

**Land to the North of Cambridge Airport
Fen Ditton, Cambridge**

Report on Archaeological Geophysical Survey 2013

A.D.H. Bartlett

Surveyed by:

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

for:

**Cambridge Archaeological Unit
Department of Archaeology
Downing Street
Cambridge CB2 3DZ**

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Archaeological Geophysical Survey 2013

Introduction

A geophysical survey has been undertaken as part of an archaeological field evaluation of a proposed development site to the north of Cambridge. The survey was commissioned from Bartlett Clark Consultancy, Specialists in Archaeogeophysics of Oxford, by Cambridge Archaeological Unit (CAU) on behalf of Terence O'Rourke Ltd and the Marshall Group.

The proposed development area (PDA), known as the 'Wing' site lies 4.5km north east of the centre of Cambridge, and to the north of Newmarket Road and Marshall's Airport. The purpose of the survey was to test for further evidence of archaeological sites and features which are known to be present at the site from previous investigations, and to indicate their location and extent.

Fieldwork for the survey was done between 29 April and 9 May 2013. Plans showing the survey findings have previously been supplied to CAU, and are now incorporated in this report.

The Site

The site has previously been the subject of an Archaeological Desk Top Assessment by Cambridge Archaeological Unit. The report on the assessment [1] includes a description of the site, and a detailed review of known and recorded archaeological sites and findings from the site and its surroundings. The following notes are summarized in part from this report.

Location and Topography

The site is located to the north of Newmarket Road at NGR TL 4917 5963, and surrounds the Newmarket Road Park and Ride site on three sides. The elevation slopes gently down towards the north west from c. 15m to 10m AOD. The PDA amounts in total to c. 59 ha, but this includes wooded strips around field edges, and a car park. The four arable fields within the site were surveyed in full, giving a total coverage of 40.1 ha.

Geology

The underlying solid geology is described in [1] as grey chalk overlain in part by alluvium and fourth terrace river gravels. Soils both on chalk and gravel are usually responsive to magnetometer surveying, although any archaeological features which are buried at depth beneath alluvium may be less readily detectable.

It is sometimes the case that small naturally magnetic stones in glacial gravels can cause an increased level of background magnetic activity, as is mentioned below.

Archaeological background

There have been extensive previous archaeological investigations both within the PDA, and nearby. These have identified Iron Age activity from c. 600BC to the Roman conquest, together with evidence of earlier prehistoric activity from the Neolithic period and Bronze Age.

An excavation at the Park and Ride site in 1996 found a dense settlement of mainly Middle Iron Age date (300-100 BC), comprising enclosures with pits and post holes. Further investigations within the PDA in 1997 and 2002 showed that the southern fields (fields 3 and 4 on survey plans) contained intensive Iron Age and early Roman activity, and the northern part of the area (field 2) contained less intensive later Iron Age features.

A further open area excavation in the north east of field 3 in 1998 identified a late Iron Age enclosure system, and 11 early Roman kilns, as well as evidence for timber-built structures with pits and post holes.

There is further evidence for extensive prehistoric activity in the vicinity of the PDA. This includes Iron Age activity south of the Newmarket Road, and cropmarks to the east of the PDA and within the airfield (to the south). A rectilinear cropmark enclosure and circular feature are recorded in the eastern field within the PDA (field 1).

Evidence for medieval and later activity is more limited, but includes pottery at various locations, and extensive ridge and furrow on the airfield, and to the north of the PDA.

Survey Methodology

Fieldwork Procedure

The site was investigated by means of a recorded magnetometer survey. The survey was carried out using Bartington 1m fluxgate magnetometers, with readings plotted at 25cm intervals along transects 1m apart.

A full magnetometer survey of this kind meets the recommendations for geophysical investigation as set out in the revised English Heritage geophysical guidelines document (*Geophysical Survey in Archaeological Field Evaluation*, English Heritage, 2008), as well as the Institute of Field Archaeologists' Code of Conduct (2006).

The magnetometer survey was supplemented by magnetic susceptibility testing. This provides evidence of local magnetic conditions, as determined by geology and soil type, and therefore informs the interpretation of the magnetometer survey. The results are commented on below.

The survey was positioned in each field by reference to OS co-ordinates measured from the digital mapping supplied by the client, and located with a differential GPS system (using Omnistar satellite corrections to give accuracy of c. 10cm). The OS coordinates of detected features can be read directly from digital copies of the Autocad plans.

Presentation and reporting

The results are presented as grey scale plots in figures 2-4 (at 1:2000 scale), and as graphical or x-y trace plots at 1:1250 scale in figures 5-10. The graphical plots show the reading after minimal pre-processing (zero mean baseline correction and truncation of extreme values). We include these plots for comparison with the grey scale presentations, and because awareness of magnetic anomaly amplitudes and profiles is necessary in reaching a considered interpretation of the survey data. The grey scale plots have been subject to additional weak low pass filtering (not applied to the graphical plots) to adjust background noise levels.

The interpretation of the magnetometer survey is intended to be schematic and illustrative, and not to reproduce the detail of the grey scale plots. Potentially significant features are indicated by coloured outlines, or broken lines. Broken lines are used to permit a simplified representation of complex features, or to represent features which are too fragmented to form a satisfactory outline.

Colour coding has been used to distinguish different effects. Magnetic anomalies of possible archaeological origin are outlined in red, and strong disturbances (which are likely to be of recent origin) in brown. Small background magnetic anomalies which may be of natural origin are indicated in light brown. Possible cultivation effects are shown in green, and pipes in blue.

Results

The site has a magnetically responsive topsoil, as was confirmed by the magnetic susceptibility readings taken during the course of the survey. The readings were uniformly high (in a range 30 to 60 x 10⁻⁵ SI) in all parts of the site, which indicates that conditions should be favourable for the magnetic detection of archaeological features (although minor non-archaeological disturbances might also be visible). The survey plots also show a relatively high background noise level, with numerous small magnetic anomalies (which are visible particularly in the graphical plots 5-10), and are indicated by light brown outlines in the interpretative plans (11-13). Magnetic activity of this kind is consistent with the presence of small naturally magnetic stones in a gravel soil, and indicates that the subsoil within the survey area is likely to be gravel rather than alluvium.

Fields within the survey area have been numbered (1-4) from east to south west for reference in this report. We describe the findings for each field in turn.

Field 1

This field has not previously been subject to trenching and excavation of the kind undertaken between 1997 and 2002 in other parts of the site, but does contain cropmarks. These are shown in figure 2 of the CAU Desk Top Assessment report [1], and have been traced (as grey lines) on to the interpretative plans (figures 11-13) for comparison with the survey findings.

The two main findings in field 1 are a circular feature (labelled A in figure 11), and a complex system of ditched enclosures and other features in the north of the field around B.

The feature at A is up to 30m in width, and located in the south western part of the field where other findings are lacking. The absence of other nearby activity could suggest it is a slightly large and irregular barrow. A few possible internal features or disturbances are marked (in red), but they are not conclusively distinguishable from the surrounding (mainly natural) background activity.

Some of the ditches within the complex of features around B correspond to the cropmarks, but the western side of the cropmark enclosure has not been confirmed. Numerous additional features have been detected to the east of the main cropmark enclosure. These include some quite distinct pit-like features, as well as ditches. (Pits are identifiable in the graphical plots as magnetic anomalies which are slightly wider or more rounded than those caused by the gravel background.) The findings suggest the presence of settlement remains within a complex system of superimposed enclosures.

These findings are intersected, and may in part be obscured by, magnetic interference from a large iron pipe (C). Various other smaller pipes were also detected, including one (D) which is less magnetic, and so could perhaps be a cable or concrete sewer pipe, rather than an iron gas or water pipe.

A curving ditch-like feature to the east of the field at E continues the line of an existing field boundary, and so is likely to be a former field boundary. Parallel linear cultivation markings are visible, particularly towards the east of the field (as indicated by broken green lines). These are narrow and align with the modern boundary, and so are likely to be recent.

Field 2

Trenching in this field in 2002 showed a few possible ditches, mainly in the south of the field towards the excavated site in field 3, and there are some possible small cropmarks to the north. The survey has not produced any very clear evidence in support of these findings. The background geological noise level remains quite high, and there are only weak suggestions of ditches or enclosures in this field. This could mean that traces of field systems may be present, but occupation remains (which would cause magnetic enhancement of the feature fill) are lacking. A possible curving ditch-like feature is indicated at F, but it is indistinct and uncertain.

A line of disturbances in the east of the field at G suggests a land drain, or perhaps a former ditch or boundary containing magnetic debris in the fill. A weak linear feature at H runs alongside, but does not correspond exactly with, an existing path. It could perhaps be a former line of the path, or possibly a drain.

There are various cultivation markings (perhaps indicating recent ploughing headlands) around the field edges, but also a distinct area of broad linear cultivation effects in the western half of the field (around J). This could well represent an area of former ridge and furrow.

Field 3

Some of the main features seen in the 1998 excavation remain visible towards the north east of the field (around K), but the response has clearly been weakened and disturbed by the excavation and backfilling.

There do not appear to be any other dense groups of findings elsewhere in the field, although a north-south ditch-like feature (perhaps a former boundary) is visible at L. A broad curving cropmark or soil mark in the southern half of the field was not detected. Various cultivation markings were seen (green). Some do not align with present boundaries and could perhaps indicate traces of ridge and furrow, but they are much less distinct than in field 2.

Strong magnetic anomalies at M, N, O are difficult to categorise. They have been outlined in brown as potentially recent disturbances, but are near to the excavated site where Roman kilns were found. It is not impossible that pits containing ancient industrial debris could give rise to anomalies similar to M and N, although O also appears to contain a large ferrous object.

Field 4

A particularly dense complex of ditches, enclosures and settlement features fills the south eastern half of the field (P). These were seen in the 1997 trenching, but were not fully excavated, and so remain more clearly visible than the excavated site in field 3.

Other findings include a possible trackway (Q) extending to the north west from the main group of features. There appear to be recent north-south cultivation markings, together with possible traces of east-west ridge and furrow.

Conclusions

The survey has confirmed that dense concentrations of archaeological findings (probably representing late prehistoric settlement sites of the kind excavated at the Park and Ride site in 1996 and in field 3 in 1998) are present in fields 1 and 4. Features are particularly concentrated in field 4, and rather less so in field 1. Some of the features excavated in field 3 in 1998 are still detectable, but there are only limited additional findings elsewhere in the field.

There may be some uncertain ditch-like features in field 2, but the main finding is a distinct area of probable ridge and furrow cultivation in the western half of the field.

Report by:

A.D.H. Bartlett BSc MPhil

Bartlett - Clark Consultancy
Specialists in Archaeogeophysics
25 Estate Yard
Cuckoo Lane
North Leigh
Oxfordshire OX29 6PW

01865 200864

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Fieldwork for this project was done by C. Oatley, N. Paveley and C. Matthews.

Reference

[1] Appleby, G. 2013. *The Wing Project: land to the North of Cambridge Airport, Fen Ditton, Cambridge. An Archaeological Desk Top Assessment.* Cambridge Archaeological Unit, University of Cambridge. Report No. 1148, March 2013.

Fen Ditton Geophysical Survey

Appendix: Inventory of Selected Findings

This list notes the more significant findings from the magnetometer survey of this site. The grading (1-4) given alongside each entry refers primarily to the reliability of the geophysical evidence, but the potential archaeological relevance of detected features is also taken into account in the definitions of grades 3 and 4.

- Grade 1: Distinct magnetic anomalies of probable archaeological origin.
- Grade 2: Weaker or more isolated magnetic anomalies which could in part be archaeologically significant.
- Grade 3: Distinct magnetic anomalies, but probably recent or natural, or of other non-archaeological origin.
- Grade 4: Weaker or more isolated magnetic anomalies of probably non-archaeological origin.
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This summary list includes only selected magnetic findings, particularly those which may be of potential archaeological interest. Magnetic disturbances which may be mentioned in the text or indicated on plans are not necessarily included if they appear to be of natural or non-archaeological origin.

Field	Feature		Grade
1	A	Circular ditched feature corresponds to cropmark.	1
1	B	Extensive complex of ditched enclosures with probably settlement features.	1
1	C	Large iron pipe (main gas pipe ?)	3
1	D	Weaker pipe: concrete sewer ?	3
1	E	Ditch-like feature continues line of field boundary. Probable former boundary.	1-2
2	F	Indistinct possible curving ditch-like feature.	2
2	G	Irregular disturbance could be drain or former boundary.	2 or 4

2	J	Broad parallel markings: probable remains of ridge and furrow.	1
2	H	Linear feature alongside footpath: former path or drain ?	3-4
3	K	Enclosures and other feature remain partially visible within area excavated in 1998.	1
3	L	Isolated linear feature: ditch or former boundary ?	1-2
3	M, N, O	Strong magnetic anomalies: could be recent (if not filled with ancient industrial debris).	1 or 3
4	P	Dense complex of strongly defined enclosures and settlement remains.	1
4	Q	Ditched track extending to west from P.	1