A later Iron Age enclosure, early Roman pottery production and later Roman agriculture at Longford, Gloucestershire

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SUMMARY

Between March 2014 and May 2015, Oxford Archaeology undertook an archaeological excavation at Longford, Gloucestershire, on a housing-development site. The excavated area extended over c. 8.5ha and revealed features dating from early prehistory to the medieval period.

Several prehistoric pits and postholes produced evidence for deposition during the middle Neolithic, with some pottery and most notably a crouched inhumation burial reflecting activity in the early Bronze Age. No evidence was found to date from the later Bronze Age and through much of the Iron Age until the establishment of a distinctive multi-ditched enclosure probably during the 2nd century BC. The enclosure was maintained until the Roman conquest, soon after which it was modified and used for pottery production. Three pottery kilns characterised this industrial phase when the site was making and supplying products for consumption in nearby Gloucester.

Pottery production continued until the early 2nd century AD when the settlement expanded northward and became more focussed on agriculture. Continual developments took place through the later 2nd and 3rd centuries AD, and it was during this period that increasing signs of domestic activity was observed farther to the north, possibly representing the development of a new settlement in this area. Funerary activity, including both inhumation and cremation burials ranging variously in date from the Bronze Age to the later Roman period, was noted in several areas within the site.

Fourth-century activity was largely absent, and it seems likely that the settlement was abandoned around this time, after which the site was predominantly used for arable cultivation through the medieval period.

A later Iron Age enclosure, early Roman pottery production and later Roman agriculture at Longford, Gloucestershire

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Introduction

Oxford Archaeology (OA) undertook an excavation at Longford, Gloucestershire, between March 2014 and May 2015 for CgMs Heritage (RPS Group Ltd) on behalf of David Wilson Homes South West. The excavation revealed features dating from the middle Neolithic to the medieval period. Early prehistoric activity was restricted to several pits and postholes in the northern part of the site, which produced evidence for the deposition of Neolithic pottery, occasionally alongside worked flints, animal bones, fired clay and plant remains. Early Bronze Age activity was represented by a crouched inhumation burial. A hiatus in activity then ensued until the later Iron Age when a square enclosure defined by three ditches was established. A radiocarbon sample from a lower fill of the largest enclosure ditch shows that it was beginning to silt up during the 2nd century BC, while pottery from the upper fills suggests that it continued in use into the mid-1st century AD (and probably post-conquest). The function of this enclosure is not clear but there are hints that it was involved in funerary activity.

The enclosure was modified in the later 1st century AD, perhaps around AD 70 or a little later, when it became used for pottery production. This 'industrial' phase lasted until the early 2nd century (c. AD 120). Around this time, the settlement expanded northward forming a second, adjoining enclosure that contained a series of internal divisions in its western half and two structures (including a possible granary) in its eastern half. Ditches were dug to the north and east of the northern extension, some of which formed a droveway around the enclosure. Further modifications occurred within the enclosure during the later 2nd and 3rd centuries AD. At the same time, evidence of activity in the form of land division and possible domestic settlement was observed in the northern part of the site. Four inhumation burials and a cremation burial were also found in this area, while several other burials were found in the southern part of the site. Fourth-century activity was notably lacking: no 4th-century coins were found, and the quantity of distinctive late Roman pottery recovered from the site was meagre. It seems likely that the settlement was largely abandoned by the early 4th century and the site was thereafter used predominantly for agriculture. Medieval features were almost exclusively of ridge and furrow.

Perhaps the most significant aspect of the site centres around the changes that occurred in the later 1st century AD. This took place at a time when the legionary fortress was operating at Gloucester, which was subsequently replaced by the *colonia* of *Glevum*. It is argued here that the revamping of the later Iron Age enclosure was a result of wider developments in the hinterland around Gloucester. Pottery production appears to have been undertaken solely to supply products for the town, and this enterprise appears to have been organised or at least supported by the state. The excavation at Longford has thus provided broader evidence for the development of landscapes around *coloniae* in Roman Britain towards the end of the 1st century AD.

Location

The site is located in Longford (OS. Nat. Grid 384220 220770), a small village situated about 2.5km north of the centre of Gloucester (Fig. 1). It lies immediately north of Longford Lane and east of the

A38 Tewkesbury Road. The local geology consists of Charmouth Mudstone Formation (BGS nd) and the site is located on one of several gravel-terrace islands (Cheltenham Sand and Gravel) that are surrounded by alluvial floodplains of the River Severn and its tributaries (Fig. 2). To the north of the site, Horsbere Brook flows westward into the River Severn, just over 1km away, and to the south Wotton Brook flows in the same direction. The land is fairly flat and gently slopes down northward from 13m aOD. Prior to excavation, the site was kept under pasture.

Archaeological background

Evidence of early prehistoric activity in the area is limited. Several possible Mesolithic or Neolithic worked flints were recovered during the trial-trench evaluation of the site (WA 2004). At Hawthorns School on Longford Lane, a poorly dated but probably early prehistoric hearth with fire-cracked stones, heated clay and charcoal was discovered in 1984 (Rawes 1985, 196). A small number of potential prehistoric finds are recorded closer to Gloucester on the Gloucestershire Historic Environment Record, though there is little of significance other than the presence of late Bronze Age/early Iron Age settlement further south along the Horsbere Brook near Hucclecote (Thomas *et al*. 2003).

In AD 49 a vexillation fortress was established, probably by Legio XX, at Kingsholm, about 1.4km SSW of the Longford site (Fig. 2) (Hurst 1985). The presence of this fortress was confirmed by excavations in 1972 and two military tombstones that may have been associated with the site were discovered at Wotton (McWhirr 1981, 12–13). Recent work at Bishop's College, c. 200m east of this fortress, revealed several pits, including a possible quarry in an area where Roman inhumation burials and quarrying had previously been identified (OA 2018). The Kingsholm fortress was replaced by a legionary fortress in the centre of the modern city of Gloucester in the AD 60s (ibid., 14–19) but the identity of the garrison and the duration and number of phases of the military occupation remain subjects for debate (for a concise summary see Holbrook 2010, 186–7). On the departure of the legion (whether Legio XX or Legio II Augusta), the fortress was succeeded by (or transformed into) the *colonia* of *Glevum*. The date of the establishment of the *colonia*, ostensibly under Nerva (AD 96–98), also remains debated (Hassall and Hurst 1999). From the later 1st century onwards an expanding urban population is indicated by several burial grounds around the town, including at London Road where excavations revealed a cemetery that was established in the Neronian period for the Kingsholm fortress and subsequently developed into one of the main cemeteries serving *Glevum* (Simmonds *et al*. 2008; Ellis and King 2014).

Much of the known rural settlement around Gloucester exists to the east along or close to Ermine Street, which led to Cirencester. These sites have previously been summarised by Hurst (1999, 127–30) who postulated that some if not all may have been part of the *territorium* of *Glevum*. The best-known sites are the villas at Hucclecote and Witcombe, and a possible shrine at Portway (ibid., 128). Recent work in this area at Barnwood on the north side of Ermine Street revealed an area of gravel quarrying and a considerable quantity of 1st-century AD metalwork, glass and pottery, including a well-preserved group of pre-Flavian South Gaulish samian ware (Brindle *et al*. 2018). A small, ditched burial plot was then or later dug to enclose a post structure and several pits, one of which included a lead ossuarium containing human remains, charred beans and hobnails.

The A38 Tewkesbury Road is thought to follow the alignment of the northward Roman road which led from *Glevum* to Worcester and passed by Longford less than 200m to the west (Margary 1973, 288; Holbrook 2006, 98, fig. 1). The present site was previously known from aerial photographs that highlighted cropmark evidence of a rectangular enclosure (HER 4470). This was seen again during a geophysical survey in 2004 (ASUD 2004) and was further exposed by evaluation trenching (WA 2004). Immediately south of the site, a Romano-British inhumation burial was discovered in a back garden on Longford Lane in 1967 (Minett-Smith 1969). The burial was dated by several pottery sherds in the grave backfill and it contained iron nails suggesting the use of a wooden coffin. In 1983, sewer

works at Plock Court Playing Fields produced Roman pottery sherds and a coin of Constantius II (AD 337–361), alongside at least five late 3rd–4th-century coins picked up by metal detectorists at the site (Garrod 1984). In 2005 and 2006, OA undertook a trial-trench evaluation over a 120ha site at Innsworth, about 1.1km north-east of Longford (OA 2006) and at the time of writing this site is being extensively excavated. Evaluation trenches in the northern part of the site exposed a late Iron Age/early Roman double-ditched enclosure with shallow internal gullies and small pits/postholes. In the central part of the site, numerous ditches appeared to form a series of enclosures that may have been part of a settlement, and a possible trackway led to the north-west. This activity spanned the late Iron Age to the 4th century AD.

After the Roman period, much of the present site appears to have been used for agriculture as indicated by remnants of medieval ridge and furrow across the area (NMR 1583775), and a medieval/post-medieval water meadow is visible on aerial photographs along the Wotton Brook at Longford (NMR 1583770).

Methods

The main phase of fieldwork was undertaken between March and July 2014 and then intermittently from October 2014 to May 2015. The excavation consisted of a single trench measuring c. 8.5ha. The site was stripped down to the first archaeological horizon using a 360º mechanical excavator. All features were surveyed using electronic distance measurement for site-plan reproduction at 1:100. More complex features were planned by measured survey at a greater resolution. The site grid was established relative to the Ordnance Survey National Grid and all levels were recorded relative to Ordnance Datum.

Sampling and recording of archaeological features was undertaken by hand, and minimum sampling levels were applied to different context types, including 20% of ditches and gullies, 50% of pits and non-structural postholes, and 100% of funerary contexts, industrial features (e.g. kilns) and structural features (e.g. postholes, beam slots, hearths, etc. where they clearly related to buildings). In total, 124 environmental samples were taken from undisturbed deposits with good potential for preserved organic remains. About half of the samples came from early Roman features, though early prehistoric, late Iron Age and late Roman contexts were also targeted. The sections of all excavated archaeological features were measured and drawn at either 1:10 or 1:20, and a photographic record of all features is maintained with the site archive.

The archive

The documentary and finds archives will be deposited with Tewkesbury Museum though the accession code is yet to be confirmed. The digital archive is to be deposited with the Archaeology Data Service (ADS), University of York.

Phasing

Phasing of the site was achieved using a context matrix to analyse the stratigraphic relationships of related features and the distribution of dated features is shown in Figure 3. Dating of each phase of activity was primarily based upon pottery spot dates, while other finds were used in a very small number of contexts (e.g. ceramic building material (CBM) or coins). The site phasing allowed a detailed chronology to be established (Table 1). The following site narrative is based upon these phased groups, though it should be remembered that there are some overlaps between the date ranges assigned to phases 3 to 6.

Site narrative

Phase 1: Middle Neolithic (c. 3400–3100 BC)

Activity dating to the middle Neolithic period was characterised by several pits and postholes located within a small area near the northern end of the trench (Fig. 4). Pit 3017 measured 1.1m across and 0.74m deep, while pit 3180 was slightly smaller at c. 0.70m across and 0.48m deep (Fig. 5, sections 863 and 797). Both had vertical sides and flat bases and may have originally functioned as postholes. A cluster of four postholes—3008, 3010, 3012 and 3086—may have formed a small structure, though their alignment was not completely regular. Postholes 3008, 3010 and 3012 were all circular in plan, measuring 0.58–0.79m across. The features had fairly flat bases, were 0.16–0.31m deep, and each contained two fills (Fig. 5, sections 746–8). Posthole 3086 had been disturbed by later activity, either tree roots or animal burrowing (3084).

Features 3010, 3012, 3017, 3086 and 3180 contained fragments of middle Neolithic Impressed Ware pottery, of which the best-preserved sherds could be identified as Mortlake and/or Fengate Ware (sub-styles of the Peterborough Ware tradition). Posthole 3124 also produced pottery that is likely to have been of the same type. Broadly, Peterborough Ware dates to c. 3600 and 2300 cal. BC (Gibson and Kinnes 1997). The likely date to the activity represented here, however, can be more accurately attributed to the earlier part of this date range. Analysis of a hazelnut shell from pit 3017 (fill 3108) produced a radiocarbon age (BP) of 4516 ±25 (SUERC-97708; GU57949), giving a rounded-out date range (at 2 sigma) of 3360–3100 cal. BC at 95.4% probability. Worked flints were also recovered from features 3008, 3012, 3017, 3086 and 3180, with those from pit 3180 including tool forms typical of a middle to late Neolithic date, while pit 3017 produced an arrowhead common to middle Neolithic assemblages alongside debitage from micro-denticulated blades. Pit 3180 also contained some fragments of fire-cracked stone and bones from pig and sheep/goat, while pit 3017 produced fragments of fired clay, charcoal and bones of pig, dog, red deer (bone and antler) and cattle (burnt).

Another group of pits and postholes (3089, 3221, 3223, 3226, 3227, 3229 and 3231) located a few metres to the west were also probably of this phase. None produced any pottery, but all the phase 1 features contained similar dark grey silty clay fills with occasional patches of orange sand, which was not often found in later features. Pit 3089 produced a small number of worked flints.

Phase 2: Early Bronze Age (c. 2200–1500 BC)

Inhumation burial 5010 was found in the south-western part of the site, seemingly isolated from other features, though it was found close to a group of undated pits (5011, 5013, 5015, 5017, 5019, 5021 and 5023) that may also have been prehistoric (Fig. 6). The grave cut (5008) was not clearly seen during the excavation but measured approximately 1.5m north–south and 1.2m east–west. The skeleton was fairly well preserved and appears to have been laid in a flexed or crouched position on its left side with the head at the northern end of the grave (Fig. 7). Other than the proximal end of the right femur, all the leg bones were missing, almost certainly due to truncation. The absence of most of the leg bones made it difficult to properly identify how the body was arranged, though the tight-knit positioning of the arms and the raised position of the surviving femur suggests that it was either fully crouched (possibly bound) or had the legs flexed upwards towards the body. The individual was a male about 26–35 years old who had several healed bone fractures, mostly on the right arm bones (humerus, radius and ulna). These probably occurred during childhood/adolescence and there is evidence to suggest that the breaks contributed to arthritis in the elbow in adulthood. The only dating evidence for the burial comes from the recovery of a well-made flint knife that was found *in-situ* next to the pelvis and femur. The form of the knife suggests that the person was buried at the very end of the Neolithic or more likely during the early Bronze Age (see *Worked flint*).

Pit 1005 was located about 54m north of inhumation burial 5010 (Fig. 6). This pit contained the rim of a probable early Bronze Age Beaker and some sherds from vessels of uncertain form that may be late Neolithic or early Bronze Age in date. A small quantity of worked flint and animal bone was recovered from the upper fill of the feature, amongst a spread of burnt material. The pit was sub-circular in plan, measuring just over 1m across and 0.92m deep, and it had steep sides that narrowed towards its base. Pit 1005 was positioned close to pits 1003 and 1008, both of which were undated but were similar in size and profile to 1005. The fills of these pits contained charred material, and it seems likely that they were contemporary with pit 1005. Several other undated features in this area, notably a pit cluster to the north-west (2555, 2557, 2559, 2561 and 2563), may also have been prehistoric.

Phase 3: Later Iron Age/Early Roman (200 BC–AD 70)

Cremation burial 3020

Cremation burial 3020 was discovered in the northern part of the site, close to the middle Neolithic features and about 2.5m south of ring gully 1 (Fig. 4). The cut of the cremation pit was oval in plan, 0.6m long and 0.1m deep. Its single silty fill (3019) contained frequent charcoal and cremated bone fragments and the disturbed remains of a grog-tempered ceramic vessel. The vessel was not closely datable, though its fabric is characteristic of the middle and late Iron Age in this region. The cremation burial was set within a tree-throw hole (3006), cutting into the natural below it. The upper part of the cremation burial appeared to have been disturbed by the tree roots, as sherds of the cremation urn were found in the surrounding fill.

The later Iron Age enclosure

The later Iron Age enclosure was defined by three concentric ditches that formed narrow inner and outer boundaries, and a more substantial central ditch (Fig. 8). The inner boundary was defined by ditch 3 and its recut, ditch 4. The internal area of the inner enclosure measured c. 50m x 50m. The entrance to the enclosure was positioned approximately in the centre of the south-west side. The terminals of ditch 3 were dug c. 7–8m apart, though the entrance was later narrowed by the recut. The excavated sections showed that both ditches 3 and 4 typically measured 1.5–1.6m across and had V-shaped profiles containing two gravelly silt fills, though ditch 3 was notably deeper than its successor, measuring 0.7–0.8m compared to 0.4–0.5m (Fig. 9a, section 741).

Ditch 2 was the largest ditch that bounded the enclosure, measuring 3.7–4.4m wide and 1.1–1.7m deep. It enclosed an area that extended 62–63m across in both directions. The distance between ditch 2 and ditches 3 and 4 averaged 3.7m, which is wide enough for the construction of a bank. However, the presence of a bank could not be confirmed either *in situ* or from the angles of the ditch fills. The location of the entrance on the south-west side of ditch 2 aligned with the entrance of the inner boundary, which also indicates that they were contemporary. The entrance measured 4.3m wide and was further defined by two short linear features—10 and 11—that were orientated perpendicular to and cut the terminals of ditch 2 (e.g. Fig. 9b, section 936). Linears 10 and 11 measured c. 2m wide and 0.5–0.6m deep and both contained several fills like those in ditch 2. The recovery of later Iron Age pottery in linears 10 and 11 indicate that the features were contemporary with ditch 2. Ditch 9 cut the south-western ends of linears 10 and 11. This feature extended over c. 20m, NW–SE, across the front of the enclosure entrance and contained late Iron Age pottery. Its purpose is uncertain, but it appears to have added further elaboration to the entrance and perhaps provided a barrier to restrict access.

Several small pits/postholes (1714, 1717, 2344 and 2352) were found in the enclosure entrance, positioned close to linear feature 10. Pit 2344 contained a probable cremation burial (2346).

This pit had very steep sides and a rounded base. Its lower fill contained fragments from a late Iron Age vessel and a small quantity of unidentifiable burnt bone.

Ditch 2 was cut by ditch 8 along the south-west side of the enclosure and partially along the north-west side, though here its line was not observed (Fig. 9b, sections 737 and 897). It was comparable in size to ditches 3 and 4, measuring 1.64m across and 0.7m deep, and it terminated c. 4m north of the terminal of ditch 2. Late Iron Age pottery was recovered from two excavated sections of ditch 8 indicating that it was in use during phase 3, though why it did not extend closer to the entrance is unclear. Ditches 2 and 8 were both cut by ditch 12 as part of a modification of the enclosure in phase 4 (see below). It was notable, however, that the Roman recut did not fully extend to the entrance terminal on this side (Fig. 9b, section 964), as the ditch here only contained late Iron Age pottery.

Ditch 2 was best preserved along the south-eastern side of the enclosure, though some recutting was also found here. A section across the eastern corner of the enclosure (cut 2021) revealed a sequence of multiple silting events (Fig. 9a, section 820). A fragment of waterlogged wood recovered from the second fill (2056) at the base of the ditch produced a radiocarbon age (BP) of 2085 ±34 (SUERC-68392; GU41373; giving (at 2 sigma) a date of 200–30 cal. BC (93%), or a single date (when the ends of the ranges are rounded out) of 200–1 cal. BC (95.4%)), suggesting that it was silting up in the second half of the 2nd century BC, and no earlier than 200 BC. Late Iron Age pottery was also recovered from this fill, while mid-1st-century pottery was recovered from the fill immediately above (2052). Thereafter, two more fills had accumulated in the ditch before it was recut (cut 2178). Given the presence of the pottery in fill 2052, it seems likely that the recut occurred in the early Roman period and potentially belongs to phase 4.

Ditch 20 extended parallel to the inner edge of ditch 2 on the north-east side of the enclosure. The ditch was c. 1m wide and curved slightly to the south. It was over 5m long, being cut by a phase 4 ditch 13 to the north. The ditch did not have a direct relationship with ditch 2 and did not contain any dating evidence, though it was cut at its southern end by pit 2216 which contained late Iron Age pottery.

The outer boundary of the enclosure was formed by ditches 5, 6, and 7 on the south-western and south-eastern sides, and possibly by ditch 41 on the north-western side. These ditches varied in width between 0.4–1.5m and reached depths of 0.2–0.48m. The outer boundary ditch was not continuous around the entire enclosure and it appears to have been fully truncated in some areas. A gap of about 15m between ditches 5 and 6 probably allowed access to the entrance to the enclosure, though there was some disturbance from later features in this area and ditch 6 was clearly cut by phase 4 ditch 15.

Internal features

Evidence of activity within the later Iron Age enclosure was restricted to five pits and two postholes, though several of these were poorly dated and contained only one or two sherds of pottery. These were confined to the western half of the enclosure and were mostly isolated features (Fig. 8).

Pits 2407 and 2409 were located together near the western corner and both were cut by a phase 4 linear feature (19). These pits were fairly shallow (c. 0.3m deep) and measured about 1m across. Pit 2407 contained five sherds of late Iron Age pottery, though pit 2409 was largely sterile. Pit 2132 was located close to the southern terminal of ditch 4. It was irregular in plan, measuring 0.3m across, with shallow sides and an uneven base. The feature had been truncated by later activity, but contained 11 sherds of Iron Age pottery, all possibly from a single vessel. A slightly larger pit (2364) was truncated by phase 4 ditch 14. Pit 2364 was approximately 1m across and 0.44m deep and contained several sherds of late Iron Age pottery and a small quantity of animal bone.

Phase 4: Early Roman (AD 70–120)

The later Iron Age enclosure was significantly modified in the early Roman period, being reduced to about two-thirds of its original size and sub-divided into two (Fig. 10). This phase is characterised by the construction and use of two pottery kilns, one located in each compartment. Pottery from these kilns became deposited in the fills of the recut enclosure ditch and was dated to c. AD 70–120 (see *Roman Pottery*). Other features included wells and a series of pits and postholes, both internal and external to the enclosure.

The early Roman enclosure

Ditch 102 was the earliest in the sequence of modifications to the later Iron Age enclosure. This extended c. 37m SW–NE, just south of the centre of the enclosure. Ditch 102 cut across phase 3 ditches 2, 3 and 4, and its fills contained a mixture of late Iron Age and late 1st/2nd-century pottery. Ditch 102 was truncated at its south-western end by pit 2636 and at its north-eastern end by ditch 13. The ditch was recut twice, latterly along its south-eastern side by ditch 14, which was also cut at its eastern end by ditch 13. Ditch 14 had fairly straight, gently sloping sides and a flat base, and it varied considerably in width from 1.1m to 2.2m and in depth between 0.49m and 0.95m. A south-westward projection (ditch 15) of the line of ditch 14 to the edge of the excavation appears to have formed a small field boundary external to the main enclosure. Along this section, ditch 15 cut through two adjacent pits (2096 and 2099). Pit 2096 was slightly smaller in plan, measuring 0.6m across and 0.3m deep, while pit 2099 was 0.9m across and 0.48m deep. Both contained animal bones and late 1st-century pottery.

Ditch 12 was a recut of later Iron Age enclosure ditch 2. The relationship between ditch 12 and ditch 2 could be clearly seen along the south-western side of the enclosure (Fig. 9b, section 737), though the former did not appear to extend all the way to the original terminal of ditch 2. Most of the late Iron Age ditch had been dug away along the north-western side of the enclosure; no sign of ditch 2 was found, for example, in the western corner where it was completely truncated by ditch 12 (Fig. 9b, section 897). Ditch 12 also cut the side of phase 3 ditch 8 and was itself recut by phase 6 ditch 101. Sherds of late 1st/2nd-century pottery were recovered from four fills of ditch 12 in this corner, including predominantly local kiln products in the two upper fills 2246 and 2247.

Ditch 13 was the latest cut in the sequence but was probably contemporary with ditch 12, though there is some sign of a recut in the middle of the north-west side of the enclosure. Ditch 13 formed an irregular square enclosure roughly containing the northern corner of the later Iron Age enclosure, recutting its north-western and north-eastern sides but turning southwards to cut across the central area of the earlier enclosure. Along the north-eastern side of the enclosure, ditch 13 had a V-shaped profile (Fig. 9a, section 975). Here, it measured nearly 3m wide and 1.14m deep. It contained three fills, the lower two of which produced late 1st/2nd-century pottery sherds. Along its south-west side, ditch 13 cut pits 2592 and 2087 (see below) and at its southern corner the enclosure cut ditches 102 and 14. Together with ditches 12 and 102/14, ditch 13 formed a rectilinear enclosure that was divided approximately into two compartments. The entrance into the north-eastern compartment was not found.

The pottery kilns

Two pottery kilns were constructed in the early Roman enclosure. The kilns were separated by ditch 13, though it is probable that at least one was operating before ditch 13 was dug because numerous kiln-product sherds were recovered from pits 2592 and 2087, both of which were cut by the ditch.

Pottery kiln 2350 was located near the western corner of the enclosure where it completely cut through the corner of ditch 3 and partially through ditch 4. The kiln was orientated with its furnace chamber to the north-west and stokehole to the south-east (Fig. 11). It was 3.2m long and it had near vertical sides and a generally flat base. The furnace chamber was sub-circular in plan, measuring 1.38m wide with a maximum depth of 0.38m (Fig. 11, sections 908, 911 and 949). A clay lining was set within the furnace chamber cut. This continued towards the stokehole to form a flue, terminating in a slightly irregular opening that may have been damaged, perhaps when the structure was abandoned or over a period of use. The clay lining was raised in the centre of the furnace chamber to form a vertically sided, tongue pedestal that extended approximately a metre from the north-western end of the chamber. The thickness of the clay lining varied between 15mm and 120mm, being thickest around the sides and thinnest at the base. Thin laminated layers within the clay fabric indicate the pattern of kiln construction, with the base being laid first and then the walls being added in successive deposits of clay, each being allowed to dry before the next was applied. The wall appeared to have been built up with slabs of clay rather than smooth layers, which produced a slightly uneven internal surface (Fig. 11, section 965). No tools marks were observed in the clay lining. No evidence of ledges or supporting structures was found in the kiln, suggesting that the pots were placed for drying at a higher level that did not survive. The lining was cracked from heating throughout the chamber and the surface had been fired a light–mid blue/grey colour.

The stokehole measured 1.05m across and reached a similar depth as the furnace chamber, though the feature was slightly deeper in the flue towards its north-western end (Fig. 11 Section 908). This part of the flue contained a mixed fill (2546) of clay, sand and charcoal, possibly raked out from the kiln. The stokehole was filled with a thick layer (2389) of dark grey sandy silt with burnt clay pieces and charcoal. This fill sloped down towards the mouth of the furnace chamber where it and fill 2546 were covered by fill 2390, which consisted of yellow clay with brown sandy patches and may have been used to level up the surface, possibly while the kiln was still in use. The upper two fills in the kiln (2387 and 2388) were demolition deposits covering most of the feature. These consisted of clay with a high proportion of broken kiln and pottery fragments and charcoal.

Pottery kiln 2351 was located close to the north-western boundary in the eastern half of the enclosure (Fig 10). It was orientated almost east–west with the furnace chamber to the west. Kiln 2351 was smaller than kiln 2350, its cut measuring 2.3m long and 1.48m across the furnace chamber (Fig. 12). The flue was comparatively short, and the stokehole measured 0.7m across. The kiln had steep sides and it varied in depth from 0.28m to 0.41m (Fig. 12, section 967). A tongue pedestal, consisting of blocks of fired clay set within a silty clay matrix, extended approximately 1m from the western end of the kiln. The pedestal was damaged and not as well constructed as in kiln 2350. Thin layers of hard-fired clay lined the sides and base of the kiln in the furnace chamber, though the floor to the north of the pedestal was damaged. The northern side of the kiln was repaired at least once, as additional wall packing (2719) slightly overlay part of the clay floor lining and was then faced with a new clay layer (Fig. 12, section 979). Several small fired-clay pedestals lined the southern side of the furnace chamber (Fig. 12, sections 921 and 922). These appear to have been left *in situ* and presumably supported the upper firing-chamber floor that no longer survives. Several other fired-clay blocks were found in the kiln backfill, probably representing pedestals knocked from their original positions. The base of the kiln consisted of heat-exposed natural gravels where the clay floor had been damaged, which suggests that the kiln continued to be used after the lining had begun eroding. This is also suggested by the accumulation of thin layers of sand (2512) and charcoal (2511) over the base. Fill 2510 was a deposit of collapsed material that covered the floor and the firing layers in the chamber, though it petered out towards the stoke hole. A thicker demolition layer (fill 2509) occurred throughout the kiln and was itself covered by a thin silt 2579 (not shown in section).

Kiln 1707 to the south-west of the enclosure appears to have been built within the upper part of a pre-existing pit and may represent a secondary use of the feature. The kiln lay a few metres from the south-western edge of the excavation and was cut by Phase 6 ditch 16 (Fig. 10; Fig. 13, section

695). The pit was oval in plan, 1.25m x 0.81m across, with a depth of 0.49m. It had fairly steep sides and a flattish base and contained seven fills. A sandy gravel fill (2373) covered the base of the feature and was overlain in the southern end of the pit by an apparently localised more compacted gravel (1755, not on section). Section 876 (Fig. 13) shows that the sandy deposit 2373 was sealed by a layer of light greenish-yellow clay (2372), which was sealed in turn beneath a clay-and-sand layer with charcoal fragments (1756). Above fill 1756, a thin layer of charcoal-rich silty sand (2356) was overlain by a much thicker (0.26m), compacted clay layer with some charcoal (1757) which appeared to have part of a clay lip in the centre, though this layer was partly truncated on the north-western side. The clay layer was built up around the sides of the pit, though this was only clear on the south-eastern side. The built-up clay sides contained six upturned pottery vessels placed in an arc with the clay packed around their sides, forming part of a structure (Fig. 14). Unfortunately, only the bottom parts of the vessels remained, and it was clear that the feature was heavily truncated. The natural subsoil surrounding the clay appeared to have been slightly reddened and was possibly heated. Above fill 1757 lay a thin burnt layer (1815) with an abundance of charcoal and pottery sherds.

The wells

Well 2374 was dug within the enclosure, a few metres from the south-western boundary (ditch 12) and c. 5m south of kiln 2350 (Fig. 10). The well consisted of a sub-circular cut (2394), measuring 3.6m east–west, that was dug through ditch 3; it is uncertain whether this represents the original construction cut for the well or a post-abandonment robber cut that left some of the stone-work extant for a period before slumping and final backfilling occurred. The following description assumes that it was a construction cut, though either possibility should be considered. The base of the well was reached c. 1.9m below the surface and an unmortared stone lining was encountered about 0.9m deep, defining the main shaft of the well (Fig. 15, section 903). The lining consisted of squared limestone blocks and smaller, less regular pieces constructed in a circular arrangement and measuring c. 0.6m in diameter between the internal faces. A slump of gravelly silt (2393) accumulated on the western side of the well cut, which had been dug wider and sloped more gently than the steep eastern side. This fill was overlain by another gravelly silt 2392, which also slumped from this side. The stone lining of the shaft appears to have been added after this to stabilise the sides of the well. The space between the well lining and the cut on the eastern side, and fill 2392 on the western side, was packed with a gravelly silt clay (2690), probably to waterproof the external surface of the stone lining. Fills 2690 and 2392 each contained 18 sherds of late 1st/2nd-century pottery including some local kiln fabrics. A thick layer of gravelly silt (2391) lay above the well lining and fill 2392, though it was difficult to tell whether this was a disturbed packing deposit or a post-abandonment accumulation. This fill appears to have been cut (2196), possibly to rob out some of the limestone lining. The final fill (2195) of the feature contained 260 sherds of late 1st-century pottery, most of which derived from the kilns, just over 1kg of animal bones and a small quantity of slag. The pottery assemblage from the well suggests that it was in use over a relatively short period and was probably used in conjunction with the pottery production.

Well 1572 (Fig. 10) was located 39m north-west of the enclosure, within the area of the phase 5/6 northern extension. The cut (1412) reached c. 2.75m below the surface and measured 2.93m across (Fig. 15, section 656). The upper part of the feature had straight, vertical sides that extended down for 0.6m to the top of the stone lining of the well shaft (1572). The stone lining extended from here to the base of the well about 1.65m further down and was constructed using unmortared limestone. The shaft was circular and measured 0.9m across internally. The space between the masonry and the cut of the well was packed with a stony/sandy gravel (1947). The fill of the main shaft was a largely homogeneous white/grey sandy gravel (1616) that extended from the base of the feature above the modern water-table level, almost to the top of the stone lining. The fill contained fragments of waterlogged wood, animal bones, late 1st-century pottery, CBM and two copper-alloy pins. Above the stone lining, the well was capped with a largely sterile fill (1610) of sand and gravel. This was

slumped in the centre where two backfills (1436 and 1437) had been dumped, the lower of which contained numerous angled stones that may have derived from the upper parts of the stone lining. The uppermost fill 1436 contained late 2nd-century pottery indicating that the well may have continued to be used in phase 5 but it had been abandoned by phase 6.

Other internal features

Feature group 19 (Figs 10 and 16) was located in the south-western quarter of the early Roman enclosure. It consisted of two linear features and several postholes or small pits. Linear 2397=2399=2401 measured c. 5.75m long and approximately 0.75m across in the centre, tapering at both ends. It was aligned NE–SW, on a similar alignment to the orientation of the enclosure. The southern half of the linear cut through pits 2407 and 2409 (Fig. 16, section 916), both of which were dated to phase 3 as they contained late Iron Age pottery (see above). The depth of the linear ranged from 0.4m to 0.65m being deepest in the northern end and it had a very irregular base (Fig. 16, sections 913–5). The south-eastern side of linear 2397=2399=2401 was cut by an oval pit (2405) and a posthole with straight sides and a flat base (2403). A second linear feature (2341=2343) was located about 2.75m south-east of the first, to which it was orientated broadly parallel. The south-western ends of both features were in line with each other. Linear 2341=2343 measured almost 3m long. It is possible that the features represented beamslots and the likelihood that they were part of a structure is suggested by the presence of six postholes (2440, 2455, 2457, 2459, 2462 and 2529) in the space between the two. The postholes varied in size: the smallest (2490) measured 0.18m across and 0.04m deep, while the largest (2462) measured 0.5m across and 0.1m deep. A large circular pit (2354) lay about 4m directly north-east of linear 2341=2343. The feature measured 1.2m across and it had a straight-sided, flat-based profile, 0.2m deep. It is possible that the feature was a large posthole rather than a pit. Several fills of the linear features contained late Iron Age and late 1st/2nd-century pottery, though an absence of local kiln fabrics suggests that the possible structure was abandoned before the kilns were operating.

Pit group 104 was located 8.5m south-east of linear 2341=2343 (Fig. 10). It consisted of at least six inter-cutting pits and postholes, together measuring about 3.2m by 2.5m across. The arrangement of the pits/postholes did not form any discernible pattern, though the fills of the features were fairly consistently of a brown silty sand and several contained small numbers of pottery sherds from kilns 2350 and 2351 and animal bones. Another small pit/posthole (2524) was positioned immediately to the west of the features, while another, smaller pit group was dug to the east.

The remaining two internal features were located in the centre of the enclosure. Pit 2592 was sub-circular in plan, 1.28m across, with near vertical sides and a flat base about 0.7m deep. It contained animal bones and fired clay, with late Iron Age pottery in its lowest fill and early Roman local kiln products in its upper fill. Pit 2087 was also sub-circular, about 2.8m long, with sloping sides and a concave base reaching 1.08m deep.

External features

Two large pits (2636 and 2788) were found close to the enclosure entrance (Fig. 10), both cutting a short gully (98) and phase 3 ditch 9. Pit 2636 also cut ditch 102 to the south-east. Pit 2636 was circular in plan, measuring 3.5m across and 1.6m deep. The pit contained 20 fills, suggesting that it had silted up fairly slowly, though there is evidence of at least two recuts: one cutting fills 2673 and 2674 and another cutting 2634, 2635 and 2643 (Fig. 17, section 969). Most of the finds from the pit came from the middle and upper fills, predominantly 2626–8, 2630 and 2632–3. A few sherds of late Iron Age pottery were recovered from fills 2645 and 2633. The last, however, included fired clay and CBM, while early Roman fabrics dominated the other fills and animal bones were also fairly common. Pit 2788 was circular in plan, c. 3.75m to 4m across, and 1.2m deep with a concave base. It contained six

fills, the first two (2786 and 2787) of which were shallow slumps on either side of the base. Three thick backfills (2785, 2783 and 2782) were dumped into the pit from the north-eastern side (Fig. 17, section 994). The pit contained over 7kg of animal bones, 1.1kg of fired clay, and almost 6kg of late 1st-century pottery, while a c. 5kg block of probable building stone was recovered from the lowest fill (2785).

Several pits and ditches were located just to the north of the enclosure entrance. Pits 2488 and 2431 were dug adjacent to ditch 12, the earlier of which contained late 1st/2nd-century pottery in the middle of three fills. This was cut on its north-western side by pit 2431, which contained a small quantity of late Iron Age pottery and animal bone fragments. Both pits were sub-circular in plan, measuring over 2m wide and reaching depths of 0.4–0.5m. Pit 2431 was cut through its centre by ditch 96, which was aligned perpendicular to enclosure ditch 12. The relationship between ditch 96 and ditch 12 was uncertain, but the former extended from the latter for 8.6m. Ditch 96 was aligned parallel to ditch 17 which was dug about 6.6m to the north-west. Ditch 17 was 18.5m long and it cut across ditch 12, which must have silted up by this time.

A total of ten pits and/or postholes were identified to the west of the enclosure. Pit 103 consisted of several episodes of recutting. The feature measured 2.45m by 2.7m across and c. 1m deep (Fig. 17, section 721). Cut 1874 was only observed on the south-eastern side of the feature. It contained a single fill (1881) with seven pottery sherds, mostly in local kiln fabrics. This fill was recut to a deeper level by 1873, which formed a pointed base and contained five fills, three of which (1878, 1879, 1882) produced small quantities of animal bones and more local kiln fabrics. Fills 1876 and 1882 were then truncated by another recut (1828) mainly on the north-western side of the pit, also cutting pit 1827 on this side. However, instead of local kiln fabrics, the main fill here (1825) produced mostly Severn Valley wares, also of late 1st/early 2nd-century date. The final recut (1746) extended 1.25m across the centre of the feature. It contained three backfills, the lowest of which (1824) contained a mixed assemblage of local kiln fabrics and Severn Valley wares, plus fragments of Dorset black burnished ware 1 which dates c. AD 120–150. This suggests that the final recut of the pit was backfilled in phase 5. The final fill (1745) produced a sizable quantity of kiln fabrics, slag and fired clay and probably represents a dump from one of the pottery kilns.

Pit 2109 (Fig. 10) was located next to the north-western corner of the main enclosure. It cut the Iron Age enclosure ditch 2 but not ditch 12, which may not have extended as far to the north (it should be noted that this corner was further complicated by recuts in phase 6—see below). Pit 2109 measured 1.2m across by 0.6m deep with straight, near vertical sides. Its lower fill contained a mixed assemblage of Malvern limestone ware, Severn Valley ware, and reduced sandy wares, while its upper fill was largely composed of local kiln fabrics.

All the other features in this area appear to represent a localised zone of activity. The features were assigned to phase 4 as they contained late 1st/2nd-century pottery, mostly sherds made in kilns 1707, 2350 and 2351. The pits ranged in size from c. 0.6m to 1.95m across, the largest of which (1870) was a bell-shaped pit that reached 1.4m deep (Fig. 17, section 719). The basal fill (1869) consisted of soft silty sand containing one complete and two partially complete vessels in a medium/fine fabric (R30), and the lower half of a locally made vessel with a large, post-firing hole in the base. All the pottery dated to the early 2nd century AD. Further partially complete pots were recovered from the second fill (1868), including several local vessels. Fired clay weighing nearly 10kg was recovered from the pit, almost certainly remains of the demolished superstructure from kiln 1707. Alongside the pottery and fired clay in this feature, a sizable animal bone assemblage was also recovered, and it seems that the whole collection represents a deliberately placed deposit. Local and imported pottery, the former including a possible ear fragment from a face pot, and animal bones were also recovered from the upper fills of the pit.

To the south of the early Roman enclosure, the later Iron Age enclosure (ditch 2) was cut by ditch 105. This feature turned at a right angle across the earlier ditch to the north-west, terminating on the opposite side, while its north-eastern section was traced for nearly 12m before it was lost,

possibly due to truncation. The feature measured c. 0.5m wide and 0.8m deep and appears to have formed part of an enclosure to the south of the early Roman enclosure.

The only other notable feature in this phase was ditch 2889 located in the south-east corner of the site. Ditch 2889 was the earliest in a series of recut field boundaries in this area, most of which date to the 2nd century AD (phase 5). Ditch 2889 was notably large, measuring c. 4.5m across and 1.1m deep, its upper fill (2890) contained late 1st/early 2nd-century pottery and was cut by ditches 2993 and 2885 (see below).

Phase 5: Middle Roman (AD 100–200)

Phase 5 was characterised by an extension to the north of the late Iron Age/early Roman enclosure (Fig. 18). This consisted of a new enclosure containing two possible buildings, one of which may have been a granary, and a series of linear features to the west. Pottery from the fills of these ditches consistently dated to the 2nd century AD, with comparatively few of the local kiln fabrics that were being produced in the preceding phase. The extension was accompanied by field boundaries to the north and to the south-east, some of which formed a droveway. The new enclosure was aligned with the main enclosure to its south-east suggesting that the latter continued in use during this period. This phase also saw the first period of activity in the north-eastern part of the site in the direction of Horsbere Brook (the 'northern settlement').

The northern extension

The northern extension was primarily formed of ditches 21, 24 and 39. Together, these features defined an area of approximately 0.4ha. Ditch 21 formed the north-west side of the enclosure, though it was partially truncated by a phase 6 recut along much of this section. Ditch 24 formed the southern side of the enclosure and was dug about 5–10m north of the late Iron Age/early Roman enclosure. It measured 1.1–1.2m wide and 0.3–0.6m deep. At its western end, ditch 24 turned to the north-west and possibly extended for 28–29m in this direction where it was probably continued by ditch 1604. At the eastern corner of the enclosure, ditch 24 was cut initially by ditch 39 and both were later cut by ditch 23 in phase 6.

A group of linear features, several intercutting, were found in the south-western part of the northern extension (e.g. 27, 29, 30, 36, 37, 84). Some of these were dug in phase 6 and it is likely that they formed a continuous sequence of activity through both phases. Most of the features were roughly aligned NW–SE and a few were NE–SW, while some turned at right angles. Their function is uncertain; it is possible that they formed boundaries, perhaps defining areas of cultivation or for enclosing livestock. Ditch 27 appears to have been one of the earliest. Located just south of ditch 21, it formed a right-angle turning north-eastward at its southern corner. Ditch 27 was cut by ditches 26 and 32, which may have formed part of the south-west side of the enclosure defined by ditches 24 and 1604. However, there were several episodes of recutting in this area, some of which occurred in phase 6 (Fig. 19, section 604). Ditch 32 was a recut of 1335 (shown in section) and it was truncated at its southern end by ditch 79 and at its northern end by ditch 21. Ditch 26 terminated at its northern end, just south of ditch 21 and it extended 28m south-east before being cut by ditch 79. Ditch 26 was notably deeper (c. 0.5–0.6m) than ditch 27 (c. 0.1–0.2m), which may have been little more than a gully.

Near the southern end of ditch 26, two small, stone-packed postholes (1480 and 1483) may have supported posts close to the putative entrance to the enclosure on this side. However, if so, this would have been truncated by phase 6 ditch 79. Posthole 1480 was the larger of the two, measuring 0.8m across with straight, vertical sides and a concave base, 0.6m deep. Both features contained roughly hewn limestone blocks.

Well 1572 probably continued to be used in phase 5, though it had been abandoned by the second half of the 2nd century AD (Fig. 20). The capping layer over the stone lining of the well (1610) contained early–middle 2nd-century pottery and a small quantity of CBM, while the uppermost fill (1436) contained late 2nd-century pottery (including Oxfordshire white wares, central or eastern Gaulish samian and Dorset BB1), iron nails and a small quantity of animal bones.

Ditches 29, 30, 36, 37 and 84 were the remaining linear features in this area. Apart from ditch 37, these were all orientated NW–SE. These ranged in length from 15m (ditch 30) to 23m (ditch 36), were typically 0.3–0.4m wide, and varied in depth between 0.2m and 0.4m.

Structure 42

Structure 42 was defined by a series of postholes orientated parallel to ditch 21 (Fig. 20). A line of eight postholes (1157, 1159, 1161, 1163, 1165, 1167, 1169 and 1171) extended over 15.5m, most of which were regularly spaced about 2.3m apart, except for 1159 which was placed next to 1157 at the south-western end and 1171 at the northern-eastern end which was positioned about 4.4m from its nearest counterpart. It is possible that an intervening posthole was not identified at this end. Posthole 1137 was positioned 6.2m north-west of 1171, at a right angle to the main posthole line. The postholes ranged in size, measuring between 0.3m and 0.6m across and 0.15–0.3m deep, and most had vertical sides and flat bases (Fig. 21, sections 545–551). Another posthole (1186) was positioned c. 2.9m south-east of the main group and may also have been associated.

Postholes 1157 and 1167 contained packing stones and some possible mortar was recovered from posthole 1163. It is possible that the features formed part of a small timber building, though with little evidence of a corresponding wall line this is difficult to substantiate; alternatively, the postholes represent a fence line. The dating evidence for the structure is poor, consisting of 2nd-century pottery recovered from posthole 1157. The structure was on the same orientation as its surrounding enclosure and structure 43 (see below), though it is possible that structure 42 continued in use into phase 6.

Structure 43

Structure 43 was located 15m south-east of structure 42 (Fig. 20). It was defined by three parallel gullies that were orientated on the same alignment as the neighbouring structure and the surrounding enclosure. The gullies measured 8.8–9.3m long and c. 0.6m across the centre, and they were positioned roughly 2.5m apart. They were generally cut with straight sides with flat bases about 0.15–0.2m deep (Fig. 21, sections 576, 578, 594 and 596), except for the south-western half of gully 1299=1301=1303 which was shallower with a concave base (Fig. 21, sections 599 and 600). Five postholes were cut into the base of the gullies. Three postholes (2811, 2813 and 2815) were dug into the north-eastern ends of each of the gullies, while one (2812) was found in the centre of 1299=1301=1303 and another (2814) at the south-western end of 1266=1268=1270 (Fig. 21, sections 596 and 598). Each posthole had vertical sides and flat bases and were generally identified by the fact that they were cut deeper than the gullies (c. 0.3m). The positions of the postholes suggest that the gullies represent the foundations of a building (see *Discussion*).

A fourth gully (46) was located immediately south-west of structure 43, aligned with gully 1299=1301=1303. The gully was identical in length, and although no postholes were found at either end, it seems likely that gully 46 was related to structure 43. Two undated postholes, one sub-square (1372) and the other oval (1374), were located to the south-east of the structure and may also have been related. As with structure 42, the dating evidence is poor. Gully 1299=1301=1303 produced pottery sherds dating AD 120+ and it is likely that the building continued to be used in phase 6.

The droveway and other field boundaries

The positions of ditches 22, 47 and 48, opposite to the north-west and north-east sides of the northern extension, created a droveway extending across the site from north-west to south-east (Fig. 18). The droveway, which varied in width between 25m and 45m, divided the northern extension from the area of land leading towards Horsbere Brook (north-east of the site). Ditch 22 extended 17m south-east from the trench edge, before turning at a right angle to the north-west and continuing in this direction for 63m. The terminals of ditches 22, 47 and 49 were positioned close together, but with space in between, to form a T-junction. Ditches 47, 48 and 49 formed a single line, orientated NW–SE, and each measured about 40m long. The position of ditch 49 created a partial enclosure with ditch 22, while a gap of about 6m between the terminals of ditches 47 and 48 also allowed for movement through the boundary. No ditches were found to continue the south-east alignment of ditches 47–49.

The north-eastern side of the northern extension was continued south-eastwards by ditch 18 and beyond by a series of recut ditches (91–95). Ditch 18 extended over 45m where it cut ditch 2 of the later Iron Age enclosure before terminating close to the eastern corner of the latter (Fig. 19, section 980), though it was not seen to extend all the way to the northern corner. The ditch had a V-shaped profile, c. 2m wide and 0.8m deep, and was clearly a substantial boundary feature. Ditches 91–95 continued the south-east boundary alignment after a gap of about 4.5m. This extended c. 37m before turning north-east at a right angle and continuing for about 70m. Ditches 91 and 94 were orientated NW–SE though the relationship between the two was uncertain. Towards their northern end, both ditches were cut by cremation pit 2949 and pit 2975 (Fig. 19, section 1541). Ditch 94 was found to recut an earlier ditch (2982) further south and two recuts of ditch 91 were observed where the group turned north-east. At this point, the SW–NE section was cut by another series of ditches. The earliest in this sequence was ditch 93, which extended for 52m from east to west. It was cut on its northern side by the more substantial ditch 112 (Fig. 19, section 1533). At its south-western end, ditch 112 measured 2.6m across and 0.6m deep. Other than a thin basal fill (2928), the ditch was largely filled with a sandy silt (2927) that appears to have accumulated fairly rapidly. Ditch 112 terminated just less than 20m to the north-east. Further east, ditch 93 cut ditch 92 on the southern side of the latter. Ditch 92 extended over 41.6m, though its terminus was not seen, and it may have continued further. Ditches 92 and 93 both cut a much larger phase 4 feature, 2899, which was not well defined in plan and it may have been either an earlier pit or a ditch (see also Fig. 10). Pottery finds were generally rare from this series of ditches, though a small number of 2nd-century Dorset BB1 sherds were recovered from a fill of ditch 92.

Activity in the north-eastern part of the site (the 'northern settlement') first commenced in phase 5. A NE–SW boundary was formed by ditches 50 and 54. No relationship was identified between these features, though given their proximity to each other and similar alignment it is likely that they were successive. Ditch 54 was the longer of the two, extending over 96m, and it was cut by ditch 47. Ditches 50 and 54 were cut by several phase 6 ditches. Other features closer to the north-east trench edge, such as ditch 56, were not fully exposed and their function remains uncertain. Two pits (3288 and 3292) were also found in this area.

Phase 6: Later Roman (AD 175–325)

The northern enclosure continued to be utilised in phase 6, particularly in the western half where several short ditches were dug replacing many of the phase 5 features in this area. The complexity of the ditch digging here suggests a continual period of activity in both phases. The northern boundary of the enclosure was recut, as was the northern side of the late Iron Age/early Roman enclosure.

Activity intensified in the area of the northern settlement, though its character was difficult to define owing to the restricted area of excavation. Much of the pottery recovered from phase 6 features consisted of 2nd-century wares found commonly in phase 5 features, accompanied by Severn

Valley wares and 3rd-century Oxfordshire white wares. It was notable that pottery from the phase 4 kilns was not found in phase 6 features. Fourth-century material was largely absent, and it was probably significant that no 4th-century coins were recovered from the site.

The northern extension

The outer boundaries of the northern extension were recut in phase 6 (Fig. 22). Ditch 68 recut the north-eastern side of the enclosure, extending over 130m along this side, turning north-west at the south-western end and south-east at the north-eastern end. The north-eastern side of the enclosure was bounded by ditch 68 and ditch 23. Ditch 68 petered out about halfway along this side, possibly due to truncation though it probably terminated at some point to form an entrance with ditch 23 which turned slightly towards the inside of the enclosure at this point. Ditch 23 extended over 39m before being cut by ditch 101 at its south-western end. It contained 2nd-century Severn Valley ware in both of its two fills, with fragments of a medium mouthed jar and a handled tankard in the upper fill (1694) being characteristic of vessels dating to the end of that century.

Ditch 101 was a recut of the northern side of the modified early Roman enclosure, defined by ditches 12 and 13, forming the southern boundary of the northern extension (Fig. 9a, section 960). At the western end, ditch 101 was cut on the western side by ditch 16 (Fig. 9b, section 897), which continued on the same alignment to the trench edge. The upper fill (2129) of ditch 101 contained numerous sherds of local kiln fabrics, though these were almost certainly residual, two southern Spanish Dressel 20 amphora sherds and three sherds of Dorset BB1, the latter dated AD 180+. The width of ditch 16 varied from 1.5m to 2.37m though its depth was fairly consistently between 0.7m and 0.86m. Residual local kiln fabrics were abundant in the fills where ditch 16 cut the earlier enclosure ditch, though later material was recovered from excavated sections further west, including fragments of a later 3rd–4th-century colour-coated beaker in the upper fill. It is notable that ditch 16 cut all the internal gullies in this part of the northern enclosure (see below).

Ditch 79 cut ditch 101 at its southern end; its relationship with ditch 68 at the northern end was unclear though it probably cut phase 5 ditch 21. Ditch 79 formed a boundary between the western half of the northern extension, containing the series of gullies, and the eastern half that contained structures 42 and 43 (which may have continued in use in this phase). The ditch cut through several features about half-way along this boundary, some of which may have been contemporary with, and possibly related to, structure 43. Here, ditch 79 cut ditch 35, which turned perpendicular to it (Fig. 23, section 665). Ditch 35 extended south-westward from its terminal and curved to the south-east on the opposite side of ditch 79. It cut gully 1641 and postholes 1606 and 1605, and possibly 1604 (Fig. 23) which may have been part of phase 5 ditch 24 (see above). Ditch 35 contained two fills that mostly produced 2nd-century pottery fabrics, though some possible 3rd–4th-century sherds were also recovered. Ditch 35 was cut on its northern side, close to its terminal, by pit 1626. Pit 1626 was sub-rectangular in plan, 1.5m long and 0.75m wide. It had vertical sides and reached 0.65m deep (Fig. 23, section 674). Two fills in the pit contained numerous, fairly large limestone fragments and it is possible that the pit formed a large posthole. Remains of two very truncated NW–SE ditches, 1634 and 1636, were found to be cut by ditch 79 (Fig. 23, section 665). Both appear to have terminated in this area as they were not seen in the southern section. Ditch 1636 contained pottery dating AD 250+ which provides a *terminus post quem* for ditch 79. Ditch 79 appears to have been a late addition to the enclosure as it was found to cut all the features it encountered, and pottery from several interventions dated to the second half of the 3rd century AD. It also cut oven/hearth 1600 on its south-western side. The hearth was sub-circular in plan, c. 0.75m across, with concave sides and a flattish base (Fig. 23, section 666). A thin basal fill (1598) of silty clay was overlain by several, seemingly placed CBM and stone fragments with pieces of charcoal, while the sides were packed with a heat-affected clay/sand (1599) and burning was observed on the surrounding natural.

The pattern of gully/ditch digging in the south-western half of the northern enclosure intensified in phase 6. The number of features present, plus the level of recutting and modification, makes it difficult to discern a clear pattern and the function of the ditches is not clear. Ditches 83, 85, 86, 87, 89, 90 and 99 appear to form small enclosures/paddocks. The widths of these ditches varied between 0.6m and 1.4m. They tended to have sloping, concave profiles usually about 0.25–0.4m deep though some, such as ditch 89, were more substantial, reaching over 1m deep. In this area, the NW–SE orientated ditches tended to be cut by the NE–SW ditches. It was notable that the central part of this area was generally kept clear of features, leaving a pathway into the eastern part of the northern extension, at least until ditch 79 blocked it off. Prior to this, the opposing terminals of ditches 33 and 83 appear to have formed a funnelled entrance. The northern half of the internal area was equally complicated with several straight-lined ditches, some oriented NW–SE (e.g. 69, 70 and 33) and some NE–SW (e.g. 34, 71 and 76), while ditches 73 and 74 were right angled. On both sides of the area the sequence of ditch digging was complicated, and it clearly represents continual modification of internal boundaries throughout phases 5 and 6.

The northern settlement

Activity in the northern part of the site intensified in phase 6 close to the north-eastern trench edge (Fig. 24). Ditch 51 represented a long, straight field boundary that extended south-east from the northern end of the trench for over c. 160m before its line was lost, possibly due to truncation. The ditch measured 1.35–1.75m wide and was consistently about 0.5m deep, with sloping sides and a concave base. Ditch 51 extended through the area of middle Neolithic activity, truncating pit 3124 in the process, and it cut phase 5 ditches 50 and 54 at its south-eastern end. It is impossible to determine how much further the ditch continued thereafter. Ditch 52 extended from the edge of the trench perpendicular to ditch 51, cutting it and terminating at its south-eastern edge. The alignment of ditches 51 and 52 suggests that these features may have bounded the northern settlement area.

The northern settlement consisted of several intercutting features, though the limits of the trench in this area made it difficult to see the plan in full. Curvilinear feature 61 may have represented a drip gully for a circular building. The gully was traced in an arc for almost 15m. It measured 0.8m across and c. 0.26m deep with a concave profile. The distance between the terminals of the gully was 11m, and it may have been associated with gullies 62, 63 and 64. Curvilinear gully 65, located to the south-east of gully 61, measured 0.67m across and 0.19m deep. This gully was traced from its south-eastern terminal for 4.5m, though it was truncated by later, possibly modern activity after this point. It is uncertain whether gully 65 represents part of a building. A series of three intercutting ditches (group 67) were located just to the north of the curvilinear features, though these extended beyond the trench edge at each end. The earliest ditch was a fairly shallow feature measuring 0.65m across and 0.16m deep. Its single fill contained sherds of Severn Valley ware, though these were not closely dated. This ditch was recut twice more on its north-eastern side by more substantial boundaries measuring 0.5–0.6m deep and each contained three fills. The basal fill of the first recut contained pottery consisting of a range of fabrics, including Dorset BB1 and Central Gaulish samian ware, and was dated to the mid-3rd century onwards, while all the fills of the second recut contained pottery consistent with a later Roman date.

Inhumation burials 3015, 3067, 3170 and 3177

Four inhumation burials were discovered close to the northern settlement (Fig. 24). Inhumation burials 3015 and 3067 were positioned fairly close to each other, on the north-east side of ditch 53, while inhumation burials 3170 and 3177 were located close to ditch 51 but were about 14.5m apart. Inhumation burials 3015 and 3067 were both orientated SW–NE, head to foot, inhumation burial 3177 was orientated NE–SW and inhumation burial 3170 was orientated SE–NW.

Inhumation burial 3015 consisted the remains of a young child of unknown sex, perhaps around 3.5–5 years old. The body was placed in a grave cut that was almost triangular in plan, measuring 0.94m long. The head was placed at the south-western end where the grave measured 0.67m wide, while the other end measured 0.4m wide (Fig. 25). Several iron nails were found in the fill, including two near to the skull and one next to the right arm, indicating the presence of a wooden coffin. No other finds were recovered from the fill. The body was positioned in an extended, supine position. The cause of death is uncertain, though the presence of enamel hypoplasia on the teeth and cribra femoralis on one thigh bone suggest the child was somewhat malnourished (see *Human remains*).

The grave cut for inhumation burial 3067 measured 1.95m long, 0.75m wide and 0.25m deep. The upper part of the grave appears to have suffered from some truncation. The grave contained the skeleton of an adult, around 26–35 years old, probably a male. This individual had been decapitated and the head was placed upside down on its right side between the knees of the individual (Fig. 26). The space in the grave where the head would have originally lain was left empty. The body was positioned in an extended, supine position. Iron nails were found *in situ* in the original head position, on either side of the pelvis, and below the feet. A few poorly dated Roman pottery sherds were recovered from the fill. The skeleton was distinctive for exhibiting several ante-mortem and peri-mortem injuries. These are detailed in the human remains report (see below), but can be summarised as follows: well healed fractures were noted to the face and to the shoulder, including a fracture line along the left maxilla (close to the cheek), while 11 bones had suffered some form of trauma around the time of death (i.e. they had not healed), including a fractured rib, blows to the right hand (thought to be a defensive injury) and chops to the back of the neck to remove the head. Further heavy blows to the mandible and occipital (back of the skull), possibly caused by a sword or similar sharp object, may have been caused prior to or during the beheading.

Inhumation burial 3177 consisted the remains of an adult over 45 years of age. The individual was possibly a female though the sex was not conclusively determined. The body was laid in an extended supine position with the left leg slightly bent inwards within a grave cut measuring 2.15m long (Fig. 27). The presence of spiculated woven bone within the sinus in the skull indicate that the individual was suffering from a sinusitis infection at the time of death, while signs of osteoarthritis were observed in several vertebrae. No iron nails were found that might indicate the presence of a coffin. A sherd of Roman pottery dated after AD 120 was recovered from the backfill.

The grave cut for inhumation burial 3170 was 2.3m long and 0.72m across and contained the incomplete remains of an adult. The individual was probably a female, about 26–35 years old at death. The skeleton was very fragmented and many of the bones broke up during excavation. The body was positioned in an extended prone position with the head decapitated and placed on its right side atop of the feet (Fig. 28). It was noted that a portion of the mandible was found in the original head position (where space was left within the grave), and no evidence of a mandible was found near the decapitated skull. The right arm was positioned by the side of the body, while the left arm was flexed across the individual, though it is uncertain whether it was originally placed in front of or behind the body. A total of 13 iron nails from a probable coffin were recovered from different positions around the skeleton. Hobnails from shoes were recovered near the feet and a single sherd of poorly dated Roman pottery was recovered from the backfill.

Cremation burial 3286

Cremation burial 3286 was discovered about 105m north of the northern inhumation burial group (within a narrow, excavated strip cleared for road access). No datable features, other than medieval and modern disturbance were noted in the vicinity, and the cremation burial had been damaged by plant machinery (Fig. 29). The cut for the burial pit measured 1.5m across and 0.2m deep, forming a concave profile. The pit was filled with a compact silty sand that contained a partially complete Central

Gaulish samian ware dish (Drag 31), dated AD 150–180, and a Dorset BB1 vessel, dating to the end of the 2nd century AD or the beginning of the 3rd. The BB1 vessel was used as an urn and the samian dish may have been used as a lid.

Much of the bone in this cremation burial was orange in colour, meaning that it had not been heated to a high temperature with fewer small fragments of calcined white and grey bone. This suggests that the skeleton had been only partially burned, perhaps due to weather conditions, a poorly constructed pyre, or that it was deemed unnecessary for the body to have been completely destroyed in the fire. The age and sex of the individual could not be determined, and the skeleton was only partially represented though this may be partly due to the modern disturbance. A small quantity of charcoal was also recovered, though there appears to have been a deliberate attempt to keep pyre debris to a minimum.

Burials 1750, 2950 and 2935

Three burials (1750, 2950 and 2935) located in the southern part of the site were attributed to phase 6 based upon the fact that they were dug into the fills of phase 5 ditches in this area (Fig. 3). Burial 1750 contained an east–west-aligned inhumation burial (Fig. 30). The grave was cut into the northern end of ditch 91, measuring 1.7m long and 0.55m across the widest part (where the shoulders were positioned), narrowing to 0.3m across at the feet. A single skeleton was placed in an extended, supine position with the skull at the eastern end of the grave. It was found largely complete in a good state of preservation and represented the remains of an adult male about 36–45 years old. Several pathologies were observed on the skeleton, including evidence of childhood malnutrition and signs of osteoarthritis developing later in life (see *Human remains*), though none were particularly extensive or unusual in skeletons of this date.

Cremation burials 2950 and 2935 were cut into the ditch fills about 7.5m and 14.5m south of inhumation burial 1750 respectively. Cremation burial 2950 was placed in a small pit (2949) that cut the upper fill of ditch 94. The pit was circular in plan with a concave profile, measuring c. 1m across and 0.45m deep. It contained an unurned cremation burial of an adult (18 years+), though the quantity of bone recovered was fairly low and suggests that only a small amount of the body was buried. Cremation burial 2935 was placed in a small circular pit, 0.4m wide and 0.17m deep. The pit had fairly straight sides and a concave base. It contained two fills, though cremated remains were found in both. The remains of two people were found: one an adult (18 years+) and the other a neonate. A small quantity of burnt animal bones and scallop shells represent pyre goods included with the burial.

Phase 7: Medieval/Post-medieval (AD 1100+)

No evidence of early medieval archaeology (AD 400–1100) was found at the site. Medieval/post-medieval features were largely restricted to ridge and furrow (Fig. 3). The preservation of these features varied across the site. Seven parallel, NE–SW-aligned furrows were located at the southern end of the site. One of these was tested by excavation and produced several finds, including glass, metal and CBM, suggesting a late medieval date. Three furrows on the same alignment were located in the eastern part of the site, and excavation of one produced post-medieval pottery. More furrows entered the site from the north-western side of the trench on an east–west alignment. These were not tested by excavation.

Several small pits or postholes located near the entrance of the later Iron Age enclosure probably dated to the post-medieval period. Although late Iron Age and early Roman pottery was recovered from three of the features, one produced medieval pottery and another produced post-medieval pottery.

Unphased features

Several features could not be dated with any degree of confidence owing to a lack of stratigraphic relationships and dating evidence. These included several isolated features, though three are of some significance—inhumation burial 1800, cremation burial 2378 and ring gully 1—and these are summarised below. Most of the unphased features were probably late Iron Age or Romano-British in date, though some may have been earlier.

Inhumation burial 1800

Inhumation burial 1800 was located within the northern extension, just to the north of ditch 16 (Fig. 3). The grave was orientated SSE–NNW. Only 1.15m of the length of the grave survived as the southern end had been truncated by later disturbance. Because of this, the head and shoulders were largely missing. The skeleton was laid in a flexed/crouched position on its right side, with the legs bent almost at a 45° angle at the knee (Fig. 31). The depth of the grave measured 0.18m and the upper part had been truncated so that much of the left side of the skeleton was missing. The remains were of a female about 26–35 years.

No dating evidence was recovered from the grave. It is thought to be Roman based upon its position in the corner of one of the northern extension enclosures, which suggests that it was contemporary. Flexed/crouched burials were common in this region during the late Iron Age, though the rite is known to have continued into the Roman period for some time, with examples being found in both rural and urban contexts (Holbrook 2006, 121–2). However, as discussed above, the only other inhumation burial found at the site in a flexed or crouched position (5010) dates to the early Bronze Age. It is possible that inhumation burial 1800 was an earlier prehistoric burial, and its position within the Roman enclosure merely coincidental.

Cremation burial 2378

Cremation burial 2378 was located close to the south-western boundary of the trench, near an area of medieval ridge and furrow (Fig. 3). The upper part of the feature had been disturbed by later activity. The cremation pit measured 0.31m by 0.14m across and 0.7m deep. The burial contained the remains of a young person, less than 15 years old. The cremated remains were not placed in an urn and no dating evidence was recovered, though a small amount of animal bone was found in the pit. Given that the majority of burials found at the site were late Iron Age or Roman, it is reasonable to suggest that cremation burial 2378 was also of this period, though an earlier prehistoric date should not be ruled out.

Ring gully 1

Ring gully 1 was located next to the northern trench edge (Fig. 4). The gully was circular in plan, measuring 6.5m across the centre. Its terminals were positioned almost 3m apart and the entrance faced NNW. The gully ranged in width from 0.45m to 0.95m and reached 0.1–0.25m deep, though it was more heavily truncated on its eastern side. It contained a single fill that was largely sterile except for a single fragment of CBM dating to the 2nd–4th century AD (fill 3151). Whether this was an *in-situ* find or an intrusive one is uncertain. The gully was located close to the area of middle Neolithic activity (see above) and only 2.5m north of later Iron Age cremation burial 3020. It seems likely that the feature dates to the later Roman period, given its proximity to the northern settlement to the east and the presence of the CBM, though the association of prehistoric ring ditches with pit clusters in this region must also be considered (e.g. Jackson and Ray 2011, 148, fig. 11.2; see *Discussion*). Although rare, ring ditches of middle Neolithic date are known, such as at King Alfred Way, Newton

Poppleford, Devon, where a similar feature was found cut by two graves dating to the middle Neolithic and set close to a series of contemporary pits and postholes (Rainbird and Lichtenstein 2018).

Prehistoric pottery

by Lisa Brown

A collection of 268 sherds of prehistoric pottery weighing 2434g was recovered from several pits and postholes in the northern end of the trench. The stylistic range spans the middle Neolithic to the earlier Bronze Age, and this group could include a date range of c. 3500–1200 BC. The assemblage is dominated by a fairly significant collection of Impressed Wares (Peterborough Ware) recovered from several pits in the northern part of the site. There is a hint of early Bronze Age, possibly, Beaker activity here, and this may reflect later disturbance/intrusion. A few sherds were residual in Roman ditches 21 and 23 and natural features 1072 and 3006 also produced small quantities of prehistoric pottery.

Methods

Fabrics were identified with the aid of a hand lens at 20x and 10x magnification. No microscopic or petrographic/chemical analysis has been undertaken and fabric descriptions are liable to revision should further analysis be undertaken. Fabrics were classified using an alpha-numeric dominant inclusion code, further subdivided by the size and frequency of the inclusions, following the recommended guidelines of the Prehistoric Ceramics Research Group (2011; 2016). Abrasion was recorded as one of three broad categories: (1) slight, little indication of wear; (2) moderate, surface preserved but clearly worn; and, (3) high, minimal surface survival and heavily eroded breaks.

Refitting of sherds produced no fully re-constructible profiles and, due to shared characteristics of middle–later Neolithic and early Bronze Age ceramic traditions, it was not always possible to identify vessel forms and dates of body sherds, even decorated fragments.

Condition

With few exceptions, the pottery is in a poor and fragmentary condition, with very high levels of abrasion and leaching. An average sherd weight (ASW) of 9g is biased by the inclusion of a large and well-preserved sherd from pit 3017. When this sherd was excluded, the ASW was a mere 6g. Most sherds were extremely worn, showing signs of exposure to weathering prior to deposition or of long periods of curation and handling, resulting in smoothed worn surfaces, sometimes obscuring the detail of surface treatment and decoration. A vessel from pit 3017 has fresh surfaces, and the acuteness of the decoration is preserved, but the sherds are very friable due to the nature of the clay mix (see below).

Fabrics

Eight fabrics were distinguished, all but one of which incorporated grog (Table 2). When grog is the predominant or only inclusion, as in G1, it can be difficult to determine the source of raw materials macroscopically.

G1, soapy or slightly granular clay incorporating dark or pale grey or brown grog pieces 0.5–3mm. May also contain rare limestone pieces and red/black oxides.

G2, very lightly sanded, slightly micaceous clay incorporating fine dark grog.

GC1, smooth, soapy clay with temper of fine dark grog and rare black iron oxides, with small sub-angular vesicules, representing calcareous material, probably Jurassic limestone.

GC2, smooth, soapy clay resembling GC1 but incorporating sparse – moderate coarse sand in addition to grog and calcareous material, probably Jurassic limestone.

GQ1, smooth, soapy clay with moderate quantities of rounded translucent quartzite, incorporating fine grog temper and rare small inclusions of sub-angular milky-white quartz up to 3mm, and very rare pieces of limestone.

GQ2 moderately coarse sandy clay with coarse grog temper up to 2mm, coarse sub-angular white quartzite up to 3mm, and rare limestone pieces. The major distinction from GQ1 is the sandy clay matrix.

QG1 slightly soapy, lightly sanded clay with coarse sub-angular quartzite pieces up to 6mm, occasional rare grog pieces <3mm.

SH1 fine soapy clay with inclusions of platey fossil shell up to 8mm.

Fabrics GC1 and GC2 contained inclusions of calcareous matter, probably limestone, which has mostly leached out, leaving small rounded or squarish vesicules. The only fabric that does not include grog is represented by a single 10g sherd in coarse shelly ware from pit 3017. Considering the position of the site, close to Jurassic outcrops, it is notable that calcareous fabrics do not form a larger share of the assemblage.

Two grog-tempered fabrics (GQ1 and GQ2) incorporate additional inclusions of milky white quartzite and the dominant inclusion of fabric QG1 is a very coarse version of this quartzite temper. This rock is not local to the Gloucester area, so the pottery produced in these fabrics was either imported to the site or the rock itself was brought in and added to local clays. The presence of local limestones in fabrics GQ1 and GQ2 suggests the latter. Gibson (1995) has described the addition of quartz temper to clays used to produce impressed wares found in Wales as almost certainly not functional in the sense of facilitating efficient firing. In fact, it arguably made the resultant vessel less stable due to potential weak points produced by the presence of large opening materials in the clay (Gibson 2002, 34–7). The Longford quartzite-tempered sherds could therefore be ‘non-local’ pottery, or at least represent a non-local potting tradition.

Ceramic traditions

Despite the problems with classification of forms outlined above, the earliest ceramic tradition represented at Longford is clearly middle Neolithic Impressed Ware (Peterborough Ware). Impressed Wares were present in most of the prehistoric features (see below) and totally dominate the early prehistoric assemblage. The most clearly classifiable vessels are profusely decorated Fengate-style bowls. The collared rims are quite pronounced on some vessels, to the extent that they resemble the shape of small Collared Urns, but the Impressed Ware assemblage from the 1961 excavations at Cam in the Severn Valley includes examples of similar rim profiles decorated with similar motifs (Smith 1968). A smaller number of sherds correspond more closely to Mortlake style, with expanded rims surmounting a defined shoulder.

The decorative range present on the Impressed Wares includes twisted cord and whipped cord impressions, slash and slash-and-drag devices, incised or tooled linear patterns including chevrons and herringbone arrangements, fingernail impressions, and impressed triangles or oval shapes. The decoration extends to the inner face of the rim on many vessels.

Although unusual within the Impressed Ware tradition, the basal fragments from pit 3017 probably do belong to a large Impressed Ware vessel rather than a later tradition, such as an early Bronze Age Food Vessel or Collared Urn. The fabric is grog and quartzite tempered (QG1), and the

quartzite inclusions measure up to 6mm. Their inclusion in the clay created areas of weakness, such that the pot is very friable, and has cracked along seams that run between the largest pieces of rock. This vessel provides a good example of the addition of functionally unsuitable temper, as discussed by Gibson (1995).

A few possible examples of Beakers were identified. An almost certain example is a corded Beaker from pit 3017 (Fig. 33, no. 10). This is a small body sherd but the wall thickness, fine grogged fabric, pale orange colour and the close-set horizontal lines of twisted-cord impressions are good indicators. Less certain, but from the same deposit, is a possible domestic Beaker sherd. This is unlike the Impressed Ware sherds, as it is the only example of a shell-tempered vessel with fingernail rustication. The basal part of a small vessel from pit 3180 in grog and quartzite tempered fabric GQ1 is decorated with twisted-cord impressions in a cross-hatch pattern which extend fully down to the base angle (Fig. 33, no. 14). This sherd belongs to a small, thin-walled vessel and so may also belong to a Beaker, but this is not certain. Pit 1005 produced the simple undecorated rim of another possible Beaker, in fabric GC1, fired to pale orange, and with a diameter of 140mm (Fig. 32, no. 1). It is not uncommon for zones of Beakers, including the rim edge, to be left undecorated. Undecorated fragments of thick-walled vessels in fabrics GC2 and GQ1 and GQ2 from the same pit may also belong to late Neolithic or early Bronze Age vessels, but of uncertain form.

Apart from this material, no other examples of early Bronze Age pottery were identified. However, amongst a group of other sherds from pit 3017 are some very thick-walled sherds in grog-tempered or grog with quartz tempered fabrics which could belong to Food vessels or Collared Urns. Faint traces of incised linear, twisted cord or other impressed decoration are visible, and would not rule out an early Bronze Age date. However, in the absence of otherwise diagnostic fragments, their classification remains uncertain. This group is in an equally abraded condition to the Neolithic material.

The pottery in context

Pit 1005 (fill 1006) contained 12 sherds (54g) in fabrics GC1, GC2 and GQL1. Body sherds belonging to thick-walled, large vessels in quartz-tempered fabrics may be early Bronze Age but cannot be classified with certainty. A plain rim of a small vessel in fabric GC1 may belong to a late Neolithic/early Bronze Age Beaker (Fig. 32, no. 1).

Posthole 3010 (fill 3009) contained one sherd (24g) of an Impressed Ware rim in fabric GQ1. This is probably a Mortlake bowl, decorated with slashes, and whipped cord and fingernail impressions. It is heavily abraded (Fig. 32, no. 2).

Posthole 3012 (fill 3011) contained seven sherds (103g). The upper part of a Mortlake style bowl in fabric G1 is decorated with twisted cord impressions and fingernail rustication on the body (Fig. 32, no. 5). Also in fabric G1 are several body sherds with fingernail rustication; fine slashed linear decoration; or incised chevrons. A single body sherd in QG1 bears whipped cord impressions on both surfaces. In the same feature, fill 3023 contained 11 sherds/62g. This group of abraded sherds are all middle Neolithic Impressed Ware, but the precise style is not always clear. They are all in fabric G1 except for a rim in fabric GC1 decorated internally and externally with twisted cord impressions (Fig. 32, no. 4). One of two very fragmentary rim sherds in fabric G1 is also decorated with twisted cord, another with an incised linear pattern (Fig. 32, no. 3), and another with incised chevrons. Two body sherds bear fingernail impressions.

Pit 3017 (fill 3018) contained 142 sherds (1458g). This group includes abraded Neolithic Impressed Ware with several body sherds exhibiting a variety of decorative motifs, including twisted cord impressions, fingernail impressions, impressed teardrop shapes, incised linear patterns, incised chevrons (Fig. 33, no. 8), and rim sherds with twisted cord impressions (Fig. 32, no. 7; Fig. 33, no. 9). The flat base of a large vessel in a very coarse quartz-tempered fabric, decorated with deeply incised

lines that cover the entire lower part of the vessel, probably belongs to a large Impressed Ware bowl, probably of the Fengate style (Fig. 32, no. 6). A single sherd of shell-tempered pottery could be an early Bronze Age domestic Beaker body sherd but the lack of grog and the fingernail rustication suggests middle Neolithic Impressed Ware. A more-likely Beaker fragment is a fine grog-tempered sherd with close lines of twisted cord decoration, fired to pale orange (Fig. 32, no. 10). Although the decoration could represent Impressed Ware pottery, the firing and fine tempering suggest a non-domestic early Bronze Age beaker fragment. If this is a Beaker sherd, it should probably be seen as an intrusive element within the group.

Posthole 3086 (fill 3085) contained five sherds (38g), all of which were Impressed Wares. A body sherd in G1 is decorated with a stab and drag herringbone pattern. Sherds in GC1 are decorated with twisted cord and whipped cord impressions.

Pit 3124 (fill 3125) contained one sherd (30g) of a thick-walled vessel of uncertain form in coarse fabric QG1.

Pit 3180 (fill 3179) contained 56 sherds (489g) in a range of forms and fabrics. Body sherds in fabric G1 are decorated with twisted cord and whipped cord impressions, one with impressed triangles forming a zigzag pattern, incised chevron and other linear arrangements, and stab marks. Two Fengate-style rims are fingernail impressed (Fig. 33, nos. 11 and 12). A rim in fabric CG1 is decorated with whipped cord impressions (Fig. 33, no. 13). Quartz-tempered sherds (GQ1) include body sherds decorated with twisted cord, stabbing, and incised linear patterns. The base of a small vessel in GQ1 decorated down to the base angle with twisted cord impressions arranged in a cross-hatch pattern (Fig. 33, no. 14) may be Beaker but could equally be Impressed Ware, which is more likely given the composition of the rest the pottery from this and the other pits in this area. Fill 3187 contained eight body sherds/64g. Seven sherds in fabric G1 with decoration including twisted cord, whipped cord and fingernail impressions. Two plain sherds are in fabric GC1.

Two fingernail decorated Impressed Ware sherds were recovered as residual material from Roman ditch 22, with fills 1032 and 1064 producing two plain body sherds in fabric G1. Root hollow 3006 yielded ten sherds (46g) in fabric G1, which include a simple rim top of possible Bronze Age date.

Discussion

The collection of pottery recovered at Longford appears to represent the deliberate deposition of material that dates, for the most part, to the middle Neolithic period. The assemblage is highly fragmented and abraded, with few exceptions, one being the well-preserved quartz-tempered decorated base from pit 3017.

Neolithic Impressed Wares (Peterborough Wares), which span the end of the fourth and beginning of the third millennium BC, remain relatively uncommon in Gloucestershire. Small assemblages have been recovered from the blocking of long barrows (Darvill 1987, 68), and there are pit deposits from Cam (Smith 1968). The importance of Gloucester during the lifespan of this ceramic tradition is evident from finds of Mortlake ware at Berkeley Street (Hurst 1972) and Barnwood (Clifford 1934, 231), and there is an abraded collection from Longlevens (Garrod and Heighway 1984, 72). A Mortlake bowl was recovered during excavations at Tewkesbury (Hannan 1993, 29–30, 47). More recent finds of Peterborough Ware are relatively few, but include Horcott Pit, Fairford (Lamdin-Whymark 2003) and Bourton-on-the Water Primary School (Nichols 2001).

At Duntisbourne Grove, a group of pits and postholes contained an assemblage of pottery, worked flint, fired clay, and animal remains (Mudd *et al*. 1999, 18–24). The pottery includes plain bowl sherds and, in one pit, possible Fengate Ware in a deposit that produced a radiocarbon date of 3650–3370 BC (NZA-8671: 4761±57 BP). This date is somewhat problematic as it corresponds better with the currently accepted dates for plain pottery but is early for Peterborough pottery (Gibson and Kinnes

1997). A cluster of pits at Birdlip Quarry were associated with a few fragments of pottery and worked flint characteristic of the fourth millennium BC (Mudd *et al.* 1999, 17–9). Impressed Wares were found associated with Grooved Ware sherds in two pits at King's Stanley, which suggests some curation of earlier material (Gibson 2010, 35–42).

Illustrated catalogue

1. Pit 1005, context 1006. Simple rim of a small vessel, probably a Beaker (two views). Fabric GC1

2. Posthole 3010, context 3009. Rim of a probable Fengate style bowl. Rim top decorated with linear slashing, the neck with whipped cord impressions, and with fingernail impressions on the inner side. Fabric GQ1

3. Feature 3012, context 3023 (sample 51). Rim of small Peterborough Ware bowl decorated on both surfaces with slashed lines. Fabric G1

4. Feature 3012, context 3023 (sample 51). Rim of a Mortlake or Fengate style bowl decorated on outer and inner surfaces with twisted cord impressions. Fabric GC1

5. Feature 3012, context 3011. Upper part of a possible Mortlake style bowl, rim top and inner side decorated with twisted cord impressions, external body rusticated with fingernail impressions. Fabric G1

6. Feature 3017, context 3018. Base of large Fengate style bowl decorated with roughly tooled lines and fingernail impressions. Fabric QG1

7. Feature 3017, context 3018 (sample 59). Rim fragments of a Fengate style bowl decorated with linear chevron type arrangements of twisted cord impressions. Fabric G1

8. Feature 3017, context 3018 (sample 59). Rim of Peterborough Ware bowl decorated with incised chevrons. Fabric G1

9. Feature 3017, context 3018. Rim of Peterborough Ware bowl with twisted cord impressed decoration on external and internal surfaces. Fabric GC1

10. Feature 3017, context 3018. Body sherd of a Beaker, probably All-over corded variety, decorated with close horizontal lines of twisted cord impressions. Fabric G1, very smooth and soapy, oxidised

11. Pit 3180, context 3179. Rim of a Fengate style bowl with overhanging rim decorated with fingernail impressions on outer and inner surfaces. Fabric G1

12. Pit 3180, context 3179. Rim of a probable Fengate style bowl decorated with fingernail impressions on outer and inner surfaces. Fabric G1

13. Pit 3180, context 3179. Rim fragment of a Fengate style bowl decorated with whipped cord impressions on the external surface, twisted cord impressions on internal surface. Fabric GC1

14. Pit 3180, context 3179. Flat base of small vessel, possibly a Beaker but perhaps a small Fengate style bowl, decorated with twisted cord impressions in a rough lattice arrangement. Fabric GQ1

Worked flint

by Mike Donnelly

A total of 50 worked flints was recovered alongside four very small fragments of burnt, unworked flint weighing 6g. The flint was in a variable condition consisting of a small fresh, heavily patinated assemblage from a group of prehistoric pits, postholes and one grave, alongside very heavily damaged, broken and sometimes rolled material from later features and subsoil horizons. The material covered a wide range of dates and included probable Mesolithic or early Neolithic blade forms but was primarily focused on middle Neolithic–early Bronze Age activity associated with several features.

These contained significant tool assemblages with some suggestion of a mixing of material from different phases of activity.

Methodology

The artefacts were catalogued according to OA South's standard protocol (Bradley 1999) and some pieces are referred to by their archive catalogue number (e.g. c56). Additional information on condition (rolled, abraded, fresh and degree of cortication), and state of the artefact (burnt, broken, or visibly utilised) was also recorded. Retouched pieces were classified according to standard morphological descriptions (e.g. Bamford 1985, 72–7; Healy 1988, 48–9; Bradley 1999). Technological attribute analysis was undertaken and included the recording of butt and termination type (Inizan *et al.* 1999), flake type (Harding 1990), hammer mode (Onhuma and Bergman 1982), and the presence of platform-edge abrasion.

The assemblage

This small assemblage was very unusual in that it contained very high levels of retouched forms (32%) in both the prehistoric contemporary pits (34.61%) and with the background residual material from later contexts (29.2%) (Table 3). The assemblage also contained quite high levels of blade forms (45.16%) suggesting a significant Mesolithic or early Neolithic component (cf. Ford 1987). Some of the blades could relate to the production of suitable blanks for knives and micro-denticulates. Both these tool types were recovered from middle Neolithic–early Bronze Age features where they had been fashioned on blade blanks. However, blades were far more common in residual contexts (60% of all blanks) than from the contemporary pit and posthole clusters (31.3%), suggesting that some probably pre-date the pits.

Provenance

The flints were recovered from a wide range of contexts but just over half (52%) were found in a closely defined group of pits (38%) and postholes (14%) (Table 4). The remainder were spread widely and found in several later features, usually ditches (30%), some pits (6%), a cremation burial fill (2%) and a probable tree-throw hole (2%). A small amount was recovered from topsoil/subsoil horizons (8%). In total, 38% of the flints originated from just two pits (3017 and 3180) which contained seven of the 15 tools present, including most of the very fine knives as well as a middle Neolithic petit tranchet arrowhead. The remaining fine tools were found as solitary finds from other features in this pit group. The remaining 28 flints (56%) were widely distributed in 24 separate features/layers located across the site.

Key Contexts

About half the flints and most of the fine tools originated from three features, part of the group of prehistoric pits and postholes located at the northern end of the site. Pit 3180 had 12 pieces including five tools, while pit 3017 had seven pieces (two tools) and posthole 3008 had two pieces including a notch.

Pit 3180

Pit 3180 contained 12 pieces including five tools, plus a further two flakes that may have been used as naturally backed knifes. Most of the non-tool assemblage consisted of flake debitage but there was

also one bladelet and a small, complex and completely exhausted flake core. The tools include a very fine backed knife (Fig. 34, No. 4) almost plano-convex in form and fashioned on a blade blank. It displayed a distinctly curved profile and had very regular and parallel invasive retouch down its convex right side, and less regular, more serrated retouch down its concave left side. The second knife was a similarly backed form (Fig. 34, No. 5) of distal trimming blade. Its left side and distal margin were backed, and the right edge was invasively worked, but was not done to the standard seen on Fig. 34 No. 4. The third knife (Fig. 34, No. 6) was a short side-trimming flake with some backing along its left edge and irregular invasive retouch along its right.

The two remaining retouched pieces could also be knives. Blade segment c54 was backed on one edge with irregular and partially invasive retouch down its right side. However, not enough of it survived to be sure of its final form. Retouched flake c56 was similar in form to a knife (Fig. 34 No. 6) with blunting down its convex left edge and scaler retouch around the middle and lower portion of its very concave right side. Utilised flake c52 also had knife-like damage, suggesting that it had been used as a cutting tool. Many pieces from this feature appear to have originated from a limited number of cores, perhaps as few as two. Knife Fig. 34 No. 5 and the retouched blade segment appear to be from the same core while several pieces, including knife Fig. 34 No. 6 and retouched flake c56, are clearly from a second core. The tool forms in this assemblage suggests a middle to late Neolithic date. Complex knifes were in use from the middle Neolithic through to the early Bronze Age. Here, the choice of blade blanks for some of the tools may suggest a Neolithic date, though simple flakes were also utilised.

Pit 3017

This pit contained seven flints consisting of five blanks and two tools. Two of the five blanks represented narrow bladelets, and a double-sided micro-denticulate (Fig. 34, No. 1) was also formed from a blade blank. This piece had a dual concave/convex micro-denticulated edge with well-defined teeth and it displayed obvious signs of use, such as rounding on the teeth and traces of gloss. The second tool was a slightly atypical *petit tranchet*-derivative arrowhead that was triangular in form rather than trapezoidal (Fig. 34, No. 2). It had fine backing along its distal and proximal edges, though these met at the lower left side. The point they formed was dissimilar to an awl or piercer as it was very thin and could not have functioned as a piercing tool. The arrowhead is typical of middle Neolithic assemblages and the micro-denticulated blade and blade debitage would still be easily accommodated by this date.

Other prehistoric features

3012 and 3085 were found in close association with posthole 3008. Posthole 3012 contained two flakes, one of which (c38) was a clear example of a Levallois flake that typifies many later Neolithic assemblages. Posthole 3085 only contained a side-trimming blade and the only other flint from this cluster was a side-trimming flake from pit 3089.

Grave 5010

Grave 5010 was located towards the southern end of the site, close to a row of undated potholes. It contained a fine knife (Fig. 34, No. 3) of broadly plano-convex type with extensive regular, parallel invasive retouch down both lateral margins, and part way around its convex distal end, but with around half of the internal surface of the dorsal side being unmodified. This resulted in both lateral margins being suitable as serrated cutting edges. The blank for this tool was either a regular flake or a fairly squat blade, but since the piece has had its outer margins heavily modified, there is no way to be certain of the exact form. This tool has a middle Neolithic–early Bronze Age date range, but as it

was found at the hip of a flexed inhumation burial a very late Neolithic or early Bronze Age date is most likely.

Stray finds

Several stray finds recovered from a variety of late Iron Age and Roman features are also of note. This part of the assemblage included numerous blade forms. The tools recovered also suggested an early element to the background assemblage and included an end scraper on an inner blade from ditch 2014, a double-sided micro-denticulate combined with an end scraper at its distal end recovered from the subsoil, and a simple retouched blade also from the subsoil. All these forms can date between the Mesolithic and the middle Neolithic.

Also present were two tools that do not have a restricted date range in prehistory. One was a broken fabricator from ditch 2301. This had heavy denticulated and abrupt retouch down both surviving lateral margins and its distal end, and it had clear signs of heavy use along its central dorsal crest. A well-made piercer on an inner flake of very red flint was recovered from ditch 1785. This piece was retouched along its distal and left lateral margins to form a slightly damaged piercer tip. The material may in fact have been some other type of stone, such as jasper, carnelian or chalcedony, and is often found in areas beyond the chalk heartlands of south-east England.

Discussion

The site yielded a small but unusual flint assemblage. It consisted largely of tools and blanks without cores or fine knapping waste, and this latter fact is especially notable given the extensive sampling program. The assemblage can be viewed as having two main elements, the first is the dispersed scatter of stray finds found in late Iron Age and Roman features that suggest limited activity during the Mesolithic to the Bronze Age. The more important element is the small set of fine tools from a grave, pits and postholes of middle Neolithic–early Bronze Age date, and these also add to the overall impression of a retouch-heavy assemblage. Many of the artefacts were selected for burial and imply a form of structured deposition.

The high levels of retouch at Longford require discussion. Similar tool-rich collections are often the product of recovery bias, but such assemblages would also feature high numbers of cores and related maintenance pieces due to these types also being large and easily recognized. The near-total lack of cores and the high proportion of tools and utilised pieces (20%) is interesting, more so when one considers the lack of finer knapping waste and less utilisable flake and blade blanks. The flint also displays unusually low levels of burning (6%) and breakage (26%), below that often found in domestic assemblages. Moreover, there were no burnt and only a very few broken pieces from the contemporary pit groups, which further exemplifies their unusual nature. Given the high quality of some of the tools, the assemblages from the pit group at the northern end of the site may represent placed/structured deposits (e.g. pits 3017 and 3180). Associated features, such as middens and shallow pits, as well as the upper portions of the identified features, all of which have subsequently suffered from plough and other forms of truncation, probably generated much of the retouch-heavy background material recovered residually in later features.

Tool-rich and sometimes structured deposits become more common in the later parts of the Neolithic (Garrow 2006; Thomas 1999) and are often found associated with other materials, such as decorated pottery and non-meat-bearing parts of animals. Similar pit groups are well known in Herefordshire (Jackson and Ray 2012), Gloucestershire (Saville 1984), and elsewhere in Britain (see papers in Anderson-Whymark and Thomas 2012). Regional patterning in the depositional practises favoured by broadly similar cultural groups is very apparent (Anderson-Whymark and Thomas 2012; Lamdin-Whymark 2009), and the discoveries at Longford provide a similar pattern of deposition as at nearby

sites such as Wellington-Moreton (Jackson and Ray 2012) and at Kings Stanley (Evans 2012). These sites strongly feature the mixing of material from distinct periods of prehistory.

Roman pottery

by Paul Booth

Some 15,608 sherds (257.5kg, 232.61 REs) of later prehistoric and Roman pottery from the excavation were recorded and analysed. These represent all the material of these periods except for a small quantity of unstratified material and sherds from a few context groups of 19th–20th century date. The present assemblage was recorded using the OA system for late prehistoric and Roman pottery (Booth 2014), in line with recently published national standards (PCRG *et al*. 2016), with sherds assigned to subgroups or individual fabrics/wares within major ware classes (for recent application of this system in a Gloucestershire context see e.g. Booth 2016; Biddulph 2018). Quantification of wares within individual context groups was by sherd count and weight. Vessel types were quantified by rim equivalents (REs) and by a more subjective vessel count (MV) based on rim sherds. Details of decoration were recorded, as well as evidence of use and reuse where identifiable. Methodological issues relating to the recording are discussed further at relevant points below.

The assemblage spanned the later part of the Iron Age (with significant groups of pottery assigned to this period) and much of the Roman period, though late Roman pottery was relatively scarce, and none appeared to be later than the early 4th century. A very important part of the assemblage was associated with pottery kilns of later 1st to early 2nd-century date. These characteristics affected the nature of the assemblage in different ways, but in general the pottery was in reasonable condition with a mean sherd weight of 16.5g. Abrasion was not consistently recorded, but heavily worn sherds were scarce. The kiln-related assemblages inevitably included a reasonable proportion of waster sherds and this material was more fragmented than the rest, resulting in a mean sherd weight (13.8g) somewhat below the overall site figure.

Fabrics/wares

The excavation produced a wide range of later Iron Age and Roman fabrics; with the exception of the kiln fabrics, described separately, these are listed in Table 5, in order within the series of major ware groups defined by the OA system on the basis of significant common characteristics, though the kiln fabrics are listed as a separate group. The ware groups can be combined to constitute two main classes of material, fine and specialist wares on the one hand, and on the other the rest of the coarse wares (cf. Booth 2004). The fine and specialist ware groups (identified by the initial letter of the fabric code) are: samian ware (S); fine wares – colour-coated, lead glazed, mica coated etc – (F); amphorae (A); mortaria (M); white wares – other than mortaria – (W); and white-slipped wares (Q). The remaining ware groups are: 'Belgic type' (broadly in the sense of Thompson 1982, 4–5), usually grog-tempered, fabrics (E); 'Romanised' oxidised coarse wares (O); 'Romanised' reduced coarse wares (R); black-burnished ware (B); and calcareous (particularly shell- and limestone-tempered) and other wares (C). This group overlaps with a final group of coarse tempered fabrics particularly associated with the Malvern area (G). In addition, a relatively small group of hand-made fabrics, most of which were probably also related to the C20 and G20 groups, were recorded in terms of their principal inclusion types in the manner normally employed within the OA pottery recording system for prehistoric material where definition in terms of ware groups is often not appropriate (see below).

Within these classes there are hierarchically arranged subgroups, usually defined on the basis of inclusion type, and individual fabrics/wares are then indicated at a third level of precision, both levels of subdivision being expressed by alpha-numeric codes. Thus, O40 is a general code for Severn Valley wares, while O41 is a specific early Severn Valley Ware product. For the bulk of the present

assemblage fabric identification was at the intermediate level of precision. Much of the material was in fabrics the sources of which are unknown or uncertain, and detailed assignment to specific fabric codes did not seem to be warranted. Attribution of sherds to ware groups or to individual fabrics was on the basis of macroscopic inspection, with frequent but not universal use of the binocular microscope at x10 or x20 magnification.

Relatively summary fabric descriptions or labels are given in Table 5, although some fabrics recently added to the OA series (but mostly of minor significance) are described in more detail. The kiln fabrics are described in greater detail below. More comprehensive descriptions can be found in the project archive and/or in the handbook to the National Roman Pottery Fabric Reference Collection (Tomber and Dore 1998).

The 'hand-made' fabrics

These fabrics, initially distinguished from the pottery assigned to defined ware codes (see above) were characterised in terms of their principal inclusions, typically two but sometimes up to four (listed in order of frequency) depending on the general appearance of the fabric, with a simple numeric scale (from 1 – very fine, to 5 – very coarse) indicating the coarseness of the fabric overall. The inclusion types noted were as follows:

A quartz sand

G grog

L limestone

P clay pellets

S shell

V organic

Z indeterminate voids

Numerous combinations of these inclusion types were recorded, but some of these could be seen as variants of a smaller number of fabric traditions. Of these only the limestone/grog group was numerically significant, accounting for 91.9% of the 'other handmade' sherds (93.2% weight), while amongst the many fabric combinations noted and assigned to this group fabrics GLAV4 and LGV4 accounted for the great majority of sherds. The overall variation in this group is interpreted in terms of slightly differing proportions of a consistent range of inclusion types, with the fabrics most likely representative of a single ceramic tradition.

Fabric/ware groups

Quantification of the fabrics/wares by the three principal measures is presented in Table 6. Variation in fabric proportions depending in the measure employed is typical. There is no one ideal measure, but for convenience sherd count is used here as the primary means of quantification in considering fabrics. Table 7 therefore shows the breakdown of the assemblage by phase in terms of sherd count. Significant aspects of each ware group are discussed below.

The non-kiln assemblage is in many ways quite straightforward. The principal coarse ware component consisted of oxidised wares, dominated by Severn Valley wares, although these (and the oxidised wares overall) were rather better represented by weight and REs (42.2% and 48.5% respectively) than by sherd count (34.2%). Reduced Severn Valley ware was also identified (fabric R49) and contributed a further 3.5% of the assemblage (sherds and REs – 4% by weight). The second major coarse ware component consisted of Malvern (G) fabrics, which completely dominated the later Iron

Age and earliest Roman assemblage, mainly in the form of the limestone tempered fabric G25. This fabric is prone to fragmentation and was consequently better represented by sherd count (30.8%) than by weight (24.5%). The even lower figure for REs (17%) reflects the use of this fabric for large, heavy cauldron-like vessels (alongside other more typical jar forms), substantial fragments of which might still only represent a small part of the vessel (see further below). It is notable, however, that the igneous Malvern fabric (G21) was very poorly represented at Longford and that its 'Romanised' reduced successor (G22) was hardly present at all. The range of hand-made fabrics of later prehistoric character discussed above, consisting principally of grog/limestone-tempered fabrics, also has similarities with the G25/C20 groups and the extent to which they were significantly different from those groups is uncertain. While their appearance suggested that they merited separate definition, they were close in character to fabric G25, which can contain rounded clay pellets and quartz sand grains (Peacock 1968, 421), but not grog or organic inclusions, supporting the view that these fabrics were slightly distinct from G25. There were, however, close typological similarities between vessels in both groupings, with details of some of the smaller jars in both being closely comparable (cf. e.g. Fig. 35, No. 14, recorded as fabric LGV4, with Nos 5, 6, and 13, all in fabric G25).

Further components of the assemblage included Dorset black-burnished ware (fabric B11) which contributed 10.6% of sherds (11.2% of REs) but was, as usual with this fabric, less well-represented in terms of weight (6.8%). These quantities are very similar to the totals of reduced fabrics, of which there was a considerable variety. None was individually very significant in numerical terms, the most common being the reduced Severn Valley fabric (R49) mentioned above, and few were assigned to known sources. A small quantity of Savernake ware (fabric R95) was amongst the latter. Fine, medium and coarse sand-tempered fabrics (R10, R30 and R20 respectively) might all have been relatively local products, and there were some similarities between R30 and kiln fabric 2 (see below), but the distinction between the two was considered to be valid. South-western micaceous ware (fabric R85) formed a small part of the later Roman assemblage (see further below). The later Iron Age and early Roman assemblage was supplemented by small amounts of 'Belgic type' fabrics, mostly wheel thrown and consisting principally of grog-tempered (fabric E80) sherds.

The fine and specialist ware group was not particularly substantial numerically but had a number of unusual components (see discussion below). Amounting to only 4.5% of the assemblage by sherd count, the figure for weight was twice this, reflecting the presence of a range of amphora and mortarium fabrics. While these included 'normal' elements such as south Spanish Dressel 20 amphorae and mortaria from the Verulamium region and (later) Oxford industries, both groups also contained less common early Roman imported fabrics, albeit in small quantities. Quantities of fine wares were tiny and amongst them only a beaker in a fine sandy oxidised mica dusted (F30) fabric was notable (Fig. 41, No. 70). Samian ware was better represented, though the total of only 1.2% of sherds was far from being remarkable, but the assemblage was notable for containing sherds of early Lezoux fabric S31 and in particular a sherd of South Gaulish marbled samian ware (fabric S22), the latter always a rare occurrence (Fig. 43). Amongst the white wares a fine unsourced fabric used for bowls, sometimes decorated with red paint, was notable (Fig. 40, No. 35; Fig. 41, Nos 56 and 58).

Vessel types

The later Iron Age and Roman vessels in non-kiln fabrics amounted to a total of 91.07 rim equivalents (REs). A minimum figure of 772 vessels based on a count of rim sherds is indicative, but less reliable, and these data are only used occasionally for comparative purposes. Vessels were recorded in terms of a series of major classes arranged approximately in a sequence from narrow mouthed to wide mouthed vessels, defined by letter codes. The classes/codes are amphorae (A), flagons/jugs (B), jars (C), uncertain jars/bowls (D), beakers (E), cups (F), tankards and handled beakers (G), bowls (H), uncertain bowls/dishes (I), dishes (J), mortaria (K), lids (L) and miscellaneous forms (M). 'Intermediate' vessel classes (D and I) are used where insufficient of the rim survives to allow an estimate of the likely

ratio of rim diameter to height, the key criterion for definition of the relevant types (Webster G 1976, 17–19) and a further 'intermediate' type code (GH) was used for vertical upper body walls in Severn Valley ware which could have derived equally from early straight sided tankards or carinated bowls (cf Fig. 40, Nos 28–31 and 33–34). The class labels are conventional terms and are not necessarily indicative of specific functions. The vessel classes are divided into broad subgroups, usually with respect to key aspects of form (e.g. a simple division between straight-sided and curving-sided bowls (and dishes), and in some cases specific typologies were also used in the recording (for example for samian ware and for Oxford fine wares and mortaria (Young 1977)). Further definition of each vessel is provided by use of a fairly elaborate system of rim codes. This is essentially a descriptive tool but serves as a useful guide to chronology in some cases, for example in distinguishing between the different types of flange on bowls and dishes, which can be of considerable significance for dating. As with the recording of fabrics, discussed above, the hierarchical definition of vessel form is considered to provide an effective approach to the material, revealing broad patterns of assemblage composition very easily, while allowing for more detailed analysis if this appears to be useful. Vessel class and sub-class definitions and overall quantities are given in Table 8 with the equivalent data for the kiln fabrics also presented here for comparison. The quantification of the major vessel classes in the non-kiln fabrics is presented in Table 9, which omits fabrics for which no rim sherds were recorded.

The most striking aspect of the breakdown of vessel classes is the contrast between the kiln assemblage and that of the other material (discussed further below), the specialised character of the kiln repertoire being emphasised by high percentages of flagons (note that detailed subdivision of the flagon types has not been undertaken here) and beakers and relatively modest numbers of jars. The non-kiln pottery presents a much more typical rural assemblage composition, with jars the dominant vessel class (68.7% of REs). These vessels completely dominated the Phase 3 assemblage (96.7% of REs) and thereafter followed a recognisable trend with a steady decline in importance through the middle part of the Roman period (70.2% in Phase 4 and 62.2% in Phase 5) before stabilising in the later Roman period (Phase 6) at 65% of the assemblage.

Only two other vessel classes contributed more than 5% of the overall assemblage. Bowls amounted to 7.3% and tankards 6.9%, while the indeterminate class GH vessels accounted for another 3.3%, mainly in Phase 4. Only 4.1% of the assemblage consisted of dishes. The GH vessels obscured understanding of the chronological development of the assemblage, in which the decline in the proportion of jars would be expected to be mirrored by an increase in the proportions of bowls and dishes. The latter did become more common, increasing from a meagre 2.2% in Phase 4 to 5.5% in Phase 5. Bowls, however, formed 9% of the Phase 4 vessels, but only 6.1% in Phase 5, increasing to 8.3% in Phase 6. The extent to which this erratic trend might have evened out had the true identity of the GH vessels been clear is uncertain. These amounted to 5.2% of the Phase 4 assemblage and 4.4% in Phase 5, by which time they could have been residual, declining to a mere 1.4% in Phase 6, when this was certainly the case—for the broadly 1st–2nd-century date for the carinated bowl form see P Webster 1976, 33–4; Evans *et al*. 2000, 35, while the vertical sided tankard is of early date by definition. The corresponding figures for tankards were 5.5%, 5.8% and 11% by Phase 6. If the majority of the class GH rims were from tankards, bowls were nevertheless comparatively better represented than expected in Phase 4, and even without a possible contribution from the class GH rims it is clear that carinated bowls (class HA) were particularly numerous in this phase, totalling just over 70% of all bowls, mostly, but not entirely, in Severn Valley ware.

Tankards are a distinct regional type and their importance here must account at least in part for the very limited quantities of beakers and cups present, the former occurring in a range of fabrics, the latter amounting to only three vessels, two in samian ware. There was only a single flagon rim (in Severn Valley ware, Fig. 35, No. 11). Lids were very rare, and 'miscellaneous' forms consisted of a single cheese press. It is possible that some of the apparent gaps in the vessel repertoire were filled with kiln products, but this is uncertain (see further below).

Phasing and chronology

In terms of chronological development the Phase 3 group was dominated by Malvernian limestone tempered fabric G25, supplemented by very small quantities of assorted hand-made fabrics for which a broadly later prehistoric date is likely, and an equally small amount of 'Belgic type' fabrics, particularly grog-tempered E80 fabrics of late Iron Age/early Roman character, but including a wheel thrown high-shouldered jar in fabric G25 (Fig. 35, No. 10). There was a minimal presence of oxidised and reduced coarse wares in this phase, with Severn Valley ware (fabrics O40, O41 and R49) totalling 1% of the assemblage. Two sherds in kiln fabrics will have been intrusive in contexts of this phase but otherwise the assemblage appears uncontaminated. The great majority of the Severn Valley and 'Belgic type' sherds came from late recuts or uppermost fills of the components of the main enclosure ditches.

The assemblage was radically transformed in Phase 4, quite apart from the impact of the pottery production activity. The Malvernian fabrics still totalled more than 35% of the pottery by sherd count (but only 28% by weight) but were supplanted as the principal coarse ware group by Severn Valley wares which had an almost identical sherd count (including the reduced fabric R49) but amounted to 44% by weight. The extent to which the Malvern fabrics remained in use or were simply residual is unclear, but it is notable that the percentages of E wares and the 'other hand made wares', both of which might have been expected to be residual, approximately doubled in this phase, although the values by weight remained more or less constant. Fabric C20 was also more common in this phase and its weight percentage did increase, though not as much as the figure for sherd count. A much wider range of reduced coarse wares was present and included Savernake ware (R95), its possible variant (R94) and other coarse storage jar sherds (R90), while the sandy reduced fabric R20 was more common than at any other time (but again was better represented by sherd count than by weight). Fine and specialist wares appeared for the first time in this phase. The decorated South Gaulish samian ware comprised three sherds each of forms 29 and 37 while plain forms were mainly form 18 dishes (the only earlier dish form, a single example of 15/17, came from a Phase 6 context). Cups were of form 27, and included a couple of Central Gaulish examples, reflecting the continuation of this phase perhaps from the early Flavian period into the first half of the 2nd century. Amphora and mortarium sherds were mostly not from closely-dated forms that help refine this range further: although relatively numerous, all the amphora sherds in this phase were body fragments while mortarium fabrics M11 and M12 are consistent with a later 1st–early 2nd-century date range but the relevant rim sherds were fragmentary.

Only three sherds of black-burnished ware came from contexts assigned to Phase 4, a figure that increased to 13.3% in Phase 5. This presence and an increased (but still modest) percentage of Central Gaulish samian ware were factors that indicate a date a little after AD 120 for the inception of this Phase. Malvern wares had now declined to 9.2% of sherds and might have been almost entirely residual, except for fabrics G21 and G22, both of which appeared for the first time (in tiny quantities) in this phase. Reduced wares increased as a percentage of sherd count, though the increase was largely accounted for by reduced Severn Valley ware (8.9% of sherds). Combined Severn Valley ware fabrics (including R49) now amounted to almost 53% of sherds (60.6% by weight), a position which was more or less maintained in Phase 6. Quantities of fine and specialist wares increased substantially in this phase, but their character did not change markedly, though white ware values were boosted by the presence of bowls in fine fabric W10 (Fig. 41, Nos 56 and 58) and, particularly, a jar in sandy fabric W20 (Fig. 40, No. 41).

In terms of vessel types, as mentioned above, differences between the Phase 5 and Phase 6 assemblages were relatively minor. The same was broadly true in relation to fabrics, with the continued dominance of Severn Valley wares already noted. The most notable change was a significant drop in the percentage of reduced coarse wares (including reduced Severn Valley ware) and a more than corresponding rise in the representation of black-burnished ware to 28.8% of sherds (only 20% by weight but 33.1% of REs, including parts of two cremation urns). This development is

reflected in a substantial increase in the proportion of type CK ('cooking pot type') jars to over 30% of all jar REs, and the first appearance of type HB straight-sided bowls, the examples present including three later 2nd-century flat rimmed types, a late 2nd–3rd-century vessel with a grooved flange, and three later 3rd–4th-century bead and flanged types. Rounded (type HC) bowls were most common in this phase and included a single example in Oxford colour-coated ware (Young 1977, type C51). In total there were just five sherds of this fabric, suggesting only a relatively low level of activity after the middle of the 3rd century. Oxford white ware mortarium forms suggest a similar pattern – the four examples were one each of Young (1977) types M2, M10, M17 and M18, the two latest with a date range of *c* AD 240–300. Overall, the more closely datable elements of the assemblage indicate continuing activity through the later 3rd century but perhaps not much later. Other coarse wares seem to be consistent with this. The wide mouthed jars characteristic of the later Severn Valley ware repertoire (e.g. P Webster 1976, types 27–33) are not particularly numerous, and the latest forms of widely flaring tankards (e.g. ibid., type 44) are completely absent

The pottery kiln products

Three pottery kilns were identified in the excavation. Pottery was recovered from them and from adjacent ditches and wells, amongst other features. Some 9096 sherds (125,463g, 141.31 REs) were assigned to fabrics thought to have been fired in these kilns. The kilns and their products belong to a potting tradition already well known in Gloucester (e.g. Rawes 1972; Timby 1991) and this relationship is discussed in detail below. Two basic fabrics, each with variants relating to firing and finish, were identified. These were given unique identifiers (fabrics K1 and K2) outside the system used for recording the rest of the pottery.

Fabric description

Fabric K1. Fine, fairly clean matrix, sparsely/moderately micaceous; sparse quartz sand up to maximum size of *c* 0.5mm; very occasional larger 'pebbles' up to *c* 1mm; sparse (occasionally moderate) small voids, irregular or (more usually) elongated, typically <1mm long but sometimes larger (up to *c* 2mm); sparse red-brown or brown-black Fe oxides, subrounded, up to *c* 0.5mm, rarely up to 1mm. As Gloucester fabric TF11A (see Timby 1991, 19, 22). Fabric K2. As above, but with moderate quantities of fine-medium quartz sand. As Gloucester fabric TF25.

Both fabrics appear in oxidised and reduced versions (K1O, K1R, etc.), and both firings were common enough to suggest that they were intentional (though not in every case). The firing of some sherds was indeterminate and while it is perhaps likely that the great majority of these were intended to be oxidised this was not certain and a 'mixed firing' coded (K1M, K2M) was used. Further suffixes identified additional characteristics of the fabrics. In the case of K1O sherds these were W (for white slipped), R (for red slipped) and MIC (mica slipped), although the last two were extremely rare. White slip was also present on some sherds of K1M and K1R, suggesting that in both cases an oxidised firing was originally intended. In addition, some sherds of K1R were given the suffix B, indicating black surfaces, probably an intentional firing effect. White slipped and black surface finishes were also noted on sherds of fabric K2.

The quantification of kiln fabrics in terms of these variants is presented in Table 10. Fabric K1 was dominant, but the difference between it and fabric K2 was clear and the latter, though much less common, must have been an intentional product. This is indicated by the quite significant differences in the typological range of the two fabrics. Reduced sherds were more common than oxidised ones in fabric K1, while the uncertain K1M firing accounted for *c* 10% of the sherds. In terms of quantification by REs oxidised K1O was less well represented than by other measures, amounting to just over 30% of the fabric K1 total. K1R accounted for 59% of fabric K1 REs, and almost exactly 50% of all REs in kiln fabrics. White-slipped sherds formed 14.3% of all K1 sherds, but almost a quarter of all K1O material

(and more than a third by weight and REs). If it is assumed that the majority of the K1M sherds were originally intended to be oxidised, as is suggested by the relatively close similarity of the K1M vessel type proportions with K1O, rather than with K1R, and if it is accepted that the K1RW sherds indicate that at least 6% of the K1R sherds represent misfiring of intended oxidised vessels, the overall balance of oxidised and reduced versions of K1 becomes much closer and is perhaps tipped in favour of the former.

There seems little doubt, however, that the preferred firing of fabric K2 was reduced, although the presence of white slipped sherds (5.7% of the total) suggests that at least some oxidised output was intended.

Wasters were not quantified completely systematically. Only some 252 sherds were specifically recorded as wasters or probable seconds—sherds clearly distorted to varying degrees or in some cases having clay kiln structure adhering. Just four of these sherds were oxidised. A reduced finish could thus indicate over-firing (many of the sherds in question were hard-fired, though very few were sintered) and further suggests that the overall proportion of reduced sherds is higher than what was originally intended by the potters, albeit to an unknown extent. In some cases, vessels may have been rejected simply because they were the wrong colour, and not because of any other defect.

Decoration

A fairly wide range of decorative techniques was used on the kiln fabrics. Instances of these have not been analysed in detail, but the frequency of the main decorative types in relation to fabric is tabulated below (Table 11 only shows fabrics on which decoration was recorded).

A number of these elements are unremarkable. The use of grooves, principally on the shoulders of vessels, was widespread, but the use of cordons, seen very commonly on the shoulders of Severn Valley ware jars, for example, was not. The use of area and linear burnishing was common in fabric K1R but much less so elsewhere. Most of these instances were of burnishing on the top of the rim, or on the shoulder (or both) on vessels such as the beakers that formed a large part of the K1R repertoire. The K1R figure for burnished lines includes a single instance of lattice decoration. Rusticated and barbotine decoration were also particularly associated with fabric K1R, again with the beakers that featured in that fabric, but also perhaps with jars (most examples were quite fragmentary). Rustication was mainly in the form of vertical strips, and when these were fairly fine there was potential merging with barbotine decoration, which was most typically in the form of vertical ‘hairpins’ (e.g. Fig. 40, No. 44 for a rather battered example). By contrast eight of the nine instances of rustication in fabric K2 were of nodular type. All but one of the combed sherds, again in fabric K1R, were on a single somewhat atypical vessel (Fig. 36, No. 30).

The commonest form of decoration (in terms of sherd count) was ‘rouletting’—not a wheel technique but consisting of regularly spaced impressions made on the side of the vessel as it was turned. There were two main types of such decoration. Impressions on bowl forms, for example in fabric K1O (e.g. Fig. 37, No. 62; Fig. 38, No. 73) tended to be quite large and relatively widely spaced, while those on beakers in fabric K1R (e.g. Fig. 37, Nos 50–53) were more closely spaced. The distinction between the two types, clear at the ends of their ranges, was blurred at the point where they met, and the examples seen here arguably represent points on a single spectrum. Its application to bowls as well as beakers is notable, the former including white-slipped vessels as well as those in the parent fabric K1O.

Vessel types

The typological range of the kiln products was wide, including ring necked and other flagons, a spouted jug, a variety of jars, beakers, mostly globular forms with angled everted rims, bowls (including carinated bowls), dishes, hook-rimmed mortaria and lids. Unusual forms included jars with small ‘cups’

on the shoulder (contexts 1908, 2313, 2379), a possible honey jar (context 1886) and a fragment of a possible face pot (context 1863) in fabric K1O, possibly originally with white slip, consisting of a small body sherd with a semi-circular strip of barbotine perhaps representing an ear (not illustrated).

Amongst these vessel classes beakers were most common by REs (39.7%), with jars second (24%, closely followed by flagons and jugs (22%). Behind these, apart from bowls (only 7.6% of REs), no other vessel class amounted to more than 2.7% of the total output. The proportion of dishes, less than 1% of the total, was remarkably low. Distinct characteristics of individual vessels are discussed further below, but more widely there is a close relationship between some of the vessels defined as jars and beakers. In this assemblage most of the latter were in any case assigned to type EH 'jar beakers', typically small globular to pyriform jars characteristically with a short angled everted rim projecting from the neck. A distinctive, facetted wedge-shaped version of this rim was particularly characteristic of these vessels (e.g. Fig. 40, Nos. 45–50), but was also present on a few larger vessels recorded as jars (e.g. Fig. 36, No. 32), underlining the connection/blurred distinction between some examples of these two classes. The presence of decoration, usually 'rouletted', was used as a further criterion in the identification of vessels as beakers. The correlation of broad vessel classes with fabrics is shown in Table 12

These associations do not need to be considered at length because of the uncertainties attaching to some firing variations. Some broad trends are evident, however. The first of these, concerning flagons, serves immediately to make the point about firing variations. Flagons total 22% of the identified kiln output, mostly in fabric K1, and with a majority in oxidised fabrics. Of the latter, nearly two thirds were white slipped (with the much smaller number of flagons in fabric K2 were mostly white-slipped). It is notable, however, that a very significant proportion of the flagons recorded in fabrics K1M and K1R were white-slipped. If, as seems likely (see above), these were misfired oxidised vessels this indicates that some 69% of all flagons were projected to be in fabric K1OW, and that, including unslipped examples and those in fabric K2, a minimum of *c* 96% of all flagons were in oxidised fabrics. On this basis it can be suggested that any reduced flagons, whether white-slipped or not, probably represented firing errors. The numbers are smaller, and the case therefore less clear cut, in relation to mortaria, 76.6% of which (by REs) are in oxidised fabrics, with a larger proportion lacking white slip, but on a priori grounds there was probably an intention that these should all have been oxidised.

The situation is much less clear with regard to other vessel classes, and it is quite possible that both oxidised and reduced versions of many of these were considered acceptable. For jars and beakers, however, the extant material indicates a strong preponderance of reduced firing; 73.9% of REs for all jars and 77.2% of REs for all beakers, the most numerous single vessel class. Here the intended colour of the irregularly fired examples is less clear, but in the case of jars in fabric K2, for example, the fact that less than 4% of these were oxidised strongly suggests that the irregularly fired examples should be associated with the reduced vessels of these forms. Overall, only 12.2% of all vessels in fabric K2 were oxidised, and the majority of these were flagons, as noted above.

Kiln pottery by phase

Quantification of kiln fabrics by phase is shown in Table 13. Since the period of use of the pottery kilns is considered to be confined entirely to Phase 4 this mainly reflects patterns of deposition. It is notable that a relatively small proportion of the total kiln material comes from contexts immediately post-dating the production phase. In Phase 6, the proportion of kiln products increases substantially, but this is explained by the fact that some of the key features in this phase were recuts of the Phase 4 enclosure ditch into which large quantities of kiln waste had been dumped: this material was therefore redeposited in the later ditch fills.

Discussion

The development of the assemblage in overall terms has been outlined above. What is striking here is the contrast between the kiln material and the rest of the assemblage. Pottery manufacture at Longford belongs to a production tradition that is intimately associated with the early phases of the nearby *colonia* of Gloucester, and perhaps with the later stages of military activity that preceded the foundation of the *colonia*, though the date of the latter has been and remains much debated.

The related Gloucester kilns are two at the College of Art site (Rawes 1972; 1978) just outside the city on the south-east side (and probably further recently excavated kilns at the same site, for which no details are currently available), and one at Berkeley Street, just inside the city wall on the north-west side (Timby 1991). A further kiln in this tradition is reported from Kingsholm (e.g. Timby 1991, 30; 1999, 39) but remains unpublished. The main Longford fabric is effectively the same as Gloucester TF11A (Timby 1991, 19) which forms the basis of the output of the Gloucester kilns. It is less certain that the products of the related Kingsholm kiln are in the same fabric, but TF11A is found at Kingsholm and it is possible that its earliest production was there (Timby 1991, 29). Kingsholm was also the likely source of earlier pottery in a different series of fabrics (Gloucester TF24, TF36 and TF39) associated with the pre-Flavian legionary fortress there and uncommon elsewhere in Gloucester (Timby 1999, 37). Inevitably, therefore, there are substantial similarities between the Berkeley Street, College of Art and Longford kilns, not least in the appearance of pipes in both kilns at the College of Art site (Rawes 1972, 25–7 and plate I), which it now seems were used as part of the lining of kiln superstructures (as suggested by Rawes 1972, 26), and in their ceramic outputs. It is presumed, though not certain, that the operation of the various kilns at the different sites was sequential but establishing such a sequence is problematic. Timby (1991, 30) suggested a late Flavian or early Trajanic date for the two kilns from the College of Art site and proposed that the Berkeley Street kiln may have been slightly earlier. There is no doubt that the Longford kilns belong in a broad late 1st/early 2nd century date range. Key points of comparison and contrast between the different sites are tabulated below. An advantage of the present assemblage compared to those from the production sites at the Gloucester College of Art and Berkeley Street, where neither fabrics nor vessel types were systematically quantified, is that identification of the Longford production material is not complicated by the existence of potentially similar material from earlier and later phases of activity (see e.g. Timby 1991, 29).

The variations in output between the different production sites can be interpreted in terms of an evolutionary sequence of production, but they could as easily relate to other factors. There are some pointers, however. The three Longford kilns are all different: they are also approximately evenly spaced. Kiln 2351 lay roughly 35 m north-east of kiln 2350, while kiln 1707 was c. 43 m south-west of 2350. Kiln 2350 was the only one of the three to be closely comparable to the other Gloucester kilns in terms of structure, having a long integral fired clay pedestal projecting from the back of the oven wall, and a relatively well-defined stokehole. The parallel with, for example, the College of Art site is strengthened by the association of kiln 2350 with fired clay pipes or tubes. Fragments of these were found in the fill of the kiln itself and in adjacent contemporary features, well 2394 and pit 1887. Other findspots of pipe fragments from later features (and also intrusive in the top of the Phase 3 enclosure ditch) are all close by; all this material was found within a radius of about 15m of kiln 2350.

The other two kilns were rather different in form. Kiln 2351 to the north-east lacked the relatively well-defined flue of kiln 2350 and had a fairly short stokehole. As in 2350, the raised floor was supported on a long rectangular pedestal, but this was constructed of fired clay blocks luted together and may not have been attached to the rear wall of the firing chamber. On the south side of the firing chamber further blocks set against its edge seem to have been intended as outer supports for the floor, but whether this was a permanent structure or of movable bars is not clear. Kiln 1707 is altogether more problematic. A large part of the structure was cut away by a later ditch, as a result of which it was not well understood at the time of excavation. The kiln seems to have been built in the upper part of an earlier pit, though it is possible that the excavated structure represented a complete

rebuild of an earlier kiln. In any case, the pottery from deposits below the identified structure consisted almost entirely of kiln fabrics. If the identified structure represented the primary form of this kiln it was certainly not a primary feature in relation to the use of the site for pottery production. The form of the kiln was also different from that of the other two. There seems to have been a central pedestal, perhaps approximately oval in form, defined by a fairly thin raised ledge of fired clay. To the east, a row of inverted vessels, all in kiln fabrics, was packed around with clay and appeared to form part of the wall of the firing chamber. Five vessels survived partly in situ, and two others were thought to have formed part of the same arrangement. This highly unusual feature is not readily paralleled. It is possible, however, that it represents a variant on a local theme of kiln superstructure construction using tubes or pipes.

In summary, the variety of kiln structures perhaps indicates a sequence, possibly with kiln 2350, typologically closest to the Gloucester examples, the earliest of the three, but can this be seen in the pottery? Comparison of the assemblages directly associated with kilns 2350 and 2351 does show some differences, but the usual caveats that apply to such material have to be borne in mind—that kiln features could have been used as dumps for pottery fired elsewhere, and that even if the pottery did all derive from the kiln where it was found it could represent partial residues of multiple firings over a period of time of unknown length. The material from kilns 2350 and 2351 (the group associated with kiln 1707 was too small to be meaningful) can be summarised as follows. Kiln 2350 produced 573 sherds (8542g, 9.61 REs). Almost 73% of sherds were in versions of fabric K1R, and fabric K1O accounted for 12.9% of sherds. Figures for weight were closely comparable. Beakers accounted for 68.7% of the REs present, jars totalling 17.5% and flagons and mortaria 7.7% and 4.2% respectively. Kiln 2351 contained 452 sherds (7326g, 9.85 REs). Here K1R variants amounted to 64.6% of sherds and K1O totalled 15%. K1M sherds were 17.3% of the total, and altogether white-slipped sherds accounted for 11.7%, nearly three times as much as in kiln 2350. Beakers were again the dominant vessel class, but only totalled 40.6% of vessels, with jars amounting to 25.4% and flagons 14.1%. Bowls and lids (9.8% and 9.4% respectively) were relatively well represented. The significance of the differences between these assemblages remains unclear, and together they only account for about 14% (by REs) of the total kiln pottery from the site, so the extent to which they can be considered representative is also questionable.

The sample of the combined kiln output from Longford clearly includes elements of specialist production and does not reflect a typical domestic assemblage. The proportion of jars (24% of REs; for the figures see Table 14) is much lower than would be expected, even allowing for significant differences in assemblage composition between contemporary urban and rural groups. Equally, the proportion of flagons (22%) is unusually high, and the representation of beakers, almost 40%, is particularly notable. Large numbers of beakers were present in both the quantified kiln groups (above), and this was clearly a favoured vessel class at Longford, though it is possible that the high numbers reflect one or two firings in which a significant proportion of the load was rejected and dumped nearby. High percentages of beakers and flagons are characteristics not seen clearly at Berkeley Street but are apparently shared with the assemblage from the College of Art site. The relatively high frequency of bowls at the College of Art, and particularly the regular use of micaceous slip, however, are not so readily paralleled at Longford, though examples of some of the bowl forms seen at the College of Art do occur. In broad terms Longford seems to have more points of similarity with the College of Art site (perhaps not least in the use of 'pipe technology' in some of the kilns) than with Berkeley Street, but there are parallels there as well, including, for example, points of detailed similarity in rim forms on some of the beakers (e.g. cf. Timby 1991, fig. 3 no. 17 with Fig. 37, Nos 48 and 50).

A key question concerns the significance of the kiln products for the contemporary users of the site, which in turn concerns the wider issue of the relationship between the potters and the original rural population of the settlement. It is perhaps improbable that the latter were responsible for the production of pottery in what would have been for them a quite alien style. The pottery

production was associated with a major reworking of the primary later Iron Age enclosure and it is therefore possible, but not demonstrable, that this involved appropriation of the site by a completely new group of people and corresponding dispossession of the existing inhabitants (this assumes that activity associated with the Phase 3 enclosure involved a domestic component—the pottery from this phase is consistent with that interpretation, but does not allow distinction between permanent and temporary occupation, the latter perhaps associated with periodic activities related to cattle management or other agricultural functions). Such a development could have taken place in several different circumstances, but a plausible context would be the establishment of the *colonia* at a still uncertain date in the later 1st century.

If this interpretation is correct and if the development involved removal of the existing population, it follows that much of the pottery from Phase 4 contexts was associated with the new users of the site (and it is possible that some of the 'kiln products' in Phase 4 were not made on site but were brought from Gloucester by the new arrivals). The components of the non-kiln element of the Phase 4 assemblage have been outlined above. The problem with determining the extent to which these characterise the proposed new users concerns the proportion of this material which was redeposited/residual from Phase 3. More specifically, were the coarse-tempered Malvernian (G25) and similar fabrics, which amounted to 28% of the non-kiln pottery in this phase by weight, still in contemporary use? It is notable that at Kingsholm Malvernian pottery did not occur until after demolition of the military site (Hurst 1985, 78), though whether because all the ceramic needs of the early fortress were completely covered by other material or the Malvernian pottery was considered unsuitable is not known. In relation to Gloucester itself, Ireland (1983, 98) notes that 'Native wares are absent at the North Gate site, and on the evidence of other excavations in the city, never occupied a significant role in the pottery supply at any period.' On this basis, it is unlikely that these wares were anything other than residual at Longford in Phase 4, but this interpretation involves an assumption about the replacement of one community by another (above). An alternative possibility is that the site's users included at least some of the earlier rural population.

The non-kiln component of the Phase 4 assemblage contained a more balanced assemblage in terms of vessel types, with jars forming about 70%. About one third of these were in Malvernian and related fabrics which were potentially residual by the end of the 1st century. If these are discounted jars still amounted to 61% of the phase total of REs in non-kiln fabrics. On the same basis bowls contributed 11.8% of REs and beakers a mere 2.1%. Tankards totalled 7.2% and the uncertain tankard/carinated bowl group (class GH) a further 6.8%. Malvernian wares aside, Severn Valley ware was now the dominant component in the assemblage, which thus began to take on the character typical of rural assemblages in the region from the 2nd century onwards, with principal contributions from Severn Valley ware and black-burnished ware. Much of the output of the kilns must have been intended for use in the *colonia* of Gloucester; some will have been consumed on site, but what proportion of the excavated assemblage consisted of such vessels is unknown. The extent of use of kiln vessels at Longford can be estimated in part from their distribution (Fig. 44). This shows a fairly tight concentration of kiln fabrics in the vicinity of the kilns themselves and in the ditches of the main enclosure system associated with the kilns. Without exception, all feature groups containing more than 50 sherds of kiln material (and in fact all but two of the groups with more than 10 sherds or more than 200g of kiln pottery) were in such contexts. The occurrence of small quantities of kiln material in Phase 5 and later features, mostly ditches, within the northern extension of the early Roman enclosure area and in the separate northern settlement area does suggest some wider use of kiln vessels, but at a very low level. Much of the pottery in the larger groups in the main enclosure ditches and adjacent features seems likely to represent discarded production waste rather than material deriving from adjacent domestic activity.

A further aspect of the non-kiln Phase 4 pottery is the appearance, albeit in small quantities, of fabrics that in a typical late 1st/2nd-century rural settlement context would be considered highly exotic. These included three different amphora fabrics and two imported mortarium fabrics (plus a

Verulamium mortarium). Associated samian ware was unremarkable except for the presence of a sherd of marbled La Graufesenque samian, which would be noteworthy in almost any context (Fig. 43). These vessels clearly derived from the military/colonial ceramic pool of Gloucester and were presumably part of the range of material considered to be standard requirements by the operators of the Longford kilns, being brought to the site by them.

The quantity and, to an extent, the range of these imported fine and specialist wares increased in Phase 5. This trend could represent in part the redeposition of material introduced to the site in the previous phase or continued close contacts between the occupants of the site and the nearby *colonia*, or (perhaps most likely), a combination of both factors. Some kiln product vessels might have continued in use at this time, but production is thought to have ceased. The combination of Severn Valley and black-burnished wares was now well on the way to achieving the complete dominance of the assemblage that was to be seen in Phase 6, when together they accounted for 78.7% of the assemblage by sherd count (76.8% by weight, 81.9% by REs, excluding kiln material, by now entirely residual but well-represented in this phase owing to recutting of earlier ditches—see above). In effect the assemblage had now become a fairly 'normal' rural one, with most of the exotica representing hangovers from Phases 3 and 4. The dominance of Severn Valley and black-burnished wares fits a well-known regional pattern recently conveniently summarised by Timby (2017, 318, 321, fig. 7.24).

Characterisation of the Phase 6 assemblage beyond these broad aspects and ignoring the relatively large quantity of redeposited kiln material, is difficult because of the extended chronological range assigned to the period, which therefore encompasses several potentially significant ceramic changes. The most obvious of these, however, developments in vessel types and the appearance of distinctive fabrics such as the late Oxfordshire repertoire (both briefly discussed above) that serve to identify the period after the mid-3rd century, are not well represented in the Longford assemblage. These include only five sherds of Oxford colour-coated ware, two later 3rd-century Oxford mortaria and two bead and flanged bowls in black-burnished ware (a third example of this type in BB1 came from a post-Roman context, it is less certain that another example, in Malvernian fabric G21 (Fig. 41, No. 74) was of this specific date range).

Based on sherd count, this phase assemblage has what appears to be a relatively modest component of fine and specialist wares (6.8%). While this is the case in comparison with the Upper Thames Valley region, further east, where analysis of comparative data in these terms has been fairly intensive (e.g. Booth 2018a, 342–5; 2018b, 134–7 for recent examples), in the Severn Valley region north of Gloucester comparable values are common (see e.g. Booth 2016, 106–7, table 3.8, where however, only two thirds of the original table is reproduced and sites closer to Gloucester, particularly at Bishop's Cleeve and Cheltenham, were accidentally omitted). Timby (2017, 332, fig. 7.33) shows fine and specialist ware percentages for a wider range of sites in Gloucestershire, but these are not distinguished chronologically, presumably because many of the published assemblages from rural sites are not divided by phase; for the Upper Thames region, at least, it is clear that chronological factors are critically important in understanding variation in these values (Booth 2004, 42, 44). While this may be less the case in the Gloucester region, with variation influenced more by site character than by any chronology, there are hints that the latter was still a relevant factor, perhaps particularly in the 4th century rather than earlier, as seen to the north at Bredon's Norton (Booth 2016, 106–8). The fact that occupation at Longford is not thought to have extended much into the 4th century likely eliminates the possibility that evolutionary trends in late Roman fine and specialist ware representation could have been detected here.

In overall terms the fine and specialist ware figures of 8.2% and 6.8% for Phases 5 and 6, the former perhaps artificially enhanced by some sandy white wares (fabric W20) of uncertain significance, are fairly consistent and sit comfortably in the middle of the range defined by Timby (2017, 332) and perhaps slightly above the average values for the Severn Valley north of Gloucester listed in part in Booth 2016 table 3.8. The Longford assemblage does not, therefore, stand out as particularly remarkable by comparison with those from other rural settlements in the region, but this

is consistent with the other evidence from the site that suggests a short phase of 'unusual' activity, focussed around pottery production (and it is notable the fine and specialist wares only amounted to 2.9% of the 2412 non-kiln product sherds in Phase 4), and probably a reversion to an agriculture-based economy thereafter, with no indication of substantial structures or related features, and no corresponding notable characteristics in the associated pottery.

Catalogue of illustrated vessels: non-kiln pottery

The illustrated non-kiln pottery is presented by phase with the vessels arranged in broad typological sequence.

Phase 3

1. Fabric AG3/4, rounded jar with simple very slightly out-turned rim. Burnished on top of rim and neck and with broad vertical and horizontal burnished lines on shoulder. Context 2570, ditch group 2.

2. Fabric G25, plain barrel shaped jar with upright very slightly expanded rim. Context 2501, ditch group 10.

3. Fabric G25, simple jar with very slightly angled thickened rim defined by groove. Burnished overall. Context 2675, ditch group 2.

4. Fabric G25, shouldered jar with angled everted rim defined by groove. Context 2570, ditch group 2.

5. Fabric G25, 'cooking pot type' jar with stubby everted rim. Burnish on rim and shoulder and vertical burnished lines below. Context 2572, ditch group 2.

6. Fabric G25, 'cooking pot type' jar with stubby everted rim. Burnish on rim and shoulder and oblique burnished lines below. Context 2572, ditch group 2.

7. Fabric G25, large handled jar with thickened slightly beaded rim. Context 2241, ditch group 8.

8. Fabric G25, large handled jar with angled everted rim. Burnish on rim and shoulder and oblique burnished lines below. Context 2572, ditch group 2.

9. Fabric G25, squat jar/bowl with angled everted rim. Burnish on top of rim, oblique burnished lines on shoulder and vertical burnished lines below. Context 2572, ditch. Single hole knocked through middle of base. Context 2691, ditch group 8.

10. Fabric G25, wheel thrown, squat high shouldered jar. Burnish on rim and shoulder. Context 2572, ditch group 2.

Phase 4

11. Fabric O40, wide necked flagon with elaborate rim and single four-ribbed handle. Context 2626, pit 2636.

12. Fabric C10, high shouldered/barrel-shaped jar with simple upright rim. Context 2785, pit 2788.

13. Fabric G25, barrel-shaped jar with short everted rim. Burnish on rim and shoulder and oblique burnished lines below. Context 2748, ditch group 105.

14. Fabric LGV4, cf fabric G25, small 'cooking pot type' jar. Burnish on top of rim and vertical burnished lines on body. Context 2782, pit 2788.

15. Fabric O41, narrow mouthed jar with cordon at base of everted rim. Multiple grooves defining narrow band of acute angled burnished lattice blocks. Context 1868, pit 1870.

16. Fabric R40, medium mouthed jar with slightly everted rim. Pronounced cordon at base of neck above zone of nodular rustication. Context 1942, ditch group 96.

17. Fabric O40, medium mouthed jar with upright rim. Grooves at base of neck and girth. Context 2713, ditch.

18. Fabric R30, medium mouthed/high-shouldered jar with thickened slightly out-curving rim. Context 2589, pit 2592.

19. Fabric O40, high-shouldered jar with slightly everted rim defined by groove. Context 2029, ditch group 14.

20. Fabric O40, high-shouldered jar with slightly everted rim. Context 2782, pit 2788.

21. Fabric O40, high-shouldered jar with slightly everted rim. Girth grooves. Context 2785, pit 2788.

22. Fabric O41, high-shouldered jar with slightly everted rim. Girth grooves. Context 2783, pit 2788.

23. Fabric O41, high-shouldered jar with slightly everted rim defined by groove. Context 2785, pit 2788.

24. Fabric C20, rounded jar with short everted rim. Context 1942, ditch group 96.

25. Fabric G25, large jar with very short slightly beaded rim. Context 2379, ditch group 13.

26. Fabric O40, spouted jar/bowl (single spout) with slightly out-curving rim. Grooves above and below girth define zone of multiple oblique burnished lines. Cf Evans *et al*. 2000, 42–43 type MS1. Context 2630, pit 2636.

27. Fabric R10 (common fine sand grains and occasional larger sand), beaker or small jar with short, deeply grooved rim. Context 2027, ditch group 14.

28. Fabric O40, straight sided tankard. Grooves beneath rim and on middle of body define a zone of burnished lattice decoration. Context 2765, ditch group 98.

29. Fabric O40, straight sided tankard with multiple grooves below rim and on body. Context 1863, pit 1870.

30. Fabric O40, straight sided tankard with pairs of grooves on body. Context 2589, pit 2592.

31. Fabric O40, straight sided tankard. Pairs of grooves on body define deep zone of acute angle burnished lattice decoration. Context 1825, pit 1746.

32. Fabric O10, carinated bowl with flaring upper body walls. Context 2381, ditch 2383.

33. Fabric O40, deep carinated bowl with upright upper body walls. Context 2358, ditch group 14.

34. Fabric O40, deep carinated bowl with upright upper body walls. Context 2782, pit 2788.

35. Fabric W10, hemispherical bowl with out-sloping rim. Grooves on upper body and red painted deep zig-zag line below. Context 1878, pit group 103.

36. Fabric G25, large bowl/cauldron. Context 2627, pit 2636.

37. Fabric G25, plain rimmed straight sided dish. Context 1908, ditch group 12.

38. Fabric O40, plain rimmed straight-sided dish. Context 2028, ditch group 14.

39. Fabric R49, complex profiled dish, loosely related to forms such as CAM 24. Context 2027, ditch group 14.

Phase 5

40. Fabric O40, narrow mouthed jar with everted rim. Context 1745, pit 1746.

41. Fabric W20, large medium mouthed jar with thickened everted rim. Multiple grooves on lower body. Context 1745, pit 1746.

42. Fabric O40, medium mouthed jar with everted rim. Grooves at base of neck and girth. Context 1424, ditch 1425.

43. Fabric O40, medium mouthed jar with everted rim. Girth grooves. Context 1745, pit 1746.

44. Fabric C20, simple bead rim jar. Context 1745, pit 1746.

45. Fabric G25, bead rim jar. Context 1745, pit 1746.

46. Fabric B11, 'cooking pot type' jar with short upright rim. Burnish on top of rim and shoulder, vertical/oblique burnished lines on body. Context 1424, ditch 1425.

47. Fabric B11, 'cooking pot type' jar with fairly short everted rim. Burnish on top of rim and shoulder, deep zone of burnished lattice on body, not consistently finished at the bottom of the decoration. Context 1703, ditch group 79.

48. Fabric B11, 'cooking pot type' jar with fairly short everted rim. Burnish on top of rim and shoulder, oblique burnished lines rather than lattice on body. Context 1424, ditch 1425.

49. Fabric R49, wide mouthed jar with out-curving rim. Girth grooves. Context 1196, ditch group 26.

50. Fabric B11, unevenly fired, large handled jar. Vertical and oblique burnished line decoration. Context 1824, pit 1746.

51. Fabric O40, spouted jar/bowl (spout missing) with an out-curving rim. Grooves on shoulder, partial white slip. Context 1745, pit 1746.

52. Fabric B11, jar beaker. Burnish on top of rim and on shoulder, deep zone of acute angle burnished lattice decoration. Context 1640, ditch 1641.

53. Fabric O10, large jar beaker with angled everted rim. Girth groove. Context 1824, pit 1746.

54.fabric R49 with black surfaces, straight sided tankard. Grooves on upper body and vertical burnished lines below. Context 1758, ditch.

55. Fabric O40, deep carinated bowl with upright upper body walls. Context 1745, pit 1746.

56. Fabric W10 (as No. 35), carinated bowl with flaring upper body wall. Red painted wavy line above carination. Context 1745, pit 1746.

57. Fabric O40. Simple hemispherical bowl. Context 1455, ditch group 36.

58. Fabric W10 (as Nos 35 and 56), curving sided flanged bowl with broad red paint arcades on flange. Context 1610, well 1572.

59. Fabric B11, straight sided dish with flat flange. Burnished on top of rim and in interior. Close set acute angle burnished lattice. Context 1703, ditch group 79.

60. Fabric B11, plain rimmed straight sided dish. Burnished on top of rim and in interior. Burnished interlocking arcades (almost zig-zag) on outer wall and wavy line pattern on underside of base. Context 1436, well 1572.

61. Fabric O40, widely splayed straight sided dish. Context 1424, ditch 1425.

62. Fabric O40, curving-sided dish. Context 1745, pit 1746.

63. Fabric M21, hook rimmed mortarium, well worn. Context 2038, ditch group 24.

64. Fabric M14, hook rimmed mortarium. Context 2980, ditch group 94.

Phase 6

65. Fabric O40, Medium mouthed jar with thickened out-curving rim. Groove at base of neck. Context 1143, ditch group 68.

66. Fabric B11, 'cooking pot type' jar. Burnish on top of rim and shoulder. Deep zone of slightly obtuse angled lattice decoration. Small holes (probably originally four) drilled through base of vessel. Context 1143, ditch group 68.

67. Fabric B11, 'cooking pot type' jar. Burnish on top of rim and shoulder. Zone of obtuse angled lattice decoration. Context 1143, ditch group 68.

68. Fabric B11, 'cooking pot type' jar, used as a cremation urn. Burnish on top of rim and shoulder. Approximately right-angled lattice decoration. Context 3298, burial 3286.

69. Fabric O40, wide mouthed jar with ?single handle. Context 3069, ditch group 53.

70. Fabric F30 (common fine sand inclusions), globular beaker with angled everted rim. Context 2498, ditch group 101.

71. Fabric O40, tankard with slightly out-sloping sides and thickened rim. Context 1143, ditch group 68.

72. Fabric O40 (sandy), carinated bowl with flaring upper body wall. Grooves on tip of rim and upper body. Context 1121, ditch group 68.

73. Fabric B11, straight sided bowl with flat flange and chamfered base. Burnished on top of rim and in interior. Burnished pointed arcades. Context 1577, ditch group 83.

74. Fabric G21, straight sided bowl with slightly offset upper body wall and projecting flange with squared end. Burnished on top of rim and flange. Context 4125, ditch group 67.

75. Fabric O40, dish or lid with thickened round-ended rim. Context 1264, ditch group 76.

76. Fabric M11. Hook-rimmed mortarium. Context 2497, ditch group 101.

77. Fabric M32, hook rimmed mortarium. Context 4102, ditch group 110.

Unphased

78. Fabric R30, cheese press. Context 1674 subsoil.

Catalogue of illustrated vessels: kiln-related pottery type series

The vessels are arranged in a single typological sequence regardless of fabric. Vessels are from contexts assigned to Phase 4 unless specified otherwise. Parallels are quoted in abbreviated form: Rawes (1972) and Timby (1991) refer to illustrated vessels in the respective publications.

Flagons and jugs

1. Fabric K1OW. Wide necked flagon with 'Hofheim type' rim. Context 2498, ditch group 101, Phase 6. Cf Rawes 116.

Flagons with everted rims

2. Fabric K1OW. Context 2277, ditch group 12, Phase 4.

3. Fabric K1MW. Context 2580, ditch group 12.

4. Fabric K1RW. Context 2510, kiln 2351.

Ring necked flagons

Cf broadly Rawes 119–126 and 128; Timby 25–31.

5. Fabric K1O. Context 2375, well 2394.

6. Fabric K1O. Context 2451, kiln 1707 structure.

7. Fabric K1OW. Context 2690, well 2394.

8. Fabric K1O. Context 2084, pit 2087.

9. Fabric K1RW. Context 1868, pit 1870.

10. Fabric K1RW. Waster. Context 2580, ditch group 12.

11. Fabric K1MW. Context 1436, well 1572, Phase 5.

Two-handled flagons

12. Fabric K1O. A possible two-handled flagon. Context 2658, ditch group 12.

13. Fabric K2OW. Context 2375, well 2394.

14. Fabric K1R. Context 2375, well 2394.

Jug

15. Fabric K1OW. Jug with simple two-ribbed handle. Context 1868, pit 1870.

High shouldered jar

16. Fabric K1R. Context 1825, ditch group 103.

Medium mouthed jars

17. Fabric K1M. Context 2510, kiln 2351.

18. Fabric K2R. Context 1869, pit 1870.

19. Fabric K2RB. Context 2451, kiln 1707 structure.

20. Fabric K2R. Context 2451, kiln 1707 structure.

21. Fabric K2RB. Context 1869, pit 1870.

22. Fabric K2RB. Context 1869, pit 1870.

23. Fabric K1R. Context 1854, ditch group 16, Phase 6.

24. Fabric K1R. Waster. Context 2498, ditch group 101, Phase 6.

25. Fabric K1R. Context 2498, ditch group 101, Phase 6.

26. Fabric K1R. Waster. Context 2498, ditch group 101, Phase 6.

27. Fabric K1R. Context 2388, kiln 2350.

28. Fabric K1O. Context 2497, ditch group 101, Phase 6.

29. Fabric K1R. Context 2310, ditch group 12.

30. Fabric K1R. Angled everted rim jar with zone of wavy line combed decoration below shoulder grooves. Context 1745, pit 1746, Phase 5.

31. Fabric K2RB. Context 1869, pit 1870.

32. Fabric K1O. Context 1854, ditch group 16, Phase 6.

Jar/bowls

33. Fabric K1O. Jar/bowl with blind spout on shoulder. Context 2365, layer. Cf Rawes 158.

34. Fabric K1O. Jar/bowl as No. 33. Context 2313, ditch group 12.

Fragments of at least two further vessels of this type were recovered.

35. Fabric K1R. Large jar/bowl with slightly thickened in-sloping rim, the outer tip defined by a groove. Waster. Context 1908, ditch group 12.

Beakers

36. Fabric K1R. Small ?beaker of uncertain form. Context 2310, ditch group 12.

Angled everted rim beakers

These are mostly of globular form similar to that of some of the jars, from which they are not always easily separated. The neck of the vessel is not usually well-defined, only Nos 54–56 have a slight shoulder.

37. Fabric K2R. Context 2451, kiln 1707 structure.

38. Fabric K2RB. Context 2451, kiln 1707 structure.

39. Fabric K1R. Context 1960, ditch group 100, Phase 5.

40. Fabric K1R. Waster. Context 2388, kiln 2350.

41. Fabric K1R. Waster. Context 2498, ditch group 101, Phase 6.

42. Fabric K1R. Waster. Context 2388, kiln 2350.

43. Fabric K1R. Waster. Context 2388, kiln 2350.

44. Fabric K1R. Context 2388, kiln 2350.

45. Fabric K1O. Context 2497, ditch group 101, Phase 6.

46. Fabric K2M. Context 2451, kiln 1707 structure.

47. Fabric K2RB. Context 2451, kiln 1707 structure.

48. Fabric K1M. Context 2498, ditch group 101, Phase 6.

49. Fabric K1R. Context 1868, pit 1870.

50. Fabric K1R. Context 2498, ditch group 101, Phase 6.

51. Fabric K1R. Context 2497, ditch group 101, Phase 6.

52. Fabric K1M. Context 2498, ditch group 101, Phase 6.

53. Fabric K1R. Context 2497 ditch group 101, Phase 6.

54. Fabric K1R. Context 2510, kiln 2351.

55. Fabric K1M. Context 2313, ditch group 12.

56. Fabric K1RB. Context 1863, pit 1870.

Carinated beaker

57. Fabric K1O. Context 2783, pit 2788. The only example of this form in the entire assemblage.

Carinated bowls with out-sloping upper body walls

58. Fabric K1R. Context 2389, kiln 2350.

59. Fabric K1OW. Context 2499, ditch group 101, Phase 6.

60. Fabric K1RW. Context 2497, ditch group 101, Phase 6.

61. Fabric K2O. Context 2690, well 2394.

62. Fabric K1O. Context 2498, ditch group 101, Phase 6. Cf Rawes 32.

63. Fabric K1O. Context 2195, well 2394. Cf Rawes 32

Carinated or slightly rounded bowls with roughly vertical upper body walls

Cf Rawes 42 and 543; Timby 44.

64. Fabric K1O. Context 2273, ditch group 13.

65. Fabric K1R. Context 4076, ditch group 61, Phase 6.

66. Fabric K1RB. Context 2277, ditch group 12.

67. Fabric K1O. Context 1866, pit 1870.

68. Fabric K1M. Context 2499, ditch group 101, Phase 6.

69. Fabric K1R. Context 2498, ditch group 101, Phase 6.

70. Fabric K1R. Context 2421, ditch group 14.

Hemispherical/rounded bowls

Cf Rawes16–21; Timby 33–39.

71. Fabric K1R. Context 2509, kiln 2351.

72. Fabric K1R. Burnished overall. Context 2511, kiln 2351.

73. Fabric K1O. Widely spaced 'rouletted' decoration. Context 2593, ditch group 101, Phase 6.

Rounded ?bowls with pronounced in-sloping rim

The rim form is paralleled on Rawes 25, a vessel apparently of rather different form from these, which are not otherwise matched in the Gloucester kilns.

74. Fabric K1RW. Context 2497, ditch group 101, Phase 6.

75. Fabric K1OW. Context 2497, ditch group 101, Phase 6.

76. Fabric K1OW. Context 1960, ditch group 100, Phase 5.

77. Fabric K1O. Context 1935, posthole 1937.

Flanged bowls

78. Fabric K1R. Context 1960, ditch group 100, Phase 5.

Straight-sided dishes

79. Fabric K2R. Context 1811, ditch group 16, Phase 6.

80. Fabric K2RB. Context 1866, pit 1870.

Curving sided dishes

81. Fabric K1R. Context 2250, ditch group 12.

Mortaria with slight upright bead and tapered down-sloping flange

82. Fabric K1O. Context 2593, ditch group 101, Phase 6.

83. Fabric K1RW. Context 1753, pit 1752.

84. Fabric K2RW. Context 1863, pit 1870.

Mortaria with (usually) more prominent upright or in-turned bead and even-sided down-sloping flange

Cf Timby 47–50.

85. Fabric K1OW. Context 2277, ditch group 12.

86. Fabric K1MW. Context 2498, ditch group 101, Phase 6.

87. Fabric K1OW. Context 1868, pit 1870.

88. Fabric K1O. Context 2386, kiln 2350.

89. Fabric K1OW. Context 1960, ditch group 100, Phase 5.

90. Fabric K1OW. Context 1960, ditch group 100, Phase 5.

91. Fabric K1O. Context 1908, ditch group 12.

92. Fabric K1O. Context 2000, ditch group 16, Phase 6.

Lids

93. Fabric K2RB. Context 2593, ditch group 101, Phase 6.

94. Fabric K1RB. Context 2273, ditch group 13.

Miscellaneous

95. Fabric K1R. Cheese press. Context 2313, ditch group 12.

Fired clay

by Cynthia Poole

A large assemblage of fired clay amounting to 3848 fragments (c. 186kg) was recovered from the excavations, with the majority of the assemblage from two pottery kilns of early Roman date (AD 70–120). This included materials sampled from the *in-situ* structures as well as the collapsed superstructures, which account for 72% (79% by weight) of the assemblage. The remainder of the fired clay was found mainly in ditches and pits of late Iron Age and early Roman date (Phases 3 and 4). Fired clay from sieved samples amounted to 1103 fragments (13kg). Structural fired clay is not intrinsically dateable, since the characteristics as preserved in demolished discarded fragments remain similar throughout the period when fired clay was mainly in use (Neolithic-medieval), though *in situ* structures may be distinctive to a period, as is the case of the kilns at Longford. Furniture is more likely to be diagnostic and typical of certain periods, as is the case with the triangular bricks (Iron Age–early Roman) and firebars (Roman) from Longford. A group of highly unusual ceramic tubes is described under the heading of ceramic building material below but because these relate to kiln structures the two classes of material are discussed together.

Included with the fired clay are small quantities of burnt soil, subsoil and unfired clay. Burnt stone found amongst the fired clay was summarily recorded before discarding (this is additional to any burnt stone included in the stone record and report). Discard has been undertaken during recording, resulting in 45% of fragments (c. 25% by weight) being discarded. This material included non-diagnostic amorphous fragments and much of the structural material with a single surface. A higher proportion of the furniture was retained on the basis that further attempts to refit more of the firebars might be undertaken. Any *in-situ* structure that had been sampled was reduced, retaining only a typical representative subsample.

In general, the fired clay is in good condition, consisting of several deposits of well-preserved items both in relation to the kilns and deposits in pits, resulting in an unusually high mean fragment weight of 63g. Even including sieved material, the MFW remains well above average at 38g. If all the material from the two kilns is excluded it falls to 29g, which is still high compared to many settlement sites and suggests that the fired clay had been deposited fairly rapidly in features following disuse without being subjected to excessive trampling or weathering.

Fabrics

The fabrics divide into three broad groups: fabrics A, Q and E. Within each group there are subsidiary categories, sometimes represented by only a single example, as well as examples with overlapping characteristics.

Fabric A was a smooth clay, essentially without inclusions in its purest form and generally fired grey, greenish grey or blue-grey or to paler shades of red, orange or brown when oxidised. It was occasionally micaceous (subtype AM) and sometimes contained sparse small shell fragments less than 3mm in size (subtype A Sh). Included within A were examples of very fine sandy or silty clay (subtype AS) and clay containing a sparse scatter of medium quartz sand c. 0.5mm (subtype AQ). A small proportion of group A had had chaff added surviving as voids and impressions within the clay.

Fabric Q appeared to be made with same basic clay matrix but was distinguished by a much higher density of medium-coarse quartz sand <1.5mm and frequently contained a scatter of small stone grits and pebbles (mostly flint or sandstone, occasionally limestone) up to 20mm in size. This was frequently fired to black, mid or dark grey, as well as red, orange and brown. A similar range of subsidiary types as for fabric A were noted based on minor inclusions (subtypes QM, Q Sh). It is uncertain whether the shelly subtypes should be grouped as a separate shelly fabric, but the size and quantity of shell inclusions suggests that this is an incidental component within the two major groups.

There is no evidence to suggest that shell was deliberately added as temper, though the shelly clays may have been deliberately selected for furniture, for which it was more frequently used.

Fabric E was the least common variety. It was distinguished by its laminated marbled clay fabric visible as paler orange and cream veins and streaks within a red or orange fired sandy clay fabric, which also contained cream silty clay and red ferruginous clay pellets and occasional small stone grits and shell. This fabric is similar in character to the CBM fabric E, suggesting that they originated from the same source.

Fabric G was represented by a single instance of a light pinkish brown grog- (or unwedged clay) tempered clay fabric.

Fabrics from all groups have been found in all phases and used for both structure and furniture. The only differences to be perceived appear to be that Fabric A was used more frequently in structures and fabric Q more frequently for furniture. Similarly, the shelly variants of both groups were more commonly used for furniture than structure. The fabrics are quantified by phase in Table 15 and in relation to function in Table 16. The shelly variants have been grouped (SH) as a separate category in the tables.

Phase 1: middle Neolithic

A few small scraps of fired clay (seven fragments, 35g) were recovered from sieved samples from a prehistoric pit (3180) and two postholes (3010, 3012). The fragments were mostly amorphous, but a couple had a moulded surface and one possibly had the impression of the wood grain from a split pole. Their function cannot be determined, though it is likely they derived from oven or hearth structures.

Phase 3: late Iron Age/early Roman

A small quantity of fired clay derived from features phased to the late Iron Age, all from ditches except for a single pit. This material is predominantly classified as oven or kiln structure. Much of it comprised fragments with a single moulded surface, which often had distinct finger grooves and undulations from smoothing the surface, a feature typical of internal oven or kiln wall surface. There were also two examples of thick slabs of clay 42mm and 47mm thick. One (from context 2598) had a smooth flat surface superficially burnt black and the opposite surface flat but roughly moulded with finger grooves and rounded folds of clay pressed over and smoothed across it. It was only lightly fired or heated and may have formed part of a drying floor in an oven for crop processing. In general character, it is very similar to Iron Age 'oven covers' from sites such as Danebury (Cunliffe and Poole 1991, 149–50) as is the second block (context 2569). This took the form of a flat plate or oven cover with upper and lower surfaces heavily moulded with deep finger grooves on one side, but less pronounced on the other with finger smoothing of surface. The curving edge forms a circular vent c. 120mm in diameter. The broken outer edge is concave and may represent a sheared interface within the clay body of the structure, but it is not uncommon to find these surviving only as a 'collar' (ibid. fig. 4.96.31), which may have been separately applied to finish a vent in a turf structure.

A curving slab from context 2037 may have formed a thin dome plate. It measured 13mm thick and had an even undulating moulded concave surface and rougher convex surface. One piece may have a rounded slightly curving moulded edge. It was associated with other blocks of oven or kiln wall 43mm thick.

All the objects identified as furniture were small pieces of triangular perforated brick. Most of the fragments came from the side face of the brick, pierced at an angle by a cylindrical perforation apart from one corner fragment. The surfaces were smooth and even and the perforations measured

11–16mm in diameter apart from one unusually small example of 8mm diameter. No complete dimensions survived but thickness was estimated to be 54mm, 85mm and 120mm on three examples. The triangular bricks were all found in the concentric ditches (2, 4, 5, 7, 10) of the main square enclosure, as was most of the structural fired clay (ditches 2, 3 and 4).

Phases 4–6: early–late Roman

The majority of the fired clay assemblage is concentrated in the early Roman period (Phase 4) (Table 17). The quantity from Phases 5 and 6 is considerably reduced and much of the material appears to represent kiln debris dumped in ditches and disturbed by later recutting or maintenance of features. The Roman assemblage is therefore described as whole.

Two pottery kilns, 2350 (Fig. 11) and 2351 (Fig. 12), of the most common Roman design found throughout the western Empire were exposed, fully excavated and their structures sampled, in addition to all collapsed debris being collected for recording and analysis. Both were updraught kilns constructed with a main circular firing chamber with integral tongue pedestal projecting from the back wall, a narrow flue projecting from the front forming the furnace and a stoking pit at the end of the flue. In both cases, only the lower sub-surface chamber survived *in situ*, whilst the upper chamber in which the pottery would have been stacked had been dismantled or collapsed. This same basic arrangement of the subsurface structure has been found for example at Colchester, in the Nene Valley, and Oxfordshire (Swan 1984) as well as at Gloucester (Rawes 1972). A third structure, pit 1707 (Figs 13 and 14), which differs in its construction from the other two kilns, can also be interpreted as a kiln.

Kiln 2350

The *in-situ* clay structure was sampled extensively from the walls, floor and pedestal. Fabric A was used for the whole of the subsurface structure and formed a hard, dense solid structure, which had been fired light to mid-bluish or greenish grey. Adhering to the back of some pieces were remnants of the surrounding natural subsoil heated to a reddish-brown colour and consisting of coarse sandy natural clayey sediment containing angular flint grit 4–8mm and rounded pebbles c. 10–15mm. The wall structure was up to 80mm thick and was evenly fired throughout. The surfaces were variably finished, some areas being smooth, even or very gently undulating, others rougher or more irregular with pronounced undulations and depressions, some clearly from fingers or thumbs pressing into the clay whilst moulding the surface. Deeper finger marks and depressions occurred in the angles joining the back wall and pedestal. Some pieces had shallow hollows 20–30mm long which appear to be the result of heat damage to the surface. Internal bonding faces or joints were rarely noted where the clay had broken. Occasionally a wedge-shaped profile was found, where the clay had been smoothed and thinned out over an adjacent area, and some back faces had an even curving surface suggesting that the clay had broken away at a constructional interface.

Pieces sampled from the floor showed that this formed a thinner tabular slab ranging from 5–44mm thick. The surface was flat and roughly smoothed often with depressions, sometimes from fingers and possibly the edge of a palm print, but others probably represent wear damage from raking out the kiln. The underside forming the surface bonding to the underlying natural was rough and flat, sometimes with gravel or pebble impressions. The sample from the flue mouth consisted in large part of the underlying burnt natural sandy clay sediment indicating this area to be heavily worn.

The fragments from the nose of the pedestal had a rounded surface (the only sample in which curvature of the surface was visible in the *ex situ* blocks), which was fairly smooth and even in places, with occasional finger grooves and depressions from shaping and ridges of overlapping clay where

batches of clay had been pressed together to build up the structure (for the *in-situ* structure see Fig. 45).

Fragments recovered from sieved samples from the fill (2546) of a hollow formed in the base at the junction of flue and stokehole produced a few small amorphous scraps of floor lining and burnt natural that is typical of rake-out debris. Stratigraphically equivalent to this was the layer (2389) covering the base of the stokehole, which is clearly the remains of charcoal and burnt debris raked out of the kiln during its use, probably mixed with trampled soil. This produced similar material, mostly from sieved samples, in the form of small broken scraps of kiln lining, some with a flat surface, some amorphous up to 44mm in size. In amongst this were fragments with pot impressions which indicates that damage to the superstructure also occurred during the use of the kiln. A single small fragment of ceramic kiln tube was also present, together with a large quantity of pottery. On account of the quantity of pottery it was concluded on site that this was a layer dumped from elsewhere. However, in view of the evidence for use of pots within the structure (below) it is probable that this all represents kiln debris produced during the use of the kiln.

A deposit of yellow clay (2390) infilled the hollow in the mouth of the flue, and although this is recorded as containing kiln structure no fired clay was retained. Although it was interpreted on site as a repair to the floor, the presence of kiln structure was noted, and it is possible that this in fact represents collapse of the stokehole arch.

The fired clay within the remaining fill of the kiln appears to consist of collapsed superstructure from the walls and dome of the kiln, accompanied by kiln tubes and pottery. The fired clay occurred in greatest quantity in the lowest layer (2388), which overlay layer 2390 and infilled the lower half of the firing chamber and flue. Quantities decreased successively in the overlying layers (2387 and 2386), which infilled the remainder of the whole structure. Broken kiln tubes were only found in the lowest layer. The tubes are described in detail in the CBM report (below), but it is clear from impressions in the fired clay and from the fired clay adhering to the tubes that these formed an integral part of the kiln structure.

Demolished structure comprised large blocks of kiln wall up to 100mm thick with a single flat moulded smooth surface, sometimes with striations from wiping or finger grooves and depressions from shaping. Thin lenses of darker grey clay 2–4mm thick partly coated the surface of some pieces, possibly being the remnants of luting material though they may also result from repairs to cracks that appeared during initial drying and firing of the kiln. Fragments had commonly broken along angled and perpendicular bonding surfaces between individual lumps, suggesting that the structure had been built with rough blocks of clay with some smeared and thinned out over adjacent structure creating the wedge-shaped pieces. The back faces were rough flat or undulating, less fired than the interior surface, reddened and sometimes had a coating of sand. Two pieces, which have two surfaces at right angles, may have formed part of a ledge to support the floor of the upper chamber. One of these has luting clay attached to the surface.

Several fragments had a curve, very roughly moulded with fine striations, irregular lumps and depressions. The curvature is concavo-convex suggesting that this formed part of the rounded edge of a curving opening, either a vent in the kiln structure or the stokehole arch. The curvature indicates a width of c. 60–85mm for the wall, whilst the arch, vent or opening may have been in the order of 0.2m in diameter.

In addition, a substantial quantity of the superstructure fragments exhibited impressions of pottery, together with distinctive pieces of luting. Pieces with vessel impressions included examples of both concave and convex smooth surfaces representing the inner and outer surface of the vessel. Some with a ridged convex surface are the impressions of the inner surface of pots based on the curvature and probable diameter of the vessels (Fig. 48). Some examples had a smooth concave surface with two parallel lines running around the circumference, which suggests these were impressions of pots such as Nos 50 or 54 (Fig. 40). Several also have the impression of the pot rim and

on some of the larger pieces have two or three potsherd impressions. Some of those with multiple impressions suggest the pots were set side by side, while others indicate the base of one pot had been set in the mouth of the adjoining pot. All these have a crudely moulded rough surface on the exposed face, with deep and irregular finger marks and depressions from pressing the clay into place. None of the impressions could be identified positively as the ceramic kiln tubes (see below), even though some of the tubes had fired clay attached to them. Substantial quantities of kiln superstructure were dumped in the very top fill of the late Iron Age ditch (cut 2493) just to the north of kiln 2350, and included well preserved pieces of walling and luting with pot impressions (Figs 53–54, Nos 16–18). These are likely to represent debris resulting from the removal of the dome of kiln 2350, not necessarily from the final demolition of the kiln but possibly prior to unloading after firing during the life of the kiln.

Pieces of luting are irregularly shaped with a mix of flat or curving, even moulded surfaces in conjunction with much more irregular, undulating and rougher areas, often with coarse finger grooves. Some of these may derive from the irregular nooks and crannies which occur in any kiln structure, especially at joints between different structural elements.

There was virtually nothing that could be construed as dome plate. Some of the thinner slabs (e.g. Fig. 49) have been categorized as such during recording, but this is by no means certain. They measured between 20mm and 50mm thick, had one smooth moulded surface, and a rougher, irregular surface on the opposite side sometimes with organic impressions including straw stems. Occasionally a roughly moulded edge was present. A further object that was possibly associated with this kiln, from pit 1887 which produced a quantity of material almost certainly derived from it, was a fragment of a portable pedestal or support (Fig. 56, No. 19).

Kiln 2351

The subsurface structure of kiln 2351 was extensively sampled. This showed that the flue walls had been worn back to the burnt natural in which the structure was set, but elsewhere the wall lining survived (Fig. 46). This typically had an even moulded undulating surface with finger depressions and grooves from shaping the clay surface and particularly pronounced in the angle joining the walls and pedestal. The back of the fragments had generally broken away at a rough sheared interface often with stone or gravel impressions. The wall fragments varied from 5–62mm thick. The sample from the nose of the pedestal was smooth, undulating and noticeably curved unlike the wall fragments which all appeared flat. The pedestal also appeared to have reused fragments of fired clay from an earlier structure built into it. The kiln floor was composed of a thin slab of clay 12–25mm thick with a worn flat even surface and poorly fired on the underside and has sheared away at the interface with the underlying unfired natural.

The kiln had clearly suffered very heavy wear across its base and it would appear the walls had also been damaged on the north since, although the original floor extended under the relining, there is little evidence of the original wall, in contrast to the south side where the original wall lining is preserved behind the blocks of firebar (Fig. 46). The kiln had been altered during its use and the firing chamber narrowed by the addition of a wide ledge against the north wall and the setting of several blocks of broken firebars against the south wall. The addition on the north side was constructed of broken blocks of firebars embedded in clay and the wall relined (Fig. 47), in contrast to the south where they appear to be more freestanding, set on end. The different treatment of each side may relate to different periods of refurbishment. It is uncertain whether the firebars were set up to act as pedestals supporting the floor of the upper chamber or whether they were intended to protect the lower walls from damage and wear. The effect of the additions to both walls was to narrow the lower chamber internally from 1.4m to just over 1m. Their use as supports would make for a very shallow lower chamber only 0.2m deep compared to the more standard 0.4–0.6m depth. At least two were placed with their moulded ends uppermost, so they would not originally have been any longer

at this period of their use and further blocks would have to have been placed on top of those found *in situ* to achieve a reasonably height for the suspended floor of the upper chamber.

The floor of the upper chamber must have been constructed of large rectangular firebars, which tapered slightly to the ends. Apart from those rebuilt into the lower chamber, a total of some 200 fragments (32.4kg) were found in the layers of demolished superstructure (2509, 2510) infilling the kiln base. The firebars (Figs 50–51, Nos 3–7) had rectangular, square or trapezoidal cross sections measuring from as little as 70mm wide at the end up to 160mm wide in the centre (Table 18). No complete length survives, the maximum found being 300mm, but their full length must have been in the region of 0.8m to span the gap between the exterior wall and the pedestal. The firebars generally had a regular, smooth flat surface recognisably different from the finish of the walls, enabling identification even when only a single surface was present. This is largely due to the longitudinal laminar texture of the clay fabric, which may indicate that they were made by rolling slabs of clay into a long column before shaping to a straight-sided rectangular form. Occasionally finger marks from handling and grasping the bar were visible (Fig. 50, No. 4). The angles between surfaces were slightly rounded but quite abrupt. Where the ends survived, these were rougher than the sides, often slightly concave smoothed into a scoop or with a depression deliberately made in the end. Some ends were angled. Each had been heavily fired to a bluish or greenish grey, often with slight vitrification or cindering on one or two sides. Some were grey on one side and red and oxidised on the other, no doubt reflecting the differential firing between top and base surfaces. It was not uncommon to find the end reddened and even underfired, suggesting that it may have been inset into the kiln wall or had been protected by a layer of bedding or luting where it was attached to either the pedestal or the outer edge of the kiln. In some cases, the missing end appeared to have eroded away, having been barely fired. One had unusually been cut, pre-firing, on opposite sides to form a point (2719, Id.134, Fig. 51, No. 7). A skim of sandy clay was often attached to the surface and frequently fired black or green, possibly the remains of luting or a sand coating to prevent the unfired objects sticking to work surfaces.

A few pieces of luting were found. Some were the typical wedge-shaped pieces with a flat base pressed over the kiln structure, a curved concave exterior with finger grooves from moulding the clay and a third internal concave surface where it had been wrapped around a cylindrical object c. 30mm in diameter, possibly the neck of a flagon (Fig. 51, No. 9). Another piece with a splayed end and with a pot impression on the back suggesting that it formed part of the kiln wall structure, appeared to form a plug in the end of a tubular object, either a kiln tube or narrow necked pot.

A few pieces of thin flat slabs of clay with smooth surfaces on both sides and measuring 5–18mm and 42–54mm in size appear to have formed bedding or luting between adjacent firebars or between firebars and the kiln wall or pedestal. Another piece (Fig. 51, No. 8) forms the splayed end of a cylindrical bar 63mm dia. x >70mm long, which probably formed a plug in the end of a ceramic tube or neck of a jar to secure it to the structure. The splayed end appears to have been attached to the kiln wall structure, as it has a pot surface impression embedded in it in the form of a smooth curving convex surface. The surface of the splayed foot is quite rough and irregular, though the surface of the cylindrical plug is more even, but with a lumpy texture.

Kiln 1707 and pit 1870

Kiln 1707 is an enigmatic feature with evidence of burning and lined by a ring of pots set in clay (Figs 13 and 14). The lower levels of the pit should probably be treated as an earlier feature together with its fill. The uppermost gravelly layer (1756) in this earlier pit may have been deliberately laid to consolidate the surface before the construction of the oven or kiln. There is some suggestion in the site photographs that this layer had been heated and discoloured to a reddish tinge. Covering this was a thin charcoal rich layer (2356 or 2367) containing large quantities of broken pottery together with fragments of clay luting from the interior and exterior of pots, including impressions of pot bases. This

layer could be remains of fuel from an early phase of firing the structure, but no evidence of any structural features survives, though it is possible that this served as the base of a single chamber kiln largely constructed of turf. The large quantity of broken pottery could be wasters from one of the other kilns used to consolidate the base of the feature, but the sherds could equally be wasters from a firing of a primary phase of use. It is impossible to be certain of the interpretation of these lower fill layers.

Following this, the structure was significantly modified by the deposit of a thick layer of grey clay (1757). A sample showed this to be entirely unheated raw clay, essentially the basis of fabric A. However, photographs of the deposit show reddened and grey areas which had been heated to some extent, suggesting the sample was deliberately taken from the unheated area. It is uncertain with only the photographic evidence available whether this clay layer might have been the superstructure from the hypothetical early phase or whether it resulted from firing of the later phase. A large quantity of unfired or lightly fired clay could easily survive from the kiln superstructure, as the exterior clay structure may remain unfired, especially if its use was short lived. The clay layer 1757 could therefore be structural debris from an early phase of use that served as the base for the second structure. A ring of whole pots, of which six survived *in situ*, were inset into this clay around the outer edge of the feature and the clay smoothed up over the pots to form a thin layer of wall lining. In the centre there was the rim of a hollow oval structure (1815) partly surviving around its southern half which measured c. 0.4m in diameter. This was probably the base of a central pedestal, which may have been constructed with a pot as its core that did not survive. The surface of the clay floor and wall lining had been burnt black superficially, but the heat does not appear to have penetrated the clay to any great depth. None of the burnt clay was collected from this deposit, so it has not been possible to compare it to the structural clay of the two kilns and any interpretation is reliant on the site photographs. The only fired clay recovered comprised a few small fragments from the sieved sample from one of the pot fills (2233). These included a wedge-shaped piece with shallow linear corrugations, which may be a piece of luting, and other scraps with a flat surface and a concave surface of a possible pot impression.

Although little fired clay was recovered from the structure itself, pit 1870 lying some 9m to the south-east produced a significant quantity of fired clay (nearly 10kg) which may represent dumps of demolished superstructure from kiln 1707 (but both features are situated close to the limit of excavations and what features existed to the south-west is unknown (Fig. 10). The fired clay from the pit comprised almost entirely kiln structure (e.g. Fig. 54, No. 15), including typical kiln wall, fragments with pot impressions and fragments of luting, of the type described from kilns 2350 and 2351. A characteristic noted during recording was that much of the fired clay appeared to be lightly or poorly fired and with a higher proportion of oxidised material fired pink, orange, red and brown, compared to the two kilns to the north-east. Pit 1870 also produced broken pieces of three triangular perforated bricks, which are the examples most closely associated with kiln debris. The fired clay was distributed throughout the pit but nearly three quarters occurred in the lower dumped fill 1868, more modest quantities in the basal and uppermost layers (1869, 1863) and a light scatter of fragments through the other fills.

Triangular perforated bricks

A significant number of triangular perforated bricks were found, accounting for 92% (86% by wt) of portable furniture found outside of the kilns during the Roman period (Figs 52–53). Many of the examples are fragmentary, mainly corners or from the perforated sides, but there are also six ranging from 70% to 100% complete. Most have a smooth, well finished triangular face, slightly uneven edges and rounded arrises and corners. All have evidence of up to three lateral perforations, one through each corner, though several clearly had only one or two perforations. Details of sizes for the more complete examples are given in Table 19. Only a few of the fragmentary pieces have a complete

thickness (c. 66mm, 74mm, c. 90mm) or estimated thickness (70mm, 75–80mm (2), 70–90mm, 82mm, 85mm, 90mm), the latter estimated from the distance of the perforation to the triangular face. Perforations were evenly distributed between 9mm and 18mm in diameter, but with two peaks at 10mm and 16mm. Most pieces are well and uniformly fired, but it was not uncommon for some areas of the surface or edges to be more heavily burnt and blackened, whilst the core sometimes remained underfired.

The bricks were all found in pits or ditches frequently associated with kiln structure or furniture, although none was directly associated with any of the kilns. Some occurred as isolated examples within a feature, whilst others were found as groups such as in a recut of the eastern corner of later Iron Age enclosure ditch 2 which contained seven broken triangular perforated bricks ranging from fragmentary to near complete in one intervention (2178). In addition to the examples from pit 1870 noted above, ditch 98 produced a group of three in one intervention (2699), including two largely complete, and two others associated with fragments of kiln bar and pedestal from a second intervention (2768). Several examples were found in different sections of ditch 12, where they were associated with fragments of kiln structure and furniture.

Ceramic building material

by Cynthia Poole

An assemblage of ceramic building material (CBM) amounting to some 1160 fragments weighing 117.4kg was recovered through hand excavation and in insignificant quantities from sieving. Approximately half the assemblage has been fully recorded in accordance with guidelines of the Archaeological Ceramic Buildings Material Group (ACBMG 2007), using codes set out in the OA recording system for this material, as well as references to typological attributes defined in other sources (e.g. Warry 2006). During recording, well-preserved diagnostic pieces were retained, and the rest discarded. The remainder of the assemblage was rapidly scanned for the assessment, when form and the presence of significant features such as flange type, cutaways and markings were noted, but not recorded in detail and neither dimensions nor the fabric were recorded. Nevertheless, this material appeared to be consistent in character with the fully recorded part of the assemblage. The assemblage is almost entirely Roman in date apart from a small quantity of post-medieval/modern fragments recovered from topsoil, subsoil, and medieval/post-medieval furrows and ditches. The most interesting item of these was part of glazed malting kiln brick of 18th–19th century date. The post-Roman material is not considered further, but summary details are recorded in the archive. Three quarters of the Roman assemblage was found in ditch fills and the remainder in pits, postholes, hearth, kiln, wells, natural features and spread layers.

Character and provenance

The assemblage includes all major forms of Roman tile: tegula, imbrex, brick, flue tile and a single tessera; quantification by type is shown in Table 20. In addition, a few unusual ceramic kiln tubes were found, which had been used in the construction of one of the kilns.

Fabrics

No detailed analysis of the fabrics has been undertaken. Where a fabric type has been assigned to a tile this has been based largely on macroscopic features sometimes with the additional aid of a x20 hand lens. Initial identification of fabrics suggests there are five main types, all sandy, ranging from very fine to coarse sandy types, all predominantly fired red-orange, though a proportion have a grey core:

A: pale pink/mauve containing calcareous grits 1–6mm; clay matrix is often laminated. Mainly used for tegula apart from one imbrex.

B: Orange, cerise or pinkish red sandy clay matrix containing frequent red-maroon iron oxide inclusions or ferruginous clay pellets 1–5mm. Used for tegula and imbrex and one example of brick.

C (including Q and S variants): red, orange, pinkish orange, reddish brown, some with grey core, frequent medium-coarse quartz sand generally well sorted and evenly dispersed in C, but more mixed and uneven in Q; may also contain small red ferruginous grits <4mm; S: mixed sand/quartz and other rock sand. Some also contained shell or limestone inclusions. Used for all tile forms.

D: orange, red, very fine sandy; sometimes visibly micaceous (DM). Used for brick, tegula, imbrex and kiln tubes.

E: sandy fabric in wide range of shades of red, orange, pink, mauve, brown, but often lighter shades predominate with distinct cream marly laminations or swirls and clay pellets and sparser sand than C. Used for brick, tegula, imbrex and a wall tile.

There is considerable overlap between fabric types with frequent intermediate examples, suggesting that the clay sources exploited derived from a similar geological resource. Based on the proportion of the assemblage where fabric has been identified, the group C sandy fabrics were most common followed by fabric E. The calcareous fabric A formed the smallest group. The laminated fabric E would appear to be closely related to the fabric used for the late Iron Age triangular perforated bricks (see below) and suggests that the clay exploited was relatively local.

Kiln tubes

In addition to the standard tile forms, a small quantity of pipes or ceramic tubes (69 fragments, 7810g) were recovered. These took the form of cylindrical hollow tubes with a flat base and very thickened walls which taper to a much thinner rounded rim at the top (Figs 55–61). The walls measure from 10 to 22mm thick from top to bottom thickening up to 39–55mm at the base. The tubes measure from 80–90mm in diameter at the top and up to 130mm at the base. The internal diameter was generally 65–80mm except at the very base where this decreased to 48mm and 27mm by 50mm in the two surviving bases. No complete lengths survive: the longest surviving example, measuring over 275mm, came from the central section missing both ends. Two base sections measure over 175mm and 205mm in length and sections with the upper rim surviving measure between 100mm and 150mm. At the College of Art site in Gloucester similar kiln tubes survived to an incomplete height of 8ins (*c* 200mm) (Rawes 1972, 25–26 and plate I). The complete height of the kiln tubes is unlikely to be greater than 400mm. A variety of kiln tubes were found at Colchester ranging in length from just over 10ins (*c* 255mm) to over 17ins (*c* 435mm) (Hull 1963, 22).

The exterior surfaces of the tubes were smoothed and only faintly corrugated, in contrast to the internal surface, which had coarse rounded corrugations running horizontally around the circumference. On the rim sections the interior corrugations have been completely smoothed out up to about 65mm from the rim. The corrugations reflect the coil-made structure of the tubes, but the smoothing of the exterior and fine diagonal striations across the corrugations inside suggest that the tubes were partly built up and smoothed on a slow wheel and on the interior, was only well smoothed at the top to a depth fingers could comfortably reach when complete.

Whilst these objects are similar to Roman water pipes, the ends do not have male/female joints to connect to form a waterproof seal. The largest group were found in the fill (2388) of kiln 2350 and their distribution in other features focuses on this kiln. They are all well fired and fired clay remnants adhered to the exteriors. The firing is typically heavily reduced, although occasional oxidised fragments were noted. Lumps of clay found in the interiors of two appear to be part of the luting used to secure the tubes in the kiln structure (e.g. Fig. 56, No. 20).

Roofing: tegula and imbrex

Roofing formed the dominant elements of the assemblage, accounting for about a quarter of the tile (by weight). The tegulae (211 fragments, 33,741g) are characterised by a regular finish, with a smooth upper surface and even bases frequently knife or wire trimmed. Rough edges were frequently knife trimmed, especially the lower section alongside the flange, and arrises were often cut to a narrow bevel. A nail hole 8mm in diameter centred 38mm from the top edge was found on one tile. The tegulae ranged from 17–38mm in thickness with roughly two thirds of above average thickness, i.e. over 25mm thick.

Rounded flange profiles were dominant (Fig. 63). Upper cutaways were all rectangular, with the end of the flange cut away to the level of the central body of the tile. The length of the cutaway varied considerably from 49mm to over 81mm, with two main groupings in the region of 50 and 70mm long. Lower cutaways consisted mainly of Warry's (2006) groups B and C with three of type D. Many of the lower cutaways were incomplete and damaged with only a few complete lengths present. Type B includes two complete lengths of 45mm and 50mm, but several others were longer than this with the longest over 60mm. No type C or D cutaways were complete: extant lengths were in excess of 45–56mm. Based on Warry's (2006) proposed development and dating of tegulae cutaways, the tile predominantly dates to the 2nd century and first half of the 3rd century. Three examples of type D, which he dates to AD 240–380, all came from phase 6 ditches (101, 79, 4082).

Imbrices (54 fragments; 8098g) were of standard form, generally with an angular rather than rounded profile (Fig. 64, No. 34). The upper surface was usually smooth and even, but the underside was frequently rough and irregular. Most edges were rough, but some ends had edges smoothed to a concave form and side edges were often angled. Thickness ranged from 12–34mm, but as with the tegulae, a large proportion appeared to be of above average thickness, with many over 20mm thick.

Flat plain tile (507 fragments; 34,544g) formed about a third of the assemblage and the recorded material ranged in thickness from 16–34mm, suggesting that most represents roofing, though it is possible that thin bricks are also encompassed by this group.

Brick

Brick (70 fragments, 16,244g) was largely identified on the basis of thickness: all plain fragments over 40mm thick were classified as brick. Only two corner fragments were seen, allowing positive identification based on the form; one of these measured only 33mm thick, indicating that some of the thicker flat tile could be brick fragments. Complete thicknesses measured up to 59mm with a couple of incomplete pieces over 60mm and 62mm. In general thicknesses over 50mm were common suggesting that many of the bricks represented may be of the larger forms or, as with the roofing, were overall thicker than average. The surfaces were smooth and even on top, occasionally with fine striations from smoothing. Edges and bases were rougher with the more irregular examples often knife or wire trimmed. Only one signature mark was noted.

Flue tile

Flue tile was represented by only four pieces (585g). Three were of a form *c* 20mm thick, probably tubuli. Two were identified by the presence of small sections of teeth marks from combing, whilst the third had knife-scored keying. A thicker tile 30mm thick had two knife-scored lines on the underside forming part of the typical diamond pattern, suggesting that this was a flat wall tile used in conjunction with spacer bobbins (Fig. 64, No. 35). Both scored forms are early, dating from the 1st or early 2nd century. The wall tile was made in fabric E and one of the tubuli in the Q variant of fabric C.

Tessera

A single small diamond shaped tessera was found in a phase 6 late Roman ditch (1535). It was very neat and well-shaped, measured 11mm by 12mm and 6mm thick and was made in an orange sandy fabric. It would have been used in the finer patterned areas of a mosaic.

Markings

Markings were rare and included 12 signature marks of the commonest type forming a semicircle or arc made with one, two, or three fingers. One was more horseshoe shaped with in-turned ends at the tile edge. All occurred on tegulae apart from one on a brick. The only imprints were finger marks from handling on two tegula fragments. A possible tally mark in the form of slightly angled vertical line was cut into the edge of a flat tile. However, the identification as a tally mark is uncertain, as it may have been entirely accidental related to the knife trimming of the edge, and as tally marks are usually associated with military production. No stamps were found on any tile, though one partial example on a tile from the evaluation (WA 2004) consisted of '[…]H' the letter standing in relief in a sunken rectangular frame. This is probably the LLH stamp (Collingwood and Wright 1993, RIB II, 2489.22), all examples of which have been recovered from Gloucester. It is grouped by Warry (2017, 93–4) with five other, relatively uncommon 'private' dies all found in the Gloucester hinterland. Their production is suggested to be in the period AD 100–150, contemporary with the production of tiles marked with the Gloucester civic dies (RPG, etc.) (ibid.).

Mortar

Four small amorphous fragments (4g) of lime mortar were recovered from context 1162. A larger block (201g) from context 1824 made in a pink sandy lime mortar containing small tile grit <3mm had a flat rendered surface and measured 46mm thick. It is probably a piece of wall surface from a mortared structure.

Discussion of the fired clay and ceramic building material

The fired clay found at Longford is related almost in its entirety to the construction and functioning of the kilns. The three kiln structures all have differences as well as features in common in their construction. Kilns 2350 and 2351 are of similar design and these are discussed together. They are similar to those previously found in Gloucester such as the College of Art site, where two kilns of the same date and type as the Longford kilns were exposed just outside the south-east defences of Roman *Glevum*, and at Berkeley Street, where a kiln was found inside the western defences of the town. Kiln 1707 has been partly destroyed by a later ditch, but it differs in its layout and construction to the other two though having features in common with them.

The basic layout of the subsurface structure of kilns 2350 and 2351 is well preserved and essentially the same, consisting of a circular firing chamber, tongue pedestal extending from the rear wall towards the mouth of the chamber, which joins to a narrower flue and thence opens into a circular stoking hollow. Kiln 2350 is of a single phase of construction, but evidence of wear at the entrance to the flue and a repair to the floor surface (2390) at this point indicates that it was in use for some length of time. A build-up of debris in the stoking hollow also suggests use over a period of time during which minor repairs of the superstructure occurred. Kiln 2351 underwent modifications, which must imply at least one major rebuild, or possibly two, following a period of prolonged use resulting in heavy wear to the floor and possibly heat damage to the walls and pedestal. The lenses of sand in its base suggest that there may have periods of disuse when clean sediment washed in, which

might indicate that, as would be expected, pottery production was seasonal and not a continuous year-round activity.

The superstructure of both kilns appears to have been constructed by creating adjacent columns of pots set one in another embedded in the clay walls and dome of the kiln. The arrangement of closely spaced pots, as seen in kiln 1707, is probably the same for all the kilns based on the evidence of some of the multiple pot impressions (e.g. Fig. 48) in the fired clay recovered from the other two kilns. There are also instances of impressions which indicate that the base of one pot was set into the mouth of the next to create a vertical or arched column in the manner of voussoir pots. It seems that the pots were used to create a permanent dome enclosing the whole upper chamber, as there is no evidence for separate dome plates, such as those described at the College of Art site (Rawes 1972, 25).

Evidence for the use of vaulting pots or tubes in Britain, either as building roof vaulting or in the construction of kiln domes, is rare. Tubes used as roof vaulting have been found at Chester (Mason 1990) and columns of pots were found *in situ* in Kiln 20 at Colchester (Hull 1963, plates IIIc and IVb). It is possible that vaulting pots were produced at the Berkeley Street kiln site in Gloucester, where fragments of a pot were incised with diagonal crossed lines which may be keying and therefore intended for use as building material (Timby 1991, 25, fig. 5, 79–80). The use of pots in vaulting may have originated in kilns and the practice adapted for the vaulted roofs of buildings (Wilson 1992, 107–8). Wilson notes their use in kilns in both Italy and Germany. Vaulting pots are also known from Gallia Narbonensis, where they have been found in the first century BC baths at Perpignan and at the pottery production centre at Sallèles d'Aude in a 1st century AD context (Bouet 1999, 114–16). At Longford, the pots used were not a special form exclusively made for vaulting but included a variety of types, that can be linked to the various products of the kilns, possibly seconds from earlier firings as were those used at Colchester.

The ceramic kiln tubes are the most unusual and significant items and relate to the construction and function of the pottery kilns. They were probably made by the potters in charge of the kilns and are unrelated to tile production in general but represent a specialist niche. The tubes, which possibly served the same purpose as vaulting pots, were found only within kiln 2350 and as discarded debris in other features, predominantly in ditches close to this kiln. Their distribution supports the view that 2350 was the only kiln to use the tubes. Impressions of kiln tubes could not be positively identified, and this absence may imply a different function. Kiln tubes of similar design and size were found at the College of Art site, Gloucester (Rawes 1972, 25–6, plate 1), where their finish appears somewhat cruder than the Longford examples and they differed in other characteristics such as cut ends.

The design of the Longford and Gloucester kiln tubes differs from the vaulting tubes found elsewhere in the Roman Empire. Vaulting tubes of cylindrical form open at one end, closed and conical at the other so that they interlock in a column are well known from North Africa (Wilson 1992) and are common in Gallia Narbonensis (Bouet 1999, 116–21). Unlike typical voussoir tubes, the Longford examples are not made to interlock, as they taper towards the open top and therefore the base of one could not slot into the mouth of the next. If they were not built into the wall structure of the kiln, they must have had another function in the kiln, as the presence of clay and luting adhering to them indicates they formed part of the structure in some manner, rather than being products of the kiln. At the College of Art site there was no firm evidence of how they were used, though it was noted that they were heat and smoke darkened on the exterior, but not the interior. It was suggested they were used as insulation pipes built into the kiln wall of the upper chamber. At Colchester (Hull 1963, plate IVb) the largest kiln tubes, which were keyed on the exterior, were built into the walls of kiln 20 together with vaulting pots. One was also found spanning the mouth of kiln 21 at the outer end of the flue (ibid, plate IIIa). The conjectural reconstruction of Colchester kiln 21 suggested that the larger kiln tubes were set in a ring as an outer continuous wall around the upper chamber. The smaller tubes formed a series of flues to conduct the smoke and fumes from the lower chamber through the upper

chamber without coming into contact with the pottery, necessary in a kiln producing sigillata type ceramics. Similar arrangements pertained in the kilns producing terra sigillata in France, and the kiln tubes can be paralleled in the 'tuyaux de chaleur' found on sites such as Lezoux (Mathonnière-Plicque and Grenier 1961) and La Graufesenque (Vernhet 1981).

Rawes (1972) suggested that the presence of the ceramic tubes could indicate the presence of superior kilns to those normally found on Romano-British sites. However, the kilns at Longford are of a very standard type and there is no evidence that they were producing specialised products like the sigillata kiln at Colchester, and no evidence to suggest the tubes were used in a similar manner. It is possible in the case of kiln 2350 that tubes were in fact used as the suspended floor of the kiln spanning the gap between the outer wall and the pedestal. To span this gap, they would have to have been at least 0.7mm long, which is considerably greater than the estimated length of about 0.4m for the tubes. It is arguable that they were used in pairs, end-to-end, with a plug of clay joining the two ends, but this is not an ideal solution. If the tubes did not form the suspended floor, then one must postulate that the floor was formed of firebars of the same type as those found in kiln 2351. If so they had been removed extremely thoroughly for re-use as not a single fragment was found in the mass of kiln debris infilling the structure. There is no mention of kiln bars for flooring at the other Gloucester kiln sites, though large kiln bars are known from the Nene Valley (Swan 1984, 96–7).

The third kiln 1707 as noted above is significantly different, which could indicate a different function to the other two. Its overall form in plan is uncertain as it had been destroyed on the north by a later ditch, but it is probable that any flue and stokehole lay on this side (possibly taking advantage of the hollow of an earlier phase silted ditch). It has been suggested above that in its earliest form it may have been a single chamber kiln structure, replaced in its later phase by a dual chamber structure. The infilling of the earlier structure meant that in its later phase it was barely subsurface, which may account for the use of pots to construct its walls for both lower and presumably upper chambers. The use of pots in the wall construction links it to the other two kilns, but in contrast, the pedestal was probably a central circular structure unattached to the kiln wall and possibly made using a pot secured by the narrow ring of clay that survived on the kiln floor, or possibly fully encased in a clay render. There is no evidence surviving from the kiln itself for the superstructure, though it is fair to suggest that the construction method of embedding pots in the clay walls continued for the upper walls and dome. At both phases of use this kiln was lightly fired. This may reflect that it was only used for a short period of time or very intermittently. Alternatively, it may indicate that it was not used for firing the pots, but to dry the pots prior to firing.

The kilns exhibit a variety of features that typify kilns local to Gloucester and which appear to be influenced by constructional features used in kilns producing terra sigillata in Britain and Gaul. Despite these links to continental Europe, there is the curious association of the triangular perforated bricks, whose distribution shadows that of kiln debris and is synchronous with the use and demise of the kilns. The presence of triangular perforated bricks, which originate in the early Iron Age, indicates a strong native tradition. The association of the triangular bricks with kiln debris is in itself of interest as this adds to the growing evidence for their use as kiln or oven furniture and for their continuing production and use during the Roman period, as opposed to being solely residual from earlier phases of Iron Age occupation. None of the triangular bricks was found in any of the kilns, which may indicate that they were used at some other stage in the production cycle, such as drying of pots prior to firing, as their distribution is not focused on the kilns. The combination of influences found in the evidence from the kilns and fired clay suggests that potters coming from other areas of the Roman Empire worked with members of the native population in producing pottery.

In general, the tile has suffered little abrasion and is quite fresh, though the mean fragment weight at 101g is average. No complete tiles are present, and thickness is the only complete dimension surviving in all cases. The largest piece was one side of an imbrex measuring at least 310mm long. A proportion of the assemblage was burnt or re-fired, indicative of reuse in ovens or hearths, but no mortar was present on any that would indicate reuse in mortared or masonry structures.

The ceramic building material is typical of rural settlements representing reused material. The general character is fairly unified, possibly derived from a single source, such as a modest masonry building or small villa with a heated reception room (though the evidence for the latter is very slight), situated in the locality. The nearest recorded villa is Willington Court, Sandhurst situated *c* 3km north of the site, though buildings in Gloucester would have provided a closer source. The tile reflects the re-use of tile, probably in ovens and hearths from the presence of burning on a significant proportion. It is possible that it was utilised in the construction of the kilns but apart from the ceramic tubes, very little CBM was recovered from the kilns and there is no evidence of tile impressions in the fired clay apart from the tubes. The tile occurs predominantly in the later Roman phase 6 (Table 21) with a much-reduced quantity from early Phase 4 and 5 features. The pieces from pre-Roman contexts are all small fragments and must be intrusive.

Catalogue of illustrated fired clay and ceramic materials (Figs 45–64)

1. Kiln wall with pot impression. Kiln 2350 (2388) Id.61, Phase 4 early Roman
2. Kiln dome lining. Kiln 2350 (2388) Id.76, Phase 4 early Roman
3. Firebar. Kiln 2351, Id.161, Phase 4 early Roman
4. Firebar. Kiln 2351, Id.162, Phase 4 early Roman
5. Firebar. Kiln 2351, Id.163, Phase 4 early Roman
6. Firebar. With ?foot impression in surface. Wt: 990g. Kiln 2351 (2719), Id.131, Phase 4 early Roman
7. Firebar. End cut to point. Wt: 432g. Kiln 2351 (2719), Id.134, Phase 4 early Roman
8. Luting: three fragments. Wt: 91g. Kiln 2351 (2509), Id.94, Phase 4 early Roman
9. Plug of clay to secure vessel. Wt: 253g. Kiln 2351 (2509), Id.25, Phase 4 early Roman
10. Triangular perforated brick. Ditch 98, 2699 (2698), Id.35, Phase 4 early Roman
11. Triangular perforated brick. Ditch 98, 2699 (2698), Id.7, Phase 4 early Roman
12. Triangular perforated brick. Pit 103, 1746 (1745), Id.26, Phase 5 middle Roman
13. Triangular perforated brick. Ditch 2, 2178 (2023), Id.2, Phase 4 early Roman
14. Triangular perforated brick. Ditch 2, 2178 (2023), Id.3, Phase 4 early Roman
15. Kiln wall or dome. Pit 1870 (1868), Id.37, Phase 4 early Roman
16. Kiln wall or dome. Ditch 101 (2497), Id.105, Phase 5 middle Roman
17. Kiln structure: luting for pots. Ditch 101 (2498), Id.142, Phase 5 middle Roman
18. Kiln structure: luting for pots. Ditch 101 (2499), Id.141, Phase 5 middle Roman
19. Kiln furniture: portable pedestal/support. Wt: 132g. Pit 1887 (1888), Id.62, Phase 4 early Roman
20. Ceramic kiln tube and fired clay plug. (1960), Id.21, Phase 4 early Roman
21. Ceramic kiln tube. Kiln 2350 (2388) Id.256, Phase 4 early Roman
22. Ceramic kiln tube. Kiln 2350 (2388) Id.257, Phase 4 early Roman
23. Ceramic kiln tube. Kiln 2350 (2388) Id.258, Phase 4 early Roman
24. Ceramic kiln tube. Kiln 2350 (2388) Id.259, Phase 4 early Roman
25. Ceramic kiln tube. Kiln 2350 (2388) Id.260, Phase 4 early Roman
26. Ceramic kiln tube. Kiln 2350 (2388) Id.261, Phase 4 early Roman

27. Ceramic kiln tube. (2498) Id.271, Phase 6 late Roman

28. Tegula flange type D. Ditch 1641 (1639) Id.12, Phase 5 middle Roman

29. Tegula flange type D2 and cutaway B6. Ditch 68, 1122 (1119) Id.6, Phase 6 late Roman

30. Tegula flange type E. Ditch 79, 1490 (1489) Id.208, Phase 6 late Roman

31. Tegula flange type F. Ditch 1502 (1501) Id.224, Phase 6 late Roman

32. Tegula flange type F2 and cutaway C5. Ditch 68, 1122 (1119) Id.7, Phase 6 late Roman

33. Tegula flange type A5. Ditch 54, 3034 (3032) Id.196, Phase 5 middle Roman

34. Imbrex. Ditch 90, 1571 (1570) Id.39, Phase 6 late Roman

35. Wall tile fragment. Well 1572 (1616) Id.100, Phase 4 early Roman

Coins and coin moulds

by Paul Booth

Roman coins

Three Roman coins were recovered from the excavation (Table 22). The earliest was an as of 1st–2nd-century date. Although in quite good condition when lost, this coin had become heavily encrusted and was thus not closely datable. The other two coins were 3rd-century radiates. One was a standard issue of Tetricus II (AD 271–274), but the other was an issue of Trebonianus Gallus (AD 251–253), in very good condition (Fig. 65a). Such coins are rare as site finds; for example, the catalogue of some 3785 coins from Cirencester excavations published by Reece (1998) contains no examples of Gallus, while the corresponding Cirencester Museum collection, of over 6600 coins, has only seven.

Coin moulds

Four pieces of fired clay with coin impressions came from fill 1249 of ditch 74 (cut 1250), one of the ditches in the western half of the northern enclosure, assigned to Phase 6 (after c. AD 175). These were found bagged with the pottery during the post-excavation assessment. The largest piece, numbered as SF 102, carries an almost complete impression of a dupondius of Hadrian with the obverse legend IMP CAESAR TRAIANVS HADRIANVS P M TR P COS III, of which only the final III is largely lost (Fig. 65b). The composition of the legend enables a date range of AD 119–121 to be assigned. Three smaller fragments were incomplete and more abraded, and are effectively illegible, but their general character is consistent with that of the better-preserved piece. They derive from at least two and perhaps three separate impressions.

The four fragments, with a total weight of 9g, are in a fine micaceous clay with occasional organic inclusions, other small voids and iron oxides, and with very occasional larger quartz sand grains up to c. 0.3mm in size. They are fairly soft and friable, fired medium-dark grey with a pale grey core, and the maximum (complete?) thickness of the largest fragment is 5.5mm.

The significance of these pieces is not certain, but comparison with some of the material published by Boon (1988) strongly suggests that they were intended as moulds for cast copies of the coin(s) in question. Comparable mould fragments are known from a number of sites in Britain (ibid.) and include one based on an as of Hadrian from Whitchurch in Somerset, but the original was worn and the mould was associated with moulds of Gallic Empire radiates (ibid., 125). Moulds using issues from the later 2nd century and later seem to be more common. Such evidence is, however, always relatively rare.

Unfortunately, no other fired clay was recovered from context 1249, so there is no other material that might have derived from the counterfeiting process to supplement the mould fragments themselves. Pottery from this context consists almost entirely of sherds of a fragmented BB1 'cooking pot type' jar with acute angle lattice, dated c. AD 120–150. This material is therefore fairly closely contemporary with the likely date of the moulds, but since the feature was probably infilled at a rather later date both the pottery and the mould fragments could have been redeposited from elsewhere in the site.

Discussion

The small coin assemblage reflects the changing character of the site. A complete absence of coins at an early Roman rural settlement is characteristic of such sites. The pottery production phase in the later 1st–early 2nd century was relatively short lived and need not have been reflected in coin loss. Nevertheless, the presence of only a single early Roman coin associated with the subsequent occupation makes the evidence for production of copies of this date the more notable. Unfortunately, the scale of this activity, and its exact original location, are unknown.

Later Roman activity is indicated by the two radiate coins. It is uncertain if the coin of Trebonianus Gallus was considered to be a particularly significant piece, given the rarity of such coins as site finds, or if its loss was fortuitous. All three coins recovered came from the fills of ditches assigned to Phase 6 located in the western part of the site. The total lack of 4th-century coins, particularly those of Reece's period 17 (AD 330–348) onwards, very common in rural assemblages, is a significant indicator that by this date occupation was at a minimal level or had ceased completely.

Metal objects

by Ian R. Scott

The metal finds assemblage is not large and comprises mostly nails and hobnails. All the finds have been x-rayed and the assemblage has been fully recorded onto an Excel spreadsheet. All finds are quantified by object and fragment count. Nails and hobnails are quantified by object by counting heads; stem fragments are only quantified in the fragment count. Preservation of the ironwork is often poor with many of the objects showing serious lamination, while other objects are quite heavily encrusted with corrosion products.

Provenance and assemblage

The assemblage comprises 290 objects and includes 144 hobnails (158 frags) and 99 nails (165 frags). Only a few finds are not stratified or phased. Most finds were from Roman contexts particularly from Phase 6 contexts, including almost all the hobnails and more than half the nails (Table 23). The only metal find from a late Iron Age or early Roman (Phase 3) context is a tiny copper-alloy fragment from pit 2316.

Phase 4 (early Roman) produced 25 metal finds including 11 nails, but only one hobnail. The finds included three brooches. A simple bow brooch in iron (No. 2) came from fill 2027 of ditch 2025 and a fragment of another simple iron bow brooch (No. 3) was recovered from kiln 2350. The third brooch is a Hod Hill brooch (Fig. 66, No. 4) from fill 2783 of pit 2788. All three brooches would fit in a mid to late 1st century context. Context 1616, the primary fill of well 1572, produced nine objects. These include four nails and several nail stem fragments. The most interesting finds from fill 1616 are a fragment of a toilet implement with a small circular spatula end (Fig. 66, No. 10), a bucket-handle mount and a fragment of a slide key comprising the bit and part of the stem. Both the handle mount and key are heavily encrusted with corrosion products.

Phase 5 (middle Roman) contexts produced 29 objects. They include 20 nails, a U-staple and three hobnails, but also three personal items including a bow brooch with hinged pin from fill 1872 of ditch 1871 (Fig. 66, No. 5), the pin from another brooch from ditch 1758, and a small ring formed from thin copper-alloy wire with twisted closure (No. 8) of the type used for securing clothing and usually dated to the late medieval or early post medieval period (cf. Camber Castle: Scott 2001, 260, fig. 7.1, 23; Carisbrooke Castle: Robinson and Griffiths, 2000, 129, fig. 6.4, 32–3; Norwich: Margeson 1993, 20, fig. 10, 98–101; see also Crummy 1988, 14, fig. 16). The item is small and therefore could be intrusive.

Phase 6 (late Roman) contexts produced significantly more finds than earlier Roman phases, in part because of the number of hobnails recovered from three separate locations. There are 36 hobnails from context 3169 in grave 3171. This grave contained a decapitated and prone inhumation burial. Fills 2936 and 2937 of cremation burial 2935 produced a total of 46 hobnails (50 frags). The hobnails suggest the presence of footwear in both contexts. The third location with hobnails in numbers is fill 1706 of ditch 1705, which produced 17 hobnails (20 frags). There are also slightly more nails (n=57) from Phase 6 than from the preceding Roman phases. Twenty-six nails (36 frags) were recovered from ditch fills and 29 nails (53 frags) from three grave fills. Grave 3016 produced four nails (6 frags), but grave 3171 had 11 nails (21 frags) and grave 3068 14 nails (26 frags) indicating the presence of a wooden coffin. Other finds from Phase 6 include a fragment of a ribbon twist bracelet (Fig. 66, No. 7) from ditch 2130 and a fragment of a possible modelling tool with a V-shaped tip (No. 1) from ditch 1383 (context 1410).

Phase 7 (medieval or post medieval) contexts produced a small number of finds, mainly nails and residual Roman hobnails. There is however the lower portion of the bow of a 2nd-century Trumpet brooch (Fig. 66, No. 6) from layer 2205. Unstratified finds are limited in number but do include a Roman stylus (Fig. 66, No. 9) with lathe cut decoration. A poorly preserved fragment of iron wire was recovered from unphased posthole 1374.

Conclusions

The finds assemblage is limited in range but includes a number of small personal items, and there is a notable lack of domestic items (e.g. no knives or vessels, etc.), with the possible exception of a bucket handle mount (fill 1616 of well 1572), and no structural fittings such as hinges. The key (fill 1616 of well 1572) is a portable item which could have been mislaid. Nails, although present, are not as numerous as might be expected on a settlement site with buildings. The only possible tool or craft implement is the possible fragment of modelling tool (No. 1).

Catalogue of selected finds

1. (not illustrated) Possible modelling tool with a V-shaped tip and a tapered square-section stem, incomplete. The broken end may have been circular in section. Fe. L extant: 84mm. Context 1410, ditch 1383. Phase 6.

2. (not illustrated) Simple bow brooch with plain curved bow, strongly angle at the head. The catch plate largely lost, and no pin or spring survives, but almost certainly had sprung pin. L extant: 45mm. Fe. Context 2027, ditch 2025, Sf 133. Phase 4.

3. (not illustrated) Simple bow brooch, catch plate and lower bow only. Fe. L extant: 29mm. Context 2389, kiln 2350, Sample <84>. Phase 4.

4. Hod Hill brooch, with small wings and tapered lower bow with no cross mouldings. Cu alloy. L: 56mm, W: 18mm. Context 2783, pit 2788, Sf 184. Phase 4.

5. Bow brooch with hinged pin and short wings, and relatively plain gently curved bow of D-section with central groove, and no foot knob. Cu alloy. L: 53mm, W: 19mm. Context 1872, ditch 1871, Sf 112.

Phase 5. The brooch has some features of a T-shaped brooch, but with wings that are rather short. Late 1st-century possible early 2nd-century.

6. Trumpet brooch. Lower portion of bow with moulded relief decoration. The inner face of the bow is flat. Cu alloy. L: 46mm. Context 2205, layer, Sf 136. Phase 7.

7. Ribbon-twist bracelet fragment with fine wires wound around a central core. Cu alloy. L: 51mm, W: 33mm. Context 2129, ditch 2130, Sf 130. Phase 6.

8. (not illustrated) Ring or loop fastener formed from a loop of thin wire with twisted closure. Cu alloy. D: 11mm; L: 14mm. Context 1436, well 1572. Late medieval or early post medieval clothes fastening. See especially Margeson 1993, 20, fig. 10, 98–101.

9. Stylus decorated with lathe cut mouldings, and probably tinned or silvered. Incomplete eraser, but extant scriber. Fe. L: 122mm. Context 1663. Unphased.

10. Spatula fragment. Thin stem with circular spatula end set a slight angle to the stem. Cu alloy. Extant L: 45mm, D: 7mm. Context 1616, well 1572, Sf 113. Phase 4.

Glass objects

by Ian R. Scott

The glass assemblage totals 23 pieces, including four chips, two pieces of window glass and 17 sherds of vessel glass. Eleven pieces of glass are Roman or probably Roman, but these include three chips from context 1616 (well 1572), dated Roman based on their blue-green colour. There are 11 pieces that are post-medieval and comprise mainly pieces from wine bottles.

There is a very small number of identifiable Roman glass items (Table 24). These comprise a small piece of pale-green, matt glossy window glass from Phase 5 ditch 100 (fill 1960), a small sherd from a pillar-moulded bowl in blue green glass, which came from context 2315 and dates from the second half of the 1st century or very early 2nd century, a small piece from the base of a square bottle in blue-green glass with moulded concentric rings from Phase 6 ditch 68 (fill 2832), which dates from the mid-1st to the end of the 2nd century, and a neck sherd with folded horizontal rim (D: 33mm) in green glass from a narrow-neck flask possibly with a square body (‘Mercury flask’) from the medieval subsoil (context 1273), which would date from the second half of the 2nd century.

Stone objects

by Ruth Shaffrey

A small but significant assemblage of worked stone was recovered from excavations at Longford. These were recorded with the aid of a x10-magnification hand lens and are described below by phase. The assemblage includes items indicative of domestic activity, such as rotary querns and whetstones plus a millstone, suggestive of centralised grain processing.

Phase 4

Two stone objects and a mortar or possible socket stone were recovered from Phase 4 features. The objects comprise a cobble and a quern. The cobble has some light percussion damage suggesting use as a hammerstone, and facetted edges suggesting some use as a hone (ditch 14, fill 2027). The quern (ditch 12, fill 2580) has one curved concave face and one flat face but no edges. It could be from either a saddle or rotary quern but given the material (Old Red Sandstone, Quartz Conglomerate, from the Forest of Dean) and the context in which it was found, its use as a rotary quern is more likely.

A third piece of stone is a boulder with a neatly pecked bowl in one face (Fig. 67, No. 5). This bowl is worn internally and whilst it could be a crude mortar, it is also possible that it was used structurally as a pivot stone.

Phase 5

Only two pieces of worked stone were recovered from Phase 5 contexts, both from fill 2992 (ditch 54). One is a large piece of an upper millstone with a probable circular or possibly oval eye and a dovetail shaped rynd-chase that is cut right through the stone (SF 186; Fig. 68, No. 7). The grinding surface has been dressed with deep peck marks, roughly arranged in radial lines, and it has a circular groove around the eye, probably a distribution circle that may have helped spread the grain across the grinding surface (Cruse 2017). A second rotary quern fragment could have been either hand-operated or mechanically powered. The projecting hopper indicates that it is most likely to have been hand operated but the large eye (10cm) suggests it is from a millstone (Shaffrey 2015) (SF 187, fill 2992 of ditch 54, Fig. 68, No. 8).

Phase 6

Four items of worked stone were recovered from Phase 6 features. A sandstone disc from ditch 79 (1410) has been chipped into a crudely circular shape (Fig. 67, No. 3). The function of stone discs is not certain, but it seems likely that they were used as pot lids or 'coasters'.

Three items were used for the sharpening of blades; all three of them are hones, that is, they utilised pre-existing resources such as stone roofing or cobbles and were not made specifically to sharpen blades. The first is a thin slab that has been used across one face, which now has some iron deposits on it (3181, fill of ditch 52). Another has made use of a naturally elongate square-sectioned stone that has been used for sharpening across the faces so that the arrises are now sharp (1525, fill of ditch 86, Fig. 67, No. 4). The third is a flat slab that may have reused a piece of stone roofing, although no edges or perforation remain to be certain of this (1628, fill of ditch 79). Use of pre-existing resources for sharpening suggests a prudent attitude towards the acquisition of tools. Such stones were often as good for sharpening as the more nicely finished primary whetstones but were likely to be free or very cheap to obtain.

Phase 7

A single fine-grained orange-brown sandstone whetstone was found in the fill of furrow 2410 (2411). This has a square cross section and sharp arrises suggesting blades were sharpened across the whole face. It is not diagnostic in form or lithology and could be either Roman or post-Roman in date.

Unphased

A worked slab is the only piece of worked stone from unphased features. Its function is uncertain, but it is made from a gritty Old Red Sandstone that would have been suitable for querns, and it may therefore represent a reused piece of quern (2333, fill of pit 2332).

Catalogue of stone objects

1. Quern fragment (not illustrated): Old Red Sandstone, Quartz Conglomerate from the Forest of Dean. Has part of flat pecked face and opposing curved convex face. Measures 72mm thick. Weighs 482g. Ctx 2580, fill of ditch 12 (cut 2582). Phase 4. AD 70–120.

2. Cobble tool (not illustrated): Fine-grained dark grey/green micaceous sandstone. Cobble, almost complete but with one long edge damaged. It has been used across both main faces (now flat) and one original edge (also flat) with some faceting along the arrises. The ends are original, and one appears to have some light percussion damage, suggesting it was used in several ways. Measures 159 x 52 x 23mm. Weighs 312g. SF 132. Ctx 2027, fill of ditch 14 (cut 2025). Phase 4. AD 70–120.

3. Disc (Fig. 67): ORS/Pennant sandstone, fine-grained reddish-brown sandstone. Flat stone chipped into approximate disc - not quite circular. Measures 50–54mm diameter x 9mm thick. Weighs 49g. Ctx 1410, fill of ditch 79 (cut 1383). Phase 6. AD 175–325.

4. Whetstone (Fig. 67): Micaceous quartzitic sandstone. Naturally long, square sectioned stone utilised as a whetstone with some smoothing to the faces. Sharp arrises. Measures 87 x 22 x 16mm. Weighs 56g. Ctx 1525, fill of ditch 86 (cut 1524). Phase 6. AD 175–325.

5. Mortar or socket stone (Fig. 67): Small boulder with a third of a fairly straight sided flat-bottomed socket/basin measuring approximately 130 x 130 x 67mm deep. It is finely pecked, and this survives on the side walls, although they are also smoothed. The base is worn completely smooth and the pecking (if it was there originally), is now lost. Measures 250 diameter x 170mm high. Limestone, fine grained. SF 179. Ctx 2374, fill of well 2394. Phase 4. AD 70–120.

6. Hone (not illustrated): Fine-grained micaceous sandstone. Thin slab, no original edges but one very worn smooth face. Presumably used as a hone - especially as has some iron deposits on it. Measures 19mm thick. Weighs 166g. Ctx 3181, fill of ditch 52 (cut 3184). Phase 6. AD 175–325.

7. Upper millstone fragment (Fig. 68): Probably Old Red Sandstone. Medium-grained greyish-red sandstone. With dovetail shaped rynd chase and circular or oval eye. The rynd chase is 220mm long. The grinding surface has deep space pecking crudely aligned in radial tool lines, especially towards the circumference. There is an 'inner distribution groove' that runs from the edge of the keyhole in a circle around the eye and is at least 270mm in diameter. The stone is slightly angled and very slightly tapered to centre. Straight, roughly tooled, vertical edges. The upper face is also crudely tooled but has been reused so that it is now smooth in places. Measures 54–83mm thick x 640mm diameter. SF 186. Ctx 2992, fill of ditch 54 (cut 3027). Phase 5. AD 120–200.

8. Upper rotary quern or small millstone (Fig. 68): Old Red Sandstone, pebbly sandstone from the Forest of Dean/Wye Valley. Eye is wide, approximately 100mm diameter, it is cylindrical with a small basin shaped hopper and a very slight projecting rim around it, *c* 2mm high. The stone is neatly pecked all over but has worn into concentric wear on the concave grinding surface. It is of rounded type with parallel concave and convex faces. The sides are also neatly pecked, straight and vertical. The upper surface has been reused and is worn very smooth over most of it. It is burnt across the upper surface and an edge, suggesting it was reused in a hearth. Measures 490–520mm diameter x 50mm thick. SF 187. Ctx 2992, fill of ditch 54 (cut 3027). Phase 5. AD 120–200.

9. Possible roofing reused as hone (not illustrated): Probable Old Red Sandstone, reddish-brown micaceous sandstone. Flat slab, no original edges. Both faces very worn smooth with a few scratches. Measures >181 x 82 x 17mm. Weighs 327g. Ctx 1628, fill of ditch 79 (cut 1601). Phase 6. AD 175–325.

10. Worked rounded slab (not illustrated): Gritty Old Red Sandstone. Lump of gritty conglomerate with flat faces. One edge is broken, but other is curved as if originally this has been a large circular flat disc. The surfaces are not dressed or worn, only the curved edge, so the precise function of this stone is unclear. Measures approximately 250mm diameter x 68mm thick. Weighs 2552g. Ctx 2333, fill of pit 2332.

11. Whetstone (not illustrated): Pale slightly orange brown fine/medium grained well sorted sandstone. Square cross section, flat faces and sharp arrises. Both ends damaged but tapers in thickness from one end to the other. Measures >62mm long x 19–29mm wide and thick. Weighs 70g. Ctx 2411, fill of furrow 2410. Phase 7. AD 1100+.

Building stone

As well as the possible socket stone outlined above, local stones such as the blue lias mudstone and limestone were used for building. None of these were ashlar, or showed any evidence of tooling, but some had certainly been cut into approximately cuboid or triangular shapes (contexts 1093, 1094, 1433, 2374 and 2785). Other stones may be fragments of stone roofing—slabs of probable Old Red Sandstone—but none retained perforations or were complete enough for this identification to be certain (1526, 1219). They were not local to the site, but as some of the hones above were made of the same stone type, they could have been salvaged from a secondary source with the intention of using them as sharpening stones. Some of the lias appeared to have been cut into long strips (2375, fill of Phase 4 well 2394). Since this material was used in tesserae production, it is possible that this was their intended function, but no stone tesserae (and only one ceramic one) were found during the excavations.

Unworked stones

Just over 4kg of heated (fire-cracked) stones, possibly associated with cooking and/or heating water, were retained from several contexts. Perhaps the most notable of these was fill 3187 of middle Neolithic pit 3180, in which the material was found in association with middle Neolithic Mortlake/Fengate Ware pottery. The remaining contexts were fills of phase 3 ditch 2 (2572 and 2528 [phase 4 recut]) and phase 4 ditch 13 (2310, 2311 and 2313). It is uncertain whether these were contemporary with late Iron Age and early Roman activity or residual from earlier prehistoric activity.

Discussion

The assemblage of worked stone is not large, but it very usefully tells us that people were doing two things here. One is that they were processing grain for flour and/or malt, and that they were probably doing it at more than just a household level, and the other is that they were maintaining or producing metal tools. Both the millstone and the possible millstone fragment had been dumped in Ditch 54 at the northern end of the site. Their large size suggests that they probably had not been moved very far from their point of use. They therefore represent the existence of a mill nearby. Such a mill may have been in use during the earlier part of Phase 5 (and thus contemporary with the granary building) or the latter part of Phase 4. No mill structure was found on the site, and it is not possible to determine from the stones themselves how they were powered, but the Horsbere Brook is very nearby and might have powered a watermill. If a mill was in existence here, it is likely that it was involved in the supply of flour to Gloucester, which, like Cirencester may have imported some of its grain ready ground from surrounding farmsteads and villas (Shaffrey 2019). The sharpening of metal tools occurred during Phase 6, and despite the tendency here to the utilisation of previously used or naturally available stones, did not reuse any earlier millstone fragments, suggesting that sharpening was not an emphasis in Phase 5 and occurred after the millstones were out of use and no longer accessible.

Human remains

by Lauren McIntyre

The excavation at Longford recovered seven inhumation burials, unburnt disarticulated bones from 13 contexts, and seven features containing cremated bone. The dates of the burials ranged between the late Iron Age and the later Roman period (c. 3rd century AD). This report details the results of the analysis of these remains and discusses their wider context. Full osteological data are recorded in the archive.

Methodology

Recording of the unburnt articulated human remains was undertaken with reference to Brickley and McKinley (2004) and Mitchell and Brickley (2017): the articulated skeletons were assessed for their condition (Grade 0–5+), completeness (0–25%, 26–50%, 51–75%, 76–100%) and fragmentation (low = <25% of the skeleton fragmented, medium = 25–75% fragmented and high = >75% fragmented). The age and sex of the skeletons was estimated using relevant standards (references for each are provided below and a summary of the age categories used is presented in Table 25). Standard metrical analysis was carried out and stature was calculated where possible using regression equations devised by Trotter and Gleser (1952) and revised by Trotter (1970). Non-metric traits were systematically recorded for adults with reference to Berry and Berry (1967) and Finnegan (1978) and any pathologies were recorded with reference to standard texts (e.g. Aufderheide and Rodríguez-Martín 1998; Ortner 2003). A summary of the inhumation burials is presented in table 26.

Disarticulated bones were also analysed using the above methodology. The minimum number of individuals (MNI) was determined by the presence/absence of repeated skeletal elements, taking account of age difference (i.e. adult versus juvenile size). Post-mortem anthropogenic modification of unburnt disarticulated bones was recorded descriptively and interpreted in accordance with guidelines set out by McKinley (2004b) and Loe and Cox (2005).

All contexts containing cremated bone were fully excavated and processed by flotation and wet sieving which sorted them into >10mm, 10–4mm, 4–2mm and 2–0.5mm fractions. Floated residues were retained in a 250µ mesh. Once dried, the cremated bone was separated from any extraneous material, which was discarded. All cremated bone was examined in accordance with national guidelines (Brickley and McKinley 2004; McKinley 2004a). Where the 4–2mm fraction weighed more than 50g, a 20g sample was sorted. An estimation of the total bone weight was calculated for the entire fraction, based on the proportion of cremated bone present in the 20g sample. The estimated weights are included in the total weights presented below. The smallest fraction sizes (2–0.5mm) were not sorted but were rapidly scanned for identifiable skeletal remains and artefacts. Estimations of the proportions of bone present within the 2–0.5mm fractions were made and recorded in the archive. These are presented below but were not included in the total bone weights.

Analysis of each cremation burial involved recording its colour, weight and maximum fragment size to provide information about the effectiveness of the cremation, the relative quantity of fuel used, the temperature attained within the pyre, the length of time the body was burned and how well collected the burnt remains were from the pyre site (McKinley 2004a: 10–11). Evidence for the presence of pyre goods was also recorded. Each deposit was also examined for identifiable bone elements. The MNI was determined based on the presence/absence of repeated skeletal elements and on the comparative size of bones (e.g. adult versus juvenile size). Where possible, age, sex, evidence of normal morphological variation and pathological lesions were explored using the same methods outlined above for the examination of inhumation burials.

Inhumation burials

SK 1750

Skeleton 1750 was 95% complete. Bone surface condition was scored as grade 1—good condition—and fragmentation was low. Overall preservation was therefore deemed to be good. The skeleton was categorised as male, based on multiple sexually dimorphic traits of the pelvis and cranium (Buikstra and Ubelaker 1994, 15) and its age was estimated as middle adult (36–45 years). The stature of the individual was calculated at 163.51cm (+/- 3.27cm), based on the maximum length of the right femur.

A total of 21 permanent teeth and 18 tooth positions/sockets were present. Three teeth had caries, while calculus was observed on 19 teeth. One tooth had enamel hypoplasia with the lesion location indicating that this occurred around the age of 3–4.9 years (Primeau *et al*. 2015). Hypoplasia marks a disruption in the formation of tooth enamel, often caused by malnutrition, and most commonly occurs during childhood (Goodman *et al*., 1988). One tooth socket showed signs of periodontal disease caused by inflammation of gums, periodontal ligament and/or alveolar bone (cf. Hillson 1996, 260). One tooth crown had ante-mortem chips on the enamel which may be related to abrasive foods.

A button osteoma was observed on the posterior right parietal. Osteomata are smooth-surfaced, sharply demarcated, circular protrusions, which are often solitary and occur on the outer table of the skull (Aufderheide and Rodringuez-Martin 1998, 375; Eshed *et al*. 2002). Osteoarthritis erosion/porosity of the joint surface, joint contour change and eburnation was observed in the left and right acromio-clavicular joint, left and right gleno-humeral joint, left wrist, right hand, and left and right hips. Osteoarthritis is a chronic, progressive and non-inflammatory disease that affects any synovial joint of the skeleton and is usually associated with progressive age (Rogers and Waldron 1995, 32; Aufderheide and Rodríguez-Martín 1998, 93; Ortner 2003, 545). Joint contour changes were observed in the left and right mandibular condyles (tempero-mandibular joint), although this change alone was not sufficient for a diagnosis of osteoarthritis. Marginal osteophytes were present in the left proximal ulna, right distal radius and distal first metacarpal, and in the right distal femur, as well as on the bodies of nine thoracic and three lumbar vertebrae.

One thoracic vertebra exhibited a Schmorl's node. These are visible as indentations on the superior or inferior surfaces of vertebral bodies, with the lesions representing sites of herniation in the intervertebral disc material through the vertebral body end plates (Rogers 2000, 169–70). These are likely to result from a combination of activity-related stresses placed on the vertebrae and intervertebral disc and developmental factors associated with vertebral formation and growth in early life (Dar *et al*. 2010, 675). Ligamentous ossification was present on the right side of three vertebral bodies (thoracic vertebrae 8–10). This bone growth is highly characteristic of Diffuse Idiopathic Skeletal Hyperostosis or DISH, though this cannot be confirmed without the formation of bone bridges across the joints of at least four adjacent vertebral bodies (Ortner 2003, 559). Nonetheless, the ligamentous ossification present may be an early sign of the disease.

SK 3015

Skeleton 3015 was 85% complete. Bone surface condition was scored at grade 1 and fragmentation was low. The age of the individual was estimated at 3.5–5 years, though sex determination was not possible.

A total of 18 erupted deciduous teeth, including 20 deciduous tooth positions/sockets, and 13 unerupted permanent teeth were present. Five teeth had dental calculus and two exhibited pitted lesions indicative of enamel hypoplasia. The location of the lesions suggest that they had formed between the ages of 36 weeks *in utero* and two months after birth (cf. WEA 1980).

Skeleton 3015 exhibited a porous lesion of the left femoral neck consistent with a diagnosis of cribra femoralis. The precise aetiology of cribra femoralis is unclear, though it has been postulated that the lesion may be indicative of nutritional stress or associated with the retention of red bone marrow in the proximal femoral metaphysis during childhood growth (Djuric *et al*. 2008; Lewis 2017, 196).

SK 3067

Skeleton 3067 was 90% complete. Bone surface condition was scored as grade 2—more extensive surface erosion with deeper surface penetration—and fragmentation was medium. The skeleton was categorised as a probable male based on multiple sexually dimorphic traits of the pelvis and cranium (Buikstra and Ubelaker 1994, 15). Age was estimated at 26–35 years and stature was calculated at 163.04cm (+/- 3.27cm), based upon the maximum length of the right femur.

A total of 27 permanent teeth and 30 tooth positions/sockets were present; three teeth were lost ante-mortem. One tooth had dental caries and all 27 had dental calculus. Two sockets showed signs of periodontal disease. Three teeth had ante-mortem chips on the tooth enamel and one tooth was overcrowded.

Several incidences of ante and peri-mortem trauma were found. The skeleton exhibited well healed fractures to the face and shoulder. A fracture line was visible in the left maxilla, travelling from the inferior margin of the left orbit in an infero-lateral direction. This fracture is very similar to a Type II Le Fort fracture (Galloway 1999, 151–3). These are rare but can be caused by a direct blow possibly resulting in radiating forces through the bone. Evidence of a possible ante-mortem avulsion fracture was observed at the lateral end of the right clavicle. At the deltoid origin site, there is a bony projection pointing antero-laterally. A small amount of secondary osteoarthritis is also present at this joint. Fractures of the lateral clavicle are rare, but where they do occur, they tend to be caused by downwards blows to the shoulder that can result in pulled muscles and displacement of the lateral clavicle (ibid. 197–9). Peri-mortem trauma, defined as any injury sustained around the time of death (Loe 2017, 48), was found on 11 bones and these are described in detail in Table 27. These comprise several injuries, most likely from a single event that resulted in decapitation.

Periosteal bone formation was observed on the visceral surface of one right rib shaft, though it was not possible to identify the affected rib. This forms because of inflammation or infection of the periosteum (Ortner 2003, 206). The growth on the rib was not severe and had partly healed. Partial sacralisation of the fifth lumbar vertebrae was observed. The left side of this vertebrae (the transverse process) articulated with the superior left ala of the first sacral vertebra. Sacralisation is a defect in which the last lumbar vertebra is incorporated into the sacrum and the lumbar section of the spine is reduced by one vertebra (Aufderheide and Rodriguez-Martin 1998, 65).

A button osteoma was observed on the right parietal. The precise location was unclear as the skull was heavily fragmented. Cribra orbitalia (CO) was observed in the left and right orbits of the skeleton (left orbit = grade 1: capillary-like impressions in the bone, and the right orbit = grade 2: scattered, fine foramina (Stuart-Macadam 1991)). This condition predominantly occurs in infants and young children but are also visible as inactive or 'healed' lesions in adults. The exact aetiology of CO is unknown, though it has been linked to several conditions including iron-deficiency anaemia, infection and vitamin deficiency (Ortner 2003, 102–6; Walker *et al.* 2009).

Osteoarthritis was observed in the lateral right clavicle, and possibly developed after a separate trauma. Changes to the joint contour were observed at the temporomandibular joint in the left temporal. Marginal osteophytes were also present in the spine, affecting one thoracic and two lumbar vertebrae. Five thoracic vertebrae and three lumbar vertebrae had Schmorl's nodes.

SK 3170

Skeleton 3170 was only 20% complete. Bone surface condition was scored at grade 2 and fragmentation was high. The skeleton was aged at 26–35 years and was possibly female, though age and sex determinations were limited.

Four permanent teeth and one tooth socket/position were present. Calculus was observed on two teeth. No evidence of skeletal pathology was present. However, during excavation, it was noted that the skull of this skeleton was placed on top of the feet, indicating deliberate removal of the head.

The vertebrae were completely absent and the cranium and mandible highly fragmented and incomplete. No evidence pertaining to decapitation was observed in the remaining fragments from these skeletal regions.

SK 3177

Skeleton 3177 was 80% complete. Bone surface condition was scored at grade 2 and fragmentation was medium. The skeleton was categorised as a possible female of a mature adult age (>45 years). The stature was estimated at 163.03cm (+/- 3.72cm), based on the maximum length of the right femur.

A total of 18 permanent teeth and 25 tooth sockets/positions were present. Five teeth were lost ante mortem. Ten teeth had dental caries and three had dental calculus. One tooth position was affected by a periapical cavity. Periapical cavities are holes at the apex of tooth sockets that arise because of inflammation of the dental pulp. They may result from several different inflammatory responses to infection of the teeth, gums and underlaying bone, including infection of the tissue surrounding the apex of the tooth root, periapical granuloma or abscess, and periodontal cysts (Dias and Tayles 1997). Spiculated woven bone in the right maxillary sinus indicated that the skeleton had active maxillary sinusitis at the time of death and some of this may have been related to dental disease.

Three cervical vertebrae and the first sacral vertebra were osteoarthritic, with the first and second cervical vertebrae exhibiting osteoarthritis at the odontoid joint. Osteoarthritis was also present in the right distal first metacarpal. Marginal osteophytes were present in the right temporomandibular joint, left and right glenoid, left and right hip, and right knee and ankle, as well as on the bodies of a further three cervical, one thoracic and all five lumbar vertebrae.

SK 1800

Skeleton 1800 was approximately 35% complete. Bone surface condition was scored at grade 2 and fragmentation was medium. The skeleton was 26–35 years old at death and possibly a female. Stature was calculated at 150.68cm (+/- 3.27cm), based upon the maximum length of the right femur. No teeth were found.

Periosteal bone formation was observed on the anterior and right sides of the bodies of the fourth and fifth lumbar vertebrae, immediately inferior to the superior margin of the body. A well-healed ante-mortem fracture was found at the proximal end of the right, second metacarpal shaft. The observed fracture line indicated a short spiral or oblique fracture, with slight shortening of the bone (compared to the left second metacarpal). Short oblique fractures in this region are usually the result of direct blows; spiral fractures are caused by indirect or rotational forces (Galloway 1999, 236). Marginal osteophytes were observed at the proximal end of one distal hand phalanx from an unidentified digit in the left hand. Porosity was observed affecting the joint surface in the left acetabulum.

SK 5010

Skeleton 5010 was 70% complete. Bone surface condition was scored as grade 1 and fragmentation was medium. The skeleton was categorised as a prime adult (26–35 years) and possibly male. Stature was calculated at 169.01cm (+/- 3.27cm), based on the maximum length of the left humerus.

A total of 16 permanent teeth and 17 tooth positions/sockets were present. Thirteen teeth had dental calculus and three tooth sockets exhibited periodontal disease.

Healed ante-mortem fractures were observed in the distal right humerus and proximal right ulna and radius. The right distal humerus had an oblique/spiral fracture ending just superior to (or potentially involving) the capitulum. A further fracture line separated the capitulum and trochlear. These fractures were all well healed and are consistent with a diagnosis of either an 'H' fracture or medial lambda fracture (Galloway 1999, 209–14). A spiral or oblique fracture appears to have separated the entire proximal ulna from the proximal shaft and the distal half of the trochlear notch is fractured in two in the sagittal plane. The observed fractures are very well healed, but the overall appearance of the proximal ulna is deformed, and osteoarthritis has developed secondary to trauma. The radial notch is absent, indicating that this injury may have occurred prior to full skeletal maturation.

The proximal radius also exhibited a possible spiral/oblique fracture, at the radial neck. This is very well healed, but the radial head exhibits secondary osteoarthritis. The changes observed in the right elbow joint are consistent with a severe traumatic event which occurred during childhood, prior to skeletal maturation (ibid. 209–14, 218–20 224). Direct blows to an extended elbow may cause comminuted fractures to occur at this joint with displacement of bone fragments. These have very variable fracture lines and frequently involve the radial head. As well as osteoarthritis in the elbow joint, this condition was also present in the left wrist. Marginal osteophytes were observed in the left acetabulum (hip joint) and right patella (knee joint).

Unburnt disarticulated bones

Disarticulated human bone was found in 13 contexts and a summary of these remains is presented in Table 28. At least 13 individuals were represented, based upon the number of discrete contexts and absence of skeletal element repetition within each context. Three bones (1908, 1960 and 2785) exhibited evidence of anthropogenic modification, consistent with deliberate cutting with either a stone or metal tool, and carnivore gnawing (Loe and Cox 2005, 15).

Cremated bone

Burnt bone was recovered from six features. Three cremation burials were unurned (2950, 2935 and 2378) and two (3020 and 3286) were urned but heavily disturbed. Cremation 3020 was located within a tree-throw hole and had suffered from root damage, while cremation burial 3286 was partially truncated by modern activity. A third possibly urned cremation burial (2346) was positioned within the entrance to the later Iron Age enclosure (see above). Burnt bone from this pit was minimal and could not be positively identified as human. This last feature is not discussed any further here. The human remains from the five positively identified cremation burial deposits are summarised in Table 29. At least seven individuals were present, as cremation burials 3020 and 2935 each contained the remains of two people.

The following account summaries different aspects of the cremated bone assemblage, though it should be noted here that no evidence for non-metric traits or pathology was present. Pyre debris was generally minimal or absent.

Bone weight

Only cremation deposit 3020 (total weight 820.25g) falls within the weight range cited by McKinley (2013, 154) for cremation burials that are commonly recovered archaeologically (600–900g) (Table 30). The combined weight of 568.7g for contexts 2936 and 2937 falls slightly short of this range (cremation burial 2935); these two contexts are likely to derive from the same deposition event. Bone

weights from deposits 2950, 3286 and 2378 were much lower, weighing 58.9g, 156.2g and 35.6g respectively. All three features were substantially truncated.

Fragmentation

A summary of fragmentation per deposit is presented in Table 31. Fragment size ranged from 24.2mm (2378) to 82.9mm (2936). The largest proportion of bone fragments came from the >10mm fraction in two deposits (2950 and 2396), and the 10–4mm fraction in the other four deposits. Large proportions of bone also came from the 10–4mm fractions in deposits 2950 and 2396. Small-to-moderate proportions of cremated bone were also present in the 2–0.5mm residue (Table 32), though the total bone weights could not be estimated.

Skeletal representation

Of the identified fragments, the skull was the most frequently observed element in all deposits except 2378, where bone fragments from the upper limbs dominated. A high proportion of skull fragments is an often-noted pattern, as the vault is comparatively identifiable even within the smaller fractions (McKinley 2004a, 11). Bone fragments from the axial skeleton and upper and lower limbs were identified in smaller proportions in all deposits.

Smaller proportions of unidentified bone were from the hands or feet, though most derived from the upper or lower limb bones or could not be identified to an anatomical region. Proportions of unidentified bone ranged from 36.28% (2935) to 61.72% (3020). It is unsurprising that the highest proportion of unidentified bone was observed in deposit 3020, as this had the highest levels of fragmentation of all the observed contexts.

Efficiency of cremation

In all but one deposit, fully calcined (white) bone fragments accounted for 50% or more of the assemblage. This indicates a generally efficient cremation process with most bones being burnt at a temperature higher than 600ºc and is a common observation in archaeological cremation burials (McKinley 2006, 84). This may indicate that in the cases presented here, much of the corpse was placed in a location on the pyre where maximum and consistent heat and oxygen supply was available (McKinley 2013, 158). Smaller proportions of bone were coloured grey, blue and black.

In cremation burial 3286, most fragments were found to be an orange colour. This is generally considered to be unburnt (McKinley 2004a, 11), though these orange fragments were co-mingled with white and grey fragments and thus had been heated to a degree.

Demography

The five cremation burials contained a minimum of three adults, three sub-adults and one individual of unknown age. The size and morphology of the identified bone fragments in deposits 2950 and 2935 were in keeping with those of adults over 18 years (Scheuer and Black 2000). As well as the adult, deposit 2935 also contained neonate bones including a proximal hand phalanx and the body of an unfused thoracic vertebra. Cremation burial 3020 contained the remains of a young adult aged 19–25 years and a young child aged 1.5–3.5 years. Cremation burial 2378 contained the remains of a sub-adult aged <15 years, based upon the presence of an unfused distal fibula epiphysis. There were no indicators of age amongst fragments in deposit 3297 (cremation burial 3286). Sex traits were observable only on cranial remains from deposits 2937 (nuchal crest) and 3020 (orbital margin) and in both cases, were found to be possibly female.

Pyre and grave goods

One small fragment of non-ferrous metal was recovered from deposit 3020 (Table 33). It is unclear whether this was burnt or unburnt. The fragment is rectangular, less than 1mm thick, and was perforated with a small hole. Unburnt animal bone was found co-mingled with burnt bone from context 2378 and 2937. The larger fragments from 2378 were identified as either scapula or pelvis from a large mammal. A scallop shell was found in cremation burial fill 2936 (of 2935).

Discussion

Phase 2 (early Bronze Age)

Human remains from a single crouched or flexed burial were found in the southern part of the site. Inhumation burial 5010 was a male who appears to have suffered from traumatic events as a child but reached adulthood before passing away in his 20s or 30s.

Phase 3 (late Iron Age/early Roman)

Human remains from phase 2 comprised disarticulated bone from two contexts and a cremation burial containing the remains of one adult female and one sub-adult. The disarticulated bones were found in fills of enclosure ditch 2 (fill 1931) and enclosure ditch 8 (fill 2241). These possibly derived from two adults of unknown sex. Such remains are typical of the late Iron Age and are frequently found in non-funerary features (e.g. ditches) of this date (Joy 2011, 409). This bone may represent the remains of excarnated cadavers, where either the corpse was left exposed in a ditch, or disarticulated body parts were gathered from the excarnation site and interred within the ditch (Carr and Knüsel 1997, 171).

Cremation burial 3020 represents a dual burial, possibly of two individuals that were cremated together. Approximately 5% of archaeological cremation burials contain two or more individuals, most frequently consisting of an adult and a child, as observed in this case (McKinley 2013, 153). Dual cremation burials are known from several Iron Age sites, such as at Hinxton, Cambridgeshire, where several examples of adult/sub-adult dual cremation graves were uncovered (Hill *et al*. 1999, 252).

Phase 4 (early Roman) and 5 (middle Roman)

Human remains from phase 4 and phase 5 are grouped together here as they solely comprised disarticulated bones from 11 contexts (Table 28). Most derive from phase 4 contexts relating to the early Roman-period enclosure and one of the phase 5 contexts was associated with a recut ditch section in the same enclosure. The remains represent at least 11 individuals (seven adults, two children and two individuals of unknown age) and all bar one example constituted single bones. The remains of an infant in ditch 94 (2952) comprised fragments of skull, ribs, pelvis, femur, tibia and fibula, and probably represent the remains of a disturbed inhumation burial. The sex of the individuals represented by the disarticulated remains was largely indeterminate; of the seven adults represented, one was a possible male.

Disarticulated human skeletal material is sometimes found in non-funerary features of Roman date (Pearce 2013, 146). One of the most interesting aspects of the assemblage is the cut marks found on two left femurs recovered from contexts 1908 (ditch 12; Fig. 69) and 2785 (pit 2788) respectively. These comprised several shallow, transverse cuts running down the side of the femoral shaft that were made using metal or stone tools (cf. Loe and Cox 2005, 15). The femur from 1908 displays very similar characteristics to a disarticulated right femur of Iron Age date from Gussage All Saints in Dorset (Redfern 2008, 286). In both the Longford and Gussage All Saints femora, the proximal end of the bone

has been gnawed in the region of the femoral neck, and parallel cut marks are observable on the lateral aspect of the proximal femoral diaphysis. At Gussage All Saints, this was interpreted as evidence for cutting of the muscle attachments around the thigh, during deliberate disarticulation of the (partially decomposed?) joints of the corpse (ibid., 294). The femur from 1908 and a tibia shaft from context 1960 also exhibited carnivore gnawing. It is unclear whether the remains were gnawed by animals before or after the cuts were made, but it is clear that dogs, foxes or wolves, had access to the remains prior to final burial.

Phase 6 (late Roman)

Human remains from Phase 6 comprise five inhumation burials; one young child, two prime adults (one possibly male and one possibly female), a middle adult (male) and one mature adult (possibly female), and three cremation burials, including one adult and the dual burial of a possible female and an infant.

The late Roman inhumation burials from Longford are fairly typical for the period in terms of stature, age profile, non-metric traits, and pathologies, e.g. osteoarthritis and periostitis, which are common in archaeological populations. However, the trauma evidence found on decapitated skeleton 3067 is exceptional. The evidence indicates that this individual was either subject to several traumatic peri-mortem events or one peri-mortem event that resulted in several injuries. Firstly, trauma either resulting from a fall or from violence caused fractures to the right hand and clavicle. The possible cut mark on the right fifth metacarpal may be indicative of the hand being raised to defend against a weapon. Defensive injuries are most often to be found on the distal upper limbs, metacarpals and bones of the fingers (Tucker 2014, 222). However, the presence of sharp-force trauma to this bone cannot be confirmed without microscopic analysis.

It is unclear whether further sharp-force trauma to the mandible and the skull (occipital) of skeleton 3067 are related to a potential violent assault or to removal of the head. Two cuts to the second cervical vertebra were made by a blow to the neck from behind. The force of this blow (and any subsequent blows) also caused several other vertebrae to fracture. A smaller cut to the dens of the second cervical vertebra suggests that final severance of the head from the body was completed via a small chop to the neck from the anterior side: the character of this cut is more in keeping with a small chop than a small incisive cut, e.g. to separate the intervertebral connective tissues (Tucker 2014, 226). Overall, the evidence indicates multiple blows from a heavy-bladed implement.

The absence of peri-mortem dental trauma in skeleton 3067 suggests that these wounds may have been inflicted when the individual was either dead or unconscious (Loe *et al*. 2014, 64–7). However, this is slightly at odds with the defensive injuries to the hand that occurred at around the same time. It is possible that the person was trying to defend himself and was subsequently knocked unconscious. Where decapitated Romano-British individuals exhibit chopping blows to the neck combined with defensive injuries these are considered to indicate decapitation as the cause of death, largely because of the similarities with evidence from medieval execution cemeteries (Tucker 2014, 230).

The moderate cremated bone weight in deposit 2935 suggests that this is likely to represent a heavily truncated dual-cremation burial. The inclusion of burnt animal bone within the deposit suggests the placement of an animal or a carcass joint on the pyre with the individual, which was a fairly common practice in Roman Britain (Philpott 1991, 196). The presence of a fragment of scallop shell is also in keeping with this pattern, although scallop shells are less often found in Roman cremation burial deposits than oysters, mussels and cockles (ibid.).

The cremated bones recovered from 2950 may represent a token burial deposit where only a small quantity of cremated material was selected from the pyre for burial (Williams 2004, 418). The interpretation of token burial is usually applied where bone weight is less than 100g (cf. McKinley

2013, 154), and similar examples have been found at Baldock Area 15, Hertfordshire, Low Borrowbridge, Cumbria, and Caerleon Lodge Hill Cemetery, Newport (McKinley, 2004c). However, it is unclear how much of the original deposit was lost via truncation.

The moderate bone weight of urned cremation burial 3286 is due to the fact that the feature was heavily truncated by modern machinery tracking across the site. The colour variation observed in bone fragments from 3286 is highly suggestive of an incomplete cremation burial as the deposit comprised both fully oxidised and unburnt bone. Such uneven burning could be accidental, e.g. a result of dousing of the pyre by heavy rain (McKinley 2008), the result of insufficient resources such as fuel or deliberate curtailment of the process (McKinley 2006, 84). Early ending of the cremation process is evidenced at Baldock Area 15, where remains suggested that areas of the body with denser soft tissue coverage had not been exposed to heat for long enough for the bones to be affected (McKinley 2000, 39). This may suggest that full oxidation of remains was not necessarily a requirement of the cremation process (McKinley 2006, 84).

Unphased

Single inhumation and cremation burials were poorly dated. Inhumation burial 1800 included the remains of a prime adult, possibly a female. Cremation burial 2378 had a low bone weight and may have been a token burial, though it may also have been truncated by later activity (Williams 2004, 418; McKinley 2013, 154).

Conclusions

The human bone assemblage from Longford is fairly typical of the late Iron Age and Roman periods, comprising adults of both sexes and children. Dental and skeletal pathologies were common and in keeping with those found in contemporary assemblages. The exception was skeleton 3067. Although decapitation burials are commonly found in the Romano-British period, particularly the later period, it is unclear whether the head of this individual was removed as the mode of death or post-mortem.

Mammal, amphibian and reptile bones

by Ian Smith

An animal bone assemblage primarily comprising the remains of cattle (*Bos taurus*), sheep (*Ovis aries*), goat (*Capra hircus*), pig (*Sus* sp.), horse (*Equus* sp.) and dog (*Canis familiaris*) was recovered by hand collection and from sieved samples. A small number of other remains were present that included specimens of red deer (*Cervus elaphus*), badger (*Meles meles*), weasel (*Mustela nivalis*), and small vertebrate species including rodents, amphibians and grass snake (*Natrix natrix*). The assemblage provides evidence for changing patterns of livestock exploitation between the late Iron Age and the early Roman period, most notably with regards to a pattern of organised cattle supply and more standardised carcass processing, and also for possible horse breeding in the 2nd century AD.

Methods

The bones were identified using comparative skeletal reference collections in addition to an osteological identification manual (e.g. Schmid 1972). Specimens were identified to species, element, side and zone. Sheep and goat were separated, where possible, following Boessneck *et al*. (1964), Kratochvil (1969), Payne (1985) and Halstead *et al.* (2002). Some elements (mainly vertebrae and ribs) were classified by size according to ‘large mammal’ (e.g. cattle and horse), ’medium mammal’ (e.g. sheep/goat, pig and large dog) and ‘small mammal’ (e.g. small dog, cat and hare). The sieved material

includes some smaller vertebrate remains, including rodent and frog/toad bones, and these remains were identified with reference to Böhme (1977), Ratnikov (2001) and Holman (1998).

Refitting fragments from a single anatomical element were counted as one specimen (NISP). Each associated or articulating animal bone group is referred to as an ABG. The minimum number of individuals (MNI) was calculated on the most frequently occurring occipital, mandibular or appendicular element for each species, using Serjeantson's (1996) zoning guide and Worley (2017, 1) mandible zones, and taking left and right sides into account.

To calculate age profiles, epiphyseal fusion data were organised into 'early', 'middle' and 'late fusing' bones and suggested ages follow the data collated in Reitz and Wing (1999, 76). Tooth wear was recorded using Grant's (1982) tooth wear stages for cattle and pig, and Payne (1973) for sheep/goat. Using these data, suggested ages were estimated based on the conversions of Halstead (1985), Payne (1973) and Halstead (1992) were used for cattle, sheep and pigs respectively. Sex estimation was undertaken on cattle pelves and pig canines following Grigson (1982). Measurements were taken following the standards of von den Driesch (1976). Withers' heights of cattle were calculated using Matolsci (1970) and (cattle metapodia) using Foch (1966), May (1985) for horse and Harcourt (1974) for dog.

Phasing

A total of 3193 fragments were recorded, comprising 2437 hand-collected specimens (Table 34) and 756 from sieved soil samples (Table 35). The bulk of the assemblage (63% NISP) derives from early Roman (phase 4) features, with 13% from middle Roman contexts (phase 5) (Fig. 70). A further 11% came from middle Neolithic contexts (phase 1) and 11% from the late Iron Age–early Roman contexts (phase 3). Less significant groups (c. 1%) were recovered from late Roman features (phase 6) and unphased features (<1%). The latter are not discussed any further in this report.

Phase 1 (middle Neolithic)

Of the 389 specimens recovered from middle Neolithic features, 77% (301 NISP) came from sieved samples. The material was generally well preserved. Phase 1 material originates only from a relatively small number of pits (1005, 3017 and 3180) and postholes (3012, 3086 and 3124) located in the same area of the site and represents a discreet sample. The hand-collected remains from phase 1 comprised cattle, sheep/goat, pig and red deer, while a dog bone was also recovered from the sieved samples. Pig was the most common species present in both the hand-collected and sieved assemblages, constituting 79% overall. The MNI ratio for cattle, sheep/goat and pig was 1:1:2 respectively. Most of the pig remains were recovered from pits 3017 and 3180 in association with pottery and worked flints. One pig mandible was aged at less than six months as the fourth deciduous premolar showed no signs of wear.

The red deer remains all derived from pit 3017 (fill 3018), comprising two antler fragments and a fused distal humerus that had been burnt midshaft. Pit 3017 (fill 3018) also produced a partially blackened and butchered cattle astragalus, which bore several fine transverse cut marks judged to relate to dismemberment. This bone is relatively large (GLm 66.5), though it is probably from a domestic animal rather than an aurochs as it is significantly smaller than the aurochs astragalus identified by Maltby (1990) from an early Neolithic context at Amesbury, Wiltshire (GLm 83.8). Several of the pig bones and a calf bone from pit fill 3018 had also been gnawed by dogs.

Phase 3 (late Iron Age–early Roman)

All the hand-collected remains from late Iron Age–early Roman contexts were recovered from ditches, mostly the fills of ditch 2 (67%) with a further 13% from ditch 4 and 8% from ditch 8. Cattle comprised 45% by NISP of the hand-collected remains from this phase, compared to 20% sheep/goat and 5% pig. Horse bones were fairly well represented, while dog remains derived from a single burial (see below), and a single badger bone was recovered from ditch (2505 fill 2506). The MNI ratio for cattle, sheep/goat and pig was 5:8:2 respectively; the high proportion of sheep/goat being due to the preservation and recovery of several distal tibiae. The variation between NISP and MNI may have been caused by the preponderance of dog gnawing on cattle bones. Dog gnawing was recorded on 16% of the material recovered from ditch fills, while none was found on bones from pits in this phase (though these were mostly from pit 2344).

Relatively few cattle bones exhibited butchery marks (only four out of 94). Those that did included an atlas from ditch 1990 (fill 1991) and a skull from ditch 1901 (fill 1896), both of which were clearly chopped. The latter skull is of a type with a high double arch (frontal profile) and with a boss as seen from above, as seen in modern Welsh or Kerry cattle (Grigson 1976, 116, 126, 128). In terms of cattle ageing, no unfused early fusing elements were identified (Table 36). Although the sample size is fairly small, the data provide no evidence of milk production, as the presence of neonates are generally expected in assemblages representing a dairy herd (Legge 1981; 1992). Only two cattle mandibles provided dental wear data. One from ditch 1901 (fill 1896) represents an animal that died at approximately 30–36 months old. In this specimen, the third permanent molar bore only a thin ridge that extended along the distal part of the root in place of the hypoconulid. The other specimen had some damage to the third permanent molar but was probably aged about 30–36 months or slightly older.

Sheep/goat mandible wear data were taken from six mandibles and one loose tooth, but only three mandibles could be assigned to a specific age stage. Similarly, only 11 specimens provided epiphyseal fusion data. Goat was represented by a mandible with a full tooth row, identified from multiple criteria outlined by Halstead *et al*. (2002).

Equids were more common than pigs in phase 2 in terms of NISP and were represented by a minimum of three individuals (based on the presence of three right-sided radii). Analysis of equid teeth suggested that all the remains were from horses rather than donkeys or mules. A 3rd molar from ditch 2021 (fill 2056) appears to be from a horse, as it had a deep ectoflexid that was almost touching the linguaflexid and this probably excludes the tooth being from a donkey (*E. asinus*). A mandible from ditch 2571 (fill 2568) has occlusal lengths amongst the P2 to M1 that suggest perhaps it was from a horse/pony rather than a donkey (cf. Eisenman 1986, 95). The 1st molar in this specimen had a relatively deep ectoflexid with a double knot of caballine type (ibid., 96). Another mandible from ditch 2550 (fill 2549) contained 1st and 2nd molars with ectoflexids that almost touched the linguaflexid but without a flattening contact. A metatarsal from ditch 2281 (fill 2282) provided a withers height of 1.3m, a height which overlaps the size ranges of small horses (or ponies), donkeys and mules (Eisenmann and Beckouche 1986).

Of the total 370 specimens identified from phase 2 features, 45% were from sieved samples. These produced significant numbers of bones from small vertebrates, including amphibians (62%), rodents (19%) and shrews (13%). A small number of sheep/goat, pig and cattle elements are also present. The sieved remains derived from ditches 2, 3, 8 and 14, and pits 1714 and 2344, with the largest group by NISP, consisting only of small vertebrates, being recovered from Pit 2344. No definite signs of predation were identified amongst this group. Toad (*Bufo bufo*), frog (*Rana cf temporaria*), newt (*Triturus* sp) and shrew (*Sorex araneus*) were present, and the frog/toad bones include some notably tiny (and clearly immature) specimens. It is likely that many of the small animals in this pit were pitfall victims.

The dog remains from ditch 2 (cut 2287, fill 2288) include articulating bones from the forelimbs (humeri, radii, ulnae), front feet (metacarpals and phalanges) and both tibiae (Table 37). All the recovered elements were fused, including the late-fusing proximal tibia. Furthermore, the radius and ulna have well developed/pronounced muscle attachments that suggest a dog of some age. The skeleton exhibited no obvious signs of butchery. While there was some modern breakage, both humeri had rough transverse breaks at the midshaft, probably caused by post-depositional disturbance. This ditch was recut in phase 5 by ditch 18, which may explain why much of the skeleton was missing and it is notable that there was part of a dog pelvis within the immediately adjacent fill of the later ditch (cut 2289, fill 2290). The dog was relatively large with a withers' height estimated at 58–59cm (taken from the humerii).

Phase 4 (early Roman)

The early Roman phase 4 assemblage comprised a total NISP of 2002 specimens. A total of 86% of remains were hand collected, with the remainder from sieved samples. Cattle bones dominated the hand-collected assemblage (47.8%), followed by sheep/goat (17.3%), horse (5.2%), pig (2.7%) and dog (1.9%). It should be noted, however, that the sheep/goat and dog NISP were inflated by partial skeletons (see Table 37). The proportions of cattle and sheep/goat show slight differences between feature type, though this is skewed by the sheep burial in well 2394 (fill 2375). About 66% of cattle bones were recovered from ditch fills and 31% from pits, while sheep/goat remains (not counting the burial) were represented by 57% and 38% in these feature types respectively.

Cattle

In terms of body-part patterns, cattle specimens were dominated by loose teeth and mandible fragments (Fig. 71). This is due to taphonomic processes causing breakages which result in higher numbers of these elements. These were followed by the scapula, metatarsal, humerus, radius and metacarpal fragments, while small elements, such as carpals and phalanges, and gracile bones such as the ulna, were poorly represented.

Cattle dental wear patterns show a high proportion of animals were killed off at age class D (Fig. 72), which equates to about 18–30 months (following Halstead 1985). This equates to 58% (NISP 31) of animals being killed in this age class and suggests that cattle represented were slaughtered primarily with beef production in mind, with much less evidence for the exploitation of secondary products. The sample suggests that 6% of cattle were killed at age class C (8–18 months) while others reached the more advanced age classes of 'old adult' (class H) or 'senile' (class I). There is no evidence for culling at age class A (0–1 months) either amongst this sample or amongst the loose deciduous fourth premolars or other partial tooth rows, which suggests that dairy production was not a concern at the site. The epiphyseal fusion data (Table 36) appear to support the dental wear data as the proportion of early fusing unfused elements is minimal ('early fusing' relates to animals under the age of c. 2 years (Reitz and Wing 1999, 76). However, three small and porous post-cranial elements of phase 4 from well 1572 (fill 1616), ditch 2252 (fill 2248) and ditch 2588 (fill 2585) are judged to be from calves and their presence suggests the need for some caution in using the wear data alone. Two of these elements (a calcaneus and tibia) appear in the fusion data, whilst the third, a humerus, bears no fusion surface. The presence of these elements highlights the possibility that taphonomic factors may have biased against the recovery of bones from young livestock. Some cattle may have been raised at the site and it is possible that a higher proportion were killed at an early age. Given that teeth are more robust than bones, however, the lack of any unworn deciduous fourth premolars or other at an early wear stage suggests that the dental wear evidence is fairly sound and that the few infant cattle bones recovered may have been from young animals that were specifically targeted and may

not have been reared at the site. Four cattle pelves were identified as female or 'probable female' and one as male (Table 38), though this sample is too small to draw robust conclusions.

A cattle mandible from phase 4 ditch 2360 (fill 2358) has lost the permanent 4th premolar ante-mortem and the alveolus had remodelled and closed over. The adjacent 1st molar was, as a result, affected by unusual wear that extended down the mesial aspect of the tooth, probably due to malocclusion. A cattle mandibular condyle from 2588 (fill 2585) is affected by significant bone remodelling and deep pitting across the entire articulation, indicative of a serious infection and was probably very painful.

Measurement of a cattle metatarsal from phase 4 ditch 2360 (fill 2358) produced a withers height of 1.1m (Table 41). Two other slightly damaged cattle metatarsals from ditches 2083 and 2380 also suggest heights of c 1.1m. A cattle tibia from ditch (2164) suggests a withers height of 1.3m, based on Matolsci's conversion (1970).

Butchery marks were most commonly found on cattle bones in phase 4, with over 20% exhibiting chops and/or cuts, compared with 3% of sheep/goat and 11% of pig bones (Table 42). Chop marks were recorded most frequently on cattle scapulae with many having the spina chopped off and cut marks around the glenoid, both made during filleting and dismemberment around the shoulder joint. Such butchery is frequently encountered in Romano-British assemblages from urban and military sites (see below; Maltby 2007). Several mandibles were chopped through the mandibular condyle, across the coronoid process, through the ascending ramus, and through the diastema (cf. Lauwerier 1988, 185). Fine cuts were rare, though one mandible exhibited possible skinning cuts on the ventral side of the horizontal ramus, and another had cuts on the mandibular condyle and coronoid process. So-called 'scoop marks' were recorded on the humerus, femur and tibia and possible longitudinal splitting of the radius and tibia was noted (Maltby 2007, 64). Three cattle metapodia were broken transversely, while another four were also possibly fractured in a similar manner. A cattle metatarsal from pit 2636 (fill 2626) bore several fine cut marks around the proximal end made during skinning and/or removal of the foot.

Phase 4 pit 2788 is worthy of closer examination with regard to element representation and butchery patterns. The pit contained a total of 597 animal bone fragments, 79% from cattle, 16% from sheep/goats, 4% from pigs, and 1% from horses. A notable concentration of cattle skull, horncore and mandible elements, which together constituted 59% NISP of the recorded cattle bones, were recovered from the feature. Scapulae were also particularly common (18%), with several exhibiting the type of filleting marks noted above. One of the scapulae also bore a possible perforation mark through the blade (e.g. Lauwerier 1998, 195). Femur and metatarsal bones were also found in the pit (each representing 4% of the cattle assemblage). As mentioned above, the butchery evidence from the scapulae and long bones is suggestive of a Roman military influence and there are signs of organised and systematic carcass processing and possible smoking or brining of shoulder joints (Maltby 2007, 72). It is possible that dressed shoulders were imported to the site, though given the preponderance of skull and foot bones left over from primary butchery, it seems likely that processing was undertaken nearby.

Sheep and goats

There were no definite identifications of goat in the phase 4 assemblage. Sixteen mandibles and 13 other elements were identified as sheep based on the criteria of Payne (1985) and Halstead *et al*. (2002) respectively.

A total of 34 mandibles provided dental wear data (Fig. 73). None aged below six months were identified. Half of the population were culled between six months and three years old, while about a third were slaughtered around 4–6 years old and this latter group represents a notable spike in the data. A further 30 incomplete sheep/goat mandibles could not be correlated with age stages based

solely on wear patterns, though using eruption data from Silver (1969) around 40% of these are estimated to have been slaughtered somewhere between age stages A–D (i.e. 0–2 years old) and probably towards the latter end of this range. This suggests that there may have been a significant kill off of sheep/goats in their second year (cf. Payne 1973; or between 10–27 months following Jones' (2006, 177) data). The spike at age stage G, which is evident in the securely aged specimens and the incomplete mandibles, probably represents the survival of breeding ewes, animals that would have also provided several clips of wool by this time. No loose unworn deciduous fourth premolars were recovered (either by hand or from samples) and the lack evidence for infant mortalities suggests that dairying was not a prime concern, there is a higher proportion of (worn) deciduous fourth premolars compared to permanent fourth premolars (probably age stages C and D, see above).

In terms of long-bone development, shows a steady kill-off of sheep/goats, with up to a third being culled prior to the maturity of 'early fusing' elements, between one and three-quarters of animals being culled before the fusion of 'middle fusing' elements, and between two-thirds and 100% of the population being culled prior to the full development of 'late fusing' elements.

A partial sheep skeleton was recovered from well 2394 (fill 2375). This ABG comprised the right mandible, both horncores (one still attached to part of the skull), numerous parts of the axial and appendicular skeleton (Table 37). Analysis of the deciduous teeth suggests that the skeleton was a sheep rather than a goat according to Payne's (1985) criteria. The humeri were unfused at their proximal ends, the distal ends were fusing, and both distal tibiae were unfused. This places the sheep within a 7–28–month age bracket (cf. Popkin *et al*. 2012, 1783). The 1st molar was just in wear, while the 2nd molar had yet to erupt, and this evidence narrows the probable age to 7–12 months (cf. Payne 1973; Jones 2006, 177). One anterior right-sided rib was affected by a porous swelling towards its distal end, possibly an inflammatory response to trauma.

Pigs

Nine pig mandibles provided ageing data. Five represent pigs that were killed at about 12–24 months. One was over 24 months old, though a more conclusive estimation could not be made owing to damage to the posterior cusp of the third molar. The other specimens were aged at less than six months, 6–12 months and 12 months plus. Only a small group of pig bones provided epiphyseal fusion data. There were no fused 'middle' or 'late fusing' elements, which supports the tooth wear data in suggesting a fairly early kill-off of pigs. Pig remains recovered from sieved samples include neonatal elements from well 2394 (fill 2375), well 1572 (fill 1616) and pit 2636 (fill 2630). This suggests that pigs may have been bred at the site.

Equids

Equid bones were more common than pigs in terms of NISP, but less so in terms on MNI. A minimum of seven equids were represented by repeating right humeri specimens. This apparent disparity also occurs at the Romano-British sites of Stallards Place (Strid 2013) and Kingshill South (Strid 2018, 125). Horses appear to have been relatively numerous at rural Roman settlements in the Upper Thames Valley and in Wessex, which appears to follow exploitation patterns originating in the Iron Age (Maltby 2010, 206; Strid 2018, 136). Estimated withers' heights for equids ranges between 1.15m to 1.29m (the largest coming a metatarsal from ditch 2655), while the average was calculated at 1.22m (Table 44).

A group of loose permanent maxillary teeth from well 2394 (fill 2195) are likely to derive from a horse (rather than donkey or mule). Each have a pli caballin and protocones that extend towards the aboral in typical caballine fashion (Zeder 1986, 388–9). An Equus mandible from ditch 2307 (fill 2313) has all teeth from the 4th premolar to the 3rd molar *in situ*, and each have double knots akin to

horses. Each of the molars have deep ectoflexids which almost touch the linguaflexid, which suggests that they derive from horses (Eisenmann 1986, 96).

Left-sided scaphoid and cuneiform elements (central and third tarsals) from ditch 2385 (fill 2384) were ankylosed and may be diagnosed as spavin (Baker and Brothwell 1980, 118). These tarsal bones may have articulated with two left metatarsals from the recut phase 5 ditch 1959 (fill 1960; see below) which suggests that the remains could have been disturbed.

Dogs

Dog bones were represented by 34 bones from the hand-collected assemblage and four from sieved samples. A group of articulating foot bones were recovered from ditch 2207 (fill 2240), comprising paired 3rd, 4th and 5th metatarsals, plus a left-sided 2nd metatarsal. The right-sided 3rd metatarsal bears some extra bone growth on the shaft that appears to have resulted from inflammation. A dog humerus from ditch 2582 (fill 2581) gave a withers height of 0.32m and a radius from the same context suggests 0.3m (following Harcourt 1974).

Phase 5 (middle Roman)

All of the phase four assemblage was hand collected and originated from eight ditches. A total of 95% came from the fills of ditch 1959, which no doubt biases the interpretation of the animal remains from this phase. Out of 382 specimens, almost two-thirds were identified as either large mammal, medium mammal or indeterminate mammal. As a proportion of the three 'main' domesticates, cattle bones constituted 76% of the assemblage identified to species, with sheep/goat contributing 17% and pigs 7%. Horse remains were slightly more common than sheep/goat in terms of NISP, though these consisted of a minimum of two individuals. Unfortunately, the small sample size limits what can be said about animal husbandry in this phase, though some of the equid remains provide useful information.

A group of Equus bones from ditch 1959 suggests that horses ranged in size and died at different ages in phase 5. A tibia had a maximum length of at least 376mm, which calculated to a withers' height of c. 1.48m. The length of this tibia was greater than any contemporary specimens recorded on the ABMAP database (UoS 2003). This height is equivalent to 'standard' Roman military horses (c 1.47m) in other parts of the empire (Lyublyanovics 2006, 245). A metatarsal from the same ditch gave a withers' height of 1.52m which again is very tall, though it exhibited a degree of slenderness (SD=34.5mm) which may suggest that it derived from a mule. Two other left-sided metatarsals, although slightly damaged and of different lengths, were from much shorter animals.

One metatarsal exhibited some minor lipping around the proximal end, it may have been partially fused with the fourth tarsal, and there was some enthesophyte development medially in the area of the distal metaphysis. Another metatarsal was fused to the 3rd tarsal, which is suggestive of an unhealthy ankle joint. Some extraneous bone growth was evident and the ankylosis was such that the articular surfaces between the third tarsal and the surviving part of the proximal metatarsal were difficult to distinguish. There was also some external syndesmophyte formation on the anterior medial side, which is a common clinical symptom of spavin (Bartosiewicz and Gal 2013, 124). Although affected animals are likely to be affected by a period of lameness, as long as the condition is not too extensive, they may be returned to slow work (Baker and Brothwell 1980, 119). Whether this animal was eventually dispatched due to lameness is not clear, but the state of the joint suggests it survived with the condition for some time.

A right maxilla contained 3rd and 4th premolars, and both had a pli caballin (or caballine fold) suggestive of horse rather than donkey (Zeder 1986, 388–90). Four left-sided teeth probably from the same skull consisted of a 2nd premolar without a pli caballing, though the remaining three teeth

clearly did. All these teeth were very heavily worn, and although this wear varies with diet and other factors (Hillson 2005, 215), they are certainly suggestive of an elderly horse. All the roots were closed, and the surviving crowns and roots appeared to be at an even more advanced stage than the specimen of a 19–year-old horse illustrated by Clutton-Brock (1992, 21). Conversely, a femur from ditch 1959 was unfused at both proximal and distal ends, meaning that it derived from an animal below 3–3.5 years of age and it was potentially much younger than this as the shaft measured a slender 25.3mm across, and both ends exhibited much actively growing and porous bone.

Conclusions

Although small, the relatively well-preserved phase 1 bone assemblage is important, as zooarchaeological remains of this date and condition are relatively scarce locally (cf. Strid 2010, 209; 2018, 126). Pig bones were most common in these features, while venison consumption was also attested. These contexts were dated to the middle Neolithic. Pig bones were common in a late Neolithic assemblage from nearby Cirencester (Strid and Nicholson 2011, 76).

The Roman-period assemblage was dominated by cattle remains. The largest groups of bones were excavated from phase 4 (early Roman) features, and it is clear that beef made up the majority of the meat consumed in this phase. While cattle numbers were possibly overrepresented by NISP counts they were also predominant in terms of MNI, and given the size of each carcass, beef was of undoubted importance. The prevalence of cattle and relatively poor representation of sheep is comparable with the Roman assemblage from the nearby site at Stallards Place, Dymock, and stands in contrast to several other rural sites in the region reviewed by Strid (2010, table 6b). Thus, the Longford assemblage fits the pattern of a 'Romanised' settlement (cf. King 1984; 1991), and this is supported by the targeted slaughter of prime beef cattle and the urban/military style of butchery employed in carcasses processing. Beef production appears to have been a priority in the early Roman period, particularly in and around urban and military sites (Maltby 2007), and it seems likely that the Longford cattle were reared specifically for meat and processed at the site.

The frequency of butchered cattle bones increases from phase 2 (late Iron Age/early Roman) (9% NISP) into phase 4 (early Roman) (17% NISP). Chop marks were rarely found on phase 2 material and it was notable that none of the four cattle scapulae from this phase exhibited the types of butchery marks that typified the shoulder joint in phase 4. The increasing use of meat cleavers as opposed to knife butchery, and the repetitive placement patterns as seen on the scapulae, are suggestive of Roman military influence. The proximity of the site to the legionary fortresses and later *colonia* at Gloucester may have tied it to a centralised livestock provisioning system that entailed standardisation in carcass processing (Dobney 2001; Maltby 2007; Allen 2017, 139–40). Although such a system appears to have been implemented, the exploitation of cattle for secondary products should not be ruled out. Some cattle did reach adult and elderly ages, which may reflect the need for some animals for use on the plough or for dairying. This is also apparent in the phase 4 slaughter patterns for sheep/goat, where there were two peaks in the culling ages: one around one–three years, and the other around four–six years. Again, meat production appeared to be important, though the maintenance of slightly older sheep would have allowed for several clips of wool to be taken. Although the sample size is relatively small, the pattern of culling very young pigs is indicative of an intensive meat-production strategy (Allen 2017, 118–9).

The horse assemblage is of interest for the variation in equid sizes encountered. These ranged from small gracile ponies up to quite large horses, some perhaps being military mounts. Horse remains increased in frequency from the early to middle Roman periods, according to both NISP and MNI counts, a trend that was also seen from the middle to late Roman periods at Kingshill South (Strid 2018, 125, table 4.4). Horse bones were more common than pigs in all the main phases of occupation at Longford and it appears that, given the frequency and diversity of horse remains, considerable time, effort and cost went into their maintenance. Such investment is supported by a couple of other

indicators. Some of the horse bones exhibited pathologies that could relate to heavy work or repeated stresses that might signal their use as pack animals. The fact that some were allowed to heal, however, suggests that the horses were being cared for. Also, the presence of a foal bone in a 2nd-century context is an indicator of the possibility of local horse breeding. Johnstone (2008, 138) discusses the evidence for the marketing and exchange of horses across the empire and suggests the presence of breeding centres in different places to dispense with the need for long-distance transportation of horses. Instead, she argues for 'local demand being met by local supply', but whether this was the case at Longford remains to be seen.

Bird bones

by Martyn Allen

A small number of bird bones were recovered from the site, mostly from phase 4 features with a couple from phase 2 features and one from phase 5. Three articulating bones from a common crane were the highlight of the assemblage. These, alongside bones from other wetland species, indicate that wildfowling was being practiced in the 1st century/early 2nd century AD. A few chicken bones were identified, though domestic fowl were not common at the site.

Methods

The bird bones were analysed at OA South using the in-house reference collection and the illustrated bird bone manual of Cohen and Serjeantson (1996) to aid species identification. Elements were recorded according to body side and anatomical zone present following to Cohen and Serjeanton's (ibid., 110–11) criteria. Juvenile bird bones were recorded based on the observation of porous bone. Butchery marks were recorded in detail. No evidence of pathology was found in the assemblage.

Results

A total of 17 bird bones were recovered during the excavation (Table 45). Twelve of these were hand-collected and five were found in environmental samples.

Three phase 2 bones were all recovered from ditch fills associated with the later Iron Age enclosure. These included humerus and coracoid elements from a juvenile bird, though it was difficult to identify the species conclusively. The bones were diagnostically similar to wading species and the presence of a coracoidal foramen suggests that they may have come from a lapwing or a plover, both of which would have been present in the local riverine landscape. The third bone derived from a thrush species and matched fairly well with redwing.

Thirteen bones were recovered from phase 4 contexts, including six from ditch fills associated with the early Roman enclosure and five from large pits located to the west of the entrance of the enclosure. Pit 2788 contained the articulated remains of a common crane foot, consisting of a distal tarsometatarsal and two 1st phalanges. The tarsometatarsal exhibited two small cuts on the anterior of the shaft, just above the central condyle, and a third slightly further up. Another large pit (2636) immediately to the south contained a mostly complete tibiotarsus from either a coot or a moorhen, while a more damaged tibiotarsus from ditch 15 was also identified as a wetland (wader) species. Domestic fowl bones were found in three phase 4 features. Three, possibly four, specimens were recovered from a fill in ditch 12. These included an ulna, a tibiotarsus and fibula, and these may all have come from the same bird. The proximal end of the ulna exhibited a small knife mark made during dissection of the wing. A complete tarsometatarsus was recovered from ditch 14 and a complete domestic fowl femur was found in soil layer 2365. The last was from a juvenile bird as the ends of the

bone had a porous texture, suggesting that it had yet to reach skeletal maturity though it had almost grown to full size.

A single bird bone was found in a phase 5 context. This was a distal ulna from a corvid that matched in size with magpie. The bone was recovered from a fill in ditch 100 which was a recut in the western corner of the early Roman enclosure ditch. Thus, the bone may be residual.

Discussion

The bird bone assemblage focuses largely on phase 4 and the early Roman use of the site. The small number of bird bones limits the interpretive value of the assemblage. Nonetheless, the presence of several wading species provides some evidence that the local wetlands were being exploited for wildfowl. Common crane bones are not frequently found at Roman sites and a recent survey has found that they occur in about 3% of avian assemblages from rural settlements of this date (Allen 2018, 110, fig. 4.21). Where they have been discovered, the sites in question are usually high status or have military connections. For example, nine crane elements were found in early Roman deposits at Fishbourne in West Sussex (Allen 2009). Eight of these were fragments of humeri and several exhibited butchery marks indicating that they had been eaten, and possibly exploited for feathers. Other notable rural sites with crane bones include Burgh, Suffolk, Camp Ground, Coln Fen, Cambridgeshire, Weekley, Northamptonshire, Claydon Pike, Gloucestershire, and Pentre Farm, Clwyd-Powys (Allen *et al*. 2018). Both Weekley and Claydon Pike have loose military associations, while Pentre Farm is thought to have been part of state-run lead-mining operations in north-west Wales (O'Leary 1989), broadly within the hinterland of Chester (Deva Victrix). Evidence that the military hunted common cranes, or at least were happy to eat them, come from sites such as Piercebridge, Co. Durham (Rackham and Gidney 2006) Stonea, Cambridgeshire (Potter and Jackson 1982) and Caerleon, Gwent (Hamilton-Dyer 1993). At Caerleon the butchered remains of at least four cranes were recovered in a well in the *scamnum tribunorum* (a senior officer's residence) along with bones of red deer, roe deer and wild boar, and other high-status food remains, such as oysters, coriander, figs and grapes.

The finding of common crane bones at Longford does not provide conclusive evidence of a military link to the site. However, the recovery of several wildfowl bones in the early Roman phase is suggestive of an authoritative presence. Wildfowl bones are consistently found in assemblages from high-status sites, such as villas, compared to other types of rural settlement (Allen 2018, 109, fig. 4.20b). It is possible that wildfowling at Longford reflects a change in cultural behaviour and a different attitude towards animals and the local landscape.

Charred plant remains

by Denise Druce

Following the assessment of 124 bulk samples taken during the excavations at the site, recommendations were made for further analysis of the charred plant remains (CPR) to explore research themes specific to the site and within its regional context (Druce 2017). These include the nature of activity taking place at the site, functional elements of specific feature types, the nature of waste disposal, agricultural practices, fuel/resource use, local environmental conditions, and how these may have changed over time.

Quantification

Eight samples were prioritised for further archaeobotanical analysis, and these primarily came from the 'industrial' phase of Roman activity at the site (Phase 4). Although deposits from several other early prehistoric pits and postholes (phase 1), and late Iron Age/early Roman (phase 3) ditches and

cremation deposits had been previously assessed (Druce 2017), they contained little in the way of charred plant remains other than charred hazelnut (*Corylus avellana*) shell fragments (in the case of the middle Neolithic features) and charcoal (See *Wood Charcoal*).

Methodology

Each sample was processed using a modified Siraf-type flotation machine. The resulting flots were collected onto a 250µm mesh and air-dried. The residue was also dried and checked for any residual organic material and finds. The flots were examined with a Leica MZ6 binocular microscope, and any charred plant remains were extracted, identified where possible, and counted. Cereal grain fragments, fine chaff (e.g. awns, lemma/palea) and other material, such as charcoal, bone fragments, ceramic building material (cbm) and metal waste, was quantified using a scale of 1 to 4, where 1 represents less than five items, 2 between six and 25, 3 between 26 and 100, and 4 over 100 items. Identification was aided by comparison with the modern reference collection held at OA North, and with reference to Cappers *et al*. (2006). Nomenclature follows Stace (2010). The results of the analyses are presented in Table 46.

Cereal grains and chaff

The evidence from the site suggests that a range of crops were under cultivation. Although many of the cereal grains, especially from ditch 2025 and pit 2592 were too distorted to identify to type, the assemblages indicate that six-row barley (*Hordeum vulgare*) and several varieties of wheat were being used, certainly during the phase 4 (late first to early second century) activity. This is supported by the presence of barley caryopses, and six-row barley rachis, wheat caryopses showing longitudinal scars characteristic of charred glumed wheat, and several short and rounded wheat grains resembling a free-threshing variety of wheat, such as bread wheat-type (*Triticum aestivum*-type). Although ditch 2021 and kiln 2350 contained relatively few charred plant remains, samples from these features were included in the study as both contained examples of possible free-threshing wheat; phase 2, late Iron Age/early Roman, ditch 2021 containing a very well-preserved example (*Plate 1*) with a length/height ratio of 1.5, which is consistent with Jacomet's (2006) measurement ratios for naked wheat (for comparison, emmer wheat's length/height ratio is 1.57–2.5 (but mostly >2), and spelt wheat is >2). It is worth noting, however, that due to the morphological overlap of wheat caryopses (Hillman *et al*. 1996), and a lack of diagnostic free-threshing wheat rachis (for a discussion on the problems of identification see Campbell 2017, 138), positive identification of this variety of wheat from Longford is tentative.

The presence of both spelt (*T. spelta*) and emmer (*T. dicoccum*) wheat glumes indicates both varieties were under cultivation. However, it is possible that the earlier variety (emmer wheat) was present as a residual crop contaminating the main crop of spelt wheat. The high numbers of oat (*Avena* sp) grains was notable, especially in phase 4 ditch 2025 and pit 2636, and although the relative abundance of oat could not be established for ditch 2025 due to the high number of indeterminate cereals, quantities of oat matched, or possibly exceeded, that of barley and wheat in pit 2636. As with the other cereals, the accurate identification of oat cannot be made using the caryopses alone, however the recovery of several oat floret bases with large 'horse shoe' shaped attachment points indicate the presence of the wild (non-cultivated) variety of oat (*Avena fatua*). Indeed, the presence of numerous grass (*Poaceae*) seeds of varying sizes, including the large (>4mm) brome (*Bromus* sp) seed, suggests that the cereal-rich deposits also contained abundant remains of wild grasses. Other parts of grasses included rare to frequent oat awn fragments, and frequent to abundant lemma/palea fragments of probable oat were found in pits 1828 and 2636. The ratio of chaff to cereal caryopses in pit 1828 was relatively high, which may suggest this feature was in receipt of more cereal-processing waste than the other features.

Other crops/edible remains

The only other certain edible item was a single large pea (cf *Pisum sativum*) from phase 4 pit 1828. Mustard/cabbage (*Brassica* sp) seeds were also recovered but identification to species is difficult and although some varieties, such as black mustard (*Brassica nigra*) and hedge mustard (*Sisymbrium officinale*) may have been hand-collected or cultivated for consumption (Campbell and Straker nd; Campbell 2017, 143), the wide range of plants within this group means this is difficult to prove. Occasional charred hazelnut shell fragments (*Corylus avellana*), elder (*Sambucus nigra*) seeds, and a single hawthorn (*Crataegus* sp) stone were also recovered, which may represent hand-collected food waste.

Although probable lentil (*Lens culinaris*) was identified in two Roman pits (later 2nd–3rd-century AD pit 488 and late 1st–2nd-century pit 241) from the evaluation at this site (WA 2004) no evidence of this, or any other unusual crops or plants, was identified in the samples from this excavation. Lentil is a Mediterranean crop introduced into Britain by the Romans and examples usually come from major towns or military sites although it has also been identified at Kingshill South, Cirencester (Boardman 2018). Its presence at both sites is probably a reflection of the proximity of the Roman military and urban settlements.

Charred weed seeds

A suite of typical cultivation/ruderal weeds was recorded, including ubiquitous weeds of cultivation such as common chickweed (*Stellaria media*), scentless mayweed (*Tripleurospermum inodorum*) and corncockle (*Agrostemma githago*); the latter certainly not tolerated in cereal assemblages, being highly toxic to humans (Moffett 2006). The presence of numerous fat-hen (*Chenopodium album*) seeds, with henbane (*Hyoscyamus niger*) and pale persicaria (*Persicaria lapathifolia*) in several of the samples indicates possible cultivation of acid, sandy, nutrient-rich soils; henbane being indicative of cattle dung (Stace 2010). Several of the taxa, including common chickweed, fat-hen, black bindweed (*Fallopia convolvulus*) and knotgrass (*Polygonum aviculare*) are considered common weeds of spring-sown crops (Campbell 1994, 69; Holden 1997, 683). Significantly, wild oats (of which there were plenty) are also believed to fare better amongst spring-sown crops (Campbell and Straker forthcoming). If this is the case then the site may have been at risk of winter flooding or severe frosts, which would not have been conducive to autumn sowing. Indeed, damp field conditions are indicated by the presence of seeds/fruits of sedges (*Carex* spp), rushes (*Juncus* sp), spike-rushes (*Eleocharis palustris*-type), blinks (*Montia fontana*), and creeping buttercup-type (*Ranunculus repens*-type). Marsh cinquefoil (*Comarum palustre*), a plant of wet fens, marshes, or bogs, was also recovered from pit 2592.

The most frequent weed seeds (other than wild oat) are small seeded grasses and wild legumes (Fabaceae; vetches, wild peas, clovers, etc.) which, like today, grow in a wide variety of habitats, including grassland and waste places. The recovery of other typical grassland plants, such as common/sheep's sorrel (*Rumex acetosa/acetosella*) and lesser stitchwort (*Stellaria graminea*) suggests that the assemblages contain a distinctive grassland element.

Other remains

Most of the features contained abundant charcoal fragments. Pottery kiln deposit 2388, however, contained very little, which may indicate either that this deposit came from a location from within the kiln in receipt of little fuel, or that the kiln had been cleaned out after its final use. Several of the features also contained bone fragments (including calcined), fine brick/tile fragments, and coal fragments. Other remains found within the flot included very rare metalworking waste (a single

fragment) in pit 1887, and fine hardened clay/daub fragments, which were particularly notable in pit 2636. The combined evidence suggests that most of the features were likely to have been used for general waste disposal including spent fuel; the occasional charred plant item in phase 2 ditch, 2021, and kiln 2350 perhaps more indicative of casual floor debris.

Discussion

The cereal assemblages from Longford are broadly consistent with those from other Romano-British sites in southern Britain in which hulled six-row barley and spelt wheat are the principal crops, with possibly minor, components of emmer wheat and a free-threshing wheat (Greig 1991, 309; Pelling 1991, 490; Lodwick 2017). The relative importance of emmer and spelt at the site is difficult to gauge due to there being so few samples and minimal chaff. However, the presence of emmer chaff, which often matches, or even exceeds that of spelt, may very tentatively indicate its presence as a main crop. A recent synthesis of Roman cereal usage from hundreds of sites across Britain suggests variations in the principal crops used from region to region (Lodwick 2017). Evidence from most areas suggests that use of emmer wheat had declined significantly by the early Roman period, however, notably, two regions not conforming to this pattern include the South West (mainly Cornwall) and the North East (the North West was not included in the study) (ibid., 32). In Gloucestershire, emmer was identified in middle Roman samples from Kingshill South, Cirencester, for example (Boardman 2018). Indeed, the consistent recovery of emmer wheat from Roman deposits at sites in the Upper Thames Valley, such as Claydon Pike (Straker *et al*. 2007, 157) suggests that it may have been more than just a minor crop, signifying a possible continuation of local tradition (Campbell 2017, 137).

The difficulties of accurately identifying free-threshing wheat have already been discussed, and although several wheat grains with free-threshing characteristics were recovered in six of the samples, the lack of accompanying free-threshing rachis means that its presence must remain tentative. Significantly, however, good evidence for free-threshing wheat, including its chaff, has previously been recorded from sites in Gloucestershire, including a middle Iron Age feature at Claydon Pike (Straker *et al*. 2007, 55), Roughground Farm (although no there was no chaff), and Upton St Leonards (Campbell and Straker nd). A small quantity of free-threshing wheat was also identified in Roman deposits at Cotswold Community (Challinor 2010) and Kingshill South, Cirencester (Boardman 2018, 160). Although records for free-threshing wheat increases in all regions during the Roman period, samples where it is dominant are rare, and its status is still unclear (Lodwick 2017, 32; Campbell 2017, 138–9). Indeed, the South West Archaeological Research Framework lists the dating of free-threshing wheat from Roman deposits as one of the key research aims for the region (Grove and Croft 2012, 30).

The high weed seed-to-cereal grain ratio in most of the assemblages suggests that the plant material is most likely to represent burnt crop-processing waste, dumped into the features alongside other refuse. The high number of seeds of wild grasses, including wild oat and brome, small legumes, and wetland plants, however, may indicate the presence of other types of waste, such as burnt fodder or dung. Given the main emphasis of the site during phase 4 activity, it is feasible that at least some of the material represents spent fuel being used in the pottery kilns. Indeed, the presence of small fragments of brick/tile and/or hardened clay/daub in pit 2636, and numerous kiln products in pit 2592 (mentioned above) supports this. The presence of other types of waste, such as animal bone (hand-lifted and from processed bulk samples), a fish scale and metalworking waste, suggests that as well as pottery production a wide range of activities, including those concerned with cereal processing, were likely to have been taking place nearby.

Conclusion

The charred plant assemblages from Longford, albeit limited, have provided useful data on the early Roman agricultural regime of the area, and are consistent with previous evidence, which show a possible continuation in the cultivation of emmer wheat alongside spelt and hulled barley, coupled with the possible early adoption of a free-threshing variety of wheat. The charred assemblages are likely to comprise cereal processing waste, possibly being used as fuel, indicative of possible spring-grown crops grown on well-manured soils, which may have been subject to seasonal flooding. Although many of the plants identified in the assemblages may have been growing in the margins of cultivated fields, a large grassland component may indicate the presence of possible burnt fodder or dung. Indeed, the presence of henbane, which grows on soils specifically manured by cattle (Stace 2010), may support evidence for a mixed-farming economy.

Waterlogged plant remains

by Julia Meen

Waterlogged plant remains were preserved in several of the deeper features of both late Iron Age and Romano-British date. Of these, only sample 63 from a peaty fill (3284) of ditch 3285 (phase 5) contained significant waterlogged remains considered worthy of further study. Analysis of this sample has been undertaken to provide evidence of local vegetation growing in the vicinity, particularly where it may relate to farming practices.

Methodology

A one litre subsample of sediment from sample 63 was processed for the recovery of waterlogged plant remains using the 'wash-over' technique of hand floatation. Flot and residue were collected separately onto 250µm meshes and stored wet to prevent desiccation of organic remains. Following assessment, the flot was fully sorted for waterlogged plant macrofossils, with all identifiable material extracted, quantified and tabulated. Identifications were made with reference to published guides (e.g. Cappers *et al*. 2006) and to the modern seed collection held at OA South. Nomenclature follows Stace (2010).

Waterlogged remains in sample 63

The most common seeds from sample 63 (Table 47) were watercress (*Nasturtium officinale,* an aquatic), rush (*Juncus* sp, a plant of wet or damp ground), bramble (*Rubus* sp., often found in rough ground), selfheal *(Prunella vulgaris,* generally a grassland plant) as well as dandelion (*Taraxacum* sp.) and buttercup (*Ranunculus acris/repens/bulbosus*). The last of these can be found in a range of habitats but is often found in grassland. Considered together, apart from plants found a range of habitats, the assemblage is dominated by seeds of aquatic plants or plants that grow in damp environments. There is also a significant grassland component. Fewer than 10% of the seeds specifically indicate cultivated or waste-ground habitats, although many of the taxa assigned to other ecological groupings may also be found growing alongside crops or in field margins, for example plants such as sedges, rushes and spike-rush may be found growing in a poorly drained arable field. Significantly, the charred crop-processing residues from this site also include seeds from taxa of damp ground.

The presence of aquatics such as water-cress, water starwort (*Callitriche* sp) and celery-leaved buttercup (*Ranunculus sceleratus*) indicates that there was standing water in the ditch for at least part of the year, with sedges and rushes growing along the damp edges. The presence of bramble suggests that the ditch was becoming over-grown as it silted up, but it is notable that there was no evidence of

nettle. The numerous seeds of grassland, and the absence of any arboreal taxa, suggest that the vicinity of the ditch was open and may have been used as pasture.

The arable weed assemblage from the ditch differs from the weeds identified from the contemporary charred assemblages. The waterlogged seeds associated with cultivation include stinking chamomile (*Anthemis cotula*), bristly oxtongue (*Helminthotheca echioides*) and corn marigold (*Glebionis segetum*). Although both this assemblage and the charred assemblages have some species in common, such as knotgrass (*Polygonum aviculare*) and stitchwort (*Stellaria* sp), the charred assemblage contains a number of taxa missing from the ditch, including henbane, scentless mayweed and corncockle. While the waterlogged material from the ditch reflects a very localised vegetation, with the relatively few arable weeds perhaps suggesting some cultivation within the surroundings of the ditch, the more diverse arable weeds from the charred assemblages presumably represent arable cultivation further afield, including on the acidic sandy soils indicated by the presence of henbane.

Charcoal

by Denise Druce

Charcoal analysis was carried out on nine samples to explore evidence for possible wood fuel selection, and how this may have changed over time. The samples came from an middle Neolithic (phase 1) posthole (3008) and pit (3017), a late 1st to early 2nd century AD (phase 4) pit (1887) and pottery kiln (2350), and a late 2nd century to early 4th century AD (phase 6) cremation pit (2949). A second cremation burial feature was not phased and could be prehistoric or Romano–British, but this was analysed for comparison with the other features.

Methodology

Charcoal analysis followed standard methods where *c* 100 fragments of charcoal >4mm, or failing this >2mm, in size were identified. The percentage volume of the analysed material in relation to the whole flot was also calculated. The charcoal fragments were initially sorted into groups based on the features visible in transverse section using a Leica MZ6 binocular microscope at up to x40 magnification. Representative fragments of each group were then fractured to reveal both radial and tangential sections, which were examined under a Meiji incident-light microscope at up to x400 magnification. Identifications were made with reference to Schweingruber (1990), Hather (2000), and modern reference material. Characteristics, such as possession of tyloses in hardwoods, any insect damage, or radial cracking were also noted as an aid to wood maturity, and condition prior to charring.

Results

The results of the charcoal analyses are shown by fragment count in Table 48. Preservation was generally good, but a relatively large number of fragments, especially from middle Neolithic pit 3017 were poorly preserved due to the charring process.

The taxonomic level of identification varied according to the observed genera/family and/or the state of preservation. In many cases the fragments could only be taken to an approximate level of identification, i.e. to sub-family level, e.g. *Alnus glutinosa*/*Corylus avellana* (alder/hazel, both in the Betulaceae family), as some of the key diagnostic features that are needed to distinguish the species were not observed. In other cases, the level of identification was limited due to the similarities of species within a family or genus, e.g. *Prunus* sp, which includes sloe/blackthorn, wild cherry or bird cherry (referred to as blackthorn-type in text), or Maloideae, which includes hawthorn, apple, pear or whitebeam (referred to as hawthorn-type in text).

Middle Neolithic (phase 1) posthole 3008, and pit 3017

Both the middle Neolithic features were dominated by alder/hazel charcoal, which could not be identified any further due to much of the material having a high mineral content. The identification of hazel in posthole 3008, and both hazel and alder in pit 3018 (sample 59), however, suggests that both were locally available; alder preferring moist soil conditions in damp woods and by lakes or rivers (Stace 2010). Both features also contained frequent to common fragments of oak (*Quercus* sp), including oak heart wood in posthole 3008, which indicates the presence of wood from mature trees over roughly 25 years in age (Dufraisse *et al* 2017). Scrubby/hedgerow taxa, such as hawthorn and blackthorn-type, including positively identified blackthorn (*Prunus spinosa*), were also recorded, which were particularly prevalent in pit 3017 (sample 59). A single fragment of elm (*Umus* sp) was identified in posthole 3008.

Early Roman (phase 4) pit 1887 and kiln 2350

Oak and, to a lesser extent, hazel (or alder/hazel), continue to be the dominant taxa in the early Roman features. Hawthorn and blackthorn-type continue to have a low presence, however, birch (*Betula* sp) is prevalent, and unique to features from this period. Large numbers of the oak fragments from at least one of the samples from each of the features comprised mature heartwood. Many of the hazel fragments from sample 138, pit 1887, were made up of roundwood fragments, which may represent coppiced stem. However, the lack of abundant whole roundwood pieces means that this interpretation is tentative. A single fragment of possible field maple (*Acer campestre*) from kiln 2350 (sample 84) suggests this may have also been growing locally. Indeed, its presence would not be unexpected, given its preference for calcareous or clay soils (Stace 2010).

Late Roman (phase 6) cremation deposit 2950, pit 2949, and unphased cremation deposit 2378, feature 2377.

The charcoal assemblage from cremation burial 2950, of an adult (see *Human Remains*), was dominated by hawthorn-type charcoal (Maloideae, a family which includes apple, pear and service), with a sub-component of oak. Other, rarer taxa included alder/hazel and ash (*Fraxinus excelsior*); the latter being unique to this deposit. In contrast, cremation deposit 2378, which was of a sub-adult (McIntyre), was dominated by oak charcoal, with frequent elm. As was expected, both features contained bone fragments. Rare charred weed seeds (small peas and cleavers) from cremation deposit 2950 may originate from vegetation surrounding the pyre site.

Discussion

The middle Neolithic features (phase 1)

An environmental synthesis of palaeobotanical evidence from South West England, which includes Cornwall, Dorset, Wiltshire, and Gloucestershire suggests that, certainly in the west, much of the landscape had become cleared by the Bronze Age period, with an emphasis on cereal based cultivation (Wilkinson and Straker 2007, 73). More locally, pollen evidence from Ermine Street, Gloucestershire, suggests that, although much of the oak-lime-hazel woodland had been cleared by the later Bronze Age or early Iron Age period, some oak-hazel-alder woodland persisted (*op cit.* 108). The charcoal evidence from the middle Neolithic features from Longford, which saw a reliance on all three of these taxa for fuel, certainly conforms to this pattern; the lack of lime charcoal perhaps indicating that it had already disappeared from the landscape, or that it was reserved for purposes other than fuel. The presence of light-demanding taxa, such as hawthorn and blackthorn, indicate areas of open woodland

or hedgerows. Stands of elm may have also survived locally, though this is based on a single fragment from posthole 3008.

All three of the middle Neolithic samples from Longford contained charred hazelnut shell fragments, which were particularly abundant in sample 61, pit 3017. Although these remains may originate from hazel branches being used as fuel (hazel charcoal was also identified), the presence of rare to frequent bone (including calcined) fragments in pit 3017, and rare to frequent heat affected clay or daub in all three samples, suggests that both features were in receipt of other refuse, which may have included food waste.

The early Roman phase (phase 4)

An emphasis on the use of oak and hazel continues during the 'industrial' phase of Roman occupation of the site. It appears, however, that by this period birch was also available/being selected, for fuel, which, since birch is a pioneer tree (Edlin 1949, 40) may signify that increased land clearance for agriculture had taken place. That oak, including mature oak wood, was the predominant fuel used for the pottery manufacturing was evidenced by its abundance in pottery kiln 2350; a wise choice given oaks superior burning properties (ibid.). Although there is abundant hazel roundwood in pit 1887, any evidence for coppicing and active woodland management is tentative.

The recovery of other waste, including charred plant remains (see above), from pit 1887 suggests that this feature was in receipt of dumped refuse other than wood fuel. Conversely, the notable lack of material, other than charcoal, from kiln 2350 suggests that this feature was not used for general waste disposal, even following its decommission.

The Romano-British cremation burials (phase 6)

In southern Britain, oak or ash was often used for prehistoric and Roman cremation burials (Robinson 1995; Gale 2004; Challinor 2007; 2012). This has often been taken as evidence for ritual selection of pyre wood (Challinor 2007, 44). The charcoal content of Roman cremation burial assemblages does vary, however, and was probably influenced by the availability of local woodland, and/or proximity to other activities. Small quantities of other taxa are often recorded in cremation burial deposits, which at Longford includes alder/hazel, ash and elm. Such small amounts are assumed to derive from kindling, packing or pyre goods (Challinor 2009a).

Previous evidence from a Romano British cremation burial site in Kempsford Quarry, Gloucestershire, showed a preference for either oak, hawthorn-type or blackthorn-type charcoal (Challinor 2007), as was also the case at Latton Lands (Challinor 2009b), while a late Roman cremation burial at Cotswold Community included hawthorn-type charcoal as well as oak and ash (Challinor 2010). Although the data from Longford are confined to two samples, it is interesting that, here too, either oak and, potentially, a similarly 'fragrant' wood, such as apple or pear (Edlin 1949, 156) appear to be the dominant taxa. Modern experiments using traditional pyre construction techniques suggest that roughly one ton of wood is required to cremate an average human body (McKinley 2004c), and mature oak would have certainly provided the bulk and sustained heat required. Although blackthorn and hawthorn might provide reasonable fuelwoods, extremely large quantities were likely to have been required to burn an average human body. Given this, it is possible that these types of wood were specifically selected on some sort of religious grounds or represent the remains of pyre furniture. However, this is purely conjecture. Challinor (2007, 45) suggests that the differences in selected taxa at Kempsford Quarry may instead relate to changes in the local availability of woodland types over time.

Conclusion

Although the charcoal study incorporates data from a relatively limited number of features, the data are informative with regards fuelwood availability and/or selection. The evidence suggests that oak and alder or hazel were the dominant wood taxa utilised during the middle Neolithic and Roman periods. This is consistent with existing pollen evidence, which indicates the presence of oak-alder-hazel woodland, certainly into the late Bronze Age/early Iron Age period. The extent of woodland clearance prior to the Roman period is difficult to gauge, however, the evidence from Longford suggests that at least some oak and hazel woodland still survived. The occurrence of birch is interesting and may indicate its colonisation of areas previously cleared for agriculture. Oak appears to have been the favoured wood used to fuel pottery kiln 2350, and although pottery production is likely to have had a significant impact on local woodland definitive evidence for woodland management was lacking.

The charcoal evidence from the two Romano-British cremation burial deposits indicates the selection of either oak or a combination of oak and hawthorn-type. Though limited, the evidence is consistent with previous data from the region, which also showed differences in selected taxa.

Site discussion

Early prehistory

Middle Neolithic activity was characterised by a series of pits and postholes near the northern end of the excavated area. These were located in four groups, three of which were closely clustered, while pits 3017, 3124 and 3180 were more loosely positioned (Fig. 4). Dating evidence was recovered from eight pits/postholes, almost all in the two eastern clusters, six of which included pottery (Table 49). All the westernmost features were phased as middle Neolithic because of their similarity and proximity to the eastern clusters. Only pit 3089 contained a small amount of worked flint, though this feature was very shallow (c. 0.18m deep) and it may have been truncated. All seven pits in the two eastern clusters contained finds: six produced middle Neolithic Impressed (Peterborough) Ware, five had worked flint, one had burnt (fire-cracked) flint, and three had fired clay. The worked flint generally consisted of finished items, some showing signs of quality workmanship. The fired clay was largely undiagnostic but seems likely to have derived from hearths/ovens. Organic material was recovered from five features, four with animal bones (including some burnt bone) and two contained charcoal and hazelnut fragments. It may be relevant that the two features with hazelnut fragments and burnt material also contained fired clay. Notably, a hazelnut shell sample from pit 3017 (fill 3018) produced a radiocarbon date of 3360–3100 cal. BC (see above), which likely covers that main period of activity in this area.

Pits 3017 and 3180 stood out from the rest of the features in the northern area in terms of the quantity and variety of finds they contained. Pit 3017, the largest of the group, contained the most middle Neolithic Impressed Ware pottery, amounting to 142 sherds (c. 1.5kg). A collection of seven worked-flint objects included a finely made arrowhead and a micro-denticulate, both consistent with middle Neolithic manufacture. The faunal assemblage in this feature mostly consisted of pig remains, though cattle, red deer and dog bones were also identified. The pig remains derived from a very young animal, possibly no more than a month or two old, based on the stage of tooth eruption and wear. A variety of pig post-cranial bones were recovered, suggesting that much of the carcass had been buried, though some signs of carnivore gnawing indicates that it may have been placed on a midden before being collected and deposited in the pit. Gnawing was also found on some of the cattle bones. Wild animals were represented by red deer antler-tine fragments and a burnt forelimb bone that appears to have been deliberately fractured. Several fragments of calcined animal bone indicated that some of the material had been burnt prior to deposition. The abraded nature of much of the pottery also suggests the presence of middened material, except for a more-complete Fengate vessel base that

appeared to have been in a fresher state. Pit 3180 contained a smaller ceramic assemblage consisting of 66 sherds (c. 0.6kg), broadly contemporary with that from pit 3017. A collection of 12 worked-flint objects including two finely made backed knives, while fire-cracked flint was also present. Animal bones in this feature included pig and sheep or goat remains.

The presence of inhumation burial 5010 and probable Beaker pit 1005 in the southern part of the excavated area suggests that there was two distinct periods of early prehistoric activity represented. No finds of middle Neolithic Impressed Ware were discovered in any features other than the northern pits. However, the dating of 5010 and pit 1005 is not clear cut and there are numerous other undated features across the excavated area that may also belong to the Neolithic and/or earlier Bronze Age. Perhaps the most notable of these is ring gully 1, which was essentially undated notwithstanding the presence of one small scrap of later Roman CBM in its fill, which may be intrusive. Ring gully 1 did not have a continuous circuit, and opposing terminals were positioned on the north-west side of the feature allowing access to the internal area. No internal features were discovered which means that its date and function are problematic. There are four possible interpretations: a middle Neolithic ring ditch, a Bronze Age barrow ditch, a late Iron Age roundhouse ditch (contemporary with the nearby cremation burial 3020), or a late Roman feature (dated by the CBM in its fill). If it is contemporary with the nearby Neolithic pits and postholes, it would be a rare but not unknown example of a middle Neolithic ring ditch, such as that found at King Alfred Way, Newton Poppleford, Devon, where a ditch was cut by two middle Neolithic cremation burials (Rainbird and Lichtenstein 2018). Alternatively, the surviving ditch of a Bronze Age barrow may suggest that it was contemporary with burial 5010 and thus later than the middle Neolithic activity. Its form is not unusual for Bronze Age ring ditches, as has been noted at Shorncote, Somerford Keynes, Gloucestershire, where several penannular ring ditches were discovered without internal features (Darvill 2006, 37–8, fig. 9).

The ephemeral nature of the early prehistoric archaeology clearly provides problems for understanding the nature and chronology of the activities represented. The area may have been utilised in the middle Neolithic with pottery perhaps discarded in middens that were later reworked with material reburied in the early Bronze Age. The lack of Bronze Age material in the northern part of the site suggests that this not likely, but it is not unknown elsewhere as was noted at Wellington-Moreton, Herefordshire, where a resumption of activity in the Beaker period/early Bronze Age, characterised by ring ditches, inhumation burial, unmarked cremation burials, and pits, followed an apparent late Neolithic hiatus (Jackson and Ray 2011, 153). Jackson and Ray (ibid., 151, 154) suggest that the presence of postholes near pits acted as markers for successive activity. Such markers may be represented at Longford by postholes 3008, 3010, 3221, 3223, 3227, 3229 and 3231, and it is possible that people were returning to the same spot potentially over many years. The low number of early prehistoric features at Longford, and their restricted distribution, probably indicates the seasonal and temporary use of the site in the middle Neolithic, while the presence of crouched inhumation burial 5010 and Beaker pit 1005 in the south-eastern part of the site may suggest that the focus of early prehistoric activity moved to different locations over time.

Pit-digging tends to be the most common form of Neolithic and early Bronze Age activity found archaeologically in the Severn-Wye region (Jackson and Ray 2011, 144–5). The focus of this activity tends to centre around the deposition of ceramics, often in pits positioned in discrete clusters in a restricted area, which is consistent with the early prehistoric evidence found at Longford. Jackson and Ray (ibid., 151) suggest that material placed in pits was carefully selected, with some items possibly deriving from nearby middens. Pits were also often paired, with similar or even conjoining finds being distributed between each. At Wellington-Moreton, pit clusters tended to be located close to ring ditches, presumably the remains of barrows (ibid., 148, fig. 11.2). This evidence raises the possibility that ring gully 1 was an early prehistoric feature rather than the remains of a late Iron Age or Roman structure (see *Unphased features*). The landscape location/context may have been relevant in the choice of site for pit-digging and other activities during this period. Many regional

Neolithic/early Bronze Age sites are found on slightly elevated gravel terraces within alluvial floodplains of the major rivers and their tributaries, areas prone to seasonal flooding. The Longford site is located on a gravel-terrace tongue bounded by Horsbere Brook to the north and Wotton Brook to the south (Fig. 2). Standing at the site, the surrounding higher ground is immediately obvious, particularly at Sandhurst Hill, 4km to the north, and the more-prominent Churchdown Hill, 4km ESE. Robins Wood Hill lies 5.5km due south with the Cotswold edge behind on the one side and the less-marked higher ground beyond the River Severn not very far away, particularly to the north-west. Just how this landscape was conceived in the Neolithic/early Bronze Age (or in the late Iron Age and Roman periods for that matter) is of course conjecture.

The later Iron Age settlement

The late Iron Age phase is characterised by a square triple-ditched enclosure. A radiocarbon date retrieved from one of the basal fills of the central ditch (ditch 2) centred on the mid-2nd century BC and suggests that the enclosure was established not too long before this date. Moore (2006a, 63; 2006b, 12–27) discusses the poor chronological resolution of the later Iron Age in this region. The predominance of local hand-made pottery between the 4th century BC and the 1st century AD makes many sites difficult to date accurately. Therefore, the 2nd-century BC radiocarbon date for the early use of the square enclosure provides new evidence for a site being established within this broad period. Moore (2006a, 69–71; 2006b, 20) notes that rectilinear enclosures became more common across the Cotswolds and the Severn Valley throughout the later Iron Age, but that the majority were fairly small, 'household-sized' settlements often no more than one hectare in extent. In terms of size, the later Iron Age enclosure at Longford bounded an area of c. 2500m^2 (0.25ha), comparable to many of the ditched enclosures presented by Moore (2006a, fig. 5; 2006b, fig. 4.6) in his survey of the region. However, the Longford enclosure stands out in other ways. It would have been an impressive monument, comprising three ditches of varying width. The central ditch was the largest of the three, measuring about 4m across all along the circuit. It is likely that two banks were built in between the three ditches, though no evidence for these survive.

Similar multivallate enclosures do not appear to have been overly common in the Gloucestershire countryside during the late Iron Age, though it is difficult to quantify the distinctiveness of the Longford enclosure without a systematic survey of excavated and cropmark sites across the region. Whimster's (1989) study of cropmark sites in the Marches highlighted 43 bivallate rectilinear enclosures out of a total of 449 sites, some appearing to be rather similar in layout to Longford (see also Wigley 2007, 176–7, fig. 4). Of course, the dating of many of these sites remains uncertain. A contemporary double-ditched enclosure was located as a cropmark on the eastern bank of the River Severn at Blackstone, Worcestershire (Hurst *et al*. 2010). Excavation here demonstrated the presence of an enclosure somewhat larger than the Longford example, at about 70m across, but with a very similar form and dated by ceramic evidence to the 1st century BC. The excavators also noted a dearth of comparable sites in the region and concluded that the Blackstone enclosure 'mark[ed] a new, though temporary, expansion of settlement sites towards the end of the Iron Age' (ibid.), an idea also forwarded more generally by Moore (2007, 47).

One aspect of the Longford enclosure that requires more consideration is the lack of internal features. A small concentration of pits and postholes was noted around the entrance between the internal and central ditches. These may have been associated with structures, a possibility perhaps supported by the presence of other features representing an elaboration to the entrance, such as ditch 9 and linear features 10 and 11. While the possible form of the entrance structure is unclear, the importance of the access point is further emphasised by the presence of possible urned cremation burial 2346 (see *Human remains* for discussion) next to linear feature 10. Other than the presence of a couple of pits, the general absence of internal features may be due to post-Roman truncation which is evident in some areas (such as the outer enclosure ditch) and may have removed all but the deepest-

cut features. If this is the case, it further reinforces the impressive nature of the enclosure ditches. An alternative explanation is that any internal features, such as buildings, were systematically and extensively removed by the early Roman occupants of the site when the enclosure was remodelled (see below). This possibility suggests that while it was important to take control of the enclosure, perhaps because it was a high-status settlement, it was also necessary (maybe symbolic) to erase signs of its earlier use.

Understanding of social organisation in during the middle and late Iron Age in southern Britain has developed considerably over the past 30 years. The traditional, hierarchical model based around the supremacy of hillforts, favoured by Cunliffe (e.g. 1984; 2005) and Saville (1984), has been challenged by archaeologists who have noted the lack of variation in material culture and settlement organisation in this region (Morris 1994; Moore 2006a, 73–4), and suggest that social stratification only increased after the abandonment of many hillforts and the emergence of oppida as high-status centres (Hill 1996), with recent work emphasising the poly-focal nature of elite landscapes (Moore 2012). The character of elite late Iron Age settlement in the Gloucester area is poorly understood, particularly compared with Cirencester for example (ibid.). Later Iron Age activity has been discovered at Kingsholm and there has been a suggestion that this relates to high-status activity prior to the construction of the legionary fortress (Hurst 2005), while the discovery of possible currency bars at Hucclecote needs further contextualisation (Sermon 1997). While current knowledge may be poor the decision on the part of the Roman state to build two legionary fortresses and establish a *colonia* in the area is likely to reflect the importance of the area in the preceding Iron Age.

The function of the enclosure is not clear, but it is possible that it served as a central place for the local/regional population, perhaps for special and/or seasonal events. One aspect which requires further consideration here is the evidence for funerary activity. Two late Iron Age cremation burials were discovered at the site, one close to the entrance and another at the very northern end of the excavated area. Alongside these was a fairly sizable collection of disarticulated human bones from at least 13 individuals. These are too many to suggest that they all represent stray finds or disturbed inhumation burials. Some of the bones were single elements, while others were groups of bones often from a particular part of the body (Table 28; see *Human remains*). The remains were primarily found in features within or close by the later Iron Age enclosure. However, they derive from features dating to phases 3, 4 and 5, primarily phase 4. Disarticulated human bones are often found on both Iron Age and Roman sites and they are often argued to reflect less archaeologically visible funerary traditions, most notably excarnation, which was probably practiced in the Iron Age and possibly continued at some sites in the Roman period (cf. Sharples 2010, 248–9, 271–2; Pearce 2013, 146; Smith 2018, 275–7). This might suggest continuity of 'invisible' funerary practices into the Roman period. However, as will be shown below, the transition from phase 2 to phase 4 at Longford was marked by significant changes at the site. Given the amount of ditch recutting undertaken when the later Iron Age enclosure was modified in phase 4, it is possible that some if not all the disarticulated human remains were found in secondary deposits. For example, human bones were found in two sections of phase 4 ditch 14, though each of these were cut through phase 2 features (ditch 2 and pit 2364). It is also possible, if not provable, that remains were present in a feature or structure that was demolished inside the enclosure (leaving little or no trace), with some remains becoming dispersed in phase 4 contexts.

One of the most interesting features of the disarticulated human remains is the discovery of two heavily modified left femurs, one in a fill of ditch 12 (a recut of ditch 2) and the other in a basal fill of pit 2788. Both bones exhibited almost identical patterns of horizonal cut marks positioned equidistant from each other along the shafts (Fig. 69). Marks around the femoral head of one of the bones suggest that the femurs were deliberately dismembered from the pelvis and the cuts on the shaft indicate removal of the thigh muscles and other tissue. Such modification signals some form of ritualised funerary activity. Recent microscopic analysis of Iron Age human-skeletal remains has shown that remains of the deceased were not always treated in the same manner. Based on results from work undertaken on material from Danebury and Suddern Farm, Hampshire, Booth and Madgwick

(2016) suggest the occurrence of at least three different burial practices. Some were found as partially or fully articulated bones with extensive but incomplete histological destruction, suggesting that they decomposed in covered or rapidly silting pits before being selected for manipulation and then properly buried. Discrete, disarticulated remains with poor bone preservation appeared to have been buried as whole bodies that, following skeletonization, were exhumed and re-buried at a later date. Finally, evidence for excarnation was represented by a single bone with 'anomalous histological and cortical preservation' (ibid., 22). The disarticulated human bones from Longford cannot be attributed to a specific mortuary rite, but there is clear evidence of dismemberment and surface modification, suggesting the occurrence of burial activities that may have included exhumation, reburial and possibly excarnation. Given the apparent lack of domestic activity within the enclosure, its use as a ritual centre remains a distinct possibility, perhaps similar to the late Iron Age shrines at Fison Way, Norfolk (Gregory 1991), Hayling Island, Hampshire (King and Soffe 1998), or Gournay-sur-Aronde, Oise (Brunaux *et al*. 1985).

Late 1st-century activity

In the later 1st century AD, probably no earlier than AD 70, the later Iron Age enclosure was modified into a smaller rectangular enclosure and became a focus for pottery production (phase 4). The large central ditch of the Iron Age enclosure was recut along the full length of the north-western side and partially along the north-eastern and south-western sides, while a new south-eastern ditch was cut across the internal area of the earlier enclosure. The new south-eastern boundary was initially defined by a relatively narrow ditch that was recut at least once (ditches 102 and 14), and both these ditches were recut again along the north-eastern half of the boundary, possibly when the rectangular enclosure was sub-divided into two compartments (Fig. 8).

As in the late Iron Age phase, signs of activity within the enclosure were limited, though the presence of two kilns (plus a third externally) demonstrate that the site became a focus for pottery production. A kiln was found in each of the two sub-divided compartments, close to the north-western boundary of the enclosure. However, at least one of the kilns was operating before this sub-division occurred because kiln products were recovered from pits 2087 and 2592, both of which were cut by the dividing ditch. Kiln 2350 cut the fills of the internal ditch of the later Iron Age enclosure, as did well 2394. It is uncertain which of the two kilns was built first, and whether they were being fired at the same time or consecutively. The construction of kiln 2351 appears to have been of slightly better quality, though no evidence of the superstructure has survived in either. It seems likely that the kilns were in use for some time since signs of repair have been noted in both structures. The overall date range assigned to this phase of activity was perhaps as much as 50 years (c. AD 70–120), though the active life of the kilns was more probably over a shorter period within this time frame.

The only sign of a possible structure within the enclosure is represented by two parallel linear features that may have been beam-slots and several postholes in between (feature group 19). The linear features were about 3m apart and may have formed part of the foundations of a small structure, perhaps associated with pottery manufacture. If not a building, the function of these features is uncertain. Remains of other buildings may have been truncated and lost if they were simple post-built structures. It is possible that the sub-division of the enclosure related to a segregation of activities. Given the quantity of animal bones and pottery (other than non-kiln products), it is reasonable to suggest that people were living in or very nearby the enclosure. It may have been that the enclosure itself had a specialist function, based on pottery manufacturing.

The third kiln, 1707, was located to the west of the enclosure very close to the edge of the excavated area. This kiln was heavily truncated on one side by a later (phase 6) ditch, though more of its superstructure had survived (Fig. 13). Kiln 1707 was built within a circular, flat-based pit almost 0.5m deep. It is uncertain whether the pit had a previous function and the kiln construction was a secondary use, or whether the pit was purpose-dug for the kiln. The base of the pit was lined with

three layers of compacted gravelly-sand with a fourth silt lining below the clay base of the kiln. The composition and compacted nature of these fills suggest that they were intended to provide a solid base and perhaps some insulation. The partially surviving south-eastern side of the kiln provides some evidence of how the superstructure was built. The remains of at least six upturned pottery vessels were positioned in a row around the sides of the kiln wall and these would have been packed with clay lining. The pots appear to have been used as vaulting for the dome of the kiln, providing solidity to the structure and insulation by trapping air within the walls. As discussed in the Roman Pottery report (see above), evidence of this construction method is rare in Romano-British kilns, primarily due to a lack of surviving structural remains. It seems likely, however, that all three Longford kilns were built in this way based on the evidence of surviving vessel impressions observed on the fired clay recovered from kilns 2350 and 2351.

Further signs of activities undertaken during this phase are represented by finds recovered from two large pits (2636 and 2788) located immediately outside the entrance to the enclosure. In pit 2636, finds were limited in the lower fills, but clear signs of dumping were discovered in the upper fills including quantities of charcoal, local pottery and fired clay/daub indicate waste cleared out from the kilns and possibly repair-work. Cereal-processing waste was also frequent and may partly represent fuel used in firing the kilns. High frequencies of oats, often considered a weed of other arable crops in this period, may have been deliberately exploited as livestock fodder, while the discovery of henbane is suggestive of cattle manure. A large grassland component in the archaeobotanical assemblages, generally, suggests exploitation of local pasture for livestock, almost certainly on the alluvial floodplains of the Horsbere and Wotton Brooks to the north and south of the site respectively. Dietary evidence was also found in these pits, providing an insight into the types of food that was being consumed by the inhabitants in phase 4. Cattle foot bones with skinning marks show that livestock were being slaughtered and processed on site, while bones from neonatal pigs, common crane and wild duck suggest a fairly high-status diet supplemented by wildfowling, probably in the local wetlands. Suckling pigs and common cranes (a large, migratory wetland bird) are noted as being favoured by elite groups and rarely exploited by lower-status rural communities (Cool 2006, 88–9; Allen 2009). The discovery of lentil in pit 2788 when it was partially excavated during the evaluation of the site provides further support for a high-status diet (lentils were recovered from two pits during this phase of work (WA 2004)). Lentils are not a native plant and while they may have been imported prior to the conquest, they were certainly consumed at military and urban sites in greater amounts than elsewhere, and probably initially by immigrant populations (Cool 2006, 127, 181, 202).

Expansion and activity in the 2nd and 3rd centuries

Sometime after the turn of the 2nd century AD, the early Roman enclosure expanded northwards with the construction of a second rectilinear enclosure and a series of linear features to the west that appear to represent internal sub-division. Further field boundaries aligned parallel to the north-east and north-west of the expanded enclosure appear to form new field boundaries and possibly a droveway that extended south-west. This arrangement continued into the 3rd century AD with little change in overall layout, but with additional recutting and redefinition of the existing boundary ditches, most notably along the northern boundary of the early Roman enclosure which suggests that it was still extant in some form into this later phase. The ditches associated with the northward expansion of the site were notably less substantial than those of the late Iron Age and late 1st-century enclosures and do not appear to have had as much of a commanding presence.

Evidence of internal structures was limited to two possible buildings (structures 42 and 43) and a stone-lined well (1572). These were clearly contemporary with the 2nd and 3rd century phase of activity, given their orientation within the extended enclosure. Structure 43 was represented by three parallel gullies of roughly equal lengths, together covering a rectilinear area c. 7m x 9.5m across. Postholes were identified at the ends and in the centre of several of the gullies which suggest that the

gullies formed the foundations of a small building. The arrangement of the gullies and the positions of the postholes suggest the presence of a raised floor supported by posts. Such a structure may have been a granary or a building of similar function that required airflow between the ground surface and the floor for ventilation to keep grain or other products dry. Few Romano-British buildings have been categorically identified as granaries (Smith 2016, 58–60), though an example similar to structure 43 has been found at Camp Ground, Coln Fen, Cambridgeshire. This building consisted of five parallel gullies or beamslots covering an area of about 6m by 9m and enclosed by a ditch (Evans 2013). Although fairly small and somewhat ephemeral, structure 43 is also comparable to the larger 'military-type' granaries found below the palace at Fishbourne (Cunliffe 1971), and bears similarities with the larger masonry granaries found at Horton Kirby (Philp and Mills 1991) and Lullingstone (Meates 1979). Unfortunately, no charred plant remains were recovered from features associated with structure 43 and its interpretation as a granary rests on its comparison with these other examples. If the building was a granary, it suggests that the expansion of the settlement in phase 5 was associated with an increased focus on agricultural activity, typified by arable production and storage, from around the beginning of the 2nd century AD.

The numerous linear features in the western half of the northern extension are more difficult to interpret but they appear to have formed a series of small sub-divisions within this part of the enclosure, possibly paddocks for livestock. The animal bone assemblages from phase 5 and 6 were small but suggest that cattle and horses may have been important. A large sample of waterlogged plant remains from a phase 5 ditch in the northern extension included a large component of grassland species and perhaps indicates exploitation of the alluvial floodplains around the site, particularly as several damp-ground taxa were identified. These areas were no doubt grazed by livestock in the summer but could also have provided suitable fodder during winter months.

Evidence for domestic activity is minimal in phases 5 and 6. The pottery and animal bone assemblages are comparatively small, though they clearly indicate people living nearby. It is reasonable to suggest that much of the site exposed by the excavation formed a largely peripheral area concerned with agricultural activity. An increasing number of features were identified in the northern part of the site. Most of these were difficult to interpret as the area was only partly exposed by the excavation. It is uncertain whether this area was a focus of domestic activity from the beginning of the 2nd century AD, or, as seems more likely, that this occurred slightly later, perhaps in the 3rd century AD, and the original location of domestic activity was elsewhere. The presence of several inhumation burials just to the west of the northern settlement and an urned cremation burial to the north provide some information about the local population in phase 6 (c. 3rd–early 4th century AD). Adults, both male and female, and one child were represented in the burial group. The inhumation burials were fairly typical of mid–late Roman burial practice in this region (Smith 2018, 254–9), being placed in purpose-dug graves some with nails around the bodies indicating the use of wooden coffins. Of the three adult inhumation burials, two were laid in an extended supine position and one prone, with two (including the prone burial) having been decapitated and the head placed between the legs/feet. Current interpretations of Romano-British decapitation burials vary and the motivation behind the rite is obscure at best; however, there has been some suggestion that many individuals buried in this way, particularly those placed in a prone position were 'among the more marginalised members of society' (Smith 2018, 279). There are signs that the Longford inhabitants lived hard lives. The child was clearly malnourished and had suffered a fairly poor diet for much of its life, as shown by the cribra femoralis on its thigh bone and the enamel hypoplasia on its teeth. One of the adult females had sinusitis when she died and had clearly suffered from a bad back for long enough for the effects of arthritis to set in on several of the vertebrae. The adult male had suffered physical injuries, including broken bones earlier in life as well as several fractures that had not healed. Broken bones in the right hand are thought to have been defensive injuries and blows around the head were caused by a sharp object that may have been delivered when the individual was beheaded or just before. This person appears to have suffered a difficult life and a particularly grim death.

Longford: military presence and colonial enterprise?

Perhaps the most intriguing aspect of the Longford site is its potential status following the abandonment and modification of the later Iron Age enclosure and its relationship with the military fortresses and subsequent *colonia* at Gloucester. Longford lies about 1.4 km NNE of the first fortress at Kingsholm and about 2.4 km NNE of the second fortress and later Roman town of *Glevum*. It is also notable that the main road north of Gloucester, Margary's road 180 (see Fig. 2), ran only 300 m west of the enclosure and kilns. In terms of archaeological evidence, the primary link between Longford and Gloucester is pottery production. Analysis of the Longford kiln fabrics strongly indicates that the products made there were of the same industry operating in and around Gloucester in the late 1st century AD (see *Roman pottery* above), most notably at kilns found immediately south-east of *Glevum* (Rawes 1972; 1978) and one within the north-western side of the town wall, while other possible examples are known at Kingsholm (Timby 1991). The connection between the Longford kilns and the Gloucester kilns is also suggested by the similar construction techniques used for the furnaces, particularly in the use of ceramic tubes within the superstructures. Ceramic tubes found at the College of Art site were thought to have been used in the vaulting of those kilns (Rawes 1972, 26), and a similar interpretation is forwarded for the tubes discovered at Longford (see *Roman pottery* and *Ceramic building material*), while pottery vessels were also used in this manner (see kiln 1707).

Two historical interpretations can be suggested for the development of the site from phase 4 onwards. One scenario sees the site coming under direct military control with pottery production being effectively 'state run' and then the site being transferred to an individual, perhaps a retired veteran, at the beginning of phase 5, coinciding with the establishment of *Glevum Colonia*, who set about expanding the site and beginning to focus on mixed farming. The second scenario sets the chronology of phase 4 slightly later, placing it within the early years of the *colonia* and the pottery production being a civilian enterprise, albeit by someone with close links to the army, who later began to diversify and become more involved in farming. A caution must be added here in that both scenarios forward the possibility of veteran settlement, which may not have been the case.

Exact dating of the establishment of the kilns at Longford is not precise enough to know whether pottery production occurred alongside the military phase of activity at Gloucester or slightly later after the establishment of the *colonia*. Civilian settlement at Gloucester possibly began after AD 49, around the time of the establishment of the fortress at Kingsholm (Hurst 1999, 114). This fortress was replaced by another at Gloucester probably around the mid-AD 60s and this was converted to a *colonia*, known as *Colonia Nervia Glevensium*, in the years thereafter. The exact date of this change is debatable, but suggestions range between AD 80 and 110 (ibid.; see also Hassall and Hurst 1999), though surely it cannot be later than the period AD 96–8 (e.g. Wacher 1995, 150–1; Birley 2005, 100). If the earliest date of pottery production at Longford was around AD 70, which is possible but not likely, it would have begun before the *colonia* was established. This is not out of keeping with pottery-production evidence from Gloucester. Timby (1999, 38) has recognised the unusual location of the Berkeley Street kiln within the town walls and suggests that it was in use during the period between the demolition of the first fortress and the construction of the second (following Hurst's reinterpreted sequence; for the difficulties of this see Wacher 1995, 150–1). This evidence thus allows for the possibility that pottery production at Longford (and the modification of the later Iron Age enclosure) was a direct military undertaking, with kiln products supplementing demand from the fortresses.

If phase 4 did commence while military activity was ongoing at Gloucester it raises the question of why Longford was used. Although the site was some distance from the fortresses, access was probably made easier by the construction of the M180 road that led directly to Kingsholm across the Wotton Brook. Another possibility lies in the status of the site prior to the arrival of Legio XX in the area and the establishment of the Kingsholm fortress around AD 49. As discussed above, the function of the later Iron Age enclosure is not clear, but it may have acted as a focal point for the pre-Roman

population in the Gloucester area. The decision to build a fortress in the Gloucester area is not properly understood, particularly given the proximity of Corinium to the south-east, and there has been much discussion concerning the relationship between the two sites and their prospective hinterlands (see Clarke 1996; Reece 1999). The likelihood that the Severn-valley area west of the Cotswolds lay in hostile territory is a possibility, and may explain why a potentially important pre-Roman site such as Longford may have been taken over (though this apparently took place considerably later than the earliest military occupation and post-dated pacification of the territory to the west). On current evidence, however, this must remain speculation.

In addition to pottery production, there are other signs of military influence in the later 1st century AD at Longford. The animal bone assemblage is revealing in the sense that the cattle kill-off pattern in phase 4 was biased towards a specific age group (nearly 60% at c. 18–30 months old). This bears the hallmark of a consumption site, such as a town or a fort, rather than a production site, a farmstead or village. It suggests that cattle were either predominantly supplied from farms elsewhere or that the occupants of the site were managing a herd of a size large enough to sustain this level of targeted slaughter (i.e. cattle ranching). The common pattern of cattle slaughter found at Romano-British towns is also targeted, but is more strongly represented by adult animals aged between three and eight years, and Maltby (2010, 287–9) argues that these were mostly cattle culled after their use as dairy and/or traction animals had ceased. In contrast, the focus on prime-beef animals at Longford suggests that the inhabitants had access to cattle that were probably more valuable and less expendable compared to those slaughtered in towns. Another characteristic of the faunal assemblage in phase 4 concerns butchery evidence. Cattle butchery included clear signs of distinctive cleaver chop and filleting marks. This type of butchery is often suggested to indicate an organised system of cattle supply, slaughter and rapid carcass-processing typically associated with urban and military sites, and rarely seen at rural settlements (Maltby 2007; 2010, 283–7). It is possible, therefore, that the occupants at Longford had ties to the large-scale livestock provisioning network, or if they were managing their own herd there may have been a specialist butcher (or butchers) who lived and operated at the site with skills and training gained in a military or urban context.

Alternatively, if pottery production began at Longford at a later date and occurred over a shorter period, perhaps at the end of the 1st century AD and/or in the first two decades of the 2nd century, it opens up the possibility of the kilns being a colonial enterprise (notwithstanding the possibility of the *colonia* being established earlier than the AD 90s (e.g. Hassall and Hurst 1999, 185)). Thus, is it possible that the site was given over to retired veterans as part of the establishment of the *territorium* of the *colonia* at *Glevum*? This question, again, is difficult to answer. Estimates indicate that about 400–800 legionaries would have retired each year in Britain (not including auxiliaries), assuming units were maintained at more-or-less full strength, and there is enough evidence (mostly from the continent) to suggest that many settled on land where they were last stationed (Fulford 1999, 177). It is plausible that activity in phase 4 represents the arrival of a settled veteran who exploited new industrial markets brought about by the growth of the *colonia*. The site clearly developed into a potentially thriving agricultural settlement soon after the pottery-production phase, exemplified by the millstone and the possible granary, while the discovery of items such as window glass and roof tile indicate the presence of a well-appointed building in the vicinity.

Conclusions

The excavation at Longford has revealed a range of evidence for activities occurring during the middle Neolithic, early Bronze Age and the late Iron Age/Roman periods. Middle Neolithic and early Bronze Age activity is comparatively ephemeral but reveals valuable insights into possibly transient use of the site during this period. The remains highlight a concern with pit deposition during the Neolithic in one area of the site, while an early Bronze Age inhumation burial and other pits/postholes were recorded elsewhere. The spatial distribution of features perhaps indicate that activities were segregated or

zoned, or that different parts of the site were used at different times. Certainly, there were no clear signs of habitation and, overall, the evidence from this phase may reflect periodic activity on the higher ground by mobile groups who were moving along the river valleys connected to the Severn estuary.

Subsequent use of the site in the later Bronze Age and earlier Iron Age is not represented in the archaeological record, and the next major phase of activity occurred in the later Iron Age. This was characterised by a square triple-ditched enclosure. This was not especially large, but its complexity and regularity suggest a considerable degree of planning and investment in resources. It was probably bounded by banks as well as ditches, at least two if not more, and it would have formed an impressive structure located on the slightly elevated ground between two tributaries of the River Severn. It is possible that the site was visible for some distance. The recovery of a radiocarbon sample from the early silting of the main enclosure ditch provided a 2nd-century B.C. date, helping to refine the chronology of this period in the region. The function of the enclosure remains unclear. If it was purely a domestic settlement, one might expect that it was home to people of particularly high status, given the unusual nature of the enclosure boundaries. If this was the case, however, there are no signs of buildings or finds that would otherwise signify elite character, such as imported pottery or metalwork. The interpretation preferred here is that the enclosure had a primarily ritual function and was perhaps used by the wider community rather than a restricted group of individuals. Again, evidence of specific activities is lacking but the recovery of several disarticulated human bones, some with clear signs of knife-cut marks and carnivore gnawing, is important. Although relatively few, these bones have the potential to contribute to our understanding of later Iron Age funerary practices.

The site underwent a dramatic change in the later 1st century AD, sometime after AD 70, when the later Iron Age enclosure was significantly modified. As discussed above, this change appears to have been linked to the establishment of the Roman military base at Gloucester and the subsequent development of *Colonia Nervia Glevensium*. Archaeologically, the most visible activity during this phase was pottery production (lasting perhaps not much longer than a generation or so between AD 70 and AD 120), most likely supplying Gloucester. There are clear similarities between the kiln and pottery types found here and those closer to Gloucester, which suggest that they were part of the same industry. The repertoire of vessels produced was clearly aimed at a military/urban market rather than the wider pattern of rural settlements. The marked changes noted between the late Iron Age and the early Roman phases provide valuable evidence for how sites within the hinterland of Roman *coloniae* were developed and adapted in the years following their establishment. It is possible that the later Iron Age enclosure, a site of clear local/regional importance prior to the Roman conquest, was deliberately (and perhaps forcefully) taken over by the Roman state or someone associated with it. There is a possibility that the pottery production phase and the subsequent development of the site into an agricultural settlement represents the establishment of veteran settlement within the *territorium* of *Glevum*. Such evidence has long been lacking, despite being a widely discussed theme in Romano-British studies. If this was the case at Longford, this site may represent a significant stride forward in our understanding of state-controlled landscapes in Roman Britain.

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Tables

Phase	Period	Date range	Description
1	Middle Neolithic	3400–3100 BC	Pits and postholes
2	Early Bronze Age	2200–1500 BC	Inhumation burial and some pits
3	Later Iron Age/Early Roman	200 BC–AD 70	Later Iron Age/Early Roman square enclosure
4	Early Roman	AD 70–120	Early Roman pottery-production phase
5	Middle Roman	AD 120–200	2nd-century agricultural phase
6	Late Roman	AD 175–325	late 2nd–early 4th-century agricultural phase
7	Medieval to post-medieval	AD 1100+	Ridge and furrow

Table 1: Site phasing

Fabric	Number	% No.	Weight (g)
G1	120	44	795
G2	2	<1	15
GC1	40	15	376
GC2	1	<1	10
GQ1	87	34	324
GQ2	5	2	68
QG1	12	5	836
SH1	1	<1	10
Total	268	100	2434

Table 2: Prehistoric pottery fabrics

Category type	Pit 3180	Pit 3017	Posthole 3008	Other prehistoric	Residual assemblage	Total
Flake	5	3		3	6	17
Blade				1	6	7
Bladelet	1	2	1		3	7
Blade index	16.67% (1/6)	40% (2/5)	100% (1/1)	25% (1/4)	60% (9/15)	45.16% (14/31)
Irregular waste					2	2
Core multi-platform flakes	1					1
Arrowhead petit tranchet derivative		1				1
Scraper end					1	1
Piercer					1	1
Micro-denticulate		1				1
Notch			1			1
Knife backed	2					2
Knife plano-convex				1		1
Knife other	1				1	2
Fabricator					1	1
Retouched flake	1				1	2
Retouched blade	1				1	2
Retouch other					1	1
Total	12	7	2	5	24	50
No. burnt (%)	0	0	0	0	3/24 (12.5%)	3/50 (6%)
No. broken (exc. chips) (%)	1/12 (8.33%)	1/7 (14.29%)	0	0	11/24 (46.67%)	13/50 (26%)
No. retouched (exc. chips) (%)	5/12 (41.67%)	2/7 (28.57%)	1/2 (50%)	1/5 (20%)	7/24 (29.17%)	16/50 (32%)

Table 3: The flint assemblage from key contexts

Category type	Total	Percentage
Pits	23	44
Ditches	15	30
Postholes	7	14
Topsoil/subsoil	4	8
Burials	1	2
Misc. features	1	2
Total	50	100

Table 4: Worked flint by context type

Code	Description	NRFRC code/reference
Samian ware		
S20	South Gaulish samian ware (general).	incl LGF SA
S22	Marbled samian ware	LGF SA?
S30	Central Gaulish samian ware (general)	incl LEZ SA 2
S31	1st century micaceous Lezoux fabric	LEZ SA 1.
S32	Les Martres-de-Veyre Central Gaulish samian ware	LMV SA
S40	East Gaulish samian ware (general)	
S43	Trier East Gaulish samian ware	TRI SA
Fine wares		
F30	'Mica dusted' fabrics	incl ROB MD
F43	Central Gaulish 'Rhenish'	CNG BS
F48	Central Gaulish	CNG CC2
F50	Major British colour-coated wares, but usually red-brown colour-coated wares (general). F50 mainly used for probable Oxford wares and related fabrics	
F51	Oxford colour-coated ware	OXF RS
F62	Sandy oxidised fabric with grey core and red/brown colour-coat	
Amphorae		
A10	Buff amphora fabrics (general)	
A11	Dressel 20 Baetican amphorae (Peacock and Williams 1986, 140)	BAT AM 1 and BAT AM 2
A12	fine buff (Cam186C) Cadiz area	CAD AM.
A13	South Gaulish (Gauloise 4 etc)	GAL AM 1
A20	Fine oxidised fabrics (general)	
A22	Fairly fine sandy oxidised (?Gauloise 4)	
A35	Campanian 'black sand' fabric	CAM AM 1
Mortaria		
M11	N Gaul/SE England (Hartley group 1)	some NOG WH 4.
M12	N Gaul/SE England (Hartley group 2)	NOG WH 4.
M14	Bushe Fox 26/30	NOG WH 4
M20	White fabrics (general)	
M21	Verulamium region white mortaria	VER WH
M22	Oxford white ware mortaria (Young 1977, 56).	OXF WH
M32	`Cirencester/SWWS'	SOW WS
White wares		
W10	Fairly fine white fabrics (general)	
W20	Coarse sandy white fabrics (general)	
W30	fine' white fabrics (generally thin walled and no/few inclusions)	
W40	miscellaneous (generally fine) white/pink wares	

Code	Description	NRFRC code/reference
W41	Fine pink buff SE England/Kent	COL WH?
W42	Fine white/buff ?import cf M11	NOG WH 4?
White-slipped wares (except mortaria)		
Q10	Fine oxidised early Roman	
Q20	Fine-moderately sandy oxidised white-slipped fabrics (general)	
Q22	`Cirencester/SWWS' sandy	SOW WS
Q30	Reduced slightly sandy white slipped fabrics	
Q40	Coarse sand-tempered oxidised fabric with white slip	
Q50	Fine oxidised (uncertain)	
'Belgic type' wares		
E10	Organic tempered 'Belgic type' fabrics	
E20	Fine sand-tempered 'Belgic type' fabrics	
E30	Medium to coarse sand-tempered 'Belgic type' fabrics	
E50	Limestone-tempered 'Belgic type' fabrics	
E80	Grog-tempered 'Belgic type' fabrics	SOB GT
Oxidised 'coarse' wares		
O10	Fine oxidised coarse ware fabrics (general)	
O20	Sandy oxidised coarse ware fabrics (general)	
O30	Fine/medium sandy oxidised fabrics	
O40	Severn Valley ware (general)	SVW OX 2
O41	organic tempered Severn Valley ware	
O42	Severn Valley ware, storage jar variant	
O50	Miscellaneous oxidised coarse ware fabrics	
O54	buff fabric with greyish core, sand and uncertain white inclusions	
O80	Coarse tempered (usually grog) oxidised fabrics, equivalent to R90	
Reduced 'coarse' wares		
R	Reduced fabrics unspecified	
R10	Fine reduced 'coarse ware' fabrics (general)	
R20	Sandy reduced coarse ware fabrics (general)	
R30	Medium/fine sandy reduced coarse ware fabrics (general)	
R35	North Wiltshire reduced coarse ware	
R40	Miscellaneous reduced coarse ware fabrics	
R49	Reduced Severn Valley ware	
R50	A hard, slightly sandy fabric, usually black to very dark grey, often with a reddish brown or reddish grey core	cf Young 1977, 203 fabric 5
R60	Reduced fabrics with significant organic inclusions (general)	
R70	Reduced fabrics with calcareous inclusions (general)	
R85	Fairly fine sandy fabric with moderate-abundant mica (SW 'micaceous wares')	
R90	Coarse tempered (usually grog-tempered) reduced fabrics	cf Young 1977, 202 fabric 1
R94	Grey fabric with sand, subrounded white, grog and organic inclusions, possibly a Savernake variant	
R95	Savernake ware	SAV GT
Black-burnished wares		
B11	Dorset BB1	DOR BB 1
Calcareous wares etc		
C10	Shell-tempered fabrics (general)	

Code	Description	NRFRC code/reference
C20	Limestone-tempered fabrics (general)	
Malvern fabrics		
G20	Malvern fabrics (general)	
G21	Malvern igneous rock fabric	MAL RE A
G22	Malvern 'Romanised' reduced fabric	Cf MAL RE A
G25	Malvern limestone fabric	Peacock 1968, fabric B1
Other handmade fabrics (see text below)		
Sand	AA3 - Medium and fine quartz sand grains	
Sand and grog?	AG3/4 and AGL3 – fine sand and slightly larger sparse grog? Inclusions, occasional limestone	
Sand and shell	AS3 and ?AZ3 – sand and medium sized shell or ?leached shell voids	
Clay pellets	PLA4 – common rounded clay pellets and sparse limestone and quartz sand	
Shell and sand	SA4 and SA5 – coarse shell and medium quartz sand	
Limestone and grog	GL5, GLAV4, GVA4, LG4, LGA4, LGV4, LGV5, LVA4: a wide range of fabrics with sand and organic inclusions also present	

Table 5: Late Iron Age and Roman pottery fabric codes and descriptions

Ware code	No. of sherds	% Nosh	Wt (g)	% wt	REs	%REs	MSW
All kiln fabrics	9096	58.3	125,463	48.7	141.31	60.8	13.8
		Excl. kiln fabrics		Excl. kiln fabrics		Excl. kiln fabrics	
S20	32	0.5	348	0.3	0.72	0.8	10.9
S22	1	+	22	+			22
S30	37	0.6	625	0.5	0.84	0.9	16.9
S31	1	+	23	+			23
S32	2	+	7	+			3.5
S40	1	+	7	+			7
S43	1	+	58	+			58
S subtotal	*75*	*1.2*	*1090*	*0.8*	*1.56*	*1.7*	*14.5*
F30	2	+	18	+	0.25	0.3	9
F43	1	+	2	+			2
F48	1	+	1	+			1
F50	2	+	5	+			2.5
F51	5	0.1	142	0.1	0.11	0.1	28.4
F62	1	+	16	+			16
F subtotal	*12*	*0.2*	*184*	*0.1*	*0.36*	*0.4*	*15.3*
A10	6	0.1	489	0.4			81.5
A11	41	0.6	4682	3.5	0.31	0.3	114.2
A12	1	+	89	0.1	0.10	0.1	89
A13	4	0.1	352	0.3	0.36	0.4	88
A20	2	+	93	0.1			46.5
A22	1	+	187	0.1			187
A35	1	+	26	+			26
A subtotal	*56*	*0.9*	*5918*	*4.5*	*0.77*	*0.8*	*105.7*
M11	12	0.2	1636	1.2	0.52	0.6	136.3
M12	5	0.1	384	0.3	0.10	0.1	76.8
M14	2	+	276	0.2	0.10	0.1	138

Ware code	No. of sherds	% Nosh	Wt (g)	% wt	REs	%REs	MSW
M20	1	+	127	0.1			127
M21	7	0.1	770	0.6	0.31	0.3	110
M22	6	0.1	400	0.3	0.52	0.6	66.7
M32	1	+	219	0.2	0.21	0.2	219
M subtotal	*34*	*0.5*	*3812*	*2.9*	*1.76*	*1.9*	*112.1*
W10	31	0.5	414	0.3	0.64	0.7	13.4
W20	31	0.5	1187	0.9	0.41	0.5	38.3
W30	41	0.6	140	0.1			3.4
W40	1	+	9	+			9
W41	1	+	14	+			14
W42	4	0.1	61	0.1			15.3
W subtotal	*109*	*1.7*	*1825*	*1.4*	*1.05*	*1.2*	*16.7*
Q10	2	+	28	+			14
Q20	1	+	23	+			23
Q22	2	+	54	+			27
Q30	1	+	7	+			7
Q40	1	+	6	+			6
Q50	2	+	14	+			7
Q subtotal	*9*	*0.1*	*132*	*0.1*			*14.7*
Fine and specialist ware subtotal	*295*	*4.5*	*12961*	*9.8*	*5.50*	*6.0*	
E10	14	0.2	92	0.1	0.13	0.1	6.6
E20	6	0.1	101	0.1	0.15	0.2	16.8
E30	20	0.3	278	0.2	0.19	0.2	13.9
E50	4	0.1	37	+	0.07	0.1	9.3
E80	107	1.6	1123	0.9	0.62	0.7	10.3
E subtotal	*151*	*2.3*	*1631*	*1.2*	*1.16*	*1.3*	*10.8*
O10	39	0.6	530	0.4	0.38	0.4	13.6
O20	28	0.4	312	0.2	0.25	0.3	11.1
O30	1	+	8	+			8
O40	1993	30.6	49235	37.3	39.67	43.4	24.7
O41	146	2.2	5236	4.0	4.02	4.4	35.9
O42	2	+	44	+			22
O50	7	0.1	108	0.1			15.4
O54	1	+	29	+			29
O80	12	0.2	248	0.2			20.7
O subtotal	*2229*	*34.2*	*55750*	*42.2*	*44.32*	*48.5*	*25*
R	3	+	10	+			3.3
R10	22	0.3	178	0.1	0.35	0.4	8.1
R20	107	1.6	1672	1.3	1.00	1.1	15.6
R30	126	1.9	2063	1.6	2.22	2.4	16.4
R35	2	+	20	+			10
R40	10	0.2	225	0.2	0.58	0.6	2.3
R49	276	3.5	5306	4.0	3.20	3.5	19.2
R50	9	0.1	116	0.1	0.09	0.1	12.9
R60	46	0.7	1103	0.8	0.52	0.6	24
R70	6	0.1	88	0.1	0.19	0.2	14.7
R85	16	0.2	266	0.2	0.20	0.2	16.6
R90	83	1.3	2397	1.8	0.37	0.4	28.9
R94	24	0.4	308	0.2	0.03	+	12.8
R95	19	0.3	922	0.7	0.44	0.5	48.5
R subtotal	*749*	*11.5*	*14674*	*11.1*	*9.19*	*10.1*	*19.6*

Ware code	No. of sherds	% Nosh	Wt (g)	% wt	REs	%REs	MSW
B11 subtotal	*692*	*10.6*	*8927*	*6.8*	*10.28*	*11.2*	*12.9*
C10	9	0.1	487	0.4	0.36	0.4	54.1
C20	193	3.0	2433	1.8	2.17	2.4	12.6
C subtotal	*202*	*3.1*	*2920*	*2.2*	*2.53*	*2.8*	*14.3*
G20	17	0.3	148	0.1	0.20	0.2	8.7
G21	10	0.2	284	0.2	0.33	0.4	28.4
G22	3	+	32	+	0.07	0.1	10.7
G25	2016	30.8	32405	24.5	15.49	17.0	16.1
G subtotal	*2040*	*31.3*	*32786*	*24.8*	*16.09*	*17.7*	*16.1*
A fabrics	8	0.1	126	0.1	0.27	0.3	15.8
G/L fabrics	136	2.2	2191	1.7	1.90	2.1	16.1
P fabrics	1	+	17	+	0.06	0.1	17
S fabrics	3	+	16	+			5.3
Other handmade fabrics subtotal	*148*	*2.4*	*2350*	*1.8*	*2.23*	*2.4*	*15.8*
Total less kiln fabrics	6512	(41.7)	132082	(51.3)	91.30	(39.2)	20.3
TOTAL	15608		257545		232.61		16.5

Table 6: Late Iron Age and Roman pottery fabric quantification by sherd count, weight and Res (MSW = mean sherd weight)

Ware code	Ph. 2	Ph. 3	Ph. 4	Ph. 5	Other	Total	% Nosh
All kiln fabrics	2	5849	1079	2132	34	9096	58.3
	Percentage of phase sherd totals excluding kiln fabrics					Excl. kiln fabrics	
S20		0.5	1.1	0.4	0.9	32	0.5
S22		+				1	+
S30		0.2	0.5	1.4	1.8	37	0.6
S31			0.1			1	+
S32			0.1		0.4	2	+
S40			0.1			1	+
S43				0.1		1	+
S subtotal		*0.7*	*1.9*	*1.8*	*3.1*	*75*	*1.2*
F30				0.1		2	+
F43				0.1		1	+
F48			0.1			1	+
F50				0.1		2	+
F51				0.3		5	0.1
F62				0.1		1	+
F subtotal			*0.1*	*0.6*		*12*	*0.2*
A10		0.2		0.1	0.4	6	0.1
A11		0.9	0.6	0.5	2.2	41	0.6
A12			0.1			1	+
A13		+	0.1	0.1		4	0.1
A20				0.1		2	+
A22				0.1		1	+
A35					0.4	1	+
A subtotal		*1.1*	*0.8*	*0.8*	*3.1*	*56*	*0.9*
M11		0.2	0.5	0.2		12	0.2
M12		0.2	0.1			5	0.1
M14			0.1	0.1		2	+
M20					0.4	1	+

Ware code	Ph. 2	Ph. 3	Ph. 4	Ph. 5	Other	Total	% Nosh
M21		0.1	0.4			7	0.1
M22				0.3		6	0.1
M32				0.1		1	+
M subtotal		*0.4*	*1.0*	*0.6*	*0.4*	*34*	*0.5*
W10		0.5	1.6	0.2		31	0.5
W20		0.1	2.6			31	0.5
W30				2.3		41	0.6
W40		+				1	+
W41		+				1	+
W42				0.2		4	0.1
W subtotal		*0.7*	*4.2*	*2.7*		*109*	*1.7*
Q10		+	0.1			2	+
Q20		+				1	+
Q22				0.1		2	+
Q30			0.1			1	+
Q40			0.1			1	+
Q50				0.1		2	+
Q subtotal		*0.1*	*0.3*	*0.2*		*9*	*0.1*
Fine and specialist ware subtotal		*2.9*	*8.2*	*6.8*	*6.6*	*295*	*4.5*
E10	0.1	0.5		0.1		14	0.2
E20		0.2		0.1		6	0.1
E30		0.6	0.3	0.1		20	0.3
E50	0.1	0.1				4	0.1
E80	2.2	3.2	0.4	0.1		107	1.6
E subtotal	*2.4*	*4.7*	*0.7*	*0.3*		*151*	*2.3*
O10		0.2	2.8	0.2		39	0.6
O20	0.1	0.6	0.1	0.6	0.4	28	0.4
O30		+				1	+
O40	0.3	26.9	42.8	44.4	42.7	1993	30.6
O41	0.1	3.5	1.2	2.0	5.3	146	2.2
O42				0.1		2	+
O50		0.3				7	0.1
O54		+				1	+
O80		0.3	0.1	0.2		12	0.2
O subtotal	*0.5*	*31.8*	*47.0*	*47.6*	*48.5*	*2229*	*34.2*
R		0.1				3	+
R10		0.5	0.3	0.3	0.4	22	0.3
R20		3.0	2.1	0.7		107	1.6
R30		1.5	3.6	2.4	4.4	126	1.9
R35			0.2			2	+
R40		0.3		0.1		10	0.2
R49	0.3	4.3	8.9	3.4	6.6	276	3.5
R50		0.1	0.4	0.1		9	0.1
R60	0.1	1.4	1.0	0.1		46	0.7
R70		0.2		0.1		6	0.1
R85				0.6	2.6	16	0.2
R90	0.5	1.8	2.1	0.7	0.4	83	1.3
R94		1.0				24	0.4
R95		0.6	0.2	0.1		19	0.3
R subtotal	*0.9*	*14.7*	*18.7*	*8.6*	*14.5*	*749*	*11.5*
B11 subtotal		*0.1*	*13.3*	*28.8*	*15.4*	*692*	*10.6*
C10	0.1	0.3				9	0.1

Ware code	Ph. 2	Ph. 3	Ph. 4	Ph. 5	Other	Total	% Nosh
C20	1.7	4.8	2.5	1.7	1.8	193	3.0
C22		0.1				2	+
C subtotal	*1.8*	*5.2*	*2.5*	*1.7*	*1.8*	*204*	*3.1*
G20		0.1		0.7	0.4	17	0.3
G21			0.2	0.5		10	0.2
G22			0.2		0.4	3	+
G25	92.3	35.3	8.8	4.9	11.0	2008	30.8
G subtotal	*92.3*	*35.4*	*9.2*	*6.1*	*11.9*	*2038*	*31.3*
A fabrics						8	0.1
G fabrics						65	1.0
L fabrics						77	1,2
P fabrics						1	+
S fabrics						3	+
Other handmade fabrics subtotal	*2.0*	*5.2*	*0.4*		*1.3*	*154*	*2.4*
Total less kiln fabrics	1030	2416	1063	1776	227	6512	
TOTAL	1032	8265	2142	3908	261	15608	

Table 7: Late Iron Age and Roman pottery fabric quantification by phase (% sherd count) (Column percent)

Class	Description	Non-kiln products		Kiln products	
		REs	%	REs	%
A	*Amphorae (not subdivided)*	*0.77*	*0.8*		
B	Flagons/jugs (not specified)	1.00	1.1	28.37	20.1
BC	handled jugs/flagons			1.20	0.8
BE	two-handled flagons			1.55	1.1
B total		*1.00*	*1.1*	*31.12*	*22.0*
C	Jars (not specified)	24.30	26.7	9.27	6.6
CB	barrel shaped jars	3.38	3.71		
CC	narrow mouthed jars (rim diameter less than 2/3 girth)	5.28	5.8	0.22	0.2
CD	medium mouthed jars (general)	10.58	11.6	23.14	16.4
CE	squat, high shouldered (or `necked') jars	1.76	1.9		
CG	globular jars			0.05	+
CH	bead rim jars	0.97	1.1		
CI	angled everted rim jars	0.18	0.2	1.09	0.8
CK	'cooking pot type' jars (eg black-burnished ware jar types)	9.65	10.6	0.17	0.1
CM	wide mouthed jars (rim diameter greater than girth)	2.91	3.2		
CN	storage jars (large, generally thick walled)	2.49	2.7		
CV	handled jars	1.10	1.2		
C total		*62.60*	*68.7*	*33.94*	*24.0*
D	Uncertain jars/bowls	1.22	1.3	0.74	0.5
DD	spouted jars/bowls (cf CV)	0.69	0.8	0.25	0.2
D total		*1.91*	*2.1*	*0.99*	*0.7*
E	Beakers (not specified)	0.47	0.5	16.79	11.9
EA	butt beakers	0.15	0.2	0.45	0.3
ED	globular beakers			7.95	5.6
EG	carinated beakers			0.40	0.3
EH	'jar' beakers, usually small examples of angled everted rim types, cf CI, with small, fine rim	0.99	1.1	30.49	21.6
E total		*1.61*	*1.8*	*56.08*	*39.7*
F total	*Cups (not specified)*	*0.17*	*0.2*		
G	Tankards (not specified)	1.19	1.3		

Class	Description	Non-kiln products		Kiln products	
		REs	%	REs	%
GA	Straight-sided handled tankards	5.06	5.6		
G total		*6.25*	*6.9*		
GH	*Uncertain straight sided tankards/carinated bowls*	*2.99*	*3.3*		
H	Bowls (not specified) (diameter:height ratio from *c* 1:1 to 3:1)	0.74	0.8	1.25	0.9
HA	carinated bowls	2.74	3.0	2.72	1.9
HB	straight sided (usually flat-based) bowls	0.79	0.9		
HC	curving sided bowls	2.40	2.6	5.49	3.9
HD	necked bowls				
HG	globular bowls			0.23	0.2
H total		*6.667*	*7.3*	*9.69*	*7.6*
I	Uncertain bowls/dishes	0.16	0.2	0.67	0.5
IA	straight sided bowls/dishes	0.44	0.5		
IB	curving sided bowls/dishes	0.21	0.2	0.10	0.1
I total		*0.81*	*0.9*	*0.77*	*0.5*
J	Dishes (unspecified) (diameter:height ratio generally greater than 3:1)	0.22	0.2	0.05	+
JA	straight sided dishes	2.47	2.7	0.87	0.6
JB	curving sided dishes	1.02	1.1	0.13	0.1
J total		*3.71*	*4.1*	*1.05*	*0.7*
KA	hook rimmed/bead and flange mortaria	1.34	1.6	3.54	2.5
KB	collared mortaria	0.12			
KE	tall bead/stubby flange types (eg Young M22)	0.30	0.3		
K total		*1.76*	*1.9*	*3.54*	*2.5*
L	*Lids (not subdivided)*	*0.25*	*0.3*	*3.83*	*2.7*
M	Miscellaneous				
MF	cheese press	0.43	0.5	0.05	+
Z	*Uncertain*	*0.14*	*0.2*	*0.25*	*0.2*
TOTAL		91.30		141.31	

Table 8: Summary description and overall quantification of late Iron Age and Roman vessel classes by rim equivalents (REs)

Ware code	A	B	C	D	E	F	G	GH	H	I	J	K	L	M	Z	REs	%REs
All kiln fabrics																141.31	60.8
S20						4.2			30.6		65.3					0.72	0.8
S30						6.0			52.4		41.7					0.84	0.9
S subtotal						*5.1*			*42.3*		*52.6*					*1.56*	*1.7*
F30					100											0.25	0.3
F51									100							0.11	0.1
F subtotal					*69.4*				*30.6*							*0.36*	*0.4*
A11	100															0.31	0.3
A12	100															0.10	0.1
A13	100															0.36	0.4
A subtotal	*100*															*0.77*	*0.8*
M11												100				0.52	0.6
M12												100				0.10	0.1
M14												100				0.10	0.1
M21												100				0.31	0.3
M22												100				0.52	0.6
M32												100				0.21	0.2
M subtotal												100				*1.76*	*1.9*
W10									100							0.64	0.7
W20			100													0.41	0.5
W subtotal			*39.0*						*61.0*							*1.05*	*1.2*
Fine and specialist ware subtotal	***14.0***		***7.5***		***4.5***	***1.5***			***25.6***		***14.9***	***32.0***				***5.50***	***6.0***
E10			76.9							23.1						0.13	0.1
E20			100													0.15	0.2
E30			78.9	21.1												0.19	0.2
E50			100													0.07	0.1
E80			40.3	19.4									40.3			0.62	0.7
E subtotal			*62.1*	*13.8*						*2.6*			*21.6*			*1.16*	*1.3*
O10				13.2	68.4				18.4							0.38	0.4
O20			96.0		4.0											0.25	0.3
O40		2.5	62.4	2.3	0.5	0.2	14.1	6.0	8.6	0.5	2.5			0.2	0.1	39.67	43.4
O41			77.1	3.0			12.9	1.7			5.2					4.02	4.4
O subtotal		*2.3*	*63.4*	*2.5*	*1.1*	*0.2*	*13.8*	*5.6*	*7.8*	*0.5*	*2.8*			*0.2*	*0.1*	*44.32*	*48.5*

Ware code	A	B	C	D	E	F	G	GH	H	I	J	K	L	M	Z	REs	%REs
R10			57.1		42.9											0.35	0.4
R20			84.0							10.0					6.0	1.00	1.1
R30			72.5		6.8						4.5			16.2		2.22	2.4
R40			87.9						12.1							0.58	0.6
R49			56.3	9.1			7.8	16.3	6.6		4.1					3.20	3.5
R50			100													0.09	0.1
R60			73.1		26.9											0.52	0.6
R70			100													0.19	0.2
R85			65.0	15.0						20.0						0.20	0.2
R90			100													0.37	0.4
R94			100													0.03	+
R95			100													0.44	0.5
R subtotal			*71.8*	*3.5*	*4.8*		*2.7*	*5.7*	*3.0*	*1.5*	*2.5*			*3.9*	*0.7*	*9.19*	*10.1*
B11 subtotal			*73.0*		*4.4*				*7.0*	*3.9*	*11.8*					*10.28*	*11.2*
C10			100													0.36	0.4
C20			92.2						5.1		2.8					2.17	2.4
C subtotal			*93.3*						*4.3*		*2.4*					*2.53*	*2.8*
G20			100													0.20	0.2
G21			63.6						21.2						15.2	0.33	0.4
G22			100													0.07	0.1
G25			92.6	2.1					3.9	0.2	1.1					15.49	17.0
G subtotal			*92.2*	*2.1*					*4.2*	*0.2*	*1.1*				*0.3*	*16.09*	*17.7*
A fabrics			100													0.27	0.3
G fabrics			100													0.73	0.8
L fabrics			100													1.17	1.3
P fabrics			100													0.06	0.1
Other handmade fabrics subtotal			*100*													*2.23*	*2.4*
TOTAL	**0.77**	**1.00**	**62.72**	**1.91**	**1.61**	0.17	**6.36**	**2.99**	**5.93**	**0.81**	**3.71**	**1.76**	**0.25**	**0.43**	**0.14**	**91.30**	
%	0.9	1.1	68.7	2.1	1.8	0.2	6.9	3.3	6.5	0.9	4.1	1.9	0.3	0.5	0.2		

Table 9: Quantification of vessel classes by non-kiln fabric (REs) (Row percent)

Fabric code	No. of sherds	% Nosh	Wt (g)	% wt	REs	%REs	MSW (g)
K1O	2631	28.9	31,356	25.0	23.17	16.4	11.9
K1OW	845	9.3	16,465	13.1	13.26	9.4	19.5
K1OR	1	+	6	+			6
K1OMIC	2	+	2	+			1
K1O subtotal	*3479*	*38.2*	*47,829*	*38.1*	*36.43*	*25.8*	*13.7*
K1M	710	7.8	9678	7.7	8.49	6.0	13.6
K1MW	88	1.0	2603	2.1	3.95	2.8	29.6
K1M subtotal	*798*	*8.8*	*12,281*	*9.8*	*12.44*	*8.8*	*15.4*
K1R	3395	37.3	42,342	33.8	58.87	41.7	12.5
K1RW	239	2.6	4672	3.7	7.20	5.1	19.5
K1RB	291	3.2	3380	2.7	4.13	2.9	11.6
K1R subtotal	*3925*	*43.2*	*50,394*	*40.2*	*70.20*	*49.7*	*12.8*
K1 total	*8202*	*90.2*	*110,514*	*88.1*	*119.06*	*84.3*	*13.5*
K2O	128	1.4	1349	1.1	1.40	1.0	10.5
K2OW	48	0.5	834	0.7	1.32	0.9	17.4
K2O subtotal	*176*	*1.9*	*2183*	*1.7*	*2.72*	*1.9*	*12.4*
K2M	*139*	*1.5*	*1752*	*1.4*	*2.94*	*2.1*	*12.6*
K2R	454	5.0	6789	5.4	11.91	8.4	15.0
K2RW	3	+	103	0.1	0.06	+	34.3
K2RB	122	1.3	4132	3.3	4.61	3.3	33.9
K2R subtotal	*579*	*6.4*	*11,024*	*8.8*	*16.58*	*11.7*	*19.0*
K2 total	*894*	*9.8*	*14,959*	*11.9*	*22.24*	*15.7*	*16.7*
TOTAL	9096		125,463		141.31		

Table 10: Quantification of kiln fabrics

Fabric code	Groove	Cordon	Burnished zone	Burnished line	Rustication	Barbotine	Comb	'Roulette'	Total
K1O	77		14	7	8	7		111	2631
K1OW	26	2				1?		6	845
K1M	20	1	6		3			45	710
K1R	158	14	247	14	42	50	9	328	3395
K1RW	6							2	239
K1RB	13	1	9	3	2	11		8	291
K1 total	*300*	*18*	*276*	*24*	*55*	*69*	*9*	*500*	*8202*
K2O	3							8	128
K2OW	1								48
K2M					4			6	139
K2R	15	4	3	2	4	1		23	454
K2RB	17		1		1			5	122
K2 total	*36*	*4*	*4*	*2*	*9*	*1*		*42*	*894*
TOTAL	336	22	280	26	64	70	9	542	9096

Table 11: Quantification of broad decoration type by kiln fabric (sherd count)

Type	K1O	K1OW	K1M	K1MW	K1R	K1RW	K1RB	K1 total	K2O	K2OW	K2M	K2R	K2RW	K2RB	K2 total	TOTAL	%
B	6.59	9.48	0.26	3.69	0.24	6.20		26.46	0.38	0.32		0.21			0.91	27.37	
BA		1.00						1.00								1.00	
BC		1.00				0.20		1.20								1.20	
BE					0.55			0.55		1.00					1.00	1.55	
B total	*6.59*	*11.48*	*0.26*	*3.69*	*0.79*	*6.40*		*29.21*	*0.38*	*1.32*		*0.21*			*1.91*	*31.12*	*22.0*
C	1.56				4.51	0.13	0.30	6.50	0.13		0.24	2.35		0.05	2.77	9.27	
CC											0.22				0.22	0.22	
CD	2.03		2.56		10.00	0.14		14.73	0.30		1.11	4.13		2.87	8.41	23.14	
CG	0.05							0.05								0.05	
CI	0.20		0.18		0.63		0.08	1.09								1.09	
CK							0.17	0.17								0.17	
C total	*3.84*		*2.74*		*15.14*	*0.27*	*0.55*	*22.54*	*0.43*		*1.57*	*6.48*		*2.92*	*11.40*	*33.94*	*24.0*
D	0.05	0.04	0.17		0.33		0.05	0.64				0.10			0.10	0.74	
DD	0.17		0.08					0.25								0.25	
D total	*0.22*	*0.04*	*0.25*		*0.33*		*0.05*	*0.89*				*0.10*			*0.10*	*0.99*	*0.7*
E	2.15		1.94		11.06		0.89	16.04	0.05			0.70			0.75	16.79	

Type	K1O	K1OW	K1M	K1MW	K1R	K1RW	K1RB	K1 total	K2O	K2OW	K2M	K2R	K2RW	K2RB	K2 total	TOTAL	%
EA					0.45			0.45								0.45	
ED	0.12				5.10		0.13	5.35			0.60	1.07		0.93	2.60	7.95	
EG	0.40							0.40								0.40	
EH	3.87		2.48		19.20		1.45	27.00	0.43		0.77	2.14		0.15		30.49	
E total	*6.54*		*4.42*		*35.81*		*2.47*	*49.24*	*0.48*		*1.37*	*3.91*		*1.08*	*6.84*	*56.08*	*39.7*
H	0.11		0.06		0.72		0.16	1.05				0.05		0.15	0.20	1.25	
HA	0.72	0.61	0.28		0.92	0.06		2.59	0.03			0.09		0.01	0.13	2.72	
HC	2.71		0.21		2.11		0.36	5.39						0.10	0.10	5.49	
HG		0.08			0.05	0.10		0.23								0.23	
H total	*3.54*	*0.69*	*0.55*		*3.80*	*0.16*	*0.52*	*9.26*	*0.03*			*0.14*		*0.26*	*0.43*	*9.69*	*7.6*
I	0.32				0.23		0.02	0.57				0.09		0.01	0.10	0.67	
IB					0.10			0.10								0.10	
I total	*0.32*				*0.33*		*0.02*	*0.67*				*0.09*		*0.01*	*0.10*	*0.77*	*0.5*
J							0.05	0.05								0.05	
JA												0.77		0.10	0.87	0.87	
JB					0.13			0.13								0.13	
J total					*0.13*		*0.05*	*0.18*				*0.77*		*0.10*	*0.87*	*1.05*	*0.7*
KA total	*1.66*	*1.05*	*0.08*	*0.26*		*0.37*	*0.06*	*3.48*					*0.06*		*0.06*	*3.54*	*2.5*
L	*0.46*		*0.14*		*2.34*		*0.36*	*3.30*	*0.08*			*0.21*		*0.24*	*0.53*	*3.83*	*2.7*
MF					*0.05*			*0.05*								*0.05*	*+*
Z			*0.05*		*0.15*		*0.05*	*0.25*								*0.25*	*0.2*
TOTAL	23.17	13.26	8.49	3.95	58.87	7.20	4.13	119.07	1.40	1.32	2.94	11.91	0.06	4.61	22.24	141.31	

Table 12: Vessel type by kiln fabric (REs)

Ware code	Ph. 2	Ph. 3	Ph. 4	Ph. 5	other	Total
K1O	4	1568	382	662	15	2631
K1OW	2	562	151	126	4	845
K1OR		1				1
K1OMIC		2				2
K1M	2	421	123	163	1	710
K1MW		58	12	18		88
K1R	5	2306	295	780	9	3395
K1RW	1	180	12	46		239
K1RB		196	38	57		291
K2O		60	11	57		128
K2OW		45	1	2		48
K2M		73	10	54	2	139
K2R		277	40	134	3	454
K2RW		1	1	1		3
K2RB		87	3	32		122
TOTAL	14	5837	1079	2132	34	9096
% of total	0.2	64.2	11.9	23.4	0.4	

Table 13: Kiln fabrics by phase (number of sherds)

	Berkeley Street	**College of Art**	**Longford**
Kilns			
Structure	Single tongue pedestal	Single tongue pedestal (x2)	Single tongue pedestal; long central pedestal; rounded central pedestal?
Other features		Ceramic tubes	Ceramic tubes; vessels in one kiln wall
Fabrics			
K1/TF11A	Dominant	Dominant, mostly oxidised	Dominant
K1OW/TF7	Mostly flagons	Mostly flagons?	Mostly flagons
K2/TF25	Mostly oxidised	Uncommon	Mostly reduced
K1OMIC/TF3A	Uncommon	Fairly common	Extremely rare
K1O/K1OW/TF9B mortaria	Present	Present	Present
Decoration			
Rouletting	On beakers and some bowls	'on a few unusual sherds', but appears on several illustrated bowls	Common on beakers, less so on bowls
Rustication	Nodular on a beaker, Kingsholm parallels noted	'some sherds ... were found, but no wasters'	Occasional, vertical strips on K1 and nodular on K2
Barbotine 'hairpin'	Not present?	One example illustrated	Uncommon
Vessel types			
Flagons	1% of waste material in TF11A	Ring necked flagons 'common'	22% of all REs
Jars	57% of waste material in TF11A	'Common'	24% of all REs
Beakers	2% of waste material in TF11A	Ovoid beakers 'common', indented beakers present	39.7% of all REs, mostly ovoid
Bowls	29% of waste material in TF11A	Flanged rim bowls 'common'	7.6% of all REs
Dishes	1% of waste material in TF11A	'Not numerous', but a range of forms	0.7% of all REs
Mortaria	Present	Present	2.5% of all REs
Lids	10% of waste material in TF11A	Present	2.7% of all REs

Table 14: Comparison of selected characteristics of kilns and associated assemblages

Fabric	A		Q		SH		E		G		U		Total	
Phase	**Nos**	**Wt g**	**Nos**	**Wt g**	**Nos**	**Wt g**	**Nos**	**Wt g**	**Nos**	**Wt g**	**Nos**	**Wt g**	**Nos**	**Wt g**
1 Preh	3	21	1	3	3	11							7	35
2 LIA	141	1486	1	19	2	28	13	412			1	0	158	1945
3 ER	3584	133519	530	25702	104	7084	69	1900	3	255	50	5000	4340	173460
4 MR	6	489	22	3386	1	4	9	297					38	4176
5 LR	205	5049	26	901			26	231			16	299	273	6480
6 LIA-Ro	22	190			16	500							38	690
Post-Ro	10	147	19	82	3	154							32	383
Total	**3971**	**140901**	**599**	**30093**	**129**	**7781**	**117**	**2840**	**3**	**255**	**67**	**5299**	**4886**	**187169**

Table 15: Quantification of fired clay fabrics by phase

Fabrics	A		Q		SH		E		G		U		Total	
Function	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g
Furniture	66	4205	37	1063	23	892	44	1159					170	7319
Furniture?	4	242	17	91	11	483	1	34					33	850
Kiln furniture	215	39470	142	11809	77	6231	5	53					439	57563
Kiln str./ furniture	53	974											53	974
Kiln structure	1364	73774	276	15819					3	255	50	5000	1693	94848
Kiln/oven str.	16	994											16	994
Structural	2175	19503	80	988	7	105	38	1145			1	0	2301	21741
Structural?	6	75	4	79			7	316					17	470
Indet.	71	621	26	142	11	70	22	133			1	0	131	966
Clay sample	1	1043											1	1043
Burnt natural sediment			17	102							15	299	32	401
Total	3971	140901	599	30093	129	7781	117	2840	3	255	67	5299	4886	187169

Table 16: Quantification of fired clay fabrics in relation to function

Phase	1 Preh		2 LIA		3 ER		4 MR		5 LR		6 LIA-Ro		Post-Ro		Total	Total
Function	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g	Nos	Wt g
Furniture					11	840							14	76	25	916
Triangular bricks			10	352	303	13257	7	2545	6	340	16	500	10	206	352	17200
Kiln furniture					252	46257	11	1266	2	93					265	47616
Kiln structure/ furniture					53	974									53	974
Kiln structure					1676	94248			15	511			2	89	1693	94848
Kiln/oven structure					16	994									16	994
Structural			131	1209	1931	14998	9	297	208	5047	22	190			2301	21741
Structural?	3	21	4	274	8	146	2	29							17	470
Indeterminate	4	14	13	110	80	636	1	4	27	190			6	12	131	966
Clay sample					1	1043									1	1043
Burnt natural sediment					9	67	8	35	15	299					32	401
Total	7	35	158	1945	4340	173460	38	4176	273	6480	38	690	32	383	4886	187169
MFW		5g		12g		40g		110g		24g		18g		12g		38g

Table 17: Quantification of fired clay functional categories in relation to phase

Id	Context	Nos	Wt (g)	Fabric	Th (mm)	W (mm)	L (mm)	Comments
161	2351	1	2701	Q	92-99mm	138-148mm (back); 92-114mm at front.	>165mm	End section; trapezoidal cross-section
162	2351	1	3073	Q	110 - >116mm	113-116	>185mm	End section; square cross-section
163	2351	1	1920	Q	85-90mm	90-120 →100-145mm	>140	End section; trapezoidal cross-section
13	2509	5	4122	AQ	a) 88; b)91→96; c) 93	a) 107; b) 98→103 & 110→127;	a) >160; b) >140	a & b both have original end
14	2509	1	236	AQ	98 to 102-112	>123	>110	Central section, trapezoidal
15	2509	6	3765	AQ	-	154-157; 158; 148-162; 145	-	Line of four fingertip marks
18	2509	63	4720	A	-	112	-	Finger marks
20	2509	1	3588	AQ	92→116	90-95 → 105-110	>300	Central section, no ends
22	2509	8	1636	Q	>60	122	>115	
28	2510	1	1252	A	93 →100	>90	>130	Central section
29	2510	4	1162	AS Sh	103	91→105	>125	Trapezoidal cross-section; end underfired
30	2510	13	3348	A	92	105→110	>240	End unfired and eroded away
31	2510	6	1482	A	a) 69→74; b) >66	b) 96	>110	Finger marks

Id	Context	Nos	Wt (g)	Fabric	Th (mm)	W (mm)	L (mm)	Comments
32	2510	4	1004	A Sh	105→115	95 → >110	>105	End section
120	2719	1	1815	A	79-89mm to 45-60mm at end	95-105mm to 84-94mm at end	>170mm	End fire damaged. Trapezoidal cross-section
123	2719	1	2320	A	95-106mm	89-108mm+	>240	Central section. Square cross-section
124	2719	1	1435	A	68-79mm at end - 74-82mm centre	88-92mm	>150mmm	End section; trapezoidal cross-section
125	2719	6	1119	A	89	>85	>125	End section
126	2719	15	2503	A	a. 103; b. 88	a. >80; b. >97	a. >200; b. >160	End sections
127	2719	1	1443	Q	110	113	>170	End section with square cross-section.

Table 18: Sizes of firebars

Context	Illustration	Id.	Nos	Wt g	Th.	Height	Length	Perfs	Perf size	Comment
1745	y	26	1	2056	92	160mm	170	2	12-14mm dia.	70%. Heavily burnt, blackened and heat damaged over one face. One corner apex worn.
2023	y	2	1	1009	75-85mm	130mm	138mm L	1	14-16mm dia.	75%. Corners slightly flattened at apex. Only one corner perforated.
2023	y	3	5	950	63-66mm	135mm	140, 145mm	1	11mm w.	90%. Two corners damaged. Only one corner perforated.
2023	-	4	3	541	>47mm	-	c.170mm	0	-	Three corner fragments probably from same brick, with no evidence of perforations. Pattern of firing suggests triangular face was burnt black across a circular area in the centre.
2396	?	147	26	2121	100	170mm	190	2	15-18mm	80%. One corner broken off along perforation. Third corner unperforated.
2698	y	7	1	1854	84-96mm	130, 140, 145mm	145, 150, 155mm	2	10-11mm	Nr complete. One corner unperforated. Both perforations placed off-centre between triangular faces.
2698	y	35	67	2006	80	150mm	165, 170mm	2	13mm & 15mm dia.	Nr complete. Across one of the perforated corners are two external moulded grooves running from side to side, measuring 13mm w and set 16mm apart. One triangular face is heat damaged and the surface sheared off. The other surface has been burnt black towards the centre leaving the corners red.

Table 19: Sizes of triangular perforated bricks

Date	Form	Nos	Nos %	Wt g	Wt %
Post-medieval	Brick	20	1.7	1603	1.4
	Field drain	1	0.1	15	0.0
	Roof tile	8	0.7	489	0.4
	Glazed roof tile	1	0.1	44	0.0
	Malting kiln floor tile	1	0.1	81	0.1
Roman	Brick RB	70	6.0	16244	13.8
	Flat tile	507	43.7	34544	29.4
	Tegula	207	17.8	35699	30.4
	Imbrex	118	10.2	18558	15.8
	Flue	4	0.3	585	0.5
	Tessera	1	0.1	3	0.0
	Kiln tube	69	5.9	7810	6.7
	Indeterminate	153	13.2	1748	1.5
	Total	1160	100.0	117423	100.0

Table 20: Quantification of ceramic building material forms

Phase	Nos	Nos %	Wt g	Wt %
1 Early Bronze Age	1	0.1	6	0.01
2 LIA–ER: 200BC–AD70	4	0.3	136	0.12
3 ER: AD70–120	150	12.9	14180	12.08
4 MR: AD100–200	203	17.5	23207	19.76
5 LR: AD175–325	593	51.1	62167	52.94
6 Med/Post-med	112	9.7	5773	4.92
Unphased	97	8.4	11954	10.18
Total	1160		117423	

Table 21: Ceramic building material quantities by phase

SF	Context	Phase	Date	Denomination	Obverse	Reverse	Mint	Wear	Reference/comment
103	1339	5	1st –2nd century AD	As 25mm	]VS AVG head r	P]MTR…. Standing figure		SW/SW	encrusted
101	1182	5	AD 251–3	Radiate 19–21mm	IMP C C VIB TREB GALLVS P F AVG	ROMAE AETER NAE AVG	? (3 dots in exergue)	SW/SW	RIC IViii, 89
100	1095	5	AD 271–4	Radiate 18mm	.. TET]RICVS CAES, radiate head r	SPES] PUBLICA? Spes l		SW/W	RIC Vii, 272? Eroding, rev legend not certain

Table 22: List of coins

Phase	Feature type	Tools	Personal	Toilet	Footwear	Household	Security	Structural	Nails	Misc.	Query	Totals
	pit										1	1
2	*sub-total*										*1*	*1*
	ditches		1						3		3	7
	kiln		1						*			1
	pits		1		1				3	1		6
	wells			1		1	1		5	1	1	10
	layer							1				1
3	*sub-total*		*3*	*1*	*1*	*1*	*1*	*1*	*11*	*2*	*4*	*25*
	ditches		2		3			1	8	1		15
	hearth								1			1
	posthole								1			1
	well		1						10	1		12
4	*sub-total*		*3*		*3*			*1*	*20*	*2*		*29*
	cremation				46							46
	ditch	1	1		51			1	26	6	1	87
	grave				36				29			65
	linear								1			1
	pit								1		1	2
5	*sub-total*	*1*	*1*		*133*			*1*	*57*	*6*	*2*	*201*
	posthole									1		1
6	*sub-total*									*1*		*1*
total		1	7	1	137	1	1	3	88	11	7	257

Table 23: Summary of metal finds, excluding unphased and unstratified finds (*nail stem only)

Phase	Feature type	Cut	Context	Romano-British	Romano-British?	post-medieval	undiag.	totals
	well	1572	1616	5				5
	ditch	2307	2313			1		1
3	*sub-total*			*5*		*1*		*6*
	ditch	1959	1960	1				1
4	*sub-total*			*1*				*1*
		1311	1312	1				1
		2014	2148				1	1
	ditches	2832	2831	1				1
5	*sub-total*			*2*			*1*	*3*
		2183	2184			1		1
	furrows	2410	2411			2		2
	subsoil	-	1001			1		1
	-	-	1273	1	1			2
6	*sub-total*			*1*	*1*	*4*		*6*
	modern cut	2997	2998			1		1
	topsoil	-	1001/3000			5		5
	-	-	2315	1				1
unphased	*sub-total*			*1*		*6*		*7*
Total				10	1	11	1	23

Table 24: Summary of glass by phase

Age group	Age range
Pre-term	<37 weeks gestation
Neonate	Birth–1 month
Infant	1–12 months
Young child	1–5 years
Older child	6–12 years
Adolescent	13–17 years
Young adult	18–25 years
Prime adult	26–35 years
Middle adult	36–45 years
Mature adult	>45 years
Unspecified Child	2–12 years
Unspecified Juvenile	<18 years
Unspecified Adult	>18 years

Table 25: Summary of age categories of human skeletal remains

SK	Phase	Comp.	Surf. cond.	Frag.	Pres.	Sex	Age	Stature (cm)	Metrics	Non-metric traits	Dental pathology	Skeletal pathology
5010	1	70%	1	Medium	Good	M??	Prime adult	169.01	Platymeric; mesocnemic	L hypotrochanteric fossa	Calculus, periodontal disease	Ante-mortem fracture, osteoarthritis, marginal osteophytes, joint contour change, 1x undiagnosed pathology
1750	5	95%	1	Low	Good	M	Middle adult	163.51	Eurymeric; mesocnemic	L & R lambdoid ossicles, R mandibular torus, L&R parietal foramen; R hypotrochanteric fossa, L & R exostosis in the trochanteric fossa, L & R lateral tibial squatting facets L & R calcanal double anterior facet	Caries, calculus, enamel hypoplasia, periodontal disease, ante mortem tooth chips	"Button" osteoma, osteoarthritis, marginal osteophytes, Schmorl's node, early? DISH
3015	5	85%	1	Low	Good	–	Young child	–	–	–	Calculus, enamel hypoplasia	Cribra femoralis
3067	5	90%	2	Medium	Fair	M?	Prime adult	163.04	Platymeric; eurymeric	Ossicle at lambda, L accessory infraorbital foramen, L & R supraorbital foramen, L & R Poirier's facet, T lateral tibial squatting facet, R lateral talar extension, double anterior facet L calcaneus	AMTL, caries, calculus, periodontal disease, ante mortem tooth chips, dental overcrowding	Ante-mortem fracture, peri mortem fracture, peri-mortem sharp force trauma, periostitis, sacralisation, button osteoma, cribra orbitalia, osteoarthritis, Schmorl's nodes, marginal osteophytes, joint contour change
3170	5	20%	2	High	Fair	F??	Prime adult	–	–	Double anterior facet R calcaneus	Calculus	–
3177	5	80%	2	Medium	Fair	F??	Mature adult	163.03	Platymeric; eurycnemic	R lambdoid ossicle, L absent zygomaticofacial foramen, L & R acetabular crease, R Poirier's facet, L & R hypotrochanteric fossa	AMTL, caries, calculus, periapical cavity	Maxillary sinusitis, osteoarthritis, marginal osteophytes
1800	–	35%	2	Medium	Fair	F??	Prime adult	150.68	Platymeric	R Poirier's facet, L & R lateral tibial squatting facets, absence of the L calcaneal anterior facet	–	Periostitis, ante-mortem fracture, marginal osteophytes, 2x undiagnosed pathological lesions

Table 26: Summary of inhumation burials (L = left; R = right; M = male; M? = probable male; M? = possible male; F?? = possible female; AMTL = ante mortem tooth loss)

Element	Side	Description	Cause/Interpretation (after Galloway 1999)
Occipital	Left	Two cuts to the left infero-posterior occipital. Both cuts failed to fully perforate the bone. Cut 1 located infero-lateral to the nuchal crest, and measures 30.3mm in length. The cut has been made at a slight angle into the bone, in an infero-medial to proximo-lateral orientation. The second cut measures at least 26.5mm in length - the ends of the cut have suffered post-depositional damage and are not present. The orientation of the second cut is unclear, because the skull is broken and cannot be fitted back with the occipital confidently. The kerf wall itself is slightly laminated, and there is a corresponding hairline fracture running along the endocranial surface of the bone.	Sharp force trauma. Likely made by an individual standing behind SK 3067. unclear whether these are related to head removal (after death), or are a separate peri mortem incident (cause of death?). If the former, these cuts would have to be made with the individual laid prone. If the latter, the assailant would either be behind or on the left side, with the weapon taking an upward swing.
Zygomatic	Right	Only one small fragment of the right zygomatic is present - the infraorbital margin. There are likely fractures across the frontal process and maxillary process. These two fractures have slightly ragged margins, but this could be the result of taphonomic overprinting. Also, a longitudinal break travelling inferiorly from the fracture line at the frontal process, and another travelling laterally from the maxillary process. It is less clear whether these are peri-mortem fractures or post depositional breakage. However, there is argument for the former in that the rest of the zygomatic body is absent, despite good preservation/completeness in the rest of the skeleton.	Possible fracture(s): direct impact during a fall, resulting from interpersonal violence
Mandible	Right	Oblique cut to the ascending ramus, completely severing the right coronoid process. Cut is oriented anterior/inferior to superior/posterior. Small amount of polishing on the kerf wall, and peeling/flaking of the bone on the cut margin on the interior side of the ascending ramus.	Sharp force trauma: unclear if this is related to deliberate removal of the head or is a separate (superficial) peri mortem injury.
First cervical vertebra	–	Bilateral fracture of the posterior arch with some taphonomic overprinting. Possible anterior arch fracture with taphonomic overprinting. Some bone loss on the right side of the anterior arch, and this looks to be contemporary with the arch fracture rather than being post-depositional.	Possible Jefferson fracture: typically caused by direct blows to the top of the cranium, compression into adjacent CV2 causes CV1 to "burst" apart. It's possible that this could occur in reverse as a result of substantial compression from CV2 upwards towards the occipital condyles. This would be consistent with forces to this region during removal of the head with a heavy bladed implement.
Second cervical vertebra	–	Cut through the inferior vertebral body and left and right lamina (severing the spinous process), and associated fracture of the right superior articular facet. The cut did not completely sever the vertebra in two, but there is a transverse radiating fracture of the superior right articular facet that has completed this. The fracture runs obliquely from the vertebral foramen to the transverse process. The spinous process is absent. Also, a cut to the superior dens, in the opposite orientation to the first, main cut to CV2's body. This cut to the dens was made postero-inferiorly, from the apex, stopping in the superior part of the posterior dens. This cut has not completely severed the apex, with the bone stopping the blade. There is also evidence of flaking here.	Two cuts: sharp force trauma, with associated radiating fracture. Likely caused by removal of the head. The angle of the main cut indicates a downward swing to the back of the neck, with a slightly angled blade. Cut to the dens made from the anterior side of the neck – supplementary cut (with a smaller blade?) to sever the head from the body?

Element	Side	Description	Cause/Interpretation (after Galloway 1999)
Sixth cervical vertebra	–	Possible laminar fracture. Slightly ragged in appearance, unclear whether this is peri mortem or post depositional.	Possible fracture: the result of acute/abrupt forces. May indicate a radiating fracture resulting from head removal.
First thoracic vertebra	–	Transverse fracture of the spinous process.	Fracture: possibly the result of radiating forces associated with removal of the head.
1x unidentified articular facet	–	Oblique fracture, which separated this facet from the rest of the vertebrae. Unclear whether this belongs to third or fourth cervical vertebrae, both of which are absent.	Fracture: possibly the result of radiating forces associated with removal of the head.
Fourth metacarpal	Right	Transverse midshaft fracture	Fracture resulting from a direct blow: possible defensive injury? Or a fall from height.
Fifth metacarpal	Right	Possible cut to the proximal part of the metacarpal with taphonomic overprinting. The cut has not immediately severed the bone into two fragments, but has halted approximately two thirds of the way through the bone. The cut terminates with the bone breaking at a right angle.	Sharp force trauma: possible defensive injury?
Clavicle	Right	Fracture of the midshaft. Exact type of fracture unclear—some taphonomic damage/possible post-depositional bone loss—short oblique? Spiral? Possible comminuted, which accounts for bone fragment loss? Edge of the break is slightly ragged, so likely to be a fracture rather than a cut (also absence of polishing, flaking).	Fracture resulting from either a direct blow to the hand or a fall from height, e.g. onto an outstretched hand

Table 27: Summary of peri-mortem trauma observed, SK 3067 (CV1 = first cervical vertebrae; CV2 = second cervical vertebrae)

Context	Context description	Phase	Elements present	MNI	Age	Sex	Dentition	Skeletal pathology	Anthropogenic modification
1931	Fill of enclosure **ditch 2** (1893)	2	2x R MTs, 1x R proximal phalanx (foot)	1	Adult >18 yrs	U	–	–	–
2241	Upper fill of **ditch 2** (2244)	2	1x unsided femoral midshaft	1	Adult >18 yrs	U	–	–	–
1908	Uppermost fill of enclosure **ditch 12** (recut 1925)	3	L femur	1	Adult >18 yrs	U	–	–	Multiple (16?) shallow v-shaped/u-shaped, transverse cut marks running parallel to each other all the way down the lateral side of the femoral shaft. Slight post-depositional abrasion. 3.5–13.5mm in length. Uniform depth. Proximal end of the bone exhibits both ancient and post-depositional breakage. Two or three shallow ragged grooves running and parallel to each other around the medial femoral neck. Carnivore gnawing?
2580	Upper fill of **ditch 12** (2582)	3	Frontal	1	Adult >18 yrs	U	–	–	–
2379	Fill of **ditch 13** (2380)	3	Unsided parietal fragments	1	Adult >18 yrs	U	–	–	–
2028	Primary fill of **ditch 14** (2025)	3	Unsided parietal fragments	1	U	U	–	–	–
2359	Fill of **ditch 14** (2360)	3	L parietal	1	U	U	–	–	–
2421	Fill of enclosure **ditch 14** (recut 2420)	3	Frontal, L & R maxilla	1	18–25 yrs	M??	9x permanent teeth. 16 tooth sockets/positions. 8x dental calculus. 1x dental caries. 2x overcrowding	Fine, remodelled ectocranial porosity on the superior frontal	–
2782	Upper fill of **pit 2788**	3	Unsided fibula midshaft	1	Adult >18 yrs	U	–	Slight periostitis	–
2785	Primary fill of **pit 2788**	3	L femur	1	Adult >18 yrs	U	–	–	Multiple (5?) shallow v-shaped/u-shaped, transverse cut marks running parallel to each other down the antero-lateral

Context	Context description	Phase	Elements present	MNI	Age	Sex	Dentition	Skeletal pathology	Anthropogenic modification
									side of the proximal femoral shaft. 2–4mm in length. Uniform depth. 1x possible scrape mark in the same location. Further possible transverse cut marks on the anterior and medial shaft.
1960	Fill of **ditch 100** (recut 1959)	4	L tibia	1	Adult >18 yrs	U	–	–	Ragged, sub-rounded, shallow pitting on the distal end: possible depositional breakage or carnivore gnawing.
2952	Fill **of ditch 94** (2951)	4	Occipital, unsided parietal fragments, 2x L ribs, 1x R ilium, L femur, L & R tibiae, L fibula	1	6 m–1 yr	U	–	–	–
3267	Primary fill of **pit 3258**	4	Unsided parietal fragments	1	Sub-adult <18 yrs	U	–	–	–

Table 28: Summary of disarticulated bones (L = left; R = right; M?? = possible male; U = unknown)

Cremation	Cut	Period	Total weight	Colour	MNI	Sex	Age
3019	3020	2	820.25g*	White 85%, grey 10%, blue 5%	2	1x F??, 1x U	19–24 yrs, 1.5–3.5 yrs
2950	2949	5	58.9g	White 50%, grey 20%, blue 20%, black 10%	1	U	Adult >18 yrs
3286	3297	5	156.2g	White 15%, grey 5%, orange 80%	1	U	U
2936 2937	2935	5	568.7g*	White 80%, grey 10%, blue 5%, black 5%	2	1x F??, 1x U	1x adult >18 yrs, 1x neonate
2378	2377	6	35.6g	White 75%, grey 10%, blue 10%, black 5%	1	U	Sub-adult <15 yrs

Table 29: Cremated human bone, osteological summary (F?? = possible female; U = unknown. * denotes inclusion of estimated 4–2mm fraction weight)

Cremation	Skull	Axial	Upper limb	Lower limb	Unid. long bone	Unid. hand/foot	Unid. joint surface	Unid. other	Total
3019	98.0g (11.94%)	15.6g (1.90%)	12.9g (1.57%)	15.3g (1.86%)	118.7g (14.46%)	6.9g (0.84%)	46.8g (5.78%)	506.55g (61.72%)	820.25g (100%)
2949	14.1g (23.94%)	1.7g (19.86%)	3.5g (5.94%)	0.7g (1.19%)	18.5g (31.41%)	0.5g (0.85%)	4.4g (7.47%)	23.7g (40.24%)	58.9g (100%)
3286	21.8g (13.96%)	4.1g (2.62%)	0g (0%)	6.4g (4.10%)	39.0g (24.97%)	1.1g (0.70%)	16.0g (10.24%)	67.8g (43.41%)	156.2g (100%)
2936 (fill of 2935)	62.7g	10.9g	14.5g	67.1g	83.7	6.9g	21.3	148.6g	415.7g (73.10%)
2937 (fill of 2935)	47.0	6.8g	6.7g	7.6g	15.5g	1.1g	10.6g	57.7g	153.0g (29.90%)
2935 total	109.7g (19.29%)	17.7g (3.11%)	21.2g (3.73%)	74.7g (13.14%)	99.2g (17.44%)	8.0g (1.41%)	31.9g (5.61%)	206.3g (36.28%)	568.7g (100%)
2378	1.5g (4.21%)	0.5g (1.40%)	1.8g (5.06%)	1.4g (3.93%)	9.7g (27.25%)	0.1g (0.28%)	0.6g (1.69%)	20.0g (56.18%)	35.6g (100%)

Table 30: Summary of weights of cremated human bone

Cremation	Total weight	>10mm	10–4mm	4–2mm	Max. frag. size
3019	820.25g*	196.7g	364.1g	259.45g*	34.6mm, humeral head
2950	58.9g	25.2g	23.3g	10.4g	52.5mm, distal humerus
3286	156.2g	52.3g	72.4g	31.5g	44.8mm, unid. long bone
2936 (fill of 2935)	415.7g	175.5g	174.9g	65.3g	82.9mm, tibial shaft
2937 (fill of 2935)	153.0g	60.7g	69.5g	22.8g	44.0mm, cranial vault
2378	35.6g	4.5g	23.9g	7.2g	24.2mm, scapula fragment

Table 31: Summary of fragmentation of cremation burials (*weights include estimated weights from 4–2mm fractions)

Cremation	Total weight	% cremated bone
3019	1327.6g	20%
2950	3389.1g	<5%
3286	50.1g	80%
2936 (fill of 2935)	1390.0g	10%
2937 (fill of 2935)	99.0g	40%
2378	951.5g	<5%

Table 32: Proportional content of cremated human bone in 2–0.5mm fraction

Cremation	Fraction	Object	Weight	Comments
3019	4–2mm	Unid. non-ferrous metal fragment x1	<0.1g	Thin metal fragment, with a possible pin hole in the centre. Unclear whether this is burnt or unburnt
3286	10–4mm	Charcoal	0.1g	–
	4–2mm	Pottery	1.7g	–
	4–2mm	Charcoal	0.2g	–
2936 (fill of 2935)	10–4mm	Burnt shell x1	0.2g	Scallop
2937 (fill of 2935)	10–4mm	Burnt animal bone	0.3g	Unidentified mammal bone
2378	>10mm	Unburnt animal bone	14.2g	Unidentified large mammal (scapula or pelvis)
	10–4mm	Unburnt animal bone	3.2g	Unidentified mammal

Table 33: Summary of pyre/grave goods and pyre debris

Taxa	Ditch	Layer	Pit	Posthole	Gully	Well	Total
Phase 1							
cattle			5	1			6
sheep/goat			2				2
pig			14	5			19
red deer			3				3
large mammal			17	1			18
medium			2				2
indet			21	17			38
Sub-total			*64*	*24*			*88*
Phase 3							
cattle	93						93
sheep	6						6
goat	1						1
sheep/goat	34						34
pig	11						11
horse	26						26
dog	29*						29
badger	1						1
large mammal	2						2
medium	2						2
Sub-total	*205*						*205*
Phase 4							
cattle	539	5	246	2		26	818
sheep	37		10			37*	84
sheep/goat	128	1	74			9	212
pig	28		14	1		4	47
horse	45	1	23			20	89
dog	33*		1				34
large mammal	4	1	38				43
medium	4		9				13
frog			3				3
toad	1		1				2
frog/toad			2				2
indet			365				365
Sub-total	*819*	*8*	*786*	*3*		*96*	*1712*
Phase 5							
cattle	91						91
sheep/goat	20						20
pig	8						8
horse	21						21
dog	3						3
large mammal	55						55
medium	18						18
indet	165						165
Sub-total	*381*						*381*
Phase 6							
Sub-total	*45*						*45*
Phase 7							
Sub-total					*6*		*6*
Total	**1450**	**8**	**850**	**27**	**6**	**96**	**2437**

Table 34: NISP of the hand-collected animal bone assemblage by phase and feature type (*includes specimens from ABGs—see table 37)

Taxa	Ditch	Kiln	Pit	Posthole	Well	Total
Phase 1						
cattle			2			2
sheep/goat			1			1
pig			32	4		36
dog			1			1
large mammal			12	1		13
medium mammal			22	9		31
small/medium			4			4
indet.			187	26		213
Sub-total			*261*	*40*		*301*
Phase 3						
cattle	1					1
sheep	2					2
sheep/goat	5					5
pig	1		1			2
mouse			2			2
water vole	1					1
vole	1					1
vole/rat	1					1
rodent	3		22			25
cf rodent	2					2
shrew			21			21
frog	1		25			26
toad	1		9			10
frog/toad	1		63			64
newt			2			2
Sub-total	*20*		*145*			*165*
Phase 4						
cattle	16		13			29
sheep	2		6		61*	69
sheep/goat	8	1	30		3	42
pig	1		5		3	9
horse	1		2			3
dog			4			4
large mammal			1			1
medium mammal					3	3
weasel	1					1
mouse	1					1
vole	1				1	2
rodent	3		7		6	16
cf rodent			1		2	3
shrew			1		1	2
grass snake					13	13
frog	1		18		10	29
toad	2		2		6	10
frog/toad	7		27		19	53
Sub-total	*44*	*1*	*117*		*128*	*290*
Total	**64**	**1**	**523**	**40**	**128**	**756**

Table 35: NISP of the sieved animal bone assemblage by phase and feature type (*includes specimens from ABGs—see Table 37)

Element	Phase 2			Phase 4		
	fused	unfused	% fused	fused	unfused	% fused
						Early fusing
humerus d	2	0	100	27	0	100
radius p	7	0	100	20	0	100
acetabulum	9	0	100	0	0	–
phalanx 1	1	0	100	20	0	100
phalanx 2	0	0	–	8	0	100
scapula d	2	0	100	32	1	97
						Middle fusing
tibia d	5	1	83	7	4	64
calcaneus	0	0	–	2	2	50
metapodial d	3	0	100	10	10	50
						Late fusing
femur p	0	0	–	7	0	100
tibia p	1	0	100	1	0	100
femur d	0	0	–	3	2	60
humerus p	1	0	100	3	3	50
radius d	2	0	100	11	3	79

Table 36: Cattle epiphyseal fusion data

Dog ABG, phase 2 (context 2288)	**left**	**right**	**not**	**total**
humerus	1	1		2
radius	1	1		2
ulna	1	1		2
tibia	1	1		2
2nd metacarpal	1	1		2
3rd metacarpal	1	1		2
4th metacarpal	1	1		2
5th metacarpal	1	1		2
metapodial			3	3
phalanx 1			6	6
total	8	8	9	25
Dog ABG, phase 4 (context 2240)	**left**	**right**	**not**	**total**
2nd metatarsal	1			1
3rd metatarsal	1	1		2
4th metatarsal	1	1		2
5th metatarsal	1	1		2
total	*4*	*3*		*7*
Sheep ABG, phase 4 (context	**left**	**right**	**not**	**total**
horncore	1	1		2
skull		1		1
mandible		1		1
atlas			1	1
axis			1	1
cervical vertebra			4	4
thoracic vertebra			7	7
lumbar vertebra			5	5
sacrum			1	1
vertebral epiphysis			11	11
vertebra fragment			2	2
rib	6	11	5	22
scapula	1	1		2
humerus	1	2		3
radius	1	1		2
ulna		1		1
pelvis	1	1		2
femur	1	1		2
tibia	1	1		2
astragalus	1	1		2
calcaneus	2	1		3
metacarpal	1	1		2
metatarsal	1	1	1	3
phalanx 1			5	5
phalanx 2			4	4
phalanx 3			5	5
total	*18*	*26*	*52*	*96*

Table 37: List of remains from partial animal skeletons

Taxa	Element	Male	Female
phase 1			
pig	canine	2	2
phase 3			
cattle	pelvis	2	2
phase 4			
cattle	horncore	1	0
cattle	pelvis	1	4
sheep/goat	pelvis	0	2
pig	mandible	2	3
phase 5			
cattle	pelvis	1	0
phase 6			
cattle	metacarpal	1	0
cattle	pelvis	0	1
Total		10	14

Table 38: Animal remains sex data

Context	Feature	Phase	Element	Side	8	9	10	12	13	15	16	GL	Bp	SD	Bd	SDO	DPA	LAR	SB	SH
2658	Ditch 12	3	maxilla	both						51.76	14.93									
2023	Ditch 2.1	3	mandible	left	74.39															
2206	Ditch 13	3	mandible	left	74.55		36.5	34.95												
2277	Ditch 12	3	mandible	right			34.62	32.26												
2470	Ditch 14	3	mandible	right	66.31		31.6	29.61												
2580	Ditch 12	3	mandible	left	59.98	55.67	28.98													
1861	Ditch 84	4	mandible	right	65.57	61.02		34.54												
2023	Ditch 2.1	3	mandible	right					20.98											
2288	Ditch 2	2	humerus	right								178		11.76	33.73					
2288	Ditch 2	2	humerus	left								179.5		12.57	34.53					
2470	Ditch 14	3	humerus	right								*c*137			26.5					
2581	Ditch 12	3	humerus	right								102.24		9.69	24.6					
2288	Ditch 2	2	radius	left								*c*173.5	19.23	13.63	23.64					
2288	Ditch 2	2	radius	right									18.96	13.41						
2425	Ditch 96	3	radius	left											21.79					
2581	Ditch 12	3	radius	right								89.02	13.2	9.11	17.61					
2288	Ditch 2	2	ulna	right												21	24.67			
2288	Ditch 2	2	ulna	left												21	25.18			
2581	Ditch 12	3	ulna	right												14.88	17.39			
2581	Ditch 12	3	pelvis	left														16.11	6.8	12.94
2384	Ditch 102	3	femur	right									32.65							
1894	Ditch 2	2	tibia	left											c25.05					
2288	Ditch 2	2	tibia	left									35.21							
2288	Ditch 2	2	tibia	right									35.27							
2379	Ditch 13	3	tibia	left									28.96+							
2581	Ditch 12	3	tibia	left									24.13							
2240	Ditch 13	3	mt2	left								57.45			8.49					
2240	Ditch 13	3	mt3	right								65.06			8.89					
2240	Ditch 13	3	mt3	left								65.62			8.95					
2379	Ditch 13	3	mt3	left								*c*57.59			7.37					
2240	Ditch 13	3	mt4	left								66.52			8.32					
2240	Ditch 13	3	mt5	right								57.16			7.91					
2240	Ditch 13	3	mt5	left								57.56			7.67					
2288	Ditch 2	2	mc2	left								59.88			9.57					

Context	Feature	Phase	Element	Side	8	9	10	12	13	15	16	GL	Bp	SD	Bd	SDO	DPA	LAR	SB	SH
2288	Ditch 2	2	mc2	right								60.13			8.87					
2288	Ditch 2	2	mc3	right								68.05			9.64					
2288	Ditch 2	2	mc3	left								68.35			9.4					
2288	Ditch 2	2	mc4	right								67.84			9.38					
2288	Ditch 2	2	mc4	left								67.5			9.26					
2288	Ditch 2	2	mc5	right								56.91			9.96					
2288	Ditch 2	2	mc5	left											9.89					
2240	1 Ditch 3	3	mc4	right								66.17			8.31					

Table 39: Dog bone measurements

Context	Feature	Phase	Element	Side	44	45	46	47	1	7	8	9	L	WP
2027	Ditch 14	3	horncore	left			*c*27.90							
2358	Ditch 14	3	horncore	left	170	63.82	45.17	185						
2359	Ditch 14	3	horncore	right		*c*36.59	25.79							
2421	Ditch 14	3	horncore	left		49.73	31.97							
2528	Ditch 2	3	horncore	left		39.61	26.74							
2748	Ditch 105	3	horncore	left		37.9	*c*29.55							
2783	Pit 2788	3	horncore	right	145	55.3	36.8							
2783	Pit 2788	3	horncore	right	126	46.4	30.3	76						
1960	Ditch 100	4	horncore	left	111	41.1	27.8	94						
1960	Ditch 100	4	horncore	left			43.6							
1960	Ditch 100	4	horncore	right	137	51.6	32.3	112						
1960	Ditch 100	4	horncore	right	111	41.8	27.7	87						
1896	Ditch 2	2	mandible	left							79.01			
2313	Ditch 12	3	mandible	right								48.33		
2313	Ditch 12	3	mandible	right					327.5	131.52	83.45	47.37		
2358	Ditch 14	3	mandible	left							79.34			
2379	Ditch 13	3	deciduous 4th premolar	left									31.93	12.39

Table 40: Cattle skull and tooth measurements

Context	Feature	Phase	Element	Side	GL	Bp	BFp	SD	Bd	BFd	BT	HT	HTC	LA	GLl	GLm	GLP	LG
2507	Ditch 2	2	scapula	left													57.94	
2532	Ditch 4	2	scapula	right													57.35	50.36
2081	Ditch 13	3	scapula	right													56.52	47.24
2081	Ditch 13	3	scapula	right														51.47
2082	Ditch 13	3	scapula	left														48.4
2082	Ditch 13	3	scapula	left														50.28
2084	Pit 2087	3	scapula	left													63.63	
2030	Ditch 15	3	scapula	left													66.50	
2586	Ditch 13	3	scapula	right													54.11	
1963	Ditch 101	5	scapula	left														
1882	Pit 103	3	humerus	right					70.5		66.1	40.84						
2278	Ditch 12	3	humerus	left					86			48.7						
2308	Ditch 12	3	humerus	left							61.32	37						
2049	Ditch 4	2	humerus	right									29.90					
2379	Ditch 13	3	humerus	right					65				29.74					
2375	Well 2394	3	humerus	left					85		75.11		35.64					
2568	Ditch 2	2	radius	left					72.19									
2593	Ditch 101	5	radius	right	*c* 285	84.36		41.38	77.3									
2593	Ditch 101	5	radius	right			77.5											
2052	Ditch 2	2	radius	left		69.94	65.38											
2056	Ditch 2	2	radius	right			64.57											
2572	Ditch 2.1	2	radius	right		69.52	63.52											
2542	Ditch 20	2	radius	left		73.59	71.12											
1895	Ditch 2	2	radius	left	*c* 236	67.7		33.55										
1966	Ditch 12	3	radius	right		71.36	64.83											
2027	Ditch 14	3	radius	right		74.33	68.52											
2080	Ditch 13	3	radius	left		76.81	69.69											
2100	Ditch 14	3	radius	left		74.09	68.05											
2171	Ditch 13	3	radius	right	*c* 260	77.22	69.57	39.44										
2310	Ditch 12	3	radius	right		66.47												
2526	Ditch 12	3	radius	right		74.06	66.07											
2626	Pit 2636	3	radius	right		64.5	59.58											
1953	Ditch 2	2	pelvis	right										63.77				
2580	Ditch 12	3	pelvis	right										63.51				

Context	Feature	Phase	Element	Side	GL	Bp	BFp	SD	Bd	BFd	BT	HT	HTC	LA	GLl	GLm	GLP	LG
2580	Ditch 12	3	pelvis	right										58.18				
1895	Ditch 2	2	tibia	right					51.49									
2055	Ditch 8	2	tibia	left					52.88									
2501	Ditch 10	2	tibia	left					53.89									
2082	Ditch 13	3	tibia	left					52									
2011	Well 2109	3	tibia	right					57.90									
2165	Ditch 13	3	tibia	right	367.5	93.13		39.55	64.09									
2023	Ditch 2.1	3	tibia	right					53.14									
2586	Ditch 13	3	tibia	left					53.01									
1960	Ditch 100	4	tibia	left					55.7									
3018	Pit 3017	1	astragalus	left												66.7		
2748	Ditch 105	3	astragalus	right					37.38						60.4	54.75		
1897	Ditch 2	2	metacarpal	right					59.27	59.27								
1953	Ditch 2	2	metacarpal	right	199.4	50.88		28.55	53.65									
1953	Ditch 2	2	metacarpal	right						53.68								
2421	Ditch 14	3	metacarpal	left					51.36	51.36								
1869	Pit 1870	3	metacarpal	left		50.71												
2027	Ditch 14	3	metacarpal	left		46.52												
2027	Ditch 14	3	metacarpal	right		50.06												
2027	Ditch 14	3	metacarpal	right		60.17												
2082	Ditch 13	3	metacarpal	left		48.40												
2358	Ditch 14	3	metacarpal	left		46.83												
2586	Ditch 13	3	metacarpal	right		52.92												
1830	Ditch 16	5	metacarpal	right				34.89										
1864	Pit 1870	3	metatarsal	left		42.18												
2028	Ditch 14	3	metatarsal	left		41.97												
2028	Ditch 14	3	metatarsal	left		39.07												
2028	Ditch 14	3	metatarsal	left		38.47												
2080	Ditch 13	3	metatarsal	right		42.06												
2082	Ditch 13	3	metatarsal	right		39.19		20.58	45.42									
2084	Pit 2087	3	metatarsal	left		44.86												
2100	Ditch 14	3	metatarsal	left		38.56												
2023	Ditch 2.1	3	metatarsal	left		40.12												
2024	Ditch 2.1	3	metatarsal	right		47.69												

Context	Feature	Phase	Element	Side	GL	Bp	BFp	SD	Bd	BFd	BT	HT	HTC	LA	GLl	GLm	GLP	LG
2358	Ditch 14	3	metatarsal	right	195.5	38.14		22.2	44.58									
2379	Ditch 13	3	metatarsal	right					53.12									
2379	Ditch 13	3	metatarsal	right						51.75								
2379	Ditch 13	3	metatarsal	left	c 210	42.07			47.69									
2379	Ditch 13	3	metatarsal	left						47.41								
2421	Ditch 14	3	metatarsal	right		41.82												
2585	Ditch 13	3	metatarsal	left		43.5												
2633	Pit 2636	3	metatarsal	left		42.14												
1960	Ditch 100	4	metatarsal	left					45.4									
1960	Ditch 100	4	metatarsal	left					49.8									

Table 41: Cattle post-cranial bone measurements

Taxa	Element	butchered	poss. butchery	no butchery	%butchered
Cattle	horncore	4	1	15	25.0
	skull	4		25	13.8
	mandible	11	3	166	7.8
	atlas	5		11	31.3
	axis	2		3	40.0
	scapula	42	5	29	61.8
	humerus	12		42	22.2
	radius	3	3	37	14.0
	ulna	1		8	11.1
	pelvis	2	2	19	17.4
	femur	3	1	26	13.3
	tibia	2	4	22	21.4
	astragalus	2		8	20.0
	calcaneus			10	
	carpal			1	
	metacarpal	7	5	23	34.3
	metatarsal	8	2	50	16.7
	metapodial	2		2	50.0
	phalanx 1	3		13	18.8
	phalanx 2			7	
	phalanx 3			2	
	Sub-total	*113*	*26*	*519*	*21.1*
Sheep/Goat*	horncore			6	
	skull			9	
	mandible			73	
	scapula			5	
	humerus	3		11	21.4
	radius	1		18	5.3
	ulna			1	
	pelvis	1	1	9	18.2
	femur			8	
	tibia			57	
	calcaneus			3	
	metacarpal			22	
	metatarsal	1	1	23	8.0
	metapodial			2	
	phalanx 1			7	
	phalanx 2			2	
	Sub-total	*6*	*2*	*256*	*3.0*
Pig	mandible			18	
	scapula	3		4	42.9
	humerus			3	
	pelvis	2		3	40.0
	radius			2	
	femur			2	
	tibia			4	
	calcaneus			1	
	metatarsal			1	
	phalanx 1			1	
	phalanx 2			1	
	Sub-total	*5*		*40*	*11.1*
	Total	**124**	**28**	**815**	**15.7**

Table 42: Numbers of butchered specimens in phase 4 features (*not including sheep ABG)

Element	fused	unfused	% fused
Early fusing			
humerus d	8	0	100
radius p	6	1	86
phalanx 1	10	2	83
scapula d	2	1	67
acetabulum	4	2	67
phalanx 2	4	2	67
Middle fusing			
tibia d	11	4	73
calcaneus p	1	3	25
metapodial d	3	9	25
Late fusing			
tibia p	1	2	33
humerus p	1	3	25
femur p	1	4	20
radius d	0	5	0
femur d	0	5	0

Table 43: Sheep/goat epiphyseal fusion data

Context	Feature	Phase	Element	Side	GL	Bp	SD	Bd	BFd	BT	LmT	GB	GH	GLP	LG
2283	Ditch 4	2	scapula	right										82.28	50.14
2082	Ditch 13	3	scapula	right										86+	
2627	Pit 2636	3	scapula	left										97.56	
1963	Ditch 101	5	scapula	right										83.38	
1963	Ditch 101	5	scapula	left										82.25	
1866	Pit 1870	3	humerus	left			40.25	90		81.97					
1878	Pit 1873	3	humerus	right			25.51	*c*70		63.55					
2365	Layer 2365	3	humerus	right						77					
2580	Ditch 12	3	humerus	left				73.5							
2580	Ditch 12	3	humerus	right				73.5		63.93					
2568	Ditch 2	2	radius	right	296	74.3	34.35								
2570	Ditch 2	2	radius	right				70.6	61.47						
1960	Ditch 100	4	radius	left				66.1							
1868	Pit 1870	3	femur	left				*c*84							
1868	Pit 1870	3	femur	left		110									
2580	Ditch 12	3	femur	right	314		*c*32.97	81.5							
2580	Ditch 12	3	femur	left				94+							
2082	Ditch 13	3	tibia	right			*c*32.66	59.18							
2359	Ditch 14	3	tibia	left	305.5		32.3	60.39							
2375	Well 2394	3	tibia	right	339	90.86+	38.12	69.35							
1960	Ditch 100	4	tibia	right	379		46.3	79.8							
2313	Ditch 12	3	astragalus	right					40.25			50	50		
2421	Ditch 14	3	astragalus	right					42.78		50.37	51	49		
1811	Ditch 16	5	astragalus	left							62.07	61	*c*59		
2282	Ditch 4	2	metatarsal	right	249	45.81	26.24	44.88	44.88						
2012	Well 2109	3	metacarpal	left		47.78									
2279	Ditch 12	3	metacarpal	right	*c*195		27.34								
2658	Ditch 12	3	metatarsal	–	246	46.86		47.32							
2082	Ditch 13	3	metatarsal	right	219	41.29	25.79	52.95							
2023	Ditch 2.1	3	metatarsal	left	228.5	41.32	25.39								
2429	Pit 2431	3	metatarsal	right	234	41.96	25.41								
2470	Ditch 14	3	metatarsal	left	239.5	*c*44.33	26.54	42.77							
2994	Ditch 91	4	metatarsal	right		53.84									
1960	Ditch 100	4	metatarsal	right	293	55.9	35.2								

Context	Feature	Phase	Element	Side	GL	Bp	SD	Bd	BFd	BT	LmT	GB	GH	GLP	LG
2658	Ditch 12	3	metapodial	–				43.23							
1912	Ditch 2	3	phalanx 1	–	*c*77	52.22	33.87	49.04	43.69						
2163	Pit 2026	3	phalanx 1	–				42.29	39.32						
2080	Ditch 13	3	phalanx 1	–	*c*64	48.18	27.4	40.6	37.02						
2273	Ditch 13	3	phalanx 1	–	83	50.51	31.41	43.74							
2313	Ditch 12	3	phalanx 1	–	77.5	49.78	30.96	42.41	40.32						
2627	Pit 2636	3	phalanx 1	–	90.5	57.25	35.97	49.52							
2012	Well 2109	3	phalanx 2	–		48.01	40.57	46.88							
2313	Ditch 12	3	phalanx 2	–	43	48.61	40.13	44.63							

Table 44: Equid measurements

Context	Feature	Phase	Taxon	Element	Side	Completeness	Juvenile?	Butchery	Comments
2055*	ditch 8	2	wader sp.	humerus	r	proximal	yes		articulates with coracoid?
2055*	ditch 8	2	wader sp.	coracoid		proximal	yes		cf. lapwing/plover
2668*	ditch 2	2	turdus sp.	ulna	l	proximal			cf. redwing
2785	pit 2788	3	common crane	tarsometatarsal	r	distal		cuts on the anterior of shaft	articulates with phalanges
2785	pit 2788	3	common crane	1st phalanx		complete			
2785	pit 2788	3	common crane	1st phalanx		complete			
2030*	ditch 15	3	wader sp.	tibiotarsus	l	distal			
2310	ditch 12	3	domestic fowl	ulna	l	proximal		small cut on articulation	
2310	ditch 12	3	domestic fowl	tibiotarsus	r	distal			
2310	ditch 12	3	domestic fowl	fibula	r	proximal			
2310	ditch 12	3	bird sp.	long bone		shaft			
1825*	pit 1828	3	bird sp.	vertebra		complete			
2626	pit 2636	3	cf. coot/moorhen	tibiotarsus	r	distal			
2365	layer 2365	3	domestic fowl	femur	r	complete	yes		
2025	ditch 14	3	domestic fowl	tarsometatarsus	l	complete			
2206	ditch 13	3	turdus sp.	tibiotarsus	r	distal			cf. redwing
1960	ditch 100	4	corvid sp.	ulna	r	distal			cf. magpie

Table 45: Summary of bird bones by phase (* specimen from environmental sample)

Context No		2055	2027	2630	1825	1886	2388	2589	1736
Sample No		132	108	98	94	138	79	86	116
Cut/group No		2021	2025	2636	1828	1887	2350	2592	1735
Feature Type		Ditch	Ditch	Pit	Pit	Pit	Kiln	Pit	Ditch
Phase/Period		2/LIA-ER	3/ER	3/ER	3/ER	3/ER	3/ER	3/ER	5/LR
Sample Size l		40	40	40	9	40	10	40	40
Flot size ml		<5	50	40	<5	350	10	100	25
Percenatge of flot analysed		100%	100%	100%	100%	100%	100%	100%	100%
Charred cereal grains									
Avena sp	cultivated/ wild oat		38	28	2	3		3	1
Hordeum vulgare undiff	barley		31	12	4	3		12	
Hordeum vulgare hulled	hulled barley		3	12	1	2		8	
Triticum sp	wheat	2	3	11	2	4			5
Triticum sp *cf glumed*	cf glumed wheat							21	
Triticum cf *aestivum*-type	cf bread wheat-type	1		3		3	2	1	1
Indeterminate cereals		3	201	29		9	4	214	13
Indeterminate cereal grain fragments			(4)	(4)		(2)		(4)	(2)
Detached cereal grain coleoptiles					(1)				
Sub-total		*6*	*275*	*95*	*9*	*24*	*6*	*259*	*20*
Charred cereal chaff									
Triticum spelta glume base	spelt wheat		7	20	7	5		53	7
Triticum spelta spikelet forks	spelt wheat							20	
Triticum cf *dicoccum* glume base	cf emmer wheat		3	5	4				1
Triticum cf *dicoccum* spikelet fork	cf emmer wheat		2	1	9				
Triticum sp glume base	wheat		8	45	5	2			
Triticum sp spikelet fork	wheat		1	2	1	1			
Hordeum vulgare (6-row) rachis segment	barley			3	1			4	
Hordeum vulgare (6-row) rachis node	barley		1	6	7			3	
Hordeum sp rachis internode	barley		1	1	5			1	
Avena fatua floret base	wild oat		2	1	1			1	
Avena sp awn fragments	oat			(2)	(1)				
Lemma/palea fragments (cf *Avena* sp)	cf oat			(2)	(4)				
Indeterminate chaff fragments			(1)	(1)	(1)			(2)	(1)
Sub-total		*0*	*25*	*84*	*40*	*8*	*0*	*82*	*8*
Other charred edibles									
cf *Pisum* cf *sativum*	cultivated pea				1				
Charred weed seeds									
Ruderals and arable/cultivated land									
Agrostemma githago	corncockle							1	
Anagallis arvensis	scarlet pimpernel				1				
Brassica sp	mustards/cabbages	1	17	3		2		10	3
Chenopodium album (esp manured)	fat-hen	1	6	35	56				
Fallopia convolvulus	black-bindweed		3	3				2	

Context No		2055	2027	2630	1825	1886	2388	2589	1736
Sample No		132	108	98	94	138	79	86	116
Cut/group No		2021	2025	2636	1828	1887	2350	2592	1735
Feature Type		Ditch	Ditch	Pit	Pit	Pit	Kiln	Pit	Ditch
Phase/Period		2/LIA-ER	3/ER	3/ER	3/ER	3/ER	3/ER	3/ER	5/LR
Sample Size l		40	40	40	9	40	10	40	40
Flot size ml		<5	50	40	<5	350	10	100	25
Percenatge of flot analysed		100%	100%	100%	100%	100%	100%	100%	100%
Fumaria sp (and hedgebanks)	fumitories				1				
Hyoscyamus niger (also maritime sand and shingle, esp manured by rabbits or cattle)	henbane		2	2					
Malva sylvestris	common mallow		2			2			
Polygonum aviculare	knotgrass		1	10		1		18	
Persicaria lapathifolia (esp damp)	pale persicaria		4	4		3			
Stellaria media	common chickweed		1	3	5			1	
Tripleurospermum inodorum	scentless mayweed			1	2				
Grassland									
Poaceae seeds >4mm	grass family		22	c 50	1	1		26	
Poaceae seeds 2-4mm	grass family		138	59	5	12		155	4
Poaceae seeds <2mm	grass family	1	1	11	2	1			
Rumex acetosa	common sorrel		1	2	1	2			1
Rumex acetosella	sheep's sorrel		3	10	1			1	2
Stellaria graminea	lesser stitchwort					1			
Damp/wet places									
Carex trigonous	sedges three-sided			3		1		5	
Carex lenticular	sedges two-sided			1		1		7	
Eleocharis palustris-type	spike-rushes		2	6	2			4	
Montia fontana	blinks		1	1					1
Ranunculus repens-type	creeping buttercup-type		2					1	
Juncus sp	rushes				3				
Fens/marshes/bogs									
Comarum palustre	marsh cinquefoil							1	
Woodland/scrub/ hedgerows									
Corylus avellana nut shell fragments	hazel		1				1		
Crataegus sp stone	hawthorn		1						
cf Sambucus nigra	elder			1				1	
Broad									
Bromus sp	bromes		5	c 30	1	1		22	2
Centaurea sp	knapweeds				1				
Fabaceae seeds < 4mm (*Vicia/Lathyrus* type)	pea family (vetch/ wild pea type		147	121	3	22		104	11
Fabaceae seeds < 4mm (*Medicago/trifolium/lotus* type), primarily grassland	pea family-medick/ clover type	1	3	10		4		5	
Galium sp	bedstraws		7			1		9	
Lamiaceae	dead-nettle family			1					
Polygonaceae	knotweed family				1				
Rumex obtusifolius	broad-leaved dock		42	68	1	4		2	
Rumex sp	docks		1	10		2		3	

Context No		2055	2027	2630	1825	1886	2388	2589	1736
Sample No		132	108	98	94	138	79	86	116
Cut/group No		2021	2025	2636	1828	1887	2350	2592	1735
Feature Type		Ditch	Ditch	Pit	Pit	Pit	Kiln	Pit	Ditch
Phase/Period		2/LIA-ER	3/ER	3/ER	3/ER	3/ER	3/ER	3/ER	5/LR
Sample Size l		40	40	40	9	40	10	40	40
Flot size ml		<5	50	40	<5	350	10	100	25
Percenatge of flot analysed		100%	100%	100%	100%	100%	100%	100%	100%
Stellaria media	common chickweed		1	3	5			1	
Silene sp	campions		2	1				1	
Unknown seeds/fruits			5	2		2		1	
Indeterminate seeds/fruits		2	24			11		27	2
Sub-total		*6*	*446*	*457*	*87*	*74*	*1*	*407*	*26*
Other charred plant remains									
Juncus sp seed head	rushes			(1)					
Poaceae stem fragments	grasses			(2)					
Indeterminate rhizome/tuber fragments								(1)	
Other remains									
Charcoal		(2)	(4)	(4)	(4)	(4)	(2)	(4)	(3)
Bone fragments			(2)	(1)		(1)		(2)	(3)
Calcined bone fragments				(1)		(1)		(2)	(1)
Fish scales								(1)	
Industrial waste/hammerscale						(1)			
Coal fragments			(1)			(2)		(1)	(2)
Hardened clay/daub fragments				(4)		(1)		(1)	
Brick/tile fragments		(1)	(1)			(1)	(1)	(1)	

Table 46: Quantification of charred plant remains. The charred remains are given as actual counts, whereas other remains are based on a scale from 1-5 where (1)=<5 items, (2)=5-25, (3)=26-100, (4)=>100 items. Counts are of seeds/fruits unless stated otherwise.

Taxa	Common name	No. items
Cultivated/Waste Ground		
Aphanes sp.	parsley-piert	1
Polygonum aviculare L.	knotgrass	4
Stellaria sp.	stitchwort	1
Plantago major L.	greater plantain	6
Helminthotheca echioides (L.) Holub	bristly oxtongue	2
Sonchus sp.	sowthistle	2
Anthemis cotula L.	stinking chamomile	2
cf *Glebionis segetum* (L.) Fourr.	corn marigold	1
Aethusa cynapium L.	fool's parsley	1
Grassland		
Prunella vulgaris L.	selfheal	11
Leontodon spp.	hawkbit	3
cf *Bellis perennis* L.	daisy	4
Daucus carota L.	wild carrot	3
Medium Poaceae	medium grasses	5
Large Poaceae	large grasses	6
Damp Ground/Aquatics		
Ranunculus sceleratus L.	celery-leaved buttercup	3
Nasturtium officinale W.T. Aiton	water-cress	16
Callitriche sp.	water-starwort	1
Lycopus europaeus L.	gypsywort	1
Apium nodiflorum/repens	fool's-water-cress/creeping marshwort	11
Alisma plantago-aquatica L.	water-plantain	1
Juncus sp.	rush	****
Eleocharis sp.	spike-rush	5
Carex spp.	sedge	9
Mixed Habitat		
Ranunculus acris/repens/bulbosus	meadow/creeping/bulbous buttercup	23
Rubus sp.	bramble	18
Hypericum sp.	St John's-wort	2
Persicaria sp.	knotweed	1
Rumex sp.	dock	2
Cerastium sp.	mouse-ear	6
Chenopodium/Atriplex	goosefoot/orache	5
cf *Verbascum* sp.	mullein	1
Mentha sp.	mint	3
Asteraceae	daisy family	5
Cirsium/Carduus	thistle	3
Taraxacum sp.	dandelion	37
Sambucus nigra L.	elder	1
Apiaceae	carrot family	2
Indet		4

Table 47: Waterlogged plant remains from sample 63, context 3284 (**** = 50-99 items)

Context No		3021	3018	3018	1886	1886	2389	2389	2950	2378
Sample No		49	59	61	24	138	81	84	167	74
Cut/Group No		3008	3017	3017	1887	1887	2350	2350	2949	2377
Feature Type		Posthole	Pit	Pit	Pit	Pit	Pottery kiln	Pottery kiln	Cremation pit	Cremation deposit
Phase/Period		1/EBA	1/EBA	1/EBA	3/ER	3/ER	3/ER	3/ER	5/LR	Unphased
Sample size l		16	40	40	36	40	13	23	40	7
Flot size ml		50	60	30	250	350	100	200	100	20
% of > 10mm charcoal analysed		-	-	-	100%	100%	-	-	-	-
% of > 4mm charcoal analysed		100%	100%	100%	25%	25%	100%	75%	100%	100%
% of > 2mm charcoal analysed		c 50%	c 25%	c 75%	-	-	c 5%	-	50%	100%
Acer campestre								cf 1		
Alnus glutinosa	alder		6							
Alnus glutinosa or *Corylus avellana*	alder/hazel	56	26	45	6	9r	15	7	4	
Corylus avellana	hazel	25	5		27	21r	4			
Betula sp	birch				14	10	7	8		
Fraxinus excelsior	ash								3	
Maloideae	hawthorn-type	2	12	5	1	6		3	54	
Prunus cf spinosa	blackthorn			2						
Prunus sp	blackthorn-type	1	16	7		1	4	2		
Quercus sp	oak	13h	14	27	52	53hs	64h	77	29	51h
Ulmus sp	elm	1								7
Indeterminate		2	21	14		2	6	3	10	2
No of fragments identified		*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*60*
Other remains										
Charred cereal remains						(3)				
Charred weed seeds						(3)			(1)	
Charred *Corylus avellana* shell fragments	hazelnut	(2)	(2)	(4)						

Context No		3021	3018	3018	1886	1886	2389	2389	2950	2378
Sample No		49	59	61	24	138	81	84	167	74
Cut/Group No		3008	3017	3017	1887	1887	2350	2350	2949	2377
Feature Type		Posthole	Pit	Pit	Pit	Pit	Pottery kiln	Pottery kiln	Cremation pit	Cremation deposit
Phase/Period		1/EBA	1/EBA	1/EBA	3/ER	3/ER	3/ER	3/ER	5/LR	Unphased
Bone fragments			(1)	(2)	(1)				(3)	
Calcined bone fragments				(2)					(2)	(1)
Heat affected clay/daub		(1)	(2)	(2)	(3)					
Brick/tile fragments (cbm)					(3)	(1)		(1)		

Table 48: Results of the charcoal analyses (figures are actual counts where h = heartwood prominent, s = sapwood prominent, and r = roundwood prominent. Other remains are quantified on a scale of (1) to (4), where (1) = < 5 items, (2) = 6-25, (3) = 26-100, and (4) = > 100 items)

Feature	**Impressed Ware (Neo)**	**Worked flint**	**Fire-cracked stone**	**Fired clay**	**Charcoal**	**Hazelnut**	**Animal bones**	**animal species**
3008		x		x	x	x		
3010	x			x				
3012	x	x						
3017	x	x		x	x	x	x	Piglet, dog, red deer (antler and bone), and cattle (burnt)
3086	x	x					x	
3089		x						
3124	?						x	
3180	x	x	x				x	Pig and sheep/goat

Table 49: Summary of finds categories recovered from Phase 1 pits and postholes

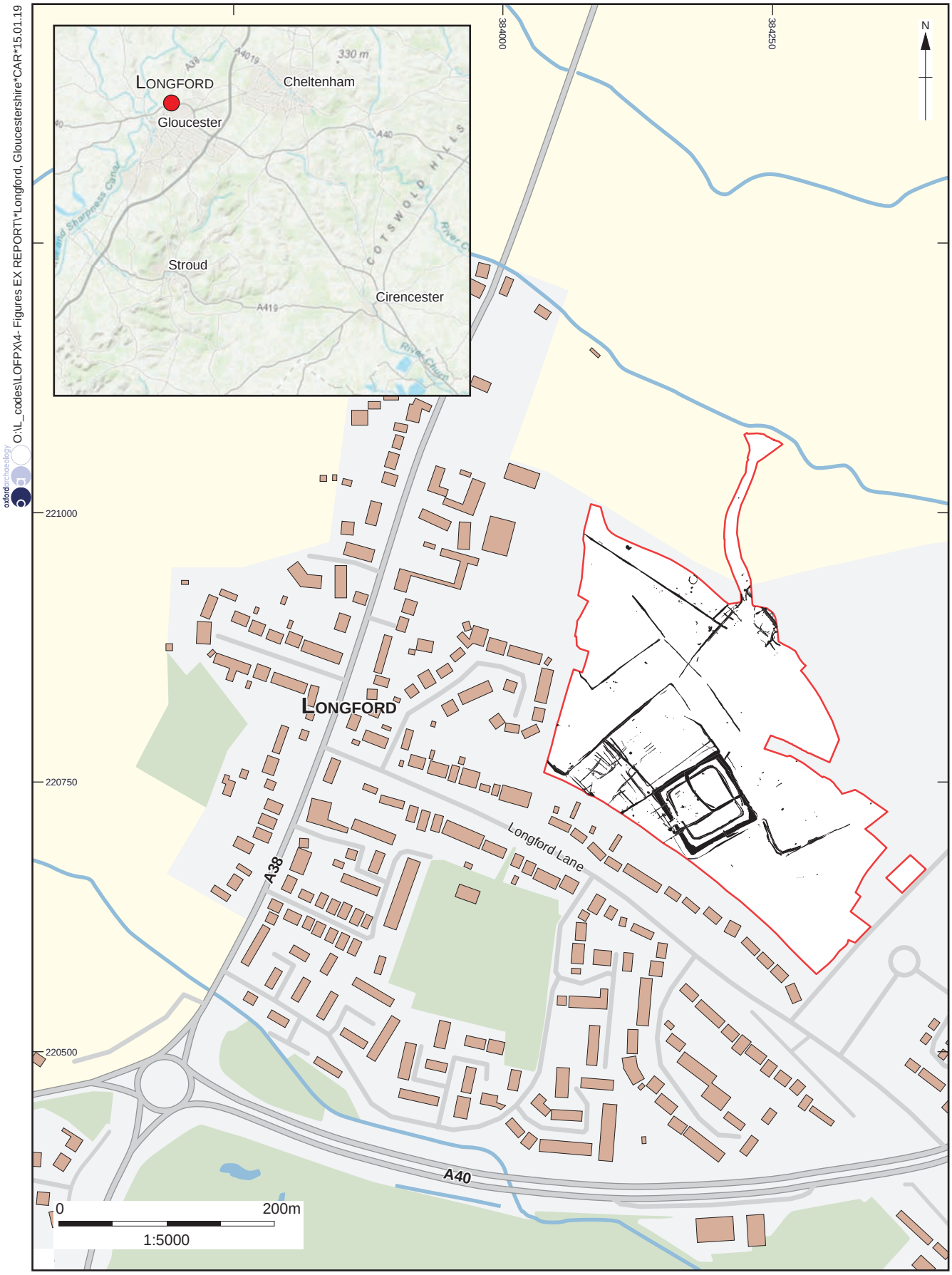

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Figure 1: Site location

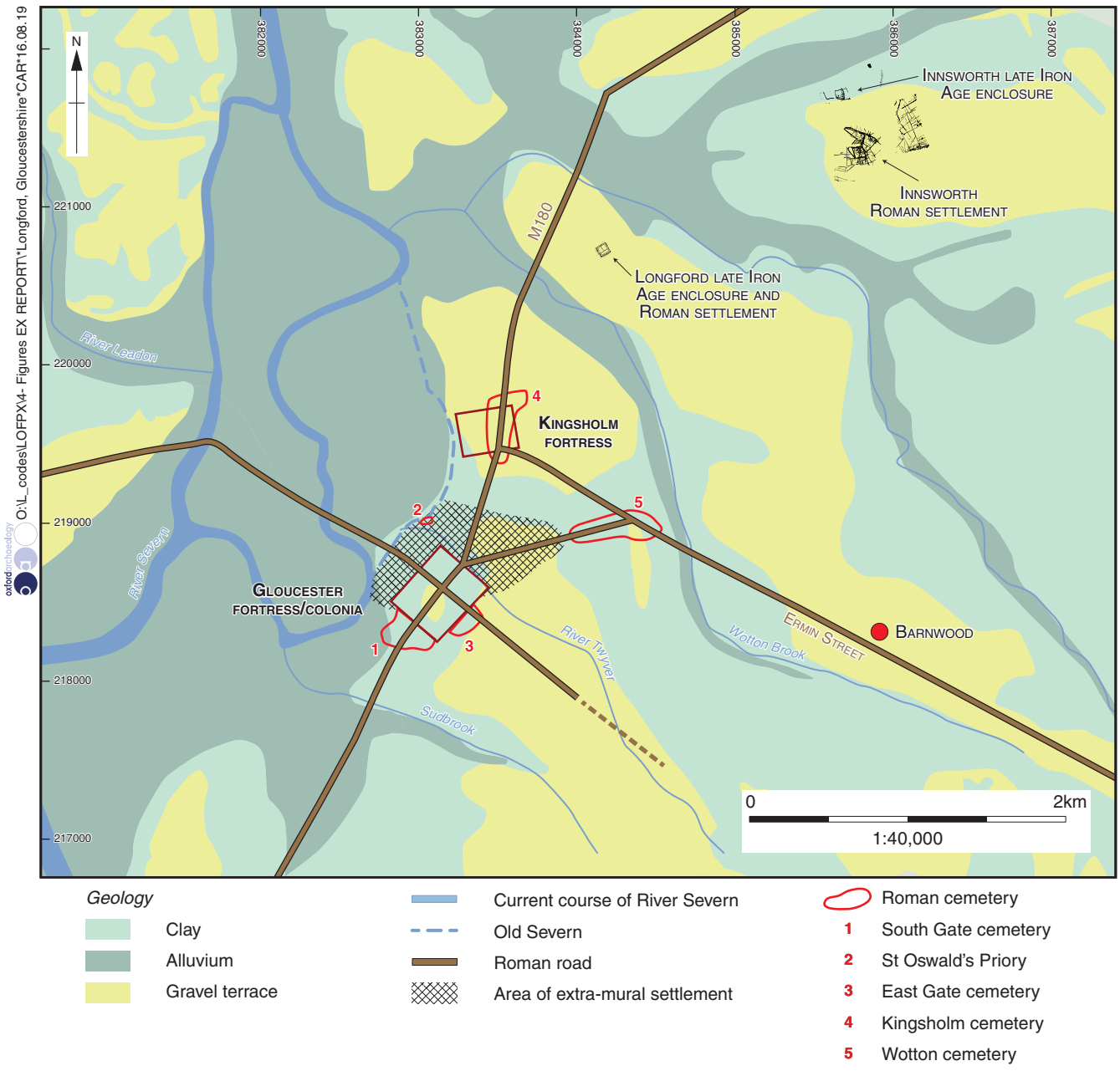

Figure 2: The Roman landscape around Gloucester

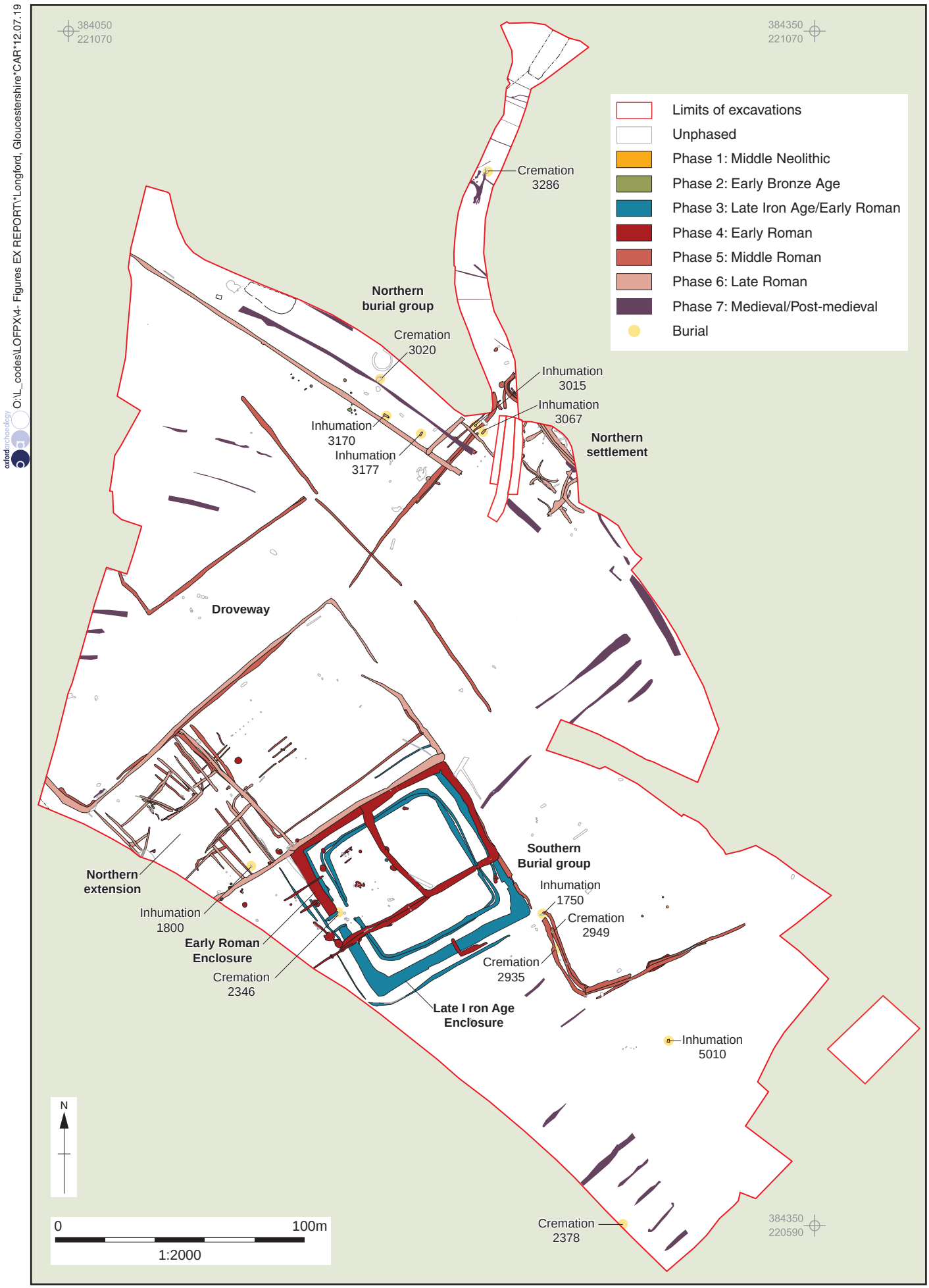

Figure 3: Phased site plan

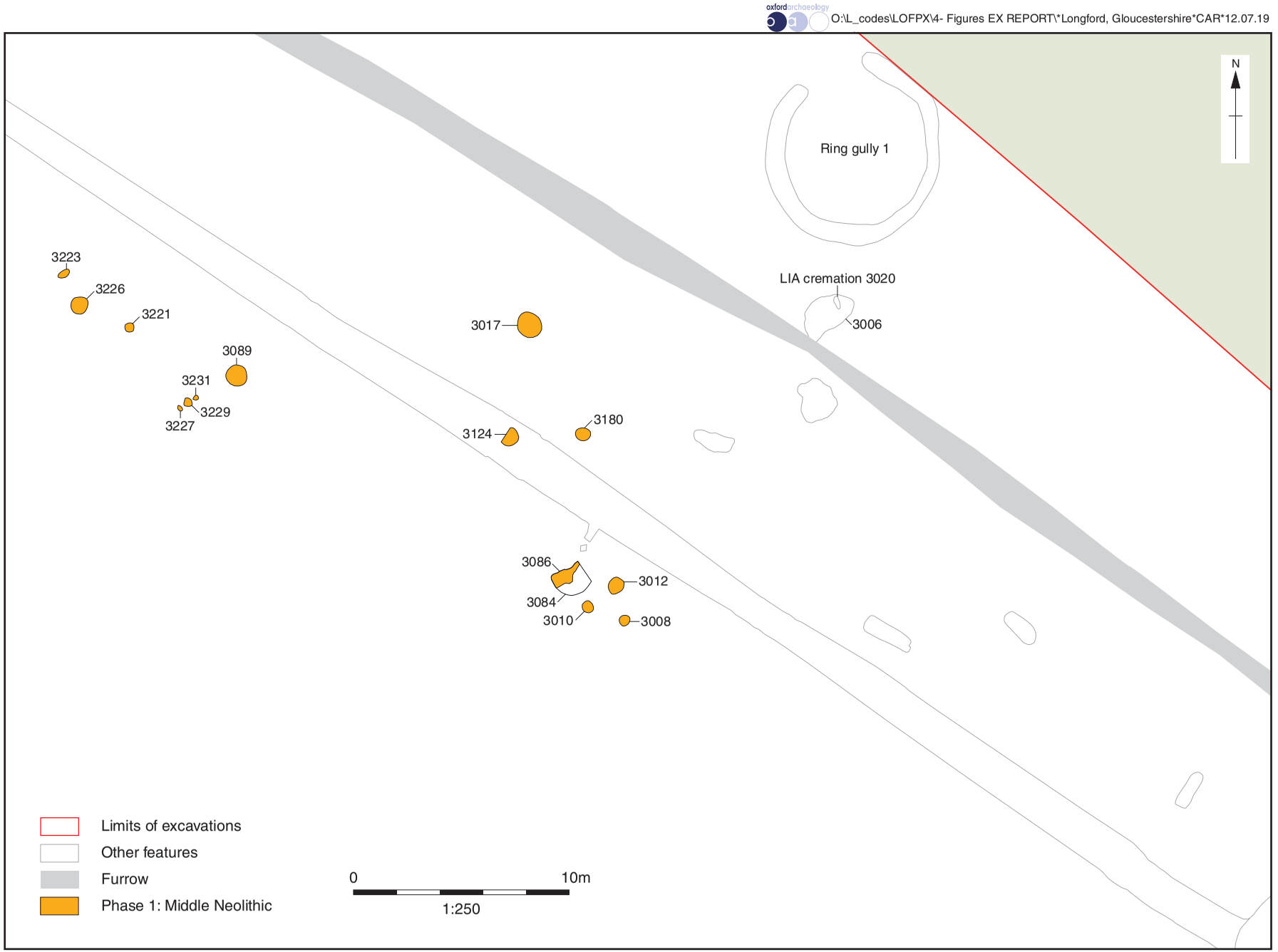

Figure 4: Plan of Middle Neolithic features (Phase 1) in northern part of the site

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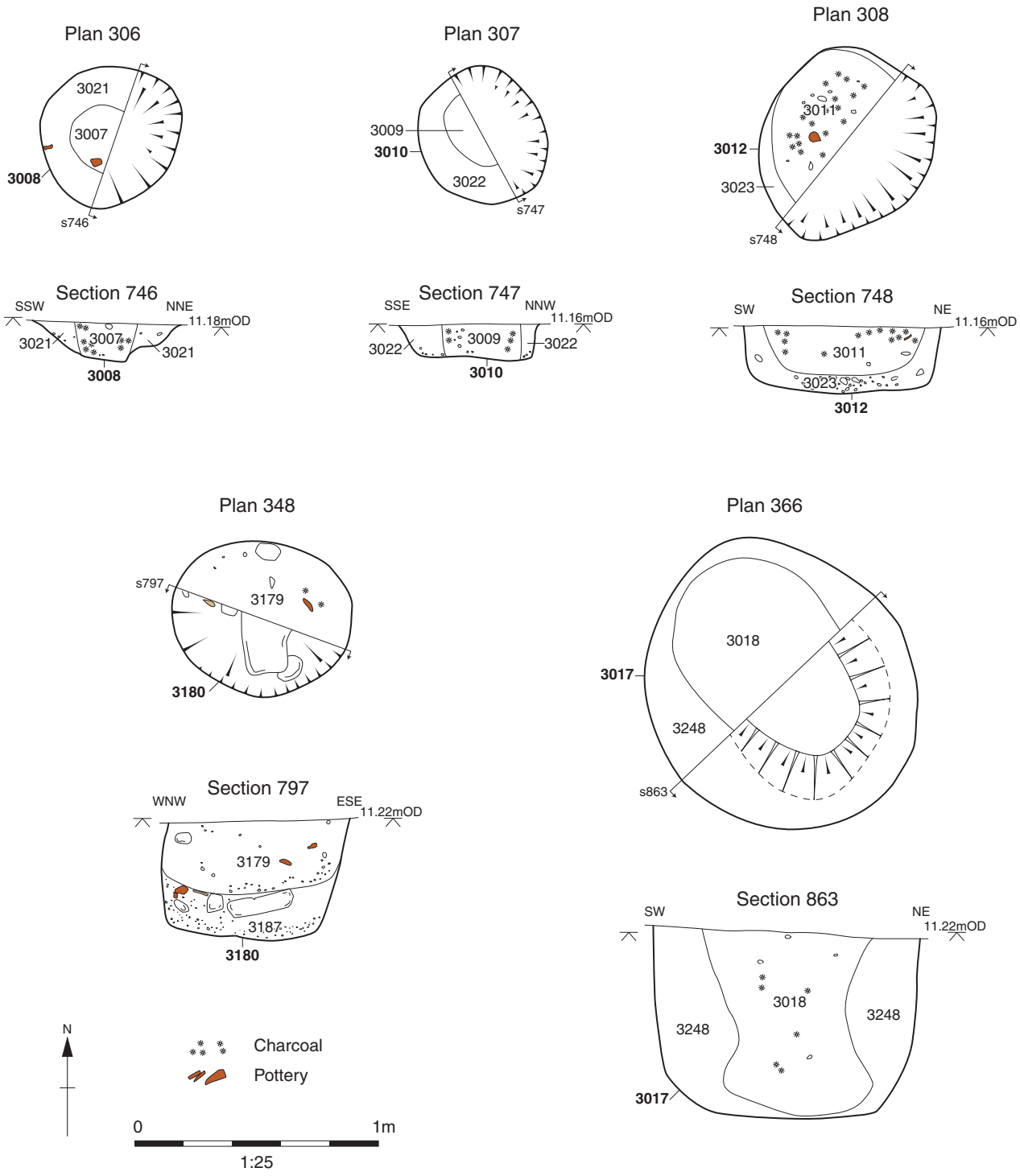

Figure 5: Plans and sections of Middle Neolithic features

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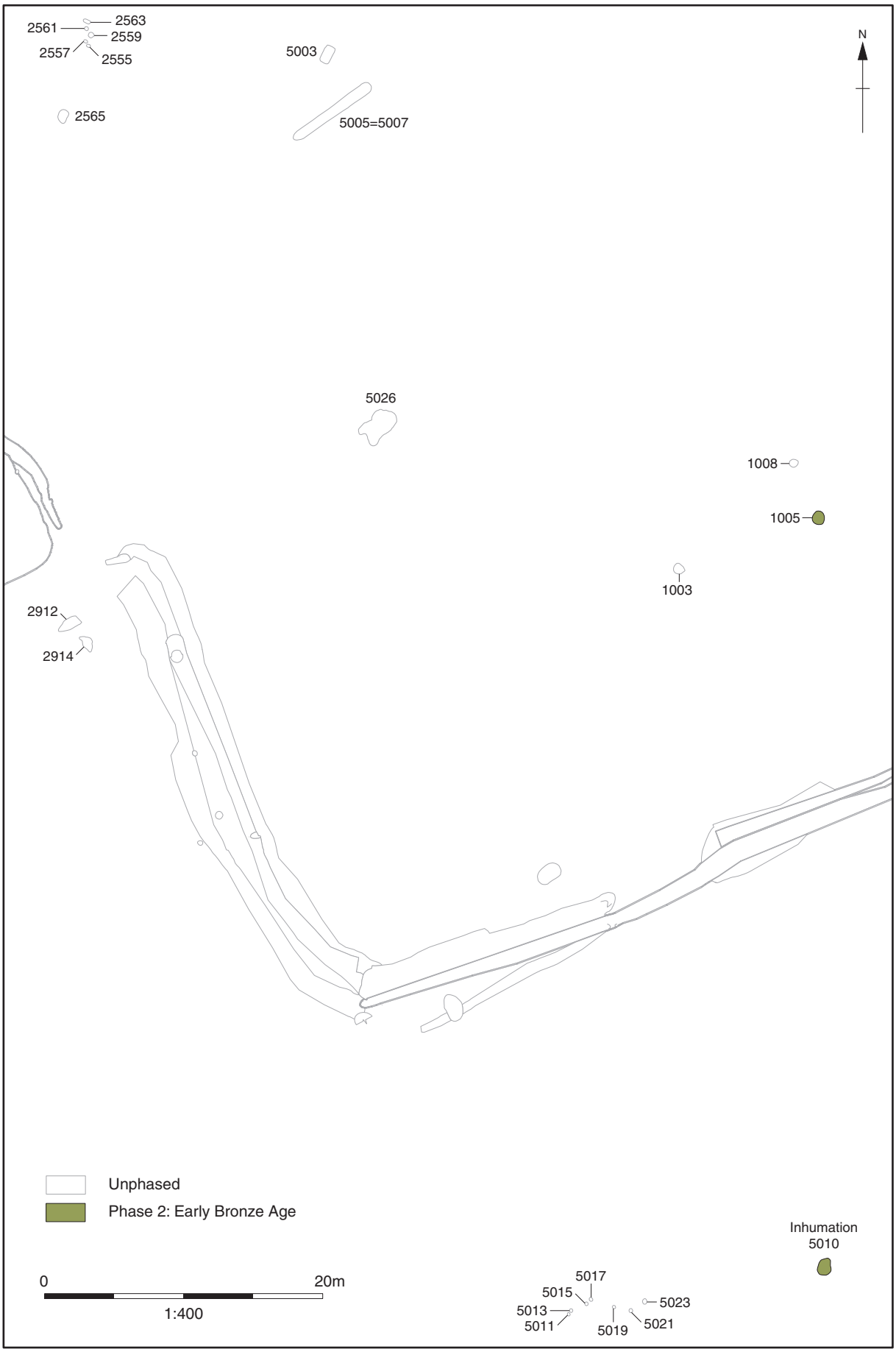

Figure 6: Plan of early Bronze Age features (Phase 2) and possible prehistoric features in southern part of the site

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Figure 7: Plan of inhumation 5010 showing the position of worked-flint knife (SF188)

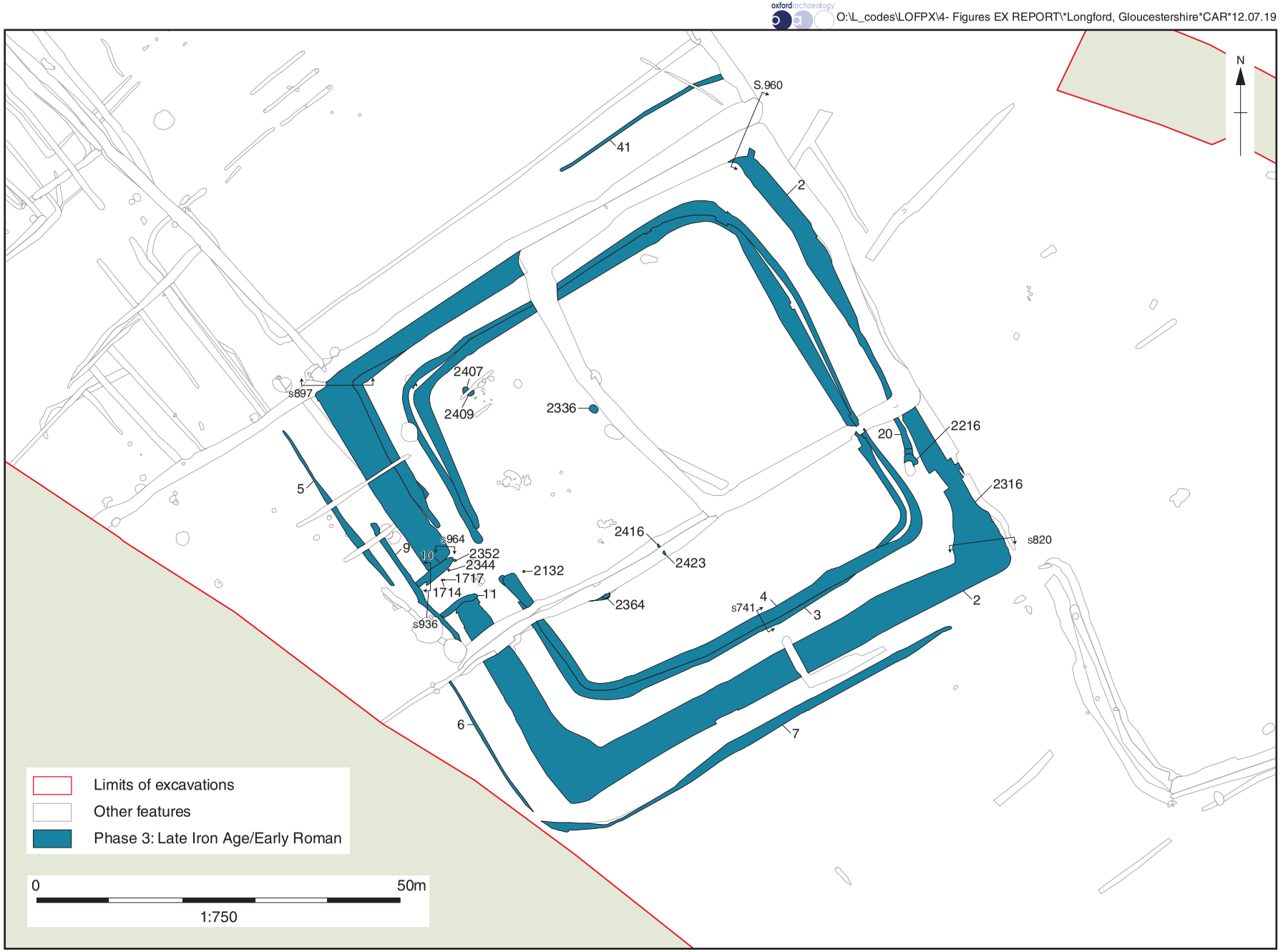

Figure 8: Overview plan of Late Iron Age/Early Roman Features (Phase 3)

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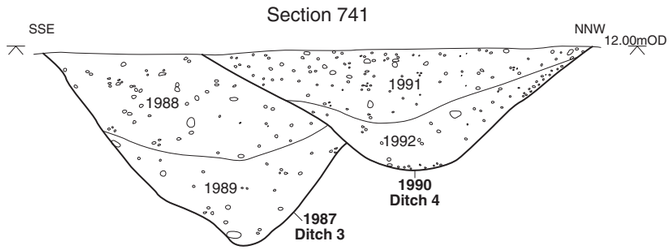

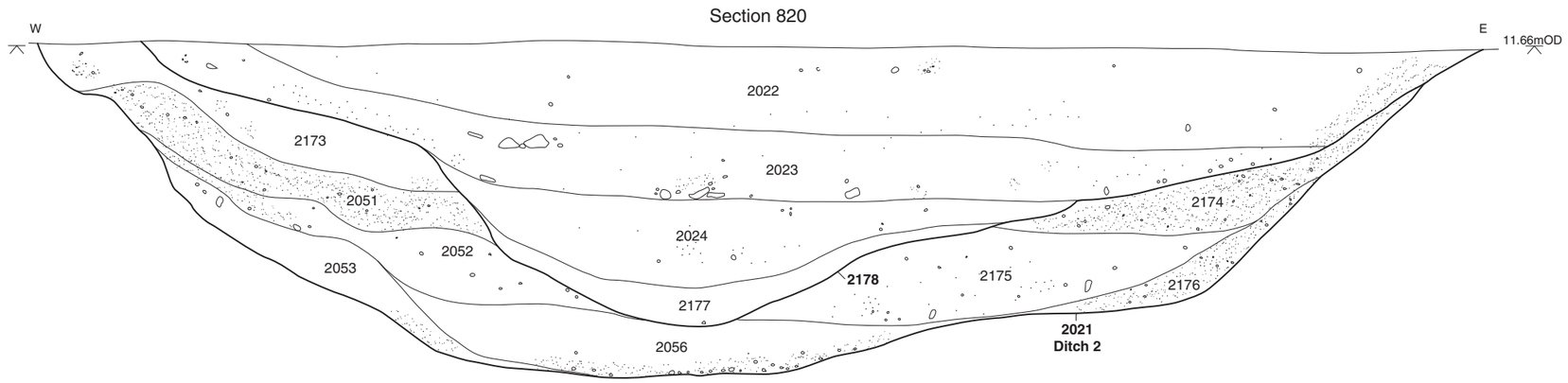

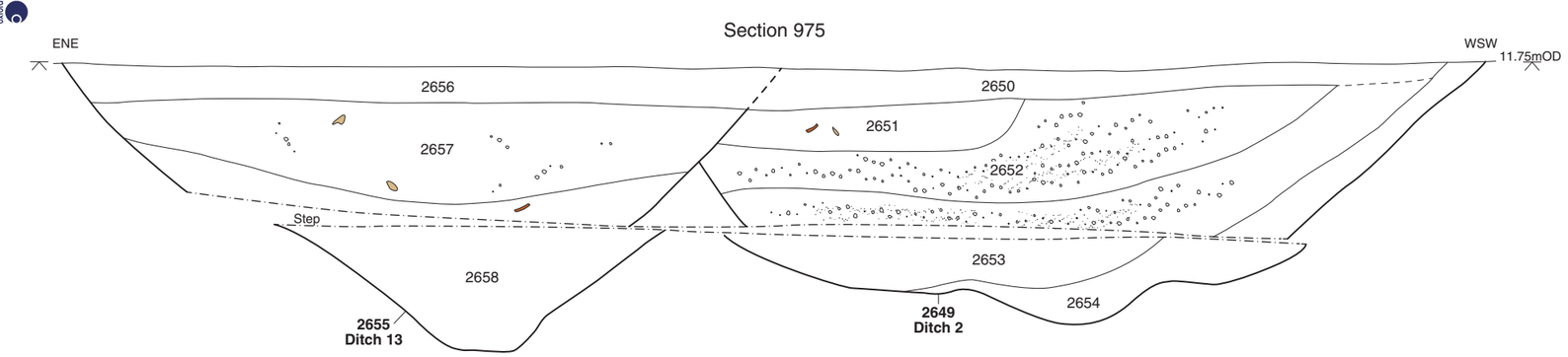

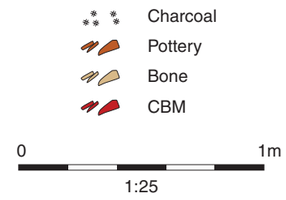

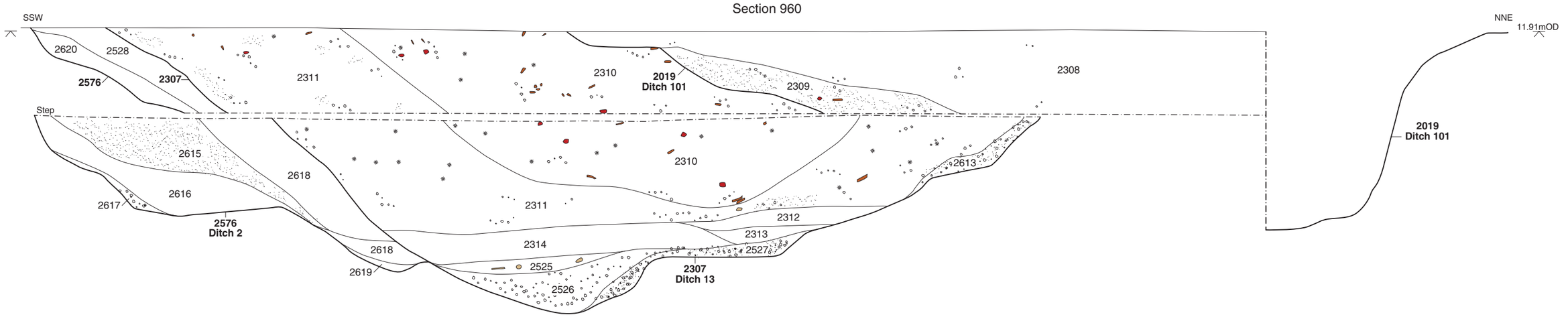

Figure 9a: Sections through Late Iron Age/Early Roman enclosure ditches

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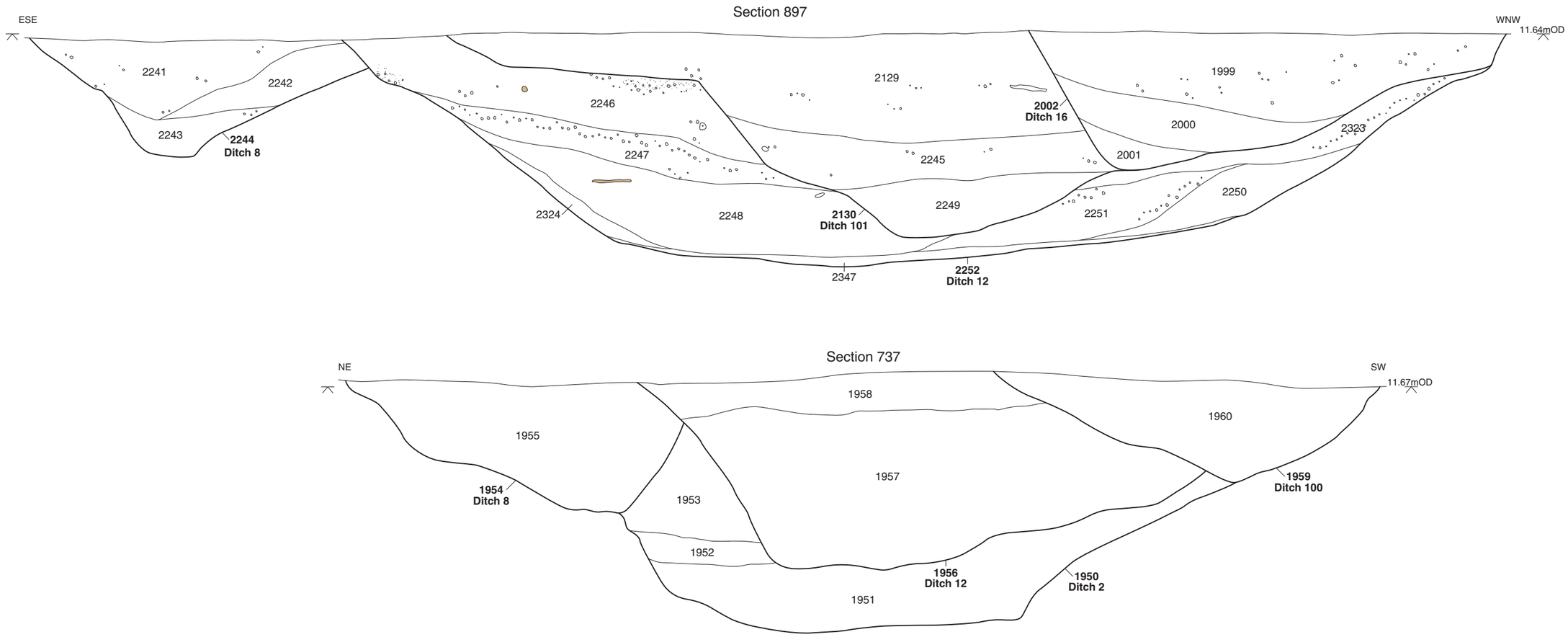

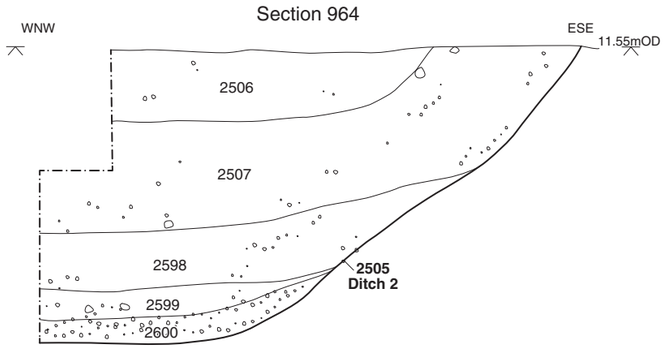

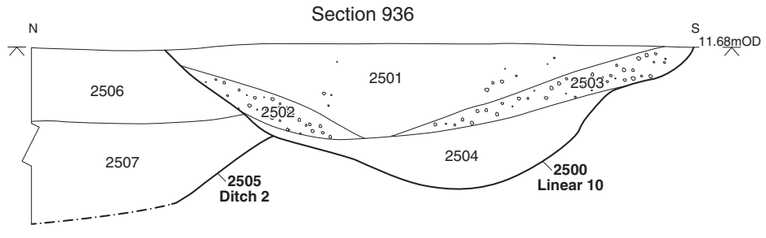

Figure 9b: Sections through Late Iron Age/Early Roman enclosure ditches

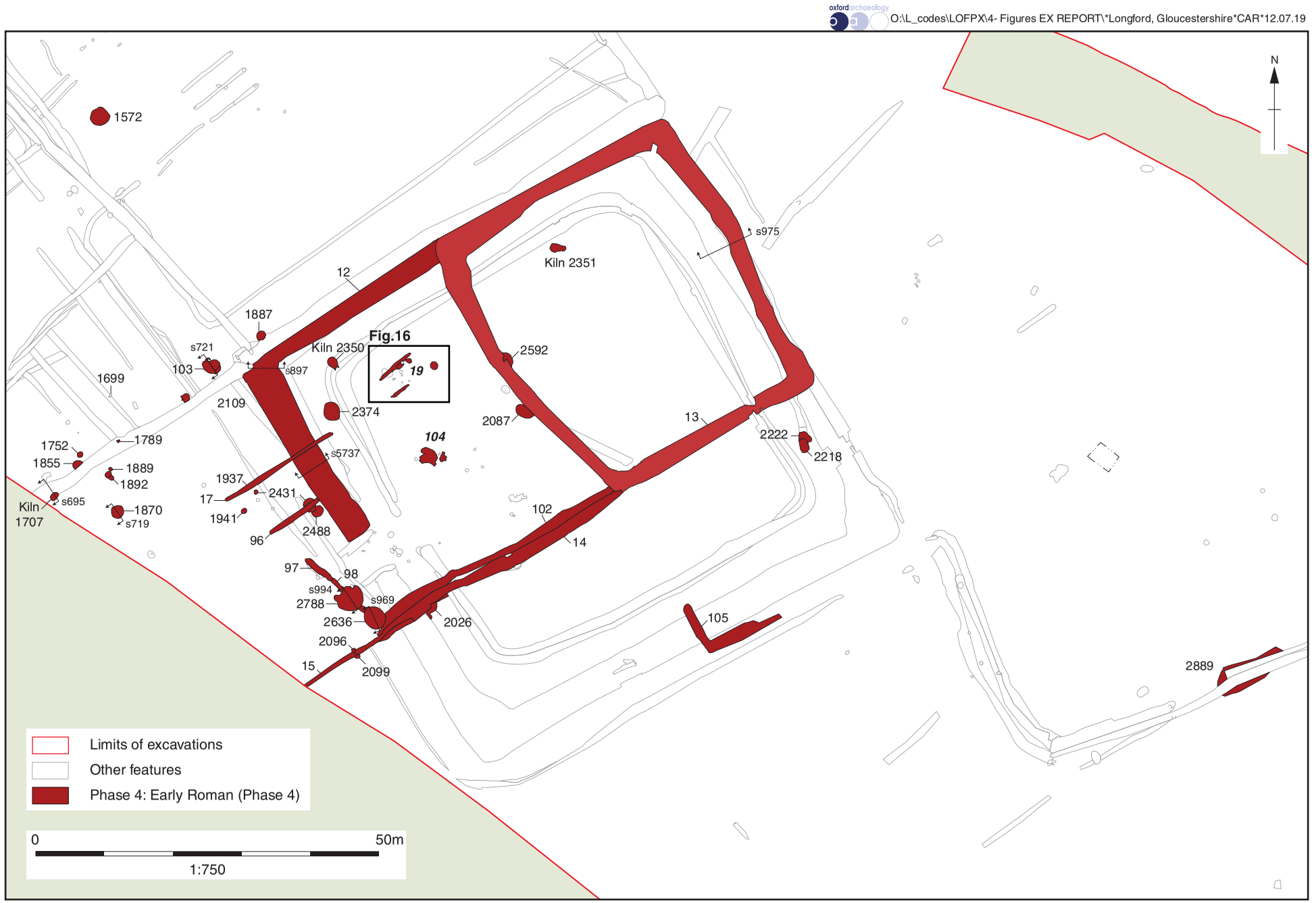

Figure 10: Overview plan of Early Roman Features (Phase 4)

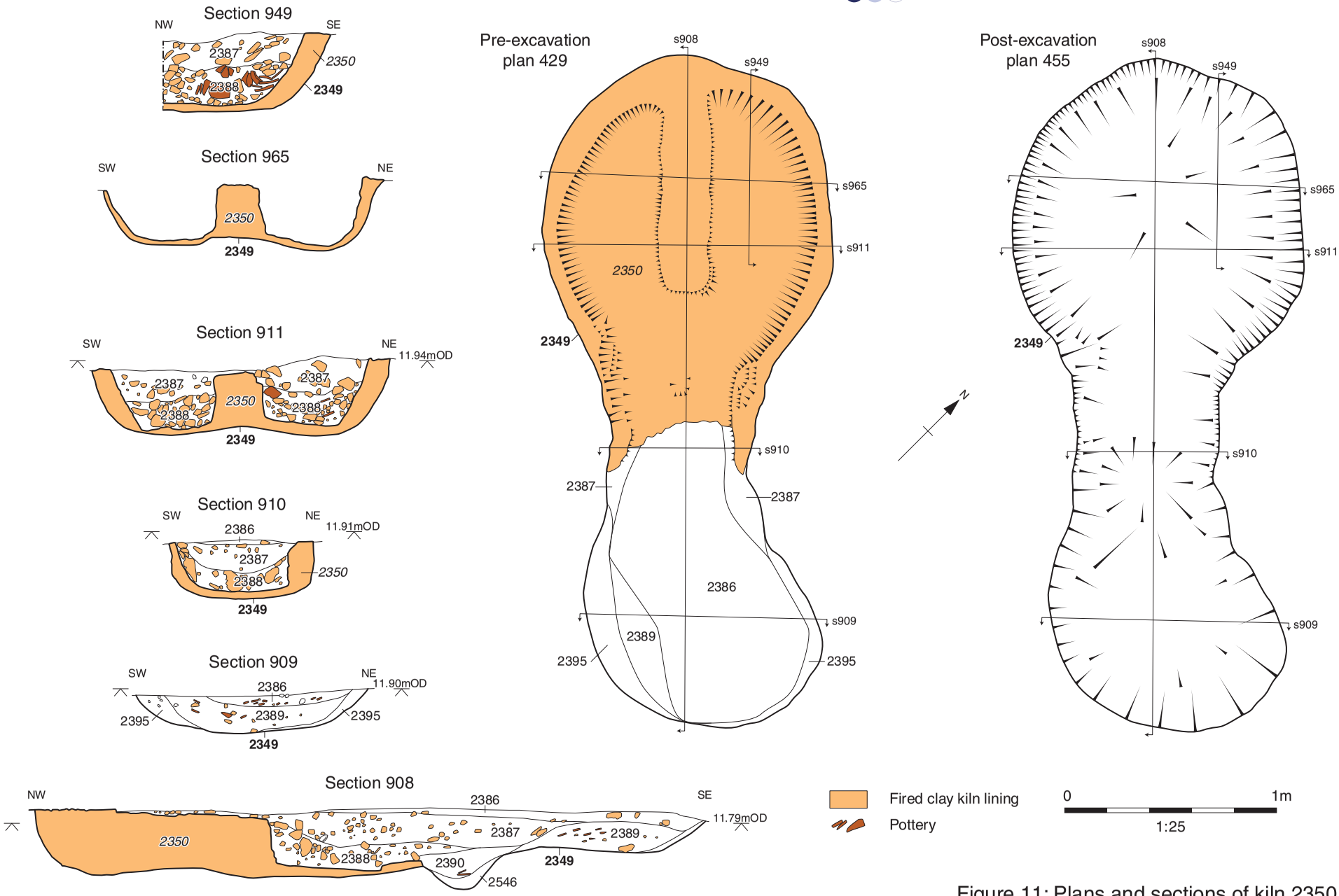

Figure 11: Plans and sections of kiln 2350

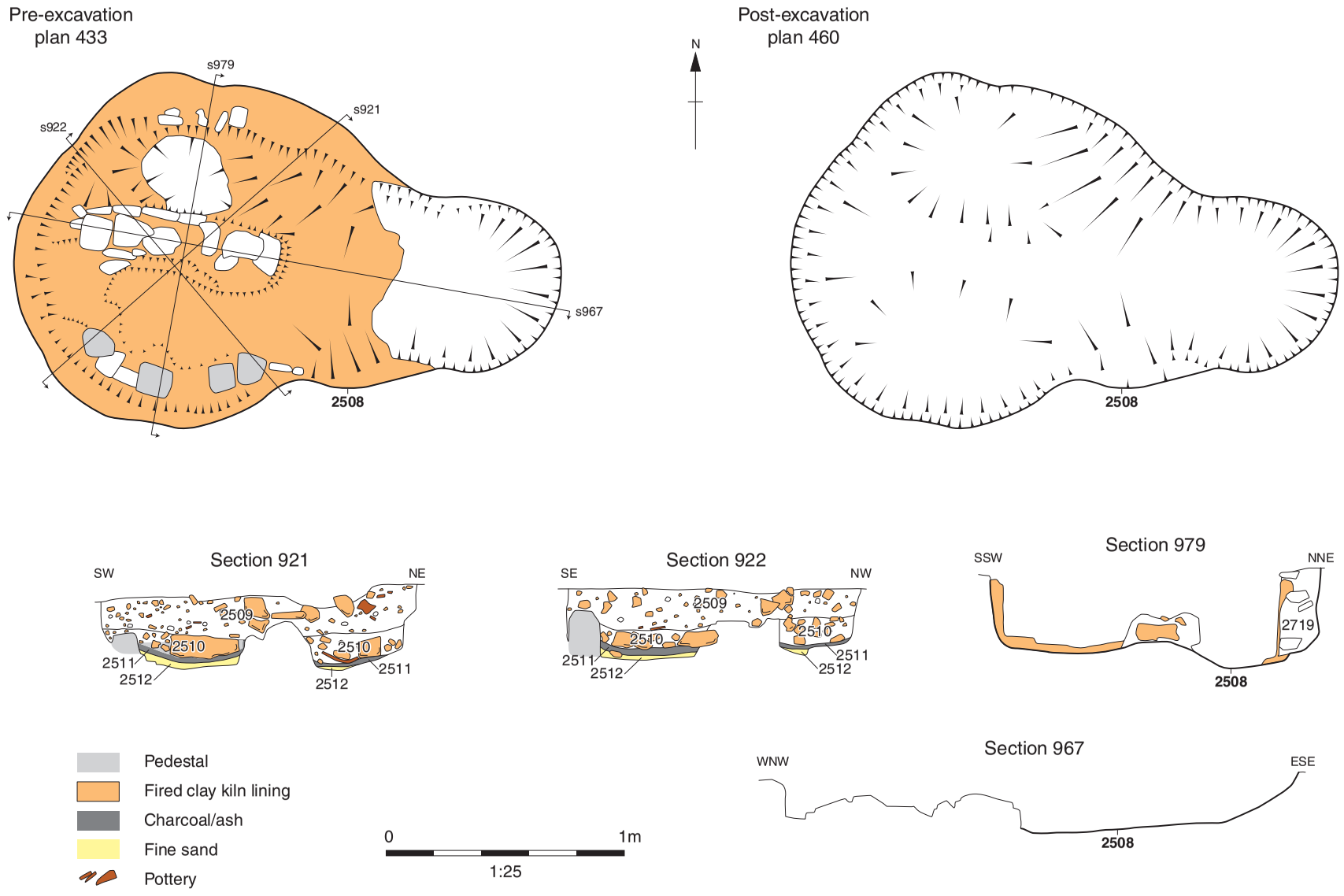

Figure 12: Plans and sections of kiln 2351

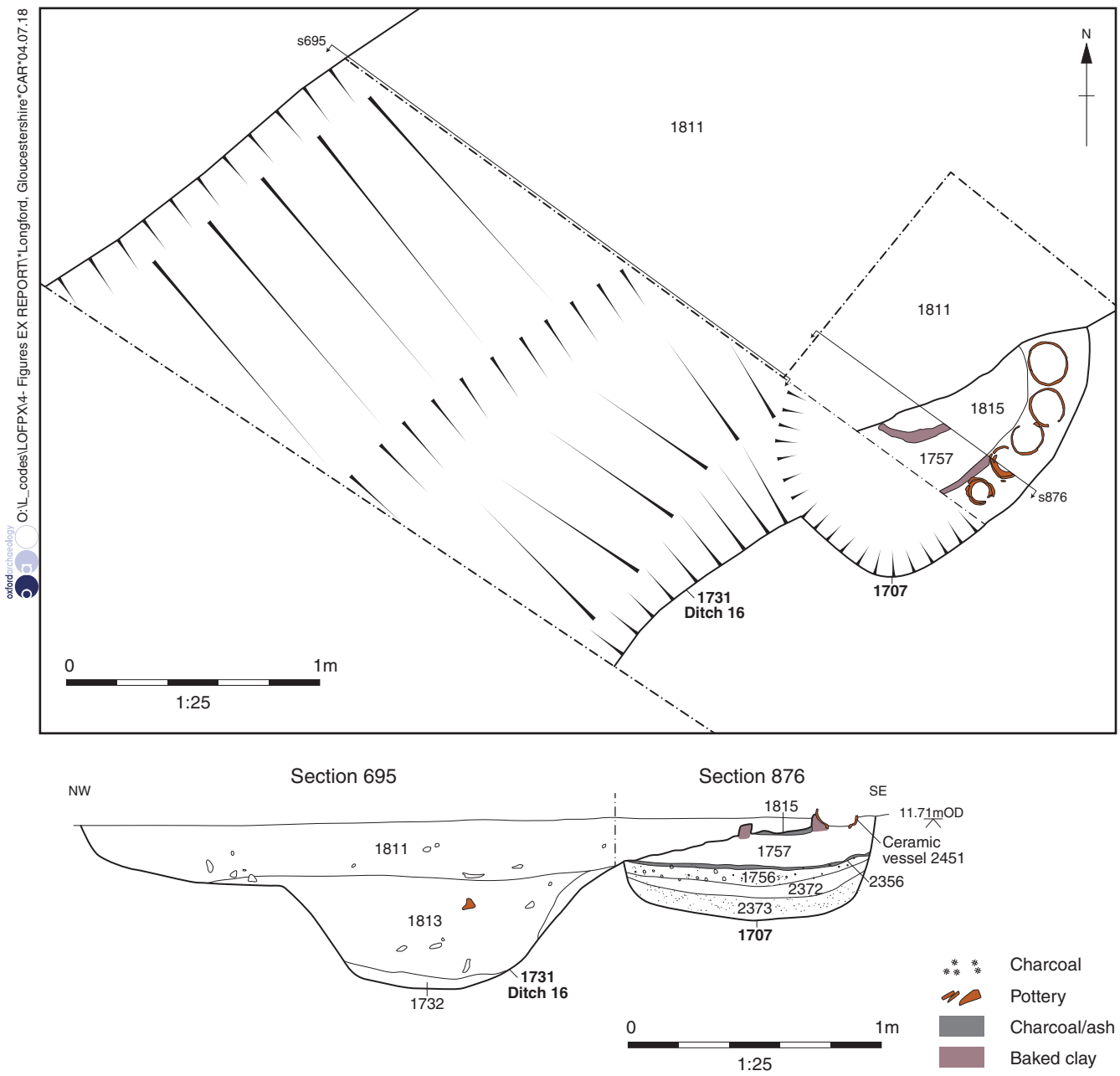

Figure 13: Plan and section of kiln 1707 and ditch 16

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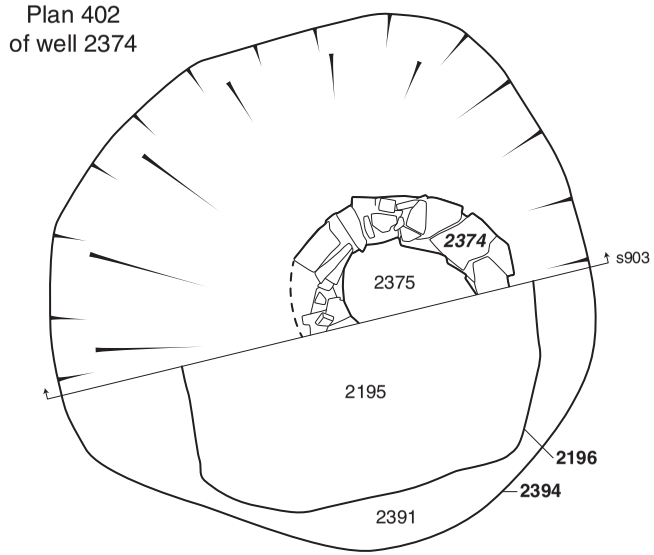
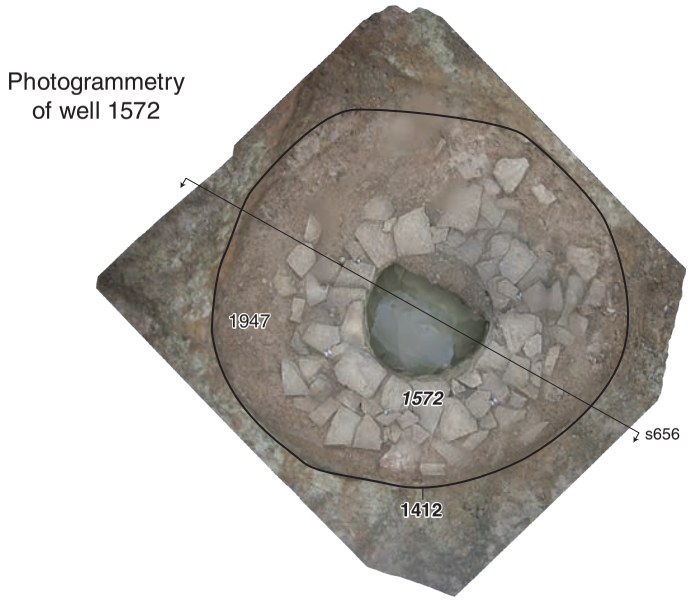
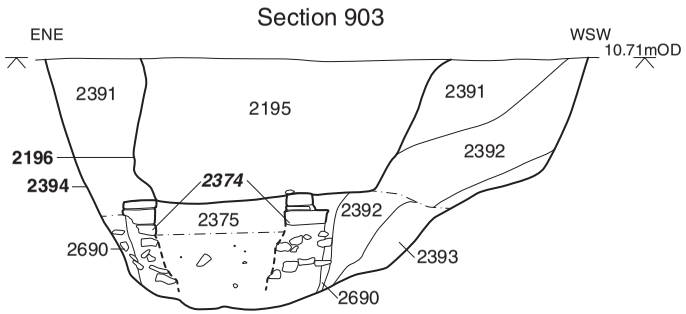
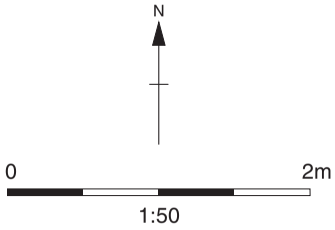
Figure 14: Kiln 1707









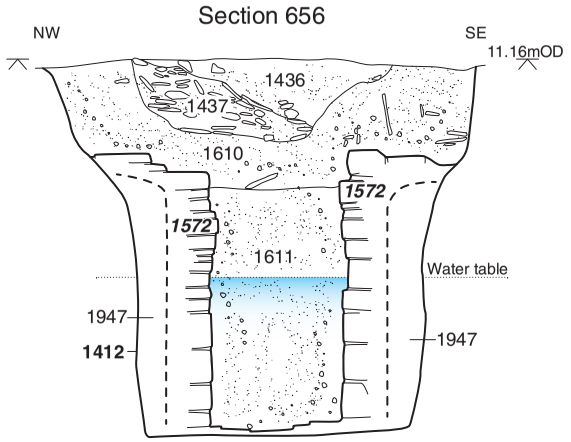
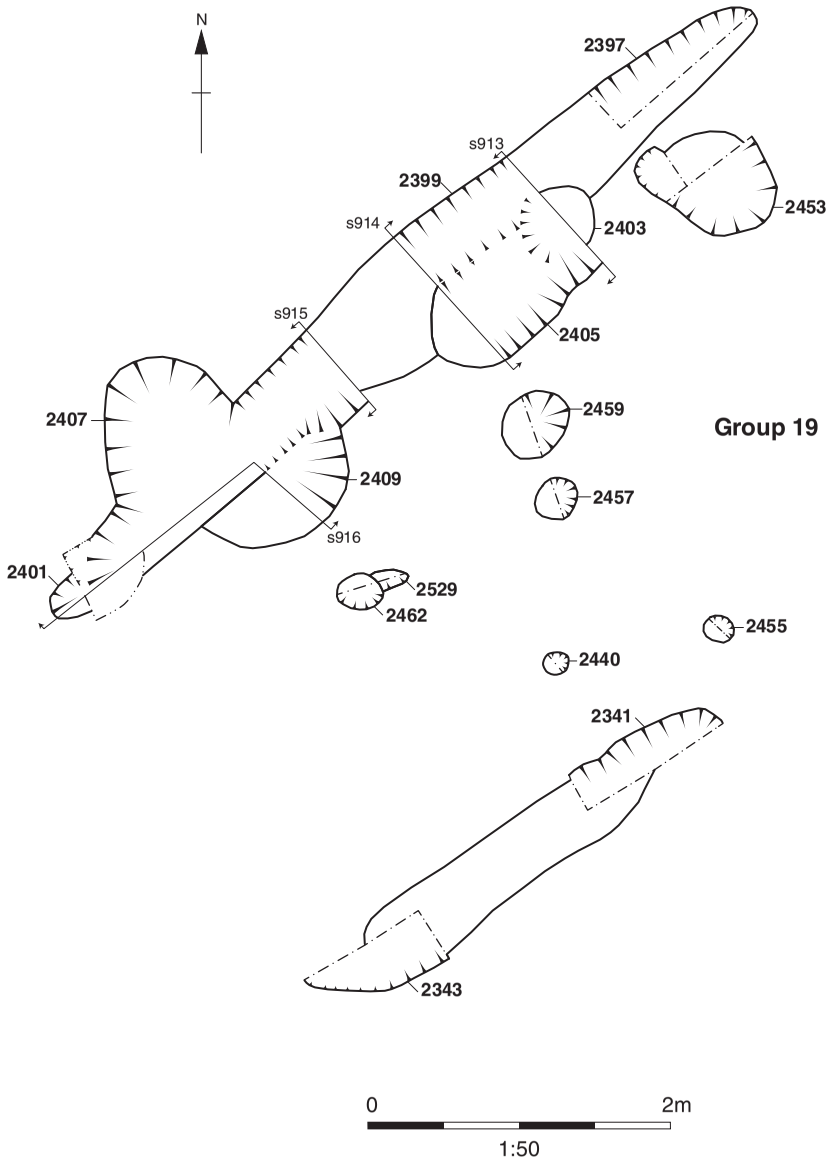
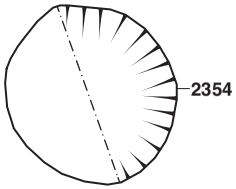


Figure 15: Plans and sections of wells 2374 and 1572





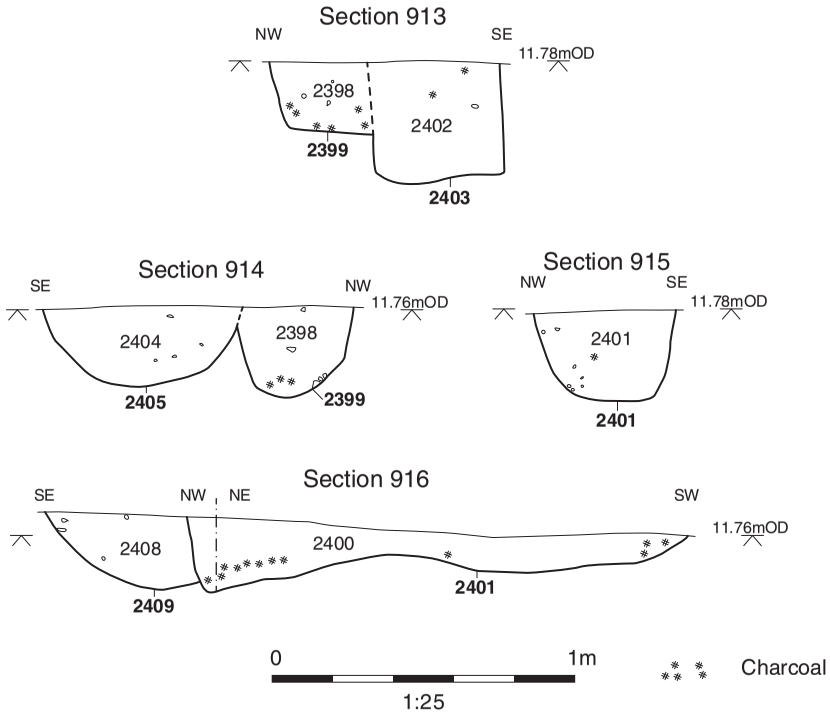
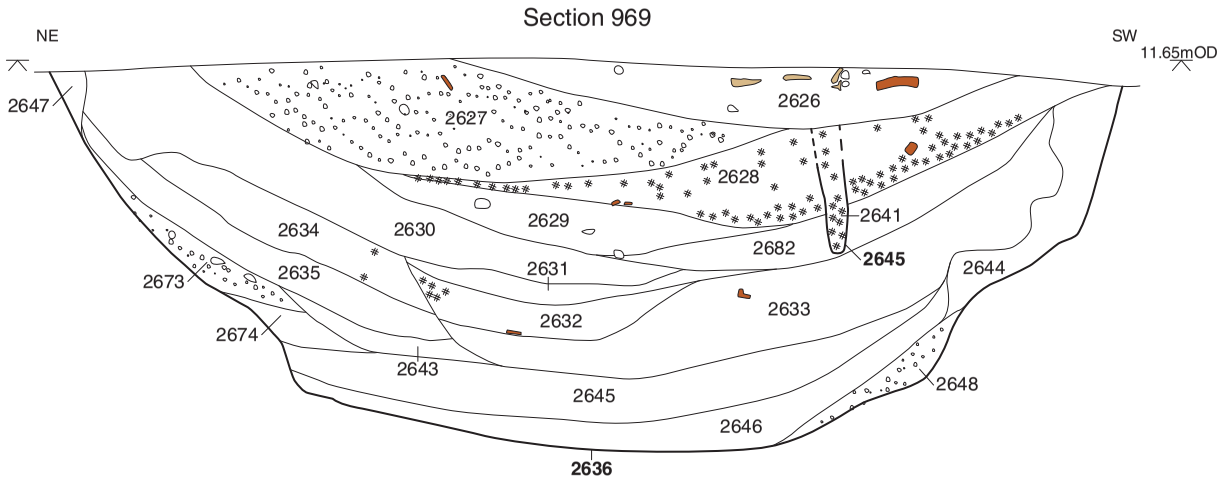
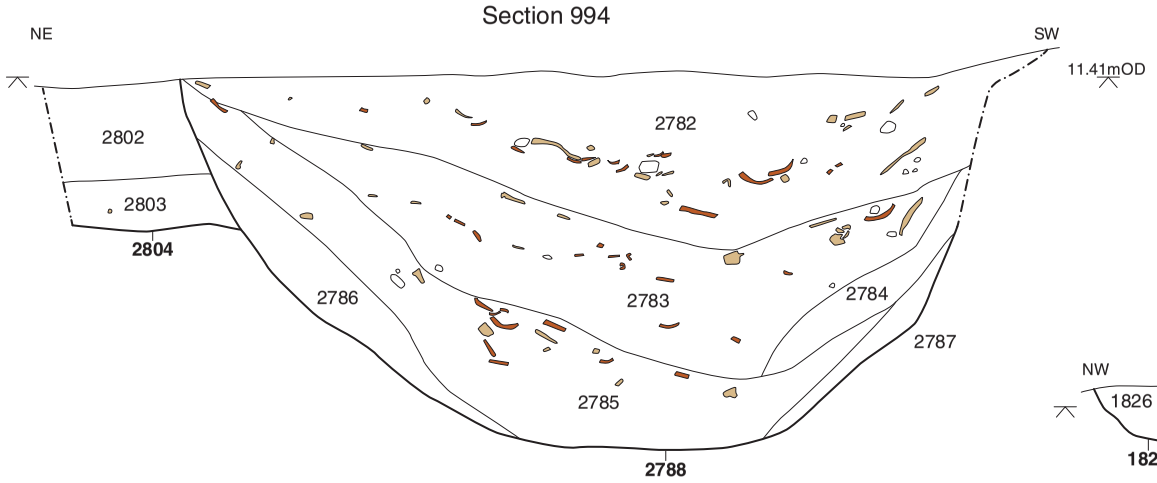
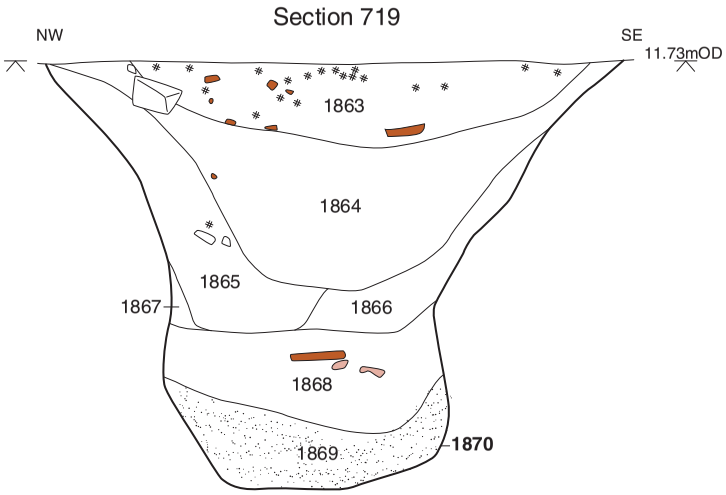
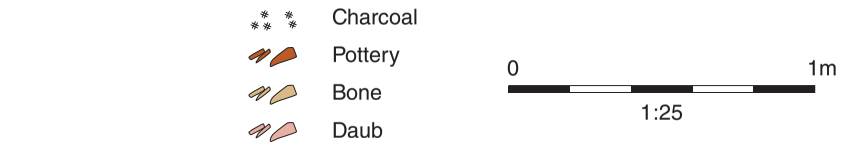


Figure 16: Plans and sections of feature group 19 and pit 2354









Pit group 103

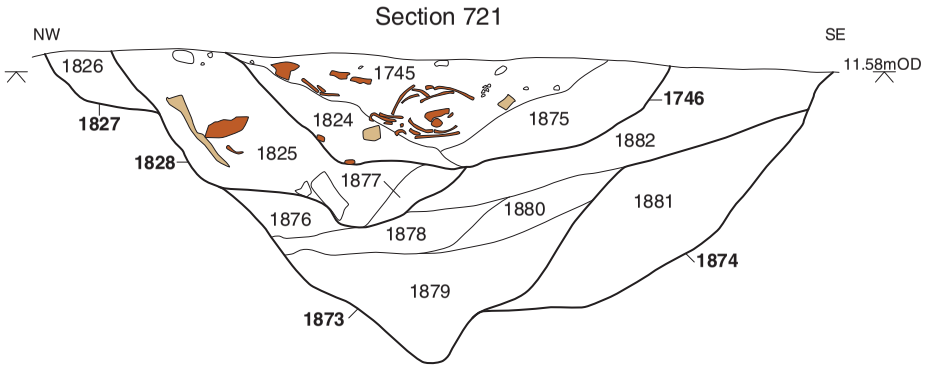


Figure 17: Sections of Early Roman pits

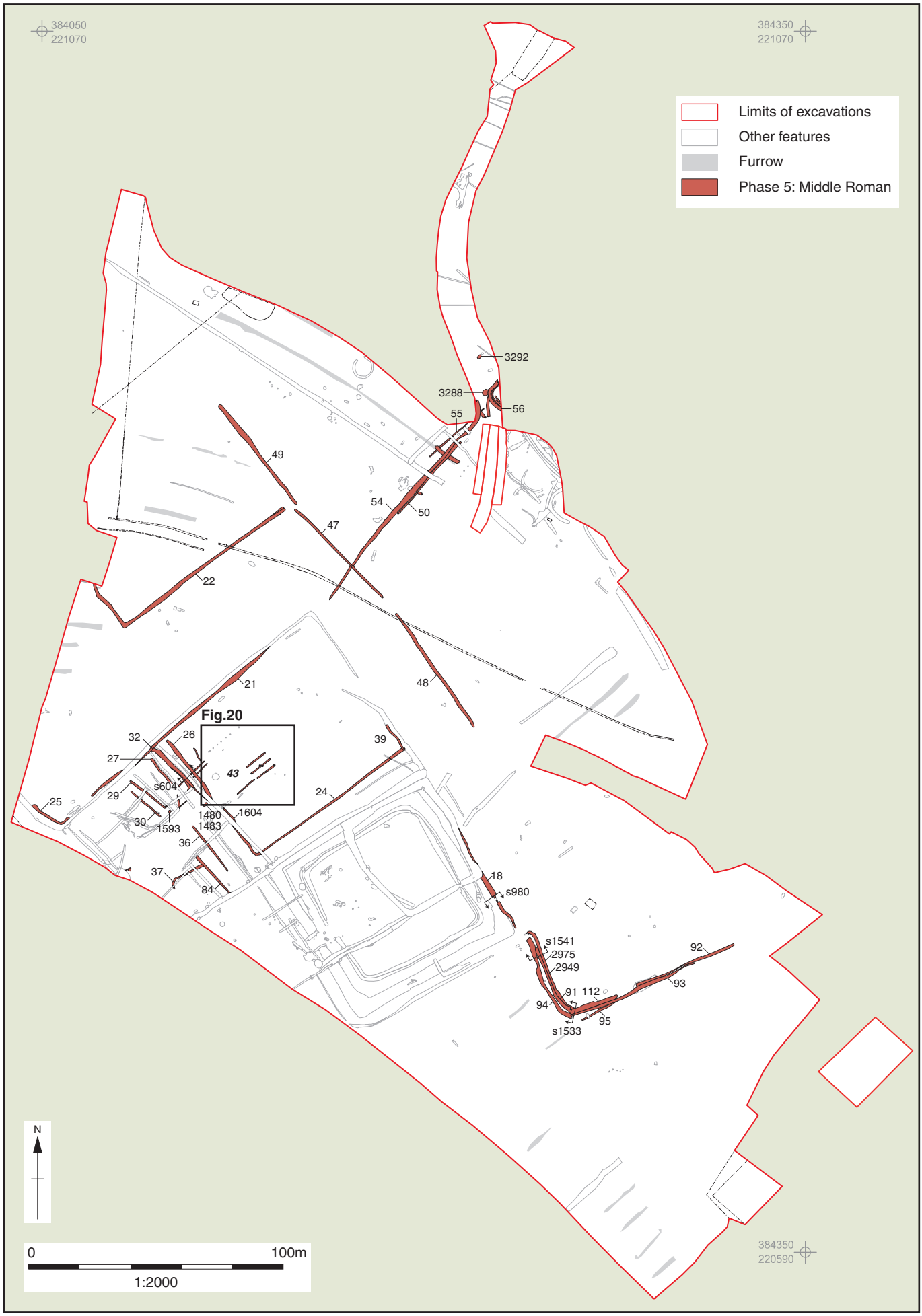


Figure 18: Overview plan of Middle Roman features (Phase 5)

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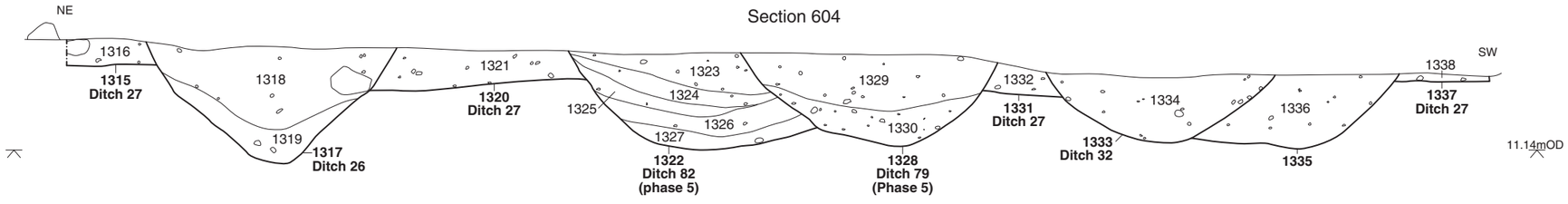

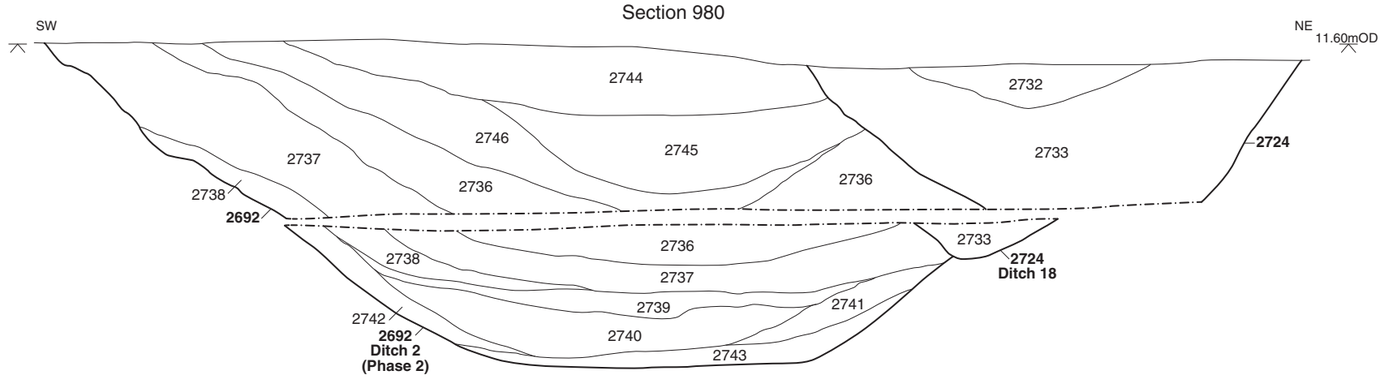

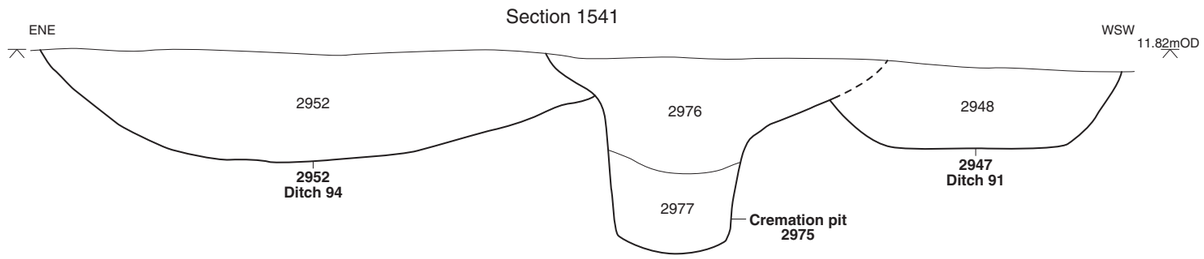

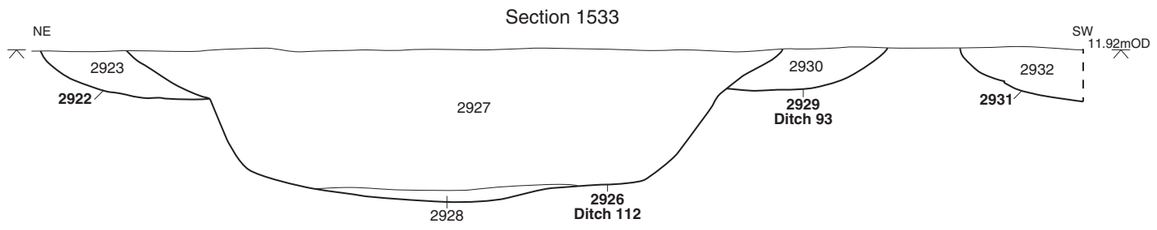

Figure 19: Sections of Middle Roman features

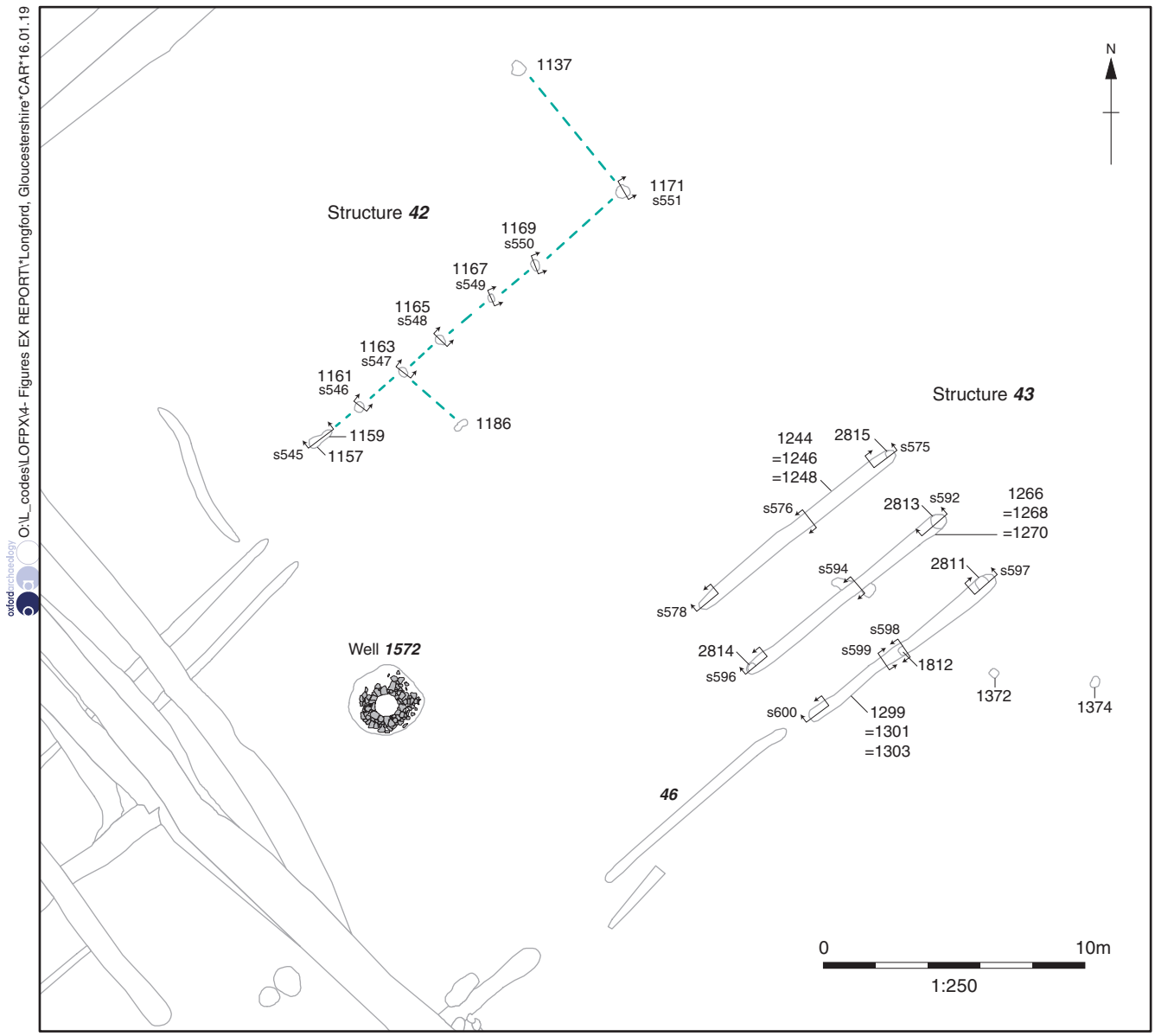

Figure 20: Detailed plan of structure 42 and structure 43

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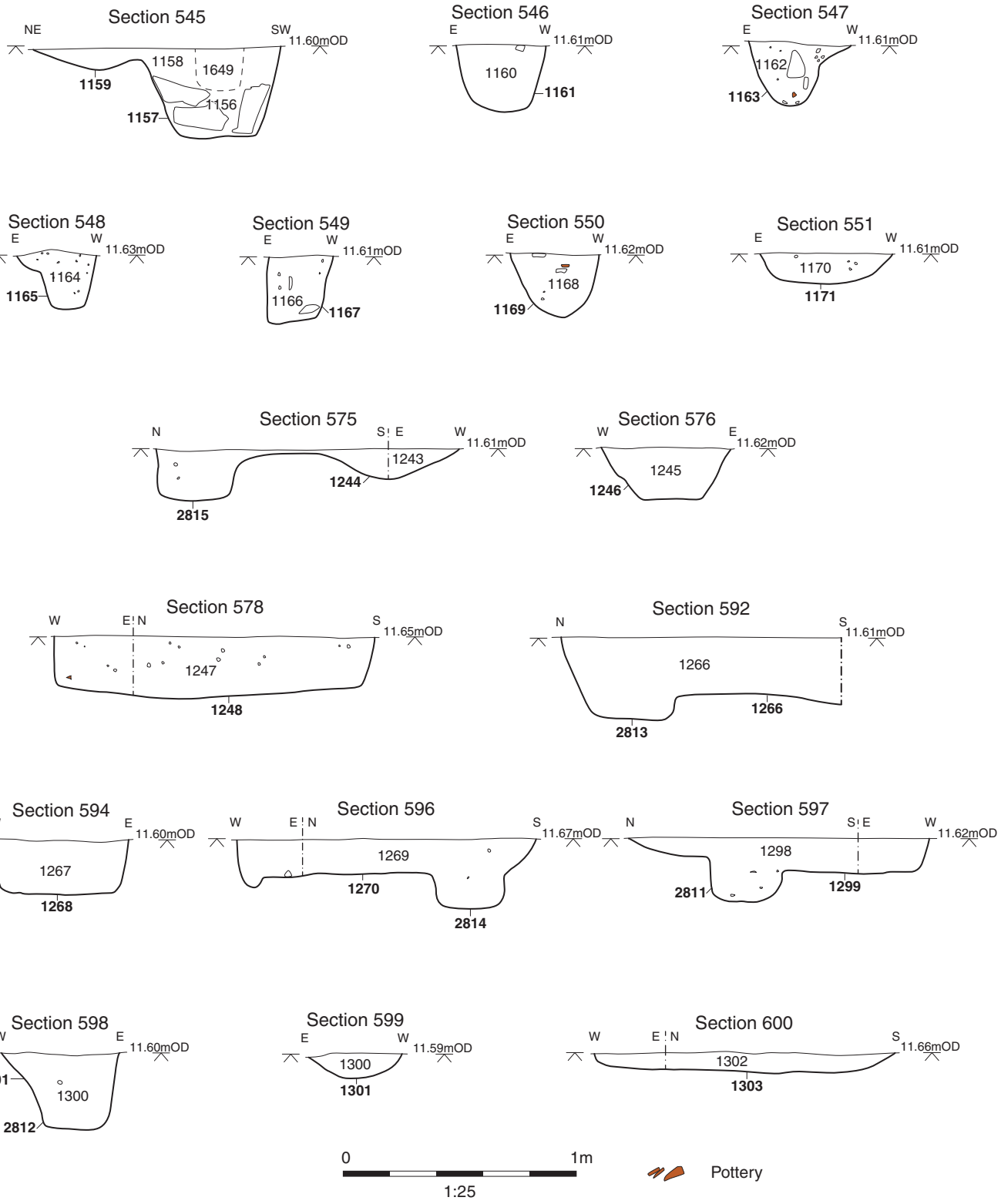

Figure 21: Sections of structures 42 and 43

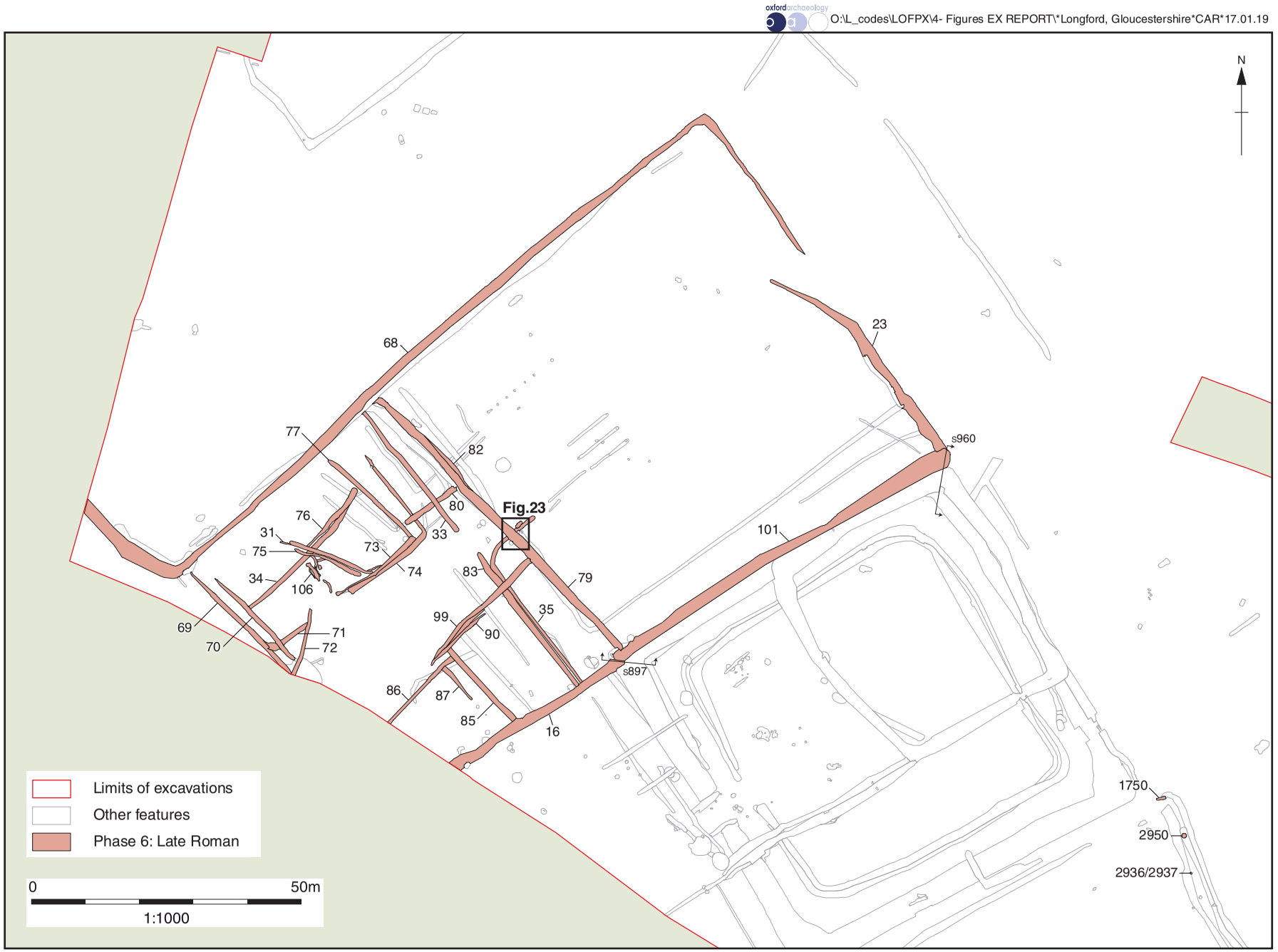

Figure 22: Plan of late Roman features in the northern extension (Phase 6)

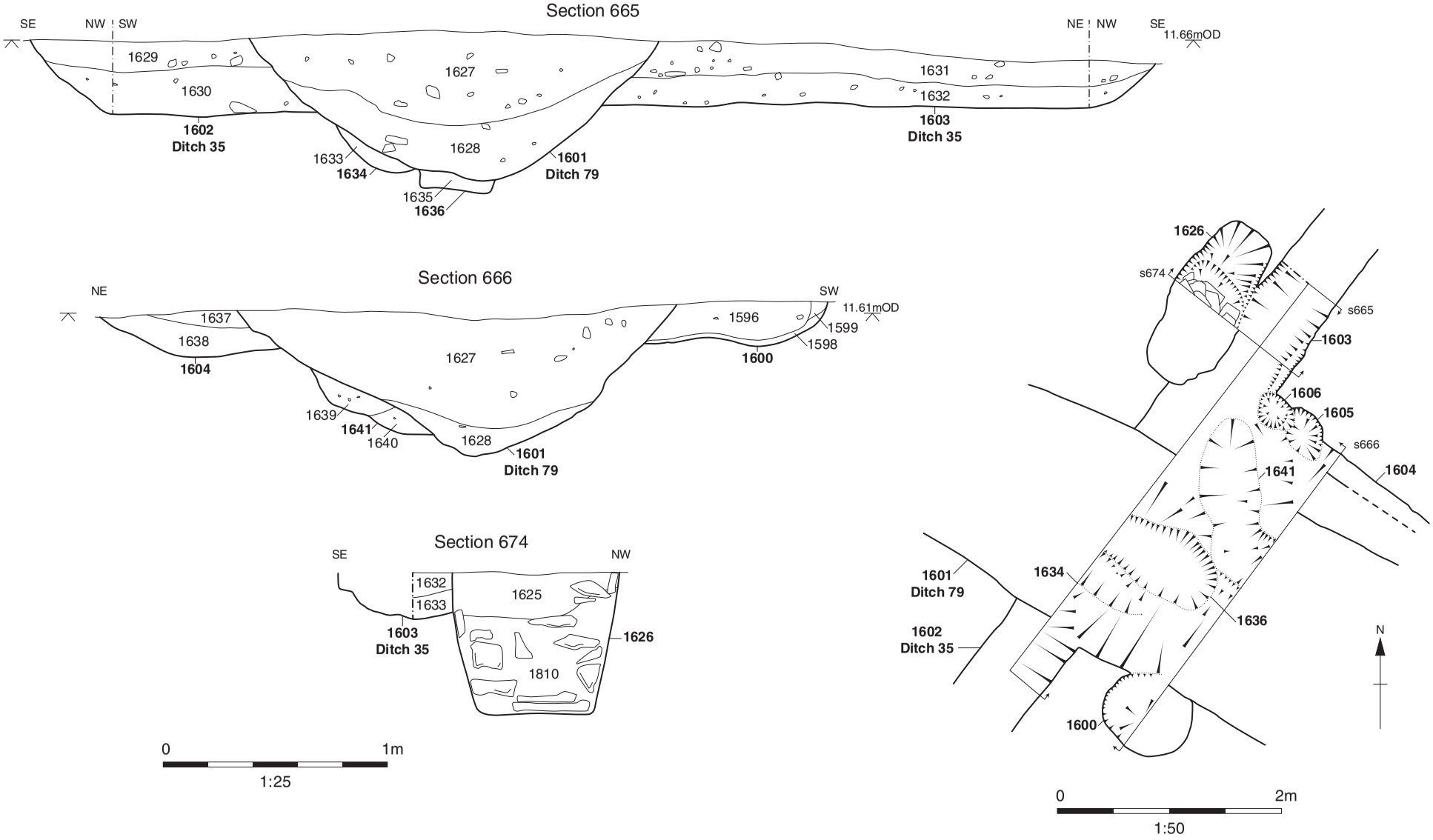

Figure 23: Detailed plan and sections of intercutting features in the northern extension

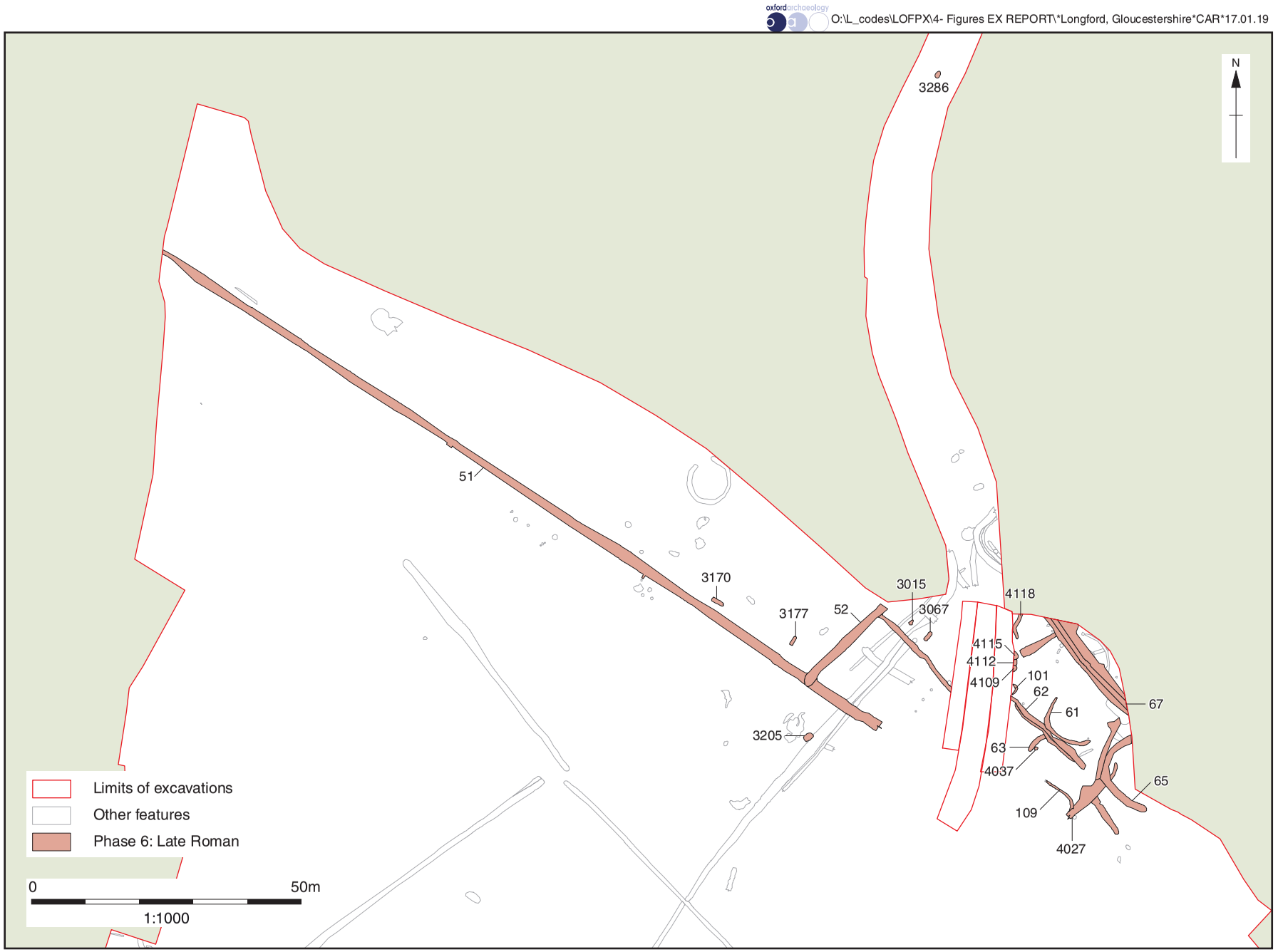

Figure 24: Plan of late Roman features in the northern settlement (Phase 6)

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Figure 25: Inhumation 3015

Figure 26: Inhumation 3067

Figure 27: Inhumation 3177

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Figure 28: Inhumation 3170

Figure 29: Cremation 3286

Figure 30: Inhumation 1750

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Figure 31: Inhumation 1800

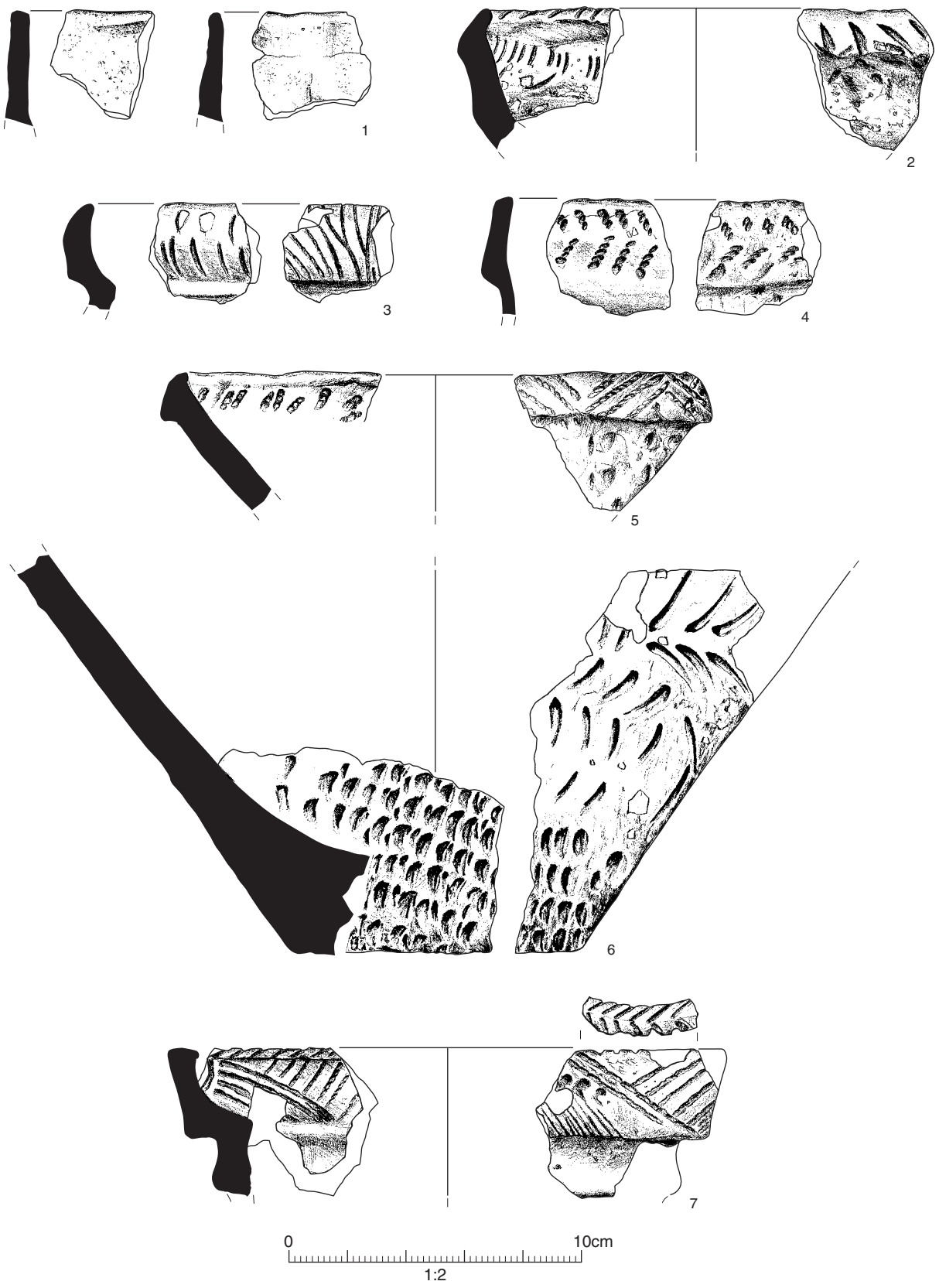

Figure 32: Prehistoric pottery, nos 1-7

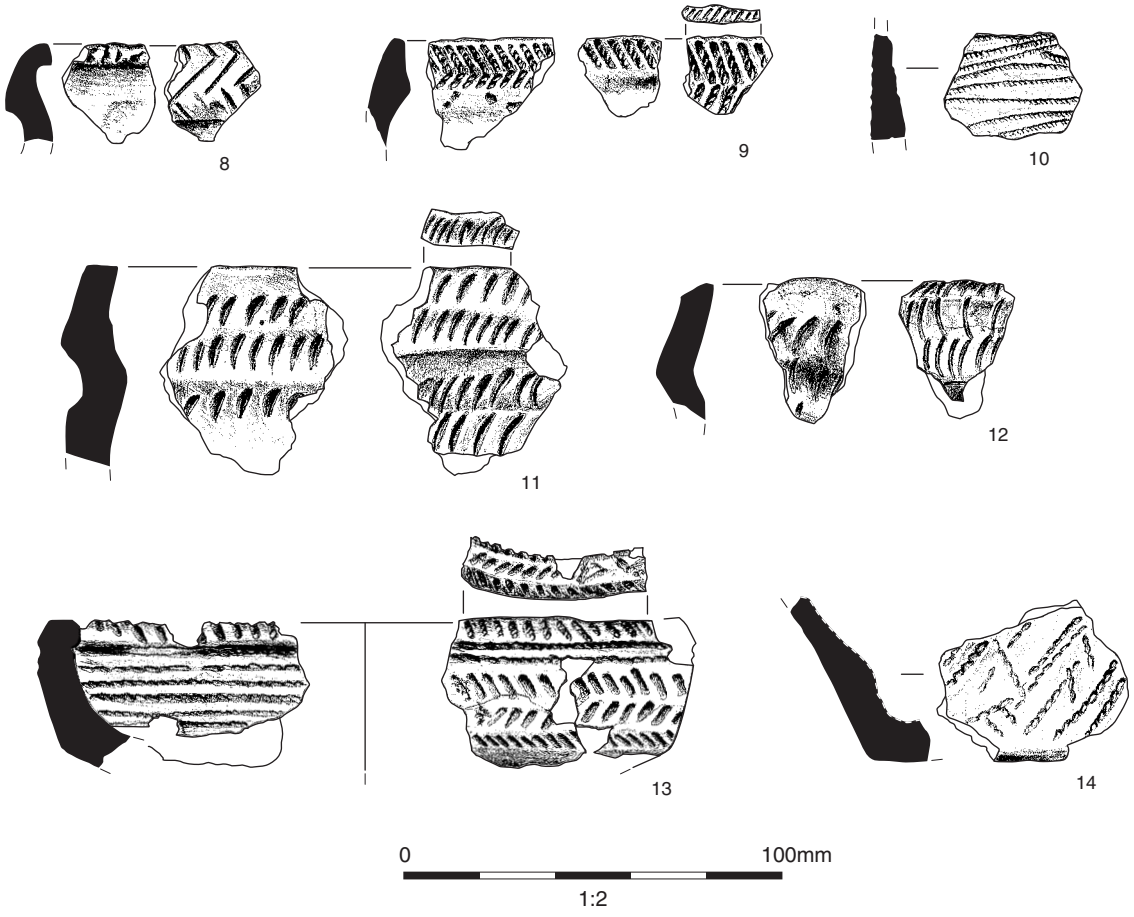

Figure 33: Prehistoric pottery, nos 8-14

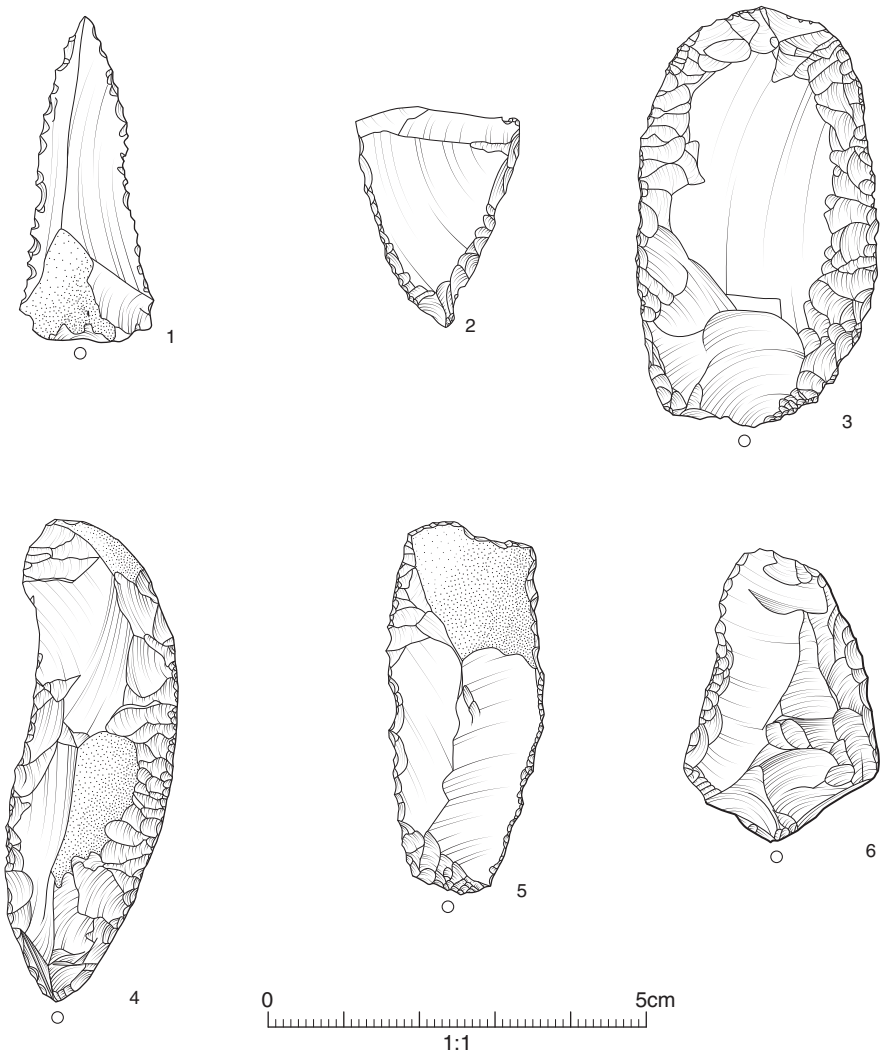

Figure 34: Worked flint

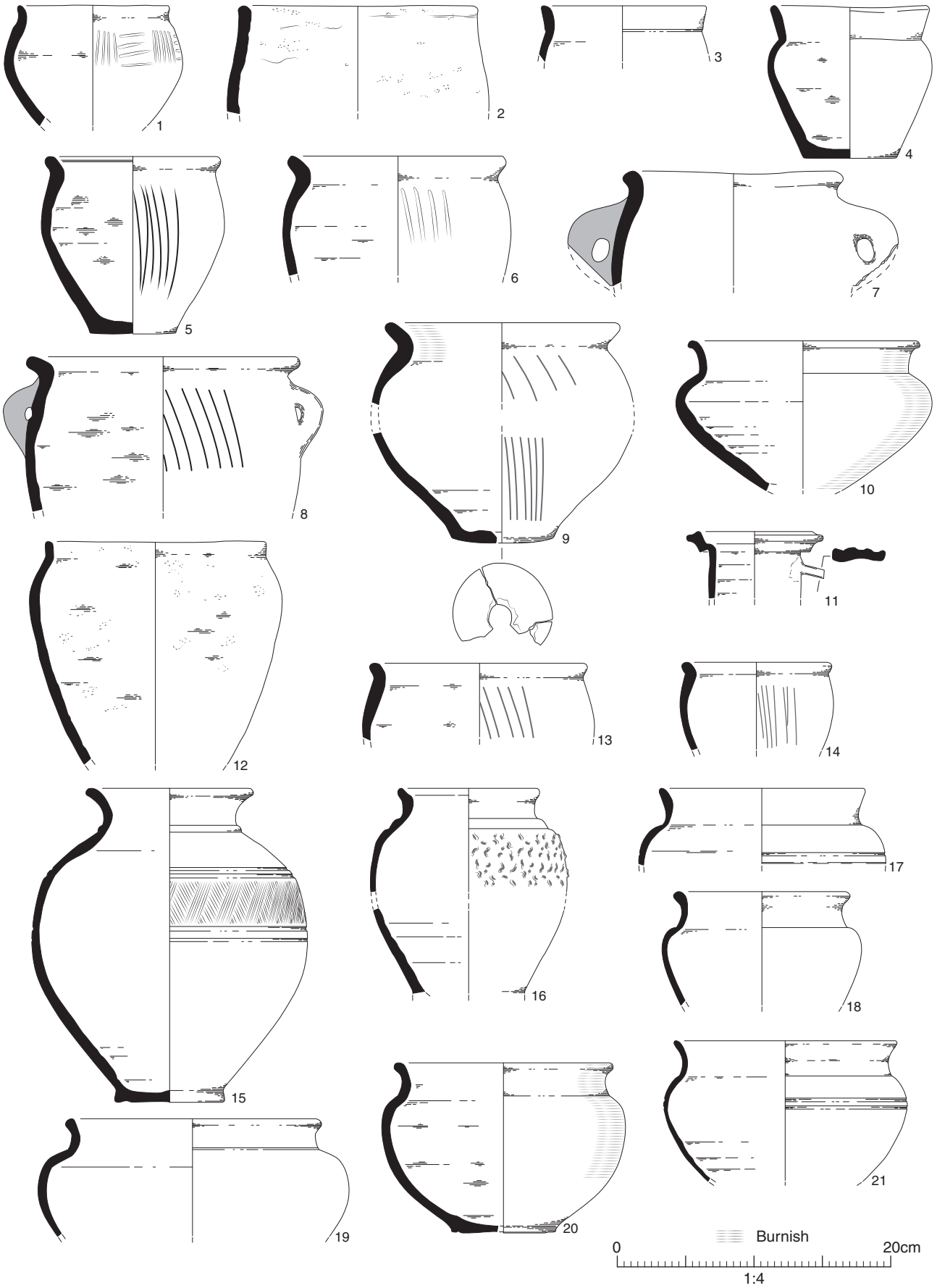

Figure 35: LIA/Roman pottery, non-kiln vessels 1-21

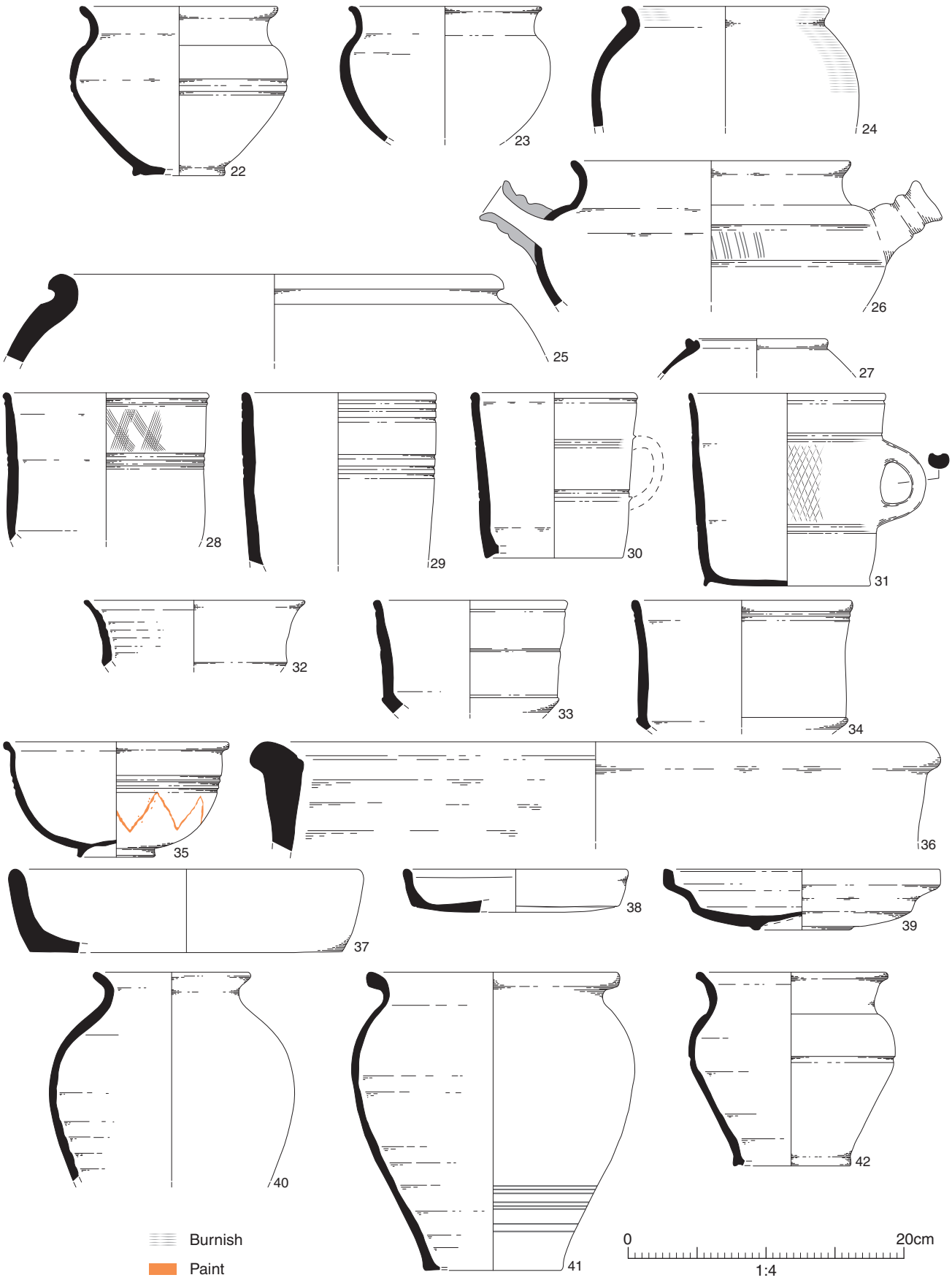

Figure 36: Roman pottery, non-kiln vessels 22-42

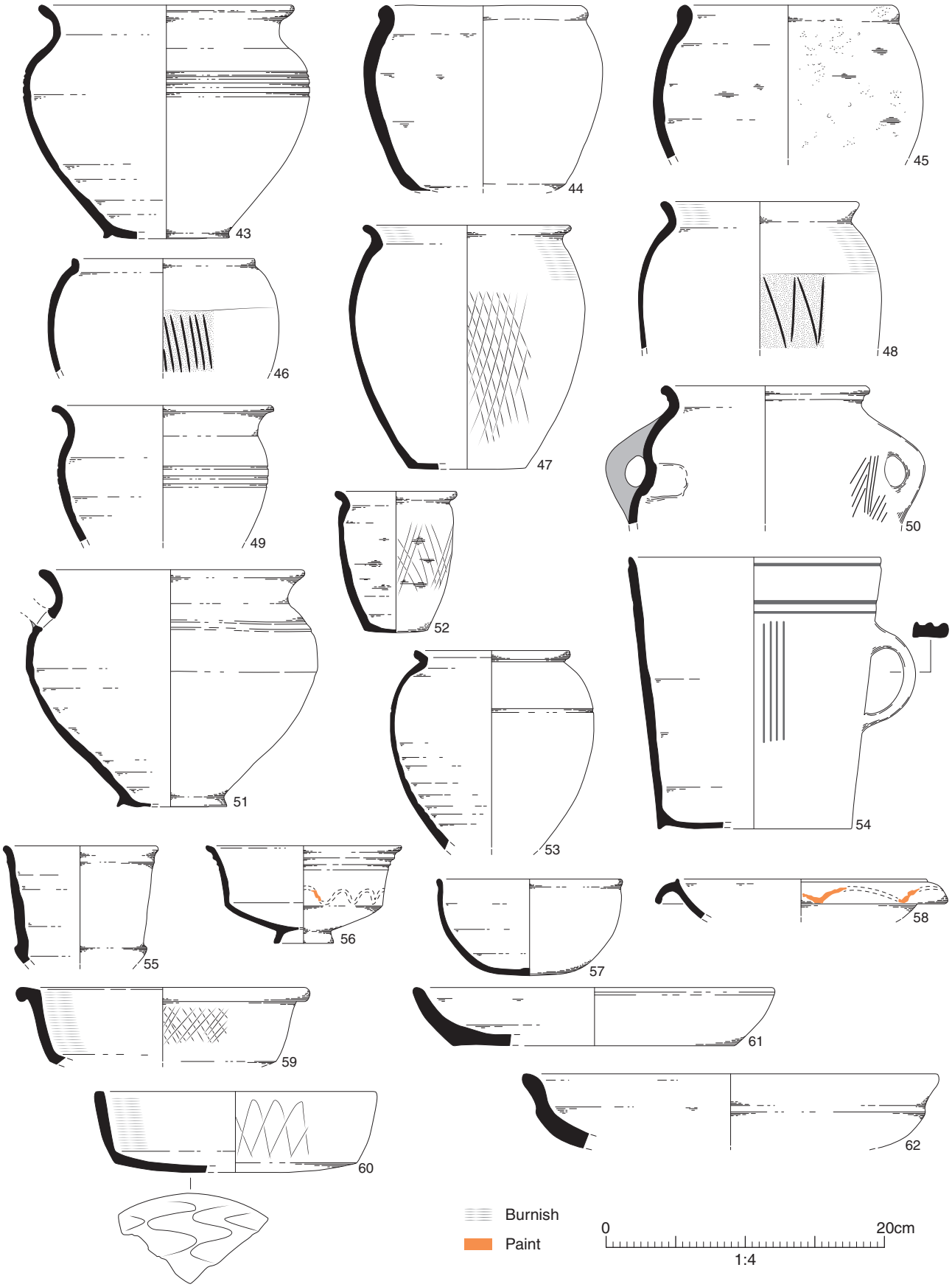

Figure 37: Roman pottery, non-kiln vessels 43-62

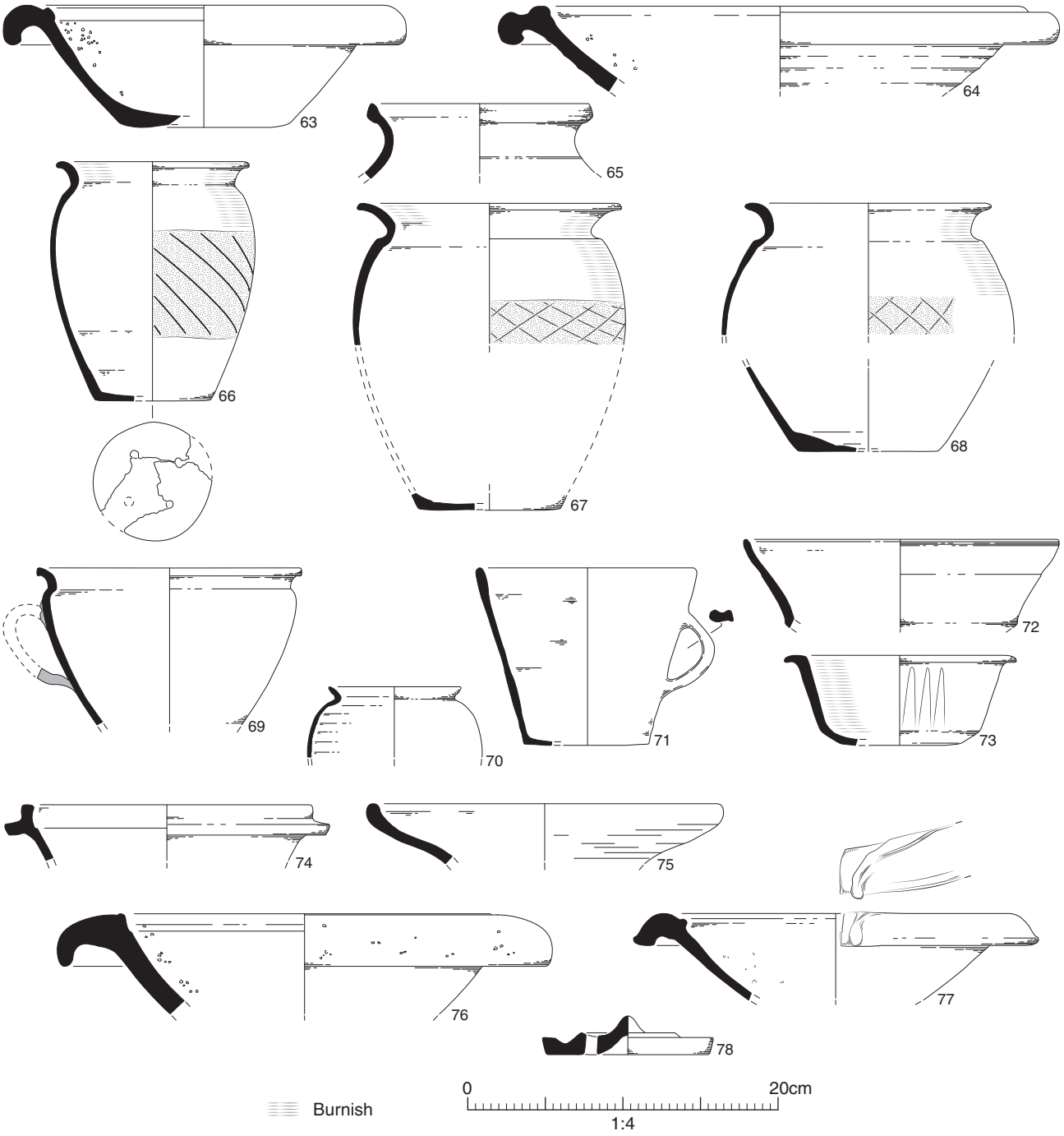

Figure 38: Roman pottery, non-kiln vessels 63-78

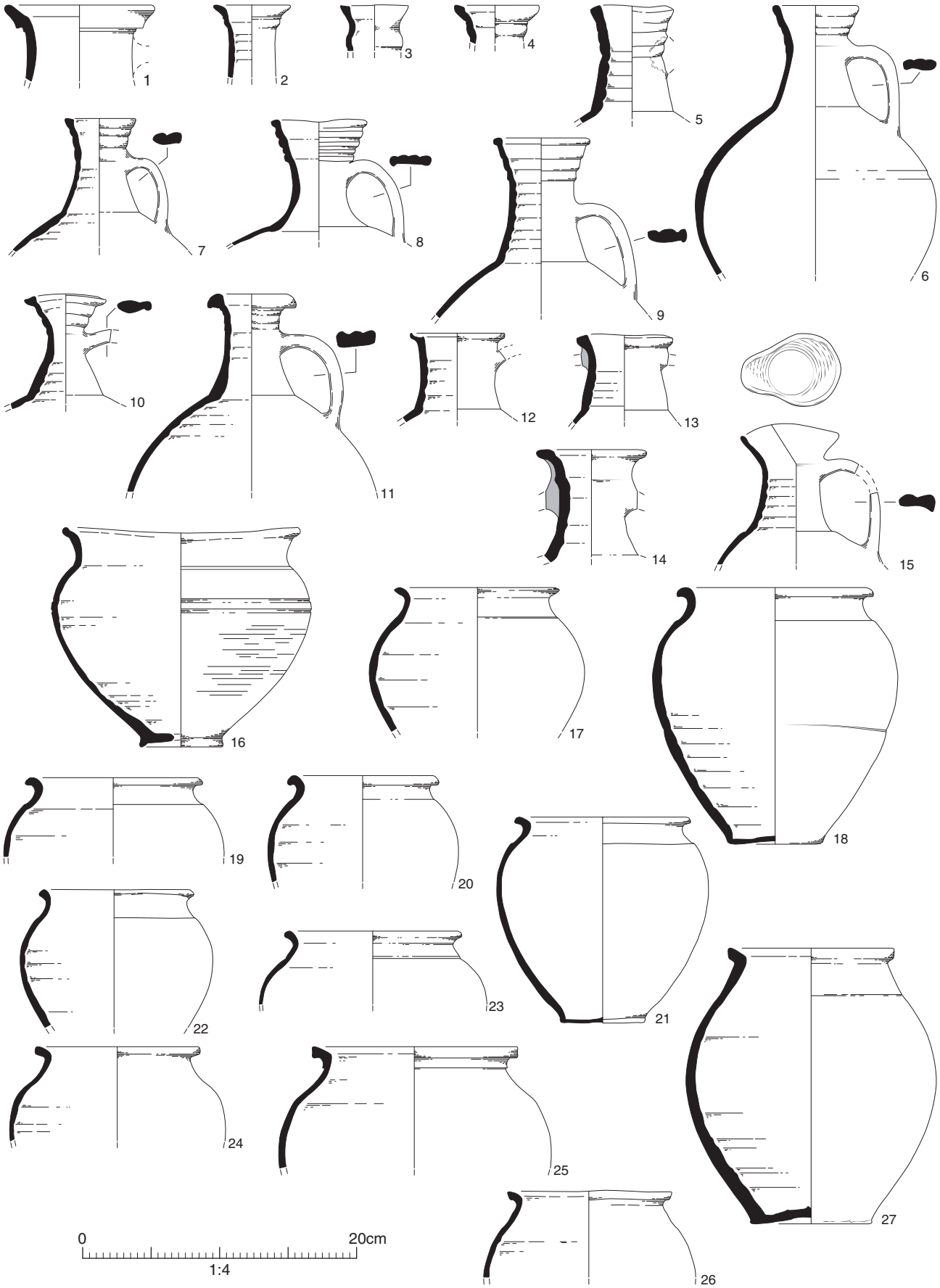

Figure 39: Roman pottery, kiln vessels 1-27

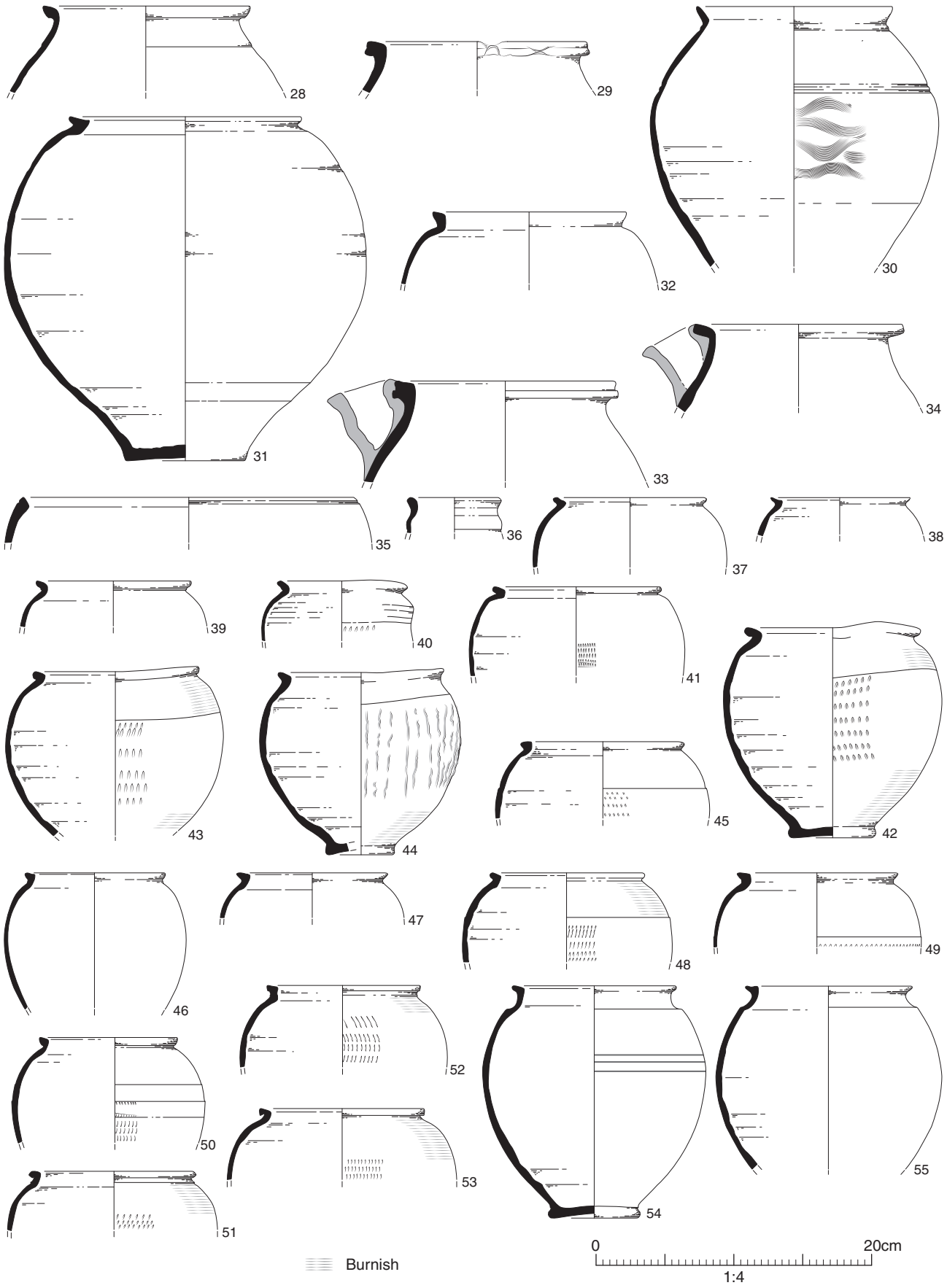

Figure 40: Roman pottery, kiln vessels 28-55

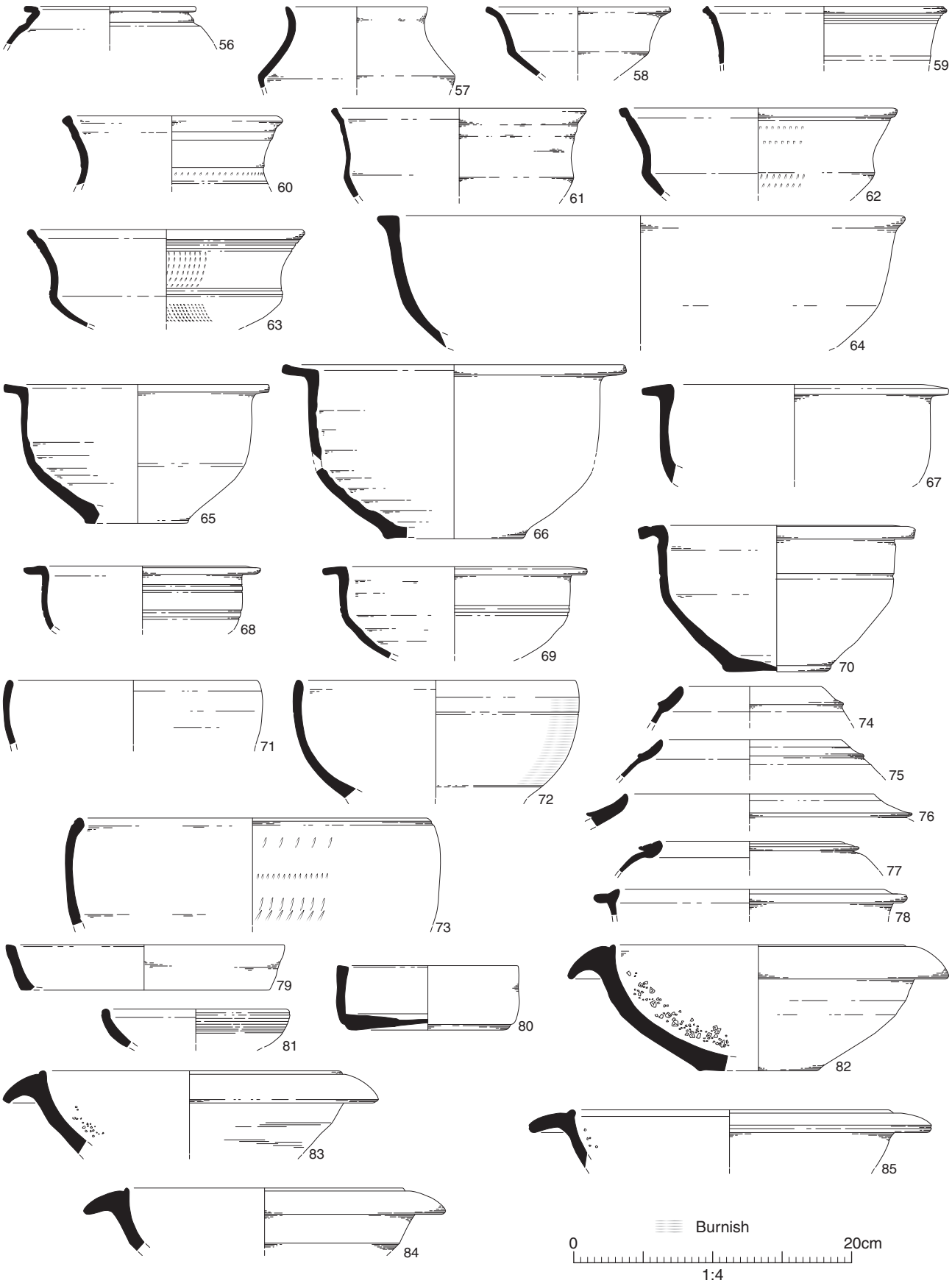

Figure 41: Roman pottery, kiln vessels 56-85

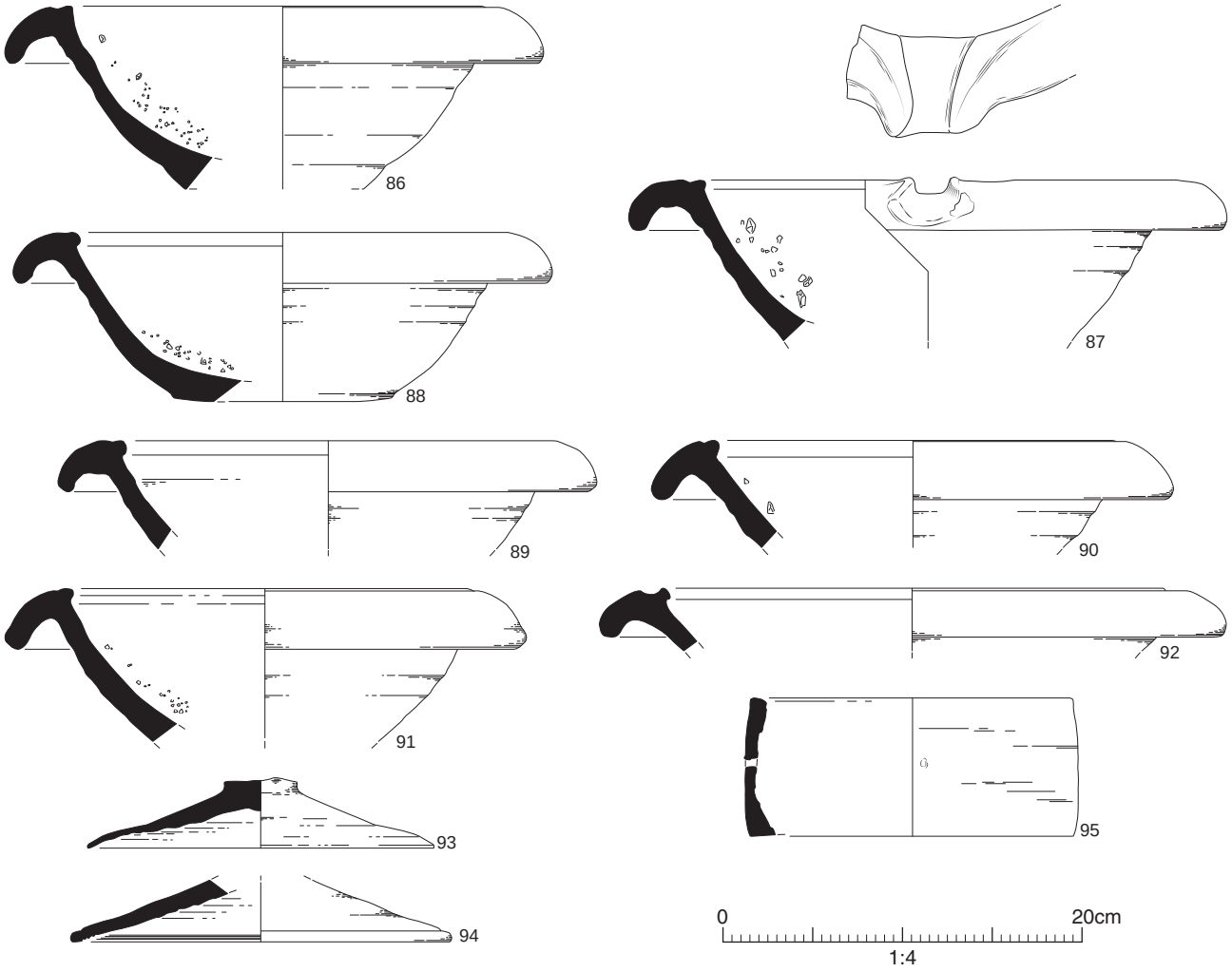

Figure 42: Roman pottery, kiln vessels 86-95

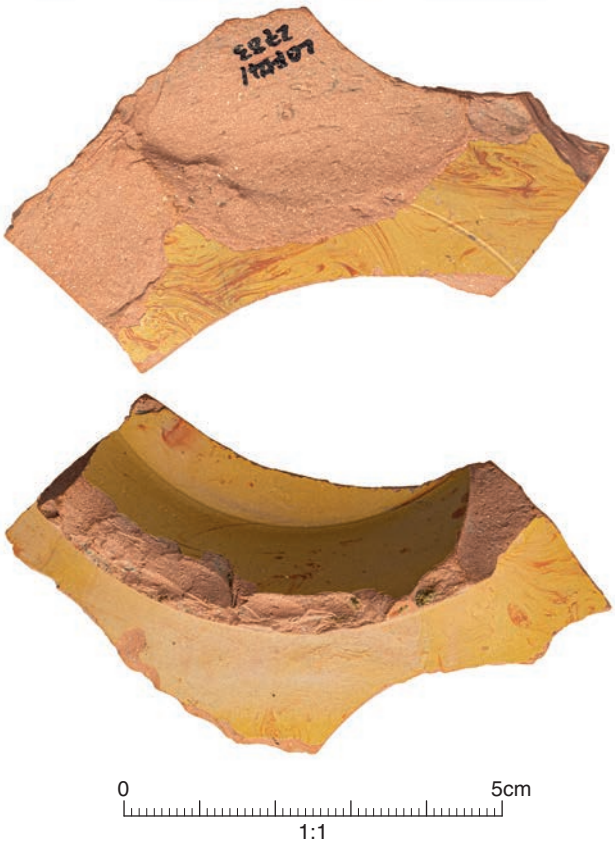

Figure 43: Marbled La Graufesenque samian base sherd

Figure 44: Spatial distribution of all kiln pottery by weight.

Figure 45: Kiln 2350 detail showing finish of nose of pedestal

Figure 46: Kiln 2351 detail showing finish of kiln wall surface

Figure 47: Kiln 2351, wall rebuild 2719 showing firebar built into kiln wall

Figure 48: Catalogue no 1

Figure 49: Dome lining of kiln 2350 (2388)

Figure 50: Firebars from kiln 2351, nos 3-5

Figure 51: Fired clay, nos 6-9

Figure 52: Triangular perforated bricks, nos 10-12

Figure 53: Triangular perforated bricks, nos 13-14

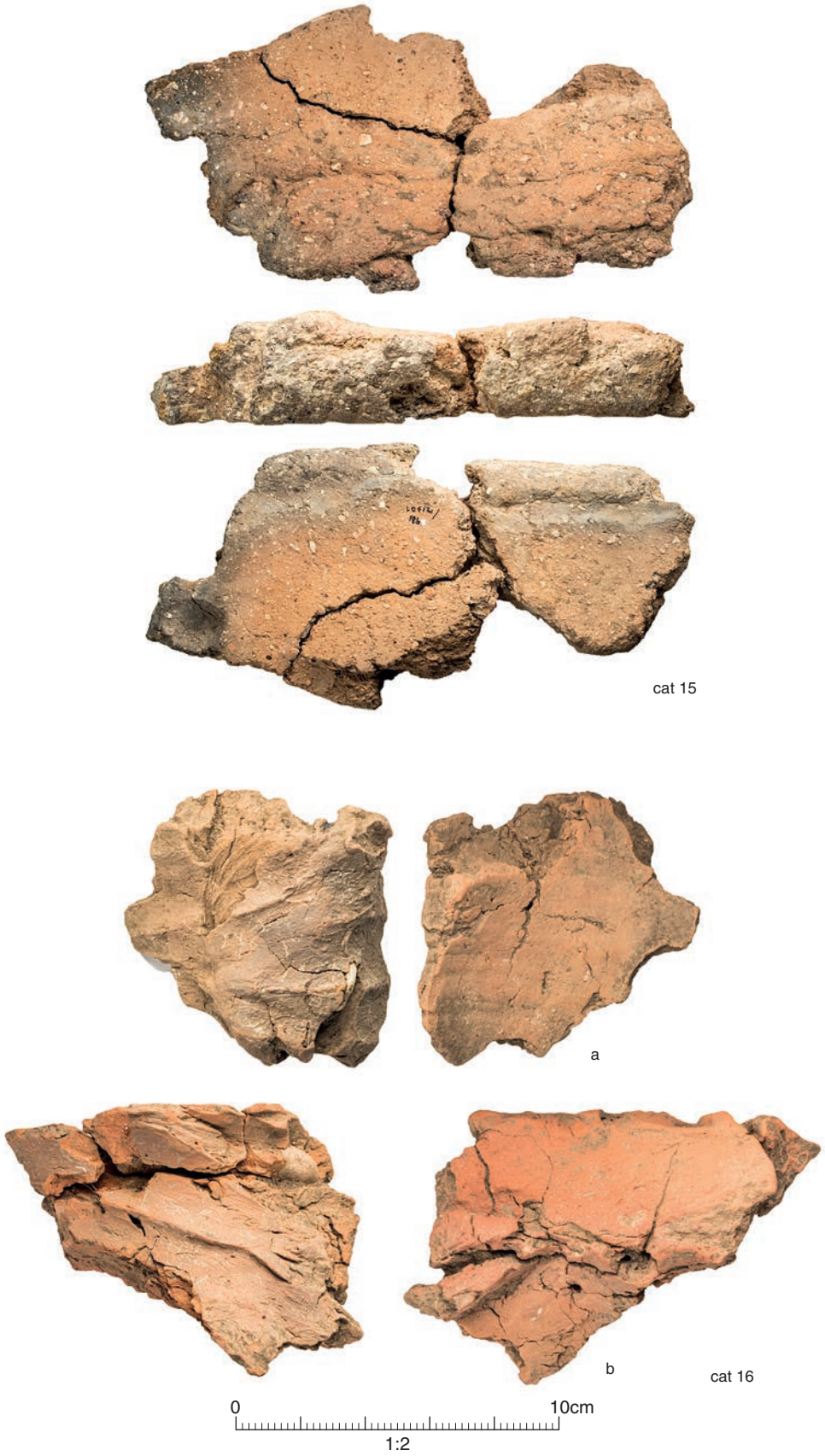

Figure 54: Kiln wall or dome, nos 15-16

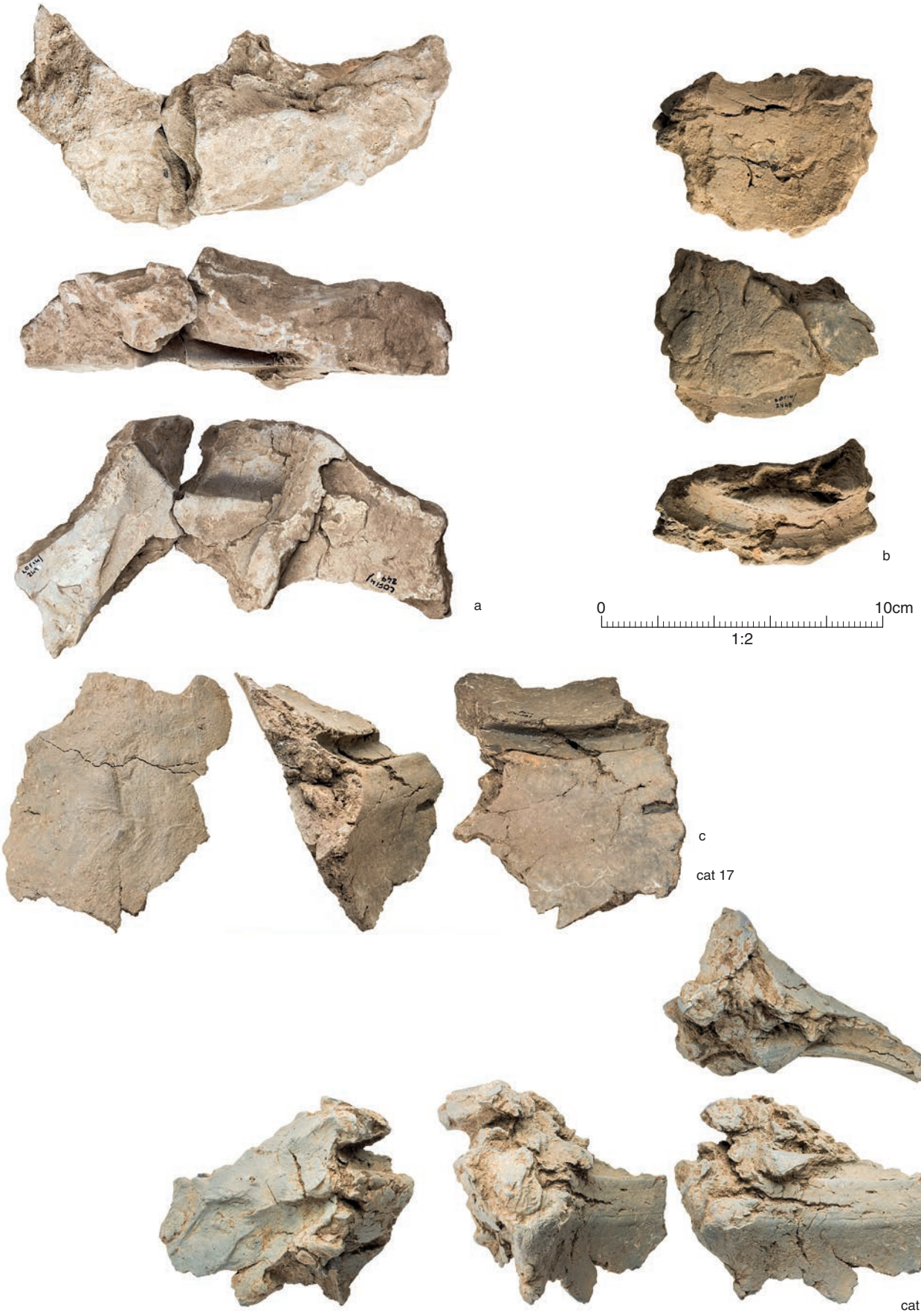

Figure 55: Kiln structure, nos 17-18

Figure 56: Portable pedestal (no. 19) and ceramic kiln tube (no. 20)

Figure 57: Ceramic kiln tube, no. 21

Figure 58: Ceramic kiln tube, no. 22

Figure 59: Ceramic kiln tubes, nos 23-24

Figure 60: Ceramic kiln tube, no. 25

Figure 61: Ceramic kiln tube, no. 26

Figure 62: Ceramic kiln tube, no. 27

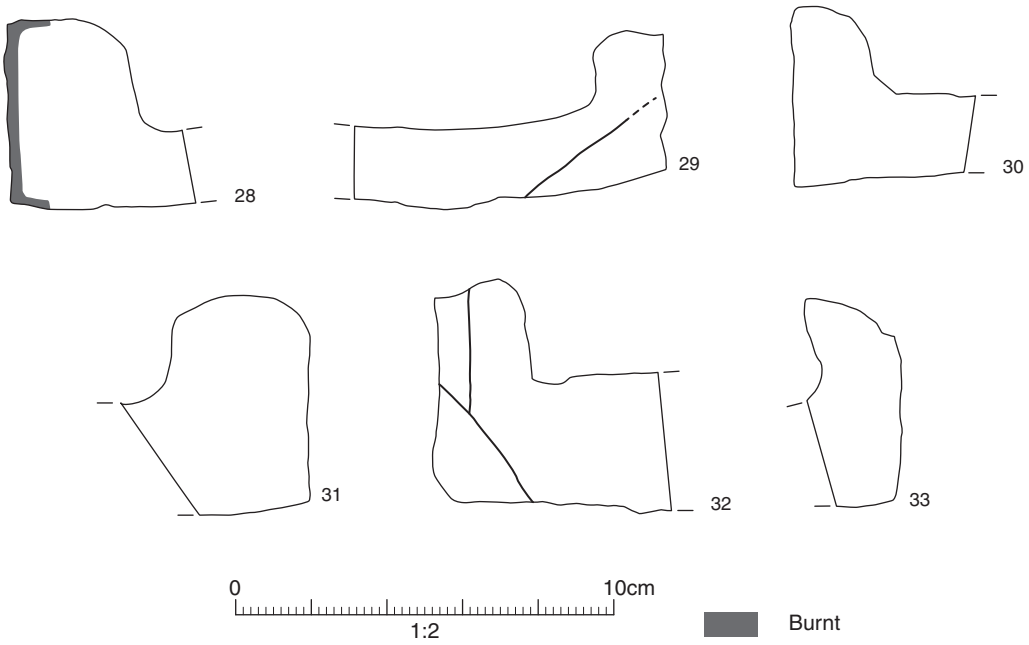

Figure 63: Profiles of tegulae flanges, nos 28-33

Figure 64: Imbrex (no. 34) and wall tile fragment (no. 35)

Figure 65: (a) Trebonianus Gallus coin (AD 251–253) and (b) coin mould fragments

Figure 66: Metal objects

Figure 67: Worked stone objects

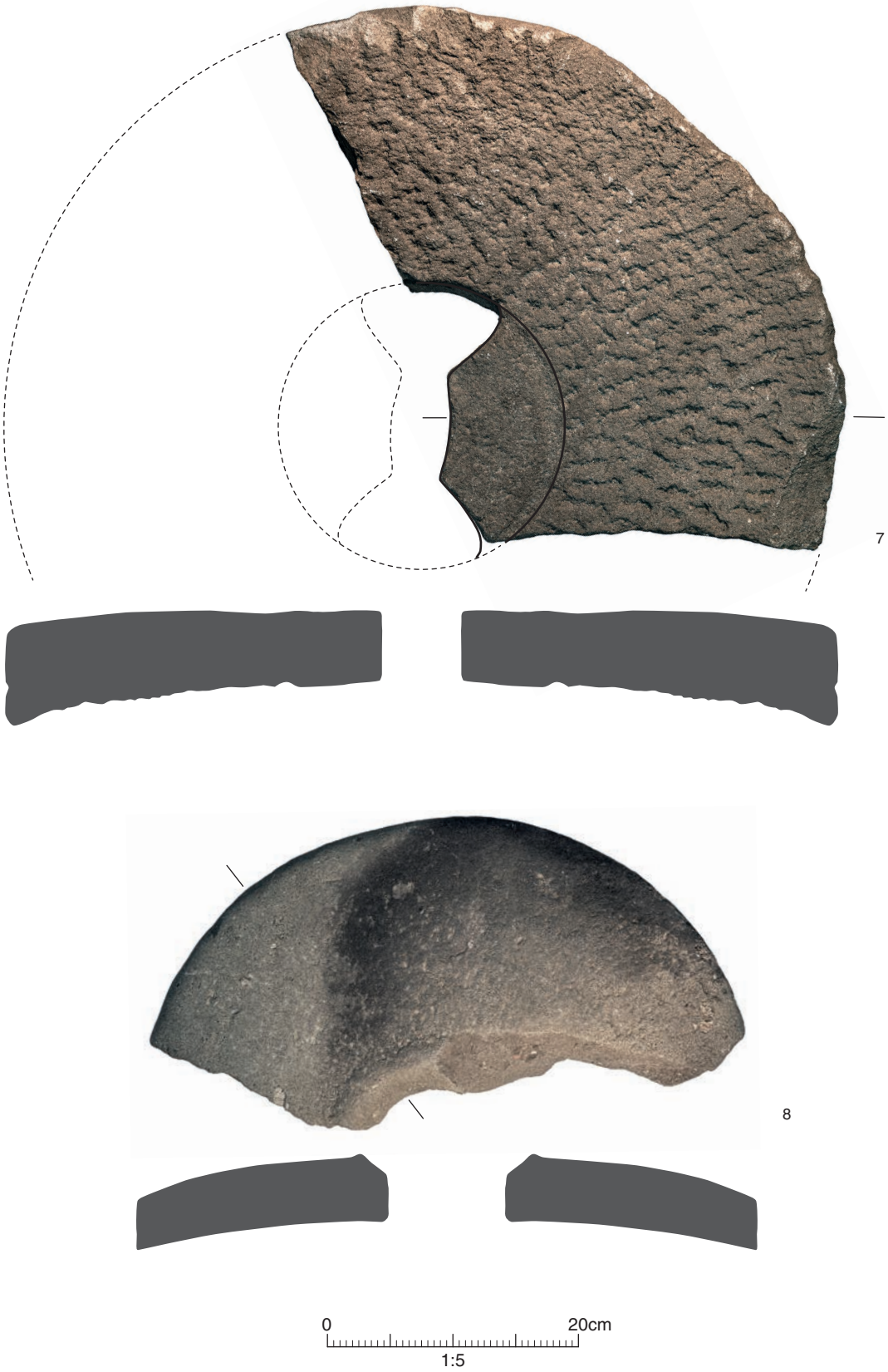

Figure 68: Mill/Quern stones

Figure 69: Human femur from context 1908 (ditch 12)
exhibiting peri-mortem cut marks and evidence of carnivore gnawing

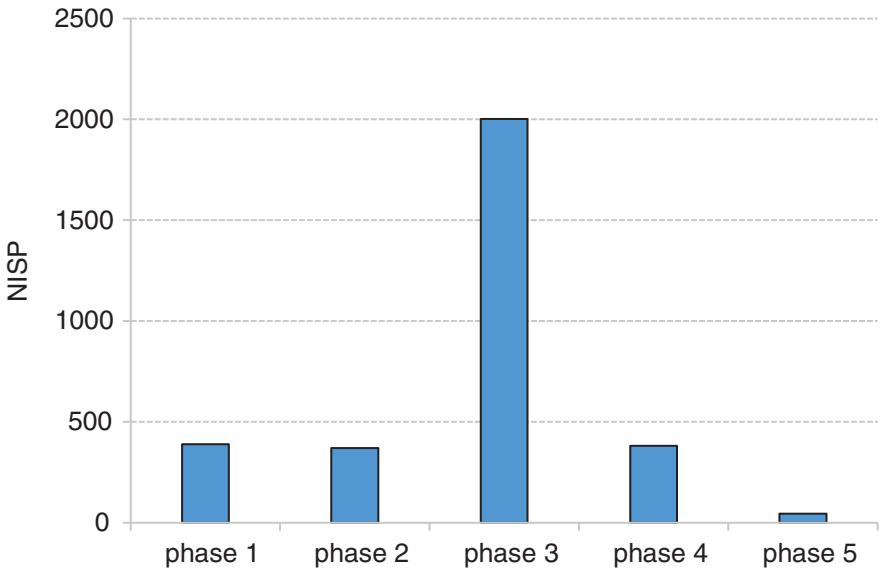

Figure 70: Number of animal bone specimens from each phase

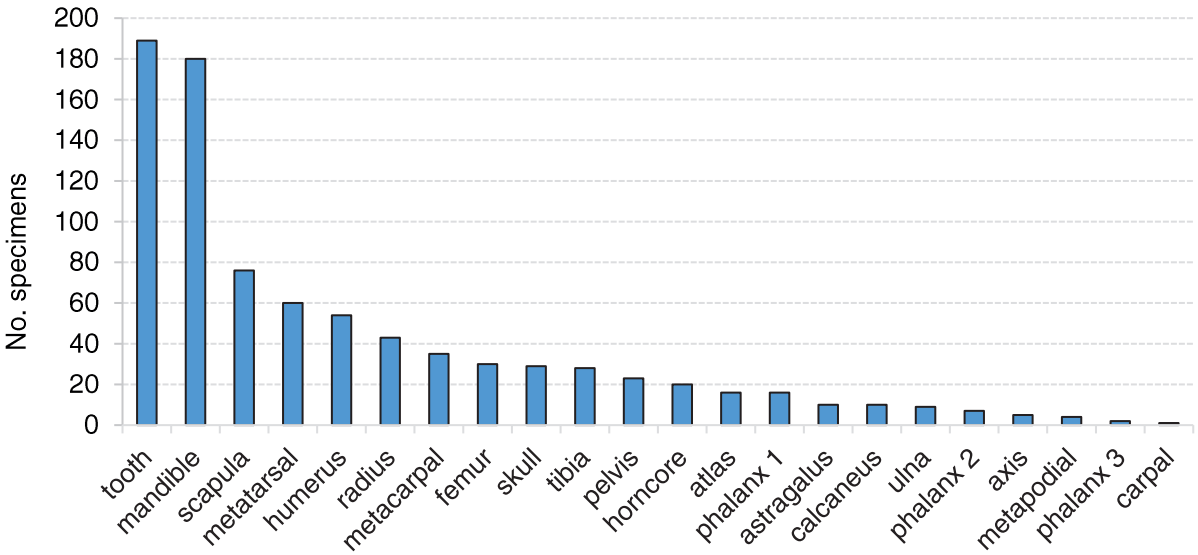

Figure 71: Number of cattle specimens by element from phase 3 features

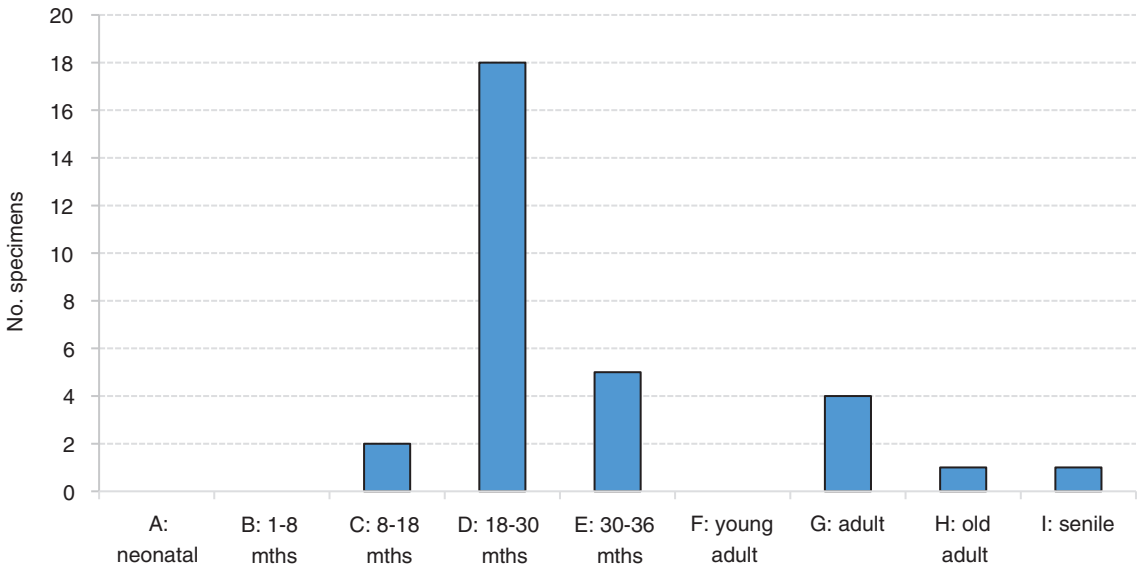

Figure 72: Cattle dental ageing data (phase 3)

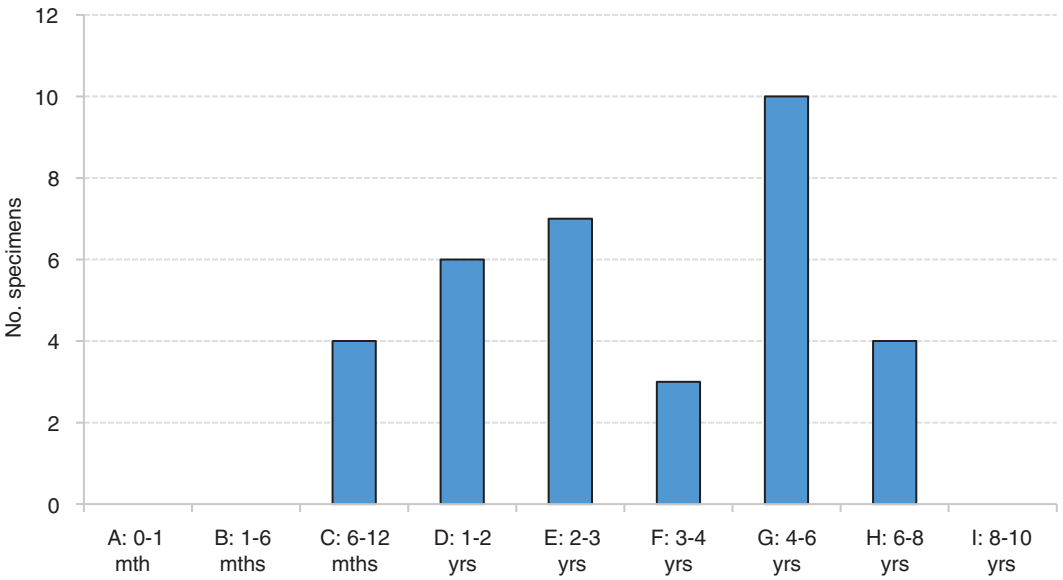

Figure 73: Sheep/goat dental ageing data (phase 3)

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