ARCHAEOLOGICAL SERVICES WYAS

Land South of Chesterton
Cirencester
Gloucestershire

Geophysical Survey

Report no. 2759

May 2015

Client: Bathurst Development Limited

Land South of Chesterton, Cirencester Gloucestershire

Geophysical Survey

Summary

A geophysical (magnetometer) survey, covering 16 hectares, was carried out on agricultural land south of Chesterton, Cirencester to provide further information on the extent and layout of archaeological features within a possible Romano-British settlement site which is protected as a scheduled monument (Ref. GC 464). The results from this survey relate to the southern portion of the scheduled monument and contribute to the findings of a previous geophysical survey which previously took place within the Chesterton Farm area. Anomalies indicative of two distinct settlement sites have been identified either side of a low valley. Within the northernmost enclosure, anomalies suggestive of multiphase occupation have been identified, with a possible structure also identified. In addition, several linear anomalies may represent a field system and three possible extraction sites have also been identified. Therefore, on the basis of the survey, the archaeological potential of site is assessed as being high in the north-west and south-east and moderate elsewhere.

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Report Information

Client:	Bathurst Development Limited
Address:	Estate Office, Cirencester Park, Cirencester, GL7 2BU
Report Type:	Geophysical Survey
Location:	West of Cirencester
County:	Gloucestershire
Grid Reference:	SU 015 998
Period(s) of activity:	Romano-British
Report Number:	2759
Project Number:	4107
Site Code:	WOC14
OASIS ID:	archaeol11-212463
Section 42 Licence No.:	SL00060336
Museum Accession No.:	n/a
Date of fieldwork:	April 2015
Date of report:	May 2015
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Authorisation for distribution: ----------

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1 Introduction

Archaeological Services WYAS (ASWYAS) was commissioned by the Environmental Dimension Partnership (EDP - the Consultant), on behalf of their client, Bathurst Development Limited (BDL - the Client), to undertake a geophysical (magnetometer) survey of land to the south-east of Chesterton Farm, Cirencester, to provide further information on the extent and layout of archaeological remains within two fields which form the southern half of a scheduled monument (Ref. GC 464). This survey will inform the client, and English Heritage, with regards to future management proposals. The work was undertaken in line with current best practice (CIfA 2014; David *et al.* 2008) and to a Project Design (Harrison 2013) submitted to and approved by the Client and English Heritage (see Section 42 - Appendix 4). The survey was carried out between January 6th and January 8th 2015 and on April 16th and April 17th 2015 to provide additional information on the archaeological resource within the designated area, as a response to a request by English Heritage following on from previous work and to inform future management proposals.

Site location, topography and land-use

The survey area comprises the scheduled area within two fields forming a trapezoid-shaped parcel of land 1km west of Cirencester and 200m south-east of Chesterton Farm, centred at SU 015 998 (see Fig. 1 and Fig. 2). It is bound to the north by a farm track and by hedged field boundaries to the east, west and south-west. The south-eastern survey extents are unbound. At the time of survey, the western field (Field 1) contained stubble (see Plate 1), whereas the eastern field (Field 2), was under a short wheat crop (see Plate 2). The topography is undulating although generally both fields are situated at 115m above Ordnance Datum (aOD), sloping to 112m aOD at the base of a low valley within which a field boundary divides the designated area.

Soils and geology

The underlying bedrock mainly comprises Forest Marble Formation – Limestone. No superficial deposits are recorded although winding bands of alluvium are recorded in the surrounding landscape (British Geological Survey 2015). The soils in this area are classified in the Sherbourne association, characterised as shallow, well-drained calcareous clays (Soil Survey of England and Wales 1983).

2 Archaeological Background

The survey area is protected as a scheduled monument (Ref. GC 464), with the designated area also extending into the fields to the north (see Fig. 2). Cropmarks identified on aerial photographs suggest the presence of ditches and enclosures which are thought to indicate a possible Iron Age or Roman farmstead. In addition to the cropmarks, surface finds recovered

from the north of the survey area, including large slabs of limestone, old red sandstone tiles and Roman pottery, suggest the presence of a building at SU 0154 9997. An Archaeological Assessment (Lewis 2011), which was produced in advance of the possible development of land to the north of the current survey area highlighted the fact that the majority of the known archaeological resources in the surrounding landscape probably date to the Roman period. However, it was also recognised that the site's topographic and geological position is such that '*it is of at least moderate potential for the presence of prehistoric archaeological remains, with a likely emphasis on the Iron Age period*'.

Previous geophysical survey (see Fig. 2) of land to the immediate north of the current survey area (Webb 2014) identified two distinct areas of settlement activity, one of which is contained within the northern portion of the scheduled area. Elsewhere within the Chesterton Farm site beyond the scheduled area, anomalies forming parts of a trackway and five probable enclosures of differing sizes and forms were identified, as well as a circular anomaly interpreted as a probable round barrow (Webb 2014).

3 Aims and Methodology

Magnetometer Survey

The aim of the geophysical survey as described in the Project Design (Harrison 2013) is to, as far as possible, identify the presence or absence, and extent and layout, of buried archaeological remains across the survey area, through the interpretation of magnetic anomalies identified following the processing of data gathered during the survey.

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. Features such as a ditch, pit or kiln can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the Earth's magnetic field. In mapping these slight variations, detailed plans of sites can be obtained as buried features often produce reasonably characteristic anomaly shapes and strengths (Gaffney and Gater 2003). Further information on types of anomaly is provided as Appendix 1.

On this site Bartington Grad601 magnetic gradiometers were used. These instruments are calibrated to take readings at 0.25m intervals on zig-zag traverses 1m apart within a series of 30m by 30m grids resulting in 3600 readings per 30m grid square. The data is stored in the memory of the instrument before being downloaded to a lap-top computer every day in preparation for data processing and interpretation.

The survey grid was laid out using a Trimble VRS differential Global Positioning System (Trimble 5800 model) providing an accuracy greater than 0.01m. The locations of the survey grid and anomalies are available as a DXF file. The survey grids were then super-imposed

onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if co-ordinates are measured off hard copies of the mapping rather than using the digital co-ordinates.

Data Processing

The gradiometer data has been presented in this report in XY trace and greyscale formats. In the former format the data shown is 'raw' with no processing other than grid biasing having been done. An XY plot presents the data logged on each traverse as a single line with each successive traverse incremented on the Y-axis to produce a 'stacked' plot. A hidden line algorithm has been employed to block out lines behind major 'spikes' and the data has been clipped. The main advantage of this display option is that the full range of data can be viewed, dependent on the clip, so that the 'shape' of individual anomalies can be discerned and potentially archaeological anomalies differentiated from 'iron spikes'. The data in the greyscale images has been interpolated and selectively filtered, using Geoplot 3 (Geoscan Research) software to remove the effects of drift in instrument calibration and other artificial data constructs and to maximise the clarity and interpretability of the archaeological anomalies.

Presentation

A general site location plan, incorporating the 1:50000 Ordnance Survey (OS) mapping, is shown in Figure 1. Figure 2 shows the survey location and scheduled monument area together with the previous geophysical survey data at a scale of 1:6000. Figure 3 shows the overall magnetic data whilst Figure 4 shows an overall site interpretation, both at 1:1500. Detailed data plots ('raw' and processed) and interpretative figures from the three sectors are presented at a scale of 1:1000 in Figures 4 to 13 inclusive.

Further information on magnetic survey and characterisation and interpretation of anomaly types are given in Appendix 1. Appendix 2 describes the composition and location of the site archive and Appendix 3 reproduces the OASIS entry. The Section 42 Licence is shown in Appendix 4.

The survey methodology, report and any recommendations comply with the Project Design (Harrison 2013) and guidelines outlined by English Heritage (David *et al.* 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All figures reproduced from Ordnance Survey mapping are with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

Disclaimers

The figures in this report have been produced following analysis of the data in 'raw' and processed formats and over a range of different display levels. All figures are presented to

most suitably display and interpret the data from this site based on the experience and knowledge of Archaeological Services staff.

The results and subsequent interpretation of data from geophysical surveys should not be treated as an absolute representation of the underlying archaeological and non-archaeological remains. Confirmation of the presence or absence of archaeological remains can only be achieved by direct investigation of sub-surface deposits.

Archaeological Services WYAS cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

4 Results and Discussion

Overview

There is a clear contrast in the magnetic backgrounds between the eastern and western halves of the survey area, with an increased level of background variation apparent throughout Field 1. This contrast is also apparent in the previous magnetic data to the immediate north and is considered to be geological in origin, probably being caused by a localised, unmapped geological change. Against both of these backgrounds numerous anomalies have been identified by the survey which are discussed below and cross-referenced to specific examples depicted on the interpretative figures, where appropriate.

Ferrous Anomalies

Ferrous anomalies, as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris or material is common on rural sites, often being present as a consequence of manuring or tipping/infilling.

A broad area of magnetic disturbance, **A**, within the centre of Field 2 is caused by the proximity of two electricity pylons (see Plate 2). Within Field 1, a smaller area of magnetic disturbance, **B**, is caused by a water trough which was observed at the time of the survey. A linear anomaly, **C**, can be seen extending from the trough on an easterly trajectory. This is likely to be due to a buried water pipe.

Within the north of Field 1, a broad area of magnetic disturbance, **D**, corresponds to the site of a building which is depicted on the first edition Ordnance Survey map (1876). The high magnitude response is likely to be caused by demolition material, rubble and possibly *in-situ* building remains. Surface finds suggestive of Roman building remains have been recovered from this part of the field but no further anomalies of obvious structural origin have been detected by the survey. It is notable, however, that the magnetic background response is

particularly enhanced in this area, suggesting an increase of magnetic material within the topsoil.

Magnetic disturbance around the perimeters of some of the fields is caused by ferrous material within, or forming part of, the field boundary.

Agricultural Anomalies

A faint linear trend, **E**, can be seen on a north-west/south-east alignment within the east of Field 1 and the south-west of Field 2. The continuous and linear nature of the trend is suggestive of a field drain. Within the north-east corner of Field 1 parallel linear anomalies **F** and **G** are located within a low-lying part of the site and are also considered to be due to field drains. Two east-west aligned anomalies, **H** and **I**, within Field 1 are ascribed an agricultural interpretation given their orientation at right-angles to the current and historical pattern of land division. It is thought likely that the anomalies are due to soil-filled ditches and probably relate to former field boundaries which were removed prior to the publication of the first edition Ordnance Survey map in 1876. As such, an archaeological origin cannot be completely dismissed. Numerous parallel linear trends are identified in most parts of the site, but particularly within Field 1 where the background is more variable. These anomalies are indicative of recent ploughing regimes.

Geological Anomalies

As mentioned in the overview (see above), there is a clear contrast between the background magnetic variation in Field 1 and Field 2 resulting in an increase in the density of discrete areas of magnetic enhancement (anomalies) in the west of the survey area. The anomalies are due to localised variations within the bedrock and variations in the composition of the topsoil. The two backgrounds are separated by a north/south-aligned band of low magnitude anomalies, **J**, which correspond to the base of a slope. The band can be seen in the previous geophysical survey data (see Fig. 2) meandering north-westwards. Given the sinuous nature of the band of anomalies and its location within a low valley through the landscape, it seems likely that the anomalies are caused by alluvium (clay, sand, silt and gravel) deposited along a former watercourse. Sinuous bands of alluvium are recorded elsewhere in the local landscape (British Geological Survey 2015).

Possible Quarrying Anomalies

Three localised, amorphous areas of increased response, **K**, **L** and **M**, can be seen in the south of Field 1. The areas are higher in magnitude than the prevailing discrete anomalies and it is possible that they are caused by in-filled quarry pits. Anomalies suggestive of extraction were detected within the magnetic survey to the immediate north (Webb 2014) and localised quarry pits are shown on historical Ordnance Survey mapping throughout the surrounding landscape. Given the local context, an earlier, archaeological origin for these anomalies is possible.

Archaeological and Possible Archaeological Anomalies

Unless otherwise stated, anomalies of archaeological and possible archaeological origin are thought to be caused by infilled cut features such as ditches and discrete features such as pits. Whilst these anomalies do not necessarily manifest in any coherent archaeological pattern, they are located within a landscape of high archaeological potential, and cannot be satisfactorily interpreted as either being of modern, agricultural or geological origin. On this basis they have therefore been interpreted as being potentially archaeological. These anomalies are discussed in more detail below.

Two distinct areas of archaeological anomalies have been detected by the survey. Within the north of Field 1 a rectangular enclosure can be seen, defined by linear anomalies, **N**, which are likely to soil-filled ditches. The anomaly appears on a north-east/south-west alignment and measures 93m by 105m. Numerous anomalies within the interior of the enclosure are likely to represent pits, post-holes, ditches and spreads of enhanced material, and are indicative of settlement activity. At least two smaller enclosures or internal divisions, **O** and **P**, are identified appended to the northern extent of the enclosure. There are notably fewer internal anomalies within the south of **N,** although an oval anomaly, **Q**, is clearly visible. The anomaly is 8m in width and 25m in length and may be due to a small enclosure or perhaps a structure. If so, the anomaly may be caused by the soil-filled foundation trench.

Lower magnitude, fragmented linear anomalies, **R**, can be seen extending from the south-west of **N** and, whilst less-well defined, appear to form another rectangular enclosure on a separate alignment. It is possible that this enclosure represents a separate phase of activity.

Immediately north of **N** a clear linear anomaly, **S**, can be seen on a north-west/south-east alignment. It is likely that this anomaly is caused by a continuation of the probable late-prehistoric/Romano-British 'ladder' settlement site and field system which was identified in the geophysical survey to the north (See Fig. 2; Webb 2014). Numerous anomalies of probable archaeological origin are contained to the north of this probable ditch.

The second distinct area of archaeological activity is identified in the south of Field 2 and is characterised by an oval enclosure, **T**, measuring 31m from east to west and at least 55m from north to south. The full extents of the enclosure are not known, as the anomalies extend beyond the scheduled area to the south. Numerous internal anomalies are constrained by the enclosure ditch, **T**, and are due to occupational features such as pits, post-holes, hearths and enhanced spreads of archaeological material. To the immediate north of this enclosure, two parallel linear anomalies, **U** and **V**, are clearly discernible. The anomalies, which are thought to indicate ditches, appear on approximately the same north-west/south-east orientation as the two settlement sites and field systems which were identified in the survey of land to the north (see Fig. 2). It is thought possible that they form field boundaries which are part of the same pattern of land division/field systems. Two isolated linear anomalies, **W** and **X**, within the

north of Field 2 are aligned parallel with and at right angles to this pattern and may be due to sections of former field boundary ditches.

5 Conclusions

Two distinct settlement sites have been identified by the geophysical survey as probable ditched enclosures located either side of a low valley.

The northernmost site is rectangular in form and contains a dense cluster of anomalies within its interior. It is notable that the enclosure does not conform to the 'ladder' settlement pattern of land division which is known to the immediate north, nor to its orientation. Internal divisions and dense clusters of magnetic anomalies have been identified within the interior of the enclosure and an oval anomaly may indicate a structure. Pottery sherds and building remains of possible Roman origin are known from the north of this field and it is probable that these anomalies originate from this period.

The southernmost site is situated 200m to the south-east and appears to be oval in form. The enclosure extends beyond the scheduled area (also the survey area) and so the full extents are unknown. Numerous pit-type anomalies can be seen within the interior of the enclosure, suggesting settlement activity. Beyond the two enclosures a number of linear anomalies have been identified on a north-west/south-east alignment and are thought to define a former field system.

Other anomalies of note include three possible localised extraction sites. Limestone has been utilised as a source of building material in the vicinity and previous geophysical survey to the immediate north identified several anomalies as infilled quarry workings. Only one, to the north-east of Chesterton Farm, is shown on any Ordnance Survey map.

Overall, the geophysical survey has successfully identified anomalies which corroborate the results of the Archaeological Assessment (Lewis 2011). The anomalies identified by the survey appear to be consistent with Roman settlement activity which is known from previous geophysical and archaeological investigations in the locality. The survey has both confirmed and enhanced the known archaeological resource and confirmed the potential suggested by the site's topographic and geological position, as described in the archaeological assessment.

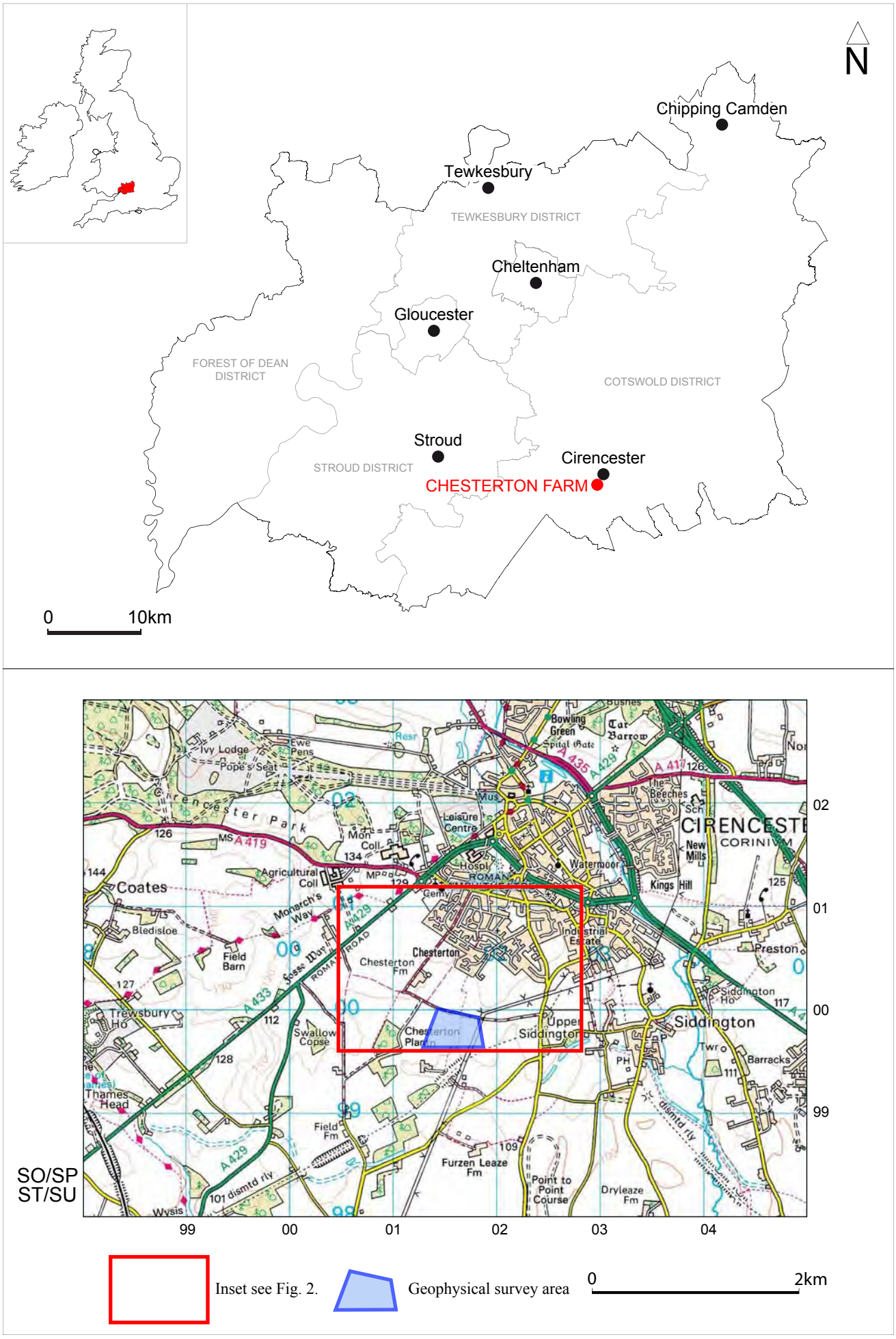

Fig. 1. Site location

GEOPHYSICAL SURVEY BOUNDARY

PREVIOUS GEOPHYSICAL SURVEY BOUNDARY (ASWYAS 2011)

SCHEDULED MONUMENT BOUNDARY

LOCATION AND DIRECTION OF PLATES

N

2.0

-1.0

nT

FIELD 1

FIELD 2

2010 00

2000 00

4010 00

4020 00

0 200m

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Fig. 2. Survey location showing scheduled monument area and previous greyscale magnetometer data (1:6000 @ A3)

SECTOR BOUNDARY

SECTOR 1
(SEE FIGS 5-7)

SECTOR 2
(SEE FIGS 8-10)

SECTOR 3
(SEE FIGS 11-13)

FIELD 1

FIELD 2

2.0
-1.0
nT

N

2000 00

1998 00

4014 00

4016 00

4018 00

0 50m

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Fig. 3. Overall greyscale magnetometer data (1:1500 @ A3)

TYPE OF ANOMALY		INTERPRETATION
•	DIPOLAR ISOLATED	FERROUS MATERIAL
	MAGNETIC DISTURBANCE	FERROUS MATERIAL
	LINEAR TREND	WATER PIPE?
	LINEAR TREND	FIELD DRAIN
	LINEAR TREND	AGRICULTURAL
	LINEAR TREND	GEOLOGICAL BOUNDARY
	MAGNETIC ENHANCEMENT	GEOLOGY
	MAGNETIC ENHANCEMENT	QUARRYING?
	MAGNETIC ENHANCEMENT	ARCHAEOLOGY?
	MAGNETIC ENHANCEMENT	ARCHAEOLOGY

	SECTOR BOUNDARY
	SCHEDULED MONUMENT BOUNDARY

N

SECTOR 1 (SEE FIGS 5-7)

SECTOR 2 (SEE FIGS 8-10)

SECTOR 3 (SEE FIGS 11-13)

FIELD 1

FIELD 2

Track

Track

Track

Pond

Pond

ETL

ETL

118.6m

119.3m

122m RH

122m RH

ED & Wa Bdy

FW

S G D N P O N F U Q R R J J W X N E K C H R I B A L T V U E M

2000 00

1998 00

4014 00

4016 00

4018 00

0 50m

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Fig. 4. Overall interpretation of magnetometer data (1:2500 @ A3)

SECTOR BOUNDARY

N

2000 00

1998 00

2.0

-1.0

nT

4012 00

4014 00

0 30m

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Fig. 5. Processed greyscale magnetometer data; Sector 1 (1:1000 @ A3)

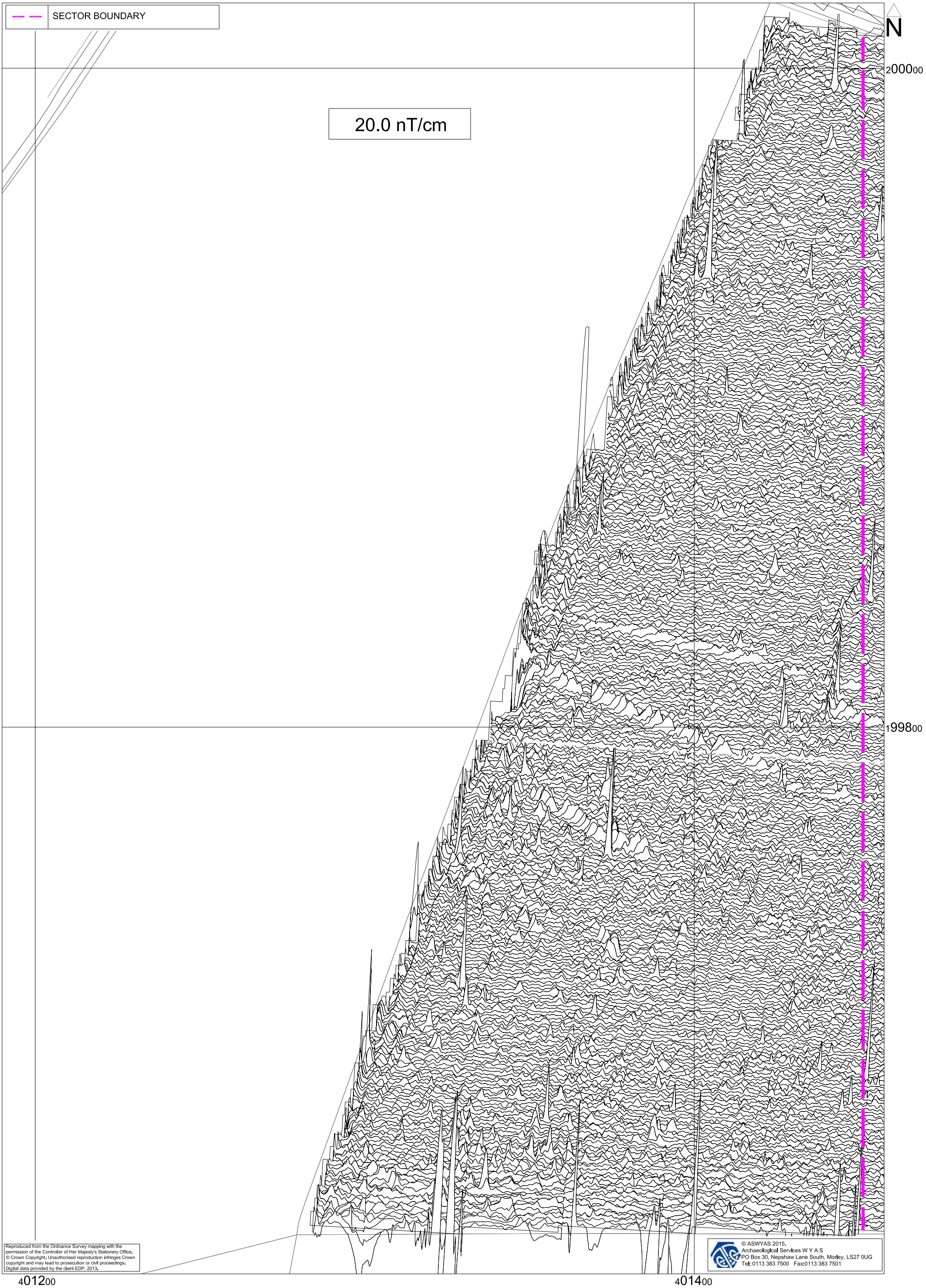

Fig. 6. XY trace plot of minimally processed magnetometer data; Sector 1 (1:1000 @ A3)

— —	SECTOR BOUNDARY

TYPE OF ANOMALY		INTERPRETATION
•	DIPOLAR ISOLATED	FERROUS MATERIAL
	MAGNETIC DISTURBANCE	FERROUS MATERIAL
-------	LINEAR TREND	WATER PIPE?
	LINEAR TREND	AGRICULTURAL
	MAGNETIC ENHANCEMENT	GEOLOGY
	MAGNETIC ENHANCEMENT	ARCHAEOLOGY

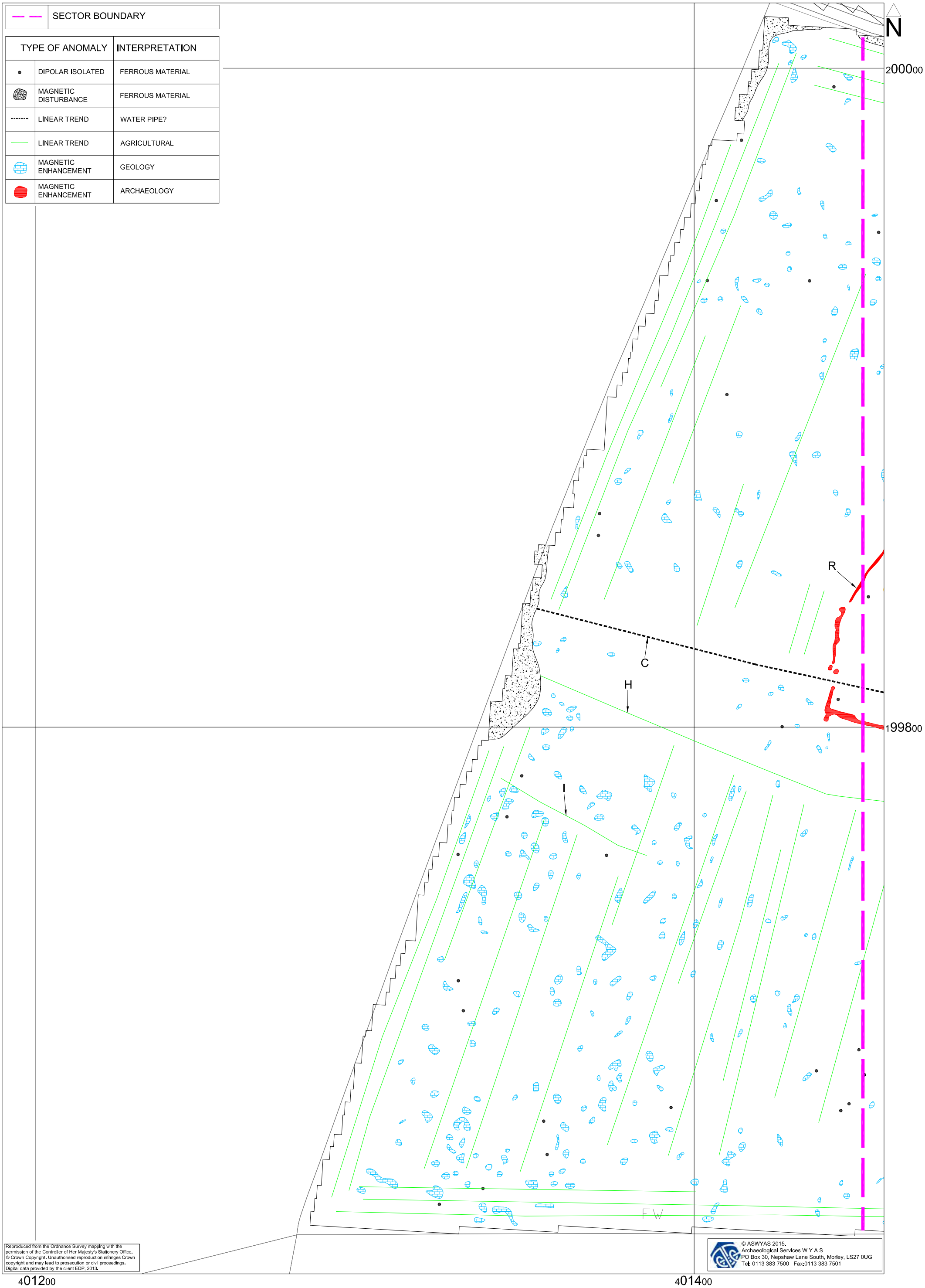

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Fig. 7. Interpretation of magnetometer data; Sector 1 (1:1000 @ A3)

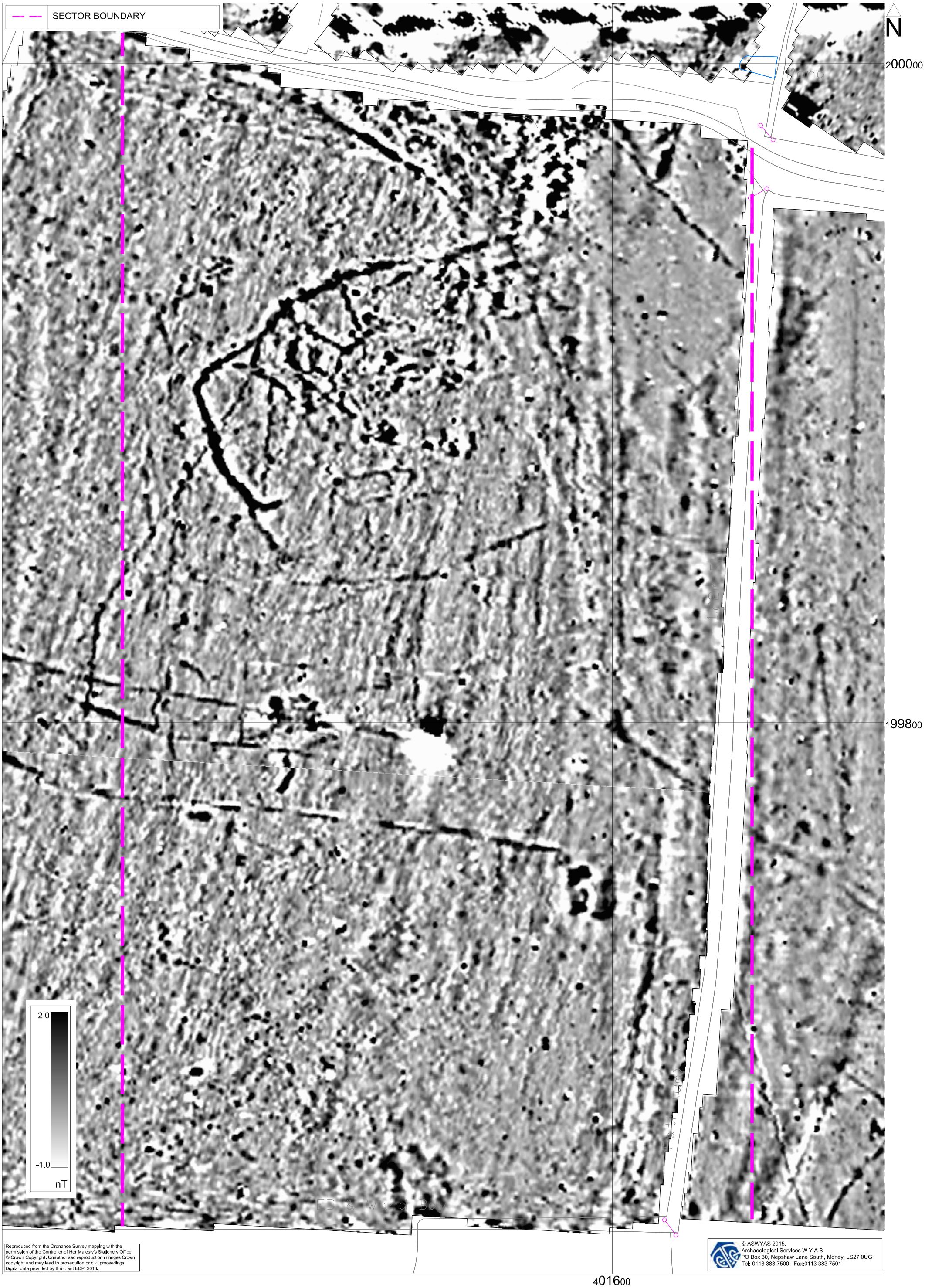

Fig. 8. Processed greyscale magnetometer data; Sector 2 (1:1000 @ A3)

SECTOR BOUNDARY

N

20.0 nT/cm

200000

199800

401600

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Fig. 9. XY trace plot of minimally processed magnetometer data; Sector 2 (1:1000 @ A3)

0 30m

SECTOR BOUNDARY

TYPE OF ANOMALY		INTERPRETATION
•	DIPOLAR ISOLATED	FERROUS MATERIAL
	MAGNETIC DISTURBANCE	FERROUS MATERIAL

LINEAR TREND	WATER PIPE?	MAGNETIC ENHANCEMENT — GEOLOGY
LINEAR TREND	FIELD DRAIN	MAGNETIC ENHANCEMENT — QUARRYING?
LINEAR TREND	AGRICULTURAL	MAGNETIC ENHANCEMENT — ARCHAEOLOGY?
LINEAR TREND	GEOLOGICAL BOUNDARY	MAGNETIC ENHANCEMENT — ARCHAEOLOGY

N

2000 00

1998 00

4016 00

1,22m RHA

Path (um)

ED & Ward Bdy

S D G P N O N F J N R N L R C K R B H J L V V U E J M T

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Fig. 10. Interpretation of magnetometer data; Sector 2 (1:1000 @ A3)

0 30m

SECTOR BOUNDARY

N

Track

122m

2.0

-1.0

nT

1998$_{00}$

4016$_{00}$

4018$_{00}$

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0 30m

Fig. 11. Processed greyscale magnetometer data; Sector 3 (1:1000 @ A3)

SECTOR BOUNDARY

N

20.0 nT/cm

Track

1.22m R

1998 00

4016 00

4018 00

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Tel: 0113 383 7500 Fax:0113 383 7501

0 30m

Fig. 12. XY trace plot of minimally processed magnetometer data; Sector 3 (1:1000 @ A3)

SECTOR BOUNDARY

TYPE OF ANOMALY		INTERPRETATION
•	DIPOLAR ISOLATED	FERROUS MATERIAL
	MAGNETIC DISTURBANCE	FERROUS MATERIAL
	LINEAR TREND	FIELD DRAIN
	LINEAR TREND	AGRICULTURAL
	LINEAR TREND	GEOLOGICAL BOUNDARY
	MAGNETIC ENHANCEMENT	GEOLOGY
	MAGNETIC ENHANCEMENT	QUARRYING?
	MAGNETIC ENHANCEMENT	ARCHAEOLOGY?
	MAGNETIC ENHANCEMENT	ARCHAEOLOGY

N

Track

1.22m RH

Path (4m)

G F J E V L W X A U T

199800

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401600 401800

Fig. 13. Interpretation of magnetometer data; Sector 3 (1:1000 @ A3)

0 30m

Plate 1. General view of Field 1, looking north

Plate 2. General view of Field 2, looking south

Appendix 1: Magnetic survey - technical information

Magnetic Susceptibility and Soil Magnetism

Iron makes up about 6% of the Earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haemetite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms. Areas of human occupation or settlement can then be identified by measuring the magnetic susceptibility of the topsoil because of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. The magnetic susceptibility of a soil can also be enhanced by the application of heat and the fermentation and bacterial effects associated with rubbish decomposition. The area of enhancement is usually quite large, mainly due to the tendency of discard areas to extend beyond the limit of the occupation site itself, and spreading by the plough. An advantage of magnetic susceptibility over magnetometry is that a certain amount of occupational activity will cause the same proportional change in susceptibility, however weakly magnetic is the soil, and so does not depend on the magnetic contrast between the topsoil and deeper layers. Susceptibility survey is therefore able to detect areas of occupation even in the absence of cut features. On the other hand susceptibility survey is more vulnerable to the masking effects of layers of colluvium and alluvium as the technique, using the Bartington system, can generally only measure variation in the first 0.15m of ploughsoil.

Types of Magnetic Anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes)

These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance

These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend

This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies

Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies

Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

Appendix 2: Geophysical archive

The geophysical archive comprises:-

- an archive disk containing compressed (WinZip 8) files of the raw data, report text (Microsoft Word 2000), and graphics files (Adobe Illustrator CS2 and AutoCAD 2008) files; and
- a full copy of the report.

At present the archive is held by Archaeological Services WYAS although it is anticipated that it may eventually be lodged with the Archaeology Data Service (ADS). Brief details may also be forwarded for inclusion on the English Heritage Geophysical Survey Database after the contents of the report are deemed to be in the public domain (i.e. available for consultation in the Gloucestershire Historic Environment Record).

Appendix 3: OASIS Form

OASIS DATA COLLECTION FORM: England

OASIS ID: archaeol11-212463

Project details

Project name	Land south-east of Chesterton Farm
Short description of the project	A geophysical (magnetometer) survey, covering 16 hectares, was carried out on agricultural land south-east of Chesterton Farm, Cirencester to provide further information on the extent and layout of archaeological features within a possible Romano-British settlement site which is protected as a scheduled monument (Ref. GC 464). The results from this survey relate to the southern portion of the scheduled monument and contribute to the findings of a previous geophysical survey which previously took place within the Chesterton Farm area. Anomalies indicative of two distinct settlement sites have been identified either side of a low valley. Within the northernmost enclosure, anomalies suggestive of multiphase occupation have been identified, with a possible structure also identified. In addition, several linear anomalies may represent a field system and three possible extraction sites have also been identified. Therefore, on the basis of the survey, the archaeological potential of site is assessed as being high in the north-west and south-east and moderate elsewhere.
Project dates	Start: 06-01-2015 End: 08-01-2015
Previous/future work	No / Not known
Any associated project reference codes	4107 - Contracting Unit No.
Any associated project reference codes	WOC15 - Sitecode
Type of project	Recording project
Site status	None
Current Land use	Cultivated Land 3 - Operations to a depth more than 0.25m
Monument type	NONE None
Significant Finds	NONE None
Investigation type	"Geophysical Survey"
Prompt	National Planning Policy Framework - NPPF
Solid geology (other)	Forest Marble Formation – Limestone
	None Recorded

Drift geology (other)	
Techniques	Magnetometry

Project location

Country	England
Site location	GLOUCESTERSHIRE COTSWOLD CIRENCESTER Land south-east of Chesterton Farm
Study area	16.00 Hectares
Site coordinates	SU 015 998 51.6964853593 -1.97829459658 51 41 47 N 001 58 41 W Point
Height OD / Depth	Min: 112.00m Max: 115.00m

Project creators

Name of Organisation	Archaeological Services WYAS
Project brief originator	Consultant
Project design originator	Archaeological Services WYAS
Project director/manager	Harrison. D
Project supervisor	D. Harrison
Type of sponsor/funding body	Developer
Name of sponsor/funding body	Bathurst Development Ltd

Project archives

Physical Archive Exists?	No
Digital Archive recipient	N/A
Digital Contents	"none"
Digital Media available	"Geophysics"
Paper Archive Exists?	No

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Land south-east of Chesterton Farm, Cirencester, Gloucestershire: Geophysical Survey
Author(s)/Editor (s)	Harrison, D.
	2759

Other bibliographic details	
Date	2015
Issuer or publisher	ASWYAS
Place of issue or publication	Morley
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Entered by	zoe horn (zhorn@aswyas.com)
Entered on	28 May 2015

Appendix 4: Section 42 Licence

ENGLISH HERITAGE

SOUTH WEST OFFICE

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Leeds
LS27 0UG

Direct Dial: 0117 975 1300
Direct Fax: 0117 975 0683

Our ref: AA/75618/5

28 January 2015

Dear Mr Harrison

Ancient Monuments and Archaeological Areas Act 1979 (as amended) section 42

SETTLEMENT SE OF CHESTERTON FARM, SIDDINGTON, GLOUCESTERSHIRE
Case No:SL00060336
Monument no: GC 464

Re: Section 42 Licence Extension

Further to your e-mail of 27 January 2015, I can confirm that an extension to the Section 42 licence - ref. SL00060336 - to undertake a geo-physical survey at the above scheduled monument has been agreed. The licence will be valid for another three months from today and therefore expire on 20th April 2015.

All of the conditions remain the same for this licence and the report on the licence is due within 3 months of the completion of the survey.

Please do not hesitate to contact us if you have any questions about this letter.

Yours sincerely

Jasper Lamoen
Business Officer
E-mail: jasper.lamoen@english-heritage.org.uk

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