

**Substrata**

Archaeological Geophysical Surveyors

An archaeological gradiometer survey

## Land north of Gaydon, Warwickshire

Centred on NGR (E/N): 435898,254278 (point)

Report: 1508GAY-R-1

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10 June 2016

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## Project archive

Report.....	Adobe PDF format
Copies of report figures .....	Adobe PDF format
Raw and processed grid & composite files.....	DW Consulting TerraSurveyor 3 formats
Unprocessed 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

# 1 Survey description and summary

## 1.1 Survey

Type: twin-sensor fluxgate gradiometer  
Date: between 16 and 25 May 2016  
Area: 15.3ha  
Lead surveyor: Mark Edwards BA  
Author: Ross Dean BSc MSc MA MifA

## 1.2 Client

SLR Consulting Ltd (Nottingham office), Aspect House, Aspect Business Park, Bennerley Road, Nottingham NG6 8WR

## 1.3 Location

Site: Land north of Gaydon  
Civil Parish: Gaydon  
District: Stratford-on-Avon  
County: Warwickshire  
Nearest Postcode: CV35 0HJ  
NGR: SP 359 543 (point)  
Ordnance Survey NGR (E/N): 435898,254278 (point)

## 1.4 Archive

OASIS number: substrat1-254480  
Archive: At the time of writing, the archive of this survey will be held by Substrata.

## 1.5 Introduction

This report presents the results of an archaeological magnetometer (gradiometer) survey. It has been prepared for SLR Consulting on behalf of Jaguar Land Rover Limited in connection with future development at the above site. The survey was undertaken over two survey areas as shown in Figure 1.

The work was completed according to a Written Scheme of Investigation (SLR, 2016) approved by Warwickshire County Council's Planning Archaeologist.

## 1.7 Summary

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

*Forty-eight magnetic anomaly groups were mapped as representing possible archaeological deposits and features. Of these, three extended groups, and perhaps a fourth group, represent historical ridge-and-furrow recorded on aerial photographs. One group represents a former field boundary recorded on historical maps which was erected over a ploughing headland as indicated by the ridge-and-furrow patterns. A complex pattern of magnetic anomaly groups in the southern survey area probably indicates the presence of an area of former occupation with possible enclosures and two potential sub-circular structures. Within this pattern, four anomaly groups may indicate the presence of heated deposits associated with craft or industrial activities. One group within the pattern and one to the southwest may represent in-situ heated deposits from kilns or furnaces although this is not certain. Five groups may represent large pits to the southwest of the anomaly complex. The remaining anomaly groups outwith the complex anomaly pattern discussed above have characteristics typical of those representing former field and enclosure boundaries of unknown origin.*

## 2 Survey aims and objectives

### 2.1 Aims

To contribute to establishing the extent and significance of any archaeological remains which may exist within the survey areas.

### 2.2 Survey objectives

- to establish the location, extent and character of possible archaeological features present within the survey areas which provide suitable magnetic responses so that they can be targeted for further investigation in trenching; and
- to identify the extent of any areas apparently devoid of archaeological features so that they can be tested in trenching.

## 3 Standards

The standards used to complete this survey are defined by the Chartered Institute for Archaeologists (2014a) and Historic England (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).

## 4 Site description

### 4.1 Landscape and land use

The survey area covers 15.3 split into two areas as shown in Figure 1. The survey covered two areas of ecological enhancement outside the operational south-east boundary of the Jaguar Land Rover site on arable land north of Gaydon village. The land slopes down from north-west to south-east as shown in Figure 3.

At the time of the survey the land was under young crop.

### 4.2 Geology

The survey area has a solid geology of rocks from the Jurassic Charmouth Mudstone Formation. In general the formation comprises dark grey laminated shales and dark, pale and bluish grey mudstones. Mid Pleistocene glacial till is present in Area 1 and part of Area 2 (British Geological Survey, undated).

## 5 Archaeological background

The archaeological context has been set out in an Environmental Statement, submitted in January 2016 (Pegasus Group, 2016). The baseline study addressed an area of land within 2000m of the survey area.

Prehistoric, Roman and early medieval assets within the study area are too few to provide an assessment of occupation or settlement patterns. There are none recorded within the application sites. There have however been significant finds from fieldwork connected with the B4100 roadworks to the east of the survey area.

The general medieval settlement pattern is well-understood with the settlements of Lighthorne, Chadshunt and Gaydon set within extensive areas of arable cultivation. A plough headland is recorded within Area 2 and, potentially, remains of Gaydon village may extend within the area.



## 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 features.

The terms 'archaeological deposit' and 'archaeological feature' 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

Figures 2 and 3 provide an overview of the interpretation of the survey data. Figures 4 to 8 show sections of the interpretation plot at more detailed scales and include the anomaly groups identified as relating to archaeological deposits along with their identifying numbers. Table 1 is an extract from the detailed analysis of the survey data sourced from the attribute tables of the GIS project provided in the project archive.

Figures 2 to 8 along with Table 1 comprise the analysis of the survey data.

Figures 9 to 14 are plots of the processed data as specified in Table 3. Figures 15 and 16 are plots of minimally processed survey data.

### 6.2 Discussion

#### 6.2.1 General points

##### Discussion scope

Not all anomalies or anomaly groups identified in Table 1 are necessarily discussed below. All identified anomaly groups are fully recorded in the GIS project held the survey archive.

##### Data collection

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

##### Anomaly characterisation and mapping

There are a number of 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.

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.

Anomalies thought to relate to natural features were not mapped.

Numerous dipole magnetic anomalies are scattered across the data set. These are likely to represent recent buried ferrous objects and such patterns are frequently found in close proximity to settlements.

##### Anomaly trends

A number of parallel linear anomaly trends are present across the data set. Some of these indicate the presence of historic ridge-and-furrow ploughing and were mapped as part of the

analysis. Other sets of parallel linear anomaly trends are most likely to represent relatively modern ploughing and were not mapped as part of the data analysis.

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

Magnetic anomaly groups **4** (Figures 5, 6 and 7), **44** (Figures 5 and 7) and **47** (Figure 8) reflect historic ridge-and-furrow ploughing recorded on aerial photographs as listed in Table 1 and on other aerial photographs not cited in this report but recorded in the Warwickshire Country Council Historic Environment Record (HER). Group **1** (Figure 4) is also likely to reflect ridge-and-furrow although the anomalies are less clearly defined and so open to interpretation as recent ploughing.

Group **45** (Figure 8) represents a field boundary recorded on historical mapping as shown in Table 1 and erected over a ploughing headland between two visible phases of ridge-and-furrow as recorded in the survey data (Figure 14) and on aerial photographs listed in Table 1.

Referring to Figure 14, there is a north-north-west to south-south-east trend in the data seen as a reduction in the magnetic response best illustrated just southwest of group 48. This corresponds to the position of a former ploughing headland recorded in the Warwickshire HER entry MWA19460. Aerial photographic evidence shows the headland extant in 1947 and levelled by 2007. Whilst not clear from the survey results, the HER record states that the headland was overlain by later ridge-and-furrow and so is from an earlier phase of field system.

#### 6.2.3 Data with no previous archaeological provenance

##### Area 1

Groups **2** and **3** in Area 1 may indicate the presence of field boundaries along the line of historic ridge-and-furrow ploughing (group 1) although the anomaly patterns may reflect relatively recent deposits along the ploughing alignment, be it ridge -and-furrow or recent (see Section 6.2.1).

##### Area 2

There is a complex pattern of magnetic anomaly groups (**9** to **43**) in the south-western part of Area 2, as shown in Figures 5, 6, 11 and 12 and listed in Table 1. These almost certainly indicate the presence of an area of former occupation in the form of enclosures and two possible sub-circular structures (groups **29** and **31**). Groups **17**, **20**, **33** and **35** may indicate the presence of heated deposits associated with craft or industrial activities such as pottery production, metal production and/or metal working. Group **25** may indicate the presence of in-situ heated deposits from a kiln or furnace. A similar anomaly pattern (group **6**) further to the southwest could indicate a second such feature. Caution must be exercised in the interpretation of groups 6 and 25, however, as their patterns could relate to fortuitously orientated anomalies pertaining to relatively recent buried iron or steel.

Groups **5** and **7** may indicate the presence of large pits to the southwest of the anomaly complex discussed above.

Group **8** appears to have a similar trend to an adjacent possible service trench (group 102, Figure 5), a field boundary to the south and an area of former ridge-and-furrow (group 44, Figure 2). The nature of the feature represented by group 8 is not clear and historical ridge-and-furrow, a linear archaeological deposit such as a ditch or a relatively recent service trench are all options.

Groups **46** and **48** have clear and distinct magnetic responses that may represent former field and enclosure boundaries of unknown origin.

#### 6.3 Conclusions

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

Forty-eight magnetic anomaly groups were mapped as representing possible archaeological deposits and features. Of these, three extended groups, and perhaps a fourth group, represent historical ridge-and-furrow recorded on aerial photographs. One group represents a former field boundary recorded on historical maps which was erected over a ploughing headland as indicated by the ridge-and-furrow patterns. A complex pattern of magnetic anomaly groups in the southern survey area probably indicates the presence of an area of former occupation with possible enclosures and two potential sub-circular structures. Within this pattern, four anomaly groups may indicate the presence of heated deposits associated with craft or industrial activities. One group within the pattern and one to the southwest may represent in-situ heated deposits from kilns or furnaces although this is not certain. Five groups may represent large pits to the southwest of the anomaly complex. The remaining anomaly groups outwith the complex anomaly pattern discussed above have characteristics typical of those representing former field and enclosure boundaries of unknown origin.

## 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). This report contains material that is non-Substrata copyright or the intellectual property of third parties. Such material is labelled with the appropriate copyright and is non-transferrable by Substrata.

## 8 Acknowledgements

Substrata would like to thank Gavin Kinsley, Principal - Archaeology and Heritage, SLR Consulting Limited, for commissioning us to complete this survey.

## 9 Bibliography

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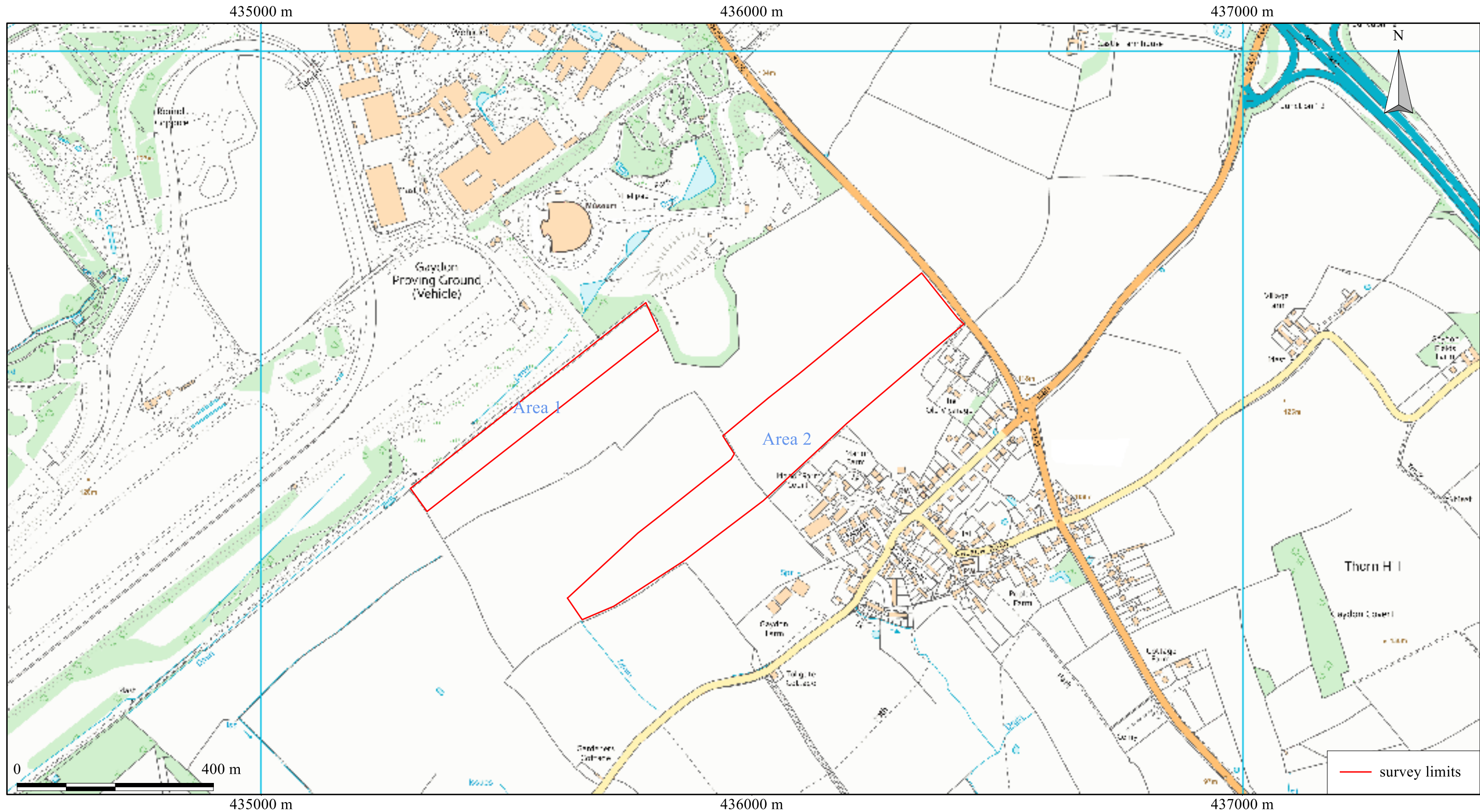
SLR (2016) *Jaguar Land Rover, Gaydon, Warwickshire: Written Scheme of Investigation for a Programme of Archaeological Work*, SLR unpublished document 402.03651.00015, Version No: 3, June 2016

## Appendix 1 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: 435983.21 m, centre Y: 254269.54 m

Scale: 1:8000 @ A3. Spatial Units: Meter. Do not scale off this drawing

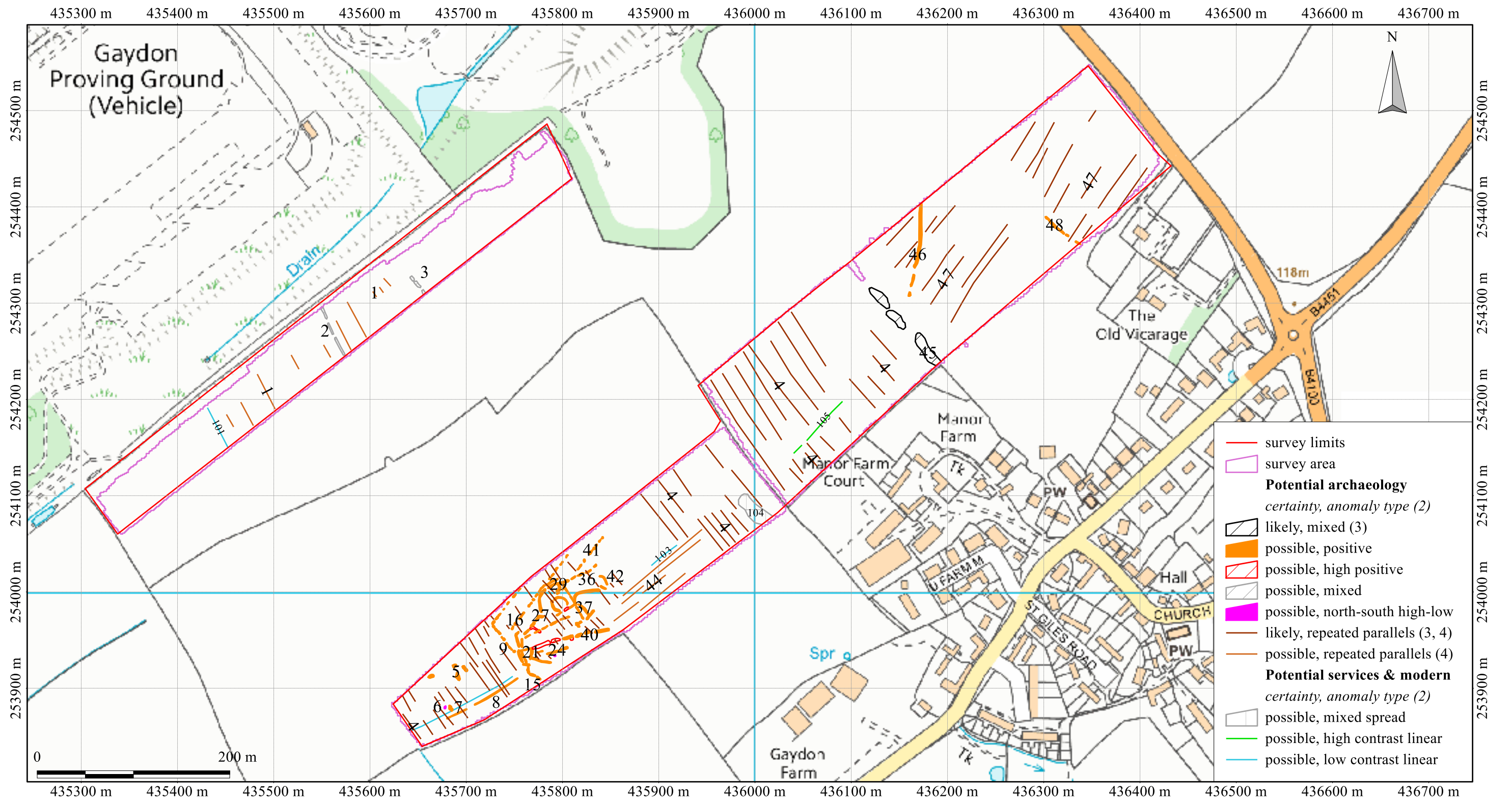
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 Land north of Gaydon, Warwickshire  
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Figure 1: location map

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

Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological description.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Representative; not all instances are mapped.
5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

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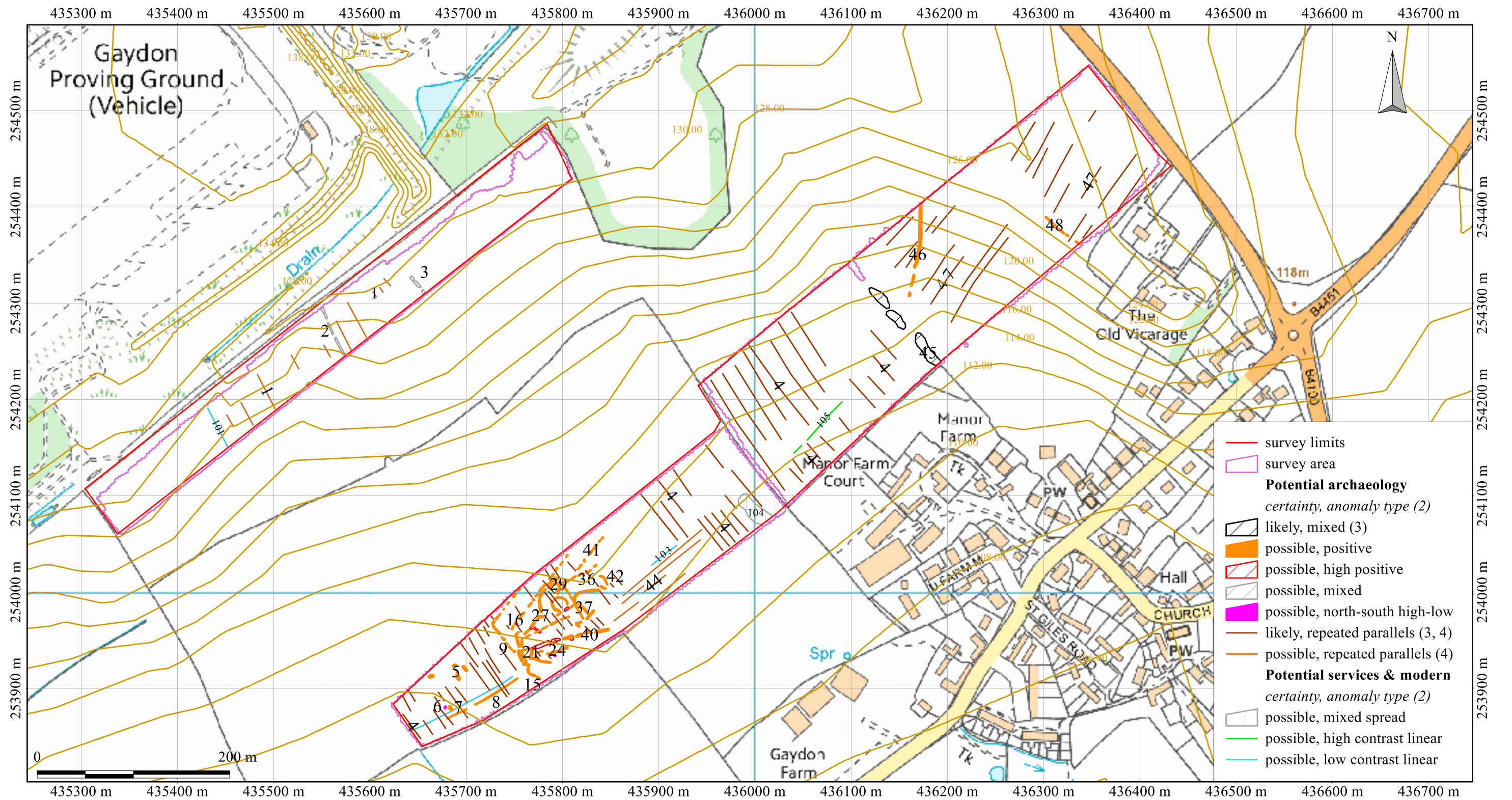
British Grid  
 centre X: 435994.68 m, centre Y: 254195.96 m

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Figure 2: survey interpretation; all areas

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

Notes:

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2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological description.
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4. Representative; not all instances are mapped.
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 Report: 1508GAY-R-1

Figure 3: survey interpretation; all areas with  
 Ordnance Survey DTM 2m contours

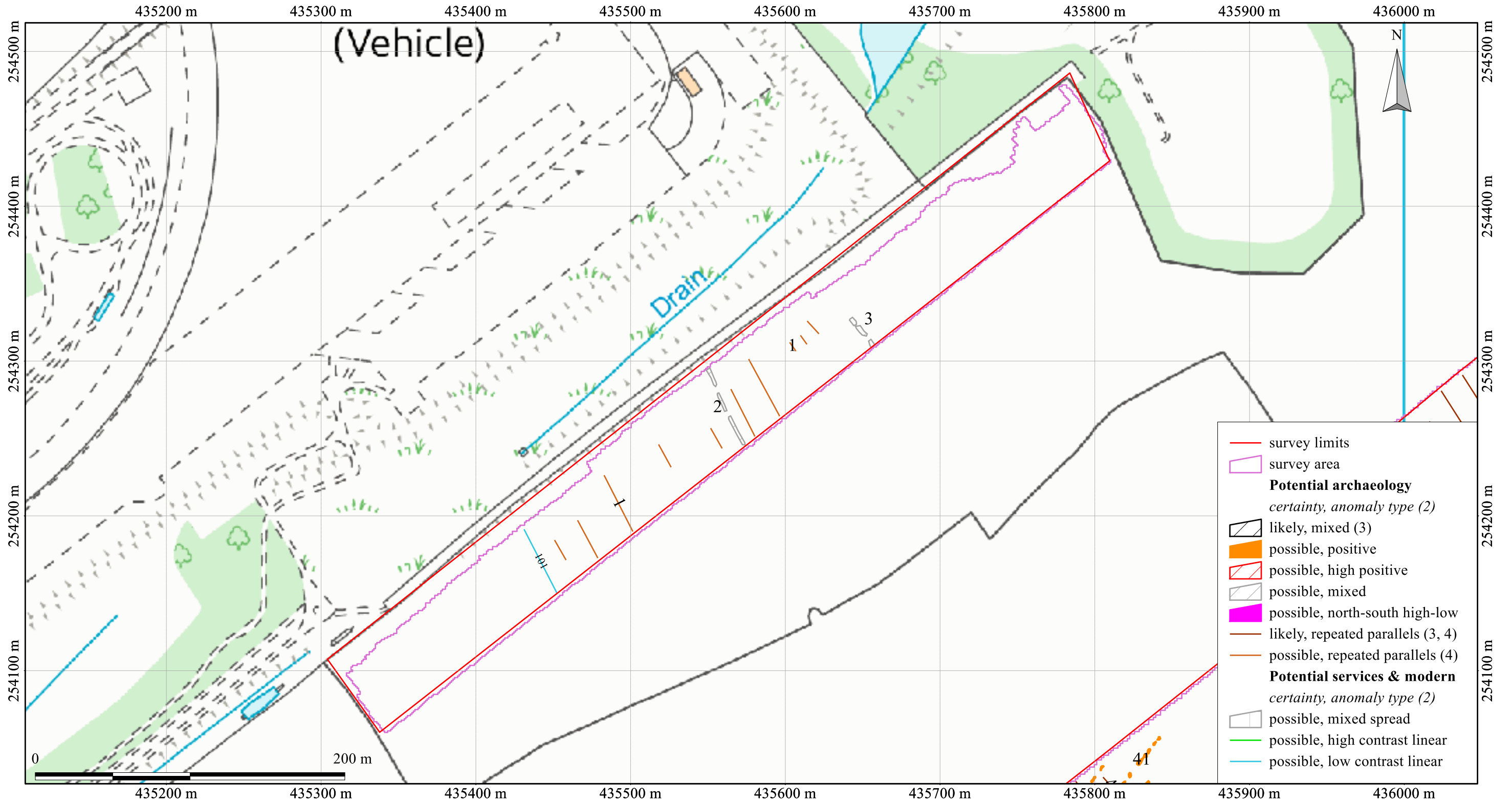
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area number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	1		possible, repeated parallels		ridge-and-furrow		
	2		possible, mixed	linear	field boundary?		
	3		possible, mixed	linear	field boundary?		
	101		possible, low contrast linear		service trench along line of ridge-and-furrow		
2	4		likely, repeated parallels		ridge-and-furrow	location and trend corresponds with ridge-and-furrow recorded on air photos	Historic England Archive AP: RAF-58-4705-F21-0485, 22 September 1961
	5		possible, positive	disrupted ovals	large pits or tree boles	anomalies represent distinct deposits, possibly disrupted by ridge-and-furrow	
	6		possible, north-south high-low		in-situ heated deposits	anomaly group may represent in-situ remains of highly heated deposits such as those from a kiln or furnace	
	7		possible, positive	oval	large pit or tree bole	represent a field drain but archaeological origins cannot be ruled out	
	8		possible, positive	disrupted linear	ridge-and-furrow, a linear archaeological deposit ditch or a relatively recent service trench		
	9		possible, positive	disrupted return		the north-north-west to south-south-east trending section may represent ridge-and-furrow and the northeast to southwest trend may represent a field drain but archaeological origins cannot be ruled out	
	10		possible, positive	disrupted linear		anomaly group may represent a field drain but archaeological origins cannot be ruled out	
	11		possible, positive	disrupted curvilinear			
	12		possible, positive	linear			
	13		possible, positive	disrupted curvilinear			
	14		possible, positive	linear			
	15		possible, positive	disrupted curvilinear			
	16		possible, positive	disrupted linear			
	17		possible, high positive	return	heated deposits within other archaeological deposits		
	18		possible, positive	disrupted linear			
	19	20	possible, positive	disrupted linear		anomaly groups 19 and 20 probably represent differing deposit compositions within the same archaeological feature	
	20	19	possible, high positive	disrupted linear	heated deposits within other archaeological deposits	anomaly groups 19 and 20 probably represent differing deposit compositions within the same archaeological feature	
	21		possible, positive	linear			
	22		possible, positive	linear			
	23		possible, positive	linear			
	24		possible, positive	linear			
	25		possible, north-south high-low		in-situ heated deposits	anomaly group may represent in-situ remains of highly heated deposits such as those from a kiln or furnace	
	26		possible, positive	disrupted curvilinear			
	27		possible, positive	linear			
	28		possible, positive	linear			
	29		possible, positive	curvilinear			
	30		possible, positive	disrupted linear			
	31		possible, positive	disrupted sub-circular			
	32	33	possible, positive	linear		anomaly groups 32 and 33 probably represent differing deposit compositions within the same archaeological feature	
	33	32	possible, high positive	linear		anomaly groups 32 and 33 probably represent differing deposit compositions within the same archaeological feature	
	34		possible, positive	disrupted linear	archaeological deposit or ridge-and-furrow		
	35		possible, high positive	oval	heated deposits		
36		possible, positive	curvilinear				
37		possible, positive	curvilinear				
38		possible, positive	linear				
39		possible, positive	linear				
40		possible, positive	linear	archaeological deposit or ridge-and-furrow			
41		possible, positive	disrupted linear		anomaly group may represent a field drain but archaeological origins cannot be ruled out		
42		possible, positive	curvilinear				
43		possible, positive	linear				
44		likely, repeated parallels		ridge-and-furrow	location and trend corresponds with ridge-and-furrow recorded on air photos	Historic England Archive AP: 05-71061-V-488,12 April 1971 Ordnance Survey 1885-6 1:2500 to at least 1981-93 1:10000, Historic England Archive AP: 05-71061-V-488,12 April 1971	
45		likely, mixed	disrupted linear	headland and field boundary	anomaly groups representing ridge and furrow alter trend at this anomaly group - trend change also seen on air photographs; mapped as a field boundary on historic maps		
46		possible, positive	disrupted curvilinear				
47		likely, repeated parallels		ridge-and-furrow	location and trend corresponds with ridge-and-furrow recorded on air photos	Historic England Archive AP: 05-71061-V-488,12 April 1971	
48		possible, positive	disrupted curvilinear				
102		possible, low contrast linear		service trench	anomaly group may represent remnant ridge-and-furrow		
103		possible, low contrast linear		service trench	anomaly group may represent remnant ridge-and-furrow		
104		possible, mixed spread	broad linear	rubble and/or landfill			
105		possible, high contrast linear		ferrous pipe, cable or buried wire			

Table 1: data analysis



Scale: 1:2500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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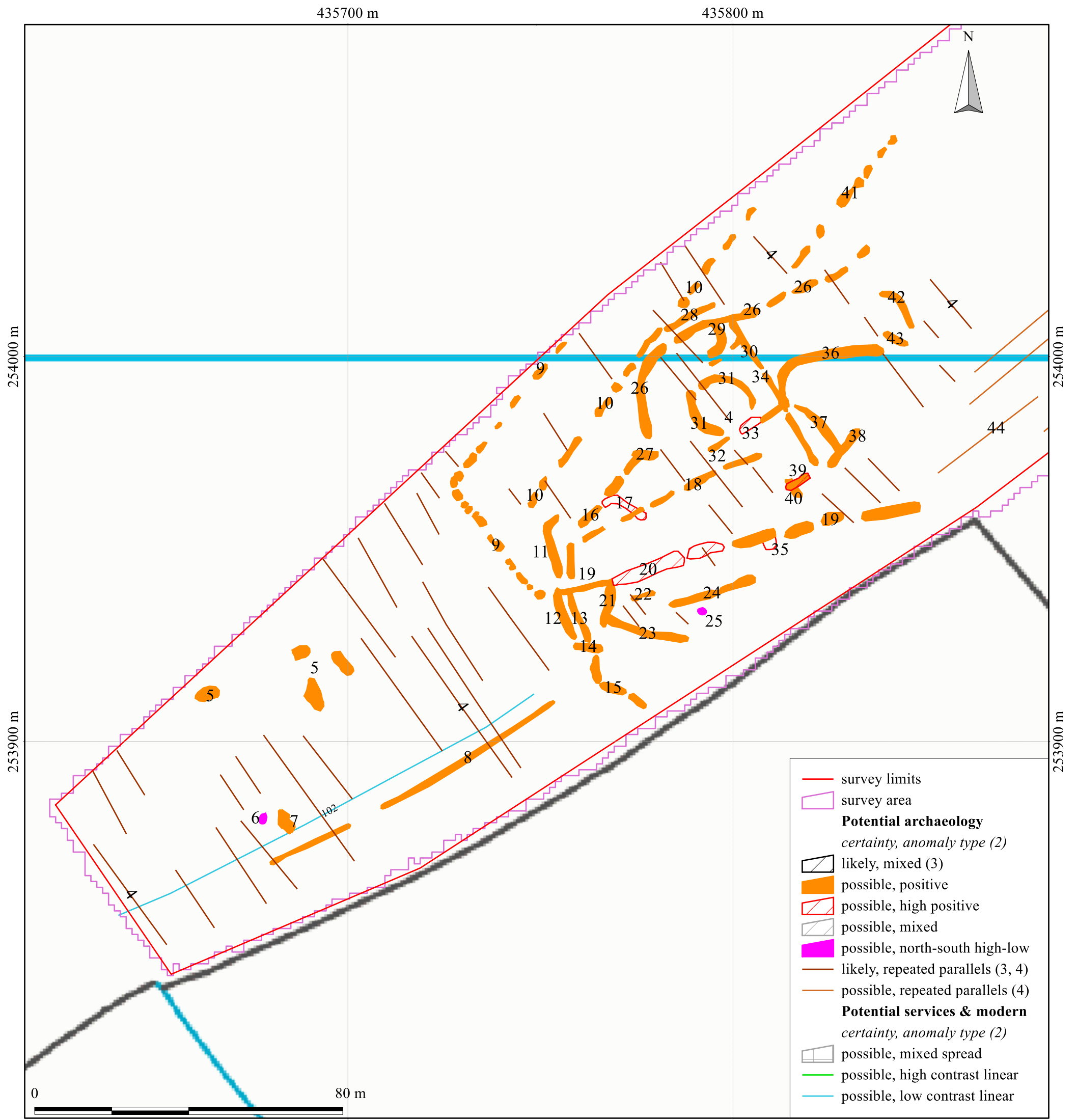
Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological description.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Representative; not all instances are mapped.
5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

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Figure 4: survey interpretation, Area 1

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British Grid  
centre X: 435749.03 m, centre Y: 253944.21 m

Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

Notes:

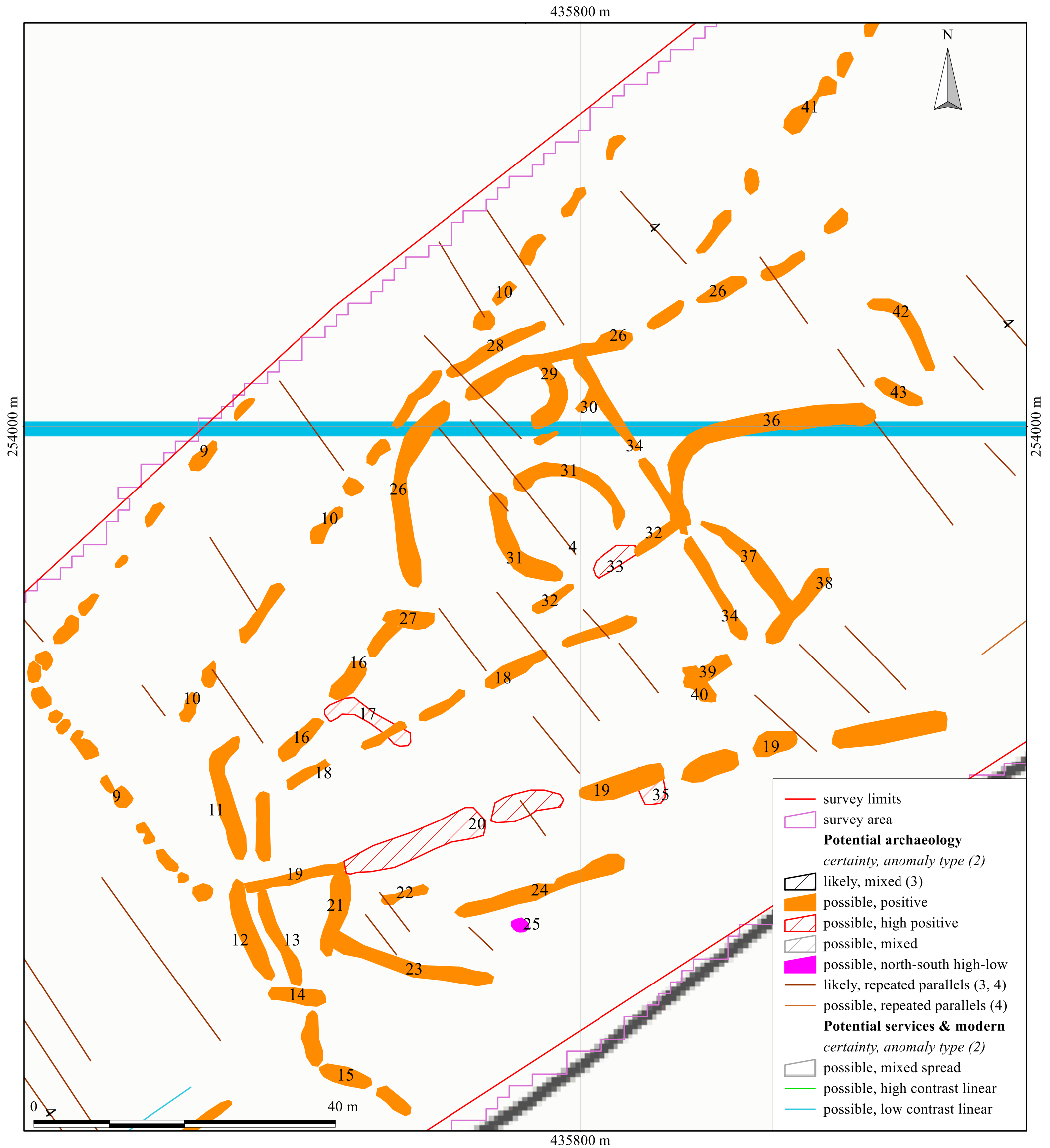
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Figure 5: survey interpretation, Area 2 southwest



British Grid  
centre X: 435792.66 m, centre Y: 253980.04 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

Notes:

1. All interpretations are provisional and represent potential archaeological deposits.
2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological description.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Representative; not all instances are mapped.
5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

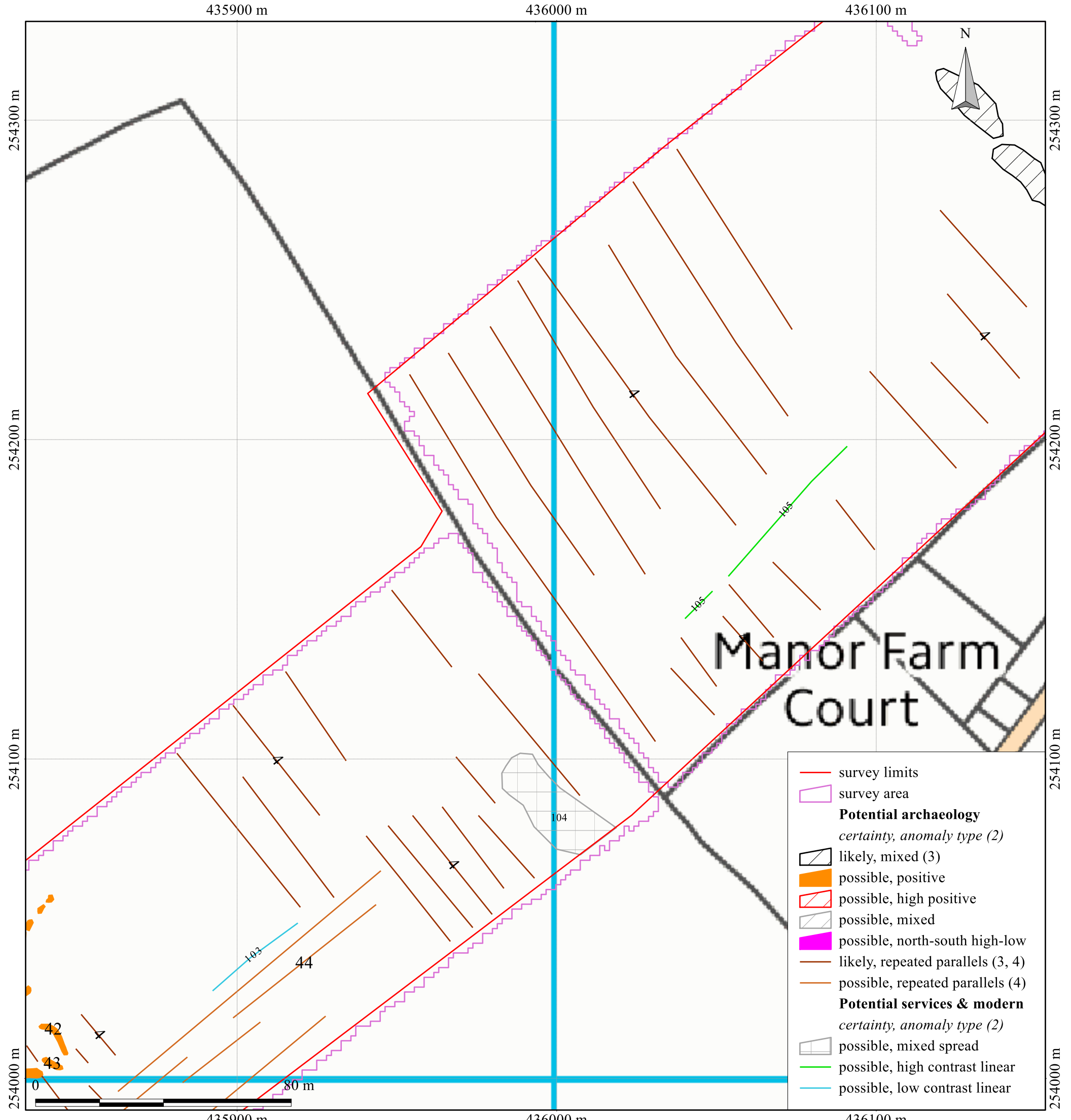
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An archaeological gradiometer survey  
Land north of Gaydon, Warwickshire  
Centred on NGR (E/N): 435898,254278 (point)  
Report: 1508GAY-R-1

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Email: [geophysics@substrata.co.uk](mailto:geophysics@substrata.co.uk)  
Web: [substrata.co.uk](http://substrata.co.uk)

Figure 6: survey interpretation: Area 2 southwest; detail





British Grid  
 centre X: 435993.37 m, centre Y: 254160.51 m

Scale: 1:1200 @ A3. Spatial Units: Meter. Do not scale off this drawing

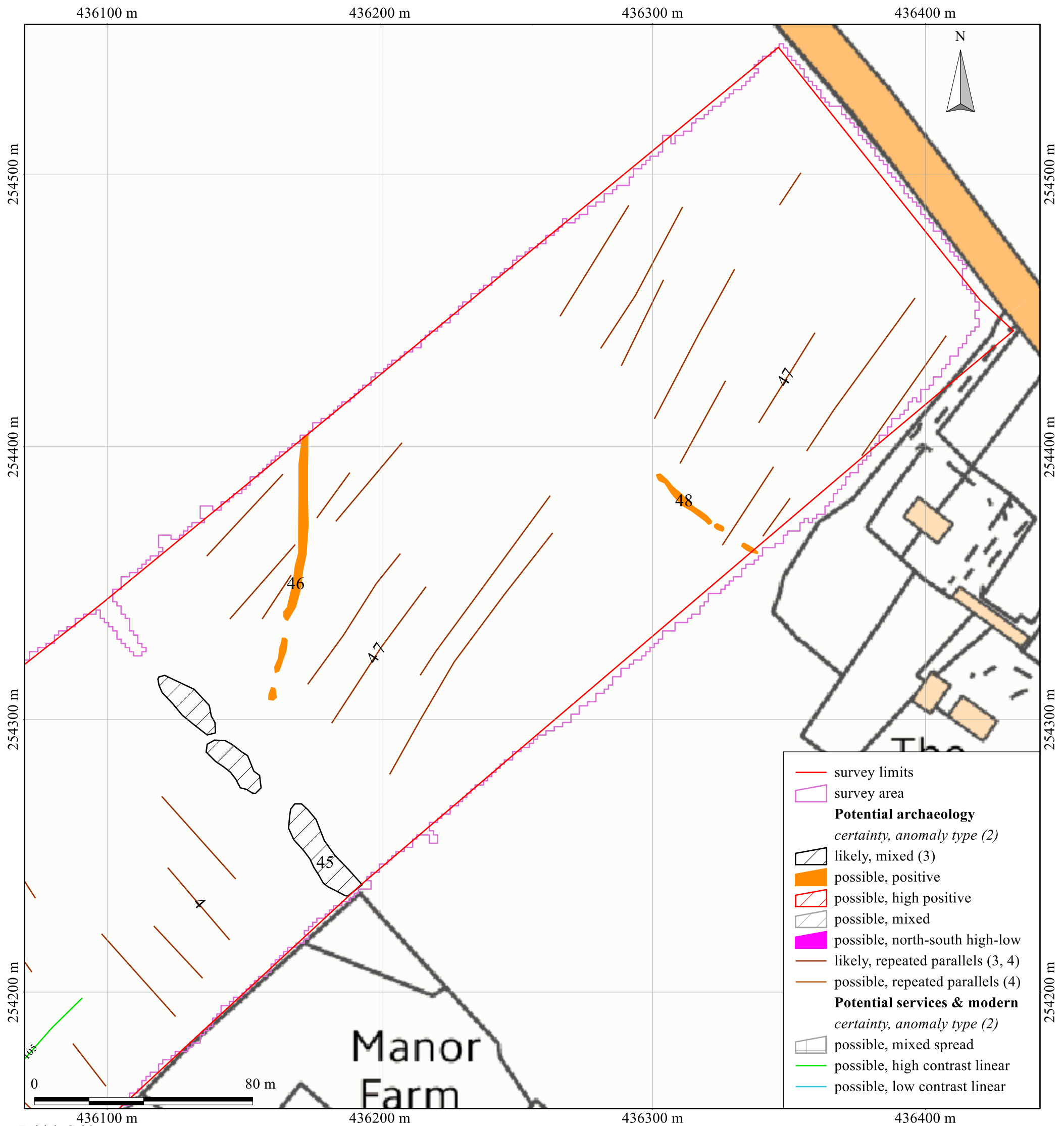
Geophysical survey: Copyright Substrata 2016.  
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- Notes:
1. All interpretations are provisional and represent potential archaeological deposits.
  2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological description.
  3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
  4. Representative; not all instances are mapped.
  5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

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Figure 7: survey interpretation, Area 2 central



British Grid  
 centre X: 436255.84 m, centre Y: 254356.11 m

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 Base map: Ordnance Survey (c) Crown Copyright 2016,  
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Scale: 1:1400 @ A3. Spatial Units: Meter. Do not scale off this drawing

- Notes:
1. All interpretations are provisional and represent potential archaeological deposits.
  2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological description.
  3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
  4. Representative; not all instances are mapped.
  5. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

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 Land north of Gaydon, Warwickshire  
 Centred on NGR (E/N): 435898,254278 (point)  
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Figure 8: survey interpretation, Area 2 northeast





British Grid  
 centre X: 435994.68 m, centre Y: 254195.96 m

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

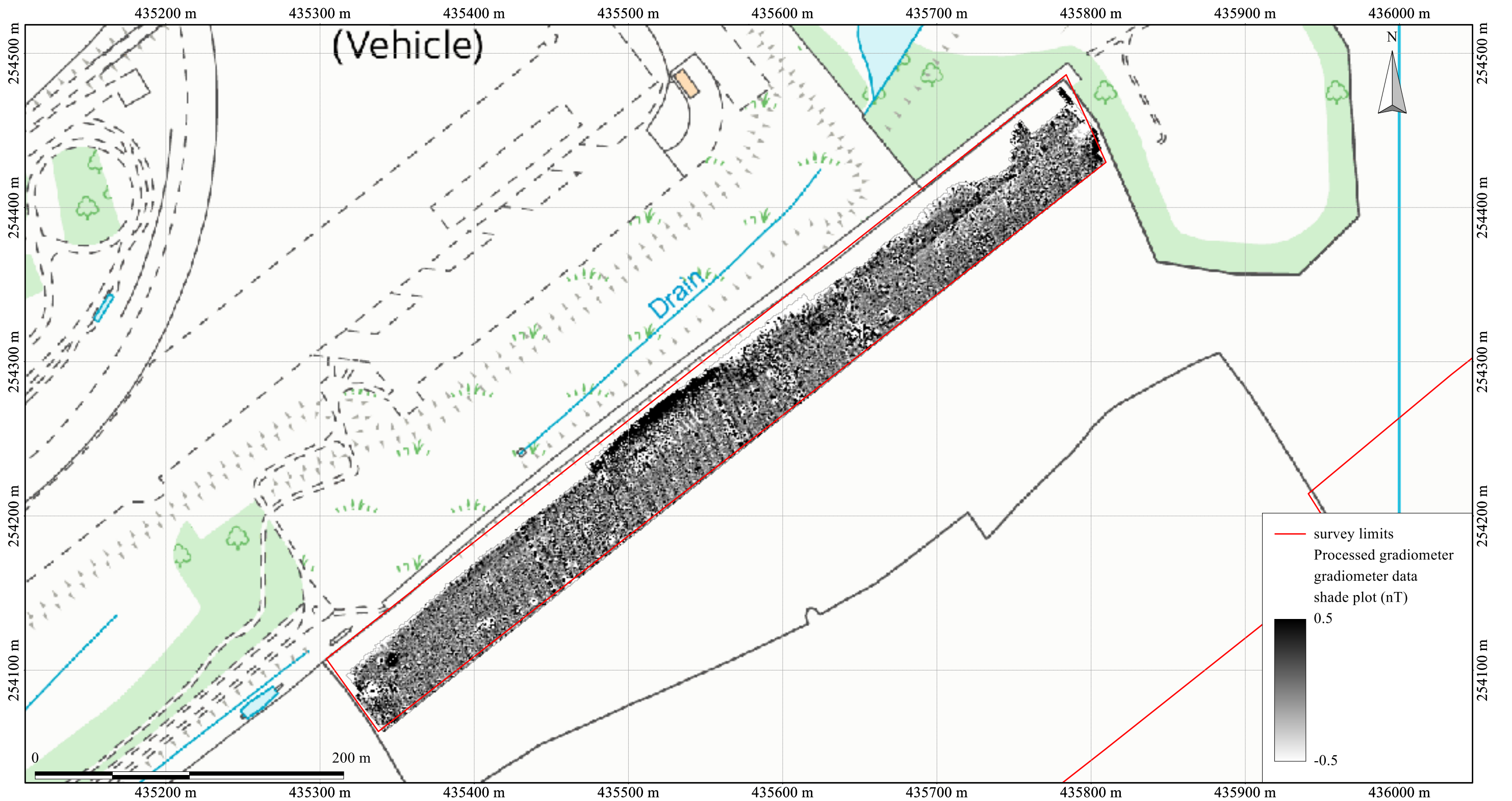
Geophysical survey: Copyright Substrata 2016.  
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Figure 9: shade plot of processed gradiometer data, all areas

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Scale: 1:2500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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British Grid  
 centre X: 435578.07 m, centre Y: 254272.73 m

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Figure 10: shade plot of processed gradiometer data, Area 1

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British Grid  
 centre X: 435749.03 m, centre Y: 253944.21 m

Scale: 1:1000 @ A3. Spatial Units: Meter. Do not scale off this drawing

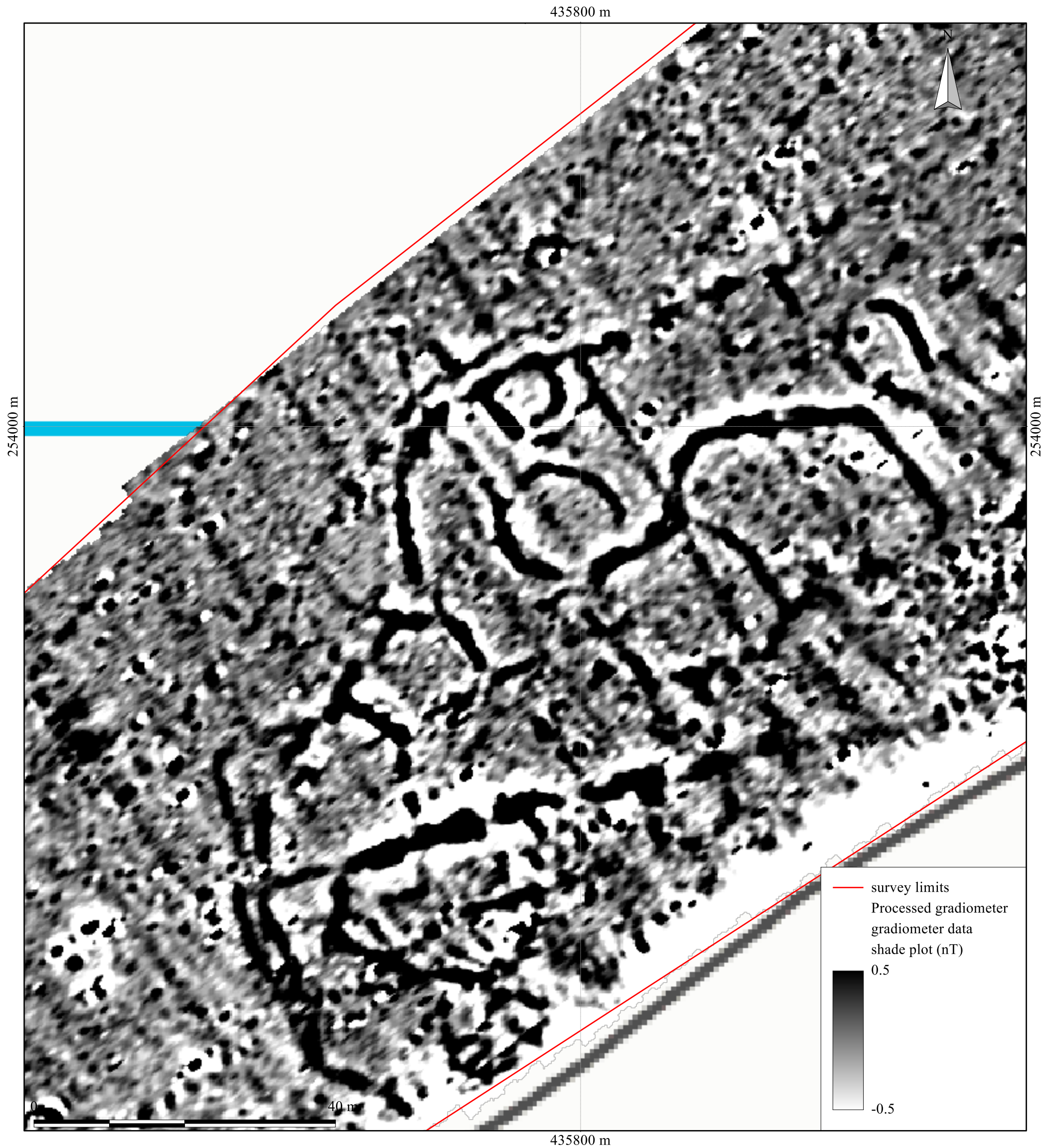
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Figure 11: shade plot of processed gradiometer data, Area 2 southwest





British Grid  
centre X: 435792.66 m, centre Y: 253980.04 m

Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

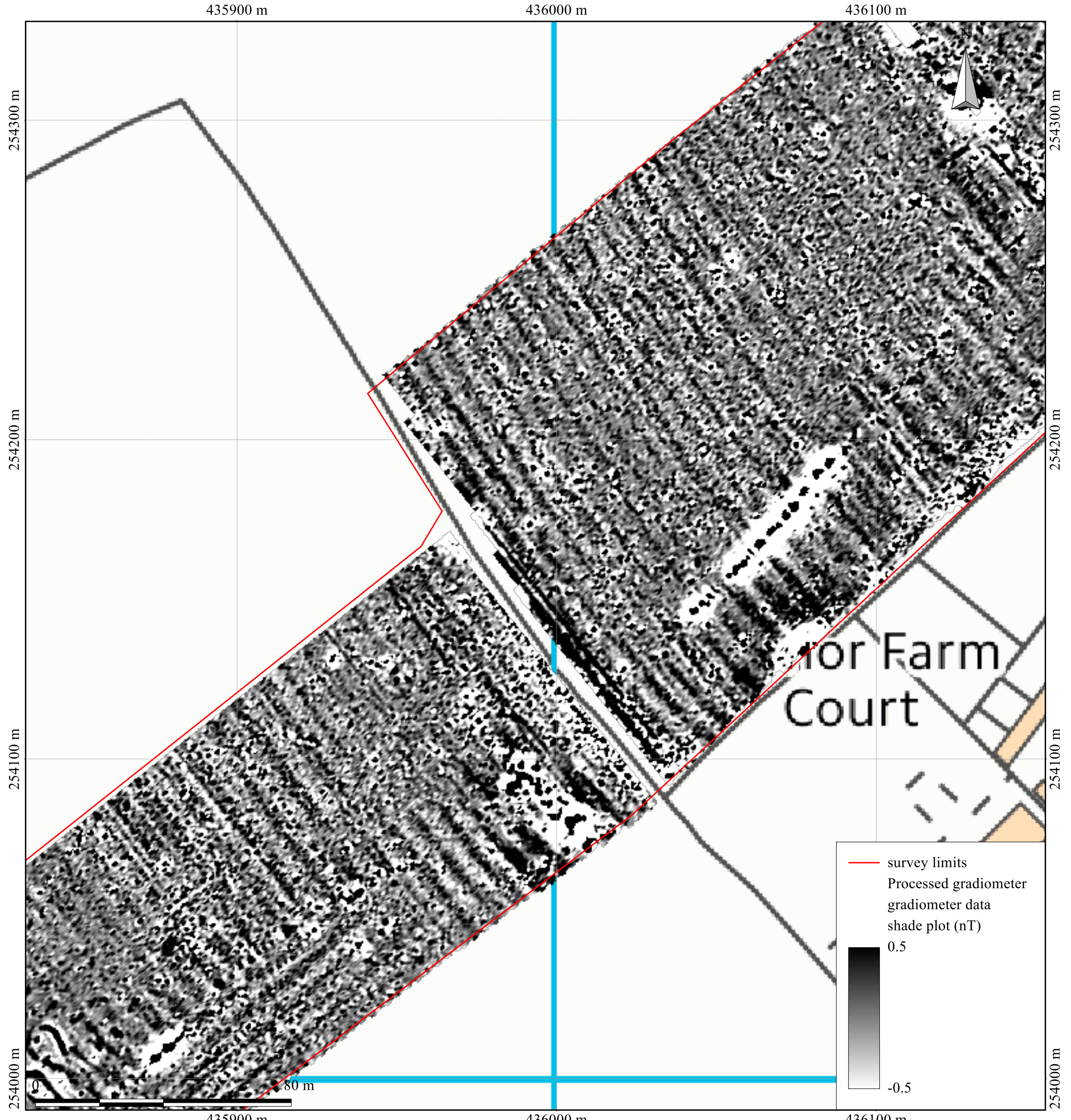
Geophysical survey: Copyright Substrata 2016.  
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Figure 12: hade plot of processed gradiometer data: Area 2 southwest; detail





British Grid  
 centre X: 435993.37 m, centre Y: 254160.51 m

Scale: 1:1200 @ A3. Spatial Units: Meter. Do not scale off this drawing

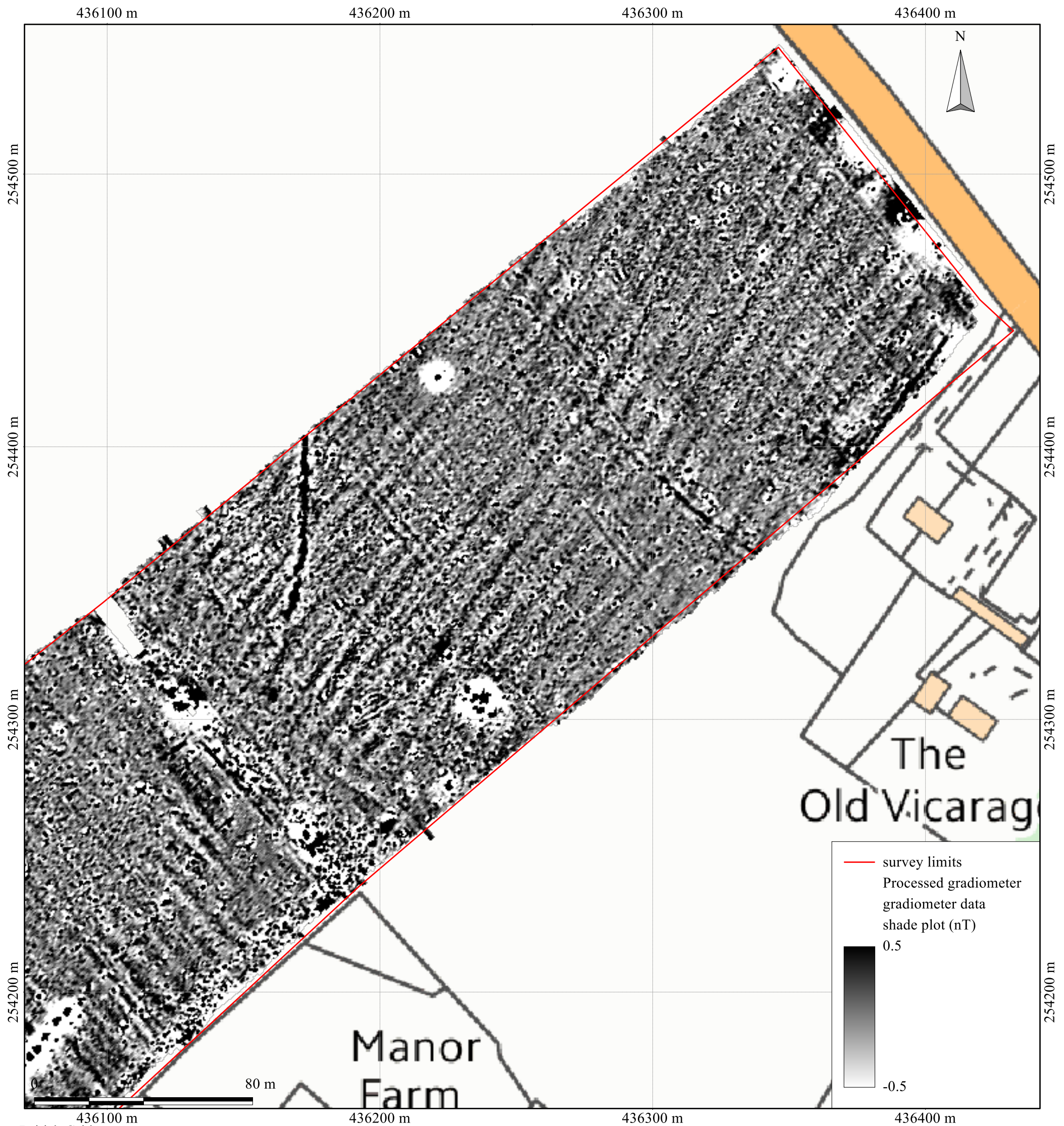
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Figure 13: shade plot of processedgradiometer data, Area 2 central





British Grid  
 centre X: 436255.84 m, centre Y: 254356.11 m

Scale: 1:1400 @ A3. Spatial Units: Meter. Do not scale off this drawing

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 Base map: Ordnance Survey (c) Crown Copyright 2016,  
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Figure 14: shade plot of processed gradiometer data, Area 2 northeast

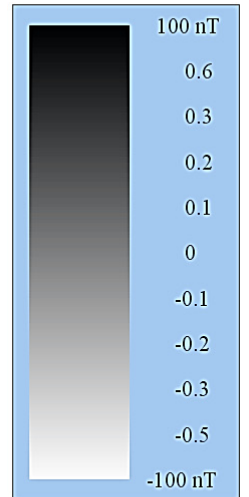
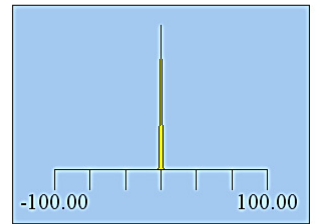
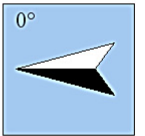
## Appendix 2 Methodology Summary

Table 2: methodology summary	
<p><b>Documents</b>            WSI: SLR (2016)            Survey methodology statement: Dean (2016)</p>	
<p><b>Methodology</b></p> <ol style="list-style-type: none"> <li>1. The work was undertaken in accordance with the survey methodology statement written in response to the WSI which took account of generic geophysical survey guidelines provided by Warwickshire County Council. The geophysical (magnetometer) 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> Trimble R4-3, GLONASS, internal GSM, EUR/ROW</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> 0.25m  <i>Traverse Interval:</i> 1 metre  <i>Traverse Method:</i> zigzag  <i>Traverse Orientation:</i> GN180</p>
<p><b>Data Processing, Analysis and Presentation Software</b>            IntelliCAD Technology Consortium IntelliCAD 8.0            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>	

Table 3: magnetometer survey - processed data metadata	
Instrument Type:	Bartington Grad-601 gradiometer
Units:	nT
Direction of 1st Traverse:	GN180
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	2047.5
Program Name:	TerraSurveyor
Version:	3.0.29.3
<b>Area 1</b>	
Stats	Processes: 6
Max: 55.84	1 Base Layer
Min: -82.41	2 Clip at 2.00 SD
Std Dev: 2.23	3 De Stagger: Grids: All Mode: Both By: -2 intervals
Mean: -0.01	4 DeStripe Median Traverse: Grids: All
Median: 0.01	5 Edge Match (Area: Top 300, Left 0, Bottom 419, Right 119) to Right edge
	6 Interpolate: Match X & Y Doubled
<b>Area 2</b>	
Stats	Processes: 15
Max: 165.77	1 Base Layer
Min: -160.66	2 Clip at 2.00 SD
Std Dev: 4.36	3 De Stagger: Grids: All Mode: Both By: -1 intervals
Mean: -0.01	4 De Stagger: Grids: All Mode: Both By: -1 intervals
Median: 0.00	5 DeStripe Median Sensors: Grids: All
	6 Edge Match (Area: Top 0, Left 0, Bottom 29, Right 479) to Bottom edge
	7 Edge Match (Area: Top 750, Left 600, Bottom 869, Right 719) to Left edge
	8 Edge Match (Area: Top 870, Left 480, Bottom 1019, Right 599) to Left edge
	9 De Stagger: Grids: f18.xgd Mode: Both By: -2 intervals
	10 De Stagger: Grids: f15.xgd Mode: Both By: -2 intervals
	11 De Stagger: Grids: f10.xgd Mode: Both By: -2 intervals
	12 Edge Match (Area: Top 750, Left 600, Bottom 779, Right 719) to Left edge
	13 Edge Match (Area: Top 780, Left 600, Bottom 809, Right 719) to Left edge
	14 Edge Match (Area: Top 810, Left 600, Bottom 839, Right 719) to Left edge
	15 Interpolate: Match X & Y Doubled

## Appendix 4 Minimally processed data plots





Instrument Type: Bartington Grad 601  
 Units: nT  
 Direction of 1st Traverse: 180 deg  
 Collection Method: ZigZag  
 Sensors: 2 @ 0.00 m spacing.  
 Dummy Value: 2047.5  
 Grid Size: 30 m x 30 m  
 X Interval: 0.25 m  
 Y Interval: 1 m

Stats  
 Max: 100.00  
 Min: -100.00  
 Std Dev: 2.83  
 Mean: -0.04  
 Median: 0.00

PROGRAM  
 Name: TerraSurveyor  
 Version: 3.0.29.3

Processes: 3  
 1 Base Layer  
 2 DeStripe Median Sensors: Grids: All  
 3 Clip from -100.00 to 100.00 nT

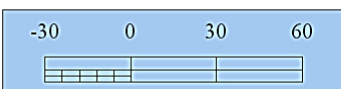
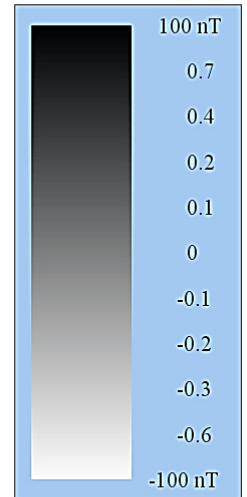
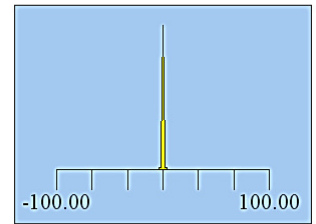
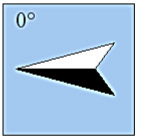
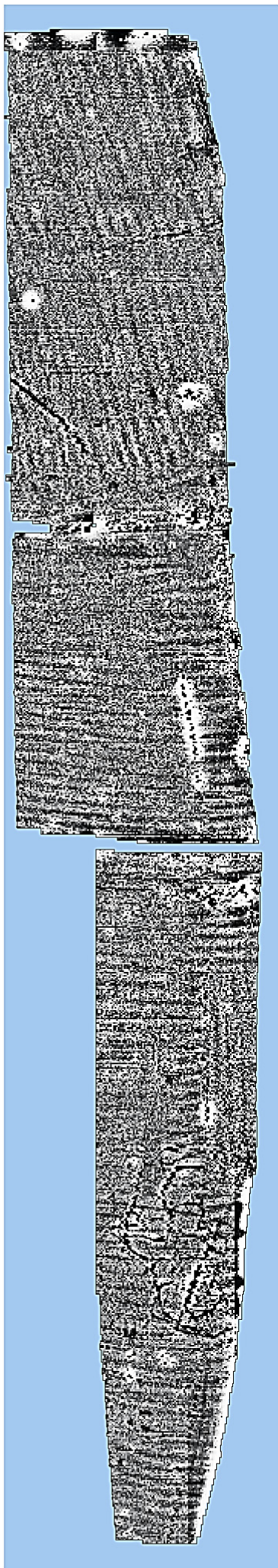


Figure 15: shade plot of minimally processed gradiometer data, Area 1





Instrument Type: Bartington Grad 601  
 Units: nT  
 Direction of 1st Traverse: 180 deg  
 Collection Method: ZigZag  
 Sensors: 2 @ 0.00 m spacing.  
 Dummy Value: 2047.5  
 Grid Size: 30 m x 30 m  
 X Interval: 0.25 m  
 Y Interval: 1 m

Stats  
 Max: 100.00  
 Min: -100.00  
 Std Dev: 4.17  
 Mean: 0.00  
 Median: 0.00

PROGRAM  
 Name: TerraSurveyor  
 Version: 3.0.29.39

Processes: 3  
 1 Base Layer  
 2 DeStripe Median Sensors: Grids: All  
 3 Clip from -100.00 to 100.00 nT

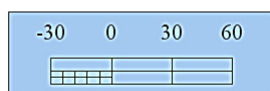
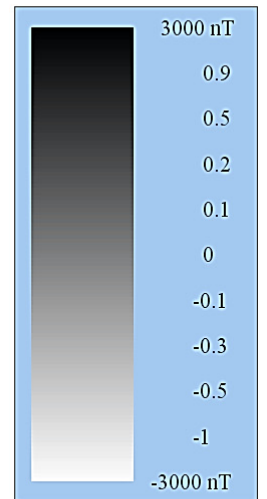
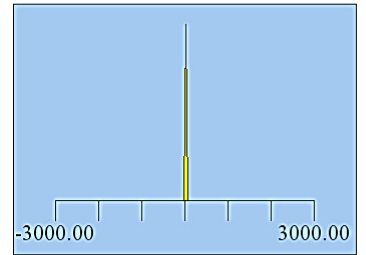
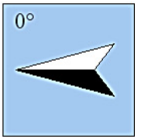


Figure 16: shade plot of minimally processed gradiometer data, Area 2

## Appendix 5 Unprocessed data plots



Instrument Type: Bartington Grad 601  
 Units: nT  
 Surveyed by: on 30/12/1899  
 Assembled by: on 30/12/1899  
 Direction of 1st Traverse: 180 deg  
 Collection Method: ZigZag  
 Sensors: 2 @ 0.00 m spacing.  
 Dummy Value: 2047.5  
 Grid Size: 30 m x 30 m  
 X Interval: 0.25 m  
 Y Interval: 1 m

Stats  
 Max: 3000.00  
 Min: -3000.00  
 Std Dev: 26.04  
 Mean: -0.17  
 Median: 0.00

PROGRAM  
 Name: TerraSurveyor  
 Version: 3.0.29.3

Processes: 1  
 1 Base Layer

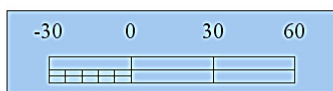
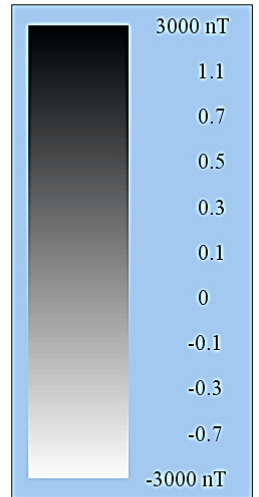
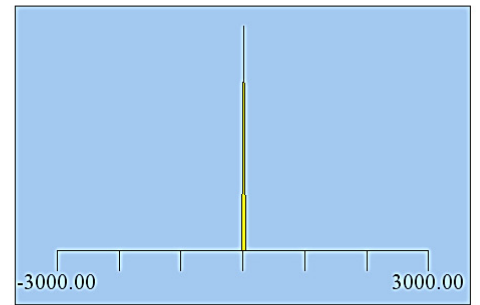
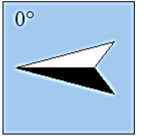
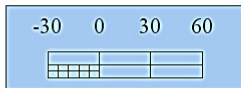
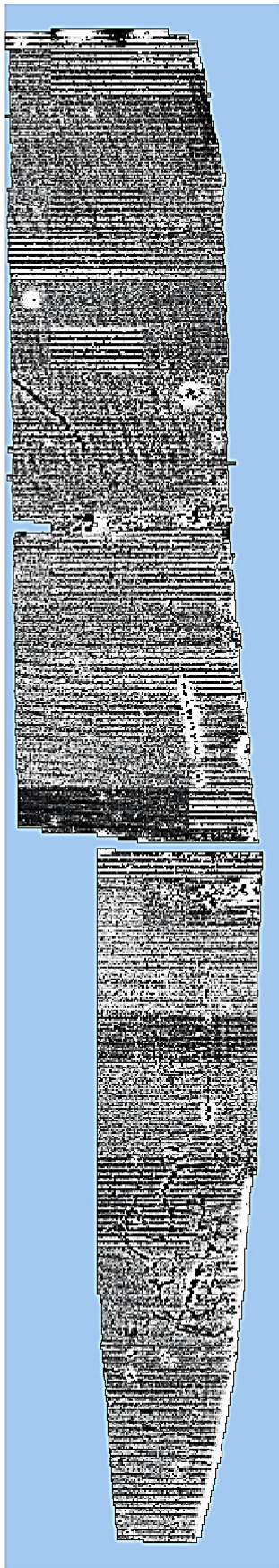


Figure 17: shade plot of unprocessed data, Area 1



Instrument Type: Bartington Grad 601  
 Units: nT  
 Direction of 1st Traverse: 180 deg  
 Collection Method: ZigZag  
 Sensors: 2 @ 0.00 m spacing.  
 Dummy Value: 2047.5  
 Grid Size: 30 m x 30 m  
 X Interval: 0.25 m  
 Y Interval: 1 m

Stats  
 Max: 3000.00  
 Min: -3000.00  
 Std Dev: 61.35  
 Mean: 0.45  
 Median: 0.10

PROGRAM  
 Name: TerraSurveyor  
 Version: 3.0.29.3

Processes: 1  
 1 Base Layer

Figure 18: shade plot of unprocessed data, Area 2