Northamptonshire County Council

Northamptonshire Archaeology

Archaeological excavation at

Bread and Meat Close, Warwick

Warwickshire

2003

Volume 1: Site report, figures and plates

Danny McAree

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Report 07/108

Northamptonshire Archaeology
2 Bolton House
Wootton Hall Park
Northampton NN4 8BE
t. 01604 700493 f. 01604 702822
e. sparry@northamptonshire.gov.uk
w. www.northantsarchaeology.co.uk

REGISTERED IFA ORGANISATION

STAFF

Project Manager	Adam Yates BA, AIFA
Text	Danny McAree MA MBA PG Dip PIFA
Fieldwork	Danny McAree Adrian Burrow MA Nathan Flavell BA PG Dip Anne Foard-Colby Cert Ed Samantha Hepburn BA PG Dip Rob Smith
Historical Research	Christine Hodgetts PhD
Pottery	Paul Blinkhorn BTech
Encaustic Tile	Iain Soden BA MIFA
Roof Tile	Pat Chapman BA CMS PIFA
Other Finds	Tora Hylton
Animal Bone	Karen Deighton MSc
Wood	Maisie Taylor BA Cert Ed MIFA
Charcoal	Maisie Taylor
Archaeo-magnetometry	Mark Noel PhD
Illustrations	Jacqueline Harding BA HND Pat Walsh BA

QUALITY CONTROL

	Print name	Signed	Date
Checked by	Adam Yates		25.05.06
Verified by	Andy Chapman		16.04.07
Approved by	Steve Parry		21.06.07

***OASIS* REPORT FORM**

PROJECT DETAILS		
PROJECT TITLE	Warwick, Bread and Meat Close	
Short description	Archaeological excavation was carried out on 0.58ha of land at Bread and Meat Close, Warwick. Two medieval tile kilns were exposed, together with a tile lined tank/cistern, a stone working surface, an oven and a series of postholes and gullies forming part of the domestic and industrial occupation of the site. Archaeo-magnetometry dates place the last firing of the kilns between 1300-1330 and 1340-1370, both dates consistent with the pottery sequences from the occupation area. Encaustic and glazed floor tiles dated to the late 13th-early 14th century had been incorporated into the structure of the earlier kiln, although no evidence for floor tile production was uncovered. A stone and timber 'landing stage' on the Saltisford Brook was contemporary with the later 14th century kiln and linked to it by a stone walkway.	
Project type	Open area excavation	
Previous work	Trial Trenches and Desk Based Assessment Warwickshire Museum Field Services Archaeology Projects Group	
Current land use	Brown field site – overflow car park for Warwick Racecourse	
Future work	No	
Monument type/period	Medieval tile kilns, cistern, working surfaces and oven.	
Significant finds	13th-14th century tile kilns, 14th century encaustic and glazed floor tiles	
PROJECT LOCATION		
County	Warwickshire	
Site address	Bread and Meat Close, Warwick, Warwickshire	
Study area	0.58ha	
Easting /Northing	SP 277950 647360	
Height OD	51.48m OD	
PROJECT CREATOR		
Organisation	Warwickshire County Council Planning Department	
Project Brief originator	Ed Wilson, Warwickshire Planning Archaeologist	
Project Design originator	Northamptonshire Archaeology	
Director/Supervisor	Danny McAree	
Project Manager	Adam Yates	
Sponsor or funding body	Laing Homes	
PROJECT DATE		
Start date	November 2003	
End date	December 2003	
ARCHIVES	(Accession no.)	Content
Physical		Pottery, tile, animal bone
Paper		Site Records, Photos and Slides Drawings/ Report
Digital		CD ROM
BIBLIOGRAPHY	Journal/monograph, published or forthcoming, or client report	
Title		
Serial title & volume		
Author(s)		
Page numbers		
Date		

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ARCHAEOLOGICAL EXCAVATION AT BREAD AND MEAT CLOSE, WARWICK

NOVEMBER 2003

REPORT 05/78

Abstract

Archaeological excavation was carried out on 0.58ha of land at Bread and Meat Close, Warwick. Two medieval tile kilns were exposed, together with a tile-lined drain, a stone working surface, an oven and a series of postholes and gullies forming part of the domestic and industrial occupation of the site.

Archaeo-magnetometry dates place the last firing of the kilns to between 1300 -1330 and 1340 -1370, which is consistent with the pottery sequence from the occupation area. Encaustic and glazed floor tiles dated to the late 13th-early 14th century had been incorporated into the structure of the earlier kiln, plain and glazed floor tiles were incorporated into the structure of the later kiln and other features although no evidence for floor tile production was uncovered.

The kilns were constructed of roof tiles. These were the sole output of both kilns. Huge amounts of roof tile and tile wasters were spread across the site. A stone and timber 'landing stage' on the Saltisford Brook was contemporary with the later 14th century kiln and was linked to it by a stone walkway

1 INTRODUCTION

Planning permission has been granted for residential development of land at Bread and Meat Close, Warwick (NGR SP 27795 64736, Fig 1). The development occupies a 0.94ha, 'n' shaped plot, surrounding St Paul's Church, bounded by Friars Street to the south, the racecourse to the west and other developments to the north and east.

The development area lies in the west of Warwick town, outside the medieval fortifications, in an area that developed as a suburb in the medieval and post-medieval periods. Immediately to the south is the site of a Dominican Friary established prior to 1263. Friars Street is thought to be of medieval origin with buildings constructed at least at the east of the street frontage in medieval times.

As a condition of the planning process, the site was evaluated by Warwickshire Museum Field Services Archaeology Projects Group (WMFS 2003a). This determined that significant archaeology dating to the medieval period was present within the development area. As a result of this, a second phase of archaeological mitigation works was required. These were set out in a Brief prepared by Warwickshire Museum Field Services (WMFS 2003b) comprising the excavation of Areas 1 and 2, with a contingency if required to excavate Areas 3 and 4 (Fig 2). The work was carried out in accord with a specification prepared by Northamptonshire Archaeology (NA 2003). Following excavation of Area 1, and in consultation with Ed Wilson, Warwickshire Planning Archaeologist, additional contingency was invoked. It was agreed that Area 3 would not be excavated, but additional areas contiguous with Area 1 and taking in part of Area 4 were to be excavated (Fig 2). Area 2 was excavated in 2005 and is subject of a separate report (Colby-Foard 2007).

The report is presented in two volumes, the site report, figures and plates in Volume 1 and Appendices in Volume 2.

2 ARCHAEOLOGICAL BACKGROUND

2.1 Archaeological and historical background

A full historical and documentary research paper of the known antecedents of Bread and Meat Close has been researched and prepared by Christine Hodgetts and is attached at Appendix A.

Only a synopsis of the known history of the immediate area drawn from recent documents and Sites and Monuments Record data is included within this report.

The development of Warwick as a permanent settlement probably began in the 6th century AD around a natural weir that provided a crossing place on the River Avon (VCH 1969, 418, WMFS 2003a). Its location on the border between the kingdoms of Hwicce and the South Mercians may have generated a market for royal protection or sponsorship (Slater 1982). The town proper dates from 914 when Ethelfleada, sister of Edward the elder, established a burh (fortified town) at Warwick, one of ten towns designed to defend Mercia against the Danes. The burh acquired an administrative status in the early 10th century with the establishment of a shire centred on the town (VCH 1969, 418). The defences were possibly broken in 1016 by Danish invaders, probably under Cnut, when 'during the season of Christmas (they) turned into Warwickshire, and harried and burned and slew all they found' (Klingelhofer 1975, 2) A silver penny of Cnut (SMR WA 5661) was found 150m north east of the site.

The site lies approximately 100m to the west of the town defences (SMR WA 1923), which in addition to Ethelfleada's rampart and ditch, would have been the town wall and the 13th century 'common ditch' (VCH 1969). The line of the late medieval defences of a wall and ditch on the western side of the town is indicated by the line of Bowling Green Street. Excavations in 1965 revealed a 6.8m wide ditch (SMR WA 1988) with a 2.7m deep vertical inner face cut into the bedrock between Market Street and Bowling Green Street (Powell 1965). Rubble in the ditch and a robber trench indicated the presence of a wall. An 0.9m layer of dark grey clay, possibly the remains of an early rampart was also exposed. It was sealed by metalling, apparently a roadway. A section across the defences at Bowling Green Street was also recorded in 1991 (Palmer 1991).

A Dominican friary (SMR WA 1959) was established on the western side of the town at the end of the reign of Henry III. Construction of buildings was under way by 1263 and continued until 1296 when some works were still in progress; however the church was completed in 1268. The friary was located between West Street and Friars Street almost directly opposite the site, although its detailed layout is uncertain and no visible remains survive.

The friary continued to acquire lands in 1347 and 1361 and was one of the larger houses in the country (VCH 1969, 422). A Prior and seven friars remained to surrender the house and possessions to the Crown on 20th October 1538. The lands and the ruinous friary buildings were purchased by John, Duke of Northumberland in 1551 and the church and other buildings were demolished (VCH 1908, 101) but at least one structure appears to have survived into the 17th century (Hodgetts 2006).

A burial ground for the friary is presumed to be located in the area opposite St Paul's Church. Human remains were recovered in Friars Street in 1835 and during work on a foundation trench for a cellar in 1972.

At 69-73 Friars Street in 1993 the remains of at least two individuals were recorded. Near the friary was an area of common pasture or waste called the 'clay pits' recorded in 1268 in the southern part of the modern common (VCH 1969, 484).

The medieval suburb on the western side of town appears to have been concentrated along West Street and around the adjacent friary. The suburbs later grew in size during the 19th century when areas around the site (including Monk Street and Crompton Street were developed (Ordnance Survey 1887).

A series of seven pits, two of which produced a considerable quantity of 11th and 12th century pottery, were found during work 400m to the north in Market Street in 1966 (SMR WA 5660). No medieval buildings were revealed, but 1967 excavations revealed 12th-13th century pits. A succession of pottery kilns were revealed during further work in 1967 on the Market Street site (SMR WA 6552). Industrial activity continued on the site during the 14th-15th century when handled green glazed jugs, plain cooking pots, pipkins, fish dishes and decorative roof tiles appear to have been produced (Farr and Taylor 1967). Excavations on the opposite side of Market Street revealed rubbish pits sealed with wasters from a pottery kiln and evidence of medieval buildings built over the road.

The suburbs were largely occupied by small houses and outbuildings. A 16th century timber framed barn (SMR WA 1998) with later additions, located in Theatre Street was photographically recorded before its demolition. Quarry pits were revealed during investigations (SMR WA 1990) along the supposed line of the town ditch at Bowling Green Street (Farr and Taylor 1967). No evidence for the ditch was revealed, but the pits contained 18th century mason's debris. The stone may have been quarried for rebuilding of the town following the fire of 1694. A trial hole west of the town defences revealed the western slope down from the town, but no archaeological deposits were recorded (SMR WA 2160).

A brick-lined well located on the north side of Linen Street (SMR WA 1996) was probably associated with the Victorian housing. Additionally several massive sandstone walls were revealed, but no dating evidence was associated with them (Mytum 1976). At Marble House, two further post-medieval wells were recorded (SMR WA 2160).

The secure documentation for Bread and Meat Close only goes back to 1649 with the will of Edward Rainsford, Gent, though the title of the adjacent Hill Close Gardens (earlier Linen Lane Close) includes an abuttal indicating ownership by St Michael's hospital in 1536. At that time and in all subsequent records of the rentals or transfer of the property through wills etc, the site was open pasture (Hodgetts 2005).

The present Warwick Racecourse (SMR WA 1974) immediately adjacent to the western boundary of the site was established on the common and Lammas Field by 1775. The earliest race took place in 1707. Warwick race course may therefore be one of the oldest race courses in the country. The Common Gate entrance next to the south-west corner of the site provided access from earliest times. An ornamental lodge was built for the herdsman in 1817. It was demolished in the 20th century.

Immediately to the north of the site lies Hill Close Gardens (SMR WA 7040), a Grade II*, Registered garden (EH 1994, 2000). They were created as pleasure gardens in 1845 and only around half the original area survives. The division of the gardens into service lanes and 32 plots was completed by 1866.

In the early part of the 20th century plots to the north were sold and built on thus reducing the surviving element of the gardens. Several mid-late 19th century summerhouses still survive. The stables occupying the north-east of the development site were also later built on part of the gardens.

St Paul's church (SMR WA 1947) and churchyard is located between the western and eastern halves of the development site. The church was built in 1848-50 when the existing cemetrey chapel was extended. The chapel, St Mary's Episcopal Chapel, which now forms the south transept of the church, was built in 1824-25.

The boundaries of the cemetrey around the chapel and the existing church remained the same as indicated by historical maps.

Earlier historical maps including Speed's 1610 map of Warwick (Speed 1610) and James Fish's 1711 map of Warwick show the site as open ground. Roadside buildings are shown on either side of Friars Street approximately as far the Seven Stars public house with gardens, yards or open space beyond. William James' map of 1806 illustrates a similar arrangement showing Friars Street (the Friars Lane) as partly built up. The 19th century maps also show little evidence of building on the site, one building is shown in the position of 52 Friars Street and two glasshouses or summerhouses behind the Seven Stars public house. The rest of the site was occupied by gardens or allotments (Ordnance Survey 1887).

The land to the west of St Paul's church was used as pleasure and allotment gardens from the late 19th century and into the 1960s (Plate 15). At that time it was acquired for use as a car park for Warwick Racecourse. This use has continued until the present time.

2.2 Previous archaeological work

In May 2003, archaeological evaluation of the car park site at Bread and Meat Close, Warwick was undertaken by Warwickshire Museum Field Services Unit (WMFS 2003a). This revealed evidence of medieval industrial activity represented by a probable tile kiln and the base of a hearth or oven at the south of the site. Adjacent to the oven was a stone spread, interpreted as the remains of a collapsed or disturbed wall foundation. Its proximity to the Friars Street frontage was considered a possible indicator for the presence of a building or structure. Further evidence of activity was recorded on site including possible clay pits or rubbish pits.

The evaluation concluded that there was evidence for medieval activity in all four trenches opened in the car park area of Bread and Meat Close. The site is located at the edge of the western suburb of medieval Warwick. The activity dated mainly from the 13th and 14th centuries and is largely industrial in nature represented by a probable tile kiln and abundant fragments of tiles and tile wasters.

Pits revealed to the north of the site may have been dug to extract clay and be part of the industrial activity related to the tile kiln.

The circular oven and the spread of stone immediately adjacent to it are located at the south of the site in proximity to the frontage of Friars Street.

This may indicate a relationship between the oven and the potential building or structure represented by the stone spread and indicated street front occupation in this location. The evaluation did not allow the likely plan or extent of the building to be revealed and the nature or function of the building or structure was not clear.

The presence of the stream to the west of the site and its potential for use in the various industrial activities on the site was noted. Layers of silt in the northern part of the site were indicators that the stream may have had a different course earlier in the history of the site.

2.3 Topography and geology

The underlying solid geology is Bromsgrove Sandstone Foundation (BGS 1984). The drift geology of the site is 2nd Terrace River Gravel deposits. The soils are of the Wick 1 series: 'Deep well drained coarse loamy soils, often stoneless.

Some similar soils with slowly permeable subsoils and slight seasonal water logging. Slight risk of water erosion' (SSEW 1983).

The site slopes from east to west across the site falling from 53.6m AOD at the boundary with St Paul's Churchyard to 51.48m AOD along the bank of the stream which marks the western limit of the site.

3 OBJECTIVES AND METHODOLOGY

3.1 Objectives

The main objective of the archaeological excavation, as defined in the Design Brief, was to excavate and record the archaeological remains in order to understand the nature, function and character of the site in its cultural and environmental setting. The specific aims of the project were to:

- Determine the character of the medieval occupation at the site as suggested by the structural remains seen in Evaluation Trench 1.
- Understand the medieval industrial activity on the site as evidenced by the malting oven /drier seen in Evaluation Trench 1, the tile kiln in Evaluation Trench 2 and the extraction pits seen across the site.
- Understand the post-medieval activity on the site.
- Obtain a chronological sequence for the human activity on the site and to place it within its regional context.

The national framework for research is set out by English Heritage (1997); the Research Aims set out in this document are addressed by the project. The research framework for Warwickshire is under development as part of the West Midlands Regional Research Framework for Archaeology. A seminar was held in February 2003 to discuss the medieval period, and a paper on Medieval Warwickshire presented by Nicholas Palmer (Palmer 2003). This assessed the resource and highlighted gaps in current coverage, among which were the medieval suburbs of Warwick.

A report on the project will be published in the proceedings of the Birmingham and Warwickshire Archaeological Society (BWAS) and in West Midlands Archaeology, the annual report of the Council for British Archaeology (CBA) West Midlands.

3.2 Method statement

Mitigation Strategy

It was proposed to mitigate against the impact of the development on the archaeological deposits through preservation by record over the four defined areas:

Area 1 comprised the initial areas for excavation. The methodologies for excavation, recording and sampling are set out below. Areas 3 and 4 were contingency areas. Area 2 was subject of a separate report. The initial excavation area, Area 1, was located in the large parking area between St Paul's Churchyard in the east and the racecourse to the west (Fig 2).

There was a slight slope from east to west towards the stream forming the west boundary of the site. Following excavation of the archaeology in Area 1, part of the contingency area, Area 4 was also excavated. The north boundary of Area 1 was excavated 12m to the north and the west boundary extended 10 metres to the west (Fig 2). No work was undertaken in Area 3.

Fieldwork and Recording

All works were conducted in accordance with the IFA Standards and Guidance for Archaeological Excavations (1994, revised 1999) and the Code of Conduct of the Institute of Field Archaeologists (1985, revised 2000).

Monitoring of the programme of fieldwork was carried out by Warwickshire Museum Field Services on behalf of Warwick District Council.

The topsoil, subsoil and any non-structural post-medieval or later deposits were removed by a 360º mechanical excavator, fitted with a toothless ditching bucket, to reveal significant archaeological remains or, where these were absent, the natural substrate. Spoil was transported by a dumper and stockpiled along the east and north margins of the development area. This work was carried out at all times under archaeological supervision. Spoil from contaminated areas of the site was retained and stacked separately at the south west of the site.

The site was excavated as agreed in site consultation with Ed Wilson, Warwickshire Planning Archaeologist. It was subsequently extended to the north and west as part of the project contingency (Fig 2).

A site grid was established and related to the Ordnance Survey National Grid, and all levels are related to Ordnance Survey Datum. The archaeological surface was cleaned by hand and planned at a scale of 1:50. Complex features were planned at scales of between 1:50 to 1:10, as appropriate.

All discrete features were sectioned. Where they were shown to form part of recognisable structures, contain deposits of particular value or significant artefact or environmental assemblages, they were fully excavated. Industrial features were fully excavated without recourse to destruction of the structures required to be preserved in situ.

The character, composition and general depositional sequence of the site stratification were recorded on pro-forma sheets, with a unique context number being allocated to each distinct deposit and feature.

Samples were taken for flotation from contexts with a potential for the recovery of industrial residues, charcoal and carbonised plant remains. The sampling strategy conformed to English Heritage Guidelines (2002).

Specific sampling strategies were agreed on site in consultation with Dr Helen Keeley, formerly head of the English Heritage Environmental Laboratory and Lisa Moffett, Scientific Adviser, English Heritage.

Archaeo-magnetic dating for the tile kilns was conducted by Dr Mark Noel of Geoquest Associates.

A full photographic record comprising both 35mm monochrome negatives, with associated prints, and colour transparencies was maintained.

All records completed during fieldwork have been compiled into a comprehensive and fully cross-referenced site archive.

4 THE EXCAVATED EVIDENCE

4.1 Summary of chronology

Table 1: Site chronology and phasing

ACTIVITY	PERIOD	PHASE
Two boundary ditches and a single isolated pit	12th-13th century	Phase 1
Tile kiln, tile lined 'tank', stone surface, hearths, pits and gullys	13th-14th century	Phase 2
Tile kiln, walkway and landing stage.	14th century	Phase 3
Abandonment - reversion to agriculture or pasture	15th-18th century	Phase 4
Divided up for use as pleasure gardens	19th century	Phase 5
Construction of modern car park	20th century	Phase 6

Details of the excavated features are at Appendix B.

4.2 Agriculture and ditches, pre 13th century (Phase 1)

On the east of the site, the exposed natural sub soil was yellow/grey silt clay, very compact, stiff and sticky. Towards the centre and west of the site, this clay was covered with a layer of coarse gritty gravel and rounded river pebbles banded with dark grey/blue silts and clays.

From the north east corner of the excavation and running in a diagonal across the site towards the south west corner of the site, lay the silted up palaeochannel of the brook that marks the west boundary of the site. The fill of the palaeochannel was grey/blue mottled silt clay containing abundant grit and gravel.

The only evidence for early activity on the site was two ditches, both containing pottery from the 12th-13th century and aligned roughly parallel to the original line of the brook. They extended towards the medieval street frontage and may be early field boundaries. A single isolated pit to the west of the site contained a number of sherds of 12th-century pottery (Figs 3-4).

4.3 Tile kiln and street front occupation, 13th-14th century (Phase 2)

There was evidence of increased activity during the 13th century with the construction of a tile kiln and the occupation of land along the medieval street frontage at the south of the site (Figs 3 and 5).

The tile kiln

A tile kiln was built to north of the medieval street. It was a rectangular tile built structure oriented roughly north-east to south-west and measured 2.9m long and 2.4m wide. It was 1.9m wide internally and divided by a central axial wall into two semi circular vaulted flues supporting a single firing chamber (Figs 5-6, Plates1-5).

The side walls and the south wall were built entirely of whole and broken roof tile and wasters laid narrow side on into the kiln giving walls of about 0.26m-0.3m (10"-12") thick. The north wall was 0.63m thick, twice the width of the other walls and pierced by the two flue arches to allow the firing of the kiln (Figs 6-7, Plates 1-5). The surviving west arch was 0.8m wide and stood 0.4m high at the apex of the arch.

The flues had been formed of six tile arches supported on the side walls and resting on the central axial spine wall of the kiln forming the two stoking chambers. None of the internal arches survived intact. A modern service trench had cut through the kiln removing the eastern firing arch of the north wall, the spine wall and the central part of the south wall. There was no evidence that the spine wall had been tied into the north wall of the kiln, the relevant section of the south wall had been lost in the cutting of the modern service trench.

The kiln walls had probably been partially demolished prior to abandonment but appear to have survived to the north and east to about 0.8m above the kiln floor. The cutting of the modern service trench and an earlier evaluation trench (WMFS 2003a) had reduced the east wall to only 0.4m high. At the south-west of the kiln, part of a later stone walkway overlay the west wall at 0.45m above the kiln floor indicating that this part of the kiln had been reduced to this level by at least the early 14th century.

The floor in each of the flue chambers had been constructed as a mix of sandstone slabs and clay roof tiles laid on a bed of lime mortar. Forming part of the floor of the west chamber there were 49 stamp decorated (encaustic) floor tiles set into the lime mortar base of the kiln (Fig 6, Plates 1-5).

The encaustic tiles are dated on stylistic grounds to the late 13th century - early 14th century (Appendix C2). Pottery recovered from the kiln fill is dated to the 13th-14th century (Appendix C1). These dates are corroborated by the results of archaeo-magnetic analysis of samples from the floor and walls of the kiln that gives a date of last firing in the range 1300-1330 (Appendix E).

There was clear evidence that after the last firing, the fired tile load of the kiln had been removed. There was little identifiable charcoal and ash from the final firing of the kiln except against the side and back walls of the kiln. Imprints in the surviving lime mortar floors of both chambers beneath and inside the firing arches of the north wall, reveal many of the tiles forming the kiln floor had been removed prior to the final back-filling of the kiln.

The fill of the chamber was a mix of collapsed roof tiles from the arches and walls mixed with a deliberate infilling of sticky red clay mixed with charcoal, ash and tile fragments. A stokehole extended to the north of the kiln (the dimensions of which were lost under the construction of the later kiln).

Tile lined tank/cistern

To the north of the kiln, a ditch extended east-west across the site. A 5m section of the ditch was lined with sandstone slabs to form a base and two parallel walls of roof tiles built to form a 0.2m square channel along the base of the feature (Fig 5 and 9, Section 8, Plate 12). A 3m section of the channel/ditch was then blocked by the insertion of rough boulders of sandstone packed with stiff red clay.

Set within the original ditch cut, the blocking created a substantial cistern or tank up to 1m deep and connected via the tile lined drain in the base to the adjoining Saltisford Brook (Fig 9 and Plate 12).

Pottery from the silted fill of the drain was dated to the mid – late 13th century. Occasional glazed floor tiles used in its construction are from the late 13th or early 14th century.

To the north of the kilns, a large spread of tile and tile wasters extended east beyond the limit of excavation. It is probable that another kiln or kilns had been in use further up the hill towards Bowling Green Street. It is unclear if these would have been contemporary with this phase or the subsequent kiln built on the site.

Occupation evidence

At the southern edge of the site, adjacent to the medieval street frontage, a stone working surface, hearths, a stone-lined oven and a series of pits, gullys and postholes were uncovered (Fig 5 and 10, Plates 9-11).

The stone floor was roughly rectangular (3m x 2.6m) and truncated on three sides by modern service trenches (Fig 5, 10 and 17, Plate 10). There were three surviving postholes associated with the floor indicating that it had probably been roofed over. There was no evidence for wall foundations or a slot for a sleeper beam. Given the coarse build and rough edges and surface of the floor, it appears to have been part of a shelter or workshop rather than an enclosed house or structure. Pottery recovered from between the stones in the floor dates from the 13th-14th century.

There were three hearths or ovens on the site, two survived as areas of burnt clay up to 1m in diameter, the remainder of the features having been lost to modern disturbance. The third was a circular stone-lined hearth or oven 1.1m in diameter and 0.2m high lined with sandstone blocks bonded in stiff grey clay (Fig 10 and 13, Section 12, Plate 9 and 11). The only pottery recovered from the base of this oven was dated to the 12th century.

A number of short gully sections, isolated postholes and small pits (all less than 1m in diametre and none deeper than 0.4m) were scattered across the whole frontage area. There was no evidence of industrial use, nor any obvious linear alignments or correlation between the features to indicate the outline of buildings or structures.

Two short linear sections of irregular and roughly aligned sandstone fragments may represent the vestigal remnant of walls or foundations but these were so fragmentary that no conclusion as to their overall length or purpose can be drawn.

Pottery from these features has been dated to the 13th and 14th centuries. Several features contained isolated fragments of 12th-century pottery. It is likely that these were residual, representing low intensity activity pre-dating the industrial use of the site, probably from agricultural manuring of the site.

A single ditch aligned roughly east to west and parallel with the street frontage cut across one of the earlier ditches. It may have marked the rear boundary of the early street front occupation of the site.

4.4 Tile kiln, walkway and landing stage, 14th century (Phase 3)

A second tile kiln was built in the stokehole and against the north face of the earlier kiln. The original firing arches were blocked using stacks of broken tiles or tile wasters and the base of the stokehole was built up with clay and gravel packed with broken tile, ash and charcoal. When this reached the height of the firing arches, it was compacted and sealed under a thick layer of clean red clay that formed the foundation layer for the floor of the new kiln (Figs 6, 8 and 11, Plates 1-2, 6-8).

The kiln was 2.8m long and 2.6-7m wide, built of roof tiles and wasters in much the same way as the earlier structure. The kiln was 2.0m wide internally, with two semi circular vaulted flues formed from seven sets of tile arches in each chamber supported by a central spine wall. The north wall was again pierced by two arches to allow firing of the kiln. None of the arches survived but based on the remnants of the north wall, each flue chamber would have been 0.9m wide and 0.45m high. The spine wall was 0.3m wide where it survived the cutting of the modern service trench. There was no evidence that the spine wall was tied into either the original kiln wall to the south or to the north wall of the new kiln.

Incorporated into the walls of this kiln were a number of square floor tile dating on stylistic grounds to the 14th century (Appendix C.3).

A course of roof tile laid flat to form a threshold outside the north wall of the firing arches covered a complete pottery lid dated to the late 13th or early 14th century.

Archaeo-magnetic dating of this kiln placed the date of last firing in the range 1340-1370. Glazed floor tiles, encaustic tiles and pottery recovered from the fill of this kiln would support an early 14th-century date.

Sandstone walkway

Probably contemporary with the construction of the second kiln was an alignment of sandstone blocks forming a walkway overlaying the west wall of the early kiln. This was built of single randomly split sandstone blocks up to 1m long by 0.35m wide and 0.25m thick bedded in stiff red clay and packed with rounded river cobbles and broken roof tile to create a secure footway. It extended 15m from the kiln towards the bank of the Saltisford Brook in the south west of the site (Fig 11, Plate 13).

Landing stage

A small stone jetty or landing stage was located at the end of the walkway at its junction with the bank of the Saltisford Brook (Fig 11-12, Plate 14). It was composed of three main elements, a spread of sandstone fragments and broken roof tile extending 1.5m along the length of the walkway and widening to about 1-1.5m either side of the walkway along the edges of the bank of the brook. A single balk of roughly squared timber 2m long formed an edge and revetment for the tile and stone surface on the bank.

Immediately to the west and sloping at about 45° down the side of the bank and into the brook was an arrangement of large flat stone slabs forming a solid facing to the bank of the waterway. At the base of the stone arrangement, four wooden stakes were fixed in the bed of the stream holding the stones in place and preventing them slipping into the bed of the brook (Fig 11-12, Plate 14).

4.5 Abandonment and reversion to pasture, 15th-18th century (Phase 4)

Following the industrial activity related to the tile kilns in the 13th-14th century, the site appears to have been abandoned and reverted to agricultural use, probably as pasture. The upper structure of the kilns was probably left to deteriorate and collapse before being levelled.

The broken tile was spread over an area of about 4m in each direction around the kilns. This was deepest, up to 0.3m deep, near the kilns and tapered out further from the kiln site. A layer of pale sandy colluvial clay up to 0.4m deep spread over the site, sealing the evidence of the kilns. This was in turn sealed below a layer of dark brown/black topsoil up to 0.4m deep.

Two sandstone walls were cut into the layer of grey colluvium on the eastern edge of the site (Fig 14-15, Section 15-16). These extended beyond the limits of excavation and were truncated to the north and east by a modern service trench. The walls were 1.8m long and about 1m apart. The west wall was the more substantial structure, the other being only a linear alignment of fractured sandstone rubble badly truncated by modern site levelling.

Only one course of the west wall survived in the excavated area. It is unclear whether this was a foundation or the base of a wall.

It was built of random blocks of sandstone up to 0.3m square and up to 0.4m long. They were set into a shallow foundation trench and bonded with stiff grey clay.

To the east of the wall there was a layer of dark brown organic clay loam containing frequent fragments of broken roof tile. To the west of the wall there was only the grey colluvial clay that covered the site. It is clear that the wall formed a boundary with no evidence of activity on the west (brook side) of the wall and apparent mixing and disturbance of the soil to the east.

The wall extended across the earlier tile-tiled drain but 0.2m above the silted fill of the ditch in which it was constructed. The only pottery recovered from the layers abutting the wall dates from the 13th and 14th century and must be residual.

4.6 Pleasure gardens, 19th century (Phase 5)

In the late 19th century, the land was divided into pleasure gardens, some of which converted to use as allotment gardens in the early 20th century and continued in use until around 1960. Some of the undated and isolated postholes and pits may relate to this phase of activity (Fig 16, Plate 15).

4.7 Car park, 20th century (Phase 6)

The final phase of activity on the site was the levelling of the site in 1961 to create a car park for the adjacent Warwick Racecourse. Soil from the higher, eastern side of the site was shifted to the west to create a more level surface. This removed much of the topsoil and truncated the grey colluvial layer over the eastern part of the site. Build up layers of red shale, hardcore and limestone gravel were brought in to level and consolidate the site and top-dress it for use as a car park.

Both contemporary with this phase of development and subsequent to it, a series of service trenches for drainage and the installation of lighting in the car park were cut across the site (Fig 17, Plate 15).

5 DISCUSSION

Tile history

Although bricks and tiles had been manufactured during the Roman occupation of Britain, little evidence for continued production has been identified in the subsequent Anglo-Saxon period. Brick and tile seen in surviving Anglo-Saxon structures (mainly churches) is almost invariably attributed as being Roman in origin. Thermoluminescence tests on apparently Roman brick forming part of the Anglo-Saxon church at Brixworth, Northamptonshire however, suggest that essentially similar bricks may have been produced in the Roman, Anglo-Saxon and later medieval periods (Everson 1977; McWhirr and Viner 1978; Everson and Parsons 1979).

The earliest recorded English use of contemporary ‘wall tiles’ or ‘great bricks’ was in the construction of the church at Coggleshall Abbey, dedicated in 1167 (Gardner 1955).

Roof tiles are first listed in the London building regulations of 1212 as part of a list of permitted roof coverings (Salzman, 1952; Chew and Kellaway, 1973).

Tile fragments occur in London in contexts dating from the 12th century onwards. From about 1200, roof tiles start to appear elsewhere, the nibbed tiles at Bordesley Abbey in the early years of the century and the camera at Wharram, Yorkshire, built *c*1180 and demolished *c*1250 (Rhatz and Hirst, 1976; Hurst, 1979). Roof tiles do not seem to have come into more general use in England until the middle of the 13th century.

Early roof tiles were generally large and hung on laths by means of projecting nibs. By the beginning of the 14th century, smaller peg-tiles with no nibs had become almost universal in south-east England.

Tile dimensions and quality were regulated first by localized enactments to ensure standardisation and in 1477, by statute (17 Edward IV, c iv).

The whole range of ceramic production was rarely undertaken by a single producer although there is evidence that brick and tile, sharing the same basic moulding processes, were often made at the same location.

Despite the fundamentally different fabrication processes of throwing or moulding, pottery and tiles were sometimes produced in the same kilns.

This has been recorded in Kent and Sussex at Hastings (Lower, 1859), Rye (Vidler, 1932), Binstead (Wilson and Hurst, 1967) and also at Lyveden, Northamptonshire (Steane and Bryant, 1975). At Lyveden a normal tile kiln was apparently used to fire pottery, whereas the structures at Binstead and Rye seem to have been kilns specially built for the dual production.

In Warwickshire, pottery, patterned floor tiles and roof tiles were all manufactured at Chilvers Coton (Warwickshire SMR WA 1792), although it appears different types of kiln were in use on the site. Brick and tile kilns are recorded on Baker's 1766 map of Stoneleigh and evaluation in 1993 uncovered a tile kiln and part of the medieval field system (Jones, 1993), which may indicate a late medieval industry there. In Polesworth, medieval patterned tile and roof tile wasters indicate a tile industry in the village (Warwickshire SMR WA 276).

Floor tiles with relief stamped designs are found in the late 10th and into the 11th century and are known at St Albans, Peterborough, Winchester, Bury St Edmund's Abbey and All Saints Pavement, York. Locally the earliest recorded relief patterned floor tiles are at Coventry Priory (Drury, 1981).

There then seems to have been a lull in the production of tile pavements until the early 13th century, coincident with the marriage of Henry III and Eleanor of Provence in 1236. The earliest record of tile paving in an English royal residence is at Westminster Palace in 1237 and in parts of pavements in Clarendon Palace in 1244. There is no clear evidence of the use of monochrome tiles in mosaic pavements in England prior to the introduction of inlaid tiles, despite their use in France by the early 12th century. The earliest documented dates for mosaic pavements are at Fountains Abbey in 1220-47 and at Meaux in the abbey church between 1249-69 (Drury, 1981). The tiling at the Corona Chapel at Canterbury Cathedral dates to about 1280.

It is believed that the tiles were produced by itinerant craftsmen moving about the country from one commission to the next and establishing kilns close to the site where the tiles were required. They would presumably engage local labour to assist in the construction of the kiln, obtain the necessary raw materials and provide the labour to fashion and fabricate the tiles.

Examples of tiles fabricated using identical patterned stamps are known at Waltham Abbey in Essex, St Faith Priory, Horsham and Broomholm Priory, Baton, the latter both located in Norfolk. All date to the third quarter of the 13th century.

Additional tiles with designs derived from this original group are recorded at a range of sites in Norfolk and Suffolk borders including Campsea Ash Priory and again at Waltham Abbey in Essex. This clustering of sites utilising the same stamps and in the same time frame would seem fair corroboration for the existence of an itinerant craftsman or group of craftsmen moving from site to site as new commissions arose, taking with them their expertise and the stamps for the decorated floor tiles to be re-used on the next project.

The kilns built for a single commission could have been fairly flimsy, built of wattles and clay and allowed to collapse when the commission was completed. For a larger scale project, a more substantial kiln, built of stone and tile might be used as at Clarendon Palace (Drury, 1981). There is evidence from the 14th century of the introduction of high quality and sophisticated patterned tiles at Temple Dinsley, Hertfordshire and at Chelmsford Dominical priory. Wasters have been found at the tile and pottery making kilns at Mill Green, Ingatstone some 8km to the south-west. As no similar tiles or tile wasters have been found elsewhere in the county, it seems likely that in this instance, the itinerant craftsman chose to make tiles at the nearest suitable industrial centre, probably fired in one of the existing kilns.

Tile making

Raw materials needed to manufacture tiles both for roofs and floors would have been water, clay and fuel. Water was readily available at Bread and Meat Close from the Saltisford Brook that has formed the western edge of the site.

Clay could have been obtained from the immediate vicinity. The evaluation by Warwickshire Museum Field Services revealed probable clay pits immediately to the north of the excavated site (WMFS 2003a).

In 1268 it was recorded that there was an area of common land or waste adjacent to the friary and called the ‘clay pits’ (VCH 1969, 484). This was granted as a common to the town by Margery, sister of Thomas Earl of Warwick, some time before her death in 1263 (Hodgetts, 2006). Local clay had clearly been exploited for pottery and other uses well before the start of work on the adjacent friary or the development of the tile industry at Bread and Meat Close.

It is probable that the clay in the immediate vicinity to the kilns, within Bread and Meat Close, was used in the first instance. As this was exhausted, clay from the adjoining Saltisford and common lands would have been increasingly exploited.

Fuel would have been brought from the surrounding countryside. Managed woodland and coppices were common in medieval Warwickshire, which held one of the largest extant woodlands in the country, the Forest of Arden. The charcoal recovered from the kilns was mainly from managed (coppiced or pollarded) trees as were the stakes recovered from the landing stage associated with the later kiln (Taylor 2004).

Tile making was a seasonal occupation, largely because freshly made tiles are hard to dry in winter and are susceptible to frost. Tile making combined with other seasonal work is attested at Penn, Buckinghamshire as early as 1332. In 1368, John Horn of Danbury, a *tighlere* (tiler) and his wife Agnes acquired a messuage and 11 acres of Danbury – a far from insignificant holding. Similarly, tillers at Ingatstone can be shown to be substantial holders of lands and properties in the 14th and 15th centuries (Drury, 1981). It is probable that in all these cases, the tile making was an adjunct to their management of their other land holdings.

The making of tiles, whether for floors or for roofing, entailed very much the same methods (derived from Hudson 1989, Betts 2002). Clay was normally dug in the late autumn and stacked on site adjacent to the kilns.

It was turned at least once to allow it to weather over winter when the rain and frost would break it down from the heavy lumps dug from the ground into a softer, smoother and more easily worked consistency.

In the early spring, clay would be brought into a covered working area so that sand and organic materials could be added. The clay was worked to a smooth and even consistency and any impurities; particularly stones that would distort moulding or cause 'spalling' or fragmentation in the firing were removed. The worked clay was then mixed with sufficient water to make it pliable and was rolled into lumps. These were then pushed down into wooden frames or moulds for the required size of tile.

Floor tiles, being thicker often had moulds with sloping sides, narrower at the base, so that the moulded tile could be taken out more easily. Roof tiles were pushed down into oblong wooden moulds and kneaded into place with the hand, often causing distinctive raised edges as the clay was forced up around the edges of the mould.

The excess clay above the sides of the mould was then removed, either with a wire or a flat blade to create the flat rectangular shape required. Occasionally tiles were not cut but left with the slightly irregular hand moulded upper surface.

To prevent the clay sticking to the mould or the moulding table, fine sand could be scattered which allowed the tiles to be easily removed. This can sometimes be seen baked onto the surface of finished tiles. There is no evidence for sanding on the tiles from Bread and Meat Close and it is probable that these tiles were moulded on a moulding table and in moulds splashed with water to ease the turning out of the soft clay tiles.

It is this process that most probably took place over the tile-lined tank and drain to the north of the kilns. The water in the tank would have been used to soften the clay and to lubricate the moulds and moulding surface. The muddy, clay filled, excess water would have been carried down the channel to the adjacent stream.

If patterned tiles were required, a carved wooden stamp was laid on the wet tile while still in the mould and struck with a mallet until the design was set. White clay might then be pushed down into the recessed design to form the colour contrast, or the tile would be lifted from the mould and dipped in slip. The tile surface was then wiped clean leaving the impressed design filled with the slip.

If roof tiles were being made, while still soft, the nib would be hand moulded by either attaching a separate plug of clay to the end surface of the tile, or more commonly, by pulling the edge of the tile up and over a 'former', usually a squared piece of wood, to give the distinctive raised nib. Numerous examples of this 'pulled' type of nib were observed during excavation (Fig 31.1, Plate 17). Peg holes might be cut using a purpose made pattern applied while the tile was still in the mould. In most cases at Bread and Meat Close, a sharp pointed instrument was pushed into the soft tile creating distinctive square shaped holes (Fig 31.1, Plate 17).

The soft clay tiles would have been stacked to dry in the air for several weeks until 'leather hard'. Drying racks would have been used to keep the tiles off the ground and to allow air to circulate around them. On other sites, these have taken the form of long narrow sheds containing open shelving and roofed over to provide weather protection for the drying tiles. Although no such structures have been positively identified on this site, it is probable that some of the post holes uncovered may relate to these types of structures.

Some tiles, particularly thicker floor tiles had 'scoops' or 'keys' removed from the base to improve drying and to provide a 'key' for the mortar setting.

Several of the floor tiles recovered from Bread and Meat Close had 'keys' or holes cut into the base (Fig 31.3). If required, glaze was spread over the air-dried tiles before they were stacked in the kiln (Eames, 1980).

In other excavated kilns where the upper structure has survived, access was gained through a gap in the side or back walls of the kiln.

At Bread and Meat Close, outside the west wall of both kilns there was a spread of sandstone and tile forming an area of hard standing beside the kiln and may indicate an access at that side. Greater truncation of the kiln walls to the east has removed any potential evidence of a similar spread of material adjacent to the kiln. However the location of the surviving hard surface along the side closest to the stream and the later walkway and landing stage is circumstantial support for possible access along the western wall of the kilns.

The tiles were stacked on edge with the long axis of the tiles spanning the gap between each pair of arches. The heat and gasses from the burning fuel below would have risen through the tiles drying and baking them. The upper walls of the kiln would probably have been up to 1.5 to 2m high and could have been either open to the sky or enclosed with only a vent to assist with drawing the heat and gasses through the chamber. There was no surviving evidence for the exact nature of the upper structure of the kilns.

There was no evidence for spacers within the kiln or the surrounding material and it is probable that they were stacked with the nibs at alternate ends creating regular spacing between the tiles. The tiles would have been tightly packed with two tiles taking up a width of approximately 50mm.

Assuming this is an accurate guide to the stacking density, then about 50 tiles could stacked across the width of the firing chamber. The six arches in the early kiln or the seven arches in the later kiln could have supported seven or eight stacks of tiles respectively, assuming a stack between each end arch and the front and rear walls of the kiln.

Stacking tiles across both end spaces would have restricted the flow of air, heat, smoke and hot gasses around the kiln and it is probable that they were not both stacked or at least were only partially stacked with tiles to allow the heat to circulate freely around the kiln. If a minimalist view is taken of the stacking, with only five or six stacks of tiles placed across the internal arches, with both end spaces left open, then a kiln capacity of between 300-400 tiles was possible for each tile layer.

If the upper structure extended to the generally accepted 1.5-2m above ground, then the potential capacity of the kiln would have been between 3600 and 4800 per kiln firing (based on a maximum 12 layers of tiles).

Experimental archaeology has shown that a kiln for 6000 handmade tiles took about 15 tons of fuel in round wood billets between 40mm and 300mm thick and up to 2m long. This burned sufficiently to fire all the tiles within 24 hours and left behind less than 30 litres of ash and charcoal. This would be consistent with the small volume of ash and charcoal seen on the floor of the two kilns when excavated (Hudson 1989).

Nibbed tiled roofs were laid with the nibs hooked over a batten and held in place with nails or wooden pegs. Not every row of tiles was nailed or pegged as each tile had to have a two-thirds overlap down its length, the weight of the overlapping tiles effectively holding them in place.

Tiles were laid from the bottom of the roof and each subsequent layer of tiles was offset to allow the joints to meet in the centre of the tile below. The effect of the overlap and offset jointing was to create a stable and waterproof roof surface (Smith 1999).

A standard tile from Bread and Meat Close measures approximately 0.3m x 0.15m or about twelve inches by six inches. Allowing for the overlap above, and the effect of the pitch of the roof (tiles require a minimum of 30° pitch) it would need 48 tiles to cover one square metre of roof (Smith 1999).

No details of the buildings at the adjacent friary are known, but it is certain that it took 500 carts to remove stone from the site in 1538 for works at Warwick Castle (Hodgetts, 2006). At the same time a building 60 feet (20m) long was identified as suitable for transfer to the castle. This building was roofed with tile – almost certainly from Bread and Meat Close. Based on a figure of 48 tiles per square metre of roof many thousands of tiles would have been required to cover the expected range of buildings recorded on other monastic sites.

The volume of tiles needed to construct the kilns themselves would have been substantial. The tiles are laid short side on to the inner chambers of the kiln. Assuming a maximum height of 2.5 metres, about 18000 tiles would have been needed to construct the walls, spine walls and arches of the two kilns.

In addition, the drying sheds, clay working areas, moulding sheds and domestic buildings of the workers would all have required roofing tiles, certainly many thousands.

The volume of tiles remaining on the site can be assessed based on the survival of the broken tile layer 0.3m deep tapering to nothing about 3-4m in each direction from the kilns.

Taking the minimum range of the spread and assuming only 50% of the layer was actually broken tile, it would have needed at least 20,000 tiles to produce this volume of waste.

Clearly much of this residual tile waste would be from the upper structure of the kiln, demolished and spread across the site. Assuming none of the upper structure had been salvaged in antiquity, this could account for about 10,000 tiles with the remainder still in the surviving structures. It would still leave in excess of another 10,000 tiles needed to generate the measured volume of tile fragments. Even if an extreme estimate of 20% of each firing were damaged or wasters, it would require a minimum firing of over 100,000 tiles in the life of the kilns to create this volume of waste alone.

The remainder of the site was quite literally littered with broken tile fragments and the second tile spread to the north-east of the kilns must have contained a substantial amount of tile, certainly on a par with that observed over the excavated kilns. It must be assumed that the kilns produced several hundreds of thousand tiles during their working life.

5.2 Kiln comparisons

A kiln for handmade peg tiles (no nibs) was uncovered at Shenley Church End, Milton Keynes (Edmundson and Thorne 1989). The kiln comprised a rectangular structure built of limestone blocks set into a construction pit. The outer walls and two interior spine walls along the length of the trench were all built of limestone plastered with clay.

The firing arches were built of small tiles (90x90x150mm) cut from unfired peg tiles (some still had the peg holes). The arches were centred over wattles some 20mm in diameter and the whole structure was then plastered in clay which had retained the cast of the wattles.

The structure had apparently twisted and partially collapsed during its last firing and stacks of tiles were still in position over the firing arches when excavated. The analysis of the *in situ* tiles gave a figure of about 5000 tiles per firing, very similar to those postulated at Bread and Meat Close. The pottery recovered from the fill dated from the 13th to 15th century. It is probable that the kiln fell out of use in the early 15th century.

It appears to have remained as an open ruin into which later pottery and rubbish was deposited. An imprint of textile recovered from the clay lining of the kiln would support a 13th-14th century date.

Two rectangular tile built kilns have been excavated at 9-19 The Tything, Worcester (Miller, Griffen & Pearson 2004) and at Penn, Buckinghamshire (Hutchings and Farley 2003). Both date from the 15th century but otherwise match the excavated detail of the Bread and Meat example quite well. The Worcester kiln was used to make roof tile, floor tile and brick. The Gloucester kiln was used for roof tile only.

A kiln at Stoke in Coventry was excavated during the construction of a new housing estate in 1911. The kiln was built onto the sandstone floor of a large pit; the walls were built of roofing tiles. There were two firing arches and seven arches in the interior were carried by the side walls and a central spine wall, all built of roof tiles and wasters.

At the rear of the kiln, the upper part of the superstructure still stood over 2m tall, a good indication of the original operating height of the kiln (Chatwin 1936).

Excavations in the 1960s and again in 1971 revealed tile kilns at Tyler Hill, Kent. They were built mainly from roof tiles with some ridge and hip tiles incorporated into the structures. During excavations for a new sewer, pottery wasters, kiln furniture and part of another medieval tile kiln were uncovered elsewhere on Tyler Hill in 1994 (Cotter 1994). The kilns were used for the production of predominantly roof tile but also produced some pottery and specialist ceramic building materials, plain and glazed floor tiles, encaustic tiles and chimney pots.

There have been a number of medieval and late medieval kilns excavated in Warwickshire. Many were used for pottery and brick making as well as for manufacturing tiles. The Chilvers Coton kilns represent a major ceramic industry with over 40 kilns excavated and many others spread about the area. Brick and tiles kilns are recorded on mapping at Stoneleigh with at least one kiln attested by excavation (Jones, 1993) Pottery kilns are already known from Warwick and the later tile and brick industry along the Saltisford Brook is attested in documentary records (Hodgetts, 2006). It is probable that other tile kilns remain to be discovered in and around the town.

5.3 Bread and Meat Close

The site lay outside of the early medieval town in an area that only developed as a suburb in the 13th and 14th centuries. There is no evidence for occupation or activity other than probable agriculture. In the 13th century, there was a sudden and significant increase in activity on the site.

A tile kiln was built in the centre of the site with hearths and shelters being constructed along the street frontage. These features appear roughly contemporary with the development of the tile kiln. There is no evidence for substantial structures or the outline of houses or buildings. The evidence points to insubstantial temporary structures, probably shelters or roughly built open workshops associated with the tile making further up the site.

The pits and gullys would be consistent with rubbish disposal and efforts to drain working areas in inclement weather, the site remains prone to water-logging after heavy rain.

It is known that major building work started on the opposite side of Friars Street in the mid 13th century. The Dominicans were granted land at this location shortly before 1263 and the church was consecrated in 1268. King Henry III granted the friars timber from his forests in 1263 and 1267-8 for the buildings.

The friary was later expanded to provide for thirty to forty friars and would have been a substantial complex with church, cloister, chapter house, kitchens, refectory and dormitories. In addition there would have been a need for accommodation for visitors, lay brethren and storage to provide for the daily needs of the community.

Although the earliest site buildings and dormitories may have been timber and thatch, the church itself would most likely have been built of stone. High status medieval buildings, particularly churches were often roofed with lead, always an expensive material. The friars preached and lived by begging and the receipt of charitable donations. It was never a rich establishment and even at the time of the Dissolution the friary only had lead in the gutters and on the steeple. The inference must be that the church was roofed with tile, and as the early timber and thatch structures were rebuilt or upgraded to stone, they too were roofed with tile, in itself a relatively high status and expensive roofing material.

Additional phases of building at the friary are recorded in 1296 when Edward I granted seven oaks from his forest at Kinver for the erection of buildings on the site, in 1361 and in 1369 (Hodgetts 2006).

It is probable that it was a commission to produce the tiles for the new friary that was the impetus for the development of the tile kiln industry on Bread and Meat Close. An itinerant tile maker would probably have been commissioned to produce tiles for the church in the first instance. The roof tiles used to construct the early kiln could not have been made in that kiln. It is possible that they were surplus to requirements elsewhere and carried to this site. This seems unlikely, if this amount of tiles could readily be transported to site, why not merely transport all the tiles required for the commission? It is much more likely that the tiles were manufactured and fired on site. It is probable that at least a temporary kiln or even a more substantial tile kiln was located elsewhere within the immediate vicinity of the site. This probably produced tiles for the initial phase of the commission, the wasters and excess production being used to build the kiln excavated in Bread and Meat Close.

With the substantial tile built kiln in place, tile making would probably have continued on site after the initial phase of friary building was over to produce tiles for high status houses and buildings in the adjoining town and the surrounding area. As the town and friary grew and expanded, new buildings and the expansion, upgrading or replacement of older buildings would have created an ongoing demand for tiles.

It is possible that the kiln was not in constant use but used as and when there was demand from the town or the friary. The craft tiler may have accepted other commissions, returning when there was sufficient demand from the Warwick area. Even under ideal conditions with constant demand from the local area, the kiln would only be in use during the late spring through to late autumn each year.

Roof tiles are known to have been manufactured in England from at least the early 12th century, although there is as yet no good dating methodology to attribute individual tiles to a particular period. Floor tile, particularly patterned encaustic tiles can be dated with more certainty. On stylistic grounds, the encaustic tiles laid in the base of the kiln could be dated to the very late 13th or the early 14th century.

It is significant that the patterned tiles included the Coat of Arms of the Beauchamp family, then Earls of Warwick. It is known that Thomas Beauchamp (1345-1401) was Earl of Warwick during this period and used the exact same armorial bearings as shown on the tiles recovered from the early kiln (Figs 29-30, Plate 16).

While there is no evidence for the manufacture of encaustic tiles, or indeed of floor tiles of any sort in the excavated kiln, it is highly likely that those recovered from the floor of the kiln were fabricated in the immediate vicinity. Since few if any matching tiles with these exact patterns have been found elsewhere, the inference must be that they were from a single commission for the adjoining friary, probably the church. As excess tiles left over from an earlier commission, their incorporation into the tile kiln structure during later ongoing maintenance and repair is not unreasonable.

The tile lined drain to the north of the kiln was constructed of tiles and wasters from the kiln and also floor tiles, almost certainly from another kiln on the site. The blocking of the ditch would have created a cistern or tank capable of holding a substantial head of water that could be released or replenished via the channel in the base. It is probable that this structure was intended to assist in working the clay prior to moulding the tiles ready for drying and firing (Drury 1979; Figs 5 and 9, Plate 12).

The excavated kilns were buried under an extensive spread of broken tiles and wasters, up to 0.3m deep in the immediate vicinity of the kilns and tapering out at about 4m on all sides. To the north of the kilns, an equally large spread of tile and tile wasters extended across part of the site and beyond the limits of the excavation.

It is highly probable that a contemporary kiln or kilns had been in use further up the hill to the north and west of the excavated kilns. Pottery from the silting of the tile lined drain and cistern dates from the 13th and 14th century and is consistent with contemporary use of the early kiln but may equally be related to the putative kiln located immediately to the north.

There is evidence of partial collapse and repair of the western firing arch of the early kiln and this may have precipitated the replacement of the kiln with the second kiln built against the north wall. Re-using part of the original structure would have saved considerable time and effort. The original north wall became the back wall and the stoke hole became the foundation/construction trench for the new kiln. Tiles from the upper part of the old kiln could have been re-used in the new structure. It was roughly the same size and design of the original kiln but with seven arches instead of six (Figs 6-8, Plates 1-8).

There is no evidence for a break in activity between the dating of material from the two kilns or from the occupation area to the south of the site. It is likely that when the first kiln required major refurbishment, it was more economical to build a new kiln than to repair the old. A large pot lid, tiles and pottery from this kiln place it in the early 14th century. This is consistent with the archaeo-magnetic samples from the early kiln that date the last firing between 1300-1330. The highest degree of confidence is in the five years each side of the median date; therefore it is likely that the second kiln was erected some time around 1315.

The working life of the second kiln ended with the date of last firing (based on the archaeo-magnetic analysis) sometime between 1340-1370. The most likely date for abandonment is again focused in the five years either side of the median date 1355.

There is evidence, albeit of a circumstantial nature, of a probable decline in demand for tiles from Warwick and its surrounding area at this time. The Black Death struck Warwick first in 1349 and re-visited in subsequent years with a major outbreak in 1364. The impact of the plague would have severely impacted upon the people of Warwick. The plague disrupted normal trade and markets declined, harvests were depleted through the deaths of farmers and labourers.

Those who survived the plague often perished through starvation caused by the disruption caused to food production, transport and trade.

Properties where occupants had died became vacant, there would have been a decline in new building and possibly the re-cycling of re-useable materials from abandoned or derelict buildings to repair or expand occupied buildings. The friary depended on charitable donations and endowments and may have seen a decline in income from rents or from its lands even if there were continued donations from people desperate to invoke the support of the church to protect them and their families from the plague. Assuming that the tile makers themselves had not succumbed to the plague, the decline in demand from both the town and the friary brought about by the plague may have caused the abandonment of the tile kiln at this time.

The excavations produced no evidence for continued activity on the site after the final firing of the kiln in the mid to late 14th century. Only two sherds of pottery from the late 14th or 15th century were recovered from site. It seems probable that when the tile kilns went out of action, activity on the site also ceased. There is no evidence for continued activity along the street frontage.

The sandstone walls uncovered to the east of the site clearly post-date the kiln activity by a considerable period. The ditches and the site had been covered in colluvium into which the wall foundation was cut. It is probable that the walls formed part of a structure, possibly a store or stable associated with the use of the land for pasture and the grazing of horses, a recorded source of income in the 17th -18th century (Hodgetts 2006).

Alternatively, the walls may have formed the foundation for a store or structure associated with the use of the land as a pleasure garden or allotment garden in the 19th-20th centuries. Certainly the very rich organic loam to the east of the wall has all the characteristics of a garden soil. In the absence of secure dating or associated features, attribution of provenance and use must be conjectural.

5.4 Conclusion

The excavations at Bread and Meat Close have revealed little evidence for activity on the site prior to the 13th century.

The presence of clay pits immediately to the north of the kilns and the historically attested clay pits on the adjacent common lands all point to a local source for the clay to make tiles. There was ample water from the brook and plenty of timber from the local woodland to establish and sustain a tile industry. It is known that medieval tile makers were peripatetic, it being more economical to move tile makers from site to site where required rather than paying to move heavy materials or finished tiles from source or to site from the tile maker's location.

In the mid 13th century, a tile maker(s) moved onto Bread and Meat Close. A kiln was built, clay pits excavated and the road frontage along Friars Street was occupied with evidence for several structures, hearths and ovens linked with the working of the early tile kiln. This surge of activity was almost certainly associated with the establishment of the Dominican Friary on Friars Street, in full flow by 1263 with the church being built and dedicated by 1268. Almost certainly, at least one other kiln was used to fire the tiles used in the construction of the earlier of the two excavated kilns. It was also probably used to fire a commission for pattern stamped floor tiles, possibly for the new church or another high status friary building.

In either event, spare tiles and wasters from this early kiln were used to construct the earliest of the excavated kilns that also incorporated left over patterned floor tiles into the floor of the firing chamber.

Given that tile making was essentially a seasonal occupation, there may not have been sufficient demand to justify a full time commitment to the kilns at Bread and Meat Close. It is possible that the kilns were only used as new orders for tiles were received, the tile maker moving from place to place fulfilling other commissions in the interim period. Although the initial impetus may have been the commission from the friary, it is highly likely that any excess capacity of the kiln would have been used to trade in the wider market of Warwick and the surrounding area. The historical research shows that other kilns developed later around the common lands producing tiles, bricks and pottery, meeting a growing demand for these products from as far away as Stratford upon Avon and Kenilworth (Hodgetts 2006).

All the evidence indicates that tile production at Bread and Meat Close continued for almost 100 years at this location. When the first kiln became too dilapidated or too expensive to repair in the early 1300s, it was replaced by a second kiln built into the stoke hole of the original and re-using the north wall of the original in its construction. This kiln continued in use until the final firing in the years around 1355.

It may be significant that the last firing of the kiln is presaged by the onset of the Black Death that struck Warwick first in 1349 and again in subsequent years. Even if all the tile makers managed to survive the plague, demand must have been reduced as the population declined and labour and materials became more difficult and expensive to acquire. The curtailment of movement, quarantine of the sick and dying, the loss of lives and livelihoods would all have adversely affected markets, trade, travel and the production and availability of food and materials essential to support the local economy. It would certainly have impacted on any expansion or building programmes in or around the town at that time.

The friars would not have been immune to the effects of the plague, particularly given their role of ministering to the sick, holding funerals and praying for the dead and bereaved. Perversely, despite a reduction in population, the decline in trade and the probable loss of rents where tenants had died, the fortunes of the friary are likely to have improved during the plague years, even if individual friars were among the lost.

It is clear from contemporary records that the medieval population initially perceived the plague as a punishment from God. People were urged to repent and atone for their sins in the hope of avoiding God's wrath. Donations and endowments were made to churches and religious houses for masses to be said and prayers offered for the dead and dying, and to seek God's intervention to avoid contagion of the donors. Far from reducing income, it is likely that religious houses received greater donations during plague years than at other times. This may be reflected in a small number of surviving records of notable events recorded by the friary around this period. An endowment of 5 marks was received in 1354. There are indications of a further phase of building in 1361-2 when the friars sought permission to extend the homestead. The burial of Sir Peter de Montfort in 1369 earned an endowment of £10 and corresponded with a recorded period of building, possibly the culmination of the 1361 building programme, or a separate build financed by de Montfort. After this, there is little mention of major endowments, expansion or refurbishment in the surviving record (Hodgetts 2006).

It seems unlikely that the kiln would have been just abandoned at a time when there was potential for additional demand from the friary, even if there was reduced demand from the town. Even if the tile makers themselves had succumbed to the plague, other craftsmen could have utilised the kilns and ancillary buildings on the site to continue tile making.

The evidence shows that when the first kiln became too distressed or expensive to repair, a new kiln was constructed. It is probable that after 30-40 years of use, the second kiln would also have needed repair or refurbishment and that the decision was taken not to rebuild it on Bread and Meat Close.

It is highly likely that raw materials in the immediate vicinity of the close, particularly clay, must have been worked out and used up in the 100 years of operation from the 1260s to the cessation of tile making in or around the 1355.

The clay pits in Bread and Meat Close would have been exploited and exhausted first, clay then being brought in from the adjoining common lands. Again, as nearby sources were exhausted, clay and fuel would have had to be transported further and at increasing cost. An indicator of this transport requirement may be seen in the construction of the sandstone alignment or walk way from the second kiln to the edge of the stream at the west of the site.

This would have provided secure footing for individuals carrying timber or clay to the new kiln or equally, fresh tiles from the kiln to the stream. A small timber and stone surface formed a simple, secure loading/unloading point for the use of water transport to and from the site. No definitive dating evidence was recovered from this feature but the stratigraphy clearly points to use with the second kiln (Fig 11-12, Plates 13-14).

It is axiomatic that such water borne transport was not required when the first kiln was in operation and resources were to hand. It only became necessary as the nearby resources became exhausted. As the brook runs along the edge of the common lands and the nearest available source of clay, it is highly likely that the landing stage and walkway were built to facilitate the transport of clay and timber to the tile workers in Bread and Meat Close and may have had a role in transporting tiles from kiln to site.

If the tile kiln itself was in need of repair or replacement, the cost and effort of refurbishing and repairing the kiln may have induced a move to another site. At some point, it was inevitable that it would be cheaper to re-locate to the common, nearer to the clay, rather than staying on Bread and Meat Close and transporting materials to the kiln. The materials for building the new kiln were to hand, much of the original kilns could easily have been stripped out and carried to a new location and the hovels and sheds associated with the tile making and curing either abandoned or transported and re-used at the new location.

It seems highly likely that the arrival of the Black Death in 1349 presaged a decline in demand for tiles from Warwick and the surrounding area. Endowments to the friary led to additional building or refurbishment at the friary but probably not enough to sustain the kiln through the economic decline brought about by subsequent outbreaks of plague, reputed to have killed up to half the population in many towns.

After 100 years of clay extraction and tile making at Bread and Meat Close, the cost in time, manpower and transport to bring clay and fuel to the site would have inevitably outweighed the cost of relocating the kiln. The very success and longevity of the kilns had exhausted the local source of raw materials. Linked to the inevitable disruption to markets and demand caused by the Black Death, the economic constraints would have precipitated a need to re-locate and contributed to the inevitable demise of the tile industry at Bread and Meat Close.

It is clear that the kiln was not just moved elsewhere within the close, it was abandoned and all activity along the street front ceased at about the same time. There were only two sherds of pottery recovered from the entire site dating to the late 14th or 15th century with no evidence at all of continued activity on the site.

It is probable that when the kiln was abandoned, it was allowed to deteriorate and collapse until such time that it could be levelled and spread across the site. Within a few years it would have become overgrown and topsoil would begin to form. By the time of the first documentary references to the land in 1649, it was a close of pasture and trees and remained so until its acquisition and division into pleasure gardens in the late 19th century (Hodgetts, 2006). This is confirmed by the soil analysis that shows little evidence for agriculture or crop processing.

Later records show tile, brick and pottery kilns located around the common and Saltisford into the post medieval period. The successor to Bread and Meat Close is likely to be found amongst them.

BIBLIOGRAPHY

Baker, M, 1788 Map of Warwick *Warwick Town maps 1610-1851*, Warwickshire Museum

Berendsen, A, 1967 *Tiles, A General History*, London: Faber and Faber

BGS 1984 Map of Solid and Drift Geology – 1:50,000 Series, England and Wales, Sheet 184, Warwick, British Geological Survey

Chew, H A, & Kellaway, W, (eds) 1973 *The London Assize of Nuisance 1301-1994*, Canterbury Archaeological Trust

Cotter, J, 1994 Tyler Hill Rising Main, *Canterbury's Archaeology 1993-1994,* Canterbury Archaeological Trust

Drury, P J, 1981 The Production of brick and tile in Medieval England, *Medieval Industry: CBA Research Report,* **40**

Eames, E S, 1980 *Catalogue of medieval lead-glazed earthenware tiles in the Department of Medieval and Later Antiquities*, British Museum, **I** & **II**, British Museum Publications

Eames, E S, 1985 *English medieval tiles*, Harvard University Press

Eames, E S, 1992 *English Tilers (Medieval Craftsmen Series),* University of Toronto Press

Edmundson, E P, and Thorne, A T, 1989 A late medieval tile-kiln at Shenley Church End, Milton Keynes, Buckinghamshire*, Records of Buckinghamshire,* **31,** 78-87

EH 1974 *Register of parks and gardens of special historic interest in England*, English Heritage

EH 1997 *English Heritage Archaeology Division Research Agenda*, Unpublished Draft, English Heritage

EH 2002 *Environmental Archaeology: A Guide to Theory and Practice for Methods, from sampling to post-excavation*, English Heritage

Everson, P, 1977 Excavations at the vicarage gardens, Brixworth, 1972, *J Brit Archaeol Ass*, **130**, 55-132

Everson, P, & Parsons, D, 1979 *Brixworth Church- are the bricks really Roman*?, in McWhirr 1979, 405-11

Farr, M, and Taylor, S J, 1996 Warwick, *West Midlands Archaeological News Sheet*, **9**, 4

Fish, J, and Bridgeman, C, 1711 Map of Warwick *Warwick Town maps 1610-1851*, Warwickshire Museum

GRM Ltd, 2002 *Site Appraisal at Bread and Meat Close, Warwick*, Report for Laing Homes Ltd

Harrington, D, 1971 The Excavation of a Medieval Tile Kiln near Canterbury, *Kent Archaeological Review,* ***25***

Hodgetts, C, 2006 *Warwick Bread and Meat Close,* Unpublished Research Document

Hollar, W, 1654 'The Ground plot of Warwick', in Dugdale, W (1730, 424-5) *The Antiquities of Warwickshire*, London

Holliday, J R, 1874 Maxstoke Priory, *Transactions of Birmingham and Warwickshire Archaeological Society, no volume number*, 56-105

Hudson, J, 1989 The York Medieval Tile making Project – A Potter's Tale, *Medieval Ceramics,* **13**, 43-52

Hurst, D, 2003 *Medieval Industry in the West Midlands,* Paper presented to the West Midlands Regional Research Framework Seminar for the Medieval Period, **5**

Hurst, J G, (ed) 1979 Wharram: a study of settlement on the Yorkshire Wolds, **1**, *Soc Medieval Archaeol Monogr Ser,* ***8***

Hutchings, N and Farley, M 2003 *A 15th-16th century pottery industry at Tylers green, Penn, Buckinghamshire,* Buckingham County Archaeological Services

James, W, 1806 Map of Warwick, *Warwick Town maps 1610-1851*, Warwickshire Museum

Jones, C, 1993 *Stoneleigh Abbey-The Cunnery Site Archaeological Excavation*, Warwickshire Museum Archaeology Service

Klingelhofer, E C, 1975 Evidence of Town Planning in Late Saxon Warwick, *Midland History,* **3**, 1-10

Klingelhofer, E C, 1978 Barrack Street Excavations, Warwick 1972, *Transactions of Birmingham and Warwickshire Archaeological Society,* **88** (1976-7), 87-104

Lines, C, 1985 *The Book of Warwick*, Buckingham

Locock, M P, 1994 *Meaningful Architecture: social interpretation of building* Worldwide Archaeology Series, **9**, 147-66.

Miller, D, Griffen, L, & Pearson, E 2004 *A programme of archaeological work at 9-10 The Tything, Worcester*, Archaeological Service, Worcestershire County Council

Mytum, H C, 1976 *West Midlands Archaeological News Sheet*, **75**

NA, 2003 *Bread and Meat Close, Warwick: Project Design for Archaeological Excavation and Recording,* Northamptonshire Archaeology

Ordnance Survey 1887 First edition 1:10560 map, Warwickshire Sheet 33 SW

Ordnance Survey 1887 Second edition 1:2500 map, Warwickshire Sheet 33 13

Palmer, N, 1991 Warwick, Bowling Green Street, *West Midlands Archaeology,* **34**, 85

Palmer, N, 2003 *Warwickshire (and Solihull) – the Medieval Period*, Paper presented to the West Midlands Regional Research Framework Seminar for the Medieval Period

Powell, B, 1965 Warwick, Market Street, *Warwickshire Museum Archaeology Service,* **8**, 9

Rahtz, P A, & Hirst, S, 1976 Bordesley Abbey, Redditch, Hereford and Worcester: first report on the excavations, 1969-73, *BAR*, **23**

Rylatt, M, and Mason, P, 2003 *The archaeology of the medieval Cathedral and Priory of St Mary, Coventry*, Coventry

Salzman, L F, 1952 *Buildings in England down to 1540*

Slater, T, 1982 Urban genesis and medieval town plans in Warwickshire and Worcestershire, in Slater, T, and Jarvis, P J, (eds.) *Field and Forest: An historical geography of Warwickshire and Worcestershire*, Norwich

Smith, T P, 1999 London's earliest medieval roofing tiles: a comparative study, *Medieval Ceramics,* **22-23**, 1998-1999

Soden, I C, 1991 Warwickshire tile design in the later 15th century, with particular reference to floors adjacent to the Beauchamp Chapel, Warwick, *West Midlands Pottery Research Group bulletin*

Soden, I C, 1991 Power-politics and benefaction; the stamped heraldic tiles from St Anne's Charterhouse, Coventry, *West Midlands Pottery Research Group bulletin*

Soden, I C, 1994 The propaganda of monastic benefaction: statement and implication in the art of St Anne's Charterhouse, Coventry, in Locock, M P, 1994 *Meaningful Architecture: social interpretation of buildings*, Worldwide Archaeology Series, **9**, 147-66

Soden, I C, 1995 *Excavations at St Anne's Charterhouse, Coventry 1968-87*, Coventry Museums Monograph, **4**.

Soden, I C, 2005 *Medieval Coventry: An archaeology*, Tempus 2005

Speed, J, 1610 Map of Warwick *Warwick Town maps 1610-1851*, Warwickshire Museum

SSEW, 1983 *Soils of England and Wales: Sheet 3, West Midlands,* Soil Survey of England and Wales, Harpenden, Herts

Steane, J M, & Bryant, G F, 1975 Excavations at the deserted medieval settlement at Lyveden, Nothants; fourth report, *J Northampton Mus*, **12**, 1-161

Victoria County History, 1908 *The Victoria History of the County of Warwickshire*, **II**, London

Victoria County History, 1969 *The Victoria History of the County of Warwickshire*, **VIII**, The City of Coventry and the Borough of Warwick, London

Vidler, L A, 1932 Floor tiles and kilns near the site of St Bartholomew's Hospital, Rye, *Sussex Archaeol Collect*, **73**, 83-101

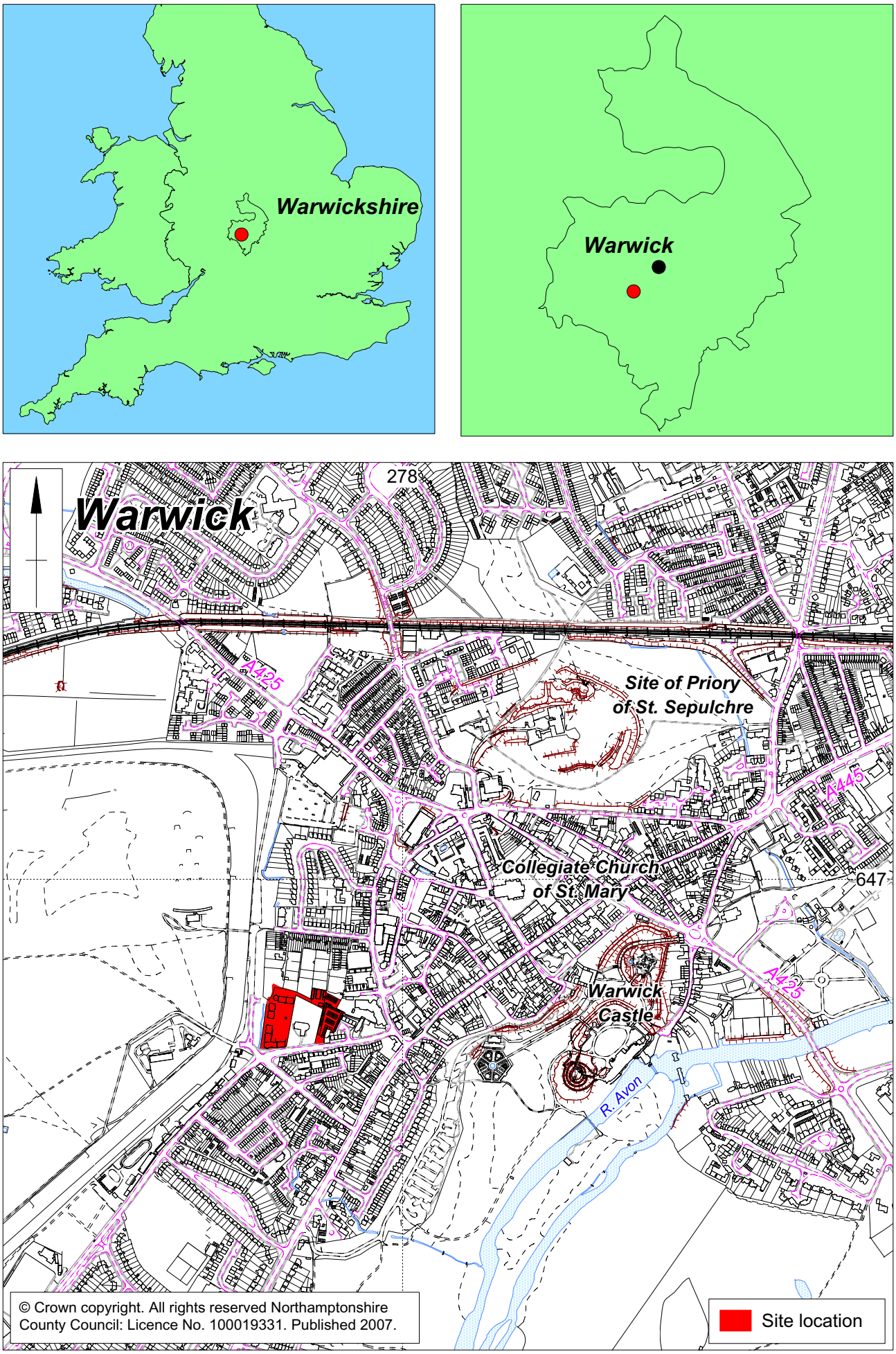
Watkinson, D, and Neal, V, 1998 *First Aid for Finds (3rd Edition),* RESCUE / UKIC

Wilson, D M, & Hurst, D G, 1967 Medieval Britain in 1066, *Medieval Archaeol*, **11**, 262-319

WMFS, 2003a, *Archaeological Evaluation at Bread and Meat Close, Warwick*, Warwickshire Museum Field Services

WMFS, 2003b, *Brief for Archaeological Excavation Bread and Meat Close, Warwick*, Warwickshire Museum Field Services

Northamptonshire Archaeology
A service of Northamptonshire County Council July 2007



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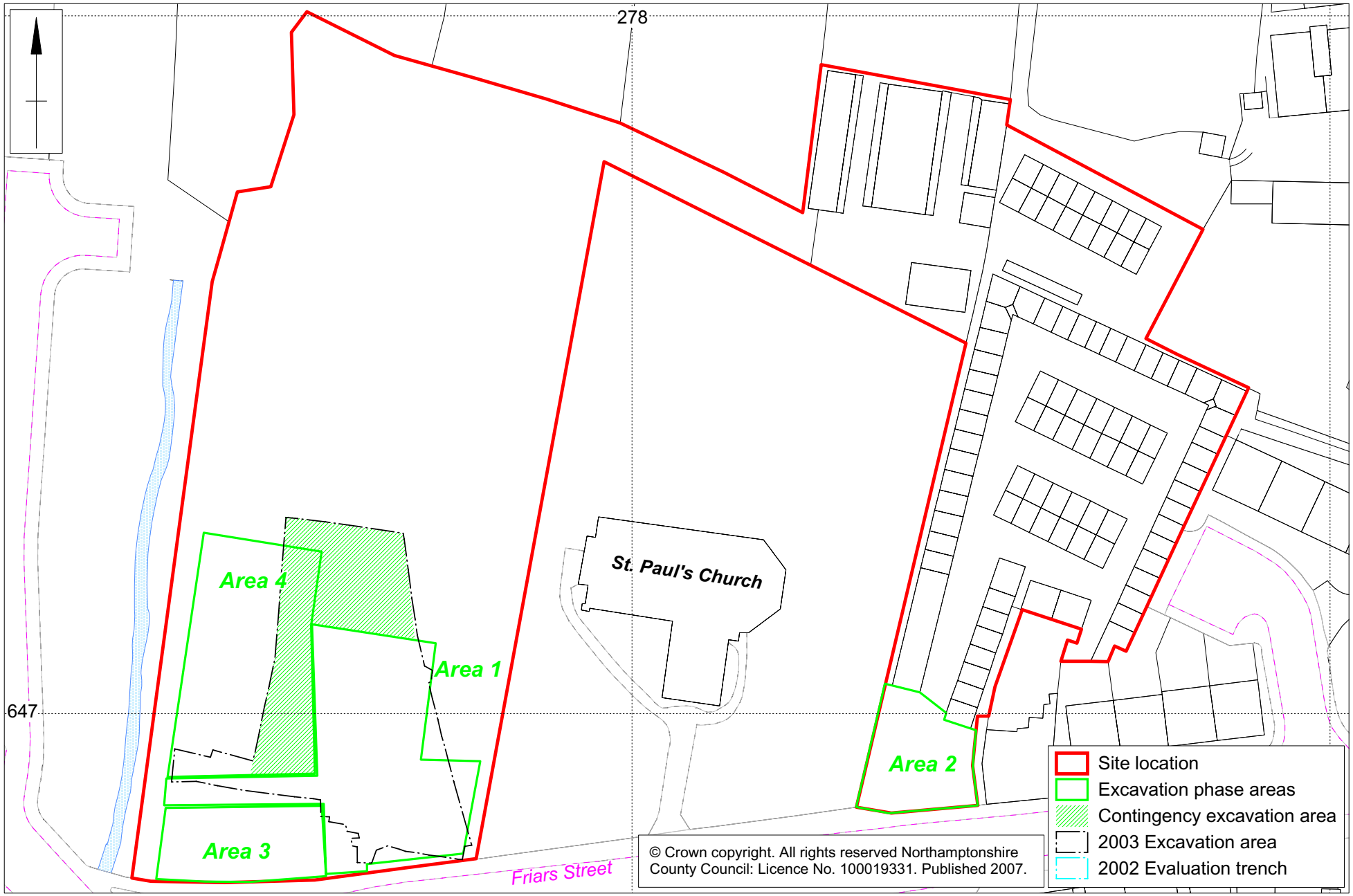
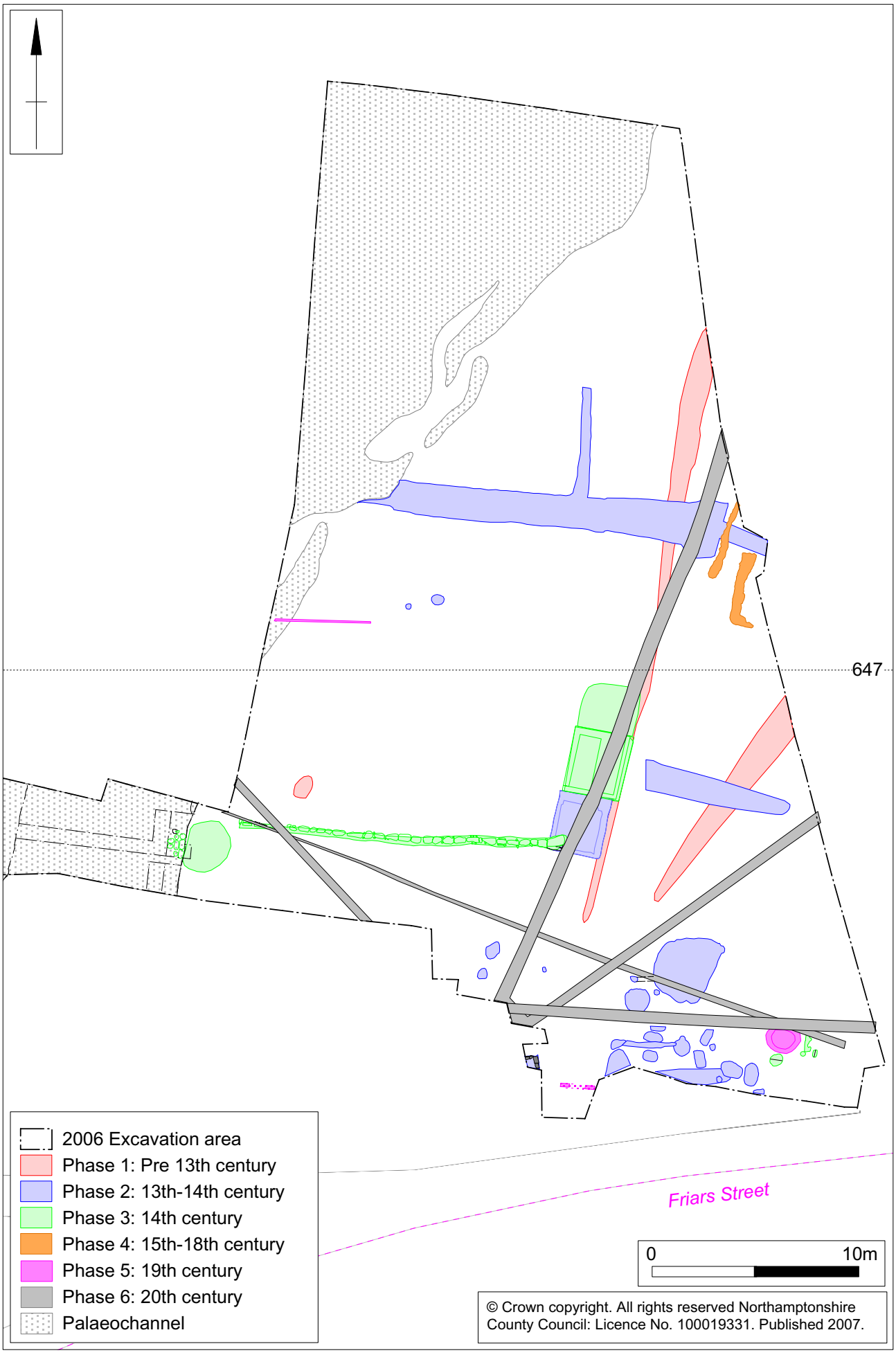
Site location Fig 1



Development areas and service information Fig 2



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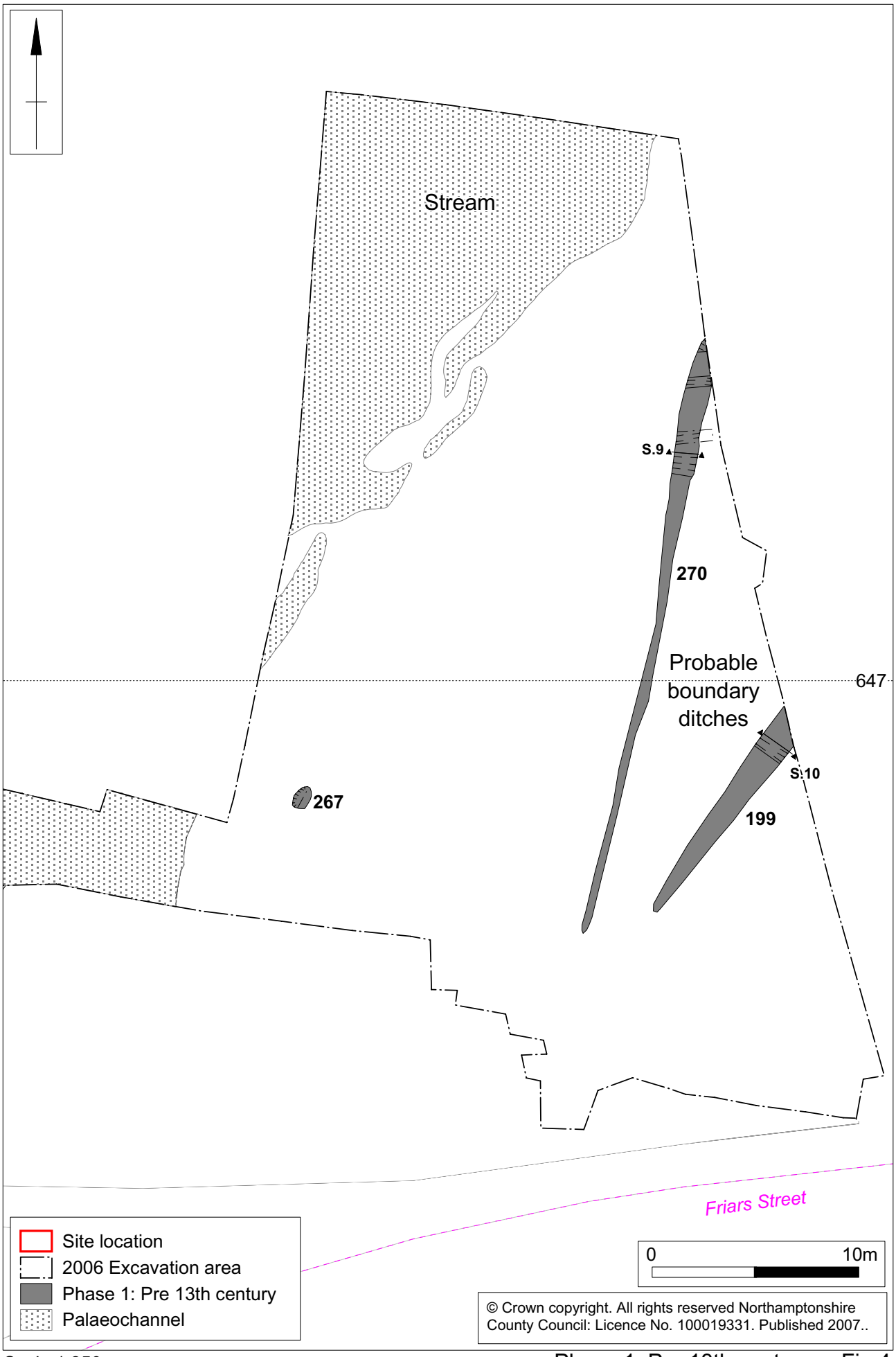
General plan of site Fig 3



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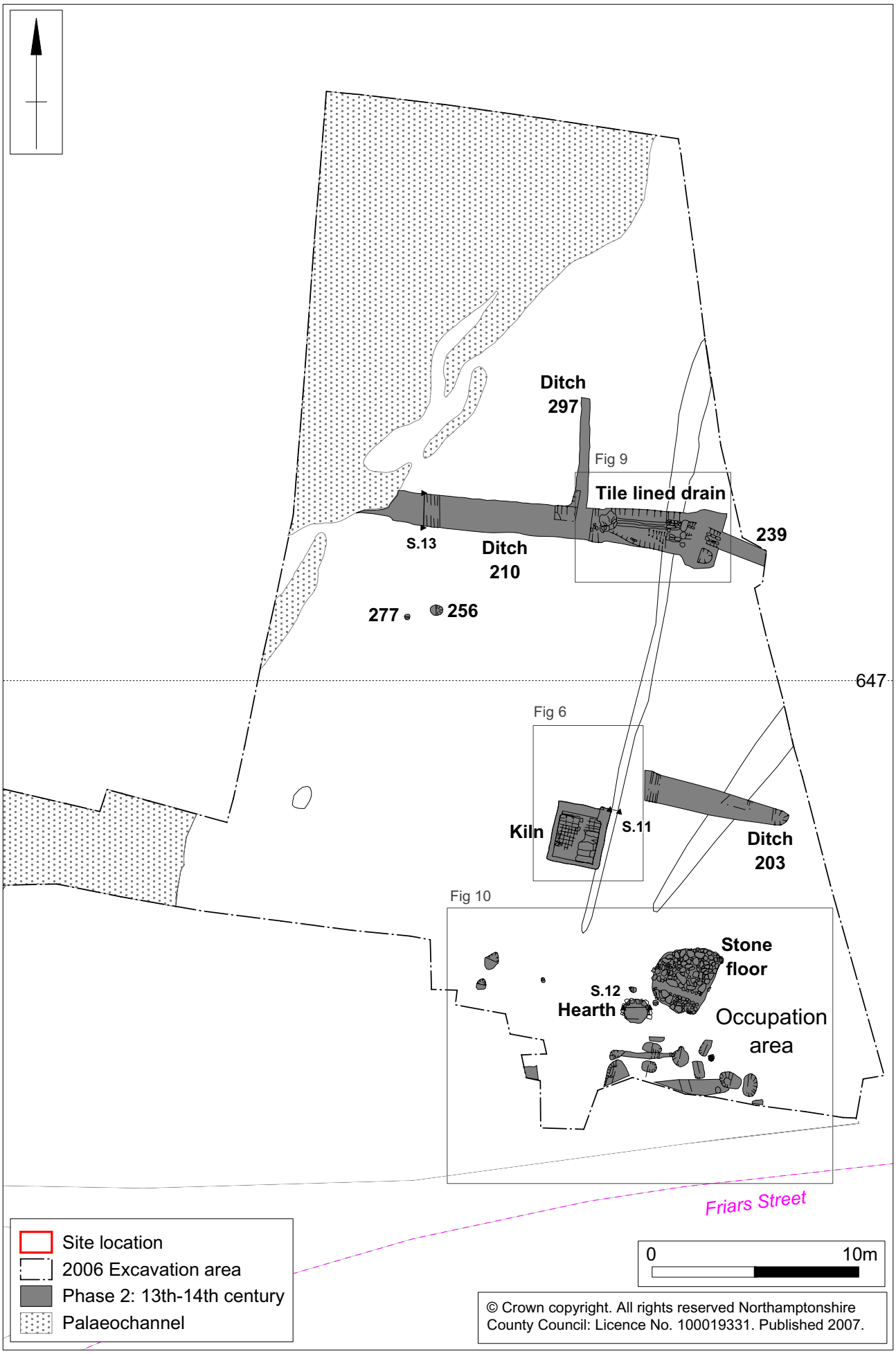
Phase 1: Pre 13th century Fig 4



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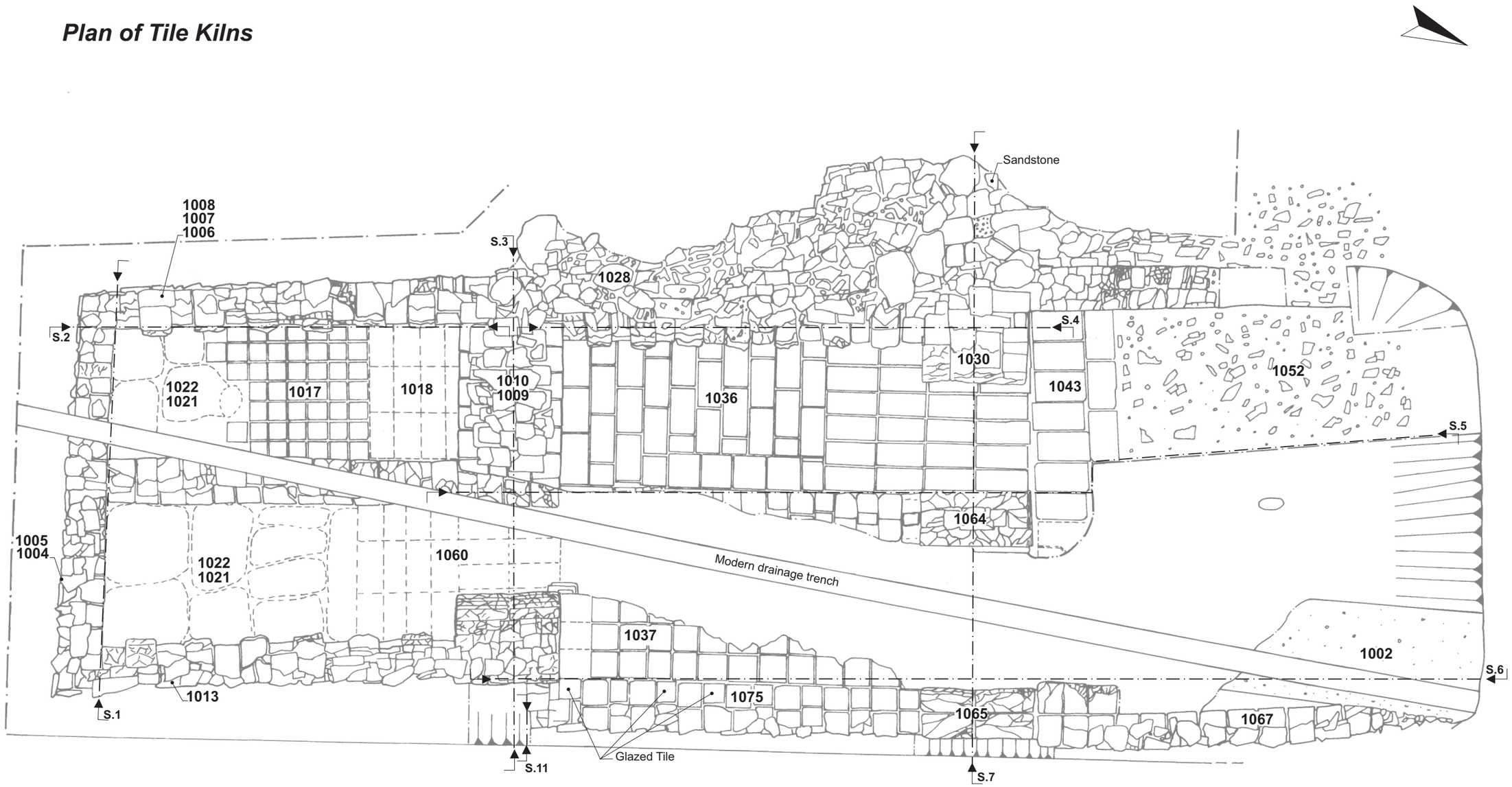
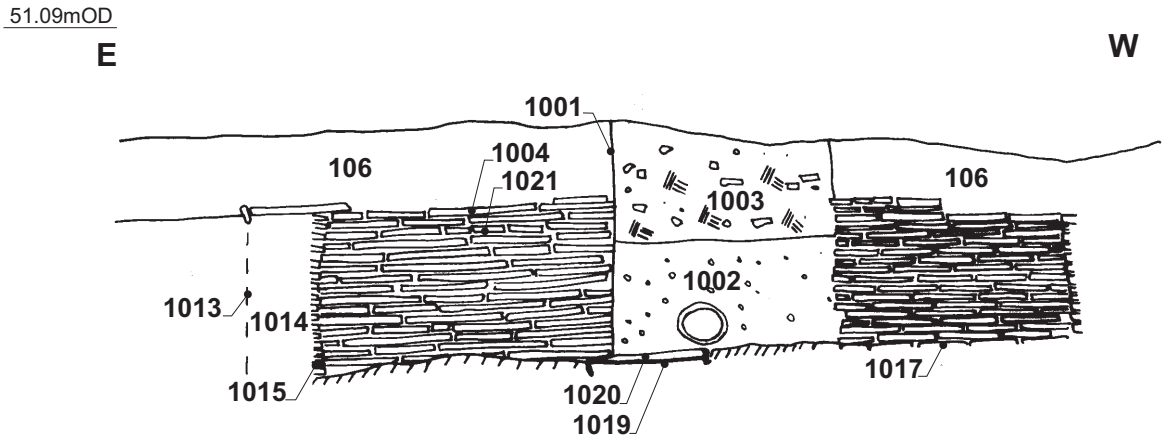
Phase 2: 13th -14th century Fig 5

Plan of Tile Kilns



Plan of Tile Kilns Fig 6

Section 1



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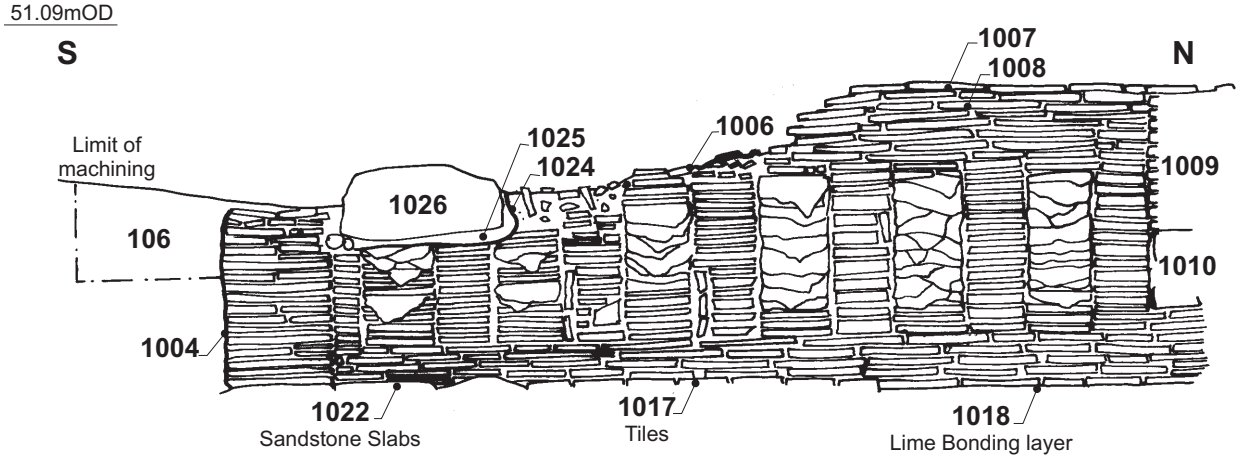

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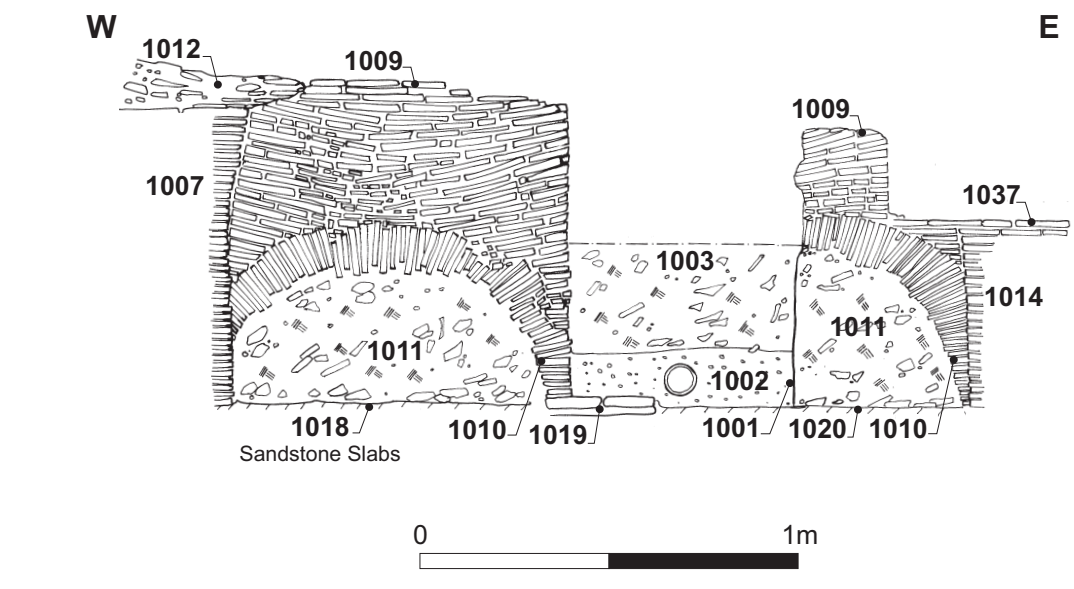
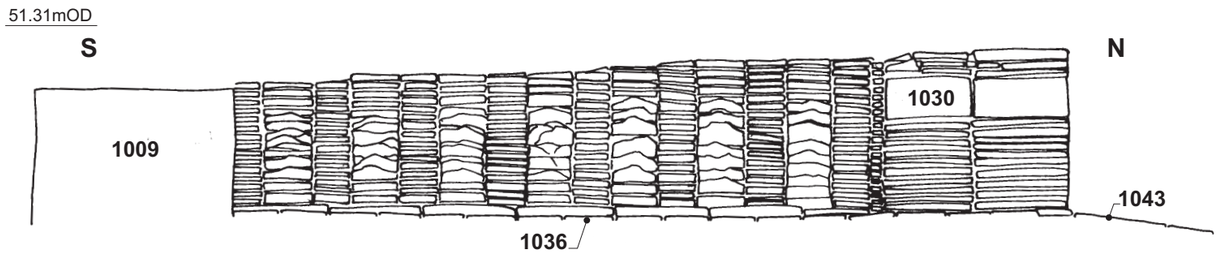


Sections of tile kilns, 1 - 3 Fig 7

Section 4



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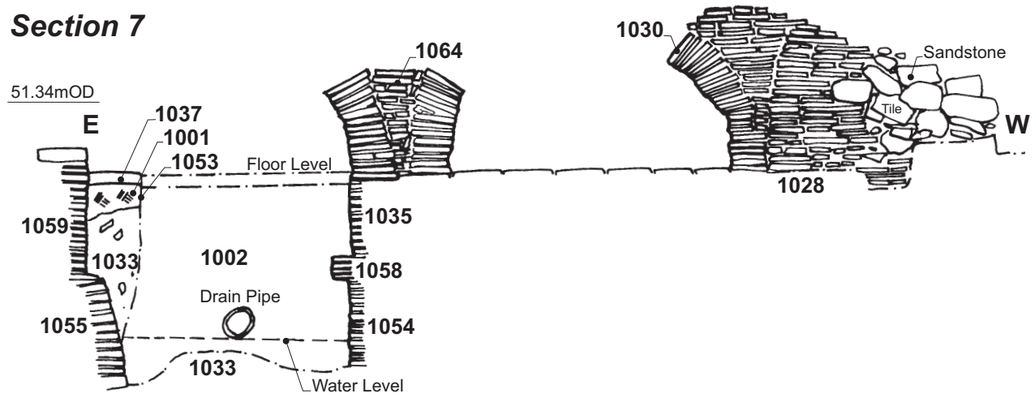

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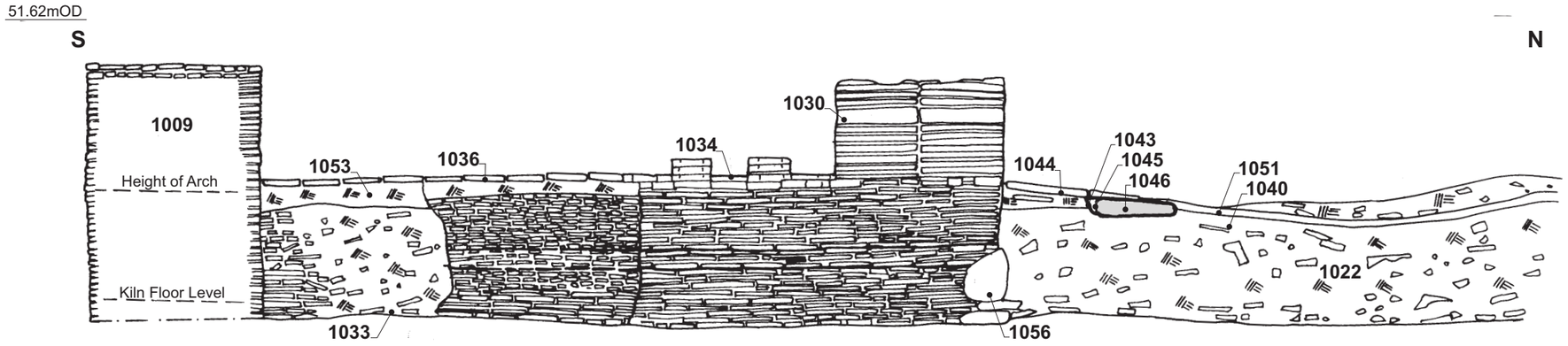

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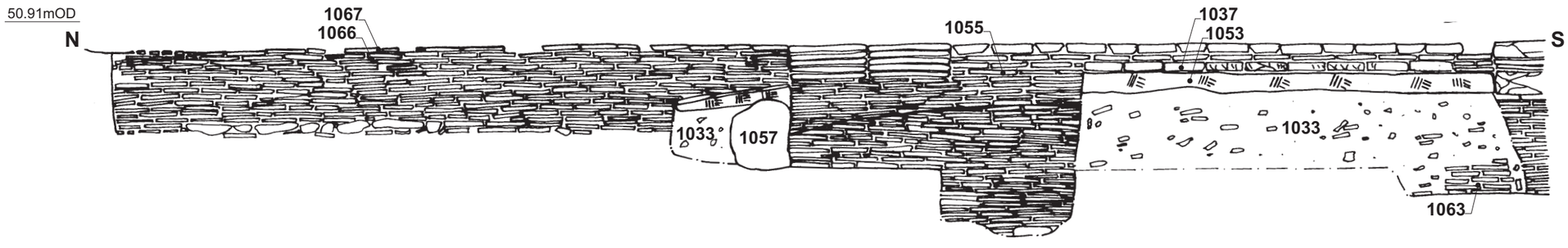

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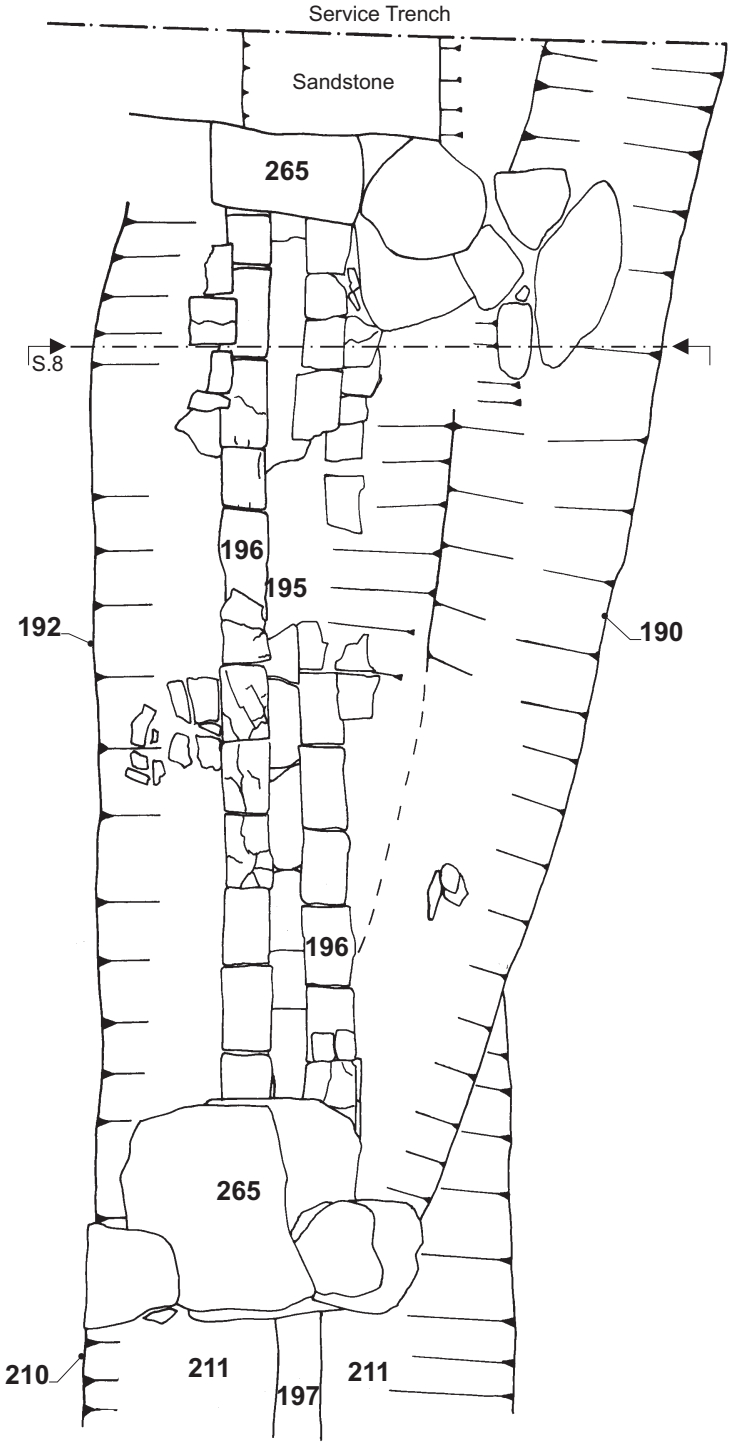
Sections of tile kilns, 4 - 7 Fig 8

Plan of Tile-lined Tank / Cistern



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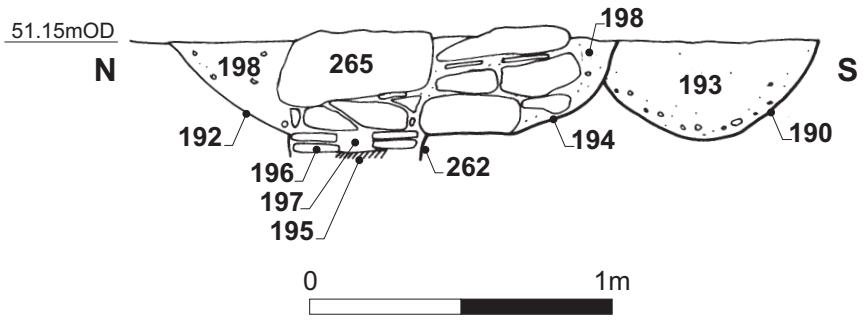
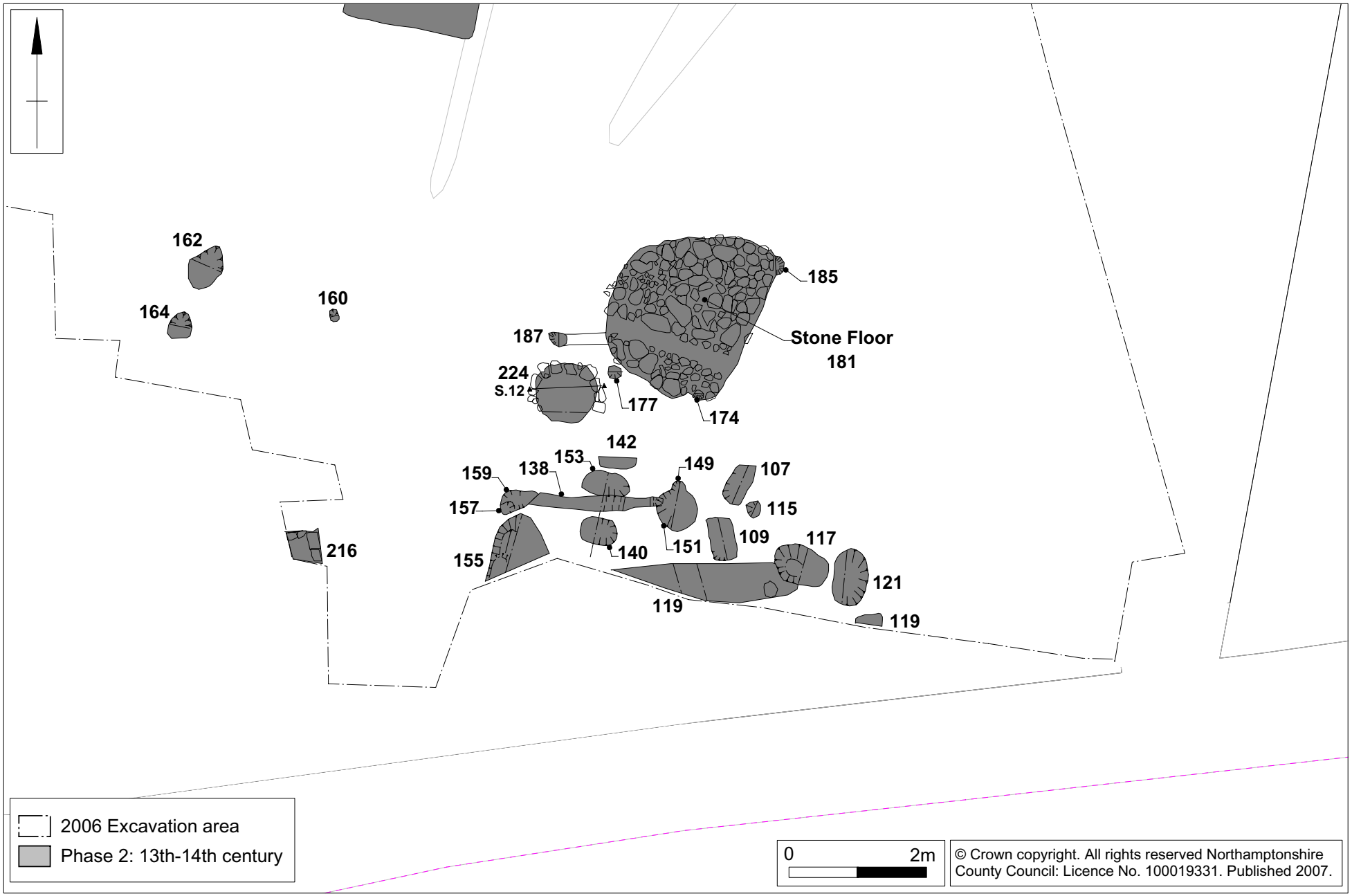
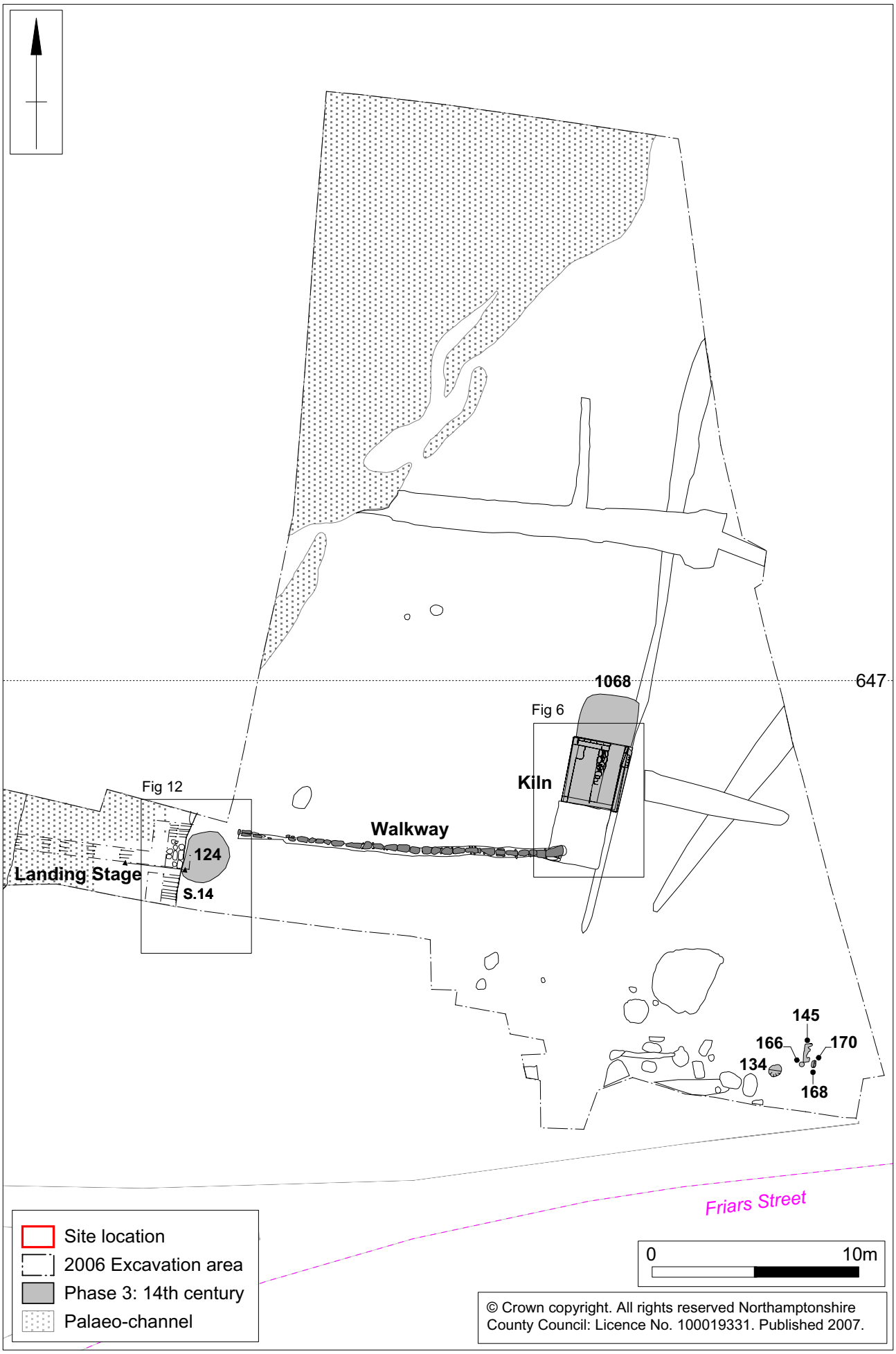


The tile-lined tank / cistern Fig 9

Scale 1:100



Phase 2: Occupation Area Fig 10



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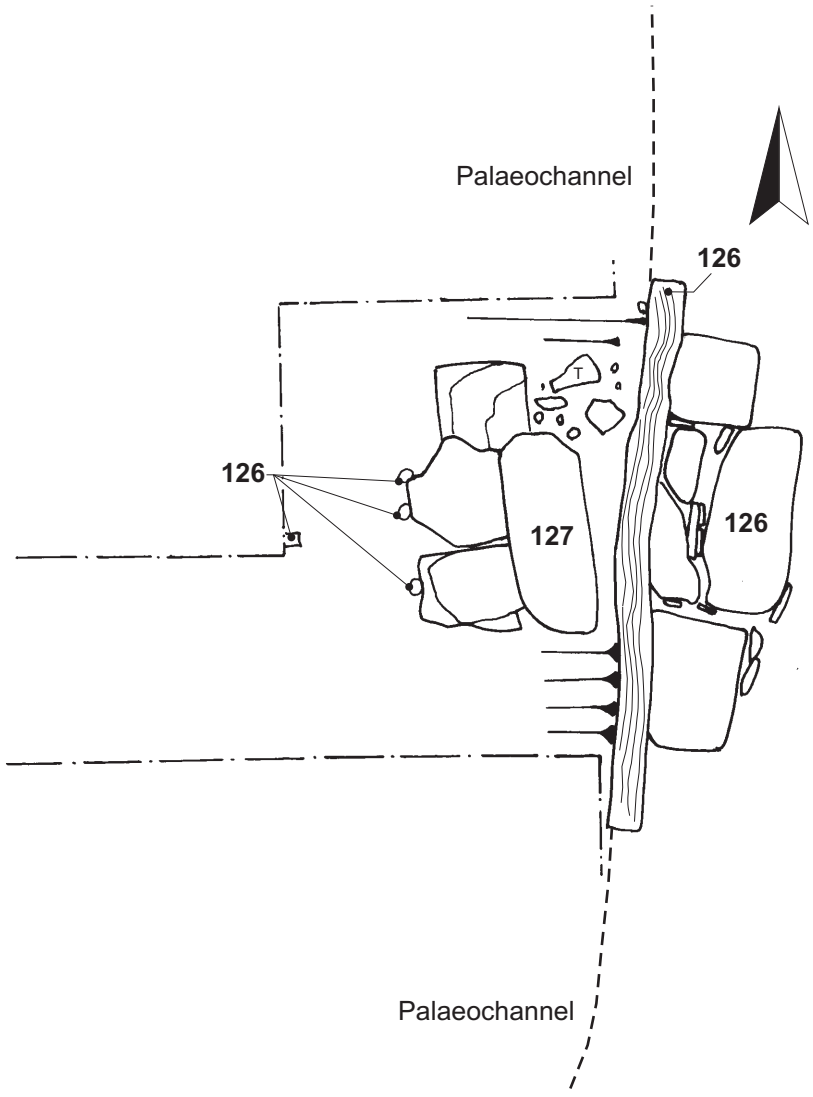
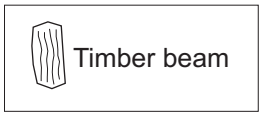
Phase 3: 14th century Fig 11

Plan of Landing Stage





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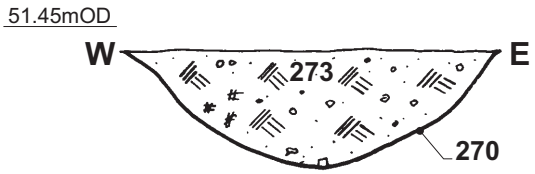
Plan of landing stage Fig 12

Section 9



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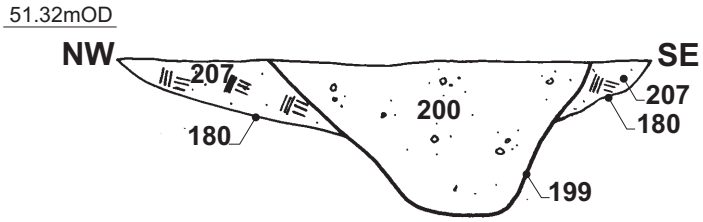

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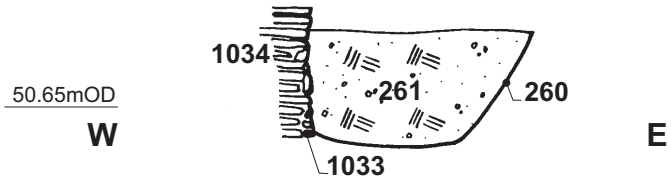

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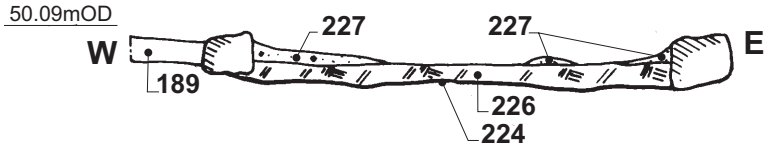

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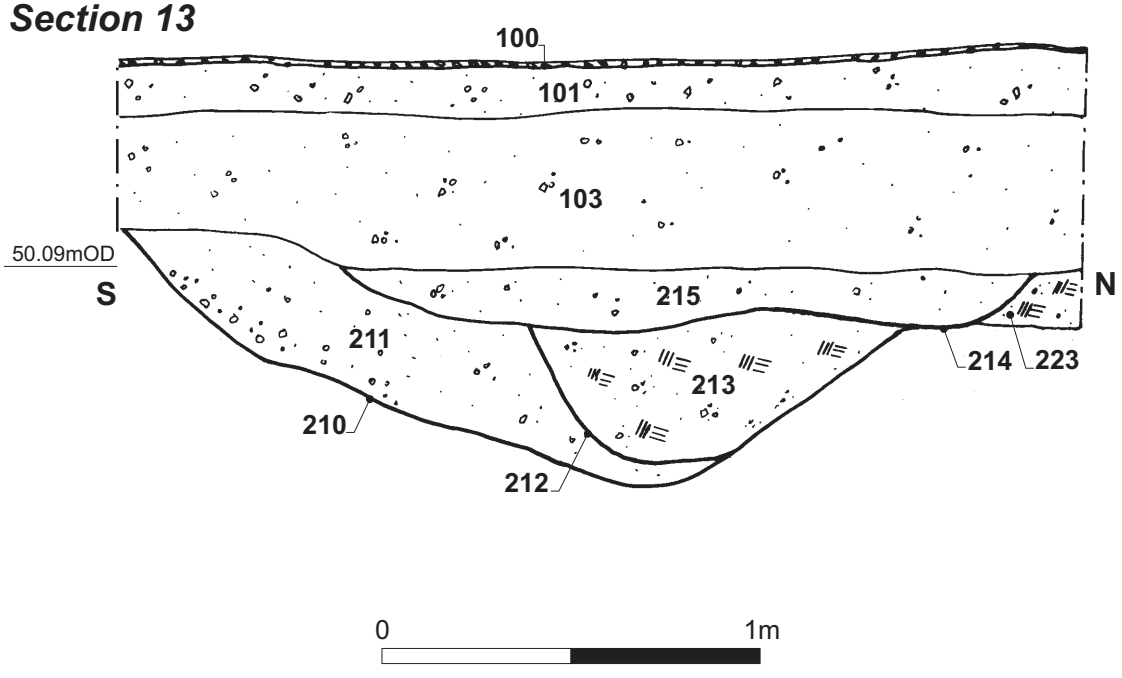

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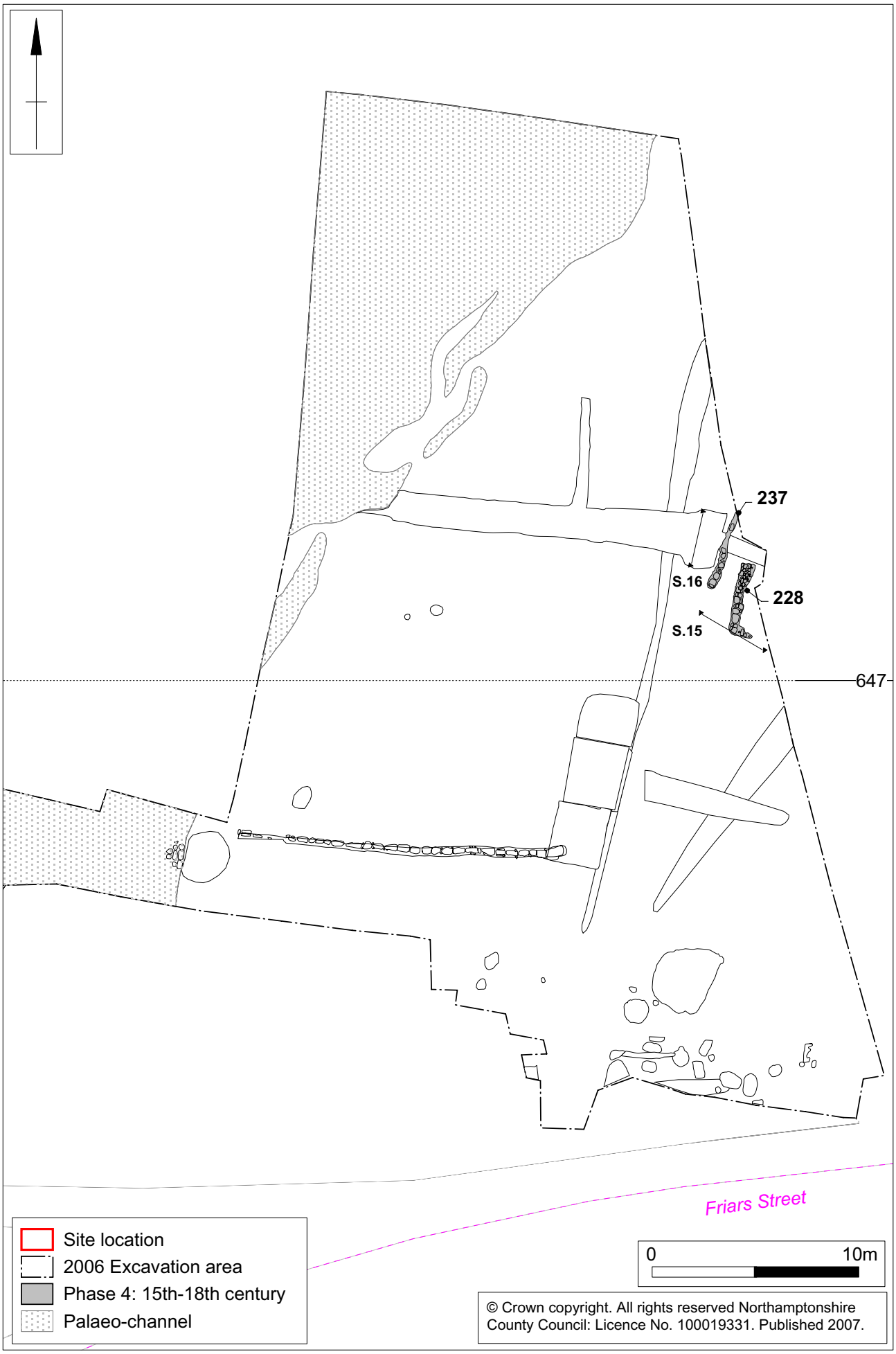
Sections 9 - 13 Fig 13



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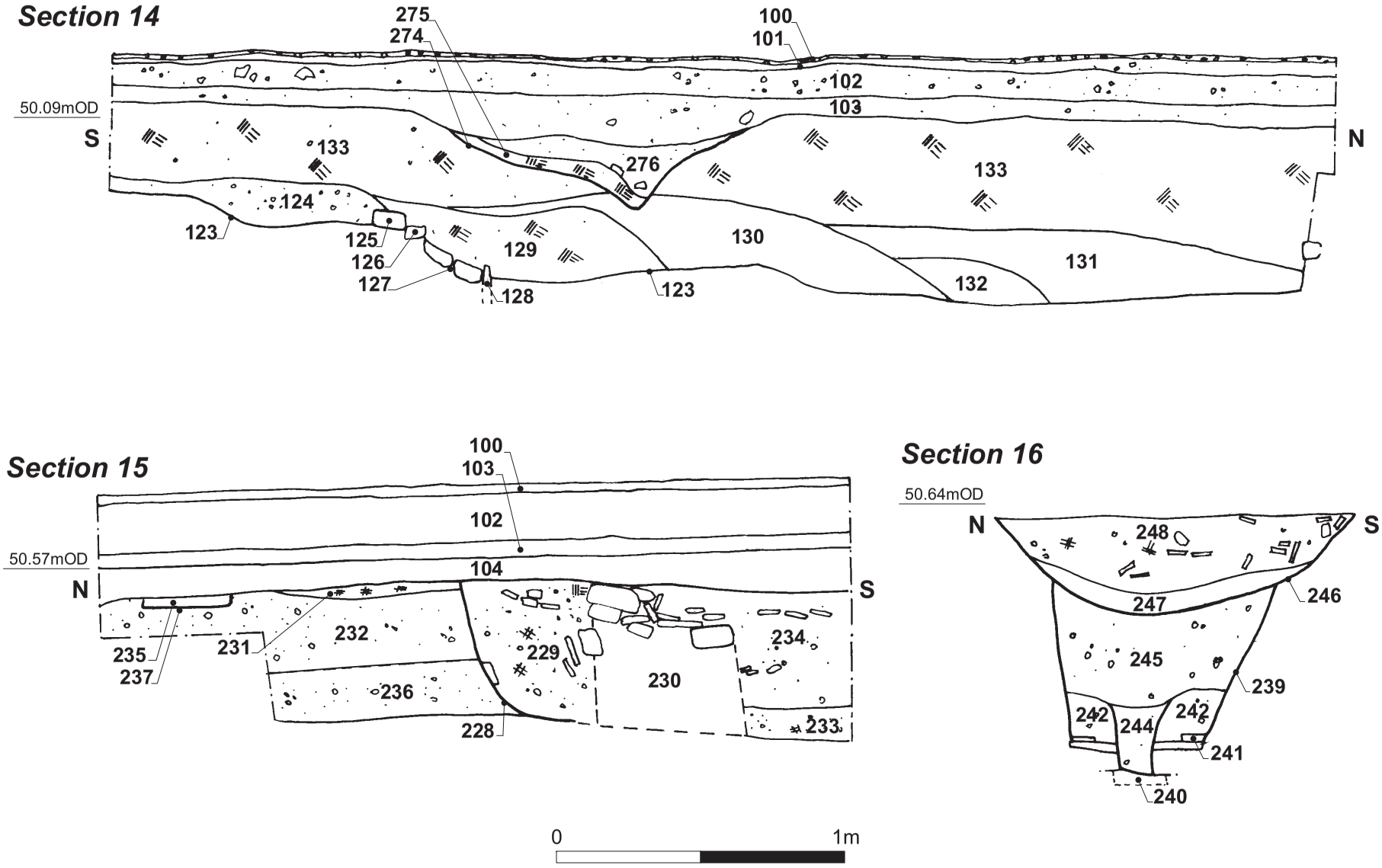
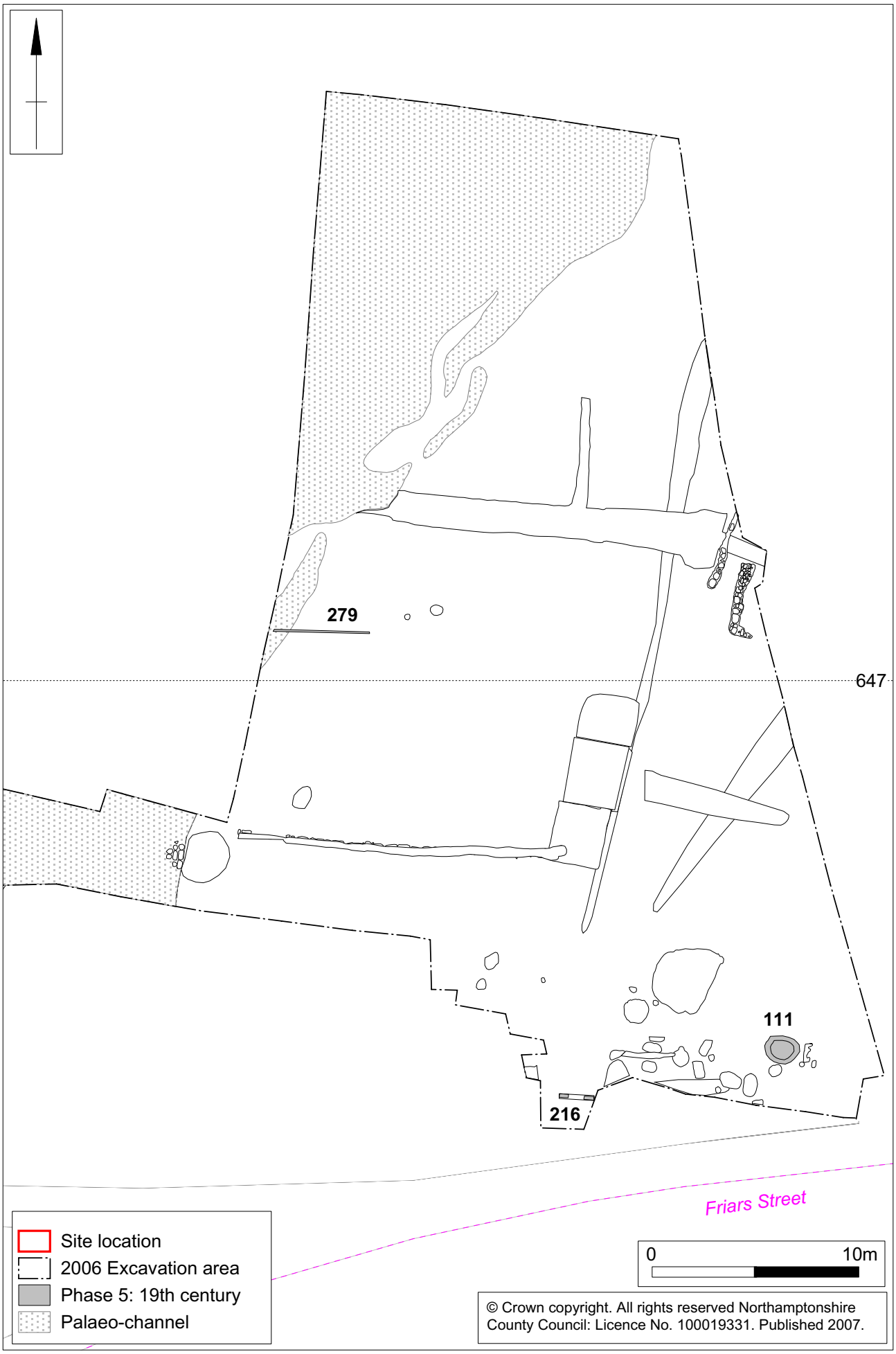
Phase 4: 15th -18th century Fig 14

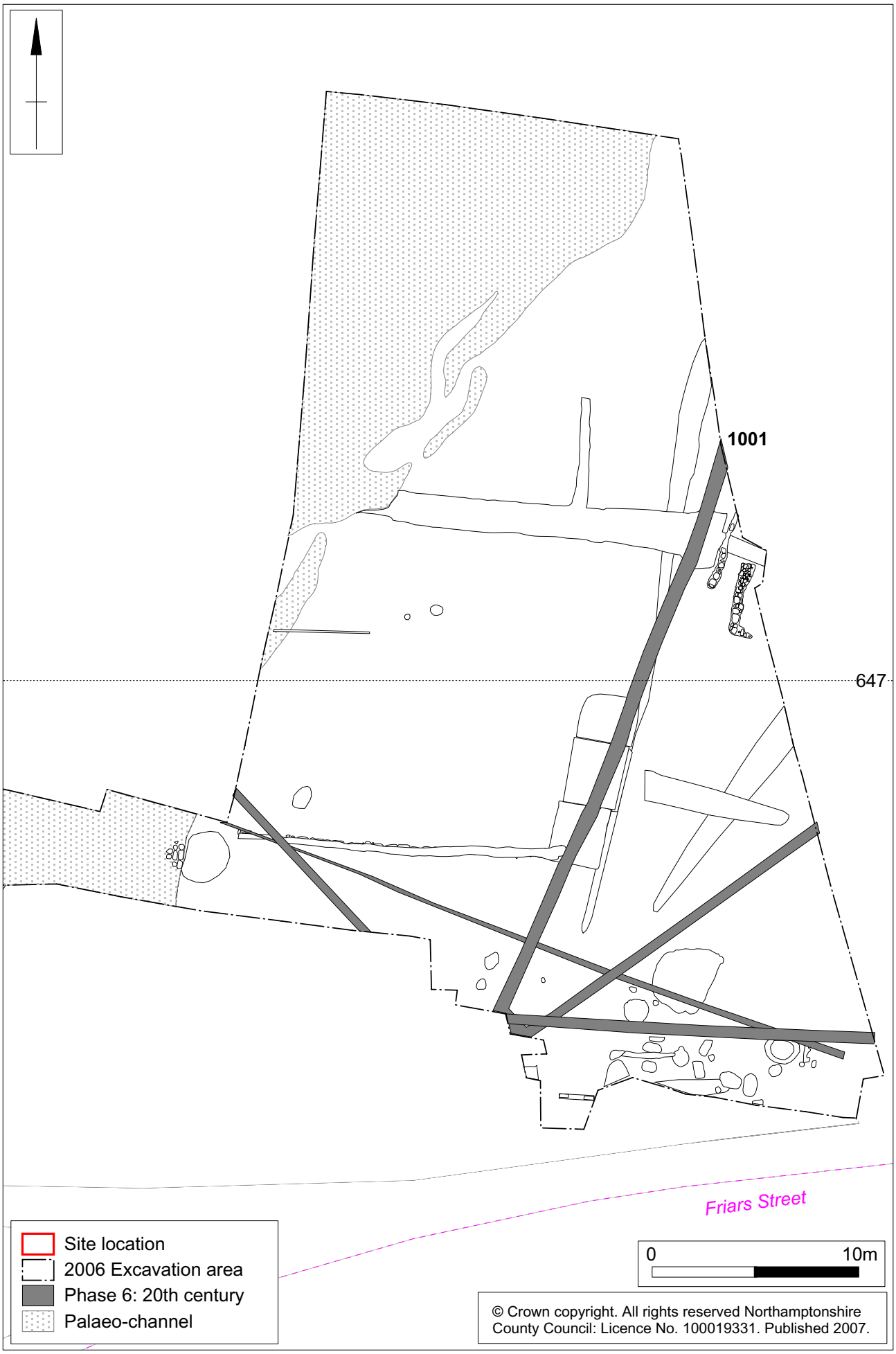


Sections 14 - 16 Fig 15



Scale 1:250

Phase 5: 19th century Fig 16



Scale 1:250

Phase 6: 20th century Fig 17

Plate 1: Tile kilns – looking west

Plate 2: Tile kilns – looking north

Plate 3: South kiln – west wall, north wall with firing arch, floor and encaustic tiles

Plate 4: South kiln – south and east walls

Plate 5: South kiln – encaustic tiles (detail)

Plate 6: North kiln – looking south

Plate 7: North kiln – looking south-west

Plate 8: North kiln – looking west

Plate 9: The occupation area, hearth pits and stone floor

Plate 10: Stone floor – looking west

Plate 11: Stone oven/hearth – looking east

Plate 12: Tile lined drain – looking east

Plate 13: Stone walkway - looking west

Plate 14: Landing stage – looking south

Plate 15: Aerial photograph of site circa 1950s