



**Northamptonshire
County Council**

Northamptonshire Archaeology

Archaeological Evaluation (Geophysical Survey
and Trial Trenching Phases)

Ellands Farm, Hemington, Northamptonshire
May-June 2005



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Report 05/107

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QUALITY CONTROL

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OASIS REPORT FORM

PROJECT DETAILS		
Project title	Archaeological Evaluation (Geophysical Survey and Trial Trenching Phases), Ellands Farm, Hemington, Northamptonshire	
Short description (250 words maximum)	An extensive area of Roman and Iron Age occupation was revealed by selective detailed geophysical survey and trial trench excavation on land proposed for a windfarm development. The Roman settlement was dated to the 1st and 2 nd centuries and characterised by a large number of sub-rectangular enclosures covering an area of at least 3 ha. The adjacent Iron Age settlement, which was not identified by the geophysical survey, was characterised by shallow gullies and other small features, and was not tightly defined. The finds from both occupations were unexceptional and suggest modest agricultural establishments. There were a few undated features and extensive furrows probably relating to medieval cultivation.	
Project type (eg desk-based, field evaluation etc)	Geophysical survey and trial trench evaluation	
Previous work (reference to organisation or SMR numbers etc)	Archaeological desk-based assessment in 2005 (with references)	
Future work (yes, no, unknown)	Unknown	
Monument type and period	Romano-British settlement enclosures, Iron Age occupation	
Significant finds (artefact type and period)	Iron Age and Roman pottery and animal bone, several quernstone fragments.	
PROJECT LOCATION		
County	Northamptonshire	
Site address (including postcode)	Ellands Farm, Hemington, Northamptonshire	
Easting (use numeric 100km grid square no.)	5084	
Northing	2846	
Height OD	70m OD	
PROJECT CREATORS		
Organisation		
Project brief originator	Northamptonshire County Council Archaeology Officer	
Project Design originator	Northamptonshire Archaeology	
Director/Supervisor	Steve Morris	
Project Manager	Andy Mudd for Northamptonshire Archaeology	
Sponsor or funding body	Haskoning UK Ltd for Enertrag UK Ltd	
PROJECT DATE		
Start date	23 rd May 2004	
End date	9 th June 2004	
ARCHIVES		Content (eg pottery, animal bone etc)
Physical	Pottery, bone, quern stone	1 box pottery, 1 box bone, 1 box miscellaneous
Paper	Contexts, registers Plans, sections	1 file 5 plan sheets 6 section sheets
Digital	Report, illustrations	

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**ARCHAEOLOGICAL EVALUATION (GEOPHYSICAL SURVEY AND TRIAL
TRENCHING PHASES)**

ELLANDS FARM, HEMINGTON, NORTHAMPTONSHIRE

MAY-JUNE 2005

ABSTRACT

An archaeological evaluation was undertaken in May and June 2005 on the site of a proposed group of six wind turbines near Hemington, Northamptonshire. Twenty-five trenches, each 50 m long, were excavated over the 50 ha site. Two main areas archaeological of features were discovered. One Roman area, largely comprising linear ditches and gullies representing a concentration of enclosures covering c 3 ha, was dated to the 1st and 2nd centuries AD. Finds included rotary quern and mortar fragments, charred cereals and animal bones. To the east, a less well-defined area of Iron Age occupation also was identified, comprising mostly curvi-linear gullies, shallow pits and postholes, but including Roman ditches and gullies. The Iron Age occupation is not closely datable but the pottery is characteristic of the middle to late Iron Age. A few undated linear gullies/ditches were identified outside these two areas, but generally features and finds were sparse. Probable medieval furrows were identified extensively across the site.

1 INTRODUCTION

Northamptonshire Archaeology was commissioned by Haskoning UK Ltd, on behalf of Enertrag UK Ltd, to undertake an archaeological work on land at Ellands Farm, Hemington, Northamptonshire in support of a planning application for a group of six wind turbines. The current work forms part of a programme of archaeological survey contributing to an Environmental Impact Assessment for the scheme. The site occupies about 50ha in two large arable fields south-west of the village of Hemington, on the south side of the Barnwell to Hemington road (NGR TL 084846; Fig 1).

The scope of work was set out in a brief issued by Myk Flitcroft, Team Leader of NCC's Historic Environment Team (NCCHET). The work was carried out in May and June 2005 in accordance with approved specifications produced by Northamptonshire Archaeology (NA 2005a, 2005b).

The archaeological work entailed the progressive stages of geophysical reconnaissance survey, detailed geophysical survey and targeted trial trenching. The geophysical reconnaissance covered an area of 29ha around the locations of the proposed turbines. This was followed by detailed magnetometer over 6.8ha, largely where magnetic anomalies had been recorded. A total of 1250 linear metres of trenching (25 trenches, each 50m long) were then excavated, targeted on recorded features and blank areas.

2 TOPOGRAPHY AND GEOLOGY

The site lies on open cultivated farmland on a south-east facing slope overlooking Alconbury Brook, a small stream which drains eventually into the Great Ouse to the south-east. The land lies at between 50 and 70 m OD between the villages of Hemington and Thurning to the south and Barnwell to the west. The underlying geology is Boulder Clay (*Geological Survey of Great Britain (England and Wales) Sheet 171 (1989)*). Excavation showed this to vary in colour from blue/grey to yellow and orange, and contain mixed yellowish brown gravel, fragmented flint nodules, chalk pebbles and silty patches throughout the trenches

At the time of fieldwork the land was under a low crop of barley.

3 PREVIOUS ARCHAEOLOGICAL WORK

An archaeological desk-based assessment was undertaken by Northamptonshire Archaeology in September 2004 (NA 2004). This identified prehistoric (probably Iron Age) and Roman sites, comprising one or more ditched enclosures and other features, identified from aerial photographs, within the proposed development area. One of the proposed wind turbines was located on the Roman cropmark site. Surface collections of Roman finds had been made nearby, and a Roman road was also suspected to lie in the area.

4 GEOPHYSICAL SURVEY

Methodology

The specification proposed a two-phased survey encompassing geophysical reconnaissance by gradiometer ‘scanning’, to be followed by detailed magnetometer survey (NA 2005a). The reconnaissance covered an area of about 29ha located mainly around the proposed turbine locations, but extending more widely on the western side of the site where the DBA had suggested archaeological features to be present.

The detailed magnetometer survey was undertaken over 6.8ha, examining both magnetic anomalies and apparently blank areas.

Reconnaissance survey

The ‘scanning’ was carried out utilising three magnetometers – a pair of Bartington Grad601-2 fluxgate gradiometers and a Geoscan FM256 fluxgate gradiometer. Gradiometer reconnaissance survey was carried out by three operators walking parallel traverses 20m apart. The instruments were constantly monitored for magnetic anomalies which exceeded +/-3nT. Such anomalies

were tested for shape (i.e. level of linearity or discreteness) and the likelihood of it being surface ferrous or ceramic waste flagged and subsequently plotted using GPS (Fig 2).

Gradiometer survey

All detailed magnetometer survey was undertaken using either two Geoscan FM36 and FM256 fluxgate gradiometers or a pair of Bartington Grad601-2 fluxgate gradiometers, to maintain data consistency. Unlike the single sensor Geoscan models, the Grad601-2 is constructed as a dual-sensor instrument with two vertical gradiometers separated on a yoke to enable two lines of survey to be recorded in tandem.

A total of 75.5 separate 30m x 30m grid-squares, totalling c6.8ha over five areas, were surveyed in detail (Fig 3). Each grid square was traversed at rapid walking pace in zigzag traverses spaced at 1m intervals. Four readings were automatically recorded per metre, every 0.25m along the traverse. All fieldwork was carried out in accordance with English Heritage and the Institute of Field Archaeologists Guidelines (EH 1995; Gaffney, Gater and Ovendon 2002).

The data was analysed using Geoplot 3.00p software. Low (negative) magnetism is shown as white and high (positive) magnetism as black in the resultant greyscale plots. To avoid the introduction of bias, minimal processing was carried out on the data. The 'Zero Mean Traverse' function was applied in order to bring the average level of each line of data into a balanced zero. Due to drag introduced in operator walking by high crop growth it was necessary to utilise the 'de-stagger' function on several data grids in order to realign mismatched anomalies.

The processed data is presented here in the form of greyscale, highlighting the weaker magnetic anomalies (-3.0nT / +3.0nT scale, Fig 3) and interpretive plots (Fig 4) and are referred to directly in the following Survey Results section. The traditional stacked trace plots have not been included as they would serve only to highlight the paucity of response in majority of areas when compared with those from Area A.

Survey results

The reconnaissance survey determined a large amount of magnetic activity in the vicinity of the crop marks around Turbine 5. These anomalies appeared likely to follow the linear features identified in aerial photography. A wide spread cluster of anomalies were located south-west of Ellands Farm and another south of Turbine 4. Only a single anomaly was scanned in the vicinity of Turbine 2.

Detailed survey was carried out in five blocks *A-E*, totalling c6.8 ha (Figs 3 and 4).

Survey of *Area A* revealed a complex of positive magnetic anomalies, the majority of which were linear or curvi-linear in shape and are likely to reflect buried ditches. A parallel pair of particularly magnetic linear anomalies was identified orientated north-west through the area, approximately 10m apart. These features may represent the side-ditches of a road or track way, around which a small settlement appears to have been established. The majority of this 'settlement' would appear to be laid out co-axially to the north-east with ditches dividing into a checkerboard pattern surrounded by a larger ditch (north-west).

Area B suffered from a great deal of magnetic interference due to the proximity of a steel turkey shed to the north-east and large amounts of ferrous waste in the plough soil adjacent to Ellands Farm. Frequent noisy magnetic readings due to iron debris in the soil were located through out the survey and the deeper buried, weaker examples of these were undoubtedly detected during the scanning phase.

Survey of *Area C* detected no anomalies of significance other than enhancement near to an electricity transformer and several points of iron debris.

Area D was surveyed around proposed Turbine 4. Intense dipolar anomalies indicating a linear pipeline was detected orientated north-west towards Ellands Farm. A linear anomaly, possibly a ditch was located to the west of a number of more discrete anomalies that may reflect a group of pits and short lengths of ditch. An intense anomaly possibly representing a keyhole-shaped kiln was detected towards the centre of the area. Two highly positive and negative anomalies to the south may reflect waste from this.

Little of interest was identified in *Area E* other than slight positive banding orientated south-east, believed to represent ridge and furrow cultivation.

5 TRIAL TRENCHING AIMS AND METHODS

Aims

The trenching was designed to characterise the nature, survival and the extent of the potential archaeological remains identified by geophysical survey and aerial photography, and to assess the potential for other areas to contain archaeological deposits.

The trenching also aimed to provide sufficient information to help develop any further mitigation measures which may be needed in the areas to be affected by the proposed development.

Methods

A total of 25 trenches were requested by NCCHEM, targeted mainly on potential archaeological features identified by crop marks and the geophysical survey (Fig 5).

Fields 1 and 2 contained 21 and 4 trenches respectively. The trenches were located on the site of or near the six proposed wind turbines (numbered 1 to 6 on Fig 2), and also on the routes of the interconnecting cables. Turbine 1 was located in Field 2 with four trenches (Trenches 19 to 22). Turbines 2 to 6 were located in Field 1, with Trenches 1 to 18 and 23 to 25. All the trenches were 50m long by 2m wide, the exceptions being Trenches 8 and 20 which were 34m long, due to the proximity of overhead electric cables. Features within each trench were numbered using the trench number as a prefix (Ditch 410 being Ditch 10 in Trench 4, Ditch 1117 being Ditch 17 in Trench 11, etc.).

The removal of the topsoil and other overburden was carried out by a wheeled 360-degree mechanical excavator fitted with a 2m wide toothless ditching bucket, operating under archaeological supervision. In all trenches mechanical excavation proceeded as far as the surface of the natural substrate (at a depth of 0.34-0.80 m), there being no archaeologically significant horizons above this level. Subsoil was a continuous deposit throughout the trenches. It consisted of yellowish to orange brown loamy clay with thickness of between 0.15 m and 0.65 m. Most features were sealed directly by the subsoil. The topsoil generally consisted of a dark-yellowish brown or dark brown loam.

All potential archaeological features were examined by hand excavation, normally by cutting a section through them (nominally 1m wide in the case of linear features, and half sections in the case of discrete features). Standard Northamptonshire Archaeology single context recording procedures were employed.

The trenches and spoil were scanned using a metal detector at regular intervals. Most of the metal finds from the site were retrieved in this way. There was a general paucity of metal finds (of any date) from such a large area.

6 EXCAVATED EVIDENCE

General

Subsurface features were encountered in 16 of the 25 trenches excavated. Most features were ditches and gullies, although there were also a few pits and post-holes. Nine trenches were devoid of any archaeological features. Features were present in fifteen trenches in Field 1 (Trenches 1, 3-8, 10, 11, 12, 13, 15, 23, 24 and 25); and one trench in Field 2 (Trench 20).

Features were concentrated in the area around and to the north-east of Turbine 5, as predicted from the Desk-Based Assessment and geophysical survey (Trenches 1, 4, 5, 6, 15 and 25). These formed an orthogonal pattern of enclosures which were confirmed to be Roman and provide the site's main archaeological interest. The cropmark evidence of a boundary ditch was also confirmed by Trench 11 further north-east. More unexpectedly, in this trench and in trenches 12 and 13 (Turbine 4), a number of shallow gullies and pits were discovered. The dating evidence indicates that a number of these were Iron Age, but there were also Roman ditches.

A few undated gullies and two postholes were found in Trenches 7, 8 and 10 around Turbine 6, but these are of minor significance. The other trenches revealed little of importance, the minor linear gullies perhaps relating to medieval or later agriculture, along with evidence of medieval ridge and furrow cultivation which was common in the trenches on the higher ground. There were no features in the trenches around Turbine 3.

In the following description attention is paid to the more significant groups of features, principally those containing dating evidence and those which were more clearly elements of a recognisable pattern. Other features are not described in the main body of this report, but a full context inventory is presented in Appendix 1. The terms 'ditch' and 'gully' are employed following common usage where a gully is understood to be a small ditch. There has been no attempt to differentiate the two by measured criteria.

Archaeological Features

Field 1, Turbine 5 (Fig 6)

The most significant and extensive features were present in Trenches 1, 4, 5, 6, 15 and 25 around and to the north-east of proposed Turbine 5. The archaeological features consisted of a number of ditches, gullies and two pits and post-holes. Trenches 2, 3 and 16 on the periphery of this group contained plough furrows, and four undated shallow gullies were found in Trench 3. These were on the same alignment as the furrows.

Most of the features were ditches and gullies. They were mostly aligned NW-SE and NE-SW. The cropmark and geophysical survey plot make it clear that there is a block of enclosures and a major linear boundary in this area. The ditches and gullies found in the trenches confirmed several of these features. The gullies were generally steep-sided, rounded or flat-based features, approximately 0.45m to 1.10m wide and 0.15m to 0.38m deep. The ditches were larger, but not massive. The majority were U-shaped or broad and flat-based, between 0.9m to 2.08m wide, with depths of 0.20m to 0.64m, but some were larger.

Several ditches can be identified with those on the cropmark and geophysics plots, and this provides a basis for linking them between trenches. Ditch [112] in Trench 1, coincided closely with a cropmark and appeared to represent the westernmost boundary to this complex. This ditch was 0.64 m deep and contained 1st-century Roman pottery. The slightly shallower ditch to the south-east [105] did not show on the cropmark or geophysical plot, although there is a faint linear feature on this alignment to the north which can be identified with Ditch [508] in Trench 5. At the south-eastern end of Trench 1, Ditch [110] (0.56 m deep) coincided with a ditch on the geophysical survey (Fig 11 Section 2; Plate 1). This contained a large assemblage of pottery of the later 2nd century AD and charred material suggesting nearby domestic occupation (Appendix 2 and Table 2). It cut a possible earlier ditch [114].

Trench 4 has a similarly aligned NE-SW Ditch [406] (re-cut Ditch [410]) coinciding with a crop mark and geophysics anomaly (Fig 11 Section 1; Plate 2). This may form the south-eastern side of this enclosure. The original ditch [406] was 1.25 m deep and the recut slightly smaller at 1.10 m. Associated pottery suggests that [406] can be dated to the late 1st or early 2nd century AD, while [410] is more securely 2nd century in date. There was a shallower gully [404] further south-east but no other features.

The features in the interior of this enclosure (Trench 25) seem to confirm the detail of the geophysical survey which shows a smaller enclosure here (Fig 9). This would appear to be

represented by two pairs of ditches [2514]/[2522] and [2504]/[2507], probably dating from the 1st century AD. There were also two shallow interior pits [2510] and [2520], without finds.

To the north-east there is a clear, large rectangular cropmark enclosure. Its north-western boundary corresponds closely to Ditch [506] in Trench 5, which was 0.70m deep, although it is not clear what this relates to on the geophysical plot. Gully [510] ran approximately at right-angles to it. Ditch [506] may be linked to Ditch [1509] in Trench 15 on the north-eastern side of the enclosure. Ditch [1509] was, however about twice the size of Ditch [506] (Fig 9 & Fig 12 Section 3). A number of smaller gullies in Trench 15, which lie outside the enclosure, indicate that there was further activity in this direction. It is possible that some of these gullies were beam-slots, while their orientations indicate more than one phase (Fig 9).

To the north of this enclosure, the boundary ditch [604] in Trench 6 was the largest of the ditches. It was 3.90m wide and over 1.60m in depth, with a projected base at about 1.8m (Fig 10 & Fig 13 Section 4). It contained pottery dating from the mid 1st century AD. The ditch appears to be the same as Ditch [1113], [1117] and re-cut [1115] in Trench 11 to the north-east (Fig 10 & Fig 13 Section 5; Plate 3). This group of ditches in Trench 11 were, however, considerably shallower. The Iron Age pottery from the lower fill of [1117] suggests an Iron Age origin to this group of features.

There were a large number of other features in Trench 6 (Fig 10) most of which were not examined. These lie both inside and outside the small cropmark enclosure, and, as with Trench 15, it is apparent that occupation is more widespread than the cropmark and geophysical evidence indicates.

Turbine 4 (Fig 7)

Archaeological features were found in trenches 12 and 13 to the south-west of the proposed turbine location, and Trench 11 to the north-west. Trench 14 did not contain any archaeological features.

As well as the re-cut boundary ditch [1113]/[1115]/[1117] in Trench 11, there was a group of three, shallow, intercutting gullies and several small pits and post-holes (Fig.10). Pit [1111] contained fire-cracked pebbles (Plate 5). There was Iron Age pottery from Gullies [1107] and [1109] and Posthole [1105]. These features would seem to be related to a roundhouse of probable Iron Age date. There were also several gullies in Trenches 12 (Fig 9) and 13 (Fig 10) ([1206], [1220], [1304], [1306], [1308]) together with several pits ([1204], [1215], [1217],

[1219]) (Plate 6). These would also appear to indicate Iron Age occupation here.

There were also three Roman ditches in these trenches, [1208], cut by [1315] and [1310]. Ditch [1208], which at 0.45m was the deepest feature, appears to relate to a faint line on the geophysical plot, but none of the other features were identifiable.

Turbine 6 (Fig 8)

Four linear gullies, one slightly larger ditch and two possible post-holes were identified in Trenches 7, 8 and 10. Gullies [704], [706] and [806] were approximately parallel and orientated north-east to south-west (Plate 7). Ditch [804] and Gully [808] were approximately at right-angles to this. Ditch [804] was the largest feature (0.34m deep) and the other features shallower. There was no dating evidence from these features, although some were cut by plough furrows and are therefore likely to be medieval or earlier.

In Trench 10 were two small sub-circular features which may have been post-holes. Feature [1004] measured 0.6m in width and 0.45m in depth. It had steep sloping sides with a concave base filled by a dark yellow grey/grey brown clay loam. In contrast, feature [1006] had shallow sides and rounded base. Both features could be natural root holes.

Turbine 2 (Fig 5)

In Trenches 23 and 24 two linear gullies [2305] orientated north-west to south-east and [2404] orientated north-east to south-west were identified. Gully [2305] was V-shaped measuring 0.45m in width and 0.16m in depth filled by mid brown silty clay. In contrast, [2404] was a shallow, steep-sided feature with an irregular flat base. It was filled by mid orange brown silty clay. It measure 0.64m wide and 0.09m deep. Neither feature contained finds. Both gullies were on the same alignment as the land drains identified in the trenches and they may be drainage features.

Turbine 3 (Fig 5)

No archaeological features were identified in Trenches 17 and 18. In Trench 17, there were six land drains and two others in Trench 18. All were orientated north-south.

Field 2 Turbine 1 (Fig 5)

There were no features other than land drains and a probable furrow ([2004]) in Trenches 19-22. A linear gully ([2004]) was found in trench 20.

5 THE FINDS

The flint *by Andy Mudd*

Six pieces of worked flint were recovered from the evaluation. One is a small end scraper from 1305, undated gully 1304. It is formed on a thick primary flake from a small nodule with a creamy cortex. The non-cortical areas are lightly patinated. There is extensive, steep, carefully worked retouch around the distal end.

The other five pieces are broken flakes and lumps. One heavily bashed lump of river pebble (from 605, Roman ditch 604), which is probably naturally derived, appears to have been formed into a crude irregular scraper. There is another piece from 605 which may be a fragment of a blade core. The remaining pieces, one from 2505 (Roman gully 2504), and two from 2511 (undated pit 2510), are irregular flakes.

This represents an unremarkable collection of flint from very occasional prehistoric activity of an unspecific nature.

The Iron Age and Roman pottery *by Jane Timby*

Introduction

The archaeological work resulted in the recovery of 421 sherds of pottery weighing *c* 4.9 kg accompanied by 18 fragments of fired clay. The assemblage includes material of Iron Age and Romano-British date.

Pottery was recovered from 37 recorded contexts. In particular pottery was associated with trenches 1, 4, 5, 6, 7, 11, 12, 13, 15 and 25.

The pottery was of moderately good condition with an overall average sherd weight of 11.6 g. There were a few instances of multiple sherds from single vessels. Over three-quarters of the contexts, 78%, produced fewer than 10 sherds thus limiting the degree of confidence that can be put on close dating.

For the purposes of the assessment the assemblage was scanned to determine the form and fabrics and the likely date of the pieces. These were quantified by sherd count and weight for each context. The resulting data is summarised in Appendix 2.

The assessment has been undertaken without knowledge of the site layout or the stratigraphic sequence which may help refine the conclusions reached.

No associated work in terms of library research has been carried out in conjunction with the assessment to look for local parallels for the material or to consider it in its local context.

Iron Age

One major problem in distinguishing Iron Age from early Roman pottery in this area is the perpetuation of the shelly ware tradition. In the absence of featured sherds the handmade wares could date from the middle Iron Age through to the 2nd century AD.

A small number of Iron Age contexts have been tentatively identified on the basis of a coarser shell-tempered ware but from all of these there is only one rimsherd, a simple undifferentiated rim jar (1119); a form that appears to survive into the later Iron Age in this area.

Eight contexts have been dated to the Iron Age with a ninth context producing a prehistoric type single sherd (1128) but of indeterminate date at present. These include contexts 621, 1106, 1108, 1110, 1119, 1205, 1221 and 1311. Context 507 could be Iron Age or Roman. Many of the sherds are little more than crumbs but occasional pieces of fired clay feature in most of these groups.

A decorated rimsherd from 626 may be a redeposited Iron Age piece. It is from a large plain-rimmed vessel with stabbed decoration around the outer edge. One bodysherd has some concentric tooled lines.

Of note is the fact that there are no scored or finger-smear wares typical of the middle-late Iron Age as seen at Weekley, for example, nor are there any decorated finewares.

Roman

Sherds of Roman date dominate the group and appears to span the 1st to late 2nd or early 3rd centuries.

The pottery largely comprises sherds of local grey or black sandy ware, shelly ware and various grog-tempered wares (orange, white, grey). In addition there are 14 pieces of Lower Nene Valley colour-coated ware, which are only in circulation from the late 2nd century.

Only three traded wares are present: two pieces of samian (108, 109) and one sherd of Verulamium whiteware (626).

The earliest material includes wheelmade grog-tempered necked jars. One such vessel from 1209 has several holes pierced through the base. Other 1st-century wares include the group from 2515, which includes a greyware imitation of an imported Gallo-Belgic platters Camulodunum form 14 and 16, which are unlikely to have survived much beyond the Flavian period. Within these groups are orange and blackened whiteware grogged vessels and a necked greyware jar with a ridged neck.

The latest contexts in the group can be distinguished by the presence of Nene Valley colour-coated sherds, largely from beakers. At least six contexts fall into this group, 1008, 1207, 1504, 1505, 1508 and 1536.

Potential / further work

The potential of the pottery lies in the interpretation of the site and in the absence of site information this is difficult to gauge. As a pottery assemblage *per se* it has relatively limited value in that there are few large groups and a paucity of featured pieces.

The assemblage appears to suggest a small rural site dating from the pre-Roman Iron Age through to the late 2nd/ early 3rd century. Most of the wares are local in origin and there are markedly few imports present.

If further work is carried out at the site this group of material should be integrated with future analyses. If publication is envisaged in the present group a short summary should suffice.

Fired clay by Pat Chapman

This is a small assemblage of generally tiny fragments of fired clay. This assemblage comprises 35 fragments, weighing 132g, and one large piece of 178g. In addition, 18 small fragments were among the pottery assemblage (Timby, this report). The fragments come from Iron Age, Roman and undated contexts.

The one large fragment, from context 605, Roman ditch 604, has been worn very smooth. It is 60mm thick between two parallel flat surfaces, suggesting that it may have broken off from a *pilae* tile or brick. It is a hard silty clay fired to brown with a partial orange interior, with gravel,

flint and calcined flint inclusions up to 20mm long. Five other fragments from the same context are very small and worn, one has grog inclusions and one has been burnt completely black.

Another fragment, from context 1504, Roman ditch 1509, is thin and flat with smooth but uneven surfaces. One side blackened, otherwise it is a hard fine silty orange.

The 16 mainly tiny fragments from context 1207, Roman gully 1206, are similar in fabric to 605 and 1504, but angular, except for one red friable piece.

There are two different sorts of fired clay from context 2511, undated pit 2510. Seven fragments are hard and small with frequent small gravel inclusions. The remaining six pieces are in a coarser hard grey brown clay with organic and frequent tiny gravel inclusions and with grass impressions on surviving surfaces.

The assemblage and the fragments are too small to be able to draw any conclusions, other than that they come from general occupational activity.

Querns, millstone and mortar *by Andy Chapman*

There are three pieces from rotary querns, a single piece from a larger millstone and a single stone from a probable mortar (Table 1).

The quern fragments are all from the standard small, flat-topped rotary querns that were in use in the Roman period (Watts 2002, 33-38). They are all part of upper stones varying from 320mm to 500mm in diameter and from 29-50mm thick at the circumference and tapering to around 20mm thick towards the centre. They all retained part of the circumference, but only the puddingstone quern also had the central eye surviving, as a plain opening 60mm in diameter. This is surrounded by a shallow recess, 16mm wide and up to 5mm deep. One of the smaller pieces had broken along a handle slot.

The two smaller pieces are in fine-grained sedimentary stones that have not been identified, while the most complete example is a puddingstone, with sparse larger pebbles set in a matrix light brown in colour and rich in fine angular quartz (title page photograph).

A larger irregular chunk of Millstone Grit, with no original edges, is 90mm thick, indicating that it comes from a millstone, either animal or water powered. The upper surface retains pecked tool marks, but the grinding surface, whilst level, has no signs of wear, suggesting either that the

grinding surface has been lost or that the stone was unused. This surface also retains an arc of V-shaped groove.

A single stone is fashioned on a large, irregular cobble, probably a glacial erratic. The underside had been worked to a more regular curve, and pecked tool marks survive. The surviving part of the upper surface comprises a smooth concave bowl. This has probably been utilised as a mortar for grinding or crushing substances other than grain.

Table 1: Worked stone from querns and a mortar

Context/ Feature (SF No.)	Quern type	Dimensions	geology	Comment
605/ Ditch 604	Upper stone Flat rotary	500mm diam 19-44mm thick	Fine grained sedimentary unidentified	Small fragment, with circumference
628/ Ditch 604	Upper stone Flat rotary	c350-400mm diam 19-29mm thick	Fine grained sedimentary unidentified	Small fragment, with circumference and handle slot
411/ Ditch 410	Millstone?	90mm thick	Millstone Grit	Irregular fragment from large stone
2515/ Gully 2514	Upper stone Flat rotary	320mm diam eye 60mm diam 20-50mm thick	Puddingstone	Half a full upper stone, circumference and eye
2515/ Gully 2514	Mortar	75mm thick	?quartzite, probably glacial erratic	Smooth concave surface

Metalworking debris by *Andy Chapman*

A single context (507, Ditch 508) produced five small pieces of miscellaneous ferrous slag, weighing 80g. On the largest piece one surface is covered with fired clay, grey in colour, indicating that it has come from the lining of a furnace or hearth. The nature of the material and the small quantity recovered only suggest that some minor episode of iron smithing was carried out nearby.

Other finds by *Ian Meadows*

There was a small collection of other Roman non-ceramic finds comprising a fragment of copper alloy brooch, two coins, three pieces of ironwork, and a lead vessel mend. None are intrinsically remarkable. A catalogue is presented below.

SF1 (1504), Ditch 1509. Fe nail 74mm long with a triangular head of Manning (1985) type 2. The rectangular section shank tapers from 10 x 7mm to 5 x 4mm. This is an example of the second most common Roman nail.

SF2 (1504), Ditch 1509. Two fragments of iron. One was a triangular fragment 65mm long and a maximum of 20mm wide. This piece was probably part of a binding or one arm of a joiners dog.

The other fragment was a figure of eight shaped plate 40mm long with a maximum width of 16mm narrowing to a waist of 10mm. This plate was probably part of some binding perhaps through which nails had been driven.

SF5 (108), Ditch 110. A sub circular lead vessel mend 28 x 25mm and up to 6mm thick. The lead was smooth on one sided but rough on the other. A complete edge groove was not evident which would normally indicate a ceramic vessel, although the rough side had clearly been lapped over the edge of what was being repaired, perhaps a metallic vessel.

SF6 U/S Tr 4 Part of the head and bow of a Colchester derivative brooch of late first century to 150AD date. This example preserved part of the iron hinge bar within the surviving wing. This example had been crushed by machine traffic.

SF7 U/S Tr 6 A copper alloy AE3, probably a Constantius II *Victoria Augustorum* issue 341-346. Both faces are however too poor for positive identification.

SF8 U/S Tr 25 A copper alloy AE4 minim based upon a House of Constantine issue. The reverse bears the image of an advancing victory.

No SF (507), Ditch 508. A 9mm long iron hobnail.

No SF (2503). A fragment 24 x 20mm and 3mm thick of post-medieval bottle glass.

6 FAUNAL AND ENVIRONMENTAL EVIDENCE

Mammalian bone by Philip Armitage

A total of 134 hand-collected bone elements from 21 contexts were submitted for assessment. All of the bone is recognized as mammalian, representing six species, as follows: human *Homo sapiens*; horse *Equus caballus* (domestic); cattle *Bos* (domestic); sheep/goat *Ovis/Capra* (domestic); pig *Sus* (domestic or wild?); and roe deer *Capreolus capreolus*.

Summaries of the numbers of identified bone elements and bone weight data by species/taxon and context are presented in Tables 1 and 2 (Appendix 3). Bone element distribution by species and context are summarized in Tables 3 to 8 (retained in archive).

Overall, the preservation of the bone is assessed as fair to poor with relatively high degree of fragmentation in virtually all samples - as evidenced by the high frequencies of isolated teeth. Post-depositional attrition and leaching/weathering appears to have made the bones particularly fragile and susceptible to damage during excavation. Several specimens exhibit root etching on the bone surfaces and others (e.g. cattle tibia from 504 fill of Ditch 506) are silt encrusted with tubular structures made by small worm-like larvae of chironomid flies (midges) – such bones must have been partially submerged in silt or mud.

Comments on results

Most of the bone was from Roman ditches and gullies, with a smaller number from Iron Age features (features 1107, 1117, 1219 and 1310). Two features (Ditch 1115 and Pit 2510) are at present undated but are likely to be Roman or Iron Age.

The relative numbers of species follows the usual Roman pattern, with cattle dominant and sheep second. There are fewer numbers of pig and horse and a single humerus of roe deer implying little reliance on wild food resources.

The presence of human bone, outside an obvious funerary context, is unusual. All fragments were small suggesting that they had been redeposited from elsewhere. The majority came from the Roman ditch terminal or pit 1537 and comprised a number of cranium fragments, five isolated teeth and a shaft of long bone. Six cranium fragments also came from the boundary ditch [1115] which is likely to be Iron Age or Roman.

Size of the cattle and pigs

Height at the withers may be calculated from length measurements (GL) in two of the bones:

Cattle metacarpus from 505 – with an estimated withers height (method of Fock 1966) of 112.2 cm (comparable with the stature of modern Kerry cows)

Pig metacarpus IV from 2515 – with an estimated withers height (method of von Cornelia Becker 1980: 27) of 87.8 cm.

Proposals for further analyses

The bulk of the material submitted represents discarded domestic refuse and could therefore with some further analysis provide insight into the dietary habits and food procurement strategies of the inhabitants. Discard practices of the food debris also merit consideration. Distribution at the site of the non-food bones (human & horse remains) also requires further examination.

Charred plant remains by Val Fryer

Six soil samples were taken for the retrieval of plant macrofossils. The samples were bulk floated by Northamptonshire Archaeology, and the flots were collected in a 500 micron mesh sieve. One sample (Sample 1 from context 1207, Ditch 1206) yielded no material. The other five dried flots were scanned under a binocular microscope at magnifications up to x 16, and the

plant macrofossils and other remains noted are listed on Table 2. Nomenclature within the table follows Stace (1997). All plant remains were charred. Modern contaminants including fibrous and woody roots, seeds and arthropod remains were present throughout.

Mollusc shells, predominantly those of open country and freshwater obligate taxa, were also recorded from all but Sample 6. Some retained very crisp surface structuring and may be modern in origin, but the freshwater specimens (including *Armiger crista*, *Anisus leucostoma* and *Lymnaea* sp.) appeared slightly more weathered, and may be contemporary with the ditch/gully fills. These would indicate turbid water conditions and a seasonal tendency for the ditches to become dry.

With the exception of charcoal fragments, plant macrofossils were rare, with moderately well preserved cereals/seeds occurring in only three of the assemblages. Although this paucity of material may, in part, be due to the difficulty of processing samples composed largely of clay, it would also appear most likely that samples were taken from features in areas that were peripheral to any main centre of activity during the Late Iron Age/Roman periods. The assemblage from sample 4 (Ditch 604) contained both barley (*Hordeum* sp.) and wheat (*Triticum* sp.) grains and a small quantity of spelt wheat (*T. spelta*) chaff. Rare seeds of common segetal weeds including wild radish (*Raphanus raphanistrum*) and scentless mayweed (*Tripleurospermum inodorum*) were also recorded, and it would appear most likely that the assemblage is derived from burnt cereal processing waste. However, such a low density of material may not be indicative of deliberate deposition, as it could equally have accidentally accumulated within the ditch fill. Similar assemblages may be represented by Samples 3 and 5, although a far lower density of material is present within these samples. The remaining assemblages contain insufficient material for conclusive interpretation.

In summary, three of the assemblages present may be related to the burning and deposition of small quantities of cereal processing waste. Although these possibly indicate that cereal production/ processing was of local importance, the low density of material recovered suggests these activities were not occurring in the immediate vicinity of the site. The mollusc assemblages may indicate that the ditches were seasonally water filled, although it has yet to be established whether the shells are contemporary with the features from which the samples were taken.

As none of the assemblages contain sufficient material for further analysis, no further work is recommended at present.

Table 2: Charred plant remains from Ellands Farm, Hemington

Sample No.	2	3	4	5	6
Context No.	1108	605	108	628	1508
Feature No.	1107	604	110	604	1509
Feature type	Gully	Ditch	Ditch	Ditch	Ditch
Cereals					
<i>Hordeum</i> sp. (grains)		x	x		
<i>Triticum</i> sp. (grains)			x		
(glume bases)			x		
(spikelet bases)			x		
<i>T. spelta</i> L. (glume bases)			x		
Cereal indet. (grains)			x	x	
Herbs					
<i>Bromus</i> sp.				x	
Small Poaceae indet.			x	x	
<i>Ranunculus</i> sp.			x		
<i>Raphanus raphanistrum</i> L. (siliquae)			x		
<i>Tripleurospermum inodorum</i> (L.)Schultz-Bip			x		
<i>Vicia/Lathyrus</i> sp.		x		x	
Other plant macrofossils					
Charcoal <2mm	x	x	xx	x	x
Charcoal >2mm	x		x		
Charred root/stem		x	x		
Indet.seeds			x	x	
Other materials					
Black tarry material			x	x	
Bone			xb		
Small mammal/amphibian bone				x	
Sample volume (litres)	40	40	40	40	40
Volume of flot (litres)	<0.1	<0.1	<0.1	<0.1	<0.1
% flot sorted	100%	100%	100%	100%	100%

x = 1 – 5 specimens xx = 5 – 20 specimens b = burnt

7 DISCUSSION

Extent of archaeological features

The results of the geophysical survey and trial trenching have confirmed the presence of an extensive block of Roman settlement enclosures in the western part of the site (around proposed Turbine 5) as had been suspected from existing aerial photograph records. The enclosures,

which appeared to be associated with a linear boundary ditch, coincide with the plotted cropmarks, but the field evidence shows that the features are denser and more widespread than the cropmarks indicated (Figs 5 & 6).

The fieldwork results indicate that the limits of this settlement have been approximately defined in a NW-SE direction by Trenches 1, 2, 4 and 5, with nothing of significance beyond this area. The overall width of the enclosure complex is therefore about 150m. It is significant that nothing was recorded in the north-west part of the site (Trenches 2, 3 and geophysics Area B) despite the anomalies recorded in the magnetometer scanning reconnaissance (Fig 2) which now appear likely to have been caused by modern material.

The limits of archaeological interest have not, however, been defined to the south-west (where features extend outside the application site) nor to the north-east, where Trenches 6 and 15 showed numerous features north-east of the cropmark enclosure without establishing their limits.

More unexpectedly was the discovery in Trenches 11, 12 and 13 of features which had not been located by the cropmark or geophysical survey. These were in the main shallow gullies and pits which are difficult to locate with either prospection technique. Many of these features are middle to late Iron Age in date, suggesting a settlement of this period extending south-east from the linear boundary ditch in Trench 11 and to the south of Turbine 4. The limits of this settlement have not been established with any certainty, but it appears that it did not extend further down the slope (Trench 14), but it may well have filled the gap to the west between Trenches 12 and 13 and the Roman complex.

There appears to be little of significance elsewhere on the site. The combined geophysical and trenching results suggest nothing around Turbine 2, although the single trench is perhaps insufficient to be sure of this in the light of the unreliable geophysical results at Turbine 4. The trenching at Turbine 1 suggests that the cropmark enclosures in this field do not extend this far down the slope, and there is no reason to suspect anything around Turbine 3. The few gullies in the trenches around Turbine 6 do not seem to be archaeologically significant, while the geophysical survey at Area C and Trench 7 indicate that the large rectangular cropmark enclosure to the north-west does not extend into the application site.

Date and nature of archaeological features

There is no indication of pre-Iron Age occupation on the site. The few worked flints can be interpreted as background scatter relating to intermittent prehistoric activity of an ill-defined but probably transient nature. While the undated features containing flint (Gully 1304 and Pit 2510) could in theory be pre-Iron Age, the widespread presence of Iron Age and Roman features in these trenches make this proposition unlikely.

The Iron Age occupation identified in trenches 11, 12 and 13 is not precisely datable due to the absence of diagnostic pottery (Timby, this report). The coarse, handmade pottery was current in the middle and late Iron Age (from about 400 BC) and even present in the early Roman period, so the dating cannot be refined at present. The occupation is characterised by relatively shallow gullies, of a type often found to enclose or partly enclose roundhouses (Plate 4). The pits discovered were all also quite shallow and not characteristic of grain storage pits. It is possible that underground grain storage was not practised due to the clay geology of the site. The detailed geophysical survey suggested the presence of other pits which may have been more substantial (Fig 4). The possible kiln now does not seem likely in view of the shortage of Roman pottery from the trenches in this area, since kiln sites are usually associated with wasters and other debris in relatively large quantities.

The Iron Age settlement does not seem to have been enclosed by a ditch - a factor which makes it difficult to establish its extent - but it may be significant that the recut linear boundary ditch in Trench 11 yielded 15 Iron Age sherds from one of its earlier phases (Ditch [1117]) which seem unlikely to be redeposited. This suggests an Iron Age origin to this land division, although a section through the feature in Trench 6 showed the upper fill to be demonstrably Roman (Fig 13, Section 4, Ditch [604]).

The pottery from the site indicates that Roman occupation started in the 1st century AD and continued through until the late 2nd or 3rd century. It seems inherently likely that there was direct continuity from the Iron Age, but this is not possible to demonstrate conclusively on present evidence. The Roman features in Trenches 1, 4, 5, 6, 15 and 25 were of more than one phase but density of features in Trenches 1, 4, 5 and 25 was not all that great and the geophysical survey plot appears reliable in that sense. The phasing would seem to be no more complex than redefining or extending an existing layout. The great density of features in Trench 6 in particular, and also Trench 15, suggests more complexity to the phasing, and this might be due to the presence of Iron Age features in this part of the site. Two 4th-century coins were

recovered unstratified but no pottery of this date was recovered and the status of the coins remains uncertain.

The features were mainly gullies and moderately large ditches defining relatively small enclosures. Some of the gullies may have been beam-slots, but generally there was a lack of features which were obviously structural. No hearths or ovens were found, and nor were there any large pits. This is not, however, unusual on minor Roman farmsteads and it is highly likely that the features relate to domestic settlement, rather than exclusively stock management. The presence of human bone suggest that there may be burials associated with the settlement, although it is not possible to estimate how many there might be since Roman burials can be quite isolated or form part of larger cemeteries.

A relatively large, if mundane, assemblage of pottery was recovered and the other finds include fired clay (possibly daub or oven lining), five fragments of quernstone/mortar, and charred cereal grains, as well as occasional items of metalwork. The presence of three rotary querns and a fragment of what seems to be a millstone in this limited investigation suggest that cereal cultivation was significant. There was an insufficient quantity of building materials (brick, tile, plaster etc.) to indicate a highly 'Romanised' settlement, and few exotic or traded items, the querns perhaps being the most important.

Archaeological potential

The evaluation has demonstrated that archaeological remains of Iron Age and Roman date are present and reasonably well preserved. The truncation of the land by ploughing, probably since the medieval period, has resulted in the loss of stratified deposits above the level of the natural Boulder Clay, and it appears unlikely that any structural detail, such as floors or walls will have survived anywhere on the site. Preservation is therefore about average for a site in this sort of location.

The range of features and material discovered is unexceptional, although there is clearly the possibility for localised features on the site containing unusual deposits (eg kilns, wells, corn dryers). The palaeo-environmental potential is reasonably good, and attention can be drawn to the presence of molluscs in the samples (Fryer, this report), which are not usually preserved on this type of geology. The indication, from the presence of aquatic snails, that some of the deeper features contained water, at least seasonally, suggests the potential for waterlogged organic remains in any deeper features on the site. This would raise the archaeological

significance of the site, particularly for this part of Northamptonshire where palaeo-environmental evidence is rare.

Potential for further analysis

The potential for further analyses of the finds is limited by the range, quality and contextual background of the material and none is proposed at this stage. However, in the event that further archaeological excavations are undertaken, the findings from this evaluation should be integrated with those of any subsequent work.

Publication of the present results should also await the results of any further archaeological mitigation. If no further archaeological work is undertaken these investigations warrant publication as a brief note in the county archaeological journal.

8 ARCHAEOLOGICAL MITIGATION

Potential effects of development

Turbine locations

Current proposals for the wind turbines in the locations shown on Figure 5 will result in the direct impact of Turbine 5 on Roman ditches and other features in this area.

There is also some potential for Turbine 4 to impact upon Iron Age and Roman features. These were found in Trenches 12 and 13, within 40m of the illustrated turbine location, although Trench 14 itself contained no archaeological features.

The other turbines appear unlikely to impact directly upon anything of archaeological significance.

Connecting cables

The trenches and working easements for connecting cables between the turbines will also have impacts upon archaeological features. This relates particularly to connections to and from Turbine 5 where direct routes to Turbines 4 and 6 will pass through some of the densest archaeology on the site. There is also less dense archaeology between Turbine 5 and the road and between Turbines 5 and 3.

There is also potential for archaeological features between Turbines 4 and 6, although the location and density of features in this area is less clear.

Access tracks

If the construction of the access tracks entails the disturbance of ground below subsoil levels, there is potential for some impact upon archaeological deposits between Turbines 5 and 3.

Enabling works

Other potential effects relate to the locations of construction sites or other enabling works which may be required.

Scope for mitigating adverse effects

Turbine 5

In order to avoid impact on known archaeological deposits, it may be desirable to move Turbine 5 to the north-west, beyond Trench 1, or to the south-east, toward the southern end of Trench 4.

If the turbine cannot be moved the archaeological planning officer may find it acceptable to archaeologically excavate the site of turbine and associated construction area in advance of construction.

Connecting cables

In order to minimise the impact on known archaeological deposits it may be desirable to run the cables less directly from Turbine 5 to Turbines 4 and 6, thereby avoiding the main concentration of archaeological features shown by the geophysical survey and trenching.

Alternatively, or in addition, the archaeological planning officer may find it acceptable for any archaeological features discovered during soil stripping for the pipe easements to be archaeologically excavated and recorded ahead of the development.

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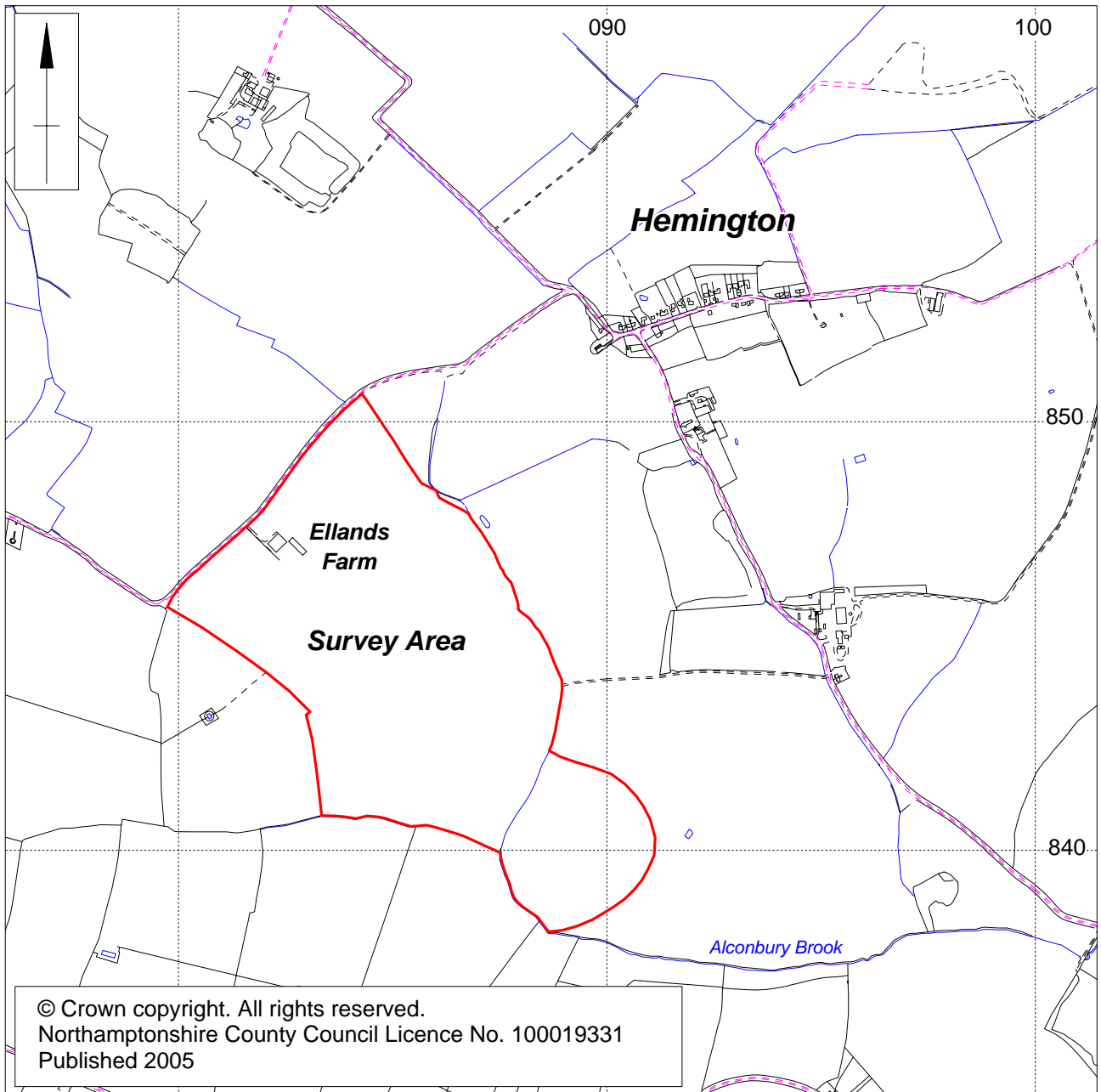
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Scale 1:15,000

Fig. 1

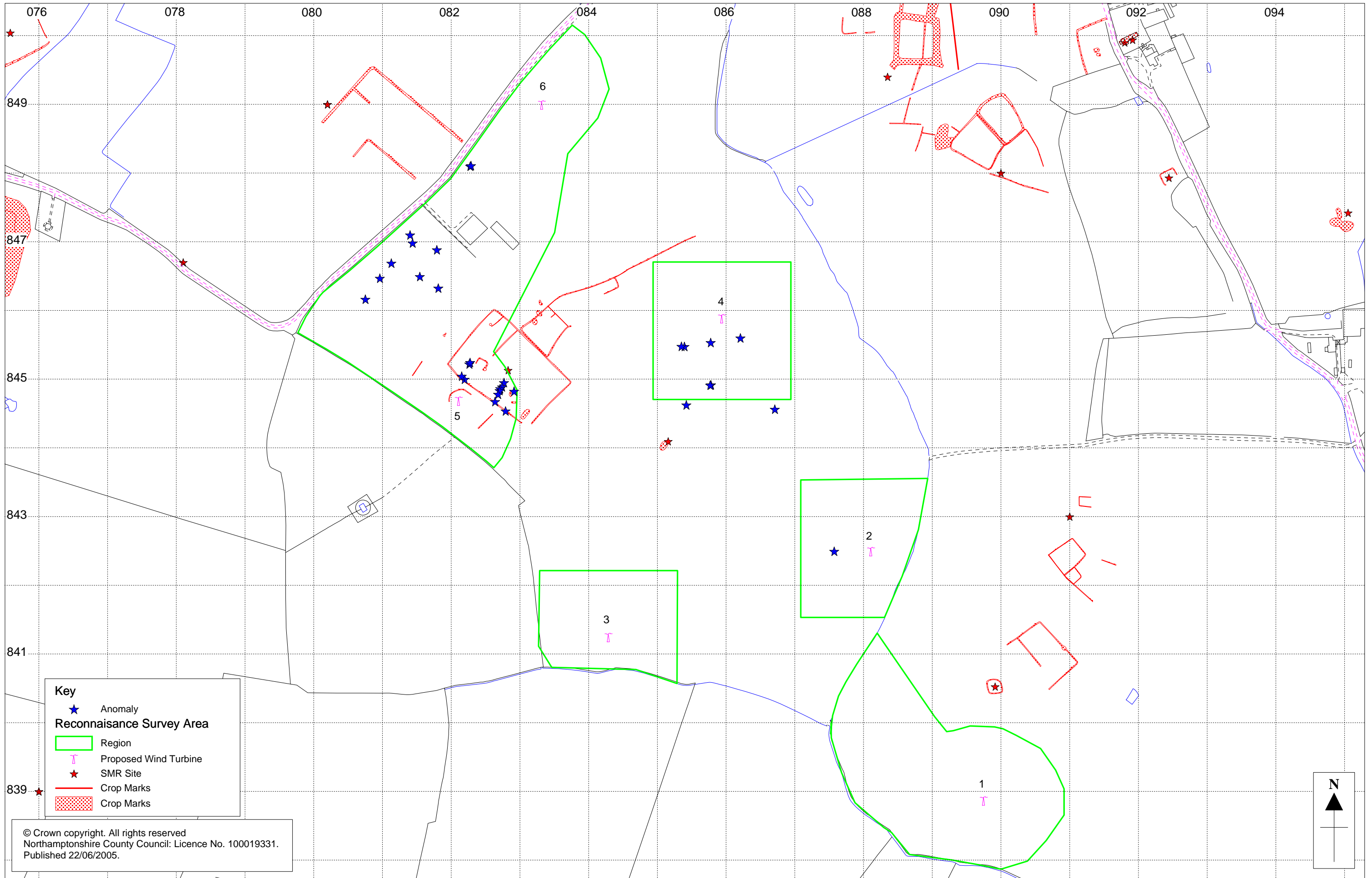


Fig. 2 Reconnaissance Scanning Results with Crop Marks at Ellands Farm

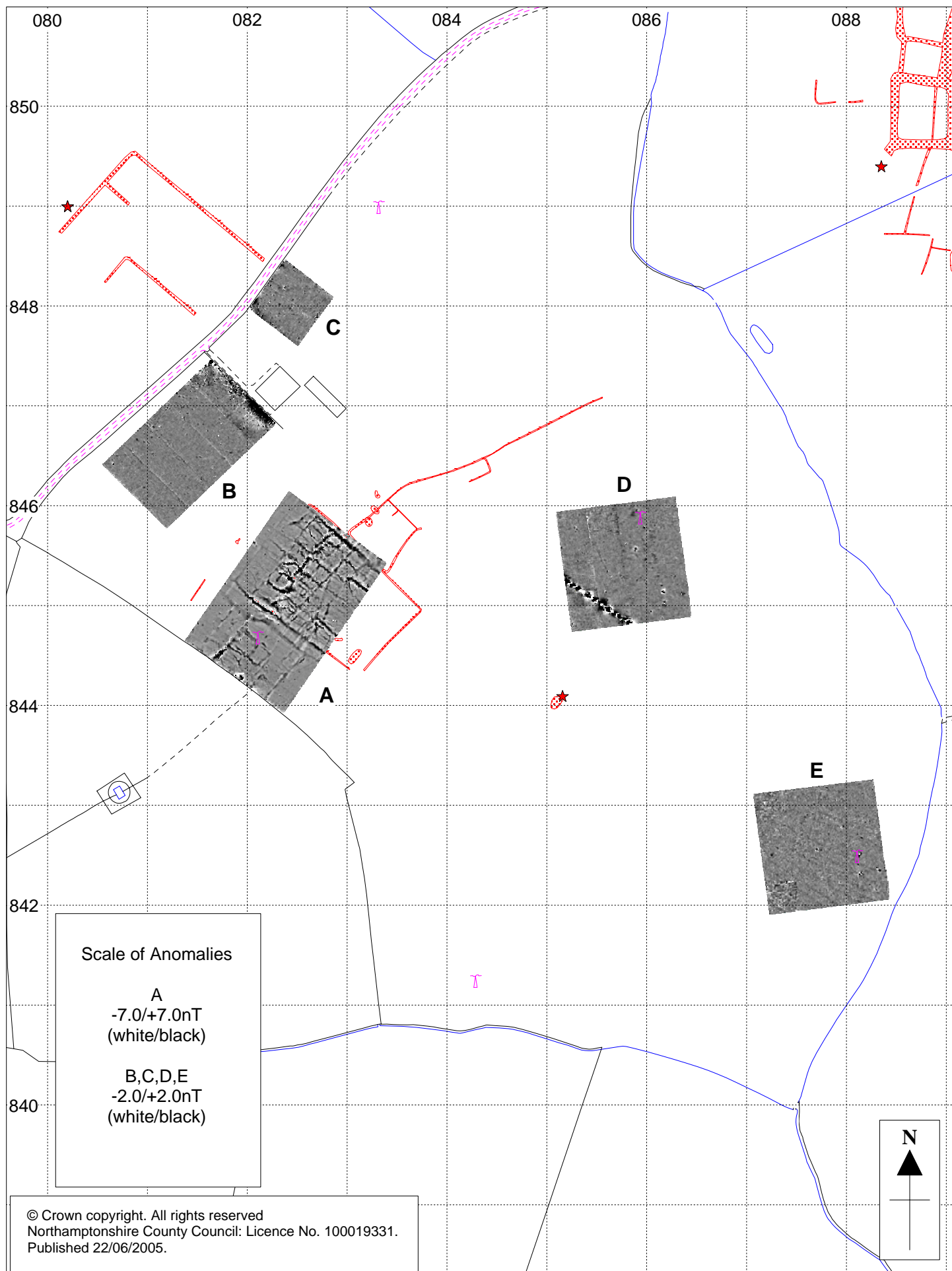


Fig. 3 Detailed Gradiometer Survey

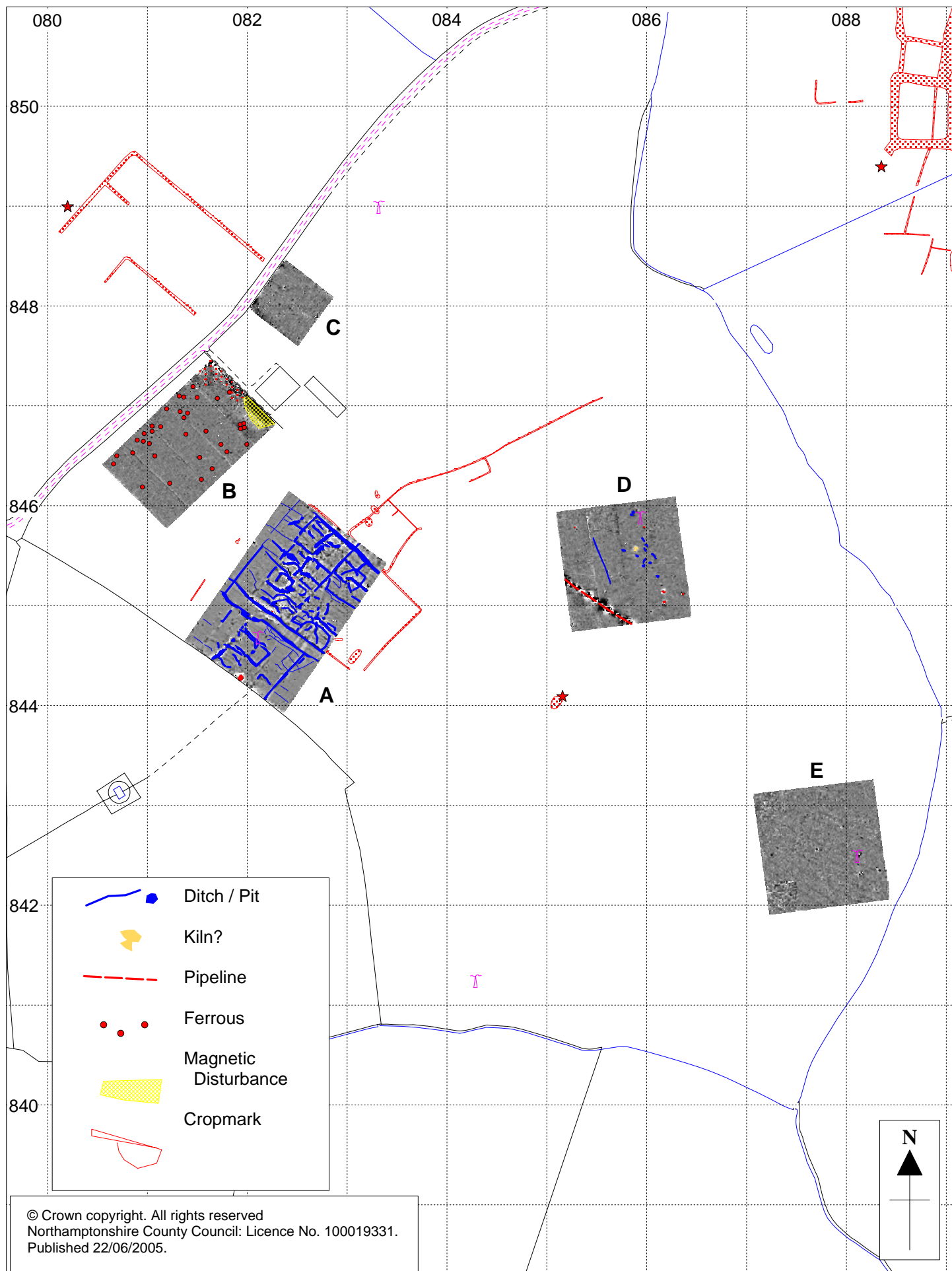


Fig. 4 Detailed Gradiometer Survey with Interpretation

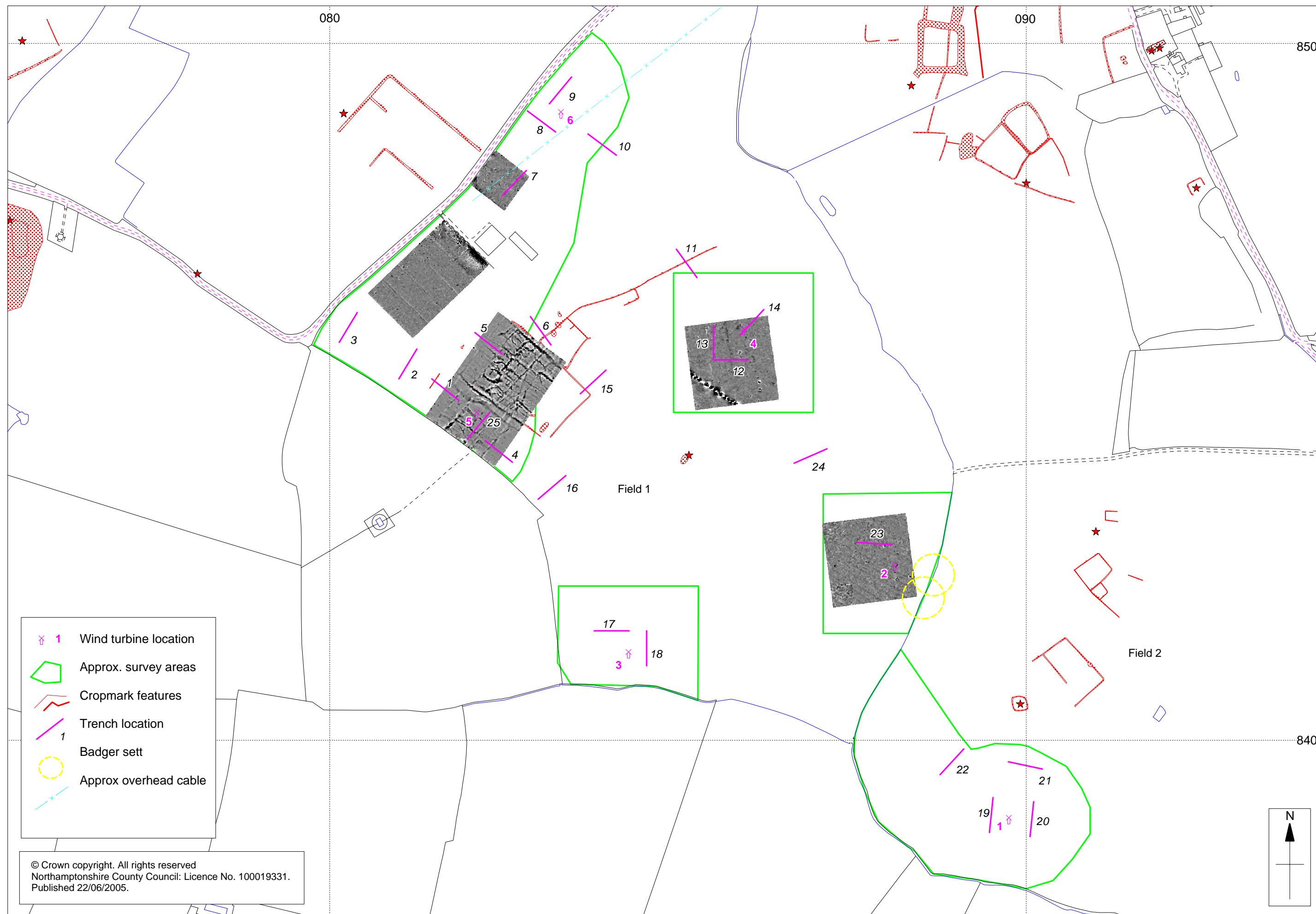
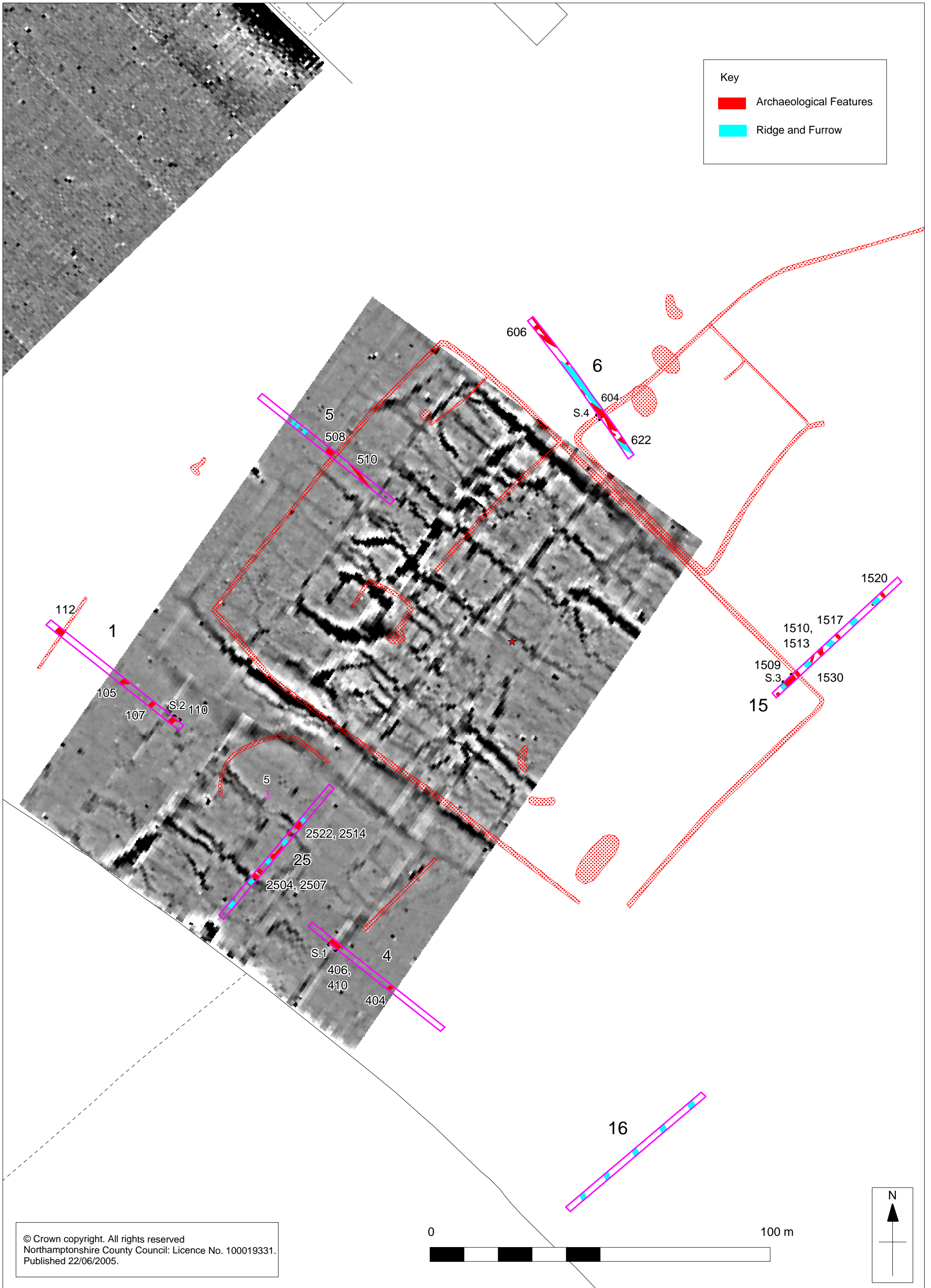


Fig. 5 Gradiometer Survey and Trench Layout



Key

- Archaeological Features
- Ridge and Furrow

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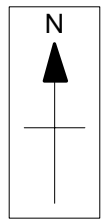


Fig. 6 Composite plan Turbine 5

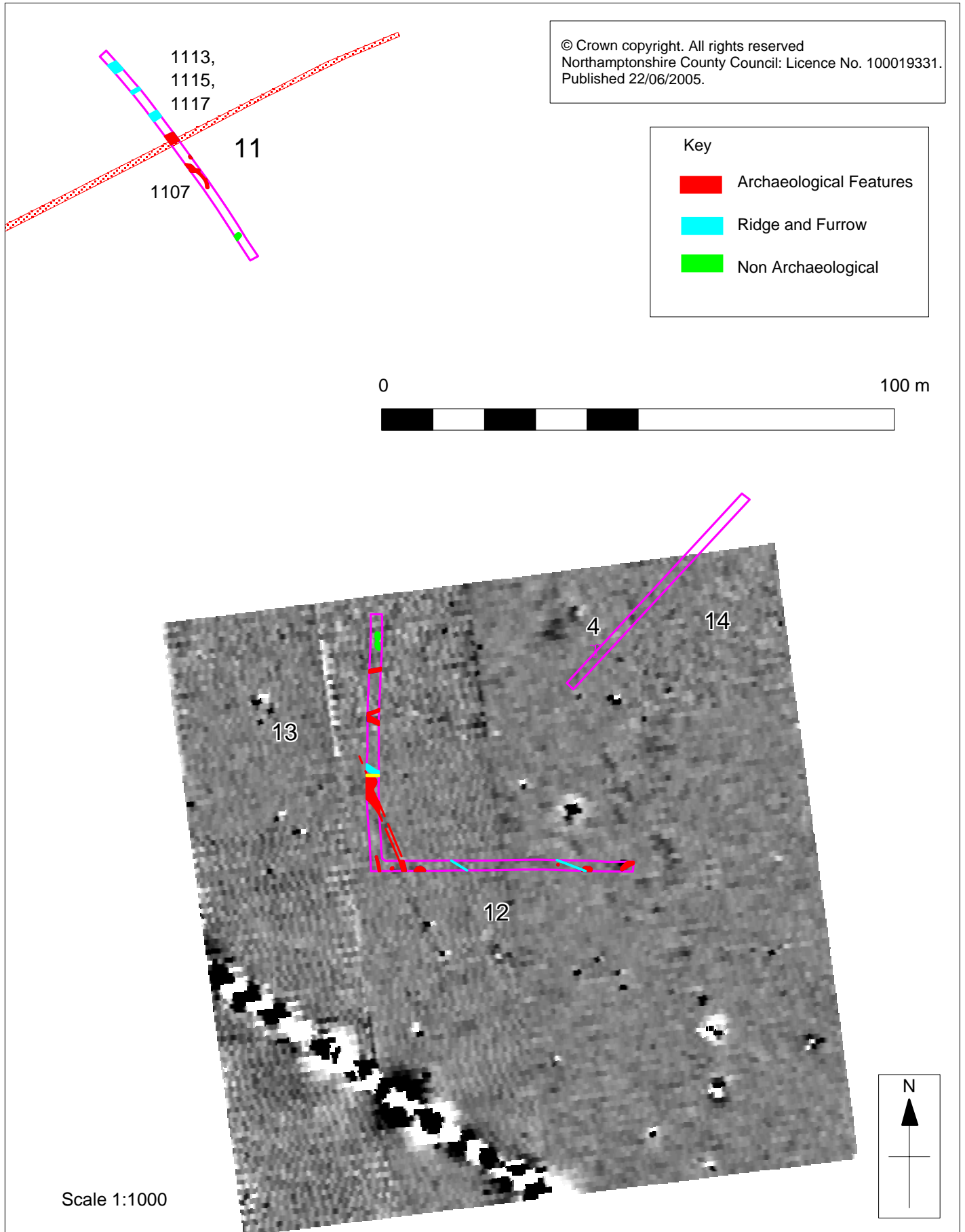


Fig. 7 Composite plan Turbine 4

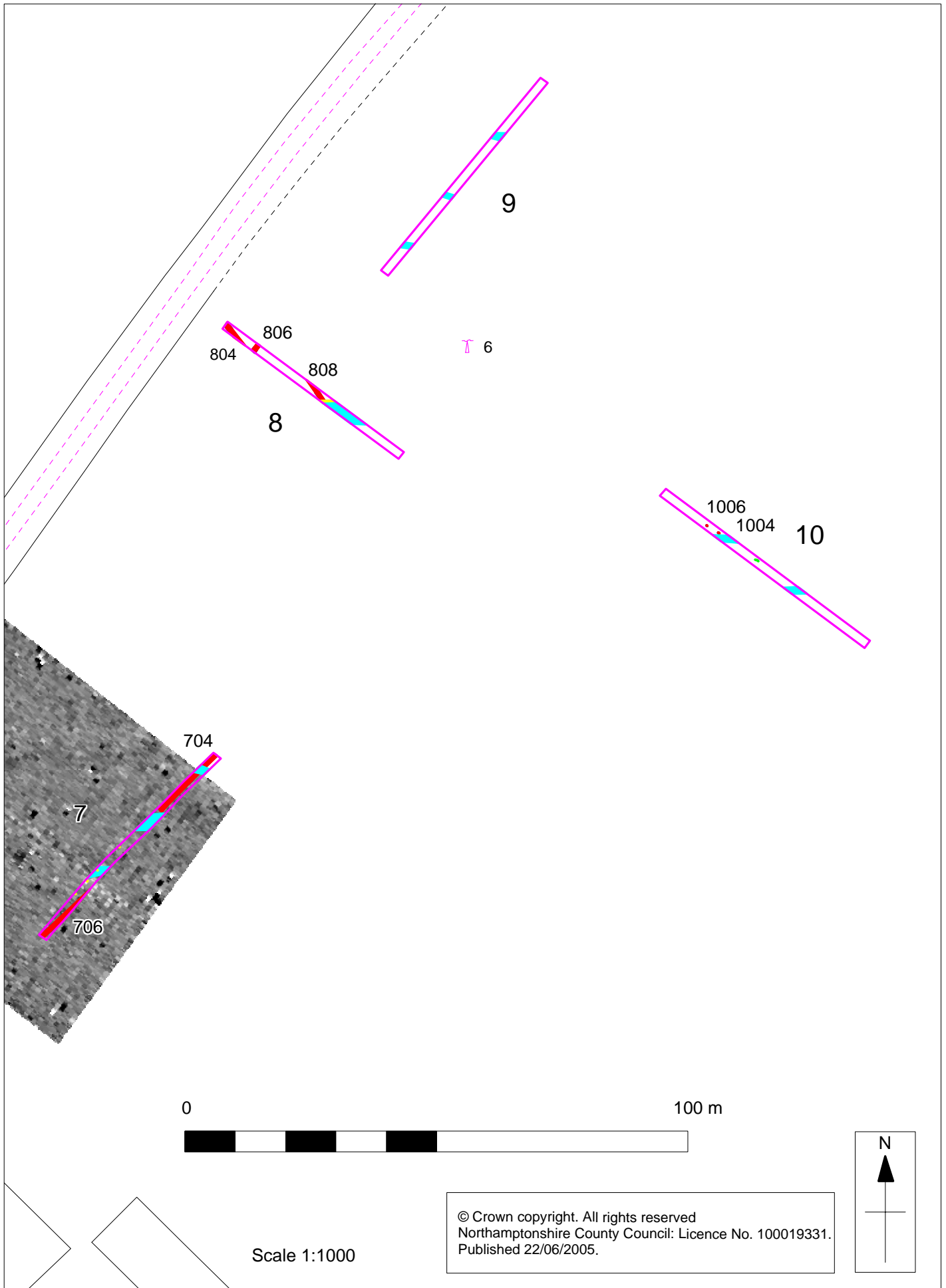
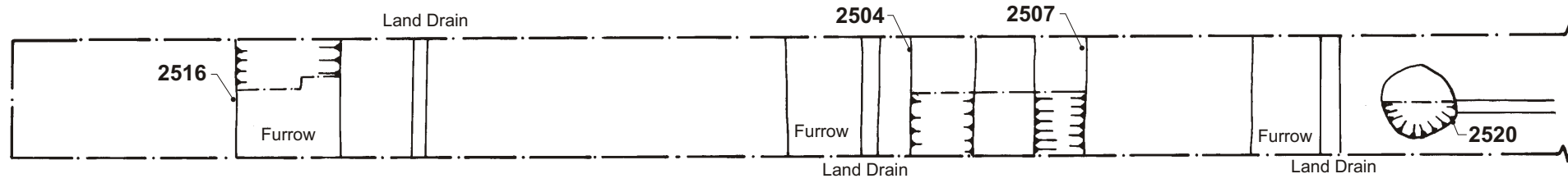
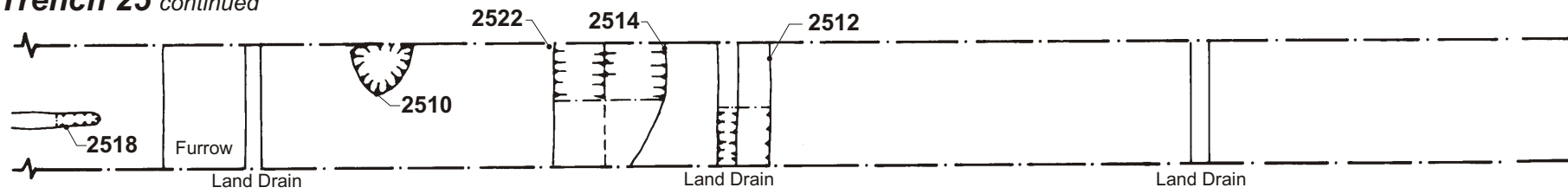


Fig. 8 Composite plan Turbine 6

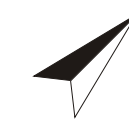
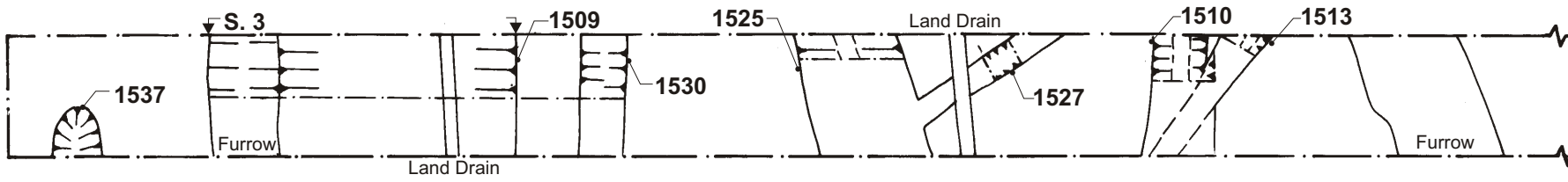
Trench 25



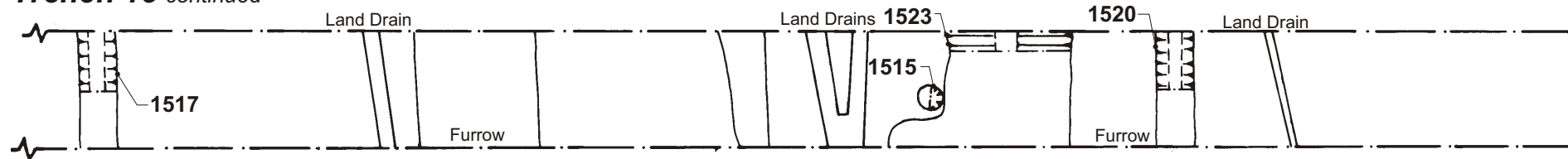
Trench 25 continued



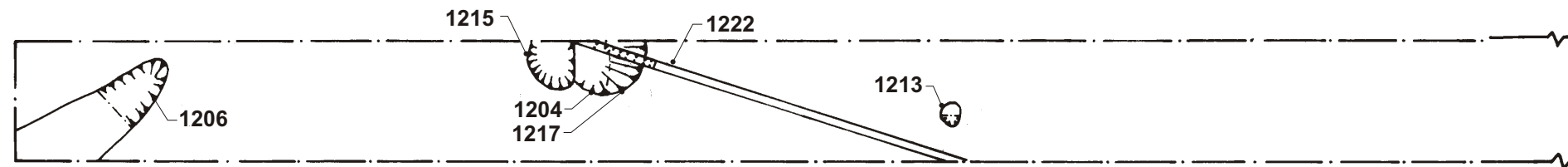
Trench 15



Trench 15 continued



Trench 12



Trench 12 continued

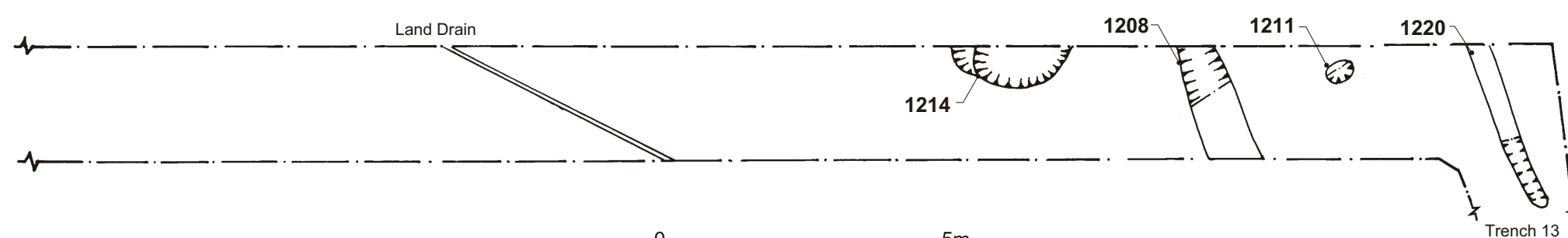
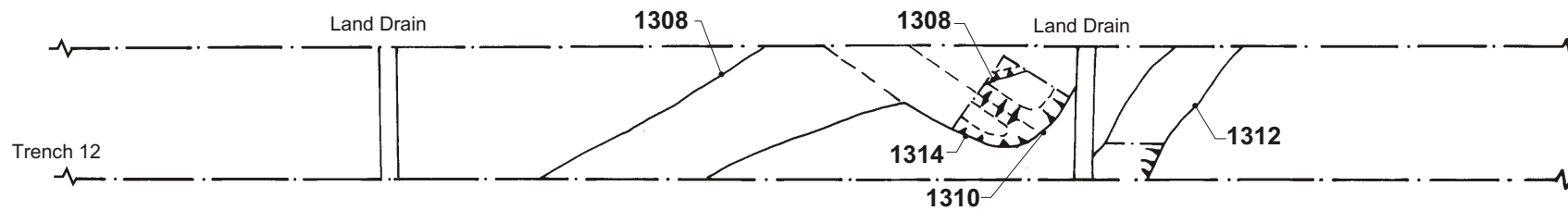
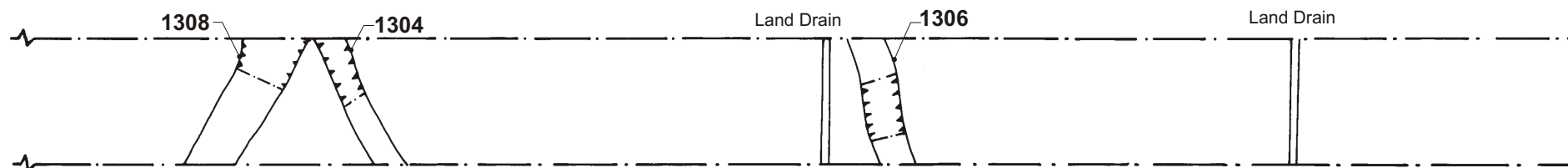


Fig. 9

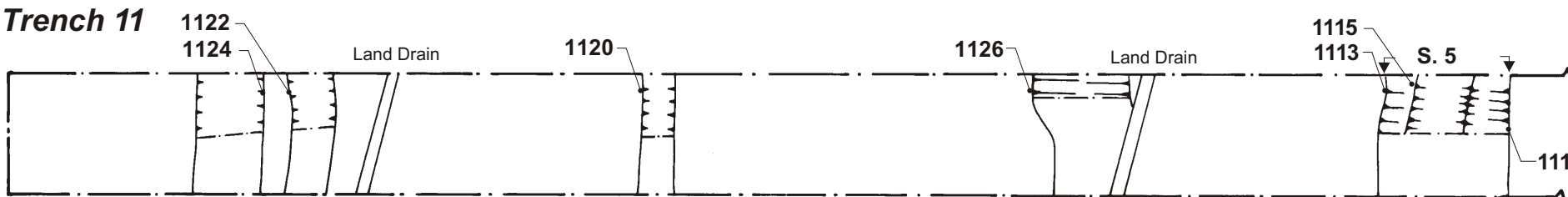
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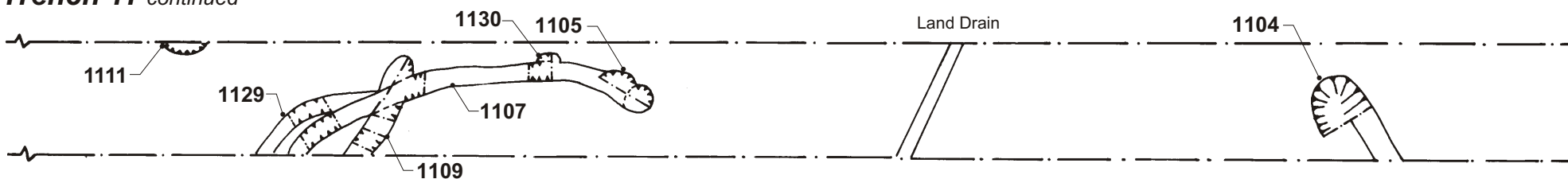
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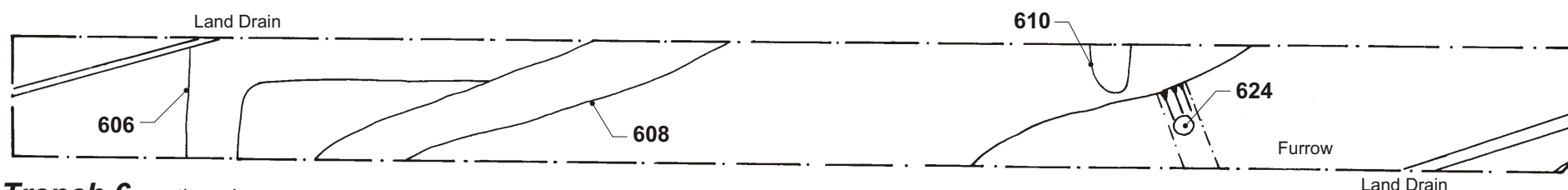
Trench 11



Trench 11 continued



Trench 6



Trench 6 continued

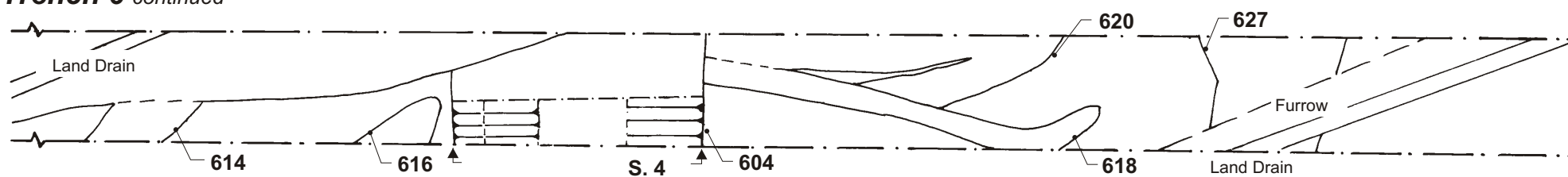
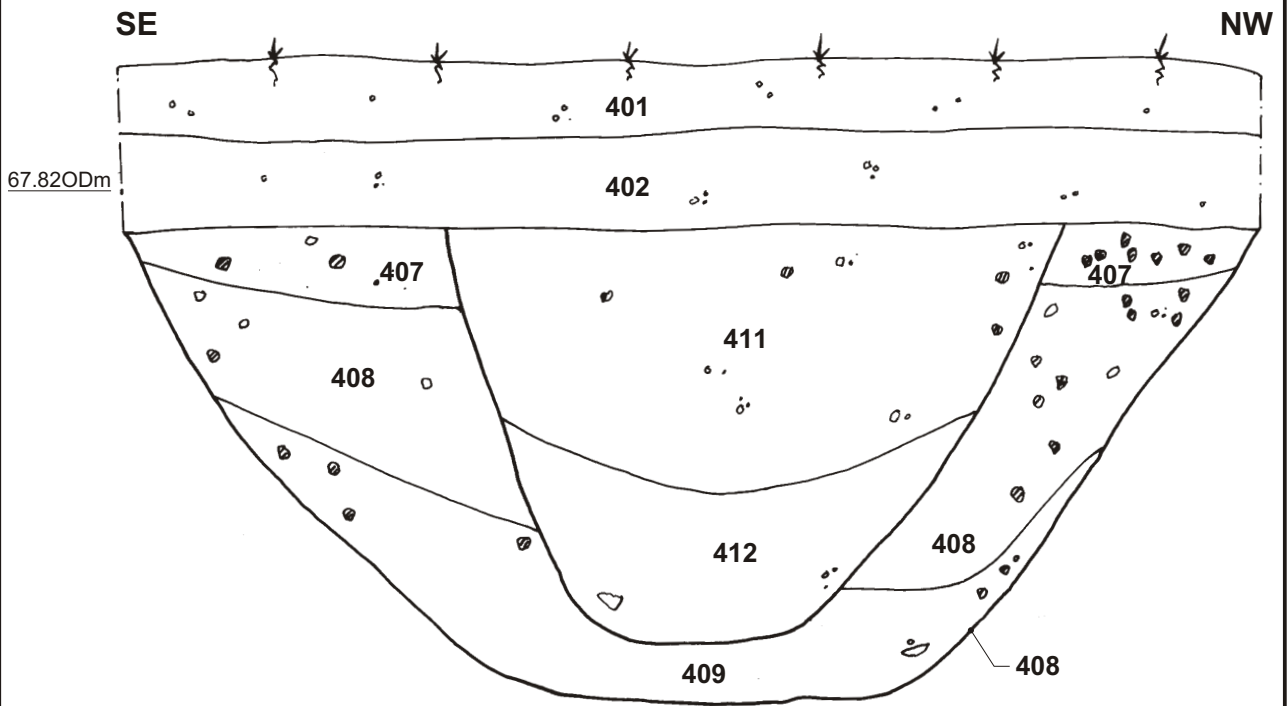


Fig. 10

Section 1



Section 2

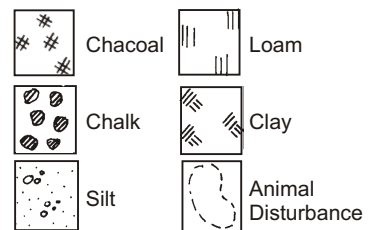
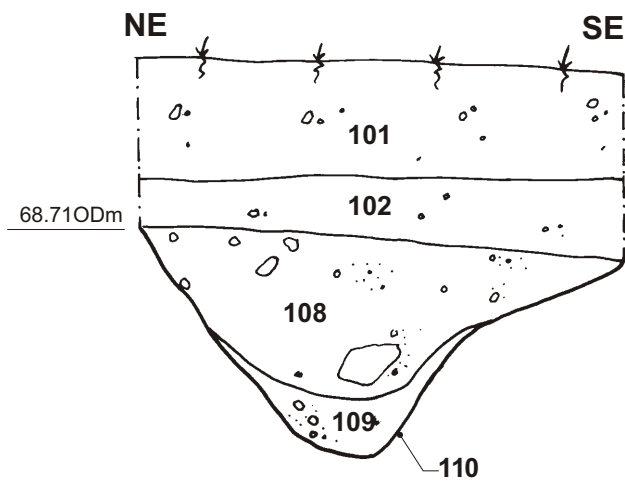


Fig. 11

Section 3

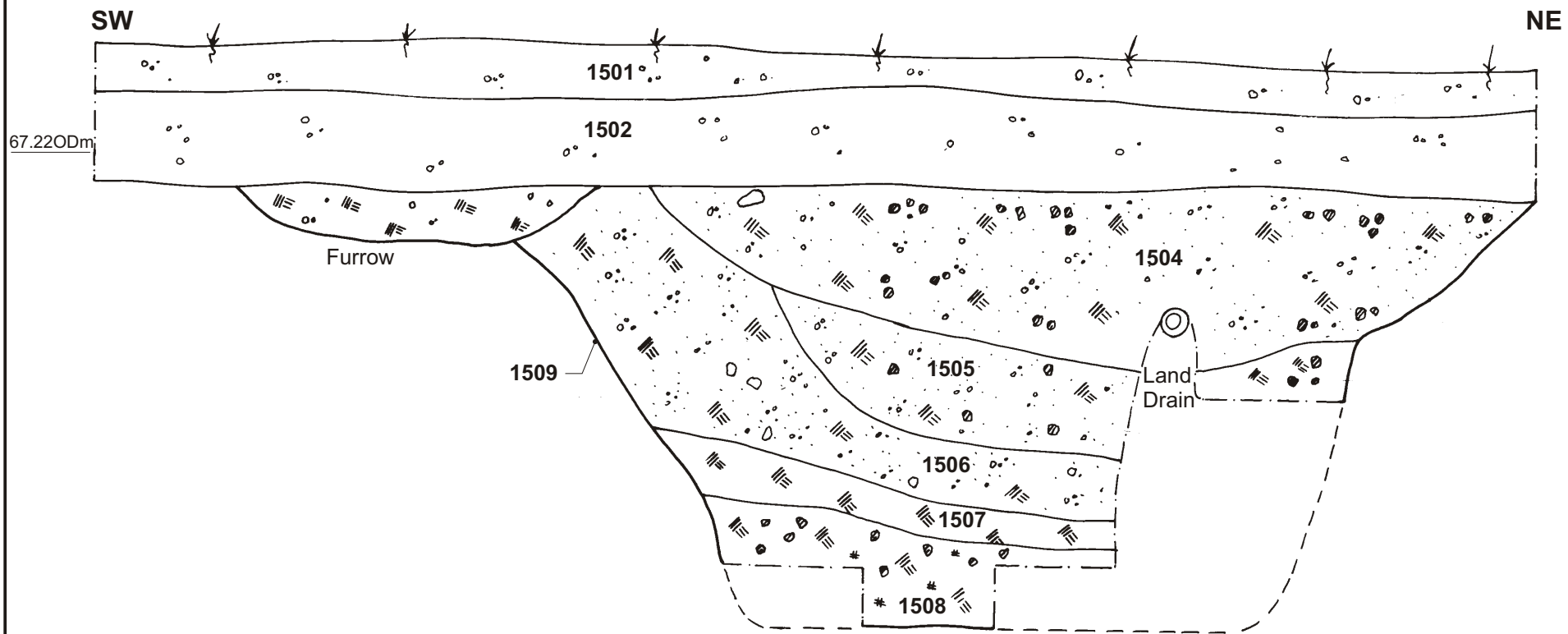


Fig. 12

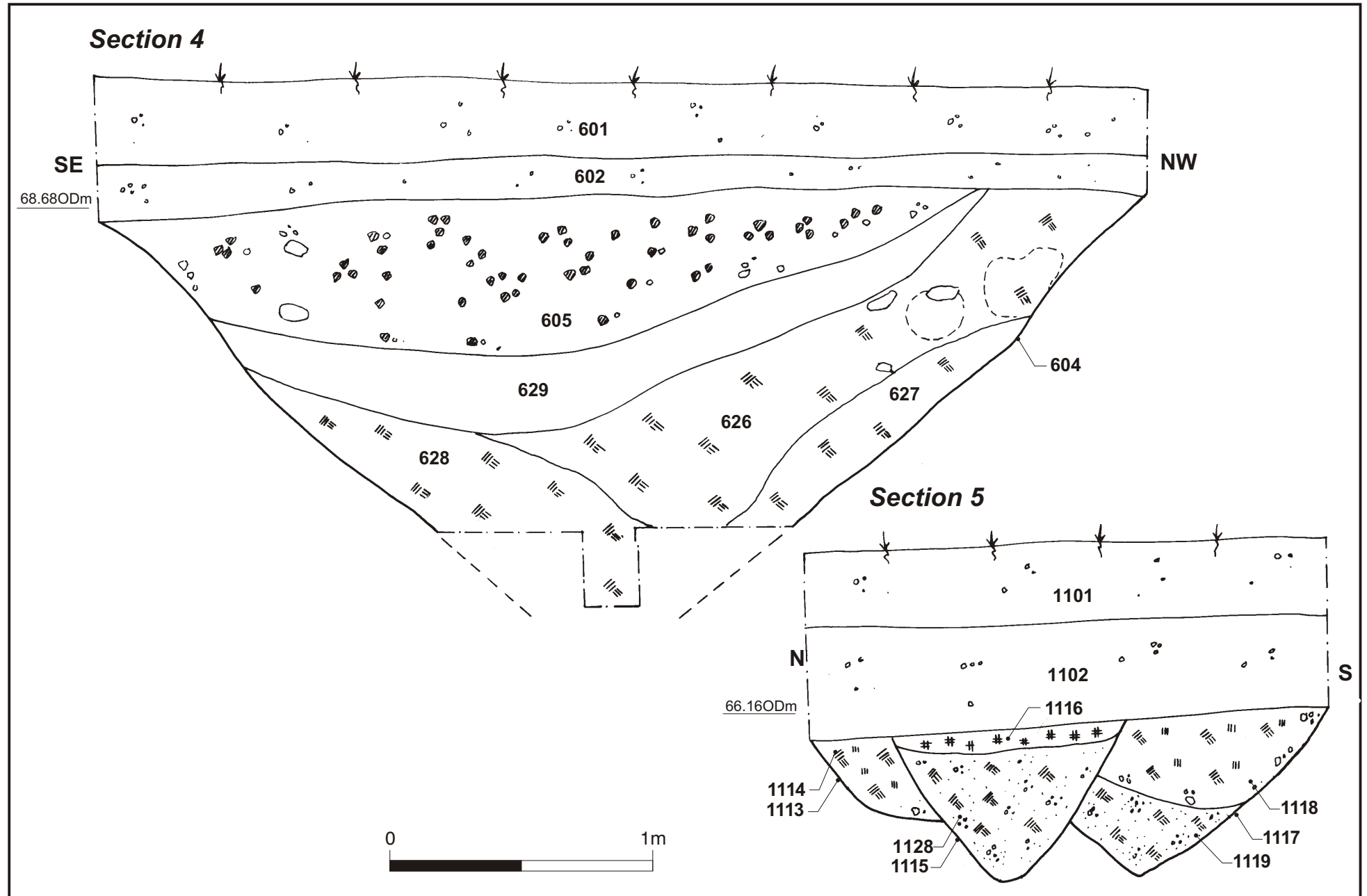


Fig. 13



Plate 1



Plate 2



Plate 3



Plate 4



Plate 5



Plate 6

Appendix 1 Context Inventory

feature nos. in []

IA = Iron Age Rom. = Roman med. = medieval

Trench	Context No	Type	Description	Width in M	Depth in M	Date
1	101	Topsoil	Dark brown clay loam		0.25	
	102	Subsoil	Dark yellow brown clay loam		0.23	
	103	Natural	Light yellow - brown			
	104	Fill of [105]	Light yellow – brown silty clay			2 nd cent.
	105	Ditch	Steep-sided, uneven flat base	0.97	0.44	2 nd cent.
	106	Fill of [107]	Dark grey - brown silty clay	0.82	0.08-0.15	2 nd cent.
	107	Gully	Shallow slightly stepped sides, uneven flat base	0.82	0.15	2 nd cent.
	108	Upper fill of [110]	Dark grey silty clay	1.20	0.43	late 2 nd cent. +
	109	Lower fill of [110]	Light grey – brown silty clay	0.44	0.14	late 2 nd cent. +
	110	Ditch	Slightly rounded V-shaped	1.20	0.56	late 2 nd cent. +
	111	Fill of [112]	Light yellow – brown silty clay	2.08	0.64	1 st cent. +
	112	Ditch	Uneven sides, uneven flattened base	2.08	0.64	1 st cent. +
	113	Fill of [114]	Dark grey – brown silty clay			Roman
	114	?Ditch	Largely truncated by [110]			Roman
	115	Fill of [116]	Light grey – brown silty clay			
	116	?Pit	cut by land drain	?	?	
2	201	Topsoil	Mid brown loamy clay		0.30	
	202	Subsoil	Light brown – grey silty clay		0.20-0.25	
	203	Natural	Blue – grey clay with orange sandy patches and flakes of chalk			
3	301	Topsoil	Mid brown loamy clay		0.30	
	302	Subsoil	Light brown – grey silty clay		0.20-0.25	
	303	Natural	Blue – grey clay with orange sandy patches and flakes of chalk			
	304	Gully	Bowl shaped, flat base	0.70	0.09	
	305	Fill of [304]	Mid orange brown silty clay	0.70	0.09	
	306	Gully	Bowl shaped, rounded base	0.70	0.12	
	307	Fill of [306]	Mid orange brown silty clay	0.70	0.12	
	308	Gully	Near vertical sides uneven flat base	0.52	0.18	
	309	Fill of [308]	Mid brown silty clay	0.52	0.19	
	310	Gully	Steep sided, flat base	0.68	0.14	
	311	Fill of [310]	Mid orange brown silty clay	0.68	0.14	
	312	Furrow	Gently sloping sides, rounded base	1.30	0.95	med.
	313	Fill of [312]	Mid – dark brown silty clay	1.30	0.95	med.
4	401	Topsoil	Dark yellow – brown clay loam			
	402	Subsoil	Yellow brown loam clay			
	403	Natural	Mottled yellow brown – blue grey clay			
	404	Gully	Shallow sides, curved base	0.80	0.30	

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Trench	Context No	Type	Description	Width in M	Depth in M	Date	
	405	Fill of [404]	Dark yellow - brown loam clay	0.80	0.30		
	406	Ditch	Steep sides, broad flat base	3.00	1.25	1 st /2 nd cent.	
	407	Fill of [406] (Upper)	Dark yellow grey loam clay	3.00	1.25	1 st /2 nd cent.	
	408	Fill of [406] (Middle)	Dark yellow brown loam clay	3.00	1.25	1 st /2 nd cent.	
	409	Fill of [406] (Lower)	Orange brown – blue grey silty clay	3.00	1.25	1 st /2 nd cent.	
	410	Ditch	Steep sides, flat base	1.60	1.10	2 nd cent.	
	411	Fill of [410] (Upper)	Dark grey loam clay	1.60	1.10	2 nd cent.	
	412	Fill of [410] (Lower)	Dark grey brown silty clay	1.60	1.10	2 nd cent.	
	5	501	Topsoil	Dark brown clay loam		0.34	
		502	Subsoil	Medium yellow brown clay		0.28	
		503	Natural	Blue grey – brown grey			
		504	Fill of [506]	Dark grey brown clay silt	1.20	0.25	Roman
505		Fill of [506]	Light grey brown clay silt	2.08	0.52	IA/Rom.	
506		Ditch	U shaped ,flat base	2.08	0.70	IA/Rom.	
507		Fill of [508]	Mid brown clay silt	1.07	0.38	2 nd cent.	
508		Ditch	Steep sides, flat base	1.07	0.38	2 nd cent.	
509		Fill of [510]	Light brown yellow	0.45	0.26		
510		Gully	Steep sides, uneven flat base	0.45	0.26		
511		Fill of [512]	Light yellow brown clay silt	0.60	0.06	med.	
512		Furrow?	Steep sides. Uneven flat base	0.60	0.06	med.	
513		Fill of [514]	Light brown grey silty clay	0.65	0.06	med.	
514		Furrow?	Steep sides, irregular flat base	0.65	0.06	med.	
6	601	Topsoil	Dark brown grey clay silty loam				
	602	Subsoil	Mid orange brown silty clay				
	603	Natural	Grey blue boulder clay				
	604	Ditch	Steep sides, not fully excavated	3.90	1.60+	mid 1 st cent.	
	605	Fill of [604] (Upper)	Dark grey brown / dark yellow brown loam clay			mid 1 st cent.	
	606	Gully/ditch		0.85			
	607	Fill of [606]	Mid grey brown silty clay				
	608	Gully/ditch		0.75			
	609	Fill of [608]	Mid grey brown silty clay				
	610	Gully/ditch		0.60			
	611	Fill of [610]	Dark grey brown sandy loam clay	0.60			
	612	Furrow?	Shallow sides, curved base	2.75	0.16	med.	
	613	Fill of [612]	Mid grey brown silty clay	2.75	0.16	med.	
	614	Land drain		1.25		modern	
	615	Fill of [614]	Mid grey brown loam silty clay	1.25		modern	
	616	Pit/ditch		1.30			
	617	Fill of [616]	Mid brown grey loam silty clay	1.30			
	618	Ditch					
	619	Fill of [618]	Mid grey brown loam silty clay				
	620	Ditch			0.65	Iron Age	
	621	Fill of [620]	Grey brown loam clay		0.65	Iron Age	
	622	Gully/ditch		2.60			
	623	Fill of [622]	Mid grey brown silty clay	2.60			

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Trench	Context No	Type	Description	Width in M	Depth in M	Date
	624	Post hole		0.30		
	625	Fill of [624]	Dark grey brown silty clay	0.30		
	626	Fill of [604] Lower fill	Dark grey brown silty clay			late 1 st /2 nd cent.
	627	Fill of [604] primary fill?	Dark grey brown silty clay			late 1 st /2 nd cent.
	628	Fill of [604] Primary fill?	Dark grey brown silty clay			
	629	Fill of [604] Middle fill	Dark grey yellow brown loam clay			
7	701	Topsoil				
	702	Subsoil				
	703	Natural	Light grey brown			
	704	Gully/ditch	Steep sides, curved base Bowl shaped	0.70	0.19	
	705	Fill of [704]	Mid – dark brown silty clay	0.70	0.19	
	706	Gully	Near vertical sides, uneven flat base	0.50	0.08	
	707	Fill of [706]	Mid – dark brown silty clay	0.50	0.08	
8	801	Topsoil				
	802	Subsoil				
	803	Natural	Light grey brown			
	804	Ditch	Steep sides, flat base U shaped	0.90	0.34	
	805	Fill of [804]	Medium yellow brown silty clay	0.90	0.34	
	806	Gully	Gentle sloping sides, flat base	0.73	0.15	
	807	Fill of [806]	Grey brown yellow silty clay	0.73	0.15	
	808	Gully	Gentle sloping sides, uneven flat base	0.71	0.19	
	809	Fill of [808]	Light yellow brown silty clay	0.71	0.19	
9	901	Topsoil				
	902	Subsoil				
	903	Natural				
10	1001	Topsoil				
	1002	Subsoil				
	1003	Natural	Orange grey brown			
	1004	Post hole	Steep sides, concave base	0.60	0.45	
	1005	Fill of [1004]	Dark yellow grey / grey brown clay loam	0.60	0.45	
	1006	Post hole	Shallow sides, rounded base	0.30	0.07	
	1007	Fill of [1006]	Grey brown clay loam	0.30	0.07	
11	1101	Topsoil	Grey brown loam clay			
	1102	Subsoil	Orange brown silty clay			
	1103	Natural	Orange brown – light grey brown silty clay			
	1104	Tree hole				
	1105	Post hole	Steep sides, rounded base	0.35	0.20	Iron Age
	1106	Fill of [1105]	Yellow grey brown loam clay	0.35	0.20	Iron Age
	1107	Gully	Steep sloping sides, rounded base	0.30	0.25	Iron Age
	1108	Fill of [1107]	Dark yellow loam clay	0.30	0.25	Iron Age
	1109	Gully	Steep sides, concave base	0.45	0.30	Iron Age
	1110	Fill of [1109]	Mixed yellow – dark yellow brown silty clay	0.45	0.30	Iron Age

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Trench	Context No	Type	Description	Width in M	Depth in M	Date
	1111	Pit	Steep sides, flat base	0.75	0.25	
	1112	Fill of [1111]	Dark yellow grey loam clay with burnt pebbles	0.75	0.25	
	1113	Ditch	Steep sides, slightly rounded base			
	1114	Fill of [1113]	Dark yellow brown loam clay			
	1115	Ditch	Steep sloping sides, rounded base	0.90	0.75	
	1116	Fill of [1115] Upper fill	Dark yellow brown loam clay			
	1117	Ditch	Steep sides, narrow concave base	1.10	0.70	mid-late IA
	1118	Fill of [1117] Upper fill	Yellow – grey brown loam clay			
	1119	Fill of [1117] Lower fill	Yellow brown silty clay			mid-late IA
	1120	Furrow			0.05?	med.
	1121	Fill of [1120]			0.05?	med.
	1122	Furrow			0.10?	med.
	1123	Fill of [1122]			0.10?	med.
	1124	Furrow			0.10?	med.
	1125	Fill of [1124]			0.10?	med.
	1126	Furrow			0.25?	med.
	1127	Fill of [1126]			0.25?	med.
	1128	Fill of [1115] Lower fill	Dark yellow brown loam clay			IA?
	1129	Gully	Shallow sides, concave base	0.30	0.10	
	1130	Post hole / pit	Steep sides, flat base	0.50	0.10	
	1131	Fill of [1130]	Dark yellow clay loam	0.50	0.10	
	1132	Fill of [1129]	Dark yellow brown silty clay	0.30	0.10	
12	1201	Topsoil	Dark grey brown clay loam		0.33	
	1202	Subsoil	Yellow brown silty clay		0.52	
	1203	Natural	Blue grey boulder clay			
	1204	Pit?	Steep sides, rounded base	0.79	0.20	Iron Age
	1205	Fill of [1204]	Mid grey brown silty clay	0.79	0.20	Iron Age
	1206	Gully/ditch	Steep sides, curved base	0.70	0.31	late 2 nd cent. +
	1207	Fill of [1206]	Dark brown grey loam silty clay	0.70	0.31	late 2 nd cent. +
	1208	Ditch	Steep sides, flat base	1.10	0.45	late 1 st /2 nd cent.
	1209	Fill of [1208] Upper fill	Dark yellow brown silty clay			late 1 st /2 nd cent.
	1210	Fill of [1208] Lower fill	Yellow brown silty clay			
	1211	Post hole	Steep sides, concave base	0.45	0.35	
	1212	Fill of [1211]	Yellow grey sandy clay	0.45	0.35	
	1213	Post hole	Steep sides, concave base	0.30	0.12	
	1214	Fill of [1213]	Mid brown silty clay	0.30	0.12	
	1215	Post hole	Steep sides, uneven base	0.69	0.37	
	1216	Fill of [1215]	Mid brown grey loam clay	0.69	0.37	
	1217		Shallow sides, flat base	0.13	0.42	
	1218	Fill of [1217]	Mid grey brown silty clay	0.13	0.42	
	1219	Pit	Steep near vertical sides, concave base	2.0	0.5	Iron Age
	1220	Fill of [1219]	Light grey brown loam clay			Iron Age

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Trench	Context No	Type	Description	Width in M	Depth in M	Date
		Upper fill				
	1221	Fill of [1219] Lower fill	Dark grey brown loam clay			Iron Age
	1222	Plough cut	U shaped	0.08	0.07	med.?
	1223	Fill of [1222]	Dark grey silty clay	0.08	0.07	med.?
	1224	Gully	Shallow sides, rounded base	0.32	0.08	
	1225	Fill of [1224]	Dark yellow brown silty clay	0.32	0.08	
13	1301	Topsoil	Dark grey brown clay loam		0.45	
	1302	Subsoil	Yellow brown silty clay		0.20	
	1303	Natural	Blue grey boulder clay			
	1304	Gully	Shallow sides, flat base	0.50	0.15	
	1305	Fill of [1304]	Yellow brown silty clay	0.50	0.15	
	1306	Gully	Shallow sides, Concave base	0.50	0.10	
	1307	Fill of [1306]	Dark yellow brown silty clay	0.50	0.10	
	1308	Gully	Shallow sides, uneven flat base	0.85	0.18	
	1309	Fill of [1308]	Yellow brown silty clay	0.85	0.18	
	1310	Gully	Steep sides, flat base	0.55	0.32	Iron Age ?
	1311	Fill of [1310]	Yellow brown silty clay	0.55	0.10	Iron Age ?
	1312	Furrow	Shallow sides, flat base	0.90	0.10	med.
	1313	Fill of [1312]	Yellow brown silty clay	0.90	0.10	med.
	1314	Gully	Steep sides, flat base	0.80	0.28	
	1315	Fill of [1314]	Yellow brown loam clay	0.80	0.28	
	1316	Ditch	Steep sides, flat base			same as 1208
	1317	Fill of [1316]	Dark yellow brown silty clay			same as 1209
14	1401	Topsoil	Mid brown loam clay			
	1402	Subsoil	Light brown silty clay			
	1403	Natural	Grey brown clay			
15	1501	Topsoil	Dark brown grey clay silty loam			
	1502	Subsoil	Mid orange brown silty clay			
	1503	Natural	Grey blue boulder clay			
	1504	Fill of [1509] Upper fill	Dark grey brown clay silt		0.55	late 2 nd cent. +
	1505	Fill of [1509] Mid-upper fill	Mottled grey green brown silty clay		0.40	late 2 nd cent. +
	1506	Fill of [1509] Middle fill	Mottled orange grey silty clay		0.50	
	1507	Fill of [1509]	Dark grey clay		0.18	
	1508	Fill of [1509] Primary fill	Mottled yellow – mid grey clay		0.40	late 2 nd cent. +
	1509	Ditch	Steep straight sides, flat base	3.20	1.40	late 2 nd cent. +
	1510	Gully	Bowl shaped – steep sides, rounded base	0.82	0.25	
	1511	Fill of [1510]	Dark grey brown silty clay		0.18	
	1512	Fill of [1510]	Mid grey brown silty clay		0.07	
	1513	Gully	Concave base	0.26	0.17	
	1514	Fill of [1513]	Mid grey brown silty clay	0.26	0.17	
	1515	Post hole	Bowl shaped, steep sides, round base			
	1516	Fill of [1515]	Mid grey brown			
	1517	Gully	Bowl shaped, steep sides, round base	0.73	0.26	

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Trench	Context No	Type	Description	Width in M	Depth in M	Date
	1518	Fill of [1517]	Dark grey brown silty clay		0.23	
	1519	Fill of [1517]	Mid grey brown silty clay		0.03	
	1520	Gully	Bowl shaped, steep sides, flat base	0.52	0.12	
	1521	Fill of [1520]	Dark grey brown silty clay	0.10		
	1522	Fill of [1520]	Mid grey brown silty clay	0.02		
	1523	Furrow	Shallow sides, curved base	2.02	0.21	med.
	1524	Fill of [1522]	Mid grey brown silty clay	2.02	0.21	med.
	1525	Furrow	Shallow sides, curved base	1.75	0.19	med.
	1526	Fill of [1525]	Mid grey brown silty clay	1.75	0.19	med.
	1527	Gully	Bowl shaped, steep sides, flat base	0.30	0.67	
	1528	Fill of [1527]	Mid grey brown silty clay	0.30	0.67	
	1529	Fill of [1530]	Brown grey clay	0.60	0.20	
	1530	Gully	Bowl shaped, steep sides, curved base	0.60	0.20	
	1531	Gully	Bowl shaped, steep sides, curved base	0.51	0.17	
	1532	Fill of [1531]	Mid grey brown silty clay	0.51	0.17	
	1533	not used				
	1534	not used				
	1535	not used				
	1536	Fill of [1537]	Dark grey brown yellow clay	0.90	0.40	late 2 nd cent. +
	1537	Ditch /pit	Bowl shaped, steep sides, curved base	0.90	0.40	late 2 nd cent. +
16	1601	Topsoil	Dark yellow – brown clay loam			
	1602	Subsoil	Yellow brown loam clay			
	1603	Natural	Mottled yellow brown – blue grey clay			
17	1701	Topsoil	Dark grey brown clay loam		0.30	
	1702	Subsoil	Yellow brown silty clay		0.52	
	1703	Natural	Blue grey boulder clay			
18	1801	Topsoil	Dark grey brown clay		0.33	
	1802	Subsoil	Yellow brown silty clay		0.42	
	1803	Natural	Blue grey boulder clay			
19	1901	Topsoil	Dark brown clay loam		0.27	
	1902	Subsoil	Yellow brown silty clay		0.47	
	1903	Natural	Blue grey boulder clay			
20	2001	Topsoil	Dark brown clay loam			
	2002	Subsoil	Yellow brown silty clay		0.50	
	2003	Natural	Blue grey boulder clay			
	2004	Furrow	Bowl shaped, shallow sides, flat base	0.60	0.06	med.
	2005	Fill of [2004]	Mid orange brown silty clay	0.60	0.06	med.
21	2101	Topsoil	Dark brown clay loam			
	2102	Subsoil	Yellow brown silty clay		0.49	
	2103	Natural	Blue grey boulder clay			
22	2201	Topsoil	Dark brown clay loam		0.27	
	2203	Subsoil	Yellow brown silty clay		0.57	
	2204	Natural	Blue grey boulder clay			
23	2301	Topsoil	Dark grey brown clay loam		0.33	
	2302	Subsoil	Yellow brown silty clay		0.52	
	2303	Natural	Blue grey boulder clay			
	2304	Vegetation	Mid brown	0.69	0.18 –	

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Trench	Context No	Type	Description	Width in M	Depth in M	Date
		ditch fill			0.27	
	2305	Gully/furrow	V shaped, steep sides, rounded base	0.45	0.16	
	2306	Fill of [2305]	Mid brown silty clay	0.45	0.16	
	2307	Gully/furrow	Bowl shaped, shallow sides, rounded base	0.31	0.06	
	2308	Fill of [2307]	Mid orange brown clay	0.31	0.06	
24	2401	Topsoil	Dark grey brown clay loam		0.28	
	2402	Subsoil	Yellow brown silty clay		0.30	
	2403	Natural	Blue grey boulder clay			
	2404	Ditch	Steep sides, uneven flat bottom	0.64	0.09	
	2405	Fill of [2404]	Mid orange brown silty clay	0.64	0.09	
	2406	Natural deposit	Silty clay	1.47	0.21	
25	2501	Topsoil	Dark grey brown clay loam		0.28	
	2502	Subsoil	Yellow brown silty clay		0.30	
	2503	Natural	Blue grey boulder clay			
	2504	Gully	Shallow sides, uneven flat base	1.05	0.21	1 st cent. +
	2505	Fill of [2504] Upper	Mid – dark brown silty clay	1.05	0.12	1 st cent. +
	2506	Fill of [2504] Lower	Light yellow brown silty clay	0.70	0.08	
	2507	Ditch	U shaped, steep sides, rounded base	0.85	0.51	early Rom.?
	2508	Fill of [2507] Upper	Mid – dark brown silty clay	0.70	0.30	early Rom.?
	2509	Fill of [2507] Lower	Light yellow brown	0.50	0.40	
	2510	Pit	Steep sides, uneven rounded base	0.69	0.30	
	2511	Fill of [2510]	Dark – mid brown silty clay	0.69	0.30	
	2512	Furrow?	Shallow sides, uneven flat base	0.52	0.04	med.?
	2513	Fill of [2512]	Mid grey brown silty clay	0.52	0.04	med.?
	2514	Gully	Steep sides, uneven base	0.90	0.28	mid-late 1 st cent?
	2515	Fill of [2514]	Mid grey brown silty clay	0.90	0.28	mid-late 1 st cent?
	2516	Furrow?	Shallow sides, uneven flat base	1.56	0.19	med.?
	2517	Fill of [2516]	Light brown silty clay	1.56	0.19	med.?
	2518	Plough score?	Shallow sides, rounded base	0.32	0.08	med.?
	2519	Fill of [2518]	Light grey brown silty clay	0.32	0.08	med.?
	2520	Pit	Shallow sides, uneven flat base	1.16	0.26	
	2521	Fill of [2520]	Mid grey brown silty clay	1.16	0.26	
	2522	Gully	Steep sides, uneven flat base	0.83	0.32	
	2523	Fill of [2522]	Dark grey brown silty clay	0.83	0.32	

Appendix 2 Summary of pottery

Cont	SHELL	GW	LNVC	other IA	other Ro	Tot No	Tot wt	fclay	Date
104	17	2	0	0	1	20	137	0	C2
106	1	8	0	0	0	9	71	0	C2
108	11	17	4	0	20	52	625	0	late C2+
109	0	45	0	0	1	46	190	0	C2
111	0	0	0	0	4	4	10	0	C1+
113	6	0	0	0	0	6	12	0	Roman
408	2	0	0	0	0	2	36	0	C1/C2
411	0	2	0	0	0	2	11	0	C2
504	1	0	0	0	0	1	10	0	Roman
505	3	0	0	0	0	3	431	0	IA/RO
507	0	2	0	0	0	2	8	0	C2
605	5	2	0	0	7	14	203	0	C1+
605	9	1	0	0	4	14	85	5	mid C1+
621	2	0	0	0	0	2	90	0	IA
626	8	2	0	0	4	14	160	1	late C1-C2
627	0	0	0	0	2	2	70	0	late C1-C2
1106	12	0	0	0	0	12	6	0	IA
1108	1	0	0	6	0	7	5	7	IA
1108	4	0	0	0	0	4	20	0	IA
1110	12	0	0	0	0	12	38	0	?IA
1110	1	0	0	0	0	1	8	0	IA
1114	1	0	0	0	0	1	1	1	nd
1118	0	0	0	0	0	0	0	1	nd
1119	15	0	0	0	0	15	56	0	M-LIA
1127	2	0	0	0	0	2	1	0	nd
1128	0	0	0	1	0	1	10	0	Preh
1205	3	0	0	0	0	3	7	0	IA
1207	0	1	1	0	1	3	68	0	late C2+
1207	0	0	0	0	0	0	0	1	ND
1209	2	3	0	0	19	24	286	0	late C1-C2
1221	7	0	0	0	0	7	78	0	IA
1311	0	0	0	2	0	2	8	0	?IA
1504	6	2	5	0	0	13	184	0	late C2+
1505	2	0	2	0	0	4	36	0	late C2+
1508	0	0	1	0	0	1	155	0	late C2+
1536	0	0	1	0	0	1	3	0	late C2+
2505	3	0	0	0	3	6	154	0	C1+
2508	1	0	0	0	0	1	2	1	?ERo
2513	6	9	0	0	2	17	259	0	late C1-C2
2515	12	51	0	0	25	88	1338	1	mid-late C1
2517	2	0	0	0	0	2	4	0	?ERo
Tr 12 us	1	0	0	0	0	1	5	0	IA
TOTAL	158	147	14	9	93	421	4881	18	

SHELL: shelly ware

GW: grey ware

LNVC: Lower Nene Valley Colour-Coat

Appendix 3 Table 1: Number of identified mammalian bone elements by species/taxon and context

Sample Context No.	Feature	Trench No.	human	horse	cattle	sheep/ goat	pig	roe deer	LAR	SAR	mammal	TOTALS
104	ditch [105]	1			5		1				14	20
106	gully [107]	1							2			2
108	ditch [110]	1			5	4					14	23
111	ditch [112]	1			1	1						2
409	ditch [406]	4			1							1
411	ditch [410]	4			2							2
504	ditch [506]	5			2							2
505	ditch [506]	5			13							13
605	ditch [604]	6			10		1	1		2		14
626	ditch [604]	6			3	17				1		21
1108	gully [1107]	11				1						1
1119	ditch [1117]	11		1							1	2
1128	ditch [1115]	11	1									1
1221	pit [1219]	12			1	1					1	3
1311	gully [1310]	13		1								1
1504	ditch [1509]	15		1	1	1						3
1505	ditch [1509]	15			3		1					4
1536	ditch [1537]	15	7									7
2508	gully [2507]	25		1		1						2
2511	pit [2510]	25			1							1
2515	gully [2514]	25			2	3	2			2		9
TOTALS			8	4	50	29	5	1	2	5	30	134

LAR = large artiodactyl (cattle sized fragments)

SAR = small artiodactyl (sheep/goat/pig sized fragments)

mammal = unidentified small mammal bone fragments

ELLANDS FARM, HEMINGTON

Appendix 3 Table 2: Weight of bone (g) by species/taxon and context

Sample Context No.	Feature	Trench No.	human	horse	cattle	sheep/goat	pig	roe deer	LAR	SAR	mammal	TOTALS
104	ditch [105]	1			124.1		15.9				20.9	160.9
106	gully [107]	1							9.3			9.3
108	ditch [110]	1			67.1	36.5					16.2	119.8
111	ditch [112]	1			100.8	3.2						104
409	ditch [406]	4			67.2							67.2
411	ditch [410]	4			163.3							163.3
504	ditch [506]	5			403.5							403.5
505	ditch [506]	5			550.0							550
605	ditch [604]	6			290.0		9.1	11.6		7.2		317.9
626	ditch [604]	6			17.9	72.7				3.2		93.8
1108	gully [1107]	11				0.8						0.8
1119	ditch [1117]	11		29.3							4.1	33.4
1128	ditch [1115]	11	41.8									41.8
1221	pit [1219]	12			2.0	5.9					2.4	10.3
1311	gully [1310]	13		37.3								37.3
1504	ditch [1509]	15		11.3	14.9	11.7						37.9
1505	ditch [1509]	15			87.3		7.4					94.7
1536	ditch [1537]	15	105.3									105.3
2508	gully [2507]	25		74.0		5.8						79.8
2511	pit [2510]	25			20.1							20.1
2515	gully [2514]	25			340.0	10.6	14.3			9.0		373.9
TOTALS			147.1	151.9	2248.2	147.2	46.7	11.6	9.3	19.4	43.6	2825.0