Northamptonshire Archaeology

A possible Roman vineyard on land off Tavistock Avenue, Ampthill, Bedfordshire

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QUALITY CONTROL

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OASIS REPORT FORM

PROJECT DETAILS		
Project name	A possible Roman vineyard on land off Tavistock Avenue, Ampthill, Bedfordshire	
Short description	Open area excavation in 2010 by Northamptonshire Archaeology examined extensive archaeological features left behind by Roman plantation agriculture, possibly a vineyard. Initially there was small scale planting on the upper slope of a small stream valley and the larger area was divided by ditches, with open ground between. Subsequent reorganisation brought the whole of the area under plantation using the earlier boundaries to define planting groups, although the boundaries themselves were disused. Numerous parallel cultivation rows were laid out, probably for growing soft fruit, grapes or hops. The pottery was extremely abraded and in poor condition, often with cessy accretions gained from manure and had probably originated from a domestic settlement nearby that was occupied from the late Iron Age to the Roman 2nd century AD. The manure was perhaps sourced from middens and turned over into pre-prepared bedding trenches. The plantation probably failed within the first half of the 2nd century, as it showed no evidence for late 2nd-century developments and was abandoned.	
Project type	Area excavation	
Site status	None	
Previous work	Archaeological appraisal (CPM 1999), Evaluation specification (Bourne 2006), Geophysical survey (Smalley 2006), Trial trench evaluation (King 2006)	
Current Land use	Scrubland	
Future work	Residential housing	
Monument type/period	Roman	
Significant finds	Flint, pottery, tile and brick	
PROJECT LOCATION		
County	Bedfordshire	
Site address	Land between the A507 and Tavistock Avenue, Ampthill	
Study area	*c*9.1ha	
OS Easting & Northing	TL 0280 3687	
Height OD	*c*72-76m above Ordnance Datum	
PROJECT CREATORS		
Organisation	Northamptonshire Archaeology	
Project brief originator	Martin Oake & Hannah Firth, Central Bedfordshire Council	
Project Design originator	Adam Yates, Northamptonshire Archaeology	
Director/Supervisor	Jim Brown, Northamptonshire Archaeology	
Project Managers	Adam Yates & Anthony Maull, Northamptonshire Archaeology	
Sponsor or funding body	Bellway Homes and Bloor Homes	
PROJECT DATE		
Start date	February 2010	
End date	March 2010	
ARCHIVES	Location (Accession no)	Content (eg pottery, animal bone etc)
Physical	BEDFM 2009.85	Flint, pottery, tile and brick
Paper		Context sheets, permatrace plans & sections, site registers, photographic archive, background documents
Digital		Client PDF report
BIBLIOGRAPHY	Journal/monograph, published or forthcoming, or unpublished client report	
Title	A possible Roman vineyard at Land off Tavistock Avenue, Ampthill, Bedfordshire	
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February-March 2010

Abstract

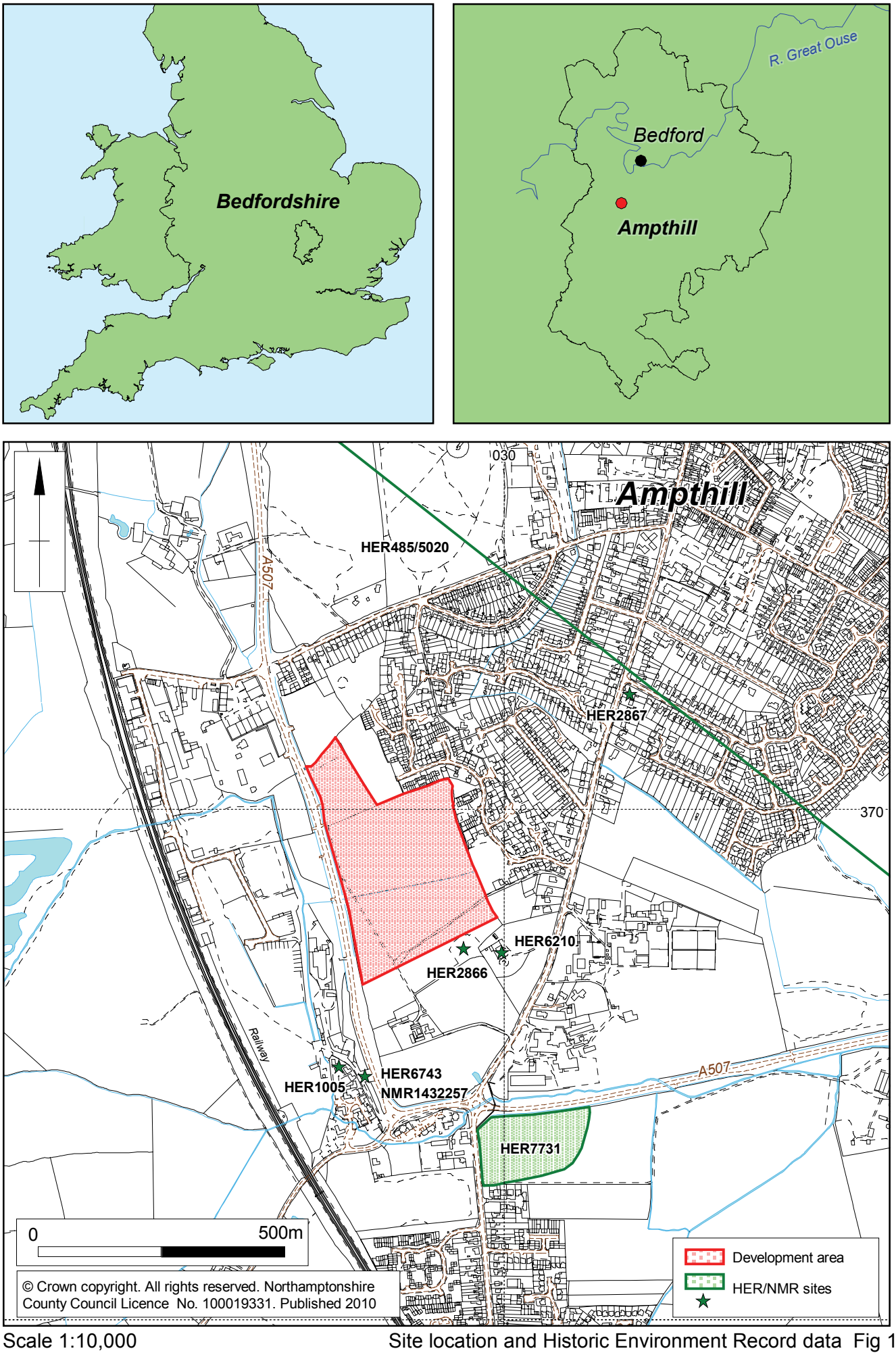
Open area excavation in 2010 by Northamptonshire Archaeology examined extensive archaeological features left behind by Roman plantation agriculture, possibly a vineyard. Initially there was small scale planting on the upper slope of a small stream valley and the larger area was divided by ditches, with open ground between. Subsequent reorganisation brought the whole of the area under plantation using the earlier boundaries to define planting groups, although the boundaries themselves were disused. Numerous parallel cultivation rows were laid out, probably for growing soft fruit, grapes or hops. The pottery was extremely abraded and in poor condition, often with cessy accretions gained from manure and had probably originated from a domestic settlement nearby that was occupied from the late Iron Age to the Roman 2nd century AD. The manure was perhaps sourced from middens and turned over into pre-prepared bedding trenches. The plantation probably failed within the first half of the 2nd century, as it showed no evidence for late 2nd-century developments and was abandoned.

1 INTRODUCTION

During February and March 2010 Northamptonshire Archaeology (NA) carried out an archaeological excavation on land between the A507 and Tavistock Avenue, Ampthill, Bedfordshire (Fig 1; NGR TL 0280 3687). The work was carried out for Bellway Homes and Bloor Homes in advance of residential development on the edge of the town.

In 2006 geophysical survey and trial excavation were carried out and revealed the potential for archaeological remains likely to be effected by the construction works (Smalley 2006, King 2006). Following these preliminary investigations Central Bedfordshire Council issued a Brief for a Scheme of Archaeological Resource Management (SARM) (CBC 2009). The SARM was compiled by Northamptonshire Archaeology in liaison with Bellway Homes, Bloor Homes and the Central Bedfordshire Council Archaeologists to define and agree the scope of further works (Yates 2009). The SARM identified four Areas of Archaeological Significance (Fig 2; AAS1-4). An agreement was reached between the parties for a design solution that would allow archaeological remains in AAS1-2 to be preserved *in situ.* Open area excavation subsequently concentrated upon AAS3-4 and a linking road corridor where extensive Roman cultivation remains were exposed. The excavations were monitored by Central Bedfordshire Council Archaeologists and all work was conducted in accordance with the agreed SARM (Yates 2009).

Given the small quantity of material retrieved, it was agreed that preliminary post-excavation assessment could move directly to full analysis as part of post-excavation procedure without an intermediate stage of reporting. This document comprises the report for all of the work undertaken and will form the basis of any future publication note.



Scale 1:10,000 Site location and Historic Environment Record data Fig 1

2 BACKGROUND

2.1 Archaeological background

Archaeological appraisal

An archaeological appraisal was undertaken by Waterman CPM Ltd in support of planning proposals (CPM 1999). This short document consulted the Bedfordshire Historic Environment Record (HER), the Bedfordshire and Luton Archives and Records Service (BLARS) and the National Monuments Record (NMR) in Swindon for sites within a 500m search radius (Fig 1). The report concluded that there was a general lack of archaeological information owing to a dearth of fieldwork and other sources of information.

Prehistoric

A note of Belgic style pottery occurs in reference to a kiln site near Doolittle Farm (HER6743). The reference may not be entirely accurate as Belgic pottery kilns continuing into the Roman period would be extremely unusual.

Roman

The pottery kiln group to the south-west was in use into the Roman period (HER6743, NMR1432257). They were discovered in 1982 by local archaeologists during the construction of Ampthill bypass but have not been published. There were three definite kilns and traces of two possible kilns, which may have been part of a larger group in the vicinity (Fadden pers comm).

A Roman road is thought to have passed to the north-east of the site on a north-west to south-east alignment. It was identified during the *Viatores* study in 1964 (HER485/5020, *Viatores* 170b). Most such projected road alignments have since been discredited including this example (Simco 1984).

Saxon

There were no Saxon references identified (CPM 1999).

Medieval

Ampthill received its market charter in 1219 from Henry III, confirming what by then would have already been a thriving economic centre. Initially the town was surrounded by heath, marginal land used for rough grazing. Some of this land was enclosed within a deer park, Ampthill Park, which lies *c*1.45km to the north and was the focus of a late medieval estate and palatial residence, Ampthill Castle (Brown 2010). The castle and its grounds were owned by the Crown estate in the reign of Henry VIII and it was occupied for a short period by Katherine of Aragon during their divorce.

Land *c*500m to the east was known as Ampthill Warren, possibly used for breeding rabbits (BCC 1996).

Post-medieval

Doolittle Mill, a former watermill, lay south-west of the site along a small brook (HER1005). A former clay pit lay south of the site (HER2866). A second clay extraction pit was located north-east of the site (HER2867). The pits were abandoned by 1901 and it is suggested that they may have served Grange Tile Works on Flitwick Road (CPM 1999, 4).

A place-name reference is recorded to the south from Jeffrey's Map of Bedfordshire, 1725, for How Green (HER7731). This may be a field name for lush pasture or it may refer to a lost village green, although no known settlement is recorded nearby. The Russell estate map of 1773 indicates the presence of a house, the drawing includes an image two storeys high with pitched roof and central doorway.

Ampthill Grange or Grange Farm is situated immediately south-east of the site (HER6210). The name has been present since the 16th century, although the present farmhouse is of mid-19th-century build in neo-Tudor style with modern accretions.

Geophysical survey

Detailed magnetic survey using gradiometry was conducted on behalf of CgMs Consulting Ltd by Stratascan over *c*9.5ha of rough pasture (Smalley 2006). This survey identified potential bank and ditch arrangements, together with possible pits, in the south-west and south-east of the site that were subsequently designated AAS1-2 by the SARM (Yates 2009). Probable agricultural marks were identified as parallel linear anomalies across the larger part of the development site. The east side of the site was dominated by magnetic disturbance, and bipolar anomalies across the site indicated the presence of scattered ferrous objects.

Trial excavations

A specification for archaeological trial trench evaluation was produced by CgMs Consulting Ltd and the evaluation works were undertaken by Foundations Archaeology (Bourne 2006; King 2006). Evaluation encompassed a 3% sample of the total development area, comprising forty trenches, each of which was 30m long by 1.8m wide. The location of trenches was based on a broad distribution across the site, targeting geophysical anomalies where they had been identified. Trial excavations established a correlation between the alignment of subsurface features and the linear anomalies identified by the geophysical survey. A single Saxon pit and a post-medieval ditch were identified. The quality and quantity of finds was generally very low, with pottery sherds all being heavily abraded and indistinct. Preliminary spot dates for pottery included possible sherds of Bronze Age, Roman and Saxon origin. Environmental sampling indicated that whilst charred seeds and other ecofacts were present, they were of generally poor quality and in insufficient quantities to present anything meaningful for analysis.

2.2 Topography and geology

The site comprised *c*9.1ha of land, sloping towards a small central stream that flowed through the site from north-east to south-west. The slopes are sheltered from the north and west by the rise in ground and the tributary valley dropping gently away to the south-east. The slopes lie between *c*72-76m above Ordnance Datum within the excavated areas. The site was bounded on all sides by hedgerows that divide the land from the housing estate along Tavistock Avenue to the east, allotments to the north, the A407 trunk road to the west and a riding stable to the south. The stream forms a tributary within the Flit Valley in its upper course.

The underlying drift geology of the site comprises Ampthill Clay and Lower Greensand, with the clay lying towards the base of the tributary valley (BGS 2001). The soils are of Evesham 3 association which tend to be more calcareous clayey soils that are subject to waterlogging (LAT 1983; CPM 1999, 3).

3 EXCAVATION STRATEGY

3.1 Aims and objectives

The general aim of the Scheme of Archaeological Resource Management (SARM) was to put in place a series of measures to mitigate the impact of the development on the archaeological resource. Four Areas of Archaeological Significance were identified (AAS1-4). These comprised two areas where the archaeological remains would be preserved *in situ* (AAS1-2) and two areas where the archaeological remains would be adequately investigated and recorded in advance of development (AAS3-4).

The principal objectives of the recording strategy were defined using the guidance of national and regional research frameworks. These included the National Framework (EH 1997), the research frameworks for the Eastern Counties (Brown and Glazebrook 2000; Medlycott and Brown 2008), and the assessment for Bedfordshire (Oake *et al* 2007). The research aims set out in these documents were addressed by the project and excavation objectives defined as follows:

- Determine the nature and character of any *in situ* Bronze Age remains
- Contribute to the understanding of farming, settlement and the role of monuments and burial practices in Bronze Age society (Brown and Glazebrook 2000, 10-12; Oake *et al* 2007, 10-11; Medleycott and Brown 2008, 31-2)
- Contribute to the understanding of landscape development, settlement patterns and continuity in the later Bronze Age, Iron Age and Roman periods (Oake *et al* 2007, 10-11)
- Investigate the site for any evidence belonging to the late Iron Age to Roman transition period (Medleycott and Brown 2008, 46)
- Determine the date and phasing of the field system and probable agricultural features (Oake *et al* 2007, 11). Work following a controlled methodical manner able to produce relative and absolute dating that will place the results of the geophysical survey and trial trenching in context
- Re-examine the possible hearth identified in Trench 39 and place it in context with the associated remains
- Identify any evidence for continuity of use in the field systems between the Roman and Saxon periods (Edgeworth 2007a, 93)
- Contribute to the understanding of Saxon settlement patterns and how they relate to late Roman settlements (Oake *et al* 2007, 13)
- Recover evidence for the palaeo-environment and palaeo-economy of the site.

3.2 Methodology

The open area excavations were divided into three parts; AAS3 was a 0.71ha irregular pentagon that was 125m long by 92m wide located centrally upon the principal geophysical anomalies, AAS4 was a 0.43ha area to the south of this on the opposite slope, also located upon geophysical anomalies, and the road corridor formed a third open area covering 0.21ha that provided a transect across the east and north-east

sides of the site (Fig 2). The total 1.35ha of open area excavations comprised *c*14.8% of the development area.

The open area excavations were set out by NA using survey grade GPS (Leica System 1200). Topsoil deposits were removed to the surface of the subsoil using a D6 bulldozer as a blade to avoid rutting the wet ground. Removal of the subsoil was carried out by a tracked 360° mechanical excavator, fitted with a toothless ditching bucket and operating under archaeological supervision. Spoil from the subsoil was also removed using the D6 bulldozer retaining topsoil and subsoil deposits in bunds at the edge of excavation, separate from each other. Excavation proceeded to the surface of the significant archaeological horizon or, where this was absent, the natural substrate. Movement of machinery during site preparation was conducted in such a manner as to avoid impact on the archaeology.

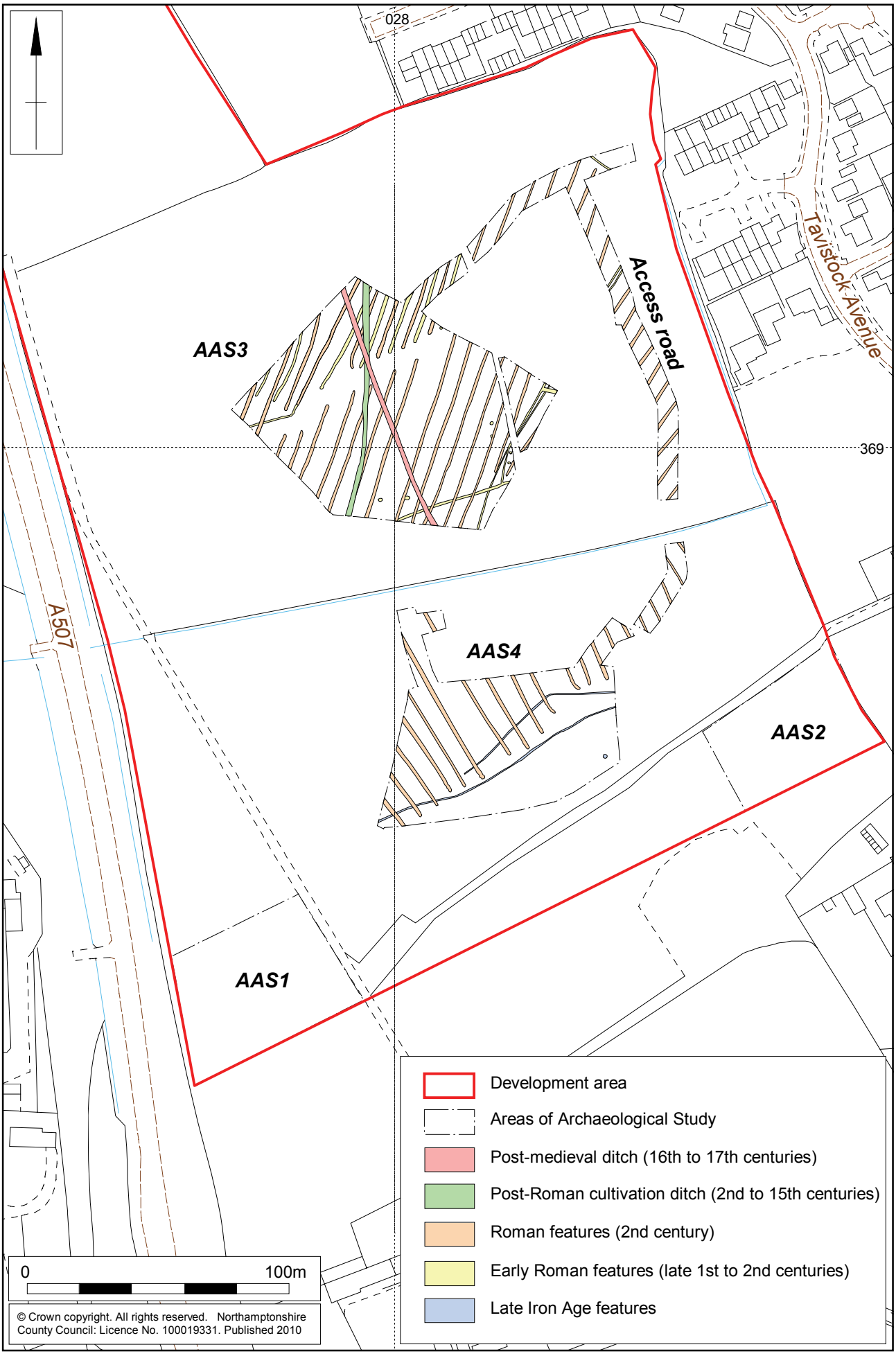
The excavation area was cleaned sufficiently to enable the identification and definition of archaeological features. A hand drawn site plan of all archaeological features in AAS3-4 was made at scale 1:100, related to the Ordnance Survey and was supplemented by GPS plans of features in the road corridor.

All archaeological deposits and artefacts encountered during the course of excavation were fully recorded. The recording methodology followed the standard NA context recording system with context sheets, cross-referenced to scale plans, section drawings and photographs; digital, on 35mm monochrome film and on colour slides (NA 2006). Deposits were described on *pro-forma* context sheets to include measured and descriptive details of the context, its relationships, interpretation and a checklist of associated finds. The record was supplemented by direct annotations of the site general plan as required. All levels were related to Ordnance Survey datum. Sections of sampled features were drawn at scale 1:10 or 1:20, as appropriate, and related to Ordnance Survey datum. Representative samples of all exposed archaeological features were excavated, generally using sections of between 2.5-5m length and allowing them to weather to expose smaller variations within them.

All discrete features were sampled to no less than 50% of the whole, features of particular interest were 100% excavated. Linear features were sampled at frequent intervals to determine their function and date with interventions placed at terminals and midsections. Intersections were excavated where the relationships were not clear in plan. Artefacts and soil samples were collected by hand. Hand spoil and the surface of archaeological features was scanned with a metal detector to ensure maximum finds retrieval from secure contexts.

Environmental samples were taken from charcoal rich pits and from individual groups of linear features. Samples were only sought in deposits with a potential for the recovery of charcoal, carbonised plant remains and other ecofacts from secure and uncontaminated contexts (EH 2002). A minimum of 40 litres was taken for flotation from charcoal rich pits or 100% of the fill where this was less than 40 litres. Column samples were retrieved from within each distinct group of linear features for pollen analysis.

All works were conducted in accordance with *Standards for Field Archaeology in the East of England* (Gurney 2003), The Institute for Archaeologists' *Standard and Guidance for archaeological excavation* (1995, revised 2008) and *Code of Conduct* (1985, revised 2010).



Scale 1:2,000

General site plan Fig 2

4 THE EXCAVATED EVIDENCE

The underlying drift geology of the site was Ampthill Clay along the stream and lower valley slopes. As the ground arose to the north and south, this clay was overlain by Lower Greensand (BGS 2001).

The subsoil comprised medium to dark soft orange-brown and greyish-brown mottled silty clay and sandy clay loam with occasional fragments of iron pan and sparse clay patches, distributed fairly evenly across the site between 140mm to 180mm thick.

Above this the topsoil was soft mid- to dark greyish-black and brown silty clay loam containing infrequent to moderate well sorted pebbles <20mm in size. The soil was generally waterlogged and unable to drain freely. It was *c*250mm thick on the upper slopes of the site, thickening to *c*330mm beside the stream.

4.1 Summary of the site chronology

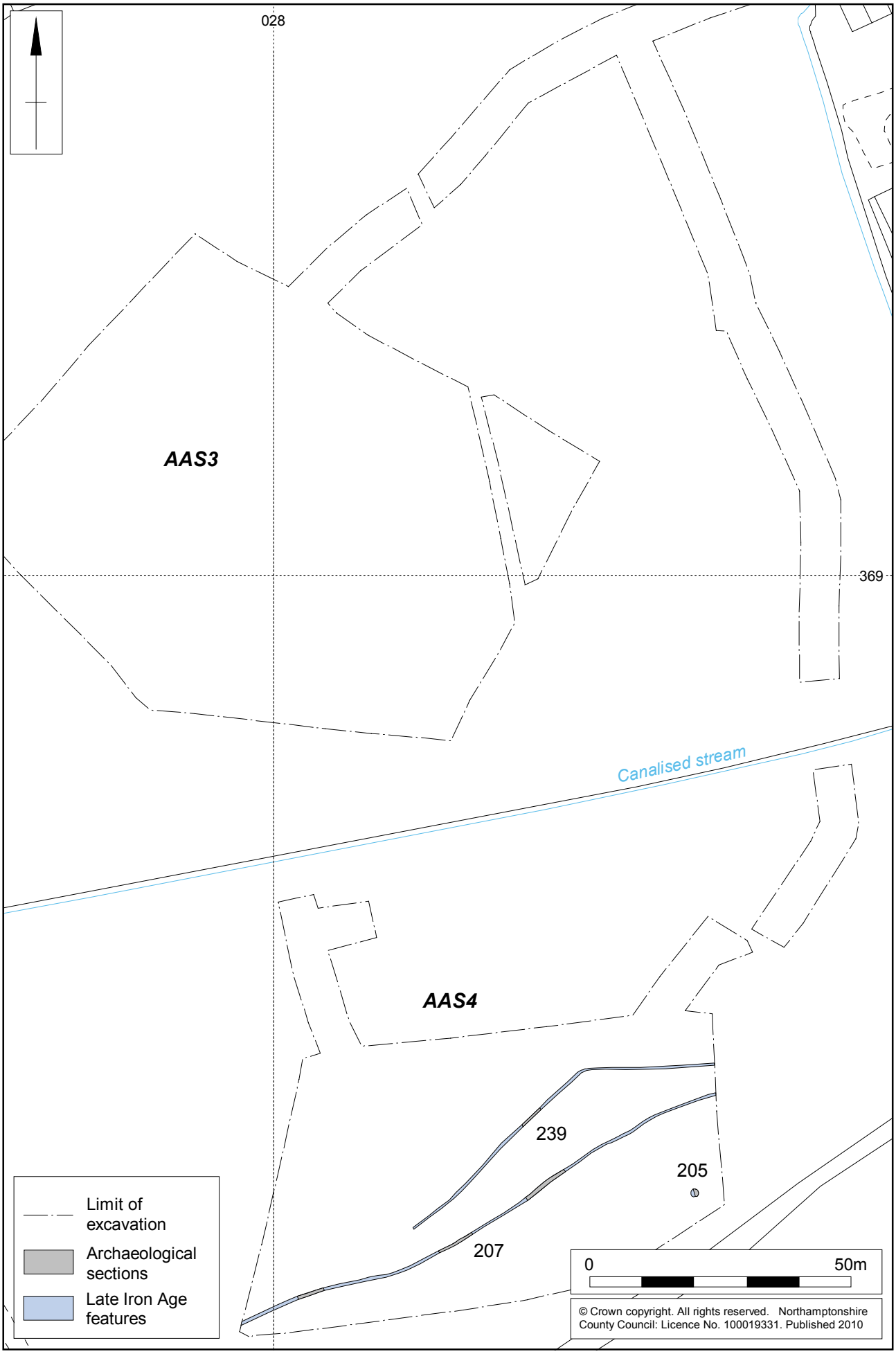
The site was dominated by Roman cultivation rows which were present within all of the excavated areas (Figs 2-4). A small number of other features pre-dated and post-dated the Roman activity.

Table 1: Site chronology

Period	Nature of activity
Late Iron Age	An isolated pit and sinuous gullies in AAS4
Early Roman (late 1st to 2nd centuries AD)	Sparsely distributed ditches and charcoal rich pits Initial planting in AAS3 in curving rows
Roman (early 2nd century AD)	Linear cultivation rows divided into planting groups
Late Roman and post-Roman (late 2nd to 15th centuries AD)	A single ditch aligned through AAS3 with no comparable boundary alignments
Post-medieval (16th to 17th centuries AD)	The continuation of a hedgerow boundary through Area AAS3 from the north-west

4.2 Late Iron Age features

Two sinuous gullies, [207] and [239], lay in AAS4. The gullies followed the contour of the valley side on a generally north-east to south-west orientation (Fig 3). One was probably the antecedent of the other, but it is uncertain which came first. The size of the two gullies was extremely inconsistent, varying between 0.20-0.52m wide and 0.10-0.26m deep. Both gullies tended to meander along their course. Each was filled with soft light to mid- greyish-blue sandy clay with infrequent red iron salt patches akin to disturbed natural. A possible reason behind this may be that the gullies were the bases of former hedgerows for which there was no formal ditch or plantation cut. The gullies seem to have become redundant before the cultivation rows were laid out. Each gully produced a single sherd of late Iron Age pottery (Table 6).



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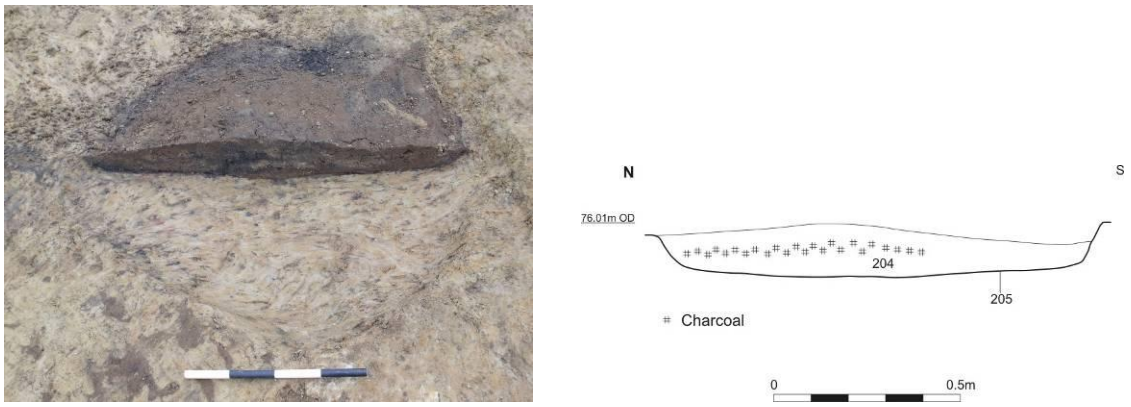
Late Iron Age features Fig 3

An isolated pit, [205], in the south-east corner of AAS4 was oval in plan, 1.70m wide by 0.26m deep, with shallow curved sides and a broad flat round base (Figs 3-4). The fill comprised dark mid-greyish-brown and russet brown sandy clay (204), blended with thin bands of charcoal rich burning between minor layers forming the overall matrix. There was, however, no evidence of scorching of the natural to suggest burning *in situ.* The fill is likely to have constituted the remnants of a small fire or fires deposited into the pit, but contained very few charred seeds. The charcoal was exclusively oak, probably burned from logs as there was no roundwood present. One half of the pit had previously been removed during trial excavation (King 2006, pit 3906).

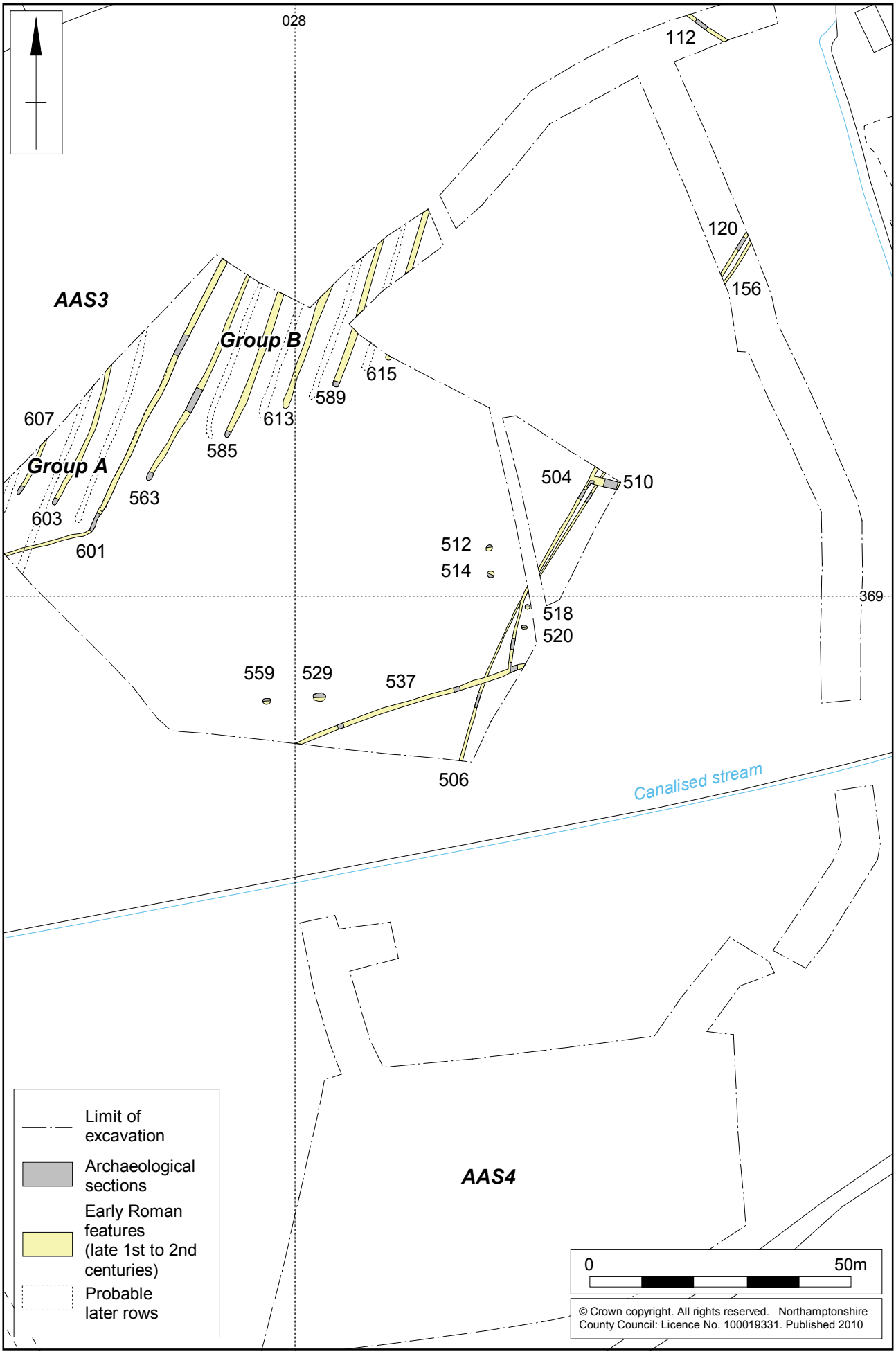
During the open area excavation this feature was re-excavated and the earlier context tag and nail were found pinned into the base of the pit. The pottery assemblage from 2006 was checked, since this feature produced no further datable finds in 2010. The four large sherds from this pit are considered by Slowikowski to have been previously misidentified, Slowikowski considers them to be of Iron Age origin instead of Saxon as previously supposed (see pottery report).



Late Iron Age pit [205], looking east, photograph and section Fig 4

4.3 Initial planting (late 1st to 2nd centuries AD)

A small number of ditches and gullies indicated some early boundaries closer to the stream (504, 506, 510, 537). The full extent of these boundaries was not clearly visible and did not follow a uniform or predictable pattern. It is likely that they formed the basis for the later expansion of the planting groups. Pottery from these ditches was a mixture of late Iron Age and early Roman fabrics, all heavily abraded. Most of these ditches were probably backfilled immediately prior to the expansion of the cultivation rows in the 2nd century. There was little evidence for sedimentation, which would also suggest a relatively short period of use estimated around the late 1st to early 2nd centuries. The overall distribution of features suggested that the early boundaries divided the land into manageable units.



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Early Roman features Fig 5

Boundary features

Boundary features were concentrated to the south-east of AAS3. Gully [506] was aligned north-east to south-west and followed a gradual curve. It was visible in the area of the access road, [156]. The gully was 0.42m wide by 0.15m deep, somewhat eroded at the top of the cut profile with a short steep side that met with a narrow flattish base. Mid-greyish-brown clayey silt (505) filled the gully, merging with lighter mottled bluish-grey and orange clayey silt towards the base. The gully appears to have silted up and required replacement.

The gully was cut by ditches [504], [510] and [537]. Ditch [504] retained the down slope orientation of the earlier gully, also present in the access road, [120]. It connected with ditch [510] and at its south-west end it joined with ditch [537]. Together the three ditches formed possible boundaries of pre-cultivation enclosure activity (Fig 3). Ditch [504] was 0.51m wide by 0.28m deep, ditch [510] was 1.14m wide by 0.49m deep and ditch [537] was 0.88m wide by 0.29m deep. They appeared to have been for light drainage relief. The backfill was fairly consistent between all three and comprised dark greyish-brown and russet orange-brown patchy clayey silt with slight sandy grit, mottled with iron salts and manganese. One ditch [510] produced pottery, which was a mixture of late Iron Age and early Roman sherds.

In the west of AAS3 lay ditch [601], which was 0.45m wide by 0.29m deep and lay parallel to ditch [537]. The ditch appeared to turn north-east, parallel with ditch [504] and gully [506]; however, its north-east extent had been replaced by a later cultivation row. The profile was a sharp V-shape but with significant root disturbance at its junction with the later cultivation row. The fill comprised soft wet mid-brownish-grey and orange sandy clay (600), mixed with darker silty clay loam backfill.

At the north extent of the access road was a single ditch, [112], which did not match the alignment of the later cultivation rows in the vicinity. The ditch may have belonged to an earlier layout upon which later cultivation rows were superimposed. It could also have been the perimeter of planting, given that cultivation row [116] respected its position (Fig 9). Ditch [112] was 1.0m wide by 0.39m deep. It had fairly regular sharp sloping sides with a rapid break of slope into a flat channel that was 0.5m wide. The fill comprised soft light to mid-orange and greyish-brown mottled sandy silt (111) with mottled grey and orange sandy clay patches but produced no pottery.

Planting groups A and B

The first Roman cultivation rows may have been laid out on the upper slopes to the north of AAS3 (Fig 5). At this time they did not extend all the way down towards the stream, which may indicate an unpredictable or poorly managed watercourse at that time. Two early planting groups are likely to predate the wider distribution of later cultivation row expansion across the site (groups A and B). There was a distinct difference between the slightly curved alignments of earlier cultivation rows in group A and the uniform parallel lines of those that came later. This reorganisation within the layout of cultivation rows was not evident from the pottery dates of individual rows and during pottery analysis it was believed that groups A, B, E & L represented a single planting group (all part of group E), rather than four subdivisions. When considered as a single block the spacing was particularly narrow, it was between two thirds and one half of the distance in other groups. As a model the block made better sense split into four smaller groups representing two separate phases of planting, although without physical stratagraphic relationships we cannot be sure this was the case. At the west extent of the block the spacing is more consistent with groups elsewhere but there was a distinct difference between the slightly curved alignments of Group A cultivation

rows, [603] and [607], which respected gully [601], suggesting that they were different to the uniform parallel lines of those elsewhere (Fig 5). Gully [601] was redefined as cultivation row [575], incorporating the former boundary as a cultivation row along the edge of the later planting group L and providing a wide access route between that and group E (Fig 9).

The individual rows varied between 0.74-0.95m wide and were between 0.40-0.51m deep. They had sharply angled sides, eroded at the top, which cut steeply towards a flattish base. The sides and base were frequently disturbed by root hollows forming narrow channels, ridges and indentations within the natural (Fig 6).

Group A, cultivation row [563], looking south-west Fig 6

The fills of these cultivation rows varied both between rows and along the length of each row. The sandy clay loam was generally soft and wet; the colours were usually fairly light and not easily visible at the surface. Colours tended to be greyish-brown or yellowish-orange and brown. The fills were often mottled with orange, russet and black iron pan and manganese salts. The soils tended to be darker, more greyish-blue, within the hollows than towards the surface. Boundaries between contexts were always diffuse and hard to define, although the edges were distinct where clay or sand was identified.

Charcoal-rich pits

Six pits were associated with the later expansion of the cultivation rows, of these; four were rich in charcoal and were sampled. All of the pits lay south-east of planting group B (Fig 5).

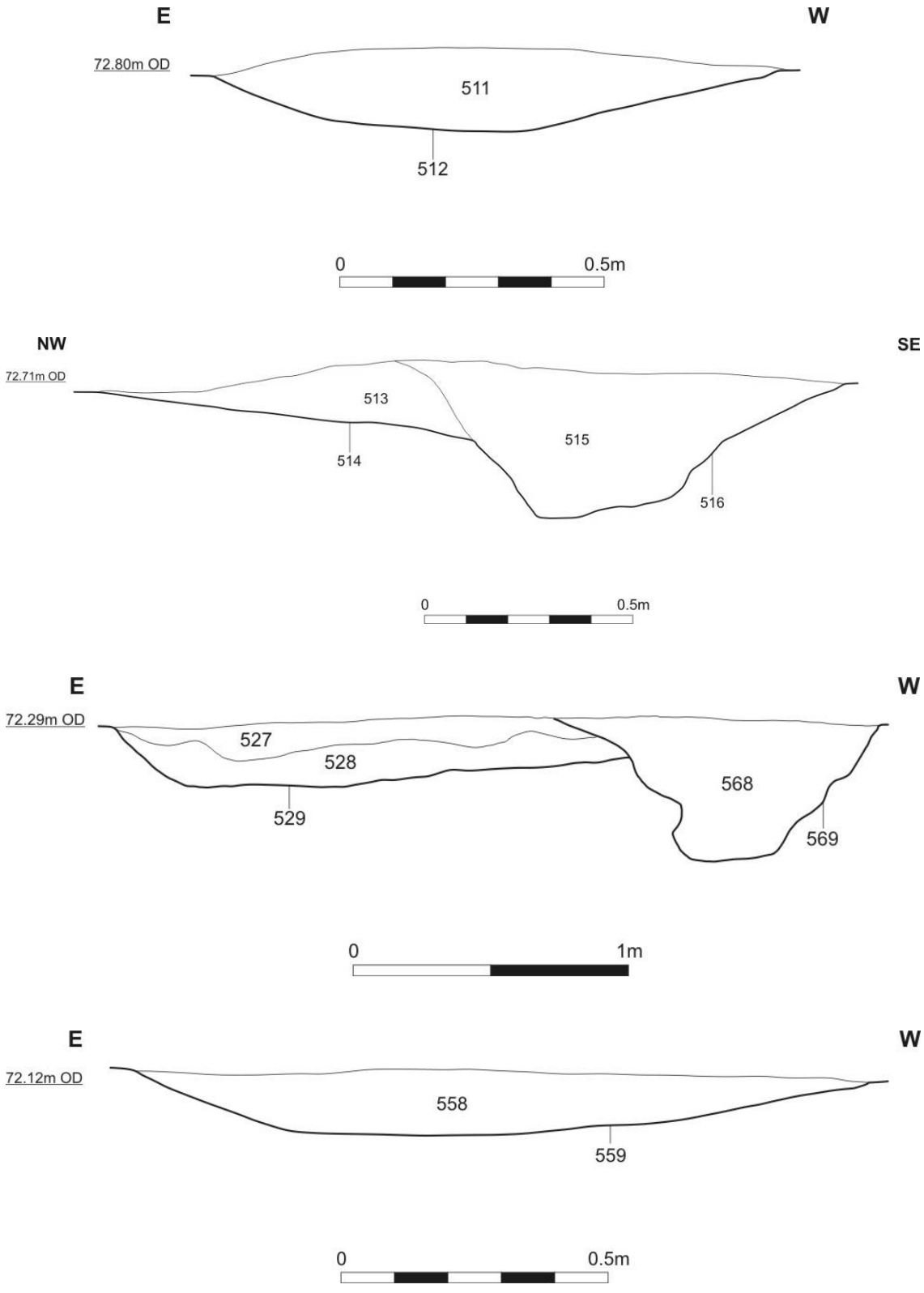
Two of the charcoal-rich pits were cut by later bedding trenches. Pit [529] was cut by row [541], and pit [514] was cut by row [516]. The pits had been truncated and the soil turned over into the cultivation rows rather than being removed. This left charcoal staining where pits were intersected (Fig 7). Given the preponderance of oak (*Quercus*) charcoal and a general absence of roundwood, they appear to have been from a number of small log fires and were unlikely to have resulted from clearance prior to cultivation.

Table 2: Charcoal-rich pits

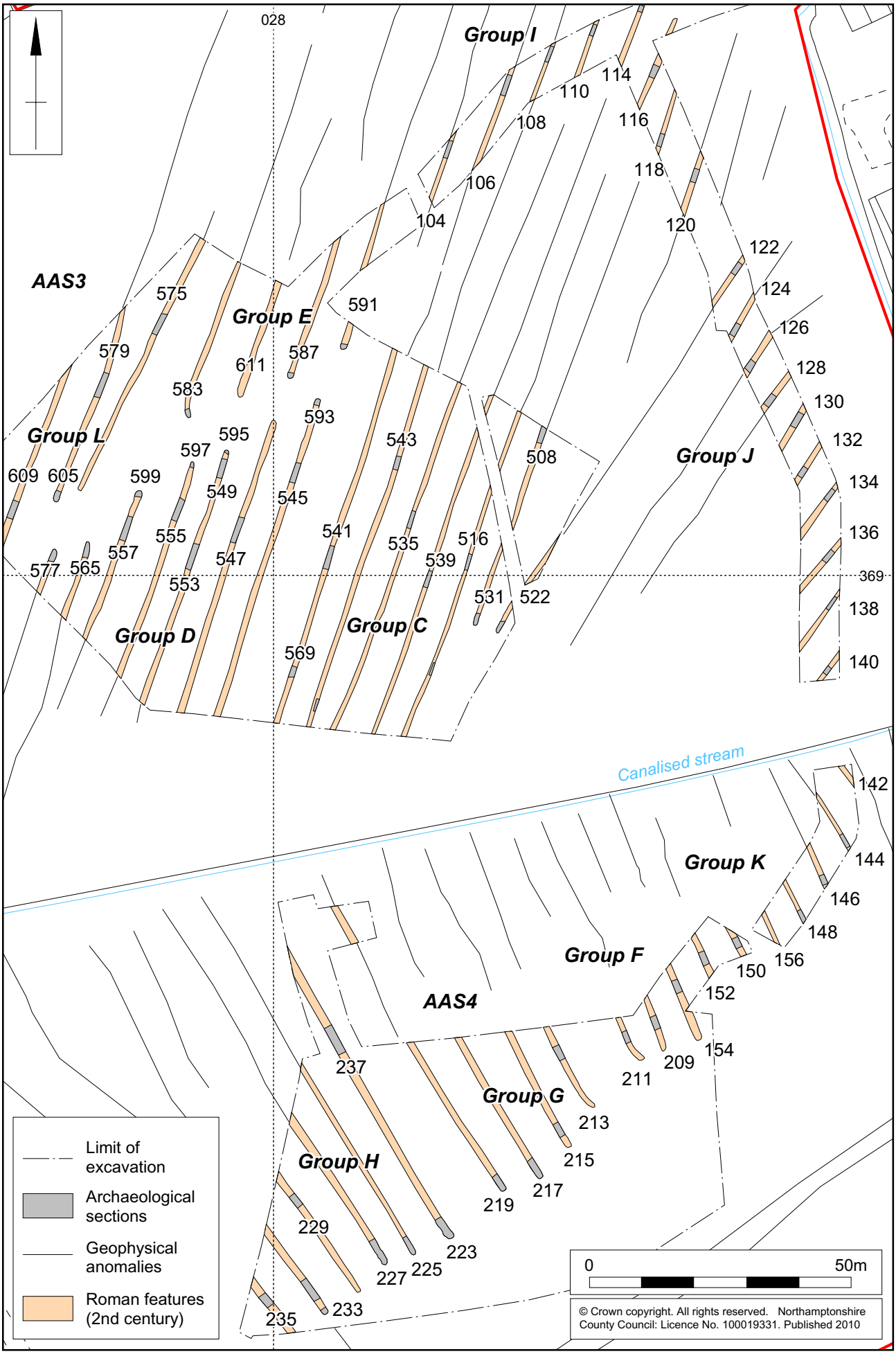
Pit	Shape	Fill	Fill description	Length (m)	Width (m)	Depth (m)
512	Round	511	Soft wet dark grey-black silty clay	1.10	1.00	0.15
514	Oval	513	Soft wet dark grey-black silty sandy clay	1.10	0.95	0.17
529	Oval	527	Soft moist dark grey-black & bluish-grey silty clay loam (upper fill)	1.82	1.47	0.10
529	Oval	528	Soft moist black and bluish-black silty clay loam (lower fill)	1.82	1.47	0.11
559	Oval	558	Soft wet dark greyish-black silty clay	1.36	1.08	0.11

Charcoal-rich pit [514] and, Group C, row [516], looking north-east Fig 7

Pits [518] and [520] were located on the east side of the planting group. These two pits did not have particularly high levels of burnt material and charcoal specks were low to moderate within the fills. The pits were both round, and 0.78m and 1.08m in diameter respectively. Pit [518] was 0.11m deep. Pit [520] was 0.14m deep. Both pits were discrete and, whilst shallow, the sides were sharp and bases flat. The fills comprised dark mottled greyish-brown silty clay loam, (517) and (519), with mottled reddish brown iron salts.



Section drawings of the charcoal-rich pits [512], [514], [529] and [559] Fig 8



Scale 1:1,000

Planting groups Fig 9

4.4 Expansion of the cultivation rows (early 2nd century AD)

Long strip cultivation rows were laid out in parallel rows (Fig 9). These cultivation rows formed ten planting groups, with two groups (I and K) in the access road perhaps forming parts of groups C and F.

The plan layout of cultivation rows probably has important horticultural significance. Light (and shade), accessibility (for frequent maintenance) and air flow (affecting mildew and frost) would be important considerations (White 1970, 230-231). This would be particularly the case for soft fruit, grapes and hops. Environmental data retrieved through the analysis of pollen samples did not, however, produce evidence to elucidate upon possible differences in crop. Even if it had demonstrated the type of crop grown, it would have been highly unlikely to demonstrate any differences in variety between plants of the same genus, which is the reason Pliny gives for setting different species of grape vine in separate compartments 'so as not to deteriorate the flavour [of the wine]' (*Natural History,* XVII, 35). One might suspect that a similar approach would be employed for other species.

Spacing of cultivation rows

The spacing within cultivation row groups is given in Table 3. Measurements are given for the range of rows from centre point to centre point. The spacing between trenches is generally comparable. Spacing would have affected the distance at which a shadow would be cast upon the neighbouring row. It would be desirable with fruit to maximise the available light and avoid shade.

Table 3: Cultivation row spacing by groups

Planting groups	Row spacing (m)	Cultivation rows (cut numbers)
Initial		
A	6.5-6.7	603, 607
B	6.6-7.0	563, 585, 613, 589, 615
Later		
C	6.0-6.6	508, 531, 522, 516, 539, 535, 543, 569, 541
D	5.8-6.6	593, 545, 547, 595, 549, 553, 597, 555, 599, 557, 565, 577
E	6.0-7.6	583, 611, 587, 591
F	6.0-7.1	150, 152, 154, 209, 211
G	6.8-7.8	213, 215, 217, 219
H	6.2-7.3	223, 225, 227, 229, 233, 235, 237
I	6.0-6.8	104, 106, 108, 110, 114, 116, 118, 120
J	6.1-6.4	122, 124, 126, 128, 130, 132, 134, 136, 138, 140
K	6.5-7.5	142, 144, 146, 148, 156
L	6.1-6.4	575, 579, 605, 609

Access routes dividing planting groups

The gap between groups L and E was 9.5m wide. For the regular attention of high maintenance crops frequent access would have been essential. There are a number of gaps between groups that are wider than others and coincide with differences in the shape of features or their alignments. Noticeably the end of row [583] in group E was hooked, curving into the gap between groups D and E which itself clearly forms a route, *c*8.0m wide. This also led to the gap between groups C and D, which was 10.6m wide. There may also be a gap between groups C and I. This is unconfirmed as the area in question lay outside the limit of excavation. Whilst superficially on the same alignment, two groups of features do not quite match in plan and there are two extra rows in group I than in group C. Group I may, however, be an extension of group E since the distance between row [591] and row [104] remains consistent with that

between row [545] and row [541]. This suggests that the north-east to south-west break between groups D and E may continue within the unexcavated part of the site between AAS4 and the access road.

In AAS4 there were two distinct breaks. Group K was probably part of group F, excavated in two separate areas this was not evident on the ground. The gap between groups F and G was 12.0m wide. The ends of rows [211] and [213] that flanked it both curved slightly to the east indicating a possible route of traverse. There was also a gap, 11.7m wide, between groups G and H.

For the most part the later planting groups had few clearly associated boundaries beyond the plantation and the land was either open or perimeter features were of a less substantial nature.

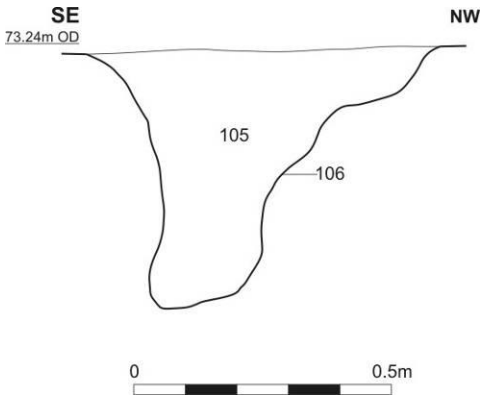
Bedding trenches

Each and every bedding trench was unique in character and different at every point along its respective row. The many variations in pattern and form produced by the root systems were themselves key features in identifying their origins as bedding trenches. Some features appeared ephemeral as surface soil discolorations which, when excavated produced only rows of root systems without distinctive bedding cuts (Figs 10-13). Others had been deeply cut and prepared as planting beds (Figs 14-25). These latter examples were more prevalent whilst the former were exclusively confined to planting groups I and J, but were by no means typical of these two groups as a whole.

Where bedding cuts existed these were typically in the region of 0.6-0.8m wide by 0.4-0.5m deep. Their sides were often steep and generally met with a flat base. Most had a slightly eroded upper edge, perhaps the result of having been dug over and replanted. The ends were usually rounded and straight, although three examples curved, (211, 213 and 583), and may have been associated with movement between the planting groups. The sides and bases were riddled with hollows, narrow channels, ridges and indentations caused by root activity.

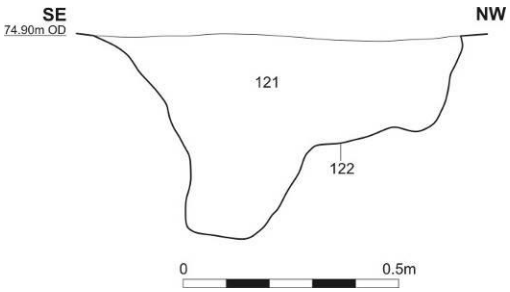
Fill materials were variable throughout tending towards soft, wet sandy clay loam with infrequent clay patches. Colouration was fairly light tending towards greyish-brown or orange-brown with mottling caused by sporadic iron pan and manganese salts. Darker, more greyish-blue, soil filled the root hollows. None of the bedding trenches contained evidence for postholes.

Group I, row [106], looking north-east Fig 10



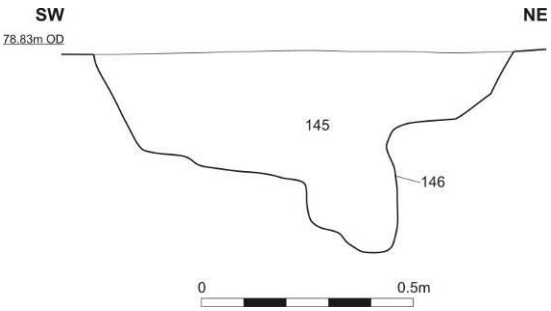
Section of row [106], looking south-west Fig 11

Group J, row [122], looking north-east Fig 12



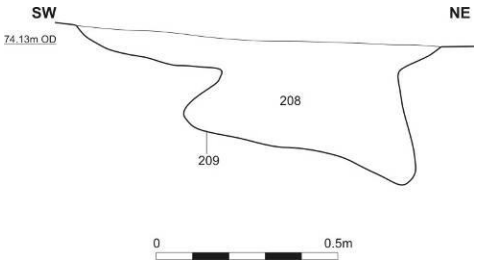
Section of row [122], looking south-west Fig 13

Group K, row [146], looking south-east Fig 14



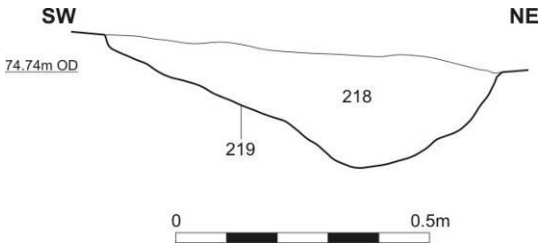
Section of row [146], looking south-east Fig 15

Group F, row [209], looking north-west Fig 16



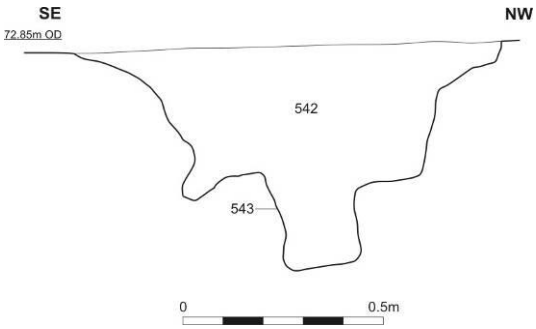
Section of row [209], looking north-west Fig 17

Group G, row [219], looking north-west Fig 18



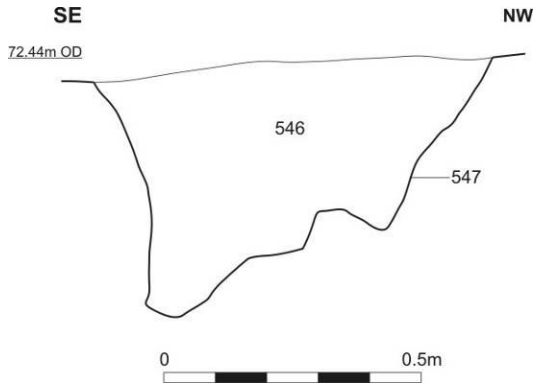
Section of row [219], looking north-west Fig 19

Group C, row [543], looking south-west Fig 20



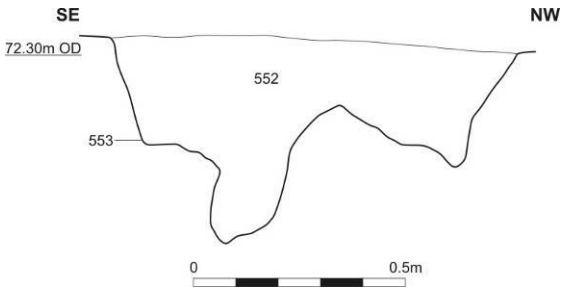
Section of row [543], looking south-west Fig 21

Group D, row [547], looking south-west Fig 22



Section of row [547], looking south-west Fig 23

Group D, row [553], looking south-west Fig 24

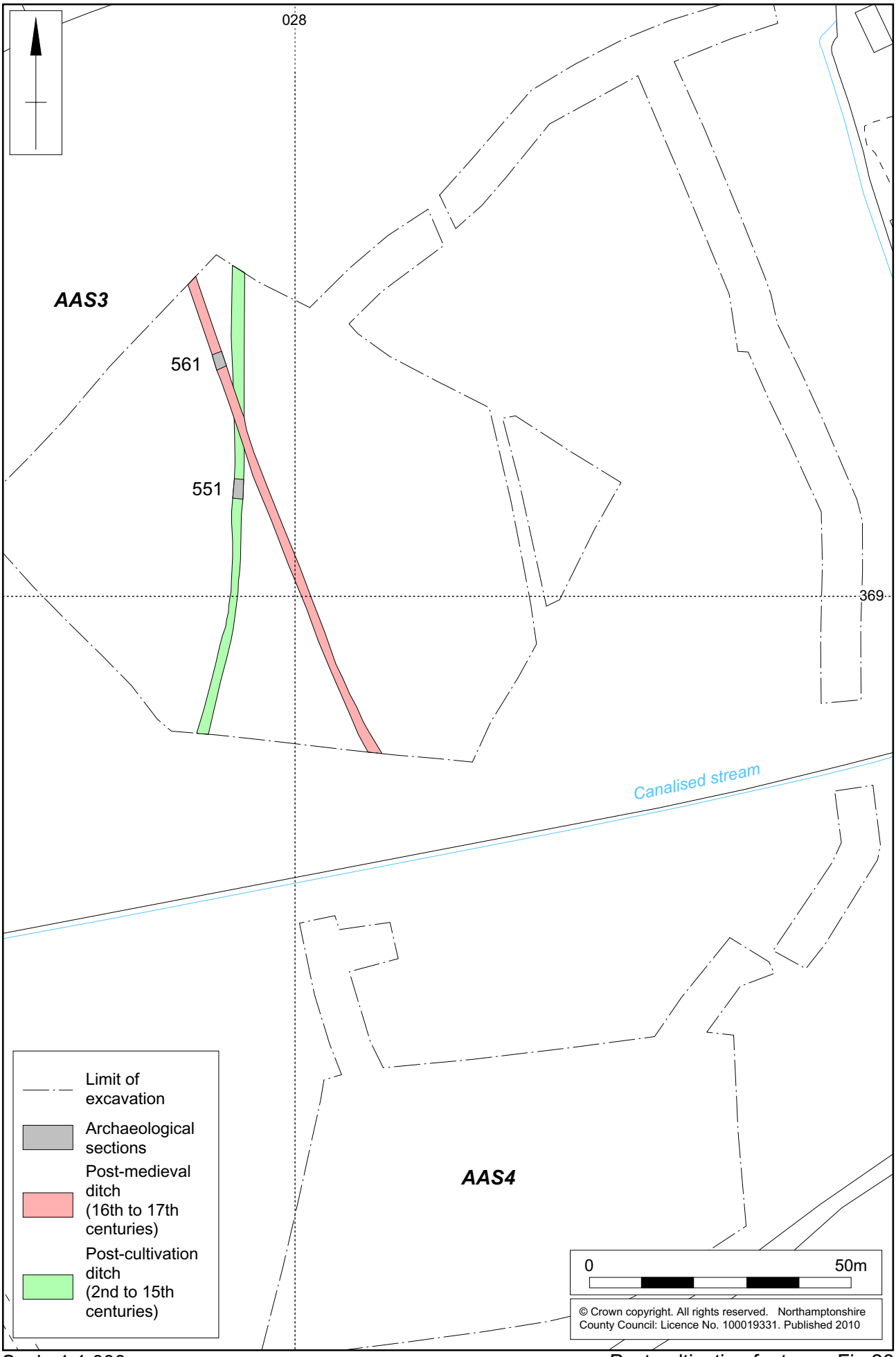


Section of row [553], looking south-west Fig 25

4.5 A post-cultivation boundary (2nd to 15th centuries AD)

Following the disuse of the Roman cultivation rows it is uncertain how long the land lay unused or, if it was used, the activities that took place left no archaeological trace.

A single ditch partitioned the land some time after cultivation practises ceased (Fig 26). The ditch was aligned north to south, curving gradually westward at its southern end. This was consistent with the direction of run-off down slope towards the stream which, although now canalised, has probably always existed in one form or another. Ditch [551] was 1.64m wide by 0.34m deep. It had shallow, slightly curving sides that descended into a broad rounded base, stepped on its west side. The fill comprised soft wet mid- to dark bluish-grey and greyish-brown mottled sandy clay (550) with dark bluish-grey smears and dark orange speckles concentrated towards the base. Whilst the ditch produced pottery of Roman date, it was heavily abraded and could easily have been residual. The ditch does not match any modern landscape boundaries in the surrounding fields and whilst its date is uncertain it is probably no later than the 15th-century since does not appear on any historic maps.



Scale 1:1,000

Post-cultivation features Fig 26

4.6 A post-medieval boundary (16th to 17th centuries AD)

There was a single feature orientated north-west to south-east across the site in a single straight line. Boundary [561] was consistent with the continuation of a field hedgerow surviving to the north of the site on the same alignment (Fig 26). The feature was 2.18m wide by 0.25m deep. The sides were uneven, ragged and the base undulated, with occasional hollows. Its fill comprised soft wet light to mid- pinkish-grey sandy clay (560), mottled with greyish-brown and orange sand and clay loam. At its base were several sherds of glazed red earthenware of 16th to 17th-century date along with brick and tile of types consistent with those found at Ampthill Castle (Chapman 2010). The feature was heavily disturbed by two large ceramic field drains that lay along its length, probably 18th to 19th-century in date. The feature seems to have been a field boundary of pre-parliamentary origin, which probably formed a hedgerow, and lasted until fairly recently.

5 THE FINDS

5.1 **Worked flint** by Yvonne Wolframm-Murray

Six pieces of worked flint were recovered as residual finds from Roman contexts. The artefacts comprised of five flakes and one blade, summarised in Table 4 below. Post-depositional edge damage was present on all artefacts consisting of irregular nicks on one or both lateral edges. Patination was present on two of the flints, which was a slight cloudy white discolouration of the surface. Heat treatment is evident on the blade in the form of reddish discolouration.

The raw material was a vitreous flint ranging from mid- to dark greyish brown and an opaque grey or honey coloured flint. The cortex present on the dorsal surfaces of one flake was light brown and worn. It is likely that the raw materials were locally procured gravel flints. The blade, 88mm long by 25mm wide, had a bulb of percussion on both ends suggesting it was anvil struck.

The technological characteristics of the blade suggest a late Mesolithic or early Neolithic date. The remainder of the worked flint is not directly dateable but the technological characteristics suggest a Neolithic date.

Table 4: Summary of worked flint

Context	Artefact	Material	Cortex	Patination	Comments
Ditch 504	Whole blade	opaque dark grey	no	no	anvil struck blade (heat treated)
Pit 205	Distal flake	vitreous light grey	no	no	post-depositional edge damage
Row 150	Proximal flake	vitreous mid-grey	no	slight	Burnt flint
Row 136	Proximal flake	opaque mid-greyish-brown	no	slight	possible proximal portion of a blade
Row 563	Whole flake	vitreous mid-greyish-brown	no	no	broad striking platform
Row 563	Whole flake	opaque mid-honey	light brown	no	partial cortical striking platform

5.2 Late Iron Age and Roman pottery by Anna Slowikowski

There were a total of 373 ceramic sherds, weighing 2.102kg, recovered from excavation. The author also re-identified thirty-one sherds, weighing 290g, from the preceding evaluation (King 2006). This was done as a simple check for reference purposes to test for the corroboration of pottery dates for the site and not as re-analysis. The pottery was checked because Bronze Age and Saxon sherds had been previously reported, but did not occur during open area excavation.

The 2010 pottery was recorded by context and fabric, and quantified by sherd count and weight. The forms were recorded where they could be identified, but the assemblage is in very poor condition and comprised mainly single un-diagnostic body sherds. The level of abrasion, decoration and any other unusual features were noted where they existed. Identification was made difficult by the small size of the sherds and the level of abrasion. Codes from the Bedfordshire Ceramic Type Series have been used throughout and this information was entered onto a Microsoft Access database.

The pottery has been recorded following the guidelines of the Institute for Archaeologists (2008); the Prehistoric Ceramics Research Group (1992); the Study Group for Roman Pottery (Darling 1994) and the Medieval Pottery Research Group (2000).

Table 5: Quantification of the pottery assemblage from the 2010 excavations

Fabric	Common name/description	Sherd count	Weight (g)
Late Iron Age			
F04	Organic	3	2
F05	Grog and shell	14	71
F06B	Grog tempered - medium	28	93
F06C	Grog tempered - coarse	14	132
F07	Shell tempered	2	14
F09	Shell and grog	31	218
F19	Sand and organic	4	196
F22	Grog and organic	3	9
F34	'Belgic' sandy	5	19
Roman			
R01A	Samian – central Gaulish	2	2
R03E	Fine white ware	4	2
R05A	Orange sandy	30	106
R06B	Grey ware - coarse	38	256
R06C	Grey ware - fine	14	55
R06D	Grey ware - micaceous	5	37
R06E	Grey ware – calcareous	1	2
R06F	Grey ware – grog and sand	25	68
R06I	Grey ware – black slipped	1	16
R06K	Grey ware - glaucanitic	6	14
R07A	Black burnished	2	13
R07B	Sandy black ware	20	123
R07F	Silty black ware	2	9
R10A	Buff gritty	2	16
R13	Shell tempered	1	2
R14	Sandy (red-brown harsh)	1	3
R18A	Pink gritty	6	21
R18B	Fine pink	5	30
R40	Reduced sandy	89	353

Fabrics

One new fabric type was identified, a grey ware with glauconite (R06K), all other fabrics have been previously published (Parminter and Slowikowski 2004, 442-455).

R06K Grey ware with glauconite

A grey ware but with variation in surface coloration from a light grey throughout to a patchy grey-brown. Characterised by the presence of abundant round black inclusions (glauconite), 0.1-0.3mm, clearly visible to the naked eye particularly on the surfaces. Other inclusions are frequent, poorly sorted, sub-angular quartz, 0.2-0.5mm.

No forms were distinguished. It may be that this type is relatively common in the region but has not been recognised before because the abrasion on the sherds from this site reveal the glauconite inclusions unusually clearly.

Discussion

With the exception of a small quantity of post-medieval pottery, the assemblage dates to the late Iron Age and early Roman periods. There is nothing that can be positively dated after the end of the 2nd century AD.

Pre-cultivation

The earliest pottery is from pit [205], and was retrieved during evaluation, comprising four joining sherds from a single vessel making up about 25% of the pot (Table 6). These relatively large fragments may have been deliberately placed in the pit as a ritual deposit. The vessel is a high round-shouldered jar in a sand and organic fabric of a form that could date to the middle rather than the late Iron Age. It is the only occurrence of this fabric in the assemblage. Pottery which contains organic temper is common in the Saxon period but it also occurs in the county in the Iron Age, for example at Salford, where it is dated to the middle Iron Age (Slowikowski 2005, 102).

Other pre-cultivation features contained either late Iron Age pottery or a mixture of late Iron Age and Roman material (Table 6). This was principally the case with ditch [510]. All other sherds have no diagnostic features.

Table 6: Pre-cultivation pottery by sherd count: weight (g) from the 2010 excavations

Fabric	Pre-cultivation feature		
	*Pit [205]	Ditch [510]	Gullies [207] and [239]
F19	4:196	-	-
F05	-	1:1	-
F06C	-	1:2	-
F09	-	-	1:4
F34	-	-	1:3
R06B	-	2:8	-
R06C	-	1:2	-
R06E	-	1:2	-
R07B	-	2:3	-
R40	-	6:49	-

* pottery recovered during the 2006 evaluation.

Cultivation

These features contained a mixture of pottery dating to the late Iron Age and the early Roman period. The late Iron Age pottery may have continued in use well after the introduction of fully Romanised pottery. Groups A, B, E and L were modelled as separate compartments at a late stage of post-excavation analysis when addressing the distribution of rows in plan. Pottery in these four groups is therefore included as part of group E.

The late Iron Age pottery is primarily grog-tempered with the addition of varying amounts of shell, sand and organic matter. It was possible to identify at least two lid-seated jars and seven cordoned jars, both typical of the conquest period. The fill (2604) of a cultivation row that was excavated during the evaluation contained three sherds, possibly originally a single sherd, from the same vessel, probably a jar decorated with a band of diagonal incisions on the shoulder (Timby 2006).

The Roman assemblage is made up largely of local sandy wares, either reduced or oxidised, and greywares. For such a small assemblage there are a large number of greyware variants, suggesting several production sources. The small number of whitewares may originate from Verulamium. Forms are domestic kitchen and tablewares, comprising jars, bowls, dishes, flagons and beakers. Two flagons and three poppy-head beakers, dating to the 2nd century AD, were identified. A single base sherd with pre-firing holes drilled into it was identified as a sieve or strainer.

Table 7: Cultivation pottery by sherd count: weight (g) from the 2010 excavations

Fabric	Feature group								
	C	D	E	F	G	H	I	J	K
F04	-	2:1	1:1	-	-	-	-	-	-
F05	2:11	-	6:33	2:10	-	2:2	-	-	-
F06B	3:7	6:34	4:9	4:19	-	-	4:9	7:15	-
F06C	-	3:41	3:38	-	-	1:16	1:5	3:19	1:6
F07	-	-	-	1:9	-	-	-	1:5	-
F09	-	8:71	7:67	-	3:5	9:52	-	2:3	1:16
F22	1:4	-	-	-	1:4	1:1	-	-	-
F34	3:9	-	-	-	-	1:7	-	-	-
R01A	-	-	-	2:2	-	-	-	-	-
R03E	-	-	-	4:2	-	-	-	-	-
R05A	11:32	1:2	-	2:4	3:3	8:47	1:15	1:4	3:3
R06B	1:21	1:14	-	17:114	-	2:9	3:15	7:37	5:38
R06C	-	1:1	2:29	5:16	-	1:3	2:3	2:1	-
R06D	-	1:9	1:2	3:26	-	-	-	-	-
R06F	1:9	19:12	-	1:3	2:54	-	-	2:6	1:11
R06I	-	-	-	1:16	-	-	-	-	-
R06K	-	-	-	-	-	-	3:8	3:6	-
R07A	-	-	-	2:13	-	-	-	-	-
R07B	1:12	-	-	12:69	-	-	2:21	2:11	1:7
R07F	-	-	-	2:9	-	-	-	-	-
R10A	-	-	-	2:16	-	-	-	-	-
R13	-	-	-	-	-	-	1:2	-	-
R14	-	-	-	-	1:3	-	-	-	-
R18A	-	-	-	-	-	-	-	3:9	3:12
R18B	-	-	-	-	-	-	3:12	2:18	-
R40	3:8	12:52	11:42	15:67	7:6	-	6:9	7:20	22:100

What is absent is as significant as what is present. Imported pottery is rare; only two small flakes of samian were recovered. No forms could be identified but the fabric suggests that this samian is of central Gaulish origin. There are no amphora or

mortaria fragments present and there is a surprisingly small number of vessels in shelly fabrics, one of the most common fabric types throughout the Roman period particularly in north Bedfordshire, but also common further south. Large quantities were recovered from excavations at nearby Ruxox, where it made up just under 15% of the site assemblage, so its relative scarcity here is noteworthy (Parminter 2004, 494).

The pottery is in a very poor condition, abraded, fragmentary, and is likely to have been re-deposited. The consistent early Roman date for the assemblage suggests that there was a single source, possibly the middens of a nearby domestic settlement. A large number of contexts, at least fourteen, produced pottery that was covered in cessy accretions or iron staining. This may be due to the manuring, possibly in waterlogged conditions, or the original place of deposition from a midden.

5.3 **Roman ceramic building materials** by Anna Slowikowski

A small number of fragments of ceramic building material were recovered alongside the pottery from cultivation rows to the north of the stream. Six may be from fired clay 'slabs', sometimes called 'belgic bricks', of the type commonly found on late Iron Age or early Roman sites. Well preserved assemblages of these objects have been recovered elsewhere in Bedfordshire, they are often found on pottery production sites like those at Stagsden, and used as portable kiln furniture (Slowikowski 2000, 88). Their presence on domestic sites, however, suggest other uses, possibly as bake-stones for baking flatbreads or, in an agricultural context, as salt-licks for cattle (Slowikowski 2008, 278; Stead and Rigby 1089, 52).

Table 8: Quantification of the Roman ceramic building material

Description	Form	Sherd count	Weight (g)
Grog and sand	Slab	3	67
Grog	Slab	1	14
Organic	Slab	1	10
Sandy	Slab	1	15
Sandy	Roof tile	2	18

Two fragments of Roman roof tile were also present, represented by flat *tegula* in an orange sandy fabric.

5.4 **Roman glass** by Tora Hylton

There is a single fragment of Roman bluish-green vessel glass was recovered from the subsoil. Although the piece is basically undiagnostic, it does preserve features which suggest that it is a concave base sherd, possibly from a cup or bowl. The underside of the base sherd is worn with a pimply surface, the interior surface is smooth and there is evidence for a slight kick. Air bubbles are held within the matrix.

5.5 **Worked stone** by Andy Chapman

There is a roughly rectangular block of coarse-grained sandstone, possibly Millstone Grit, 100m long by 87mm wide and up to 50m thick, from the fill of ditch [561]. This may be a fragment from a quern, but all surfaces are worn and none are certainly original, indicating reuse after the breaking up of the original object.

5.6 **Post-medieval pottery** by Anna Slowikowski

The latest feature, ditch [561], was dated to the 16th-17th centuries by the presence of a single post-medieval Glazed Red Earthenware vessel comprising five sherds. The 18th-century Staffordshire slipware (P30) sherd is unstratified and comes from the topsoil.

Table 9: Post-medieval pottery fabrics

Fabric	Description	Sherd count	Weight (g)
P01	Glazed red earthenware	5	90
P30	Staffordshire slipware	1	1

5.7 **Post-medieval brick and tile** by Pat Chapman

There are eleven items in this assemblage, comprising six sherds of roof tile, two floor tile/brick sherds and the remains of three bricks, all from ditch [561].

Roof tile

The six sherds of roof tile are made from coarse sandy clay, mainly orange in colour with one reddish-brown with the occasional grog inclusion up to 13mm in diameter. These sherds are 12-15mm thick. One sherd has a complete round peghole, measuring 15mm by 20mm with the vestige of another peghole 25mm away. The complete hole is 55mm from the edge, and if the pegholes are equidistant it would indicate that the tile is about 165mm (6½ inches) wide, which would conform to the standard set up in the 15th century.

Floor tile and brick

The floor tile is about 25mm thick with a chamfered edge, made from coarse sandy orange clay. The top and bottom surfaces have both been lost. A brick, rather than a tile, was also probably used in a floor. It is 112m wide by 33mm thick, possibly cut in half longways, and in excess of 200mm long (4⅜ x 1¼ x at least 7⅞ inches). It is made from slightly coarse sandy reddish-brown clay. The top is worn down very smooth so parts of the core show through.

Bricks

Enough remains of the bricks to demonstrate the differences in size, although the lengths are not known. All three are heavily abraded and at least slightly overfired, which gives a cindery feel to the fabric. The largest is 116mm wide and 62mm thick (4¼ x 2½ inches) and made from dense fine orange-brown sand with occasional grog and gravel up to 20mm. The second brick is also 62mm thick and made from slightly coarse sandy clay fired to reddish-brown. The third brick seems to be quite small, only 62mm wide and 42mm thick (2½ x 1⅝ inches), made from coarse sandy reddish-orange clay with some gravel up to 10mm long. It has what appears to be a frog and the end is chamfered in the manner of a king closer, either to fit in a corner or as a decorative feature.

All these building materials could date from the 15th to 18th centuries, though they are probably later rather than earlier. These tiles and bricks bear some similarities to others from the excavations at Ampthill Castle and may include reused building materials (Chapman 2010).

5.8 **Post-medieval and modern finds** by Tora Hylton

There are two 19th-century buttons which were recovered from the subsoil. One is a stamped brass button with a sunken central panel containing four perforations. The outside edge of the button is marked with 'FIRMIN LONDON', a company which was established in 1677. The company moved to Birmingham in the late 19th century and they are still in business today as the leading supplier of uniforms, livery, badges and buttons for the royal household and military. The other button is less informative, it is copper alloy, plain and flat with a recessed underside from which the vestige of an eye protrudes.

6 FAUNAL AND ENVIRONMENTAL EVIDENCE

6.1 **Charred plant remains** by Karen Deighton

There were five 40 litre bulk samples which were collected by hand from charcoal-rich pits. This material was assessed to ascertain the presence, nature and level of preservation of plant remains.

The samples were processed using a modified siraf tank fitted with a 250micron mesh and flot sieve. The resultant flots were dried and examined under a microscope at 10x magnification. Identifications were made with the aid of the author's reference collection and published seed atlases (Schoch *et al* 1988; Cappers *et al* 2006).

Preservation

The condition of ecofacts was reasonable, only charred remains were present. All of the samples produced charcoal fragments which were large enough for further analysis.

Taxa present

Table 10: Ecofacts by sample and context

Sample	1	2	3	4	5
Cut/fill	512/511	514/513	205/204	529/528	559/558
Charcoal fragments	1,000+	1,000+	1,000+	1,000+	1,000+
Naked barley (*Hordeum vulgare*)	2	-	-	-	-
Indeterminate chaff	1	-	-	-	-
Small pulse	-	-	2	-	-
Fat hen (*Chenopodium album*)	3	10	4	-	-
Cleavers (*Galium aparine*)	-	1	-	-	-
Dock type (*Rumex* sp)	2	-	-	-	-

Discussion

Due to the paucity of material little can be gleaned about the horticultural economy of the site or its surrounding environment from the charred seeds. The wild taxa are all common crop weeds or plants from rough ground, which were possibly burned as refuse.

All of the samples produced charcoal fragments that were large enough for further identification and were subsequently passed onto a charcoal specialist for further analysis.

6.2 **Charcoal** by Dana Challinor

Samples were retrieved from five secure charcoal-rich Roman contexts (Table 11). Most of the sampled pits (4 of 5) were located within planting group C and thought to be clearance/burning between crops. The aim of the charcoal analysis was to test the hypothesis that the charcoal came from burning off-cuttings from along the cultivation rows.

The charcoal was sieved to ensure that a 2-4mm size range was represented. A selection of fragments (*c*20-30) were fractured and sorted into groups based on the anatomical features observed in transverse section at x7 to x45 magnification. Representative fragments from each group were then selected for further examination using a Meiji incident-light microscope at up to x400 magnification. The remaining charcoal and any charcoal from additional bags from the same sample were scanned at low magnification. Identifications were made with reference to Schweingruber (1990), Hather (2000) and modern reference material.

Results

All of the samples produced one positively identifiable taxon, *Quercus* sp. (Oak). No other taxa were recorded. Oak has a particular way of fragmenting along its large rays, which enables it to be distinguished fairly reliably from diffuse porous species at low magnification. This indicated that the assemblages were all overwhelmingly dominated by oak.

The preservation was generally good, with some large fragments, and only minor staining or infusion of sediment. The larger fragments were reasonably clear and it was possible to examine maturity with confidence. The distinction between heartwood and sapwood relies upon the presence (heartwood) or absence (sapwood) of tyloses. All samples contained fragments indicative of sapwood, and a few exhibited tyloses. No obvious roundwood from twigs, small branches or roots were noted. One piece of bark was recorded from pit [529], and some faint ring curvature was apparent on occasional fragments, consistent with large branchwood or fairly young coppiced stems.

Table 11: Charcoal from sieved samples

Sample	Cut/fill	Notes	*Quercus* sp. (oak)	Bark
1	512/511	Some faint curvature to rings, including sapwood	✓	
2	514/513	Quite large fragments, including sapwood & heartwood	✓	
3	205/204	Including sapwood & heartwood	✓	
4	529/528	Abundant charcoal, large fragments, including sapwood, heartwood, &large roundwood	✓	✓
5	559/558	Smaller assemblage than the others, with small fragments	✓	

Growth rates varied, with some larger (>8mm) fragments exhibiting only one growth ring, whilst others of a similar size were at least 12 years old. All of the samples produced fragments which showed narrow rings, characteristic of slow growth.

Discussion

The charcoal is consistent with the anatomy of the two native deciduous oak species (*Quercus robur and Quercus petraea).* Oak is the most common species recovered

from Romano-British contexts, and was exploited for many uses, including fuel. It is probable that oak woodlands were subjected to management through coppicing to provide large amounts of timber in a variety of forms. The presence of sapwood indicates that some immature wood and/or mature wood, with intact sapwood, had been burned. The evidence suggests trunkwood, rather than side branches which would be appropriate for trimmings. Given the limited distribution of charcoal between features (which excludes Iron Age pit [205]), the remaining fires may have burnt wood from the same source.

The charcoal is not representative of vines, nor is there anything in the record to suggest off-cuttings from other cultivation or general clearance. It seems likely that the charcoal is unrelated to the cultivation rows but since the Romano-British people commonly used oak as a fuel, for domestic, ritual and industrial uses, the activity which produced the assemblages cannot be determined from the charcoal record.

6.3 **Pollen** by Sarah Jones

Initial assessment evaluated the pollen concentration and preservation across the site, seeking identify samples with the greatest potential for further palynological analysis as the best means to determine to what extent the results indicated the possible crop being grown at the site.

Eight samples were taken from four monoliths and the best quality sample was selected (Row [535], 360-370mm depth). The further analysis increased the pollen count to 1000 TLP in order to increase the frequency of rare-types.

Laboratory procedure

Volumetric samples of 2ml, as opposed to the standard 1ml, were taken from 40-50mm and 360-370mm depth from each of the four monoliths. These samples were counted to 100 Total Land Pollen (TLP). The results of the initial assessment indicated that the sample from row [535] at 360-370mm depth had the greatest potential for further analysis given its central location within the site, together with an adequate concentration and preservation of pollen grains. Subsequently, a pollen sum of 1000 TLP was employed in this single sample to increase the reliability of the record of rare pollen type frequencies (Turner and Brown 2004). The pollen sum for this sample was based on the percentage of TLP, excluding obligate aquatics, spores and indeterminate grains. Percentages for these excluded groups were based on percentage TLP plus the sum of the relevant group.

Samples for pollen analysis were prepared using standard techniques (Moore *et al* 1991), including treatment with HCl to remove carbonates, HF digestion to remove silicates and acetolysis to digest organic matter. Prior to chemical digestion, all samples were passed through microsieves (aperture 10µ), a procedure that is especially effective in concentrating pollen grains in sediments of low primary pollen. A known quantity of *Lycopodium* spores were added to each sample to enable the calculation of pollen concentrations within the samples (Stockmarr 1971). The residues were mounted in safranin-stained glycerine jelly and analysed under a Leica DMR microscope at a magnification of x400, with critical identifications at x630 and, where necessary, under oil at x1000. In sediments where pollen concentration is too low to achieve a statistically significant count, the number of pollen grains to 100 *Lycopodium* spores is counted. Pollen was identified using standard pollen keys and type collections (Andrew 1980; Moore *et al* 1991). Plant nomenclature follows Stace (1997). The state of pollen preservation is referred to using the categories identified by

Jones *et al* (2007), such as corroded (biochemical deterioration) and degraded (chemical deterioration).

Results

The results of the initial assessment are presented in Table 12, and are expressed as actual pollen counts, excluding cultivation row [535] (360-370mm). In all but two of the samples (row [555], 360-370mm; row 547, 360-370mm), a pollen count of 100 TLP was achieved. Table 13 presents the results of cultivation row [535] at 360-370mm depth and these are expressed as a percentage of the Total Land Pollen sum (+1000 TLP). Corrosion and degradation of the pollen grains were noted in all of the pollen slides, and a high number of indeterminable grains were also recorded.

Row [535] at 40-50mm depth

Pollen preservation was moderate and relatively low pollen concentrations of 21470 grains/ml were recorded. The pollen assemblage was dominated by herbs. Grass and dandelion pollen was well-represented, together with other pollen taxa associated with grasslands, including ribwort plantain, dock, bedstraw, daisy and pinks. The assemblage also contained some tree and shrub pollen (<15 TLP), including alder, oak, *Corylus* t. (most probably hazel), lime and pine.

The results of the pollen data from the upper sample of row [535] appear to reflect a grassland dominated landscape, with limited stands of wood and scrub or distant woodlands also evident. The herbs recorded are more usually indicative of grassland and pastures, than of arable, disturbed or bare ground (Behre 1986).

Row [535] at 360-370mm depth

A pollen count of +1000 TLP was easily achieved in this sample. Pollen preservation was moderate, with difficulty in identifying pollen to species level in many cases due to degradation and corrosion of the pollen grains. A relatively high concentration of 35,073 grains/ml was recorded. The sample was dominated by herbaceous pollen taxa, which accounted for 90% TLP. Undetermined grass species formed a large proportion of this (65% TLP), together with a high representation of dandelion. (17% TLP), and other relatively well represented herbs, such as daisies and pinks, including marsh stitchwort. A variety of herbaceous taxa reflecting both pastoral and arable weed species were also recorded at values of <1% TLP, including goosefoot, thistle, common knapweed, sedges, bedstraw, scabious, ladys mantle, ribwort and hoary/greater plantains, cinquefoil, primrose, crowsfoot, pheasants eye, mustard, corn buttercup, dock and umbellifers. Cereal pollen was also recorded, albeit at <0.4% TLP and badly degraded. Tree and shrub pollen comprised 10% TLP, with values of *c*4% TLP recorded for alder and hazel, whilst birch, pine, oak, willow, lime and wild privet were also recorded in low percentages. Spores and aquatics were present, with ferns comprising 4% TLP, together with low percentages of duckweed, common bulrush, bracken and ferns.

The pollen spectra in the basal sample from cultivation row [535] reflect a largely open landscape. Low percentages of cereal pollen, together with other herbs associated with cultivation and bare or disturbed ground suggest that limited cultivation was taking place in the vicinity of the site. Other herbs indicative of pastoral farming practices were present in much greater percentages, especially dandelion, which is commonly associated with grazed or closely mown grasslands. Dandelion is particularly robust windblown pollen and is easily distinguishable even when damaged. There is evidence that limited mixed scrub and deciduous woodland areas persisted nearby.

Row [209] at 40-50mm and 360-370mm depth

Moderate pollen preservation was recorded for this sample, with relatively high pollen concentrations of *c*40,000 grains/ml throughout. The pollen assemblage from this sample is similar to that of row [535], dominated by grass pollen, together with a high representation of dandelion. Other herbs recorded include plantains, thistles, heather and cabbage. Tree and shrub pollen are present, and this is where the most notable difference is recorded. At 360-370mm depth a much higher representation of tree and shrub pollen is recorded than in any of the other samples from the site, comprising 48 TLP. Hazel is the most abundant, whilst alder, oak and lime are also well-represented. Corrosion of the surface of, in particular, the lime pollen grains was noted.

Cultivation row [209], at the southern edge of the site reflects a similar landscape to that indicated in row [535], although with a higher representation of tree and shrub pollen. This may be a result of preferential preservation due to differing sand and clay substrates. However, it is possible that the location of this trench may have been in closer proximity to woodland and scrub remaining in the area.

Row [547] at 40-50mm and 360-370mm depth

The pollen in both levels from this sample was poorly preserved and pollen concentrations were low, falling to 3,136 grains/ml at the base of the sequence, and a count of 100 TLP could not be achieved in this level. Herbaceous pollen dominated the pollen assemblage with grass and dandelion comprising the majority of the pollen count. Other herbs recorded include sedges, cabbage, goosefoot, plantain, daisies and pinks, the pollen grains of the latter being particularly badly corroded. Fern and bracken spores were also recorded, whilst tree and shrub pollen were limited, with only hazel and sycamore.

Row [555] at 40-50mm and 360-370mm

Pollen preservation and concentration was poor, with 2,359 grains/ml being recorded in the lower sample, based on a pollen count of only 19 TLP. The pollen assemblage was similar to that in row [547], although pollen with resistant exines appears to have been better preserved in this sequence, including dandelion and fern or bracken spores (Havinga 1964).

Cultivation rows [547] and [555] are located in group D and are in close proximity to each other. The upper and basal samples from both these trenches appear to have suffered from pollen preservation and distribution problems, with reduced pollen counts being recorded at the base of the monoliths and a greater number of pollen grains and spores commonly regarded as more resistant to the processes of degradation being recorded.

Discussion

Despite the palynological evidence for viticulture from a similar site at Wollaston, Northampton (Brown and Meadows 2000), the pollen-analytical data from Ampthill is insufficient to indicate the presence of a vineyard, with no record of *Vitis* t. (grape) pollen in any of the samples, particularly that of cultivation row [535] where the pollen count was increased to 1000 TLP. Palaeoecological evidence for viticulture is particularly difficult to detect, with results of previous studies suggesting substantial on-site variation in concentrations of *Vitis* pollen, together with the under-representation of *Vitis* t. in pollen diagrams and the loss of pollen due to preservation problems as a result of pedological processes (Brown *et al* 2001). However, a broadly comparable landscape to that recorded at Wollaston is recorded, dominated by grasses and dandelion, suggesting that the ground locally was grassland and is likely

to have formed an understory to the crop being grown. Limited arable cultivation and woodland or scrub may also have persisted on the boundaries of the site.

Limited conclusions may be drawn from the pollen analyses regarding the type of crop grown. None of the pollen assemblages are representative of crop cultivation. Although the pollen concentration was generally good, the state of pollen preservation across the site was variable with particularly robust pollen grains distorting the overall results. Given the inorganic nature of the samples from Ampthill and the preservation problems identified, it is likely that pollen from the cultivated plants simply does not survive. However, given the potential significance of the site and the lack of other demonstrable Roman vineyard sites, the present analysis has been a worthwhile contribution towards understanding cultivation in Britain during the Roman period.

Table 12: Pollen data expressed as counts

Cultivation row	**535**	**209**	**209**	**547**	**547**	**555**	**555**
Sample depth (mm)	**40-50**	**40-50**	**360-370**	**40-50**	**360-370**	**40-50**	**360-370**
Pollen type							
Trees and Shrubs	**12**	**8**	**49**	**2**	**1**	**3**	**3**
Acer pseudoplatanus (Sycamore)	-	-	-	-	1	-	-
Alnus glutinosa (Alder)	3	6	10	-	-	1	-
Betula (Birch)	-	-	1	-	-	-	-
Corylus t. (Hazel)	3	1	23	2	-	2	1
Pinus (Pine)	1	-	-	-	-	-	1
Quercus (Oak)	3	1	10	-	-	-	1
Tilia (Lime)	2	-	5	-	-	-	-
Herbs	**89**	**109**	**62**	**114**	**27**	**94**	**16**
Cyperaceae und. (Sedges)	-	-	-	1	-	-	-
Lactuceae und. (Dandelions)	19	15	7	28	16	62	8
Poaceae und. (Grasses)	63	90	52	75	11	29	7
Asteraceae und. (Daisies)	5	1	-	2	-	4	1
Brassicaceae und. (Cabbages)	-	-	1	1	-	-	-
Calluna (Heather)	-	-	1	-	-	-	-
Caryophyllaceae und. (Pinks)	-	-	-	5	-	2	-
Chenopodiaceae und. (Goosefoot)	-	-	-	1	-	-	-
Cirsium (Thistle)	-	1	-	-	-	-	-
Galium t. (Bedstraw)	1	-	-	-	-	-	-
Plantago lanceolata (Ribwort Plantain)	1	2	1	1	-	-	-
Rumex und. (Dock)	-	-	-	-	-	-	-
TLP	**101**	**117**	**111**	**116**	**28**	**100**	**19**
Lycopodium (Club mosses)	59	39	34	85	112	200	101
TLP conc per ml	**21470**	**37626**	**40946**	**17116**	**3136**	**6271**	**2359**
Pteropsida (Ferns)	**3**	**1**	**-**	**3**	**-**	**9**	**-**
Polypodium (True ferns)	3	1	-	1	-	4	-
Pteridium (Coarse ferns/bracken)	-	-	-	2	-	5	-
Pteropsida monolete und.	-	-	-	-	-	-	5
Charcoal	-	-	-	-	-	1	-
Indeterminate grains (Total)	**7**	**12**	**11**	**10**	**3**	**18**	**6**
Corroded	2	5	4	3	-	6	2
Degraded	1	5	5	5	1	8	3
Crumpled	4	2	2	2	2	4	1

Table 13: Pollen data from row 535 at 360-370mm depth, expressed as a percentage of the Total Land Pollen sum (1000+ grains) with values under 0.4% shown as +.

Cultivation row	**535**		**535**
Sample depth (mm)	**360-370**		**360-370**
Pollen type		**Pollen type**	
Trees & Shrubs	**10**	*Potentilla* (Cinquefoil)	+
Alnus (Alder)	4.3	Primulaceae und. (Primroses)	+
Betula (Birch)	+	Ranunculaceae und. (Crowfoot)	+
Corylus t. (Hazel)	3.6	*Ranunculus arvensis* (Corn Buttercup)	+
Ligustrum vulgare (Wild Privet)	+	*Rumex* t. (Dock)	+
Pinus (Pine)	+	*Scabiosa* (Scabious)	+
Quercus (Oak)	1.0	*Sinapis* t. (Mustard)	+
Salix (Willow)	+	*Stellaria palustris* (Marsh Stitchwort)	+
Tilia (Lime)	0.5	**TLP (actual count)**	**1099**
Cultivars	**+**	*Lycopodium* (Club mosses)	393
Cereals	+	**TLP conc per ml**	**35073**
Herbs	**90**	**Aquatics**	**+**
Cyperaceae und. (Sedges)	0.4	*Lemna* (Duckweed)	+
Lactuceae und. (Dandelions)	17.3	*Typha latifolia* (Common Bulrush)	+
Poaceae und. (Grasses)	65.0	**Pteropsida (Ferns)**	**6.2**
Adonis aestivalis t. (Pheasants Eye)	+	*Polypodium (True ferns)*	1.5
Alchemilla (Ladys Mantle)	+	*Pteridium (Coarse ferns/bracken)*	0.5
Apiaceae und. (Umbellifers)	+	Pteropsida monolete und.	4.0
Asteraceae und. (Daisies)	2.5	Pteropsida trilete und.	+
Caryophyllaceae und. (Pinks)	1.5	Charcoal	0.6
Centaurea nigra (Common Knapweed)	+	**Indeterminate grains (Total)**	**6.9**
Chenopodiaceae und. (Goosefoot)	+	Corroded	1.4
Cirsium t. (Thistle)	+	Degraded	2.0
Galium t. (Bedstraw)	+	Broken	+
Plantago lanceolata (Ribwort Plantain)	+	Crumpled	2.4
Plantago media/major (Hoary Plantain)	+	Concealed	1.0
Plantago und. (Plantains)	0.5		

7 DISCUSSION

Although preliminary evaluation suggested that Bronze Age to Saxon remains were likely, the subsequent excavations have demonstrated that archaeological features within the development area fall within a much tighter chronology, between the late Iron Age and Roman to the 2nd century. All of the pottery previously identified as Bronze Age or Saxon in date has been checked for reference purposes and is considered to be a combination of highly abraded Roman material with occasional late Iron Age sherds.

The principal features that were uncovered in each of the excavated areas were minor boundaries and features of agricultural origin, mainly bedding trenches, with a few ditches and pits containing burnt waste. There was a marked absence of domestic activity, structural features, or artefacts indicative of structures, such as ceramic building materials, fired clay, daub or worked stone which is usually expected on Roman sites of the 2nd century. All of the pottery was in extremely poor condition, abraded, with many inclusions replaced by voids. Such pottery was consistent with material that had been mixed with manure, and in some cases it still retained cessy accretions.

Features that were identified as bedding trenches were laid out in parallel lines and divided into distinct compartment groups. The bases of such were deeply convoluted as a result of root activity. The nature of the crop is, however, less certain. The grouping of cultivation rows was based on the plan layout and used during the post-excavation analysis in an unsuccessful bid to identify a chronology of development by pottery analysis or identify any possible differences in the type of crop grown using seed, pollen and charcoal samples. The pottery evidence seems to have been of contemporary date across the site, the latest fabrics were of 2nd-century origin with a high residual content, probably the result of midden clearance. There was no evidence from the environmental samples to discern differentiation in the planting groups or the specific crop that was grown. Charcoal analysis demonstrated that the four charcoal-rich pits within group C were probably not associated with the planting since they produced solely oak charcoal. There was no evidence for trellis style supports or posts and the use of oak timber for this purpose would have been unusually expensive.

A similar site with parallel cultivation rows was excavated at Wollaston, Northamptonshire (Meadows 1996; Brown and Meadows 2000; Brown *et al* 2001). The dating evidence from the two sites compare favourably, lying in the late 1st to early 2nd-centuries. The bedding trenches at Wollaston were generally 0.85m wide by 0.30m deep and distanced at 5m intervals. The fill material, like Ampthill, contained a darker zone towards the base indicative of root hollows that were often uneven and convoluted, particularly along the centre. The base of the bedding trenches at Wollaston also exhibited evidence for postholes, *c*150mm wide by up to 150mm deep. An estimate of the distance between root concentrations suggested that plants had been set at 1.5m intervals. Such an estimate was not possible to obtain at Ampthill, since the root concentrations were far less predictable. However, assuming that they were similar, then the excavated area at Ampthill would have contained *c*4.6km of cultivation rows containing *c*3100 individual plants. On this basis the plantation probably had a distinctly commercial context and perhaps explains the fairly large scale of development that the site underwent in the early 2nd century.

Initial planting at Ampthill seems to have taken place within existing late 1st-century fields, demarcated by a sparse distribution of ditches. It is likely that these were associated with nearby settlement, as would have been expected for the late Iron Age

to early Roman kilns to the south (HER 6743). The first Roman planting groups may have been a short term measure, left to grow for up to a decade or so, to test the viability of growing a certain cash crop. Once the plants demonstrated the ability to grow in the soil then it would seem that a much larger area was planted soon thereafter. Digging *c*4.6km of bedding trenches would have been a massive labour task. There was no evidence for domestic occupation of the site, but temporary fires may have been laid by the labour force for breaks and meals. The examination of charcoal rich pits demonstrated that the wood that was burned was exclusively oak, and that it was burned as logs. Such fires are typically domestic in character and, a marked anomaly for the site.

The commercial venture seems to have failed at Ampthill, as the abrupt cessation of pottery deposition before the late 2nd century marked an early demise for manuring, whereas many Roman sites in Britain continued in use well into the 3rd century. Given the otherwise flourishing economy at the time, the reason is likely to have been more localised and is not immediately explicable.

The type of cash crop grown at Ampthill remains uncertain, but viticulture is amongst the most plausible explanations. Given the variable geology of the site at Ampthill and the unknown local variations of the water table over the last 2000 years, it was not known if pollen would survive in sufficient quantities to identify the crop. An assessment of four monoliths was made that confirmed a generally moderate level of preservation, but highlighted that most concentrations were fairly low and dominated by the more common and robust windblown species. Since initial assessment did not indicate a particular crop, it was decided on the basis of the work at Wollaston, to take the best sample and increase the count to 1000 TLP in order to search for rare and less robust species, such as *Vitis* t. (grape) pollen, which may have otherwise been missed. Horticultural practise of a specialised nature was the most explicable origin of the cultivation rows, however, no species were identified that could confirm vineyard cultivation or, indeed, any alternatives.

It has been argued that the parallel site at Wollaston represented a vineyard, bearing similarity to the ancient wine producing regions of France and Italy (Brown *et al* 2001). According to the edict of Emperor Probus (AD270), viticulture was already employed in Britain by the 3rd century (*Historiae Augustae*, Probus, 18.8). At Wollaston *Vitis* t. (grape) pollen was successfully identified. The method of cultivation used was *pastinatio*, as described by the classical writer, Columella (*De Re Rustica*, 4.25, 424-7). The method was later further described by Pliny who further described the preparation of the trenches, the training of the vine, and also discussed those vines that support themselves (*Natural History,* XVII, 35). Pliny also noted that it was advantageous to separate different species of vine and to set them into different compartments, as the mixture of species was apt to deteriorate the flavour of the wine. A variety of methods were employed for training the vines, amongst which were both unsupported vines allowed to train along the ground and those encouraged to form a head, a small self-supporting bush that was three feet in height (White 1970, 231). Other methods employed a variety of stakes, yokes, trellises, palisades and pergolas, which did not necessarily require substantial or even permanent post supports and these varied between 4-7 feet in height (*ibid*, 232-236). On the continent it was commonplace to plant the area between cultivation rows with a low canopy crop such as beans or root vegetables. Pollen samples from both Wollaston and Ampthill corroborate that the area between cultivation rows was probably weeded and allowed to lie fallow either as close cut grass or bare earth, allowing the maximum absorption of heat into the earth during the day. The distance of up to 7m between rows ensured that the shadow of any potential vine, *c*2m high, would not be cast on the neighbouring rows at any time of the day. However, it is not clear how the aspect and drainage

would have affected the quality of the wine. It is a fact of the Moselle valley in France that the finest wines are produced from the vineyards on the steep inside bends of the river (*ibid,* 231). Perhaps the vintages of Ampthill were somewhat lacklustre towards the palate.

In addition to the argument for vineyard cultivation, the classical texts of Pliny (after Columella) also offered two other alternatives that used trench cultivation, both taking advantage of poorly draining ground. In regions where viticulture was prevalent it was commonplace to grow willow staves in prepared bedding trenches in order to provide the vine supports (*Natural History,* XVII, 32; *De Re Rustica*, 4.30). For this purpose such trenches were two and a half feet deep (0.76m). Willow was a useful commodity for many other things such as wickerwork and wattle. Viticulture would have been only one example of a consumer market. The other alternative that Pliny offered was that of reed beds (*Natural History,* XVII, 33; *De Re Rustica*, 4.32). In this instance the trenches were three quarters of a foot in depth (0.23m). However, neither example satisfactorily explains the considerations of drainage, airflow and shade that the orientation and layout of the cultivation rows at Ampthill demonstrate.

This site is a good example of Roman cash crop plantation agriculture, but lacks the defining evidence to place it firmly within the context of viticulture or its alternatives.

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