LAND AT ECCLESHALL ROAD, STONE STAFFORDSHIRE

Archaeological Geophysical Survey 2015

Report by:

A.D.H. Bartlett

Bartlett-Clark Consultancy
25 Estate Yard, Cuckoo Lane,
North Leigh,
Oxfordshire OX29 6PW
01865 200864

for:

Taylor Wimpey UK Ltd

Planning Application No. 14/20845/OUT

Land Between Common Lane and Eccleshall Road, Stone, Staffordshire

Geophysical Survey 2015

Abstract

This geophysical survey was undertaken as part of an archaeological field evaluation of a proposed housing development site at Eccleshall Road, Stone, Staffordshire.

The survey has produced only limited findings. These include a former field boundary and a few possible pit-like features which do not appear to be of archaeological relevance. The survey also detected traces of ridge and furrow cultivation, and various drainage channels and land drains.

1. Introduction

The survey was commissioned from Bartlett Clark Consultancy, Specialists in Archaeogeophysics of Oxford, by EDP of Cirencester on behalf of Taylor Wimpey UK Ltd. Fieldwork for the survey was done on 7 April 2015.

Notes on the location and condition of the site, and the archaeological background to the project, were included in the Written Scheme of Investigation (WSI) prepared in advance of the survey [1]. The following notes are reproduced in part from this document.

2. The Site

Topography and geology

The evaluation area is a field located to the south of Eccleshall Road, to the east of Walton, and 2km south-west of Stone, Staffordshire, as indicated on the location plan inset in figure 1. The site is centred approximately at NGR SJ 893326, and totals 3.69ha.

The site is situated on a bedrock of Mercia Mudstone, with superficial deposits of Devensian Diamicton. The strength of the magnetic response may vary according to the detailed composition of superficial deposits. Magnetic anomalies may be relatively weak if the soil is mainly clay, and the background noise level may be raised if the drift material contains gravel of glacial origin. [The noise level was in fact found only to be moderate, as is indicated by the limited density of small background magnetic anomalies outlined lightly in brown in the interpretation. This means that small archaeological features are less likely to be obscured by natural disturbances, and is consistent with the presence of a mainly clay soil.]

Magnetic susceptibility measurements taken on soil samples from the site gave values in a

range 6-8 (m^3 kg^{-1}). These readings (which are affected by soil composition together with past and present land use, and indicate the probable strength of response to be expected from a magnetometer survey) are at the lower end of the range of commonly encountered values (as is often the case on mainly clay soils), but are not abnormally low. It is likely in these conditions (as often) that smaller or more isolated features may respond less reliably than larger features, or any clusters or concentrations of archaeological findings which may be present.

Archaeological background

A plan showing an aerial photographic transcription has been supplied to us by EDP. This shows potential archaeological features including traces of ridge and furrow cultivation, possible infilled clay extraction pits, and traces of ditched enclosures. The possible enclosures appear to be more clearly defined in the adjacent field to the south-west, rather than within the evaluation area. One purpose of the survey was therefore to test for any additional evidence for the presence of such features. Isolated earthworks or ditches might not respond strongly to the survey, particularly on a clay soil, but any associated settlement remains would usually be detectable.

3. Objectives of the Survey

The usual purpose in undertaking an archaeological geophysical survey is to test for evidence of archaeological sites or remains, and to provide information which may inform further stages of the archaeological evaluation.

A geophysical survey is usually able to identify the extent and character of any archaeological remains capable of producing a magnetic response. The magnetometer will detect cut features such as ditches and pits when they are silted with an increased depth of topsoil, which usually responds more strongly than the underlying natural subsoil. Fired materials, including baked clay structures such as kilns or hearths are also likely to produce a localised enhancement of the magnetic field strength, and the survey therefore responds preferentially to the presence of ancient settlement or industrial remains. The survey is also strongly affected by ferrous and other debris of recent origin.

Objectives for the survey included the following (not all of these items can be addressed directly at this stage of the evaluation):

1) Determine the presence and form of the cropmark enclosures identified on aerial photographs and plot the extent of medieval and post-medieval agricultural activity across the site. [Ridge and furrow cultivation is often visible in a magnetometer survey, although the response may be weak in a clay soil.]

2) Identify the presence/absence and location of any other possible archaeological anomalies across the site and identify their possible nature (i.e. ditches, pits, walling). [Ditches and pits are commonly detectable in surveys, particularly when associated with settlement activity, but the possible presence of masonry structures may have to be inferred from associated magnetic disturbances, rather than observed directly.]

3) Inform the development of an appropriate trial trenching methodology (if necessary).

4) Review the efficacy of the geophysical survey based on the results of the subsequent trial trenching exercise.

4. Survey Procedure

The procedure used for the investigation was a fluxgate gradiometer survey. A survey grid was set out at the required locations, and tied to the OS grid using a GPS system with VRS correction to provide 0.1m or greater accuracy. The plans are therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans.

The magnetometer readings were collected along transects 1m apart using Bartington 1m fluxgate gradiometers, and are plotted at 25cm intervals along each transect. The results of the survey are presented as grey a scale plot (at 1:1500 scale) in figure 1, and as a graphical (x-y trace) plot in figure 2 (at 1:1250 at A3). Inclusion of both types of presentation allows the detected magnetic anomalies to be examined in plan and profile respectively.

The graphical (x-y) plot represents minimally pre-processed magnetometer readings, as recommended for initial presentation of survey data in the 2008 English Heritage geophysical guidelines document [2]. Adjustments are made for irregularities in line spacing caused by variations in the instrument zero setting (as is required for legibility in gradiometer data), but no further filtering or other process which could affect the anomaly profiles or influence the interpretation of the data has been applied. A weak additional 2D low pass filter has been applied to the grey scale plot to adjust background noise levels.

An interpretation of the findings is shown in figure 2, and is reproduced separately to provide a summary of the findings in figure 3. Colour coding has been used in the interpretation to distinguish different effects. The interpretation is intended to categorise most of the identifiable magnetic anomalies, but cannot reproduce the detail of the grey scale plot.

Features as marked include magnetic anomalies which may show characteristics to be expected from features of potential archaeological significance (in red), and recent disturbances in grey. Small (and mainly natural) background magnetic anomalies are outlined in light brown. Some of the more conspicuous ferrous objects (identifiable as narrow spikes in the graphical plots) are outlined in light blue. Possible cultivation effects are indicated in green. Probable land drains (or infilled drainage channels) are also marked.

5. Results

A number of the findings detected by the survey correspond to features shown on the air photograph transcription plan which was supplied to us by EDP, which is shown inset in figure 3. One difference between the AP evidence and the survey is that ridge and furrow (as indicated by broken green lines in the survey interpretation) is most clearly visible in

the survey plots at the east of the field, where it is absent in the AP plan. Ridge and furrow is indicated across much of the remainder of the field in the AP plan, but only a few fragments or traces of it are seen in the survey plots. This perhaps suggests that the ridge and furrow has been more completely levelled in the east of the field than elsewhere. It is often the case that ridge and furrow responds more clearly in a survey when it has been levelled (so that there is an increased depth of detectable fill in the furrows) than when it survives.

Other findings include a line of disturbances representing a former field boundary at B (also shown on the AP plan). Part of this boundary is represented by a more continuous ditch-like feature towards the SE side of the field (C). This connects with other drain-like features (as at D) in the vicinity of the flooded hollow in the centre of the field. Other drains (E, F, G) converge on the flooded area. They are represented both by intermittent linear magnetic disturbances which are likely to indicate buried clay drain pipes (as at F, G) or trenches infilled with hardcore or similar debris (as at D, E). The linear feature at E corresponds to a partially extant channel which is visible on the ground.

A stream extending from the flooded hollow to the NE corner of the field is shown on the AP plan, but has not been detected in the survey. It must therefore (if genuine) be very shallow, and (unlike features D-G) may contain only a clean earth fill with no clay pipes or imported debris.

Possible enclosure ditches which are shown in green on the AP plan lie partly within the flooded area, which was not surveyed, but may also be the result of drains, which are concentrated in this part of the site, as noted above.

The remaining finding as shown on the AP plan is a group of features labelled as possible clay extraction pits in the NW of the field. A few individual magnetic anomalies which could be interpreted as infilled pits have been outlined in red in the interpretation, and some of the stronger examples (H ,I) are located in this part of the field. It is possible that other silted pits could be present, but lack magnetically enhanced fill (of a kind which might be expected if they were of archaeological origin), and so have remained undetected.

One additional finding (not shown on the AP plan) is a pipe (shown in blue) at J.

6. Conclusions

The survey results are broadly consistent in character with the features indicated in the AP interpretation, but the survey has not detected any additional findings of clear archaeological relevance.

A former field boundary was detected, together with various infilled drainage channels or land drains. One of these (E) corresponds to a surviving channel, and is marked as a stream on the AP plan. Ridge and furrow was detected at locations which complement rather than reproduce the cultivation markings shown in the AP interpretation. A few small and scattered pit-like features were detected, some of which may relate to the possible clay extraction pits shown on the AP plan. There are no clusters or concentrations of such features as might be expected at a former settlement site, or of a kind which might indicate the presence of any additional substantial or detectable archaeological features.

Report by:

A. Bartlett BSc MPhil
Bartlett - Clark Consultancy
Specialists in Archaeogeophysics
25 Estate Yard
Cuckoo Lane
North Leigh
Oxfordshire
OX29 6PW 01865 200864 bcc123@ntlworld.com

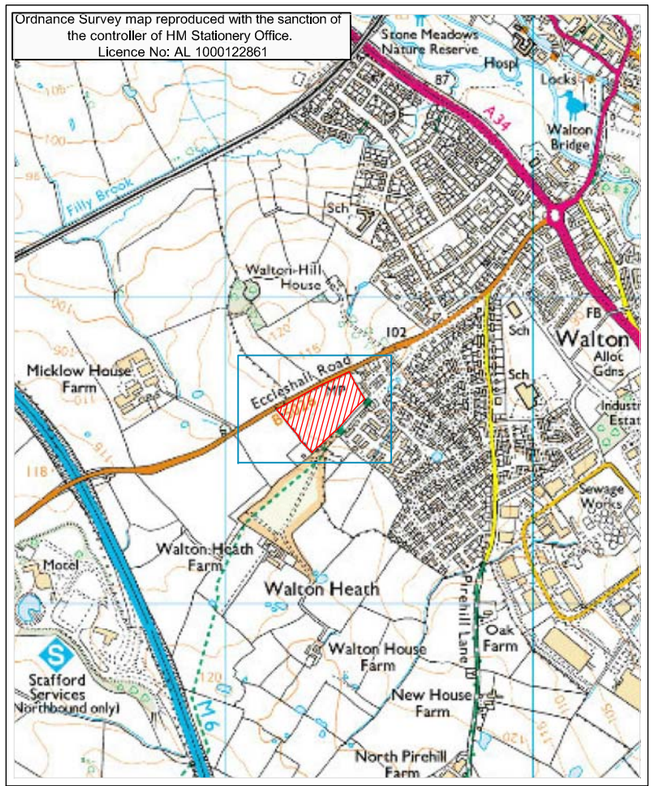
21 April 2015

The fieldwork for this project was done by R. Organ and M. Berry.

References

[1] *Land at Eccleshall Road, Stone, Staffordshire: Written Scheme of Investigation for Archaeological Geophysical Survey 2015.* Document submitted to EDP by Bartlett Clark Consultancy; 1 April 2015.

[2] English Heritage 2008 *Geophysical Survey in Archaeological Field Evaluation* [online facsimile] (English Heritage: Swindon, 2008), English Heritage Research.



Site location 1:20000

389300E

332600N

N

Evaluation area

Location of 1:1250 figures (2-3)

1.8nT

-1.6

LAND AT ECCLESHALL ROAD, STONE, STAFFORDSHIRE
Geophysical Survey 2015
Figure 1: Magnetometer survey (grey scale plot)

Scale 1:1500 @ A3
0 100m

Surveyed by Bartlett - Clark Consultancy (01865 200864)
for The Environmental Dimension Partnership

Background mapping based on site plan supplied by Taylor Wimpey UK Ltd

- magnetic anomalies (archaeological ?)
- strong (recent /natural ?) magnetic disturbances
- small background magnetic anomalies (natural ?)
- pipe
- cultivation
- strong (ferrous) magnetic anomalies
- drain

N

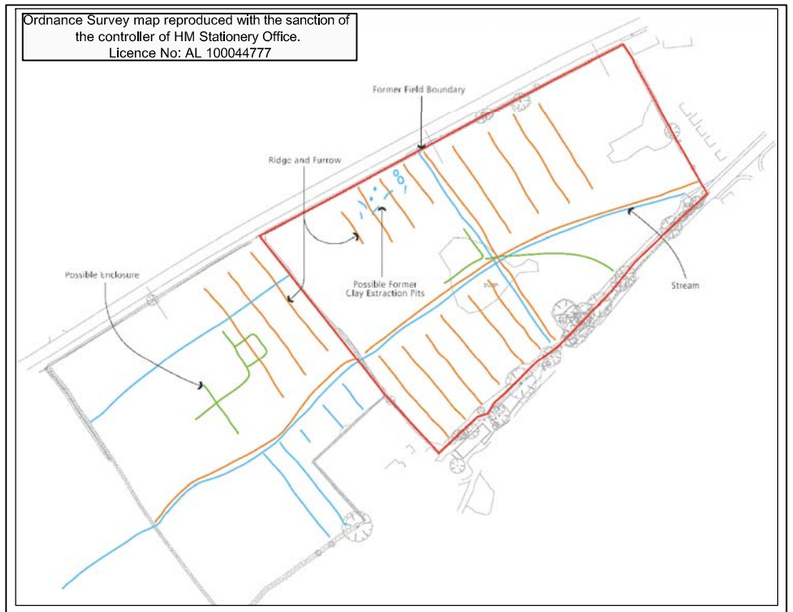
50 nT

Surveyed by Bartlett - Clark Consultancy (01865 200864)
for The Environmental Dimension Partnership

LAND AT ECCLESHALL ROAD,
STONE, STAFFORDSHIRE
Geophysical Survey 2015
Figure 2: Magnetometer survey
(with interpretation)

0 1:1250 @ A3 50m

Ordnance Survey map reproduced with the sanction of the controller of HM Stationery Office.
Licence No: AL 100044777



Air Photograph Transcription (supplied by EDP) 1:4000

389300E

N

Eccleshall Road

Pasture Field

Area Flooded

Nos 1 & 2

Nos 3 & 4

Common Lane

Castlewood Drive

A

B

C

D

E

F

G

H

I

J

332600N

- magnetic anomalies (archaeological ?)
- strong (recent /natural ?) magnetic disturbances
- small background magnetic anomalies (natural ?)
- pipe
- cultivation
- strong (ferrous) magnetic anomalies
- drain

Surveyed by Bartlett - Clark Consultancy (01865 200864)
for The Environmental Dimension Partnership

LAND AT ECCLESHALL ROAD,
STONE, STAFFORDSHIRE
Geophysical Survey 2015

Figure 3: Summary of findings

0 1:1250 @ A3 50m