

GEOPHYSICAL SURVEY REPORT

# STRATASCAN™



Project name:  
**East Appleton and Stripe Farms, Richmondshire, Yorkshire**

Client:  
**Cotswold Archaeology**

**September 2015**

Job ref:  
**J8849**

Report author:  
**Thomas Richardson MSc ACIfA**

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Project name:

**East Appleton and Stripe Farms, Richmondshire, Yorkshire**

Client:

**Cotswold Archaeology**



Job ref:

**J8849**

Techniques:

**Detailed magnetic survey –  
Gradiometry**

Survey date:

**17th-21st August 2015**

Site centred at:

**SE 233 958**

Post code:

**DL10 7QE**

Field team:

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## 1 SUMMARY OF RESULTS

A detailed gradiometry survey was conducted over approximately 21.7 hectares of agricultural land. The survey has detected two areas of enclosures and settlement activity, likely to be late prehistoric or Roman in origin. A number of possible archaeological anomalies, many of which may relate to the settlement activity, have also been identified, however their exact origin cannot be determined with any degree of confidence. A former field boundary, modern ploughing, and areas of ridge and furrow cultivation suggest that the area has been used for agricultural purposes since the medieval period. The remaining anomalies are natural or modern in origin, relating to land drains, a modern service, ferrous objects, and fencing.

## 2 INTRODUCTION

### 2.1 *Background synopsis*

Stratascan were commissioned to undertake a geophysical survey of an area outlined for a solar development. This survey forms part of an archaeological investigation being undertaken by Cotswold Archaeology.

### 2.2 *Site location*

The site is located to the west of Catterick Lane, Richmondshire, North Yorkshire at OS ref. SE 233 958.

### 2.3 *Description of site*

The survey area is approximately 21.7 hectares of agricultural land over three fields. The site lies on a south facing slope with no obstructions.

### 2.4 *Geology and soils*

The underlying geology is Cadeby Formation – Dolostone (British Geological Survey website). The drift geology is Till, Devensian - Diamicton (British Geological Survey website).

The overlying soils for the west of the site are known as East Keswick 1, which are typical brown earths. These consist of deep, fine, loamy soils. The east of the site is covered by Brickfield 2, which are typical cambic stagnogley soils. These consist of fine loamy soils (Soil Survey of England and Wales, Sheet 1 Northern England).

## 2.5 **Site history and archaeological potential**

Desk based assessments (DBAs) of the area have identified a probable late prehistoric enclosure and pit seen as cropmarks. Although there is no other evidence of remains from this period in close proximity to the site. The site is likely to have formed the agricultural hinterland of surrounding settlements during the medieval period, as such there is limited potential for significant archaeological remains during this period (Cotswold Archaeology 2015a, b).

## 2.6 **Survey objectives**

The objective of the survey was to locate any features of possible archaeological origin in order that they may be assessed prior to development.

## 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 potential for prehistoric activity in the area detailed magnetic survey (gradiometry) was used as an efficient and effective method of locating archaeological anomalies. More information regarding this technique is included in Appendix A.

## 2.8 **Processing, presentation and interpretation of results**

### 2.8.1 **Processing**

#### **Manually Collected Data**

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)

## Cart Collected Data

Data has been processed using an in house software package (CartEasy<sup>N</sup>) and a colour plot has been produced using Surfer 8 software. The filters used on the data were:

Zero Median Traverse	This process sets the background median of each traverse to zero. Limits are applied to reduce the effect of extreme readings which can skew the statistics. The operation minimises the differences between adjacent sensors.
Projection	Greyscale images require data to be sampled at regular intervals on each traverse. Due to the high precision of the RTK GNSS on the CartEasy <sup>N</sup> magnetometer cart small velocity & traverse separation variations result in an irregular sampling interval. Projection involves converting WGS84 coordinates to OSGB36 and re-sampling the collected data at regular intervals during the post processing stage.
Colouring extreme values	Surfer 8 software is used to colour extreme values within the dataset. A colour scale is used with plotting parameters set at +100nT and -100nT.

### 2.8.2 Presentation of results and interpretation

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.

## 3 RESULTS

The detailed magnetic gradiometer survey conducted at East Appleton and Stripe Farms 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 *Probable Archaeology*

- 1 A positive rectilinear anomaly 50-55m across with an opening in the eastern side. This is indicative of an enclosure ditch, and relates to the late prehistoric enclosure cropmarks recorded in the DBA.
- 2 Positive linear and rectilinear anomalies in the east of the site. These are indicative of former cut features, and are likely to be associated with the enclosure seen in Anomaly 1.
- 3 A positive rectilinear anomaly 30-35m across with an opening in the north-eastern corner. This is indicative of a former cut feature, and is likely related to a former enclosure ditch.
- 4 Positive linear and curvilinear anomalies in the west of the site. These are indicative of former cut features, and are likely associated with the enclosure seen in Anomaly 3.

### 3.2 *Possible Archaeology*

- 5 A number of positive linear anomalies mostly across the west of the site. These are indicative of former cut features, and may relate to the enclosures and settlement activity seen in Anomalies 1-4. However, they could equally relate to modern agricultural activity.
- 6 A number of positive linear and curvilinear anomalies mostly across the west of the site. These are indicative of former cut features, and may relate to the enclosures and settlement activity seen in Anomalies 1-4. However, they could equally be of a natural origin.
- 7 A mottled area of weak magnetic disturbance. This may relate to a plough damaged archaeological feature given its proximity to Anomalies 3 and 4.
- 8 A negative linear anomaly in the west of the site. This is indicative of a bank or earthwork feature, and may be of archaeological origin. However, it could equally be of modern agricultural or natural origin.
- 9 Discrete positive anomalies across the site. These are indicative of former cut features, and may relate to the enclosures and settlement activity seen in Anomalies 1-4. However, they could equally be of a natural origin.
- 10 Small, discrete, positive anomalies in the west of the site. These are indicative of small former cut features, such as backfilled pits, and may be related to the



enclosure and settlement activity seen in Anomalies 3 and 4. However, they could equally be of a natural origin.

### 3.3 *Medieval/Post-Medieval Agriculture*

- 11 A weak bipolar linear anomaly running across the west of the site. This is likely to relate to a post-medieval field boundary not present on available mapping.
- 12 Areas of widely spaced, curving, parallel linear anomalies in the west of the site. These are indicative of ridge and furrow cultivation.
- 13 Areas of closely spaced, parallel linear anomalies across the west of the site. These are indicative of modern agricultural activity, such as ploughing.

### 3.4 *Other Anomalies*

- 14 Weak bipolar linear anomalies in the west and east of the site. These are indicative of land drains.
- 15 A high amplitude bipolar linear anomaly in the east of the site. This is indicative of a modern service, such as a pipe or cable.
- 16 Areas of amorphous magnetic variation across the site. These anomalies are likely to be geological or pedological in origin.
- 17 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.
- 18 A number of magnetic 'spikes' (strong focussed values with associated antipolar response) indicate ferrous metal objects. These are likely to be modern rubbish.

## 4 DATA APPRAISAL & CONFIDENCE ASSESSMENT

Sedimentary geologies, such as dolostone, can generally be recommended for magnetic survey. The detection of a number of archaeological anomalies, including an enclosure also seen as cropmarks, suggest that the survey has been effective. However, an equipment fault with the cart collected data in the east of the site means that interpretation of anomalies in this area does not carry as much confidence as in the manually collected areas. Small or weak archaeological features may not be abstracted within this area. After discussion with the client

it was felt unnecessary to recollect this portion of data as the objectives of the survey in determining that the site contains archaeological features has been met.

## 5 CONCLUSION

The survey at East Appleton and Stripe Farms have identified a number of anomalies of probable and possible archaeological origin. Two areas of enclosures and settlement activity have been detected. These are likely to be late prehistoric or Roman in origin, in keeping with the information provided in the DBAs. A number of possible archaeological anomalies, many of which may relate to the settlement activity, have also been identified, however their exact origin cannot be determined with any degree of confidence. A former field boundary, modern ploughing, and areas of ridge and furrow cultivation suggest that the area has been used for agricultural purposes since the medieval period. The remaining anomalies are modern or natural in origin. The modern anomalies relate to land drains, a modern service, 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.

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(<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>

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Cotswold Archaeology, 2015b. *Stripe Solar Farm, Tunstall, Richmondshire, North Yorkshire Heritage Desk-Based Assessment*

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## 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.

### ***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.

For the manually collected data the 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.

For the cart collected data the survey was carried out using a CartEasyN magnetometer cart system utilizing Bartington 1000L Gradiometer sensors. 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.

### ***Sampling interval***

Manually collected - readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30m x 30m grid.

Cart collected - readings were taken at intervals of 0.125m along traverses 0.75m apart.

### ***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.

## **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.

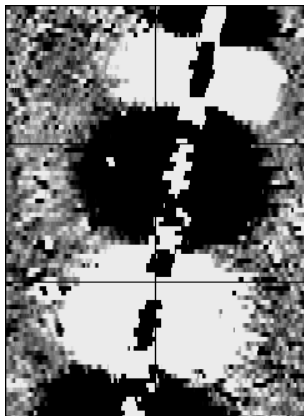
Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement 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.

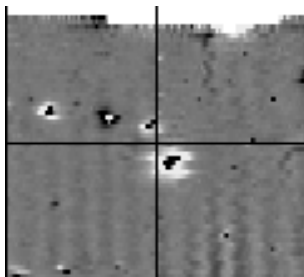
## APPENDIX C – GLOSSARY OF MAGNETIC ANOMALIES

### 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

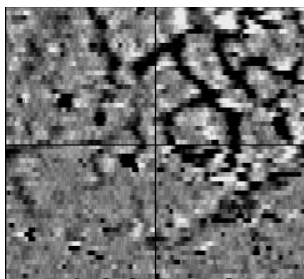


This consists of a single positive anomaly with an associated negative response. There should be no separation between the two polarities of response. These responses will be created by a single feature. The interpretation of the anomaly will depend on the magnitude of the magnetic measurements. A very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

### Positive anomaly with associated negative response

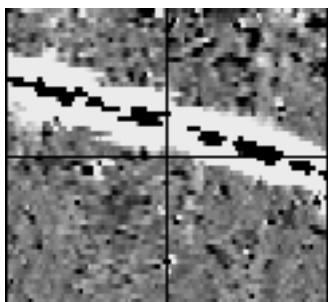
See bipolar and dipolar.

### Positive linear



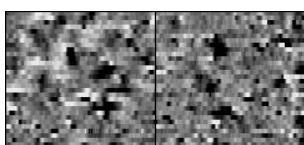
A linear response which is entirely positive in polarity. These are usually related to in-filled cut features where the fill material is magnetically enhanced compared to the surrounding matrix. They can be caused by ditches of an archaeological origin, but also former field boundaries, ploughing activity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

### Positive linear anomaly with associated negative response



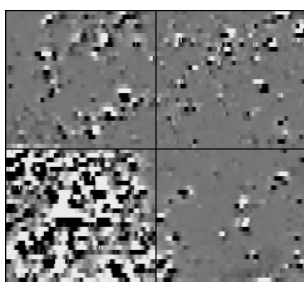
A positive linear anomaly which has a negative anomaly located adjacently. This will be caused by a single feature. In the example shown this is likely to be a single length of wire/cable probably relating to a modern service. Magnetically weaker responses may relate to earthwork style features and field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

### Positive point/area



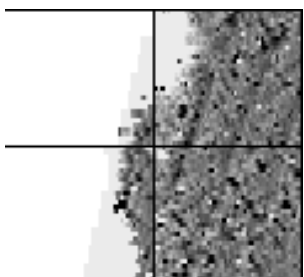
These are generally spatially small responses, perhaps covering just 3 or 4 reading nodes. They are entirely positive in polarity. Similar to positive linear anomalies they are generally caused by in-filled cut features. These include pits of an archaeological origin, possible tree bowls or other naturally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

### Magnetic debris



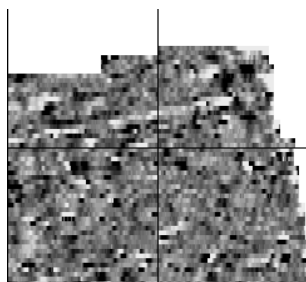
Magnetic debris consists of numerous dipolar responses spread over an area. If the amplitude of response is low ( $\pm 3nT$ ) then the origin is likely to represent general ground disturbance with no clear cause, it may be related to something as simple as an area of dug or mixed earth. A stronger anomaly ( $\pm 250nT$ ) 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

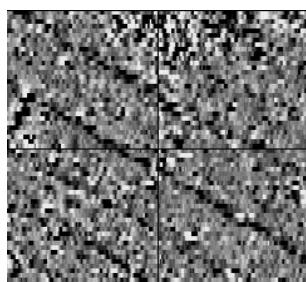


A linear response which is entirely negative in polarity. These are generally caused by earthen banks where material with a lower magnetic magnitude relative to the background top soil is built up. See also ploughing activity.

### 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

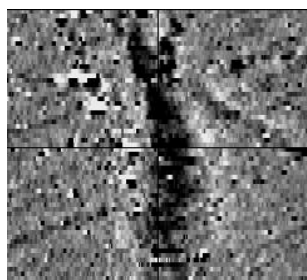
The amplitude of a magnetic response is an important factor in assigning an interpretation to a particular anomaly. For example a positive anomaly covering a 10m<sup>2</sup> area may have values up to around 3000nT, in which case it is likely to be caused by modern magnetic interference. However, the 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.



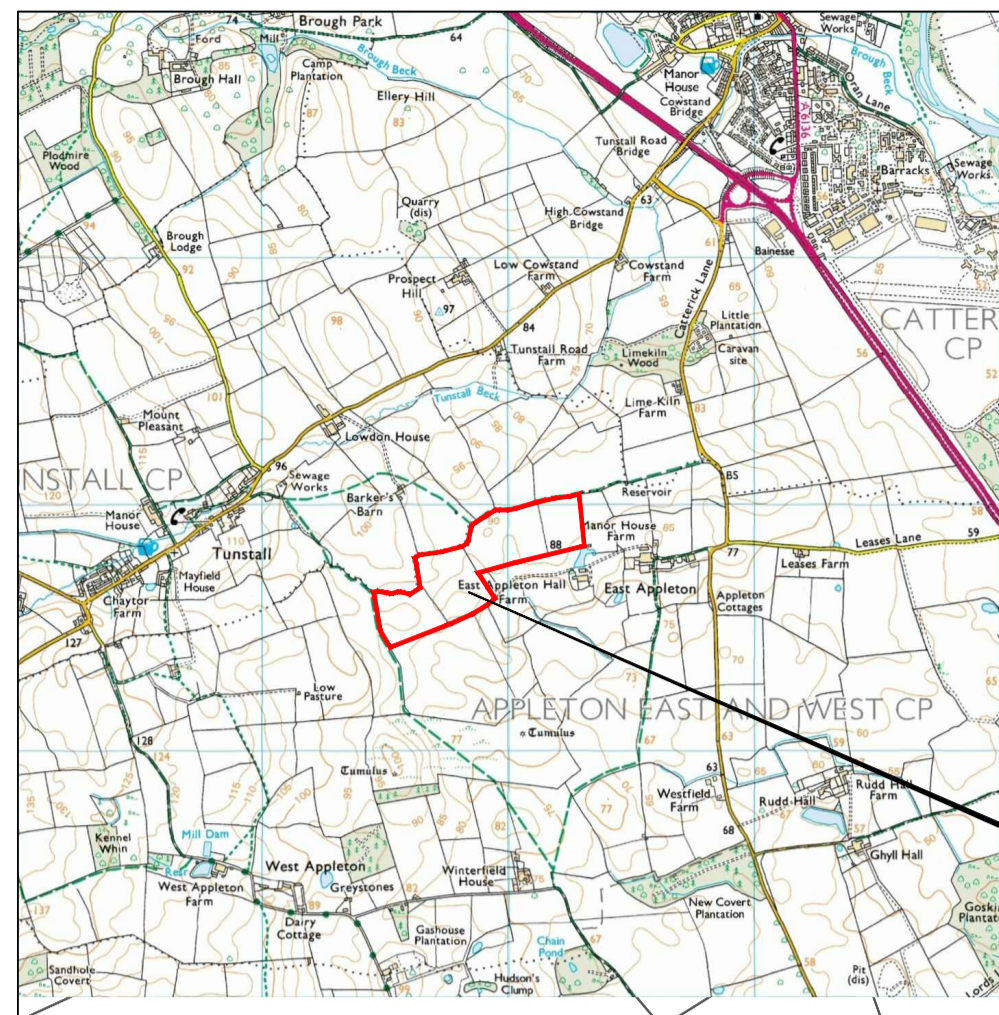
### Thermoremanent response

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

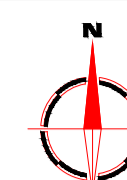


Weakly magnetic wide scale variations within the data can sometimes be seen within sites. These usually have no specific structure but can often appear curvy and sinuous in form. They are likely to be the result of natural features, such as soil creep, dried up (or seasonal) streams. They can also be 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.



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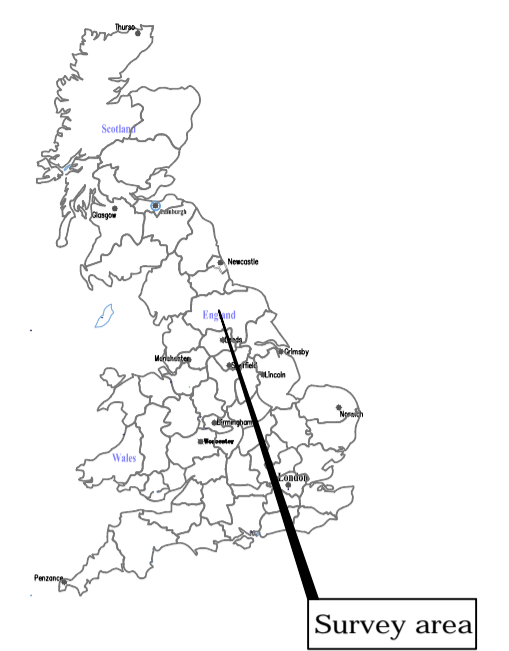
Survey area



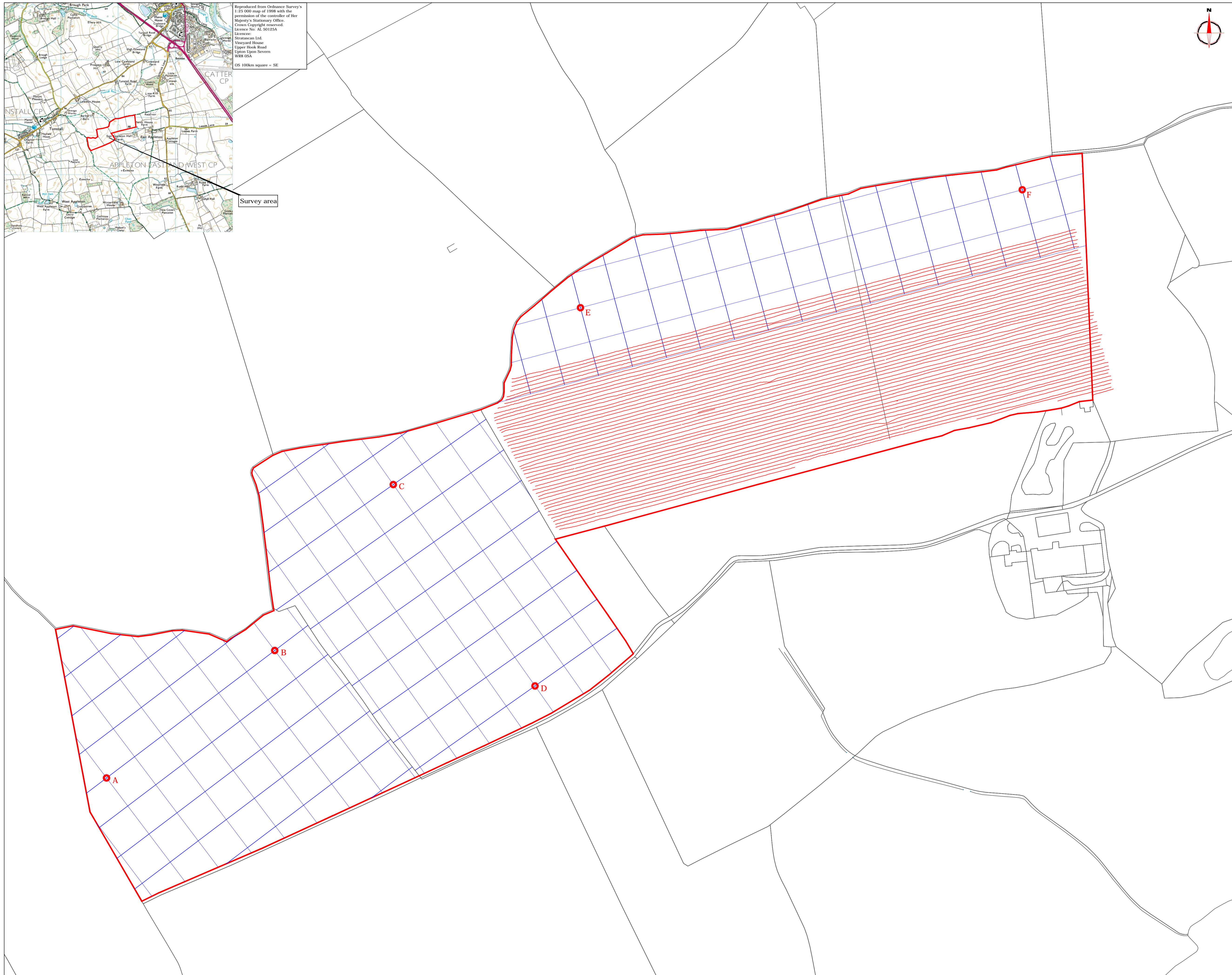
**Amendments**

Issue No.	Date	Description
-	-	-
-	-	-

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Site centred on NGR SE 233 958



**KEY**

- Manually collected grid
- Cart collected traverse

**OS REFERENCING INFORMATION**

<b>A</b>	422492.95, 495516.19
<b>B</b>	422636.44, 495624.86
<b>C</b>	422737.55, 495766.36
<b>D</b>	422858.43, 495594.64
<b>E</b>	422897.21, 495917.15
<b>F</b>	423274.01, 496017.74

Job No.	Survey Date
<b>J8849</b>	<b>AUG 15</b>

Client  
**COTSWOLD ARCHAEOLOGY**

Project Title  
**EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE**

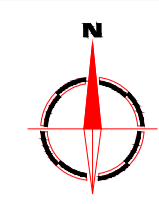
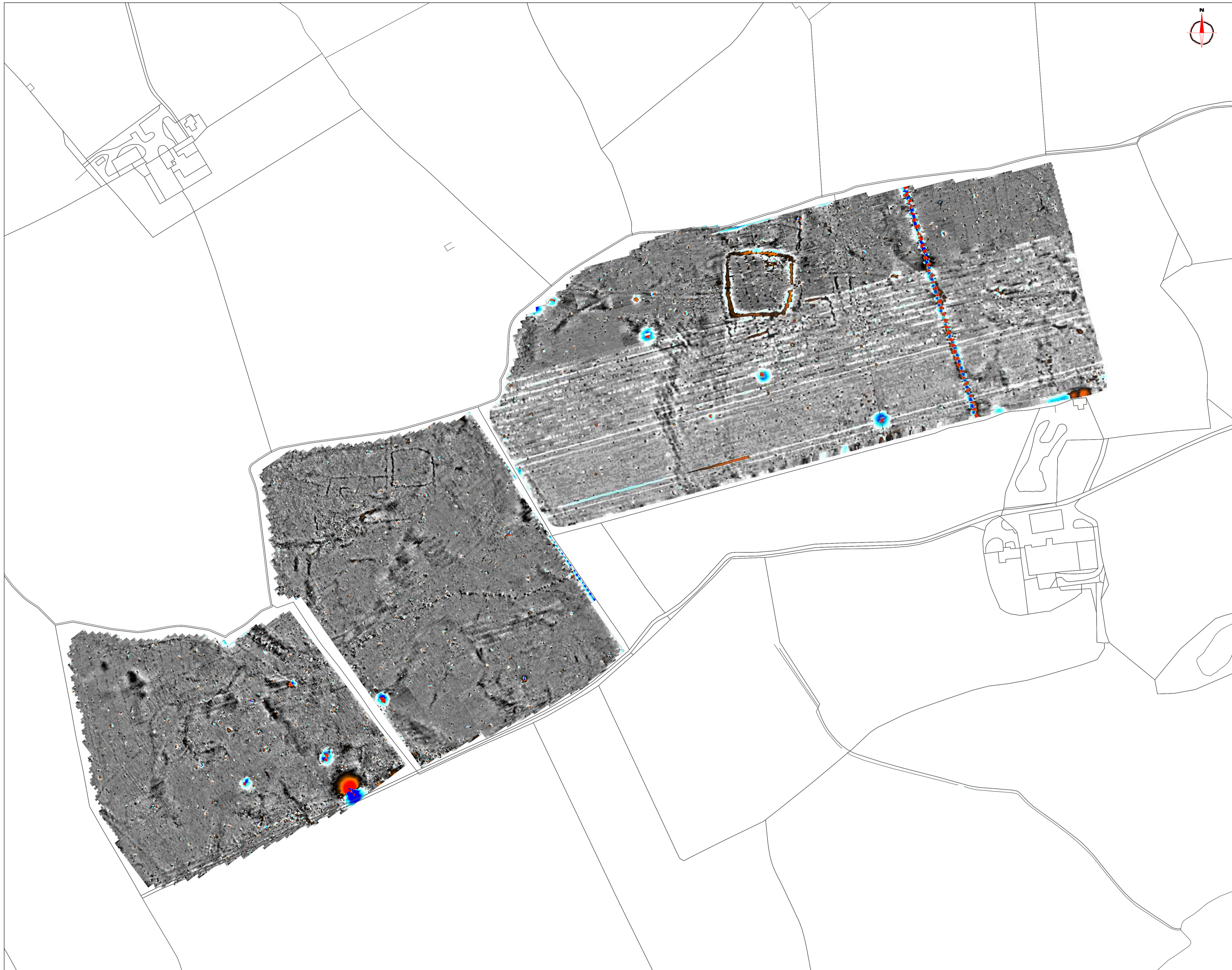
Subject  
**SITE LOCATION, SURVEY AREA & REFERENCING**

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Scale 0m 10 20 30 40 50 60 70 80 90m  
**1:1500**

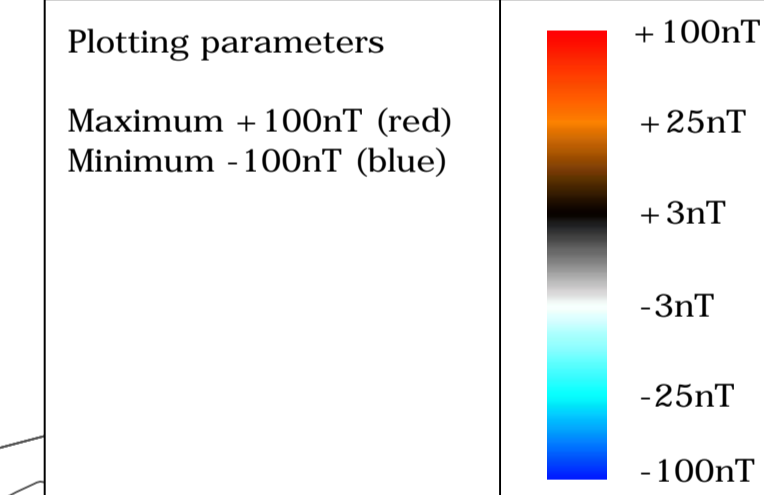
Plot	Checked by	Issue No.
<b>A1</b>	<b>DGE</b>	<b>01</b>
Date	Drawn by	Figure No.
<b>SEP 15</b>	<b>TR</b>	<b>01</b>



**Amendments**

Issue No.	Date	Description
-	-	-
-	-	-

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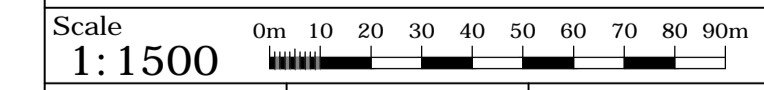
Job No. <b>J8849</b>	Survey Date <b>AUG 15</b>
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Client  
**COTSWOLD ARCHAEOLOGY**

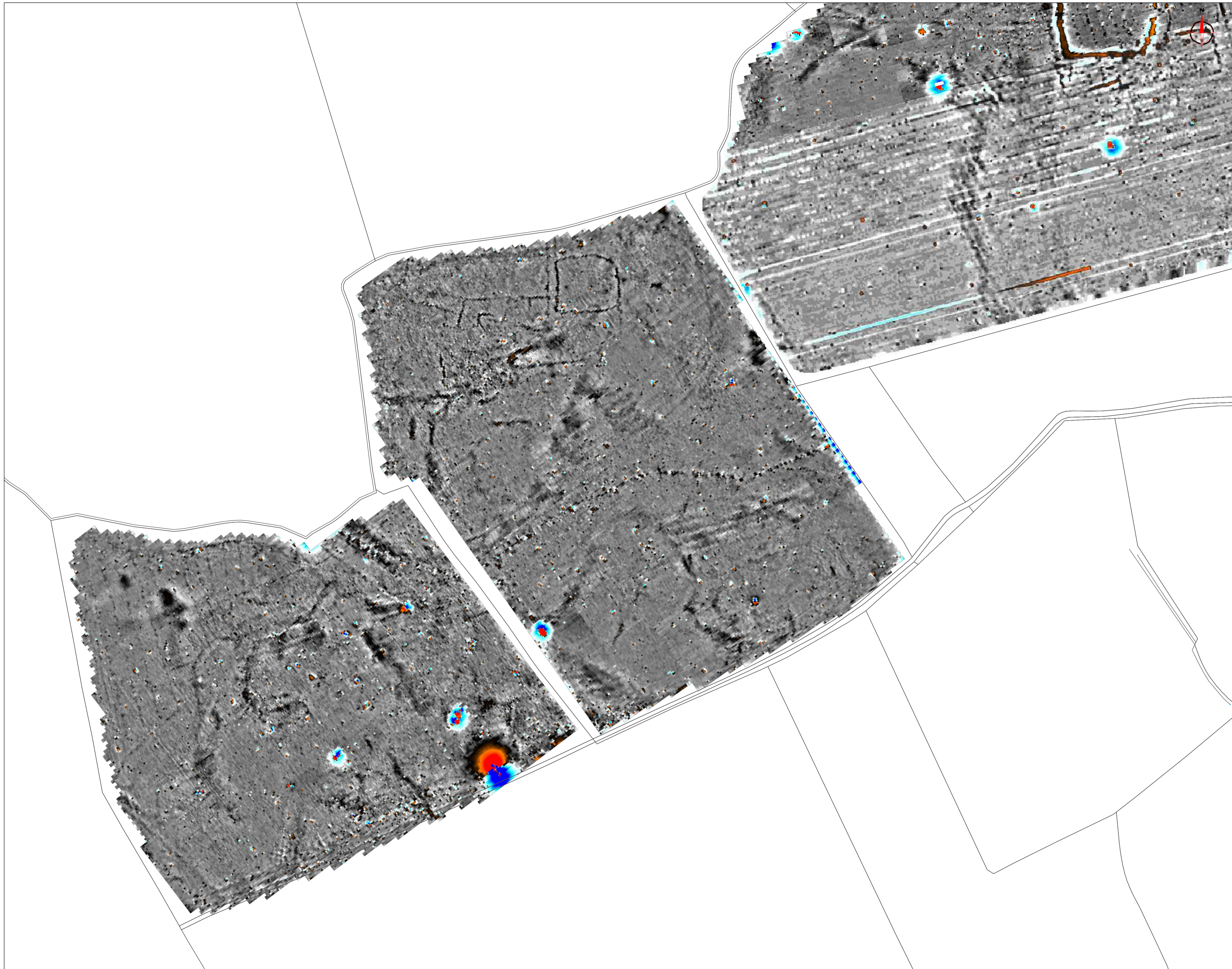
Project Title  
**EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE**

Subject  
**COLOUR PLOT OF GRADIOMETER DATA SHOWING EXTREME VALUES - OVERVIEW**

**STRATASCAN™**  
GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING  
VINEYARD HOUSE UPTON UPON SEVERN WR8 0SA T: 01684 592266 E: info@stratascan.co.uk www.stratascan.co.uk



Plot <b>A1</b>	Checked by <b>DGE</b>	Issue No. <b>01</b>
Date <b>SEP 15</b>	Drawn by <b>TR</b>	Figure No. <b>02</b>



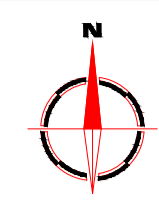
Amendments		
Issue No.	Date	Description
-	-	-
-	-	-
-	-	-
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Plotting parameters		
Maximum + 100nT (red)		
Minimum - 100nT (blue)		

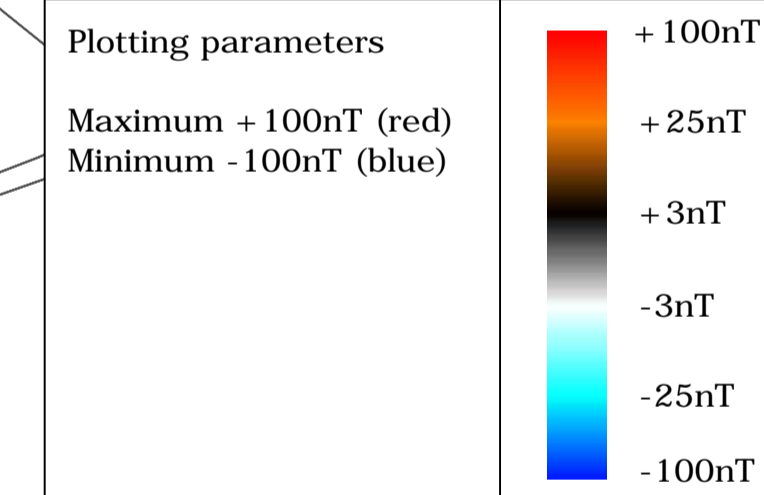
Job No.	Survey Date	
J8849	AUG 15	
Client		
COTSWOLD ARCHAEOLOGY		
Project Title		
EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE		
Subject		
COLOUR PLOT OF GRADIOMETER DATA SHOWING EXTREME VALUES - WEST		
<small>GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING</small> VINEYARD HOUSE T: 01684 592266 UPTON UPON SEVERN E: info@stratascan.co.uk WR8 0SA www.stratascan.co.uk		
Scale 0m 10 20 30 40 50 60m <b>1: 1000</b>		
Plot	Checked by	Issue No.
A1	DGE	01
Date	Drawn by	Figure No.
SEP 15	TR	03



**Amendments**

Issue No.	Date	Description
-	-	-
-	-	-

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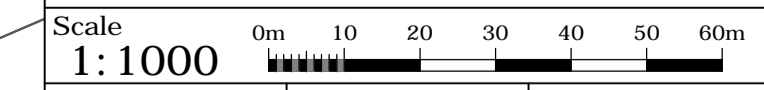
Job No.	Survey Date
J8849	AUG 15

Client  
**COTSWOLD ARCHAEOLOGY**

Project Title  
**EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE**

Subject  
**COLOUR PLOT OF GRADIOMETER DATA SHOWING EXTREME VALUES - EAST**

**STRATASCAN™**  
GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING  
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Plot	Checked by	Issue No.
A1	DGE	01
Date	Drawn by	Figure No.
SEP 15	TR	04



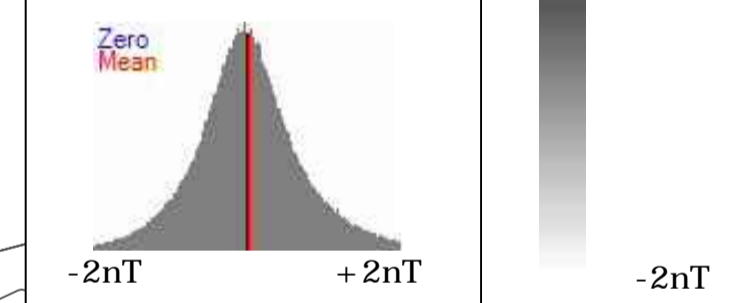
**Amendments**

Issue No.	Date	Description
-	-	-
-	-	-

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**Plotting parameters**

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



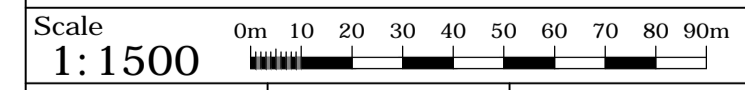
Job No.	Survey Date
J8849	AUG 15

Client  
**COTSWOLD ARCHAEOLOGY**

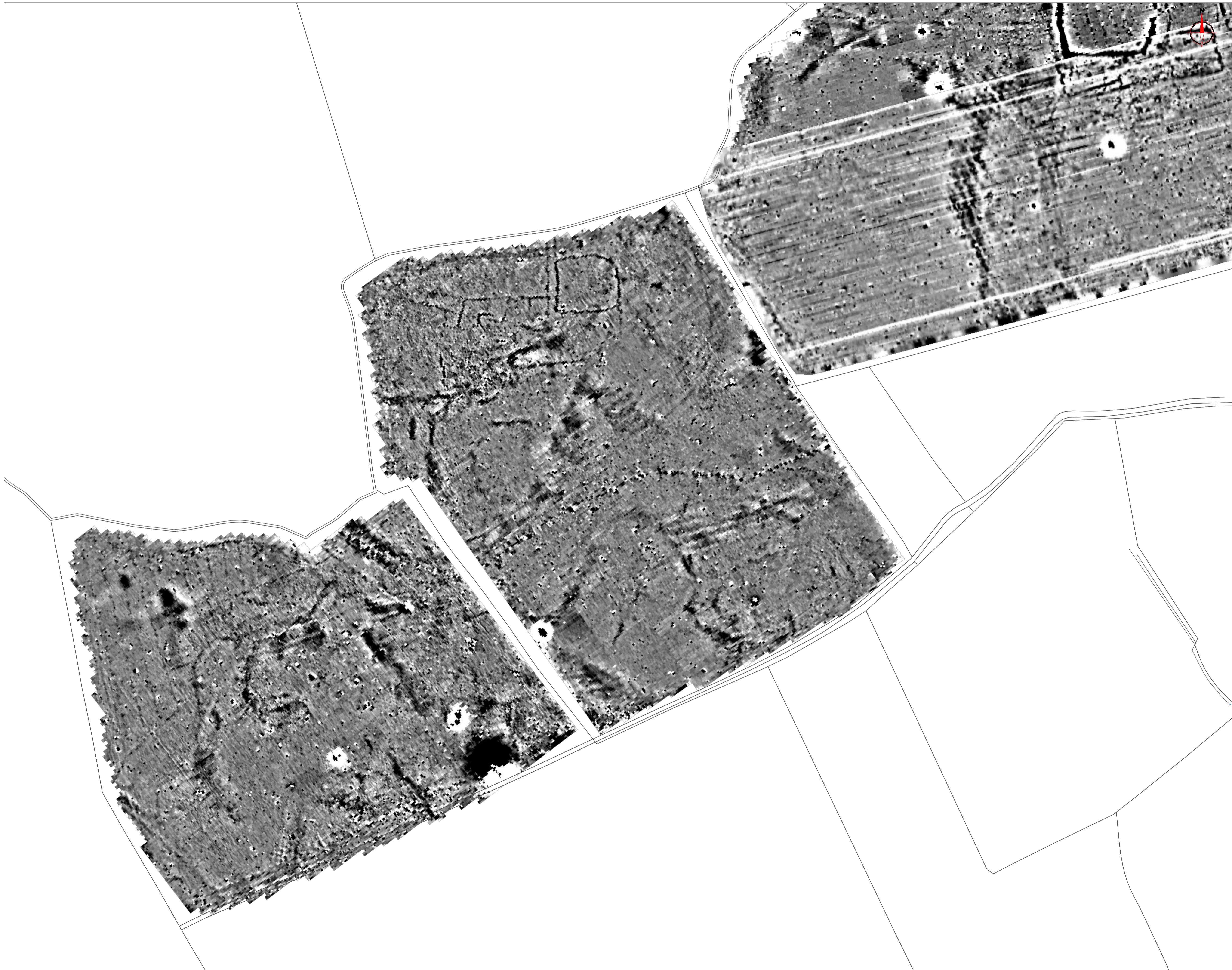
Project Title  
**EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE**

Subject  
**PLOT OF MINIMALLY PROCESSED GRADIOMETER DATA - OVERVIEW**

**STRATASCAN™**  
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Plot	Checked by	Issue No.
A1	DGE	01
Date	Drawn by	Figure No.
SEP 15	TR	05



Amendments		
Issue No.	Date	Description
-	-	-
-	-	-
-	-	-
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Plotting parameters		+ 2nT
Maximum + 2nT (black)		
Minimum -2nT (white)		
Job No.	Survey Date	
J8849	AUG 15	
Client		
COTSWOLD ARCHAEOLOGY		
Project Title		
EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE		
Subject		
PLOT OF MINIMALLY PROCESSED GRADIOMETER DATA - WEST		
<small>GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING</small>		
<small>VINEYARD HOUSE T: 01684 592266</small> <small>UPTON UPON SEVERN E: info@stratascan.co.uk</small> <small>WR8 0SA www.stratascan.co.uk</small>		
Scale		
1: 1000		
Plot	Checked by	Issue No.
A1	DGE	01
Date	Drawn by	Figure No.
SEP 15	TR	06



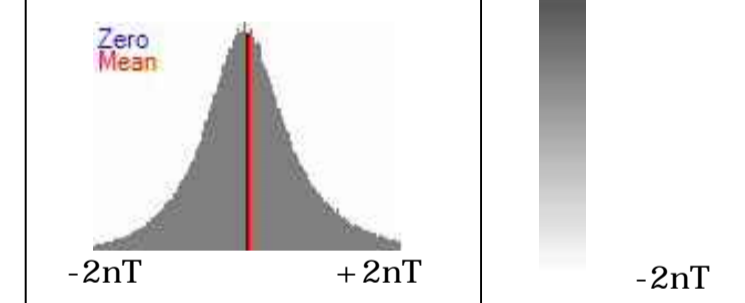
**Amendments**

Issue No.	Date	Description
-	-	-
-	-	-

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**Plotting parameters**

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



Job No. **J8849** Survey Date **AUG 15**

Client  
**COTSWOLD ARCHAEOLOGY**

Project Title  
**EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE**

Subject  
**PLOT OF MINIMALLY PROCESSED GRADIOMETER DATA - EAST**

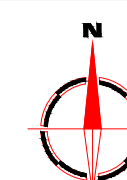
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UPTON UPON SEVERN E: info@stratascan.co.uk  
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Scale 1:1000  
0m 10 20 30 40 50 60m

Plot by <b>A1</b>	Checked by <b>DGE</b>	Issue No. <b>01</b>
Date <b>SEP 15</b>	Drawn by <b>TR</b>	Figure No. <b>07</b>

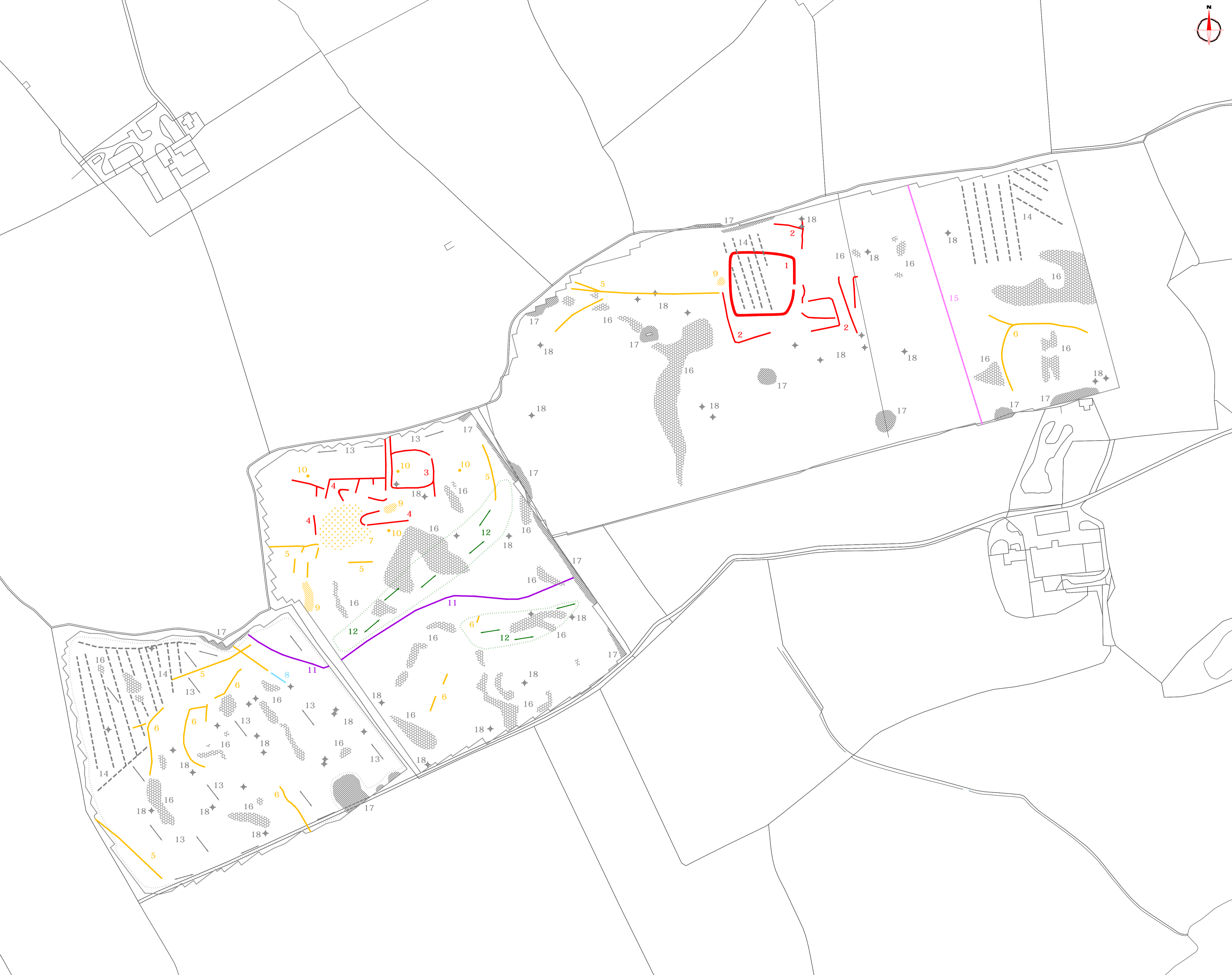




Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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PROBABLE ARCHAEOLOGY

- 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
- Mottled area of magnetic variation - possible archaeological activity

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
- Linear anomaly - probably related to a former field boundary not present on available mapping
- Linear anomaly - related to a former field boundary present on available mapping

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

Job No.	Survey Date
J8849	AUG 15

Client  
**COTSWOLD ARCHAEOLOGY**

Project Title  
**EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE**

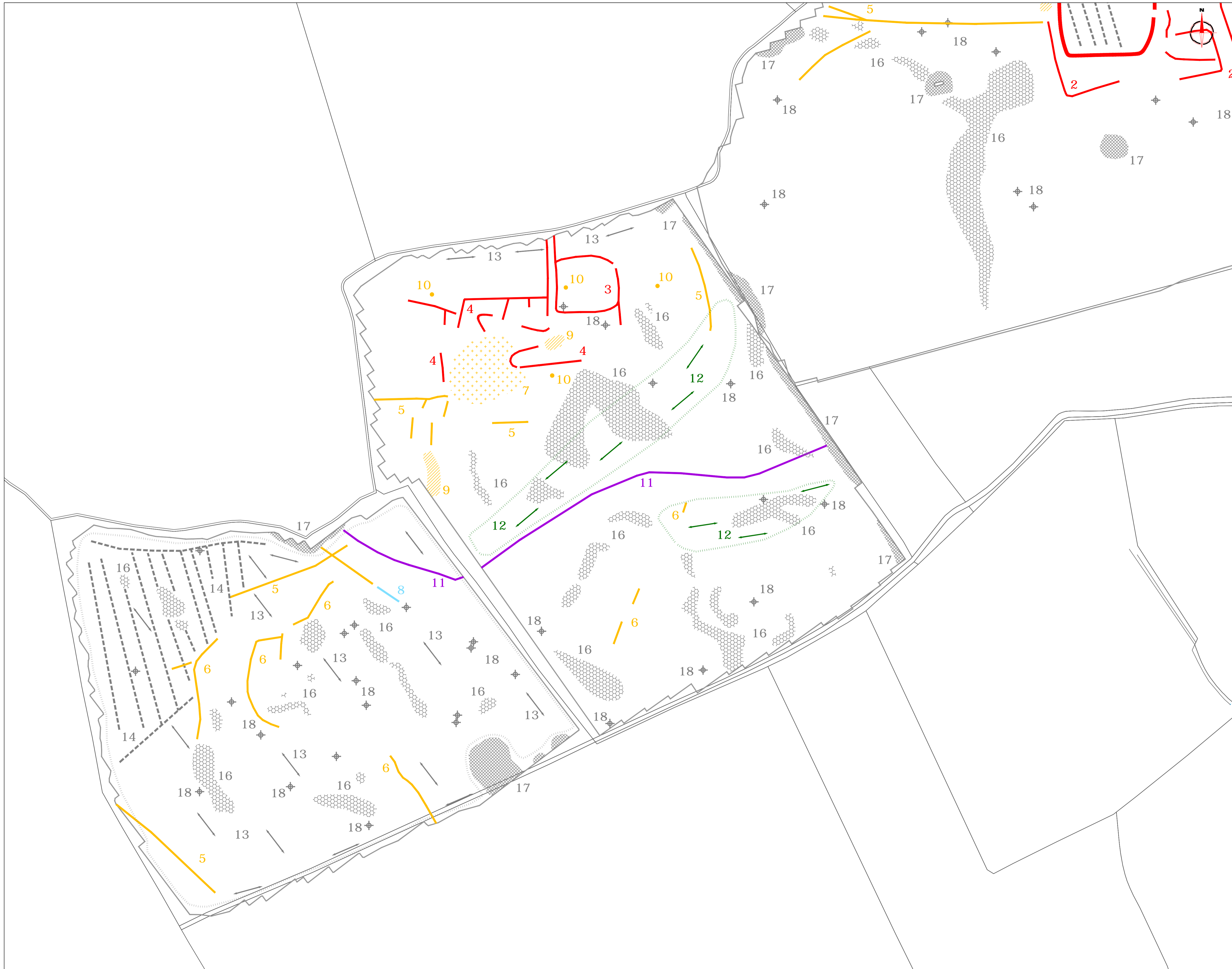
Subject  
**ABSTRACTION AND INTERPRETATION OF GRADIOMETER ANOMALIES - OVERVIEW**

**STRATASCAN™**  
GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING  
VINEYARD HOUSE UPTON UPON SEVERN WR8 0SA T: 01684 592266 E: info@stratascan.co.uk www.stratascan.co.uk

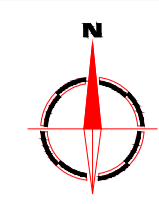
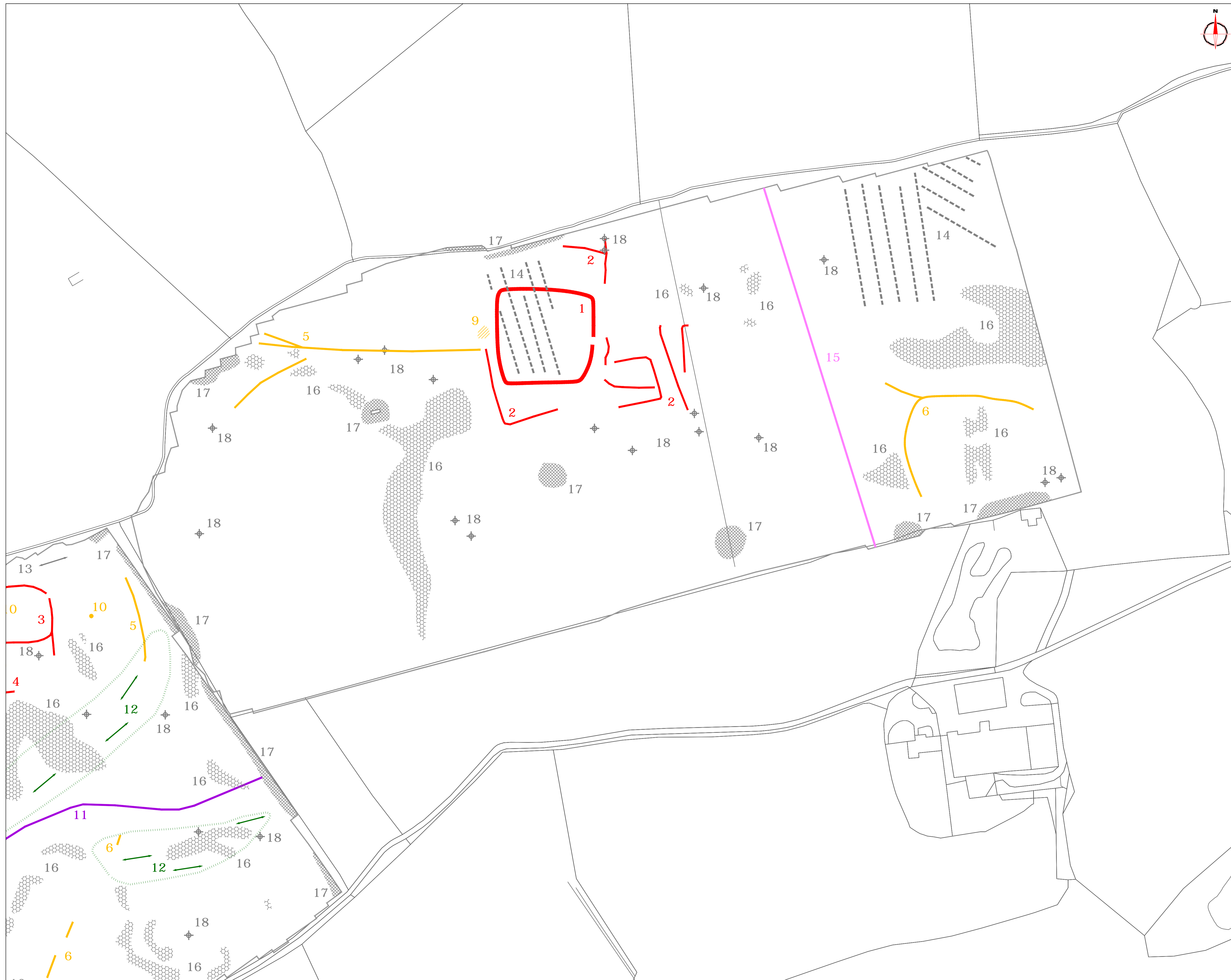


Scale 0m 10 20 30 40 50 60 70 80 90m  
**1:1500**

Plot	Checked by	Issue No.
A1	DGE	01
Date	Drawn by	Figure No.
SEP 15	TR	08



Amendments		
Issue No.	Date	Description
-	-	-
-	-	-
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<b>PROBABLE ARCHAEOLOGY</b>		
	Positive anomaly / weak positive anomaly - probable cut feature of archaeological origin	
	Negative anomaly / weak negative anomaly - probable bank or earthwork of archaeological origin	
<b>POSSIBLE ARCHAEOLOGY</b>		
	Positive anomaly / weak positive anomaly - possible cut feature of archaeological origin	
	Negative anomaly / weak negative anomaly - possible bank or earthwork of archaeological origin	
	Mottled area of magnetic variation - possible archaeological activity	
<b>MEDIEVAL/POST-MEDIEVAL AGRICULTURE</b>		
	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	
	Linear anomaly - probably related to a former field boundary not present on available mapping	
	Linear anomaly - related to a former field boundary present on available mapping	
<b>OTHER ANOMALIES</b>		
	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	
Job No.	Survey Date	
J8849	AUG 15	
Client		
COTSWOLD ARCHAEOLOGY		
Project Title		
EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE		
Subject		
ABSTRACTION AND INTERPRETATION OF GRADIOMETER ANOMALIES - WEST		
<b>STRATASCAN™</b>		
GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING		
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WR8 0SA		www.stratascan.co.uk
Scale		
1:1000		
0m 10 20 30 40 50 60m		
Plot	Checked by	Issue No.
A1	DGE	01
Date	Drawn by	Figure No.
SEP 15	TR	09



**Amendments**

Issue No.	Date	Description
-	-	-
-	-	-

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**PROBABLE ARCHAEOLOGY**

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

Mottled area of magnetic variation - possible archaeological activity

**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

Linear anomaly - probably related to a former field boundary not present on available mapping

Linear anomaly - related to a former field boundary present on available mapping

**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

Job No. **J8849** Survey Date **AUG 15**

Client

**COTSWOLD ARCHAEOLOGY**

Project Title

**EAST APPLETON AND STRIPE FARMS, RICHMONDSHIRE, YORKSHIRE**

Subject

**ABSTRACTION AND INTERPRETATION OF GRADIOMETER ANOMALIES - EAST**

**STRATASCAN™**

GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING

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Scale 1:1000

Plot **A1** Checked by **DGE** Issue No. **01**

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