

**Archaeological evaluation by trial
trenching, land south of Torksey
Castle, Lincolnshire
1–12 June 2020**



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Torksey trial trenching TOCF20

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1 INTRODUCTION

1.1 Project Background

The fieldwork reported here was undertaken as part of the wider University of York ‘Tents to Towns’ project, with funding from the British Academy and Society of Antiquaries of London. The project aims to uncover new evidence for the impact of the Vikings on England, specifically with respect to the emergence of towns and industry. It focusses on Torksey, Lincolnshire, where the Viking ‘Great Army’ spent the winter of AD 872–3, and where in a previous project we identified the site of a camp of *c.* 55ha to the north of the village, and extensive evidence for trade and manufacture (Hadley and Richards 2016a). We have subsequently targeted fields south of the modern village of Torksey, where 9th-/10th-century pottery kilns and burials have been identified, as well as the only pre-Viking occupation evidence known from Torksey (Barley 1964). This presents a unique opportunity to trace the impact of the Army as it made the transition from overwintering to permanent settlement, and to investigate the contribution of the Army and its followers to the origins and growth of one of the most important pottery industries in later Anglo-Saxon England (Perry 2016).

1.2 The Site

The site is approximately centred on NGR SK 83636 78365 and lies on the eastern bank of the River Trent, to the south of the village of Torksey (Fig. 1). It comprises agricultural land in the angle formed by the confluence of the Foss Dyke, believed to be of Roman construction (HER no. 1034549), and the Trent at Torksey Lock; it is bounded to the north by residential dwellings of the village and to the east by the A156. Approximately rectangular in shape, the site has gentle contours, with the highest point, in the middle of the western edge, *c.* 8m AOD; from here the land drops away steeply to the floodplain to the west, while sloping gradually but persistently down to the road on the east. The land also drops down to the north and south.

The bedrock geology comprises Mercia mudstones, which are overlain by Holme Pierrepont sand and gravels, and deposits of Aeolian sand.¹

1.3 Archaeological and historical background

The site is scheduled as the location of the ‘Medieval Town of Torksey’ (English Heritage Scheduled Monument no. 1004991). It has long been recognised as the site of medieval town, with the mid-16th-century antiquarian John Leland describing it as follows:

The old buildings of Torksey were on the south of the new town, but there now is little scene of old buildings, more than a chapel, where men say was the parish church of old Torksey, and on Trent side the earth so balkith up that it showeth that there by likelihood hath been some wall, and by it is a hill of earth cast up: they call it the Windmill Hill, but I think the dungeon of some old castle was there. By old Torksey stands southley the ruins of Fosse Nunnery, hard by the stone bridge over Fosse Dyke; and there Fosse Dyke has his entry into Trent (Toulmin Smith 1907).

¹ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

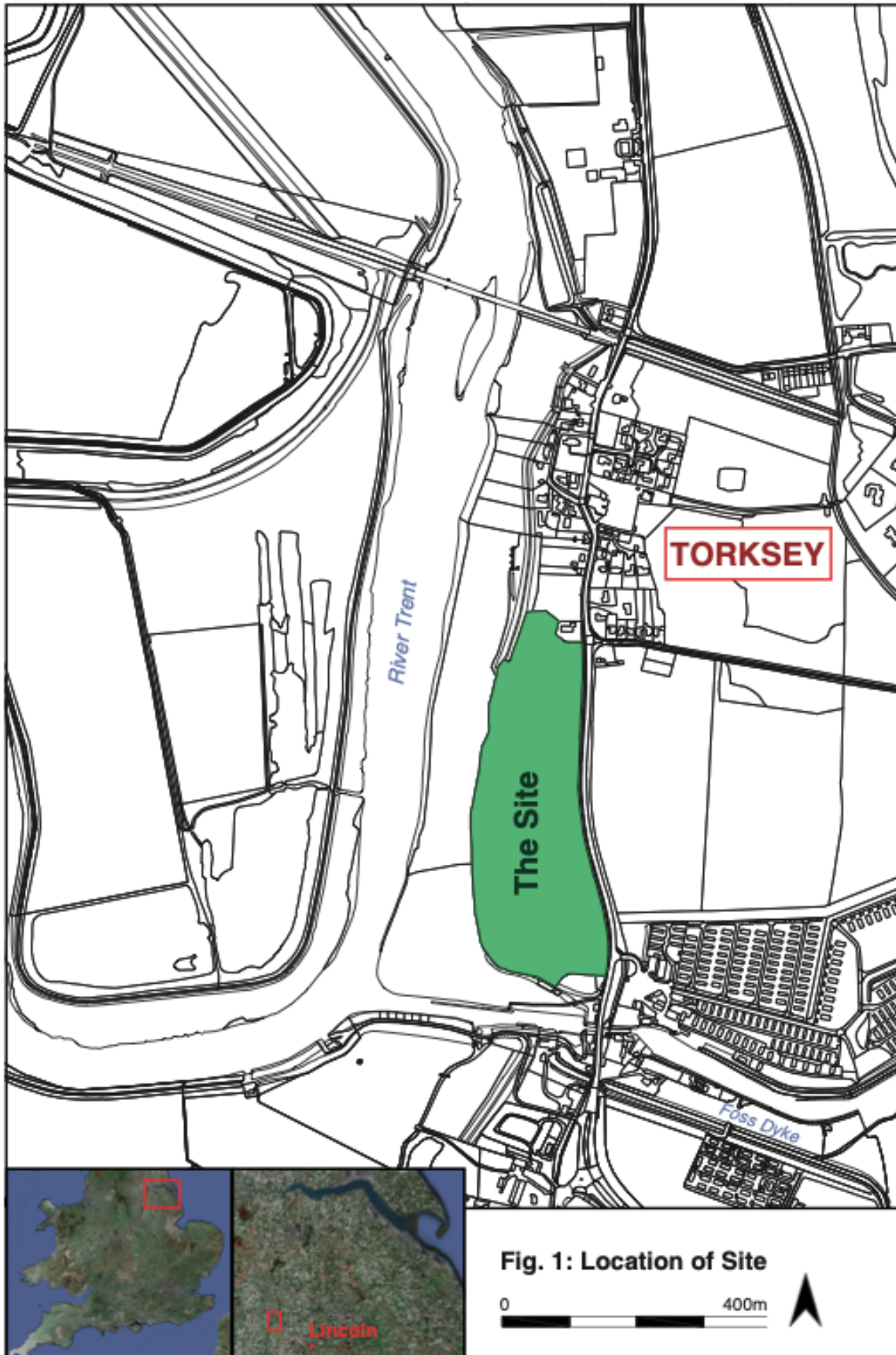


Figure 1: The location of the site. Courtesy DIGIMAP. © Crown Copyright and database rights 2020 Ordnance Survey (100025252)

No remains of any such buildings now remain visible above ground, nor do any earthworks survive (Trott 2018, 22).

Located to the immediate north-west of the site are the scheduled remains of Torksey Castle, constructed of stone and brick. Despite the name by which it is now known, it was not a medieval castle but rather a Tudor manor house built in the 16th century (Scheduled Monument no. 1005056). By the end of the century it was owned by the Jermyn family of Rushbrooke Hall, Suffolk, prominent among whom was Sir Robert Jermyn (d.1614), a member of parliament. The house was damaged during the Civil War in the mid-17th century, but continued to be held by descendants of the Jermyn family, including Sir Jermyn Davers (d.1743), a member of parliament whose father had married Jermyn heiress, the Hon. Mary Jermyn. Davers held the house in 1726 when it was illustrated by engraver Samuel Buck, at which time it was in a ruinous state (Fig. 2). It was subsequently sold to the Dukes of Newcastle and then to Sir Abraham Hume, in whose possession it was by 1751, when it appeared on an estate map of all his properties in Torksey. The west facade, and parts of the north and south walls survive, and it is a Grade I Listed Building (no. 1064079), but is on the Historic England Heritage at Risk Register.



Figure 2: Engraving of the west facade of Torksey Hall by Samuel Buck in 1726; at this time the house was owned by Sir Jermyn Davers and was in a ruinous state. The village of Torksey can be seen to the rear on the left-hand side of the engraving. Copyright the Trustees of the British Museum; reproduced under a CC BY-NC-SA 4.0 license

The site is now a single field, but on the estate map of Alexander Hume from 1751 it is divided into two fields. The northern one was then called Pal'd [Paled] Close, the name of which suggests it may then have been fenced, and the southern field was called 'High Fosse Close'. On the floodplain are two further fields. To the south is 'Abram's Hoult' (island), which is separated from High Fosse Close by an outflow from the Foss Dyke which can still be seen on aerial photographs, and to the north is a field called House Marsh, presumably a reference to Torksey Castle (Trott 2018, 26).



Figure 3: Estate map of Alexander Hume Esq. of 1751. Lincolnshire Archives

1.4 Archaeological evidence from previous fieldwork

1.4.1 Roman

In his 1906 paper, 'The Royal Burgh of Torksey', the Revd. R.E.G. Cole mentions that 'many fragments of Roman work have at various times been ploughed up on the high ground south of the castle on which the Roman station stood; and a whole series of Roman coins, from the First Century to the close of their occupation of Britain, found here was in the possession of the late Sir Chalres Anderson, of Lea' (Cole 1906, 456). A Roman copper-alloy statue of the god Mars was recovered from the Foss at Torksey in 1773 and is now in the British Museum (BM registration no. OA.248). A Roman 'pavement' and 'coins' are noted at the southern end of the site on OS maps of the late 19th century, but subsequent archaeological investigations have failed to confirm the presence of Roman occupation there (e.g. Barley 1964, 174). Recent fieldwalking and metal-detector survey have, however, recovered a small array of Roman pottery, coins and other metalwork, although in insufficient amounts to suggest any extensive Roman occupation anywhere on the site (Perry 2020; Richards and Hadley 2020). Roman pottery kilns were excavated by Adrian Oswald in the 1930s on the southern banks of the Foss Dyke to the south-east of the site and near a farmhouse known as Little London (Barley 1964, 165; Fig. 4).

1.4.2 Anglo-Saxon

Maurice Barley (1964, 172), of the University of Nottingham's Department of Continuing Education, noted finding some early Anglo-Saxon pottery during his investigations of the site in the early 1960s. Pottery recovered during fieldwalking on the site in 2012 also included a small amount of early Anglo-Saxon date (Perry 2020). No pottery of securely middle Saxon date has, however, been found

on the site, and the vast majority of the archaeological evidence of the Anglo-Saxon period from the site dates from the late 9th century onwards.

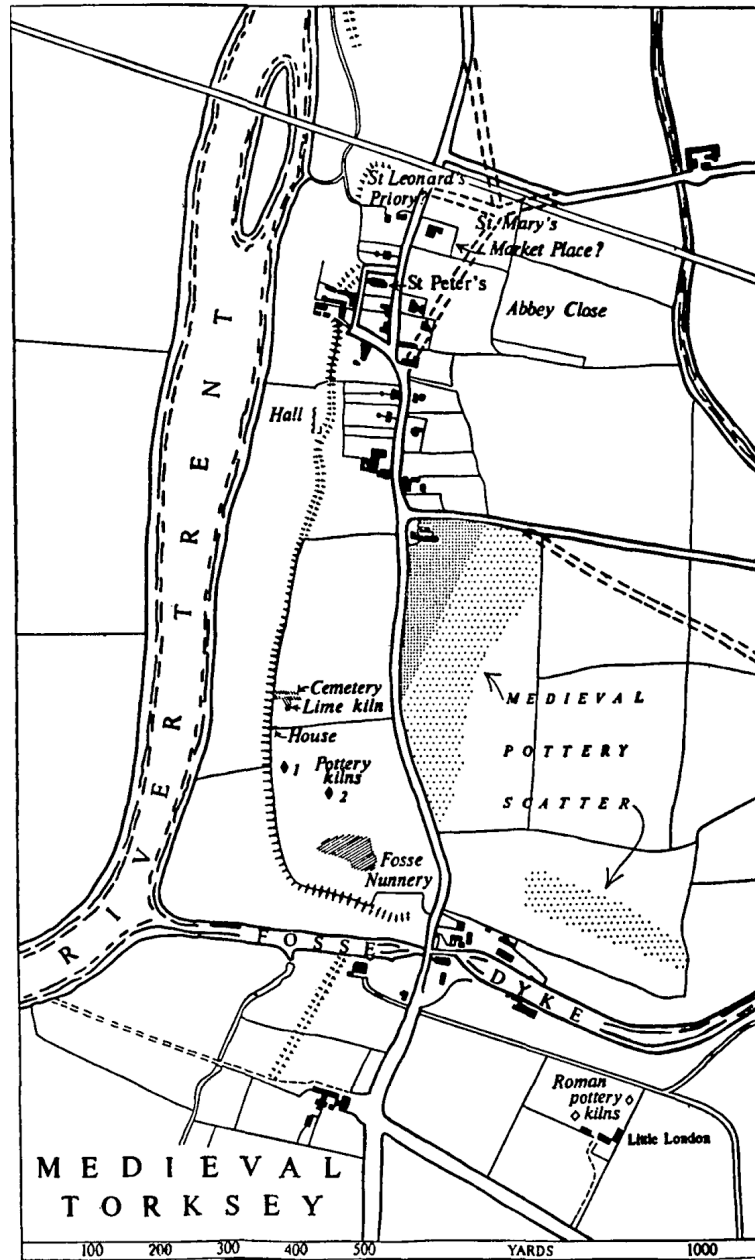


Figure 4: Map of medieval Torksey from Maurice Barley's 1964 paper on his excavations on the site; this shows the locations of the two kilns, cemetery, lime kiln, and the nunnery

Torksey is well known for its pottery industry dating to between the late 9th and late 11th centuries. The first known reference to this industry comes from the diary of Lincolnshire folklorist and archaeologist Ethel Rudkin, who visited the site in 1932 and recorded seeing a concentration of unglazed pottery in the southern field (Barley 1981, 290). That this may have been the location of one of the kilns seems to have been confirmed by an excavation undertaken in 1949 by Spencer Cook, who had identified its location by surface scatters of pottery (Barley 1964, 175). This kiln was re-excavated in 1961 by Maurice Barley (1964), who used a magnetometer survey to locate it, and

also identified a second one to the south-east which he also excavated; both of these kilns were located in the southern field (Fig. 4). The pottery recovered was in a grey, sandy ware, decorated with rouletting and thumb bands of applied clay, and it was shown that the kilns produced cooking pots, bowls, storage jars and spouted pitchers (Barley 1964, 177–80). Barley (1981) and his students excavated another five kilns at the southern end of the village between 1963 and 1968; two were in the field on the east side of the A156, and the other three were to the north on the opposite side of Sand Lane (then known as Common Lane).

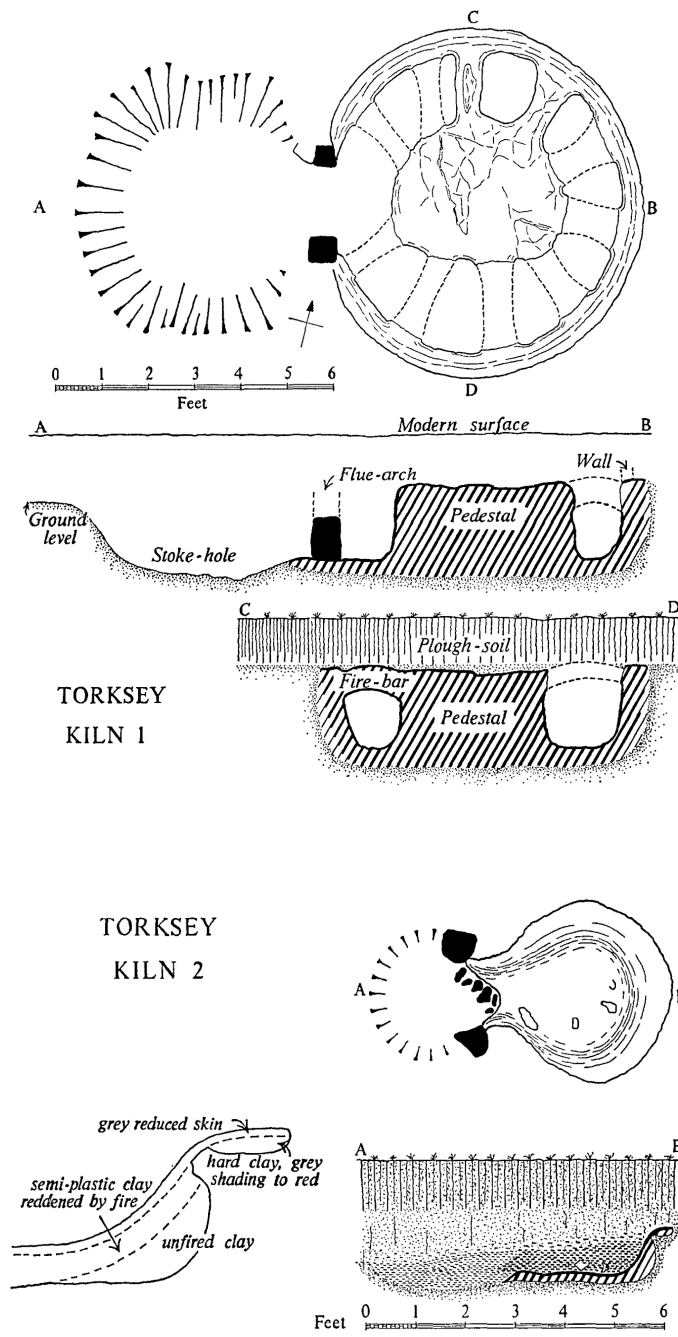


Figure 5: Two kilns excavated by Maurice Barley in the early 1960s (Barley 1964)

Barley (1964, 180–2) initially dated the Torksey industry to between the late 10th and early 12th centuries. This was partly because he was aware of sherds of the type produced by Kiln 1 in the town ditch at Nottingham which had been filled in during the latter part of the 11th century, while sherds of this type were also sealed beneath the rampart of Newark Castle (Notts), which was constructed in the early 12th century. On typological grounds, and similarities with the then better understood similar industry from Thetford, Norfolk, Barley believed that the products of Kiln 2 were earlier in date, perhaps dating to before *c.* 1000. By the time that Barley published his second paper on the Torksey kilns in 1981, he now argued that pottery production may have commenced in the early 9th century. He drew attention to the similarities of the pottery to continental products and thought that the industry originated in the 8th or 9th century, but that ‘it was the circumstances of mobility and enterprise created by the Scandinavian settlements which enabled it to flourish’ (Barley 1981, 287–9). However, more recent work by Gareth Perry (2016) on the Torksey pottery industry has reassessed the chronology of the industry, arguing that production began in the late 9th century. He included in his work analysis of the products of a further eight pottery kilns identified within the modern village of Torksey, five of which were located immediately north of the site at Castle Farm (Field 1990; Palmer-Brown 1995).

A magnetometer survey undertaken in 2012 as part of the current project identified a series of magnetic anomalies that were interpreted as the locations of additional kilns (Brown 2012; Fig. 6). Anomaly G33 seemed to correspond with the location of Barley’s Kiln 1, and the anomalies G37–40 were also interpreted as revealing kilns (although G37 seems to correlate with the lime kiln excavated by Barley; see Section 1.4.3 below). Barley’s Kiln 2 did not, however, show up on the magnetometer survey. In the vicinity of the locations of these possible kilns were scatters of other magnetic anomalies, between 2m and 5m across, which were thought to represent associated structures, such as sunken-featured storage, workshops or accommodation, and negative features relating to the industry, such as waster pits or clay/sand pits (Brown 2012, 11). More recently, a magnetometer survey was undertaken by Headland Archaeology (Harrison 2018) on behalf of the Environment Agency in advance of planned flood defence works on the western and southern edges of the site. The survey investigated those areas of the site that had not been surveyed in 2012, and at the northern end of the site, along its eastern edges, ten features (K1–10) were interpreted as kilns. Confidence that these magnetic anomalies do, indeed, reveal the locations of kilns has recently been increased by analysis of pottery recovered from the site during fieldwalking in 2012. Perry (2020) identified concentrations of Torksey ware in the vicinity of these magnetic anomalies.

Barley (1964, 184) had hoped to excavate urban buildings from the early medieval town. One was excavated 160ft (*c.* 49m) north of Kiln 1 in the northern field. This was represented by the lower part of an irregular wall slot of very dark sand, extending for *c.* 16 feet (*c.* 4.9m) west-east, with a circle of dark sand to the east of it, possibly a posthole. Three similar patches were encountered in a parallel line 5ft 6in (1.7m) to the south, which may also have been postholes (Fig. 7). The red clay exposed in this area was initially thought to be the floor surface of the building, but was actually natural. Outside the building pottery from Kiln 1 had been trodden into the ground, along with ash and charcoal, in a possible cooking hollow. A channel filled with dirty sand was interpreted as a path leading from the house towards the kiln, and from this he deduced that the house seems to have been contemporary with the kiln, ‘and may well have belonged to the potter’. He also noted that some of the pottery from the area of the house was not like any of the pottery known from Kiln 1, and from this he surmised

that there were other kilns remaining to be discovered nearby, or that the Kiln 1 products known were only from its last firing. A sherd of Stamford ware was also found on the house site.

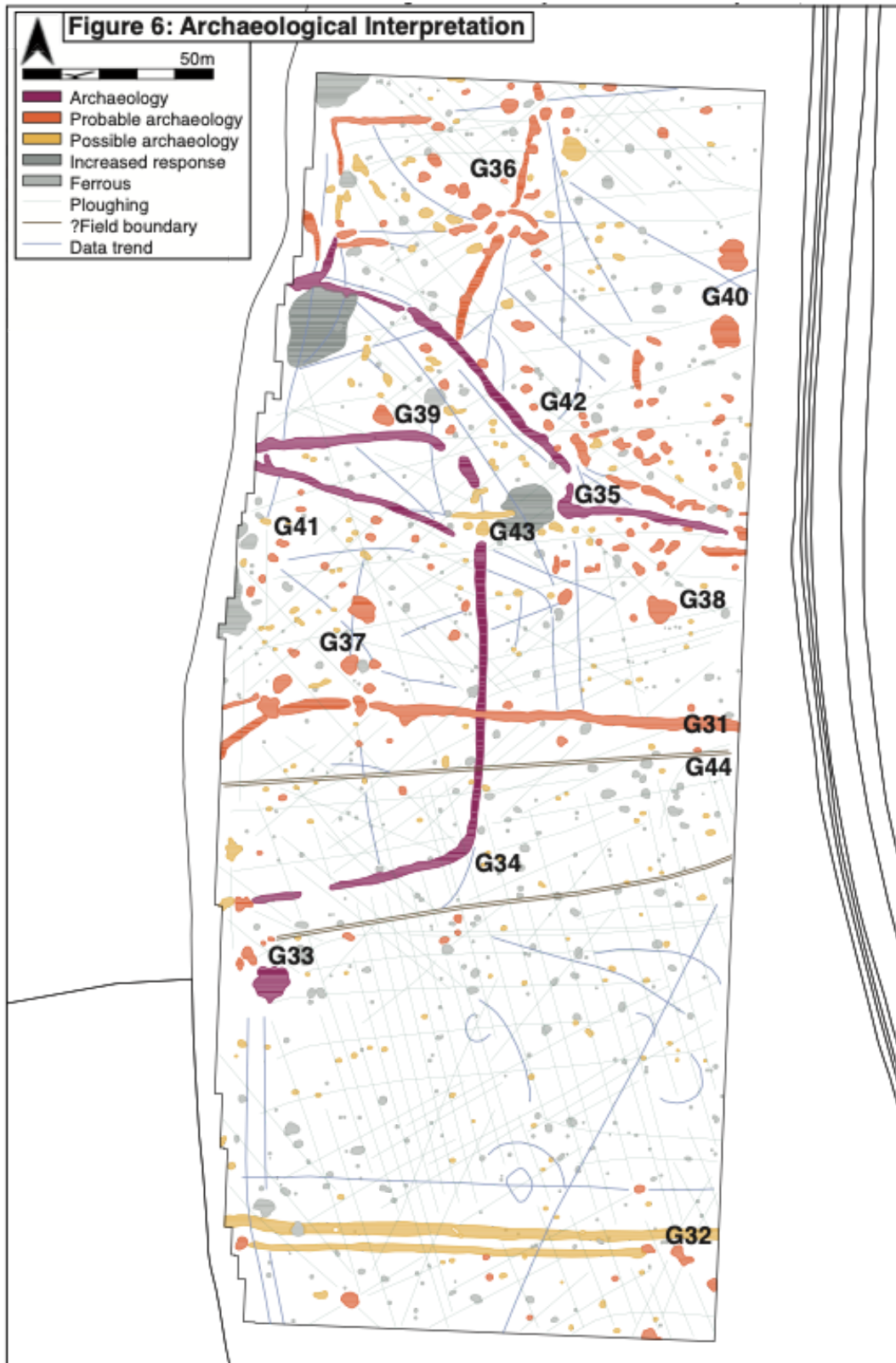


Figure 6: Archaeological interpretation of the results of the magnetometer survey undertaken in 2012 on the site (Brown 2012)

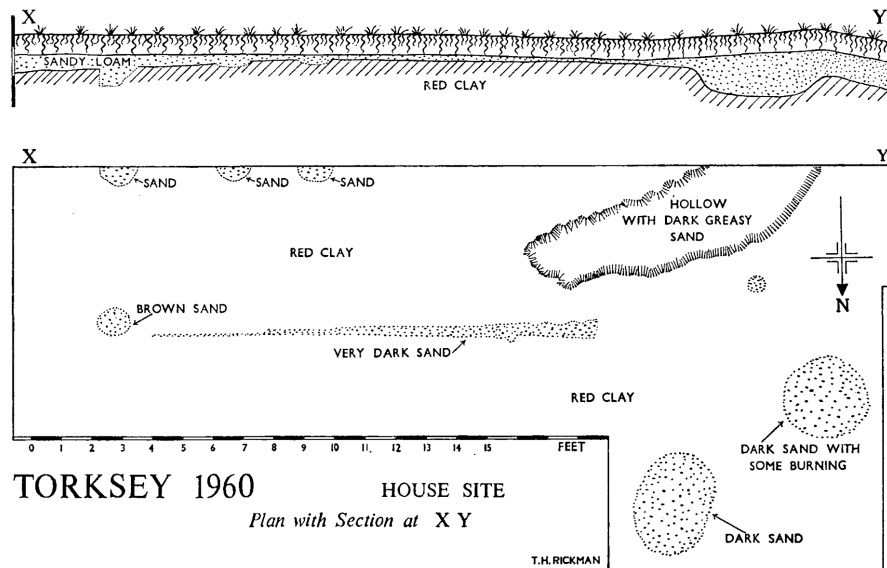


Figure 7: Plan and section of the house that Barley excavated at the southern end of the north field (Barley 1964, 185)

Barley (1964, 187) investigated a spread of stone in a 6 ft (1.8m) square near Kiln 2, which revealed stone foundations, laid in clay, which were constructed of the local sandstone. He concluded that the building had been abandoned before Kiln 2 was built. He also investigated a stone spread ‘in the northern half of Castle Close’. Excavation revealed evidence of a building 4–5ft (1.2–1.5m) down. While he did not explicitly describe this structure, the conclusion to his paper suggests he believed it was early medieval when he noted that ‘the most interesting dwellings on the site of old Torksey are stone- and clay-walled structures of middle Saxon or Viking date’.

Barley also excavated burials in the northern field and while he believed they were late medieval (see Section 1.4.3), radiocarbon dates from skeletal remains collected during fieldwalking in 2012 indicates that burial commenced in this part of the site in at least the late Anglo-Saxon period (Craig-Atkins 2020). The 2012 magnetometer survey identified an enclosure on the west side of the site, on the higher ground. This D-shaped enclosure runs *c.* 60m from the western edge of the field, roughly 15m north of anomaly G33, which is believed to be Barley’s Kiln 1. It then continued north for *c.* 100m. The enclosure is clearly defined, although this clarity is somewhat reduced in the northern section, where it appears to run through an area of multiphase archaeology and is cut by at least one separate anomaly. There is an apparent gap in the southern side of this feature, possibly an entrance way, although it was alternatively thought possible that there was a lack of anomaly strength at this point, due, for example, to plough damage (Brown 2012, 6–7). It is, however, notable that this is in the area where Barley (1964, 184) excavated a building, with its path leading towards Kiln 1, which may strengthen the argument that there was, indeed, an entrance way into the enclosure at this location.

Given that the concentration of human remains recovered during the 2012 fieldwalking sits within the northern part of this feature (Craig-Atkins 2020) and the kilns appear to have been located outside it (Perry 2020) this may be an enclosure ditch for the cemetery. However, the distribution of human

bone revealed by fieldwalking suggests that the southern part of the enclosure was apparently not used for burial.

1.4.3 Late medieval

A small Cistercian nunnery of the rule of St Benedict was founded in Torksey *c.* 1200 and is believed to have been situated at the southern end of the site, close to the Foss Dyke (see Section 1.3). The nunnery was dedicated to St Mary and St Nicholas; its 15th-century seal is in the form of a pointed oval, depicting the seated Virgin within a canopied niche, with the Christ Child standing on her right knee, beneath which was a praying St Nicholas, with mitre and pastoral staff. It was sometimes also known as the nunnery of St Nicholas de Fossa; given its location, St Nicholas was an appropriate dedication being the patron saint of sailors. It was always a small house; for example, in 1440 the house comprised only the prioress and five nuns, while in 1539 there were eight nuns and the nunnery was described as ‘a beggarly poor house’ (Page 1906, 157).

There is some evidence to suggest that the nunnery had a place of burial, because when the prioress Dame Agnes of Grantham died in 1394 her body was laid ‘in the sepulchre’ (Cole 1906, 504). Nuns were still drawing a pension from the house as late as 1553, and so the nunnery survived the immediate aftermath of the Reformation, but seems to have disappeared some time in the later 16th century. Cole (1906, 463) claimed that the nunnery was in the parish of the church of All Saints, which extended down to the Foss Dyke, although the basis on which this claim was made is unclear. It may derive from the statement by Leland that the parish church of Torksey was in the fields to the south of the village, and the fact that the other lost church of Torksey, that of St Mary, is recorded as lying further north in the village close to the surviving parish church of St Peter (Hadley and Richards 2016b).

In 1961 Barley (1964, 174) revealed what he believed to be traces of the nunnery. He excavated two trenches each of 20 feet (*c.* 6m) square in the southern field ‘near where the Ordnance Survey records “pavements and Roman coins”’ and where limestone building debris was present on the surface. Traces of walls had been identified by a resistivity survey, and excavation revealed that they were formed of clay foundations with small fragments of limestone. Barley interpreted these as the bases for mud walls rather than for timber or stone walls. They enclosed three sides of an area of 31 feet across from west to east, and he thought that it was more likely to have been a yard surface than a building due to its size and the absence of any evidence for flooring. On the west side of the enclosure were post-holes, which suggested the presence of a lean-to structure, while a spread of stones to the south suggested the surface of another yard. The walls were interpreted as outbuildings of the nunnery. Barley reported that only in this part of the field was green-glazed pottery evident on the surface, and the excavations recovered largely late medieval pottery with nothing later in date than the first third of the 16th century. Barley concluded that the OS reference to ‘pavements’ about here ‘must relate to the good flooring of one of the conventual buildings which were in fact found in a trial hole in 1960’.

Seven test pits were excavated in early 2019 at the southern end of the site by Headland Archaeology on behalf of the Environment Agency in advance of flood defence improvements. Two of these test pits produced 101 sherds of late medieval ceramic building material, and 20 sherds of pottery. These were from TP5 (dug through the top of the embankment) and TP3 (to the south of the embankment, *c.*

20m to the southeast of TP5). Jane Young's report on this material noted that several tiles have 'glassy' edges, which is a trait often associated with waste tile found at kiln sites, although this does not necessarily mean that the tiles were wasters or that there was a production site nearby. It was noted that many of the tile fragments found on the site are similar to those recovered from previous excavations at Main Street, Torksey, but that six new fabrics had been identified. Only two fragments of tile were glazed. The moulded nibs present suggested that the tiles dated to between the mid- to late 12th and mid-13th century. Also recovered was a single small flake from a handmade brick of 14th- or 15th-century date. A single sherd of late Anglo-Saxon pottery was recovered (of Lincoln Shelly-ware), and eight sherds of late medieval date, all of regional manufacture and dated to between the late 12th and 13th centuries.

Four of the test pits, dug along the top of the southern embankment, revealed that this was part natural, but had been artificially built up with made ground of silt and clay cap and contained a small amount of both late medieval and post-medieval material. TP5 contained stone rubble, perhaps dumped to build up the embankment, and an archaeological feature filled with a clean, fine sand with flecks of charcoal and 13th-century pottery as well as a single sherd of 10th-century Lincoln Shelly-ware, although there was also intrusive modern material present. This was interpreted as dumped building waste to stabilise the embankment (Roberts 2019, 9–10).

The geophysical survey conducted by Headland Archaeology in 2018 took in the southern part of the site. Two parallel linear features (D7 and D8) that run west-east across the site were thought to have framed a trackway or road (Harrison 2018, 4); it is possible that this defined the area of a property to the south. To the south of this they identified three linear anomalies (W13), measuring 37m east to west and 7m north to south, which they interpreted as buried stone walls, perhaps of a building or buildings (Harrison 2018, 4).

As noted above, Barley's excavations also identified burials in the northern field, the first of which was encountered 50 feet (*c.* 15m) north of the hedge line that separated the two fields, and he noted that 'according to local report, skeletons have been disturbed about 200 yards further north still' (Barley 1964, 172). His first trench was cut *c.* 120 feet (*c.* 36 m) north of the hedge and revealed seventeen skeletons 'in an area only 9 feet [2.74m] by 5 feet [1.52m]'. No evidence of coffins was identified. No building debris was found to suggest the location of a church, and his resistivity survey also failed to identify any traces of one. The grave fills contained more shell-filled ware than Torksey ware and since there was also no green-glazed wares of later date present Barley concluded that the burials dated to the 13th century. Nine radiocarbon dates acquired from human remains collected during fieldwalking confirmed that although burial commenced in the Anglo-Saxon period it certainly continued into the 13th century (Craig-Atkins 2020).

Another trench 80 feet (*c.* 24m) from the hedge revealed undisturbed bodies in a lime kiln; the filling of the pit contained a few lumps of lime and pieces of unburnt lias limestone, and the soil was 'reddened by fire', and a spouted bowl of Torksey Kiln 1 fabric was found in its fill (Barley 1964, 173). This lime kiln may correlate with feature G37 revealed on the 2012 magnetometer survey (see above; section 1.4.2). Further human remains have been recovered from badger setts on the western edge of the site, in the bank overlooking the floodplain and it is assumed that these derive from the same cemetery (Trott 2018, 10–11; Craig-Atkins 2020).

1.4.4 Undated

The 2012 magnetometer survey also identified several features which are undated but may represent post-medieval field boundaries. A linear feature runs east-west across the centre of the survey area from G31, and curves towards the south as it reaches the western edge of the site (Fig. 6). This anomaly was roughly 2–3m wide, and was interpreted as an enclosure ditch. While it was thought possible that it reflected a relatively modern field boundary, the feature did not correspond to any boundaries evident on cartographic evidence from the mid-18th century onwards. The 2018 Headland Archaeology magnetometer survey picked up this linear feature running to the eastern edge of the site (Harrison 2018, 4).

A second linear anomaly interpreted as archaeological in nature was identified running from the western edge of the site, curving south-east around the contour to G35. This may have formed part of a roughly symmetrical enclosure with another anomaly, similar in character, which ran from the western edge of the site to the north of G41, towards G43, from where it may have continued on towards G35. From G35, at least two linear anomalies *c.* 5m apart ran east to the edge of the site, and were thought to have been a continuation of one or both of the other linear anomalies. To the south of G35, there was the suggestion of a third roughly-parallel linear feature, most strongly visible on the eastern edge of the dataset. The 2018 magnetometer survey by Headland Archaeology detected two linear anomalies running east at this part of the site, which seem to be continuations of two of these features (Harrison 2018, 4).

The 2012 magnetometer survey also identified a linear feature running west-east across the site (G44) at a point that seems to correspond with the boundary between the two fields present at the time when Barley was conducting his excavations. This boundary is also at the same location as the field boundary present on the 1751 Hume estate map. While it is not certain when that boundary was created it seems likely to post-date the D-shaped enclosure on the western edge of the site, since it runs through the southern part of it. The division of the site into two fields, may reflect later medieval arrangements, after the enclosure had ceased to be used and perhaps after the town had shrunk away from this area because the NNW–SSE plough marks visible on the magnetometer survey in the southern part of the site appeared to respect linear feature G44, uniformly ending roughly 20m to south of it (Brown 2012, 10).

To the south of G44 was another linear feature running across the site (between G33 and the southern line of the D-shaped enclosure), which may have been another former field boundary. This was also picked up running further east by the Headland Archaeology survey (Harrison 2018, 4).

While the dates of the various linear anomalies detected by geophysical survey are uncertain, it is notable that some of them seem to line up with the boundaries of the closes visible to the east of the A156 on the estate map of 1751 (Fig. 3). This may suggest something of the layout of Torksey in the late medieval period, but it is difficult to be certain of this, since the 1751 map is schematic. Nonetheless, considering the evidence of the geophysics alongside the 1751 map suggests that the Castle Field had previously been divided into smaller closes, which by the mid-18th century had long since disappeared.

2 AIMS OF THE EXCAVATION

The ‘Tents to Towns’ research project aims to gain a fuller understanding of the Viking Great Army *c.* 865–878, and its impact on the development of Anglo-Saxon England. The impact of Scandinavian raiders and settlers on urbanisation is a major research question for our understanding of the society and economy of later Anglo-Saxon England. It forms Research Objective 6E of the *Updated Research Agenda and Strategy for the Historic Environment of the East Midlands* (Knight *et al.* 2012, 88) which is to ‘undertake further research on urban development in the Anglo-Saxon and Viking periods’, where it is recommended that ‘further archaeological investigations may be proposed to elucidate the growth of the important riverside trading centre and pottery production site’ at Torksey. While there has been much debate about the influence on urban origins of palaces, minster churches, and Mercian/West Saxon burh foundations of the late 8th/9th centuries, archaeological evidence from West Saxon and Mercian towns currently cautions against assuming a linear development from any of these antecedents, with fully urban activities typically not visible until the late 10th century. However, in contrast, dynamic urban expansion in regions of Scandinavian settlement further north and east is becoming apparent from the later 9th century, especially through evidence for industrial processes, such as pottery production. This typically occurs at newly founded sites or following relocation of earlier trading and manufacturing activities, but the impetus for these developments now needs investigation. We are therefore currently undertaking a wide-ranging study of urban development in northern and eastern England, and of the new pottery industries that emerged there.

Our previous research into the winter camp of the Viking ‘Great Army’ in 872–3 at Torksey analysed over 2000 metal-detected finds, and undertook geophysical and geomorphological survey to reveal extensive evidence for trade and manufacture across a *c.* 55ha island, accommodating thousands of people. We suggested that the Army was virtually a town on the move (Hadley and Richards 2016a; Richards and Hadley 2016). However, in transforming understanding of the Great Army, our work raised questions about its role as a catalyst for urban development. Torksey presents a unique opportunity to examine the contribution of Viking armies, and those following in their wake, to industrial and urban development. The Viking camp lay to the north of the modern village, but by the turn of the 11th century there was an extensive burh to the south, with a mint, four cemeteries and at least three churches. However, the most important evidence for incipient urbanism comes from its pottery industry, which saw new manufacturing technologies introduced by continental potters, arriving in Torksey with the ‘baggage train’ of the Great Army (Perry 2016). Since Torksey was in decline by the 13th century, shrinking in size, much of the former town is unencumbered by later occupation, and in the 1960s Maurice Barley recognised the potential ‘to study by excavation the character of an urban settlement in the early middle ages’ at Torksey.

Scheduled Monument Consent (Ref S00226460) was granted to allow limited evaluation assessment in up to three areas of the scheduled area. The evaluation trenching was used to target two areas of archaeological interest identified by previous fieldwalking, geophysics and metal-detecting of the field.

Evidence from both trenches was also gathered to establish the presence/absence, nature, date, depth, quality of survival and importance of any archaeological deposits and to enable an assessment of the

potential and significance of the archaeological remains. This might help inform the future land management strategy for the scheduled area.

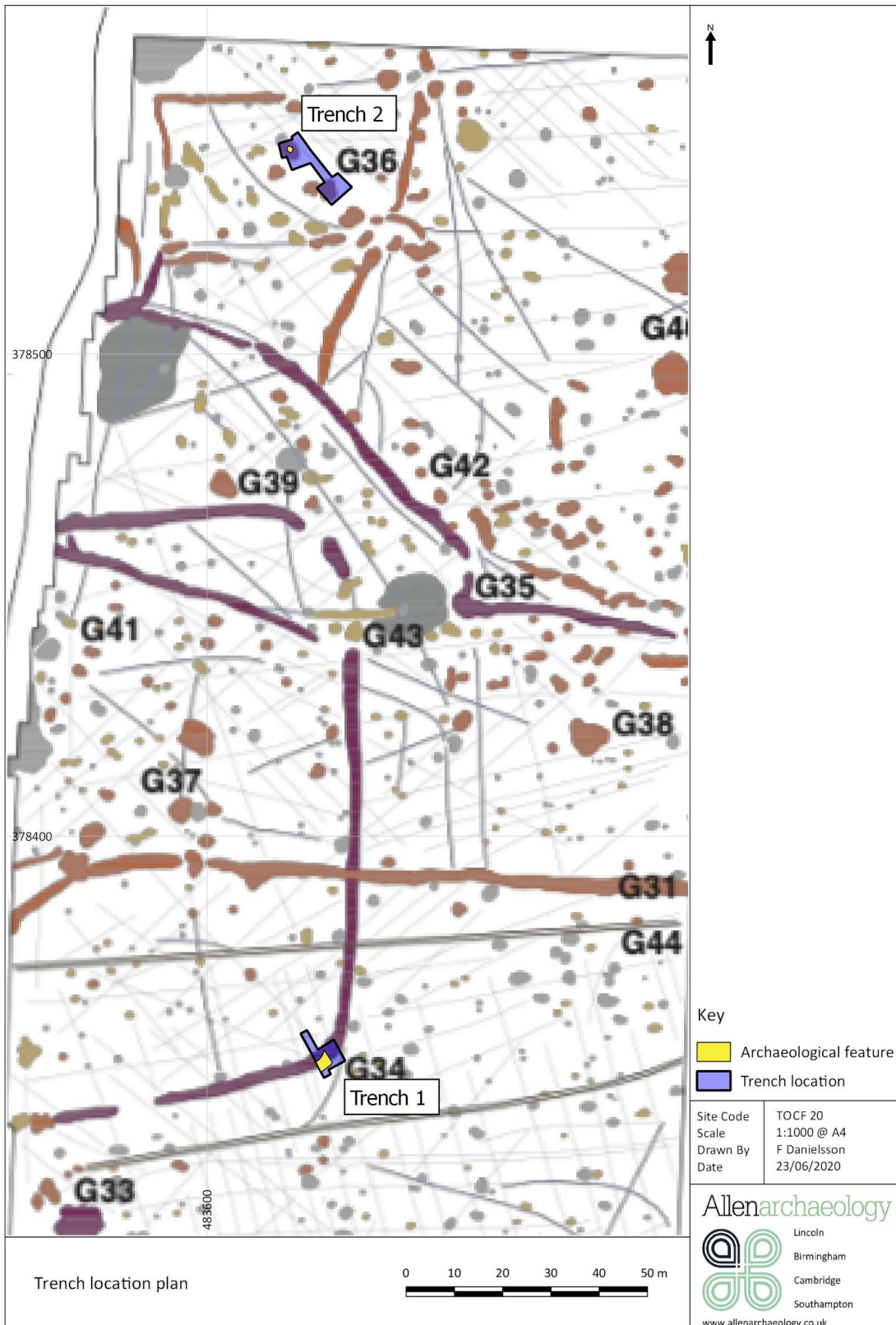


Figure 8: Trench location plan

2.1 Trench 1

Trench 1 was located to investigate the ditched enclosure identified by geophysical survey. The aim was to confirm if this feature was indeed a ditch and to investigate its size and character. It was also hoped that artefacts would be recovered which might help to date the enclosure, and potentially to clarify its relationship with the cemetery.

The trench, initially 1.8m x 10m long, was sited to intersect the southern arm of the enclosure ditch shortly before it turned northwards. A secondary aim was to establish if there was any trace of burial at the southern end of the enclosure. The fieldwalking survey had led us to consider whether the absence of burial here was real or a product of differential truncation. It was considered possible that the higher ground to the north-west, which had yielded the greatest concentrations of human remains in the fieldwalking had suffered from more erosion, making burials vulnerable to plough damage, whilst the area downslope might have seen more deposition of windblown sand, affording burials here a greater degree of protection.

2.2 Trench 2

The aim of the second trench was to test one of the geophysical features that had been interpreted as a possible pottery kiln in the 2012 survey. There were several options here but it was decided to focus on the western half of the field where there was both magnetometry and fieldwalking evidence (Perry 2020). A concentration of Torksey ware amongst the surface finds would increase the degree of confidence that buried features might be kilns. However, it was recognised that the scale of our initial 1.8 x 10m trench would create a degree of chance in encountering a kiln.

Trench 2 was therefore positioned *c.* 60m north of the D-shaped enclosure in an area where the magnetometer survey had recorded several geophysical anomalies, potentially of different origin (see Fig. 8):

A number of similar discrete anomalies have been identified in this dataset, at G37, G38, G39 and G40, which it is suggested may relate to similar archaeological features. These anomalies are visible in the greyscale data plot as sub-circular or sub-rectangular, positive anomalies of very high magnitude surrounded by a strongly negative 'halo'. The similar character of the responses to G33 is apparent from the xy data plot, and in the context of the known archaeology it seems likely that at least some of these may be interpreted as pottery or lime kilns, or similar features involving areas of intense localized heating. A concentration of potentially similar anomalies is clustered around G36, although their forms in the xy trace data suggest some of these are likely to be generated by ferrous sources (Brown 2012, 8).

The cluster of features around G36 was therefore of particular interest. The number of features increased the likelihood of our trench intersecting with at least one of them but, if the survey interpretation was correct, there was also a possibility that some might be kilns, whilst others might be

natural. In theory this might allow us to identify other possible kilns in the field, based upon the 2012 and 2018 surveys.

The fieldwalking data also indicated a concentration of Torksey ware in this area, increasing our confidence that there was a kiln nearby. Furthermore, the sherds from this part of the fieldwalking grid included several examples of glazed Torksey ware. There are no previously known examples of glazed Torksey ware and this is the first evidence that Torksey's potters were experimenting with glaze.

3 METHODOLOGY

All works were undertaken in accordance with the methodology set out within the Written Description of Investigation (Allen *et al.* 2020) and followed the standard recording practices employed by Allen Archaeology. The trenches were set out by Allen Archaeology by means of GPS, and tied into the OS grid.



Positioning Trench 1, using GPS

Mechanical excavation took place by means of a 13-ton tracked excavator fitted with a toothless ditching bucket, and under continuous archaeological supervision. Trenches were initially dug to a width of 1.8m given that this was the width of the bucket. Excavation took place in *c.* 100 mm spits and was monitored under archaeological supervision. Mechanical excavation continued until an archaeological horizon, or natural deposits, were encountered.

Metal-detecting was undertaken prior to excavation and repeated at regular intervals during machining. In addition the removed spoil was detected and also raked, and any other finds, including pottery and bone spotted by eye, were collected.

Where archaeological features and deposits were encountered, excavation was carried out by hand, sufficient to characterise and date the remains. The weather during the two-week excavation was

generally dry and bright during the first week, but more unsettled in the second week, with overcast skies and heavy rain showers.



Commencing removal of topsoil, with metal detector survey

Written and drawn records were made of the stratigraphy within the area investigated. Unexcavated archaeological deposits were recorded to the maximum extent possible. Overall site plans were drawn at 1:50, with sections at 1:20 or 1:10. All archaeological features were related to the Ordnance Survey Datum and to the National Grid. Survey was undertaken using a GPS system to a three-dimensional accuracy of 0.05m or better.

All archaeological deposits were recorded using Allen Archaeology's *pro forma* recording system, centred on the context record. Each context record fully describes the location, extent, composition and relationship of the subject and is cross-referenced to all other assigned records. A full digital photographic record was maintained comprising formal images of features before and after excavation, as well as soil profiles in section. A large number of working record shots were taken, particularly during the excavation of the kiln, and several MPEG movie files were recorded on a digital camera. Digital photogrammetry was also employed to make a complete record of the excavated kiln, which will form part of the digital archive.

Finds collected during the fieldwork were bagged and labelled with the appropriate deposit context number. During post-excavation processing they were sorted according to broad category and counted. All sherds of pottery, ceramic and stone tile, kiln debris, animal bone, worked flints and

fragments of lead melt and iron animal were grouped according to context number. All other metal and glass finds were individually catalogued. As all the animal bone was recovered during machining of the ploughsoil and therefore comprised undated fragments it was assessed to check for any unusual species or evidence for working, but no further analysis is recommended. The Torksey ware recovered from the ploughsoil supplements the field-walked material but assessment indicates that it has little potential to contribute additional information. On the other hand, the Torksey sherds recovered from the sealed assemblage of the kiln have the potential to help identify the range of products and dating of the kiln so they will be subject to further study and publication (Hadley *et al.* forthcoming).

Samples were taken of the fills of the ditch and kiln and of the natural clays, to aid in comparison with the fabrics of the Torksey ware pottery and kiln structure. All the kiln furniture which had collapsed into the kiln was recovered and samples were taken of the degraded kiln debris. Samples were also taken of the kiln walls and pedestal, and of the kiln base. Over 20 samples for archaeomagnetic dating were taken by specialists from the University of Bradford, from the upper surviving edges of the kiln walls and the pedestal, and a further 6 samples from the base of the kiln.



Positioning samples for archaeomagnetic dating

On the completion of the excavation backfilling was undertaken by mechanical excavator, with hand backfilling around the remains of the kiln.

4 TRENCH 1: THE ENCLOSURE DITCH

4.1 Stratigraphic sequence

In Trench 1 over 1m of deposit was removed in 0.2m spits by a mechanical excavator without encountering any archaeological features. This overburden comprised *c.* 0.55m of light greyish brown silty sand with occasional small stones (100), overlying a further 0.45m of soft mid-brown light yellowish brown fine sand (101). Layer 100 was within the plough zone and had been thoroughly mixed; layer 101 appears to comprise windblown sand. Excavation ceased on top of a distinctive but irregular surface of mixed firm sandy clays, with patches of brownish red clay (102) and light blueish green clay (105). These clays appear (from the ditch profile; see below) to be at least 0.6m in depth and were interpreted as natural or disturbed natural deposits. Both types of clay were sampled. In some places there were what were interpreted as natural dips in the clay, filled with sand.



At the southern end of Trench 1 a band of mixed mid-brown and light yellowish brown sand (103) crossed the trench east-west, running almost perpendicular to the trench edge. This appeared to correspond with the approximate position of the cemetery enclosure ditch, observed in the magnetometer survey. Given the potential depth of this feature, Trench 1 was therefore widened by an additional metre for a *c.* 3m length along its eastern side, so as to allow safe excavation by means of a stepped terrace down to the ditch.

Layer 103 was then excavated by hand across the full width of the original trench. It contained very occasional small to medium very occasional sub-rounded to sub-rectangular stones. A sample was taken for later analysis but the only artefact recovered was a single small abraded sherd of Torksey ware. Layer 103 was confirmed as the upper fill of the enclosure ditch (104) which had been cut into

the red and green clay, and so the ditch cut was clearly visible, although there were some natural cracks and fissures in the clay which had filled with sand. Fill 103 was very similar to the overlying sand (101), which is probably the same sand which had blown into the ditch. In the trench extension the top of cut 104 could now be discerned in plan as a division between the fill (103) and surrounding sand (101) *c.* 0.2m above where it was cut into the solid clay. However, it is impossible to say that this was the original ground surface from which the ditch had been cut as that may have been truncated by ploughing. Including this additional 0.2m which had been removed by machine, the fill (103) was therefore *c.* 0.75m deep, at its maximum depth. On initial cleaning it was thought to be the only fill of

the ditch (104), as there were lumps of brownish red and blueish green clay (106) identical to the clay which formed the ditch sides, at its base.



Ditches 104 and 113 fully excavated, facing southwest, with post-hole 111 against the section

However, on further examination it was revealed that the mixed clays sat on top of a further fill of mid-brown coarse sand (107) which extended to both sides of the ditch. Fill 106 therefore appears to represent limited collapse of the ditch sides, probably as part of a single episode. Fill 107 was removed to reveal a lower fill (108) which also extended across the full width of the ditch and was notable for a slightly 'crusty' surface. Fill 108 comprised light yellowish brown fine sand, but intermixed with occasional lumps of brownish red and blueish green clay, as well as small pea grit gravel. This appears to have been a natural accumulation made up of silting of the ditch and some slumping from the sides, over an extended period of use, and became weathered and hardened in the base of the ditch. On removal of fill (108) a central ridge of natural reddish brown and blueish-green clay (102/105) was seen to extend across the full length of the exposed ditch section. To the north-west of this ridge there was a fill of mid-yellowish brown coarse sand with occasional lumps of reddish brown and blueish green clay (112), whilst to the south-west of the natural clay ridge there was a different fill of light yellow brown coarse sand with frequent sub-rounded stones, and occasional brownish red clay lumps (109). This had a hard surface, suggesting it may have accumulated over a longer period. These fills were removed to reveal natural clays across the full width of the ditch, with the base of two U-shaped cuts (104 and 113), either side of the central ridge, indicating that the enclosure ditch had been recut. Cut 113, on the inside, had steep straight sides, sloping sharply to the concave base. Cut 104 had moderately steep straight sides, particularly on its

north-western edge, whilst the south-eastern edge sloped more gradually, and again came to quite a sharply sloping base.

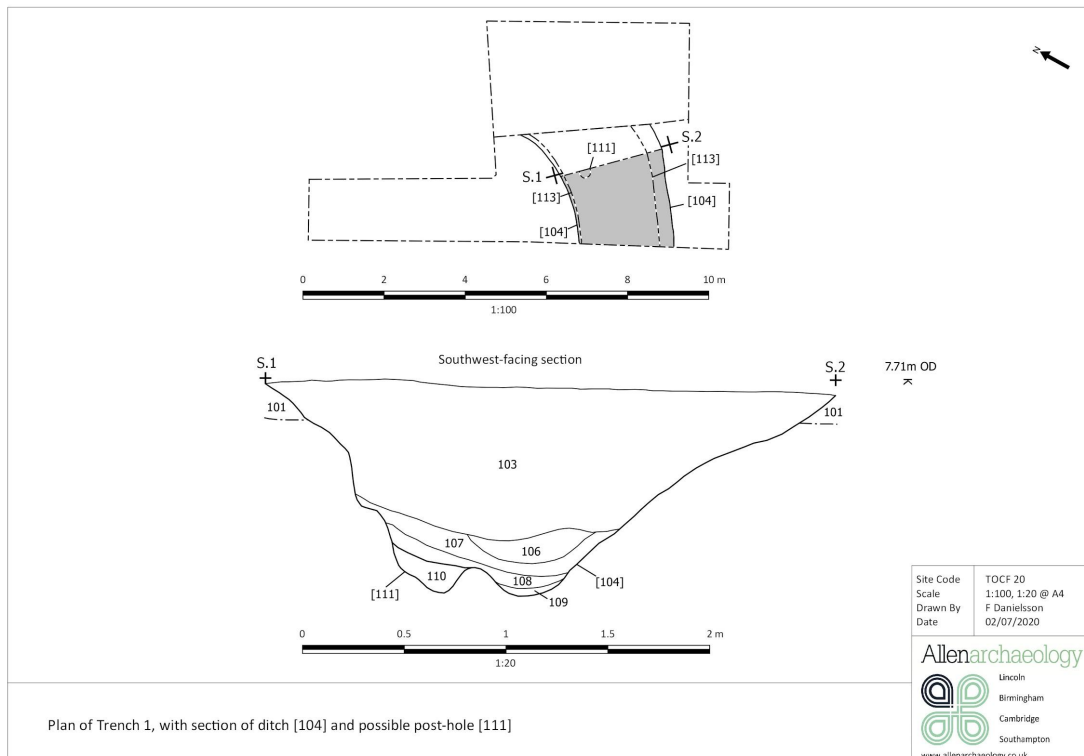


Figure 9: Plan of Trench 1, with section of ditch (104) and possible post-hole (111)

The stratigraphic sequence was complicated by the fact that immediately against the south-west facing section, and going into it, there was a patch of very soft mid-yellowish brown coarse sand with occasional sub-rounded stones (110). This filled a circular feature (111), c. 0.18m NE–SW by 0.28m NW–SE, and more than 0.12m deep, which was cut into the base of ditch 113. The base of feature 111 was angled, sloping down to the south. This is interpreted as the base of a possible post-hole, left by the removal of a timber post which had a shaped point, with the hole backfilled by loose sand falling into it, on removal of the post. The post-hole fill was not visible in section in fill 108, indicating that it had been removed before that fill was deposited. When post-hole fill 110 was removed there was clay on all sides, except against the trench section.

Given that only a small section of the ditch was excavated it is not possible to say if there was a line of post-holes in the base of the ditch, possibly indicating that the enclosure was fenced, or whether this was a single post near the corner. It seems intuitively unlikely that if a fence as well as a ditch was required, that the base of the fence would be set in the ditch. The more likely interpretation, therefore, is that this was an isolated post, placed at the angle of the ditch, and plausibly used to layout the enclosure as guide for the ditch-diggers. As such, there might be an equivalent post at the north-west corner.

In summary, the ditch sequence appears to have been as follows:

- (1) The first enclosure ditch (113) was cut through the windblown sand into the natural clays, possibly using a substantial marker post to indicate the south-eastern corner. It was probably steeply sloping on both sides, and maybe 1.5m wide at the top, and at least 0.75m deep.
- (2) The primary fill (112) built up in the base of the ditch, including some slumping from the ditch edge.
- (3) The marker post was removed, and loose sand fell into the hole it left. Given that the hole was wider at the northern edge this might suggest that the post was pulled out from that direction, against the ditch edge, and that it was originally *c.* 0.2m in diameter.
- (4) The ditch was recut (possibly as part of the same event in which the post was removed), with the new base to the south of the previous edge, and with a shallower external profile, leading to a new ditch (104) which was about the same depth but wider, up to 2.5m wide at the top.
- (5) The primary fill (108) built up in the base of the new ditch over an extended period, and was followed by a secondary fill of sand and stones (107). Collapse of some of the ditch sides led to the collapse of some of the southern clay edge into the ditch (107). This period of use was followed by an extended period of natural accumulation of windblown and collapsed sand (103), which removed any physical trace of the enclosure ditch.

4.2 Finds

Apart from the single sherd of Torksey ware from the upper ditch fill (103), any finds were confined to the topsoil (100), and were recovered during machining and from the spoil heaps, by raking and metal-detecting. They comprised 22 sherds of Torksey ware (including 6 rims, 2 bases, and 14 body sherds), 1 sherd of Lincoln Shelly-ware, 6 sherds of medieval and 3 sherds of post-medieval pottery. There were also 3 fragments of clay tile, 26 fragments of animal bone, 9 flints, and 17 tiny pieces or globules of lead, and 17 nails. There were also a number of individual finds recovered during detecting, including a fragment of an early medieval annular copper-alloy brooch (sf7), but the majority were of medieval or post-medieval date, including a silver half groat of Charles I (1625–49) (sf1), which provides a connection with the Civil War attack on Torksey Castle, and a pewter button decorated with a rose (sf5).

4.3 Discussion

Trench 1 has confirmed that the feature identified during the 2012 magnetometer survey was indeed a D-shaped enclosure. Excavation failed to resolve when the ditch was first cut, but the final backfilling did not take place until at least the late 9th or 10th century, given the presence of an abraded sherd of Torksey ware in the upper fill. The absence of other finds from the ditch fill is remarkable, suggesting it was largely backfilled by natural processes of deposition of windblown sand, and also that there was little human activity immediately adjacent to it, of either domestic or industrial nature. The absence of any sign of human burial on the interior, even allowing for the presence of a bank immediately inside the ditch, has confirmed that there were no human burials in the southern part of the enclosure. This also reflects the absence of skeletal remains recovered from the surface in this part of the site during the fieldwalking survey, and confirms that this is not due to burials here being at a greater depth.

5 TRENCH 2: THE KILN

5.1 Stratigraphic sequence

In Trench 2, *c.* 1m of deposit was removed in 0.2m spits by a mechanical excavator, initially without encountering any archaeological features. The stratigraphy had a similar profile to that in Trench 1, although here the topsoil (200) was a little deeper, comprising 0.7m of firm light greyish brown silty sand with very occasional sub-rounded stones. It overlay a layer of mixed mid-brown to light yellowish brown fine sand (201), *c.* 0.35m deep, reflecting an equivalent layer of windblown sand to that in Trench 1, but may be shallower because the ground surface here was higher than that of Trench 1 and so suffered from more erosion.

Excavation ceased on top of a distinctive but irregular surface of mixed firm sandy clays, with patches of brownish red clay (202) and light blueish green clay (203). The green clay was much less common than in Trench 1, and was confined to one or two areas. The overlying sand (201) had settled into cracks and dips in the clay, such that the surface of the superficial geology undulated throughout the trench.



North-east facing section showing layers 200 and 201 sitting on top of undulating surface of clay 202

Given the lack of features it was decided to extend the original 1.8m x 10m trench in two directions. Firstly, the southern end was extended and widened into a rectangular area approximately 4m x 6m, in the hope that the open area would make it easier to identify some of the features that had been interpreted as possible or probable archaeology in the magnetometer survey. Here there was indeed a larger irregular spread of natural blueish green clay, but nothing that was clearly the result of human intervention.



The southern extension of Trench 2 showing surface of mixed clays 202 and 203

Trench 2 was also extended at its northern end, as it had been observed during topsoil clearance that more pottery was recovered in this area. An extension of approximately 6m x 4m was stripped by machine on the northwestern side of the trench. Within the upper 0.3m of the topsoil, patches of bright orange-red clay began to appear, and excavation continued by hand.

On cleaning, the patches of clay resolved into a roughly circular clay wall, approximately 0.05–0.1m thick, apart from the eastern side, where there was a gap, *c.* 0.3m wide. On its external surface the clay was a dark brownish-red or mid purple-red, of similar colour to the natural clay (202). On the inside it was fired to a compact surface and was a mixture of orange-red, with a light brownish yellow surface, with evidence of sooting in places. This was clear the outer wall of a kiln (204) which had

collapsed and had been further truncated by ploughing. The walls bowed outwards and the external diameter of the kiln as it survived was 1.14m at the top, and 0.89m at the base. The internal surviving height was 0.37m. In the centre of the kiln was a solid circular block of clay, 0.43m in diameter, which formed a central pedestal. This splayed outwards towards the top and was leaning towards the west. A rim sherd of Torksey ware was found within the decayed clay in the centre of the pedestal. Hand prints were clearly visible on both the kiln walls and central pedestal, where the clay had been pressed into shape, pre-firing. Regularly spaced cracks in the kiln wall also indicated that it had been formed from slabs of clay, roughly the size of a hand, which had been pressed into place against the bowl of the kiln hollow.

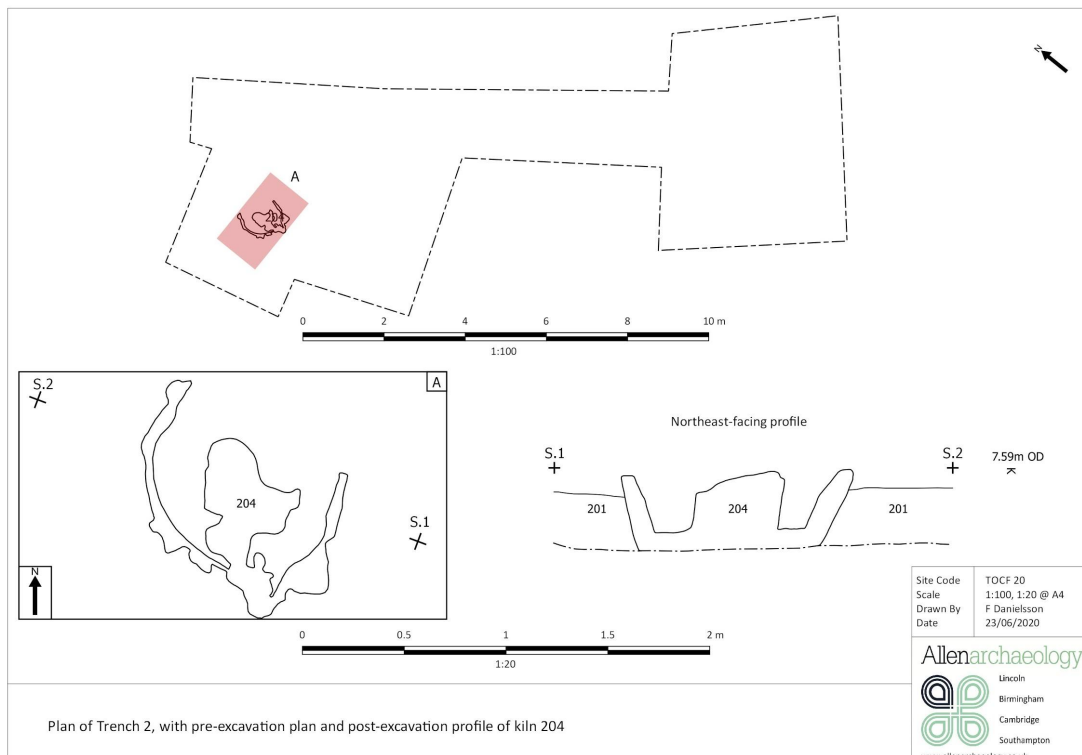


Figure 10: Plan of Trench 2, with pre-excavation plan and post-excavation profile of kiln 204

The kiln was excavated in four quadrants and diagonally-opposed quadrants were removed first to provide a cross-section. The south-east and north-west quadrants were sampled. External sections were also excavated, removing the external silty sand (201) down to the floor of the kiln to provide a full internal and external cross-section.

The kiln was filled with a mixture of topsoil comprising firm mid-greyish brown silty sand (205), collapsed kiln structure and fire bars, and large sherds of several Torksey ware bowls and jars. The fire bars were between c. 0.1-0.12m in diameter, widening to c. 0.15m where they had been attached to the flue wall or the central pedestal. Several retained smooth and regular cylinder-like hollows, presumably the impressions of wooden rods around which the clay bars had been formed, and which provided rigidity.



Pre-excavation photograph of kiln 104, looking east



Kiln 104 after removal of NW and SE quadrants, looking east towards flue, and showing collapsed kiln furniture



Post-excavation photo of kiln 104, with collapsed firebars in the north-west quadrant



Kiln wall showing that it was built from hand-pressed slabs of clay



Flue pit 209, looking north-west, prior to excavation of fill 206



Flue pit 209, looking north-west, after removal of fills 206, 207 and 208

On the north-eastern side of the kiln there was a 0.3m–0.4m gap in the kiln wall, which extended to its base. This was edged on one side by a rectangular fragment of a gritstone quern, which had been placed vertically on its edge, and seems to have formed part of the flue wall. Barley (1964, 175) noted that the flue of Kiln 2 comprised two broken pieces of quernstone, one of Niedermendig-type lava stone, and the other of Derbyshire millstone grit. Outside the kiln in this area there was a circular depression with shallow concave sides (209), at least 0.85m in diameter, and 0.23m in depth, which must have been the flue pit. Several fills of broken pottery and kiln debris fanned out from the flue and filled the pit in this area. The first surviving fill comprised firm mid-greyish brown silty sand with frequent inclusions of light brown yellow clay and kiln debris (208). This may reflect the period of use of the kiln, but it is also possible that the kiln had been used for multiple firings and that the flue pit may have been regularly emptied, so that fill 208 was just the first fill that was not removed. It was overlain by a similar layer of firm mid greyish brown silty sand but with less clay and kiln debris (207), maybe reflecting a period of silting into the flue pit. Finally, the upper fill comprised more firm mid-greyish brown silty sand (206), but this contained a high proportion of lumps of burnt clay kiln debris and broken pieces of Torksey ware, including several very large sherds. This must reflect the final raking-out of the flue, perhaps combined with debris from the kiln collapse. Two regularly shaped house-brick sized pieces of fired-reddened mudstone were found at the edge of the flue and may represent fragments of the flue wall or entrance which had been disturbed and carried by the plough.

5.2 Finds

Finds were recovered during machining and from the spoil, including by metal-detecting and raking. Large numbers of Torksey ware sherds were found in the topsoil (200), the majority probably from nearby kilns. They comprised 104 rim sherds, 72 base sherds, 692 body sherds, and 1 complete spout, making 869 Torksey ware sherds in total. The rims included many rouletted and inturned examples as well as those that were thumbled. A range of vessel forms are represented, including small and large jars and bowls – including socketed bowls – and these span the period of Torksey ware production from the late 9th to late 11th century. Sixteen glazed sherds of Torksey ware were also identified and 23 of the body sherds also had traces of rouletted decoration. Glazing is confined to early forms, including roulette decorated jars, typical of the later 9th and early 10th centuries. The topsoil finds from layer 200 also included 2 sherds of Roman pottery and 7 sherds of Early Anglo-Saxon pottery as well as 11 sherds of other Late Saxon types, including 8 sherds of Stamford ware, and 51 sherds of medieval and post-medieval pottery. There were 12 fragments of kiln debris, 7 pieces of tile, 7 pieces of dressed stone, as well as 56 fragments of animal bone, and 15 pieces of flint. There were also large numbers of metal finds, including 96 nails, 51 small fragments and melts of lead, and 2 pieces of post-medieval glass. A number of individual finds were recovered by metal-detector during machining. These included a Roman copper-alloy coin (sf21) and two silver medieval cut quarters (sf20 and sf22), including one of Henry I (1100–35); a medieval lead cloth seal (sf44); and a medieval copper-alloy rotary casket key with a single prong and open oval handle (sf15). Three iron spikes or awls (sf16, sf17 and sf18) were also recovered, as well as three iron knife blades (sf46, sf47 and sf48), and multiple metal buttons and studs.

Torksey ware sherds were also recovered from the sandy subsoil (201), with 12 sherds from the original trench, but with an additional 93 sherds from the extension associated with the kiln. These

comprised 16 rim sherds (including some rouletted examples), 6 base sherds, and 83 body sherds. One of the base sherds had evidence for a deliberate post-firing perforation, and one of the body sherds had an unusual external boss. Two Early Anglo-Saxon sherds (one with traces of stamped decoration), 2 other Late Saxon sherds, 8 medieval sherds (including a 12th-/13th-century jug handle), and 24 fragments of kiln debris were also recovered from this area, as well as a tiny fragment of post-medieval window glass (sf58).



From the kiln fill itself (205) 158 sherds of Torksey ware were recovered, comprising 34 rim sherds, 17 base sherds, and 107 body sherds, but notably none of these sherds were decorated. Many of these sherds were clearly from the same vessels. One small residual body sherd of Roman Huntcliffe ware and a sherd of Late Saxon LFS (Lincoln Fine Shelly ware) also came from the kiln area, but as this must belong to the last quarter of the 10th century it is most probably an intrusive find from later disturbance. A single Torksey ware rim sherd was found embedded in the top of the kiln pedestal (204). Samples of fire bars, kiln walls and the kiln base were also collected. From the flue area (206) there were an additional 42 sherds of Torksey ware, many of them large pieces, which must have been raked out from the kiln. They comprised 3 rim sherds, 5 base sherds, and 34 body sherds.

5.3 Discussion

The discovery of kiln 104, and its spatial correlation with a cluster of features (G36) classed as probable archaeology in the 2012 magnetometer survey, confirms that at least some of these features are Torksey ware kilns. However, the fact that there was no trace of another kiln within the southern extension of Trench 2, where there was a second anomaly, also supports the geophysical interpretation that other features were caused by ferrous sources, as noted above (Section 2.2). There was a large spread of blueish green clay in this area, and the metal detectorists reported that this presented strong ferrous signals. Barley (1981, 266) reported that he found a small pit full of green potter's clay associated with Kiln 3, and second close to Kiln 5 at the southern end of the village (Barley 1981, 270). Perry (2006, 91) has proposed that Rhaetic clay, green in colour, used in the production of Torksey ware was brought from a slope 1.5 km east of Torksey and stored in these pits ready for use. However, it is unlikely that the blue greenish clay overlaying reddish brown clay in Trenches 1 and 2 (105 / 203) represents a large quantity of Rhaetic clay brought to site from 1.5km away; rather it

represents the boundary between the Cropwell Bishop and Blue Anchor Formations, the upper formations of the Mercia Mudstone Group, and which, respectively, are reddish brown and green blue in colour.

The kiln is the 16th to be identified through excavation in Torksey as a whole, and will henceforth be referred to as Kiln 16. However, it confirms that many related anomalies on the site, highlighted in the 2012 and 2018 magnetometer reports (Brown 2012; Harrison 2018), may reflect additional unexcavated kilns, reinforcing the scale and density of Torksey ware production on the site.

Kiln 16 was surprisingly close to the modern ground surface, and had clearly been truncated. What survives is probably the part that had originally been below ground level, and reflects the fire pit below the surface. In constructing the kiln, a circular bowl-like depression had been created in the sandy subsoil and slabs of clay had been pressed into it. It is not possible to say exactly how much of the kiln would have extended above the surviving level, but at the top the walls appeared to turn inwards whilst the central pedestal was splaying. This, combined with the fact that large numbers of moderately intact fire bars were found in the fire pit suggests that these had radiated from the pedestal at a point just above that which survived. Given we know that the radius of the central circular pedestal was *c.* 0.2m we can calculate that its circumference was *c.* 1.25m. As the fire bars were *c.* 0.15m wide where they were attached to the pedestal then, allowing for a small gap between each one this indicates that, if they were regularly spaced, there would have been between six and eight fire bars in the kiln.



Fire-bar, showing it splaying where it met the central pedestal. Scale 0.2m

The substantial number of Torksey ware sherds in the base of the kiln, some buried beneath kiln debris and fire bars, suggests that some must have been from vessels which had been broken before the kiln collapsed, maybe those that had been broken during an earlier firing, or during the emptying of the kiln. The sherds include several fragments of large bowls which may have been stacked in the bottom layer within the kiln, resting directly on the fire bars. It was also noteworthy that several had pieces of limestone embedded in the fabric at the break, maybe indicating why the pot may have shattered at this point. It is also notable that several vessel forms are represented, including bowls and jars, confirming that multiple types of pottery were manufactured in one kiln, and even during one firing. The large number of bowls with inturned rims suggests a mid-10th century or earlier date for Kiln 16. Concurrently, rim and vessel forms are closely paralleled with pottery produced in Kilns 3 and 4, thought to be early in the Torksey ware sequence, yet much of Kiln 3 and 4's pottery was roulette decorated, a type of decoration absent from Kiln 16. Rouletting was most common in the very early stages of Torksey ware production, from the later 9th to the early/mid-10th century, and therefore, this absence allied with a lack of thumb-impressed decoration, typical of the later 10th century (Young *et al.* 2005, 90), indicates that Kiln 16 is likely to have been in operation in the middle decades of the 10th century.



Reverse of fire bar shown in previous illustration, showing impression of a timber rod around which the fire bar had been formed. Scale 0.2m

The form of Kiln 16 is very similar to that of Kiln 1 (see fig. 5), excavated first by Spencer Cook and then re-excavated by Barley. That also had a central pedestal and radiating fire bars, and the flue pit was of slightly smaller diameter than the kiln. However, Kiln 16 was unusual in that the flue was facing to the north-east, rather than facing the prevailing wind direction from the south-west, a characteristic of most of the other excavated kilns. The form of the kiln, with a central pedestal and radiating fire bars is typical of Torksey's larger kilns (e.g. Kilns 1, 5, 6, 7, 8, 9, 13). Yet, at just over 1m in diameter, Kiln 16 is much smaller and is closer in size to the early Kilns 2 and 4, neither of which possesses a central pedestal. This, along with the mid 10th-century date of the pottery suggest that Kiln 16 is a transitional type, and is therefore extremely important to our understanding of the development of kiln structures at Torksey. Unfortunately the archaeomagnetic dating was only able to confirm a broad 9th-11th century date range for the final firing of the kiln. Analysis by Ann Wilkinson yielded reasonable correlation in the magnetic directions obtained for the floor and pedestal samples, but the magnetic directions of the wall samples were found to be quite scattered. As a result, a preliminary determination of archaeomagnetic dating was undertaken based on a combination of the floor and pedestal samples only, which yielded the date range of AD 823 - 1203, with a midpoint date of AD 1013 \pm 190 years, although this may be subject to revision based on further analysis (Wilkinson in prep).



Digital photogrammetric model of Kiln 16, post-excavation. See doi:10.5284/1083529 for interactive model

The large quantities of Torksey ware recovered from the plough soil (200) must also reflect production in the vicinity, either from this or neighbouring kilns. The assemblage includes rouletted rims of likely late 9th-century date, and 16 sherds with indications of a dark green glaze. There were traces of glazing on rims as well on the interior surface of several base sherds, suggesting the glaze may have dripped onto these pots in the kiln. In the case of one sherd the glazing extended over the fracture, indicating that the pot must have broken within the kiln, with the glaze dripping onto the

broken vessel. The rim forms cover the full date range of Torksey ware production, although early rouletted and inturned rims dominate the assemblage, with far fewer later thumbbed rim forms, suggesting the kilns in this part of the site were generally late 9th to mid 10th century in date. However, traces of sooting on some of the Torksey ware suggests that there was domestic use of the pottery adjacent to the kilns.

6 FAUNAL REMAINS, by Angelos Hadjikoumis

In total 21 remains of animals were identified in the faunal assemblages from Trench 1 and Trench 2 (Table 1). The following mammalian taxa were identified: cattle, sheep, pig, equid, hare. The possibility of the presence of goat (among caprine) and rabbit (among lagomorph) remains open. Slightly more than half of the identified remains (11) belonged to cattle, 6 to caprines (only sheep identified), 2 to lagomorphs (only hare identified), and 1 each for pig and equid (most likely horse). Given these are unstratified plough soil remains the date of the assemblage cannot be defined. Moreover, the faunal composition (and the predominance of cattle and sheep) is one of the most common across different periods in the British Isles, and is based on a sample which is too small for reliable analysis. The butchery marks on the bones, however, were inflicted with the use of metal tools, which excludes an early prehistoric date. The preservation condition of the assemblage is good, excluding 2 specimens with severe erosion. This pattern suggests the possibility of some residual material redeposited from earlier periods, but the majority of the material appears to derive from broadly the same period. Moreover, cattle first and second phalanges appear to articulate with each other, which can be considered as another indication for limited movement and re-deposition of the contexts they derived from. To conclude, animal remains are present in the area and further excavation would probably produce a larger faunal sample that could support more reliable analysis in the future.

Table 1: Faunal remains summary

Context	Element	Species	Side
100	Femur	Cattle	Right
100	Metatarsus	Cattle	Left
100	Tibia	Cattle	Right
100	Astragalus	Sheep	Left
100	Loose mandibular	Sheep	Left
100	Loose mandibular	Sheep	Left
100	Mandible	Sheep	Right
200	Astragalus	Cattle	Right
200	1st Phalanx	Cattle	Unsidied
200	2nd Phalanx	Cattle	Unsidied
200	Humerus	Cattle	Left
200	Calcaneus	Cattle	Left
200	Metatarsus	Cattle	Unsidied
200	Loose mandibular	Cattle	Right
200	Loose mandibular	Cattle	Left
200	Scapula	Sheep	Right
200	Humerus	OC	Right
200	Metatarsus	Pig	Left
200	Loose mandibular	Equid	Left
200	Humerus	Hare	Left
200	Femur	Lagomorph	Left

7 PALAEOENVIRONMENTAL ASSESSMENT, by Ellen Simmons

One sample from the ditch fill (103) and three from the pottery kiln (204; from the north-west quadrant, south-west quadrant, and flue area, respectively) were processed for the recovery of charred plant remains and wood charcoal. The methodology employed is fully described in Simmons (2021).

7.1 Charred plant remains

Low concentrations of charred plant remains were present in all of the samples. The charred plant remains assemblage is composed of cereal grain and wild or weed plant seeds as well as some nutshell. The crop types found in the samples are hulled barley (*Hordeum distichum/vulgare*), rye (*Secale cereale*) and free threshing wheat (*Triticum* sp. free threshing). Oat grains (*Avena* sp.) are also present, but no diagnostic oat floret bases were found, so it is not possible to determine whether the grains are cultivated oats or wild oats brought to the site as crop weeds. Fragments of hazel nutshell (*Corylus avellana*) are also present.

The wild or weed plant seed assemblages from kiln 204 and upper fill 103 from ditch 104 includes stinking chamomile (*Anthemis cotula*), which is a typical crop weed, and fat hen (*Chenopodium album*) which is also a crop weed and plant of fertile disturbed soils. Seeds of spike rush (*Eleocharis* sp.), bristle club rush (*Isolepis setacea*), timothy (*Phleum pratense*) and small seeded grasses (<2mm Poaceae) are present in the samples from the kiln. Other types of plant material found in the samples from the kiln are a tuber/rhizome and a heather family (Ericaceae) stem fragment. A small assemblage of thirteen <2mm culm nodes were also found in the sample from the flue area of the kiln.

7.2 Wood charcoal

Relatively high concentrations of >2mm³ wood charcoal fragments are present in sample 3 from fill 103 of ditch 104 and in the samples from the south-east and north-west quadrants of kiln 204. A low concentration of >2mm³ wood charcoal fragments is present in the sample from the flue area of kiln 204. Preliminary identification of a sub-sample of twenty-five >4mm³ charcoal fragments from the north-west quadrant of kiln 204 indicates that the charcoal assemblage includes oak (*Quercus* sp.), field maple (*Acer campestre*), hazel (*Corylus avellana*), poplar/willow (*Populus/Salix* spp.), bird/wild cherry (*Prunus* cf. *avium/padus*), hawthorn/apple/pear/rowan/service tree/whitebeam (Pomoideae) and birch (*Betula* sp.). The hazel charcoal fragment and seven of the Pomoideae charcoal fragments have strong ring curvature, indicating the use of smaller branches or twigs. Two of the oak charcoal fragments have weak ring curvature and tyloses in the vessel cavities, indicating the use of heartwood from large diameter branches or trunk wood.

7.3 Discussion

The charred plant remains have some very limited potential to provide evidence for cereal crops and crop cultivation practices. The crop types of free threshing wheat, hulled barley and rye are typical for the early medieval period in England (Moffett 2011). At least some of the wild or weed plant seeds are likely to have been brought onto the site with the crops and charred as components of by-products from crop processing. Stinking chamomile for example, which is present in the ditch and kiln samples, is a typical medieval arable weed, which starts to appear in the late Roman period, and

becomes increasingly common in the medieval period in England. The presence of stinking chamomile in charred plant remains assemblages has been interpreted as an indicator of the expansion of agriculture onto heavy soils, facilitated by improvements in plough technology such as the development of the mouldboard plough (Jones 1981).

The presence of seeds from spike rush and bristle club rush, which are commonly associated with damp soils, in the samples from the kiln may indicate the cultivation of poorly drained fields (Jones 1981). However, it is also possible that these seeds are from plant material collected for use as fuel in the kiln. Other plant remains from the kiln samples include a heather family stem fragment, an unidentified tuber or rhizome and a small assemblage of <2mm culm nodes, as well as small grass seeds, which may also indicate the use of plant material such as heather, grasses or turves as fuel.

The wood charcoal assemblage from ditch 104 and kiln 204 has good potential to provide evidence for the availability and exploitation of local woodland and scrub. Preliminary identification of 25 >4mm³ wood charcoal fragments from the north-west quadrant of kiln 204 indicates the exploitation of a diverse range of taxa for use as fuel, including mature heartwood of oak and small diameter wood of hawthorn/apple/pear/rowan/service tree/whitebeam and hazel. Other underwood, scrub or hedgerow taxa, which are present in this preliminary sub-sample, are field maple, poplar/willow, bird/wild cherry and birch. The charcoal assemblage from kiln 204 is similar to charcoal from early medieval pottery kilns at Castle Farm, Torksey (Gale in Palmer-Brown 1995) which also includes heartwood of oak as well as ash and small diameter wood of alder and gorse/broom.

Analysis of charcoal from Iron Age, Roman and medieval kilns in north-western France has demonstrated that oak charcoal used in kilns was most often of large diameter wood which produces a slow rise in kiln temperature and a sustained fire (Marguerie 2002). Bundles of small diameter wood from shrubs or small trees such as hazel, Pomoideae, birch, maple, broom, gorse and alder, as well as plant material such as straw, reeds and heather, were also used to produce a rapid rise in temperature.

Despite the low concentration of charred plant remains found in the samples, the charred plant remains assemblage is still of some regional research significance in terms of providing evidence for early medieval cereal crops and the possible cultivation of heavy clay soils (Monckton 2006, 279; Knight *et al.* 2012, 83). The wood charcoal assemblage is of regional research significance in terms of providing evidence for the availability and exploitation of local woodland (Monckton 2006, 279; Knight *et al.* 2012, 82). The identification and analysis of early medieval wood charcoal from the Midland region is rare and any sites with rich assemblages of wood charcoal are therefore a priority for analysis (Murphy 2001, 22).

Table 2: Paleoenvironmental sample assessment

Context number	103	205	205	205
Feature number	104	204	204	204
Trench number	1	2	2	2
Sample number	3	4		
Feature type	Ditch	Kiln SE quadrant	Kiln NW quadrant	Kiln flue area
Archaeological period	9 th -10 th century	10 th century	10 th century	10 th century
Sample volume (litres)	16	20	20	10
Volume of intrusive root material (ml)	0	0	0.2	0
Flot volume excluding intrusive root material (ml)	3	3	4	1
Cereal grain				
<i>Hordeum distichum/vulgare</i> (hulled barley)	3	1		
<i>Hordeum distichum/vulgare</i> (barley)			1	1
cf. <i>Hordeum distichum/vulgare</i>	1			
<i>Secale cereale</i> (rye)	1			2
<i>Triticum</i> cf. free threshing (free threshing wheat)	1			
<i>Triticum</i> sp. (wheat)	5	3	2	
Cereal	1	1	3	
Other plant remains				
<i>Corylus avellana</i> (hazel) nutshell		1	2	
<i>Chenopodium album</i> (fat hen)	1	1		
Ericaceae (heather family) stem fragment			1	
<i>Anthemis cotula</i> (stinking chamomile)	1	2	1	
<i>Eleocharis</i> sp. (spike rush)			1	
<i>Isolepis setacea</i> (bristle club rush)		1		
<i>Avena</i> sp. (oat)	2			
<i>Phleum pratense</i> (timothy)				1
<2mm Poaceae (small seeded grasses)		1	4	2
Tuber/rhizome		1		
<2mm culm node				13
Wood charcoal				
>4mm ³ round wood charcoal		1	2	
>4mm ³ charcoal fragments	10	11	23	6
2-4mm ³ wood charcoal fragments	114	59	107	20
<2mm ³ charcoal fragments	++++	++++	++++	++++
Charcoal notes	RP (narrow rings) some DP	DP	DP some RP	RP (cf. <i>Quercus</i> sp.) and DP
Finds from heavy residues (>4mm)				
Black concretion				++
Bone	-	-	-	
Ceramic	-	+	+	-
CBM	-	++++	+++++	++
Metallurgical debris		-	-	
>1mm magnetic material	+	+	+	+

- = < 10 items, + = 10-29 items, ++ = 30-49 items, +++ = 50-99 items, ++++ = 100 - 499 items, +++++ = > 500 items. DP = diffuse porous, RP = ring porous.

Table 3: Identification of a sub-sample of wood charcoal from the north-west quadrant of kiln 204.

Fragment No.	Species	Ring curvature ^a	Fungal hyphae ^b	Insect degradation ^b	Pith ^b	Bark ^b	Tyloses ^b	Reaction wood ^b	Vitrification ^c
1	Pomoideae	3							
2	Pomoideae	3							
3	Pomoideae	3							
4	Pomoideae	3							
5	Pomoideae	3			1				1
6	<i>Quercus</i> sp.								
7	<i>Quercus</i> sp.	1					1		
8	<i>Quercus</i> sp.								
9	<i>Prunus avium/padus</i> cf.								
10	<i>Acer campestre</i>								
11	Pomoideae	3							
12	<i>Acer campestre</i>								
13	Pomoideae	3							
14	<i>Populus/Salix</i> spp.								
15	<i>Prunus avium/padus</i> cf.								
16	Pomoideae								
17	<i>Acer campestre</i>								
18	<i>Quercus</i> sp.								
19	<i>Betula</i> sp.								
20	<i>Prunus avium/padus</i> cf.								
21	<i>Quercus</i> sp.	1	1				1		
22	<i>Quercus</i> sp.								
23	<i>Corylus avellana</i>	3							
24	<i>Acer campestre</i>								
25	Pomoideae								

^a1 = low curve rings; 2 = intermediate curved rings; 3 = strong curve rings. ^b1 = yes. ^c1 = low brilliance; 2 = strong brilliance; 3 = total fusion

8 SUMMARY

The two-week evaluation largely fulfilled its objectives. Trench 1 confirmed that the D-shaped feature G34 identified in the magnetometer survey was an enclosure ditch; Trench 2 confirmed that the anomalies north of the enclosure in cluster G36 were a mixture of iron-rich patches of clay, and that at least one was a Torksey ware kiln. The kiln, the 16th in the existing numbered sequence, was of a transitional type, of the middle of the 10th century, with a central pedestal and radiating fire bars. It was used for the manufacture of bowls and jars, and there is evidence for the production of glazed Torksey ware in the vicinity.



Reconstruction drawing of a Torksey ware kiln, showing the flue pit, stoke hole, and cutaway section showing vessels stacked inside (Drawing by Drazen Tomic; copyright Hadley and Richards and Thames & Hudson Ltd).

The excavation was unable to establish when the D-shaped enclosure was first constructed, but the ditch was recut at least once, and it was still open in the 10th century. The fact that almost all the human remains recovered on the site are within the enclosure whilst all the kilns are located on the

exterior makes it very likely that the kilns were contemporary with the cemetery for at least some of its period of usage, and that the enclosure ditch was intended to define the extent of the burial ground. The juxtaposition of kilns and burials in close proximity can be seen in other Late Saxon towns, such as that at Thetford in Norfolk (Hadley *et al.* forthcoming).

However, the absence of burial from the southern end of the enclosure suggests that there must have been something else in this area, adjacent to the entrance way. Barley had identified a possible timber building in this area. It would be unusual for a cemetery which continued in use into the 12th century not to have an associated church. Although there is no evidence for there having been a stone structure here, it is certainly possible that a timber church or mortuary chapel occupied the southern end of the enclosure. There are other examples of an ecclesiastical precinct being defined by a substantial ditch, such as that identified around the 9th-century minster church at Stow, *c.* 4.5km to the north-east (*pers. comm.* Jane Young).

The finds recovered from the two trenches were also very different in character, reflecting the underlying activity. The enclosure ditch is deep beneath the ploughzone and is safe from disturbance, but Kiln 16 is relatively close to the surface. There were few plough soil finds in Trench 1, and very few from the ditch. In Trench 2, on the other hand, there were large quantities of Torksey ware in the plough soil, reflecting the localised presence of kilns. Therefore, whilst agricultural activity is redistributing sherds within the plough soil it is not moving them far, giving confidence that the surface distributions identified during fieldwalking are a good indicator of localised activity.

The Archive

The physical archive and paper records for the excavation will be deposited at the Collection Museum in Lincoln, under the accession code TOCF20. The digital archive will be deposited with the Archaeology Data Service, as doi:10.5284/1083529, and made available under a CC BY open licence.

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References

- Allen, M., with Richards, J.D. and Hadley, D.M. 2020. 'Written scheme of investigation for an archaeological evaluation by trial trenching: Land at Castle Field, Torksey, Lincolnshire', unpublished report, Allen Archaeology Limited.
- Barley, M.W. 1964. 'The medieval borough of Torksey: excavations 1960-2', *Antiquaries Journal* **44**, 165-87.
- Barley, M.W. 1981. 'The medieval borough of Torksey: excavations 1963-8', *Antiquaries Journal* **61**, 264-91.
- Brown, H. 2012. *Magnetometer survey of land south of Torksey Castle, Lincolnshire*. York: Archaeology Data Service (doi:10.5284/1038041).
- Cole, R. E. G. 1906. 'The royal borough of Torksey, its churches, monasteries and castle', *Ass Architect Soc Rep and Pap* **29**, 451-530.
- Craig-Atkins, E. 2020. *Human skeletal remains recovered by field-walking and hand collection on land south of Torksey Castle, Lincolnshire*. York: Archaeology Data Service (doi:10.5284/1083529).
- Field, N. 1990. *Castle Farm, Torksey, exploratory excavations*, Lindsey Archaeological Services, Lincoln. York: Archaeology Data Service (doi:10.5284/1012874).
- Hadley, D.M. and Richards, J.D. 2016a. 'The Winter Camp of the Viking Great Army, AD 872-3, Torksey, Lincolnshire', *Proceedings of the Society of Antiquaries* **96**, 23-67.
- Hadley, D.M. and Richards, J.D. 2016b. 'The Viking winter camp and Anglo-Scandinavian town at Torksey, Lincolnshire – the landscape context', in O. Owen and V. Turner (eds), *Proceedings of the Viking Congress*, Shetland Amenities Trust, Lerwick, 127-39.
- Harrison, D. 2018. 'Torksey Embankment, Lincolnshire. Geophysical Survey', unpublished report, Headland Archaeology.
- Jones, M., 1981. 'The development of crop husbandry, in M. Jones and G. Dimbleby (eds), *The Environment of Man: the Iron Age to the Anglo-Saxon period*. British Archaeological Reports British Series **87**. Oxford: Archaeopress, 95-128.
- Knight, D., Vyner, B. and Allen, C. 2012. *East Midlands Heritage. An Updated Research Agenda and Strategy for the Historic Environment of the East Midlands*. Nottingham University and York Archaeological Trust.
- Marguerie, D. 2002. 'Fuel from protohistorical and historical kilns in north-western France' in S. Thiebault (ed.) *Charcoal Analysis: Methodological Approaches, Palaeoecological Results and Wood Uses*. British Archaeological Reports International Series 1063. Oxford: Archaeopress, 187-193.
- Moffett, L. 'Food plants on archaeological sites' in H. Hamerow, D.A. Hinton and S. Crawford (eds), *The Oxford Handbook of Anglo-Saxon Archaeology*, Oxford University Press, Oxford, 346-60.
- Monckton, A. 2006. 'Environmental archaeology in the East Midlands' in N.J. Cooper (ed.) *The Archaeology of the East Midlands: An Archaeological Resource Assessment and Research Agenda*. Leicester Archaeology Monographs No. 13. Leicester: University of Leicester Archaeological Services.

- Murphy, P. 2001. *Review of wood and macroscopic wood charcoal from archaeological sites in the East of England and the East and West Midlands*, Ancient Monuments Laboratory Report Series 23/2001, London: English Heritage.
- Page, W. (ed.) 1906. *A History of the County of Lincoln*. Vol. II, Victoria County History, London.
- Palmer-Brown, C. 1995. *Castle Farm, Torksey, an archaeological excavation report CFT94*, Pre-Construct Archaeology. York: Archaeology Data Service (doi:10.5284/1012796)
- Perry, G. 2016. 'Pottery production in Anglo-Scandinavian Torksey (Lincolnshire): reconstructing and contextualising the *chaîne opératoire*', *Medieval Archaeology* **60**, 72–114.
- Perry, G. 2020. *Pottery recovered during fieldwalking on land south of Torksey Castle, Lincolnshire, November 2012*. York: Archaeology Data Service (doi:10.5284/1083529).
- Richards, J.D. and Hadley, D.M. 2016. *Archaeological Evaluation of the Anglo-Saxon and Viking site at Torksey, Lincolnshire*. York: Archaeology Data Service (doi:10.5284/1018222).
- Richards, J.D. and Hadley, D.M. 2020. *Metal-detector survey of land south of Torksey Castle, Lincolnshire 2019-20*. York: Archaeology Data Service (doi:10.5284/1083529).
- Roberts, P. 2019. 'Torksey Embankment Flood Defence Works, Torksey, Lincoln, Lincolnshire. Archaeological test pitting and geotechnical investigations', unpublished report, Headland Archaeology.
- Simmons, E. 2021. *Torksey, Lincolnshire (TOCF20) - Palaeoenvironmental Assessment Report*. York: Archaeology Data Service (doi:10.5284/1083529).
- Toulmin-Smith, L. (ed.) 1907. *The Itinerary of John Leland in or About the Years 1535-1543*, G. Bell, London.
- Trott, N. 2018. 'Environment Agency Torksey Embankment Cultural Heritage Desk-Based Assessment', unpublished report, JacksonHyder Ltd.
- Young, J., Vince, A. and Nailor, V. 2005. *A Corpus of Anglo-Saxon and Medieval Pottery from Lincoln*, Oxford: Oxbow.
- Wilkinson, A. in prep. Torksey Kiln 16 archaeomagnetic dating report. University of Bradford.