

Archaeological Geophysical Survey Report



May 2014

Client: Stirling Maynard

OASIS No: oxfordar3-179410

NGR: TG 268050

**HILL FARM, KIRBY BEDON
NORFOLK**

**Report on Archaeological Geophysical Survey
2014**

Survey commissioned by:

**Oxford Archaeology East
15 Trafalgar Way
Bar Hill
Cambridge
CB23 8SQ**

on behalf of:

Stirling Maynard

Report by:

A.D.H. Bartlett

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16 May 2014

Norfolk CC reference: CNF4546_2

HILL FARM, KIRBY BEDON NORFOLK

Archaeological Geophysical Survey

Introduction

This report presents the results from a geophysical survey which has been undertaken as part of an archaeological evaluation of the site of a proposed reservoir at Kirby Bedon near Norwich.

The survey was commissioned on behalf of Stirling Maynard Construction Consultants from Bartlett Clark Consultancy (BCC), Specialists in Archaeogeophysics of Oxford, by Oxford Archaeology East. Fieldwork for the survey was done on 28-30 April 2014.

The Site

Notes on the condition and character of the site were previously included in the Method Statement prepared in advance of the survey [1]. The following comments are reproduced in part from this document.

Location

The area requiring investigation amounts to c. 18.4ha (as indicated by blue shading on the attached location plan). The site is located on arable land (at NGR TG 268050) to the north of the A146 about 1km SW of Kirby Bedon village, and 5km SE of the centre of Norwich.

Geology and topography

The site occupies gently sloping ground rising slightly to the south between an elevation of 37m AOD at the north of the site, and 44m AOD to the south. It is on a bedrock of Norwich Crag beneath drift deposits of Lowestoft Formation Diamicton (chalky till with sands, gravels and clay). The strength of magnetic response may vary according to the detailed composition of the till, but the site conditions should not present any unusual difficulties for a magnetometer survey.

Magnetic susceptibility measurements on soil samples collected at the site gave readings between 21-25 ($\times 10^{-8}$ SI/kg). These values are well within a range for which magnetometer surveying should be able to detect archaeological features.

Archaeological background

The site is located about 500m NE from the deserted medieval village of Bixley, and within the extent of a medieval deer park associated with Kirby Hall. It is noted (in correspondence between the developers and Norfolk County Council Historic Environment Service) that there are no below-ground recorded heritage assets at the proposed development site, but potential exists for previously unidentified archaeological sites or remains to be present within the application area. The purpose of the survey will therefore be to test for evidence of any such features which may be present.

Survey methodology

The survey followed procedures as described in the standard brief for magnetometer surveys issued by Norfolk County Council [2].

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 survey data is shown at 1:2000 scale as a grey scale plot (figure 2), and as graphical (x-y trace) plots at 1:1250 (figures 3-4). Comparison of these alternative presentations allows the detected magnetic anomalies to be examined in plan and profile respectively. An interpretation of the findings is also shown superimposed on figures 3-4 (which permits the interpreted outlines to be compared with the underlying data). A further interpreted summary of findings is presented in figure 5.

The graphical plots in figures 3-4 show the magnetometer readings after minimal pre-processing [of the kind permitted by English Heritage (2008) *Geophysical Survey in Archaeological Field Evaluation* Section 4.8]. This includes adjustment for irregularities in line spacing caused by variations in the instrument zero setting, and truncation of extreme values. Additional weak 2D low pass filtering has been applied to the grey scale plot to adjust background noise levels.

Figure 6 is included in the report to meet additional specific requirements stated in the generic brief for magnetometer surveys, as issued by Norfolk Historic Environment Service [2]. These figures show the magnetometer data without the conventional correction to the zero level in each transect, which is the usual initial step in data processing. The brief also requires a data block to be re-surveyed at the end of each day of fieldwork. The re-surveyed sample blocks are shown alongside the main survey in figure 6.

Colour coding has been used in the interpretation to distinguish different effects. Magnetic anomalies which may show characteristics to be expected from features of potential archaeological interest are outlined (or indicated more schematically by broken lines) in red. Small background magnetic anomalies which may be of natural or non-archaeological origin are indicated in light brown, and a few larger (but probably natural) features in a light green. Stronger (and perhaps recent) disturbances are in grey. Possible cultivation effects are indicated by green lines, and land drains in blue/purple. Some of the more conspicuous ferrous objects (identifiable as narrow spikes in the graphical plots) are marked in light blue.

The magnetometer responds to cut features such as ditches and pits when they are silted with topsoil, which usually has a higher magnetic susceptibility than the underlying natural subsoil. It also detects the thermoremanent magnetism of fired materials, notably baked clay structures such as kilns or hearths, and so responds preferentially to the presence of ancient settlement or industrial remains. It is also strongly affected by ferrous and other debris of recent origin.

Survey location

The survey grid was set out and tied to the OS grid using a Trimble ProXRT GPS system (with VRS correction to give accuracy of c. 0.1m). 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.

1 Results

The survey has responded clearly to a number of magnetic features and disturbances, but has produced only minimal findings of potential archaeological relevance.

One distinct feature visible in the survey plots is a ditch-like linear magnetic anomaly marked in red in the south-east corner of the site (labelled A in figure 5). This appears to link to a weaker north-south linear feature at B. It is possible they could represent former field boundaries. Their accurate linear plan perhaps suggest they are unlikely to form part of an ancient field system.

Another slightly curving linear feature was detected towards the north of the site at C. This could perhaps also be a field boundary, but it links two strong disturbances (outlined in grey), which could be pits or hollows containing modern debris. It is perhaps possible that C is a drain, or a ditch containing a non-ferrous pipe. Two other more fragmentary linear features of a kind which could more typically represent land drains are marked at D and E.

A linear pattern is visible in the grey scale plot in directions as indicated by green lines in the interpretation. The pattern as visible in the plot is narrowly spaced, which suggests it relates to modern ploughing rather than ridge and furrow cultivation.

There is a moderate level of overall background magnetic activity (as indicated by the small magnetic anomalies outlined in light brown in the interpretation). This probably indicates the presence of naturally magnetic stones in the gravel component of the drift deposits. It is difficult to identify any slightly larger magnetic anomalies of a kind which could be interpreted as silted pits (as are often found at archaeological sites). Two small examples are outlined in red at F and G, but they are too isolated to be convincing. A number of broad and weak magnetic anomalies (as at H) are outlined in light green. These are likely to be natural silted hollows or clay pockets in the topsoil.

Disturbances (shown in grey) at the east of the field are probably caused by metaling or hardcore along a track at the edge of the field.

Conclusions

Conditions at the site appear to be favourable for the magnetic detection of archaeological features, but the main findings are limited to a small number of possible former ditches of uncertain significance. The linear markings (A, B, C) could represent former field boundaries, but no other findings can be identified which appear to be of clear archaeological significance.

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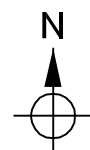
email: bcc123@ntlworld.com

16 May 2014

References

- [1] *Hill Farm, Kirby Bedon, Norfolk: Method Statement for Archaeological Geophysical Survey.* Document prepared by Bartlett Clark Consultancy for Oxford Archaeology East, 23 April 2014.
- [2] *Generic Brief for Archaeological Evaluation by Magnetometer Survey.* Document issued by Norfolk County Council Historic Environment Service, 7/12/2012.

Background mapping based on site plan
supplied by Stirling Maynard Construction
Consultants, Peterborough



5

2, 6

3

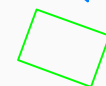
4

627000E

305000N



Area specified for
geophysical investigation



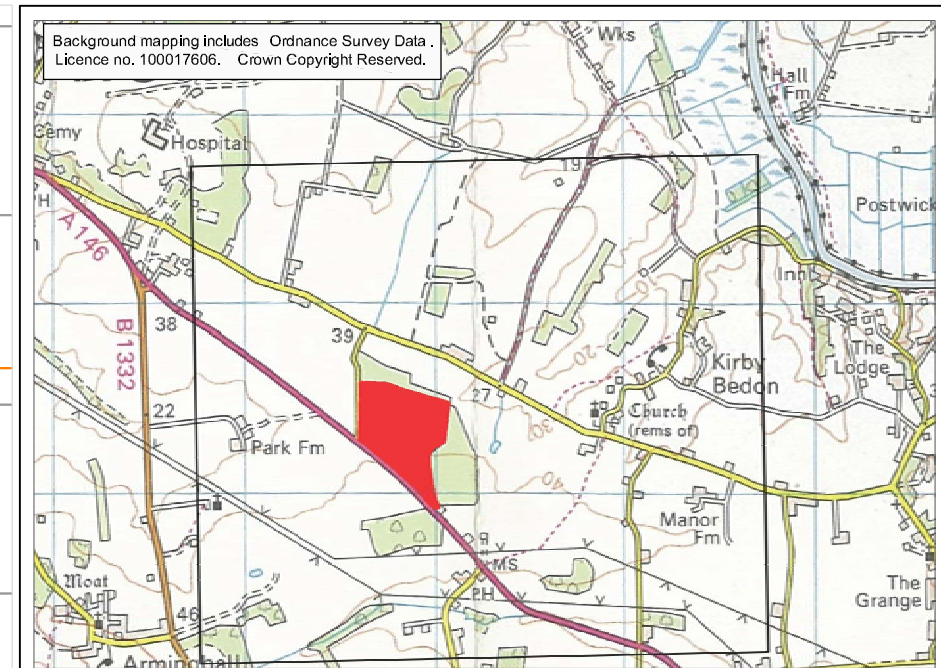
Location of 1:2000 figures
(2, 6)



Location of 1:1250 figures
(3-4)



Location of 1:2500 summary plan
(5)



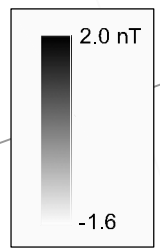
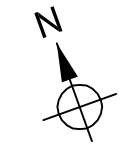
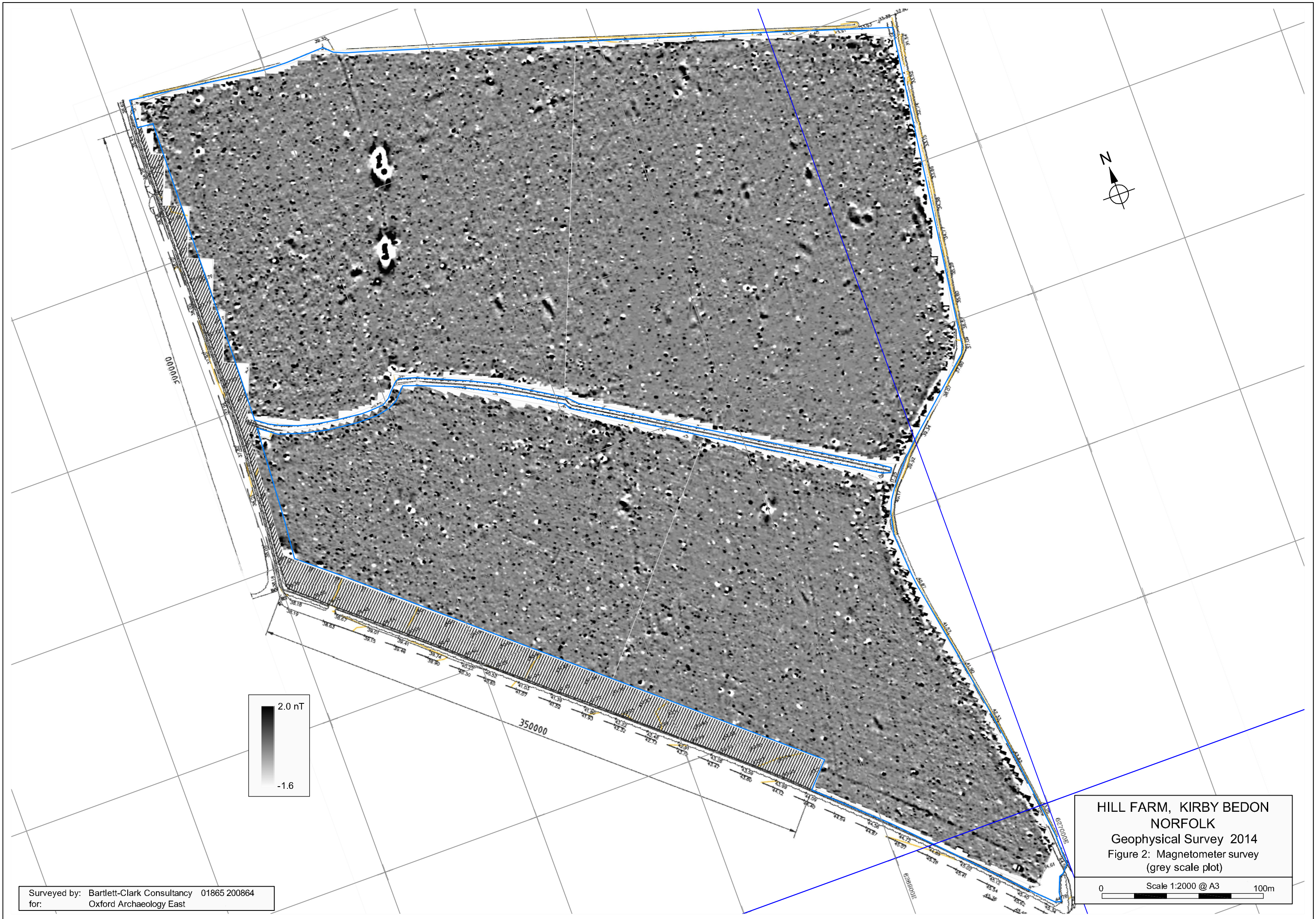
Site location

1:40000

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Geophysical Survey 2014
Figure 1: Location of survey

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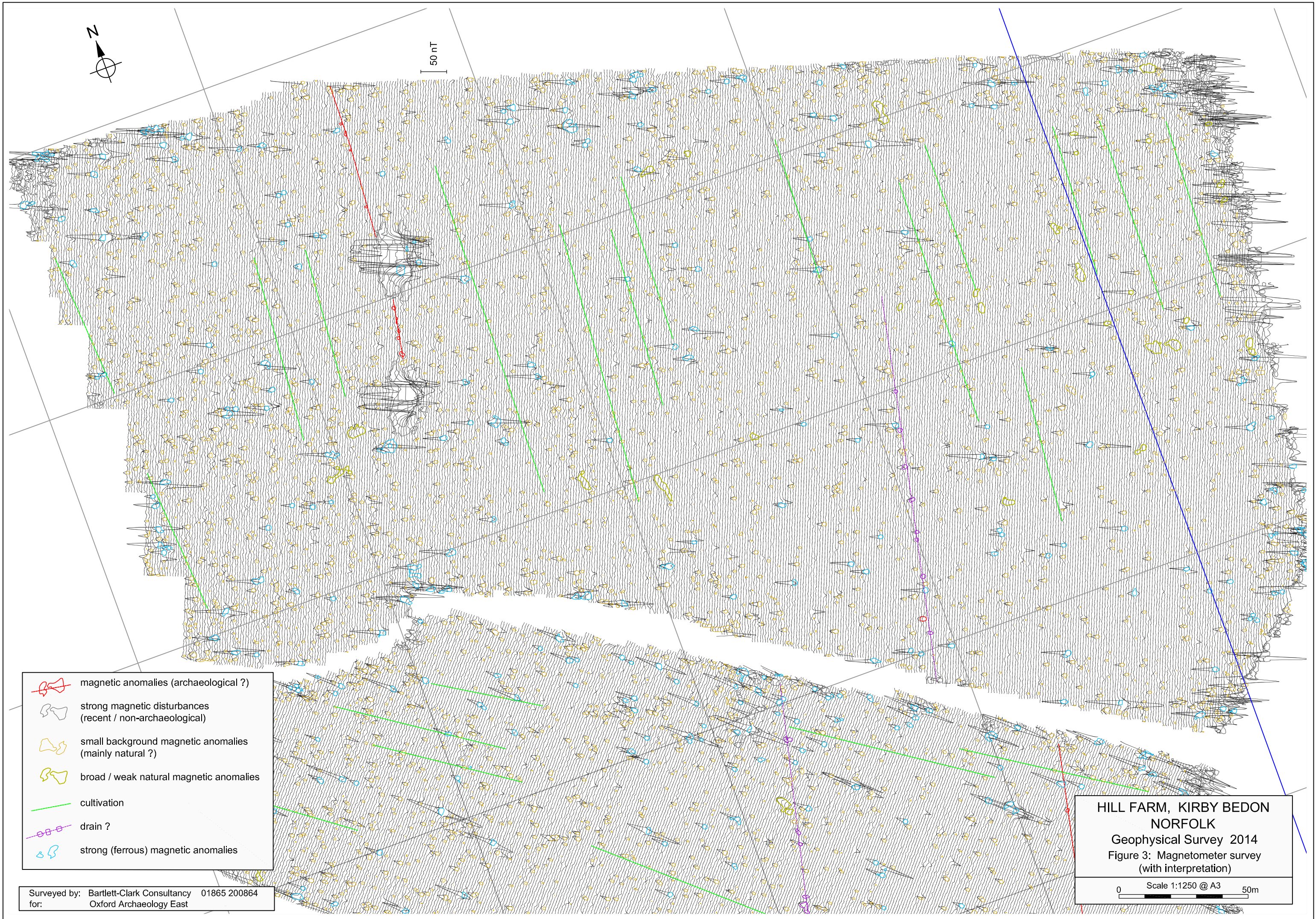
Surveyed by: Bartlett-Clark Consultancy 01865 200864
for: Oxford Archaeology East



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Figure 2: Magnetometer survey
(grey scale plot)

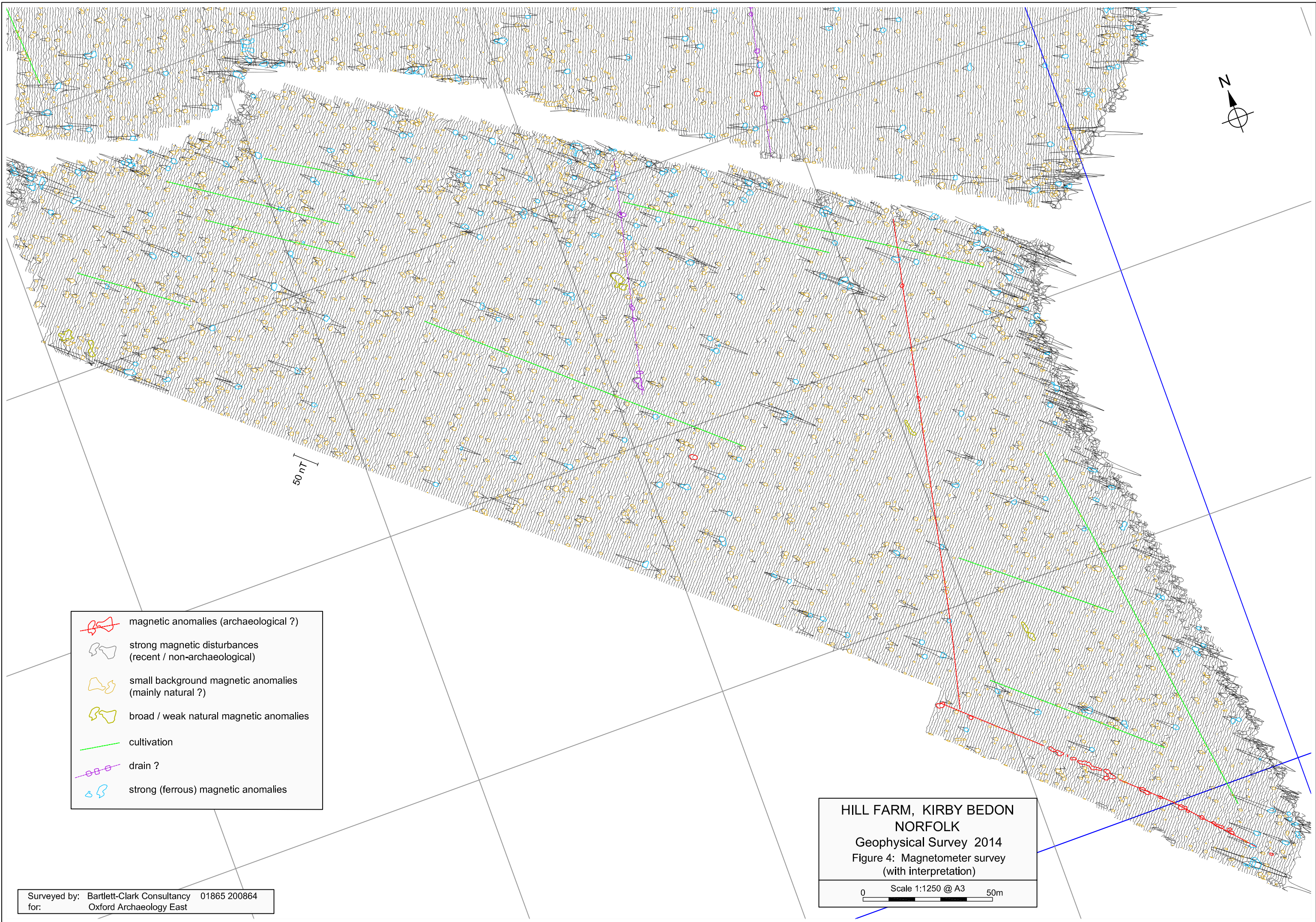
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Surveyed by: Bartlett-Clark Consultancy 01865 200864
for: Oxford Archaeology East










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Figure 3: Magnetometer survey
(with interpretation)

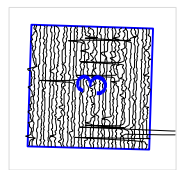
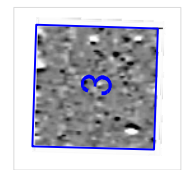
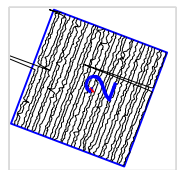
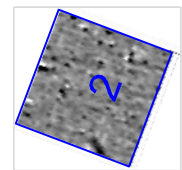
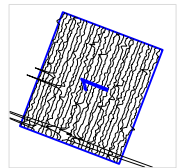
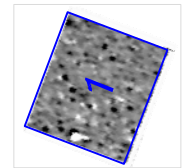
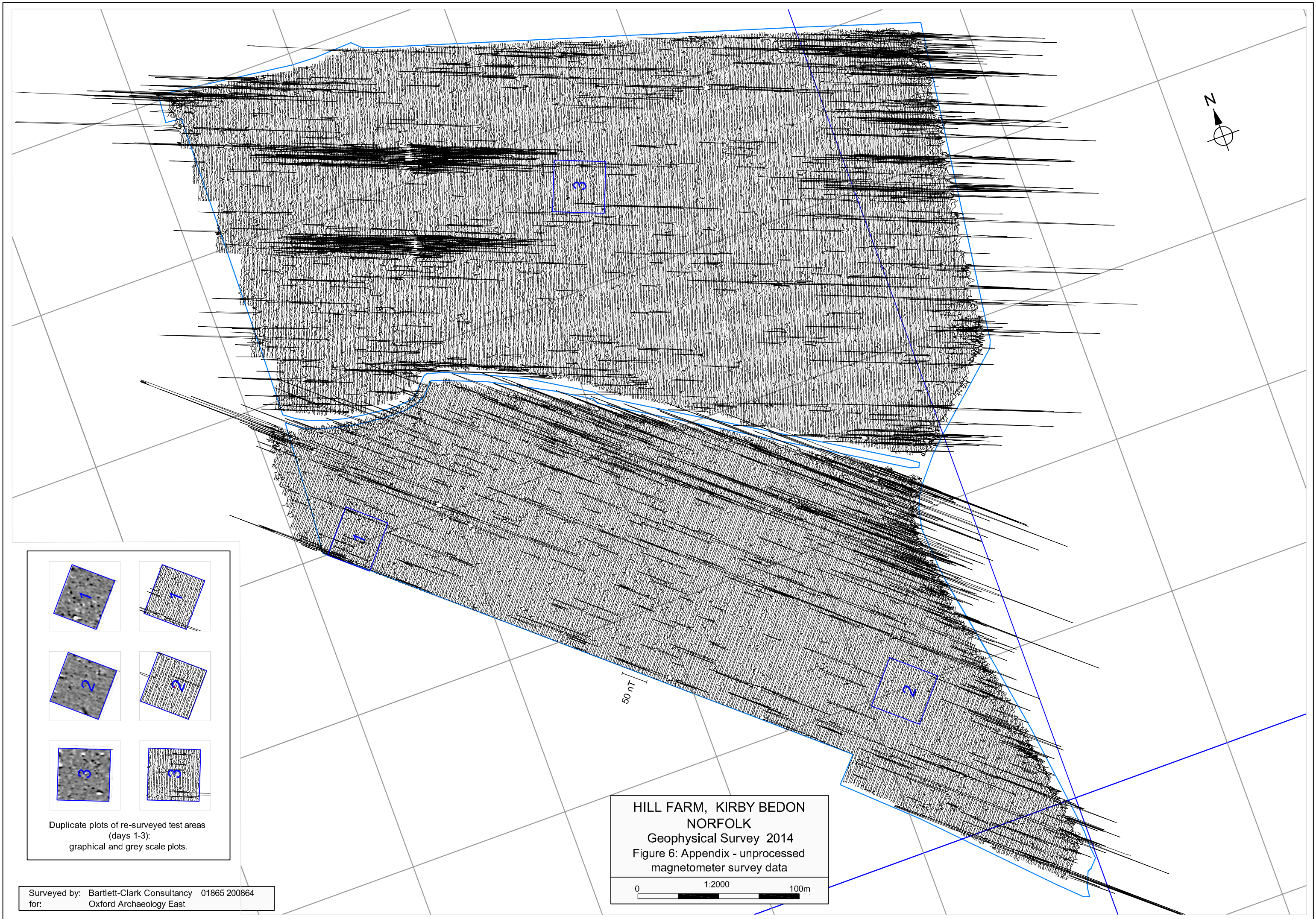




-  magnetic anomalies (archaeological ?)
-  strong magnetic disturbances (recent / non-archaeological)
-  small background magnetic anomalies (mainly natural ?)
-  broad / weak natural magnetic anomalies
-  cultivation
-  drain ?
-  strong (ferrous) magnetic anomalies

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Figure 5: Summary of findings

0 Scale 1:2500 @ A3 100m



Duplicate plots of re-surveyed test areas
(days 1-3):
graphical and grey scale plots.

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for: Oxford Archaeology East

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Figure 6: Appendix - unprocessed
magnetometer survey data



APPENDIX E. OASIS REPORT FORM

All fields are required unless they are not applicable.

Project Details

OASIS Number	oxfordar3-179410		
Project Name	Hill Farm, Kirby Bedon, Norfolk		
Project Dates (fieldwork)	Start	28-04-2104	Finish 30-04-2104
Previous Work (by OA East)	No	Future Work	Unknown

Project Reference Codes

Site Code	XNFKIB14	Planning App. No.	
HER No.		Related HER/OASIS No.	

Type of Project/Techniques Used

Prompt	Planning condition
Development Type	Service Infrastructure

Please select all techniques used:

<input type="checkbox"/> Aerial Photography - interpretation	<input type="checkbox"/> Grab-Sampling	<input type="checkbox"/> Remote Operated Vehicle Survey
<input type="checkbox"/> Aerial Photography - new	<input type="checkbox"/> Gravity-Core	<input type="checkbox"/> Sample Trenches
<input type="checkbox"/> Annotated Sketch	<input type="checkbox"/> Laser Scanning	<input type="checkbox"/> Survey/Recording Of Fabric/Structure
<input type="checkbox"/> Augering	<input type="checkbox"/> Measured Survey	<input type="checkbox"/> Targeted Trenches
<input type="checkbox"/> Dendrochronological Survey	<input type="checkbox"/> Metal Detectors	<input type="checkbox"/> Test Pits
<input type="checkbox"/> Documentary Search	<input type="checkbox"/> Phosphate Survey	<input type="checkbox"/> Topographic Survey
<input type="checkbox"/> Environmental Sampling	<input type="checkbox"/> Photogrammetric Survey	<input type="checkbox"/> Vibro-core
<input type="checkbox"/> Fieldwalking	<input type="checkbox"/> Photographic Survey	<input type="checkbox"/> Visual Inspection (Initial Site Visit)
<input checked="" type="checkbox"/> Geophysical Survey	<input type="checkbox"/> Rectified Photography	

Monument Types/Significant Finds & Their Periods

List feature types using the [NMR Monument Type Thesaurus](#) and significant finds using the [MDA Object type Thesaurus](#) together with their respective periods. If no features/finds were found, please state "none".

Monument	Period	Object	Period
Ditches	Uncertain		Select period...
	Select period...		Select period...
	Select period...		Select period...

Project Location

County	Norfolk	Site Address (including postcode if possible)
District	South Norfolk	Hill Farm
Parish	Kirby Bedon	Kirby Bedon
HER	Norfolk	Norfolk
Study Area	18.75ha	National Grid Reference TG 268050

Project Originators

Organisation	OA EAST
Project Brief Originator	Norfolk County Council
Project Design Originator	Bartlett Clark
Project Manager	Paul Spoerry
Supervisor	A. D. H. Bartlett

Project Archives

Physical Archive	Digital Archive	Paper Archive
None	OA East	OA East
None	XNFKIB14	XNFKIB14

Archive Contents/Media

	Physical Contents	Digital Contents	Paper Contents
Animal Bones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ceramics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human Bones	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Metal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stratigraphic		<input type="checkbox"/>	<input type="checkbox"/>
Survey		<input type="checkbox"/>	<input type="checkbox"/>
Textiles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worked Bone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worked Stone/Lithic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Digital Media	Paper Media
<input type="checkbox"/> Database	<input type="checkbox"/> Aerial Photos
<input type="checkbox"/> GIS	<input type="checkbox"/> Context Sheet
<input checked="" type="checkbox"/> Geophysics	<input type="checkbox"/> Correspondence
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<input type="checkbox"/> Illustrations	<input type="checkbox"/> Drawing
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	<input type="checkbox"/> Research/Notes
	<input type="checkbox"/> Photos
	<input type="checkbox"/> Plans
	<input checked="" type="checkbox"/> Report
	<input type="checkbox"/> Sections
	<input type="checkbox"/> Survey



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