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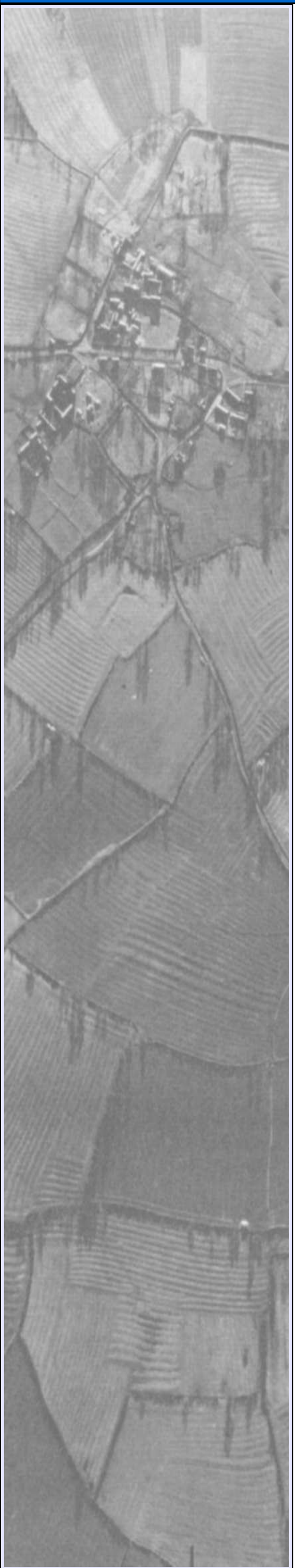

Otterham Down, Cornwall

MAGNETOMETER SURVEY REPORT

for

Mr R M Quinn

David Sabin and Kerry Donaldson

June 2011

Ref. no. 369

ARCHAEOLOGICAL SURVEYS LTD

Otterham Down, Cornwall

Magnetometer Survey

for

Mr R M Quinn

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

Survey date - **17th June 2011**
Ordnance Survey Grid Reference – **SX 15725 90525**

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CONTENTS

LIST OF FIGURES

LIST OF PLATES

LIST OF TABLES

SUMMARY

A detailed magnetometer survey was commissioned on an area of land at Otterham Down in Cornwall. The survey aimed to provide information on the archaeological potential of land likely to be disturbed by construction of a wind turbine, access road and cable trenches. The site was located immediately adjacent to two Bronze Age round barrows (SM CO 923). The results indicated the presence of widespread positive and negative broadly linear and rectilinear anomalies which are likely to relate to variations in the underlying geology and soils.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Peter Wonnacott Planning on behalf of Mr R M Quinn of Kernick Farm, Otterham, to undertake a magnetometer survey of an area of land at Otterham Down to the north of Camelford in Cornwall. The survey aims to provide information on the archaeological potential of land likely to be disturbed by construction of a wind turbine, access road and cable trenches.

1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2011) and approved by Phil Copleston, Historic Environment Planning Advice Officer for Cornwall Council.

1.1.3 The geophysical survey was requested by Cornwall Council due to the presence of two scheduled Bronze Age round barrows, immediately adjacent to the cable route.

1.2 Survey objectives and techniques

1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin, so that they may be assessed prior to development of the site.

1.2.2 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 west of Otterham in the northern part of Cornwall and centred on Ordnance Survey National Grid Reference (OS NGR) SX 15725 90525, see Figures 01 and 02.

1.3.2 The geophysical survey covers approximately 2ha of pasture split within two fields and three survey areas. Area 1, in the north western part of the site, covers the proposed location of the wind turbine and the associated cable route. Area 2 is in the adjacent field, immediately to the east of the turbine location in Area 1, and Area 3 is to the south of Area 1 and contains the proposed cable track south of the turbine.

1.3.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data although long grass in Area 2 proved difficult to cross. Weather conditions during the survey were variable with periods of heavy rain and high winds. The site is highly exposed at 248m ODN, facing the prevailing winds.

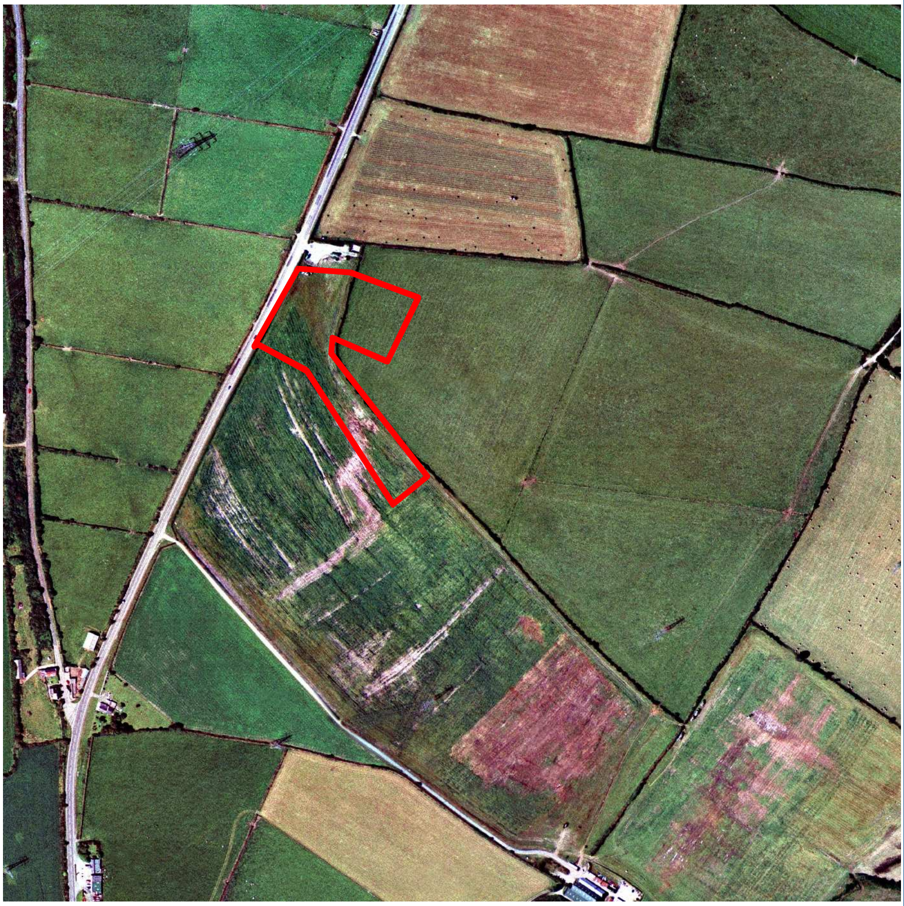

Plate 1: Aerial photograph of survey area. *© Getmapping*

1.4 Site history and archaeological potential

1.4.1 Two bowl barrows are located immediately south east of the site. They are Scheduled Monuments (CO 923) although their designated boundaries are located outside of the survey area immediately south of survey Area 2. There is some evidence that a third barrow may once have existed within the southern part of the survey area. The potential site of the barrow is not scheduled and English Heritage refer to it as being 'completely effaced by ploughing' (PastScapes, 2007).

1.5 Geology and soils

1.5.1 The underlying solid geology across the majority of the site is from the Boscastle Sandstone Formation of the Carboniferous, with a small area of Boscastle Mudstone and Siltstone in the northern half of Areas 1 and 2 (BGS, 2011).

1.5.2 The overlying soil across the survey area is from the Hafren association and is a ferric stagnopodzol (Soil Survey of England and Wales, 1983).

1.5.3 Magnetometry survey carried out across similar soils has produced good results. The underlying geology and soils are therefore considered acceptable for magnetic survey.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.

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

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

2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to 10^{-9} Tesla (T).

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using 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 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 gradiometers undergo regular servicing and calibration by the manufacturer. A current assessment of the instruments 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.

2.2.6 Data were collected at 0.25m centres along traverses 1m apart. Areas 1 and 2 were separated into 30m by 30m grids (900m²) giving 3600 recorded measurements per grid. Area 3 was separated into 20m by 20m grids (400m²) giving 1600 readings. 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 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,
- 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.

2.3.4 The main form of data display prepared for 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 63°anticlockwise for Areas 1 and 2, and 41°antic lockwise for Area 3, to restore north to the top of the 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 a total of three survey areas covering approximately 2ha. Geophysical anomalies located can be generally classified as positive anomalies with an uncertain origin, negative anomalies probably relating to natural features, areas of magnetic debris and disturbance and strong discrete dipolar anomalies relating to ferrous objects.

3.1.2 Data are considered representative of shallow magnetic anomalies within the site. The northern part of Area 1 contained a number of steel objects that produced high levels of magnetic disturbance preventing useful data collection. High level magnetic disturbance was also encountered adjacent to a steel communications mast close to the south eastern end of Area 3. Long grass within Area 2 may have increased 'noise' within the data due to instability in the position of the magnetometers; however, this is unlikely to have obscured archaeologically significant anomalies.

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 an uncertain origin AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG POS AREA 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 a probable 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.
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. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.

Table 2: List and description of interpretation categories

3.2 List of anomalies

Anomalies with an uncertain origin

(1) – Weakly positive anomalies have been located within the site. It is not possible to determine if any of them relate to “cut” features, or magnetic enhancement due to increased depth of topsoil or other natural features as many of them appear to be directly related to negative anomalies (2).

Anomalies with a probable natural origin

(2) – The site contains widespread broadly linear and rectilinear negative anomalies. These are responses to magnetically enhanced materials and material of low magnetic susceptibility and appear to relate to the underlying geology.

Anomalies associated with magnetic debris

(3) – Patches of magnetic debris are likely to relate to modern magnetically thremoremnant material that has been dumped on site or used for ground consolidation.

(4) – Strong discrete dipolar anomalies relate to ferrous objects within the topsoil.

Anomalies with a modern origin

(5) – Magnetic disturbance has been caused by ferrous material on the northern and western edge of Area 1.

4 CONCLUSION

4.1.1 The geophysical survey located a number of positive anomalies that cannot be confidently interpreted, although it may be that they relate to natural features. Widespread negative broadly linear and rectilinear anomalies appear likely to be natural in origin. Although they form broadly linear and rectilinear elements, they lack the clear definition usually associated with anthropogenic features. It is possible that they represent variability in the soil – rock interface or with the magnetic susceptibility of underlying rock layers.

4.1.2 The survey was carried out close to two Bronze Age round barrows, and over the possible location of another ploughed out barrow indicated from PastScapes. No anomalies were identified that could confidently be attributed to this type of monument or any other archaeological feature.

5 REFERENCES

Archaeological Surveys, 2011. *Otterham Down, Geophysical Survey Written Scheme of Investigation.* Unpublished typescript document.

British Geological Survey, 2010. *Geology of Britain viewer, 1:50 000 scale [online]* available from http://maps.bgs.ac.uk/geologyviewer/ [accessed 13/6/2011].

English Heritage, 2008. *Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No.1.* 2nd ed. Swindon: English Heritage.

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

PastScapes, 2007. *Monument no. 434700. Two bowl barrows and one other barrow site*. [online] http://www.pastscape.org.uk/hob.aspx?hob_id=434700&sort=4&search=all&criteria=otterham&rational=q&recordsperpage=10&p=0&move=p&nor=48&recfc=0#aRt [accessed 13/6/11].

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 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: J369-mag-Area1-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 19/06/2011
Assembled by: on 19/06/2011
Direction of 1st Traverse: 315 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 480 x 120
Survey Size (meters): 120 m x 120 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: 4.94
Mean: -1.36
Median: -0.16
Composite Area: 1.44 ha
Surveyed Area: 0.69905 ha

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

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:1 Row:0 grids\05.xgd
6 Col:1 Row:1 grids\06.xgd
7 Col:1 Row:2 grids\07.xgd
8 Col:2 Row:0 grids\08.xgd
9 Col:2 Row:1 grids\09.xgd
10 Col:2 Row:2 grids\10.xgd
11 Col:3 Row:0 grids\11.xgd
12 Col:3 Row:1 grids\12.xgd

Area 1 processed data

COMPOSITE
Filename: J369-mag-Area1-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.27
Mean: -0.35
Median: -0.11
Composite Area: 1.44 ha
Surveyed Area: 0.69905 ha

Processes: 3
1 Base Layer
2 DeStripe Mean Traverse: Grids: All Threshold: 0.5 SDs
3 Clip from -3.00 to 3.00 nT

Area 2 raw data

COMPOSITE
Filename: J369-mag-Area2-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 19/06/2011
Assembled by: on 19/06/2011
Direction of 1st Traverse: 315 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 480 x 90
Survey Size (meters): 120 m x 90 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: 1.53
Mean: 0.02
Median: 0.03
Composite Area: 1.08 ha
Surveyed Area: 0.7243 ha

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

Source Grids: 10
1 Col:0 Row:0 grids\01.xgd
2 Col:1 Row:0 grids\02.xgd
3 Col:1 Row:1 grids\03.xgd
4 Col:1 Row:2 grids\04.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:3 Row:0 grids\08.xgd
9 Col:3 Row:1 grids\09.xgd
10 Col:3 Row:2 grids\10.xgd

Area 2 processed data

COMPOSITE
Filename: J369-mag-Area2-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.81
Mean: 0.00
Median: 0.00
Composite Area: 1.08 ha
Surveyed Area: 0.72395 ha

Processes: 5
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -3.00 to 3.00 nT
4 De Stagger: Grids: All Mode: Both By: -1 intervals
5 Clip from -3.00 to 3.00 nT

Area 3 raw data

COMPOSITE
Filename: J369-mag-Area3-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 19/06/2011
Assembled by: on 19/06/2011
Direction of 1st Traverse: 315 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702

Dimensions
Composite Size (readings): 160 x 160
Survey Size (meters): 40 m x 160 m
Grid Size: 20 m x 20 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 30.00
Min: -30.00
Std Dev: 4.08
Mean: 0.66
Median: 0.64
Composite Area: 0.64 ha
Surveyed Area: 0.6002 ha

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

Source Grids: 16
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\15.xgd
8 Col:0 Row:7 grids\16.xgd
9 Col:1 Row:0 grids\07.xgd
10 Col:1 Row:1 grids\08.xgd
11 Col:1 Row:2 grids\09.xgd
12 Col:1 Row:3 grids\10.xgd
13 Col:1 Row:4 grids\11.xgd
14 Col:1 Row:5 grids\12.xgd
15 Col:1 Row:6 grids\13.xgd
16 Col:1 Row:7 grids\14.xgd

Area 3 processed data

COMPOSITE
Filename: J369-mag-Area3-proc.xcp

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.91
Mean: -0.04
Median: 0.00
Composite Area: 0.64 ha
Surveyed Area: 0.5408 ha

Processes: 6
1 Base Layer
2 DeStripe Median Traverse: Grids: 01.xgd 02.xgd 03.xgd 04.xgd 05.xgd 07.xgd 08.xgd 09.xgd 10.xgd 11.xgd
3 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 116, Left 67, Bottom 155, Right 159)
4 DeStripe Median Traverse: Grids: 06.xgd 15.xgd 16.xgd 12.xgd 13.xgd 14.xgd
5 Edge Match (Area: Top 140, Left 80, Bottom 159, Right 159) to Left edge
6 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.

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

- 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 J369 Otterham – 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).