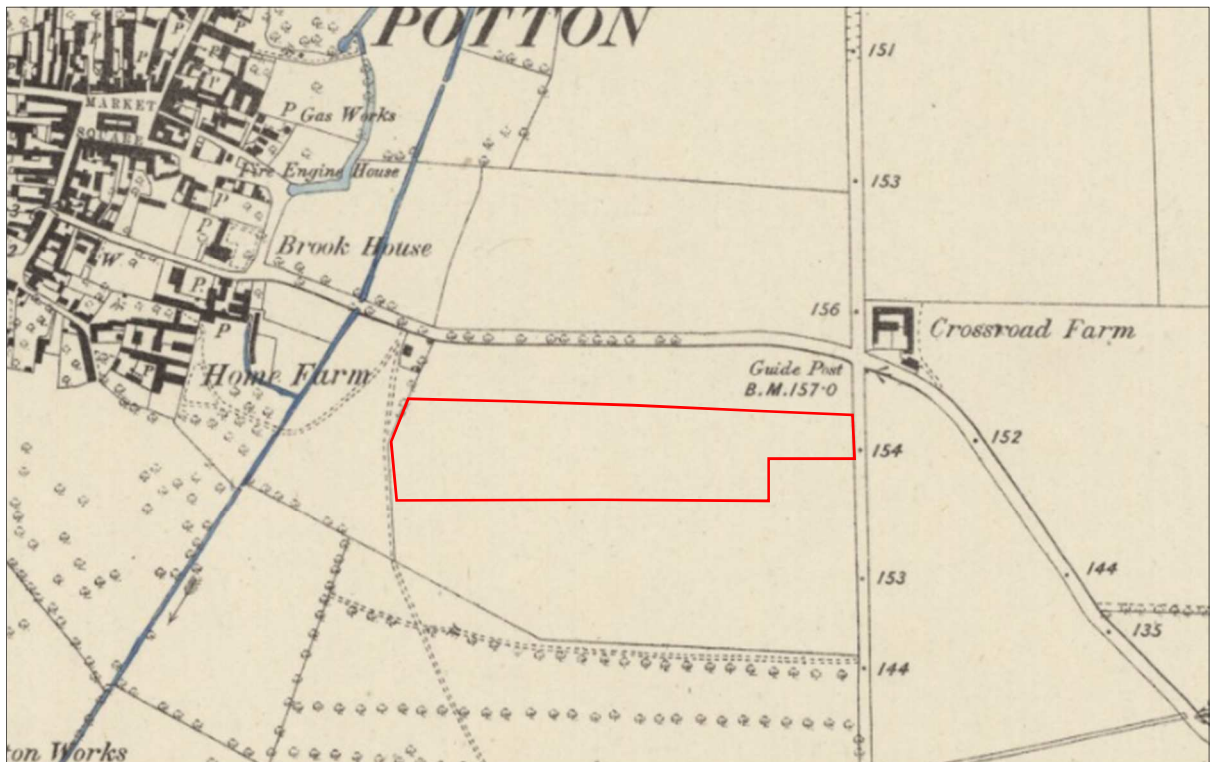


ARCHAEOLOGICAL EVALUATION REPORT:
GEOPHYSICAL SURVEY BY MAGNETOMETRY ON LAND OFF SUTTON ROAD, POTTON,
BEDFORDSHIRE

NGR: TL 22805 48900
AAL Site Code: POSR 17
Planning reference: CB/17/01096/OUT
OASIS Reference Number: allenarc1-284014



Report prepared for Hollins Strategic Land

By
Allen Archaeology Limited
Report Number AAL 2017067

May 2017



Allenarchaeology



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Document Control

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Executive Summary

- Allen Archaeology Limited was commissioned by Hollins Strategic Land to undertake a geophysical survey using magnetometry on land off Sutton Road, Potton, Bedfordshire prior to determination of a planning application.
- The survey identified very little of archaeological interest, with the majority of linear positive features most likely relating to cultivation activity, potentially ploughed or medieval ridge and furrow. Two parallel linear anomalies are likely to be of archaeological origin, and resemble drainage ditches to either side of a former trackway. There were a large number of dipolar spikes across the entire site, likely to have been caused by near-surface ferrous litter.
- The likelihood that significant archaeological remains will be encountered across the site is considered to be low. Given the likelihood of significant archaeological remains on the site is low, it is considered that this geophysical survey is an appropriate and sufficient level of detail "proportionate to the assets' importance" at this outline application stage, in-line with para.128 of the NPPF. Any further intrusive work requested by the authority can be secured by condition and undertaken prior to development.

1.0 Introduction

- 1.1 Allen Archaeology Limited was commissioned by Hollins Strategic Land to undertake a geophysical survey using magnetometry on land off Sutton Road in Potton, Bedfordshire, prior to determination of a planning application for development of the site.
- 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), and the Chartered Institute for Archaeologists '*Standard and guidance for archaeological geophysical survey*' (CIfA 2014).

2.0 Site Location and Description

- 2.1 Potton is both a town and civil parish in Central Bedfordshire, approximately 17km east of Bedford. The proposed development area comprises a c.3.4ha broadly rectangular block of land, approximately 500m from the traditional core of the village. The site centres on NGR TL 22805 48900 (Figure 1).
- 2.2 The bedrock geology of the proposed development area comprises Woburn Sands Formation sandstone, with no overlying superficial deposits recorded on the site (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>). The response of magnetometry to this geology can be variable but survey is considered to be appropriate over any sedimentary geology (English Heritage 2008).

3.0 Planning Background

- 3.1 An outline planning application has been submitted for a '*development of up to 80 dwellings with associated landscaping, open space and vehicular and pedestrian access*' (Reference CB/17/01096/OUT). Prior to the determination of the planning application, the Archaeologist at Central Bedfordshire Council has requested a programme of evaluation, initially comprising a geophysical survey, in order to provide further information concerning the nature and extent of the archaeological resource. This work is intended to provide information to allow the planning authority to make a reasoned decision as to whether any further intrusive investigations will be required prior to development and to establish any mitigation measures that may be appropriate.
- 3.2 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 The archaeological background has been addressed within the advice note provided by the Archaeologist at Central Bedfordshire Council (Memorandum CB/17/01096/OUT 6th April 2017), and is summarised here.
- 4.2 Cropmarks are known to extend into the site area, although it is believed that some of these may have been partially obscured by alluvium (HER reference 15083). These cropmarks may include rectilinear and sub-rectilinear enclosures.

- 4.3 Close by are a number of other recorded cropmarks, including ring ditches of possible Bronze Age date, and linear features suggestive of an extensive later prehistoric and/or Roman date (HER references 2812 and 2941).
- 4.4 The town of Potton is first mentioned in the Domesday Survey of 1086, and so is likely to have had its origins in the Saxon period (<http://opendomesday.org/place/TL2249/potton/>). At the time of the survey Potton had 37 households and its tax was 10.1 geld units, both indicating a large and profitable settlement. The two main landowners were Countess Judith and Hugh of Beauchamp.
- 4.5 Immediately to the north of the site, a small quantity of Victorian pottery was recovered from test pits in 2012. No evidence for earlier activity was uncovered (HER reference 19476). Also to the north are several, undated sand extraction pits (HER references 10704 and 10705).
- 4.6 Previous archaeological work to the east of the site has identified medieval activity (HER reference 10802).

5.0 Methodology

- 5.1 The geophysical survey consisted of a detailed gradiometer survey of the area, totalling approximately 3.4 hectares. The survey was undertaken in a series of 20m grids across the site.
- 5.2 The fieldwork was carried out by a team of experienced geophysicists on Wednesday 26th April 2017. The survey area was located using a Leica GS08 RTK NetRover GPS. This accurately 3D plotted the area of investigation and tied it into the National Grid.
- 5.3 The geophysical 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:	0.01nT
Processing Software:	3.0.31.0
Surface Conditions:	Cut grass
Area Surveyed:	3.4 hectares

Date Surveyed: Wednesday 26th April 2017
Surveyor: George Bunn
Survey Assistants: Nick Pearce and Gareth Ward Stevens
Data Interpretation: David Bunn

Data Collection and Processing

5.6 The grids were marked using pre-programmed grids on the Leica GS08 Net rover. A north-south alignment 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 the grids were aligned to very close to north-south due to the orientation of the survey area.

5.7 The data collected from the geophysical survey has been analysed using Terrasurveyor 3.0.31.0. 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-striping
- 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. However, the de-stripe process is used with care 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

Geophysical Survey

- 6.1 For the purposes of interpreting the anomalies, the survey data has been processed to the values of -4 to 4 nT/m (Figure 3). This enhances faint anomalies that may otherwise not be noted in the data. A number of anomalies have been identified across the data set, and are discussed in turn and noted as single or double digit numbers in square brackets.
- 6.2 Around the edges of the survey are some areas of magnetic noise which are likely to have been caused by ferrous litter along the site boundaries.
- 6.3 Throughout the survey there are linear positive anomalies running east-northeast to west-southwest, which reflect former cultivation trends, i.e. ridge and furrow. A second group of linear anomalies, running parallel with the southern boundary and orientated east to west, may indicate a separate phase of ridge and furrow ploughing or more recent cultivation trends.
- 6.4 Towards the southeast end of the survey are two linear features running northwest to southeast, [1] and [2]. These are potentially of archaeological origin, and may be former ditches.
- 6.5 At the west end of the site a further short linear anomaly running northwest to southeast, [3], may also be a former ditch.
- 6.6 Two further small linear features, [4] and [5], running broadly east to west may be of archaeological origin, although this is far from certain.
- 6.7 There are a number of dipolar spikes within the data set, with those showing magnetic readings of -10 to 10 nT/m depicted on Figure 3. These may be indicative of near-surface ferrous material.

7.0 Discussion and Conclusions

- 7.1 The survey identified very little of archaeological interest with the majority of linear positive features relating to cultivation activity, with probable ploughed out medieval ridge and furrow present across much of the site. There were two parallel northwest to southeast orientated linear anomalies that may be former drainage ditches on either side of a former trackway, with one or two further linear anomalies that may be archaeological. A number of dipolar spikes across the site may result from near-surface ferrous material of limited archaeological interest.

8.0 Effectiveness of Methodology

- 8.1 The non-intrusive survey methodology employed has proved reasonably successful in revealing potential archaeological features.

9.0 Acknowledgements

- 9.1 Allen Archaeology Limited would like to thank Hollins Strategic Land for this commission. PCG are also thanked for undertaking the fieldwork at short notice.

10.0 References

Aspinall, A, Gaffney, C, and Schmidt, A, 2008, *Magnetometry for Archaeologists*, Plymouth: Altamira Press

CIfA, 2014, *Standard and guidance for archaeological geophysical survey*, Reading: Chartered Institute for Archaeologists

Department for Communities and Local Government, 2012, *National Planning Policy Framework*, London: Department for Communities and Local Government

English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*. English Heritage

Gaffney, C, Gater, J, and Ovenden, S, 2002, *The Use of Geophysical Techniques in Archaeological Evaluations*. IFA Paper No. 6, Reading: The Institute for Archaeologists

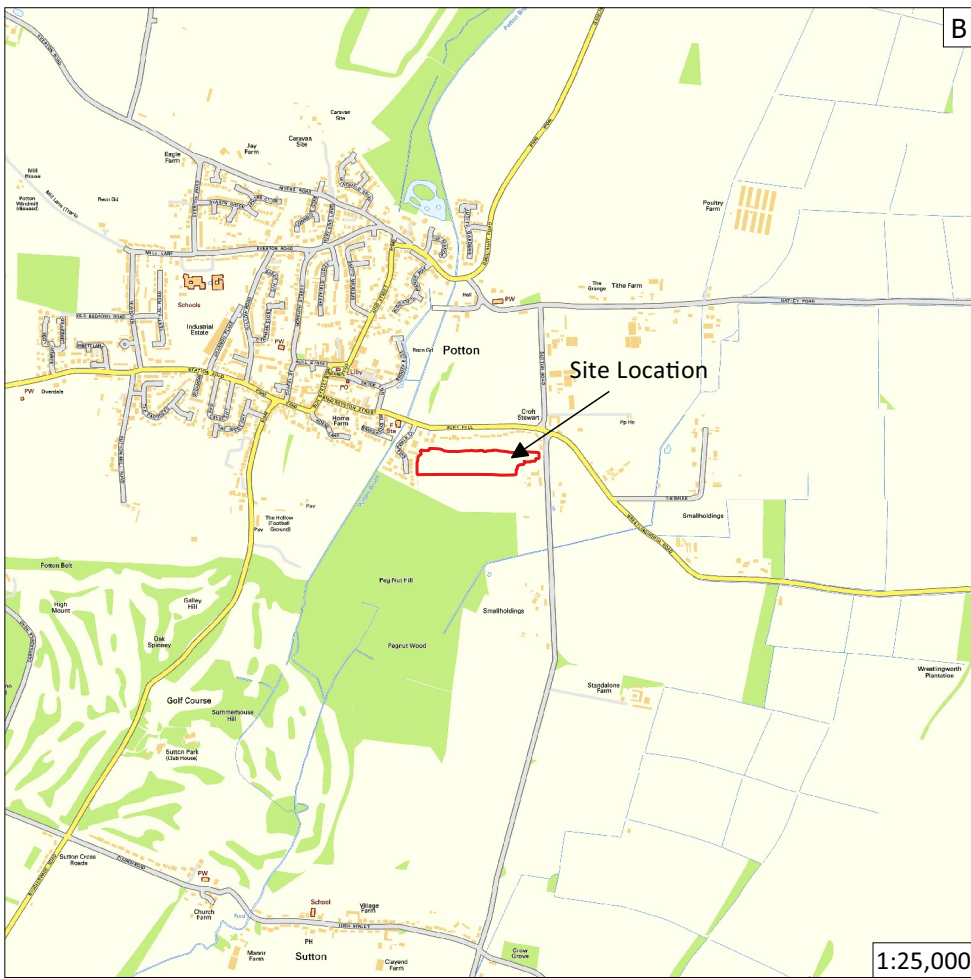


Figure 1: Site location outlined in red

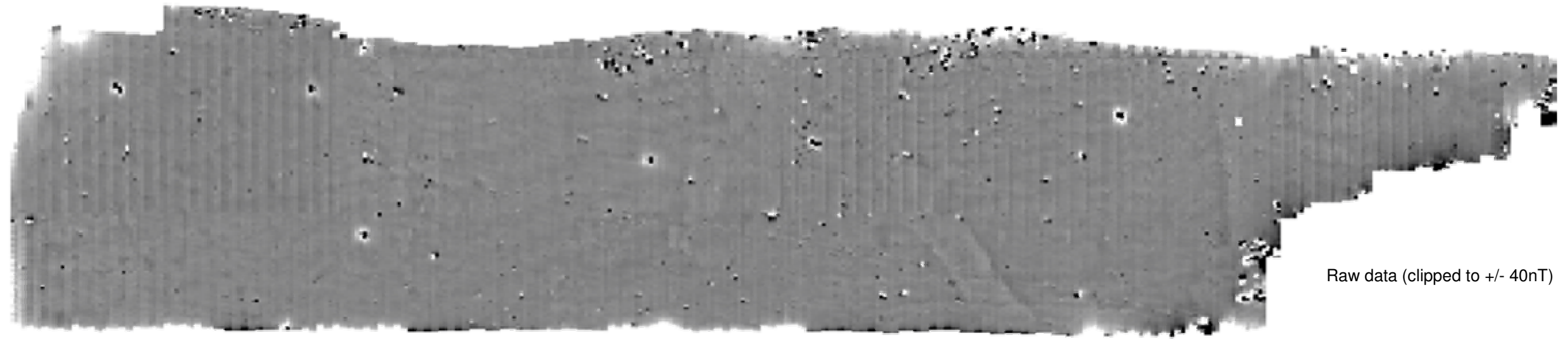
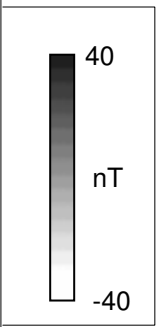
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Drawn by	S Jones
Date	02/05/17

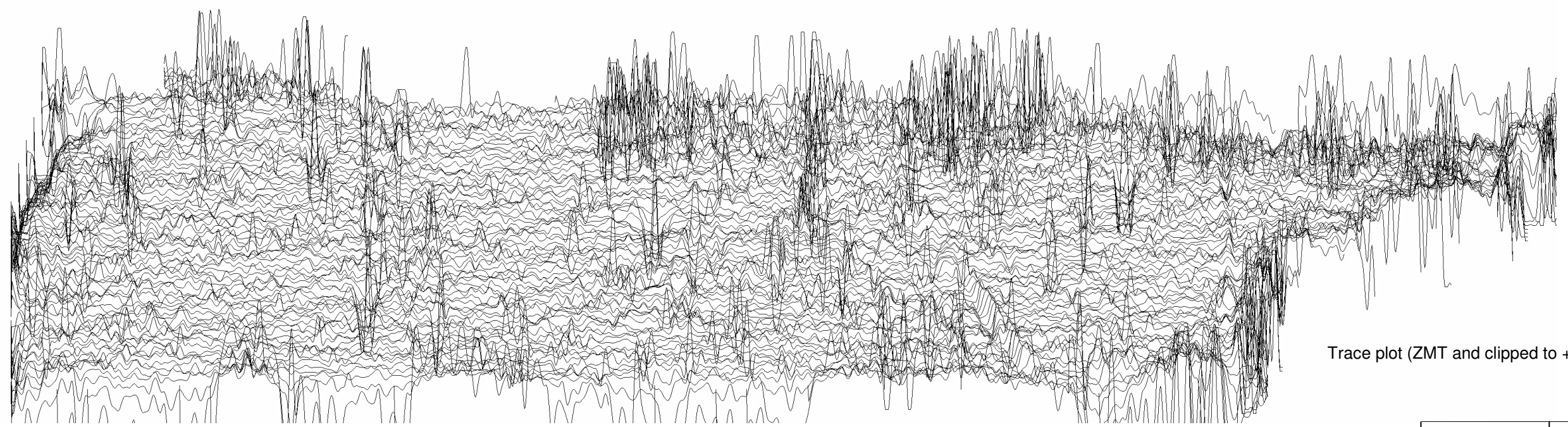
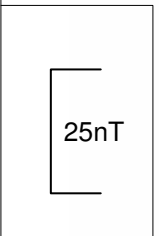
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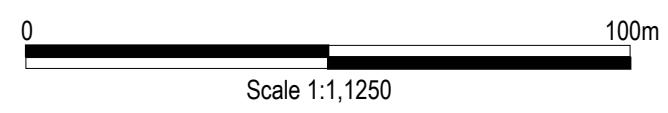
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Raw data (clipped to +/- 40nT)



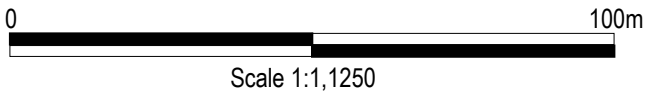
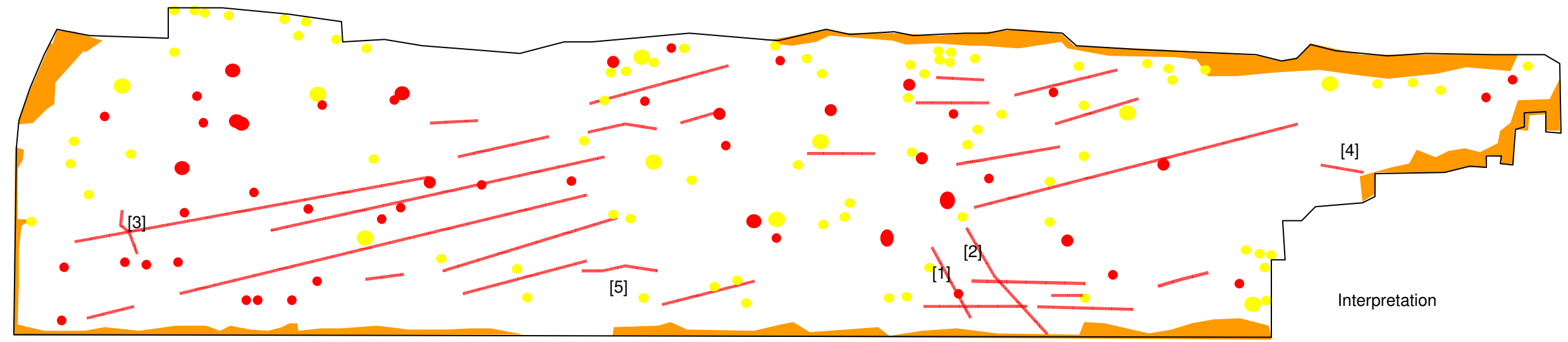
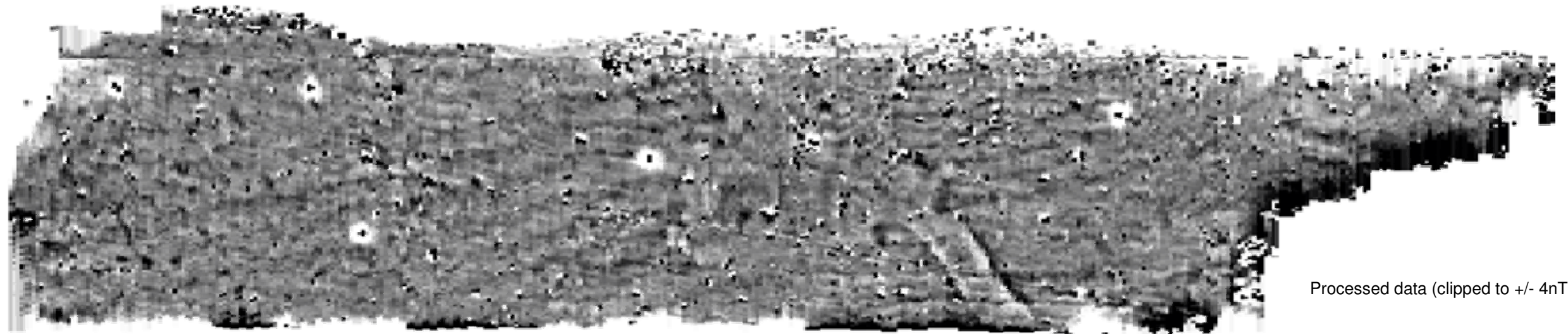
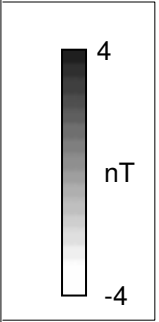
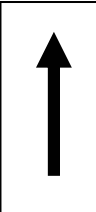
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Site Code	POSR17
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Drawn by	Mark Allen
Date	02/05/17

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Figure 2: Greyscale raw data and processed trace plot



Key	Site Code	POSR17
	Scale	1:1,1250 @ A3
	Drawn by	Mark Allen
	Date	02/05/17

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Figure 3: Processed greyscale plot and interpretation



Site Code	POSR17
Scale	1:1,250 @ A3
Drawn by	M Wood
Date	02/05/2017

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Figure 4: Processed greyscale location

0 10 20 30 40 m

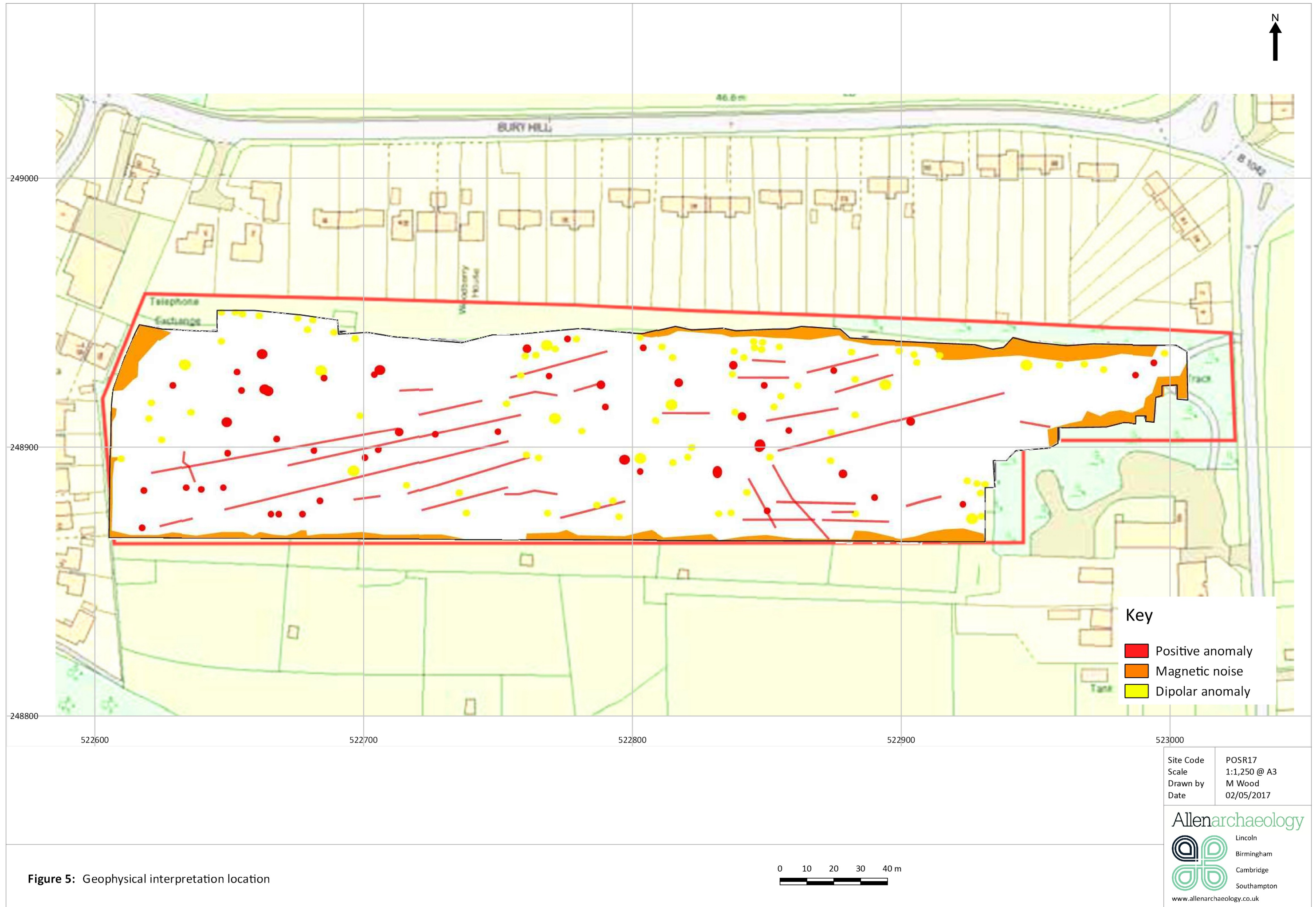


Figure 5: Geophysical interpretation location

Site Code	POSR17
Scale	1:1,250 @ A3
Drawn by	M Wood
Date	02/05/2017

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