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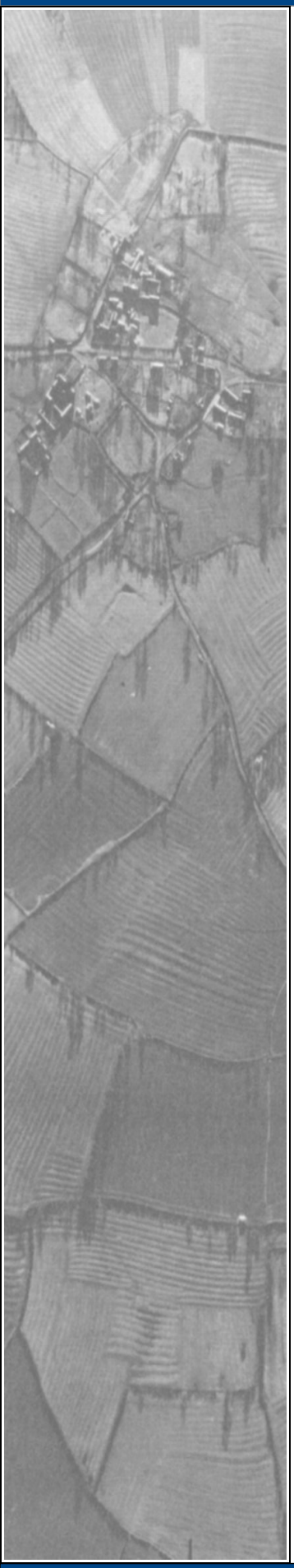

Wallingford Road
Phase 2
Cholsey
Oxfordshire

MAGNETOMETER SURVEY REPORT

for

Cotswold Archaeology

Kerry Donaldson & David Sabin

August 2019

Ref. no. J800

ARCHAEOLOGICAL SURVEYS LTD

Wallingford Road
Phase 2
Cholsey
Oxfordshire

MAGNETOMETER SURVEY REPORT

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Cotswold Archaeology

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Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

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SUMMARY

Detailed magnetometry was carried out within a 6ha field prior to a proposed residential development at Cholsey in Oxfordshire. The results indicate the presence of a number of rectilinear enclosures, trackways, linear ditches and pits of archaeological potential. The anomalies have a similar orientation to features previously located immediately to the south west and dated to the Bronze Age/early Iron Age, with some later Roman ditches. The site also contains a number of further positive linear and discrete anomalies which could relate to further cut features with archaeological potential; however, they are weak and cannot be confidently interpreted. An extant low linear bank crosses the south eastern part of the site and is associated with a very weak magnetic response. The southern part of the low bank appears to have been utilised as a headland for ridge and furrow cultivation.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Cotswold Archaeology, on behalf of Bellway Homes, to undertake a magnetometer survey of an area of land off Wallingford Road, Cholsey, Oxfordshire. The site has been outlined for a proposed second phase of residential development. The Phase 1 site, immediately to the south west, was subject to a previous geophysical survey (Archaeological Surveys, 2016) and the greyscale images and abstraction have been included in the report figures for context. Subsequent archaeological investigations identified that the site contained Bronze Age, Iron Age, Roman and early medieval archaeological features (Foundations Archaeology, 2016; Cotswold Archaeology, 2018).

1.1.2 This geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2019) and approved by Richard Oram, Planning Archaeologist for Oxfordshire County Council, prior to commencing the fieldwork.

1.2 Survey objectives and techniques

1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin so that they may be assessed prior to development of the site. The methodology is considered an efficient and effective approach to archaeological prospection.

1.2.2 Geophysical survey can provide useful information on the archaeological potential of a site; however, the outcome of any survey relies on a number of factors and as a consequence results can vary. The success in meeting the aims and objectives of a survey is, therefore, often impossible to predetermine.

1.3 Standards, guidance and recommendations for the use of this report

1.3.1 The survey and report generally follow the recommendations set out by: European Archaeological Council (2015) *Guidelines for the Use of Geophysics in Archaeology;* Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations.* The work has been carried out to the Chartered Institute for Archaeologists (2014) *Standard and Guidance for Archaeological Geophysical Survey and* English Heritage (2008) *Geophysical survey in archaeological field evaluation*.

1.3.2 Archaeological Surveys Ltd provide a detailed geophysical survey report and it is recommended that where possible the contents should be considered in full. The Summary provides a brief overview of the results with more detail available in the Discussion and/or Conclusion. The *List of anomalies* within the Results provides a detailed assessment of the anomalies within separate categories which can be useful in inferring a level of confidence to the interpretation. Quality and factors influencing the interpretation of anomalies is also set out within the results.

1.3.3 It is recommended that the full report should always be considered when using data and interpretation plots; where this is not possible, in the field for example, the abstraction and interpretation plots should retain their colour coding and be used with a corresponding legend.

1.3.4 Where targeting of anomalies by excavation is to be carried out, care should be taken to place trenches over solid lines or features visible on the abstraction and interpretation plots. Archaeological Surveys abstraction and interpretation avoids the use of dashed or dotted line formats, and broken or fragmented lines used in interpretive plots may well correspond closely with truncation of archaeological features.

1.4 Site location, description and survey conditions

1.4.1 The site is located on the north eastern edge of Cholsey in Oxfordshire. It is centred on Ordnance Survey National Grid Reference (OS NGR) SU 59445 86800, see Figs 01 and 02.

1.4.2 The geophysical survey covers approximately 6ha of a single arable field that had been left uncultivated for a period. The land slopes down gently from the south west towards the north east. A concrete track bounds the eastern side of the site, to the north west there are houses and to the south west the area was bounded by Heras steel fencing as the adjacent land was undergoing residential development.

1.4.3 The ground conditions across the site were generally considered to be suitable for geophysical survey, although patchy weed cover caused difficulty traversing some parts of the area. Weather conditions during the survey were

dry and hot.

Plate 1: Survey area looking south west

1.5 Site history and archaeological potential

1.5.1 Previous archaeological investigations on land immediately to the south west of the site include a geophysical survey (Archaeological Surveys, 2016), archaeological evaluation (Foundations Archaeology, 2016) and excavation (Cotswold Archaeology, 2018). The results indicated a number of linear and discrete geophysical anomalies and the evaluation and later excavation revealed a Late Bronze Age/Early Iron Age field system, including a trackway, Iron Age pits, Roman ditches and a Saxon sunken-featured building. LiDAR imagery also reveals a number of broad, low, linear banks crossing the wider landscape that overlay the Bronze Age features and may relate to a Roman field system. A Roman building in a farm or villa complex including ditches, pits, enclosures, boundaries and droveways is located 500m to the south (Foundations Archaeology, 2015). With Neolithic pits, Roman field boundaries and an Iron Age enclosure located 300m to the south.

1.5.2 The site lies within an area with widespread archaeological features. The LiDAR imagery indicates the presence of broad, low, linear banks extending through the southern part of the site. There is, therefore, some potential for further archaeological remains to be present within the site.

1.5.3 The surface conditions within the site were generally unsuitable for the observation of cultural material during the course of the survey. However, evidence of modern burning was visible in the northern part of the site and fragments of brick and concrete were occasionally noted across the field.

1.6 Geology and soils

1.6.1 The underlying solid geology across the site is from the West Melbury Marly Chalk Formation with overlying sands and gravels from the Northmoor Sand and Gravel Member in the north and Summertown Radley Sand and Gravel in the south (BGS, 2017).

1.6.2 The overlying soil across the survey area is from the Sutton 2 association and is a typical argillic brown earth. It consists of a well drained, fine and coarse soil over gravel (Soil Survey of England and Wales, 1983).

1.6.3 Magnetometry carried out over similar geology and soil has produced variable results as the underlying geology and soils can be frequently associated with low magnetic contrast and low levels of magnetic susceptibility. However, cut features of archaeological potential may be located where human activity has altered the magnetic characteristics of the soil sufficiently. The underlying geology and soils are, therefore, considered acceptable for magnetic survey.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance (also known as thermoremanence) are factors associated with the formation of localised fields.

2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.

2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.

2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to 10^{-9} Tesla (T). Additional details are set out in 2.2 below and within Appendix A.

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers (FGM650) spaced 0.5m apart with readings recorded at 20Hz. The cart is pushed at walking speed and not towed. Each sensor is not zeroed in the field as the vertical axis alignment is precisely fixed leaving sensor offsets that are removed during data processing. The fixing of the vertical alignment ensures the sensors are not unduly influenced by localised magnetic fields and that the vertical component of a magnetic anomaly is measured. The gradiometers have a range of recording data between ±0.1nT and ±8000nT. They are linked to a Leica GS10 RTK GNSS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.

2.2.2 Due to the fixed offsets within the fluxgate sensors, as a result of the manufacturing and tensioning process, the survey data do not provide a visually useful dataset until a zero median traverse algorithm is applied. It is recognised that this has the potential to affect some anomalies detrimentally by removing linear features orientated parallel to survey transects. However, this has not been noted as a particular problem with the system due to the high resolution data collection, generally long length of traverses and variability within the magnetic characteristics of a linear anomaly.

2.2.3 Data are collected along a series of parallel survey transects to achieve 100% coverage of the surveyable land. The length of each transect is variable and relates to the size of the survey area and other factors including ground conditions. A visual display allows accurate placing of transects and helps maintain the correct separation between adjacent traverses. Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).

2.2.4 Fluxgate sensors are highly sensitive to temperature change and this manifests as drift during the course of a survey. This can be particularly noticeable during the morning as temperatures rise and the equipment warms or cools. Sensor drift within the course of a traverse will appear as a line trending from negative to positive after processing with a zero median traverse algorithm. To remove the potential for temperature drift, data were collected after a 20 minute stabilisation period and traverses were limited to a time of generally <100s.

2.3 Data processing and presentation

2.3.1 Magnetic data collected by the MAGNETO®MXPDA cart-based system are initially prepared using SENSYS MAGNETO®DLMGPS software. The software effectively allocates a geographic position for each data point and can compensate for fixed offsets present within the FGM650 sensors. The offsets are positive or negative values present on all fluxgate gradiometer sensors. Some systems use manual or electronic balancing to effectively zero the sensors; however, this is a short term measure that is prone to drift

through temperature changes and vibration and can easily be incorrectly set due to localised magnetic fields. The FGM650 sensors are very accurately aligned to the vertical magnetic gradient and are highly stable showing negligible drift on long traverses. The offset values are removed using TerraSurveyor software.

2.3.2 Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display within TerraSurveyor. The removal of the offset values (compensation) of the sensors is also carried out in TerraSurveyor using a zero median traverse function. Data are then considered to be minimally processed. Note: without the zero median traverse function it is not possible to create a meaningful data plot as all sensors have a different offset value. Although a zero median traverse algorithm can remove anomalies aligned with the survey tracks, in practice this rarely occurs due to the use of long traverses, high resolution measurement and variability within the magnetic susceptibility of long linear features.

2.3.3 The minimally processed data are collected between limits of ±8000nT and clipped for display at ±3nT. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track.

2.3.4 Additional data processing has been carried out in the form of high pass filtering. This effectively removes low frequency variation along a traverse that has been caused by large magnetic bodies, cultivation or rapid temperature change. Data treated to additional processing have been compared to unprocessed data to ensure that no significant anomalies have been removed.

2.3.5 Appendix C contains metadata concerning the survey and data attributes and is derived directly from TerraSurveyor. Reference should be made to Appendix B for further information on processing.

2.3.6 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report is the minimally processed greyscale plot. With regard to the Sensys MXPDA, minimally processed data are considered by the manufacturer to be data that are compensated by SENSYS MAGNETO DLMGPS software, see 2.3.1 and 2.3.2. Note: traceplots are not considered to be appropriate as they do not provide an accurate or useful assessment of the magnetic anomalies due to the very high density of data collection. In addition, traceplots cannot be meaningfully plotted against base mapping and in areas of complexity traces may be lost or highly confused. Traceplots may be used to demonstrate characteristic magnetic profiles across discrete features where it is considered beneficial.

2.3.7 The raster images are combined with base mapping using ProgeCAD Professional 2016, creating DWG (2010) file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. The CAD plots are effectively georeferenced facilitating relocation of features

using GNSS, resection method, etc.

2.3.8 An abstraction and interpretation is drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing. Appendix E sets out CAD layer names with colour and graphic content for each interpretation category, see 3.3.

2.3.9 A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within the survey area.

2.3.10 The abstraction and interpretation procedure has been supported by analysis of the Environment Agency's LiDAR data.

2.3.11 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

3 RESULTS

3.1 General assessment of survey results

3.1.1 The detailed magnetic survey was carried out over a total of 6.2ha within a single former arable field.

3.1.2 Magnetic anomalies located can be generally classified as positive responses of archaeological potential, positive anomalies of an uncertain origin, anomalies associated with land management, linear anomalies of an agricultural origin, areas of magnetic disturbance and strong discrete dipolar anomalies relating to ferrous objects. Anomalies located within each survey area have been numbered and are described in 3.4 below.

3.2 Statement of data quality and factors influencing the interpretation of anomalies

3.2.1 Data are considered representative of the magnetic anomalies present within the site. There are no significant defects within the dataset.

3.2.2 Magnetic contrast associated with former cut features is generally low but sufficient for the abstraction of numerous linear anomalies of archaeological potential. The contrast is also sufficient for the abstraction and interpretation of linear anomalies associated with former ridge and furrow cultivation.

3.2.3 Some very small zones within the site were highly magnetically disturbed; these include the northern corner, which contained agricultural implements at the time of survey, and along the south western boundary, which was defined by Heras steel fencing with several steel storage containers and scaffolding beyond but only a few metres from the boundary. Magnetic disturbance has

the potential to obscure anomalies associated with archaeological features.

3.2.4 Magnetic debris is widespread across the site but with increased density in the northern part of the site closer to the farmyard. The widespread nature of the material may imply that it is associated with 'soil improvement'. Although there is no clear evidence that it is associated with contaminated green waste, the nature of the response is similar. Recent burning was also evident in the northern part of the field. It is unlikely that the debris is sufficiently strong to obscure anomalies, although it does appear to degrade the magnetic contrast of former cut features.

3.3 Data interpretation

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A general explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, see Table 1.

Interpretation category	Description and origin of anomalies
Anomalies with archaeological potential	Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as pits, ring ditches, enclosures, etc. The category is used where there is a high level of confidence which may be due to additional supporting information where morphology is unclear or uncharacteristic.
Anomalies with an uncertain origin	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Morphology may be unclear or uncharacteristic and there may be a lack of additional supporting information. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
Anomalies relating to land management	Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates ceramic land drains.
Anomalies with an agricultural origin	The anomalies are often linear and form a series of parallel responses or are parallel to extant land boundaries. Where the response is broad, former ridge and furrow is likely; narrow response is often related to modern ploughing. This category does not include agricultural features of early date or considered to be of archaeological potential (e.g. animal stockades, enclosures, farmsteads, etc).
Anomalies associated with magnetic debris	Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil. Where these are very numerous and widespread, this can often be associated with fragments of ferrous material within spreads of composted green waste.
Anomalies with a modern origin	The magnetic response is often strong and dipolar indicative of ferrous

	material and may be associated with extant above surface features such as wire fencing, cables, pylons etc. Often a significant area around these features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically adjacent to strong magnetic sources.

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 459445 186800, see Figs 03 – 07.

Anomalies of archaeological potential

(1) - The survey area contains a number of linear and rectilinear anomalies that relate to a series of enclosures. These have a similar orientation to linear anomalies located immediately to the south and which were dated to the late Bronze Age.

(2 & 3) - Double, parallel linear anomalies are associated with and form part of the enclosure ditches (1), but may also relate to former trackways.

(4) - Located within the eastern part of the survey area are a number of positive linear anomalies. Some are generally parallel with anomalies relating to enclosures, although it appears that they cross anomalies (2) and (3).

(5) - A fragmented positive linear anomaly extends through the north eastern part of the survey area. It has a more north north east to south south west orientation, different from the majority of the other anomalies within the site. However, there is another fragmented positive linear with a similar orientation located 46m to the west and these are likely to be associated.

(6) - A small number of discrete positive responses appear to relate to cut, pit-like features with archaeological potential. They have a magnitude of 4-7nT, stronger than anomalies (7), and an association with burnt material is possible.

Anomalies with an uncertain origin

(7) - The survey area contains widespread, discrete positive anomalies with a response of 1-3nT. While some could relate to further pit-like features with archaeological potential, it is possible that the majority relate to naturally formed features.

(8) - A positive linear anomaly in the south western part of the survey area could relate to a modern cultivation mark, although it is on a slightly different orientation to anomalies (12).

(9) - The survey area contains a number of positive linear and curvilinear anomalies with no coherent morphology. It is possible that several may relate to further cut

features with archaeological potential, but this is uncertain.

Anomalies associated with land management

(10) - A positive and negative band extends across the south eastern part of the site and corresponds to an extant low bank within the field. The response is only to the western edge as the bank is much wider than the response to the east. This is part of a wider landscape of boundary features. It has been partly used as a headland for ridge and furrow cultivation, which indicates that it is likely to pre-date it.

Anomalies with an agricultural origin

(11) - Former ridge and furrow cultivation has utilised a low linear bank (10) as a headland in the south eastern part of the site, but has crossed it in the northern half. The parallel linear anomalies are broadly spaced at 15m apart.

(12) - A series of parallel linear anomalies relate to modern cultivation.

Anomalies associated with magnetic debris

(13) - The entire survey area contains widespread magnetic debris. Only the stronger dipolar responses have been abstracted. Such widespread anomalies indicates that the field may have had fragments of ferrous and other magnetically thermoremnant material incorporated into the soil through the process of soil improvement.

Anomalies with a modern origin

(14) - The south western edge of the survey area has been affected by magnetic disturbance from nearby Heras fencing, steel containers and scaffolding. In the northern part of the site a number of farm implements have also caused a similar response.

4 CONCLUSION

4.1.1 The results of the geophysical survey indicate the presence of a landscape of rectilinear enclosures, trackways, linear ditches and pits. Linear anomalies on a similar orientation were located through a previous geophysical survey on land immediately to the south west and these were subsequently dated to the late Bronze Age/early Iron Age, with some later Roman ditches.

4.1.2 Ridge and furrow, with a broad 15m spacing is also evident. It appears to have utilised a low linear boundary bank as a headland in the south eastern part of the site and to have crossed it further north. A number of weakly positive linear and discrete anomalies could relate to further cut features, but they are poorly defined.

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Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material. Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field. Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The SENSYS gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 65cm apart. The instrument is carried about 10-20cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried magnetic field. The difference between the two sensors will relate to the strength of the magnetic field created by the buried feature.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Despike

Removal of data points that exceed the mean/median/threshold by selecting a window size of data points and replace by mean/median/threshold. Magnetic spikes can be caused iron objects on the surface or within the topsoil. Despike can improve the appearance of data and remove extreme readings that may affect further processing.

High Pass Filter

Removes low frequency anomalies within the data that are not considered to be archaeologically significant and may be natural in origin. A window passes over the data, the mean of all the data within the window is subtracted from the centre value. The size of the window is adjusted as is the weighting which may be uniform or Gaussian. The process is used to improve the visibility of anomalies of interest.

Low Pass Filter

Removes high frequency anomalies or 'noise' within datasets and provides a smoother output. A window passes over the data, the mean of all the data within the window is used to replace the centre value. The size of the window is adjusted as is the weighting. The process is used to improve the visibility of anomalies of interest.

Zero Median/Mean Traverse

The median (or mean) of data from each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise differences between the offset values of the gradiometer sensors. The process can remove archaeological features that run along a traverse but with the high resolution datasets created by the Sensys FGM650 sensors and the method of data collection this has not been a notable problem. In fact, the removal of offsets using software avoids carrying out a balancing procedure on site, which

inevitably can never be done in magnetically clean conditions and results in improperly aligned fluxgate sensors and/or electronic adjustment values.

Appendix C – survey and data information

Minimally processed data

Filename: J800-mag-proc.xcp
Description: Imported as Composite from: J800-mag.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 459239.77, 186952.76m
Southeast corner: 459570.97 186622.61m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702
Source GPS Points: 1953800
Dimensions
Composite Size (readings): 2208 x 2201
Survey Size (meters): 331 m x 330 m
Grid Size: 331 m x 330 m
X Interval: 0.15 m
Y Interval: 0.15 m
Stats
Max: 3.32
Min: -3.30
Std Dev: 1.21
Mean: 0.05
Median: 0.02
Composite Area: 10.935 ha
Surveyed Area: 5.9732 ha
PROGRAM
Name: TerraSurveyor
Version: 3.0.23.0
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 Clip from -3.00 to 3.00 nT

Filtered data

Filename: J800-mag-proc-hpf.xcp
Description: Imported as Composite from: J800-mag.asc
Stats
Max: 3.32
Min: -3.30
Std Dev: 1.17
Mean: 0.06
Median: 0.02
GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 High pass Uniform (median) filter: Window dia: 300
5 Clip from -3.00 to 3.00 nT

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire. Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site.

A draft digital copy of the summary report (in PDF format) shall be supplied to the client for review and this will be forwarded to the office of the Oxfordshire County Archaeological Officer; for verification and assessment by the CAO or his representative. When the report has been agreed a final digital copy will then be supplied to the Oxfordshire Historic Environment Record (HER) at *archaeology@oxfordshire.gov.uk* on the understanding that it will become a public document after an appropriate period of time (generally not exceeding six months).

Archive contents:

File type	Naming scheme	Description
Data	J800-mag.asc J800-mag.xcp J800-mag-proc.xcp J800-mag-proc-hpf.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data TerraSurveyor high pass filtered data
Graphics	J800-mag-proc.tif J800-mag-proc-hpf.tif	Image in TIF format
Drawing	J800-**[version number]**.dwg	CAD file in 2010 dwg format
Report	J800 report.odt	Report text in Open Office odt format

Table 2: Archive metadata

Appendix E – CAD layers for abstraction and interpretation plots

The table below sets out Archaeological Surveys Ltd CAD layer names with associated colours and graphical content. Where CAD files are available layers may be extracted for further CAD/GIS use. Note: hatched polygon boundaries are contained within layers with the RGB colour code 254, 255, 255 (near white) in order to prevent their visibility.

Report sub-heading and associated CAD layer names	Colour with RGB index		Layer content
Anomalies with archaeological potential			
AS-ABST MAG POS DISCRETE ARCHAEOLOGY		Red 255,0,0	Solid donut, point or polygon (solid)
AS-ABST MAG POS LINEAR ARCHAEOLOGY		Red 255,0,0	Polyline or polygon (solid)
AS-ABST MAG POS ENCLOSURE DITCH		127,0,255	Line, polyline or polygon (solid)
Anomalies with an uncertain origin			
AS-ABST MAG POS LINEAR UNCERTAIN		255,127,0	Line, polyline or polygon (solid)
AS-ABST MAG POS DISCRETE UNCERTAIN		255,127,0	Solid donut, point or polygon (solid)
Anomalies relating to land management			
AS-ABST MAG BOUNDARY		127,0,0	Line, polyline or polygon (solid or cross hatched ANSI37)
Anomalies with an agricultural origin			
AS-ABST MAG AGRICULTURAL		Green 0,255,0	Line or polyline
AS-ABST MAG RIDGE AND FURROW		0,127,63	Line, polyline or polygon (cross hatched ANSI37)
Anomalies associated with magnetic debris			
AS-ABST MAG STRONG DIPOLAR		132, 132, 132	Solid donut, point or polygon (solid)
Anomalies with a modern origin			
AS-ABST MAG DISTURBANCE		132, 132, 132	Polygon (hatched ANSI31)
AS-ABST MAG SERVICE		132, 132, 132	Line or polyline

Table 3: CAD layering

Appendix F – copyright and intellectual property

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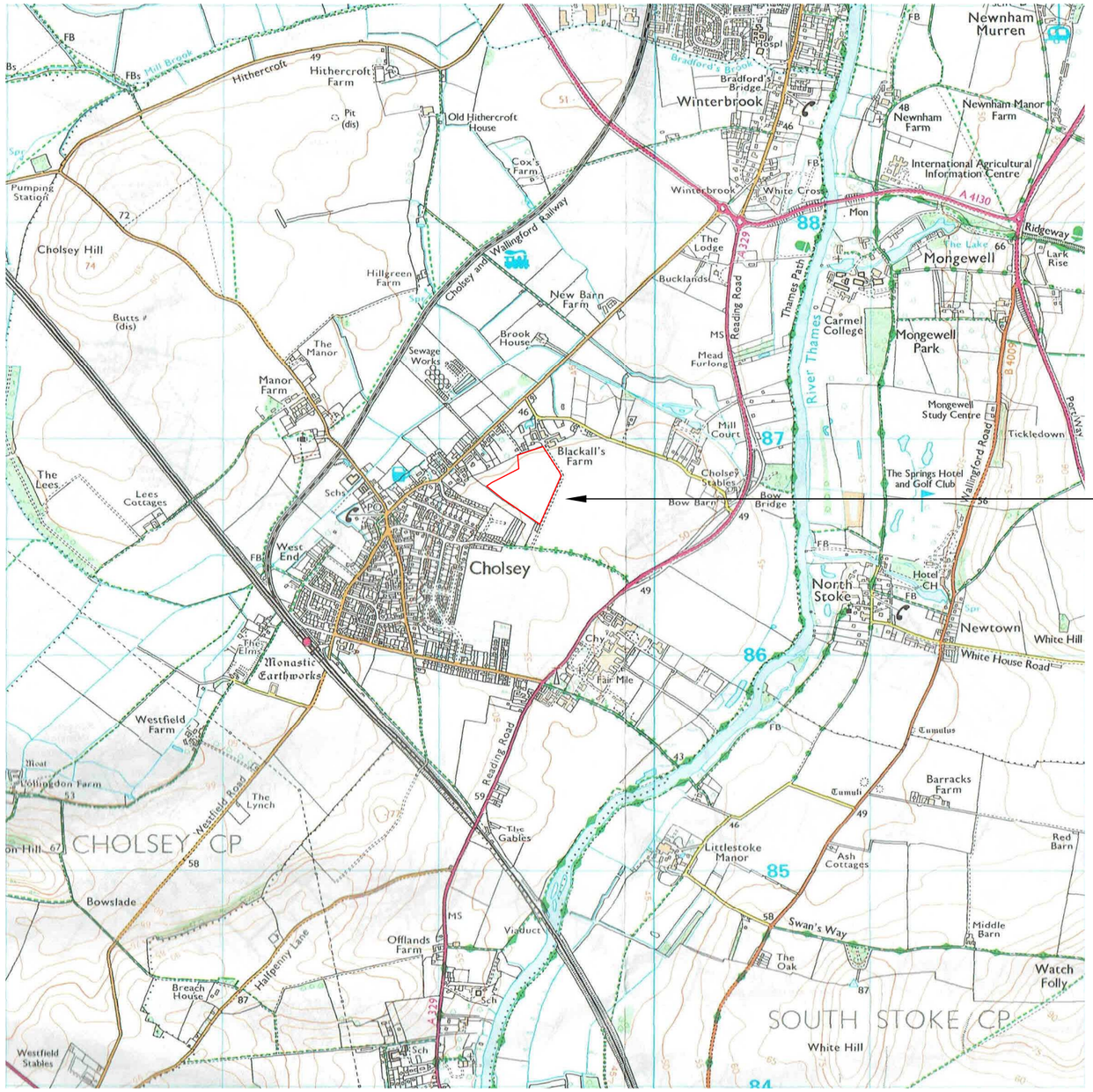
info@archaeological-surveys.co.uk
Tel: 01249 814 231

Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Wallingford Road Phase 2
Cholsey
Oxfordshire

Map of survey area



Survey location

Site centred on OS NGR
SU 59445 86800

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 01

Reproduced from OS Explorer map no.170 1:25 000 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence number 100043739.

459250
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186650
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Oxfordshire

Referencing information

Referencing grid to OSGB36 datum at 50m intervals

459300 186750

Survey tracks

Survey track start

Survey track stop

SCALE 1:1250

0m 10 20 30 40 50m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 02

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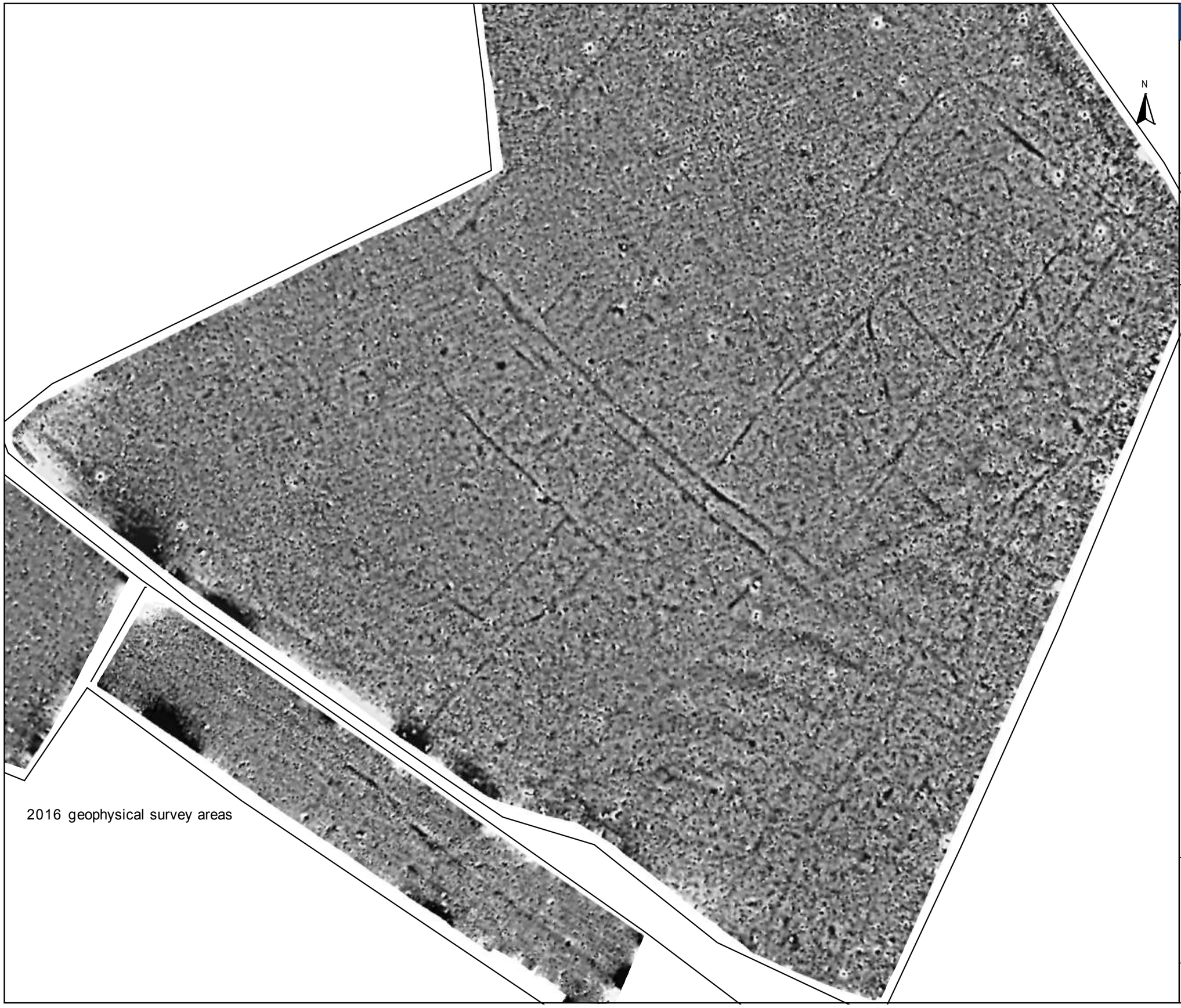
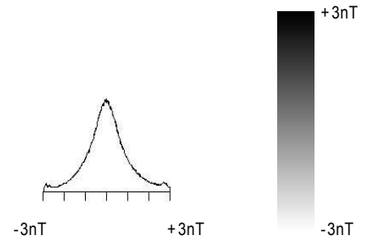
Greyscale plot of minimally processed magnetometer data - south





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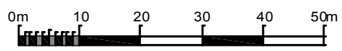
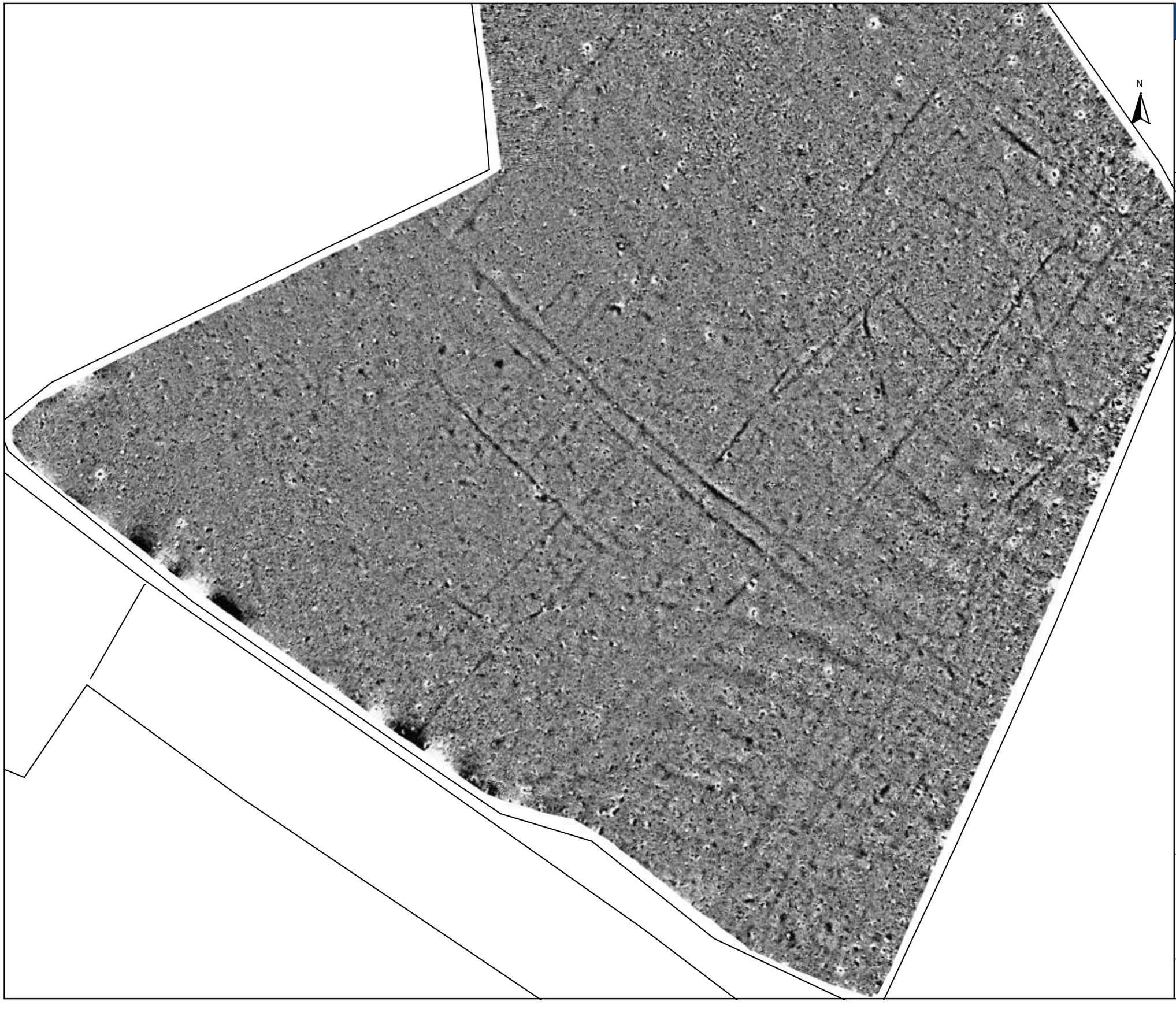


KTD	DJS	FIG 03



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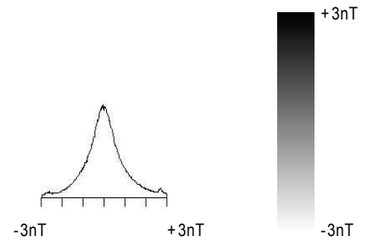
Cholsey
Oxfordshire

Greyscale plot of high pass filtered magnetometer data - south



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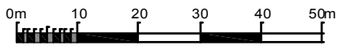

KTD	DJS	FIG 04

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Abstraction and interpretation of magnetic anomalies - south

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2016 geophysical survey areas

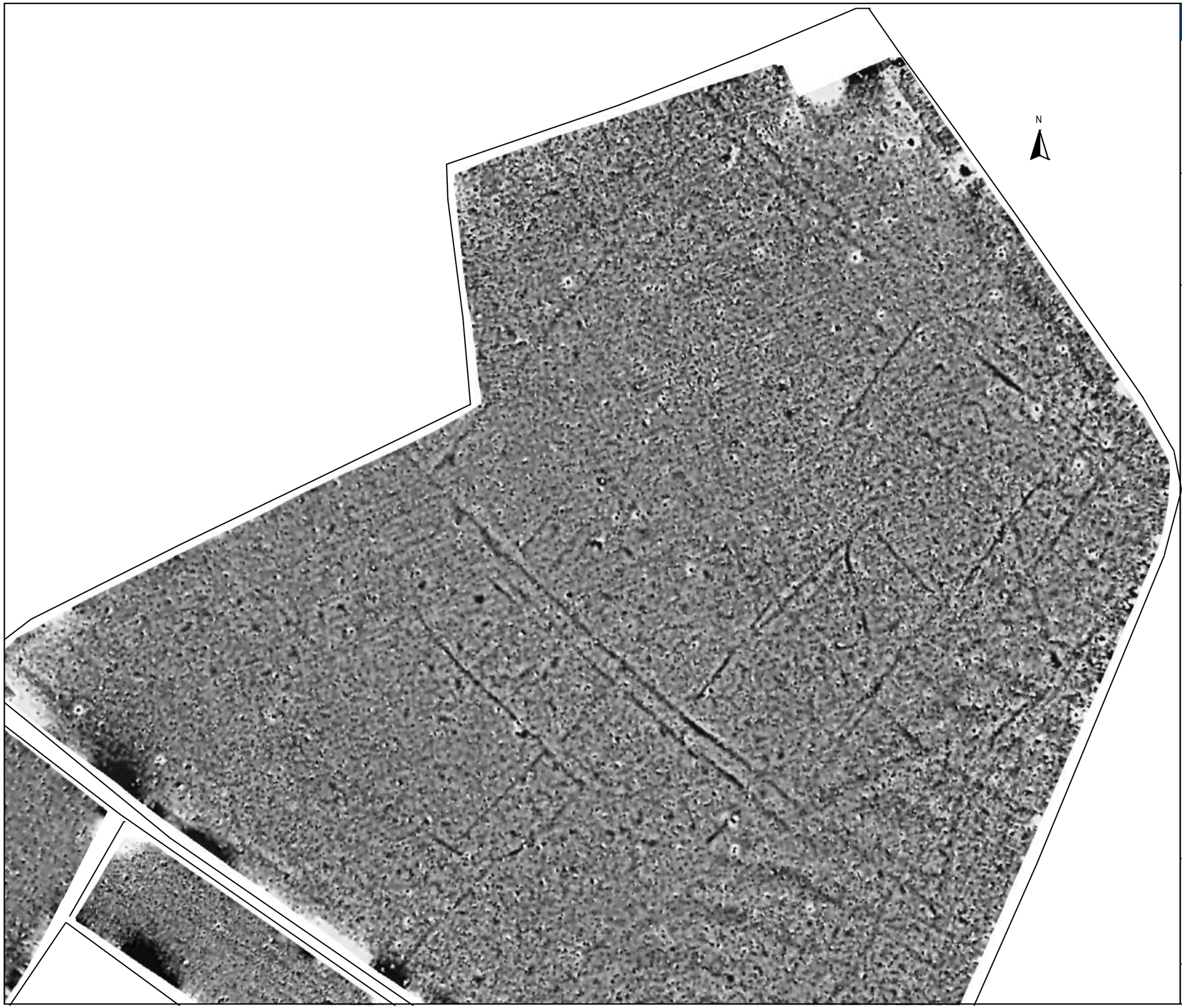
- Positive linear anomaly - cut feature of archaeological potential
- Positive rectilinear anomaly - enclosure ditch
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - ridge and furrow
- Broad positive/negative anomaly - extant low boundary bank
- Discrete positive response - cut feature of archaeological potential
- Discrete positive response - possible pit-like feature
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 05



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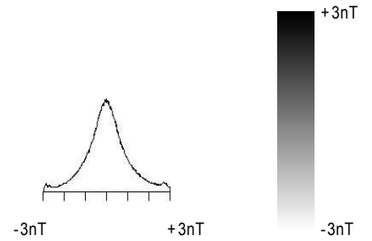
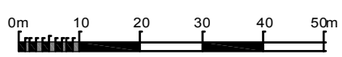
Oxfordshire

Greyscale plot of minimally processed magnetometer data - north



SCALE 1:1000



KTD	DJS	FIG 06

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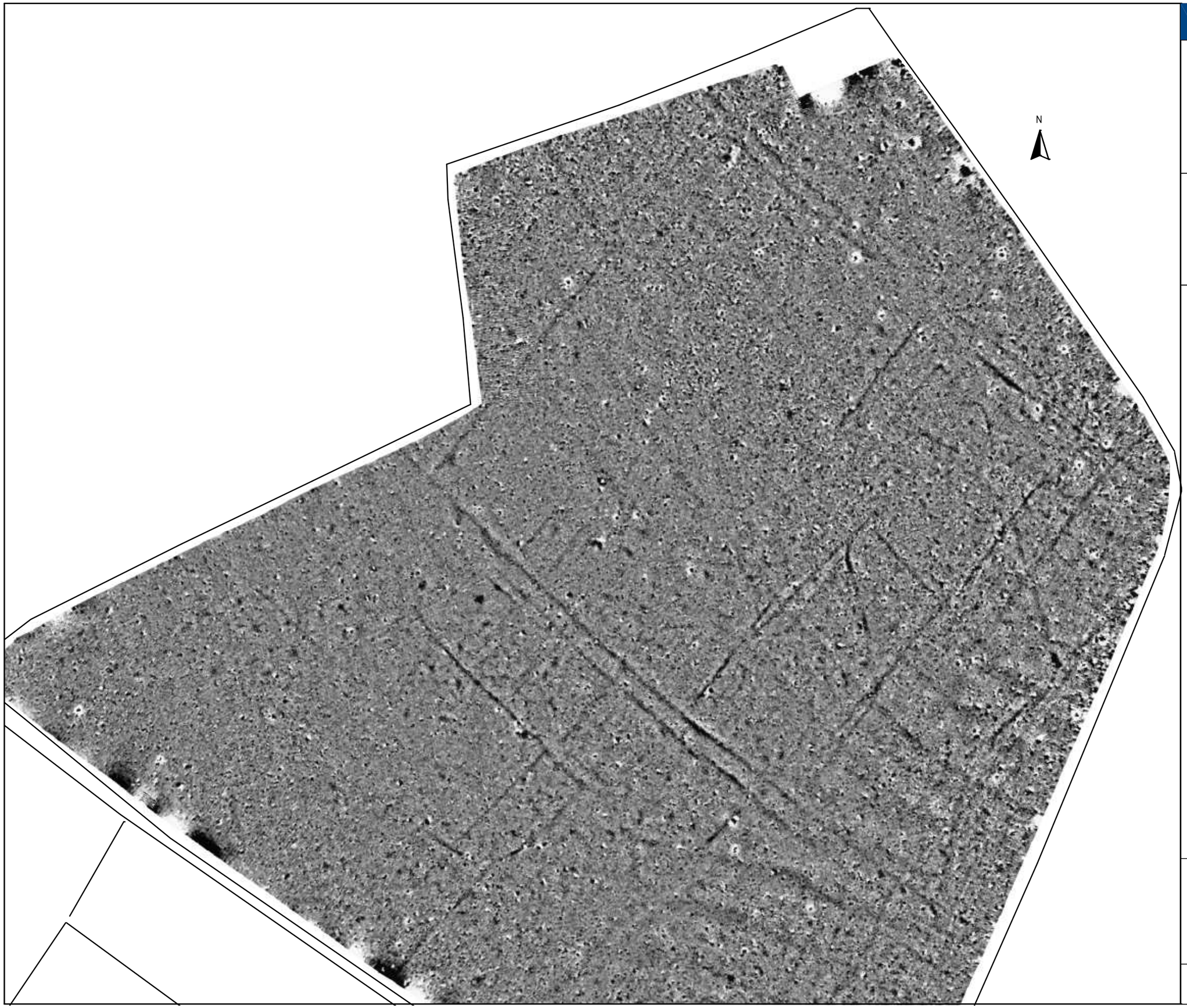
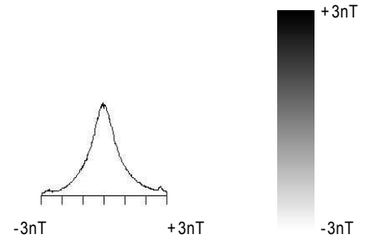
Oxfordshire

Greyscale plot of high pass filtered magnetometer data - north





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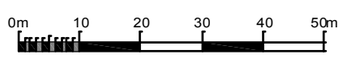

KTD	DJS	FIG 07

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Oxfordshire

Abstraction and interpretation of magnetic anomalies - north

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- Positive linear anomaly - cut feature of archaeological potential
- Positive rectilinear anomaly - enclosure ditch
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - ridge and furrow
- Broad positive/negative anomaly - extant low boundary bank
- Discrete positive response - cut feature of archaeological potential
- Discrete positive response - possible pit-like feature
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 08

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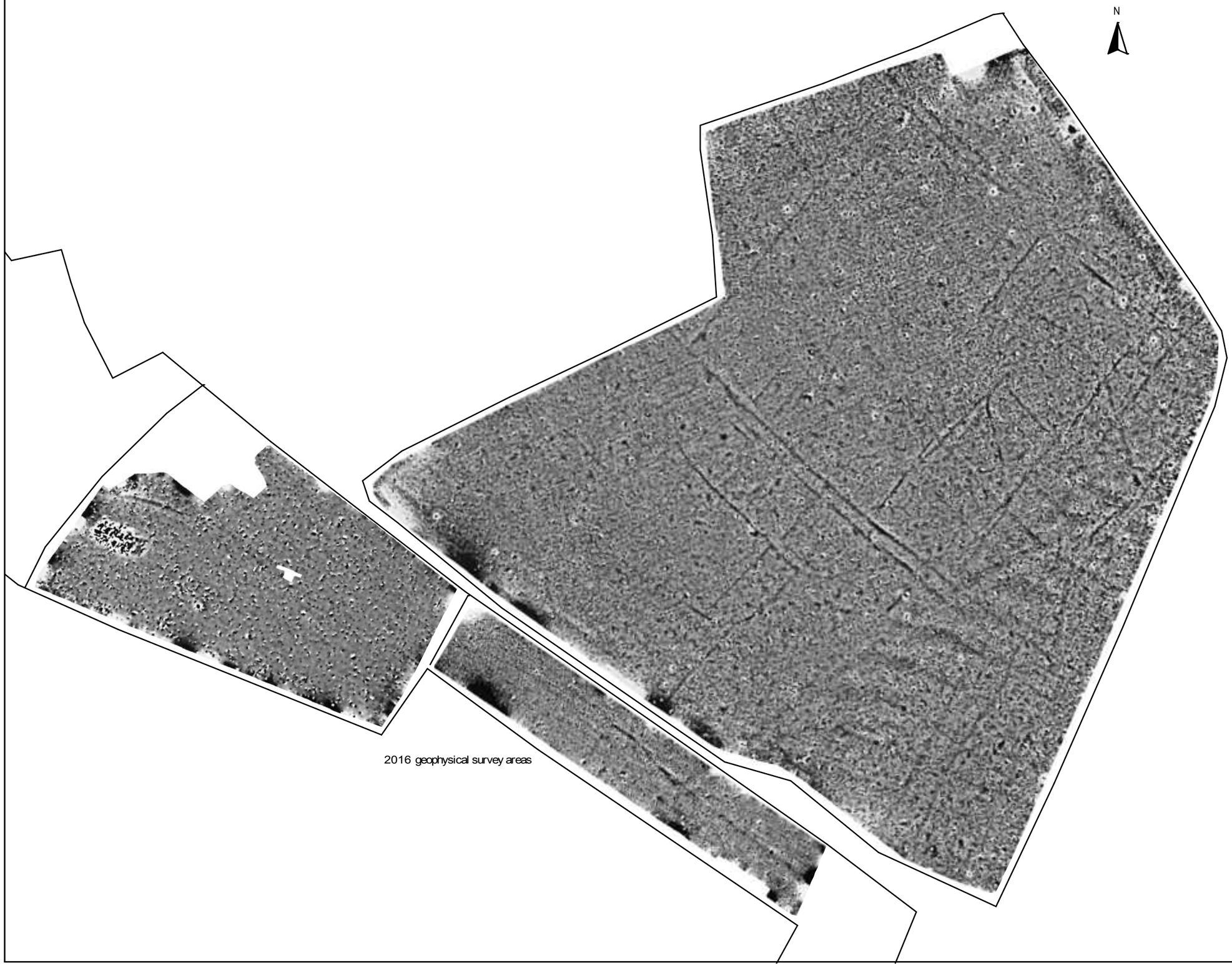
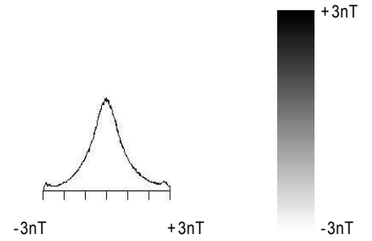
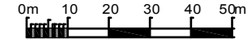
Oxfordshire

Greyscale plot of minimally processed magnetometer data





SCALE 1:1500



KTD	DJS	FIG 09

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Abstraction and interpretation of magnetic anomalies

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2016 geophysical survey areas

- Positive linear anomaly - cut feature of archaeological potential
- Positive rectilinear anomaly - enclosure ditch
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - ridge and furrow
- Broad positive/negative anomaly - extant low boundary bank
- Discrete positive response - cut feature of archaeological potential
- Discrete positive response - possible pit-like feature
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 10