

An archaeological gradiometer survey

**Proposed photo-voltaic power array at  
Eveley Farm, Houghton  
Stockbridge, Hampshire**

Centred on SU 33213 34071

Report: 150526

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27 May 2015

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## Accompanying CD-ROM

Report.....	Adobe PDF format
Copies of report figures.....	Adobe PDF format
Raw and processed grid & composite files .....	DW Consulting TerraSurveyor 3 formats
Minimal processing data plots and metadata .....	DW Consulting TerraSurveyor 3 formats
Final data processing data plots and metadata .....	DW Consulting TerraSurveyor 3 formats
GIS project, shape files and classification schema	
GIS project .....	Manifold 8 ‘.map’ file
GIS shape files .....	ESRI standard
GIS classification schema .....	Adobe PDF format
AutoCAD version of the survey interpretation .....	AutoCAD DXF

*Website: [substrata.co.uk](http://substrata.co.uk)*

*For an overview of Substrata, our archaeological geophysical surveying techniques and the results we obtain.*

## 1 Survey description and summary

### 1.1 Survey

Type: twin-sensor fluxgate gradiometer  
Date: between 10 and 21 May 2015  
Area: 30 ha  
Lead surveyor: Ross Dean BSc MSc MA MifA

### 1.2 Client

AC Archaeology Ltd, 4 Halthaies Workshops, Bradninch, Nr Exeter, Devon EX5 4QL

### 1.3 Location

Site: Proposed photo-voltaic power array at Eveley Farm  
Civil Parish: Houghton  
District: Test Valley  
County: Hampshire  
Nearest Postcode: SO20 6SA  
NGR: SU 33213 34071 (point)  
Ordnance Survey NGR (E/N): 433213,134071 (point)  
Planning reference: Test Valley Borough Council 13/02735/FULLS

### 1.4 Archive

OASIS number: substrat1-212347  
Archive: At the time of writing, the archive of this survey will be held by Substrata and deposited with the ADS as required.

### 1.5 Introduction

This document has been prepared following consultation between AC Archaeology Ltd (our client) the Hampshire County Archaeologist. It reports on a magnetometer survey associated with the construction of a solar farm, with attendant infrastructure on land at the above site. The survey complies with the requirements specified in a Written Scheme of Investigation (Valentin, 2015) produced in response to a proposed condition of planning permission following an appeal. The work is required by Test Valley Borough Council, as advised by the Hampshire Historic Environment Service. The work was commissioned by KS SPV32 Ltd and PS Renewables.

The application area comprises three parcels of land. Of these, Area A is the main part of the application area and consists of an irregular area north of Eveley Wood. It is approximately 65 hectares in area and comprises all or parts of three land parcels designated Plots 1 to 3 (Figure 1). Area A area will form the major part of the development, with the photo-voltaic arrays being positioned here on the south facing slope.

This magnetometer survey was undertaken as a first stage of archaeological mitigation in the areas of Area A shown in Figure 1 to establish first, whether associated early settlement is present and then its extent and character sufficient to inform whether further mitigation is required. The areas in Figure 1 were established using existing data and topographic nature to target the zones of the highest archaeological potential for as yet unrecorded settlement.

The survey area comprised some 30ha of plots 1 and 2, Area A, as shown in Figure 1.

### 1.6 Summary

*The magnetic contrast across the area was sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses.*

*The aims of the survey were to establish first, whether associated early settlement is present and then establish its extent and character sufficient to inform whether further mitigation is required. No firm evidence for early settlement was found. Two anomaly groups may define a single sub-circular archaeological feature which may indicate settlement but the anomaly*

*groups concerned are highly disrupted by later ploughing and no firm conclusions regarding the archaeological nature of these anomalies could be drawn.*

*Twenty-eight magnetic anomaly groups were identified as possibly representing archaeological deposits or features. Five anomaly groups related to three possible ring ditches or barrows, two of which are in are in relatively close proximity to soil marks previously mapped and interpreted by AC Archaeology as potential ring ditches or barrows. As discussed above, two disrupted anomaly groups may relate to a sub-circular archaeological feature that could not be characterised in more detail. Three anomaly groups may relate to a relatively recent structure or group of deposits, speculatively part of a World War Two bombing decoy system. One anomaly group may relate to a former edged routeway or track. The remaining magnetic anomaly groups identified as possibly representing archaeological deposits or features were fragmented linear and curvilinear groups that are most likely to relate to past field boundaries or other enclosures of unknown date.*

## 2 Survey aims

### 2.1 Aims

Two main aims were set for the survey. The first was to establish whether early settlement associated with previously recorded soil marks representing likely Prehistoric ring-ditches, barrows and fields is present. If evidence for settlement is established, the second main aim was to record its extent and character sufficient to inform whether further mitigation is required.

### 2.2 Objectives

- Establish the presence/absence of archaeological remains;
- Determine the extent, condition, nature, character, date and significance of any archaeological remains encountered;
- Establish the nature of activity on the site;
- Identify any deposits or structures that may relate to the occupation or use of the site;
- Provide further information on the archaeology of the site from any archaeological remains encountered.

## 3 Standards

The standards used to complete this survey are defined by the Chartered Institute for Archaeologists (2014a) and English Heritage (2010). The codes of approved practice that were followed are those of the Chartered Institute for Archaeologists (2014b) and Archaeology Data Service/Digital Antiquity Guides (undated). The document text was written using the house style of the Chartered Institute for Archaeologists (Chartered Institute for Archaeologists, undated).

## 4 Landscape, land use and geology

The survey areas occupy an area of approximately 30 hectares to the north of Eveley Farm (Figure 1). The land is part of a series of gently sloping chalk coombes and spurs and is currently utilised for arable cultivation. The rolling landscape in the wider study area varies in height from approximately 150-175m above Ordnance Datum in height (Cottam, 2013).

The geology comprises mostly Cretaceous Seaford Chalk, with occasional Cretaceous Stockbridge Rock Member Limestone. In the dry valleys and hollows, Quaternary clays, silts, sands and gravels have accumulated as colluvium from hill wash (Cottam, 2013 and British Geological Survey, undated).

## 5 Archaeological background

The following summary is adapted from Valentin (2015) after Cottam (2013).

There are four assets of Prehistoric date (before AD 43) within the original proposed application area. Sites 43 -45 and 52 (Figure 1) are extensive Prehistoric field systems which are visible on air photographs in and beyond the north and north-west parts of the proposed application area. These are recorded by the HCCHER as being Iron Age (circa 600 BC to AD 43) 'Celtic' field systems, but it is possible that they have earlier or later origins. Immediately to the south-east of the application area are circular cropmark features identified from air photographs (Sites 41 and 42). These have not been archaeologically investigated but have been assumed to be ring ditches of Bronze Age date (circa 2300 BC to circa 600 AD) associated with former burial mounds, now ploughed out. Site 41 is considerably larger than a 'typical' ring ditch and may be a different form of Prehistoric enclosure. These sites were within the original scheme layout, but have now been excluded from development.

There are three non-designated heritage assets of Modern date (AD 1901 to present) recorded within the proposed application area, and one previously unrecorded asset. Two Second World War bombing decoys (Sites 37 and 39) lie within the proposed application area. The remains of a control building (Site 76) survive to the west, on the north-west boundary of the proposed application area.

There are five undated non-designated heritage assets recorded within the proposed application area. Sites 71, 73, and 74 are cropmark ring ditches which, although undated, are likely to be ring ditches associated with ploughed-out Bronze Age barrows. Site 72 is a series of parallel linear cropmarks, probably representing medieval or post-medieval ridge and furrow cultivation remains in the northern part of Plot 2, Area A. Site 38 is a north-south aligned linear feature, with a further linear feature on a different alignment at its north end. The feature was identified on air photographs and may correspond with a trackway shown on the 1826 Map of Hampshire.

## 6 Results, discussion and conclusions

This survey was designed to record magnetic anomalies. The anomalies themselves cannot be regarded as actual archaeological features and the dimensions of the anomalies shown do not represent the dimensions of any associated archaeological features. The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to archaeological deposits and structures.

The terms 'archaeological features' and 'archaeological deposits' refer to any artefacts, material deposits or disturbance of natural deposits thought to be the result of human activity and not undertaken as recent land maintenance or farming.

The reader is referred to section 7.

### 6.1 Results

Figure 2 shows the interpretation of the whole survey data. It includes the anomaly groups identified as possibly relating to archaeological deposits along with their numbers. Table 1 is an extract of the detailed analysis of the survey data which is provided in the attribute tables of the GIS project on the accompanying CD-ROM and in the project archive. Figures 3 to 6 show the survey interpretation at a more detailed scale.

Figures 2 to 6 and Table 1 comprise the analysis of the survey data. Plots of the processed data are provided in Figures 7 to 11.

The survey area was divided into plots 1 and 2 as shown in Figure 1.

## 6.2 Discussion

### 6.2.1 General points

Not all anomalies or anomaly groups identified in Table 1 are necessarily discussed below. All identified anomaly groups are recorded in the GIS project on the accompanying CD-ROM.

Anomalies thought to relate to natural features were not mapped except where they are associated with or could be mistaken for archaeological deposits.

Recent man-made objects such as manholes, water management equipment, drains, cables and other services were only mapped where they comprised significant magnetic responses across the dataset that needed clarification. If mapped, they are listed in Table 1 but are not discussed below.

There are numerous anomaly groups that could be interpreted as relating to large postholes or pits although most will have natural origins. Anomalies of this sort are only mapped as potential archaeology if they are clustered in groups or otherwise form recognisable patterns.

Data collection along the survey area edges was restricted as shown in the figures due to the presence of magnetic materials in and adjacent to field and roadside boundaries. Strong magnetic responses mapped close to the field and roadside boundaries are likely to relate to these materials except where otherwise indicated in Figures 2 to 6.

A number of steel piles were placed in the survey area prior to the survey being carried out. As such objects will adversely influence the magnetic data, an area around each pile was excluded from the data collection process as shown in Figures 7 to 11.

All of the surveyed fields display groups of parallel linear anomaly patterns. These patterns are likely to reflect former ploughing. The clear patterns of groups **201** and **202** are likely to reflect former ridge-and-furrow cultivation.

### 6.2.2 Data relating to historical maps and other records

No magnetic anomalies related to features recorded on historical maps.

Magnetic anomaly group **2** along with the combined groups **11 and 12** are in relatively close proximity to, but do not coincide exactly with, two soils marks mapped and interpreted by AC Archaeology as potential ring ditches or barrows (Cottam, 2013).

### 6.2.3 Data with no previous archaeological provenance

In addition to group 2, and group 11/12 discussed above, group **21** exhibits properties suggestive of a ploughed-out barrow.

Group **6** is highly disrupted but may represent a sub-circular set of deposits that is difficult to characterise further. If they do relate to archaeological deposits, then group **7** may reflect associated internal deposits.

Groups **13, 14 and 15** (Figure 4) are unusual. Group 13 is a dipolar magnetic response that is invariably associated with strongly magnetic materials and usually ferrous-based materials such as iron and steel. Such responses are found throughout the survey data and have been interpreted as relating to relatively modern material associated with recent activities such as farming. This particular response is, however, closely associated with the sub-rectangular group 15. It is also associated with the magnetically positive group 14 which, in this case, is unlikely to be a 'shadow' anomaly of group 13. Taken together, it is likely that the three anomalies reflect a relatively recent structure or set of deposits. To speculate, the structure may be part of

the World War Two bombing decoy sites recorded elsewhere within the survey area as discussed in Section 5.

Group **16** is a highly disrupted set of parallel, linear anomalies that may represent a former edged track or routeway.

The remaining magnetic anomaly groups identified as possibly representing archaeological deposits or features are fragmented linear and curvilinear groups that are most likely to relate to past field boundaries or other enclosures of unknown date.

### 6.3 Conclusions

The magnetic contrast across the area was sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses.

The aims of the survey were to establish first, whether associated early settlement is present and then establish its extent and character sufficient to inform whether further mitigation is required. No firm evidence for early settlement was found. Two anomaly groups may define a single sub-circular archaeological feature which may indicate settlement but the anomaly groups concerned are highly disrupted by later ploughing and no firm conclusions regarding the archaeological nature of these anomalies could be drawn.

Twenty-eight magnetic anomaly groups were identified as possibly representing archaeological deposits or features. Five anomaly groups related to three possible ring ditches or barrows, two of which are in relatively close proximity to soil marks previously mapped and interpreted by AC Archaeology as potential ring ditches or barrows. As discussed above, a two disrupted anomaly groups may relate to a sub-circular archaeological feature that could not be characterised in more detail. Three anomaly groups may relate to a relatively recent structure or group of deposits, speculatively part of a World War Two bombing decoy system. One anomaly group may relate to a former edged routeway or track. The remaining magnetic anomaly groups identified as possibly representing archaeological deposits or features were fragmented linear and curvilinear groups that are most likely to relate to past field boundaries or other enclosures of unknown date.

## 7 Disclaimer and copyright

The description and discussion of the results presented in this report are the authors, based on his interpretation of the survey data. Every effort has been made to provide accurate descriptions and interpretations of the geophysical data set. The nature of archaeological geophysical surveying is such that interpretations based on geophysical data, while informative, can only be provisional. Geophysical surveys are a cost-effective early step in the multi-phase process that is archaeology. The evaluation programme of which this survey is part may also be informed by other archaeological assessment work and analysis. It must be presumed that more archaeological features will be evaluated than those specified in this report.

Ross Dean, trading as Substrata, will assign copyright to the client upon written request but retains the right to be identified as the author of all project documentation and reports as defined in the Copyright, Designs and Patents Act 1988 (Chapter IV, s.79).

## 8 Acknowledgements

Substrata would like to thank John Valentin of AC Archaeology Ltd for commissioning us to complete this survey and Mr Daniel Busk for arranging access to the site.

## 9 Bibliography

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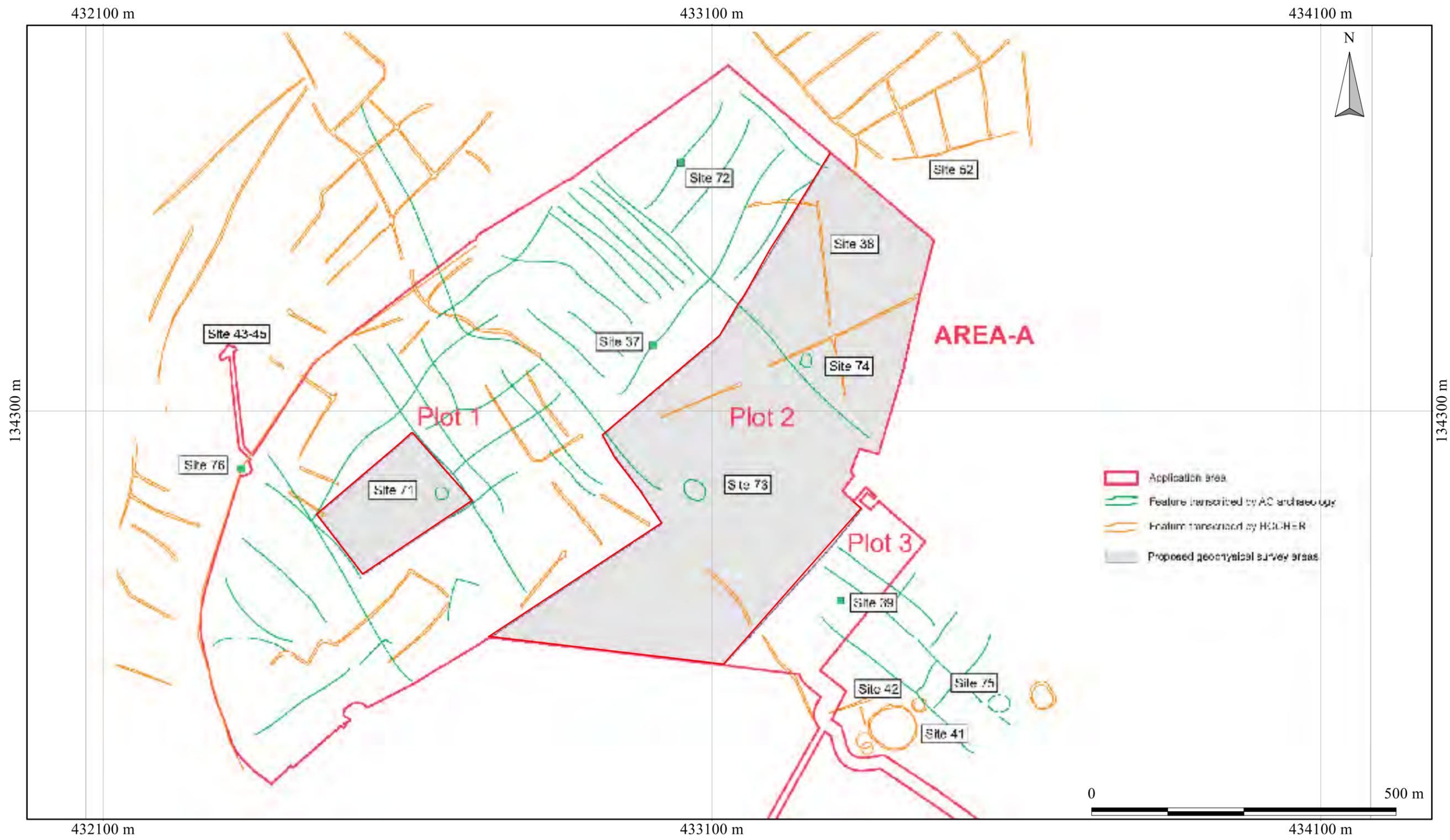
Valentin, J. (2015) *Proposed photo-voltaic power array at Eveley Farm, Houghton, Stockbridge, Hampshire, Centred on SU 33213 34071 Written Scheme of Archaeological Investigation Planning Reference Test Valley Borough Council 13/02735/FULLS*, AC Archaeology Ltd unpublished document ACD522/3/0 May 2015

## Appendix 1 Analysis table and supporting plots

### General Guidance

The anomalies represented in the survey plots provided in this appendix are magnetic anomalies. The apparent size of such anomalies and anomaly patterns are unlikely to correspond exactly with the dimensions of any associated archaeological features.

A rough rule for interpreting magnetic anomalies is that the width of an anomaly at half its maximum reading is equal to the width of the buried feature, or its depth if this is greater (Clark, 2000: 83). Caution must be applied when using this rule as it depends on the anomalies being clearly identifiable and distinct from adjacent anomalies. In northern latitudes the position of the maximum of a magnetic anomaly will be displaced slightly to the south of any associated physical feature.



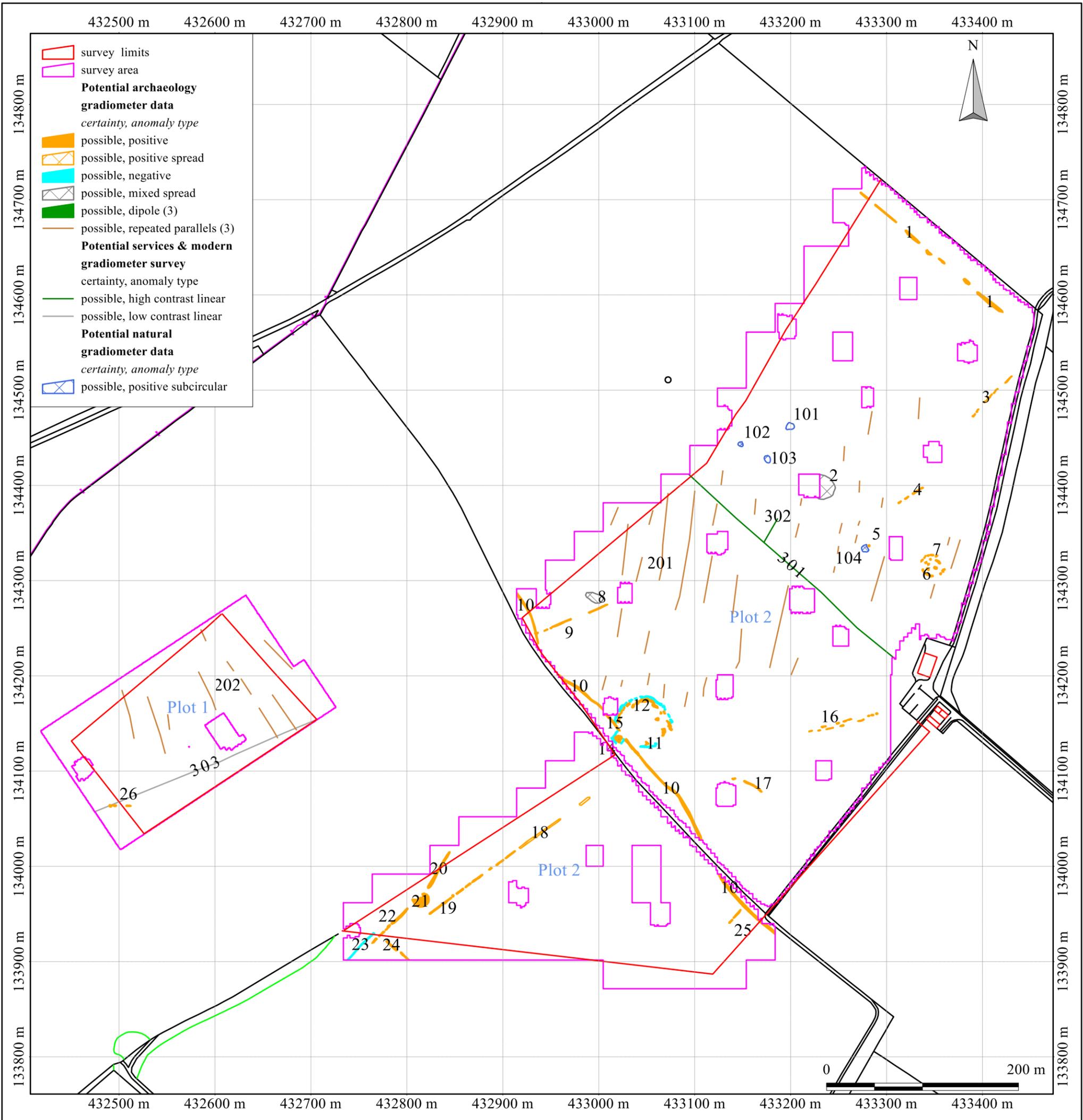
British Grid  
 centre X: 433128.63 m, centre Y: 134281.55 m

Scale: 1:6500 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological gradiometer survey  
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Figure 1: Proposed archaeological mitigation with geophysical survey areas  
 and plot numbers, after AC Archaeology Ltd document ACW522/3/0 (Valentin, 2015)

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British Grid  
 centre X: 432940.62 m, centre Y: 134317.71 m

Scale: 1:4000 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
3. Representative; not all instances are mapped.
4. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposit

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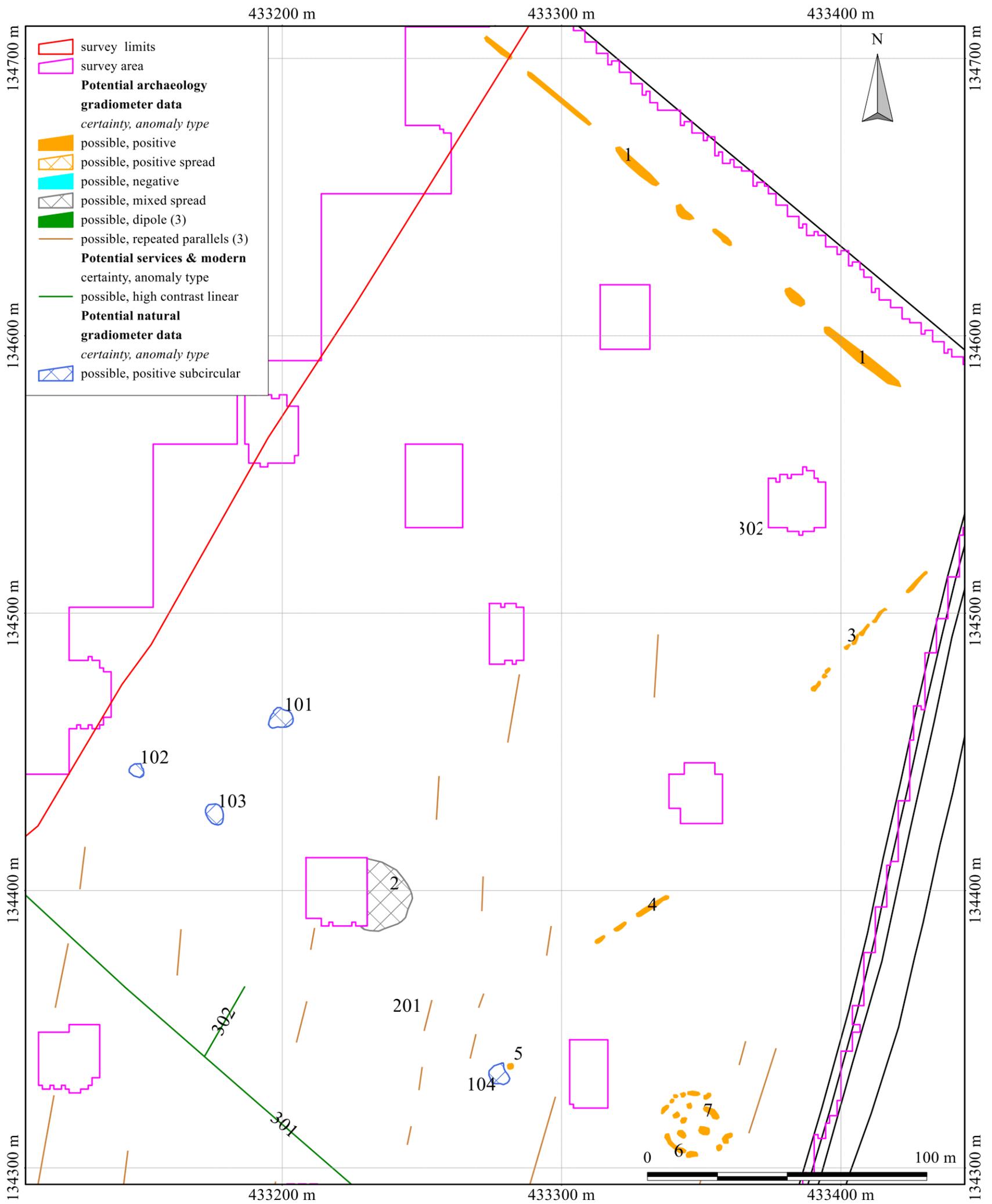
Figure 2: survey interpretation,  
 all plots

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plot number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	26		possible, positive	disrupted linear			
	303		possible, low contrast linear	linear	service trench		
2	1		possible, positive	disrupted linear		anomaly group may appear to be an extension of an extant field boundary to the south-east of the survey area	
	2		possible, mixed spread	partial oval	ring-ditch with possible burnt debris	anomaly groups are in proximity but not coinciding with a ring ditch or barrow mapped as a soil mark by AC Archaeology	AC Archaeology document ACW522/1/0
	3		possible, positive	disrupted linear			
	4		possible, positive	disrupted linear			
	5		possible, positive	oval	pit		
	6	7	possible, positive	disrupted subcircular	ring ditch or barrow	anomaly group is highly disrupted by historical and recent ploughing but may represent a sub-circular structure with possible internal features (group 7)	
	7	6	possible, positive			anomaly groups may be associated with a sub-circular feature (group 6)	
	8		possible, mixed spread	irregular	area of archaeological activity		
	9		possible, positive	disrupted linear			
	10		possible, positive	disrupted curvilinear			
11	12	possible, negative	disrupted sub-circular	ring ditch	along with group 12, this group defines the outer edge of a structure, apparently respected by historical ridge-and-furrow, lying close by a ring ditch or barrow mapped as a soil mark by AC Archaeology	AC Archaeology document ACW522/1/0	
12	11	possible, positive	disrupted sub-circular	ring ditch	along with group 11, this group defines the outer edge of a structure, apparently respected by historical ridge-and-furrow, lying close by a ring ditch or barrow mapped as a soil mark by AC Archaeology	AC Archaeology document ACW522/1/0	
13	14, 15	possible, positive	irregular				
14	13,15	possible, dipole		ferrous-rich material			
15	13, 14	possible, negative	sub-rectangular				
16		possible, positive	disrupted double linear	edged track			
17		possible, positive	disrupted curvilinear				
18	19	possible, positive spread	disrupted linear				
19	18	possible, positive	disrupted linear				
20		possible, positive	linear				
21		possible, positive	partial sub-circular	barrow			
22		possible, positive	disrupted linear				
23		possible, negative	linear	archaeological deposit or recent service			
24		possible, positive	disrupted linear				
25		possible, positive	disrupted linear				
101		possible, positive subcircular		naturally filled sink hole			
102		possible, positive subcircular		naturally filled sink hole			
103		possible, positive subcircular		naturally filled sink hole			
104		possible, positive subcircular		naturally filled sink hole			
201 & 202		possible, repeated parallels		cultivation traces	anomalies typical of those representing former ridge-and-furrow ploughing		
301		possible, high contrast linear	linear	ferrous cable, pipe or drain			
302		possible, high contrast linear	linear	ferrous cable, pipe or drain			

Table 1: data analysis



British Grid  
centre X: 433276.21 m, centre Y: 134502.85 m

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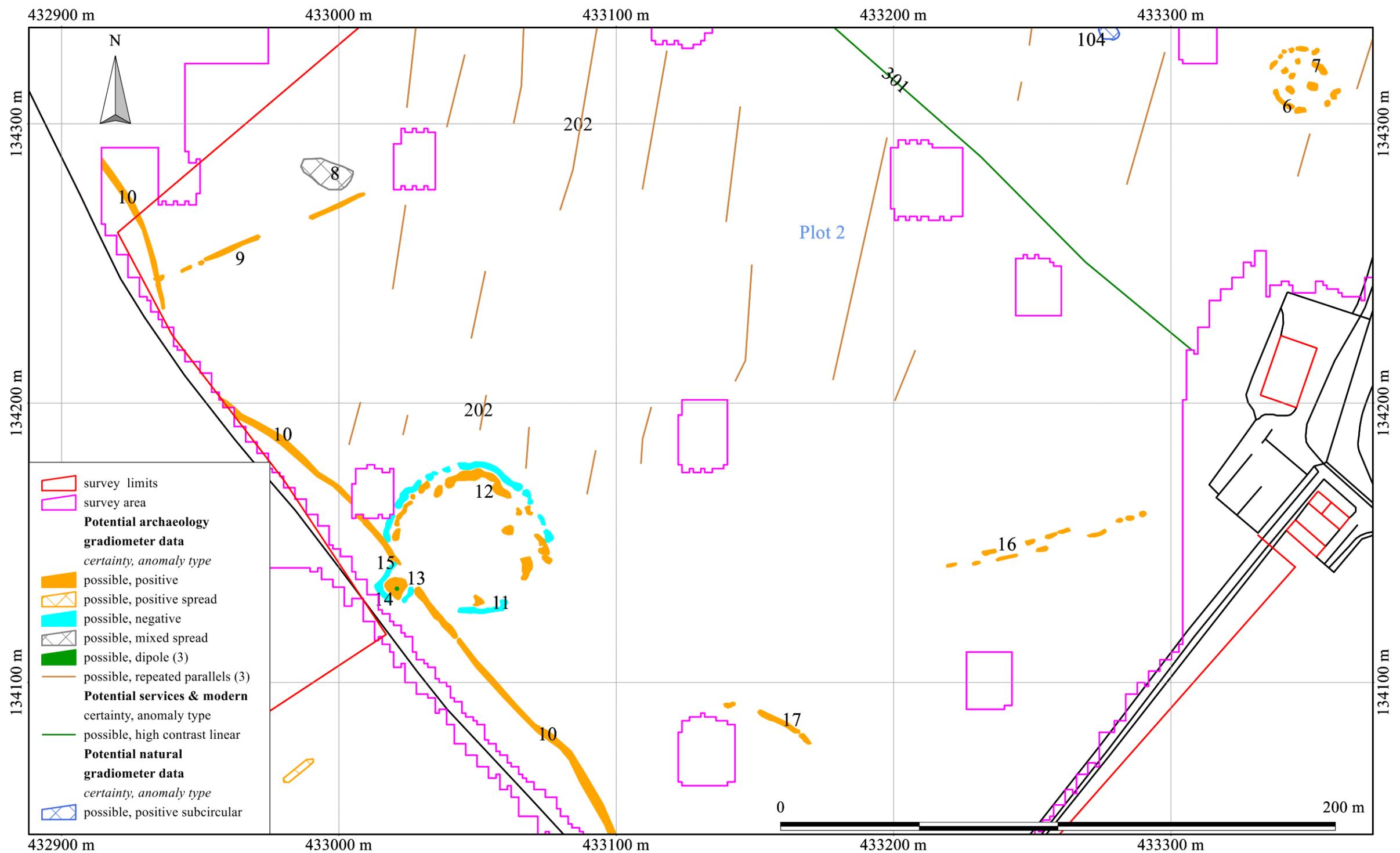
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- Notes:
1. All interpretations are provisional and represent potential archaeological deposits.
  2. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
  3. Representative; not all instances are mapped.
  4. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposit

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Figure 3: survey interpretation, plot 2 north



British Grid  
centre X: 433130.52 m, centre Y: 134190.06 m

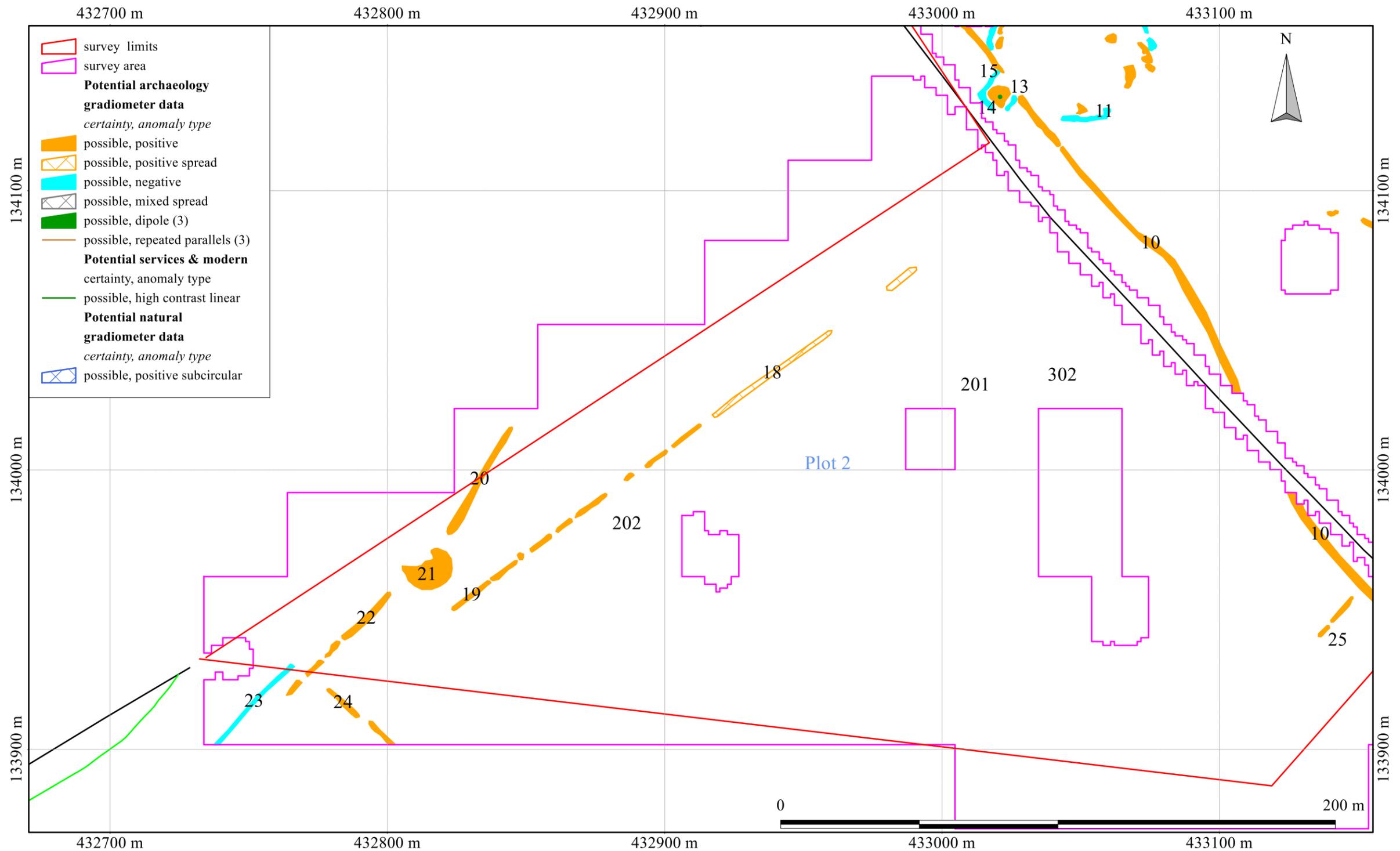
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Figure 4: survey interpretation, plot 2 central



British Grid  
centre X: 432913.03 m, centre Y: 134014.65 m

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Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
3. Representative; not all instances are mapped.
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Figure 5: survey interpretation, plot 2 south



British Grid  
 centre X: 432571.38 m, centre Y: 134141.52 m

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Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
3. Representative; not all instances are mapped.
4. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

Figure 6: survey interpretation, plot 1



British Grid  
 centre X: 432940.62 m, centre Y: 134317.71 m

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British Grid  
 centre X: 433276.21 m, centre Y: 134502.85 m

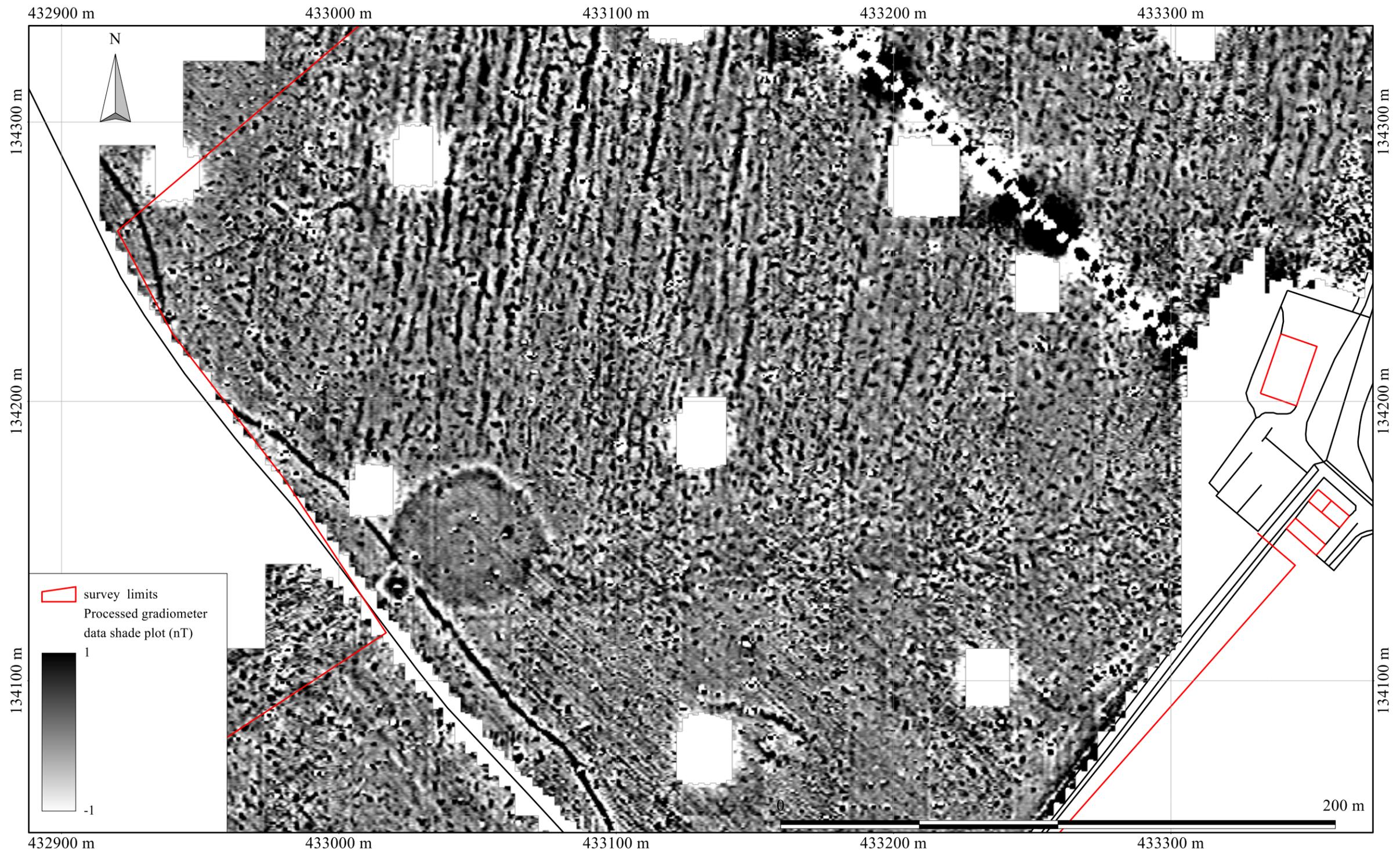
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 Web: substrata.co.uk

Figure 8: shade plot of processed data, plot 2 north

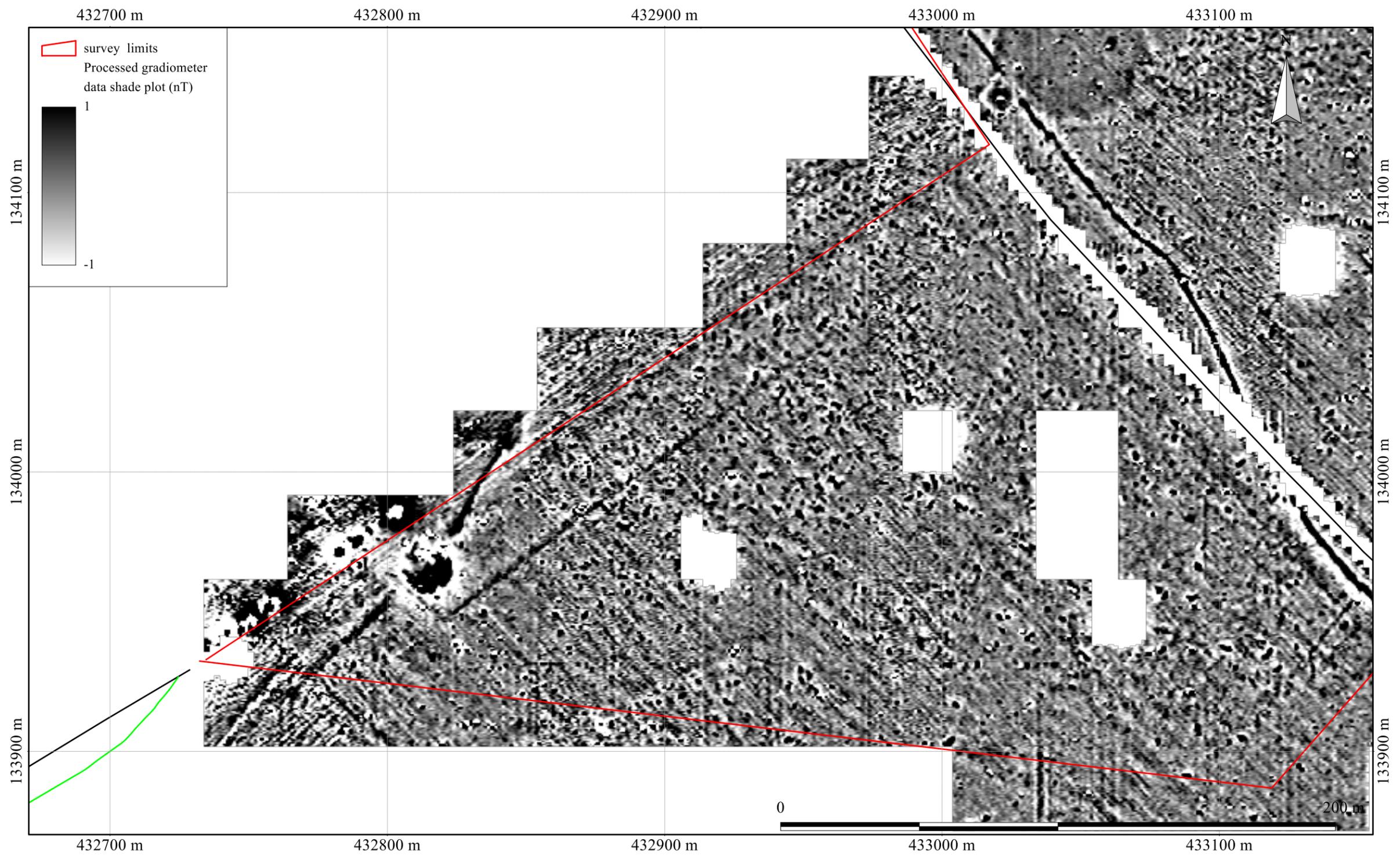


British Grid  
 centre X: 433130.52 m, centre Y: 134190.06 m

Scale: 1:1500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 9: shade plot of processed data, plot 2 central

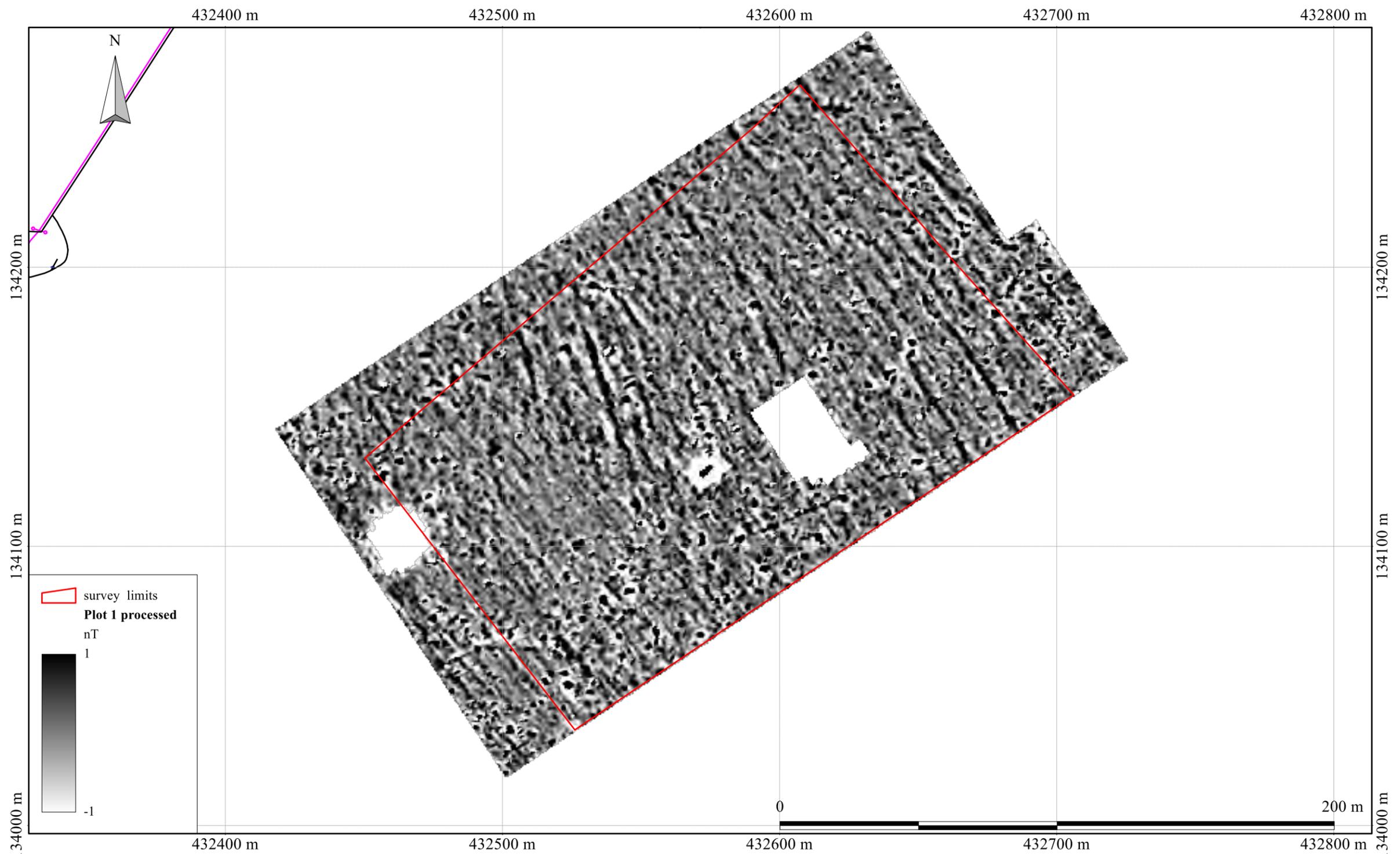


British Grid  
 centre X: 432913.03 m, centre Y: 134014.65 m

Scale: 1:1500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 10: survey shade plot of processed data, plot 2 south



British Grid  
 centre X: 432571.38 m, centre Y: 134141.52 m

Scale: 1:1500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 11: shade plot of processed data, plot 1

## Appendix 2 Methodology Summary

Table 1: methodology summary	
<p><b>Documents</b>            Written Scheme of Archaeological Investigation (WSI): Valentin (2015)            Survey methodology statement: Dean (2015)</p>	
<p><b>Methodology</b></p> <ol style="list-style-type: none"> <li>1. The work was undertaken in accordance with the WSI and survey methodology statement. The geophysical (gradiometer) survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014) and Archaeology Data Service/ Digital Antiquity Guides (undated).</li> <li>2. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system.</li> <li>3. Data processing was undertaken using appropriate software, with all anomalies being digitised and geo-referenced. The final report included a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology.</li> </ol>	
<p><b>Grid</b>  <i>Method of Fixing:</i> DGPS set-out using pre-planned survey grids and Ordnance Survey coordinates.  <i>Composition:</i> 30m by 30m grids  <i>Recording:</i> Geo-referenced and recorded using digital map tiles.  <i>DGPS used:</i> Spectra Precision PM5V2 GPS with external antenna and survey pole and DigiTerra Explorer 7 as the survey control program.</p>	
<p><b>Equipment</b>  <i>Instrument:</i> Bartington Instruments grad601-2  <i>Firmware:</i> version 6.1</p>	<p><b>Data Capture</b>  <i>Sample Interval:</i> 0.25-metres  <i>Traverse Interval:</i> 1 metre  <i>Traverse Method:</i> zigzag  <i>Traverse Orientation:</i>            GN (plot 2) and GN304 (plot 1)</p>
<p><b>Data Processing, Analysis and Presentation Software</b>            IntelliCAD Technology Consortium IntelliCAD 7.2            DW Consulting TerraSurveyor3            Manifold System 8 GIS            Microsoft Corp. Office Excel 2013            Microsoft Corp. Office Publisher 2013            Adobe Systems Inc Adobe Acrobat 9 Pro Extended</p>	

## Appendix 3 Data processing

Table 2: gradiometer survey - processed data metadata	
<b>SITE</b>	
Instrument Type:	Bartington Grad 601
Units:	nT
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	32702
<b>PROGRAM</b>	
Name:	TerraSurveyor
Version:	3.0.25.0
<b>Plot 2</b>	
Stats	
Max:	89.18
Min:	-99.53
Std Dev:	4.83
Mean:	0.06
Median:	0.00
Direction of 1st Traverse: N0	
Processes: 4	
1 Base Layer	
2 Clip at 1.00 SD	
3 DeStripe Median Sensors: All	
4 De Stagger: Grids: All Mode: Both By: -2 intervals	
Note: converting the gradiometer data into ESRI GIS files imposed an x=y interpolation on the entire dataset	
<b>Plot 1</b>	
Stats	
Max:	29.48
Min:	-29.10
Std Dev:	1.39
Mean:	0.08
Median:	0.00
Direction of 1st Traverse: N304	
Processes: 5	
1 Base Layer	
2 Clip at 1.00 SD	
3 DeStripe Median Sensors: All	
4 De Stagger: Grids: All Mode: Both By: -2 intervals	
5 De Stagger: Grids: All Mode: Both By: -1 intervals	
Note: converting the gradiometer data into ESRI GIS files imposed an x=y interpolation on the entire dataset	