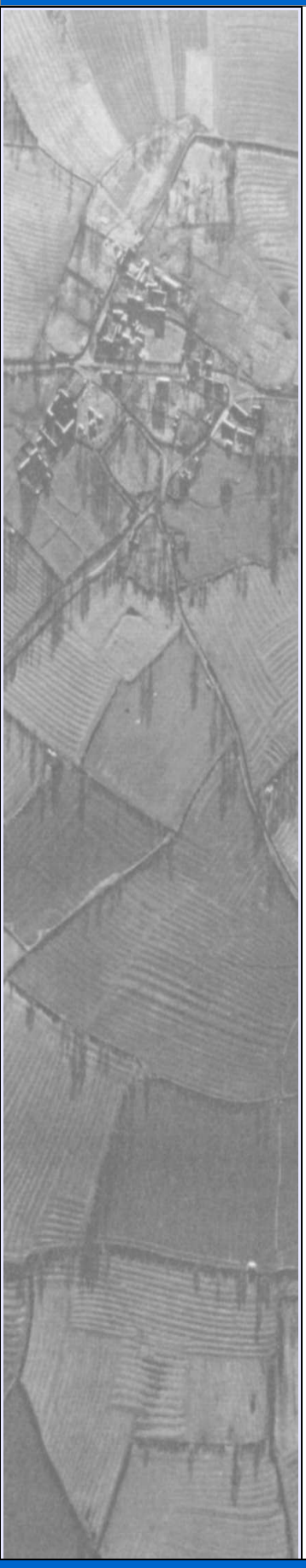

Land off Pennyford Lane
Wootton Wawen
Warwickshire

MAGNETOMETER SURVEY REPORT

for

Archaeology Warwickshire

Kerry Donaldson & David Sabin

July 2016

Ref. no. J675

ARCHAEOLOGICAL SURVEYS LTD

Land off Pennyford Lane
Wootton Wawen
Warwickshire

Magnetometer Survey Report

for

Archaeology Warwickshire

Fieldwork by David Sabin (Hons) MCIfA
Report by Kerry Donaldson BSc (Hons)
Report checked by David Sabin
Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire

Survey date – 22nd July 2016
Ordnance Survey Grid Reference – **SP 15710 62980**

Archaeological Surveys Ltd
1 West Nolands, Nolands Road, Yatesbury, Calne, Wiltshire, SN11 8YD
Tel: 01249 814231 Fax: 0871 661 8804
Email: info@archaeological-surveys.co.uk
Web: www.archaeological-surveys.co.uk

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SUMMARY

A detailed magnetometer survey was undertaken by Archaeological Surveys Ltd on land off Pennyford Lane, Wootton Wawen, Warwickshire. The north eastern part of the site contains a large depression and is associated with a curvilinear anomaly of uncertain origin; the feature may relate to the extraction of marl or other natural material. Widespread magnetic debris was also encountered across the whole of the northern part of the site, and it is likely that this has been caused by burnt material spread as part of soil conditioning. Several very weakly positive linear and discrete responses were also located, but their origin is uncertain. The site also contains linear anomalies related to extant ridge and furrow.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Archaeology Warwickshire to undertake a magnetometer survey of an area of land at Wootton Wawen in Warwickshire. The site has been outlined for a proposed residential development and the survey forms part of an archaeological assessment of the site.

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 The survey and report generally follow the recommendations set out by: English Heritage (2008) *Geophysical survey in archaeological field evaluation;* and 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.*

1.3 Site location, description and survey conditions

1.3.1 The site is located west of Pennyford Lane and south of the A3400 Stratford Road in Wootton Wawen. It is centred on Ordnance Survey National Grid Reference (OS NGR) SP 15710 62980, see Figures 01 and 02.

1.3.2 The geophysical survey covers approximately 2ha of pasture split between several paddocks that are labelled Areas 1 - 3 for the purposes of this report. The south western limit of the survey area is defined by a public footpath

rather than any physical boundary.

1.3.3 Ground cover consisted of mainly short, grazed grass within Areas 1 and 2 with longer grass and some trees within Area 3. A large depression was noted in the north eastern part of Area 1 and extant ridge and furrow is visible across much of Area 2 and the southern half of Area 1. Linear depressions within Area 3 may also relate to ridge and furrow or land drainage. Some of the trees within Area 3 were surrounded by wrought iron guards that were considered liable to produce zones of strong magnetic disturbance.

1.3.4 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. Weather conditions during the survey were fine and warm.

Plate 1: Survey area looking south east

1.4 Site history and archaeological potential

1.4.1 The survey area lies 100m east of Wootton Wawen Mill (MWA1613), which may have been one of three watermills recorded in Domesday along with Penny Ford Mill (MWA1612), 800m to the south west and another 650m to the north (MWA1614). A number of fishponds are recorded in the wider vicinity including 500m to the west (MWA1598), which is a scheduled monument (WA176) (List entry no. 1005728), also listed in that area is the site of a possible motte and bailey castle (MWA4533) and shrunken medieval village (MWA4534). Located approximately 500m to the north west are the site of a medieval priory (MWA1599) with evidence for buildings pre-dating the priory (MWA8882) and other early medieval occupation (MWA8881) which pre-date an early medieval cemetery (MWA8880), the area has also been scheduled (WA175) (List entry no. 1005727).

1.4.2 The location of medieval and post-medieval land use and occupation nearby and in the wider vicinity may indicate that there is potential for the survey to locate further archaeological features.

1.4.3 The surface conditions within the site were not suitable for the observation of cultural material during the course of the survey. However, extant ridge and furrow earthworks are visible within Areas 1 and 2 and a large depression of uncertain origin was noted in the north eastern part of the site.

1.5 Geology and soils

1.5.1 The underlying geology is from the Mercia Mudtone Group (BGS, 2016).

1.5.2 The overlying soil across the site is from the Brockhurst 2 association and is a typical stagnogley. It consists of a slowly permeable, seasonally waterlogged, reddish, fine loamy over clayey soil (Soil Survey of England and Wales, 1983).

1.5.3 The underlying geology and soils are 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 are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.

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).

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 spaced 0.5m apart with readings recorded at 20Hz. The gradiometers have a range of recording data between 0.1nT and 10,000nT. The sensors are not zeroed in the field, as the vertical axis alignment is fixed using a tension band system. In order to produce visible, useful greyscale images a zero median traverse process is undertaken in TerraSurveyor. The system is linked to a Leica GS10 RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged computer.

2.2.2 Data are collected along a series of parallel survey tracks wherever possible. The length of each track is variable and relates to the size of the survey area and other factors including ground conditions. A visual display aids accurate placing of tracks and their separation.

2.2.3 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).

2.3 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. Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display using TerraSurveyor.

2.3.2 The data are collected between limits of ±10000nT 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. A zero median traverse function is required in order to remove fixed offset values present within the sensors which do not undergo a zeroing procedure in the field. The approach ensures that the gradiometer sensors are very accurately aligned and fixed to the vertical magnetic field and are not influenced by localised magnetic fields or disturbed by vibration. 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 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 any processes, such as clipping, carried out on the data.

2.3.4 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.

2.3.5 The raster images are combined with base mapping using ProgeCAD Professional 2014, 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 GPS, resection method, etc.

2.3.6 An abstraction and interpretation is also 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.

2.3.7 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 each survey area.

2.3.8 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 approximately 2ha. The results within all of the survey areas have been considered as a whole.

3.1.2 Magnetic anomalies located can be generally classified as positive and negative anomalies of an uncertain origin, anomalies associated with surface depression, linear anomalies of an agricultural origin, areas of magnetic debris and disturbance, strong discrete dipolar anomalies relating to ferrous objects and strong multiple dipolar linear anomalies relating to buried services or pipelines. Anomalies located within each survey area have been numbered and are described in 3.4 below .

3.2 Statement of data quality

3.2.1 Data are considered representative of the magnetic anomalies present within the site. Magnetic debris is widespread within Areas 1 and 2 and has the appearance of burnt material or ash with a high ferrous content deliberately spread as a soil conditioner. Very strong magnetic disturbance was encountered along the northern part of Area 3, and this is related to an underground service, probably a steel pipe. More localised disturbance is related to wrought iron guards surrounding trees. Although the magnetic

debris is unlikely to obscure weak anomalies of archaeological potential, the high magnitude disturbance at the northern end of Area 3 could obscure features along a small proportion of the site.

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 basic explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross referencing to the abstraction and interpretation plot. CAD layer names are included to aid reference to associated digital files (.dwg/.dxf). Sub-headings are then used to group anomalies with similar characteristics.

Report sub-heading CAD layer names and plot colour	Description and origin of anomalies
Anomalies with an uncertain origin AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG NEG LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN 	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. 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 with an agricultural origin AS-ABST MAG RIDGE AND FURROW 	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.
Anomalies associated with magnetic debris AS-ABST MAG DEBRIS AS-ABST MAG STRONG DIPOLAR 	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. It often occurs where there has been dumping or ground make-up and is related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, or hearths and may therefore be archaeologically significant. It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin AS-ABST MAG DISTURBANCE AS-ABST MAG SERVICE 	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 such 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 and with hysteresis adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.
Anomalies associated with surface depression	Magnetically variable anomalies, which may be negative,

AS-ABST MAG DEPRESSION	indicating a response to geology/drift deposits and/or positive indicating an increased depth of topsoil. Very strongly magnetic anomalies are a response to highly magnetic material which can be used to infill a depression. A negative response may be a response to a band of rock near the surface, or at the edge of a depression.

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 415710 262980, see Figs 03 & 04.

Anomalies with an uncertain origin

(1) - The site contains a number of short, weakly positive linear anomalies. They are indistinct and lack a coherent morphology and it is not possible to determine if they relate to cut features.

(2) - A positive and negative linear anomaly extend southwards through Area 1. It is possible that they are related to a buried service, but this is not certain.

(3) - A small number of discrete positive responses are located in the southern part of the site (Area 3). This part of the site contains a number of trees, and it is not possible to ascertain if the discrete anomalies relate to pit-like features with a natural or anthropogenic origin.

(4) - Two very strongly magnetic positive responses are associated with a zone of magnetic debris in the northern part of the site. The responses are located within uneven ground and the strength of up to 50nT indicates an association with burnt material is likely. Bonfire ash was noted a little further to the north.

Anomalies associated with surface depressions

(5) - A positive curvilinear anomaly is located near the north eastern corner of the site and is situated on the edge of a depression, with part of the response within the depression. The cause of the depression is not known but a former marl pit is possible.

Anomalies with an agricultural origin

(6) - The site contains a number of parallel linear anomalies which relate to extant ridge and furrow.

Anomalies associated with magnetic debris

(7) - The whole of the northern part of the site (Areas 1 & 2) contain widespread magnetic debris. Only the strongest and most concentrated areas have been

abstracted, but all of this part of the site is covered.

(8) - Strong, discrete, dipolar anomalies are widespread and relate to buried ferrous and other magnetically thermoremnant objects.

Anomalies with a modern origin

(9) - A strong, multiple dipolar, linear anomaly extends along the northern part of Area 3 and relates to a buried service. It is associated with a broad zone of magnetic disturbance.

4 CONCLUSION

4.1.1 The results of the magnetometry indicate widespread magnetic contamination in the northern part of the site. It is likely that it relates to the use of burnt material within soil conditioner and there are some more intense zones in the northern part of the site, adjacent to stables, that may indicate relatively modern burning. Although the debris is widespread, it is considered unlikely to obscure weaker anomalies of archaeological potential.

4.1.2 A positive curvilinear anomaly is associated with a large depression in the north eastern part of the site. The origin of the feature is uncertain but may be associated with the extraction of marl or other natural materials. Further very weakly positive linear and discrete anomalies have been located; however, the lack of a coherent morphology prevents confident interpretation.

5 REFERENCES

Aspinall, A., Gaffney, C. and Schmidt, A. 2009. *Magnetometry for Archaeologists*. Lanham (US), AltaMira Press.

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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 field. The difference between the two sensors will relate to the strength 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. It has been found that clipping data to ranges between ±5nT and ±3nT often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero (destripe) Median/Mean Traverse

The median (or mean) of 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 baseline value of gradiometer sensors.

High Pass Filtering

A mathematical process used to remove low frequency anomalies relating to survey tracks and modern agricultural features.

Appendix C – survey and data information

Area 1

COMPOSITE
Filename: J675-mag-Area1-proc.xcp
Description: Imported as Composite from: J675-mag-Area1.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 415714.089730138, 263061.424028318 m
Southeast corner: 415794.789730138, 262928.824028318 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32000

Source GPS Points: 186600

Dimensions
Composite Size (readings): 538 x 884
Survey Size (meters): 80.7 m x 133 m
Grid Size: 80.7 m x 133 m
X Interval: 0.15 m
Y Interval: 0.15 m

Stats
Max: 3.32
Min: -3.30
Std Dev: 1.62
Mean: 0.02
Median: 0.06
Composite Area: 1.0701 ha
Surveyed Area: 0.58428 ha

PROGRAM
Name: TerraSurveyor
Version: 3.0.23.0

Processes: 1
1 Base Layer

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

Area 2

COMPOSITE
Path: C:\Business\Jobs\J675 Wootton Wawen\Data\Area 2\comps\
Filename: J675-mag-Area2-proc.xcp
Description: Imported as Composite from: J675-mag-Area2.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 415630.747499496, 263035.969541251 m
Southeast corner: 415714.747499496, 262924.669541251 m
Collection Method: Randomised
Sensors: 1
Dummy Value: 32702

Source GPS Points: 202000

Dimensions
Composite Size (readings): 560 x 742
Survey Size (meters): 84 m x 111 m
Grid Size: 84 m x 111 m
X Interval: 0.15 m
Y Interval: 0.15 m

Stats
Max: 3.32
Min: -3.30
Std Dev: 1.47
Mean: 0.03
Median: 0.02
Composite Area: 0.93492 ha
Surveyed Area: 0.60078 ha

Processes: 1
1 Base Layer

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

Area 3

COMPOSITE
Filename: J675-mag-Area3-proc.xcp
Description: Imported as Composite from: J675-mag-Area3.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 415560.494408, 262996.611815106 m
Southeast corner: 415704.344408, 262851.111815106 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702

Source GPS Points: 292200

Dimensions
Composite Size (readings): 959 x 970
Survey Size (meters): 144 m x 146 m
Grid Size: 144 m x 146 m
X Interval: 0.15 m
Y Interval: 0.15 m

Stats
Max: 3.32
Min: -3.30
Std Dev: 1.68
Mean: 0.02
Median: 0.02
Composite Area: 2.093 ha
Surveyed Area: 0.94095 ha

Processes: 1
1 Base Layer

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

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.

Three printed copies of the report and a PDF copy will be supplied to the Warwickshire Historic Environment Record. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS).
Archive contents:

Geophysical data - path: J675 Wootton Wawen\Data				
Path and Filename	**Software**	**Description**	**Date**	**Creator**
wawen1\MX\ wawen2\MX\ wawen3\MX\ .prm .dgb .disp	Sensys MXPDA	Proprietary data formats representing magnetometer survey traverses logged to a PDA.	22/07/16	D.J.Sabin
wawen1\MX\J675-mag-Area1.asc wawen2\MX\J675-mag-Area2.asc wawen3\MX\J675-mag-Area3.asc	Sensys DLMGPS	ASCII CSV (tab) file representing survey Area 1 in eastings, northings (UTM Z30N), magnetic measurement, traverse file and sensor number.	25/07/16	K.T.Donaldson
Area1\comps\J675-mag-Area1.xcp Area2\comps\J675-mag-Area2.xcp Area3\comps\J675-mag-Area3.xcp	TerraSurveyor 3.0.23.0	Composite data file derived from ASCII CSV.	25/07/16	K.T.Donaldson
Area1\comps\J675-mag-Area1-proc.xcp Area2comps\J675-mag-Area2-proc.xcp Area3\comps\J675-mag-Area3-proc.xcp	TerraSurveyor 3.0.23.0	Processed composite data file (zmt and clipping to ±3nT).	25/07/16	K.T.Donaldson
Graphic data - path: J675 Wootton WawenData				
Area1\graphics\ J675-mag-Area1-proc.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to ±3nT.	25/07/16	K.T.Donaldson
Area1\graphics\ J675-mag-Area1-proc.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	25/07/16	K.T.Donaldson
Area2\graphics\ J675-mag-Area2-proc.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to ±3nT.	25/07/16	K.T.Donaldson
Area2\graphics\ J675-mag-Area2-proc.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	25/07/16	K.T.Donaldson
Area3\graphics\ J675-mag-Area3-proc.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to ±3nT.	25/07/16	K.T.Donaldson
Area3\graphics\ J675-mag-Area3-proc.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	25/07/16	K.T.Donaldson
CAD data - path: J675 Wootton Wawen\CAD				
J675 version 1.dwg	ProgeCAD 2016	CAD file for creating plots of greyscales, abstraction, interpretation and mapping. Grid coordinates as OSGB. AutoCAD 2010 format.	18/07/16	K.T.Donaldson
Text data - path: J675 Wootton Wawen\Documentation				
J675 report.odt	OpenOffice.org 3.0.1 Writer	Report text as an Open Office document.	28/07/16	K.T.Donaldson

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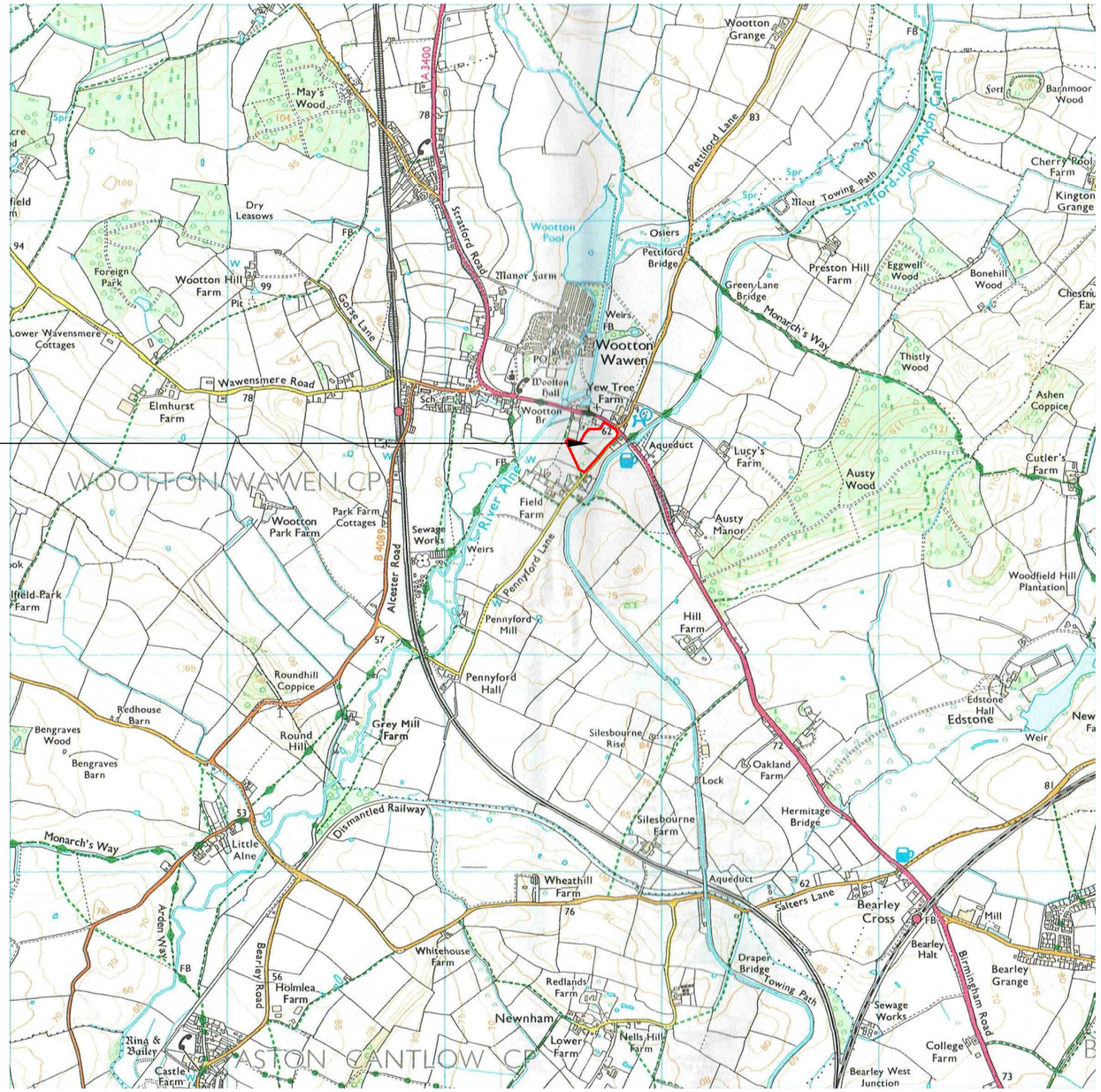
Survey location



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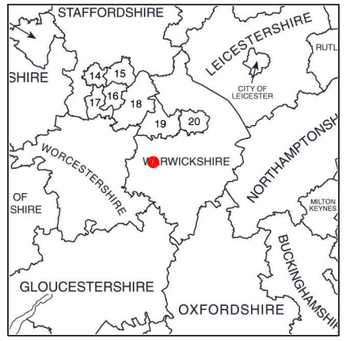
Map of survey area



Survey location

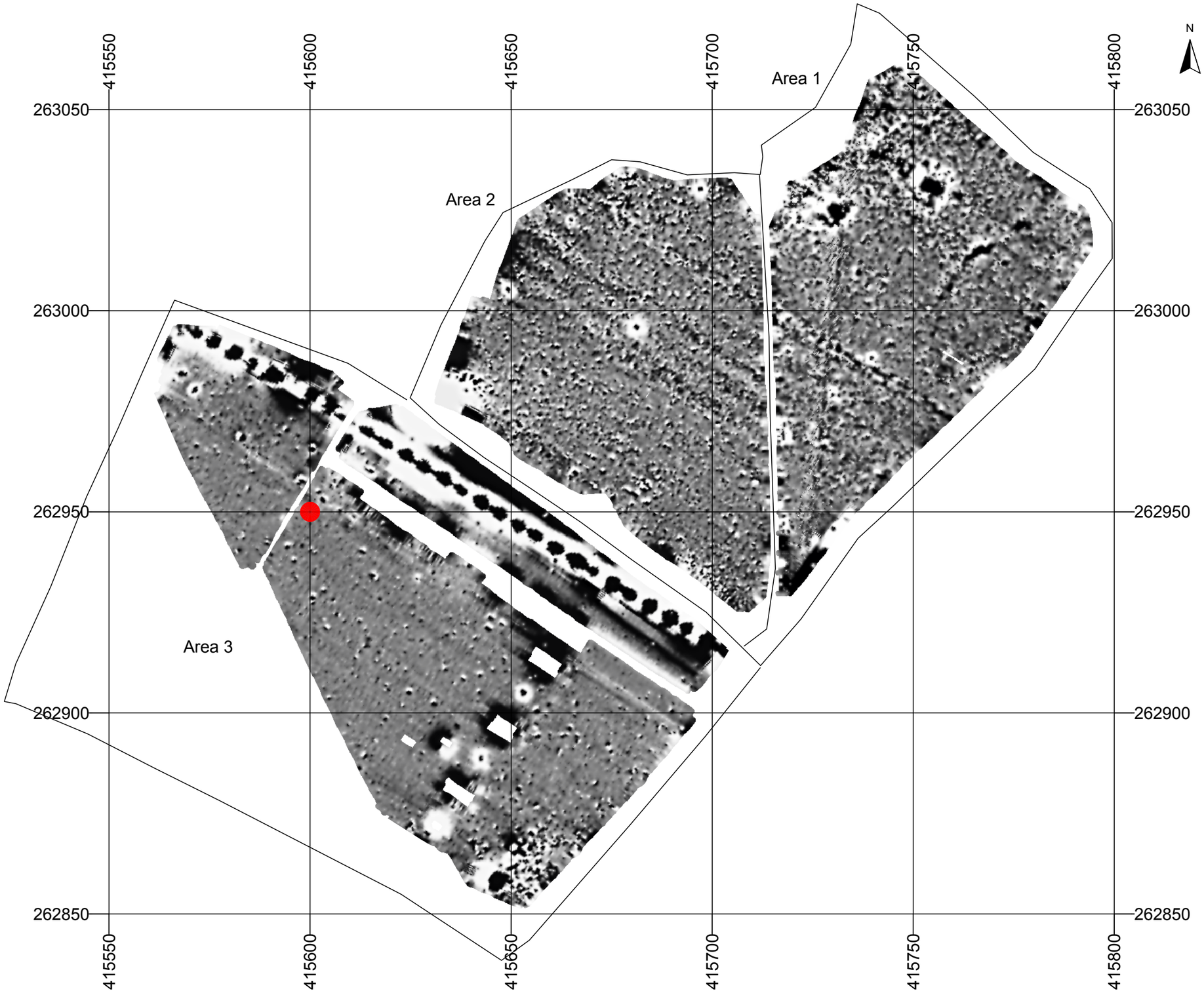
Site centred on OS NGR
SP 15710 62980

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01



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Referencing information

Referencing grid to OSGB36 datum at 50m intervals

Data collected at 20Hz and georeferenced to ETRS89 zone 30 with conversion to OSGB36 using OSTN02

● 415600 262950

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 02

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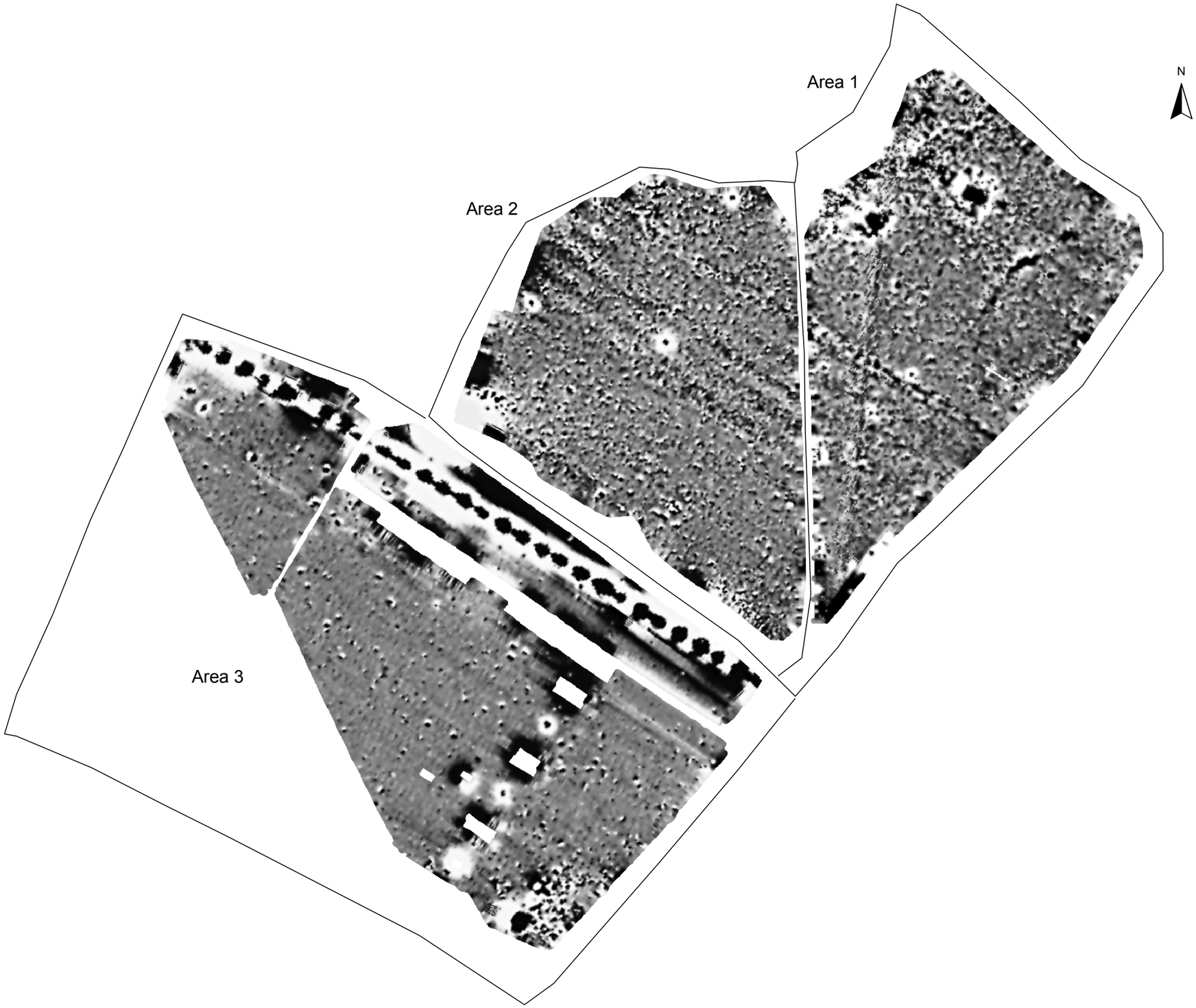
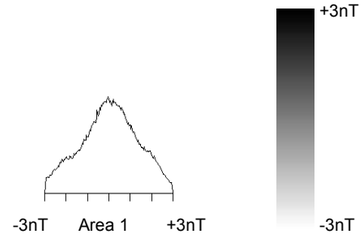


Greyscale plot of minimally processed magnetometer data



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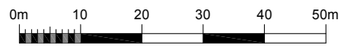

SCALE TRUE AT A3

FIG 03

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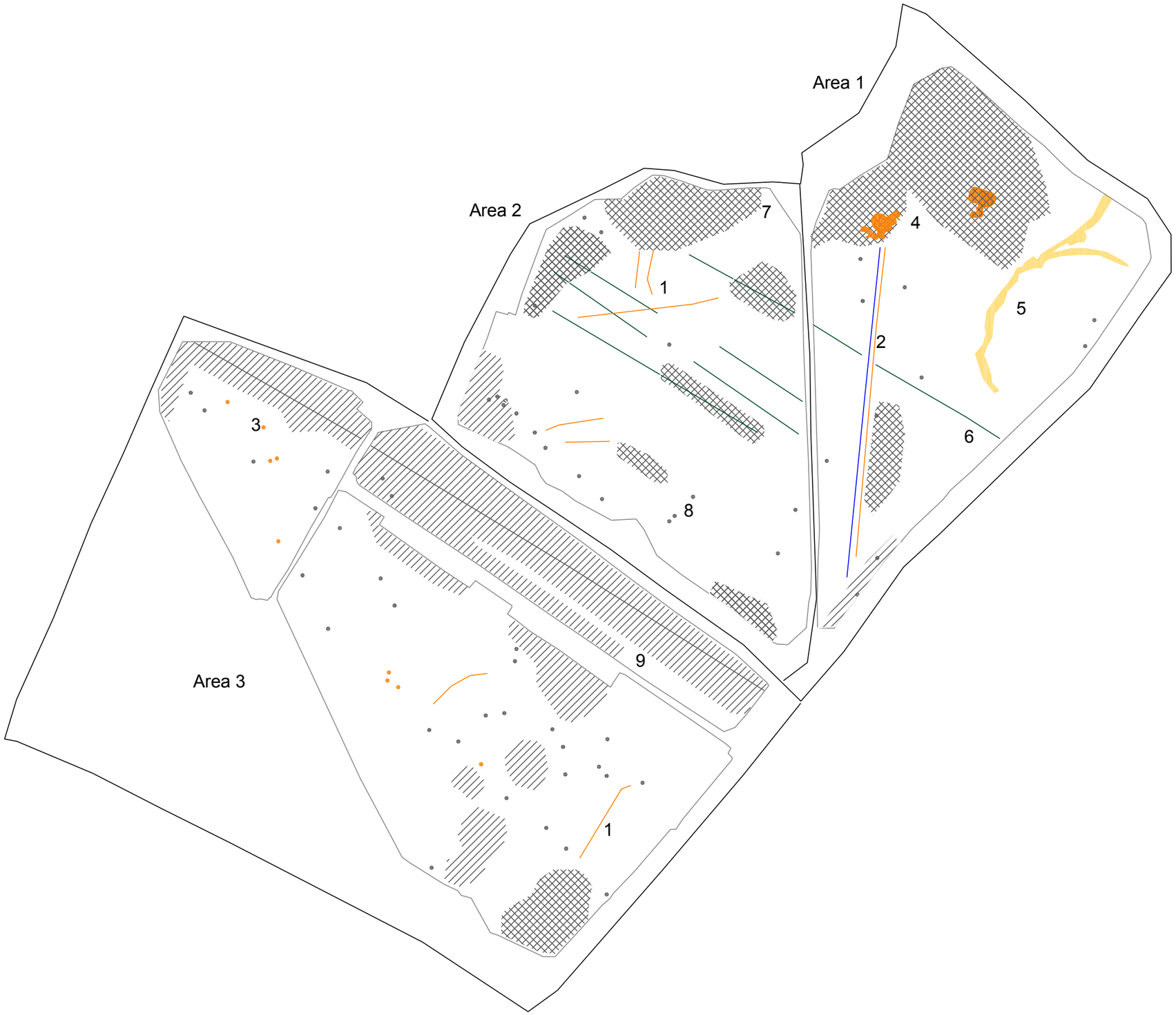
Abstraction and interpretation of magnetometer anomalies



- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - associated with depression
- Linear anomaly - ridge and furrow
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - possible pit-like feature
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 04