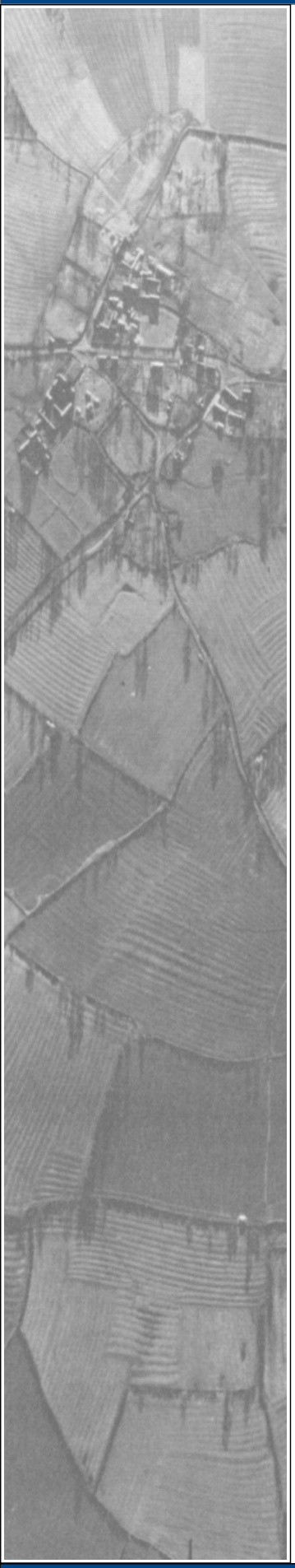


Land to the rear of Wick Farm Cottage
Heddington Wick
Wiltshire

MAGNETOMETER SURVEY REPORT

for

Mr N Hodder

Kerry Donaldson & David Sabin

January 2023

Ref. no. J945

ARCHAEOLOGICAL SURVEYS LTD

Land to the rear of Wick Farm Cottage
Heddington Wick
Wiltshire

MAGNETOMETER SURVEY REPORT

for

Mr N Hodder

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

Survey date – 13th December 2022
Ordnance Survey Grid Reference – **ST 98180 67110**

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

CONTENTS

SUMMARY....1

1 INTRODUCTION....1

1.1 Survey background....1

1.2 Survey objectives and techniques....1

1.3 Standards, guidance and recommendations for the use of this report....1

1.4 Site location, description and survey conditions....2

1.5 Site history and archaeological potential....2

1.6 Geology and soils....3

2 METHODOLOGY....3

2.1 Technical synopsis....3

2.2 Equipment configuration, data collection and survey detail....4

2.3 Data processing and presentation....4

3 RESULTS....6

3.1 General assessment of survey results....6

3.2 Data quality and factors affecting the interpretation or formation of anomalies....6

3.3 Data interpretation....7

3.4 List of anomalies....7

4 CONCLUSION....9

5 REFERENCES....10

Appendix A – basic principles of magnetic survey....11

Appendix B – data processing notes....11

Appendix C – survey and data information....12

Appendix D – digital archive....12

Appendix E – CAD layers for abstraction and interpretation plots.....12

Appendix F – copyright and intellectual property.....13

LIST OF FIGURES

Fig 01 Map of survey area (1:25 000)

Fig 02 Referencing information (1:1000)

Fig 03 Greyscale plot of minimally processed magnetometer data & abstraction and interpretation of magnetic anomalies (1:1000)

LIST OF TABLES

Table 1: List and description of interpretation categories.....7

Table 2: Archive metadata.....12

Table 3: CAD layering.....13

SUMMARY

Detailed magnetometry was carried out by Archaeological Surveys Ltd over 1.8ha on land to the north of Wick Farm Cottage, Heddington Wick, Wiltshire, ahead of the development of a proposed outdoor horse arena in the south eastern corner of a field. Although a number of anomalies of archaeological origin were located, these are mainly confined to the northern edge of the site and include a number of linear ditches associated with a Roman road and further ditches, enclosures and pits and areas of burning. Further south there are two parallel linear anomalies that may have had some truncation by ridge and furrow, but their origin is uncertain. Within the development area, in the south eastern part of the site, there is evidence for ground make-up but a lack of any other clearly defined anomalies that can be defined as having archaeological potential.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Mr Nick Hodder to undertake a magnetometer survey of an area of land to the rear of Wick Farm Cottage, Wick Farm, Wiltshire. The south eastern corner of a field has been outlined for a proposed development of an outdoor horse arena (Wiltshire planning application no: PL2022/02575) and a wider survey of the whole field was carried out in order to place anomalies in context.

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 the construction of the outdoor horse arena. 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 Archaeological Surveys Ltd is a Registered Organisation with the Chartered Institute for Archaeologists and both company directors are Members of the Chartered Institute for Archaeologists (MCIfA) and have therefore been assessed for their technical competence and ethical suitability and abide by the CIfA Codes of Conduct. The survey and report 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, updated 2020) *Standard and Guidance for Archaeological Geophysical Survey.*

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 within a pasture field to the north of Wick Farm Cottage, Heddington Wick, Heddington, Wiltshire. It is centred on Ordnance Survey National Grid Reference (OS NGR) ST 98180 67110, see Figs 01 and 02.

1.4.2 The geophysical survey covers approximately 1.8ha within a single pasture field. The proposed horse arena is within the south eastern corner of the field, adjacent to a recently constructed barn. The land is generally level at approximately 100m AODN.

1.4.3 The ground conditions across the site were considered to be favourable for the collection of magnetometry data. Weather conditions during the survey were cold but mainly dry.

1.5 Site history and archaeological potential

1.5.1 The northern edge of the site is associated with the Wansdyke and Roman road between Speen and Bath (Margary 53, 1955). The Wansdyke is a scheduled monument (List Entry no: 1003785) 600m to the east and the

Roman road is a scheduled monument 1600m to the west north west (List Entry no: 1003010). A previous geophysical survey on land immediately to the west identified anomalies relating to a continuation of the Roman road, along with overlying enclosures and ditches as well as later field boundary ditches (Archaeological Surveys, 2015). There is a high potential for these features to continue into the survey area; however, the proposed location for the new horse arena is at least 120m to the south of the location of the Roman road.

1.6 Geology and soils

1.6.1 The underlying geology is sandstone from the Lower Greensand Group (BGS, 2022).

1.6.2 The overlying soil across the site is from the Fyfield 4 association (571g) and is a typical argillic brown earth. It consists of a deep, well drained, often stoneless, coarse, loamy and sandy soil (Soil Survey of England and Wales, 1983).

1.6.3 Magnetometry carried out over similar geology and soil has produced good results. The site is, therefore, considered suitable 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 magnetic 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 positive magnetic anomalies that can be mapped by magnetic prospection. In addition, where soil is displaced by material of comparatively low magnetic susceptibility, such as many types of sedimentary rock, anomalies of negative value may occur which could be indicative of structural remains.

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 measurement range of ±8000nT, although the recorded range is ±3000nT, and resolution is approximately 0.1nT. They are linked to a Leica GS10 RTK GNSS with data recorded by SENSYS MonMX software on a rugged notebook 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.

2.3.3 The minimally processed data are collected between limits of ±3000nT 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 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.

2.3.5 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. 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.

2.3.6 The raster images are combined with base mapping using ProgeCAD Professional 2021, creating DWG (2018) 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.

2.3.7 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.

2.3.8 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.

2.3.9 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 1.8ha within a single pasture field.

3.1.2 Magnetic anomalies located can be generally classified as positive and negative responses of archaeological potential, positive and negative anomalies of an uncertain origin, anomalies associated with land management, linear anomalies of an agricultural origin, areas of magnetic debris and disturbance, 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 Data quality and factors affecting the interpretation or formation 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 Localised zones of magnetic debris and disturbance were located and these have the potential to obscure weaker anomalies. The main zone affected is immediately adjacent to the barn at the southern end of the field and a linear zone to the north of the barn representing an infilled boundary ditch. However, the majority of the area of the proposed horse arena is free of magnetic disturbance, with the exception of a narrow linear band of magnetic debris running through the centre of it and associated with the infilled boundary ditch.

3.2.3 Anomalies of archaeological potential at the northern end of the field appear to infer moderate to strong magnetic contrast between the natural soil or underlying geology and the fill of former cut features. The results indicate good conditions for magnetometry.

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	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. They often occur where there has been dumping or ground make-up and are 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, hearths and nail spreads from former wooden structures or rooves 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	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 398180 167110, see Fig 03.

Anomalies of archaeological potential

(1) – Two parallel positive linear anomalies, spaced 7m apart are situated in the northern part of the field and relate to former Roman roadside ditches. Internally there is some negative response which could indicate the remains of a former road

surface.

(2) – Positive linear and rectilinear anomalies relate to ditches forming a series of small enclosures parallel with and orthogonal to ditches (1). Further negative responses could relate to surfaces or walling/banks.

(3) – A small number of discrete positive anomalies have a response of over 40nT which suggests an association with burning such as a hearth, oven or industrial activity.

(4) – Discrete positive anomalies (3-7nT) are responses to the magnetically enhanced fill of pits.

Anomalies with an uncertain origin

(5) – The northern part of the site contains a number of weakly positive and negative linear and curvilinear anomalies. There is a lack of a coherent morphology preventing confident interpretation, but there is potential that they could relate to archaeological features.

(6) – An oval area of magnetic enhancement is situated in the central northern part of the site. This type of anomaly could relate to a naturally formed feature.

(7) – Two parallel linear anomalies are located in the southern half of the field. They are 17m long and 1.2m apart with the eastern anomaly a continuous linear feature and the western appearing as a line of fragmented anomalies. The eastern anomaly is also more enhanced at 9-15nT compared to the western one at generally 2-6nT. They appear to relate to cut features, but their date and function is uncertain. It is possible that the fragmentation has been caused by truncation by ridge and furrow, indicating that they may pre-date it.

(8) – A line of discrete, pit-like anomalies can be seen in the central, eastern part of the site. Some have a dipolar response associated with ferrous or other magnetically thermoremnant material. It is not clear if they relate to archaeological features or have a modern origin.

(9) – A number of positive and negative linear anomalies, as well as a discrete positive response are located towards the south western part of the site. They are weak and poorly defined and it is not possible to determine their origin.

Anomalies associated with land management

(10) – A positive linear anomaly is located in the central eastern part of the site, and it relates to a former boundary feature. As it extends westwards there is a response to magnetic debris, indicating that is has been filled with ferrous and other magnetically thermoremnant material, such as brick/tile in more recent times.

Anomalies with an agricultural origin

(11) – Parallel linear anomalies relate to former ridge and furrow.

Anomalies associated with magnetic debris

(12) – A linear zone of magnetic debris in the southern part of the site relates to ferrous and other magnetically thermoremnant material used to infill a former boundary ditch. Other patches of magnetic debris are also evident adjacent to the newly constructed barn.

(13) – Strong, discrete, dipolar anomalies are a response to ferrous and other magnetically thermoremnant objects within the topsoil.

Anomalies with a modern origin

(14) – Magnetic disturbance in the southern part of the site is a response to the adjacent barn.

4 CONCLUSION

4.1.1 The geophysical survey located a number of anomalies of archaeological potential within the northern part of the site. These include parallel Roman roadside ditches, with additional ditches, enclosures, pits and areas of burning. In the central eastern part of the site are two parallel linear anomalies, one of which is fragmented possibly due to truncation by ridge and furrow. Elsewhere there are a number of weakly positive and negative anomalies, but these tend to lack any coherent morphology. In the south eastern part of the site, outlined for the proposed horse arena, there is some evidence for ground make-up and infill but no anomalies that can be clearly defined as of archaeological potential.

5 REFERENCES

Archaeological Surveys, 2015. *Wick Farm, Heddington Wick, Wiltshire, Magnetometer Survey Report.* Ref J605. Unpublished typescript document.

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

British Geological Survey, 2022. *Geology Viewer, [online]* available from https://geologyviewer.bgs.ac.uk [accessed 3/1/2023].

Chartered Institute for Archaeologists, 2014 (updated 2020). *Standard and Guidance for archaeological geophysical survey*. CIfA, University of Reading.

European Archaeological Council, 2015. *EAC Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider.* Europae Archaeologia Consilium and Association Internationale sans But Lucratif, Belgium.

Historic England, 2018. Geophysical Survey Advice [online] available from https://historicengland.org.uk/advice/technical-advice/archaeological-science/geophysics/ [accessed July 2018].

Institute for Archaeologists, 2002. *The use of Geophysical Techniques in Archaeological Evaluations*. IfA Paper No. 6. IfA, University of Reading.

Schmidt, A., 2013. *Geophysical Data in Archaeology: A Guide to Good Practice.* Oxbow Books.

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 5 South West England.*

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.

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

Filename: J945-mag-proc.xcp
Description: Imported as Composite from: J945-mag.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 398123.75, 167199.02 m
Southeast corner: 398233.25, 167016.02 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702

Dimensions
Survey Size (meters): 110 m x 183 m
X&Y Interval: 0.15 m
Source GPS Points: Active: 498976, Recorded: 498981
Stats
Max: 3.32
Min: -3.30
Std Dev: 1.12
Mean: 0.04
Median: 0.01
Composite Area: 2.0039 ha

Surveyed Area: 1.6981 ha

PROGRAM
Name: TerraSurveyor
Version: 3.0.37.0
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (UTM 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.

A PDF copy will be supplied to the Wiltshire Historic Environment Record with greyscale images and abstraction layers made available on request. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS).

Archive contents:

File type	Naming scheme	Description
Data	J945-mag-**[area number/name]**.asc J945-mag-**[area number/name]**.xcp J945-mag-**[area number/name]**-proc.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data
Graphics	J945-mag-**[area number/name]**-proc.tif	Image in TIF format
Drawing	J945-**[version number]**.dwg	CAD file in 2018 dwg format
Report	J945 report.odt	Report text in LibreOffice 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 LINEAR ROADSIDE DITCH		204,102,102	Polyline or polygon (solid)
AS-ABST MAG NEG ROMAN ROAD SURFACE		204,102,102	Polygon (hatched ANSI38)
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 STRONG POS ARCHAEOLOGY		Magenta 255,0,255	Polyline or polygon (solid)
AS-ABST MAG NEG LINEAR ARCHAEOLOGY		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 NEG LINEAR UNCERTAIN	Blue 0,0,255	Line, polyline or polygon (solid)
AS-ABST MAG POS DISCRETE UNCERTAIN	255,127,0	Solid donut, point or polygon (solid)
AS-ABST MAG POS UNCERTAIN	255,127,0	Polygon (cross hatched ANSI37)
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 RIDGE AND FURROW	0,127,63	Line, polyline or polygon (cross hatched ANSI37)
Anomalies associated with magnetic debris		
AS-ABST MAG DEBRIS	132, 132, 132	Polygon (cross hatched ANSI37)
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)

Table 3: CAD layering

Appendix F – copyright and intellectual property

This report may contain material that is non-Archaeological Surveys Ltd copyright (eg Ordnance Survey, Crown Copyright) or the intellectual property of third parties, which we are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Archaeological Surveys Ltd. Users remain bound by the conditions of the Copyright, Design and Patents Act 1988 with regard to multiple copying and electronic dissemination of this report.

Archaeological Surveys Ltd shall retain intellectual property rights for the materials and records created as part of this project. A non-exclusive and royalty-free licence shall be granted to the client on full payment of works in order for them to use, reproduce and enhance the reports, documentation, graphics and illustrations produced as part of this project for the purpose for which they were commissioned.

A non-exclusive licence will also be granted to the local authority for planning use and within the Historic Environment Record for public dissemination upon payment by the client.

Please note that a non-exclusive licence does not transfer full copyright which remains with Archaeological Surveys Ltd. A non-exclusive licence also does not allow the licensee to pass on usage rights to third parties.

Any document produced to meet planning requirements may be freely copied for planning, development control, research and outreach purposes without recourse to the originator, subject to all due and appropriate acknowledgements being provided and to the terms of the original contract with the client. Archaeological Surveys Ltd shall retain the right to be identified as the author and originator of the material.

The report, data and any associated material produced by Archaeological Surveys Ltd cannot be freely used for any commercial activity other than those set out above. Any unauthorised use will be considered to be in breach of copyright including the use of graphic items by third parties unless an additional non-exclusive licence has been granted by Archaeological Surveys Ltd.

Title of Goods remains with Archaeological Surveys Ltd until payment has cleared. Late payment may jeopardise any planning decision as there will be no transfer of title, licensing or any other right of copy or use of this report. Archaeological Surveys Ltd do not give permission for use of the report and associated data in cases of late payment. Any such use will be considered to be in breach of copyright. Late payment may also incur interest at 8% over the Bank of England base rate. Non-payment will be pursued by legal action.

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

Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land to the rear of Wick Farm Cottage
Heddington Wick
Wiltshire

Map of survey area

Survey location

Site centred on OS NGR
ST 98180 67110

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 01

Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land to the rear of Wick Farm Cottage
Heddington Wick
Wiltshire

Referencing information

398050 398100 398150 398200 398250 398300

167200 167150 167100 167050 167000 166950

N

Barn

Stables

Wick Farm Cottage

Referencing grid to OSGB36 datum at 50m intervals

398200 167050

Survey tracks

Survey track start

Survey track stop

SCALE 1:1000

0m 10 20 30 40 50m

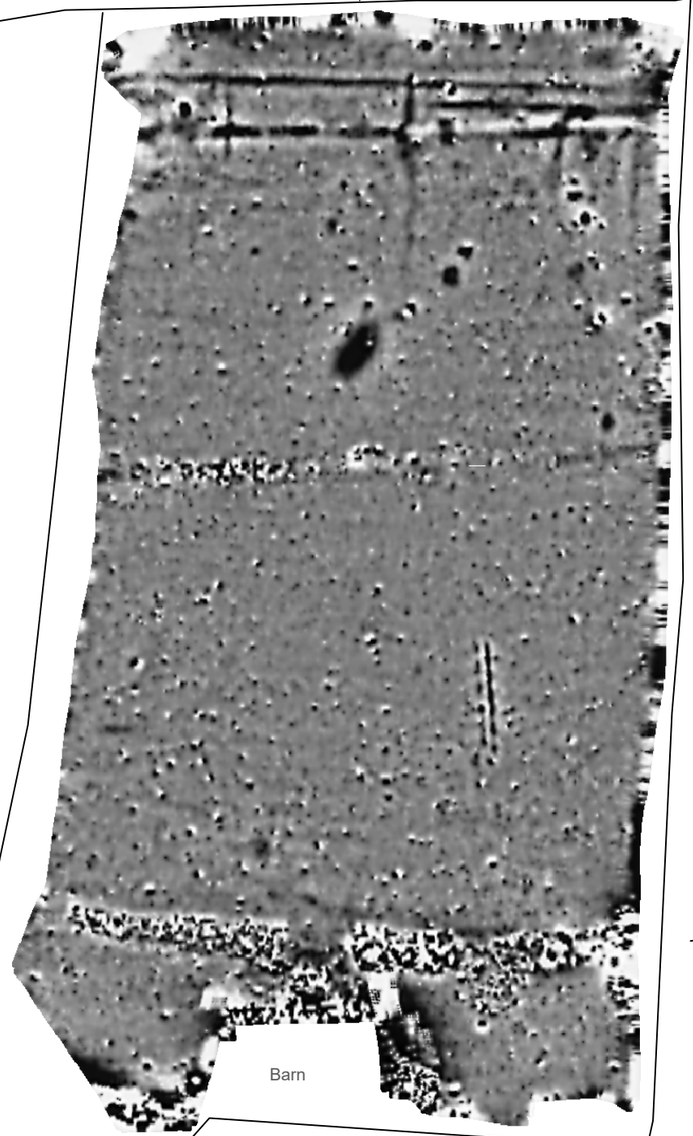
SCALE TRUE AT A3

DRAWN BY	CHECKED BY	
KTD	DJS	FIG 02

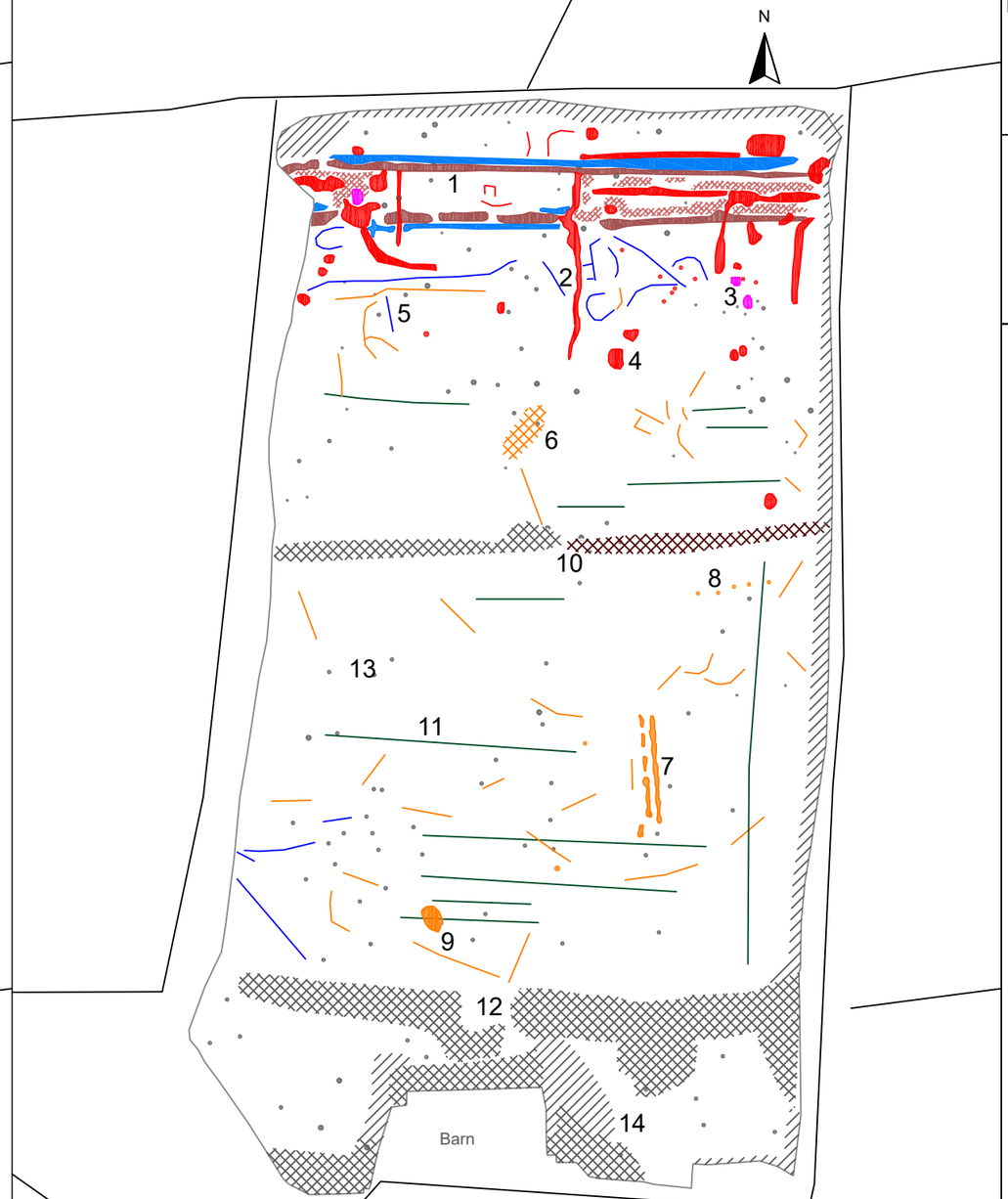
Archaeological Surveys
Specialist Geophysical Surveyors

Geophysical Survey
Land to the rear of Wick Farm Cottage
Heddington Wick
Wiltshire

Greyscale plot of processed magnetometer data



Abstraction & interpretation of magnetic anomalies



Greyscale plot of processed magnetometer data & abstraction & interpretation of magnetic anomalies

- Positive linear anomaly - Roman roadside ditch
- Positive linear anomaly - cut feature of archaeological potential
- Negative linear anomaly - of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - material of low magnetic susceptibility
- Linear anomaly - ridge and furrow
- Discrete positive response - cut feature of archaeological potential
- Strong discrete response - associated with intense burning
- Discrete positive response - possible pit-like feature
- Negative anomaly - Roman road surface
- Positive linear anomaly - former field boundary
- Positive anomaly - magnetically enhanced material
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- 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 03