GEOPHYSICAL SURVEY REPORT

STRATASCAN™

SUMO Survey Services
SUMO Group Member

Project name:

Hill Farm, Lighthorne, Warwickshire

Client:

Dr. Peter Neal

August 2015

Job ref:

J8463

Report author:

Thomas Richardson MSc ACIfA

GEOPHYSICAL SURVEY REPORT

Project name:
Hill Farm, Lighthorne, Warwickshire
Client:
Dr. Peter Neal

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Earth Resistance

Project manager:
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Survey date:
27th July, 7th & 10th August 2015

Report written By:
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Site centred at:
SP 339 565

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1 SUMMARY OF RESULTS

A detailed gradiometry survey was conducted over approximately 3 hectares of grassland. Four 30mx30m grids of earth resistance survey were then targeted based on these results. The survey has identified a number enclosures and probable Iron Age round houses, suggesting multi-phase settlement of the site. Several anomalies, including pits and ditches, are of archaeological origin, and are likely to relate to the settlement activity and enclosures. Whilst there is no evidence in either the gradiometer or earth resistance data for a Roman villa this does not preclude the possibility that one once stood on the site, but it appears likely that any foundations have been robbed out.

Ridge and furrow cultivation across the site suggests that the area has been used for agricultural activity since the medieval period. The remaining anomalies are modern in origin, relating to ferrous objects and fencing.

2 INTRODUCTION

2.1 *Background synopsis*

Stratascan were commissioned to undertake a geophysical survey of an area as part of an archaeological investigation being undertaken by Dr. Peter Neal.

2.2 *Site location*

The site is located to the west of Chesterton Road, Lighthorne, Warwickshire at OS ref. SP 339 565.

2.3 *Description of site*

The survey area is approximately 3 hectares of grassland split over three fields. The site lies on the top of Chesterton Hill, with a gentle south facing slope, becoming steeper in the south of the site. There were no obstructions to the survey area.

2.4 *Geology and soils*

The underlying geology for the majority of the site is Saltford Shale Member – Mudstone, with areas of Langport Member – Limestone and Penarth Group – Mudstone in the west and south of the site (British Geological Survey website). The drift geology is Till, Mid Plestocene – Diamicton across the majority of the site, with none present in the south of the area (British Geological Survey website).

The overlying soils are known as Evesham 2, which are typical calcareous pelosols. These consist of calcareous clayey soils, with some non-calcareous clayey and fine loamy or fine silty over clayey soils (Soil Survey of England and Wales, Sheet 3 Midland and Western England).

2.5 *Site history and archaeological potential*

The Warwickshire Historic Environment Record (HER) records Hill Farm as the site of a Roman villa (record number MWA2299). Evidence for the villa is based in a large number of Roman finds in the area including a whetstone, animal and human bone, tile fragments, and pottery sherds. Aerial photography of the area also shows evidence of enclosure ditches and possible buildings (Warwickshire County Council 2015).

2.6 *Survey objectives*

The objective of the survey was to locate any features relating to the villa, as well as any other features of possible archaeological origin.

2.7 *Survey methods*

This report and all fieldwork have been conducted in accordance with both the English Heritage guidelines outlined in the document: *Geophysical Survey in Archaeological Field Evaluation, 2008* and with the Chartered Institute for Archaeologists document *Standard and Guidance for Archaeological Geophysical Survey.*

Given the high potential for Roman remains and structural remains, detailed magnetic survey (gradiometry) with targeted earth resistance survey was used as an efficient and effective method of locating a wide range of archaeological anomalies. More information regarding these techniques is included in Appendix A.

2.8 *Processing, presentation and interpretation of results*

2.8.1 Processing

Gradiometer

Processing is performed using specialist software. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves 'flattening' the background levels with respect to adjacent traverses and adjacent grids. Once the basic processing has flattened the background it is then possible to carry out further processing which may include low pass filtering to reduce 'noise' in the data and hence emphasise the archaeological or man-made anomalies.

The following schedule shows the basic processing carried out on all minimally processed gradiometer data used in this report:

1. *Destripe* (Removes striping effects caused by zero-point discrepancies between different sensors and walking directions)
2. *Destagger* (Removes zigzag effects caused by inconsistent walking speeds on sloping, uneven or overgrown terrain)

Earth Resistance

The processing was carried out using specialist software known as Geoplot 3 and involved the 'despiking' of high contact resistance readings.

The following schedule shows the processing carried out on the processed resistance plots.

Despike	X radius = 1
	Y radius = 1
	Spike replacement

2.8.2 Presentation of results and interpretation

Gradiometer

The presentation of the data for each site involves a print-out of the minimally processed data both as a greyscale plot and a colour plot showing extreme magnetic values. Magnetic anomalies have been identified and plotted onto the 'Abstraction and Interpretation of Anomalies' drawing for the site.

Earth resistance

The presentation of the data for the site involves a print-out of the minimally processed data as a grey scale plot. Anomalies have been identified and plotted onto the 'Abstraction and Interpretation of Anomalies' drawing.

3 RESULTS

The detailed magnetic gradiometer survey conducted at Hill has identified a number of anomalies that have been characterised as being either of a *probable* or *possible* archaeological origin.

The difference between *probable* and *possible* archaeological origin is a confidence rating. Features identified within the dataset that form recognisable archaeological patterns or seem to be related to a deliberate historical act have been interpreted as being of a probable archaeological origin.

Features of possible archaeological origin tend to be more amorphous anomalies which may have similar magnetic attributes in terms of strength or polarity but are difficult to classify as being archaeological or natural.

The following list of numbered anomalies refers to numerical labels on the interpretation plots.

*3.1 **Gradiometer***

3.1.1 Probable Archaeology

1 A large, broken, rectilinear anomaly comprising positive anomalies with associated negative responses. This is indicative of a former enclosure ditch, and is visible as parch marks in aerial photography of the site.

2 A large, sub-rectilinear anomaly comprising positive anomalies with associated negative responses. This is indicative of a former enclosure ditch, possibly with an entrance in the eastern side. This anomaly is also visible as parch marks in aerial photography of the site.

3 A number of sub-circular positive anomalies in the north-east of the site. These are indicative of former cut features, and are likely to be of archaeological origin. They most likely to relate to Iron Age round houses.

4 A sub-rectilinear and linear positive anomalies in the north-east of the site. These are indicative of former cut features, and are likely to relate to a former enclosure ditch. These anomalies appear to relate to the probable round houses seen in Anomaly 3.

5 Positive anomalies in the north of the site. These are indicative of former cut features, and are likely to be archaeological in origin. These anomalies may relate to settlement activity in the area, however their exact date and origin is not known.

6 A number of positive anomalies across the north of the site. These are indicative of former cut features, and are likely to be archaeological in origin. These are likely to form pits or the remains of ditches related to the enclosures seen in Anomalies 1 and 2.

7 A number of positive linear anomalies across the site. These are indicative of former cut features, and may relate to settlement activity in the area, however their exact date and origin is not known.

8 Weak, positive linear anomalies in the north-east of the site. These are indicative of former cut features, and may relate to settlement activity in the area, however their exact date and origin is not known.

9 A number of small, discrete, positive anomalies across the north of the site. These are indicative of small former cut features, such as backfilled pits, and are likely to relate to the settlement activity seen in the area.

3.1.2 Possible Archaeology

10 A small, discrete, positive anomaly in the south of the site. This is indicative of a small former cut feature, such as a backfilled pit, and may be of archaeological or natural origin.

3.1.3 Medieval/Post-Medieval Agriculture

11 Widely spaced, parallel, linear anomalies across the site. These are indicative of ridge and furrow cultivation.

3.1.4 Other Anomalies

12 Areas of magnetic disturbance are the result of substantial nearby ferrous metal objects such as fences and underground services. These effects can mask weaker archaeological anomalies, but on this site have not affected a significant proportion of the area.

13 A number of magnetic 'spikes' (strong focussed values with associated antipolar response) indicate ferrous metal objects. These are likely to be modern rubbish.

*3.2 **Earth resistance***

Four grids of earth resistance survey were targeted over areas within enclosures (Anomalies 1 and 2) identified by the gradiometer survey. This was done in an attempt to identify any structural remains that may not be detected by a magnetic survey. The following list of anomalies refers to numerical labels on the interpretation plots.

A A low resistance area anomaly in the north-west of the targeted areas. This is indicative of a former cut feature, and corresponds with a positive anomaly in the gradiometer survey (Anomaly 6), which is also indicative of a former cut feature.

B An area of high resistance in the west of the targeted areas. This is indicative of an area of compacted ground, and appears to relate to the internal edge of an enclosure ditch (Anomaly 1). This may relate to a former bank feature and could include stone debris.

C A linear area of slight high resistance in the south-east of the targeted area. This is indicative of an area of compact ground, however its exact origin is not known. There appears to be little correspondence with any anomaly in the gradiometer survey, other than the ridge and furrow cultivation.

4 DATA APPRAISAL & CONFIDENCE ASSESSMENT

Mudstone geologies, which cover the majority of the site, can give variable responses to magnetic survey. The number of archaeological anomalies, and the correlation with parch marks visible in aerial photography of the site suggests that the survey has been successful. The earth resistance survey shows some correlation with the gradiometer survey, suggesting it has been successful.

5 CONCLUSION

The survey at Hill Farm has identified a number of archaeological anomalies, however there is no evidence for structural remains relating to a Roman villa. A number of enclosures and probable Iron Age round houses suggests multi-phase settlement of the site, with the enclosure seen in Anomaly 1 being the most typically Roman in shape. Several anomalies, including pits and ditches, are of archaeological origin and are likely to relate to the settlement activity and enclosures, however the multiple phases of activity makes it difficult to attribute dates to each feature. Whilst there is no evidence in either the gradiometer or earth resistance data for a villa this does not preclude the possibility that one once stood on the site, but it appears likely that any foundations have been robbed out.

Ridge and furrow cultivation across the site suggests that the area has been used for agricultural activity since the medieval period. The remaining anomalies are modern in origin, relating to ferrous objects and fencing.

6 REFERENCES

British Geological Survey South Sheet, 1977. *Geological Survey Ten Mile Map, South Sheet First Edition (Quaternary).* Institute of Geological Sciences.

British Geological Survey, 2001. *Geological Survey Ten Mile Map, South Sheet, Fourth Edition (Solid)*. British Geological Society.

British Geological Survey, n.d., *website*: (http://www.bgs.ac.uk/opengeoscience/home.html?Accordion1=1#maps) Geology of Britain viewer.

Chartered Institute For Archaeologists. *Standard and Guidance for Archaeological Geophysical Survey.* http://www.archaeologists.net/sites/default/files/nodefiles/Geophysics2010.pdf

English Heritage, 2008. *Geophysical Survey in Archaeological Field Evaluation.*

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 3 Midland and Western England*.

Warwickshire County Council, 2015. *Timetrail.* Available from timetrail.warwickshire.gov.uk [Accessed on 18/08/2015]

APPENDIX A – METHODOLOGY & SURVEY EQUIPMENT

Grid locations

The location of the survey grids has been plotted together with the referencing information. Grids were set out using a Leica 705auto Total Station and referenced to suitable topographic features around the perimeter of the site or a Leica Smart Rover RTK GPS.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. A SmartNet RTK GPS uses Ordnance Survey's network of over 100 fixed base stations to give an accuracy of around 0.01m.

Gradiometer

Survey equipment and gradiometer configuration

Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTeslas (nT) in an overall field strength of 48,000nT, can be accurately detected using an appropriate instrument.

The mapping of the anomaly in a systematic manner will allow an estimate of the type of material present beneath the surface. Strong magnetic anomalies will be generated by buried iron-based objects or by kilns or hearths. More subtle anomalies such as pits and ditches can be seen if they contain more humic material which is normally rich in magnetic iron oxides when compared with the subsoil.

To illustrate this point, the cutting and subsequent silting or backfilling of a ditch may result in a larger volume of weakly magnetic material being accumulated in the trench compared to the undisturbed subsoil. A weak magnetic anomaly should therefore appear in plan along the line of the ditch.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The instrument consists of two fluxgates very accurately aligned to nullify the effects of the Earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each gradiometer has a 1m separation between the sensing elements so enhancing the response to weak anomalies.

Sampling interval

Readings were taken at 0.25m centres along traverses 1m apart. This equates to 1600 sampling points in a full 20m x 20m grid.

Depth of scan and resolution

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m, though strongly magnetic objects may be visible at greater depths. The collection of data at 0.25m centres provides an optimum methodology for the task balancing cost and time with resolution.

Data capture

The readings are logged consecutively into the data logger which in turn is daily down- loaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.

Earth Resistance

Readings were taken at 1m centres along traverses 1m apart. This equates to 900 sampling points in a full 30m x 30 grid. All traverses were surveyed in a "zigzag" mode.

APPENDIX B – BASIC PRINCIPLES OF MAGNETIC SURVEY

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns and material such as brick and tile may be magnetised through the same process.

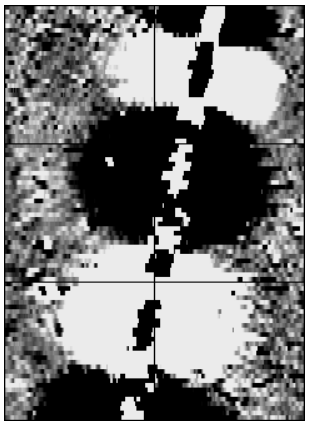
Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity, disturbance from modern services etc.

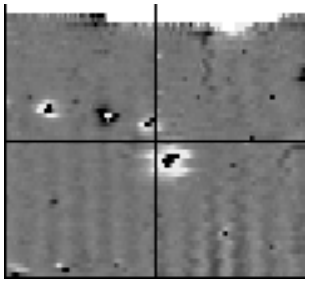
APPENDIX C – GLOSSARY OF MAGNETIC ANOMALIES

Bipolar



A bipolar anomaly is one that is composed of both a positive response and a negative response. It can be made up of any number of positive responses and negative responses. For example a pipeline consisting of alternating positive and negative anomalies is said to be bipolar. See also dipolar which has only one area of each polarity. The interpretation of the anomaly will depend on the magnitude of the magnetic field strength. A weak response may be caused by a clay field drain while a strong response will probably be caused by a metallic service.

Dipolar

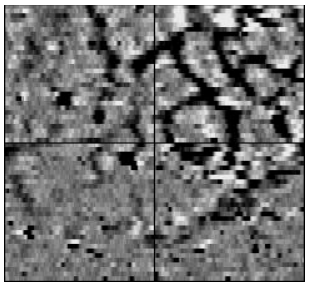


This consists of a single positive anomaly with an associated negative response. There should be no separation between the two polarities of response. These responses will be created by a single feature. The interpretation of the anomaly will depend on the magnitude of the magnetic measurements. A very strong anomaly is likely to be caused by a ferrous object.

Positive anomaly with associated negative response

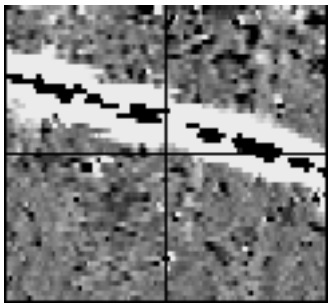
See bipolar and dipolar.

Positive linear



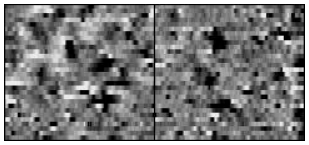
A linear response which is entirely positive in polarity. These are usually related to in-filled cut features where the fill material is magnetically enhanced compared to the surrounding matrix. They can be caused by ditches of an archaeological origin, but also former field boundaries, ploughing activity and some may even have a natural origin.

Positive linear anomaly with associated negative response



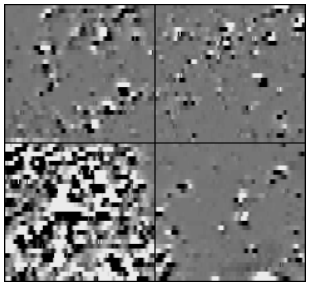
A positive linear anomaly which has a negative anomaly located adjacently. This will be caused by a single feature. In the example shown this is likely to be a single length of wire/cable probably relating to a modern service. Magnetically weaker responses may relate to earthwork style features and field boundaries.

Positive point/area



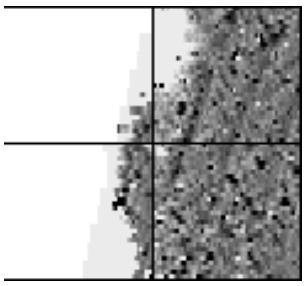
These are generally spatially small responses, perhaps covering just 3 or 4 reading nodes. They are entirely positive in polarity. Similar to positive linear anomalies they are generally caused by in-filled cut features. These include pits of an archaeological origin, possible tree bowls or other naturally occurring depressions in the ground.

Magnetic debris



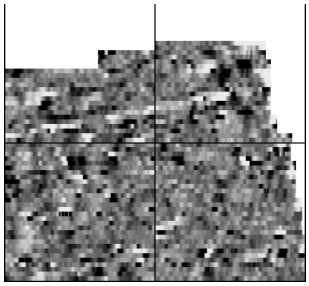
Magnetic debris consists of numerous dipolar responses spread over an area. If the amplitude of response is low (+/-3nT) then the origin is likely to represent general ground disturbance with no clear cause, it may be related to something as simple as an area of dug or mixed earth. A stronger anomaly (+/-250nT) is more indicative of a spread of ferrous debris. Moderately strong anomalies may be the result of a spread of thermoremanent material such as bricks or ash.

Magnetic disturbance



Magnetic disturbance is high amplitude and can be composed of either a bipolar anomaly, or a single polarity response. It is essentially associated with magnetic interference from modern ferrous structures such as fencing, vehicles or buildings, and as a result is commonly found around the perimeter of a site near to boundary fences.

Negative linear

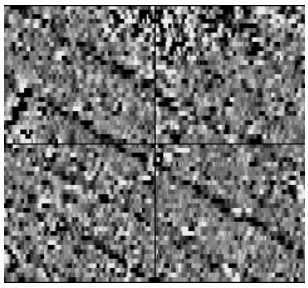


A linear response which is entirely negative in polarity. These are generally caused by earthen banks where material with a lower magnetic magnitude relative to the background top soil is built up. See also ploughing activity.

Negative point/area

Opposite to positive point anomalies these responses may be caused by raised areas or earthen banks. These could be of an archaeological origin or may have a natural origin.

Ploughing activity



Ploughing activity can often be visualised by a series of parallel linear anomalies. These can be of either positive polarity or negative polarity depending on site specifics. It can be difficult to distinguish between ancient ploughing and more modern ploughing. Clues such as the separation of each linear, straightness, strength of response and cross cutting relationships can be used to aid this, although none of these can be guaranteed to differentiate between different phases of activity.

Polarity

Term used to describe the measurement of the magnetic response. An anomaly can have a positive polarity (values above 0nT) and/or a negative polarity (values below 0nT).

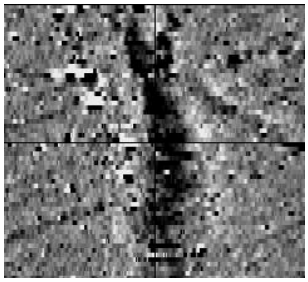
Strength of response

The amplitude of a magnetic response is an important factor in assigning an interpretation to a particular anomaly. For example a positive anomaly covering a 10m^2 area may have values up to around 3000nT, in which case it is likely to be caused by modern magnetic interference. However, the same size and shaped anomaly but with values up to only 4nT may have a natural origin. Colour plots are used to show the amplitude of response.

Thermoremanent response

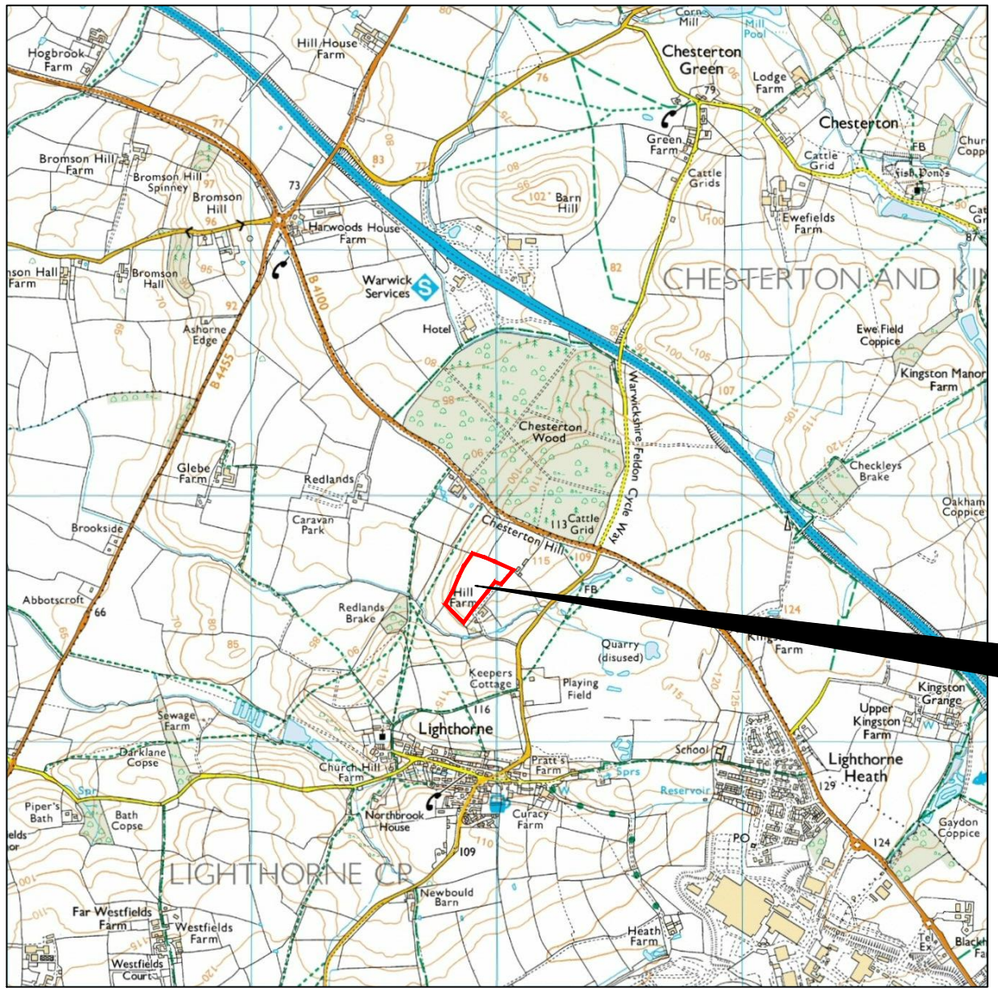
A feature which has been subject to heat may result in it acquiring a magnetic field. This can be anything up to approximately +/-100 nT in value. These features include clay fired drains, brick, bonfires, kilns, hearths and even pottery. If the heat application has occurred in situ (e.g. a kiln) then the response is likely to be bipolar compared to if the heated objects have been disturbed and moved relative to each other, in which case they are more likely to take an irregular form and may display a debris style response (e.g. ash).

Weak background variations



Weakly magnetic wide scale variations within the data can sometimes be seen within sites. These usually have no specific structure but can often appear curvy and sinuous in form. They are likely to be the result of natural features, such as soil creep, dried up (or seasonal) streams. They can also be caused by changes in the underlying geology or soil type which may contain unpredictable distributions of magnetic minerals, and are usually apparent in several locations across a site.

59
58
57
56
55



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Amendments

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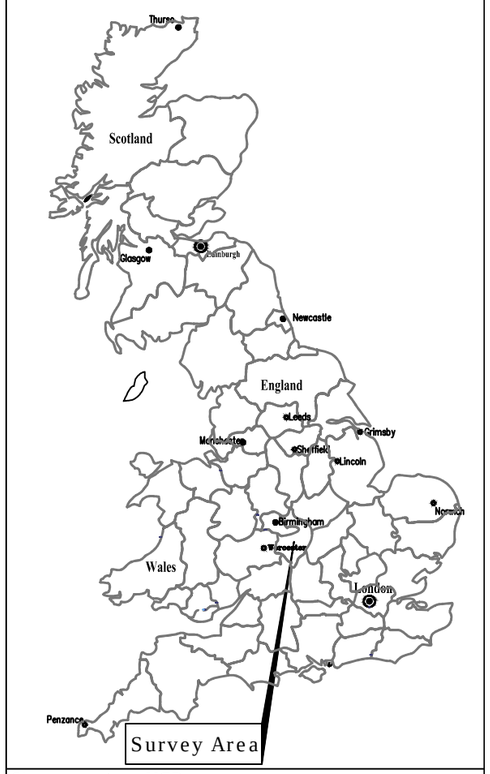

Site centred on NGR SP 339 565

Client
DR. PETER NEAL

Project Title Job No. J8463
HILL FARM, LIGHTHORNE, WARWICKSHIRE

Subject
LOCATION PLAN OF SURVEY AREA

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T: 01684 592266
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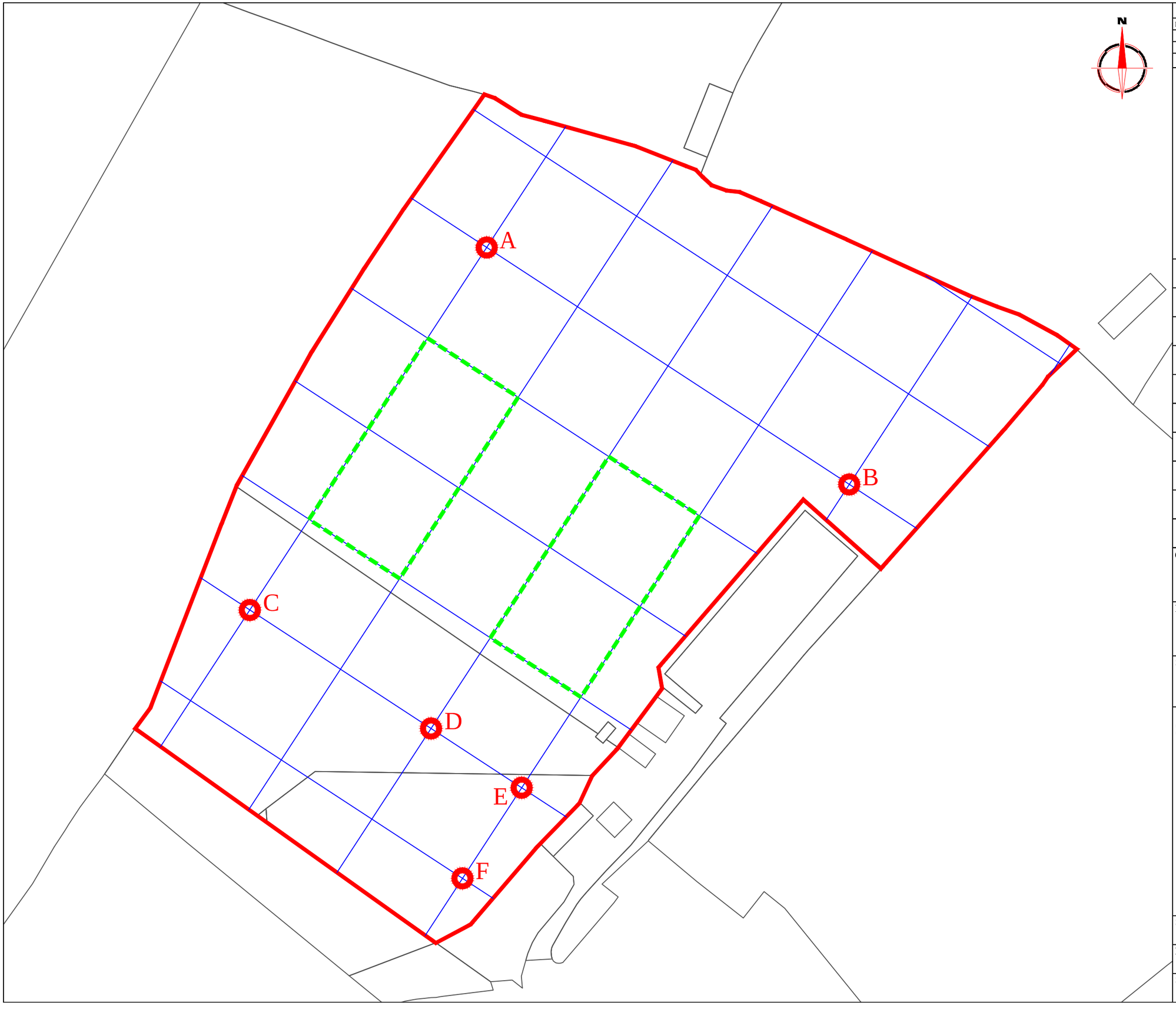
SUMO GROUP MEMBER

Scale 1:25000 (0m 500 1000m)

Plot	Checked by	Issue No.
A3	DGE	01
Survey date	Drawn by	Figure No.
JUL 15	TR	01



Amendments

Issue No.	Date	Description
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KEY

	Gradiometer grid
	Targeted resistivity grid

OS GRID REFERENCES

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B	434012.63, 256656.00
C	433846.53, 256621.20
D	433896.76, 256588.38
E	433921.87, 256571.96
F	433905.46, 256546.85

Client

DR. PETER NEAL

Project Title — Job No. J8463

HILL FARM, LIGHTHORNE, WARWICKSHIRE

Subject

LOCATION OF SURVEY GRIDS AND REFERENCING

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Scale 1:1000 (0m 10 20 30 40 50)

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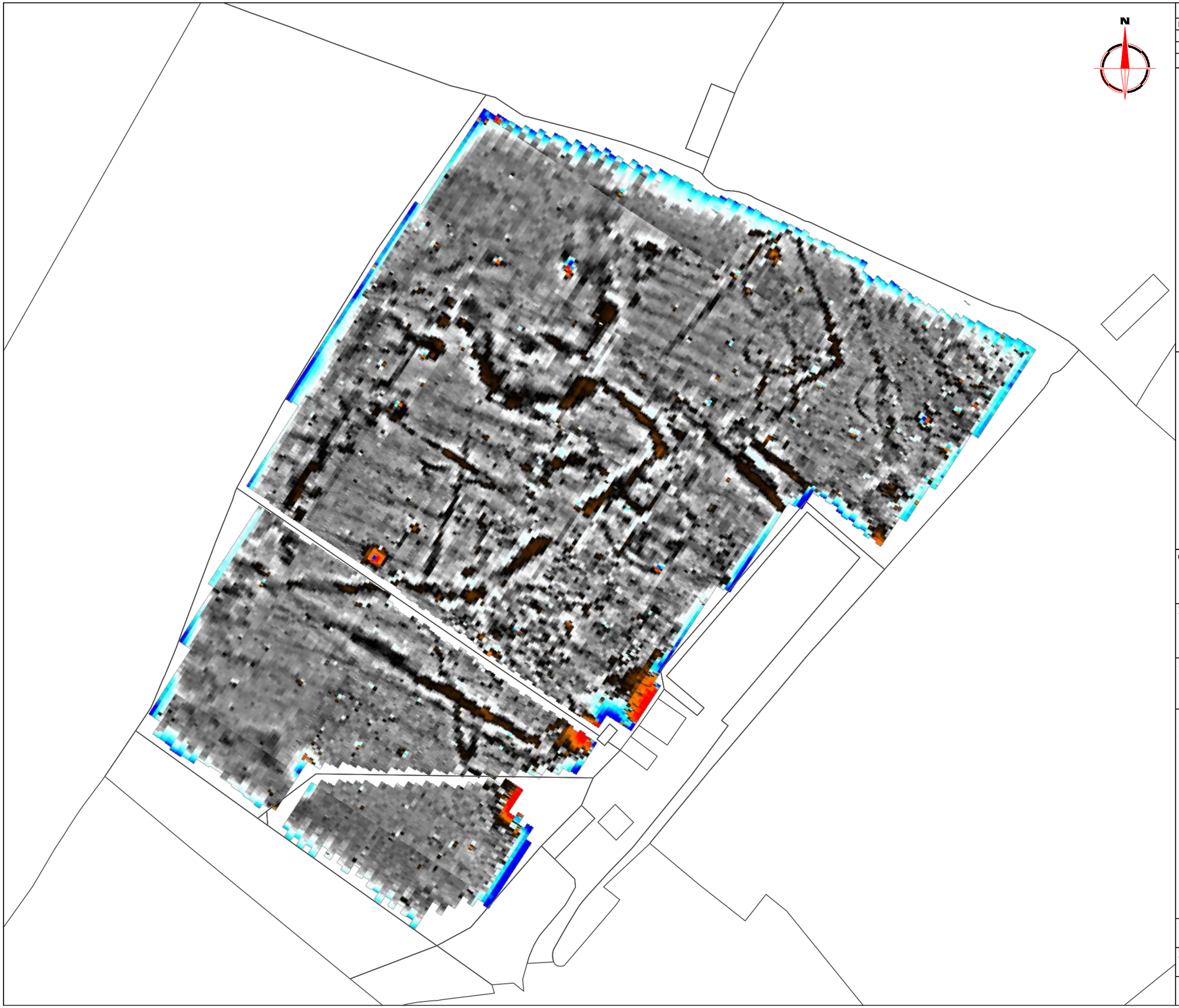
Survey date	Drawn by	Figure No.
JUL 15	TR	02



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

Plotting parameters

Maximum +100nT (red)
Minimum -100nT (blue)

+100nT
+25nT
+3nT
-3nT
-25nT
-100nT

Client

DR. PETER NEAL

Project Title — Job No. J8463

HILL FARM, LIGHTHORNE, WARWICKSHIRE

Subject

COLOUR PLOT OF GRADIOMETER DATA SHOWING EXTREME VALUES

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www.stratascan.co.uk

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Scale 1:1000 — 0m 10 20 30 40 50

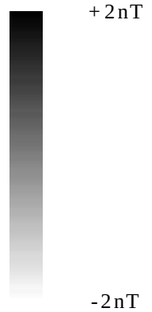
Plot	Checked by	Issue No.
A3	DGE	01
Survey date	Drawn by	Figure No.
JUL 15	TR	03

Amendments

Issue No.	Date	Description
-	-	-
-	-	-

Plotting parameters

Maximum +2nT (black)
Minimum -2nT (white)



Client

DR. PETER NEAL

Project Title — Job No. J8463

HILL FARM, LIGHTHORNE, WARWICKSHIRE

Subject

PLOT OF MINIMALLY PROCESSED GRADIOMETER DATA

STRATASCAN™
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EUROPEAN GPR ASSOCIATION

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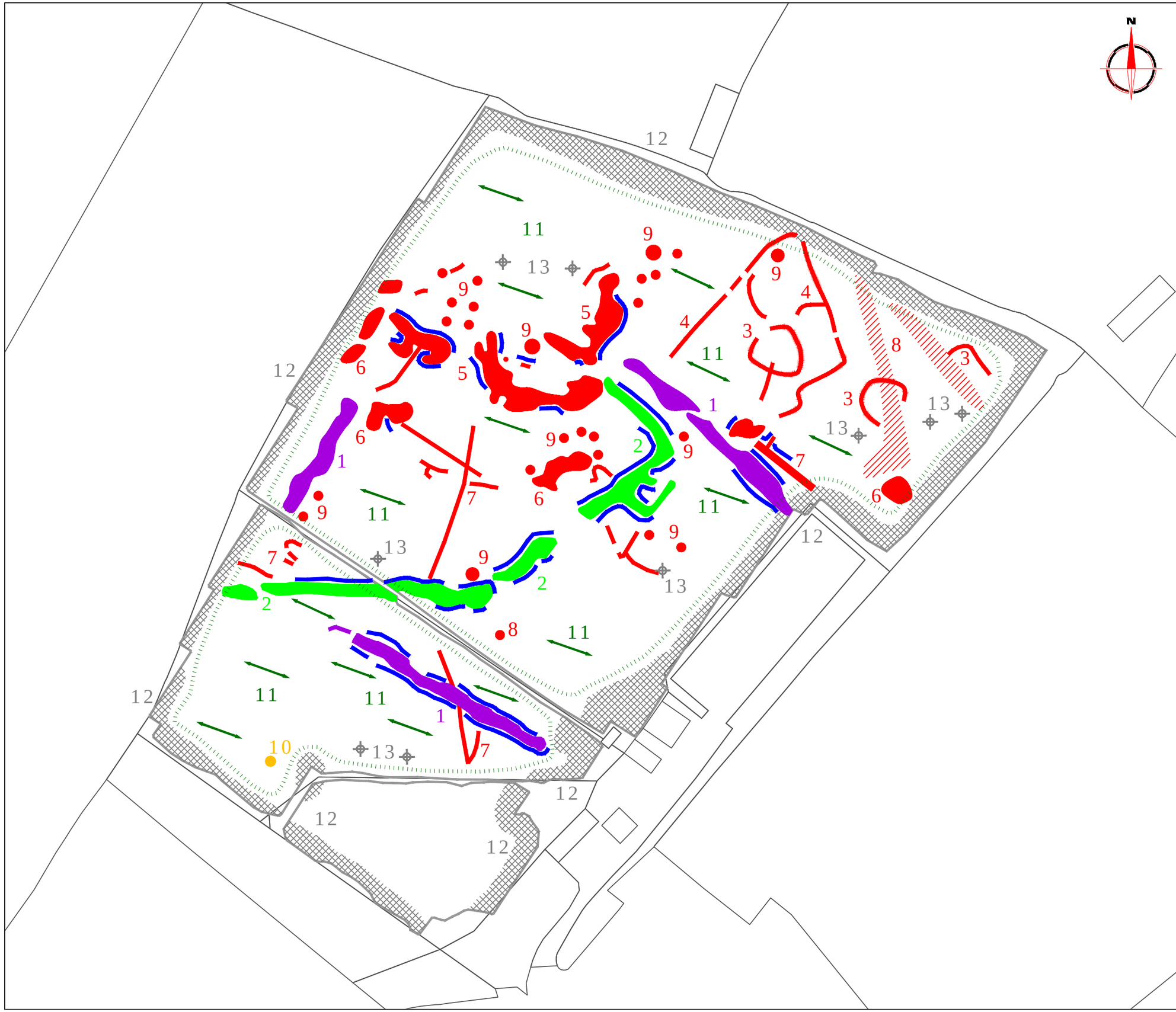
Scale 1:1000 (0m 10 20 30 40 50)

Plot	Checked by	Issue No.
A3	DGE	01
Survey date	Drawn by	Figure No.
JUL 15	TR	04



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

PROBABLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin
- Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin
- Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - probable bank or earthwork of archaeological origin

POSSIBLE ARCHAEOLOGY

- Positive anomaly / weak positive anomaly - possible cut feature of archaeological origin
- Negative anomaly / weak negative anomaly - possible bank or earthwork of archaeological origin

MEDIEVAL/POST-MEDIEVAL AGRICULTURE

- Widely spaced curving parallel linear anomalies - probably related to ridge-and-furrow
- Closely spaced parallel linear anomalies - probably related to agricultural activity such as ploughing

OTHER ANOMALIES

- Linear anomaly - probably related to pipe, cable or other modern service
- Linear anomaly - possibly related to land drain
- Magnetic disturbance associated with nearby metal object such as service or field boundary
- Strong magnetic debris - possible disturbed or made ground
- Scattered magnetic debris
- Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin
- Magnetic spike - probable ferrous object

Client

DR. PETER NEAL

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HILL FARM, LIGHTHORNE, WARWICKSHIRE

Subject

ABSTRACTION AND INTERPRETATION OF GRADIOMETER ANOMALIES

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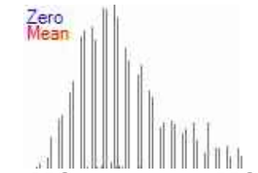
A3	DGE	01
Survey date	Drawn by	Figure No.
JUL 15	TR	05

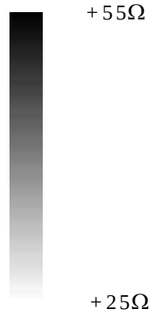
Amendments

Issue No.	Date	Description
-	-	-
-	-	-

Plotting parameters

Maximum +55Ω (black)
Minimum +25Ω (white)





Client
DR. PETER NEAL

Project Title — Job No. J8463
HILL FARM, LIGHTHORNE, WARWICKSHIRE

Subject
PLOT OF MINIMALLY PROCESSED RESISTANCE DATA

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Plot	Checked by	Issue No.
A3	DGE	01
Survey date	Drawn by	Figure No.
JUL 15	TR	06

Amendments

Issue No.	Date	Description
-	-	-
-	-	-

KEY

Low resistance area anomaly - probable former cut feature of archaeological origin

High resistance area anomaly - probable area of compact ground of archaeological origin

Client

DR. PETER NEAL

Project Title — Job No. J8463

HILL FARM, LIGHTHORNE, WARWICKSHIRE

Subject

ABSTRACTION AND INTERPRETATION OF RESISTANCE ANOMALIES

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JUL 15	TR	07

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