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Wingates Moor Wind Farm
Northumberland

Geophysical Survey

January 2011

Report No. 2166

CLIENT
WYG Environment Planning Transport Ltd

Wingates Moor Wind Farm
Northumberland

Geophysical Survey

Summary

A geophysical (magnetometer) survey covering approximately 6.75 hectares was carried out at Wingates Moor Farm, Northumberland, prior to the determination of a planning application for a proposed windfarm. Amorphous anomalies identified throughout the survey area are thought to relate to localised variations within the superficial till deposits. Parallel linear trend anomalies indicative of ridge and furrow ploughing and field drains have been identified towards the south of the proposed development area. A linear alignment of anomalies in the southern part of the development area may be caused by a former trackway or unmapped field boundary although a geological origin is also considered possible. No anomalies of obvious archaeological potential have been identified by the geophysical survey. On the basis of the geophysical survey the archaeological potential of the site is considered to be low.

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Report Information

Client:	WYG Environment Planning Transport Ltd
Address:	Arndale Court, The Arndale Centre, Headingley Leeds, LS6 2UJ
Report Type:	Geophysical Survey
Location:	Wingates
County:	Northumberland
Grid Reference:	NZ 095 938
Period(s) of activity represented:	Modern
Report Number:	2166
Project Number:	3672
Site Code:	EWW11
OASIS ID:	archaeol11-91904
Planning Application No.:	-
Museum Accession No.:	-
Date of fieldwork:	January 2011
Date of report:	January 2011
Project Management:	Sam Harrison BSc MSc AIfA
Fieldwork:	Alex Harrison BSc David Harrison BA MSc
Report:	David Harrison
Illustrations:	David Harrison
Photography:	David Harrison Alex Harrison
Research:	n/a
Authorisation for distribution:	----------

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1 Introduction

Archaeological Services WYAS (ASWYAS) was commissioned by Kirsten Holland of WYG Environment, on behalf of their client BT Plc, to undertake a geophysical (magnetometer) survey prior to the determination of a planning application for a proposed windfarm at Wingates Moor Farm, Northumberland. The scheme of works was undertaken in accordance with the requirements of Planning Policy Statement 5 and to a Written Scheme of Investigation (WSI) agreed in advance with Nick Best, Assistant County Archaeologist for Northumberland County Council.

Site location, topography and land use

The site is located to the north and south of Wingates Moor Farm which is situated to the south of Wingates, a hamlet to the west of Longhorsley, Northumberland, within a predominantly pastoral agricultural setting (see Fig. 1). Centred at NZ 095 938, it is situated on land that varies in height from 170m above Ordnance Datum (aOD) at its southern boundary to 225m aOD at its northern extent.

The site ownership boundary covers an area of approximately 121 hectares of which four areas (Areas 1 to 4), covering 6.5 hectares were subject to detailed magnetometer survey (see Fig. 2). Conditions for survey were good with the four areas under short pasture (See Plates 1-6) and the weather being fine and dry throughout. An area of former open-cast mining (now back-filled) bounds the south of Area 2 and Area 3 and the north of Area 4; Sector 1.

Geology and soils

The geology of the area comprises mudstone, sandstone and limestone of the Stainmore Formation which are overlain by superficial deposits of till from Palaeozoic and Mesozoic sandstone and shale (BGS 1977). The soils in this area are classified in the Dunkeswick Association being characterised as slowly permeable, seasonally waterlogged, fine loams over clay (SSEW 1983).

2 Archaeological background

The following archaeological background is summarised from the Written Scheme of Investigation (WSI) prepared by Kirsten Holland, Principal Archaeologist at WYG Environment.

Evidence for prehistoric activity within the immediate vicinity of the site is limited to several circular cropmarks north-west of Todburn Moor which are associated with a series of rectilinear cropmarks. However, a sufficient number of prehistoric sites are known within the surrounding landscape to conclude that the area was probably utilised during later prehistoric periods.

The only recorded Roman site within the vicinity of the survey area is the Devils Causeway Roman Road, located approximately 2km to the east of the site. There are no recorded roadside settlements within the wider environs of the region.

Sites of medieval origin appear to be focused around local villages including Nunnykirk, Rothbury, and Todburn. Wingates is first recorded in documentary sources in 1208AD as Wyndegates. Although there are no recorded remains of specifically medieval date within the village, it is thought likely that it was focused on the present village centre and that the area of East Wingates formed the primary agricultural area. Numerous sites of ridge and furrow remain within the area.

There are no known archaeological sites within the proposed survey area and it was therefore anticipated, based on research undertaken for a desk-based assessment, that there is a relatively low potential for previously unrecorded sites to be discovered.

3 Aims, Methodology and Presentation

The general aim of the geophysical survey was to establish and clarify the potential for archaeological features within the proposed development area. This information would then enable further, informed, decisions to be taken prior to the finalisation of the development proposals and in support of any planning application.

Specifically the survey sought to provide information about the nature and possible interpretations of magnetic anomalies identified during the survey and thereby determine the likely extent, presence or absence of any buried archaeological remains in and around the proposed locations of the turbines, access routes and construction compounds.

The survey area was set-out with a Trimble 5800 VRS differential GPS to the national grid. Temporary reference objects (wooden survey marker stakes) were established and left in place at the conclusion of the fieldwork for accurate geo-referencing. The locations of the temporary reference objects are shown on Figure 2 and their Ordnance Survey co-ordinates tabulated in Appendix 2.

Magnetometer survey

Bartington Grad601 instruments were used to take readings at 0.25m intervals on zigzag traverses 1m apart within 30m by 30m grids so that 3600 readings were recorded in each grid. These readings were stored in the memory of the instrument and later downloaded to computer for processing and interpretation. Geoplot 3 (Geoscan Research) software was used to process and present the data. Further details are given in Appendix 1.

Reporting

A general site location plan, incorporating the 1:50000 Ordnance Survey mapping is shown in Figure 1. Figure 2 is a more detailed site location showing the magnetometer data on the Ordnance Survey map base at a scale of 1:4000. The processed greyscale data, the 'raw' XY trace plot data and interpretation graphics are presented at a scale of 1:1000 in Figures 3 to 14 inclusive. Area 4 has been divided into two sectors for clarity of presentation (see Fig. 2).

Further technical information on the equipment used, data processing and survey methodologies are given in Appendix 1 and Appendix 2. Appendix 3 describes the composition and location of the site archive.

Archaeological Services WYAS is registered with the Online Access to the Index of Archaeological Investigations project (OASIS). The OASIS ID number for this project is **archaeol11-91904**.

The survey methodology, report and any recommendations comply with the Methodology and with guidelines outlined by English Heritage (David *et al* 2008) and by the IfA (Gaffney, Gater and Ovenden 2002).

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.

4 Results and Discussion

Summary

No anomalies of clear archaeological potential have been identified by the geophysical survey. Numerous anomalies have been detected which can be attributed to agricultural practices, modern ferrous material within the topsoil, or to localised variations within the superficial deposits of till. Further details are given below.

Ferrous, dipolar anomalies

Ferrous anomalies either as individual 'spikes' or more extensive areas of magnetic disturbance are typically caused by ferrous (magnetic) material, either on the ground surface or in the topsoil. Little importance is normally given to such anomalies unless there is any supporting evidence for an archaeological interpretation, as modern ferrous objects or material are common on rural sites, often being present as a consequence of manuring, deliberate tipping/infilling or modern landscaping. Iron spike anomalies are recorded

throughout the survey areas. There is no significant clustering and these anomalies are not considered to be archaeologically significant.

Broad areas of magnetic disturbance have been identified within Area 2 (see Figs 6 to 8). This disturbance is thought to indicate modern ground disturbance probably associated with an area of former open-cast mining (see Fig. 2). This area of magnetic disturbance raises the possibility that the area of open-cast mining may have been more extensive than previously thought. Elsewhere, magnetic interference from ferrous material within adjacent field boundaries can be seen at the perimeters of Areas 1, 2 and 4.

Geological anomalies

Numerous broad and amorphous anomalies have been identified throughout the survey areas. These anomalies are considered to be geological in origin, most likely resulting from localised variations of sands and/or gravels in the composition of the superficial deposits.

Agricultural anomalies

A series of weak parallel linear trends within Area 4, Sector 1, (see Figs 9 to 11) corresponds to an area of extant ridge and furrow topography, whilst a series of linear trends identified within Area 3 (see Figs 6, 7 and 8) and the south of Area 4, Sector 2 (see Figs 12, 13 and 14), are typical of modern field drains, the latter forming the characteristic herring-bone pattern of drainage.

Towards the south of Area 4, Sector 2, a short linear anomaly and a series of discrete anomalies much stronger in magnitude, which together form a linear alignment of anomalies aligned north-east/south-west, have been identified. These anomalies do not correspond to any features depicted on historic or modern Ordnance Survey mapping. Although an archaeological interpretation cannot be completely dismissed it is considered much more likely that the anomalies are likely to be modern in origin, perhaps representing a roughly-metalled farm access track, although no evidence of this was visible on the surface at the time of survey, or unmapped boundary feature or even be due to geological variation.

5 Conclusions

The majority of identified anomalies are interpreted as being due to localised variations in the superficial deposits or to agricultural activity such as ridge and furrow ploughing and field drainage. An area of disturbed readings could indicate that an area of open casting is more extensive than previously mapped. A linear alignment of dipolar anomalies within Area 4, Sector 2, may be of interest although an agricultural or geological origin is considered more likely than an archaeological cause.

No anomalies of obvious archaeological potential have been identified by the survey. Therefore, on the basis of the geophysical survey, the site is considered as having a low archaeological potential.

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.

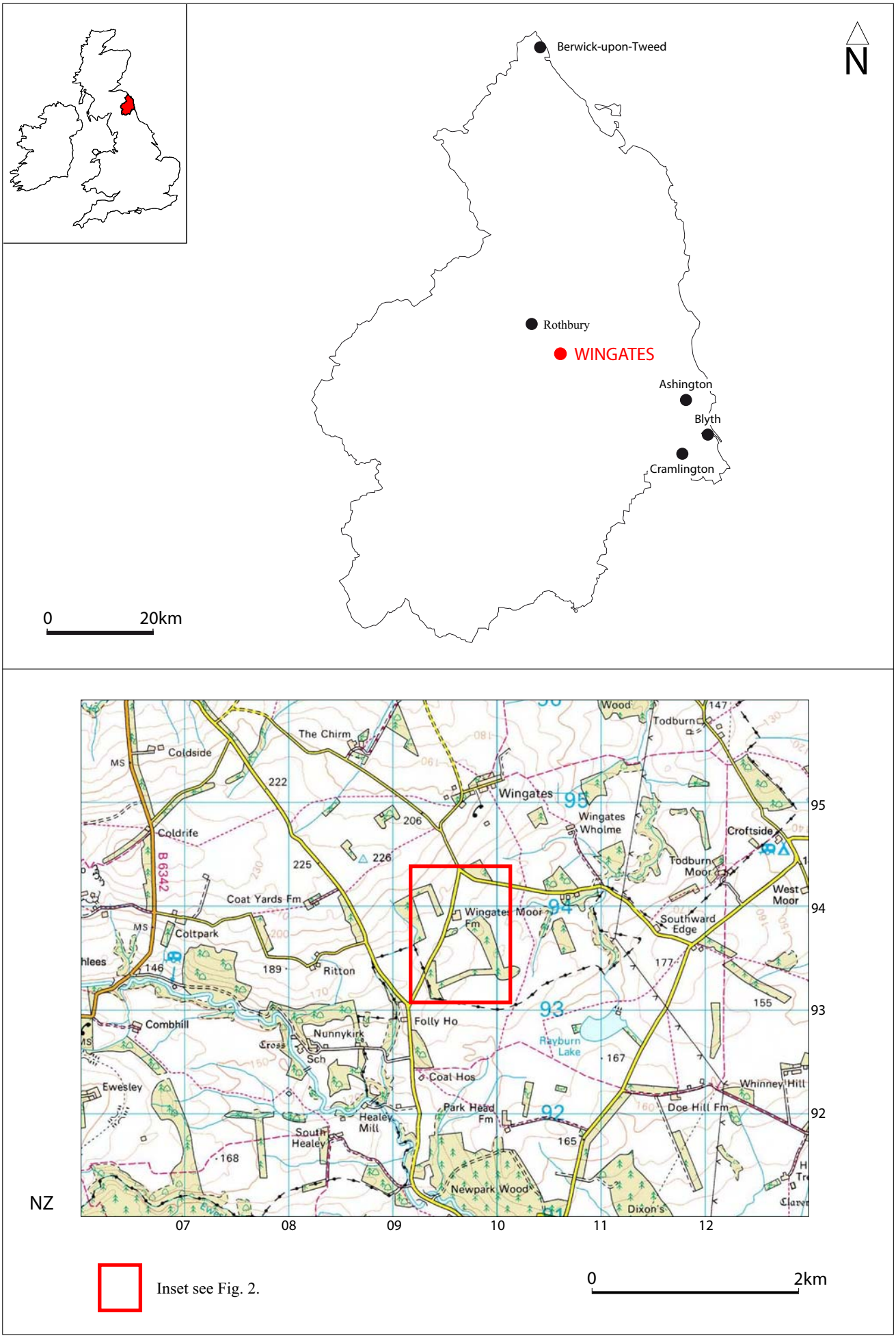

Fig. 1. Site location

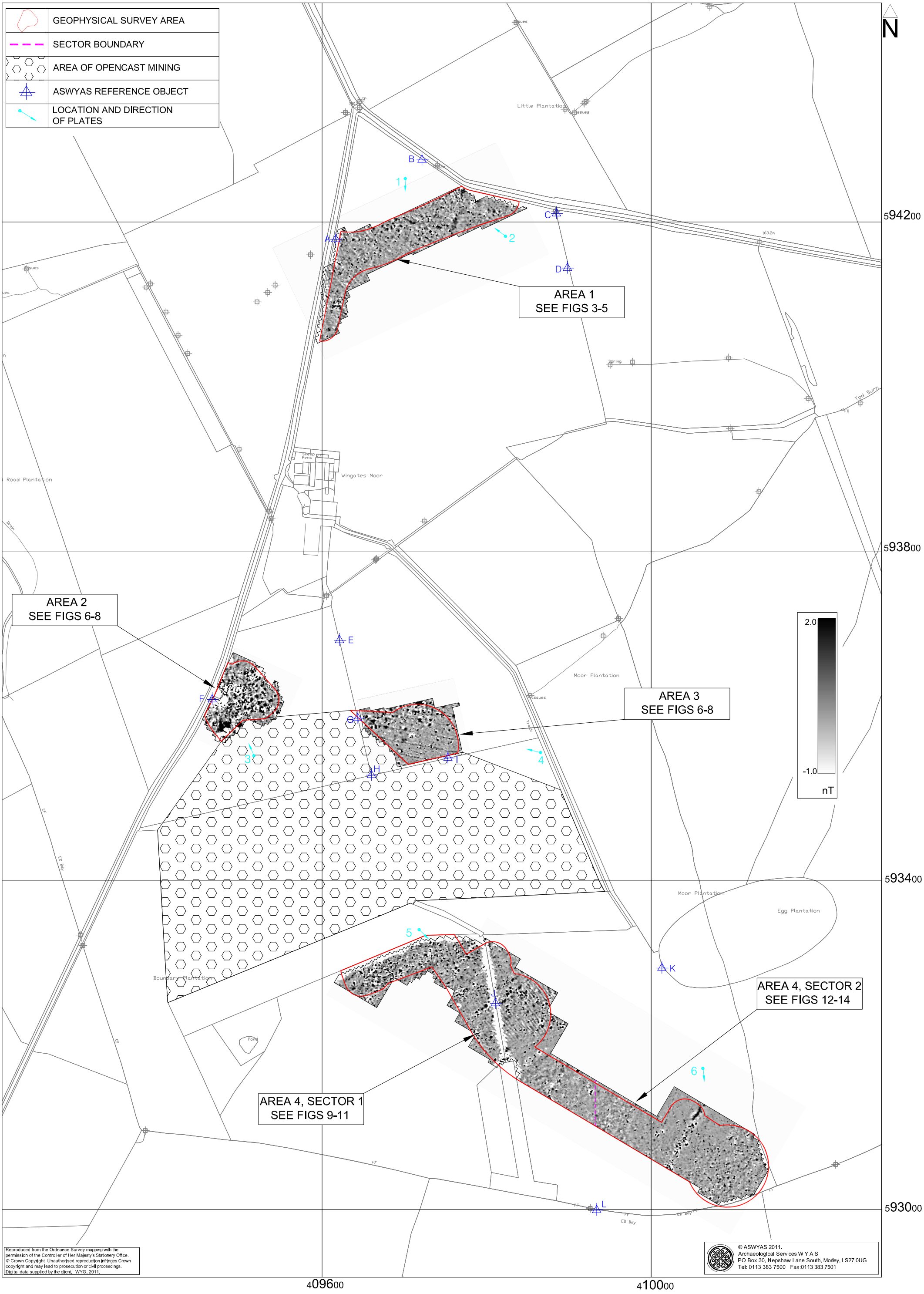

Fig. 2. Site location showing greyscale magnetometer data (1:4000 @ A3)

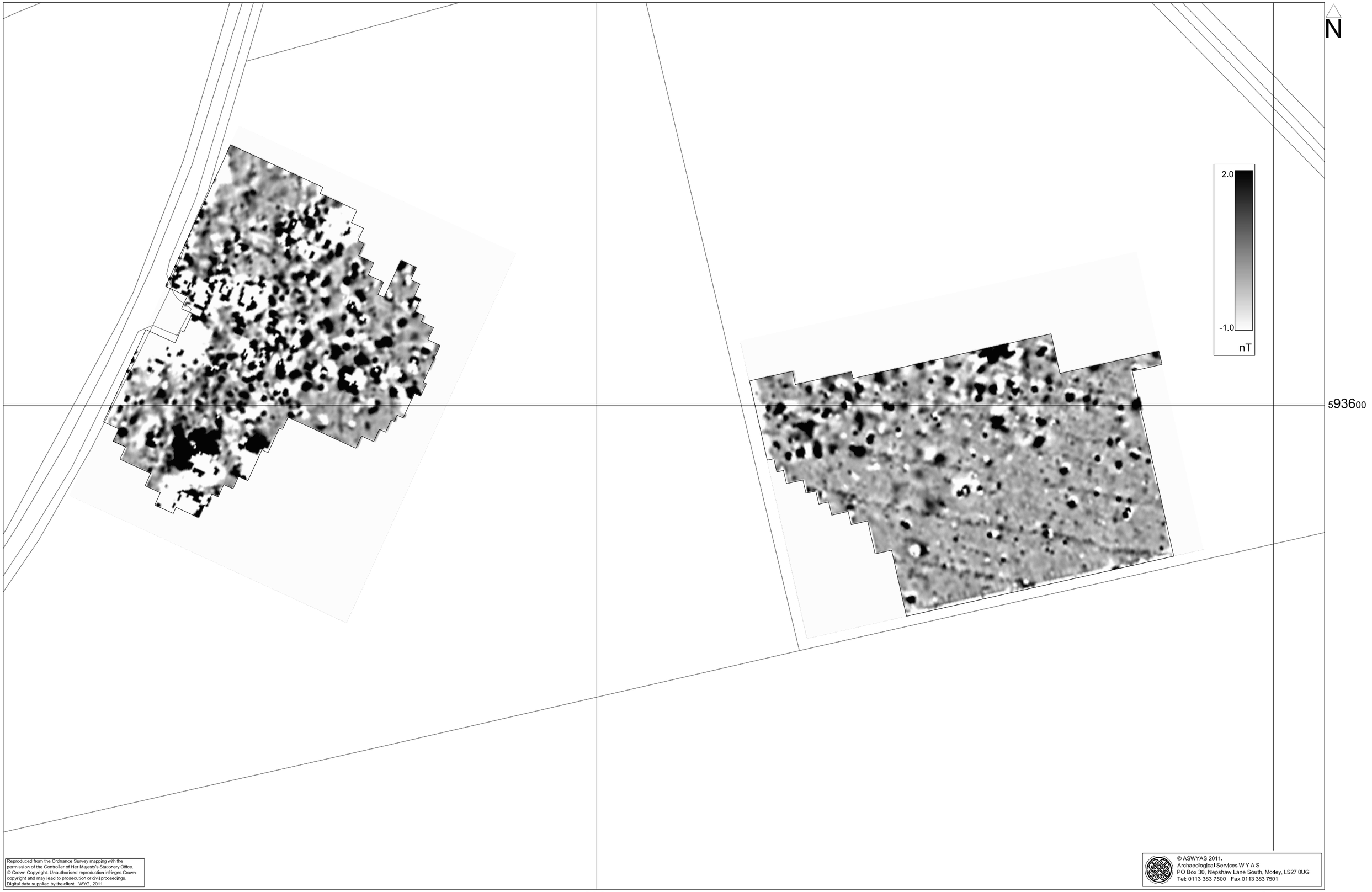

Fig. 6. Processed greyscale magnetometer data; Area 2 and Area 3 (1:1000 @ A3)

Fig. 4. XY trace plot of minimally processed magnetometer data; Area 1 (1:1000 @ A3)

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

178.2m

N

594200

409600

409800

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0 40m

Fig. 5. Interpretation of magnetometer data; Area 1 (1:1000 @ A3)

SECTOR BOUNDARY

N

2.0

-1.0

nT

5932 00

4098 00

4100 00

0 40m

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Fig. 9. Processed greyscale magnetometer data; Area 4, Sector 1 (1:1000 @ A3)

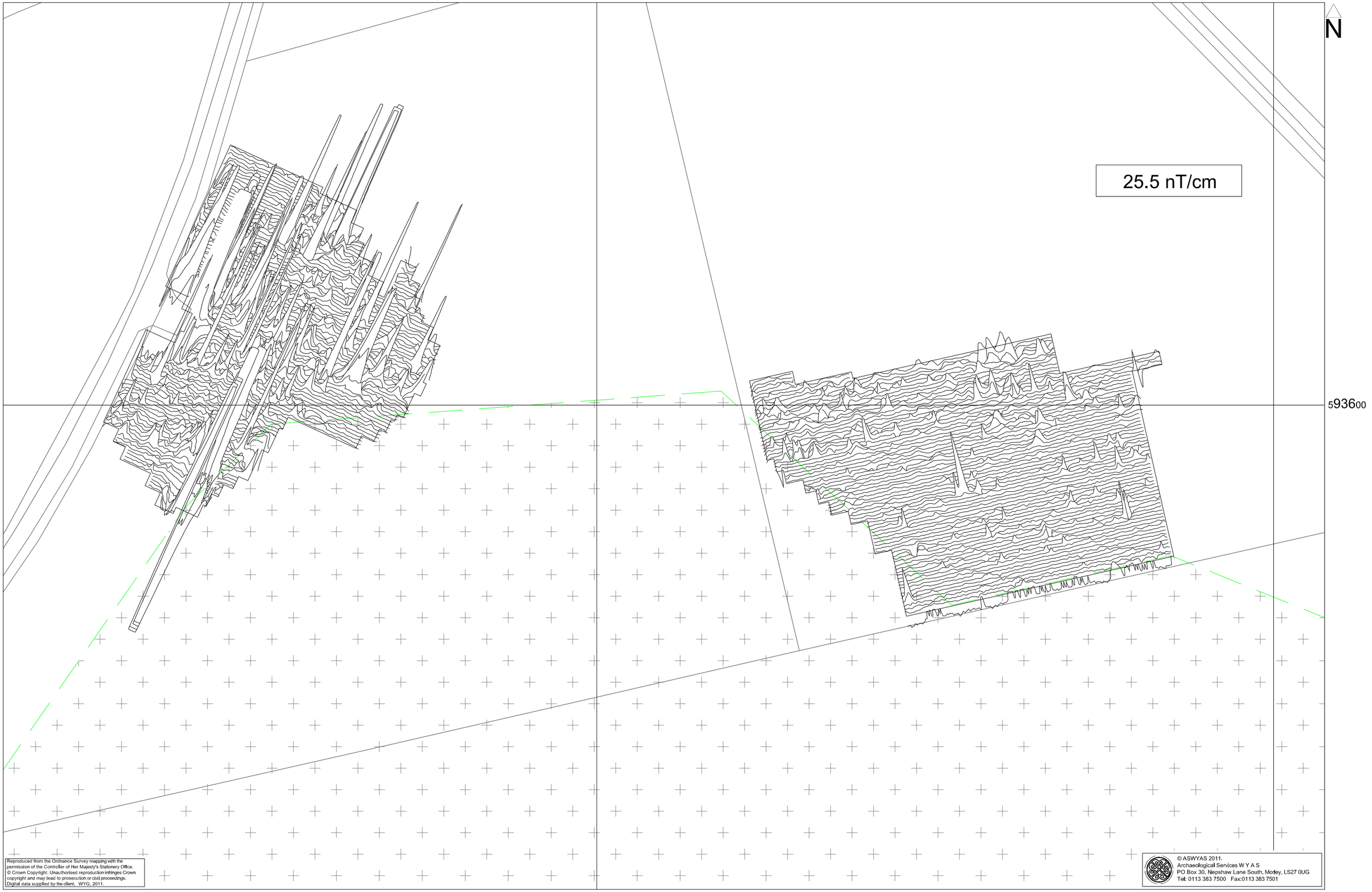

Fig. 7. XY trace plot of minimally processed magnetometer data; Area 2 and Area 3 (1:1000 @ A3)

TYPE OF ANOMALY		INTERPRETATION
•	DIPOLAR ISOLATED	FERROUS MATERIAL
	MAGNETIC DISTURBANCE	FERROUS MATERIAL
	LINEAR TREND	FIELD DRAIN
	MAGNETIC ENHANCEMENT	GEOLOGY

N

5936 00

4096 00

4098 00

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Tel: 0113 383 7500 Fax:0113 383 7501

0 40m

Fig. 8. Interpretation of magnetometer data; Area 2 and Area 3 (1:1000 @ A3)

SECTOR BOUNDARY

N

2.0

-1.0

nT

5932 00

4098 00

4100 00

0 40m

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Fig. 9. Processed greyscale magnetometer data; Area 4, Sector 1 (1:1000 @ A3)

SECTOR BOUNDARY

N

25.5 nT/cm

5932 00

4098 00

4100 00

0 40m

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Fig. 10. XY trace plot of minimally processed magnetometer data; Area 4, Sector 1 (1:1000 @ A3)

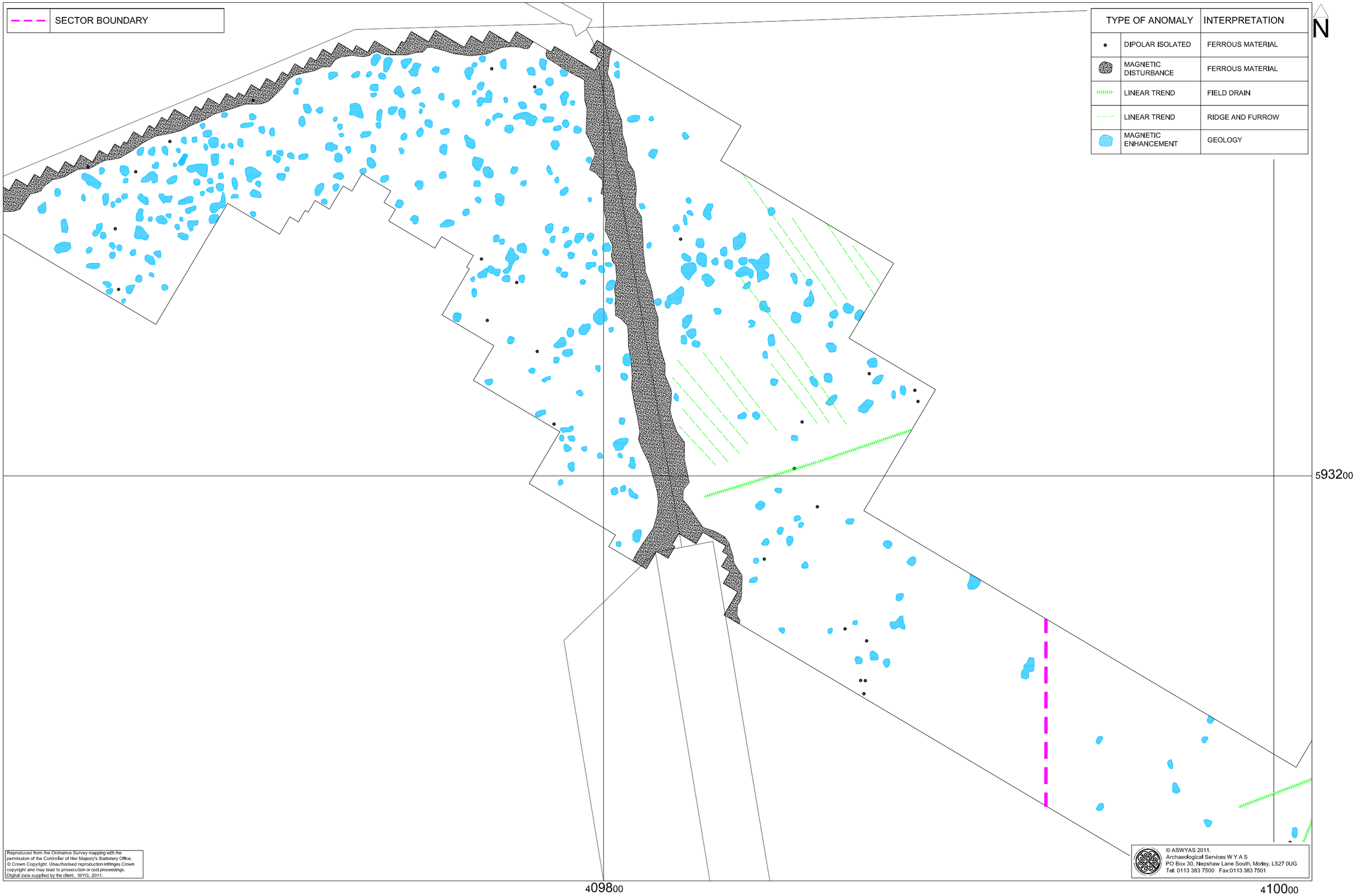

Fig. 11. Interpretation of magnetometer data; Area 4, Sector 1 (1:1000 @ A3)

Fig. 12. Processed greyscale magnetometer data; Area 4, Sector 2 (1:1000 @ A4)

Fig. 13. XY trace of minimally processed magnetometer data; Area 4, Sector 2 (1:1000 @ A4)

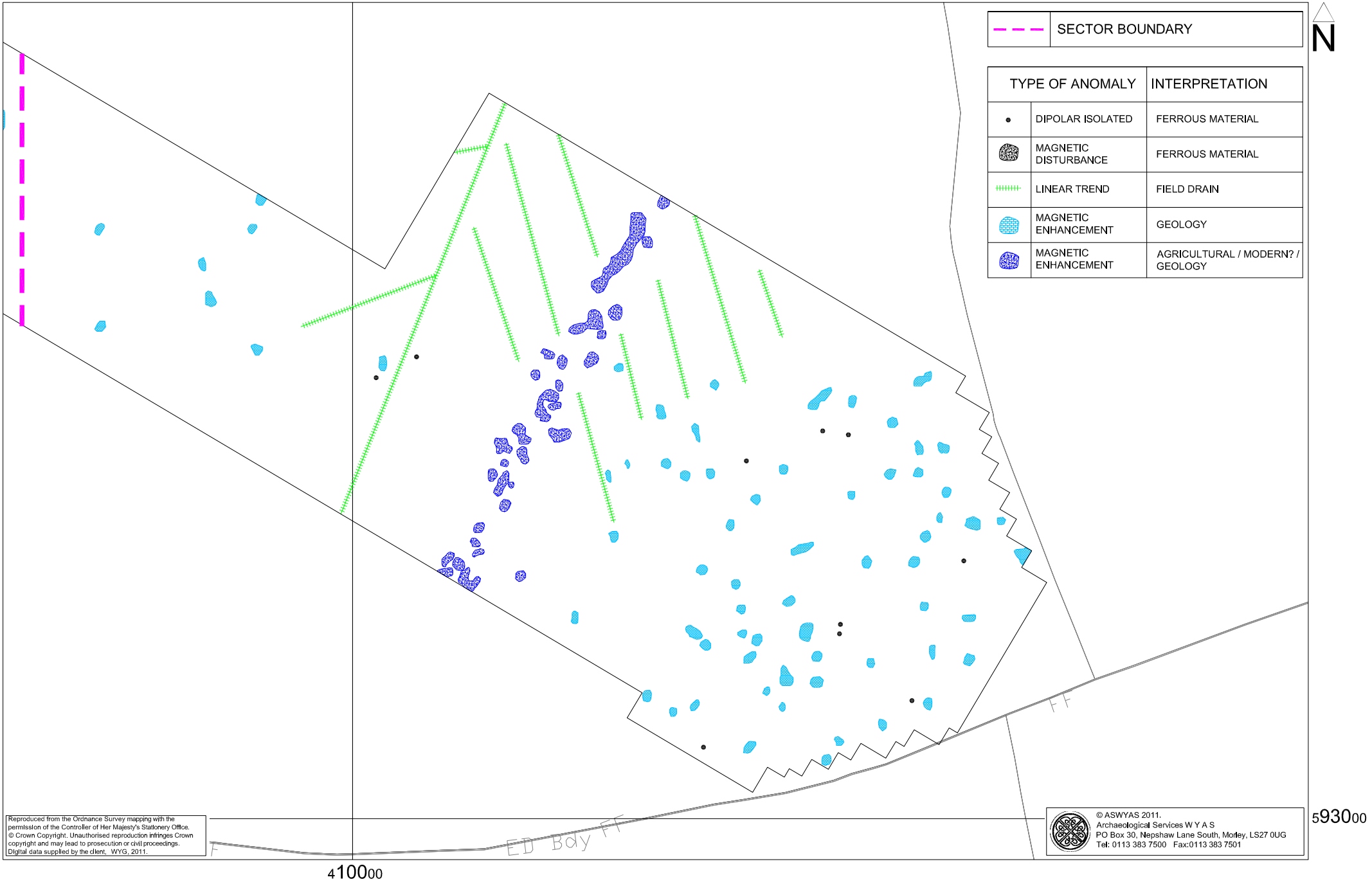

Fig. 14. Interpretation of magnetometer data; Area 4, Sector 2 (1:1000 @ A4)

Plate 1. General shot of Area 1, looking south

Plate 2. General shot of Area 1, looking north-west

Plate 3. General shot of Area 2, looking north-west

Plate 4. General shot of Area 3, looking west

Plate 5. General shot of Area 4, looking south-east

Plate 6. General shot of Area 4, 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 so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue 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 topsoil's, subsoil's 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 plough-soil.

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.

Methodology: Magnetic Susceptibility Survey

There are two methods of measuring the magnetic susceptibility of a soil sample. The first involves the measurement of a given volume of soil, which will include any air and moisture that lies within the sample, and is termed volume specific susceptibility. This method results in a bulk value that it not necessarily fully representative of the constituent components of the sample. For field surveys a Bartington MS2 meter with MS2D field loop is used due to its speed and simplicity. The second technique overcomes this potential problem by taking into account both the volume and mass of a sample and is termed mass specific susceptibility. However, mass specific readings cannot be taken in the field where the bulk properties of a soil are usually unknown and so volume specific readings must be taken. Whilst these values are not fully representative they do allow general comparisons across a site and give a broad indication of susceptibility changes. This is usually enough to assess the susceptibility of a site and evaluate whether enhancement has occurred.

Methodology: Gradiometer Survey

There are two main methods of using the fluxgate gradiometer for commercial evaluations. The first of these is referred to as ***magnetic scanning*** and requires the operator to visually identify anomalous responses on the instrument display panel whilst covering the site in widely spaced traverses, typically 10m apart. The instrument logger is not used and there is therefore no data collection. Once anomalous responses are identified they are marked in the field with bamboo canes and located on a base plan. This method is usually employed as a means of selecting areas for detailed survey when only a percentage sample of the whole site is to be subject to detailed survey.

The disadvantages of magnetic scanning are that features that produce weak anomalies (less than 2nT) are unlikely to stand out from the magnetic background and so will be difficult to detect. The coarse sampling interval means that discrete features or linear features that are parallel or broadly oblique to the direction of traverse may not be detected. If linear features are suspected in a site then the traverse direction should be perpendicular (or as close as is possible within the physical constraints of the site) to the orientation of the suspected features. The possible drawbacks mentioned above mean that a 'negative' scanning result should be validated by sample detailed magnetic survey (see below).

The second method is referred to as ***detailed survey*** and employs the use of a sample trigger to automatically take readings at predetermined points, typically at 0.25m intervals, on zigzag traverses 1m apart. These readings are stored in the memory of the instrument and are later

dumped to computer for processing and interpretation. Detailed survey allows the visualisation of weaker anomalies that may not have been detected by magnetic scanning.

During this survey a Bartington Grad601 magnetic gradiometer was used taking readings on the 0.1nT range, at 0.25m intervals on zigzag traverses 1m apart within 30m by 30m square grids. The instrument was checked for electronic and mechanical drift at a common point and calibrated as necessary. The drift from zero was not logged.

Data Processing and Presentation

The detailed 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. The data in the greyscale images has been interpolated and selectively filtered 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.

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'. Geoplot 3 software was used to create the XY trace plots. The same program was used to produce the greyscale images. All greyscale plots are displayed using a linear incremental scale.

Appendix 2: Survey location information

The site grid was laid out using a Trimble VRS differential Global Positioning System (Trimble 5800 model). The accuracy of this equipment is better then 0.01m. The locations of the temporary reference points left on site are shown on Figure 2 and the Ordnance Survey grid co-ordinates tabulated below. The internal accuracy of these markers is better than 0.01m. 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.

Temporary reference objects were left on site (see Fig. 2). The Ordnance Survey reference points are listed below.

Station	Easting	Northing	Elevation (aOD)
A	409616.6780	594178.9480	178.253m
B	409721.4050	594275.5610	178.687m
C	409884.7760	594210.2750	172.149m
D	409898.1710	594143.9810	170.476m
E	409621.2630	593691.7520	174.609m
F	409466.3770	593619.7510	180.810m
G	409643.3560	593597.1080	177.742m
H	409659.9270	593527.7280	177.861m
I	409752.8880	593548.6140	173.788m
J	409810.5700	593250.4500	167.518m
K	410012.9890	593293.2470	166.805m
L	409933.7830	592999.0570	168.629m

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

Appendix 3: 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.
- 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 relevant Historic Environment Record Office).

Additional copies of the geophysical archive will be lodged with a suitable museum and with the Online Access to the Index of Archaeological Investigations project (OASIS).

Appendix 4: Oasis Data Collection Form

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: archaeol11-91904

Project details

Project name	Wingates Moor Wind farm
Short description of the project	A geophysical (magnetometer) survey covering approximately 6.75 hectares was carried out at Wingates Moor Farm, Northumberland, prior to the determination of a planning application for a proposed windfarm. Amorphous anomalies identified throughout the survey area are thought to relate to localised variations within the superficial till deposits. Parallel linear trend anomalies indicative of ridge and furrow ploughing and field drains have been identified towards the south of the proposed development area. A linear alignment of anomalies in the southern part of the development area may be caused by a former trackway although a geological origin is also possible. No anomalies of obvious archaeological potential have been identified by the geophysical survey. Therefore, on the basis of the geophysical survey, the archaeological potential of the site is considered to be low.
Project dates	Start: 17-01-2011 End: 20-01-2011
Previous/future work	No / Not known
Any associated project reference codes	EWW11 - Sitecode
Any associated project reference codes	3672 - Contracting Unit No.
Type of project	Recording project
Monument type	NONE None
Significant Finds	NONE None
Investigation type	'Geophysical Survey'
Prompt	Planning condition
Solid geology (other)	Stainmore Formation
Drift geology (other)	Dunkeswick Association
Techniques	Magnetometry

Project location

Country	England
Site location	NORTHUMBERLAND CASTLE MORPETH LONGHORSLEY Windgates Moor Wind Farm
Study area	6.75 Hectares
Site coordinates	NZ 095 938 55.2382665754 -1.850588353490 55 14 17 N 001 51 02 W Point
Height OD / Depth	Min: 170.00m Max: 225.00m

Project creators

Name of Organisation	Archaeological Services WYAS

Project brief originator	Consultant
Project design originator	Archaeological Services WYAS
Project director/manager	T. S. Harrison
Project supervisor	T. S. Harrison.
Type of sponsor/funding body	Archaeological Consultancy
Name of sponsor/funding body	WYG Environment Planning Transport Ltd

Project archives

Physical Archive Exists?	No
Digital Archive recipient	ADS
Digital Contents	'none'
Digital Media available	'Geophysics'
Paper Archive Exists?	No

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Wingates Moor Wind Farm, Northumberland: Geophysical Survey
Author(s)/Editor(s)	Harrison, D.
Other bibliographic details	Report No.
Date	2011
Issuer or publisher	Archaeological Services WYAS
Place of issue or publication	Morley
Description	A4 bound report

Entered by	zoe horn (zhorn@aswyas.com)
Entered on	24 January 2011

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