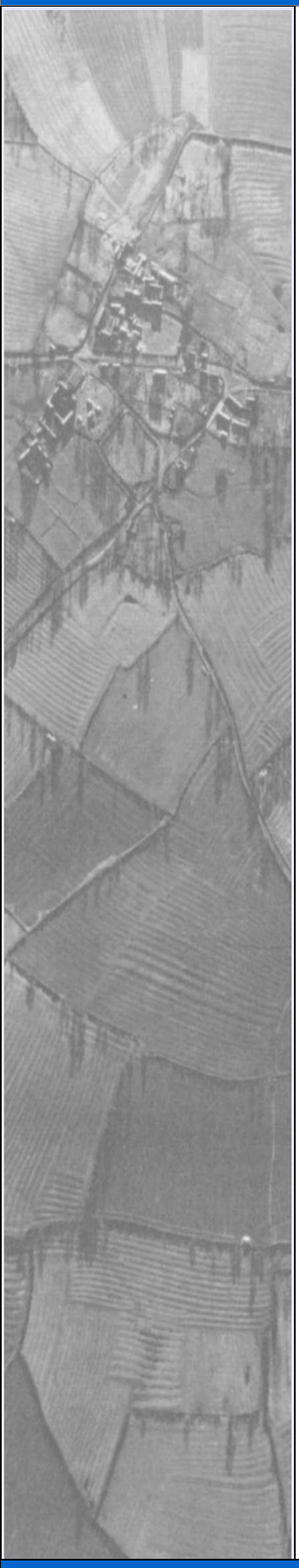

Land south of Marshfield Close
Goonhavern
Perranzabuloe
Cornwall

MAGNETOMETER SURVEY REPORT

for

Cotswold Archaeology

Kerry Donaldson & David Sabin

February 2019

Ref. no. J775

ARCHAEOLOGICAL SURVEYS LTD

Land south of Marshfield Close
Goonhavern
Perranzabuloe
Cornwall

Magnetometer Survey Report

for

Cotswold Archaeology

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 – 7th February 2019
Ordnance Survey Grid Reference – **SW 78650 53490**

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SUMMARY

A detailed magnetometry survey was carried out over a small land parcel at Goonhavern in Cornwall. The results reveal the presence of anomalies associated with the underlying geology/subsoil in the south western corner of the site and also the remains of a former field boundary, removed in the 20th century. Elsewhere there are a small number of weakly positive anomalies, but they lack a coherent morphology and cannot be confidently interpreted. Other anomalies are associated with more recent land use, including a former construction compound and recent geotechnical investigations.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Cotswold Archaeology to undertake a magnetometer survey of an area of land to the south of Marshfield Close in Goonhavern, Cornwall. The site has been outlined for a proposed residential development under pre-application number PA18/03044/PREAPP, and the survey forms part of an archaeological assessment.

1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2019) and approved by Peter Dudley, local planning archaeologist for Cornwall Council, prior to commencing the fieldwork.

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 lines; broken or fragmented anomalies may well correspond closely with subsurface truncation.

1.4 Site location, description and survey conditions

1.4.1 The site is located to the south of a new residential development at Marshfield Close on the southern edge of Goonhavern within the parish of Perranzabuloe in Cornwall. It is centred on Ordnance Survey National Grid Reference (OS NGR) SW 78650 53490, see Figs 01 and 02.

1.4.2 The geophysical survey covers just over 1ha within a single pasture field. The land tends to slope down gently towards the north west and the field is bounded mainly by Cornish hedges. A very slightly raised platform with more weedy ground cover in the north eastern part of the field is the site of a reinstated compound that was associated with house building immediately to the north of the field.

1.4.3 Prior to the survey, intrusive site investigations and soakaway testing had been carried out within the field, and this had caused rutting and bare areas of soil. Wet weather prior to the survey had produced areas of standing water and boggy conditions where the soil had been recently disturbed.

1.4.4 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. However, some difficulty in traversing the site was encountered where the field was heavily rutted and saturated, and a very narrow linear section crossing the central part could not be surveyed. The area of the former site compound was also uneven.

Plate 1: Survey area looking south east

1.5 Site history and archaeological potential

1.5.1 The site does not contain any designated or undesignated heritage assets; however, a scheduled Bronze Age bowl barrow (HE List Entry no. 1016164) is situated 70m to the south west. Prior to the new residential development, the field to the north has been previously subject to geophysical survey which indicated the presence of two parallel ditches that may have related to a former trackway (Sharpe, 2013). The area lies within post-medieval enclosed land with the 1840 Perranzabuloe tithe map indicating that the site lay at the time within unenclosed downland. By the 1877 First Edition Ordnance Survey map the site and the wider area had been enclosed, but it had not been improved as it contained furze (gorse). The south western corner of the field was partitioned by a field boundary between at least 1877 and 1963, with removal by 1973.

1.6 Geology and soils

1.6.1 The underlying solid geology across the site is from the Trendrean Mudstone Formation (Devonian mudstone) with some overlying head deposits in the far south eastern corner (BGS, 2017).

1.6.2 The overlying soil across the survey area is from the Denbigh 2 association and is a typical brown earth. It consists of a well drained, fine, loamy soil over slate or slate rubble (Soil Survey of England and Wales, 1983).

1.6.3 Magnetometry survey carried out across similar soils has produced good results although there can be anomalies associated with the underlying geology. The underlying geology and soils are 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 a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers (FGM650) spaced 0.5m apart with readings recorded at 20 Hz. 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 ±10,000nT. They are linked to a Leica GS10 RTK GPS 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 <100s.

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 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 ±10000nT and clipped for display at ±3nT. 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.

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 GPS, 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 approximately 1ha within a single pasture field.

3.1.2 Magnetic anomalies located can be generally classified as positive anomalies of an uncertain origin, anomalies associated with land management, areas of magnetic debris and disturbance, strong discrete dipolar anomalies relating to ferrous objects and anomalies associated with vehicle ruts. 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 narrow linear zone through the central part of the field, orientated north to south, could not be surveyed due to deep ruts, waterlogged soil and a linear mound of soil. The unsurveyed area is very narrow and unlikely to contain significant anomalies.

3.2.3 Localised zones of magnetic disturbance around the periphery of the field are associated with modern ferrous objects. It is unlikely that it has obscured more significant anomalies.

3.2.4 A large zone of variable magnetic response was encountered within the south western part of the field. It was considered likely that this was associated with localised variability in the magnetic susceptibility of the soil and underlying geology. A single soil and subsoil sample were obtained from recently disturbed ground and subject to mass specific magnetic susceptibility measurement in order to further understand the magnetic properties of the soil and the results of the magnetometry. These supplementary measurements were derived from a Bartington MS2 meter with MS2B sensor.

3.2.5 The topsoil gave a low frequency mass specific magnetic susceptibility value (X_{lf}) = **11.45** $10^{-8}m^3kg^{-1}$ and the subsoil was **11.78** $10^{-8}m^3kg^{-1}$. These values are unusual as most soils demonstrate significantly higher values for the topsoil compared with the subsoil. The lack of contrast may infer that some former ditches and pits may not be sufficiently enhanced for their location by magnetometry. However, the results of the magnetometry show very clear linear anomalies associated with a former field boundary and this would indicate given suitable conditions, the magnetic susceptibility of the soil can become significantly enhanced.

3.2.6 Further mass specific magnetic susceptibility measurement was carried out on both topsoil and subsoil samples after high temperature heating. This gave values of **1313.01** $10^{-8}m^3kg^{-1}$ for topsoil and **1449.68** $10^{-8}m^3kg^{-1}$ for subsoil. These results demonstrate that high magnitude magnetic susceptibility of topsoil and subsoil is easily obtained by burning and that former cut features of archaeological potential are likely to contain useful magnetic contrast in most cases, perhaps with the exception of ephemeral features.

3.2.7 The large increase in magnetic susceptibility on burning may also be useful in

understanding the origin of the zone of magnetic anomalies considered to be of natural origin in the south western part of the field. Processes such as weathering and oxidation may support conditions where soils become more naturally enhanced, and the additional testing has demonstrated that the mineralogy of the soil is able to support significantly raised values of magnetic susceptibility given suitable conditions.

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, see Table 1.

Interpretation category	Description and origin of anomalies
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	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 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.
Anomalies with a natural origin	Naturally formed magnetic anomalies 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 distinguish from pit-like anomalies with an anthropogenic origin. Fluvial, glacial and periglacial processes may be responsible for their formation within drift material and subsoil. Igneous and metamorphic activity can lead to anomalies within more solid geology.

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 178650 53490, see Figs 03 & 04.

Anomalies with an uncertain origin

(1) - Located in the eastern part of the survey area are a number of weakly positive responses. They lack a coherent morphology, and it is possible that they relate to natural features, or are possibly associated with ground disturbance or dumped material.

(2) - A small number of discrete positive responses are located in the north western part of the site. It is not possible to determine if they have a natural or anthropogenic origin.

(3) - Situated within a zone of magnetically variable responses (5) in the south western part of the site are a small number of positive linear anomalies. It is highly likely that they are associated with the natural anomalies, but this is uncertain.

Anomalies associated with land management

(4) - Two parallel positive linear anomalies flank a negative linear anomaly at the far western corner of the field. This relates to a former field boundary that was first recorded in the 1870s and removed by the early 1970s.

Anomalies with a natural origin

(5) - The south western part of the site contains a zone of magnetically variable responses which relate to variations in the underlying geology and subsoil.

Anomalies associated with magnetic debris

(6) - Strongly magnetic debris in the north eastern part of the field is associated with the use and reinstatement of a former construction compound used during the development to the north. It generally corresponds to a low platform in this part of the field.

(7) - A small patch of magnetic debris is likely to relate to dumped and burnt material.

(8) - Strong, discrete, dipolar anomalies are a response to ferrous objects within the topsoil.

Anomalies with a modern origin

(9) - Negative linear anomalies relate to modern tracked vehicle ruts.

4 CONCLUSION

4.1.1 The results of the geophysical survey demonstrate the presence of a small number of weakly positive anomalies, but these lack a coherent morphology and could relate to natural features or ground disturbance. A former field boundary, removed in the late 1960s or early 1970s, does have a strong response indicating that any cut features with an archaeological origin would be likely to have useful magnetic contrast.

4.1.2 A zone of magnetically variable responses in the south western part of the site probably relates to the underlying geology and/or subsoil. Other anomalies are associated with a former construction compound and recent vehicle ruts caused by geotechnical investigations.

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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. It has been found that clipping data to ranges between ±5nT and ±3nT 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, modern agricultural features and other large magnetic bodies within or adjacent to survey areas.

Low Pass Filtering

A mathematical process used to remove high frequency anomalies relating to uneven ground, vibration, etc.

Appendix C – survey and data information

Filename: J775-mag-proc.xcp
Description: Imported as Composite from: J775-mag.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 30U
Survey corner coordinates (X/Y):OSGB36
Northwest corner: 178565.273, 53536.10 m
Southeast corner: 178725.32, 53440.553 m
Collection Method: Randomised
Sensors: 5
Dummy Value: 32702
Source GPS Points: 372100
Dimensions
Composite Size (readings): 1067 x 637
Survey Size (meters): 160 m x 95.6 m
Grid Size: 160 m x 95.6 m
X Interval: 0.15 m
Y Interval: 0.15 m
Stats

Max: 3.32
Min: -3.30
Std Dev: 1.29
Mean: 0.02
Median: 0.01
Composite Area: 1.5293 ha
Surveyed Area: 1.0219 ha
PROGRAM
Name: TerraSurveyor
Version: 3.0.23.0
GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse:
4 Clip from -5.00 to 5.00 nT
5 Clip from -3.00 to 3.00 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 PDF copy will be supplied to the Cornwall Historic Environment Record. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS). The digital data will also be archived with the Archaeology Data Service.

Archive contents:

File type	Naming scheme	Description
Data	J775_mag_raw.csv J775_mag_proc.xcp	Raw data as CSV TerraSurveyor minimally processed data
Graphics	J775_mag_proc.tif	Image in TIF format with TFW
Drawing	J775_CAD.dwg	CAD file in 2010 dwg format
Report	J775_Goonhavern_mag_survey_report.pdf	Report in PDF 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 an uncertain origin			
AS-ABST MAG POS LINEAR UNCERTAIN		255,127,0	Line, polyline or polygon (solid)
AS-ABST MAG POS DISCRETE UNCERTAIN		255,127,0	Solid donut, point or polygon (solid)
AS-ABST MAG POS UNCERTAIN		255,127,0	Polygon (cross hatched ANSI37)
Anomalies relating to land management			
AS-ABST MAG BOUNDARY		127,0,0	Line, polyline or polygon (solid or cross hatched ANSI37)
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)
Anomalies with a natural origin			
AS-ABST MAG NATURAL FEATURES		Yellow 255,255,0	Polygon (cross hatched ANSI37)

Table 3: CAD layering

Appendix F – copyright and intellectual property

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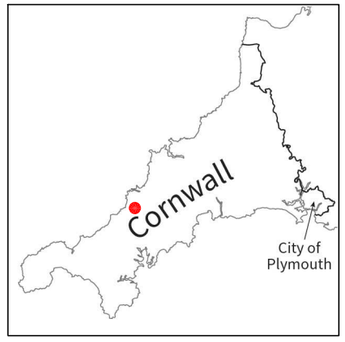
Survey location

N



Survey location

Site centred on OS NGR
SW 78650 53490

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

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Geophysical Survey
Land south of Marshfield Close
Goonhavern
Perranzabuloe
Cornwall

Map of survey area

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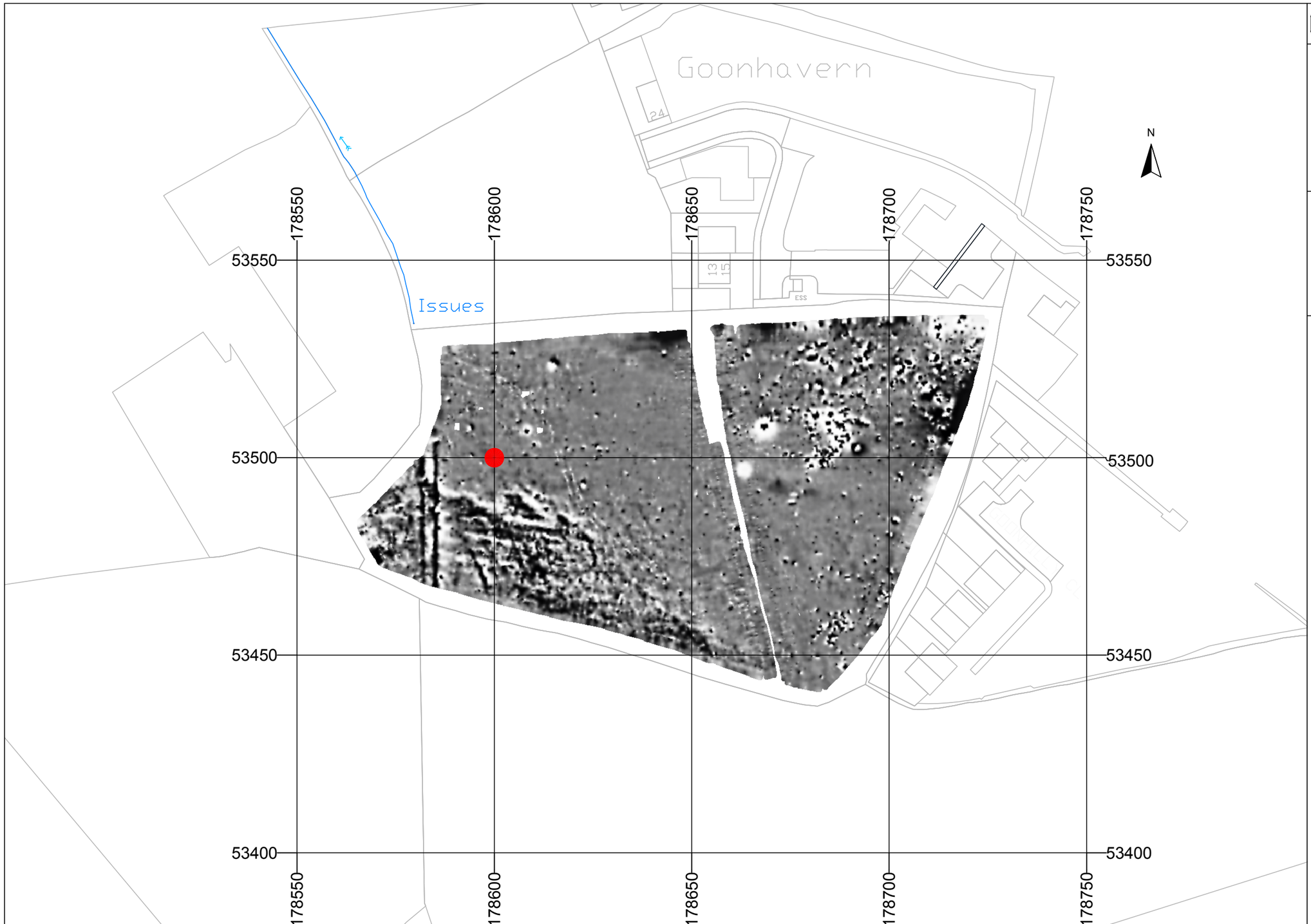
Cornwall

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

178600 53500



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SCALE TRUE AT A3

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KTD	DJS	FIG 02

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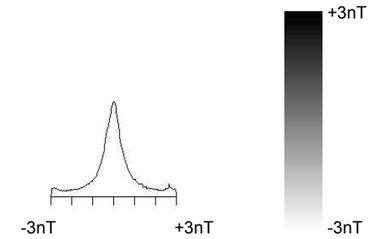
Greyscale plot of minimally processed magnetometer data



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SCALE TRUE AT A3

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Abstraction and interpretation of magnetic anomalies

- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - vehicle rut
- Parallel positive linear anomalies - former field boundary
- Discrete positive response - possible pit-like feature
- Positive anomaly - magnetically enhanced material
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:500

0m 5 10 15 20 25m

SCALE TRUE AT A3

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KTD	DJS	FIG 04