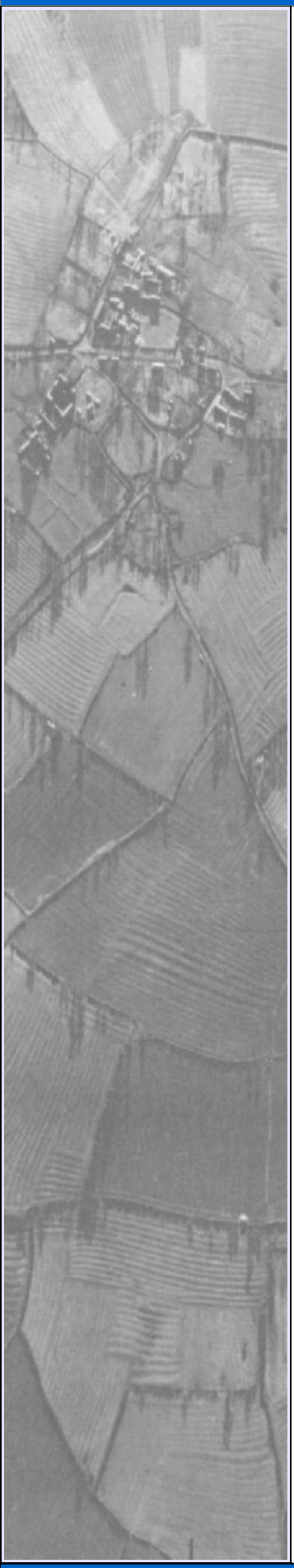

Land at Bowling Green Lane
Cirencester
Gloucestershire

MAGNETOMETER SURVEY REPORT

for

CgMs Consulting

Kerry Donaldson & David Sabin

July 2015

Ref. no. 618

ARCHAEOLOGICAL SURVEYS LTD

Land at Bowling Green Lane
Cirencester
Gloucestershire

Magnetometer Survey Report

for

CgMs Consulting

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

Survey date – 1st July 2015
Ordnance Survey Grid Reference – **SP 02275 03135**

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SUMMARY

A detailed magnetometer survey was undertaken by Archaeological Surveys Ltd within an irregularly shaped land parcel to the east of Bowling Green Lane, on the northern edge of Cirencester in Gloucestershire. The results of the survey indicate the presence of a linear ditch following the contour of the site along the western side with a possible continuation close to the southern boundary. Within the eastern part of the site are a cluster of pits, that although may have some association with quarrying, are well defined and contain a moderately enhanced fill, which may indicate an archaeological origin. Weaker and magnetically variable responses with irregular morphologies relate to former quarrying seen primarily in the north eastern part of the site. There is also evidence of relatively modern quarry infill within the south western part of the site. Other positive linear and discrete anomalies have been located; however, these lack a coherent or well defined morphology and while they may relate to cut features, their origin is uncertain.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by CgMs Consulting to undertake a magnetometer survey of an area of land at Bowling Green Lane, Cirencester, Gloucestershire. The site has been outlined for a proposed residential development, and the survey forms part of an archaeological assessment of the site.

1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2015) and approved by Charles Parry, Archaeologist for Gloucestershire County Council.

1.2 Survey objectives and techniques

1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin so that they may be assessed prior to development of the site. The methodology is considered an efficient and effective approach to archaeological prospection.

1.2.2 The survey and report generally follow the recommendations set out by: English Heritage (2008) *Geophysical survey in archaeological field evaluation;* and Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations*. The work has been carried out to the Chartered Institute for Archaeologists (2014) *Standard and Guidance for Archaeological Geophysical Survey.*

1.3 Site location, description and survey conditions

1.3.1 The site is located to the east of Bowling Green Lane on the northern edge of Cirencester in Gloucestershire. It is centred on Ordnance Survey National Grid Reference (OS NGR) SP 02275 03135, see Figures 01 and 02.

1.3.2 The geophysical survey covers approximately 3.3ha within an irregularly shaped parcel of land with a total area of 4.6ha. The site is relatively flat on the eastern and southern sides but drops steeply towards the valley of the River Churn in the west. It has been extensively quarried in the southern part, with several smaller quarry pits within the rest of the site. The survey was carried out within accessible parts of the site with the larger quarried areas unsuitable for survey.

Plate 1: Survey area looking south west towards former quarries

1.3.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data with the exception of former quarries. Weather conditions during the survey were hot and sunny.

1.4 Site history and archaeological potential

1.4.1 An Archaeological Desk-Based Assessment has been carried out by CgMs Consulting (2015). It outlines that the site lies approximately 700m west of the Scheduled Tar Barrows which are the remains of two prehistoric or Roman round barrows. It is also located 500m to the north of the Roman town of *Corinium,* and 300m west of the Whiteway Roman road and although there are Roman finds and features in the wider vicinity, none have been recorded within the site. The site also lies east of a number of post-medieval water

meadows associated with the River Churn; however, with its elevated position above the river valley, the site is not directly associated with them.

1.4.2 The southern part of the site contains greatly disturbed ground associated with quarrying dating to the 18th century and named as Bowling Green Pitts on the 1848 Map of Bowling Green Farm. In the northern part of the site are four smaller possible medieval or post-medieval quarries identified from aerial photographs as part of Historic England's National Mapping Programme. A former field boundary also extends across the centre of the site from east to west.

1.4.3 Although the site does not contain any designated or non-designated heritage assets, except for evidence of quarrying, it is possible that the survey may locate previously unrecorded cut features should they exist within the site.

1.5 Geology and soils

1.5.1 The underlying solid geology across the majority of the site is limestone from the Forest Marble Formation. The north western part of the site is underlain by White Limestone Formation (BGS, 2015).

1.5.2 The overlying soil across the survey area is from the Sherborne association and is a brown rendzina. It consists of a shallow, well drained, brashy, calcareous, clayey soil over limestone (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; however, it is likely that parts of the site contain made ground associated with partial infill of former quarries.

2 METHODOLOGY

2.1 Technical synopsis

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

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

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

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

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers spaced 0.5m apart with readings recorded at 20Hz. The gradiometers have a range of recording data between 0.1nT and 10,000nT. The system is linked to a Leica GS10 RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged computer.

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

2.2.3 Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).

2.3 Data processing and presentation

2.3.1 Magnetic data collected by the MAGNETO®MXPDA cart-based system are initially prepared using SENSYS MAGNETO®DLMGPS software. Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display using TerraSurveyor.

2.3.2 The data are collected between limits of ±10000nT and clipped for display at 5nT. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.12m along each survey track. A zero median traverse function is required in order to remove fixed offset values present within the sensors which do not undergo a zeroing procedure in the field. The approach ensures that the gradiometer sensors are very accurately aligned and fixed to the vertical magnetic field and are not influenced by localised magnetic fields or disturbed by vibration. Although a zero median traverse algorithm can remove anomalies aligned with the survey tracks, in practice this rarely occurs due to the use of long traverses, high resolution measurement and variability within the magnetic susceptibility of long linear features.

2.3.3 Appendix C contains metadata concerning the survey and data attributes and

is derived directly from TerraSurveyor. Reference should be made to Appendix B for further information on any processes, such as clipping, carried out on the data.

2.3.4 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report is the minimally processed greyscale plot.

2.3.5 The raster images are combined with base mapping using ProgeCAD Professional 2016, creating DWG (2010) file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. The CAD plots are effectively georeferenced facilitating relocation of features using GPS, resection method, etc.

2.3.6 An abstraction and interpretation is also drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.

2.3.7 A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within the survey area.

2.3.8 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

3 RESULTS

3.1 General assessment of survey results

3.1.1 The detailed magnetic survey was carried out over 3.3ha within a single survey area.

3.1.2 Magnetic anomalies located can be generally classified as positive linear and discrete positive responses of archaeological potential, positive and negative anomalies of an uncertain origin, anomalies associated with quarrying, linear anomalies of an agricultural origin, areas of magnetic debris and disturbance, strong discrete dipolar anomalies relating to ferrous objects and strong multiple dipolar linear anomalies relating to buried services or pipelines.

3.2 Statement of data quality

3.2.1 Data are considered representative of the magnetic anomalies present within the site. There are no significant defects within the dataset. Magnetic debris in the south eastern part of the site has the potential to obscure weak anomalies; however, it is likely to be associated with heavily disturbed or made ground.

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 within the 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 DISCRETE ARCHAEOLOGY	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 NEG LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
Anomalies relating to land management AS-ABST MAG BOUNDARY	Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation.
Anomalies associated with quarrying AS-ABST MAG QUARRYING	Magnetically variable anomalies, which may be negative, indicating a response to geology/drift deposits and/or positive indicating an increased depth of topsoil. Very strongly magnetic anomalies are a response to highly magnetic material which can be used to infill a depression. A negative response may be a response to a band of rock near the surface, or at the edge of a depression.
Anomalies with an agricultural origin AS-ABST MAG AGRICULTURAL	The anomalies are often linear and form a series of parallel responses or are parallel to extant land boundaries. Where the response is broad, former ridge and furrow is likely; narrow response is often related to modern ploughing.
Anomalies associated with magnetic debris AS-ABST MAG DEBRIS AS-ABST MAG STRONG DIPOLAR	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. It often occurs where there has been dumping or ground make-up and is related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, or hearths and may therefore be archaeologically significant. It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar

	anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin AS-ABST MAG DISTURBANCE AS-ABST MAG SERVICE	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically and with hysteresis adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 402275 203135, see Figures 03 & 04.

Anomalies of archaeological potential

(1) - A positive linear anomaly extends across the western part of the survey area. It is located on sloping ground, although it generally follows the contour. The anomaly is 2m wide and has a response of 7nT. It is likely to extend beyond the survey area to the north and south and it is possible that it is associated with anomaly (2) to the south east.

(2) - A positive linear anomaly with a similar width and response to anomaly (1) is situated in the southern part of the site, following the same contour as anomaly (1). It appears to have been truncated by a buried service and it is not clear if it extends south east of this due to the presence of strongly magnetic debris that has obscured the southern edge of the site. It is possible that this is a continuation of anomaly (1) and an archaeological origin should be considered.

(3) - The eastern part of the site contains a cluster of discrete positive anomalies with a response of 10nT and without a corresponding surface expression that would indicate relatively recent quarrying. It is possible that they relate to pits, possibly associated with early quarrying.

Anomalies with an uncertain origin

(4) - A positive linear anomaly extends between the southern end of anomaly (1) and two buried services (13) located along the western edge of the site. It does not appear to extend northwards beyond the services. It is weaker than anomaly (1) with a response of 3nT; however, it is possible that it relates to a cut feature with archaeological potential.

(5) - A cluster of weakly positive discrete and linear anomalies are located in the centre of the survey area on slightly flatter land. They do not have a coherent pattern or morphology, and although it is possible that they relate to shallow

geology, it should be considered that they relate to cut, ditch-like and pit-like features.

(6) - A group of positive discrete, linear and possible curvilinear anomalies are located in the northern part of the survey area. They lie close to a zone associated with former quarrying and it is not certain if these relate to shallow geology, former quarrying or cut features.

(7) - A number of positive and negative linear anomalies are located in the northern part of the survey area, close to and parallel with anomaly (1). Several others, with a similar orientation, can be seen towards the eastern edge of the site. It is not possible to determine if the relate to cut, ditch-like features.

Anomalies associated with land management

(8) - The survey area contains a number of positive linear anomalies and linear zones of magnetic debris that are associated with formerly mapped field boundaries.

Anomalies associated with quarrying

(9) - In the north eastern corner of the site there is evidence for former quarrying associated with a deep depression towards the eastern edge and a very shallow band extending westwards towards the centre of the site.

Anomalies with an agricultural origin

(10) - Parallel linear anomalies are associated with agricultural activities.

Anomalies associated with magnetic debris

(11) - Towards the south eastern part of the site is a large zone containing very strongly magnetic debris. This is a response to ferrous and other magnetically thermoremnant material that has been used as land fill within a former quarry in the southern part of the site. There is similar evidence for this material along the northern and southern edges of the site.

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

Anomalies with a modern origin

(13) - Extending along the western edge of the survey area are two buried services that converge in the centre and then diverge towards the northern and southern ends.

(14) - Within the southern part of the site is another buried service.

4 CONCLUSION

4.1.1 The results of the detailed magnetometer survey reveal the presence of a positive linear anomaly representing a linear ditch that extends along the contour on the western side of the site. It has been truncated by a small quarry in the west and a larger quarry in the south, but appears also in a small section that was available for survey just on the southern edge of the site. It is possible that it relates to a former ditch bounding an elevated area. Another ditch-like response appears to extend towards it in the western part of the site, but it is not clear if it is associated. Within the eastern part of the site are a cluster of pits with dimensions of 3-4m by 2.5-3m and 8.5m by 5m. Their responses indicate that they have a magnetically enhanced fill and there is no corresponding surface depression. While they may be associated with quarrying, an archaeological origin should be considered.

4.1.2 A number of other pit-like and ditch-like anomalies have also been located. It is not possible to determine if they relate to archaeological features, as an association with shallow geology is possible.

4.1.3 There is widespread evidence for quarrying, much of the southern part of the site being too uneven and steep to survey. The nature of the surface depressions suggest several different phases of stone extraction. A large zone of magnetic debris infers the presence of relatively modern material used as quarry infill and ground make up.

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Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material.

Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field.

Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The SENSYS gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 65cm apart. The instrument is carried about 10-20cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between ±20nT and ±10nT often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero (destripe) Median/Mean Traverse

The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise differences between the baseline value of gradiometer sensors.

High Pass Filtering

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

Appendix C – survey and data information

```
COMPOSITE
Filename:               J618-mag-proc.xcp
Description:            Imported as Composite from: J618-mag.asc
Instrument Type:        Sensys DLMGPS
Units:                  nT
UTM Zone:               30U
Survey corner coordinates (X/Y): OSGB36
Northwest corner:       402155.585731519, 203268.624441457 m
Southeast corner:       402385.145731519, 202987.824441457 m
Collection Method:      Randomised
Sensors:                5
Dummy Value:            32702

Source GPS Points:      1390200

Dimensions
Composite Size (readings):  1913 x 2340
Survey Size (meters):       230 m x 281 m
Grid Size:              230 m x 281 m
X Interval:             0.12 m
Y Interval:             0.12 m

Stats
Max:                    5.53
Min:                    -5.50
Std Dev:                2.78
Mean:                   0.00
Median:                 0.00
Composite Area:         6.446 ha
Surveyed Area:          3.2855 ha

PROGRAM
Name:                   TerraSurveyor
Version:                3.0.23.0

Processes:  1
  1  Base Layer

GPS based Proce4
  1  Base Layer.
  2  Unit Conversion Layer (to OSGB36).
  3  DeStripe Median Traverse:
  4  Clip from -5.00 to 5.00 nT
```

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire. Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site.

A copy of the report in PDF/A format will be supplied to the Gloucestershire Historic Environment Record, together with a DXF of the survey boundary. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS).

Archive contents:

Geophysical data Area 1 - path: J618 Bowling Green Lane, Cirencester\Data				
Path and Filename	**Software**	**Description**	**Date**	**Creator**
ciren1\MX\ .prm, .dgb, .disp	Sensys MXPDA	Proprietary data formats representing magnetometer survey traverses logged to a PDA.	01/07/15	D.J.Sabin
ciren1\MX\J618-mag-.asc	Sensys DLMGPS	ASCII CSV (tab) file representing survey Area 1 in eastings, northings (UTM Z30N), magnetic measurement, traverse file and sensor number.	01/07/15	K.T.Donaldson
mag/comps\J618-mag.xcp	TerraSurveyor 3.0.23.0	Composite data file derived from ASCII CSV.	01/07/15	K.T.Donaldson
mag/comps\J618-mag-proc.xcp	TerraSurveyor 3.0.23.0	Processed composite data file (zmt and clipping to ±5nT).	01/07/15	K.T.Donaldson
Graphic data - path: J618 Bowling Green Lane, Cirencester\Data				
Mag\graphics\ J618-mag-proc.tif	TerraSurveyor 3.0.23.0	TIF file showing a minimally processed greyscale plot clipped to ±3nT.	01/07/15	K.T.Donaldson
Area1\graphics\ J618-mag-proc.tfw	TerraSurveyor 3.0.23.0	World file for georeferencing TIF to OSGB36.	01/07/15	K.T.Donaldson
CAD data - path: J618 Bowling Green Lane, Cirencester\CAD				
J618 version 1.dwg	ProgeCAD 2016	CAD file for creating plots of greyscales, abstraction, interpretation and mapping. Grid coordinates as OSGB. AutoCAD 2010 format.	01/07/15	K.T.Donaldson
Text data - path: J618 Bowling Green Lane, Cirencester\Documentation				
J618 report.odt	OpenOffice.org 3.0.1 Writer	Report text as an Open Office document.	08/07/15	K.T.Donaldson

Appendix E – copyright and intellectual property

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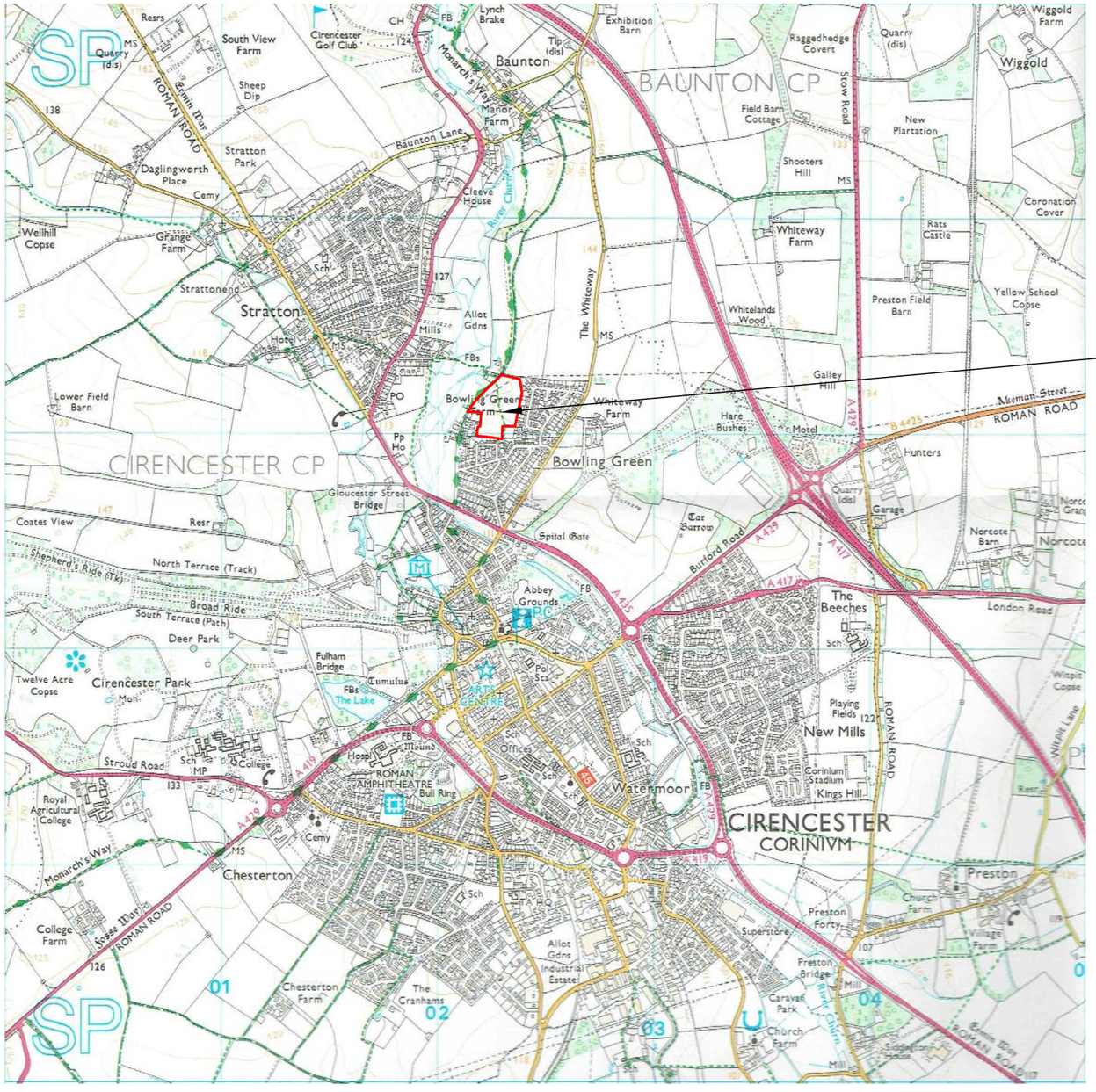


Archaeological Surveys Ltd

Geophysical Survey
Land at Bowling Green Lane
Cirencester
Gloucestershire

Map of survey area

● Survey location

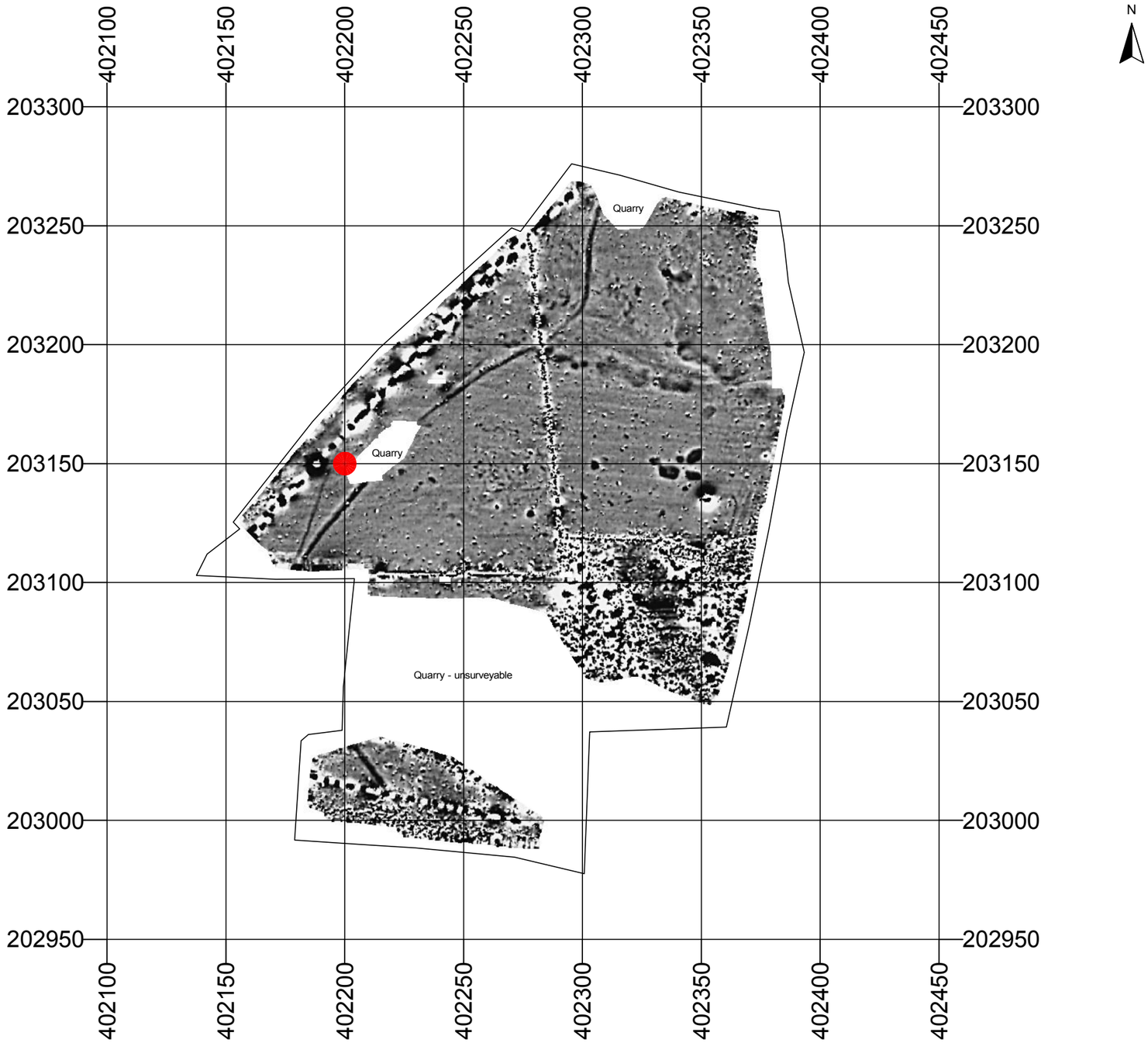
SP 02275 03135

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01



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Referencing information

Referencing grid to OSGB36 datum at 50m intervals

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

● 402200 203150

SCALE 1:2000

0m 20 40 60 80 100m

SCALE TRUE AT A3

FIG 02

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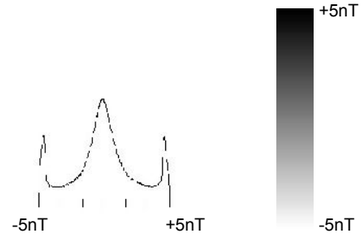
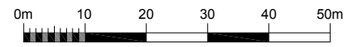
Greyscale plot of minimally processed magnetometer data



SCALE 1:1000



SCALE TRUE AT A3

FIG 03

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Abstraction and interpretation of magnetometer anomalies

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - of agricultural origin
- Positive linear anomaly - former field boundary
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature of archaeological potential
- Discrete positive response - possible pit-like feature
- Variable magnetic response - quarry
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 04