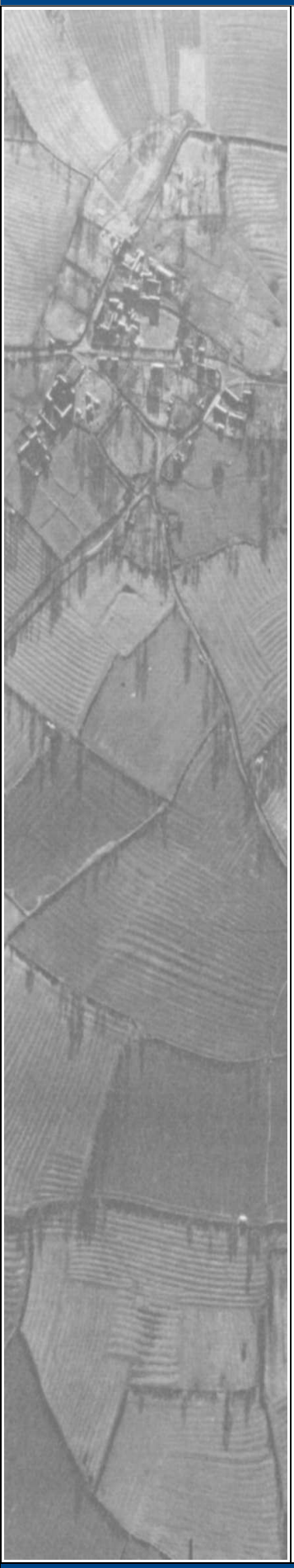

St Columba's College
St Albans
Hertfordshire

MAGNETOMETER SURVEY REPORT

for

St Columba's College

Kerry Donaldson & David Sabin

March 2020

Ref. no. J810

ARCHAEOLOGICAL SURVEYS LTD

St Columba's College
St Albans
Hertfordshire

MAGNETOMETER SURVEY REPORT

for

St Columba's College

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

Survey date – 21st February 2020
Ordnance Survey Grid Reference – **TL 14120 06380**

Archaeological Surveys Ltd
1 West Nolands, Nolands Road, Yatesbury, Calne, Wiltshire, SN11 8YD
Tel: 01249 814231 Fax: 0871 661 8804
Email: info@archaeological-surveys.co.uk
Web: www.archaeological-surveys.co.uk

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SUMMARY

A detailed magnetometer survey was carried out on the playing fields of St Columba's College, St Albans, by Archaeological Surveys Ltd, ahead of their planned refurbishment. The results indicate the presence of a number of positive linear and rectilinear anomalies that may relate to features with archaeological potential. Other linear anomalies could be associated with formerly mapped features, but this is not certain and an archaeological origin is also possible. Much of the site contains evidence for modern disturbance through land drainage measures, ground make-up and magnetic disturbance from ferrous objects.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Border Archaeology, on behalf of St Columba's College, to undertake a magnetometer survey of the school playing fields. The site has been outlined for a proposed refurbishment of the playing fields, including levelling and re-laying of the grass pitches and the introduction of an artificial grass pitch. The survey forms part of an archaeological assessment of the site.

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 Geophysical survey can provide useful information on the archaeological potential of a site; however, the outcome of any survey relies on a number of factors and as a consequence results can vary. The success in meeting the aims and objectives of a survey is, therefore, often impossible to predetermine.

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

1.3.1 The survey and report generally follow the recommendations set out by: European Archaeological Council (2015) *Guidelines for the Use of Geophysics in Archaeology;* Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations.* The work has been carried out to the Chartered Institute for Archaeologists (2014) *Standard and Guidance for Archaeological Geophysical Survey.* Note: currently Historic England (2018) no longer support the guidelines set out in English Heritage (2008) *Geophysical survey in archaeological field evaluation* and there are

currently no plans to update the document. As a consequence other sources of written guidance referring to this document may be out of date and/or contain unsupported information (e.g. Chartered Institute for Archaeologists, 2014).

1.3.2 Archaeological Surveys Ltd provide a detailed geophysical survey report and it is recommended that where possible the contents should be considered in full. The Summary provides a brief overview of the results with more detail available in the Discussion and/or Conclusion. The *List of anomalies* within the Results provides a detailed assessment of the anomalies within separate categories which can be useful in inferring a level of confidence to the interpretation. Quality and factors influencing the interpretation of anomalies is also set out within the results.

1.3.3 It is recommended that the full report should always be considered when using data and interpretation plots; where this is not possible, in the field for example, the abstraction and interpretation plots should retain their colour coding and be used with a corresponding legend.

1.3.4 Where targeting of anomalies by excavation is to be carried out, care should be taken to place trenches over solid lines or features visible on the abstraction and interpretation plots. Archaeological Surveys abstraction and interpretation avoids the use of dashed or dotted line formats, and broken or fragmented lines used in interpretive plots may well correspond closely with truncation of archaeological features.

1.4 Site location, description and survey conditions

1.4.1 The site is located within the school playing fields at St Columba's College, located between King Harry Lane to the south and residential dwellings of Westminster Court and Trevelyan Place off St Stephen's Hill to the east. To the north is the car park associated with Abbey View Golf Course and Track which is located to the west of the site. The central Ordnance Survey National Grid Reference (OS NGR) is TL 14120 06380, see Figs 01 and 02.

1.4.2 The geophysical survey covers approximately 2.35ha of playing fields that slope down to the north. The southern part of the area has been terraced and much of the site contains sports field equipment and apparatus. Numerous modern sources of magnetic disturbance were noted and include steel fencing, lighting, net supports, goal posts and ground maintenance equipment.

Plate 1: Survey area looking north east

1.4.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. The survey was carried out in fine weather conditions.

1.5 Site history and archaeological potential

1.5.1 An Archaeological Desk-Based Assessment has been undertaken by Border Archaeology (2018) which outlines that the site was located to the north east of a substantial Iron Age settlement and cemetery. It is also located 300m south east of the Roman town of Verulamium, with the route of the Roman road of Watling Street passing just to the south of the playing fields. The site is understood to lie partly within the bounds of a large Roman extramural cemetery of St Stephen's which flanked Watling Street and was in use from the mid-late 1st century to the early 3rd century AD. Recent investigations within the college have produced limited evidence for Roman activity but there is potential to locate further evidence for Roman burials and possible later Roman industrial features. During the medieval period the site lay within the rural hinterland of the Benedictine Abbey of St Albans, although evidence for industrial activity has been located in the vicinity.

1.6 Geology and soils

1.6.1 The underlying geology is from the Lewes Nodular Chalk Formation and Seaford Chalk Formation with overlying river terrace deposits of sands and gravels along the far northern section of the site (BGS, 2017).

1.6.2 The overlying soil across the site is from the Charity 2 association and is a typical argillic brown earth. It consists of a calcareous fine, silty soil over chalk (Soil Survey of England and Wales, 1983).

1.6.3 Magnetometry carried out over similar geology and soil has produced good results. The site is, therefore, considered suitable for magnetic survey.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance (also known as thermoremanence) are factors associated with the formation of localised fields.

2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce 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). Additional details are set out in 2.2 below and within Appendix A.

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers (FGM650) spaced 0.5m apart with readings recorded at 20Hz. The cart is pushed at walking speed and not towed. Each sensor is not zeroed in the field as the vertical axis alignment is precisely fixed leaving sensor offsets that are removed during data processing. The fixing of the vertical alignment ensures the sensors are not unduly influenced by localised magnetic fields and that the vertical component of a magnetic anomaly is measured. The gradiometers have a range of recording data between ±0.1nT and ±8000nT. They are linked to a Leica GS10 RTK GNSS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged

PDA computer system.

2.2.2 Due to the fixed offsets within the fluxgate sensors, as a result of the manufacturing and tensioning process, the survey data do not provide a visually useful dataset until a zero median traverse algorithm is applied. It is recognised that this has the potential to affect some anomalies detrimentally by removing linear features orientated parallel to survey transects. However, this has not been noted as a particular problem with the system due to the high resolution data collection, generally long length of traverses and variability within the magnetic characteristics of a linear anomaly.

2.2.3 Data are collected along a series of parallel survey transects to achieve 100% coverage of the surveyable land. The length of each transect is variable and relates to the size of the survey area and other factors including ground conditions. A visual display allows accurate placing of transects and helps maintain the correct separation between adjacent traverses. Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).

2.2.4 Fluxgate sensors are highly sensitive to temperature change and this manifests as drift during the course of a survey. This can be particularly noticeable during the morning as temperatures rise and the equipment warms or cools. Sensor drift within the course of a traverse will appear as a line trending from negative to positive after processing with a zero median traverse algorithm. To remove the potential for temperature drift, data were collected after a 20 minute stabilisation period and traverses were limited to a time of generally <60s.

2.3 Data processing and presentation

2.3.1 Magnetic data collected by the MAGNETO®MXPDA cart-based system are initially prepared using SENSYS MAGNETO®DLMGPS software. The software effectively allocates a geographic position for each data point and can compensate for fixed offsets present within the FGM650 sensors. The offsets are positive or negative values present on all fluxgate gradiometer sensors. Some systems use manual or electronic balancing to effectively zero the sensors; however, this is a short term measure that is prone to drift through temperature changes and vibration and can easily be incorrectly set due to localised magnetic fields. The FGM650 sensors are very accurately aligned to the vertical magnetic gradient and are highly stable showing negligible drift on long traverses. The offset values are removed using TerraSurveyor software.

2.3.2 Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display within TerraSurveyor. The removal of the offset values (compensation) of the sensors is also carried out in TerraSurveyor using a zero median traverse function. Data are then considered to be minimally processed. Note: without the zero median traverse

function it is not possible to create a meaningful data plot as all sensors have a different offset value. 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 The minimally processed data are collected between limits of ±8000nT and clipped for display at ±100nT, ±8nT and ±3nT to show different anomalies of different values. Data are interpolated to a resolution of effectively 0.5m between tracks and 0.15m along each survey track.

2.3.4 Appendix C contains metadata concerning the survey and data attributes and is derived directly from TerraSurveyor. Reference should be made to Appendix B for further information on processing.

2.3.5 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report is the minimally processed greyscale plot. With regard to the Sensys MXPDA, minimally processed data are considered by the manufacturer to be data that are compensated by SENSYS MAGNETO DLMGPS software, see 2.3.1 and 2.3.2. Note: traceplots are not considered to be appropriate as they do not provide an accurate or useful assessment of the magnetic anomalies due to the very high density of data collection. In addition, traceplots cannot be meaningfully plotted against base mapping and in areas of complexity traces may be lost or highly confused. Traceplots may be used to demonstrate characteristic magnetic profiles across discrete features where it is considered beneficial.

2.3.6 The raster images are combined with base mapping using ProgeCAD Professional 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 GNSS, resection method, etc.

2.3.7 An abstraction and interpretation is drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing. Appendix E sets out CAD layer names with colour and graphic content for each interpretation category, see 3.3.

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

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

3 RESULTS

3.1 General assessment of survey results

3.1.1 The detailed magnetic survey was carried out over a total of 2.35ha within the school playing fields. Modern sources of magnetic disturbance were avoided where possible.

3.1.2 Magnetic anomalies located can be generally classified as positive responses of archaeological potential, positive anomalies of an uncertain origin, linear anomalies associated with land management, 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. Anomalies located within each survey area have been numbered and are described in 3.4 below.

3.2 Statement of data quality and factors influencing the interpretation of anomalies

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

3.2.2 A zone of magnetic debris along the southern and eastern parts of the site is associated with material of modern origin used in ground make-up and/or terracing. The material has the potential to obscure weak anomalies associated with archaeological features should they be present within these areas.

3.3 Data interpretation

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A general explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, see Table 1.

Interpretation category	Description and origin of anomalies
Anomalies with archaeological potential	Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as pits, ring ditches, enclosures, etc. The category is used where there is a high level of confidence which may be due to additional supporting information where morphology is unclear or uncharacteristic.
Anomalies with an uncertain origin	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Morphology may be unclear or uncharacteristic and there may be a lack of additional supporting information. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone

	and subsoil.
Anomalies relating to land management	Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies.
Anomalies associated with magnetic debris	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. They often occur where there has been dumping or ground make-up and are related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, hearths and nail spreads from former wooden structures or rooves and may, therefore, be archaeologically significant. It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc. Often a significant area around these features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically adjacent to strong magnetic sources. 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 514120 206380 see Figs 03 – 06.

Anomalies of archaeological potential

(1) - Located in the northern part of the survey area are a group of positive responses including parallel rectilinear anomalies. Although centrally positioned and parallel with the current northern land boundary, no features are mapped in this area or recorded on aerial photographs. The anomalies are relatively strong, peaking at 40-70nT, indicating magnetic enhancement, burning or possible industrial activity and an association with possible structural remains. Given the position in relation to surrounding archaeological features, the archaeological potential of these anomalies should be considered.

(2) - The survey area contains a number of weakly positive linear anomalies. They often appear fragmented, and there is truncation by modern land drainage (6). They appear to relate to ditch-like features with archaeological potential.

Anomalies with an uncertain origin

(3) - A positive linear anomaly could be associated with anomalies (2); however, it partially corresponds to the line of a formerly mapped boundary feature and could be associated.

(4) - A positive linear anomaly is located close to the southern edge of the survey

area. This lies on a terrace, although away from the main zone containing magnetic made-up ground (7). It could relate to a cut feature with archaeological potential; however, it appears in the vicinity of a formerly mapped path and could be associated. A linear anomaly with a similar orientation can be seen 65m to the north east.

(5) - The survey area contains a number of weakly positive linear anomalies with no coherent morphology of pattern. It is not clear if they relate to cut features.

Anomalies associated with land management

(6) - Widespread negative linear anomalies relate to drainage of the sports field likely constructed as sand-filled channels. They form a regular gridded network in parallel lines spaced 5 - 6.5m apart where they are oriented north west to south east and 1.6m apart where they are oriented north east to south west. They have truncated earlier features (1) and (2).

Anomalies associated with magnetic debris

(7) - Strongly magnetic debris indicates ferrous and other magnetically thermoremnant material has been used in the ground make-up during construction of the terrace at the southern end of the site.

(8) - A line of strong, discrete, dipolar anomalies close to the eastern edge of the sites relates to a former fenceline.

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

Anomalies with a modern origin

(10) - Magnetic disturbance from sports field equipment and surrounding fencing.

4 CONCLUSION

4.1.1 The detailed magnetometer survey has revealed a number of positive linear and possible rectilinear anomalies within the site. A group, including a possible double parallel rectilinear anomaly is located at the northern edge of the site. The strength of the anomalies could indicate some association with industrial activity. Although parallel with the existing land boundary, the location of archaeological features in the wider vicinity may indicate that the anomalies are of archaeological potential. Other, weaker, positive linear anomalies have been located elsewhere, and while some could relate to formerly mapped features, there is evidence of fragmentation and truncation by modern land drainage, suggesting some age to the anomalies which may relate to ditch-like features with some archaeological potential.

4.1.2 Evidence for more modern use of the site include widespread sports field drainage, a former fence line, widespread magnetic debris from terracing and magnetic disturbance from sports field equipment.

5 REFERENCES

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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 magnetic field. The difference between the two sensors will relate to the strength of the magnetic field created by the buried feature.

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

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Despike

Removal of data points that exceed the mean/median/threshold by selecting a window size of data points and replace by mean/median/threshold. Magnetic spikes can be caused iron objects on the surface or within the topsoil. Despike can improve the appearance of data and remove extreme readings that may affect further processing.

High Pass Filter

Removes low frequency anomalies within the data that are not considered to be archaeologically significant and may be natural in origin. A window passes over the data, the mean of all the data within the window is subtracted from the centre value. The size of the window is adjusted as is the weighting which may be uniform or Gaussian. The process is used to improve the visibility of anomalies of interest.

Low Pass Filter

Removes high frequency anomalies or 'noise' within datasets and provides a smoother output. A window passes over the data, the mean of all the data within the window is used to replace the centre value. The size of the window is adjusted as is the weighting. The process is used to improve the visibility of anomalies of interest.

Zero Median/Mean Traverse

The median (or mean) of data from each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise differences between the offset values of the gradiometer sensors. The process can remove archaeological features that run along a traverse but with the high resolution datasets created by the Sensys FGM650 sensors and the method of data collection this has not been a notable problem. In fact, the removal of offsets using software avoids carrying out a balancing procedure on site, which inevitably can never be done in magnetically clean conditions and results in improperly aligned fluxgate sensors and/or electronic adjustment values.

Appendix C – survey and data information

Minimally processed data clipped at ±100nT

Filename: J810-mag-proc.xcp
Description: Imported as Composite from: J810-mag.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGb36
Northwest corner: 514023.61, 206496.72 m
Southeast corner: 514205.86, 206272.77 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702
Source GPS Points: 667000
Dimensions
Composite Size (readings): 1215 x 1493
Survey Size (meters): 182 m x 224 m
Grid Size: 182 m x 224 m
X Interval: 0.15 m
Y Interval: 0.15 m
Stats
Max: 110.50
Min: -110.00
Std Dev: 31.74
Mean: -0.95
Median: 0.00
Composite Area: 4.0815 ha
Surveyed Area: 2.3545 ha
PROGRAM
Name: TerraSurveyor
Version: 3.0.23.0
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 Clip from -100.00 to 100.00 nT

Minimally processed data clipped at ±8nT

Stats
Max: 8.84
Min: -8.80
Std Dev: 5.12
Mean: -0.10
Median: 0.05
GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 Clip from -100.00 to 100.00 nT
5 Clip from -8.00 to 8.00 nT

Minimally processed data clipped at ±3nT

Stats
Max: 3.32
Min: -3.30
Std Dev: 2.25
Mean: -0.01
Median: 0.04
GPS based Proce4
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 Clip from -3.00 to 3.00 n

Appendix D – digital archive

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

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

Archive contents:

File type	Naming scheme	Description
Data	J810-mag-**[area number/name]**.asc J810-mag-**[area number/name]**.xcp J810-mag-**[area number/name]**-proc.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data
Graphics	J810-mag-**[area number/name]**-proc.tif	Image in TIF format
Drawing	J810-**[version number]**.dwg	CAD file in 2010 dwg format
Report	J810 report.odt	Report text in Open Office odt format

Table 2: Archive metadata

Appendix E – CAD layers for abstraction and interpretation plots

The table below sets out Archaeological Surveys Ltd CAD layer names with associated colours and graphical content. Where CAD files are available layers may be extracted for further CAD/GIS use. Note: hatched polygon boundaries are contained within layers with the RGB colour code 254, 255, 255 (near white) in order to prevent their visibility.

Report sub-heading and associated CAD layer names	Colour with RGB index		Layer content
Anomalies with archaeological potential			
AS-ABST MAG POS LINEAR ARCHAEOLOGY		Red 255,0,0	Line, polyline or polygon (solid)
Anomalies with an uncertain origin			
AS-ABST MAG POS LINEAR UNCERTAIN		255,127,0	Line, polyline or polygon (solid)
Anomalies relating to land management			
AS-ABST MAG LAND DRAIN		Cyan 0,255,255	Line or polyline
Anomalies associated with magnetic debris			
AS-ABST MAG DEBRIS		132, 132, 132	Polygon (cross hatched ANSI37)
AS-ABST MAG STRONG DIPOLAR		132, 132, 132	Solid donut, point or polygon (solid)
Anomalies with a modern origin			
AS-ABST MAG DISTURBANCE		132, 132, 132	Polygon (hatched ANSI31)
AS-ABST MAG SERVICE		132, 132, 132	Line or polyline

Table 3: CAD layering

Appendix F – copyright and intellectual property

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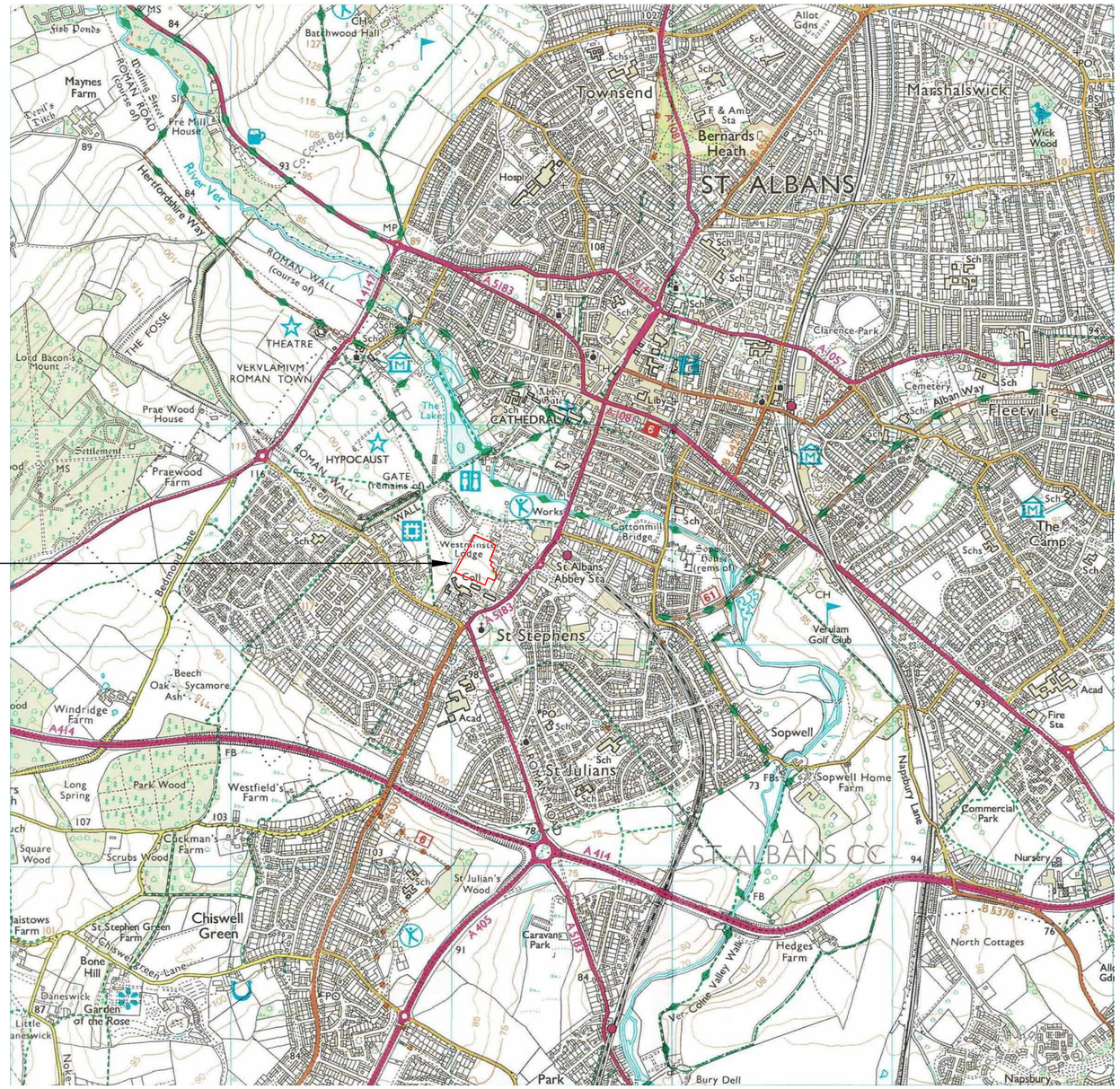
Survey location



N

Survey location

Site centred on OS NGR
TL 14120 06380

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

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KTD	DJS	FIG 01

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Hertfordshire

Map of survey area

513900 513950 514000 514050 514100 514150 514200 514250 514300 514350

206500 206450 206400 206350 206300 206250 206200 206150

Playing fields

St Columba's College

Trevelyan Place

St Stephen's Hill

King Harry Lane

N

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Referencing information

Referencing grid to OSGB36 datum at 50m intervals

514100 206450

Survey tracks

Survey track start

Survey track stop

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

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KTD	DJS	FIG 02

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Greyscale plot of minimally processed magnetometer data clipped at ±100nT

+100nT
+70nT
-70nT
-100nT

-100nT +100nT

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRUE AT A3

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KTD	DJS	FIG 03

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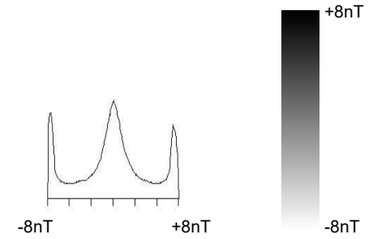
Greyscale plot of minimally processed magnetometer data clipped at ±8nT



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SCALE TRUE AT A3

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KTD	DJS	FIG 04

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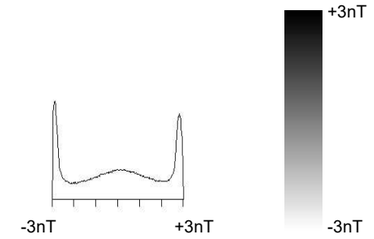
Greyscale plot of minimally processed magnetometer data clipped at ±3nT



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SCALE TRUE AT A3

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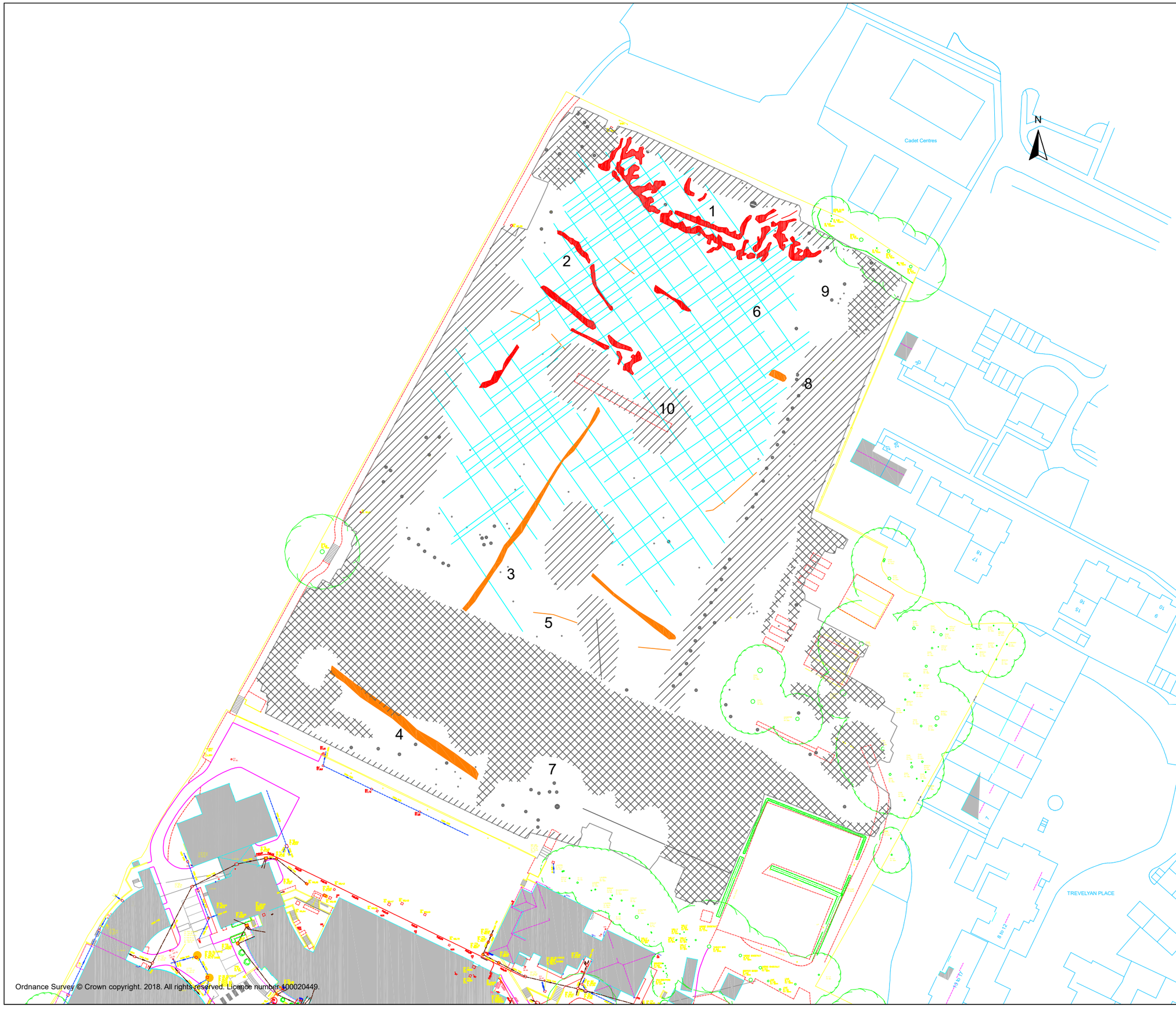
KTD	DJS	FIG 05



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Abstraction and interpretation of magnetic anomalies

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - associated with land drainage
- 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

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KTD	DJS	FIG 06