Land at Higher Winsford Farm
Bideford, Devon

Report on Archaeological Geophysical Survey 2014

Report by:

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on behalf of:

Bloor Homes

29 January 2013

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Introduction

This report describes a geophysical survey carried out as part of an archaeological field evaluation of a proposed development site at Higher Winsford Farm near Bideford, Devon. The survey was commissioned from Bartlett Clark Consultancy (BCC), Specialists in Archaeogeophysics of Oxford, by CgMs Consulting Ltd of Cheltenham, who are to undertake and co-ordinate the evaluation on behalf of Bloor Homes (South West). Fieldwork for the survey was done between 14-16 January 2014.

The Site

The site is described in an Archaeological Desk Based Assessment (DBA), which was prepared and supplied to us by CgMs [1]. This documents lists and describes previously recorded archaeological sites and findings from the evaluation site, and from the surrounding area. A description of the procedures to be used for the survey was also included in the Method Statement (prepared by BCC and submitted to CgMs) at the start of this project [2]. The following notes are reproduced in part from these documents.

Fields within the evaluation area have been numbered (1-10) for reference in this report, as indicated on the attached plans (figures 1-9).

Topography and geology

The survey was intended to cover an area of land which includes pasture and arable fields around Higher Winsford House (EX39 3QW). The area proposed for investigation is marked by red cross hatching on figure 1. This area is centred approximately at NGR SS 431262 and is c. 33.7ha in extent.

It was found on arrival at the site that two of the fields (6 and 9) had recently been cultivated, and contained deep waterlogged ridges and furrows prepared for the planting of a potato crop. These fields could not be surveyed (both because of the difficulty of walking in the deep narrow furrows, and because the ridges of topsoil would create strong magnetic interference). The survey was therefore limited to the areas marked by blue cross hatching on figure 1, which amount in total to 20.6ha.

The topography within the evaluation area is undulating, with elevations varying between c. 48m and 86m AOD, but rising broadly to the south and east.

The site is on a bedrock which includes various formations of Carboniferous sandstone (Holsworthy Group – mudstone, siltstone and sandstone; BGS website). The quality of magnetic response on sandstone is variable, but in this case the bedrock appears to be

associated with soils which are highly responsive to magnetometer surveying. This was confirmed by magnetic susceptibility readings taken during the survey. These varied widely (in a range 20-210 x 10^{-5} SI) according to surface conditions, but in most cases were unusually high (100 – 200 SI). It is probable therefore that minor variations in the depth or distribution of topsoil will give rise to clearly detectable magnetic anomalies. The survey plots therefore show a high level of background magnetic activity of mainly geological origin (as indicated by magnetic anomalies outlined in light brown). These factors need to be taken into account where possible in the interpretation of the survey findings.

Archaeological background

The DBA [1] records a number of archaeological findings from the evaluation area and its surroundings. These include a possible ring ditch (HER 65346) c. 190m to the north of the site, and other prehistoric artefacts and cropmarks at greater distance.

There are 19th C accounts of an earthwork enclosure (HER 11735) which is described as a Roman encampment, but its location is unclear. Its position as shown on the county HER map (reproduced in [2]) is near the centre of field 9 (which could not be surveyed because of the potato ridges). Another earthwork enclosure (HER 19122 of possibly medieval date) is recorded further to the south in woodland outside the evaluation area. Former ridge and furrow is visible in 1946 aerial photographs, particularly towards the west of the study area. It is likely that most of the site formed part of an open field system in the medieval period.

A 17th C house immediately to the east of the study site (Daddon House; HER 73889) was replaced by the present Moreton Park, built in 1821. Various field boundaries and trackways, some of which may relate to the landscaping of these properties, are shown on a tithe map of 1841 (reproduced as DBA figure 4), and on the 1885 OS map (DBA figure 5, and reproduced here as an inset in figure 8).

It is concluded in the DBA that there is low to moderate potential for remains of Roman or medieval occupation activity within the southern area of the study site, and there is also a possibility of enclosures or features associated with more recent landscaping towards the east of the site.

Survey Procedure

The site was investigated by means of a recorded magnetometer survey. 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 at 1:2000 scale as a grey scale plot (figures 2-3), and as in sections as a graphical (x-y trace) plot (figures 4-7). Comparison of these alternative presentations allows the detected magnetic anomalies to be examined in plan and profile respectively. An interpretation of the findings is shown superimposed on figures 4-7 (which permits the interpreted outlines to be compared with the underlying data), and is reproduced separately to provide a summary of the findings (figures 8-9).

The graphical plots show the magnetometer readings after minimal pre-processing which includes adjustment for irregularities in line spacing caused by variations in the instrument

zero setting, and slight linear smoothing. Additional 2D low pass filtering has been applied to the grey scale plots to reduce background noise levels.

Colour coding has been used in the interpretation to distinguish different effects. The interpretation is intended to be schematic and illustrative, and not to reproduce the detail of the grey scale plots.

Features as marked include magnetic anomalies which show characteristics to be expected from features of potential archaeological significance (in red). This category is subdivided, and findings which are likely to be associated with features shown on 19th C maps are marked in orange rather than red. Strong disturbances of probably recent origin are indicated in brown, and cultivation markings in green. Pipes and drains are shown in shades of blue, and some of the more conspicuous ferrous objects (identifiable as narrow spikes in the graphical plots) are outlined in light blue. Small background magnetic anomalies of probably geological origin are outlined faintly in light brown.

The survey was supplemented by magnetic susceptibility readings taken at intervals across the site, with results as noted above.

Survey location

The survey grid was set out and tied to the OS grid using a differential GPS system (with Omnistar satellite correction to give accuracy to c. 10cm). The plans are therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans, which can be supplied with this report.

Results

Findings are described by fields in the order as numbered on figures 8-9.

Field 1

Linear features at A and B in field 1 correspond to boundaries as shown on the 1885 OS map (inset in figure 8). Narrow linear markings (green) are likely to result from modern ploughing.

Various individual magnetic anomalies of a size which could indicate silted pits are outlined in red (here, and elsewhere in the survey). These are widely dispersed, and are not usually clearly distinguishable from the (generally high) level of natural background magnetic activity (as indicated by magnetic anomalies outlined in light brown). Such features could, in a relevant context, be interpreted as of archaeological interest, but here are perhaps more likely to be natural.

Fields 2-3

Ditch-like linear anomalies C and D are shown in red in the interpretation because they do not clearly correspond to non-archaeological features, but they do not clearly represent part of an interpretable group of findings which could be identified as of archaeological origin.

The linear feature E in field 2 forms a continuation of the track-like double feature F in field 3. This aligns with and lies a little to the south of a 19th C boundary. The irregular linear feature G could be a landscape feature aligning approximately with a line of trees shown slightly to the north on the 1885 map. The negative linear anomaly H is likely to be a non-ferrous pipe extending across fields 3-4. (There is also an iron pipe nearby to the south.)

Field 4

Linear feature I corresponds to a line of trees shown on the 1885 map, and aligns with a similar feature J. It is probable therefore that the features as shown here in orange relate to post-medieval landscaping.

It is unclear whether this could apply also to the features in red, and particularly the strong ditch-like magnetic anomaly K. This (and others) could form part of an alternative system of enclosures, but they do not appear to be associated with any concentrations of archaeological findings.

Field 5

Intersecting parallel linear features clearly represent land drains and cultivation effects. It is unclear whether an irregular linear anomaly (L) could represent a ditch or other underlying feature.

Field 6: potato ridges – not surveyed.

Fields 7-8

The double linear feature M in field 7 clearly relates to 19th C landscaping, and so the same is probably true of the track-like double linear marking which continues around the field at N. Linear features (O) in field 8 also correspond to lines of trees shown on the 1885 map.

The distinct circular feature (P) in field 7 is 20m in diameter. It could perhaps be a large ring ditch, but corresponds to a group of trees on the 1885 map. The trees could perhaps have been planted on an earlier earthwork, or the circular ditch could be more recent.

The linear and rectilinear features around Q in field 8 cannot clearly be accounted for by historic landscaping, and so could perhaps be of archaeological interest.

Field 9: potato ridges – not surveyed.

Field 10

Findings here appear to include a number of intersecting drains, together with cultivation effects.

The group of features around the strong but irregular circular feature (R) at the south of the field is difficult to categorise. The possibility that they could represent ditches or enclosures of archaeological origin cannot be entirely excluded.

Conclusions

It is possible, given the highly responsive soil conditions at this site, that some of the magnetic anomalies detected by the survey may represent minor or superficial displacements of the topsoil, but the survey has also detected a number of boundaries and trackways which clearly relate to features shown on historic maps.

There remain a number of findings which cannot be accounted for in this way, and may be of potential archaeological interest. These include minor ditch-like feature (C, D) in field 2; an irregular track or boundary (G) in field 3; ditches (K) in field 4; a circular enclosure D in field 7; a rectilinear enclosure Q in field 8, and a number of irregular features (R) in field 10.

Various pipes, drains and cultivation effects were also detected.

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29 January 2014

The fieldwork for the survey was done by C. Oatley, N. Paveley, P. Heykoop and N. Dawson.

References

[1] *Archaeological Desk Based Assessment; Higher Winsford Farm, Bideford, Devon.* S. Weaver, CgMs. April 2010.

[2] *Winsford Park, Bideford, Devon: Method Statement for Archaeological Geophysical Survey.* Document submitted by Bartlett Clark Consultancy to CgMs; 9 January 2014.

Land at Higher Winsford Farm, Bideford, Devon: 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.

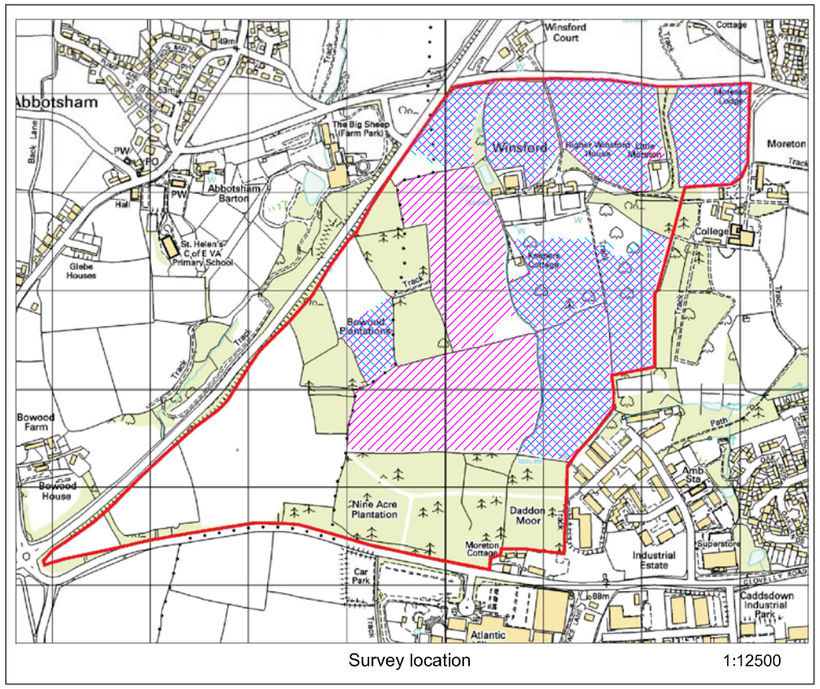
Grade 4: Weaker or more isolated magnetic anomalies of probably non-archaeological origin.

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, B	Ditch-like linear features correspond to boundaries on 1885 map.	1
2	C, D	Isolated ditch-like features.	2
2	E	Continues line of possible track F in field 3.	2
3	F	Track-like double linear feature alongside 19th C boundary.	1
3	G	Irregular linear marking aligns approximately with trees shown on 19th C map.	2-3
3-4	H	Non-ferrous pipe.	3
4	I, J	Features align with trees on 1885 map.	1
4	K	Strong ditch-like feature.	1
5	L	Irregular linear feature; ditch or non-archaeological ?	2-3
7	M, N	Track-like feature corresponds in part to 19th C landscaping.	1

8	O	Similar to M, N.	1
7	P	Circular enclosure: earthwork or landscape feature ?	1
8	Q	Rectilinear and linear ditch like features: enclosure ?	1
10	R	Irregular linear and other features: ditches + infilled pit ?	1-2

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucestershire (supplied by Bloor Homes).



Survey location 1:12500

243000E

126000N

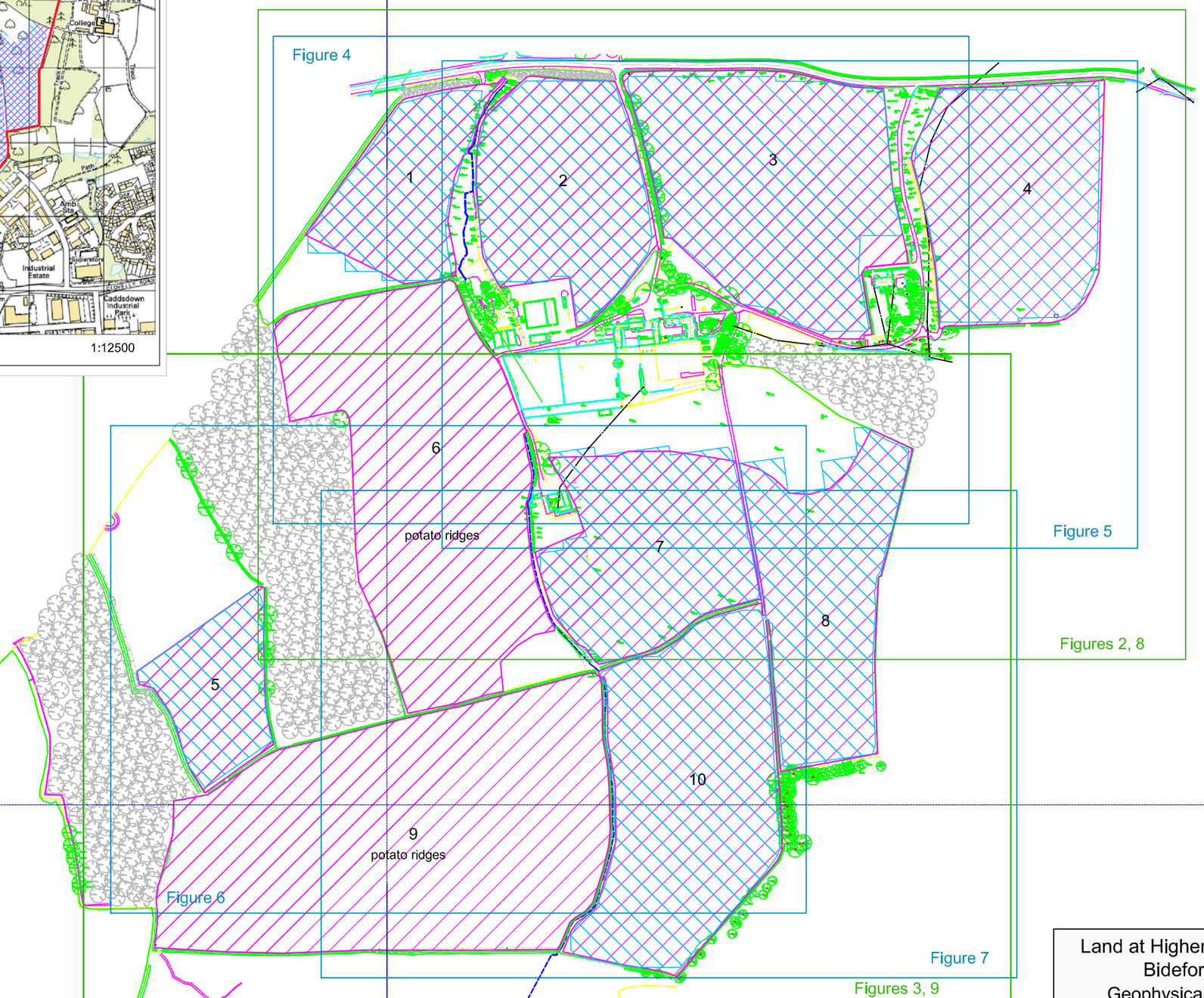


Figure 4

Figure 5

Figures 2, 8

Figure 6

Figure 7

Figures 3, 9

N

Proposed survey area (33.7 ha)

Survey coverage (20.6 ha)

Location of 1:2000 figures (2-3, 8-9)

Location of 1:1500 figures (4-7)

1 Field numbers

Land at Higher Winsford Farm, Bideford, Devon
Geophysical Survey 2014
Figure 1: Site plan

0 1:4000 200m

Surveyed by Bartlett - Clark Consultancy (01865 200864) for CgMs Consulting (Cheltenham)

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucsetershire (supplied by Bloor Homes).

Surveyed by Bartlett - Clark Consultancy (01865 200864) for CgMs Consulting (Cheltenham)

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Figure 2: Magnetometer survey (grey scale plot)

0 1:2000 100m

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucsetershire (supplied by Bloor Homes).

6

potato ridges

5

7

8

10

9

potato ridges

N

5.4nT

-5.0

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Geophysical Survey 2014
Figure 3: Magnetometer survey
(grey scale plot)

0 1:2000 100m

Surveyed by Bartlett - Clark Consultancy (01865 200864)
for CgMs Consulting (Cheltenham)

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucestershire (supplied by Bloor Homes).

N

1

2

3

200 nT

magnetic anomalies (archaeological ?)

magnetic anomalies (mostly) visible on 1885 OS map (former tracks / boundaries ?)

strong magnetic disturbances (recent ?)

background magnetic activity (geological / non-archaeological ?)

strong magnetic anomalies (ferrous ?)

cultivation

pipe (and associated magnetic disturbance)

drain ?

6

Surveyed by Bartlett - Clark Consultancy (01865 200864) for CgMs Consulting (Cheltenham)

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Geophysical Survey 2014

Figure 4: Magnetometer survey (with interpretation)

0 1:1500 50m

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucestershire (supplied by Bloor Homes).

2

3

4

N

magnetic anomalies (archaeological ?)

magnetic anomalies (mostly) visible on 1885 OS map (former tracks / boundaries ?)

strong magnetic disturbances (recent ?)

background magnetic activity (geological / non-archaeological ?)

strong magnetic anomalies (ferrous ?)

cultivation

pipe (and associated magnetic disturbance)

drain ?

200 nT

Land at Higher Winsford Farm, Bideford, Devon
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Figure 5: Magnetometer survey (with interpretation)

0 1:1500 50m

Surveyed by Bartlett - Clark Consultancy (01865 200864) for CgMs Consulting (Cheltenham)

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucestershire (supplied by Bloor Homes).

N

potato ridges

5

7

10

9

potato ridges

200 nT

magnetic anomalies (archaeological ?)

magnetic anomalies (mostly) visible on 1885 OS map (former tracks / boundaries ?)

strong magnetic disturbances (recent ?)

background magnetic activity (geological / non-archaeological ?)

strong magnetic anomalies (ferrous ?)

cultivation

pipe (and associated magnetic disturbance)

drain ?

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Figure 6: Magnetometer survey (with interpretation)

0 1:1500 50m

Surveyed by Bartlett - Clark Consultancy (01865 200864) for CgMs Consulting (Cheltenham)

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucestershire (supplied by Bloor Homes).

potato ridges

7

8

10

N

200 nT

magnetic anomalies (archaeological ?)

magnetic anomalies (mostly) visible on 1885 OS map (former tracks / boundaries ?)

strong magnetic disturbances (recent ?)

background magnetic activity (geological / non-archaeological ?)

strong magnetic anomalies (ferrous ?)

cultivation

pipe (and associated magnetic disturbance)

drain ?

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Figure 7: Magnetometer survey (with interpretation)

0 1:1500 50m

Surveyed by Bartlett - Clark Consultancy (01865 200864)
for CgMs Consulting (Cheltenham)

Background mapping based on site plan by Dando Surveying Ltd, Wickwar, Gloucsetershire (supplied by Bloor Homes).

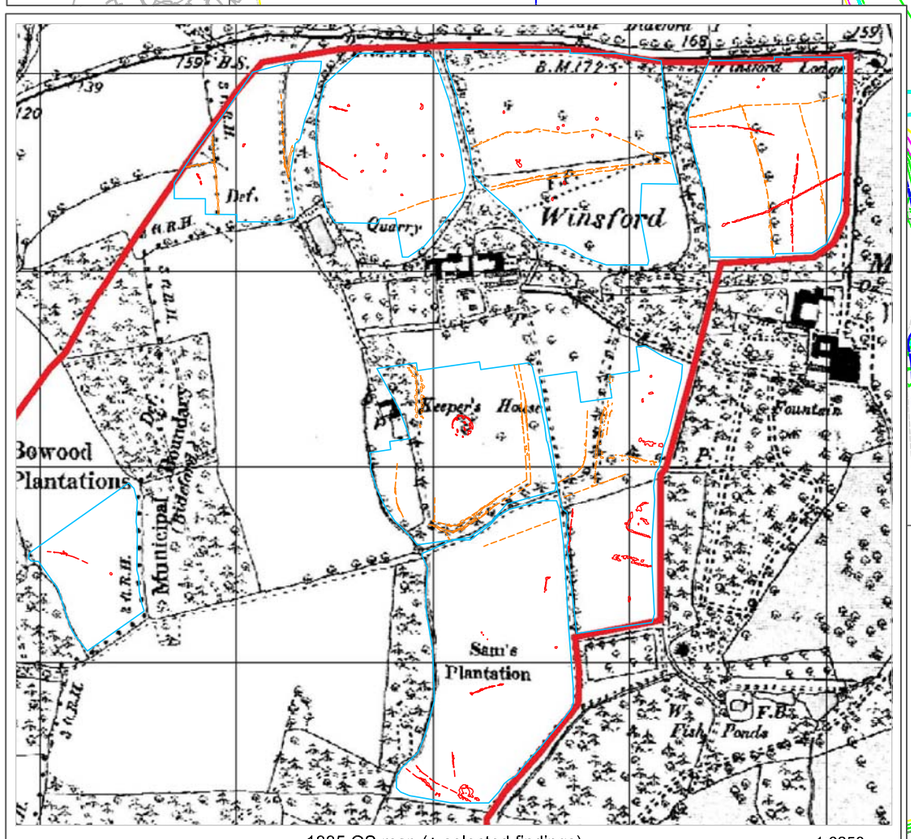
243000E

126400N

N

1 2 3 4 7 8

A B C D E F G H I J K M N O P Q



1885 OS map (+ selected findings) 1:6250

magnetic anomalies (archaeological ?)

magnetic anomalies (mostly) visible on 1885 OS map (former tracks / boundaries ?)

strong magnetic disturbances (recent ?)

background magnetic activity (geological / non-archaeological ?)

strong magnetic anomalies (ferrous ?)

cultivation

pipe (and associated magnetic disturbance)

drain ?

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Figure 8: Summary of findings

0 1:2000 100m

Surveyed by Bartlett - Clark Consultancy (01865 200864) for CgMs Consulting (Cheltenham)

Background mapping based on site plan by Dando Surveying Ltd,
Wickwar, Gloucestershire (supplied by Bloor Homes).

243000E

N

6

potato ridges

5

7

8

9

potato ridges

10

126000N

magnetic anomalies (archaeological ?)

magnetic anomalies (mostly) visible on
1885 OS map (former tracks / boundaries ?)

strong magnetic disturbances (recent ?)

background magnetic activity
(geological / non-archaeological ?)

strong magnetic anomalies
(ferrous ?)

cultivation

pipe
(and associated magnetic disturbance)

drain ?

Surveyed by Bartlett - Clark Consultancy (01865 200864)
for CgMs Consulting (Cheltenham)

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Figure 9: Summary of findings

0 1:2000 100m