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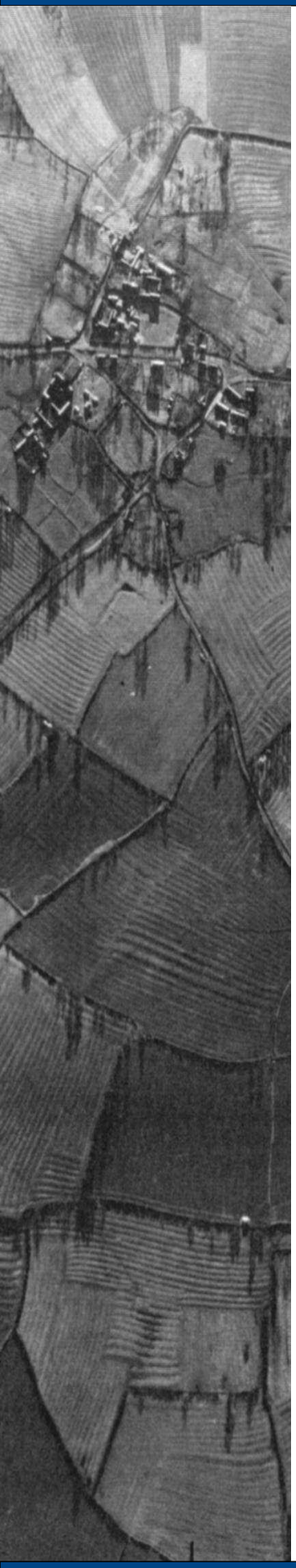

South Marston
Swindon

MAGNETOMETER SURVEY REPORT

for

AEE Renewables plc

David Sabin and Kerry Donaldson

April 2011

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ARCHAEOLOGICAL SURVEYS LTD

South Marston, Swindon

Magnetometer Survey

for

AEE Renewables plc

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Survey dates **- 19th to 28th April 2011**
Ordnance Survey Grid Reference - **SU 194 885**

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SUMMARY

A magnetometer survey was commissioned by AEE Renewables plc on land at South Marston, near Swindon. The site has been outlined for the proposed development of an array of photovoltaic solar panels.
The survey located evidence for at least five separate areas of archaeology, comprising of rectangular and sub-rectangular enclosures containing internal and external ring-ditches, rectangular enclosures, linear ditches and pits. Each survey area contained at least one enclosure, and in total an area of approximately 2.5ha contained archaeological features. The archaeology would be consistent with small, native farmsteads of prehistoric and Roman date.
Agricultural activity in the northern part of the site has disturbed some of the archaeological features, with ridge and furrow partially truncating linear ditches. Additional complexity is associated with widespread variable magnetic response associated with natural features.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by AEE Renewables plc to undertake a magnetometer survey of an area of land at South Marston to the east of Swindon. The site has been outlined for the proposed development of an array of photovoltaic solar panels.

1.2 Survey aims, 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 development of the site.

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;* and 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 to the north of South Marston, east of Swindon. It is centred on Ordnance Survey National Grid Reference (OS NGR) SU 19415 88555, see Figures 01 and 02.

1.3.2 The magnetometry covers an area of 16ha within four arable fields. Area 1, is located in the central part of the site, Area 2 is immediately to the west of Area 1, while Area 3 is immediately to the east. Area 4 lies to the south west of Areas 1 and 2. Areas 1 – 3 generally slope down gently towards the south and south west. Area 4 is mainly flat.

1.3.3 The ground conditions across Areas 1 - 3 were not considered to be favourable for the collection of magnetometry data due to a maturing arable crop. Weather conditions during the survey were dry and warm.

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 east, and Iron Age ditches and pits to the west within the Honda Car plant. Previous geophysical surveys carried out within Roves Farm , less than 700m to the north east, 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 2011).

1.5 Geology and soils

1.5.1 The underlying geology is varied across the site, with sandstone from the Hazelbury Bryan Formation and Kingston Formation, in Area 2, and the northern parts of Areas 1 and 3. The south eastern corners of Areas 1 and 3 (on the eastern part of the site) having underlying limestone from the Stanford formation, part of the Corallian beds of the Jurassic period. The western edge of Area 4, on the south western side of the site, has underlying ferruginous sandstone of the Red Down Sandstone Member, with a small area of Ampthill and Kimmeridge Clay underlying the central western part, and with overlying alluvium along the eastern edge of Area 4 (BGS, 2011).

1.5.2 The overlying soils in the north western part of the site are from the Burlesdon formation, which are stagnogleyic, argillic brown earths consisting of deep, fine, loamy soils with slight seasonal waterlogging. The overlying soils within the eastern part of the site are from the Sherborne association which are brown rendzinas. These consist of shallow, well-drained, brashy, calcareous, clayey soils formed over limestone. In the south western part of the site the overlying soils are from the Denchworth formation, which are pelo-stagnogley soils, consisting of slowly permeable, seasonally waterlogged clayey soils (Soil Survey of England and Wales, 1983).

1.5.3 Very sandy soil was noted at the northern end of the site as were a number of small ponds and pits. It is considered likely that sand from the Hazelbury Bryan formation has, in the past, been locally exploited for building and that the ponds and pits may represent episodic extraction.

1.5.4 Although there is a range of geologies and overlying soils, magnetometer surveys carried out over similar soils in the region have produced good results.

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 Bartington Grad601-2 gradiometers. The instruments effectively measure 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 instruments are extremely sensitive and are 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 instruments are 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 The Bartington gradiometers undergo 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, 242 and 396
Date of certified calibration/service	Sensors 084 and 085 - 6th August 2010 (due Aug 2012) Sensors 242 and 396 - 3rd December 2009 (due Dec 2011)
Bandwidth	12Hz (100nT range) both sensors
Noise	<100pT peak to peak
Adjustable errors	<2nT

Table 1: Bartington fluxgate gradiometer sensor calibration results

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

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

2.2.6 The survey grids were set out to the Ordnance Survey OSGB36 datum using a Penmap RTK GPS. The GPS is used in conjunction with Topcon's TopNet 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 the raw data at ±30nT to improve greyscale resolution,
- clipping of processed data at ±3nT to enhance low magnitude anomalies,
- de-stagger is used to enhance linear 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.

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 the survey area. Where further interpretation is possible, or where a number of possible origins should be considered, more subjective discussion is set out in Section 4.

2.3.4 The main form of data display used in this report is the greyscale plot. Both 'raw' and 'processed' data have been shown followed by an abstraction and interpretation 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 of` 90° anticlockwise to restore north to the top of th e image. Greyscale images are rotated by AutoCAD.

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.. A digital archive, including raster images, is produced with this report allowing separate analysis if necessary, see Appendix D below.

3 RESULTS

3.1 General overview

3.1.1 The detailed magnetic survey was carried out over 16ha. Geophysical anomalies located can be generally classified as positive linear and discrete positive responses of archaeological potential, positive anomalies of an uncertain origin, linear anomalies of an agricultural origin and strong discrete dipolar anomalies relating to ferrous objects Anomalies have been numbered and are described below with subsequent discussion in Section 4.

3.1.2 Data are considered to be representative of the magnetic anomalies across the site. Some minor positional errors were corrected by data processing, it is likely that these were a consequence of uneven surfaces.

3.1.3 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 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 RIDGE AND FURROW	The anomalies are often linear and form a series of parallel responses. 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 with a natural origin AS-ABST MAG NATURAL FEATURES	Naturally formed magnetic anomalies are are caused by localised variability in the magnetic susceptibility of soils, subsoils and other drift or solid geologies. Anomalies may be amorphous, linear or curvilinear and may appear 'fluvial' or discrete; the latter are almost impossible to distinguished from pit-like anomalies with an anthropogenic origin. Fluvial, glacial and periglacial processes may be responsible for their formation within drift material and subsoil. Igneous and metamorphic activity can lead to anomalies within more solid geology.

Table 2: List and description of interpretation categories

3.2 List of anomalies - Area 1 (central field)

Area centred on OS NGR 419450, 188545, see Figures 04 – 07.

Anomalies of archaeological potential

(1) Positive linear anomalies appear to form two, and potentially three sides of a sub-rectangular enclosure in the northern part of the field. This contains further positive linear and discrete anomalies (2), but has also been affected by later ridge and furrow (8) and strong magnetic anomalies (4).

(2) – Positive linear and discrete anomalies appear to form internal enclosures, ditches and pits within the confines of anomaly (1).

Anomalies with an uncertain origin

(3) – A very strongly magnetic response from an amorphous pit-like anomaly. This is located on the corner of anomalies (1) and may relate to a cut feature with archaeological potential.

(4) – The northern part of the survey area contains numerous amorphous pit-like anomalies. It is not possible to confidently interpret these anomalies due to their complex natural morphology. It appears that pits or depressions within the sandy soils have the ability to become magnetically enhanced, and it is possible that they relate to archaeological features that have subsequently been affected by the ridge

and furrow system of cultivation. It is, however, possible that they relate to magnetically enhanced natural features within the soils.

(5) – In the southern part of the survey area there are several weakly positive linear anomalies. Although it is possible that they relate to cut ditch-like features with some archaeological potential, it should be noted that they are parallel with the western and southern field boundaries, and an agricultural origin is possible.

(6) - A positive linear anomaly extends along the southern edge of the survey area. Although this response is extremely weak, due to its position and orientation it is possible that it is a continuation of the archaeological feature (27) within Area 3.

(7) – In the northern part of the survey area are a series of parallel weakly positive linear anomalies. It is possible that they have been caused by agricultural activity.

Anomalies with an agricultural origin

(8) – A series of parallel linear anomalies within the northern part of the survey area, are a response to former ridge and furrow. The negative linear anomalies, in this case, relate to the former furrows that have partially truncated the underlying archaeological features. It also appears that the archaeology and other pit-like anomalies have been partially disturbed by, but often preserved, under the ridges.

(9) – A series of parallel linear anomalies, located in the southern half of the survey area appears to relate to former ridge and furrow.

Anomalies associated with natural features

(10) – In the northern central part of the survey area is a zone of magnetically variable response. It appears that this may have been caused by agricultural activity disturbing soil filled depressions and the shallower surrounding sands.

Anomalies with a modern origin

(11) – A circular area of magnetic disturbance caused by the steel legs of a solar module table.

3.3 List of anomalies - Area 2 (western field)

Area centred on OS NGR 419310,188650, see Figures 08 & 09.

Anomalies of archaeological potential

(12) – A discontinuous positive linear anomaly forms an incomplete enclosure approximately 100m in diameter. It does not appear to continue on the eastern

side but it is possible that this has been eroded by ploughing. Although the anomaly is fragmented, it is possible that there is a deliberate 8.5m gap or entrance just east of the northernmost corner. The enclosure contains many associated archaeological features including ring-ditches and pits.

(13) – A positive curvilinear anomaly located within the confines of anomaly (1) and relating to a ring-ditch with a 10.5m diameter. Discrete positive responses within this anomaly may relate to pits or areas of burning. It is possible that other discrete anomalies adjacent to this anomaly may also relate to pits.

(14) – A sub-rectangular anomaly with internal dimensions of 11.5 by 13m.

(15) – A series of positive linear and discrete anomalies within the confines of anomaly (1) relate to ditches and pits with archaeological potential. The enclosure contains many other pit-like and ditch-like features (17).

Anomalies with an uncertain origin

(16) – There are several weakly positive curvilinear anomalies close to anomaly (1). Although it is not possible to confidently determine their origin, archaeology should be considered.

(17) – Weak discrete anomalies appear may infer pit-like features; however, due to agricultural disturbance, and the properties of the underlying soils, it is not possible to determine their origin.

(18) – In the north eastern part of the survey area are zones containing magnetically enhanced anomalies. These are in an area of former ridge and furrow and are similar to those seen immediately east in Area 1 as anomalies (4).

(19) – A “Z” shaped negative anomaly, flanked by two positive anomalies coincides with a raised mound in the field. Although it appears to be situated at the end of a series of ridge and furrow, it does not seem to relate to a headland.

(20) – A positive linear anomaly appears at a different orientation to the ridge and furrow and may relate to a cut feature. It is possible that it is a north westerly extension of the enclosure (1), although this is not certain.

(21) – A positive linear anomaly, parallel to , but not necessarily associated with the former ridge and furrow (23). It is possible that this relates to a cut feature.

(22) – A series of weak parallel linear anomalies that may relate to agricultural activity.

Anomalies with an agricultural origin

(23) – Area 2 contains several sets of parallel linear anomalies that relate to former ridge and furrow.

Anomalies associated with magnetic debris

(24) – A patch of magnetic debris is located along the south western corner of the survey area and relates to modern dumped material.

Anomalies with a modern origin

(25) – A circular area of magnetic disturbance caused by the steel legs of the solar module table that have been inserted into the ground.

3.4 List of anomalies - Area 3 (eastern field)

Area centred on OS NGR 419595,188500, see Figures 04 – 07.

Anomalies of archaeological potential

(26) – Positive linear and rectilinear anomalies form a series of enclosures close to the eastern edge of the survey area. There appears to be a complex of ditches which may suggest phasing of construction and use.

(27) – Positive rectilinear and linear anomalies in the south western part of the survey area represent a rectilinear enclosure with dimensions of 53m by 57m. It appears to have a deliberate 5.5m gap or entrance on the southern part of the western edge. It contains a dividing ditch, a ring-ditch and pits. Attached to the south is a smaller, second enclosure with dimensions of 11.5m by 14m. Positive linear anomalies extend south westwards and westwards, and it is possible that anomaly (6) in Area 1 is an extension of the ditch.

(28 & 29) – Two positive curvilinear anomalies relating to ring-ditches and associated with anomaly (27). Anomaly (28) is located immediately adjacent, but external to, the western edge of anomaly (27) and appears to abut up to this feature. It has an internal diameter of 13m and appears to contain pits or areas of burning. Anomaly (29) is less well defined, and has an internal diameter of approximately 8m, but also appears to contain a pit or area of burning.

Anomalies with an uncertain origin

(30) – Discrete positive anomalies may relate to pit-like features; however, due to the presence of anomalies within the underlying soils, it is difficult to determine their origin.

(31) – A weak, broad linear anomaly extends north westwards from the north west corner of anomaly (26), and then appears to extend eastwards. It is possible that this is associated with anomaly (26), although disturbance from the ridge and furrow and natural variable response has truncated/obscured this feature.

(32) – In the southern part of the site are several weak positive responses that may be natural in origin.

Anomalies with an agricultural origin

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

Anomalies with a natural origin

(34) – A zone of variable magnetic response in the northern part of the survey area appears to relate to variations within the underlying soils and geology.

Anomalies with a modern origin

(35) – A circular area of magnetic disturbance caused by the steel legs of the solar module table that have been inserted into the ground.

3.5 List of anomalies - Area 4 (south western field)

Area centred on OS NGR 419250,188425, see Figures 10 & 11.

Anomalies of archaeological potential

(36) – A positive rectilinear anomaly located in the south eastern part of the survey area. This relates to a sub-rectangular enclosure with a width of 33m on the north western end, to 50m on the south eastern end, with a length of approximately 35m. There appears to be some continuation of linear features from the southern edge and south eastern corner.

Anomalies with an uncertain origin

(37) – A series of parallel linear anomalies extend from the western field boundary, in a east-north-easterly direction towards the northern edge of anomaly (36). It appears to comprise a positive linear anomaly on the northern side, adjoined by a rectilinear anomaly, and a pair of positive linear anomalies flanking a negative linear anomaly on the southern side. It is possible that these relate to a northern ditch and a southern bank flanked by a pair of ditches and it appears that there may be some association with anomaly (36), although this is not certain.

(38) – A positive linear anomaly extends north westwards from the south eastern edge of the survey area, partially crossing the south western corner of anomaly (36) and then continues towards anomalies (37). It appears to relate to a ditch-like feature; however, its archaeological potential and its relationship with anomalies (36) and (37) cannot be established.

(39) – A weak, positive linear anomaly that may have a similar origin to anomaly (42). It is possible that there is some association with anomalies (37).

(40) – An “L” shaped positive linear anomaly, located immediately east of anomaly (36). It appears similar in response and morphology to anomalies (42), which may suggest a natural origin; however, an anthropogenic origin cannot be ruled out.

(41) – Discrete positive anomalies appear to form pit-like features. Although they may relate to natural features, an archaeological origin should be considered.

(42) – Sinuous positive anomalies appear to relate to “ditch-like” features although it is possible that they are natural in origin.

Anomalies associated with magnetic debris

(43) – A zone of magnetic debris is contained between the northern edge of anomaly (36) and (37). Although it is possible that this relates to modern magnetically thermoremnant material that has been used for ground consolidation, this is not certain.

4 DISCUSSION

4.1.1 The survey has located a minimum of five separate enclosures across the site. Area 1, in the centre of the site, appears to contain up to three sides of a sub-rectangular enclosure with internal ditches and pits. This has been truncated by subsequent ridge and furrow. It appears that within the soils across the north western part of the site, archaeological and natural features can become very magnetically enhanced. Although the furrows have truncated some of the features, it appears that the ridges have partially preserved them. Further linear anomalies in the southern part of Area 1, may also relate to cut features, including one that may be an extension from an enclosure within Area 3 to the east.

4.1.2 In the south western corner of Area 2, on the western edge of the site, is a further sub-rectangular or circular enclosure. Only two sides are visible, but it encloses internal ring-ditches, sub-rectangular enclosures and pits. In the northern part of the survey area, ridge and furrow has resulted in amorphous positive response, similar to those seen in Area 1 immediately to the east; however, it is not possible to determine the archaeological potential of these anomalies.

4.1.3 Area 3, on the eastern edge of the site, contains two separate rectilinear enclosures. Adjacent to the eastern edge several positive linear, discrete and rectilinear anomalies form a complex of ditches and pits. Natural variations within the soil have prevented confident interpretation of all the anomalies in this area. Towards the southern edge of the survey area is a further rectangular enclosure containing internal and external cut features, including ring-ditches, rectilinear

enclosures and pits.

4.1.4 Within Area 4, on the south western edge of the site, a sub-rectangular enclosure has been located. Other linear anomalies may be associated with it, but their low response has hindered interpretation. Former fluvial features may also have been located along the north eastern edge of the survey area, although there is the potential for some of these to relate to cut features.

5 CONCLUSION

5.1.1 The magnetometer survey has defined areas of archaeological potential covering up to 2.5ha. This includes five sub-rectangular enclosures with associated ring-ditches, rectangular enclosures, ditches and pits. Each of the survey areas contains at least one area of potential archaeology.

5.1.2 Former ridge and furrow has truncated at least one of the enclosures, and the agricultural activity within the sandy soils across the north western part of the site has resulted in disturbance and a widespread variable magnetic response. There is, therefore, the potential that other anomalies classified as uncertain in origin also have archaeological potential.

5.1.3 The morphology of many of the anomalies of archaeological potential would tend to be consistent with small, native farmsteads dating to the prehistoric and Roman periods.

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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.

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 raw data

COMPOSITE
Filename: J363-mag-Area1-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 21/04/2011
Assembled by: on 21/04/2011
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 1320 x 240
Survey Size (meters): 330 m x 240 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 2.62
Mean: 0.00
Median: -0.01
Composite Area: 7.92 ha
Surveyed Area: 3.9116 ha

Processes: 2
1 Base Layer
2 Clip from -30.00 to 30.00 nT

Source Grids: 54
1 Col:0 Row:3 grids\01.xgd
2 Col:0 Row:4 grids\02.xgd
3 Col:0 Row:5 grids\52.xgd
4 Col:1 Row:3 grids\03.xgd
5 Col:1 Row:4 grids\04.xgd
6 Col:1 Row:5 grids\51.xgd
7 Col:2 Row:2 grids\05.xgd
8 Col:2 Row:3 grids\06.xgd
9 Col:2 Row:4 grids\07.xgd
10 Col:2 Row:5 grids\50.xgd
11 Col:3 Row:1 grids\08.xgd
12 Col:3 Row:2 grids\09.xgd
13 Col:3 Row:3 grids\10.xgd
14 Col:3 Row:4 grids\11.xgd
15 Col:3 Row:5 grids\49.xgd
16 Col:4 Row:0 grids\53.xgd
17 Col:4 Row:1 grids\12.xgd
18 Col:4 Row:2 grids\13.xgd
19 Col:4 Row:3 grids\14.xgd
20 Col:4 Row:4 grids\15.xgd
21 Col:4 Row:5 grids\48.xgd
22 Col:5 Row:0 grids\54.xgd
23 Col:5 Row:1 grids\16.xgd
24 Col:5 Row:2 grids\17.xgd
25 Col:5 Row:3 grids\18.xgd
26 Col:5 Row:4 grids\19.xgd
27 Col:5 Row:5 grids\46.xgd
28 Col:5 Row:6 grids\47.xgd
29 Col:6 Row:1 grids\20.xgd
30 Col:6 Row:2 grids\21.xgd
31 Col:6 Row:3 grids\22.xgd
32 Col:6 Row:4 grids\23.xgd
33 Col:6 Row:5 grids\44.xgd
34 Col:6 Row:6 grids\45.xgd
35 Col:7 Row:2 grids\24.xgd
36 Col:7 Row:3 grids\25.xgd
37 Col:7 Row:4 grids\26.xgd
38 Col:7 Row:5 grids\42.xgd
39 Col:7 Row:6 grids\43.xgd
40 Col:8 Row:2 grids\27.xgd
41 Col:8 Row:3 grids\28.xgd
42 Col:8 Row:4 grids\29.xgd
43 Col:8 Row:5 grids\39.xgd
44 Col:8 Row:6 grids\40.xgd
45 Col:8 Row:7 grids\41.xgd
46 Col:9 Row:3 grids\30.xgd
47 Col:9 Row:4 grids\31.xgd
48 Col:9 Row:5 grids\36.xgd
49 Col:9 Row:6 grids\37.xgd
50 Col:9 Row:7 grids\38.xgd
51 Col:10 Row:4 grids\32.xgd
52 Col:10 Row:5 grids\33.xgd
53 Col:10 Row:6 grids\34.xgd
54 Col:10 Row:7 grids\35.xgd

Area 1 processed data

COMPOSITE
Filename: J363-mag-Area1-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.80
Mean: -0.03
Median: 0.00
Composite Area: 7.92 ha
Surveyed Area: 3.8824 ha

Processes: 13
1 Base Layer
2 DeStripe Median Traverse: Grids: 01.xgd 02.xgd 52.xgd 03.xgd 04.xgd 51.xgd 05.xgd 06.xgd 07.xgd 50.xgd 08.xgd 09.xgd 10.xgd 11.xgd 49.xgd
3 DeStripe Median Traverse: Grids: 53.xgd 12.xgd 54.xgd 16.xgd 20.xgd
4 DeStripe Median Traverse: Grids: 21.xgd 22.xgd 23.xgd 44.xgd 45.xgd 24.xgd 25.xgd 26.xgd 42.xgd 43.xgd
5 DeStripe Mean Traverse: Grids: 13.xgd 14.xgd 17.xgd 18.xgd Threshold: 0.5 SDs
6 DeStripe Median Traverse: Grids: 28.xgd 29.xgd
7 DeStripe Median Traverse: Grids: 27.xgd
8 DeStripe Mean Traverse: Grids: 30.xgd 31.xgd 36.xgd 37.xgd 38.xgd 32.xgd 33.xgd 34.xgd 35.xgd Threshold: 0.5 SDs
9 DeStripe Median Traverse: Grids: 15.xgd 19.xgd
10 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 172, Left 480, Bottom 191, Right 620)
11 DeStripe Median Traverse: Grids: 48.xgd 46.xgd 47.xgd
12 Clip from -5.00 to 5.00 nT
13 Clip from -3.00 to 3.00 nT

Area 2 raw data

COMPOSITE

Filename: J363-mag-Area2.xcp
Description:
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 26/04/2011
Assembled by: on 26/04/2011
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 1080 x 360
Survey Size (meters): 270 m x 360 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 2.32
Mean: -0.28
Median: -0.17
Composite Area: 9.72 ha
Surveyed Area: 4.7349 ha

Processes: 2
1 Base Layer
2 Clip from -30.00 to 30.00 nT

Source Grids: 70
1 Col:0 Row:3 grids\01.xgd
2 Col:0 Row:4 grids\02.xgd
3 Col:0 Row:5 grids\03.xgd
4 Col:0 Row:6 grids\04.xgd
5 Col:0 Row:7 grids\57.xgd
6 Col:1 Row:0 grids\68.xgd
7 Col:1 Row:1 grids\69.xgd
8 Col:1 Row:2 grids\70.xgd
9 Col:1 Row:3 grids\05.xgd
10 Col:1 Row:4 grids\06.xgd
11 Col:1 Row:5 grids\07.xgd
12 Col:1 Row:6 grids\08.xgd
13 Col:1 Row:7 grids\55.xgd
14 Col:1 Row:8 grids\56.xgd
15 Col:2 Row:0 grids\65.xgd
16 Col:2 Row:1 grids\66.xgd
17 Col:2 Row:2 grids\67.xgd
18 Col:2 Row:3 grids\09.xgd
19 Col:2 Row:4 grids\10.xgd
20 Col:2 Row:5 grids\11.xgd
21 Col:2 Row:6 grids\12.xgd
22 Col:2 Row:7 grids\52.xgd
23 Col:2 Row:8 grids\53.xgd
24 Col:2 Row:9 grids\54.xgd
25 Col:3 Row:0 grids\62.xgd

26 Col:3 Row:1 grids\63.xgd
27 Col:3 Row:2 grids\64.xgd
28 Col:3 Row:3 grids\13.xgd
29 Col:3 Row:4 grids\14.xgd
30 Col:3 Row:5 grids\15.xgd
31 Col:3 Row:6 grids\16.xgd
32 Col:3 Row:7 grids\48.xgd
33 Col:3 Row:8 grids\49.xgd
34 Col:3 Row:9 grids\50.xgd
35 Col:3 Row:10 grids\51.xgd
36 Col:4 Row:0 grids\59.xgd
37 Col:4 Row:1 grids\60.xgd
38 Col:4 Row:2 grids\61.xgd
39 Col:4 Row:3 grids\17.xgd
40 Col:4 Row:4 grids\18.xgd
41 Col:4 Row:5 grids\19.xgd
42 Col:4 Row:6 grids\20.xgd
43 Col:4 Row:7 grids\44.xgd
44 Col:4 Row:8 grids\45.xgd
45 Col:4 Row:9 grids\46.xgd
46 Col:4 Row:10 grids\47.xgd
47 Col:5 Row:2 grids\58.xgd
48 Col:5 Row:4 grids\21.xgd
49 Col:5 Row:5 grids\22.xgd
50 Col:5 Row:6 grids\23.xgd
51 Col:5 Row:7 grids\39.xgd
52 Col:5 Row:8 grids\40.xgd
53 Col:5 Row:9 grids\41.xgd
54 Col:5 Row:10 grids\42.xgd
55 Col:5 Row:11 grids\43.xgd
56 Col:6 Row:5 grids\24.xgd
57 Col:6 Row:6 grids\25.xgd
58 Col:6 Row:7 grids\34.xgd
59 Col:6 Row:8 grids\35.xgd
60 Col:6 Row:9 grids\36.xgd
61 Col:6 Row:10 grids\37.xgd
62 Col:6 Row:11 grids\38.xgd
63 Col:7 Row:6 grids\26.xgd
64 Col:7 Row:7 grids\30.xgd
65 Col:7 Row:8 grids\31.xgd
66 Col:7 Row:9 grids\32.xgd
67 Col:7 Row:10 grids\33.xgd
68 Col:8 Row:7 grids\27.xgd
69 Col:8 Row:8 grids\28.xgd
70 Col:8 Row:9 grids\29.xgd

Area 2 processed data

COMPOSITE
Filename: J363-mag-Area2-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.81
Mean: 0.01
Median: 0.00
Composite Area: 9.72 ha
Surveyed Area: 4.7349 ha

Processes: 7
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Median Traverse: Grids: 01.xgd 02.xgd 68.xgd 69.xgd 70.xgd 05.xgd 06.xgd 65.xgd 66.xgd 67.xgd 09.xgd 10.xgd 62.xgd 63.xgd 64.xgd 13.xgd 14.xgd 59.xgd 60.xgd 61.xgd 17.xgd 18.xgd 58.xgd 21.xgd
4 DeStripe Median Traverse: Grids: 11.xgd 12.xgd 52.xgd 53.xgd 54.xgd 15.xgd 16.xgd 48.xgd 49.xgd 50.xgd 51.xgd 19.xgd 20.xgd 44.xgd 45.xgd 46.xgd 47.xgd 22.xgd 23.xgd 39.xgd 40.xgd 41.xgd 42.xgd 43.xgd 24.xgd 25.xgd 34.xgd 35.xgd 36.xgd 37.xgd 38.xgd 26.xgd 30.xgd 31.xgd 32.xgd 33.xgd 27.xgd 28.xgd 29.xgd
5 DeStripe Median Traverse: Grids: 57.xgd 55.xgd 56.xgd
6 DeStripe Mean Traverse: Grids: 03.xgd 04.xgd 07.xgd 08.xgd Threshold: 2 SDs
7 Clip from -3.00 to 3.00 nT

Area 3 raw data

COMPOSITE
Filename: J363-mag-Area3.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 27/04/2011
Assembled by: on 27/04/2011
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 1680 x 180
Survey Size (meters): 420 m x 180 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 1.86
Mean: -0.16
Median: -0.13
Composite Area: 7.56 ha
Surveyed Area: 4.2797 ha

Processes: 2
1 Base Layer
2 Clip from -30.00 to 30.00 nT

Source Grids: 62
1 Col:0 Row:1 grids\34.xgd
2 Col:0 Row:2 grids\35.xgd
3 Col:0 Row:3 grids\37.xgd
4 Col:1 Row:1 grids\32.xgd
5 Col:1 Row:2 grids\33.xgd
6 Col:1 Row:3 grids\38.xgd
7 Col:1 Row:4 grids\39.xgd
8 Col:2 Row:0 grids\36.xgd
9 Col:2 Row:1 grids\30.xgd
10 Col:2 Row:2 grids\31.xgd
11 Col:2 Row:3 grids\40.xgd
12 Col:2 Row:4 grids\41.xgd
13 Col:3 Row:0 grids\27.xgd
14 Col:3 Row:1 grids\28.xgd
15 Col:3 Row:2 grids\29.xgd
16 Col:3 Row:3 grids\42.xgd
17 Col:3 Row:4 grids\43.xgd
18 Col:4 Row:0 grids\24.xgd
19 Col:4 Row:1 grids\25.xgd
20 Col:4 Row:2 grids\26.xgd
21 Col:4 Row:3 grids\44.xgd
22 Col:4 Row:4 grids\45.xgd
23 Col:5 Row:1 grids\22.xgd
24 Col:5 Row:2 grids\23.xgd
25 Col:5 Row:3 grids\46.xgd
26 Col:5 Row:4 grids\47.xgd
27 Col:6 Row:1 grids\20.xgd
28 Col:6 Row:2 grids\21.xgd
29 Col:6 Row:3 grids\48.xgd
30 Col:6 Row:4 grids\49.xgd
31 Col:7 Row:1 grids\17.xgd
32 Col:7 Row:2 grids\18.xgd
33 Col:7 Row:3 grids\19.xgd
34 Col:7 Row:4 grids\50.xgd
35 Col:7 Row:5 grids\51.xgd
36 Col:8 Row:1 grids\14.xgd
37 Col:8 Row:2 grids\15.xgd
38 Col:8 Row:3 grids\16.xgd
39 Col:8 Row:4 grids\52.xgd
40 Col:8 Row:5 grids\53.xgd
41 Col:9 Row:1 grids\11.xgd
42 Col:9 Row:2 grids\12.xgd
43 Col:9 Row:3 grids\13.xgd
44 Col:9 Row:4 grids\54.xgd
45 Col:9 Row:5 grids\55.xgd
46 Col:10 Row:1 grids\07.xgd
47 Col:10 Row:2 grids\08.xgd
48 Col:10 Row:3 grids\09.xgd
49 Col:10 Row:4 grids\56.xgd
50 Col:10 Row:5 grids\57.xgd
51 Col:11 Row:2 grids\05.xgd
52 Col:11 Row:3 grids\06.xgd
53 Col:11 Row:4 grids\58.xgd
54 Col:11 Row:5 grids\59.xgd
55 Col:12 Row:2 grids\03.xgd
56 Col:12 Row:3 grids\04.xgd
57 Col:12 Row:4 grids\60.xgd
58 Col:12 Row:5 grids\61.xgd
59 Col:13 Row:2 grids\01.xgd
60 Col:13 Row:3 grids\02.xgd
61 Col:13 Row:4 grids\62.xgd
62 Col:13 Row:5 grids\63.xgd

Area 3 processed data

COMPOSITE
Filename: J363-mag-Area3-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.73
Mean: 0.03
Median: 0.00
Composite Area: 7.56 ha
Surveyed Area: 4.2793 ha

Processes: 6
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -3.00 to 3.00 nT
4 De Stagger: Grids: 36.xgd 30.xgd 31.xgd 40.xgd 41.xgd 27.xgd 28.xgd 29.xgd 42.xgd 43.xgd 24.xgd 25.xgd 26.xgd 44.xgd 45.xgd 22.xgd 23.xgd 46.xgd 47.xgd Mode: Both By: -1 intervals
5 De Stagger: Grids: 54.xgd 55.xgd Mode: Outbound By: -1 intervals

6 Clip from -3.00 to 3.00 nT

Source Grids: 62
1 Col:0 Row:1 grids\34.xgd
2 Col:0 Row:2 grids\35.xgd
3 Col:0 Row:3 grids\37.xgd
4 Col:1 Row:1 grids\32.xgd
5 Col:1 Row:2 grids\33.xgd
6 Col:1 Row:3 grids\38.xgd
7 Col:1 Row:4 grids\39.xgd
8 Col:2 Row:0 grids\36.xgd
9 Col:2 Row:1 grids\30.xgd
10 Col:2 Row:2 grids\31.xgd
11 Col:2 Row:3 grids\40.xgd
12 Col:2 Row:4 grids\41.xgd
13 Col:3 Row:0 grids\27.xgd
14 Col:3 Row:1 grids\28.xgd
15 Col:3 Row:2 grids\29.xgd
16 Col:3 Row:3 grids\42.xgd
17 Col:3 Row:4 grids\43.xgd
18 Col:4 Row:0 grids\24.xgd
19 Col:4 Row:1 grids\25.xgd
20 Col:4 Row:2 grids\26.xgd
21 Col:4 Row:3 grids\44.xgd
22 Col:4 Row:4 grids\45.xgd
23 Col:5 Row:1 grids\22.xgd
24 Col:5 Row:2 grids\23.xgd
25 Col:5 Row:3 grids\46.xgd
26 Col:5 Row:4 grids\47.xgd
27 Col:6 Row:1 grids\20.xgd
28 Col:6 Row:2 grids\21.xgd
29 Col:6 Row:3 grids\48.xgd
30 Col:6 Row:4 grids\49.xgd
31 Col:7 Row:1 grids\17.xgd
32 Col:7 Row:2 grids\18.xgd
33 Col:7 Row:3 grids\19.xgd
34 Col:7 Row:4 grids\50.xgd
35 Col:7 Row:5 grids\51.xgd
36 Col:8 Row:1 grids\14.xgd
37 Col:8 Row:2 grids\15.xgd
38 Col:8 Row:3 grids\16.xgd
39 Col:8 Row:4 grids\52.xgd
40 Col:8 Row:5 grids\53.xgd
41 Col:9 Row:1 grids\11.xgd
42 Col:9 Row:2 grids\12.xgd
43 Col:9 Row:3 grids\13.xgd
44 Col:9 Row:4 grids\54.xgd
45 Col:9 Row:5 grids\55.xgd
46 Col:10 Row:1 grids\07.xgd
47 Col:10 Row:2 grids\08.xgd
48 Col:10 Row:3 grids\09.xgd
49 Col:10 Row:4 grids\56.xgd
50 Col:10 Row:5 grids\57.xgd
51 Col:11 Row:2 grids\05.xgd
52 Col:11 Row:3 grids\06.xgd
53 Col:11 Row:4 grids\58.xgd
54 Col:11 Row:5 grids\59.xgd
55 Col:12 Row:2 grids\03.xgd
56 Col:12 Row:3 grids\04.xgd
57 Col:12 Row:4 grids\60.xgd
58 Col:12 Row:5 grids\61.xgd
59 Col:13 Row:2 grids\01.xgd
60 Col:13 Row:3 grids\02.xgd
61 Col:13 Row:4 grids\62.xgd
62 Col:13 Row:5 grids\63.xgd

Area 4 raw data

COMPOSITE
Filename: J363-mag-Area4.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 28/04/2011
Assembled by: on 28/04/2011
Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 1320 x 240
Survey Size (meters): 330 m x 240 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 2.36
Mean: -0.15
Median: -0.11
Composite Area: 7.92 ha
Surveyed Area: 3.1093 ha

Processes: 2
1 Base Layer
2 Clip from -30.00 to 30.00 nT

Source Grids: 52
1 Col:0 Row:0 grids\33.xgd
2 Col:0 Row:1 grids\32.xgd
3 Col:1 Row:0 grids\34.xgd
4 Col:1 Row:1 grids\30.xgd
5 Col:1 Row:2 grids\31.xgd
6 Col:2 Row:0 grids\35.xgd
7 Col:2 Row:1 grids\27.xgd
8 Col:2 Row:2 grids\28.xgd
9 Col:2 Row:3 grids\29.xgd
10 Col:3 Row:0 grids\36.xgd
11 Col:3 Row:1 grids\23.xgd
12 Col:3 Row:2 grids\24.xgd
13 Col:3 Row:3 grids\25.xgd
14 Col:3 Row:4 grids\26.xgd
15 Col:3 Row:5 grids\52.xgd
16 Col:4 Row:0 grids\37.xgd
17 Col:4 Row:1 grids\19.xgd
18 Col:4 Row:2 grids\20.xgd
19 Col:4 Row:3 grids\21.xgd
20 Col:4 Row:4 grids\22.xgd
21 Col:4 Row:5 grids\50.xgd
22 Col:4 Row:6 grids\51.xgd
23 Col:5 Row:0 grids\38.xgd
24 Col:5 Row:1 grids\01.xgd
25 Col:5 Row:2 grids\02.xgd
26 Col:5 Row:3 grids\03.xgd
27 Col:5 Row:4 grids\04.xgd
28 Col:5 Row:5 grids\47.xgd
29 Col:5 Row:6 grids\48.xgd
30 Col:5 Row:7 grids\49.xgd
31 Col:6 Row:0 grids\39.xgd
32 Col:6 Row:1 grids\05.xgd
33 Col:6 Row:2 grids\06.xgd
34 Col:6 Row:3 grids\07.xgd
35 Col:6 Row:4 grids\08.xgd
36 Col:6 Row:5 grids\44.xgd
37 Col:6 Row:6 grids\45.xgd
38 Col:6 Row:7 grids\46.xgd
39 Col:7 Row:0 grids\40.xgd
40 Col:7 Row:1 grids\09.xgd
41 Col:7 Row:2 grids\10.xgd
42 Col:7 Row:3 grids\11.xgd
43 Col:7 Row:4 grids\12.xgd
44 Col:8 Row:0 grids\41.xgd
45 Col:8 Row:1 grids\13.xgd
46 Col:8 Row:2 grids\14.xgd
47 Col:8 Row:3 grids\15.xgd
48 Col:9 Row:0 grids\42.xgd
49 Col:9 Row:1 grids\16.xgd
50 Col:9 Row:2 grids\17.xgd
51 Col:10 Row:0 grids\43.xgd
52 Col:10 Row:1 grids\18.xgd

Area 4 processed data

COMPOSITE
Filename: J363-mag-Area4-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.90
Mean: 0.05
Median: 0.00
Composite Area: 7.92 ha
Surveyed Area: 3.1093 ha

Processes: 4
1 Base Layer
2 Clip from -10.00 to 10.00 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. Digital data are also supplied to the client on CD ROM, see below.

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.

- ArcheoSurveyor version 2.5.9.4 (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 are supplied on CD ROM which includes 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.

The CD ROM structure is formed from a tree of directories under the title J363 South Marston – CD. Directory titles include Data, Documentation, CAD and PDFs. Multiple directories exist under Data and hold Grid, Composite and Graphic files with CSV composite data held in Export.

The CAD file contains externally referenced graphics that are rotated with separate A3 size layouts for each figure. Layouts are fixed using frozen layers and named views allowing straightforward plotting or analysis on screen. (Note – CAD files are prepared using AutoCAD's e Transmit function to produce a directory containing the digital drawing along with any externally referenced graphics which may need reloading).