

GEOPHYSICAL SURVEY REPORT

STRATASCAN™



Project name:
Desborough Grange, Desborough, Northamptonshire

Client:
University of Leicester Archaeological Services

Job ref:
J9747

May 2016

GEOPHYSICAL SURVEY REPORT

Project name: Desborough Grange, Desborough, Northamptonshire Client: University of Leicester Archaeological Services	Job ref: J9747
Survey date: 4th-5th & 26th April 2016	Report date: May 2016
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Version number and issue date: V1 06/05/2016	Amendments:



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1 SUMMARY OF RESULTS

A detailed gradiometry survey was conducted over approximately 6.5 hectares of pasture. The survey has not identified any anomalies of probable archaeological origin. Two weak linear anomalies may relate to archaeological ditches; however, they could equally relate to post-medieval field boundaries or ploughing. The detection of post-medieval ridge and furrow suggests that the area has a recent agricultural past. The remaining anomalies are modern in origin, relating to underground services, trackways, scattered magnetic debris, ferrous objects, and fencing.

2 INTRODUCTION

2.1 Background synopsis

Stratascan were commissioned to undertake a geophysical survey of an area outlined for residential development. This survey forms part of an archaeological investigation being undertaken by University of Leicester Archaeological Services.

2.2 Site Details

NGR / Postcode	SP 802 847 NN14 2WD
Location	The site lies to the east of the B669 Stoke Road, Desborough, Northamptonshire.
HER	Northamptonshire
District	Kettering
Parish	Desborough CP
Topography	Flat
Current Land Use	Pasture and horse paddocks
Weather Conditions	Overcast, dry
Soils	The overlying soils are known as Hanslope, which are typical calcareous pelosols. These consist of calcareous clayey soils (Soil Survey of England and Wales, Sheet 4 Eastern England).
Geology	The underlying geology is Northampton Sand Formation – ooidal ironstone. The drift geology is Mid Pleistocene Till – Diamicton (British Geological Survey website).

<p>Archaeology</p>	<p>Extract from 'An Archaeological Desk-Based Assessment for Land to the North of Desborough, Northamptonshire' (ULAS 2010):</p> <p><i>The area round Desborough contains evidence of human activity from the prehistoric period into the medieval period and beyond. There is evidence for high status artefacts from the Iron Age period, settlement evidence from the Roman period and Anglo-Saxon cemeteries; although most of this evidence is from the town centre area or over 2km away from the assessment area. The Anglo-Saxon cemeteries cannot be accurately located.</i></p> <p><i>Desborough was the subject of intensive Ironstone mining activity throughout the latter part of the 19th century and the early part of the 20th century. A large part of the assessment area itself was mined during this period and therefore much of the southern and eastern parts of the site has very little potential for the preservation of archaeological remains. There is better potential for the preservation of earthfast archaeological remains within the fields to the north and north-west.</i></p> <p><i>There is therefore low to moderate potential for archaeological remains within the unmined areas of the assessment area and very low potential within the areas that have been subject to mining. The site contains a number of small concrete buildings, which appear to be military in nature, and most likely date from the Second World War. These may be of sufficient interest to be worthy of an assessment or photographic record.</i></p>
<p>Survey Methods</p>	<p>Gradiometry</p>
<p>Study Area</p>	<p>8.6ha, however areas of woodland, overgrown vegetation, and buildings reduced the surveyable area to approximately 6.5ha.</p>

2.3 Aims and objectives

To locate and characterise any anomalies of possible archaeological interest within the study area.

3 METHODS, PROCESSING & PRESENTATION

3.1 Standards & Guidance

This report and all fieldwork have been conducted in accordance with the latest guidance documents issued by Historic England (2008) and the Chartered Institute for Archaeologists (2002 & 2014).

Stratascan Ltd are a Registered Organisation with the CIfA and are committed to upholding its policies and standards.

3.2 Survey methods

Given the potential for archaeological remains from several periods, detailed magnetic survey was used as an efficient and effective method of locating archaeological anomalies.

More information regarding this technique is included in Appendix A.

3.3 Processing

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

1. *Destripe*
2. *Destagger*

3.4 Presentation of results and interpretation

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

When interpreting the results several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, pedology, topography etc.). Anomalies are categorised by their potential origin. Where responses can be related to very specific known features documented in other sources, this is done (for example: Abbey Wall, Roman Road). For the generic categories levels of confidence are indicated, for example: probable, or possible archaeology. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification "possible".

4 RESULTS

The detailed magnetic gradiometer survey conducted at Desborough Grange has identified a small number of anomalies that have been characterised as being of a *possible* archaeological origin. The following list of numbered anomalies refers to numerical labels on the interpretation plots.

4.1 Probable Archaeology

No probable archaeology has been identified within the survey area.

4.2 Possible Archaeology

- 1 Three weak positive linear anomalies in the east of the site. These may relate to archaeological ditch features, however they could equally relate to post-medieval field boundaries or, given their similarity to Anomaly 4, or ploughing.

4.3 *Medieval/Post-Medieval Agriculture*

- 2 An area of widely spaced parallel linear anomalies in the west of the site. This relates to an extant area of ridge and furrow cultivation. The straight nature of the ploughing suggest it is more likely to relate to post-medieval activity rather than earlier medieval practices, which tend to be curved.

4.4 *Other Anomalies*

- 3 Magnetically strong linear anomalies in the west of the site. These are indicative of underground services, such as pipes or cables.
- 4 A linear alignment of magnetic spikes in the east of the site. These run between to two larger magnetic spikes (Anomaly 10a) related to an electricity pylon and possible buried manhole. These may relate to a buried service.
- 5 A weak linear anomaly in the west of the site. This appears to correspond with an extant shallow ditch running to a service and electricity pylon. This may relate to a service trench.
- 6 A weak linear anomaly in the north-west of the site. This anomaly appears to run between an electricity pylon and stile on the northern boundary, suggesting that it is likely related to a modern path way.
- 7 Linear areas of strong magnetic disturbance in the south of the site. These relate to modern trackways.
- 8 Areas of scattered magnetic debris in the east of the site. These are likely to be modern in origin.
- 9 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.
- 10 A number of magnetic 'spikes' (strong focussed values with associated antipolar response) indicate ferrous metal objects. These are likely to be modern rubbish.

5 DATA APPRAISAL & CONFIDENCE ASSESSMENT

Ironstone geologies, such as that at Desborough Grange, generally provide a good contrast between archaeological and background responses, although results can be variable. The majority of the non-ferrous anomalies, both modern and possible archaeology, are weak in nature suggesting that the geology may not be fully conducive to magnetic survey. However, it is likely that any substantial archaeological remains would still produce an anomaly in the data.

There is no evidence of mining activity within the survey area. This increases the chances of any archaeology, were it present, being well preserved.

6 CONCLUSION

The survey at Desborough Grange has not identified any anomalies of probable archaeological origin. There is no evidence for prehistoric, Roman, or Anglo-Saxon settlement, which is recorded in the wider surrounding area. Three weak linear anomalies may relate to archaeological ditches; however, they could equally relate to post-medieval field boundaries or ploughing. The detection of post-medieval ridge and furrow suggests that the area has a recent agricultural past. The remaining anomalies are modern in origin, relating to underground services, trackways, scattered magnetic debris, ferrous objects, and fencing.

Ironstone mining to the south and east of the site does not extend into the survey area, and therefore will not have effected any archaeological remains were they present.

7 REFERENCES

British Geological Survey, n.d., *website*:
(<http://www.bgs.ac.uk/opengeoscience/home.html?Accordion1=1#maps>) Geology of Britain viewer. [Accessed 06/05/2016]

Chartered Institute For Archaeologists. *Standard and Guidance for Archaeological Geophysical Survey*. (http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics_1.pdf)

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

IfA 2002. The Use of Geophysical Techniques in Archaeological Evaluations, IFA Paper No 6, C. Gaffney, J. Gater and S. Ovenden. Institute for Archaeology, Reading

Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 4 Eastern England*

ULAS, 2010. *An Archaeological Desk-Based Assessment for Land to the North of Desborough, Northamptonshire*

Appendix A - Technical Information: Magnetometer Survey Method

Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

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. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m

Instrumentation: Bartington *Grad601-2*

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted vertically, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths. The Bartington instrument can collect two lines of data per traverse with gradiometer units mounted laterally with a separation of 1.0m.

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.

Data Processing

Zero Mean Traverse This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.

Step Correction (Destagger) When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

Display

Greyscale/ Colourscale Plot This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall*, etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

<i>Archaeology/Probable Archaeology</i>	This term is used when the form, nature and pattern of the response are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
<i>Possible Archaeology</i>	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
<i>Industrial / Burnt-Fired</i>	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal- working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
<i>Former Field Boundary (probable & possible)</i>	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
<i>Ridge & Furrow</i>	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases the response may be the result of more recent agricultural activity.
<i>Agriculture (ploughing)</i>	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
<i>Land Drain</i>	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains will often lead and empty into larger diameter pipes and which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
<i>Natural</i>	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
<i>Magnetic Disturbance</i>	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present. They are presumed to be modern.
<i>Service</i>	Magnetically strong anomalies usually forming linear features indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) cause weaker magnetic responses and can be identified from their uniform linearity crossing large expanses.
<i>Ferrous</i>	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.
<i>Uncertain Origin</i>	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of <i>Possible Archaeology</i> and <i>Possible Natural</i> or (in the case of linear responses) <i>Possible Archaeology</i> and <i>Possible Agriculture</i> ; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

Appendix B - Technical Information: Magnetic Theory

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. 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.

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.

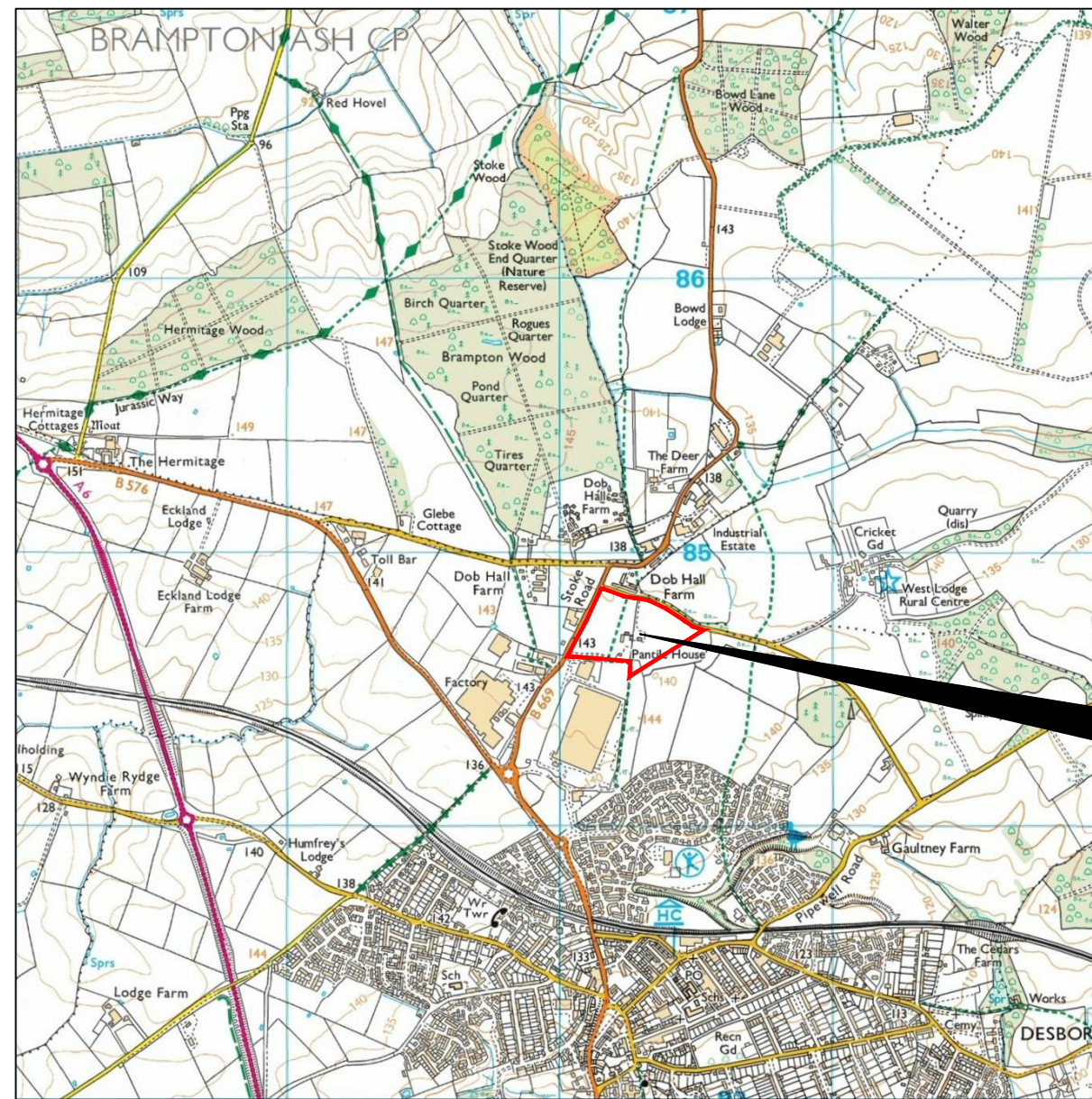
Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same 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.

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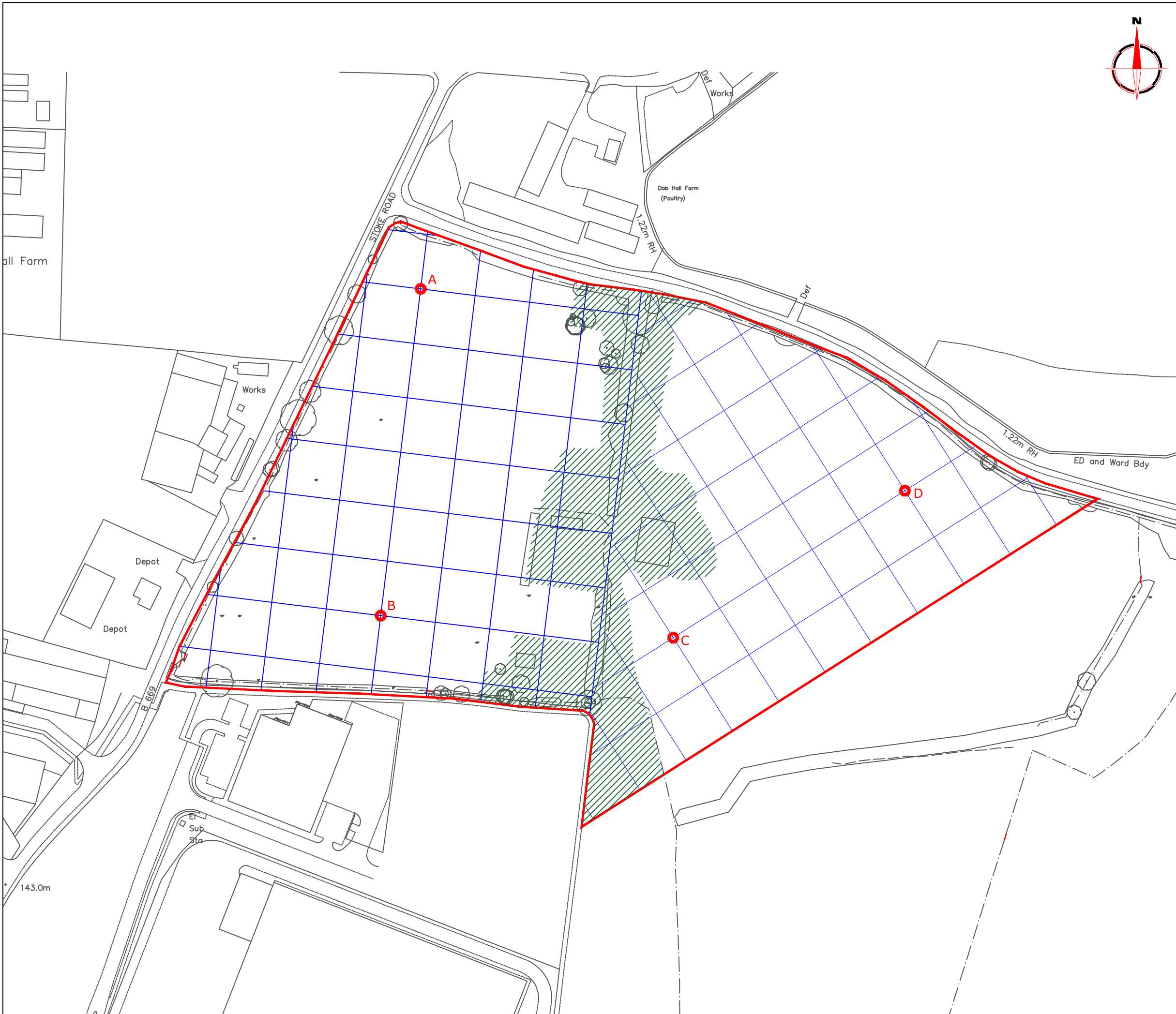
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Scale **1:25000** 0m 500m 1000m

Plot A3	Checked by DGE	Issue No. 01
Survey date APR 16	Drawn by TR	Figure No. 01



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Issue No.	Date	Description
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KEY

Area unsurveyable - buildings, woodland, and overgrown vegetation

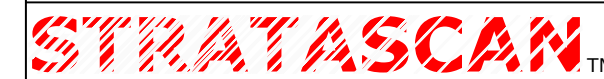
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**LOCATION OF SURVEY GRIDS AND
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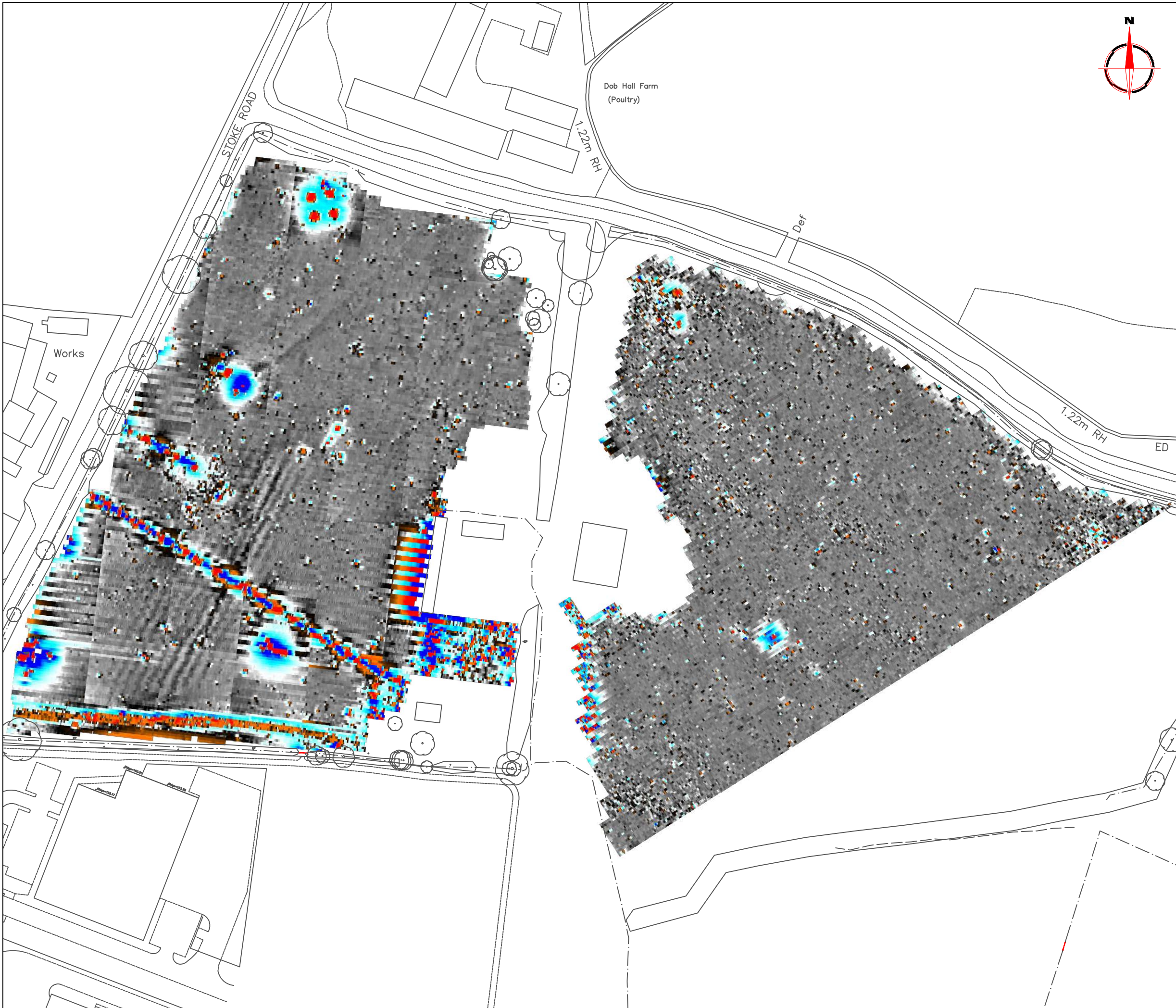


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Plotting parameters

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

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

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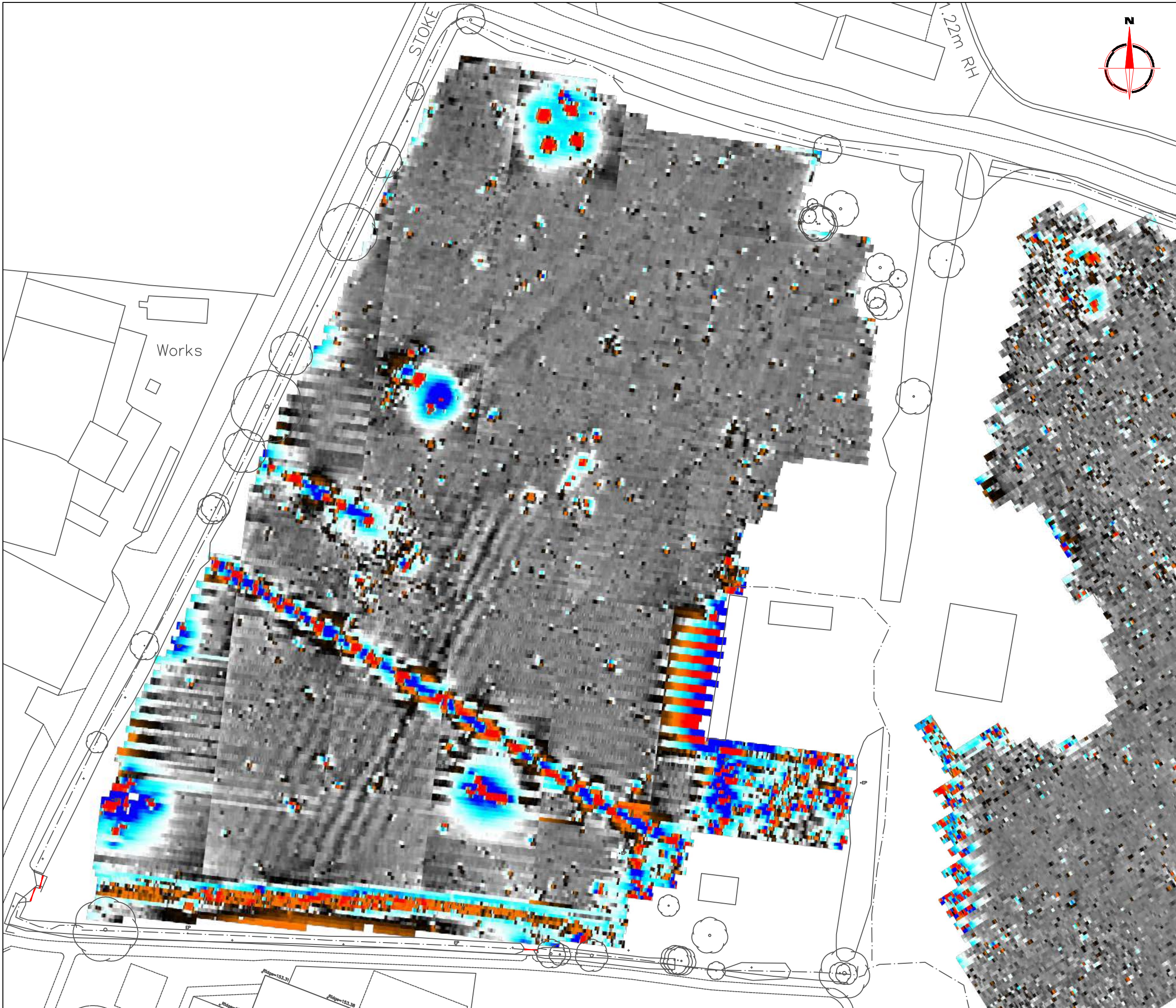
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Plotting parameters	
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Minimum -100nT (blue)	

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Subject	COLOUR PLOT OF GRADIOMETER DATA SHOWING EXTREME VALUES - WEST	

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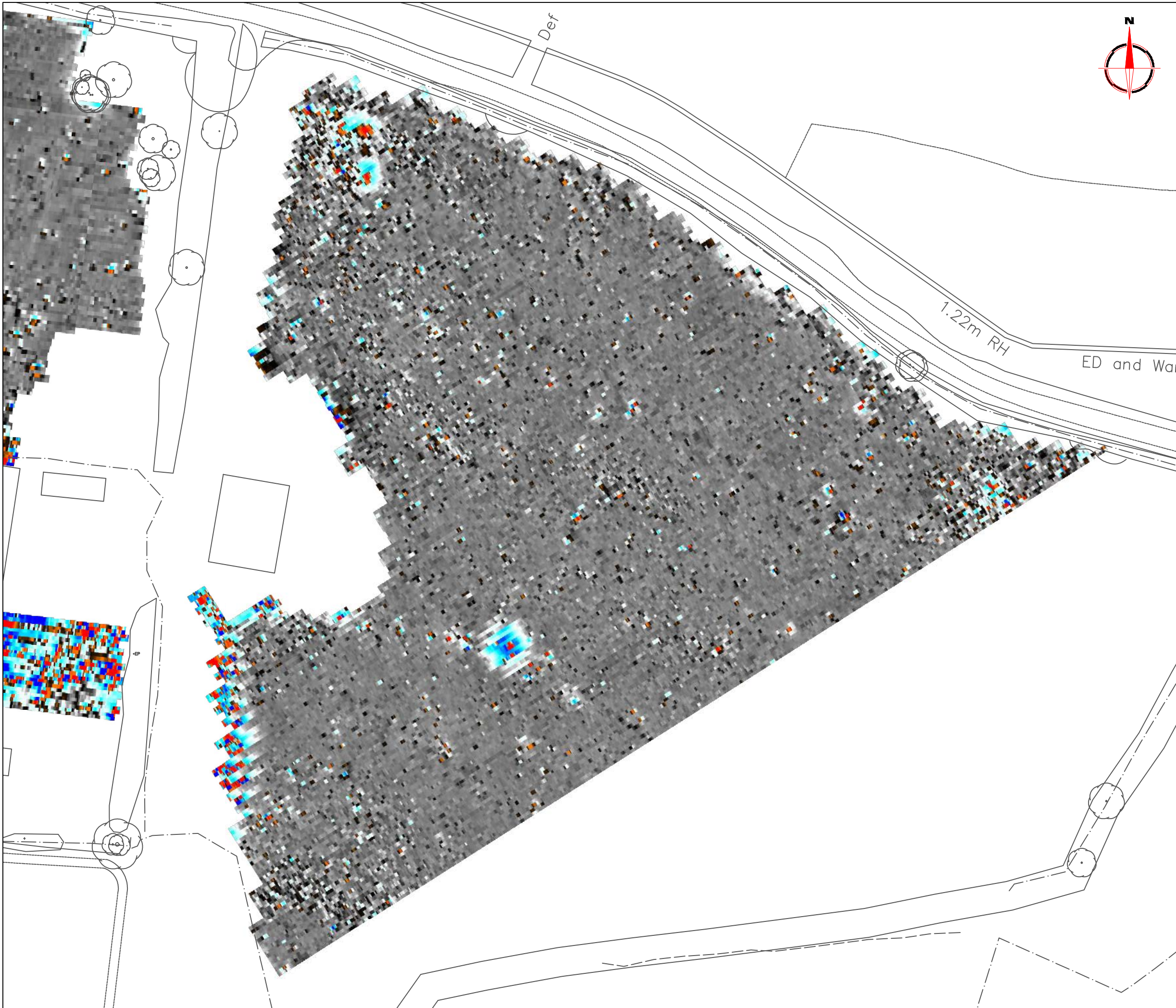
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Survey date	Drawn by	Figure No.
APR 16	TR	04



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Plotting parameters

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

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

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

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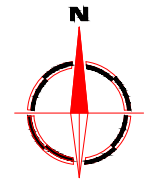
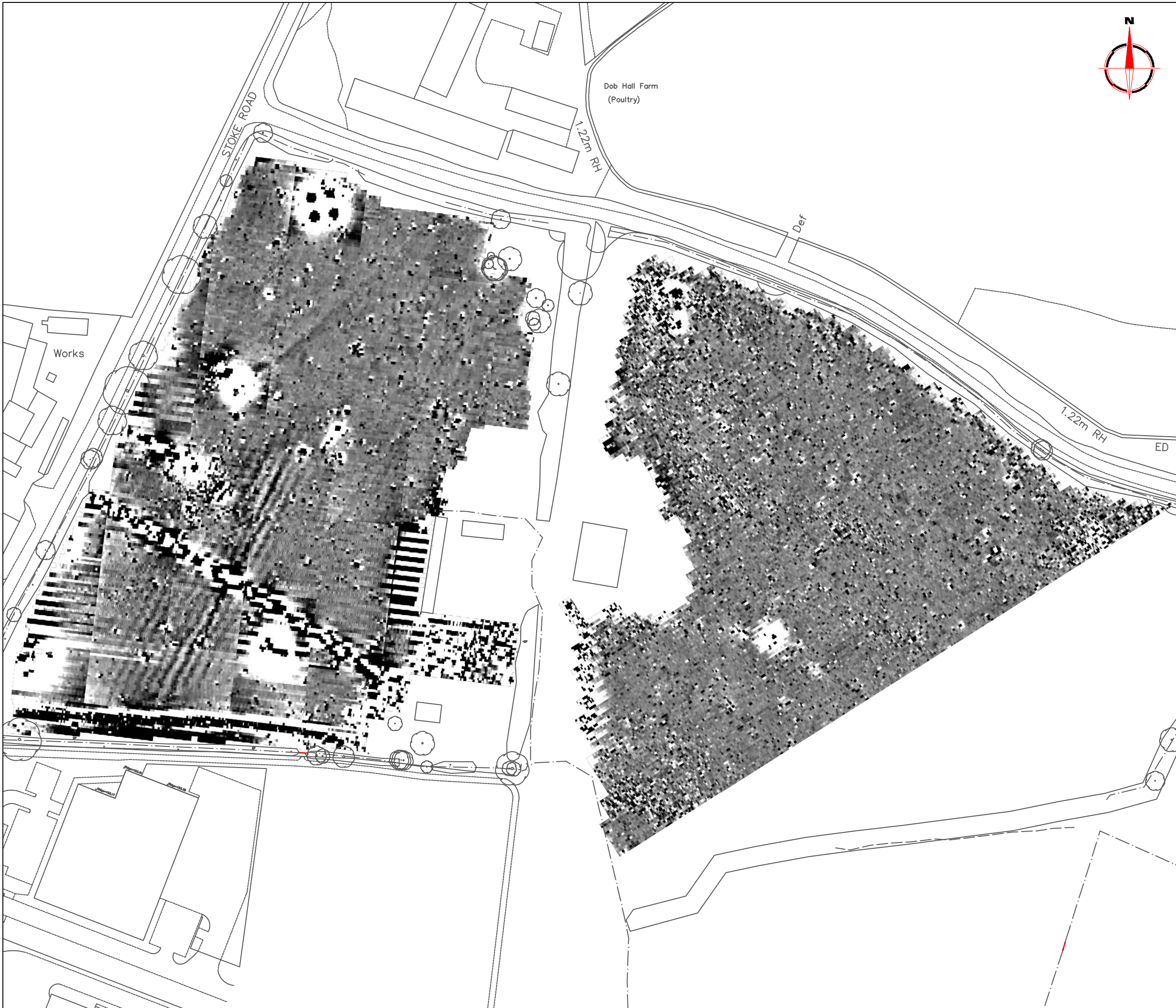


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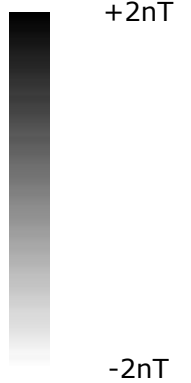
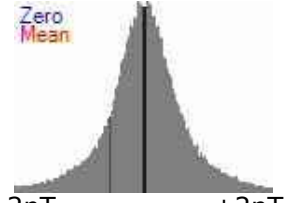
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Plotting parameters

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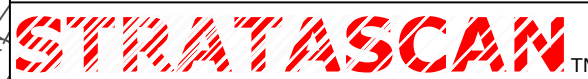


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Subject
**PLOT OF MINIMALLY PROCESSED
GRADIOMETER DATA - OVERVIEW**

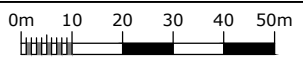


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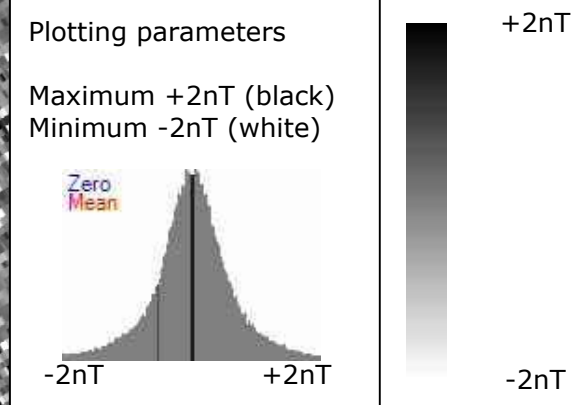
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**PLOT OF MINIMALLY PROCESSED
GRADIOMETER DATA - WEST**

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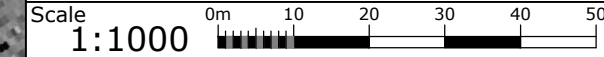
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UKAS



Plot A3	Checked by DGE	Issue No. 01
Survey date APR 16	Drawn by TR	Figure No. 07



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Plotting parameters

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

Client
**UNIVERSITY OF LEICESTER
ARCHAEOLOGICAL SERVICES**

Project Title Job No. J9747
**DESBOROUGH GRANGE,
NORTHAMPTONSHIRE**

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

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Scale 1:1000

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Survey date APR 16	Drawn by TR	Figure No. 08



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
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
OTHER ANOMALIES		
		Linear anomaly - probably related to pipe, cable or other modern service
		Weak linear trend - possible service trench
		Weak linear anomaly - possibly related to a path way
		Magnetic disturbance associated with nearby metal object such as service or field boundary
		Magnetic disturbance related to modern trackway
		Scattered magnetic debris
		Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin
		Magnetic spike - probable ferrous object

Client
**UNIVERSITY OF LEICESTER
 ARCHAEOLOGICAL SERVICES**

Project Title Job No. J9747
**DESBOROUGH GRANGE,
 NORTHAMPTONSHIRE**

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

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 AND ENGINEERING

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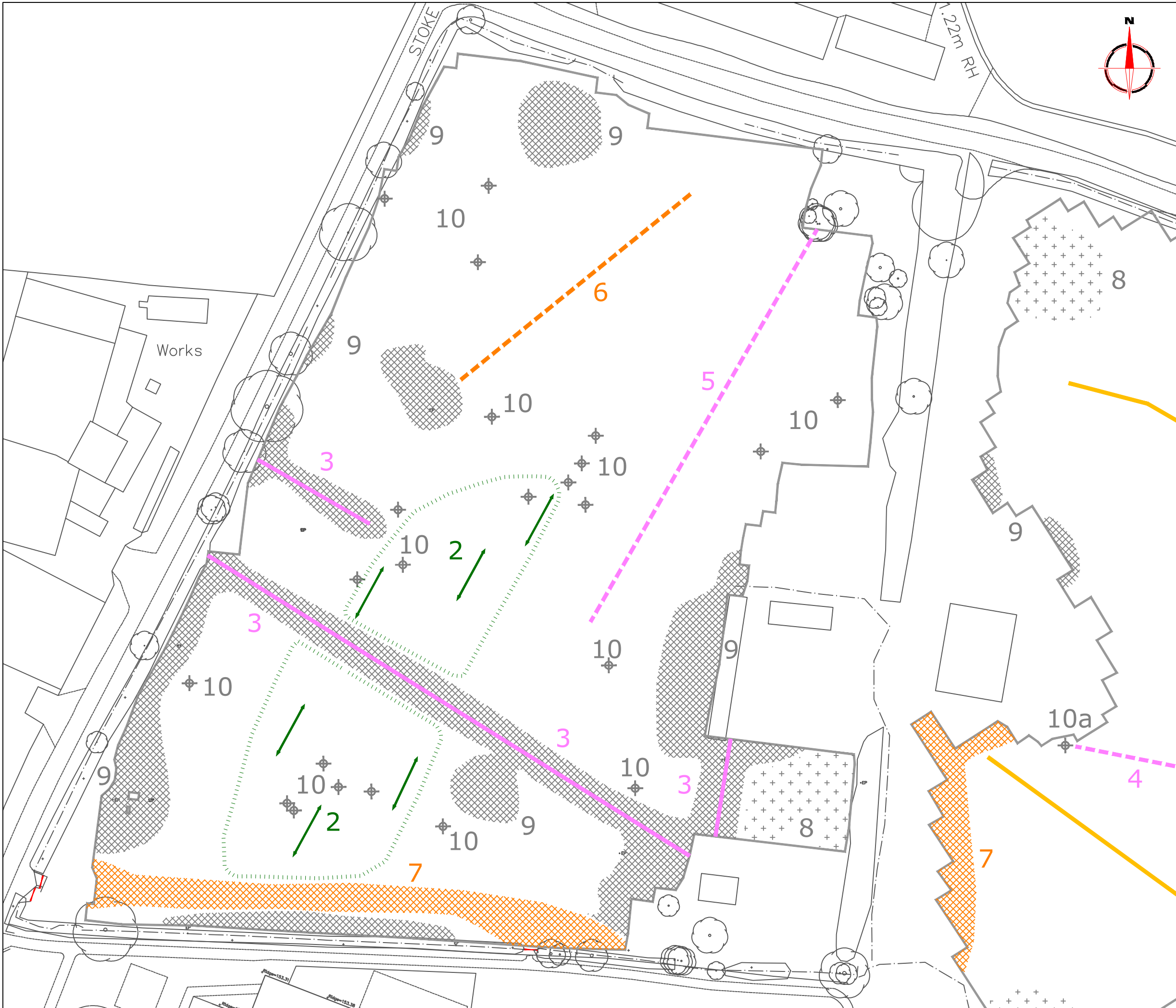
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Scale 1:1500 0m 10 20 30 40 50m

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Survey date APR 16	Drawn by TR	Figure No. 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

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

OTHER ANOMALIES

- Linear anomaly - probably related to pipe, cable or other modern service
- Weak linear trend - possible service trench
- Weak linear anomaly - possibly related to a path way
- Magnetic disturbance associated with nearby metal object such as service or field boundary
- Magnetic disturbance related to modern trackway
- Scattered magnetic debris
- Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin
- Magnetic spike - probable ferrous object

Client
**UNIVERSITY OF LEICESTER
ARCHAEOLOGICAL SERVICES**

Project Title Job No. J9747
**DESBOROUGH GRANGE,
NORTHAMPTONSHIRE**

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



**GEOPHYSICS FOR ARCHAEOLOGY
AND ENGINEERING**

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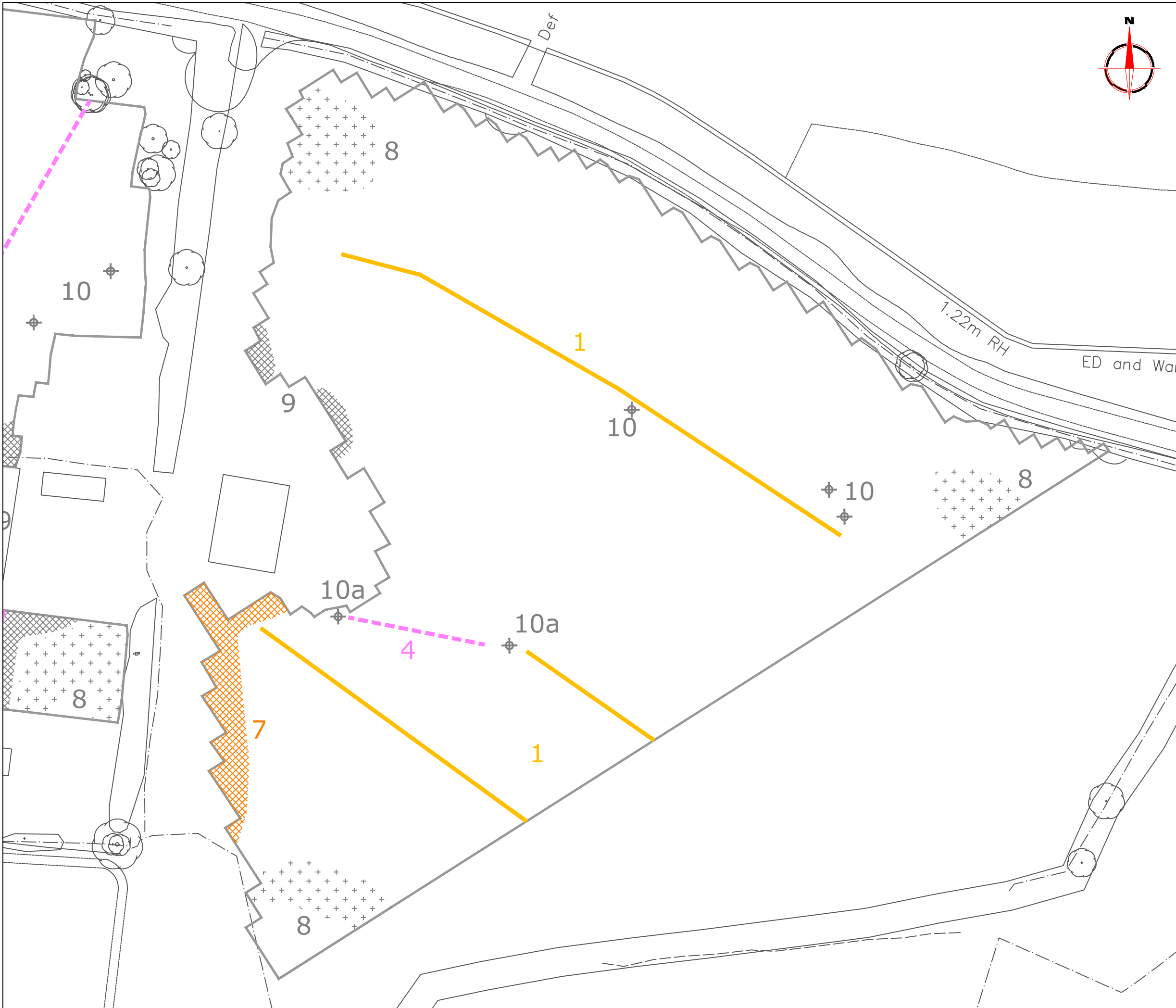


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Scale 1:1000 0m 10 20 30 40 50

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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	
MEDIEVAL/POST-MEDIEVAL AGRICULTURE		
	Widely spaced curving parallel linear anomalies - probably related to ridge-and-furrow	
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	Magnetic disturbance related to modern trackway	
	Scattered magnetic debris	
	Area of amorphous magnetic variation - probable natural (e.g. geological or pedological) origin	
	Magnetic spike - probable ferrous object	
Client		
UNIVERSITY OF LEICESTER ARCHAEOLOGICAL SERVICES		
Project Title		Job No. J9747
DESBOROUGH GRANGE, NORTHAMPTONSHIRE		
Subject		
ABSTRACTION AND INTERPRETATION OF GRADIOMETER ANOMALIES - EAST		
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