

**Substrata**

Archaeological Geophysical Surveyors

An archaeological magnetometer survey

**Land adjoining Caddsdwn Business Park  
Bideford, Devon**

Centred on NGR 243574,125245

Report: 1801BID-R-1

Ross Dean BSc MSc MA MCifA  
Mark Edwards BA

01 May 2018

Substrata Ltd  
Langstrath  
Goodleigh  
Barnstaple  
Devon EX32 7LZ  
Tel: 01271 342721  
Email: [geophysics@substrata.co.uk](mailto:geophysics@substrata.co.uk)  
Web: [substrata.co.uk](http://substrata.co.uk)

Client  
AC Archaeology Ltd  
4 Halthaies Workshops  
Bradninch  
Nr Exeter  
Devon EX5 4QL  
Tel: 01392 882410

Substrata Limited

Company number: 10348811

Registered office: Unit 6 Bude Business Centre, Kings Hill Industrial Estate, Bude, Cornwall, England EX23 8QN

## Contents

1. Introduction .....	1
2. Survey description .....	1
3. Summary .....	1
4. Aims and objectives .....	2
5. Standards .....	2
6. Methodology .....	2
7. Site.....	2
8. Archaeological background.....	3
9. Results .....	3
10. Discussion .....	4
11. Conclusions .....	5
12. Disclaimer .....	5
13. Copyright.....	6
14. Archive .....	6
15. Acknowledgements .....	6
16. Bibliography.....	6
Appendix 1 Figures .....	7
Appendix 2 Tables.....	20
Appendix 3 Project archive contents.....	26

## Figures

Figure 1: location map .....	8
Figure 2: survey interpretation, all plots.....	9
Figure 3: survey interpretation, Plots 2, 3 and 4.....	10
Figure 4: survey interpretation, Plots 5, 6 and 7.....	11
Figure 5: survey interpretation, Plots 8 and 9.....	12
Figure 6: shade plot of processed data, all plots.....	13
Figure 7: shade plot of processed data, Plots 2, 3 and 4.....	14
Figure 8: shade plot of processed data, Plots 5, 6 and 7.....	15
Figure 9: shade plot of processed data, Plots 8 and 9.....	16
Figure 10: shade plot of minimally processed data, all plots.....	17
Figure 11: survey grid location.....	18
Figure 12: data grid file plan.....	19

## Tables

Table 1a: data analysis, Plots 2 to 7 .....	21
Table 1b: data analysis, Plots 8 and 9.....	22
Table 2: methodology information, all areas .....	23
Table 3: processed data metadata .....	24
Table 4: minimally processed data metadata.....	25

## 1 Introduction

This report presents the results of an archaeological geophysical survey at the site listed below, hereafter referred to as the Site. It was commissioned by AC Archaeology on behalf of clients.

The survey and report were completed in compliance with a Survey Method Statement (Dean, 2018). The Site location is shown in Figure 1.

## 2 Survey description

### 2.1 Survey

Method:	shallow depth magnetometer survey
Instrument:	twin-sensor fluxgate gradiometer
Date:	between 09 and 23 April 2018
Area:	17ha

### 2.2 Location

Site name:	Land adjoining Caddsdow Business Park
Town & Civil Parish:	Bideford
District:	Torridge
County:	Devon
Nearest Postcode:	EX39 5EQ
NGR:	SS 43574 25245 (point)
NGR (E/N):	243574,125245 (point)
Historic environment designation:	none

### 2.3 Client

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

## 3 Summary

A magnetometer survey was selected to provide a relatively fast and cost-effective evaluation of any buried archaeology across the Site (see Section 12). The magnetic anomaly groups pertaining to potential buried archaeology were georeferenced to the Ordnance Survey National Grid (Figure 11), mapped, characterised and assigned with an appropriate degree of certainty in conformance with the survey aims and objectives set out in Section 4.

The differences in magnetic responses across the Site were sufficient to be able to differentiate between anomalies representing possible buried archaeology and background magnetic responses. Fifty-eight magnetic anomaly groups were mapped as representing potential buried archaeology.

There are two distinct areas of magnetic anomaly groups characterised as representing potential buried archaeology: a relatively high density of such groups in the southwest of the Site and a lesser but clear density in the northeast. This distribution of anomaly groups reflects the wetter conditions found across parts of the site with fewer anomalies recorded in wet areas. The authors believe the anomaly distribution broadly reflects the distribution of archaeology and that the wetter areas of the Site were not exploited in the past to the same extent as the drier areas.

Eight groups coincide with, and likely represent, field boundaries recorded on historic maps. The remaining mapped magnetic anomaly groups have characteristics typical of anomalies representing linear and curvilinear archaeological deposits such as remnants of enclosure or field boundaries. Three groups stand out: two are situated on the north-eastern are of the Site and represent an archaeological feature partially mapped as a field boundary on the 1841 Bideford Tithe map. Their magnetic response is clear and distinct from the other mapped groups. A third group, in the south-western area of the site, has a trend not seen elsewhere in the dataset.

The relative abundance of anomaly groups characterised as representing possible field and enclosure boundaries removed before the publication of the 1841 Tithe map suggests that the land has been subject to significant agrarian changes since initial enclosure.

## 4 Aims and objectives

### 4.1 Aims

Within the framework set out in Chartered Institute for Archaeologists (2014a), complete an archaeological geophysical survey and report to:

1. As far as possible inform on the presence of absence, character, extent and in some cases, apparent relative phasing of buried archaeology, in order to make an assessment of its merit in the appropriate context, which may lead to one or more of the following:
  - a. The formulation of a strategy to ensure further recording, preservation or management of the resource
  - b. The formulation of a strategy to mitigate a threat to the archaeological resource
  - c. The formulation of a proposal for further archaeological investigation within a programme of research (ibid, 2014a: 4).

### 4.2 Survey objectives

1. Complete a magnetometer survey across agreed parts of the survey area.
2. Identify any magnetic anomalies that may be related to archaeological deposits, structures or artefacts.
3. Within the limits of the technique 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 survey area about the location and possible archaeological character of the recorded anomalies.

## 5 Standards

The standards used to complete this survey are defined by the Chartered Institute for Archaeologists (2014a) and Historic England (2008). The codes of approved practice that were followed are those of the Chartered Institute for Archaeologists (2014b) and Archaeology Data Service (undated).

## 6 Methodology

The magnetometer survey was undertaken in accordance with a Survey Method Statement (Dean, 2018) to achieve the aims and objectives set out in Section 4 using the standards and guidance specified in Section 5. The survey method was selected to provide a relatively fast and cost-effective evaluation of any buried archaeology across the Site (see Section 12).

Data processing was undertaken using appropriate software (Table 2), with all anomalies being digitised and geo-referenced. The final report (this document) includes 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. The survey and report conformed to the Chartered Institute for Archaeologists standard for geophysical survey (CIFA, 2014a).

## 7 Site

### 7.1 Location

The Site comprises nine plots, all apart from Plot 1 being complete fields. Plots 2 to 9 were subject to survey. The Site location is provided in Figure 1 and the Plot locations in Figure 2.

Clovelly Road and Caddsdawn Business Park run along the north and north-western edges of the Site. Woods lie along the south-western boundary and a lane runs along the southern and eastern edges. The field boundaries are a mix of steel fencing, wire fencing and Devon Banks.

### 7.2 Land use

At the time of the survey, the field was under grass pasture.

### 7.3 Topology

The land generally descends north to south; from approximately 80m AOD at the northern end of Plot 2, rising to 90m AOD at the Plot's southern end, before descending north-south to approximately 60m AOD at the southern point of Plot 6. There is an approximately northwest to southeast trending spur of land in Plots 7 to 9, with a high point of approximately 75m AOD at the northern end of Plot 9 descending to approximately 60m AOD on the western side of Plot 9 and to 60m AOD at the eastern side of Plot 8. The Site is split by a stream which flows approximately north to south between Plots 6, 7 and 8 with issues to the northwest of Plot 6.

### 7.4 Geology

The bedrock across the site is sandstone of the Carboniferous Bude Formation. These rocks comprise grey, thick-bedded, somewhat argillaceous and silty sandstones, in laterally discontinuous internally massive beds 1-5m thick and commonly amalgamated into units up to 10m thick. When weathered the sandstones become buff and friable. Very thick beds of slumped and de-stratified strata are also present. Grey mudstones occur as interbeds up to 1m thick but locally packets of darker mudstone up to 20m thick with thin ironstone beds and bundles of thin sandstones are present, especially in the upper part of the Formation. Five named beds of black sulphurous "shales" with goniatite-bearing calcareous nodules occur within the Formation. Thin units of thin- to medium-bedded siltstones with Xithosurid trails are also present. Bude Formation mudstone and siltstone are present on the northern side of Plots 8 and 9 and the northern half of Plot 3. The superficial geology was not recorded in the source used (British Geological Survey, undated).

## 8 Archaeological background

### 8.1 Historic Environment Status

None.

### 8.2 Historic landscape characterisation

Medieval enclosures based on strip fields.

This area was probably first enclosed with hedge-banks 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).

### 8.3 Statement of research

The Devon County Council Historic Environment Record was examined via the Heritage Gateway (Historic England, undated) to gain an appreciation of historic assets pertinent to the geophysical survey data within approximately 500m of the survey area perimeter. Whilst providing a useful context for the data analysis, this source is not comprehensive and publication of the information in commercial reports is not permitted.

## 9 Results

### 9.1 Scope and definitions

This survey was designed to record magnetic anomalies. A magnetic anomaly is a local variation in the Earth's magnetic field. Such variations can result from changes in the magnetism of the underlying solid geology, superficial geology and other near-surface deposits including those altered and created by past human activities. Near-surface artefacts can also create magnetic anomalies.

Magnetic anomalies cannot be regarded as physical archaeological deposits, structures or features and the dimensions of the anomalies shown do not represent the dimensions of any associated archaeology.

The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to buried archaeology.

### 9.2 Analysis

Figures 2 to 5 show the interpretation of the survey data with Figures 3 to 5 including the

anomaly groups identified as possibly relating to archaeological deposits along with their identifying numbers. Table 1a and Table 1b are extracts of the detailed analysis of the survey data sourced from the attribute tables of the GIS project provided in the project archive.

Figures 2 to 5 along with Tables 1a and 1b comprise the analysis of the survey data.

Figures 6 and 9 are plots of processed data as specified in Table 3. Figure 10 is a plot of minimally processed data as specified in Table 4. Figure 11 shows the location of the survey grid and Figure 12 is a map of the survey grid data files.

## 10 Discussion

### 10.1 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 in 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 within and adjacent to boundaries. Strong magnetic responses mapped close to the boundaries are likely to relate to these materials except where otherwise indicated in Figure 2 and Table 1.

#### Anomaly characterisation

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 were mapped as potential archaeology when they were associated with other significant anomaly groups or otherwise formed recognisable patterns as listed in Tables 1a and 1b.

Anomalies thought to relate to natural features and 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.

Numerous dipole magnetic anomalies are present within the dataset. These are likely to represent recent ferrous objects. They are only mapped if they could influence the analysis of anomaly groups thought to have an archaeological origin.

### 10.2 Distinct anomaly patterns

There are distinct groupings of magnetic anomaly groups characterised as representing potential buried archaeology with Plots 8 and 9 (Figure 5) having a relatively high density and Plots 2, 3 and 4 (Figure 3) a lesser but clear density. Plot 5 (Figure 4) has no anomalies identified as representing potential archaeology. Plot 6 (Figure 4) has one anomaly representing a field boundary recorded on historic maps and a set of anomalies that may ridge-and-furrow (groups 107 and 108) although they are more likely to represent field drains. Plot 7 has one mapped anomaly.

This distribution of anomaly groups reflects the wetter conditions found across parts of the site with fewer anomalies recorded in wet areas. Although there will be a reduction in magnetic minerals in the soils of such areas which will affect the magnetic response, the authors are of the opinion that the anomaly distribution reflects the distribution of archaeology and that the wetter areas were not exploited in the past to the same extent as the drier areas of the Site.

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

Magnetic anomaly groups **7** and **9** (Plot 3, Figure 3), **17** (Plot 6, Figure 4), **20**, **27**, **37** with **38** (Plot 8, Figure 5), and **50** with **51** and **53** (Plot 9, Figure 5) coincide with, and likely represent, field boundaries recorded on historic maps as shown in Tables 1a and 1b.

### 10.3 Data with no previous archaeological provenance

A number of groups of field drains are clear in the dataset in Plots 3, 4 5, 6 and 8 (Figures 3 to 5). These are of unknown date but are almost certainly post-medieval in origin. The remaining magnetic anomaly groups have characteristics typical of anomalies representing linear and curvilinear archaeological deposits such as remnants of enclosure or field boundaries.

It is clear that the south-western part of the Site (Plots 8 and 9, Figure 3) has a relatively high density of these anomaly groups and that they represent more than one phase of land management. Group **25** (Plot 8, Figure 5) in particular seems to have a distinct trend compared to other mapped anomaly groups in Plots 8 and 9.

Groups 6 and 7 (Plot 3, Figure 3) together represent an archaeological feature, partially mapped as a field boundary on the 1841 Bideford Tithe map (group 7), that is very clear in the data set with characteristics that are distinct from the other mapped groups.

The reduction of the feature represented by groups 6 and 7 by the time the Tithe map was produced, along with the abundance of anomaly groups characterised as representing possible field boundaries removed before 1841 (the date of the Bideford Tithe map publication), suggests that the land has been subject to significant changes since initial enclosure.

## 11 Conclusions

The differences in magnetic responses across the Site were sufficient to be able to differentiate between anomalies representing possible buried archaeology and background magnetic responses. Fifty-eight magnetic anomaly groups were mapped as representing potential buried archaeology.

There are two distinct areas of magnetic anomaly groups characterised as representing potential buried archaeology: a relatively high density of such groups in the southwest of the Site and a lesser but clear density in the northeast (Figure 2). This distribution of anomaly groups reflects the wetter conditions found across parts of the site with fewer anomalies recorded in wet areas. The authors believe the anomaly distribution broadly reflects the distribution of archaeology and that the wetter areas of the Site were not exploited in the past to the same extent as the drier areas.

Eight groups (7, 9, 17, 20, 27, 37 with 38, 50 with 51 and 53) coincide with, and likely represent, field boundaries recorded on historic maps.

The remaining mapped magnetic anomaly groups have characteristics typical of anomalies representing linear and curvilinear archaeological deposits such as remnants of enclosure or field boundaries. Three groups stand out: two (6 and 7) are situated on the north-eastern are of the Site and represent an archaeological feature partially mapped as a field boundary on the 1841 Bideford Tithe map (group 7). Their magnetic response is clear and distinct from the other mapped groups. A third group (25), in the south-western area of the site, has a trend not seen elsewhere in the dataset.

The relative abundance of anomaly groups characterised as representing possible field and enclosure boundaries removed before the publication of the 1841 Tithe map suggests that the land has been subject to significant agrarian changes since initial enclosure.

## 12 Disclaimer

The description and discussion of the results presented in this report are the authors', based on their 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 programme of archaeological work of which this survey is part may also be informed by other archaeological work and analysis. It must be

presumed that more archaeological features will be found than those specified in this report.

## 13 Copyright

Substrata Ltd 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 Limited copyright or the intellectual property of third parties. Such material is labelled with the appropriate copyright and is non-transferrable by Substrata Ltd.

## 14 Archive

### 14.1 Online Access to the Index of archaeological investigationS (OASIS)

OASIS ID: substrat1-315877

The OASIS entry has been completed and the boundary file and report uploaded with six months delay in publication.

### 14.2 Substrata Limited archive

A full archive of this survey will be held by Substrata Limited on cloud and local hard drive storage as specified in Appendix 3.

### 14.3 Archaeological Data Service (ADS)

Depending on local authority policy, an archive may be deposited with the ADS as specified in Appendix 3.

### 14.4 Historic Environment Record (HER)

Subject to any contractual requirements on confidentiality, a PDF or printed copy of the report will be submitted to the appropriate HER within six months of completion.

## 15 Acknowledgements

Substrata would like to thank John Valentin of AC Archaeology Ltd for commissioning us to complete this survey.

## 16 Bibliography

Archaeology Data Service (undated) *Archaeology Data Service/Digital Antiquity Guides to Good Practice: Geophysical Data in Archaeology, 2nd Edition* [Online], Available: [http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics\\_Toc](http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc) [March 2018]

British Geological Survey (undated) *Geology of Britain viewer, 1:50000 scale data* [Online], Available: [http://www.bgs.ac.uk/discovering\\_Geology/geologyOfBritain/viewer.html](http://www.bgs.ac.uk/discovering_Geology/geologyOfBritain/viewer.html) [April 2018]

Chartered Institute for Archaeologists (2014a) *Standard and guidance archaeological geophysical survey* [Online], Available: [http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics\\_1.pdf](http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics_1.pdf) [March 2018]

Chartered Institute for Archaeologists (2014b) *Code of conduct* [Online], Available <http://www.archaeologists.net/sites/default/files/CodesofConduct.pdf> [March 2018]

Clark, A. (2000) *Seeing Beneath the Soil, Prospecting methods in archaeology*, London: Routledge

Dean, R. (2018) *Magnetometer survey method statement, Land adjoining Caddsdwn Business Park, Bideford, Devon, Centred on NGR 243574,125245*, Substrata Ltd unpublished document 1801BID-M-1

Devon County Council (undated) *Historic Environment* [online], Available <https://new.devon.gov.uk/historicenvironment/> [April 2018]

Historic England (undated) *Heritage Gateway* [Online], Available <http://www.heritagegateway.org.uk/gateway/> [April 2018]

Historic England (2008) *Geophysical Survey in Archaeological Field Evaluation* [Online], Available: <https://content.historicengland.org.uk/images-books/publications/geophysical-survey-in-archaeological-field-evaluation/geophysics-guidelines.pdf/> [March 2018]

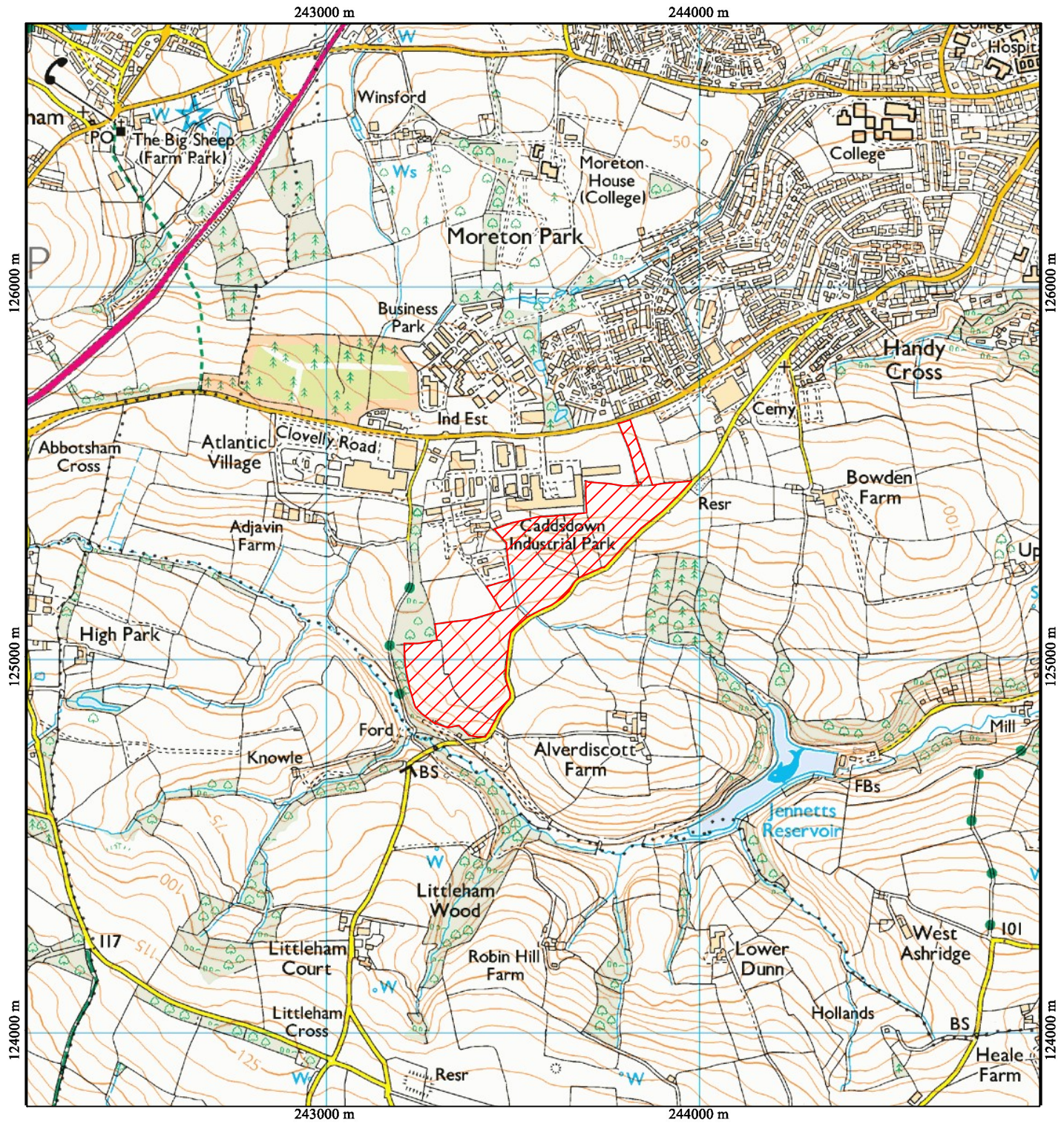


## Appendix 1     Figures

### 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: 243557.99 m, centre Y: 125248.61 m

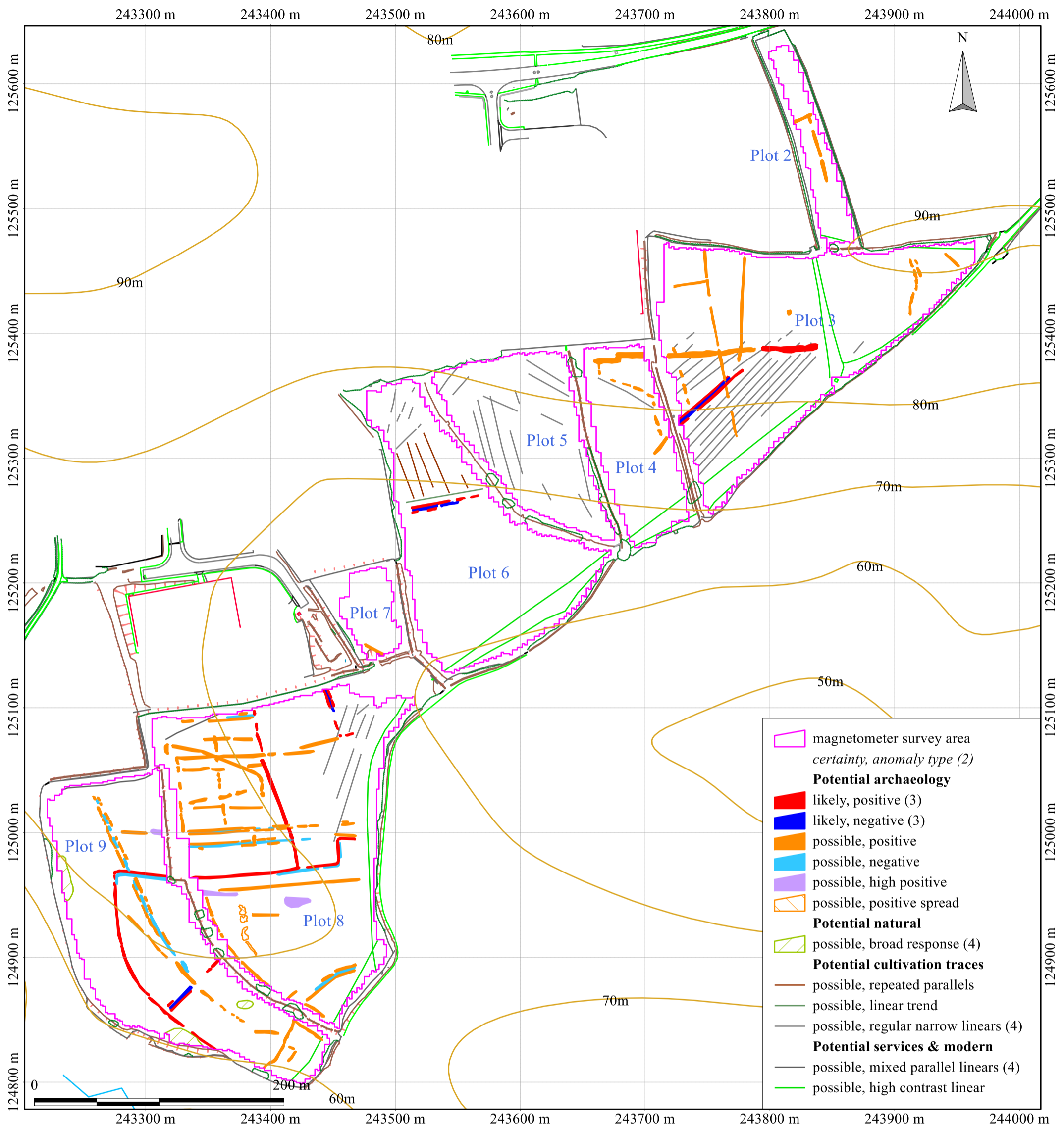
Geophysical survey: Copyright Substrata Limited.  
 Base map: © Crown copyright and database right 2017

Scale: 1:10000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological magnetometer survey  
 Land adjoining Caddstown Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 1: location map

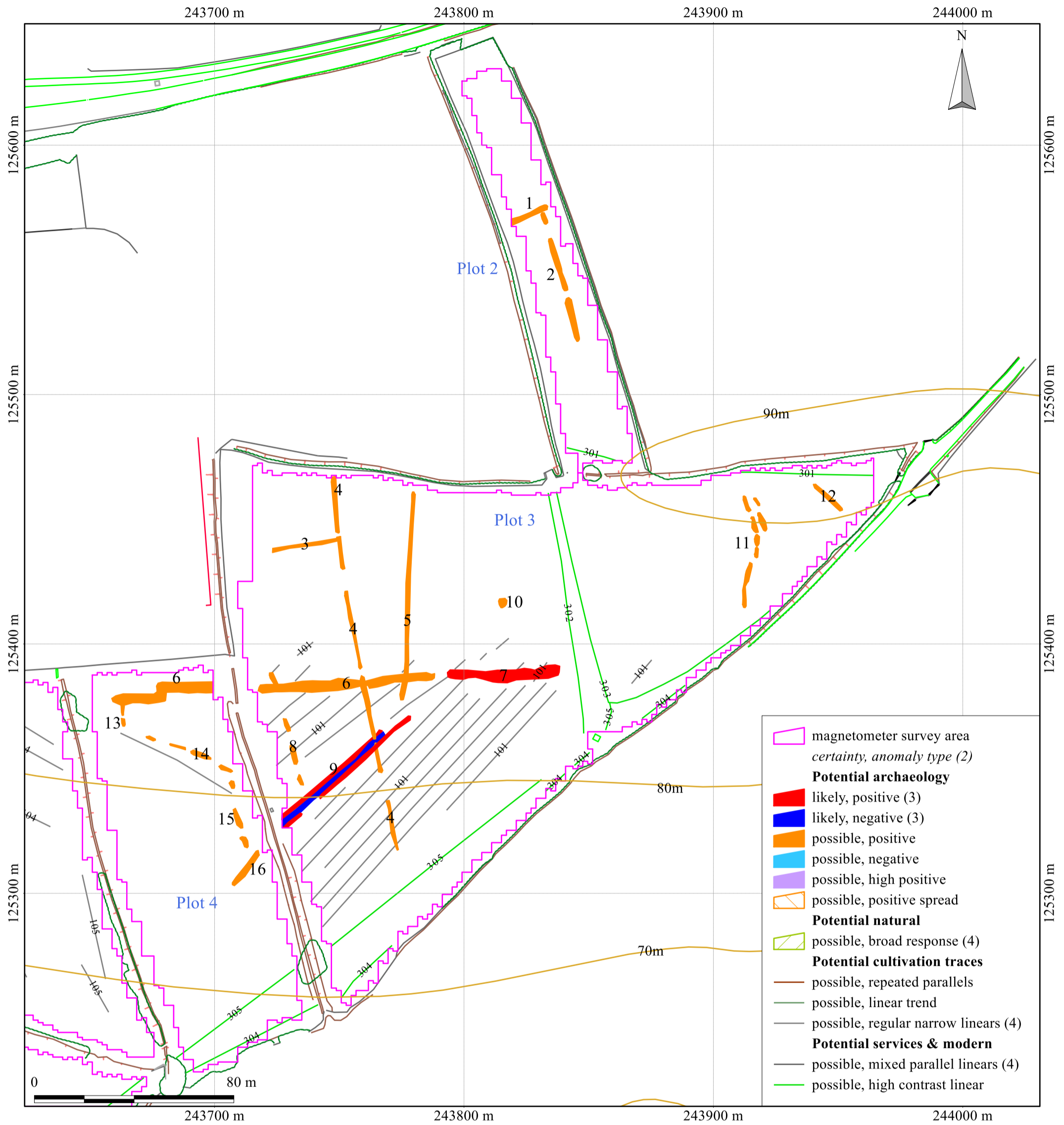
Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk



An archaeological magnetometer survey  
Land adjoining Caddsdow Business Park, Bideford  
Centred on NGR (E/N): 243574,125245  
Report: 1801BID-R-1

Figure 2: survey interpretation, all plots

Substrata Limited  
Langstrath, Goodleigh  
Barnstaple, Devon EX32 7LZ  
Tel: 01271 342721  
Email: enquiries@substrata.co.uk  
Web: substrata.co.uk



British Grid  
centre X: 243827.37 m, centre Y: 125431.64 m

Geophysical survey: Copyright Substrata Limited.  
Base map: Copyright Lewis Brown Chartered Land Surveyors  
Contours: © Crown copyright and database right 2017

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

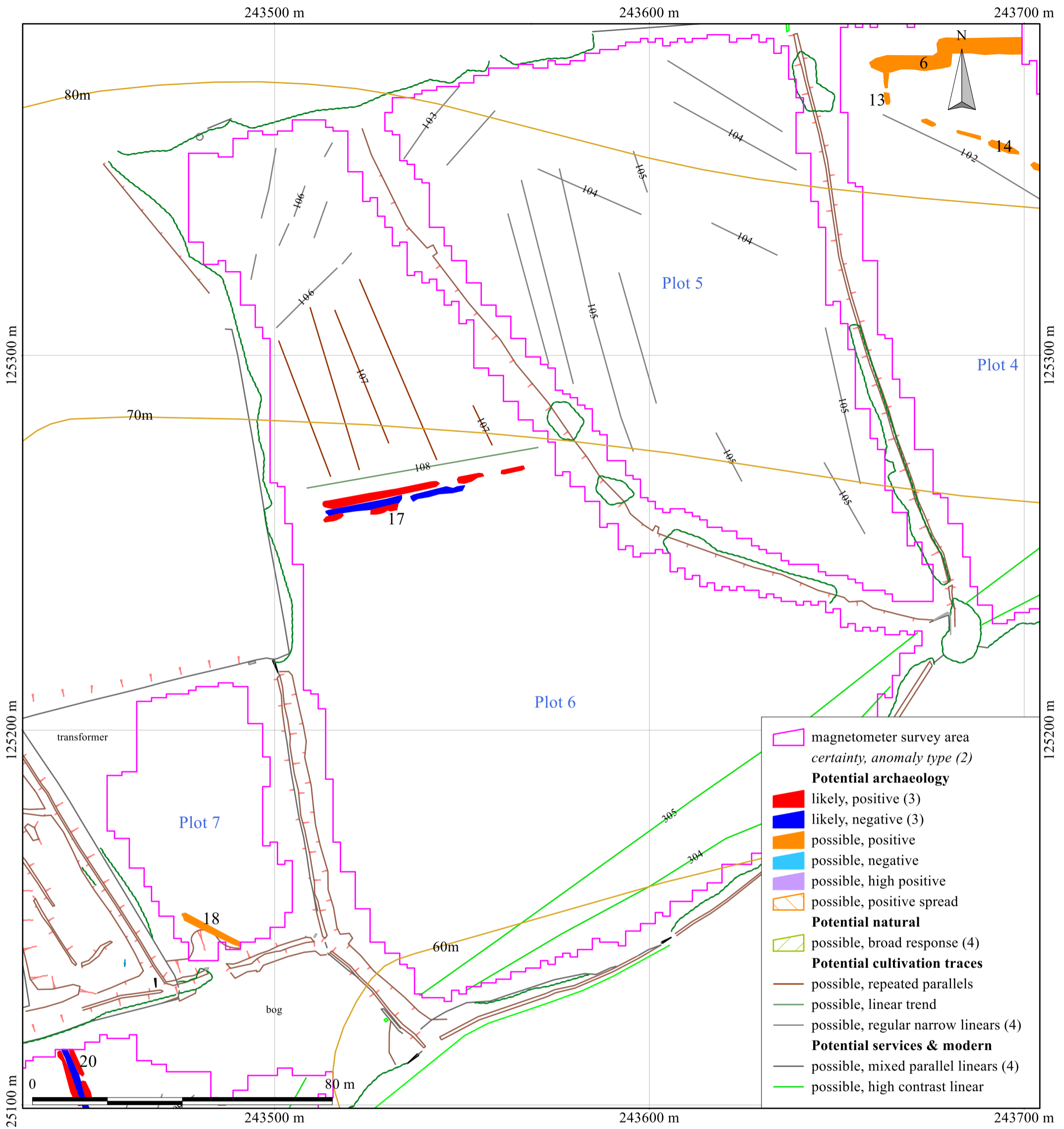
Notes:

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 characterisation.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Not all instances are mapped.
5. Anomalies likely to represent recent deposits or ground disturbance, or geological and other natural deposits are not mapped unless relevant to potential buried archaeology.

An archaeological magnetometer survey  
Land adjoining Caddsdow Business Park, Bideford  
Centred on NGR (E/N): 243574,125245  
Report: 1801BID-R-1

Figure 3: survey interpretation, Plots 2, 3 and 4

Substrata Limited  
Langstrath, Goodleigh  
Barnstaple, Devon EX32 7LZ  
Tel: 01271 342721  
Email: enquiries@substrata.co.uk  
Web: substrata.co.uk



British Grid  
centre X: 243568.48 m, centre Y: 125243.78 m

Geophysical survey: Copyright Substrata Limited.  
Base map: Copyright Lewis Brown Chartered Land Surveyors  
Contours: © Crown copyright and database right 2017

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

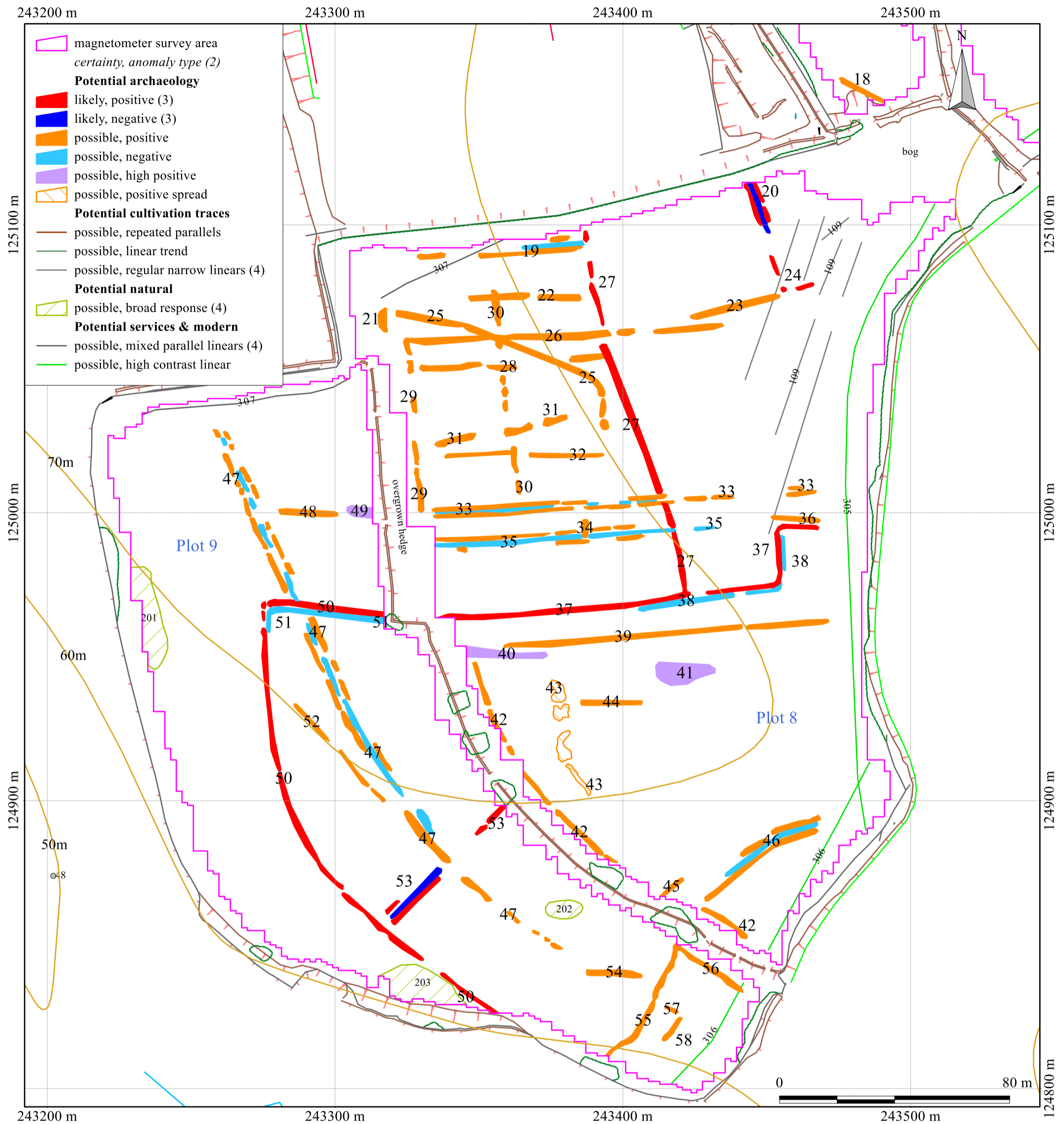
Notes:

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 characterisation.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Not all instances are mapped.
5. Anomalies likely to represent recent deposits or ground disturbance, or geological and other natural deposits are not mapped unless relevant to potential buried archaeology.

An archaeological magnetometer survey  
Land adjoining Caddsdow Business Park, Bideford  
Centred on NGR (E/N): 243574,125245  
Report: 1801BID-R-1

Figure 4: survey interpretation, Plots 5, 6 and 7

Substrata Limited  
Langstrath, Goodleigh  
Barnstaple, Devon EX32 7LZ  
Tel: 01271 342721  
Email: enquiries@substrata.co.uk  
Web: substrata.co.uk



British Grid  
 centre X: 243368.50 m, centre Y: 124981.77 m

Geophysical survey: Copyright Substrata Limited.  
 Base map: Copyright Lewis Brown Chartered Land Surveyors  
 Contours: © Crown copyright and database right 2017

Scale: 1:1300 @ A3. Spatial Units: Meter. Do not scale off this drawing

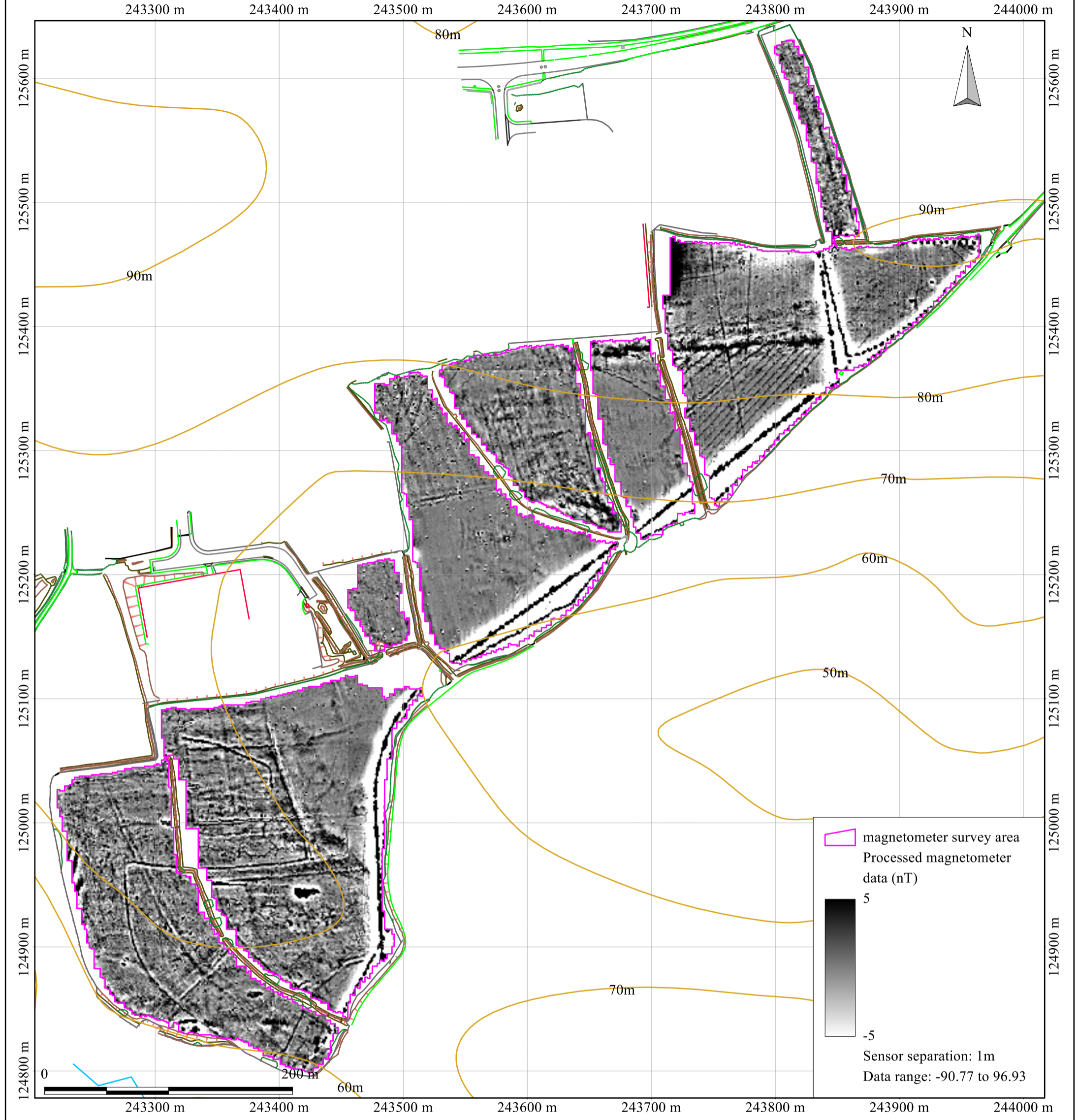
Notes:

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 characterisation.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
4. Not all instances are mapped.
5. Anomalies likely to represent recent deposits or ground disturbance, or geological and other natural deposits are not mapped unless relevant to potential buried archaeology.

An archaeological magnetometer survey  
 Land adjoining Caddsdow Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 5: survey interpretation, Plots 8 and 9

Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk



British Grid  
 centre X: 243610.04 m, centre Y: 125212.33 m

Geophysical survey: Copyright Substrata Limited.  
 Base map: Copyright Lewis Brown Chartered Land Surveyors  
 Contours: © Crown copyright and database right 2017

Scale: 1:3000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological magnetometer survey  
 Land adjoining Caddsdow Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 2: shade plot of processed data, all plots

Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk



British Grid  
 centre X: 243827.37 m, centre Y: 125431.64 m

Geophysical survey: Copyright Substrata Limited.  
 Base map: Copyright Lewis Brown Chartered Land Surveyors  
 Contours: © Crown copyright and database right 2017

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

An archaeological magnetometer survey  
 Land adjoining Caddsdow Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 7: shade plot of processed data, Plots 2, 3 and 4

Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk





An archaeological magnetometer survey  
 Land adjoining Caddsdow Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 4: survey interpretation, Plots 5, 6 and 7  
 with Ordnance Survey Contours

Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk



British Grid  
 centre X: 243368.50 m, centre Y: 124981.77 m

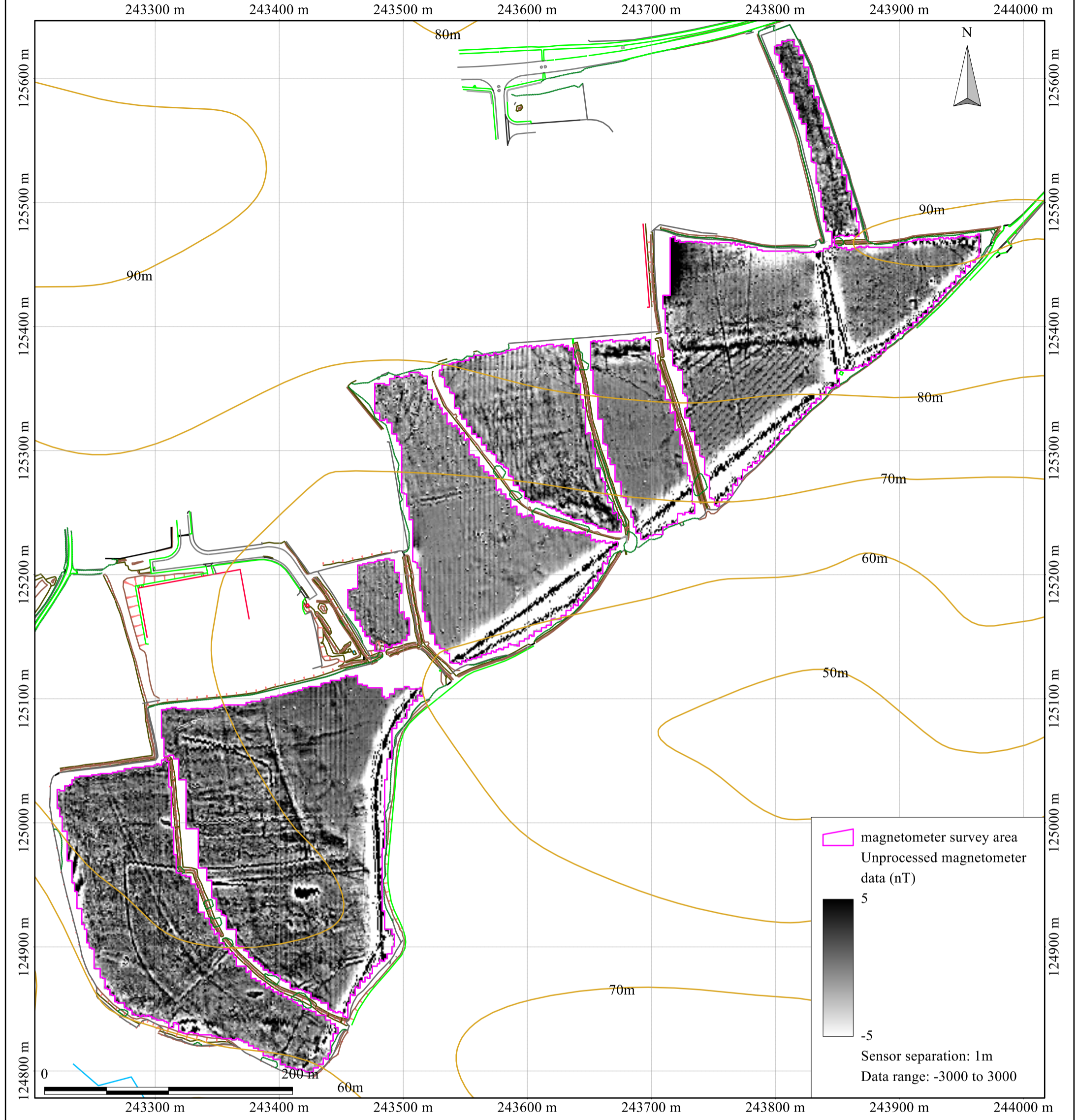
Geophysical survey: Copyright Substrata Limited.  
 Base map: Copyright Lewis Brown Chartered Land Surveyors  
 Contours: © Crown copyright and database right 2017

Scale: 1:1300 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological magnetometer survey  
 Land adjoining Caddsdow Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 9: shade plot of processed data, Plots 8 and 9

Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk



British Grid  
 centre X: 243610.04 m, centre Y: 125212.33 m

Geophysical survey: Copyright Substrata Limited.  
 Base map: Copyright Lewis Brown Chartered Land Surveyors  
 Contours: © Crown copyright and database right 2017

Scale: 1:3000 @ A3. Spatial Units: Meter. Do not scale off this drawing

An archaeological magnetometer survey  
 Land adjoining Caddsdow Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 10: shade plot of minimally processed data, all plots

Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk



British Grid  
 centre X: 243610.04 m, centre Y: 125212.33 m

Scale: 1:3000 @ A3. Spatial Units: Meter. Do not scale off this drawing

Geophysical survey: Copyright Substrata Limited.  
 Base map: Copyright Lewis Brown Chartered Land Surveyors  
 Contours: © Crown copyright and database right 2017

An archaeological magnetometer survey  
 Land adjoining Caddsdow Business Park, Bideford  
 Centred on NGR (E/N): 243574,125245  
 Report: 1801BID-R-1

Figure 11: survey grid location

Substrata Limited  
 Langstrath, Goodleigh  
 Barnstaple, Devon EX32 7LZ  
 Tel: 01271 342721  
 Email: enquiries@substrata.co.uk  
 Web: substrata.co.uk

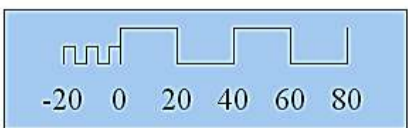
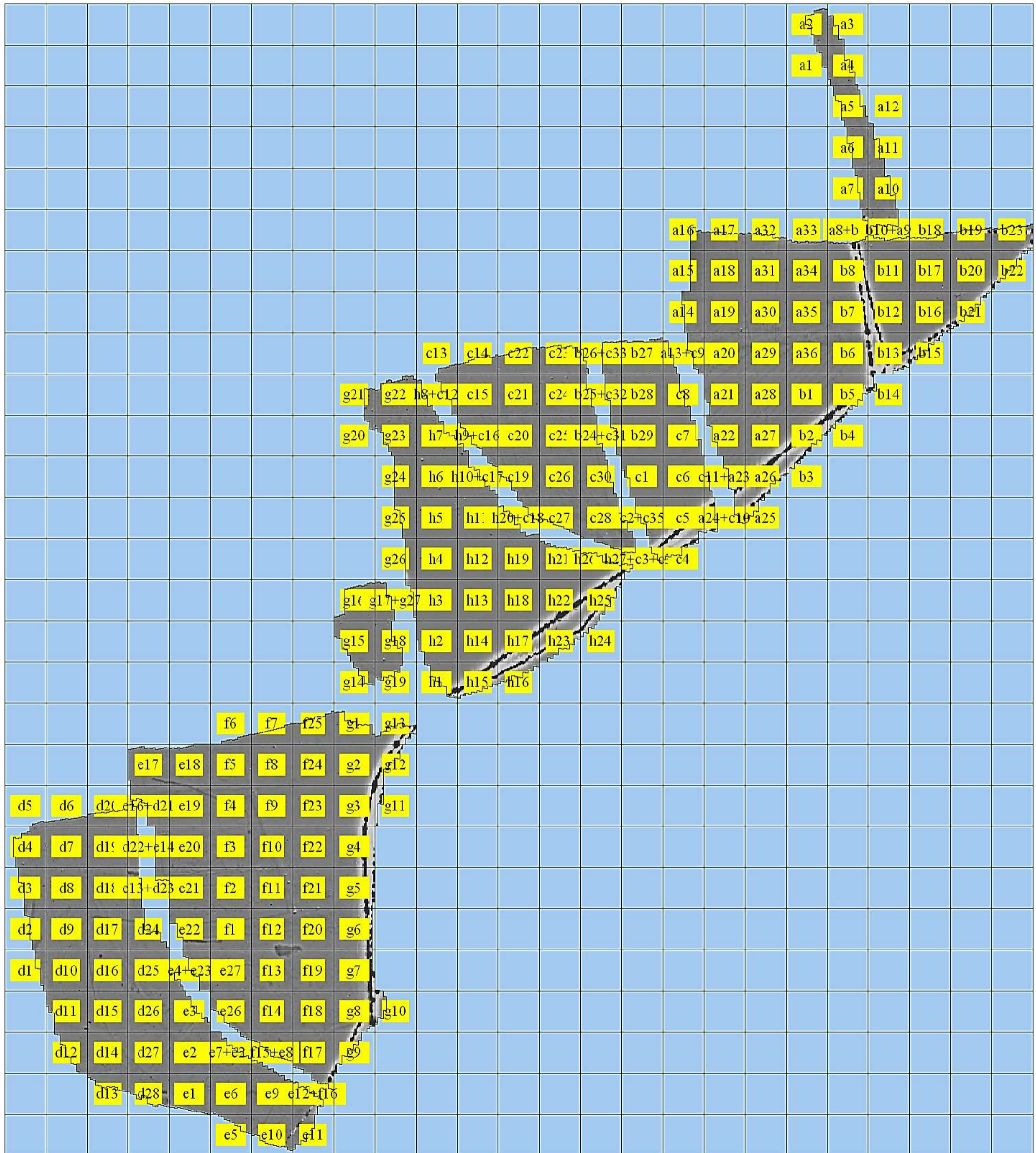
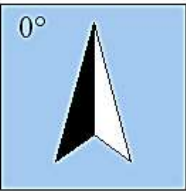


Figure 12: data grid file plan

## Appendix 2 Tables

Site: An archaeological magnetometer survey  
Land adjoining Caddsdon Business Park, Bideford, Devon  
Centred on NGR (E/N): 243574,125245  
Report: 1801BID-R-1

area number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	not surveyed						
2	1		possible, positive	linear			
2	2		possible, positive	disrupted linear			
2 3	301		possible, high contrast linear		ferrous service such as a steel cable or iron pipe		
3	3		possible, positive	linear			
3	4		possible, positive	disrupted linear			
3	5		possible, positive	linear			
3 4	6	7	possible, positive	disrupted, kinked linear		a westward extension of group 7, this is a prominent and unusual anomaly group in the dataset; it represents archaeology which clearly predates the 1841 Tithe map; some of the field drains represented by anomaly group 101 apparently pass through the group but stop just to the north; the anomaly group is situated in the lower part of an area of steeper ground on which the field drains come to a stop	
3	7	6 9	likely, positive	broad linear	field boundary	a prominent and unusual anomaly group in the dataset, it coincides with, and likely represents, a field boundary recorded on the Bideford Tithe map but not on later historical maps (group 9 is part of the same field boundary); the anomaly group extends westwards and is mapped as group 6; it represents archaeology which clearly predates the 1841 Tithe map; some of the field drains represented by anomaly group 101 apparently pass through the group but stop just to the north; the anomaly group is situated in the lower part of an area of steeper ground on which the field drains come to a stop	1841 Bideford Tithe map
3	8		possible, positive	disrupted linear			
3	9	7	likely, positive/negative/positive	disrupted linear	field boundary, possibly a Devon Bank	anomaly group coincides with, and likely represents a field boundary recorded on the Bideford Tithe map but not on later historical maps (group 7 is part of the same field boundary)	1841 Bideford Tithe map
3	10		possible, positive	oval	pit or natural feature		
3	11		possible, positive	parallel curvilinear	archaeology or vehicle track		
3	12		possible, positive	linear	archaeology or field drain		
3	101		possible, regular narrow linears		field drain	anomaly group passes through anomaly groups 6 and 7 but stop just to the north as the ground becomes steeper	
3	302		possible, high contrast linear		ferrous service such as a steel cable or iron pipe		
3	303		possible, high contrast linear		ferrous service such as a steel cable or iron pipe		
3 4 6	304		possible, high contrast linear		ferrous service such as a steel cable or iron pipe		
3 4 6 8	305		possible, high contrast linear		ferrous service such as a steel cable or iron pipe		
4	13		possible, positive	linear			
4	14		possible, positive	disrupted linear	archaeology or field drain		
4	15		possible, positive	disrupted linear			
4	16		possible, positive	linear			
4	102		possible, regular narrow linears		field drain		
5	103		possible, regular narrow linears		field drain		
5	104		possible, regular narrow linears		field drain		
5	105		possible, regular narrow linears		field drain		
5	106		possible, regular narrow linears		field drain		
6	17		likely, positive/negative/positive	disrupted linear	field boundary - Devon Bank	anomaly group coincides with, and likely represents a field boundary recorded on historical maps between 1841 and at least 1905-6	1841 Bideford Tithe map, Ordnance Survey maps 1887-9 1:2500 to 1905-6 1:10560
6	107		possible, repeated parallels		field drain or ridge-and-furrow		
6	108		possible, linear trend		headland?		
7	18		possible, positive	linear			

Table 1a: data analysis, Plots 2 to 7

Site: An archaeological magnetometer survey  
Land adjoining Caddsdon Business Park, Bideford, Devon  
Centred on NGR (E/N): 243574,125245  
Report: 1801BID-R-1

area number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
8	19		possible, positive/negative/positive	linear	field boundary? - possible Devon Bank?		
8	20		likely, positive/negative/positive	linear	field boundary - possible Devon Bank	anomaly group coincides with, and likely represents a field boundary recorded on the Bideford Tithe map but not on later historical maps	1841 Bideford Tithe map
8	21		possible, positive				
8	22		possible, positive	disrupted linear			
8	23	24	possible, positive	linear		anomaly group is a westward extension of 24	
8	24	23	likely, positive	disrupted linear		anomaly group coincides with, and likely represents a field boundary recorded on the Bideford Tithe map but not on later historical maps; extends westwards as anomaly group 23	1841 Bideford Tithe map
8	25		possible, positive	linear with return			
8	26		possible, positive	disrupted linear			
8	27		likely, positive	disrupted multi-linear	field boundary	anomaly group coincides with, and likely represents a field boundary recorded on historical maps between 1840 and 1963-4	1841 Bideford Tithe map, Ordnance Survey maps 1887-9 1:2500 to 1963-4 1:10560
8	28		possible, positive	disrupted linear			
8	29		possible, positive	disrupted linear			
8	30		possible, positive	disrupted linear			
8	31		possible, positive	disrupted linear			
8	32		possible, positive	disrupted linear			
8	33	48? 49?	possible, positive/negative/positive	disrupted linear	field boundary - Devon Bank		
8	34		possible, positive	linear			
8	35		possible, negative	disrupted linear	field boundary - Devon Bank		
8	36	37?	possible, positive	linear			
8	37	38 50	likely, positive	disrupted multi-linear	field boundary	anomaly group coincides with, and likely represents a field boundary recorded on historical maps between 1840 and 1963-4; anomaly group 36 is an eastwards extension	1841 Bideford Tithe map, Ordnance Survey maps 1887-9 1:2500 to 1963-4 1:10560
8	38	37	possible, negative	linear	field boundary	anomaly group coincides with, and likely represents a field boundary recorded on historical maps between 1840 and 1963-4; anomaly group would normally be characterised as a shadow negative anomaly of the adjacent positive anomaly group but here the group has characteristics of an archaeological deposit	1841 Bideford Tithe map, Ordnance Survey maps 1887-9 1:2500 to 1963-4 1:10560
8	39		possible, positive	disrupted linear			
8	40		possible, high positive		wet area associated with archaeology		
8	41		possible, high positive		wet area associated with archaeology		
8	42		possible, positive	disrupted curvilinear			
8	43		possible, positive spread	disrupted linear			
8	44		possible, positive	linear	archaeology or natural deposit		
8	45		possible, positive	linear			
8	46		possible, positive/negative/positive	curvilinear	field boundary? - Devon Bank?		
8	109		possible, regular narrow linears		field drain		
8 9	306		possible, high contrast linear		ferrous service such as a steel cable or iron pipe		
8 9	307		possible, mixed parallel linears		modern vehicle or animal track		
9	47	57?	possible, positive/negative/positive	disrupted curvilinear	field boundary - Devon Bank		
9	48	33? 49?	possible, positive	linear			
9	49	33? 48?	possible, high positive		wet area associated with archaeology		
9	50	37 51 53	likely, positive	disrupted curvilinear with return	field boundary	anomaly group coincides with, and likely represents a field boundary recorded on the Bideford Tithe map; the southern portion was mapped as enclosing the same field as group 53 until at least 1905-6	1841 Bideford Tithe map, Ordnance Survey maps 1887-9 1:2500 to 1905-6 1:10560
9	51	50	possible, negative	complex linear	field boundary	anomaly group coincides with, and likely represents a field boundary recorded on the Bideford Tithe map; the southern portion was mapped as enclosing the same field as group 53 until at least 1905-6 ; anomaly group would normally be characterised as a shadow negative anomaly of the adjacent positive anomaly group but here the group has characteristics of an archaeological deposit	1841 Bideford Tithe map, Ordnance Survey maps 1887-9 1:2500 to 1905-6 1:10560
9	52		possible, positive	disrupted linear			
9	53		likely, positive/negative/positive	disrupted linear	field boundary - possible Devon Bank	anomaly group coincides with, and likely represents a field boundary recorded on historical maps between 1841 and at least 1993 and shown as having been extended to the southwest sometime between 1905-6 and 1958	1841 Bideford Tithe map, Ordnance Survey maps 1887-9 1:2500 to 1993-5 1:10000
9	54		possible, positive	linear	archaeology with wet deposits?		
9	55		possible, positive	curvilinear			
9	56		possible, positive	linear			
9	57	47?	possible, positive	linear			
9	58		possible, positive	linear			
9	201		possible, broad response		wet area or spring		
9	202		possible, broad response		wet area or spring		
9	203		possible, broad response		wet area or spring		

Table 1b: data analysis, Plots 8 and 9



<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> 0.25m  <i>Traverse Interval:</i> 1 metre  <i>Traverse Method:</i> zigzag  <i>Traverse Orientation:</i> GN</p>
<p><b>Data Processing, Analysis and Presentation Software</b>  IntelliCAD 8.4  DW Consulting TerraSurveyor3  Manifold System 8 GIS  Microsoft Corp. Office 365: Excel, Publisher, Word  Adobe Systems Inc Adobe Acrobat 9 Pro Extended</p>	

Table 2: methodology information

<b>Instrument</b>	
Type:	Bartington Grad-601 gradiometer
Units:	nT
Direction of 1st Traverse:	see below
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing, each with 1m separation
Dummy Value:	32702
<b>Program</b>	
Name:	TerraSurveyor
Version:	3.0.33.6
<b>Statistics</b>	<b>Processing</b>
Max:	90.77
Min:	-96.93
Std Dev:	14.39
Mean:	-1.61
Median:	-0.10
	Processes: 40
	1 Base Layer
	2 Clip at 1.00 SD
	3 Clip at 1.00 SD
	4 DeStripe Median Sensors: Grids: e5.xgd e10.xgd e11.xgd d13.xgd d28.xgd e1.xgd e6.xgd e9.xgd e12+f16.xgd d12.xgd d14.xgd d27.xgd e2.xgd e7+e25.xgd f15+e8.xgd f17.xgd d11.xgd d15.xgd d26.xgd e3.xgd e26.xgd f14.xgd f18.xgd d1.xgd d10.xgd d16.xgd d25.xgd e4+e23.xgd e27.xgd f13.xgd f19.xgd d2.xgd d9.xgd d17.xgd d24.xgd e22.xgd f1.xgd f12.xgd f20.xgd d3.xgd d8.xgd d18.xgd e13+d23.xgd e21.xgd f2.xgd f11.xgd f21.xgd d4.xgd d7.xgd d19.xgd d22+e14.xgd e20.xgd f3.xgd f10.xgd f22.xgd d5.xgd d6.xgd d20.xgd e16+d21.xgd e19.xgd f4.xgd f9.xgd f23.xgd e17.xgd e18.xgd f5.xgd f8.xgd f24.xgd f6.xgd f7.xgd f25.xgd
	5 Edge Match (Area: Top 240, Left 960, Bottom 269, Right 1319) to Top edge
	6 DeStripe Median Sensors: Grids: g26.xgd h4.xgd h12.xgd h19.xgd h21.xgd h26+c29.xgd g25.xgd h5.xgd h11.xgd h20+c18.xgd c27.xgd c28.xgd g24.xgd h6.xgd h10+c17.xgd c19.xgd c26.xgd c30.xgd g20.xgd g23.xgd h7.xgd h9+c16.xgd c20.xgd c25.xgd b24+c31.xgd g21.xgd g22.xgd h8+c12.xgd c15.xgd c21.xgd c24.xgd b25+c32.xgd c13.xgd c14.xgd c22.xgd c23.xgd b26+c33.xgd
	7 DeStripe Median Sensors: Grids: g14.xgd g19.xgd h1.xgd g15.xgd g18.xgd h2.xgd g16.xgd g17+g27.xgd h3.xgd
	8 DeStripe Median Sensors: Grids: h13.xgd
	9 Edge Match (Area: Top 330, Left 1440, Bottom 359, Right 1559) to Right edge
	10 DeStripe Median Sensors: Grids: h14.xgd
	11 DeStripe Median Sensors: Grids: c30.xgd c1.xgd c6.xgd b24+c31.xgd b29.xgd c7.xgd b25+c32.xgd b28.xgd c8.xgd b26+c33.xgd b27.xgd a13+c9.xgd
	12 DeStripe Median Sensors: Grids: a21.xgd a28.xgd b1.xgd a20.xgd a29.xgd a36.xgd a19.xgd a30.xgd a35.xgd
	13 DeStripe Median Sensors: Grids: a7.xgd a10.xgd a6.xgd a11.xgd a5.xgd a12.xgd a1.xgd a4.xgd a2.xgd a3.xgd
	14 De Stagger: Grids: All By: 0 intervals, 50.00cm
	15 De Stagger: Grids: e22.xgd By: 0 intervals, 12.50cm
	16 De Stagger: Grids: SubGrid (Area: Top 166, Left 600, Bottom 177, Right 719) By: 0 intervals, 12.50cm
	17 De Stagger: Grids: e19.xgd By: 0 intervals, -12.50cm
	18 De Stagger: Grids: f1.xgd By: 0 intervals, 25.00cm
	19 De Stagger: Grids: e22.xgd f1.xgd By: 0 intervals, -50.00cm
	20 De Stagger: Grids: SubGrid (Area: Top 166, Left 600, Bottom 185, Right 719) By: 0 intervals, -50.00cm
	21 De Stagger: Grids: SubGrid (Area: Top 152, Left 600, Bottom 155, Right 719) By: 0 intervals, -50.00cm
	22 De Stagger: Grids: SubGrid (Area: Top 178, Left 600, Bottom 179, Right 719) By: 0 intervals, 50.00cm
	23 De Stagger: Grids: SubGrid (Area: Top 180, Left 600, Bottom 183, Right 719) By: 0 intervals, -50.00cm
	24 De Stagger: Grids: e19.xgd By: 0 intervals, 50.00cm
	25 De Stagger: Grids: SubGrid (Area: Top 150, Left 960, Bottom 169, Right 1079) By: 0 intervals, -50.00cm
	26 De Stagger: Grids: SubGrid (Area: Top 160, Left 960, Bottom 167, Right 1079) By: 0 intervals, -50.00cm
	27 De Stagger: Grids: e21.xgd By: 0 intervals, -25.00cm
	28 De Stagger: Grids: SubGrid (Area: Top 144, Left 720, Bottom 149, Right 839) By: 0 intervals, 50.00cm
	29 De Stagger: Grids: e20.xgd By: 0 intervals, -50.00cm
	30 De Stagger: Grids: g8.xgd By: 0 intervals, -25.00cm
	31 De Stagger: Grids: f5.xgd By: 0 intervals, -25.00cm
	32 De Stagger: Grids: f24.xgd By: 0 intervals, -25.00cm
	33 DeStripe Median Sensors: Grids: g3.xgd g2.xgd g1.xgd
	34 DeStripe Median Sensors: Grids: h18.xgd
	35 De Stagger: Grids: h5.xgd By: 0 intervals, -25.00cm
	36 DeStripe Median Traverse: Grids: c14.xgd c22.xgd c23.xgd
	37 De Stagger: Grids: SubGrid (Area: Top 450, Left 2280, Bottom 473, Right 2399) By: 0 intervals, -25.00cm
	38 De Stagger: Grids: a20.xgd By: 0 intervals, -25.00cm
	39 De Stagger: Grids: a36.xgd By: 0 intervals, -25.00cm
	40 De Stagger: Grids: b6.xgd By: 0 intervals, 50.00cm
	Interpolation match x and y, double is applied automatically on input to the GIS

Table 3: processed data metadata

<b>Instrument</b>	
Type:	Bartington Grad-601 gradiometer
Units:	nT
Direction of 1st Traverse:	see below
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing, each with 1m separation
Dummy Value:	32702
<b>Program</b>	
Name:	TerraSurveyor
Version:	3.0.33.6
<b>Statistics</b>	<b>Processing</b>
Max:	3000.00
Min:	-3000.00
Std Dev:	394.00
Mean:	12.23
Median:	0.00
	1 Base Layer
	Interpolation match x and y, double is applied automatically on input to the GIS

Table 4: minimally processed data metadata

## Appendix 3 Project archive contents

### A3.1 Substrata Limited archive

A full archive of this survey will be held by Substrata Limited on cloud and local hard drive storage as follows:

Report:	Adobe PDF format
Raw grid & composite files:	DW Consulting TerraSurveyor 3 format xyz files
Final data processing composite files: (excluding interpolation processes)	DW Consulting TerraSurveyor 3 format xyz files
GIS project:	GIS project Manifold 8 .map format ESRI shape files
AutoCAD version of the survey interpretation: (if generated)	AutoCAD DXF
All project working files:	various (Table 2)

### A3.2 Online Access to the Index of archaeological investigationS (OASIS)

Metadata:	online form
Georeferenced survey boundary file:	ESRI shape file
Report:	Adobe PDF format

### A3.3 Archaeological Data Service

Depending on local authority policy, an archive may be deposited with the ADS as follows:

Raw data composite file:	xyz file
Processed data plot:	rendered images in TIFF format
Survey grid plot:	image in TIFF format
Details of data processing:	image in TIFF format
Interpretation plot:	rendered images in TIFF format
Metadata:	Microsoft Excel format

### A3.4 Historic Environment Record (HER)

Subject to any contractual requirements on confidentiality, a PDF copy of the report will be submitted to the appropriate HER within 6 months of the completion of this report via the OASIS process or by other means, depending on the relevant HER process.