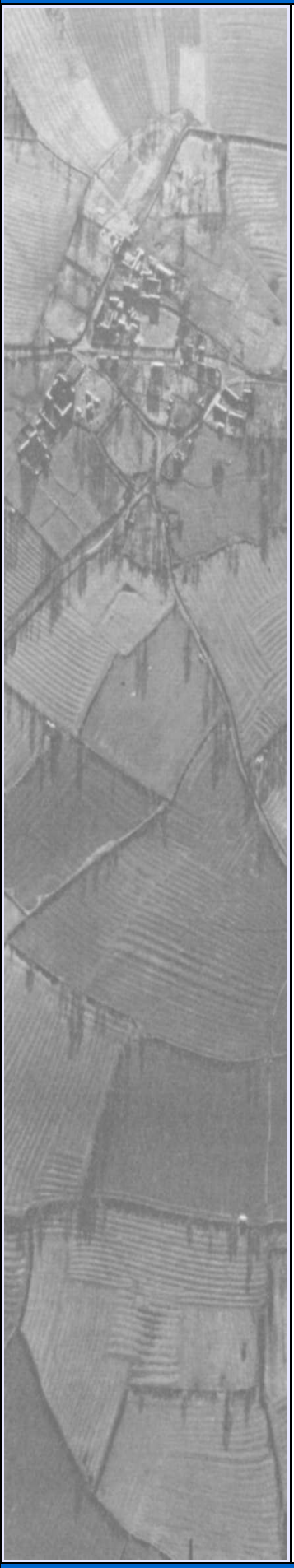

Proposed cable route
South Marston
Swindon

MAGNETOMETER SURVEY REPORT

for

AEE Renewables plc

David Sabin and Kerry Donaldson

May 2012

Ref. no. 409

ARCHAEOLOGICAL SURVEYS LTD

Proposed cable route
South Marston
Swindon

Magnetometer Survey

for

AEE Renewables plc

Fieldwork by David Sabin
Report by David Sabin BSc (Hons) MIFA and Kerry Donaldson BSc (Hons)

Survey date **– 16th and 29th May 2012**
Ordnance Survey Grid Reference – **SU 200 884**

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SUMMARY

Magnetometry was carried out by Archaeological Surveys Ltd for AEE Renewables plc along the route of a proposed electricity cable at South Marston to the east of Swindon. The cable is required to link solar photovoltaic arrays at Roves Farm, Sevenhampton with arrays to the north of South Marston. Magnetometry carried out at both of these sites revealed widespread evidence of prehistoric and Romano-British occupation.

A survey corridor across land at Sevor Farm, approximately 800m long and 30m wide, was chosen to avoid known archaeological features, discovered by previous magnetometry, just beyond both ends of the cable route. The results demonstrated the presence of only a small number of anomalies of uncertain origin that may represent former cut features. Several discrete positive anomalies were located, possibly indicative of pit-like features, the largest approximately 3.5m in diameter. Many anomalies appear to relate to former agricultural cultivation, including ridge and furrow. Towards the western end of the cable route, magnetic debris is associated with a demolished barn, once part of Marston Farm, later Old Farm.

Further survey was conducted in the central part of the South Marston solar array site (Areas 4 and 5) so as to provide an assessment of the archaeological potential of an area where the cable will cross. Within Area 4 the survey located a further ring-ditch which is associated with a previously discovered enclosure and other ring-ditches. In Area 5, positive linear and curvilinear anomalies link to anomalies discovered by previous magnetometry immediately to the north east.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by AEE Renewables plc to undertake magnetometry over areas of land at Sevor Farm, to the east of South Marston, Swindon and within solar arrays to the north east of South Marston village. The survey covers the proposed route for an underground electricity cable linking arrays of photovoltaic panels. The survey forms part of an archaeological assessment of the site.

1.1.2 The surveyed area forms a 30m wide corridor linking previous magnetometry carried out for solar arrays at Roves Farm, Sevenhampton (Archaeological Surveys, 2010 and 2011a) and arrays to the east of South Marston (Archaeological Surveys, 2011b). An additional area of survey within the centre of the South Marston site was requested in order to determine the most appropriate route for the cable.

1.2 Survey objectives and techniques

1.2.1 The aim of the survey is to inform decision-making as to further archaeological evaluation work and/or archaeological mitigation as part of the planning permission process, in line with the requirements of Planning Policy Statement (PPS) 5 policy HE6.1.

1.2.2 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 ground intrusion associated with the laying of an electricity cable.

1.2.3 The methodology is considered an efficient and effective approach to archaeological prospection. The survey and report generally follow the recommendations set out by: English Heritage, 2008, *Geophysical survey in archaeological field evaluation;* Institute for Archaeologists, 2002, *The use of Geophysical Techniques in Archaeological Evaluations*.

1.3 Site location, description and survey conditions

1.3.1 The site is located on land at Sevor Farm, South Marston, Swindon and within solar arrays to the north east of South Marston village. Central Ordnance Survey National Grid References (OS NGR) are SU 200 884 and SU 193 884 see Figures 01 and 02.

1.3.2 The geophysical survey within Sevor Farm covers approximately 2.4ha of agricultural land within two fields and split into three separate areas for the purposes of this report. The western part of the cable route is orientated east – west and crosses a field boundary (Areas 1 and 2). The eastern part is orientated south west to north east (Area 3). The western field contained a tall barley crop whilst the eastern field had no ground cover and was flat, weathered soil.

1.3.3 Within the South Marston solar array, Areas 4 and 5 cover approximately 1ha of land within the centre of the site, located immediately south of previously surveyed areas (Areas 1 and 2, Archaeological Surveys, 2011b). The areas include two separate fields with patchy grass and self-set wheat. Several large skips were located in the survey areas.

1.3.4 The ground conditions across the majority of the site were generally considered to be favourable for the collection of magnetometry data, although difficult traversing was encountered in Area 1 . Weather conditions during the survey were fine.

1.4 Site history and archaeological potential

1.4.1 The Wiltshire Sites and Monuments Record (SMR) lists a number of archaeological sites and findspots in the immediate vicinity of the site. These

include undated enclosures and a ring-ditch to the north, and Iron Age ditches and pits to the west within the Honda Car plant. Within the eastern field, the SMR lists an undated pit alignment north west of Nightingale Farm (SMR no. SU28NW611).

1.4.2 Previous magnetometer surveys carried out within Roves Farm, just beyond the north eastern limit of the cable route, located a number of enclosures, ditches, pits, trackways and ring ditches that appear to relate to Iron Age and Roman settlement (Archaeological Surveys, 2010 and 2011a). Magnetometry was also carried out to the north east of South Marston village (Archaeological Surveys, 2011b) and this revealed widespread archaeological features probably representing prehistoric and Roman occupation.

1.4.3 A basic analysis and assessment of Ordnance Survey mapping at 1:2500 and 1:10000, dating from the late 19th century, was carried out. Area 1 crosses part of the now completely demolished Marston Farm referred to by 1925 as Old Farm. A number of separate buildings and an orchard were mapped up until about 1960 but by 1970 just a single building remained, probably a simple barn. By 1993, on the 1:10000 mapping the building appears to have gone, although it is still mapped on the current 1:25000 series.

1.4.4 The archaeological potential of areas immediately adjacent to the survey zones is exceptionally high as revealed by the previous magnetometry. The archaeological features revealed by the geophysics were unknown prior to the survey and the proposed cable route may reveal associated or additional archaeological remains.

1.5 Geology and soils

1.5.1 The underlying geology is part of the Stanford Formation of the Corallian Group (BGS, 2011). The overlying soils are from the Sherborne association which are brown rendzinas. These consist of shallow, well-drained, brashy, calcareous, clayey soils formed over limestone (Soil Survey of England and Wales, 1983).

1.5.2 Magnetometry in adjacent areas has demonstrated very good results. The soils and underlying geology are considered very effective for magnetic prospection.

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 Bartington Grad 601-2 gradiometer. The instrument effectively measures a magnetic gradient between two fluxgate sensors mounted vertically 1m apart. Two sets of sensors are mounted on a single frame 1m apart horizontally.

2.2.2 The instrument is extremely sensitive and is able to measure magnetic variation to 0.01nanoTesla (nT), with an effective resolution of 0.03nT. The data are limited to ±100nT when surveying with the highest sensitivity. All readings are saved to an integral data logger for analysis and presentation.

2.2.3 The instrument is operated according to the manufacturer's instructions with consideration given to the local conditions. An adjustment procedure is required, prior to collection of data, in order to balance the sensors and remove the effects of the Earth's magnetic field; further adjustment is required during the survey due to instrument drift often associated with temperature change.

2.2.4 It can be very difficult to obtain optimum balance for the sensors due to localised magnetic vectors that may be associated with large ferrous objects, geological/pedological features, 'magnetic debris' within the topsoil and natural temperature fluctuations. Imperfect balance results in a heading error often visible as striping within the data; this can be effectively removed by software processing and generally has little effect on the data unless extreme.

2.2.5 The Bartington gradiometer undergoes regular servicing and calibration by the manufacturer. A current assessment of the instrument is shown in Table 1 below.

Sensor type and serial numbers	Bartington Grad - 01 – 1000 Nos. 084, 085
Date of certified calibration/service	Sensors 084 and 085 - 6th August 2010 (due Aug 2012)
Bandwidth	12Hz (100nT range) both sensors
Noise	<100pT peak to peak
Adjustable errors	<2nT

Table 1: Bartington fluxgate gradiometer sensor calibration results

The instrument was considered to be in good working order prior to the survey, with no known faults or defects.

2.2.6 Data were collected at 0.25m centres along traverses 1m apart. The survey area was separated into 30m by 30m grids (900m²) giving 3600 recorded measurements per grid. This sampling interval is very effective at locating archaeological features and is the recommended methodology for archaeological prospection (English Heritage, 2008).

2.2.7 The survey grids were set out to the Ordnance Survey OSGB36 datum using a Penmap RTK GPS. The GPS is used in conjunction with Leica's SmartNet service, where positional corrections are sent via a mobile telephone link. Positional accuracy of around 10 – 20mm is possible using the system. The instrument is regularly checked against the ETRS89 reference framework using Ordnance Survey ground marker C1ST7784 (Horton).

2.3 Data processing and presentation

2.3.1 Magnetometry data downloaded from the Grad 601-2 data logger are analysed and processed in specialist software known as ArcheoSurveyor. The software allows greyscale and trace plots to be produced for presentation and display. Survey grids are assembled to form an overall composite of data (composite file) creating a dataset of the complete survey area. Appendix C contains specific information concerning the survey and data attributes and is derived directly from ArcheoSurveyor; this should be used in conjunction with information provided by Figure 02.

2.3.2 Only minimal processing is carried out in order to enhance the results of the survey for display. Raw data are always analysed, as processing can modify anomalies. The following schedule sets out the data and image processing used in this survey:

- clipping of processed data at ±3nT to enhance low magnitude anomalies,
- zero median/mean traverse is applied in order to balance readings along each traverse.

Reference should be made to Appendix B for further information on the specific processes carried out on the data. Appendix C metadata includes details on the processing sequence used for each survey area.

2.3.3 An abstraction and interpretation is offered for all geophysical anomalies located by the survey. 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.

2.3.4 The main form of data display prepared for this report is the processed greyscale plot. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.

2.3.5 Graphic raster images in bitmap format (.BMP) are initially prepared in ArcheoSurveyor. Regardless of survey orientation, data captured along each traverse are displayed and processed by ArcheoSurveyor from left to right. Prior to displaying against base mapping, raster graphics require a rotation to restore north to the top of the image.

2.3.6 The raster images are combined with base mapping using ProgeCAD Professional 2009 and AutoCAD LT 2007, creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. Quality can be compromised by rotation of graphics in order to allow the data to be orientated with respect to grid north; this is considered acceptable as the survey results are effectively georeferenced allowing relocation of features using GPS, resection method etc.

2.3.7 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 5 survey areas covering approximately 3.4ha.

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

3.2 Statement of data quality

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

3.2.2 The presence of large steel skips within Areas 4 and 5 produced significant magnetic disturbance which has the potential to obscure lower magnitude anomalies. However, the data reveal no anomalies of archaeological potential surrounding or in the immediate vicinity of the disturbance.

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 for each survey area.

Report sub-heading CAD layer names and plot colour	**Description and origin of anomalies**
Anomalies with archaeological potential AS-ABST MAG POS LINEAR ARCHAEOLOGY AS-ABST MAG POS CURVILINEAR RING DITCH	Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as pits, ring ditches, enclosures, etc..
Anomalies with an uncertain origin AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN AS-ABST MAG POS AREA UNCERTAIN AS-ABST MAG NEG LINEAR 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 AGRICULTURAL 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 	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.

Table 2: List and description of interpretation categories

3.4 List of anomalies - Area 1

Area centred on OS NGR 419725 188465, see Figures 03 & 04.

Anomalies with an uncertain origin

(1) – Very weak positive linear anomalies of uncertain origin. It is possible that they have been caused by agricultural activity.

Anomalies with an agricultural origin

(2) – The survey area is crossed by several weak, broad, positive linear anomalies that probably represent former ridge and furrow cultivation.

(3) – Linear anomalies at the boundary of recent cultivation.

Anomalies associated with magnetic debris

(4) – Widespread magnetic debris in the western half of the survey area is of modern origin and may relate to a recently removed barn and former Marston Farm.

(5) – Discrete dipolar anomalies indicate shallow ferrous objects likely to be modern in origin.

3.5 List of anomalies - Area 2

Area centred on OS NGR 419935 188465, see Figures 03 & 04.

Anomalies with an uncertain origin

(6) – A possible pit-like feature approximately 3.5m in diameter. The anomaly is not strongly enhanced, peaking at <7nT.

(7) – A discrete positive anomaly that may indicate a pit-like feature.

(8) – A positive linear anomaly at the extreme north western corner of the survey area is likely to extend beyond the limit of the survey. The anomaly may relate to a feature of agricultural origin.

(9) – A weak, amorphous positive anomaly of uncertain origin. It may indicate made ground although it could be natural in origin.

Anomalies with an agricultural origin

(10) – Cultivation marks cross the survey area with an east - west orientation.

3.6 List of anomalies - Area 3

Area centred on OS NGR 420141 188582, see Figures 03 & 04.

Anomalies with an uncertain origin

(11) – Several small, discrete positive anomalies located towards the north eastern end of the survey area. It is possible that they relate to pit-like features.

Anomalies with an agricultural origin

(12) – Generally weak, positive linear anomalies probably reflect the orientation and position of former ridge and furrow cultivation. The anomalies are narrow and may have been caused by land drains placed into the former furrows.

(13) – Modern cultivation marks.

Anomalies associated with magnetic debris

(14) – Strong dipolar anomalies indicative of shallow ferrous objects.

3.7 List of anomalies - Area 4

Area centred on OS NGR 419263 188513, see Figures 05 & 06.

Anomalies of archaeological potential

(15) – A positive curvilinear anomaly relates to a ring-ditch with an internal diameter of approximately 11m. It is likely that this is a response to the fill within a drip gully of a round house. A central discrete anomaly may relate to an area of burning, such as a hearth.

Anomalies with an uncertain origin

(16) – A negative linear anomaly close to the southern edge of the survey area. This is the response to material with low magnetic susceptibility such as sub soil or a plastic pipe; however, it is broadly parallel with ridge and furrow (magnetic anomalies – not extant) and may, therefore, have an agricultural origin.

Anomalies with an agricultural origin

(17) – A positive linear anomaly extends across the northern part of the survey area, partially crossing anomaly (15). This anomaly probably relates to former ridge and furrow, seen to the north during a previous magnetometer survey.

Anomalies with a modern origin

(18) – Magnetic disturbance has been caused by the presence of large skips within the survey area.

3.8 List of anomalies - Area 5

Area centred on OS NGR 419367 188457, see Figures 05 & 06.

Anomalies with an uncertain origin

(19) – Two positive curvilinear and one linear anomaly extend south westwards from anomalies located by previous magnetometry to the north. Although it is possible that these anomalies have an agricultural origin, the parallel and curving elements may suggest a possible trackway. Although of uncertain origin, there is therefore some potential for these anomalies to relate to archaeological features.

(20) – A positive curvilinear anomaly located close to the south western corner of the survey area. It is not possible to determine the origin of this anomaly.

Anomalies with an agricultural origin

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

Anomalies with a modern origin

(22) – Magnetic disturbance has been caused by the presence of a large skip within the survey area.

4 CONCLUSION

4.1.1 The results of the magnetometer survey demonstrate the presence of a number of anomalies within all the survey areas. Anomalies with archaeological potential were located in Area 4 with evidence for a ring ditch and possible hearth belonging to a round house. These anomalies are associated with similar found immediately to the north by previous magnetometry and relate to a possible prehistoric enclosure that contains evidence for settlement in the form of pits, internal divisions and at least one other ring ditch.

4.1.2 A large pit-like anomaly was located in the central part of Area 2, and although there are no associated features that would assist in its interpretation, an undated pit alignment is listed on the Wiltshire SMR with a grid reference approximately 200m to the east.

4.1.3 Magnetic debris in Area 1 relates to the former location of a barn at Marston Farm/Old Farm. The last remnants of any buildings associated with the farm appear to have been removed in the late 20th century based on map evidence. The debris probably indicates the presence of brick, tile and ferrous objects.

4.1.4 Areas 2 and 3 crossed open soil providing very good conditions for surface observations. A small number of abraded Romano-British pottery sherds were visible and were considered likely to represent residual material, incorporated into the soil during agricultural activity within the vicinity of habitation sites. Occasional worked flints were also noted.

4.1.5 Area 5 contained evidence for the continuation of linear anomalies found during previous magnetometry immediately to the north. The anomalies have parallel and curvilinear elements, suggesting cut features or a possible trackway. It is unclear as to whether they are of archaeological potential.

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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 gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 1m apart. The instrument is carried about 30cm 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. If no enhanced feature is present the field measured by both sensors will be similar and the difference close to zero.

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 ±1nT 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 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 slight differences between the set-up and stability of gradiometer sensors and can remove striping. The process can remove archaeological features that run along a traverse so data analysis is also carried out prior its application.

De-stagger

Compensates for small positional errors within data collection by shifting the position of the readings along each traverse by a specified amount. Data lost at the end of each traverse are extrapolated from adjacent value in the same row.

Deslope

Corrects for striping and distortion caused by metal objects/services etc.. The process calculates a curve based on a polynomial best fit mathematical function for each traverse. This curve is then subtracted from the actual data.

Edge Match

Calculates the mean of the 2 lines (rows or columns) of data either side of the edge to match. It then subtracts the difference between the means from all datapoints in the selected area.

FFT (Fast Fourier Transform) spectral filtering

A mathematical process used to determine the frequency components of a traverse. Repetitive features, such as plough marks, produce characteristic spectral zones that can be suppressed allowing greyscale images to appear clearer.

Appendix C – survey and data information

Area 1 magnetometry

COMPOSITE
Filename: J409-mag-Area1.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: DJS on 16/05/2012
Assembled by: DJS on 16/05/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 120 x 210
Survey Size (meters): 30.00m x 210.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 100.00
Min: -100.00
Std Dev: 4.08
Mean: -0.38
Median: -0.52
Composite Area: 0.63 ha
Surveyed Area: 0.50 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 1
1 Base Layer

Source Grids: 7
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:0 Row:2 grids\03.xgd
4 Col:0 Row:3 grids\04.xgd
5 Col:0 Row:4 grids\05.xgd
6 Col:0 Row:5 grids\06.xgd
7 Col:0 Row:6 grids\07.xgd

Area 1 processing

Processes: 3
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -3.00 to 3.00 nT

Area 2 magnetometry

COMPOSITE
Filename: J409-mag-Area2.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: DJS on 16/05/2012
Assembled by: DJS on 16/05/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 120 x 240
Survey Size (meters): 30.00m x 240.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 99.63
Min: -100.00
Std Dev: 2.20
Mean: 0.25
Median: 0.17
Composite Area: 0.72 ha
Surveyed Area: 0.66 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 1
1 Base Layer

Source Grids: 8
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:0 Row:2 grids\03.xgd
4 Col:0 Row:3 grids\04.xgd
5 Col:0 Row:4 grids\05.xgd
6 Col:0 Row:5 grids\06.xgd
7 Col:0 Row:6 grids\07.xgd
8 Col:0 Row:7 grids\08.xgd

Area 2 processing

Processes: 3
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -3.00 to 3.00 nT

Area 3 magnetometry

COMPOSITE
Filename: J409-mag-Area3.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: DJS on 16/05/2012
Assembled by: DJS on 16/05/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 120 x 360
Survey Size (meters): 30.00m x 360.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 79.40
Min: -100.00
Std Dev: 1.70
Mean: -0.39
Median: -0.49
Composite Area: 1.08 ha
Surveyed Area: 1.05 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 1
1 Base Layer

Source Grids: 12
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:0 Row:2 grids\03.xgd
4 Col:0 Row:3 grids\04.xgd
5 Col:0 Row:4 grids\05.xgd
6 Col:0 Row:5 grids\06.xgd
7 Col:0 Row:6 grids\07.xgd
8 Col:0 Row:7 grids\08.xgd
9 Col:0 Row:8 grids\09.xgd
10 Col:0 Row:9 grids\10.xgd
11 Col:0 Row:10 grids\11.xgd
12 Col:0 Row:11 grids\12.xgd

Area 3 processing

Processes: 3
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -3.00 to 3.00 nT

Area 4 magnetometry

COMPOSITE
Filename: J409-mag-Area4.xcp
Description:
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: DJS on 29/05/2012
Assembled by: DJS on 29/05/2012
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 840 x 180
Survey Size (meters): 210.00m x 180.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 100.00
Min: -100.00
Std Dev: 19.44
Mean: 0.63
Median: -0.77
Composite Area: 3.78 ha
Surveyed Area: 0.46 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 1
1 Base Layer

Source Grids: 12
1 Col:0 Row:3 grids\11.xgd
2 Col:0 Row:4 grids\12.xgd
3 Col:1 Row:2 grids\07.xgd
4 Col:1 Row:3 grids\08.xgd
5 Col:1 Row:4 grids\09.xgd
6 Col:1 Row:5 grids\10.xgd
7 Col:2 Row:0 grids\01.xgd
8 Col:2 Row:1 grids\02.xgd
9 Col:2 Row:2 grids\03.xgd
10 Col:2 Row:3 grids\04.xgd
11 Col:2 Row:4 grids\05.xgd
12 Col:2 Row:5 grids\06.xgd

Area 4 processing

Processes: 14
1 Base Layer
2 DeStripe Median Traverse: Grids: 05.xgd
3 DeStripe Median Traverse: Grids: 04.xgd
4 DeStripe Mean Traverse: Grids: 03.xgd Threshold: 0.25 SDs
5 DeStripe Mean Traverse: Grids: 02.xgd Threshold: 0.5 SDs
6 DeStripe Median Traverse: Grids: 02.xgd
7 DeStripe Mean Traverse: Grids: 07.xgd Threshold: 0.5 SDs
8 DeStripe Mean Traverse: Grids: 08.xgd Threshold: 0.25 SDs
9 DeStripe Mean Traverse: Grids: 11.xgd Threshold: 0.25 SDs
10 DeStripe Mean Traverse: Grids: 12.xgd Threshold: 0.25 SDs
11 DeStripe Mean Traverse: Grids: 09.xgd Threshold: 0.25 SDs
12 DeStripe Mean Traverse: Grids: 10.xgd Threshold: 0.25 SDs
13 DeStripe Median Traverse: Grids: 10.xgd
14 Edge Match (Area: Top 120, Left 120, Bottom 149, Right 239) to Right edge

Area 5 magnetometry

COMPOSITE
Filename: J409-mag-Area5.xcp
Description:
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: DJS on 29/05/2012
Assembled by: DJS on 29/05/2012
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 600 x 150
Survey Size (meters): 150.00m x 150.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 100.00
Min: -100.00
Std Dev: 7.15
Mean: 1.59
Median: 0.77
Composite Area: 2.25 ha
Surveyed Area: 0.51 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 1
1 Base Layer

Source Grids: 12
1 Col:0 Row:4 grids\12.xgd
2 Col:1 Row:2 grids\09.xgd
3 Col:1 Row:3 grids\10.xgd
4 Col:1 Row:4 grids\11.xgd
5 Col:2 Row:0 grids\05.xgd
6 Col:2 Row:1 grids\06.xgd
7 Col:2 Row:2 grids\07.xgd
8 Col:2 Row:3 grids\08.xgd
9 Col:3 Row:0 grids\02.xgd
10 Col:3 Row:1 grids\03.xgd
11 Col:3 Row:2 grids\04.xgd
12 Col:4 Row:1 grids\01.xgd

Area 5 processing

Processes: 4
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Median Traverse: Grids: All
4 Clip from -3.00 to 3.00 nT

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at Castle Combe, Wiltshire (see inside cover for address). 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.

Surveys are reported on in hardcopy (recycled paper) using A4 for text and A3 for plots (all plots are scaled for A3). The distribution of both hardcopy report and digital data is considered the responsibility of the Client unless explicitly stated in the survey Brief, Written Scheme of Investigation or other contractual agreement.

This report has been prepared using the following software on a Windows XP platform:

- ArcheoSurveyor version 2.5.16.0 (geophysical data analysis),
- ProgeCAD Professional 2009 (report graphics),
- AutoCAD LT 2007 (report figures),
- OpenOffice.org 3.0.1 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

Digital data produced by the survey and report include the following files:

- ArcheoSurveyor grid and composite files for all geophysical data,
- CSV files for raw and processed composites,
- geophysical composite file graphics as Bitmap images,
- AutoCAD DWG files in 2000 and 2007 versions,
- report text as OpenOffice.org ODT file,
- report text as Word 2000 doc file,
- report text as rich text format (RTF),
- report text as PDF,
- PDFs of all figures.