

ARCHAEOLOGICAL EVALUATION REPORT:

GEOPHYSICAL SURVEY BY MAGNETOMETRY ON LAND AT ROYCROFT FARM, UTTOXETER, STAFFORDSHIRE

Planning Reference: P/2013/01287

NGR: SK 0783 3350

AAL Site Code: UTRF 16

OASIS Reference Number: allenarc1-244982



Report prepared for Lioncourt Homes

By
Allen Archaeology Limited
Report Number AAL 2016048

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Allenarchaeology



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Element:	Name:	Date:
Report prepared by:	Robert Evershed BSc (Hons)	08/03/2016
Illustrations prepared by:	Robert Evershed BSc (Hons)	07/03/2016
Report edited by:	Natasha Powers BSc MSc MCifA MCMi	22/03/2016
Report reviewed by:	Chris Clay BA MA (Hons)	23/03/2016
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Cover image: View of site, looking north

Executive Summary

- Allen Archaeology Ltd was commissioned by Lioncourt Homes to undertake a geophysical survey using magnetometry, on land off Roycroft Farm, Uttoxeter, as part of a staged evaluation prior to a residential development of the site.
- The survey revealed a number of features of potential archaeological interest. The most obvious is the ridge and furrow cultivation which is aligned roughly north-northwest to south-southeast across most of the western half of the site. At the southern end the ridge and furrow appear to stop abruptly where they meet a number of potential positive, linear anomalies which are aligned roughly east to west. These anomalies could represent a former headland or field boundary, contemporary with the ridge and furrow.
- A very faint, potentially curvilinear or circular, positive feature within the largest field surveyed could represent a former enclosure, predating the ridge and furrow.
- There are a number of short, linear features within the northern half of the site that could represent former ditches, paths or trackways. These features could be indicative of earlier field systems but their various alignments, along with their short lengths, means any theory as to their purpose or function would, at this stage, be tenuous at best, and they may represent features of natural, rather than anthropogenic origin.
- Areas of magnetic noise were located along the edges of the survey areas, and are likely to represent the build-up of waste or detritus relating to modern agricultural practices. One of the areas of magnetic noise can be directly related to a former pond which can be seen on historic maps, whilst two other areas may relate to the demolition of former buildings.
- A large linear dipolar feature aligned northeast to southwest in the northwest part of the site relates to a modern service pipe.

1.0 Introduction

- 1.1 Allen Archaeology Ltd (AAL) was commissioned by Lioncourt Homes to undertake a geophysical survey using magnetometry on land off Roycroft Farm, Uttoxeter, Staffordshire, as part of a staged evaluation, required as a condition of planning consent for a residential development.
- 1.2 The site works and reporting conform to current national guidelines as set out in 'Geophysical Survey in Archaeological Field Evaluation' (English Heritage 2008), 'The Use of Geophysical Techniques in Archaeological Evaluations' (Gaffney et al. 2002), the Chartered Institute for Archaeologists 'Standard and guidance for archaeological geophysical survey' (CIfA 2014) and a specification prepared by this company (AAL 2016).

2.0 Site Location and Description

- 2.1 Uttoxeter is situated in the administrative district of East Staffordshire Council, approximately 32km west of Derby. The site comprises a series of agricultural fields in total c.8.05ha in size, and centred on NGR SK 0783 3350.
- 2.2 The bedrock geology comprises Mercia Mudstone Group, overlain by superficial deposits of glaciofluvial sands and gravels of the mid Pleistocene period to the north, while along the southern boundary of the site the bedrock is overlain by alluvial deposits of clay, silt, sand and gravel (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>).

3.0 Planning Background

- 3.1 A planning application (P/2013/01287) for residential development was submitted for this site and was supported by a desk-based assessment (King and Nicholls 2013). The initial application was refused permission; however, following an appeal permission was granted with the following condition:

11 No development shall take place until a written scheme of investigation in accordance with Paragraph 9.5 of the Archaeological Assessment prepared by Foundations Archaeology (Reference 883 dated April 2013) securing the implementation of a programme of archaeological work has been submitted to and approved in writing by the Local Planning Authority. The programme of work shall be implemented in accordance with the approved details.

- 3.2 AAL contacted Staffordshire Historic Environment Team and were advised that the appropriate response would be for a staged evaluation including geophysical survey, fieldwalking (where possible) and targeted evaluation, prior to any possible future mitigation. This document reports on the results of the geophysics element of the project.
- 3.3 The approach adopted is consistent with the recommendations of the current National Planning Policy Framework (NPPF), with the particular chapter of relevance being 'Chapter 12: Conserving and enhancing the historic environment' (Department for Communities and Local Government 2012).

4.0 Archaeological and Historical Background

- 4.1 A desk-based assessment has been previously produced for this project (King and Nicholls 2013), and a summary of the data is reproduced here along with relevant information from the wider landscape.
- 4.2 Prehistoric activity within the immediate area of the site is limited to findspots of worked flint including a piece recovered c.500m east of the site in the 19th century (Staffordshire Monument ID MST695) and an arrowhead found c.700m to the southeast (MST694), while a Bronze palstave of late Bronze Age date was recorded in the bank of an old road c.640m northeast of the site (MST6321). Of more interest is the potential for prehistoric burnt mounds in the wider area, associated with natural waterways. Investigation in 2006 on a site at Cox Bank Farm, just over 1km to the southeast, revealed a burnt mound covering a very well-preserved timber-lined trough, dated to the mid to late Bronze Age (Hollins and Carnes 2007). Approximately 2km to the southeast are the remains of a Bronze Age bowl barrow on Toot Hill (Monument No.307387).
- 4.3 There is no evidence for Roman activity within the immediate area of the site; however, there are cropmarks thought to indicate a settlement immediately south of the site with findspots of pottery, metal artefacts and coins of Roman date. This is an antiquarian findspot and the provenance is now unsure, with the cropmark no longer visible (Monument 305130). Another findspot of a Roman coin was noted on Uttoxeter Heath (Monument 305142).
- 4.4 Uttoxeter is thought to have early medieval origins, and may have been an important settlement belonging to the Earls of Mercia (King and Nicholls 2013). Place name evidence suggests Uttoxeter developed from *Wotocheshede*, which is probably derived from the Old English personal name *Wittuc* and the suffix *haeddre*, perhaps meaning heath.
- 4.5 Medieval evidence within the site is dominated by remnants of ridge and furrow, which are present within and around the study area (King and Nicholls 2013). Findspots of medieval date in the area include a key (MST 15254) found c.600m to the east, while there is evidence for a 13th century smelting site in Uttoxeter itself (MST689).
- 4.6 Historic mapping and aerial photographs have revealed the presence of field boundaries, earthworks and structures dating to the post-medieval period, in particular a possible fishpond (MST2151). This site refers to an area labelled as 1203 on the Uttoxeter tithe map of 1839–1843 and is suggested as being of post-medieval date.

5.0 Methodology

- 5.1 The geophysical survey consisted of a detailed gradiometer survey of the proposed development area, totalling approximately 8 hectares. The survey was undertaken in a series of 30m grids across the site. It was not possible to survey some areas due in part to the presence of badger setts and material from the demolition of some of the buildings on site.
- 5.2 The fieldwork was carried out by a team of two experienced geophysicists over a period of three working days, Tuesday 1st to Thursday 3rd March 2016. The survey area was located using a Leica GS08 RTK NetRover GPS. This accurately plotted the area of investigation and tied it into the National Grid.
- 5.3 The survey was carried out using a Bartington Grad601-2 Dual Fluxgate Gradiometer with an on-board automatic DL601 data logger. This instrument is a highly stable magnetometer which utilises two vertically aligned fluxgates, one positioned 1m above the other. This arrangement is then

duplicated and separated by a 1m cross bar. The 1m vertical spacing of the fluxgates provides for deeper anomaly detection capabilities than 0.5m spaced fluxgates. The dual arrangement allows for rapid assessment of the archaeological potential of the site. Data storage from the two fluxgate pairs is automatically combined into one file and stored using the on-board data logger.

- 5.4 Data collection was undertaken in a zigzag traverse pattern, using a sample interval of 0.25m and a traverse interval of 1m.

Summary of Survey Parameters

5.5 Fluxgate Magnetometer

Instrument:	Bartington Grad601-2 Dual Fluxgate Gradiometer
Sample Interval:	0.25m
Traverse Interval:	1.00m
Traverse Separation:	1.00m
Traverse Method:	Zigzag
Resolution:	0.1nT
Processing Software:	3.0.29.1
Surface Conditions:	Short grass
Area Surveyed:	5.8 hectares
Date Surveyed:	Tuesday 1 st to Thursday 3 rd March 2016
Surveyor:	Robert Evershed BSc (Hons)
Survey Assistant:	Ryan Godbold
Data Interpretation:	Robert Evershed BSc (Hons)

Data Collection and Processing

- 5.6 The grids were marked out using the Leica GS08 Net rover. The collection of magnetic data using a north-south traverse pattern is preferable as the fluxgate gradiometer is set up and balanced with respect to the cardinal points. Since the data is plotted as north-south traverses there is considerable merit sampling the north-south response of a magnetic anomaly with as many data points as is possible, this is accomplished as the density collected along the traverse line is greater than that between traverses (Aspinall *et al.* 2008). On this occasion magnetic data was collected on a north-south alignment, due to the orientation of the field and the pre-programmed grids.
- 5.7 The data collected from the survey has been analysed using the current version of Terrasurveyor 3.0.29.1. The resulting data set plots are presented with positive nT/m values and high resistance as black and negative nT/m values and low resistance as white.

The data sets have been subjected to processing using the following filters:

- De-stripping
- Clipping
- De-staggering

- 5.8 The de-stripe process is used to equalise underlying differences between grids or traverses. Differences are most often caused by directional effects inherent to magnetic surveying instruments, instrument drift, instrument orientation (for example off-axis surveying or heading errors) and delays between surveying adjacent grids. The de-stripe process is used with care

however as it can sometimes have an adverse effect on linear features that run parallel to the orientation of the process.

- 5.9 The clipping process is used to remove extreme data point values which can mask fine detail in the data set. Excluding these values allows the details to show through.
- 5.10 The de-staggering process compensates for data correction errors caused by the operator commencing the recording of each traverse too soon or too late. It shifts each traverse forward or backwards by a specified number of intervals.
- 5.11 Plots of the data are presented in processed linear greyscale (smoothed) with any corrections to the measured values or filtering processes noted, and as separate simplified graphical interpretations of the main anomalies detected.

6.0 Results

- 6.1 For the purposes of interpreting the anomalies, the survey data has been processed to the values of -3 to 3 nT/m (Figure 3). This enhances faint anomalies that may otherwise not be noted in the data, with a number of anomalies identified across the data set, and these are discussed in turn and noted as single or double digit numbers in square brackets.
- 6.2 Due to the presence of badger setts, part of the site was not accessible for surveying. These areas had been marked out with red stakes. (Plate 1).



Plate 1: Badger area marked out by red stakes

- 6.3 At the far northeast of the survey area, part of the field was being used by a construction crew who were demolishing some of the buildings on the site. This meant that this area was unsuitable for surveying (Plate 2).



Plate 2: Area unsuitable for surveying in the northeast corner of site

- 6.4 Immediately noticeable are the linear dipolar anomalies [1] and [2], producing magnetic readings of -100 to 100 nT/m, in the northwest corner of the site. These relate to buried modern services.
- 6.5 The area of magnetic noise [3], producing readings of -100 to 100 nT/m, relates to the infill of a pond seen on historic Ordnance Survey Maps. It is highly likely the fill contains either ferrous or highly fired material which would produce such a large reading. It is possible there may also be a modern service within this area.
- 6.6 The area of magnetic noise [4], -100 to 100 nT/m, relates to large metal cables running from the ground up to a telegraph pole carrying electric cables.
- 6.7 The large area of magnetic noise [5], with readings up to -100 to 100 nT/m, along the northeastern site boundary relates to a metal fence, the current farm building and a metal gate. It is likely that the magnetic noise to the east of [5] relates to a modern dump of ferrous or highly fired material.
- 6.8 The area of magnetic noise [6], with readings up to -100 to 100 nT/m, likely represents the demolition material of a former building present on site at the time of the 1st Edition OS Map in 1884, but gone by the time of the 2nd Edition in 1901. The 1884 map also shows the location of pumps within this area.
- 6.9 The area of magnetic noise [7], -100 to 100 nT/m, also likely relates to demolition rubble of a former building seen on the 1884 map.
- 6.10 The area of magnetic noise [8], -6 to 6 nT/m with some larger spikes, along the eastern and southern borders of the largest field relates to a metal and wooden fence. It is also possible a build-up of modern farming waste or detritus along the field edge is contributing to these readings.
- 6.11 There are a series of parallel linear positive anomalies aligned roughly north-northwest to south-southeast across most of the northern part of the site [9]. These have produced readings of up to 3 nT/m, and represent ridge and furrow cultivation.
- 6.12 The linear positive anomalies [10] – [13], produced readings between 1 and 6 nT/m and likely relate to former ditches, paths or trackways, but their short length precludes any detailed interpretation.

- 6.13 A further pair of parallel positive linear features [14], 20 nT/m, could relate to the walls of a former building ditches flanking a trackway.
- 6.14 Much of the large southern field was characterised by a series of parallel linear positive anomalies [15], 2 to 3 nT/m, representing ridge and furrow cultivation, on the same alignment as [9] in the field to the north.
- 6.15 In the centre of this field was a large but very faint curvilinear/circular positive feature [16], up to 1 nT/m, possibly representing a large former enclosure feature.
- 6.16 Within this enclosure was an amorphous positive anomaly [17], 25 nT/m, and located slightly to the southeast just outside the enclosure, a second amorphous positive anomaly, 4 nT/m, which are likely to represent pits, soil-filled hollows or former ponds.
- 6.17 The linear positive anomalies [18], 1 to 4 nT/m, likely represent a former field boundary or headland, predating the First Edition OS Map. Apparent within the field there is a slight hollow aligned roughly east to west which matches up with the geophysical results. The survey suggests the ridge and furrow cultivation stops as it meets [18], further indicating that this may be a contemporary headland or boundary.
- 6.18 The series of linear dipolar spikes [19], -100 to 100 nT/m, aligned roughly east to west towards the south end of the site, could relate to a potential earlier field boundary predating the historic OS maps.
- 6.19 The amorphous positive anomalies [20], 2 to 4 nT/m, possibly relate to pits, soil-filled hollows or former ponds, or could represent geological variation or other features related to the stream running along the southern edge of the site.
- 6.20 Scattered randomly throughout the site are a number of strong and weak dipolar responses, examples of which are highlighted as [21]. The characteristic dipolar response of pairs of positive and negative 'spikes' suggest near surface ferrous metal or other highly fired material in the ploughsoil.

7.0 Discussion and Conclusions

- 7.1 The survey has revealed some features of potential archaeological interest. The most obvious features are the ridge and furrow cultivation aligned roughly north-northwest to south-southeast across most of the western half of the site. Towards the southern end of the site, the ridge and furrow appears to stop abruptly where it meets a number of positive linear anomalies aligned roughly east to west. This relationship indicates that this feature is very likely to be a headland or former field boundary contemporary with the ridge and furrow.
- 7.2 A very faint, potential curvilinear or circular, positive feature within the largest field surveyed could represent a former enclosure or boundary ditch. This appears to be overlain by the ridge and furrow cultivation, thus suggesting a pre-medieval date for the feature, although its precise date and function are not clear.
- 7.3 Other features of note comprise a number of short linear features within the northern half of the site that could represent former ditches, paths or trackways. The short sections of these features surviving suggest that they may have been heavily truncated by recent ploughing, and their limited survival makes it difficult to confidently interpret their function, and whether they indeed represent archaeological or natural features.

- 7.4 Various areas of magnetic noise were located along the edges of the survey areas, and probably represent the build-up of waste or detritus relating to modern agricultural practices. One of the areas of magnetic noise can be directly related to a former pond on the site seen on historic maps, whilst two other areas may relate to the demolition of former buildings.

8.0 Effectiveness of Methodology

- 8.1 The non-intrusive evaluation methodology employed was particularly appropriate to the scale and nature of the site to be surveyed. Magnetometry was the prospection technique best suited to the identification of archaeological remains on the site. Other techniques would have required further justification and may have proved too time consuming or cost-prohibitive.

9.0 Acknowledgements

- 9.1 Allen Archaeology Limited would like to thank Lioncourt Homes for this commission.

10.0 References

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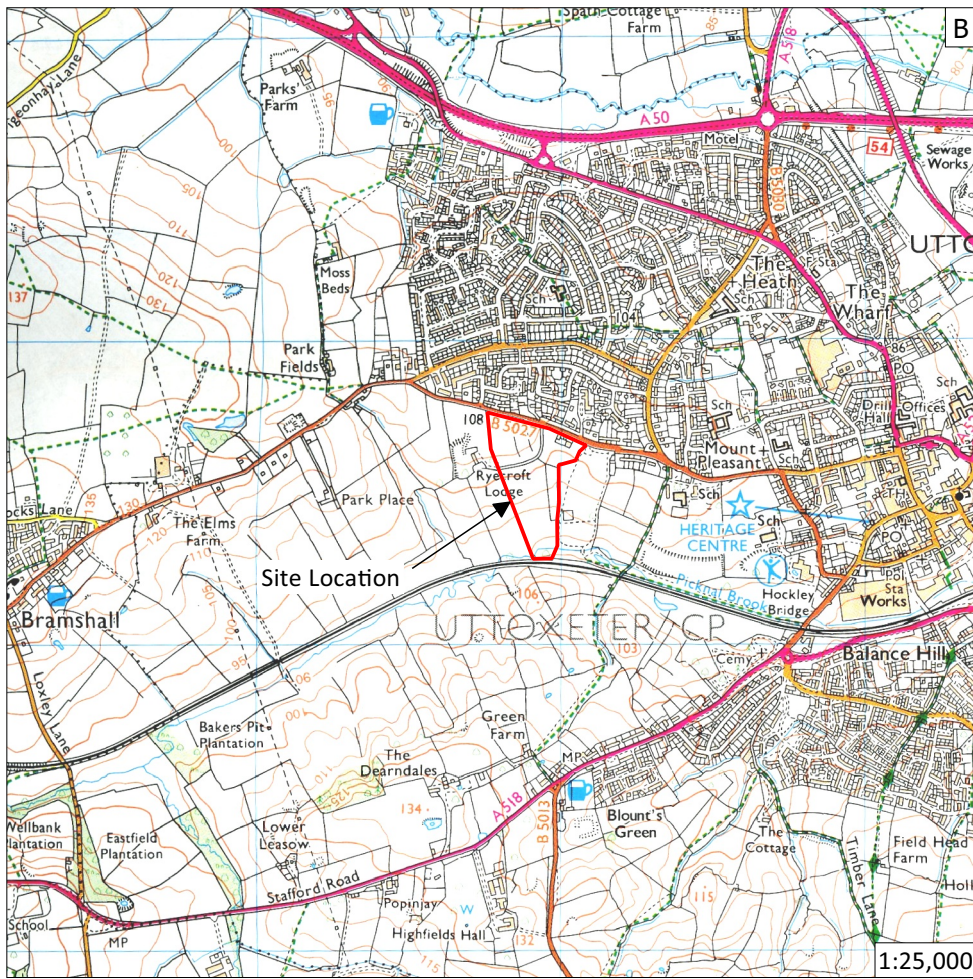
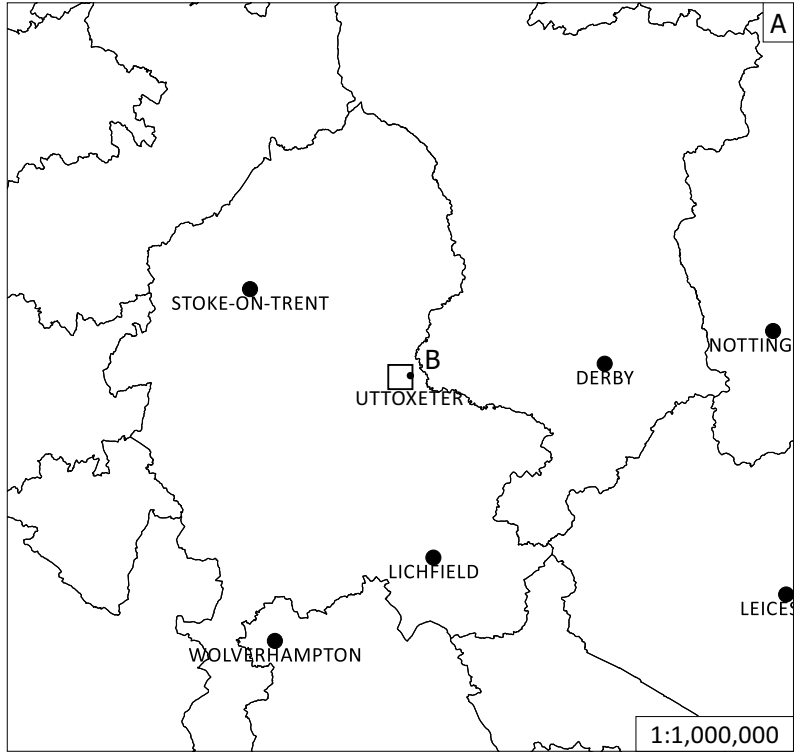
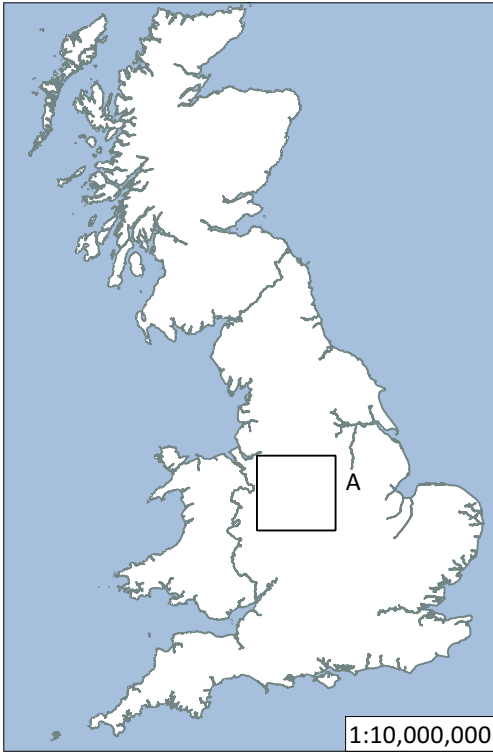


Figure 1: Site location outlined in red

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Site Code	UTRF 16
Scale	1:10,000,000 1:1,000,000 1:25,000 @ A4
Drawn by	R Evershed
Date	07/03/15

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Raw data (clipped to +/- 40 nT)

Trace Plot (ZMT and clipped to +/- 25nT)

0 300m
Scale 1:3,000

Site Code	UTRF 16
Scale	1:3,000 @ A4
Drawn by	R Evershed
Date	07/03/16

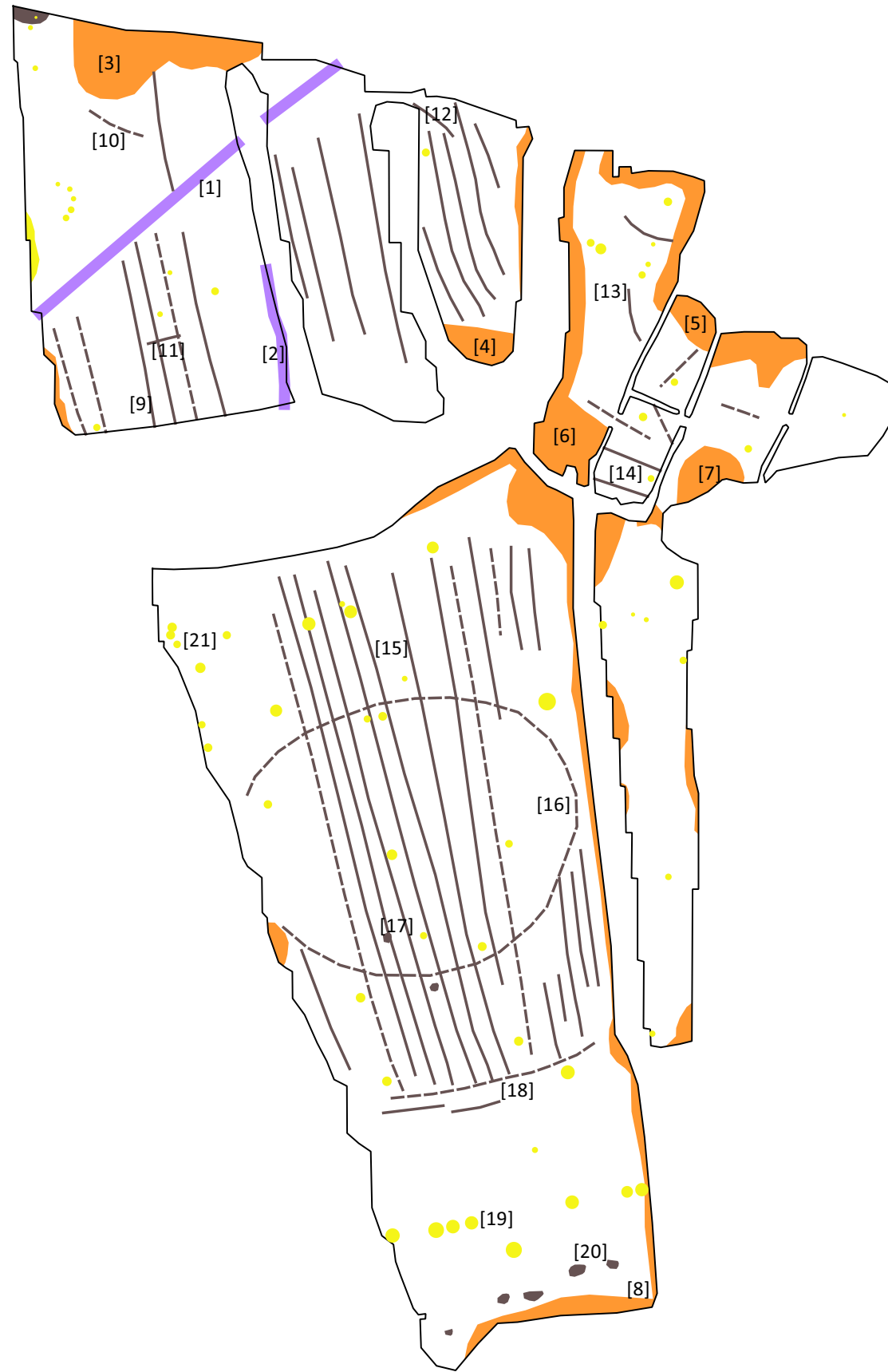
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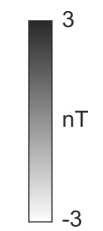
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Figure 2: Greyscale raw data and processed trace plot



Key

-  Positive anomaly
-  Magnetic noise
-  Dipolar anomaly
-  Linear dipolar anomaly
-  Site Boundary



Site Code	UTRF 16
Scale	1:2,000 @A3
Drawn	Robert Evershed
	07/03/16

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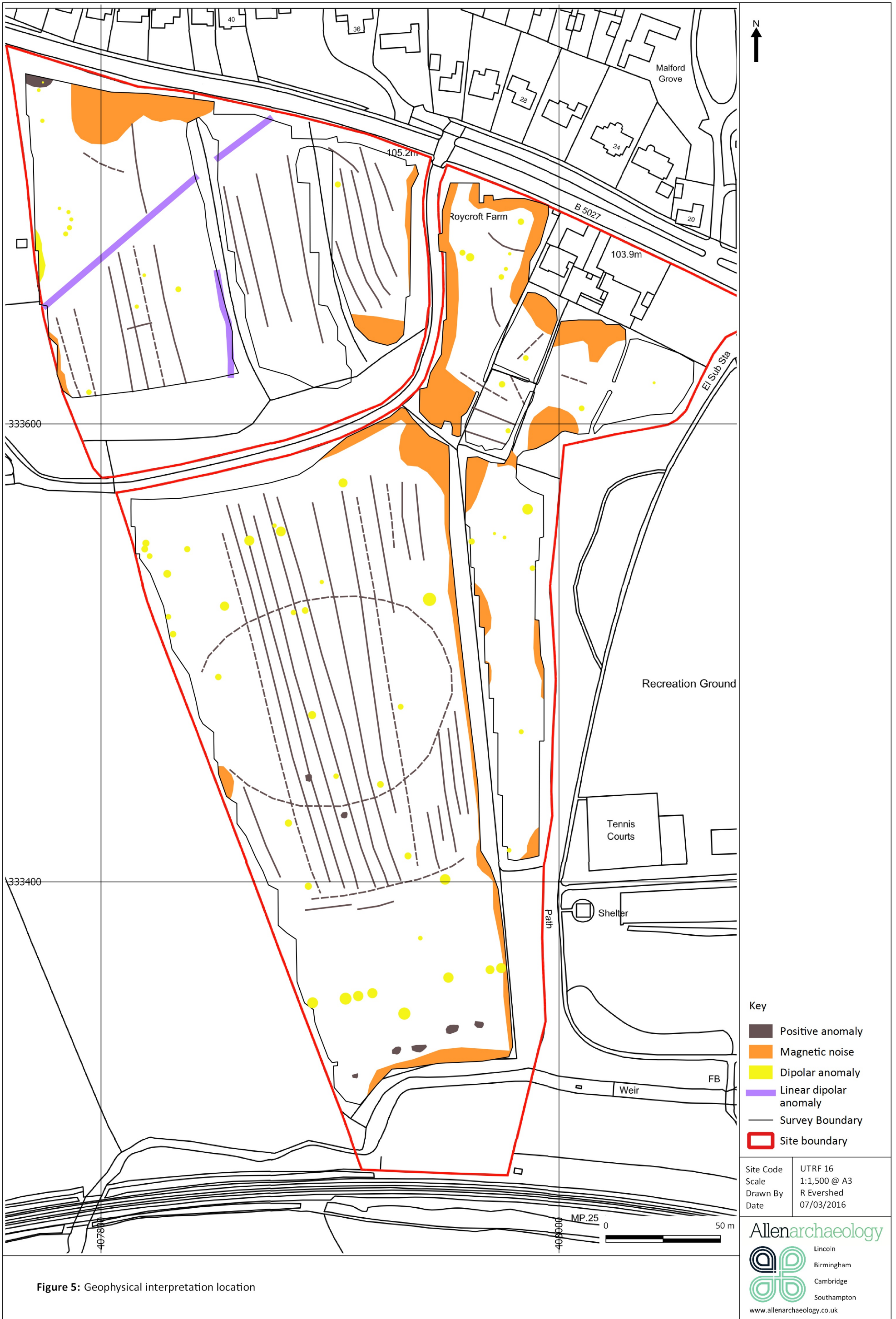
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Figure 3: Processed greyscale plot and interpretation



Figure 4: Location of geophysical survey



- Key**
- Positive anomaly
 - Magnetic noise
 - Dipolar anomaly
 - Linear dipolar anomaly
 - Survey Boundary
 - Site boundary

Site Code UTRF 16
 Scale 1:1,500 @ A3
 Drawn By R Evershed
 Date 07/03/2016

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Figure 5: Geophysical interpretation location



Allen Archaeology Limited
Website: www.allenarchaeology.co.uk

Company Registered in England and Wales No: 6935529

Lincoln
Whisby Lodge
Hillcroft Business Park
Whisby Road
Lincoln
LN6 3QL

Birmingham
Arion Business Centre
Harriet House
118 High Street
Birmingham
B23 6BG

Cambridge
Wellington House
East Road
Cambridge
CB1 1BH

Southampton
International House
Southampton International Business Park
George Curl Way
Southampton
SO18 2RZ

Tel/Fax: +44 (0) 1522 685356
Email: info@allenarchaeology.co.uk

Tel/Fax: +44 (0) 800 610 2545
Email: birmingham@allenarchaeology.co.uk

Tel/Fax: +44 (0) 800 610 2550
Email: cambridge@allenarchaeology.co.uk

Tel: +44 (0) 800 610 2555
Email: southampton@allenarchaeology.co.uk