



An archaeological gradiometer survey

Land to the north of Old Bideford Road  
Fremington, Barnstaple, Devon

Ordnance Survey (E/N): 253145,131586 (point)

Report: 1508TEW2-R-1

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13 November 2015

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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
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 24 and 25 August 2015  
Area: gradiometer survey: 3.3ha  
Lead surveyor: Mark Edwards BA  
Author: Ross Dean BSc MSc MA MifA

### 1.2 Client

AC Archaeology Ltd, 4 1Halthaies Workshops, Bradninch, Nr Exeter, Devon EX5 4QL

### 1.3 Location

Site: Land to the north of Old Bideford Road  
Parish: Fremington  
District: North Devon  
County: Devon  
Nearest Postcode: EX31 3XJ  
NGR: SS 531 315  
Ordnance Survey NGR (E/N): 253145,131586 (point)

### 1.4 Archive

OASIS number: substrat1-226342  
Archive: At the time of writing, the archive of this survey will be held by Substrata and will be deposited with the ADS in due course.

### 1.5 Introduction

This report was commissioned by AC Archaeology Ltd and is part of a programme of archaeological works undertaken in in preparation for a proposed development at the above site and follows the publication of a desk based assessment completed by Wessex Archaeology (2011). The survey location is shown in Figure 1.

### 1.6 Summary

*The magnetic responses across the survey areas were sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses. Five magnetic anomaly groups were mapped as possibly representing archaeological deposits or features. One of these represents former ridge-and-furrow ploughing. The other four anomaly groups have characteristics typical of former field boundaries and enclosures of unknown date although more recent origins cannot be ruled out.*

## 2 Survey aims and objectives

### 2.1 Aims

To establish the presence or absence, extent and character of any archaeological features and deposits within the site. The results of the survey and any subsequent trial trenching will be reviewed and used to inform any subsequent mitigation.

### 2.2 Survey objectives

1. Complete a gradiometer survey across agreed parts of the site.
2. Identify any magnetic anomalies that may be related to archaeological deposits, structures or artefacts.
3. Within the limits of the techniques and dataset, archaeologically characterise any such anomalies or patterns of anomalies.
4. Accurately record the location of the identified anomalies.
5. Produce a report based on the survey that is sufficiently detailed to inform any subsequent development on the site about the location and possible archaeological character of the recorded anomalies.

### 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). The document text was written using the house style of the Chartered Institute for Archaeologists (Chartered Institute for Archaeologists, undated).

### 4 Site description

#### 4.1 Landscape and land use

The site occupies two fields separated by a small hedge as shown in Figures 1 and 2. The western field is under pasture and the eastern one comprises boggy ground with rough vegetation. The fields are bound to the north by the sports field, to the west by Tews Lane, to the south by Bideford Rd and to the west by Fremington Clay Pits. The land lies at 30m AOD.

#### 4.2 Geology

The solid geology underlying the site comprises mudstone and siltstone of the Carboniferous Crackington Formation. In general these rocks are rhythmically bedded, dark blue-grey mudstones and subordinate predominantly grey sandstones and siltstones (British Geological Survey, undated).

The superficial geology comprises mid-Pleistocene till which is usually sandy, silty clay with pebbles but can contain gravel-rich or laminated sand layers (ibid).

### 5 Archaeological background

#### 5.1 Historic landscape characterisation

Medieval enclosures based on strip fields: these areas were probably first enclosed with hedgebanks during the later Middle Ages. The curving form of the hedge-banks suggests that earlier it may have been farmed as open strip-fields (Devon County Council, undated).

#### 5.2 Historical and archaeological background

The following is a short summary of information obtained from an Historic Environment Assessment produced by Wessex Archaeology (2011) and from the Devon Historic Environment Record (HER) via the Heritage Gateway (Historic England, undated 1). The heritage assets discussed below are within approximately 1000m of the site and relevant to the understanding of the geophysical survey.

Archaeological sites, buildings, historic parks and gardens, conservation areas, registered battlefields and other aspects of the historic environment that are considered significant because of their historic, archaeological, architectural or artistic interest are considered *heritage assets*. *Designated heritage assets* are afforded protection as either scheduled monuments, listed buildings or through their inclusion within conservation areas. *Non-designated heritage assets* are potential archaeological remains and historic landscapes.

##### 5.2.1 Heritage assets within the site

There are no known heritage assets recorded within the site.

##### 5.2.2 Heritage assets within 1000m of the survey area

Little is known about the pre-Medieval (pre-1066 AD) occupation of the area. The Prehistoric period (pre-43 AD) is represented by only a Bronze Age (2400 BC to 700BC) axe stray find and, possibly, two undated enclosures. However, the presence of monuments such as a stone row in nearby Yelland indicates Bronze Age activity in the wider landscape and therefore a potential for further finds of that date cannot be ruled out.



From the Medieval period (1066 AD to 1499 AD) onwards the site was located within the agrarian setting between the settlements of Fremington and Barnstaple, as evidence of Medieval ridge and furrow strip field systems recorded to the northwest of the site attests (MDV58776, SS 527 321).

The site lies east-south-east of Early-medieval to Post-medieval clay extraction pits at Claypit Covert (MDV904, SS 528 317) and to the southeast of the Fremington pottery centre which was located around Muddlebridge and Combrew (MDV914, SS 523 325, MDV913, SS 526 325 and MDV21748, SS 526 328). Although no features relating to the industry are shown on the historic maps, a possibility that small scale features associated with clay quarrying or pottery making cannot be excluded.

## 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.

*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 survey data. It includes the anomaly groups identified as 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.

Figure 2 and Table 1 comprise the analysis of the survey data.

Figures 3 and 4 are plots of processed data as specified in Table 3. These plots represent different views of the data that were each used to assess potential archaeology.

### 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 recorded in the GIS project held the survey archive.

##### Data collection

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

##### Anomaly characterisation and mapping

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.

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.

##### General data trends

The clear, approximately north-south trend in the data across the survey area to a greater or lesser extent (group 5 in Figure 2) is discussed below. Fainter trends in the data running west-south-west to east-north-east and west-north-west to east-south-east are most likely to represent more recent cultivation disturbance and/or field drains.

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

No magnetic anomaly groups related to features recorded on historic maps.

#### 6.2.3 Data with no previous archaeological provenance

All of the anomaly groups characterised as representing potential archaeological deposits or features are typical of anomaly groups representing former field boundaries and enclosures of unknown date.

Group **2** may represent archaeological deposits or relatively recent ploughing disturbance.

Groups **3** and **4** do not appear to conform to the current field system and may represent a different phase of past land management although both groups could equally represent recent ground disturbance such as field drains (group 4) and a relatively recent service trench (group 3).

Group **5** is likely to represent near-surface disturbance from past ridge-and-furrow ploughing which can be Medieval, Post-medieval or both in date.

#### 6.3 Conclusions

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

Five magnetic anomaly groups were mapped as possibly representing archaeological deposits or features. One of these represents former ridge-and-furrow ploughing. The other four anomaly groups have characteristics typical of former field boundaries and enclosures of unknown date although more recent origins cannot be ruled out.

## 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 John Valentin of AC Archaeology Ltd for commissioning us to complete this survey.

## 9 Bibliography

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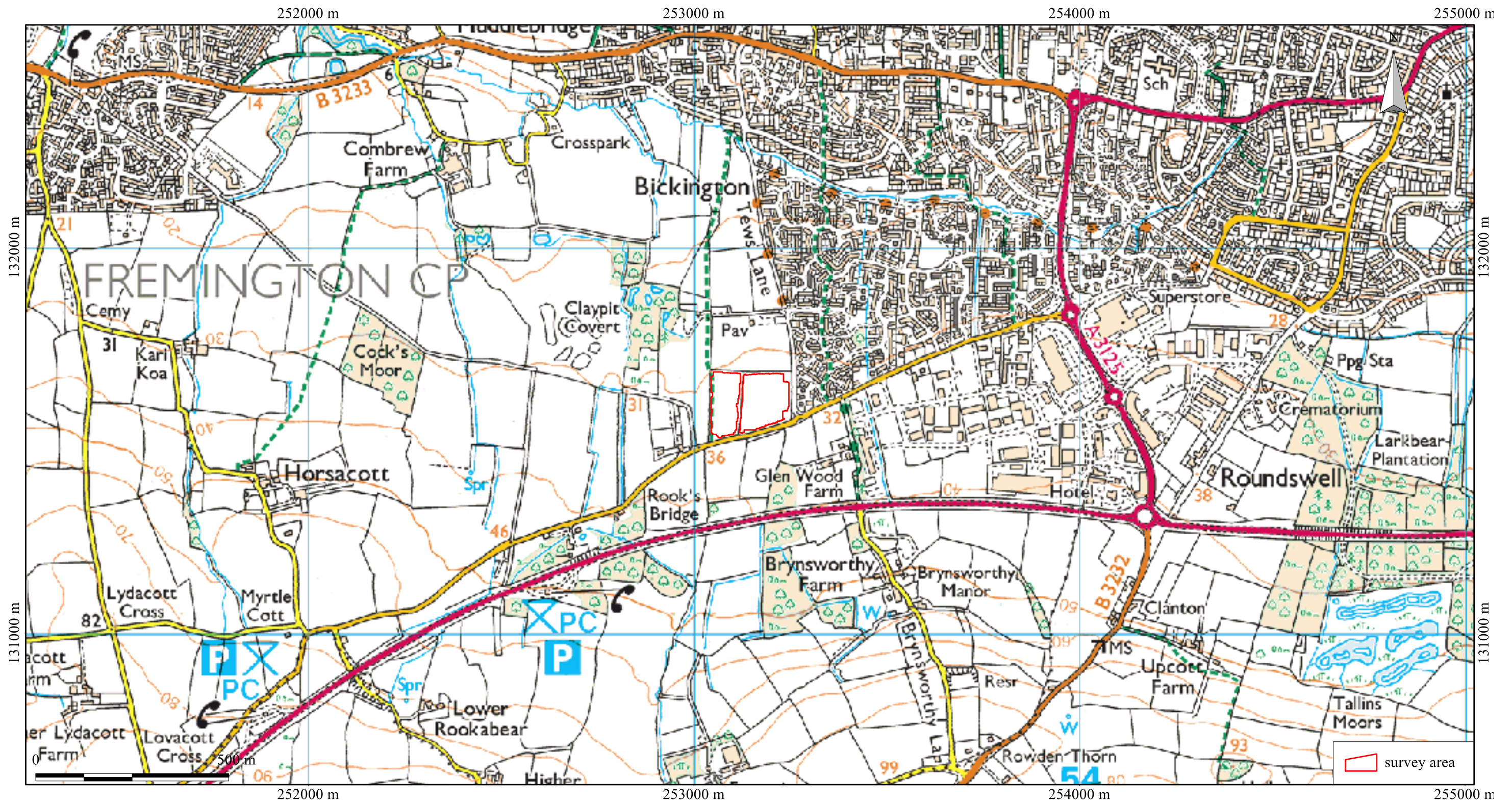
## Appendix 1      Analysis table and supporting plots

### 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.





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Figure 1: location map

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Figure 2: survey interpretation

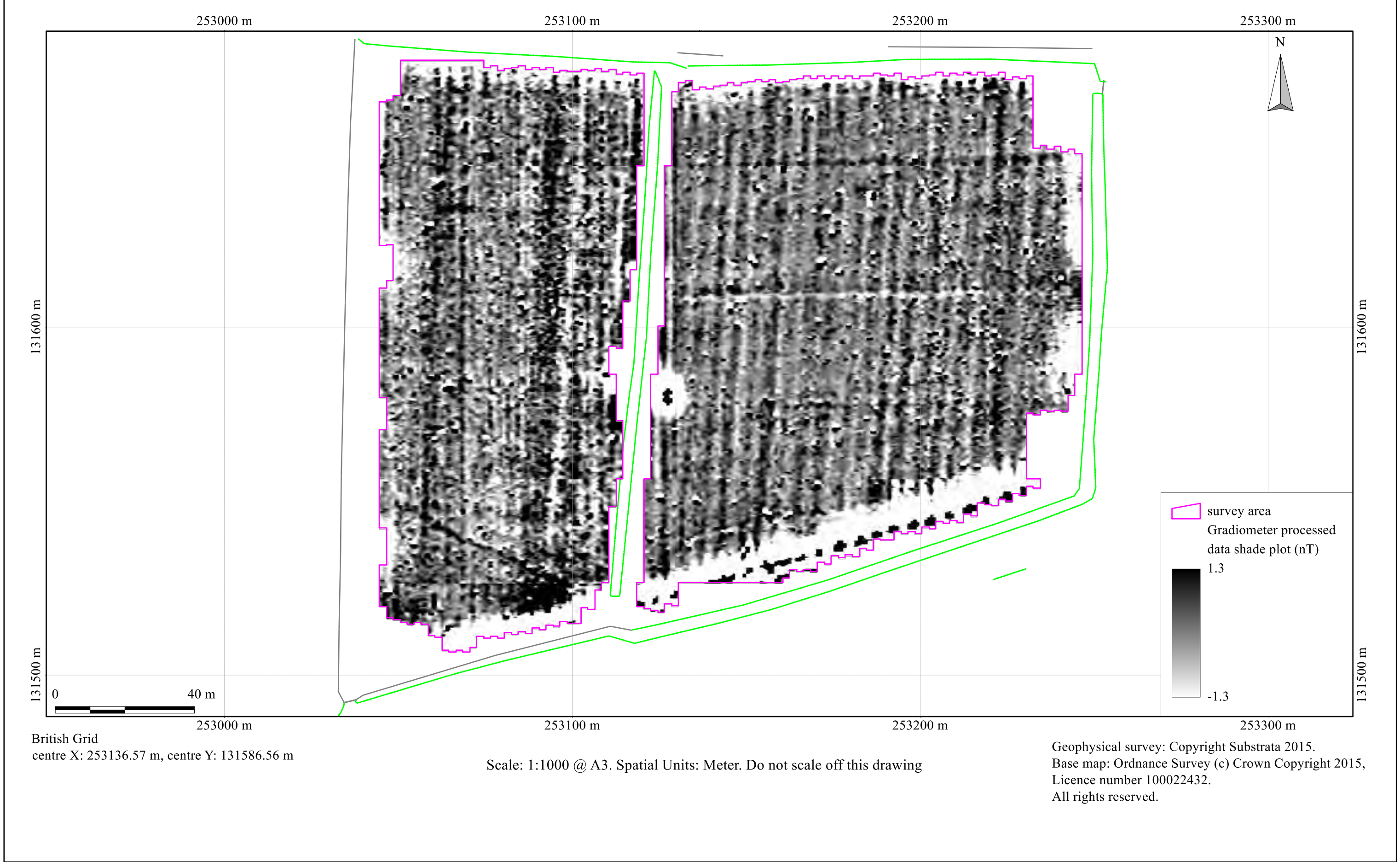
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anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1		possible, positive	disrupted linear			
2		possible, positive	disrupted linear		anomaly group has the same trend as faint ploughing disturbance and may represent either archaeological deposits or ploughing disturbance	
3		possible, positive	disrupted linear			
4		possible, positive	disrupted linear			
5		possible, repeated parallels		ploughing disturbance - possible ridge-and-furrow		
101		possible, low contrast linear		service trench		

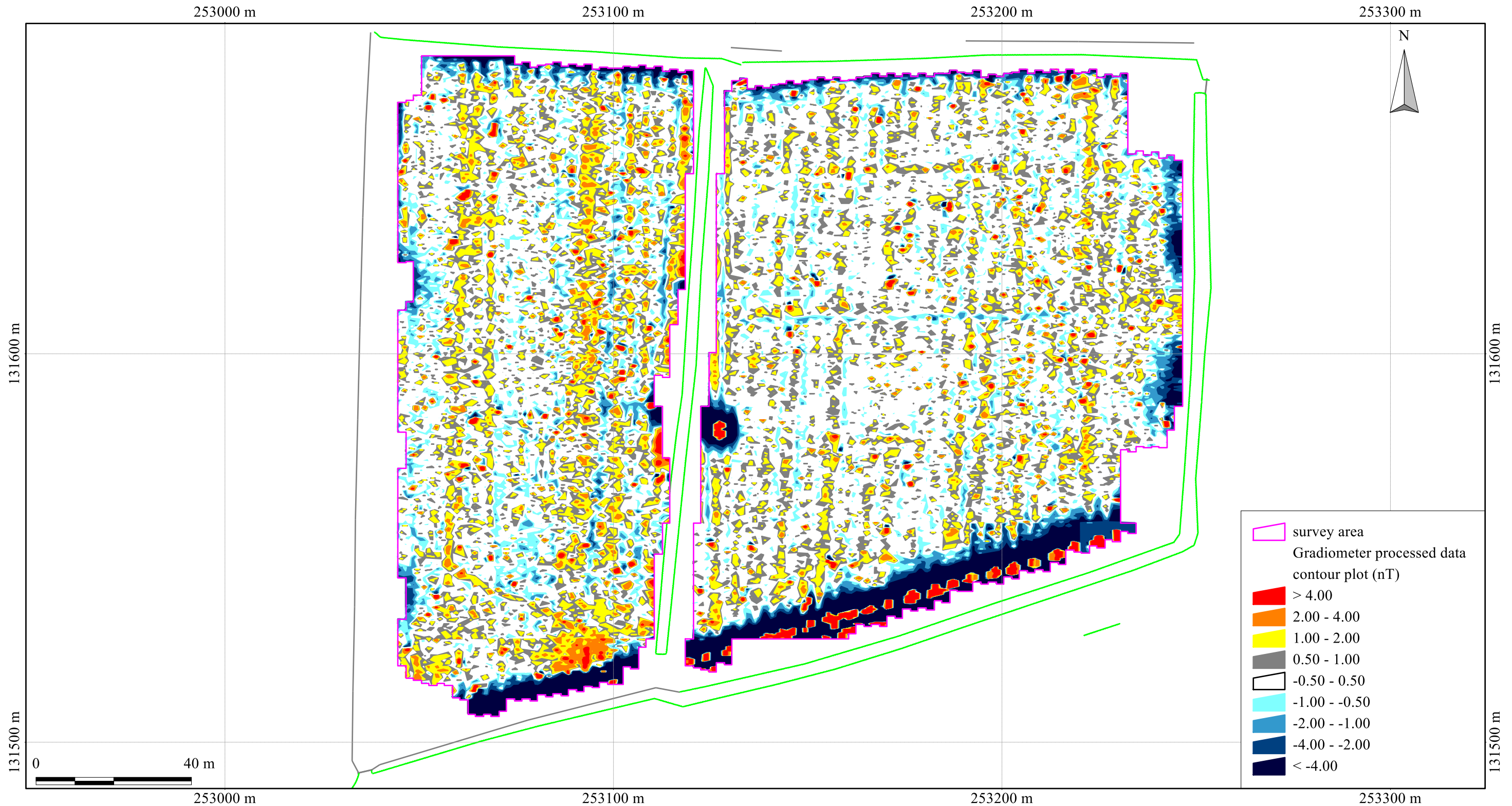
Table 1: data analysis





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British Grid  
centre X: 253136.57 m, centre Y: 131586.56 m

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

Geophysical survey: Copyright Substrata 2015.  
Base map: Ordnance Survey (c) Crown Copyright 2015,  
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Figure 4: contour plot of processed data

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## Appendix 2 Methodology Summary

Table 2: methodology summary	
<b>Documents</b> Survey methodology statement: Dean (2015)	
<b>Methodology</b> <ol style="list-style-type: none"> <li>1. The work was undertaken in accordance with the 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>	
<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.	
<b>Equipment</b> <i>Instrument:</i> Bartington Instruments grad601-2 <i>Firmware:</i> version 6.1	<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> GN
<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	



## Appendix 3 Data processing

Table 3: gradiometer survey - processed data metadata		
<p><b>SITE</b>  Instrument Type: Bartington Grad 610  Units: nT  Direction of 1st Traverse: see below  Collection Method: ZigZag  Sensors: 2 @ 1.00 m spacing.  Dummy Value: 32702</p> <p><b>PROGRAM</b>  Name: TerraSurveyor  Version: 3.0.25.0</p>		
Stats Max: 20.89 Min: -25.75 Std Dev: 1.83 Mean: -0.25 Median: -0.01	Processes: 14 1 Base Layer 2 Clip at 1.00 SD 3 Clip at 1.00 SD 4 Clip at 1.00 SD 5 De Stagger: Grids: All Mode: Both By: -2 intervals 6 De Stagger: Grids: b2.xgd b3.xgd b12.xgd b13.xgd Mode: Both By: -1 intervals 7 De Stagger: Grids: a27.xgd Mode: Both By: -3 intervals 8 De Stagger: Grids: b6.xgd Mode: Outbound By: -2 intervals 9 DeStripe Median Sensors: All 10 Edge Match (Area: Top 120, Left 120, Bottom 149, Right 239) to Top edge 11 Edge Match (Area: Top 150, Left 120, Bottom 179, Right 239) to Top edge 12 Edge Match (Area: Top 180, Left 120, Bottom 209, Right 239) to Top edge 13 Edge Match (Area: Top 60, Left 0, Bottom 89, Right 119) to Right edge 14 Interpolate: Match X & Y Doubled.	