



**Tadpole Field
Haydon Wick
Swindon**

MAGNETOMETER SURVEY REPORT

for

Swindon Borough Council

Kerry Donaldson & David Sabin

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ARCHAEOLOGICAL SURVEYS LTD

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MAGNETOMETER SURVEY REPORT

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Swindon Borough Council

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SUMMARY

A geophysical survey, comprising detailed magnetometry, was carried out by Archaeological Surveys Ltd within part of Tadpole Field on the north western edge of Swindon ahead of a proposed tree planting scheme by Swindon Borough Council. A small number of short, weakly positive linear and discrete anomalies have been located in the northern part of the site, but beyond the limits of the proposed planting areas. They lack a coherent morphology and cannot be confidently interpreted as cut features. Other anomalies relate to extant ridge and furrow earthworks although another phase of agricultural activity has also been located. A pipeline crosses the southern part of the site.

1 INTRODUCTION

1.1 *Survey background*

1.1.1 Archaeological Surveys Ltd was commissioned by Swindon Borough Council to undertake a magnetometer survey of an area of land at Tadpole Field. The site has been outlined for a proposed tree planting by the council under the Great Western Community Forest scheme.

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 tree planting along the western and southern edges 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 Archaeological Surveys Ltd is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA) and the company directors are both a Member of the Chartered Institute for Archaeologists (MCIfA) and have been assessed for their technical competence, ethical suitability and that they abide by the CIfA Codes of Conduct.

1.3.2 The survey and report 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) (updated 2020) *Standard and Guidance for Archaeological Geophysical Survey*.

- 1.3.3 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.
- 1.3.4 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.
- 1.3.5 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 parish of Haydon Wick on the north western edge of Swindon. It is bounded to the north east by Tadpole Lane, to the north west by the River Ray, to the west by the Swindon & Cricklade Railway and to the south east by residential dwellings off Boatman Close and Minnow Close. It is centred on Ordnance Survey National Grid Reference (OS NGR) SU 11185 89525, see Figs 01 and 02.
- 1.4.2 The geophysical survey covers approximately 1.4ha within an L-shaped area of land crossing between two fields divided by post and rail fencing. The areas proposed for planting are irregular zones within the southern and western parts of the site, a slightly larger area was covered in order to gain context for anomalies (see Fig 02).
- 1.4.3 The ground cover consisted of rushes, areas of long grass and some recently mowed areas. The ground surface has regular undulations associated with former ridge and furrow cultivation; many of the furrows were flooded at the time of survey. Small thorn bushes were present towards the south eastern end of the survey area and adjacent to the dividing fencing.
- 1.4.4 The ground conditions across the site were generally poor for geophysical

survey due the height of the ground cover, waterlogged ground and presence of thorn bushes; however, the majority of the site was successfully covered. Weather conditions during the survey were very wet and windy.



*Plate 1: South eastern part of survey area
looking south east*



*Plate 2: North western part of survey area
looking north west*

1.5 Site history and archaeological potential

- 1.5.1 The Wiltshire and Swindon Historic Environment Record indicates that the closest heritage assets are the sites of WW2 anti-tank cylinders immediately to the north and a vertical rail block to the west on the line of what is now the Swindon & Cricklade Railway, but was originally part of the Midland & South Western Junction Railway, in use between 1895 and 1937 and as a heritage railway since 1979. Situated 100m to the south east was the location of the 19th century Lower Tadpole Farm. Fragments of Romano-British pottery and prehistoric flint artefacts have been recorded between 300-400m east and

south east, with an undated settlement site recorded from geophysical survey approximately 750m to the north east. The site contains extant ridge and furrow on two alignments, but has been recorded as one field from the 1840s tithe map until recently where post and rail fencing has been erected to divide the area into two fields.

1.6 *Geology and soils*

- 1.6.1 The underlying geology is mudstone from the Oxford Clay Formation with overlying alluvial deposits of clay, sand, silt and gravel from the River Ray along the north western edge (BGS, 2017).
- 1.6.2 The overlying soil across the eastern part of the site is from the Wickham 2 association and is a typical stagnogley soil. It consists of a slowly permeable, seasonally waterlogged, fine, loamy over clayey soil. (Soil Survey of England and Wales, 1983). The soil in the western part of the site is from the Kelmscott association which is a calcaro-cambic gley soil and consists of a calcareous, fine, loamy soil over gravel.
- 1.6.3 The underlying geology and soils are frequently associated with low magnetic contrast and low levels of magnetic susceptibility. However, cut features of archaeological potential may be located where human activity has altered the magnetic characteristics of the soil sufficiently. The underlying geology and soils are, therefore, considered acceptable for magnetic survey.

2 METHODOLOGY

2.1 *Technical synopsis*

- 2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance (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 measurement range of ± 8000 nT, although the recorded range is ± 3000 nT, and resolution is around 0.1nT. 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 <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 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 $\pm 3000\text{nT}$ and clipped for display at $\pm 5\text{nT}$. 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 2021, creating DWG (2018) 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 The abstraction and interpretation procedure has been supported by analysis of a digital terrain model plot derived from the Environment Agency's LiDAR data. Shaded relief plots and contours are created using Surfer 15 (Azimuth:135, Altitude:45, Z factor:10), (Fig 05).
- 2.3.10 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 1.4ha.
- 3.1.2 Magnetic anomalies located can be generally classified as positive anomalies of an uncertain origin, 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.
- 3.1.3 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 The data appear to contain few anomalies and the area is too limited to allow for a useful qualitative assessment of soil magnetic susceptibility. Although the soils are likely to be associated with very low magnetic susceptibility and low

levels of magnetic contrast, anomalies associated with ridge and furrow cultivation are present and are a positive indicator for the location of other features within the site should they be present. Previous magnetometry associated with the nearby Tadpole Farm development successfully located both Roman and medieval settlement features on similar soils adjacent to the River Ray.

- 3.2.3 The southern part of the site contains high magnitude magnetic disturbance that has been caused by a steel oil pipe. The disturbance has the potential to obscure other anomalies if they are present within this part of the site. Further magnetic disturbance is also present along the south western site boundary.

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 an uncertain origin	The category applies to a range of anomalies where <u>there is not enough evidence to confidently suggest an origin</u> . Anomalies in this category <u>may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered</u> . 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 with an agricultural origin	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. This category <u>does not include</u> agricultural features of early date or considered to be of archaeological potential (e.g. animal stockades, enclosures, farmsteads, etc).
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 thermoremanent 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 <u>may, therefore, be archaeologically significant</u> . 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 411185 189525, see Figs 03 – 05.

Anomalies with an uncertain origin

(1) – The northern part of the survey area contains a small number of short, weakly positive linear anomalies and two discrete positive responses. It is not possible to determine if they relate to cut features and they are outside of the area outlined for planting.

Anomalies with an agricultural origin

(2 & 3) – The site contains two series of extant ridge and furrow oriented north to south (2) in the north and east to west (3) in the south.

(4) – A series of parallel linear anomalies oriented north to south appear to cross the ridge and furrow (3) in the southern part of the site. It is not clear if this relates to an earlier phase of ridge and furrow that pre-dates (3) or a later phase of ploughing, that post-dates (3) but pre-dates the adjacent railway, although there is no clear evidence of physical truncation to the extant ridge and furrow.

Anomalies associated with magnetic debris

(5) – Magnetic debris located at the north western corner of the survey area is likely to relate to magnetic material either dumped by or dredged from the River Ray.

(6) – Strong, discrete, dipolar anomalies are a response to ferrous and other magnetically thermoremanent objects within the topsoil.

Anomalies with a modern origin

(7) – The southern part of the site contains a pipeline which has resulted in widespread magnetic disturbance. Further magnetic disturbance is evident along the western edge and this relates to ferrous material extending along the western margin.

4 CONCLUSION

- 4.1.1 The detailed magnetometer survey located a small number of weakly positive, short linear and discrete responses in the northern part of the site, but outside of the areas outlined for planting. They lack a coherent morphology, are indistinct and cannot be confidently interpreted. Linear anomalies relating to extant ridge and furrow and another phase of agricultural activity have also been located.

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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 thermoremanent 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. Thermoremanent 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. Thermoremanent features include ovens, hearths, and kilns. In addition thermoremanent 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.

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

Filename:	J896-mag-proc.xcp	Stats	
Description:	Imported as Composite from: J896-mag.asc	Max:	5.53
Instrument Type:	Sensys DLMGPS	Min:	-5.50
Units:		Std Dev:	2.23
UTM Zone:	30U	Mean:	0.01
Survey corner coordinates (X/Y):	OSGB36	Median:	0.00
Northwest corner:	411093.45, 189641.80 m	Composite Area:	4.3836 ha
Southeast corner:	411306.30, 189435.85 m	Surveyed Area:	1.5085 ha
Collection Method:	Randomised	PROGRAM	
Sensors:	5	Name:	TerraSurveyorPre
Dummy Value:	32702	Version:	3.0.36.24
Dimensions		GPS based Proce4	
Survey Size (meters):	213 m x 206 m	1 Base Layer.	
X&Y Interval:	0.15 m	2 Unit Conversion Layer (Lat/Long to UTM).	
Source GPS Points:	Active: 488757, Recorded: 488757	3 DeStripe Median Traverse:	
		4 Clip from -5.00 to 5.00	

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 Wiltshire Historic Environment Record with greyscale images and abstraction layers made available 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	J896-mag-[area number/name].asc J896-mag-[area number/name].xcp J896-mag-[area number/name]-proc.xcp	Raw data as ASCII CSV TerraSurveyor raw data TerraSurveyor minimally processed data
Graphics	J896-mag-[area number/name]-proc.tif	Image in TIF format
Drawing	J896-[version number].dwg	CAD file in 2018 dwg format
Report	J896 report.odt	Report text in LibreOffice 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 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)
Anomalies with an agricultural origin		
AS-ABST MAG AGRICULTURAL	 Green 0,255,0	Line or polyline
AS-ABST MAG RIDGE AND FURROW	 0,127,63	Line, polyline or polygon (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)
AS-ABST MAG SERVICE		132, 132, 132	Line or polyline

Table 3: CAD layering

Appendix F – copyright and intellectual property

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**Geophysical Survey
Tadpole Field
Haydon Wick
Swindon**

Map of survey area



Survey location



● Survey location

Site centred on OS NGR
SU 11185 89525

SCALE 1:25 000



SCALE TRUE AT A3

**Geophysical Survey
Tadpole Field
Haydon Wick
Swindon**

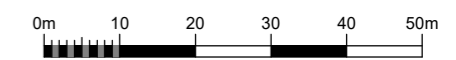
Referencing information

Referencing grid to OSGB36 datum at 50m intervals

- 411150 189550
- Survey tracks
- ⋯ Survey track start
- ⋯ Survey track stop

Proposed planting areas

SCALE 1:1000



SCALE TRUE AT A3

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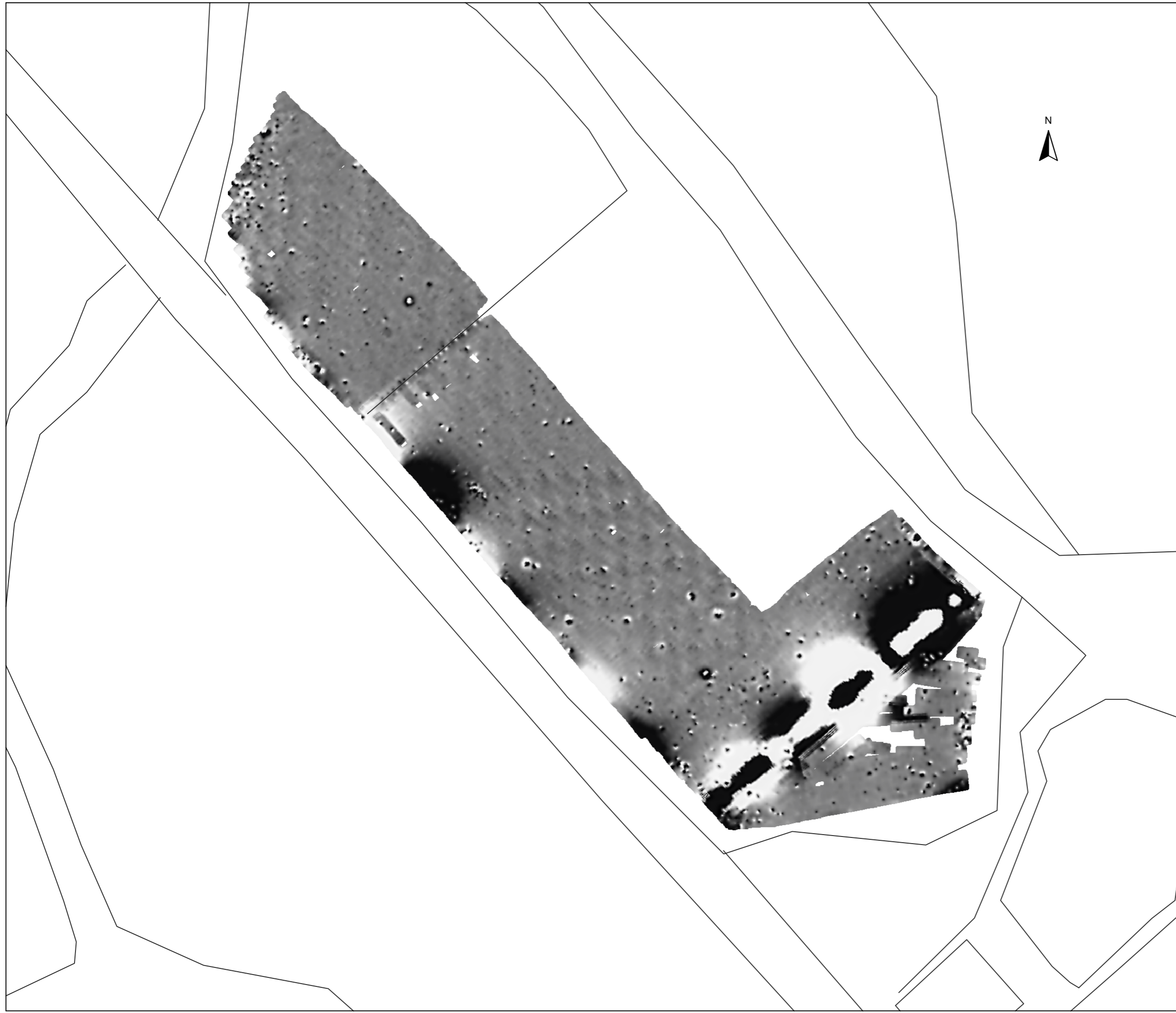
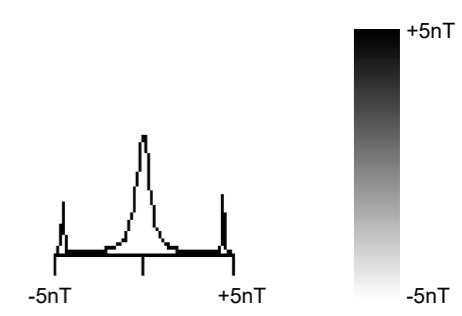
FIG 02



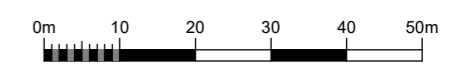


**Geophysical Survey
Tadpole Field
Haydon Wick
Swindon**

**Greyscale plot of minimally
processed magnetometer data**



SCALE 1:1000



SCALE TRUE AT AS









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FIG 03

**Geophysical Survey
Tadpole Field
Haydon Wick
Swindon**

**Abstraction and interpretation of
magnetic anomalies**

-  Positive linear anomaly - of uncertain origin
-  Linear anomaly - of agricultural origin
-  Linear anomaly - ridge and furrow
-  Discrete positive response - of uncertain origin
-  Magnetic debris - spread of magnetically thermoremanent/ferrous material
-  Magnetic disturbance from ferrous material
-  Strong multiple dipolar linear anomaly - pipeline / cable / service
-  Strong dipolar anomaly - ferrous object



SCALE 1:1000



SCALE TRUE AT A3









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FIG 04

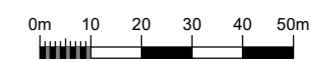
**Geophysical Survey
Tadpole Field
Haydon Wick
Swindon**

Greyscale plot of processed magnetometer data & abstraction & interpretation of magnetic anomalies

-  Positive linear anomaly - of uncertain origin
-  Linear anomaly - of agricultural origin
-  Linear anomaly - ridge and furrow
-  Discrete positive response - of uncertain origin
-  Magnetic debris - spread of magnetically thermoremanent/ferrous material
-  Magnetic disturbance from ferrous material
-  Strong multiple dipolar linear anomaly - pipeline / cable / service
-  Strong dipolar anomaly - ferrous object

 Proposed planting areas

SCALE 1:1500



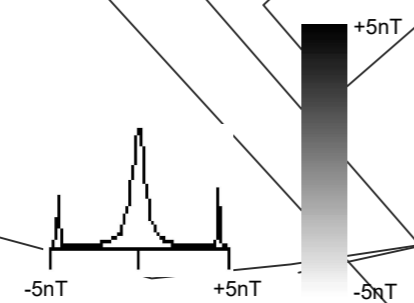
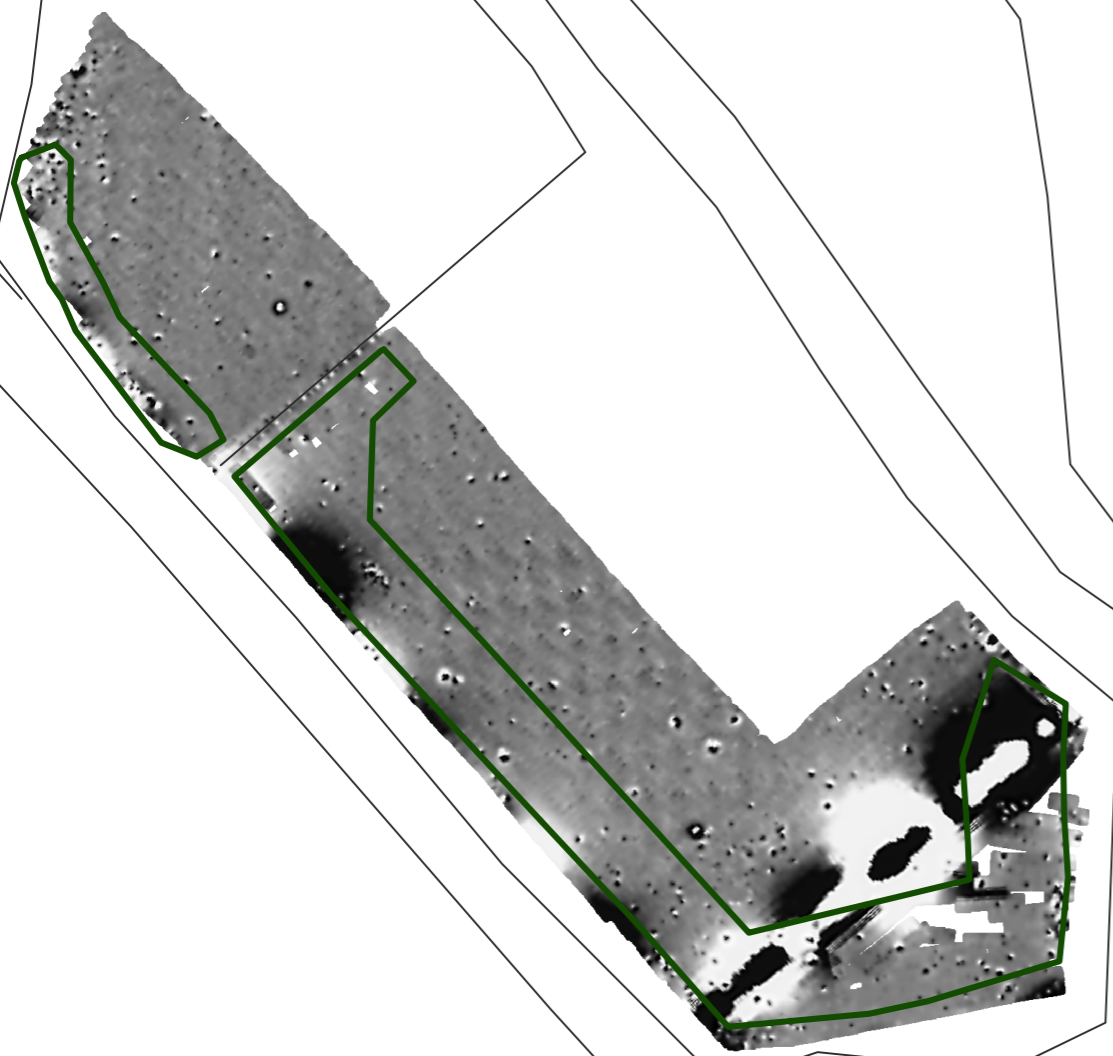
SCALE TRUE AT AS

DRAWN BY
KTD

CHECKED BY
DJS

FIG 05

Greyscale plot of processed magnetometer data





Abstraction & interpretation of magnetic anomalies



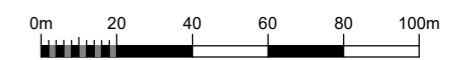
Geophysical Survey
Tadpole Field
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Digital Terrain Model

Derived from Environment Agency's
LiDAR data 1m resolution

-  Survey area
-  Proposed planting areas

SCALE 1:2000



SCALE TRUE AT A3