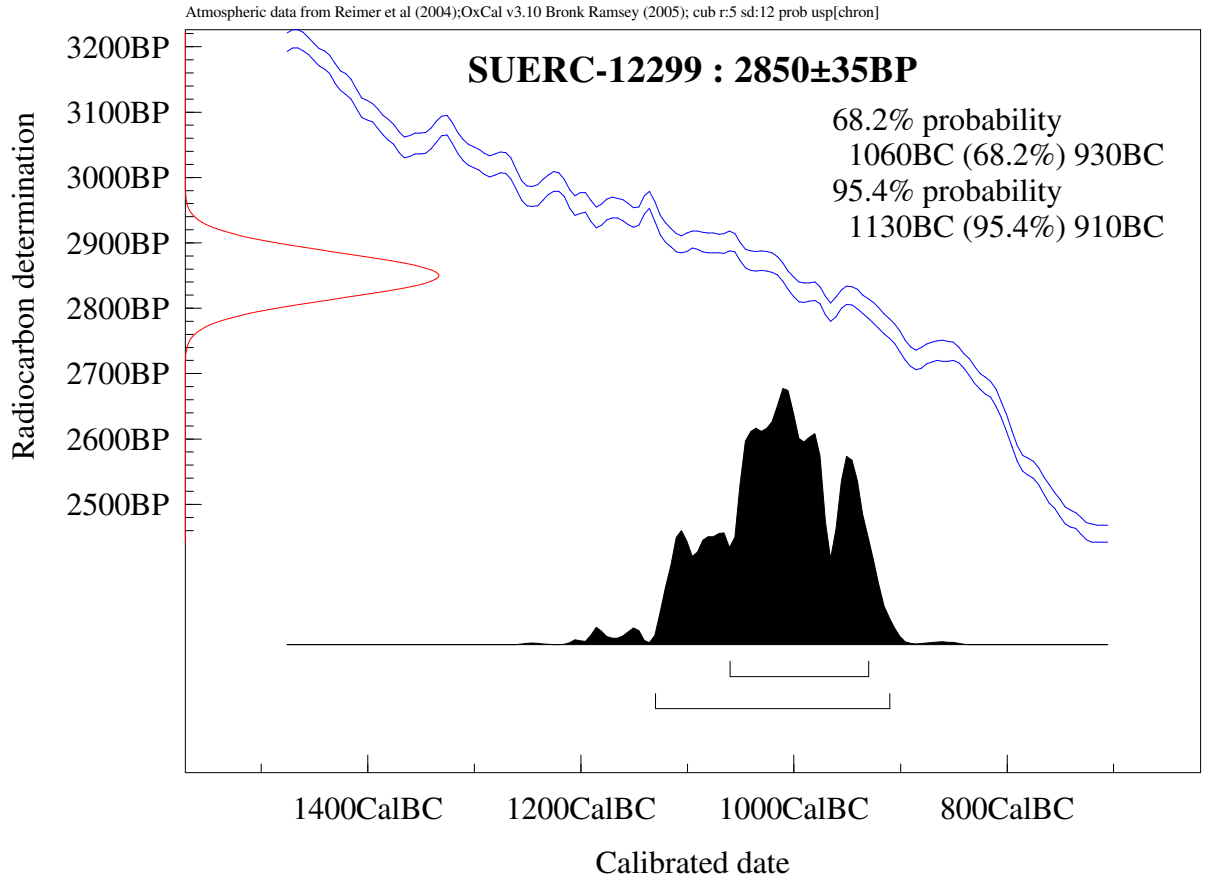
Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot



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RADIOCARBON DATING CERTIFICATE

16 January 2007

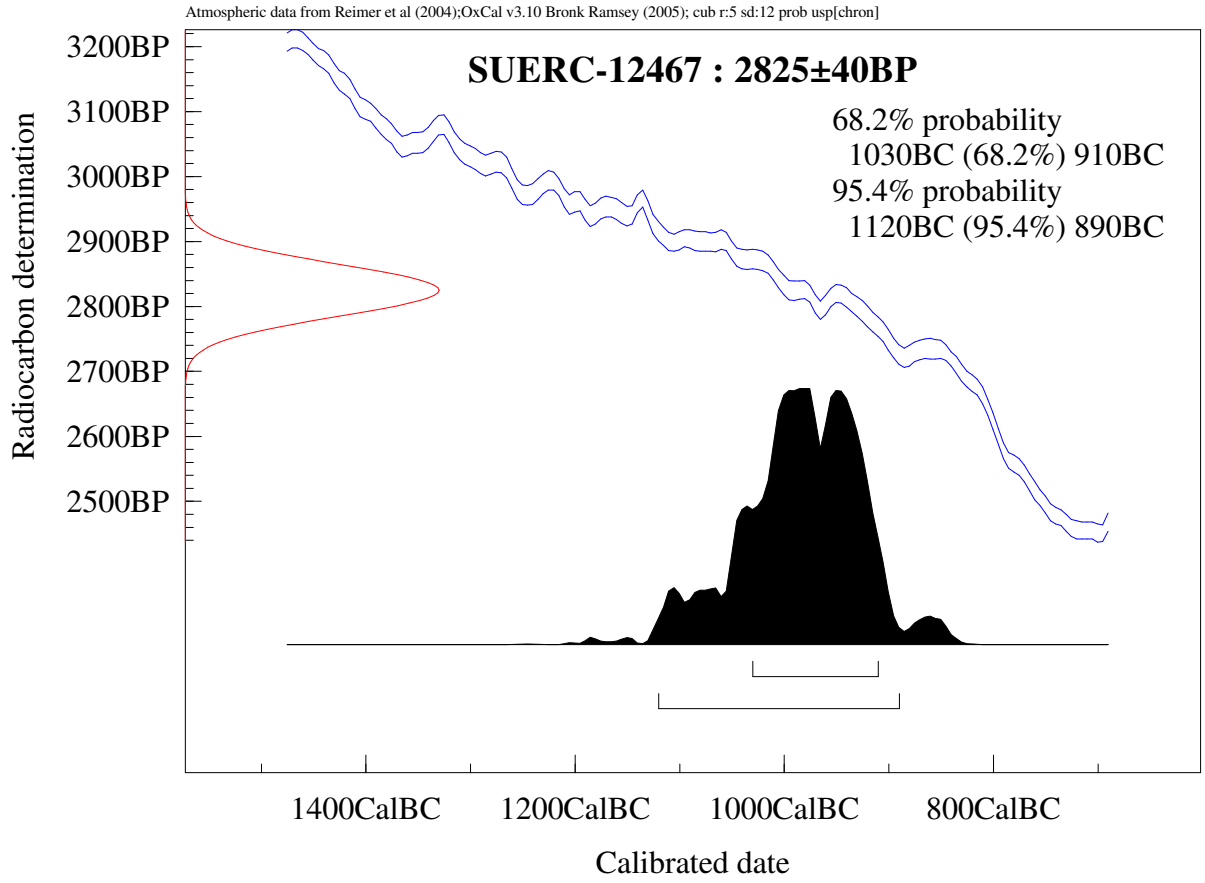
Laboratory Code	SUERC-12467 (GU-14676)
Submitter	Ben Holloway Colchester Archaeological Trust, 12 Lexden Road Colchester, Essex CO3 3NF
Site Reference	Sandon Park and Ride Phase II
Sample Reference	SDPR06 F130
Material	Cremated Bone : Human
$\delta^{13}C$ relative to VPDB	-21.5 ‰
Radiocarbon Age BP	2825 ± 40

N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot



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RADIOCARBON DATING CERTIFICATE

16 January 2007

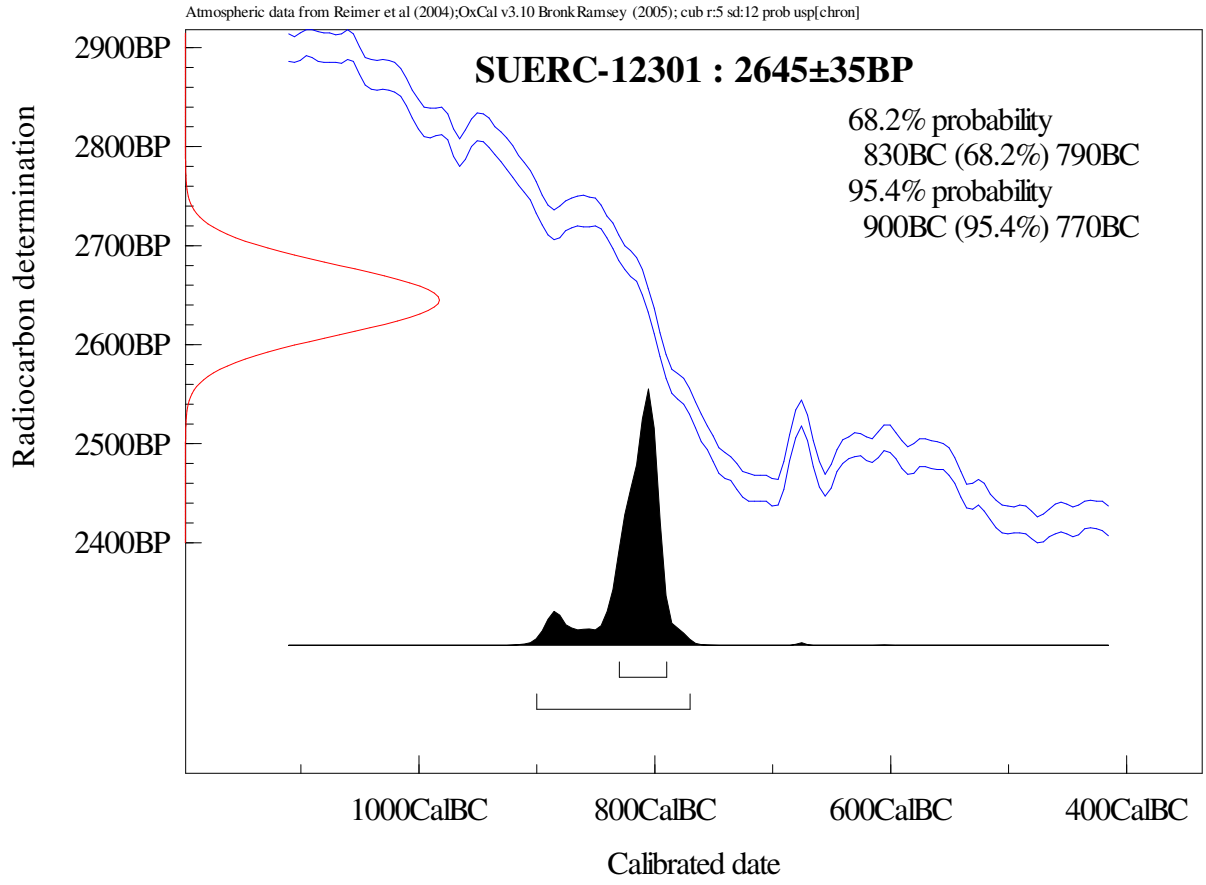
Laboratory Code	SUERC-12301 (GU-14677)
Submitter	Ben Holloway Colchester Archaeological Trust 12 Lexden Road Colchester, Essex CO3 3NF
Site Reference	Sandon Park and Ride Phase II
Sample Reference	SDPR06 F151
Material	Cremated Bone : Human
$\delta^{13}C$ relative to VPDB	-20.7 ‰
Radiocarbon Age BP	2645 ± 35

N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot



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RADIOCARBON DATING CERTIFICATE

16 January 2007

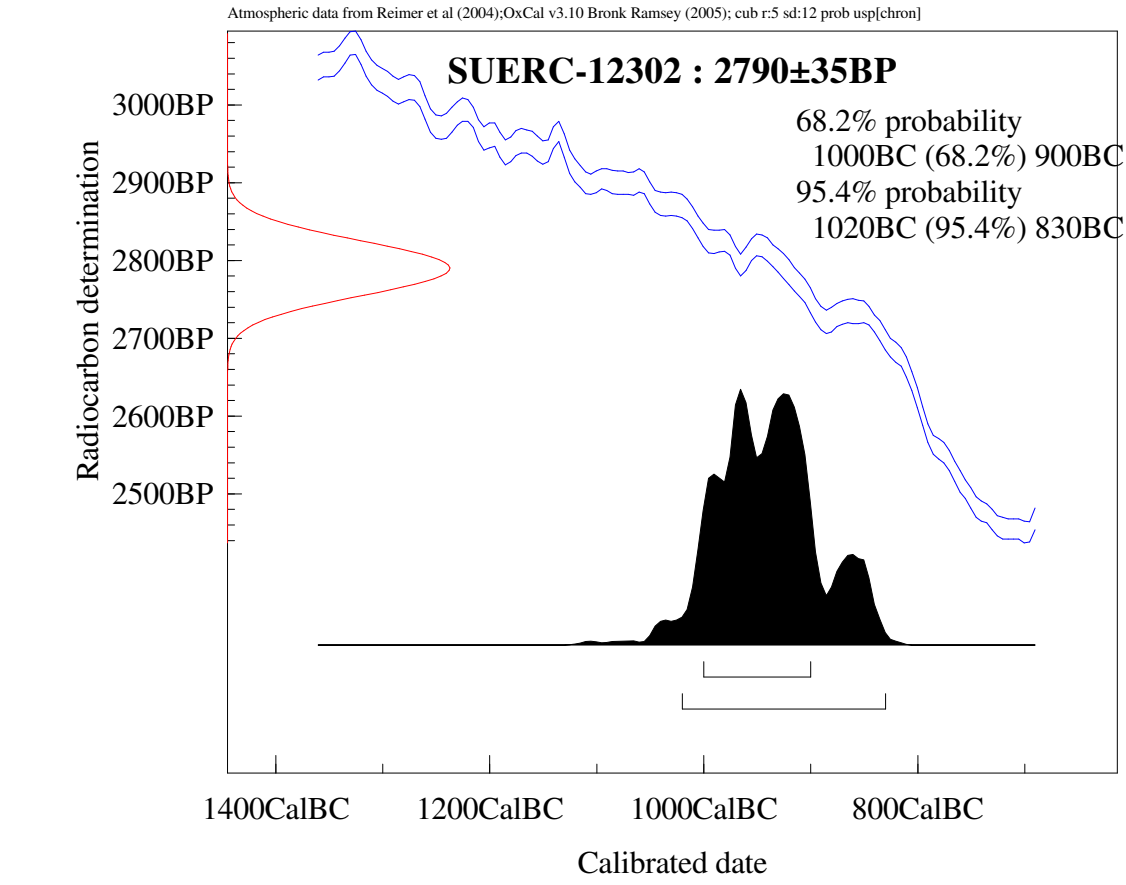
Laboratory Code	SUERC-12302 (GU-14678)
Submitter	Ben Holloway Colchester Archaeological Trust, 12 Lexden Road Colchester, Essex CO3 3NF
Site Reference	Sandon Park and Ride Phase II
Sample Reference	SDPR06 F164
Material	Cremated Bone : Human
$\delta^{13}C$ relative to VPDB	-20.5 ‰
Radiocarbon Age BP	2790 ± 35

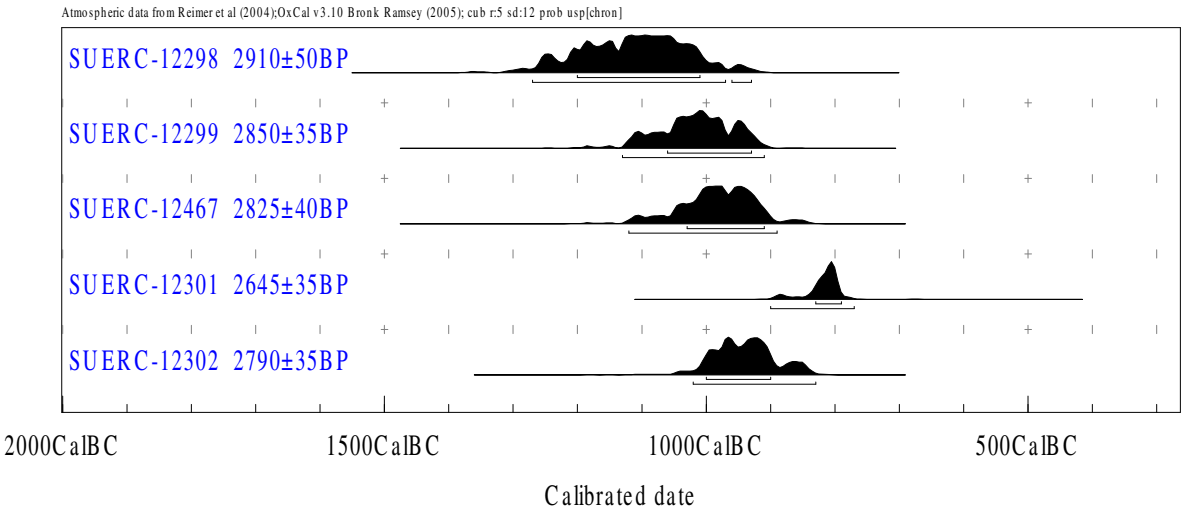
N.B.

1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code.

Conventional age and calibration age ranges calculated by :- Date :-
Checked and signed off by :- Date :-

Calibration Plot





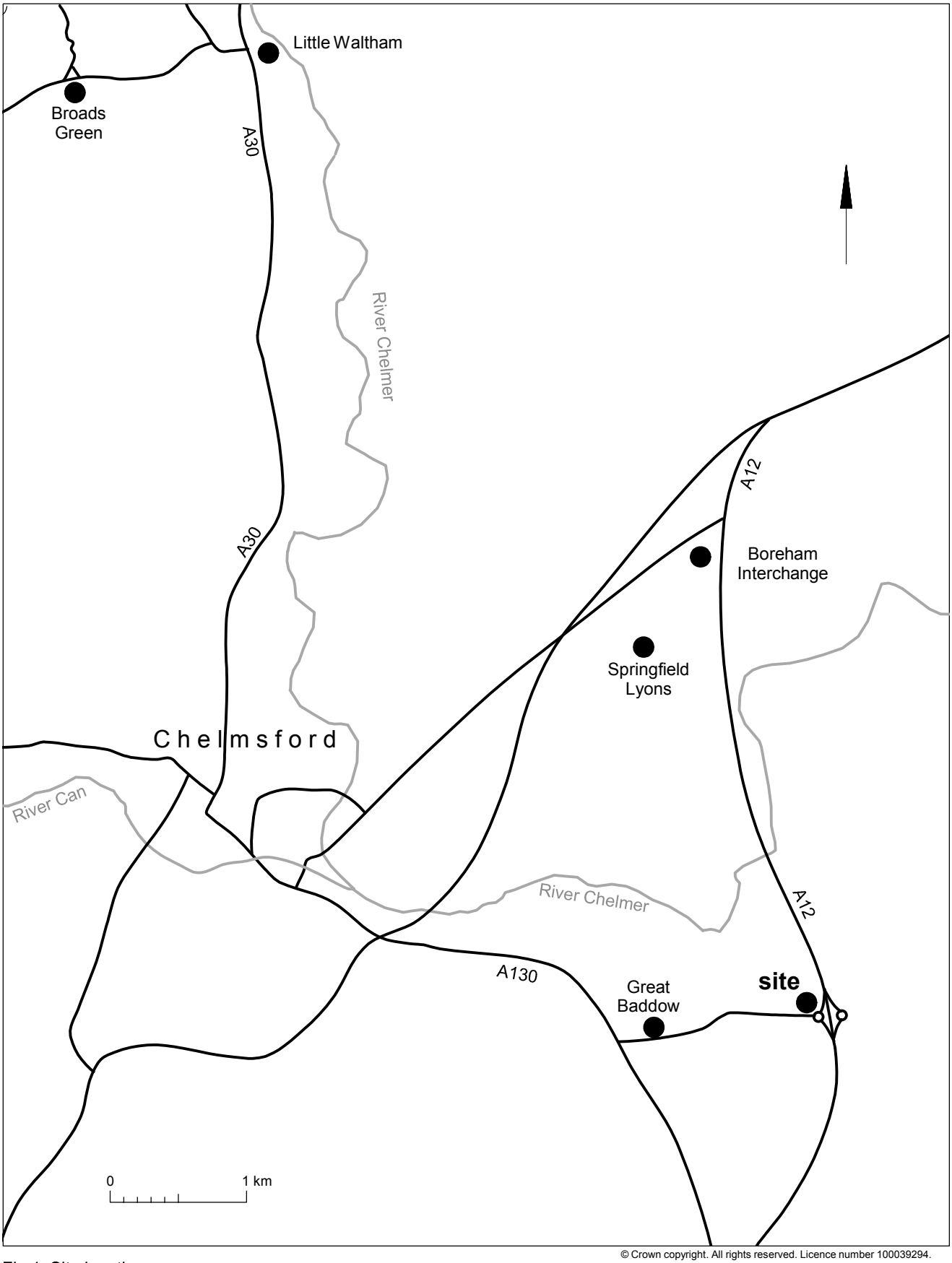


Fig 1 Site location

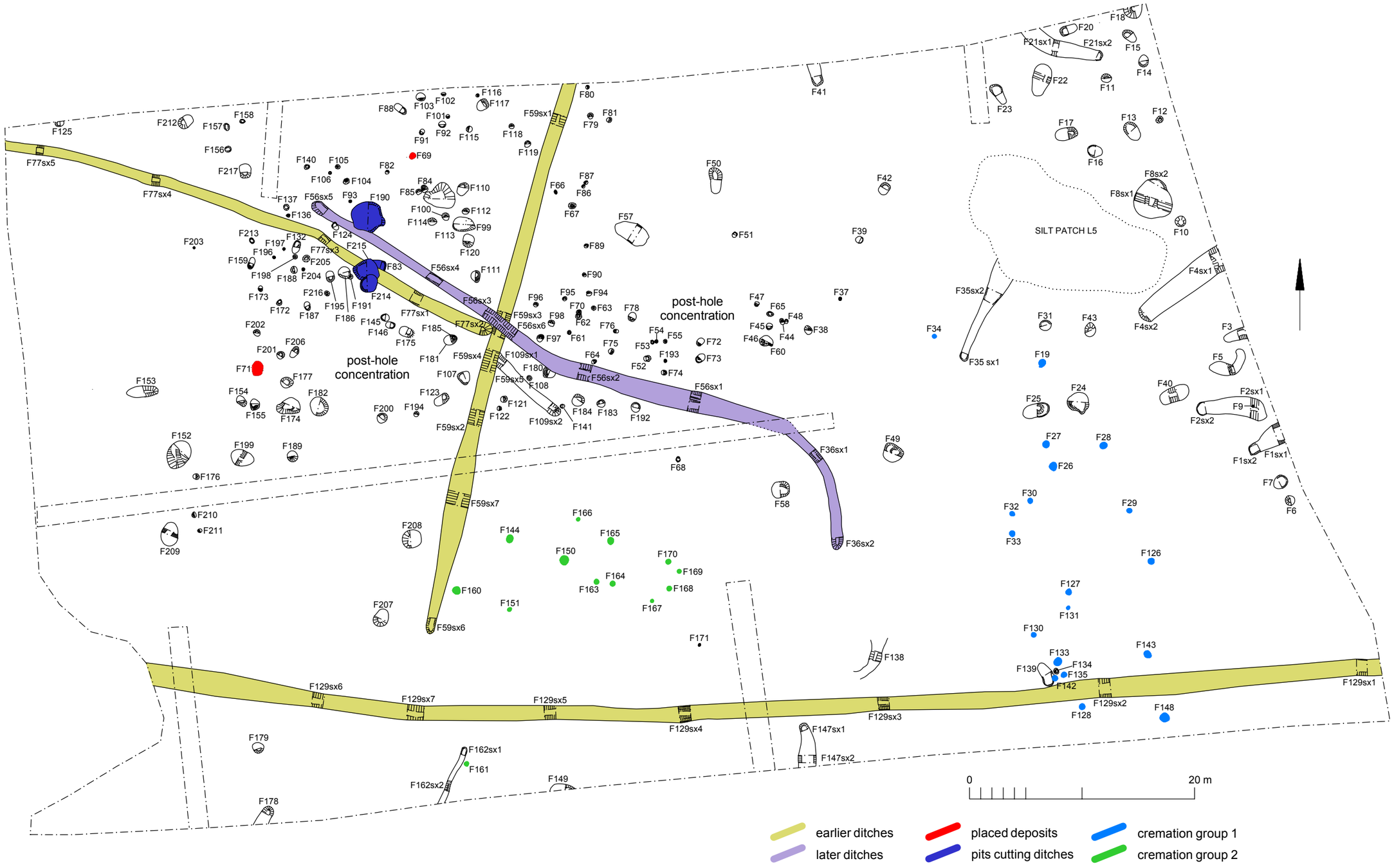


Fig 2 Site plan.

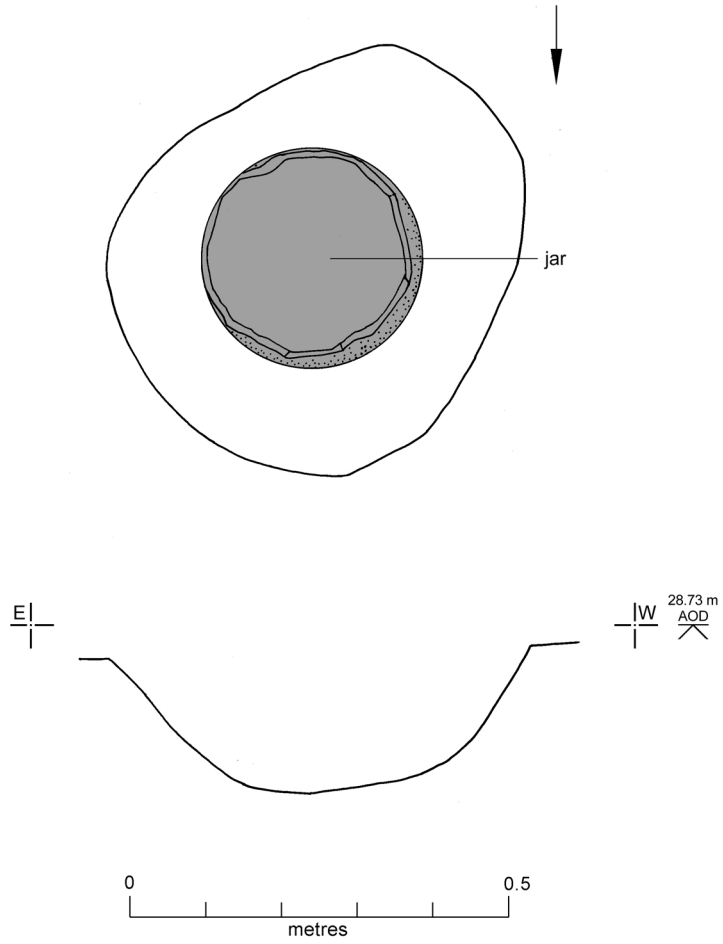


Fig 3 F69 placed deposit: plan and profile.

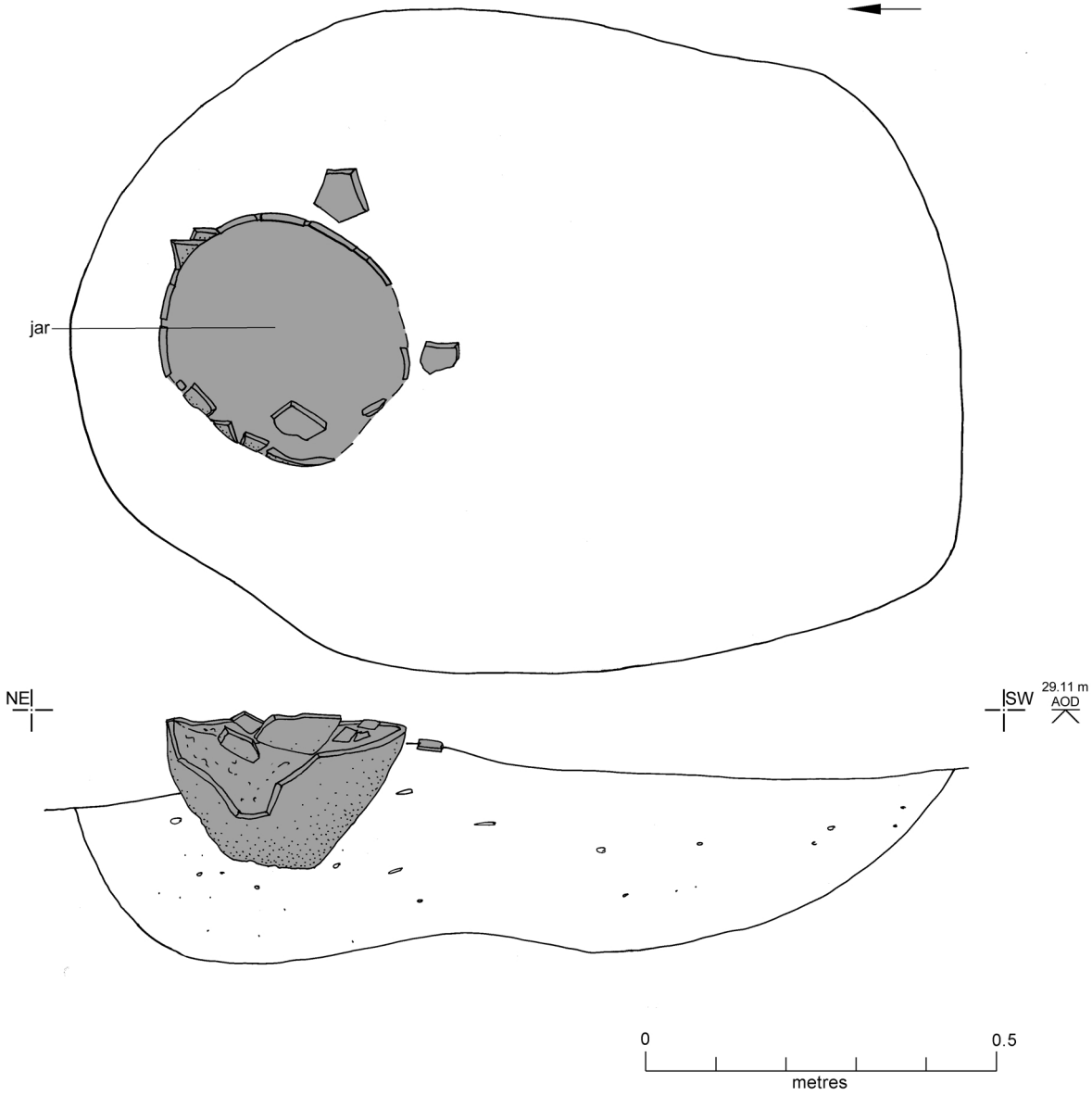


Fig 4 F71 placed deposit: plan and section.

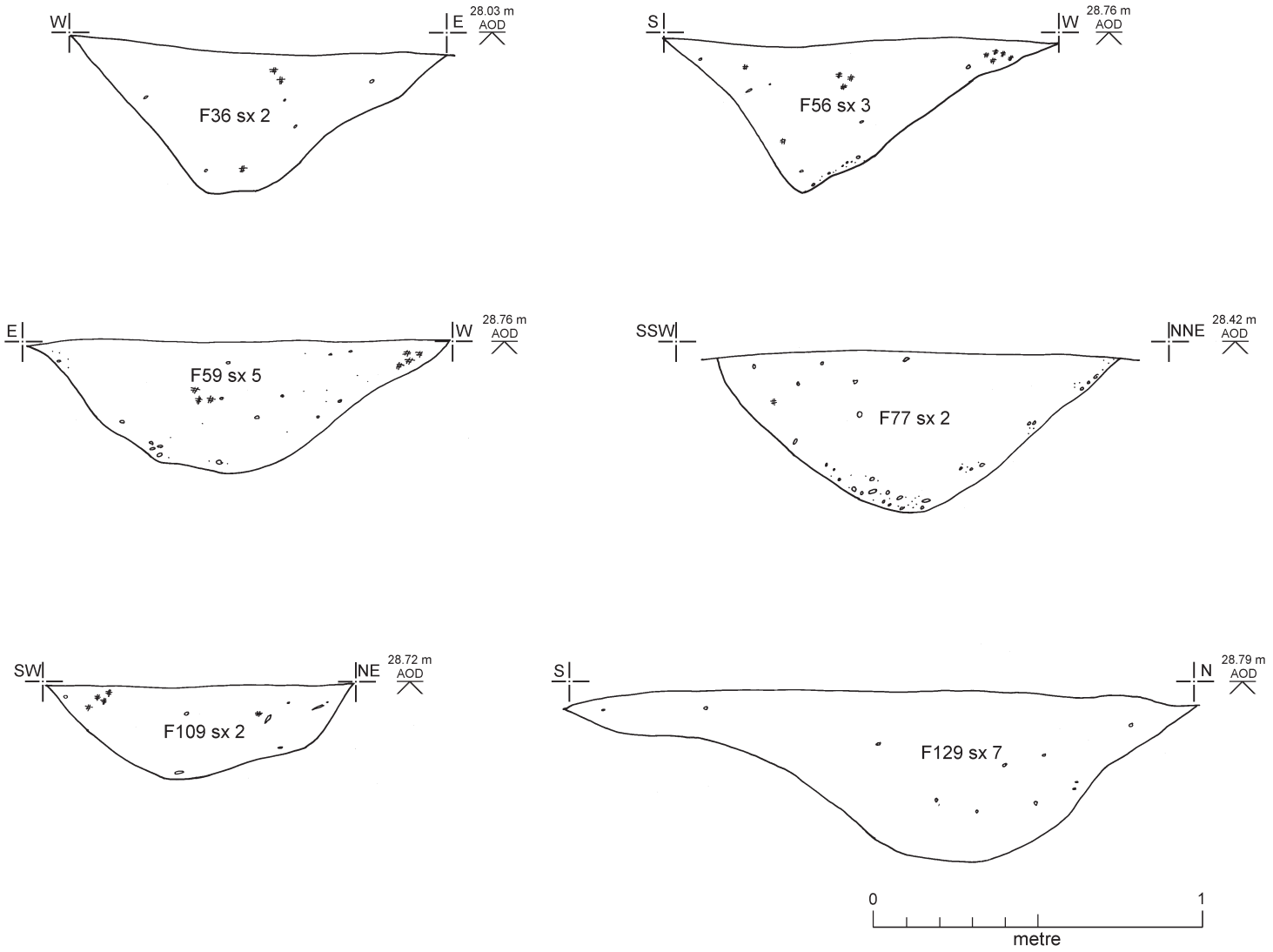


Fig 5 Ditch sections.

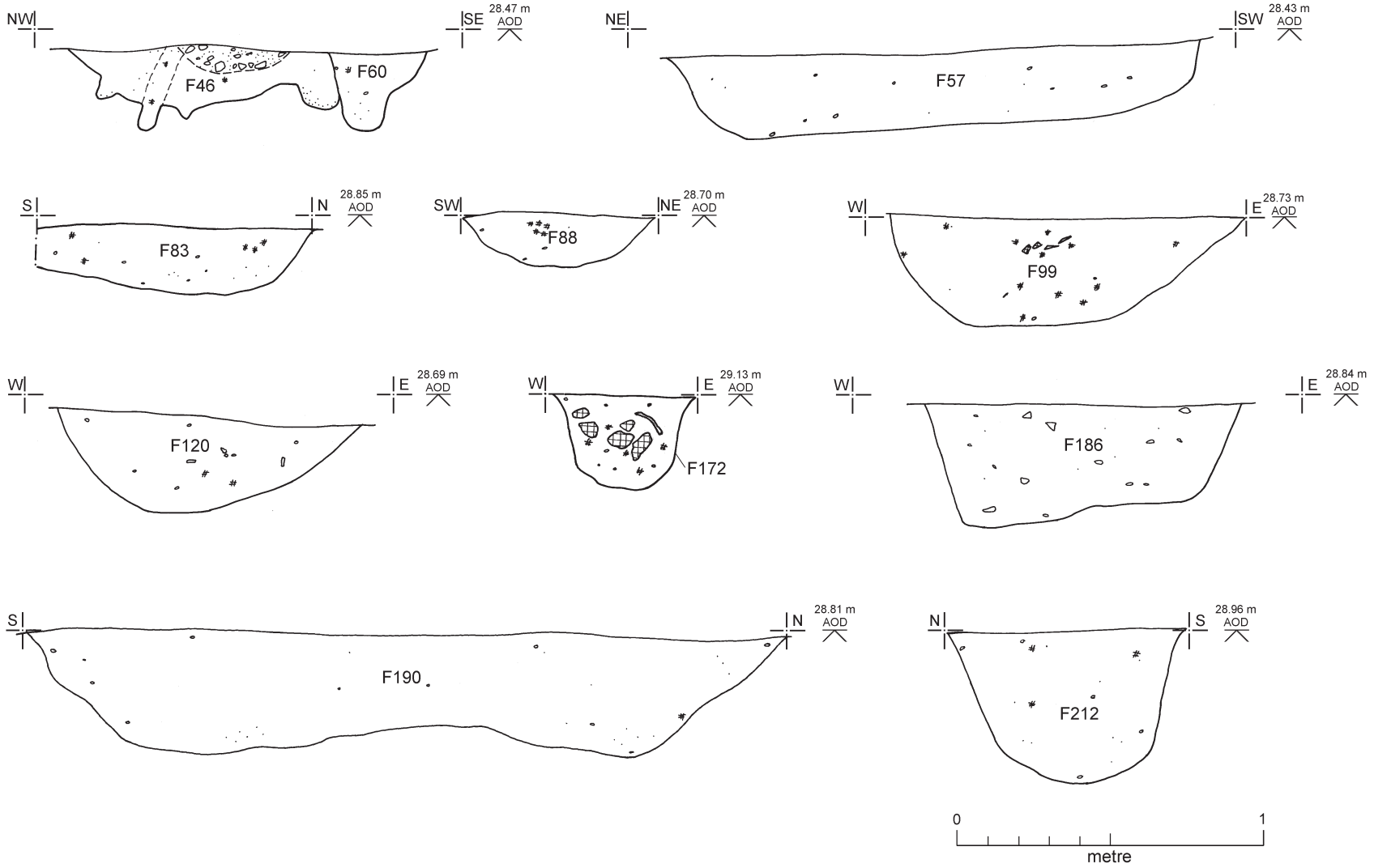


Fig 6 Pit feature sections.

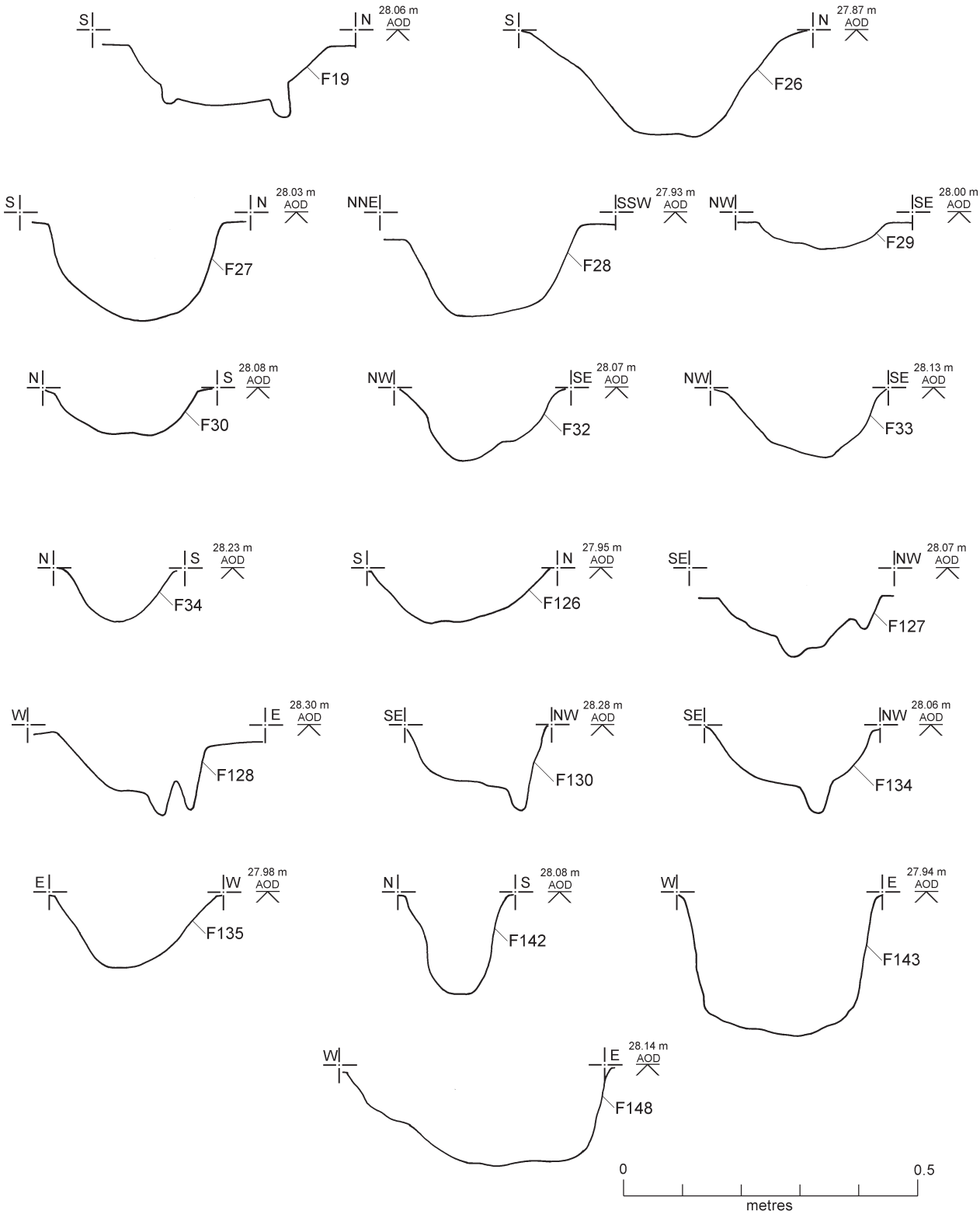


Fig 7 Cremation burial group 1: profiles.

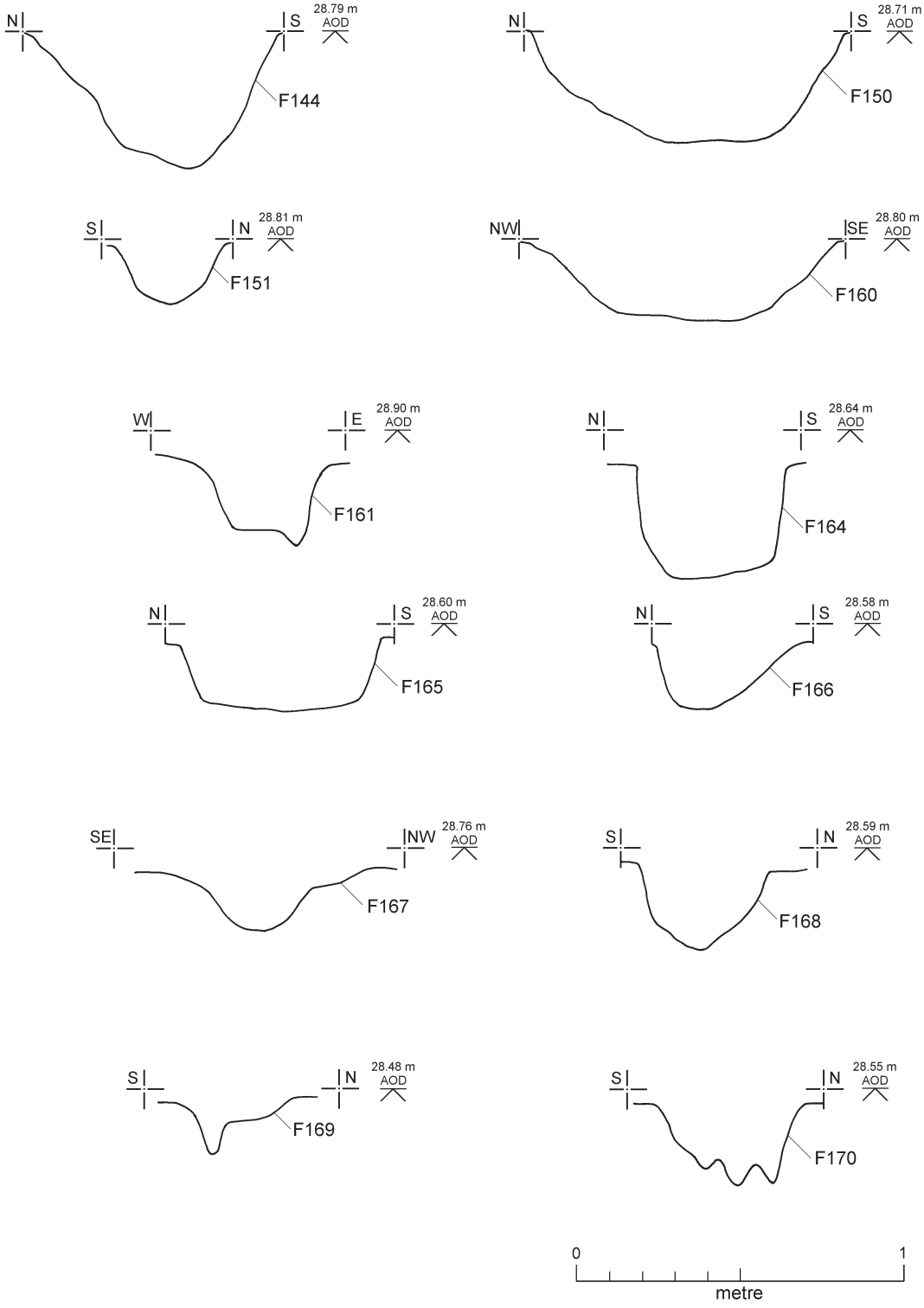


Fig 8 Cremation burial group 2: sections.

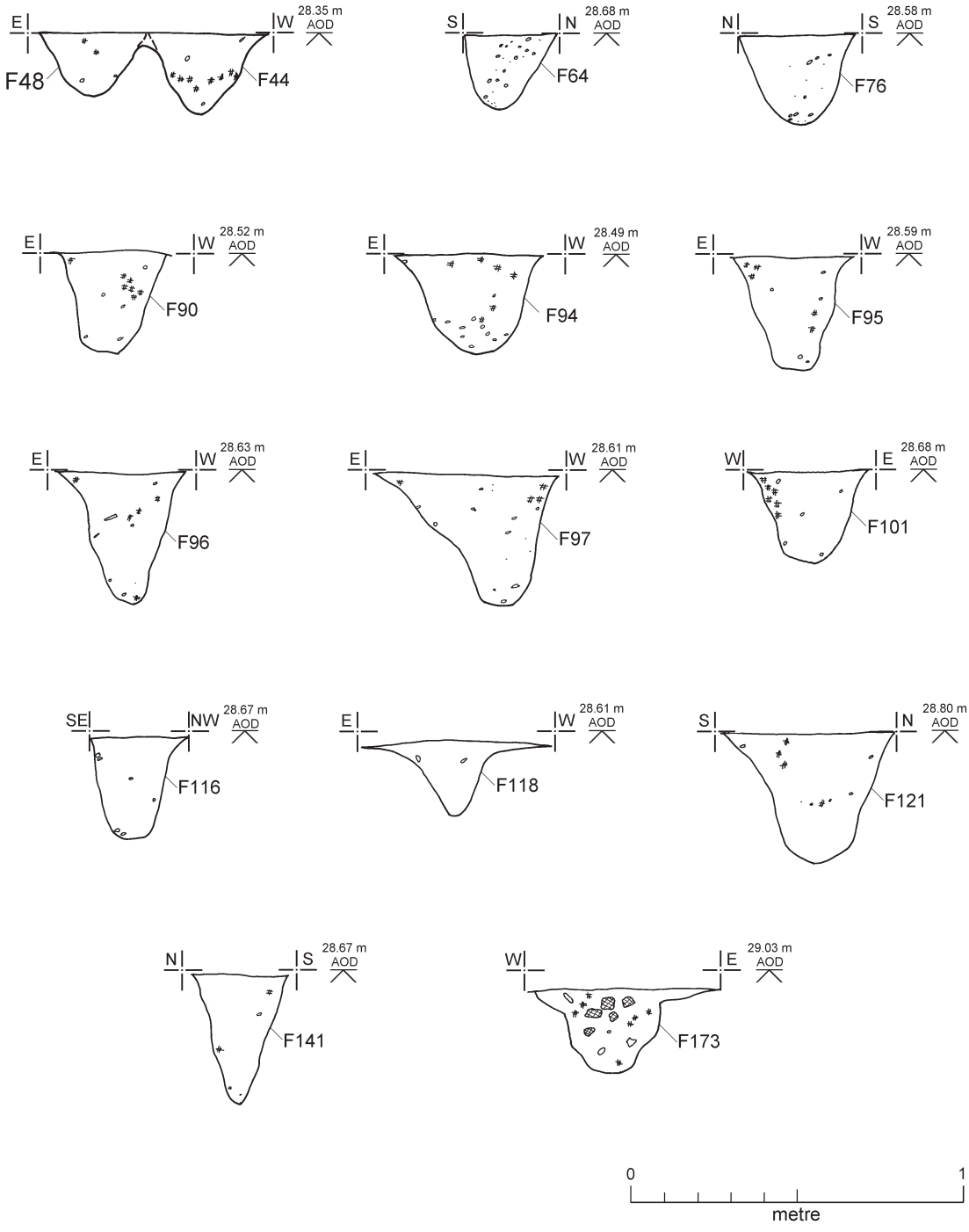


Fig 9 Post-hole sections.

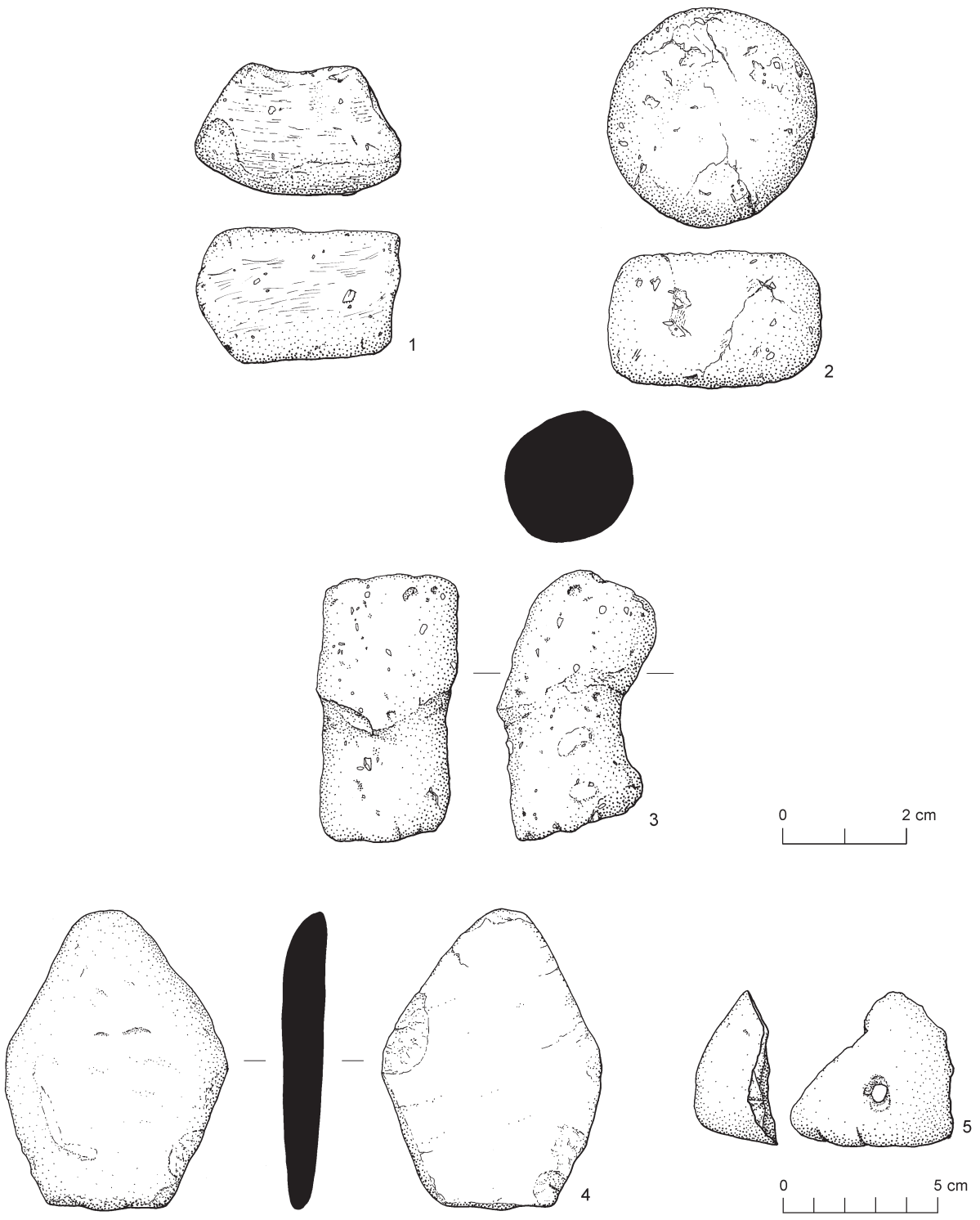


Fig 10 Ceramic and stone small finds.

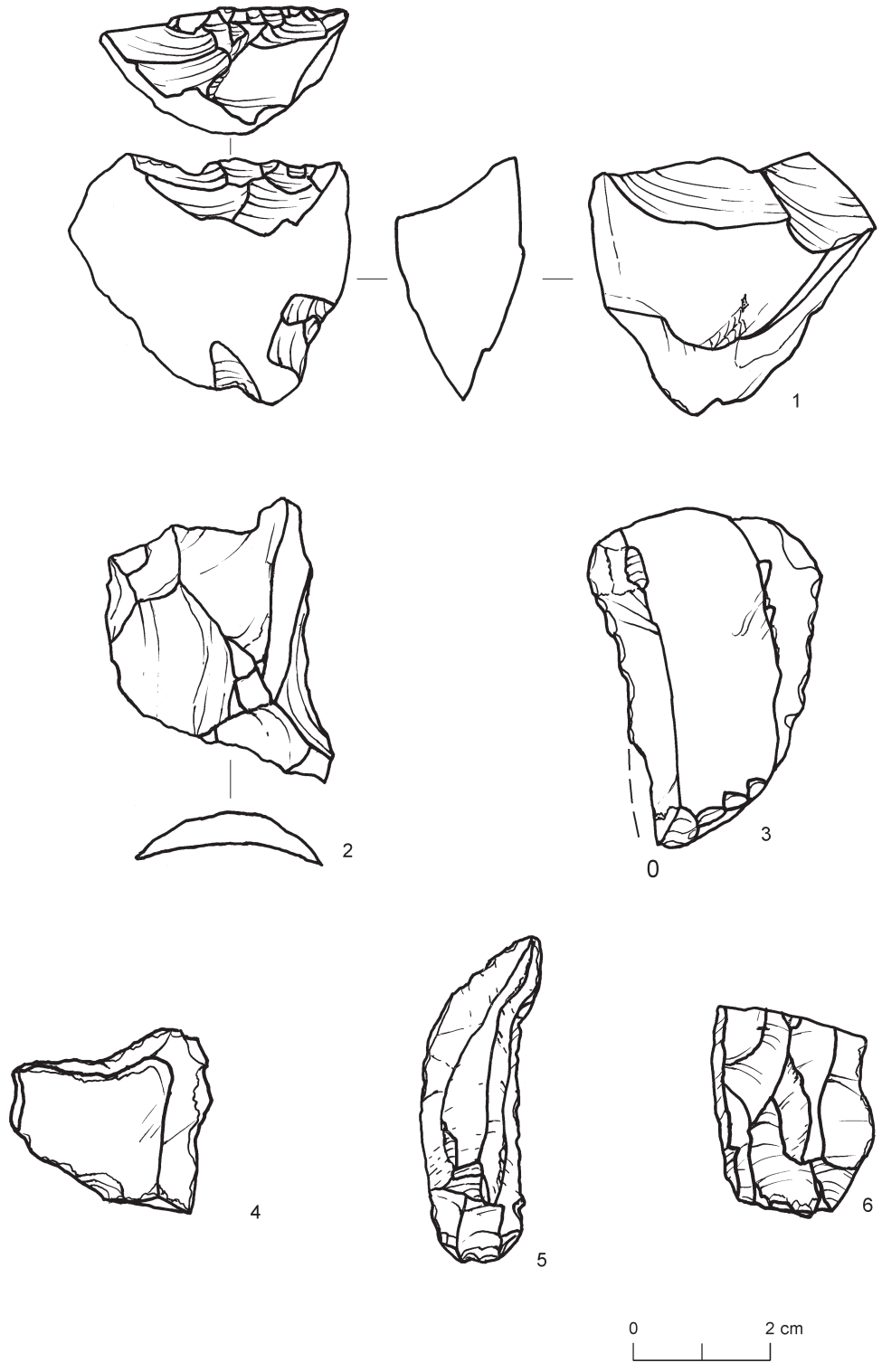


Fig 11 Worked flint (see text for descriptions)..

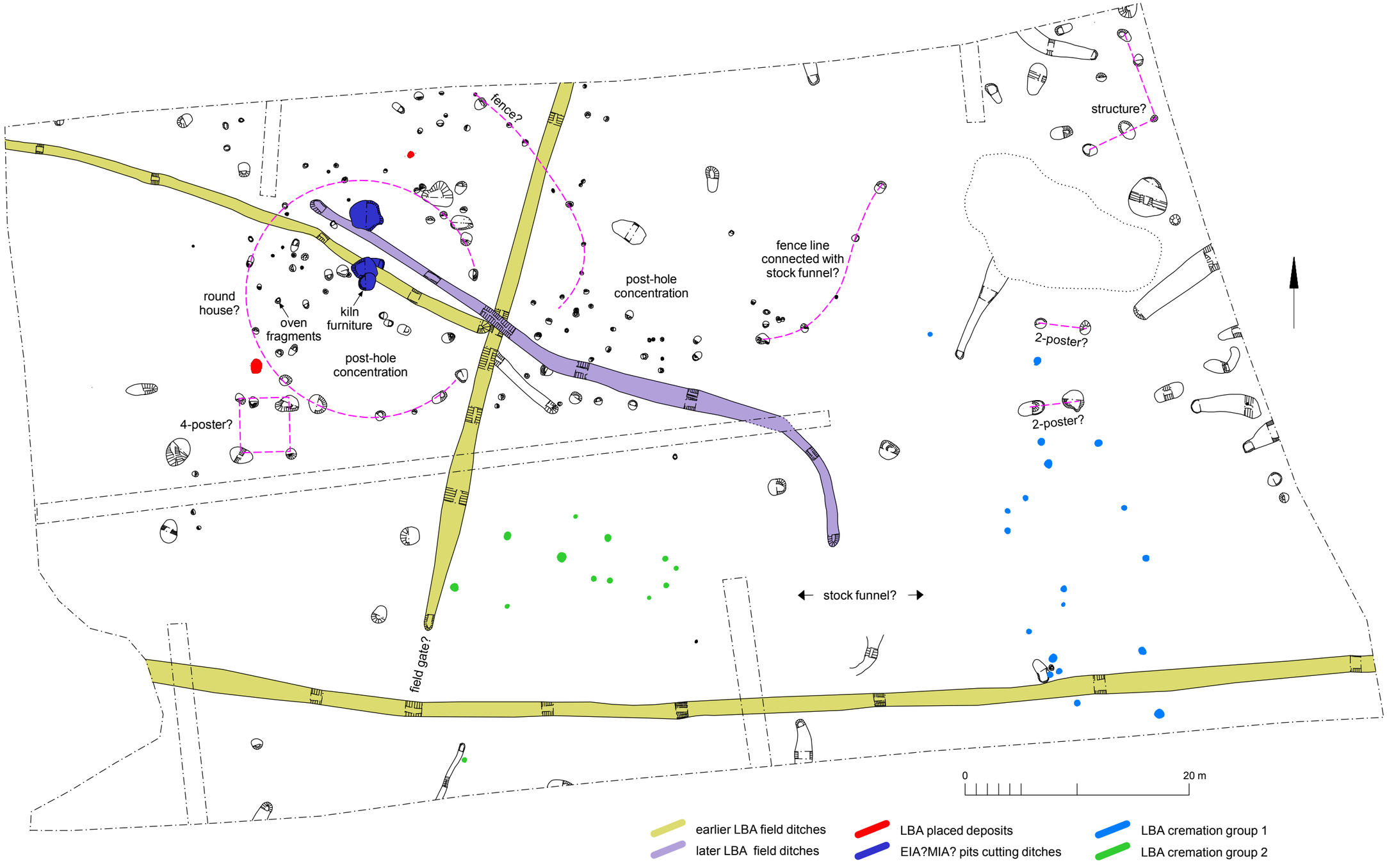


Fig 12 Interpretive plan showing main finds, phases and possible structures.

Essex Historic Environment Record/
Essex Archaeology and History

Summary sheet

Site address: Chelmsford Park and Ride site, Sandon, Essex	
Parish: Sandon	***District:*** Chelmsford
NGR: TQ 697 870 (centre)	***Site code:*** SDPR 06
Type of work: Excavation	***Site director/group:*** Colchester Archaeological Trust
Date of work: June-July 2006	***Size of area investigated:*** approx 0.80 hectares
Location of finds/curating museum: Chelmsford Museum	***Funding source:*** Developer
Further seasons anticipated? No	***Related EHER/UAD nos:*** EHER nos 5120, 5121, 5267, 5268
Final report: CAT Report 418 and summary in *EAH*	
Periods represented: Late Bronze Age to Middle Iron Age	
Summary of fieldwork results: *Excavation of an 0.8 hectare site to the north of the Chelmsford Park and Ride site at Sandon uncovered evidence of activity in the Late Bronze Age. This took the form of an area of post holes, which may include elements of domestic structures. Finds of spindle whorls and oven debris suggest a domestic occupation and a local economy which must have included an element of pastoral farming. In addition to the settlement occupation, two groups of cremation burials suggest a cemetery area separated from the domestic focus. C14 dating of the cremations suggests they are contemporary with the pottery-dated domestic activity. A series of later field ditches suggest that the site was later converted to pastoral farming (still in the LBA), and later pits show that there was some undefined activity here in the Middle Iron Age.*	
Previous summaries/reports: CAT Report 343	
Author of summary: Ben Holloway/ H Brooks	***Date of summary:*** March 2007