



An archaeological gradiometer and earth-resistance survey

**Land at Portledge House  
Fairy Cross, Alwington, Devon**

Centred on NGR (E/N): 239470,124740 (point)

Report: 1504POR-R-1

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11 September 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: 29 April and 27 July 2015  
Area: gradiometer survey: 0.3ha  
earth-resistance survey: 0.34ha  
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 at Portledge House, Fairy Cross  
Parish: Alwington  
District: Torridge  
County: Devon  
Nearest Postcode: EX39 5BX  
NGR: SS 394 247  
Ordnance Survey NGR (E/N): 239470,124740 (point)

### 1.4 Planning

Devon County Council Historic Environment Team reference: ARCH/DM/TO/22930

### 1.5 Archive

OASIS number: substrat1-223395  
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.

### 1.6 Introduction

This report was commissioned by AC Archaeology Ltd and is part of a programme of archaeological works undertaken in support of a planning application at the above site. The survey location is shown in Figure 1. The work was undertaken in accordance with a Brief provided by the Devon County Council Historic Environment Team (Dick, 2015).

The Brief specified a number of areas of garden at Portledge House that were designated for landscaping involving extensive cut and fill. From these garden areas, six locations were designated as potential geophysical survey areas. Because of on-going works at the property not all the of the designated areas could be surveyed in full as shown in Figure 2.

A geophysical survey was undertaken at the site by Substrata on behalf of AC Archaeology during the previous year (Dean, 2014) over the areas labelled 'designated survey area 2014 1 and 2' in Figure 2. The results from this earlier survey have been incorporated into the current report to provide a better overall understanding of the archaeological potential of the site.

Magnetometer (gradiometer) and earth resistance surveys were completed during both 2014 and during the current work. In environments where building and formal garden remains are likely, and the ground is likely to have been disturbed, a combination of magnetic and earth resistance surveys provides a better understanding of potential archaeological deposits and structures.

### 1.7 Summary

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

### *2014 survey*

*Within the area to the northwest of the house, two coinciding magnetic and resistance groups may represent a former ditch or drainage channel whilst the remaining anomalies are thought to relate to relatively recent activities. Within the area to the rear of the house, thought to be the front of the house in the early eighteenth century, two coinciding magnetic and resistance groups and one resistance group may represent linear deposits such as former ditches, drainage channels or track edges. One anomaly group may represent a stone or stone-filled pit. One anomaly group coincides exactly with an area of modern gravel.*

### *Current survey*

*Within the area of the walled garden, one possible rectangular magnetic anomaly group and one multi-linear magnetic group may represent former garden features. One magnetic group and two resistance groups are likely to reflect the same path or track which appears to cross the garden area at an angle and approximately coincides with a current entrance at the southeast corner of the extant garden wall.*

*Within the area of the former formal gardens to the east of the house, there are two resistance anomaly groups with relatively regular shapes that may relate to former garden features. One resistance anomaly approximately coincides with the location of a former farm building and may indicate the presence of demolition debris and wall footings of that structure.*

*The remaining anomaly groups are linear and disrupted linear magnetic and resistance anomalies that are likely to represent archaeological features or deposits but cannot be characterised further.*

## 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 and an earth-resistance survey across agreed parts of the site.
2. Identify any magnetic and resistance 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 survey areas were situated in the grounds of Portledge House to the north and east of the house itself as shown in Figures 1 and 2. The house and grounds were undergoing extensive alterations and landscaping throughout the survey period.

## 4.2 Geology

The site is located on an unconformable solid geology boundary between rocks of the Carboniferous Bude Formation to the north and the Permian Exeter Group to the south. The Bude Formation comprises 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. Very thick beds of slumped and destratified 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 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. The component formations of the Exeter Group are predominantly breccia, with subordinate sandstone. The superficial geology is not recorded in the source used (British Geological Survey, undated).

## 5 Archaeological background

### 5.1 Historic landscape characterisation

Park/garden: a park planted with ornamental trees or a garden round a house (Devon County Council, undated).

### 5.2 Historical and archaeological background

An Historic Environment Assessment was produced by AC Archaeology Ltd in support of planning application and incorporated into Dean (2014). Extracts from the Assessment relevant to the current survey are reproduced here with some additional information from the Devon County Council Historic Environment Record (Historic England, undated).

The development site and associated buildings have been subject to several recent detailed heritage planning and significance assessments (DMA Heritage 2014a, b, c). These have confirmed the significance of Portledge which is a substantial stone-built country house of double courtyard with the remnants of a Medieval hall, of relatively modest proportions in the central part of the building.

There are four designated heritage assets in proximity to the proposed development site. As well as the country house there is a Grade II listed stone granary to the northwest of the house, of probable early 19th century date, and to the west of this a Grade II listed stone and cob former cart shed and stable of possible mid to late 16th century date. To the northeast of the house is a Grade II listed sundial.

Non-designated heritage assets in proximity to the study area as revealed by data from the Devon HER for the most part relate to aspects of the standing estate buildings and furniture. Archaeological features noted are a field boundary of possible medieval date to the south of the house (Devon HER reference no. MDV102308), a ditch of unknown date to the east of the house (MDV102311), linear earthworks of former field boundaries which may date back to the medieval period to the northeast of the house (MDV102312) and two oval-shaped earthworks of unknown date or function in Kennel Copse to the northwest of the house (MDV102312, MDV102313).

Two watercolours by Edmund Prideaux dated to 1716 show that the formal gardens are to the east of the house (Gray 2013). This is confirmed by the 1840 Tithe Map whose apportionment marks the eastern garden the 'Flower Garden' (Figure 2: designated survey areas 5 and 6, survey areas g4 and r4), and the area to the northeast of the house as the walled garden (Figure 2: designated areas 1 to 3, survey areas g3 and r3). It appears from Prideaux's paintings that the house faced south at that time. The wall of the garden is eighteenth century as recorded in MDV74969.

A farm building recorded on the 1838 Tithe map but removed by the publication of the 1886 Ordnance Survey map (MDV75058) existed on the eastern side of survey areas g4 and r4 (Figure 2) and resistance anomaly group 120 (Figure 3) may relate to this former building.

## 6 Results, discussion and conclusions

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

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

The reader is referred to section 7.

### 6.1 Results

Figure 3 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 in the project archive.

Figure 3 and Table 1 comprise the analysis of the survey data. Plots of the processed data are provided in Figures 4 to 7.

### 6.2 Discussion

#### 6.2.1 General points

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

Anomalies thought to relate to natural features were not mapped.

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

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

Data collection along the survey area edges was restricted as shown in Figures 4 to 7 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 3.

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

None of the recorded anomalies related to features recorded on historic maps or other records.

#### 6.2.3 Data with no previous archaeological provenance

##### Areas g1 and r1 (2014 survey)

Magnetic anomaly group **1** most probably relates to disturbed ground and relatively recent deposits of rubble and other material. The group includes anomalies relating to ferrous materials such as iron and steel which occur most frequently on the eastern side of the anomaly group. Resistance anomaly groups **102 to 104** coincide with this area of ferrous materials and it is reasonable to conclude that this pattern of anomalies relates to the construction of a drain or similar structure. The end of a working drain

was noted by the surveying team to the south of anomaly group 104 at the base of sloping ground.

Magnetic anomaly group **2** and resistance anomaly group **101** coincide. Typically such anomalies represent deposits associated with former ditches or drainage channels.

#### Areas g2 and r2 (2014 survey)

Magnetic group **3** and resistance group **107** coincide. Typically such anomalies represent deposits associated with former ditches, drainage channels or track edges. Group **105** has similar characteristics.

Group **106** may represent a stone or a stone or gravel-filled pit.

Group **107** corresponds exactly to an area of gravel and is likely to represent this but the possibility of an archaeological deposit cannot be entirely ruled out.

#### Areas g3 and r3

Magnetic anomaly group **6** may reflect a rectangular, earth-filled structure or hollow. Group **7** coincides with **6** but no clear relationship could be established between the two groups.

Group **12** has characteristics in keeping with ditches or robbed-out wall footings and may relate to a former building or garden feature.

Magnetic group **13** and earth-resistance groups **109** and **112** may reflect a former garden path or former track passing across the area of the walled garden (see Section 5) and may be associated with a current gateway at the southeast corner of the garden.

The remaining magnetic and resistance anomaly groups in these areas represent potential archaeological linear deposits that cannot be further clarified.

#### Areas g4 and r4

Most of the gradiometer and earth-resistance anomaly groups are linear and disrupted linear groups that may relate to former ditches, wall footings or robbed out wall foundation trenches. These could reflect former garden features (refer to Section 5), drainage or, possibly, buildings.

Resistance groups **114** and **115** may reflect areas of earthen deposits with relatively regular shapes. Again, these could relate to former garden features or other ground disturbance and are unlikely to reflect natural features.

Group **120** may represent a deposit of stony material with relatively straight northern and eastern edges. The group is in the vicinity of a former farm building removed before 1886 (Section 5) and may indicate the demolition remains that building.

### 6.3 Conclusions

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

#### 2014 survey

Within the area to the northwest of the house, two coinciding magnetic and resistance groups may represent a former ditch or drainage channel whilst the remaining anomalies are thought to relate to relatively recent activities. Within the area to the rear of the house, thought to be the front of the house in the early eighteenth century, two coinciding magnetic and resistance groups and one resistance group may represent linear deposits such as former ditches, drainage channels or track edges.

One anomaly group may represent a stone or stone-filled pit. One anomaly group coincides exactly with an area of modern gravel.

#### Current survey

Within the area of the walled garden, one possible rectangular magnetic anomaly group and one multi-linear magnetic group may represent former garden features. One magnetic group and two resistance groups are likely to reflect the same path or track which appears to cross the garden area at an angle and approximately coincides with a current entrance at the southeast corner of the extant garden wall.

Within the area of the former formal gardens to the east of the house, there are two resistance anomaly groups with relatively regular shapes that may relate to former garden features. One resistance anomaly approximately coincides with the location of a former farm building and may indicate the presence of demolition debris and wall footings of that structure.

The remaining anomaly groups are linear and disrupted linear magnetic and resistance anomalies that are likely to represent archaeological features or deposits but cannot be characterised further.



## 7 Disclaimer and copyright

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

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

## 8 Acknowledgements

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

## 9 Bibliography

Archaeology Data Service/Digital Antiquity Guides to Good Practice: Geophysical Data in Archaeology [Online], Available: [http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics\\_Toc](http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc) [May 2015]

British Geological Survey (undated) *Geology of Britain viewer*, [Online], Available: [http://www.bgs.ac.uk/discovering\\_Geology/geologyOfBritain/viewer.html](http://www.bgs.ac.uk/discovering_Geology/geologyOfBritain/viewer.html) [September 2015]

Chartered Institute for Archaeologists (undated) *IfA house style*, [Online], Available: [http://www.archaeologists.net/sites/default/files/node-files/ifa\\_house\\_style.pdf](http://www.archaeologists.net/sites/default/files/node-files/ifa_house_style.pdf) [May 2015]

Chartered Institute for Archaeologists (2014a) *Standard and guidance archaeological geophysical survey*. Reading: Author [Online], Available: [http://www.archaeologists.net/sites/default/files/node-files/CIfAS&GGeophysics\\_1.pdf](http://www.archaeologists.net/sites/default/files/node-files/CIfAS&GGeophysics_1.pdf) [May 2015]

Chartered Institute for Archaeologists (2014b) *Code of conduct*. Reading: Author [Online], <http://www.archaeologists.net/sites/default/files/node-files/CodesofConduct.pdf> [May 2015]

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

Devon County Council (undated) *Historic Landscape Characterisation*, [Online], Available: <http://www.devon.gov.uk/landscape-characterisation> [September 2015]

Dean, R. (2015) *A gradiometer survey method statement, Land at Portledge House, Fairy Cross, Alwington, Devon*, Substrata unpublished document

Dean, R. (2014) *An archaeological gradiometer survey, earth resistance survey and archaeological appraisal, Land at Portledge House, Fairy Cross, Bideford, Devon, Ordnance Survey (E/N): 239424,124779 (point)*

Dick, A. (2015) *Brief for an archaeological evaluation undertaken in support of a planning application*, Devon County Council Historic Environment Team unpublished document ARCH/DM/TO/22930

DMA Heritage, 2014a. Portledge, Fairy Cross, Bideford, Devon: Heritage Significance Statement.

DMA Heritage, 2014b. Portledge, Fairy Cross, Bideford, Devon: Heritage Significance Statement and Planning Assessment in Relation to Proposals by Witcher Crawford Architects for the Erection of a Swimming Pool Building to the Northwest of Portledge House.  
DMA Heritage, 2014c. Portledge, Fairy Cross, Bideford, Devon: Heritage Planning Assessment.

Gafney, C. & Gater, J. (2003) *Revealing the Buried Past; Geophysics for Archaeologists*, Stroud: Tempus.

Gray, T. 2013, *The Art of the Devon Garden: The Depiction of Plants and Ornamental Landscapes from the year 1200* (Exeter)

Historic England (undated) *Heritage Gateway*, [Online], Available: <http://www.heritagegateway.org.uk/gateway/> [September 2015]

Historic England (2010) *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/> [May 2015]

## Appendix 1 Analysis table and supporting plots

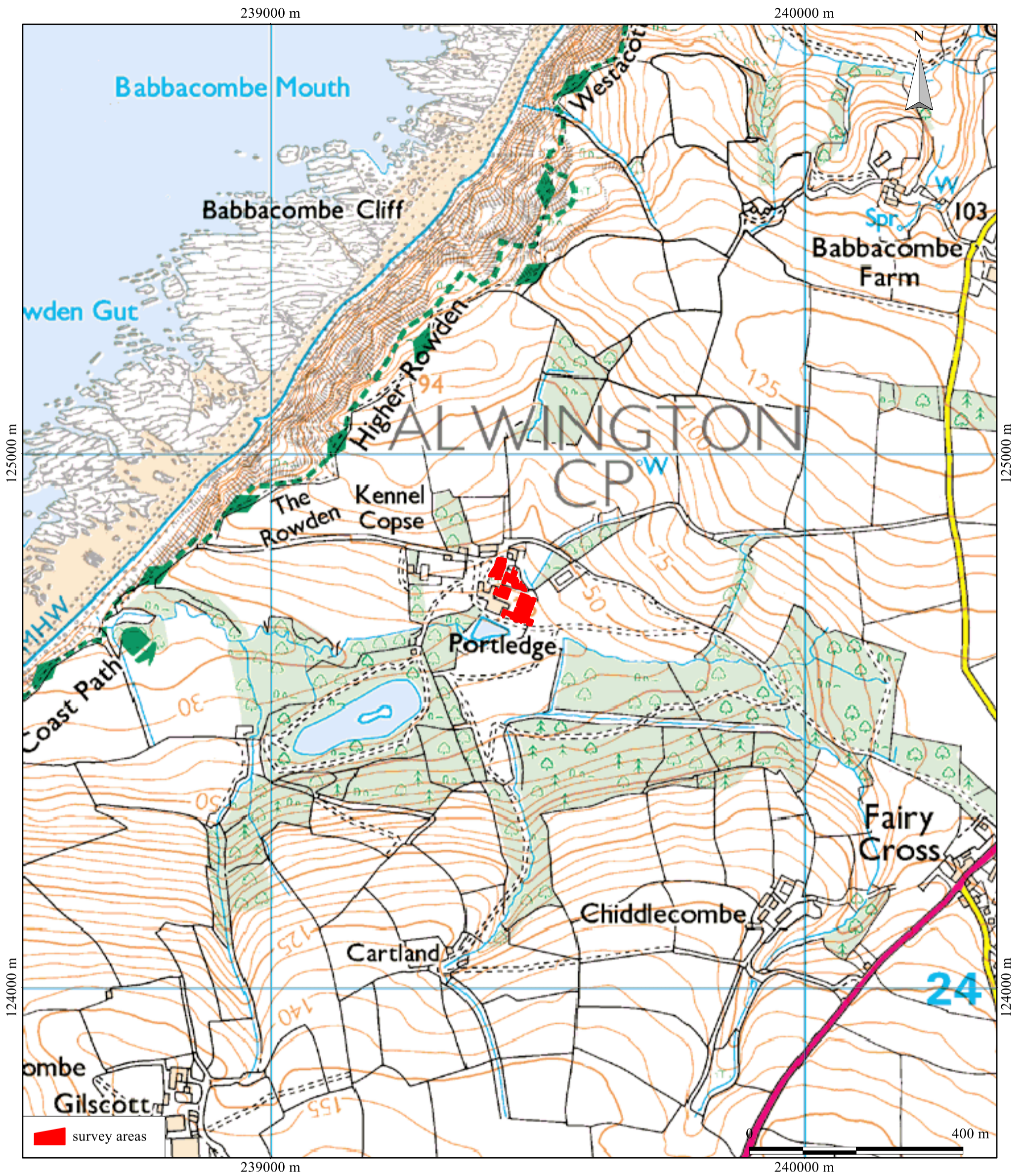
### General Guidance

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

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

A rough rule for interpreting resistance anomalies is that if an x-y trace is drawn of the resistance over an anomaly, then the width of an anomaly at half its maximum height is equal to the width of the buried feature. Caution must be applied when using this rule as it depends on the anomalies being clearly identifiable and distinct from adjacent anomalies and it should be noted that the relationship between change in resistance response and depth is not linear (Gaffney and Gater, 2003: 112).





British Grid  
centre X: 239448.10 m, centre Y: 124742.42 m

Geophysical survey: Copyright Substrata 2015.  
Base map: Ordnance Survey (c) Crown Copyright 2015,  
Licence number 100022432. All rights reserved.

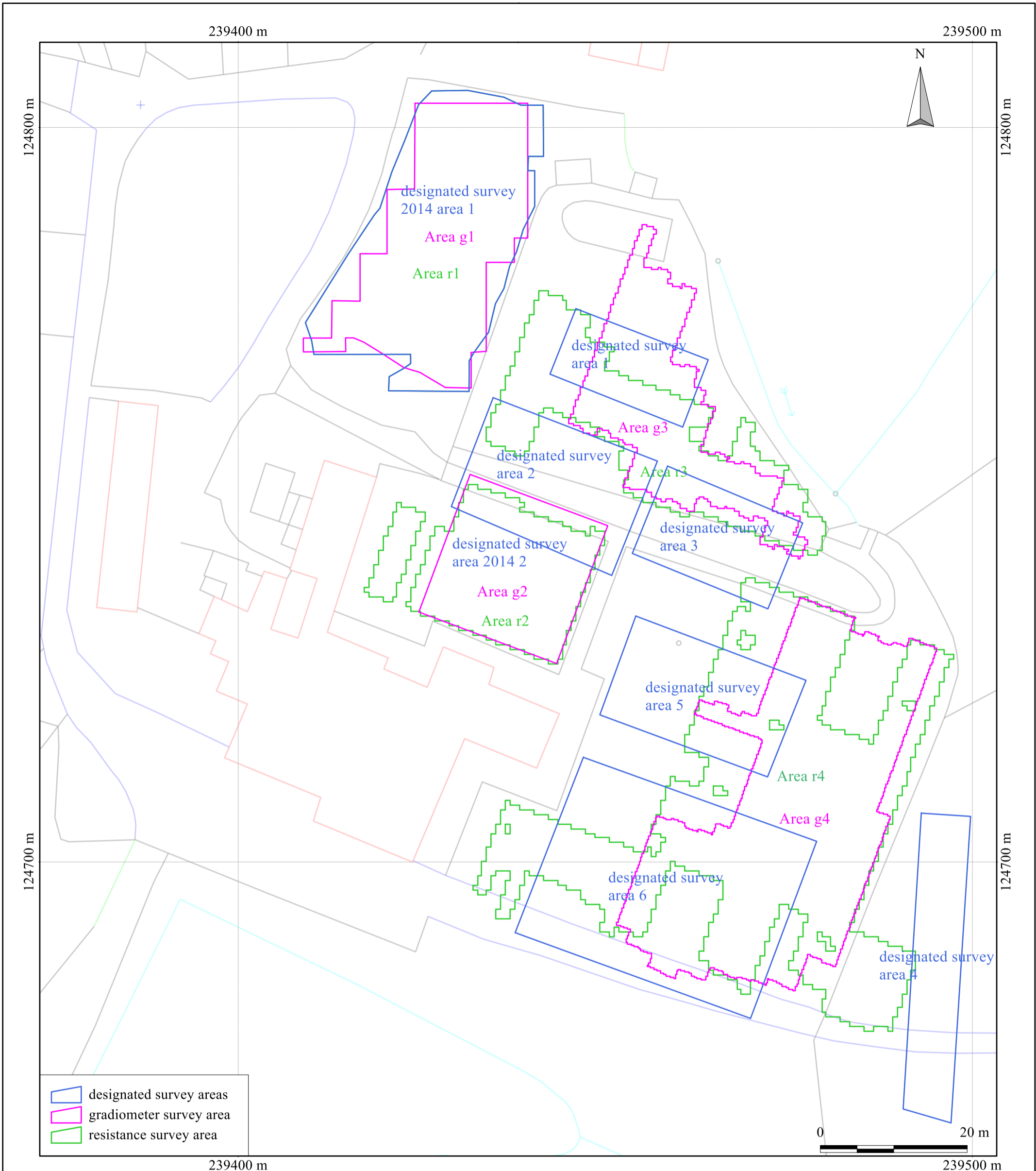
Scale: 1:7000 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 1: location map

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Web: [substrata.co.uk](http://substrata.co.uk)





British Grid  
 centre X: 239438.14 m, centre Y: 124735.78 m

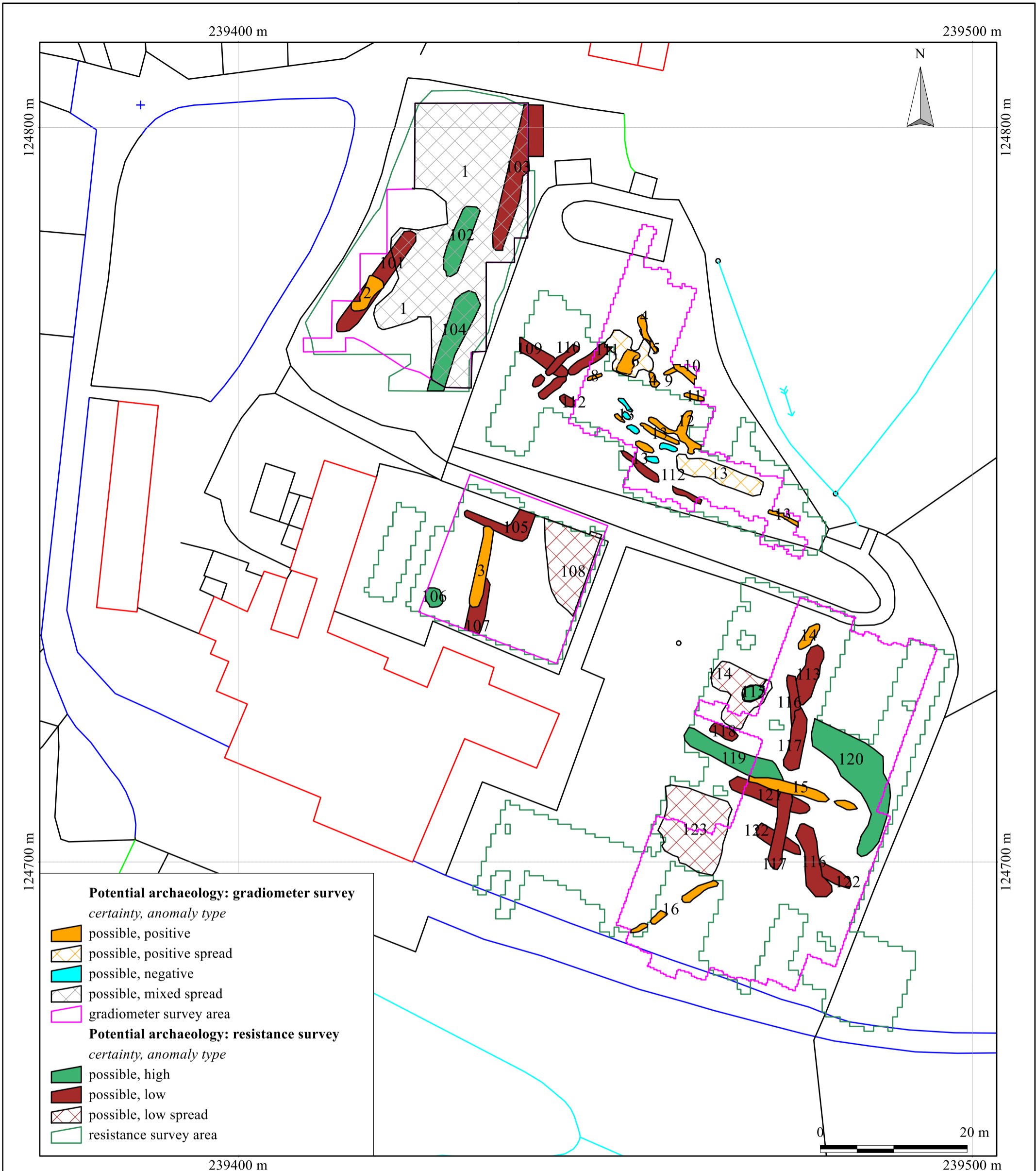
Geophysical survey: Copyright Substrata 2015.  
 Base map: Ordnance Survey (c) Crown Copyright 2015,  
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Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 2: designated survey areas and actual survey areas



British Grid  
 centre X: 239438.14 m, centre Y: 124735.78 m

Geophysical survey: Copyright Substrata 2015.  
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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. Anomalies designated "likely archaeology" have supporting evidence e.g. historical maps and or visible earthworks.
  3. Anomalies likely to represent geological or other natural deposits are not mapped unless relevant to potential archaeological events or deposits.

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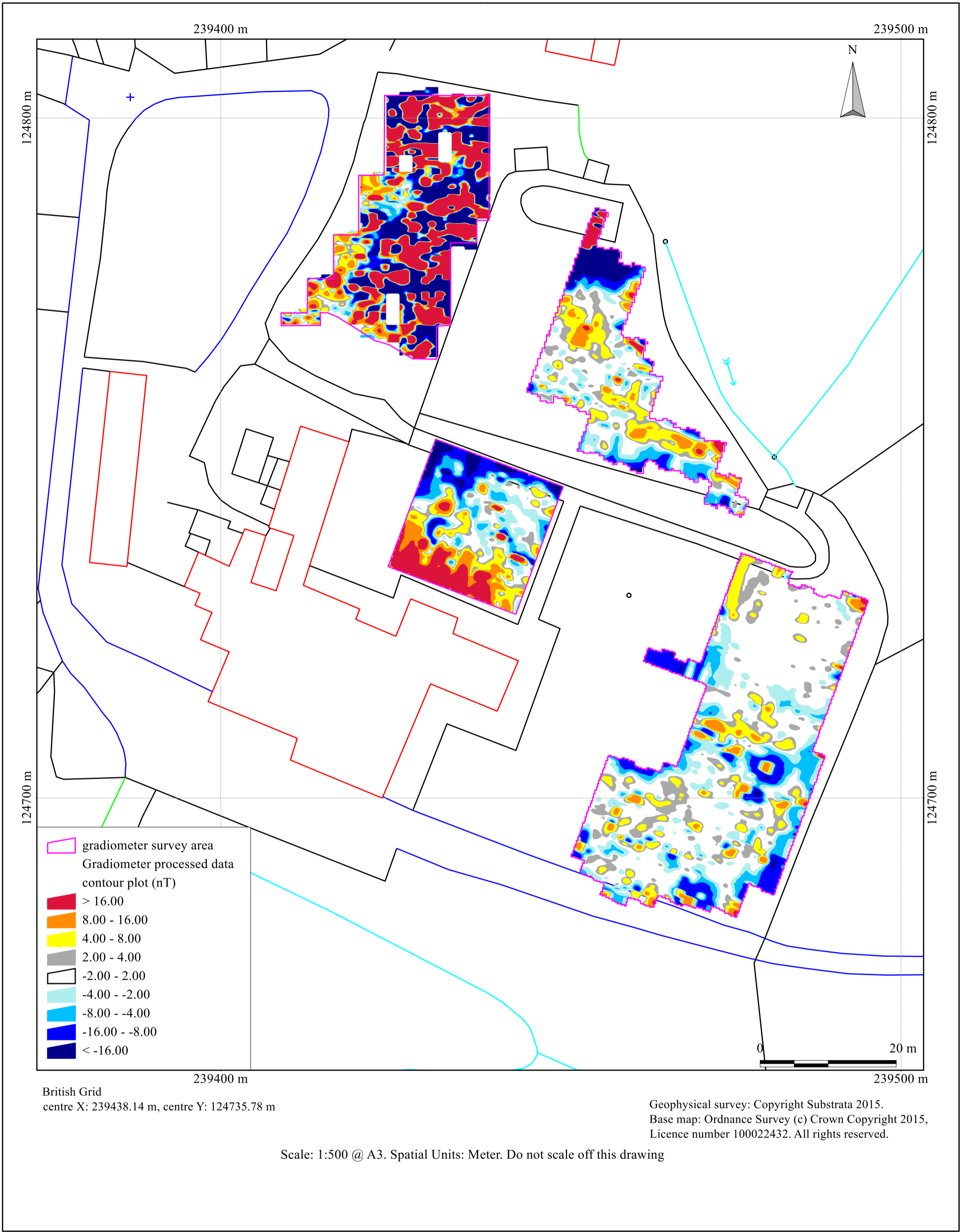
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 Web: substrata.co.uk

Figure 3: survey interpretation

Site: An archaeological gradiometer and earth-resistance survey  
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area	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
g1	1		possible mixed spread	irregular	archaeological deposit, recent rubble or near-surface bedrock	a group of mixed anomalies of medium contrast with a scatter of extreme contrast anomalies indicative of relatively recent ferrous material: probably a relatively recent fill or rubble dump	
g1	2	101	possible positive	linear		anomaly group coincides with resistance anomaly group 101	
r1	101	1	possible low	linear		anomaly group coincides with magnetic anomaly group 1	
r1	102		possible high	linear			
r1	103	104	possible low	linear		anomaly group alignment may coincide with a drain noted by the survey team as emerging at the base of a slope in the southeast corner of the survey area	
r1	104	103	possible high	linear		anomaly group alignment may coincide with a drain noted by the survey team as emerging at the base of a slope in the southeast corner of the survey area	
g2	3	107	possible positive	linear		anomaly group coincides with resistance anomaly group 107	
r2	105		possible low	multilinear			
r2	106		possible high	oval	stone or stone-filled pit		
r2	107	3	possible low	linear		anomaly group coincides with magnetic anomaly 3	
r2	108		possible low			anomaly group coincides with an area of gravel	
g3	4		possible, positive	linear			
g3	5		possible, positive	linear			
g3	6		possible, positive	rectilinear		anomaly group may represent a filled rectangular structure or hollow	
g3	7		possible, positive spread	irregular	spread of earthen material		
g3	8		possible, positive	linear			
g3	9		possible, positive	linear			
g3	10		possible, positive	linear			
g3	11		possible, positive	linear			
g3	12		possible, positive	multilinear			
g3	13	109 112	possible, positive	linear	path or track	anomaly group is most likely to represent a former routeway, perhaps a garden path or track	
r3	109	13 112	possible, low	linear	path or track	anomaly group is most likely to represent a former routeway, perhaps a garden path or track	
r3	110		possible, low	disrupted linear			
r3	111		possible, low	disrupted linear			
r3	112	13 109	possible, low	disrupted linear	path or track	anomaly group is most likely to represent a former routeway, perhaps a garden path or track	
g4	14		possible, positive	linear			
g4	15	119 121	possible, positive	disrupted linear			
g4	16		possible, positive	disrupted linear			
r4	113		possible, low	linear			
r4	114		possible, low spread	rectilinear			
r4	115		possible, high	oval	stone or stony deposit	anomaly group is distinct and more likely to represent a discrete deposit or a stone than naturally placed material	
r4	116		possible, low	disrupted linear			
r4	117		possible, low	disrupted linear			
r4	118		possible, low	linear			
r4	119	15 119 121	possible, high	linear			
r4	120		possible, high	unclear		it is unclear whether this anomaly group represents a distinct deposit or natural material with straightened edges to the north and east; approximately coincides with a farm building removed between 1838 and 1886	Devon County Council HER MDV75058
r4	121	15 119 121	possible, low	linear			
r4	122		possible, low	disrupted linear			
r4	123		possible, low spread	unclear			

Table 1: data analysis

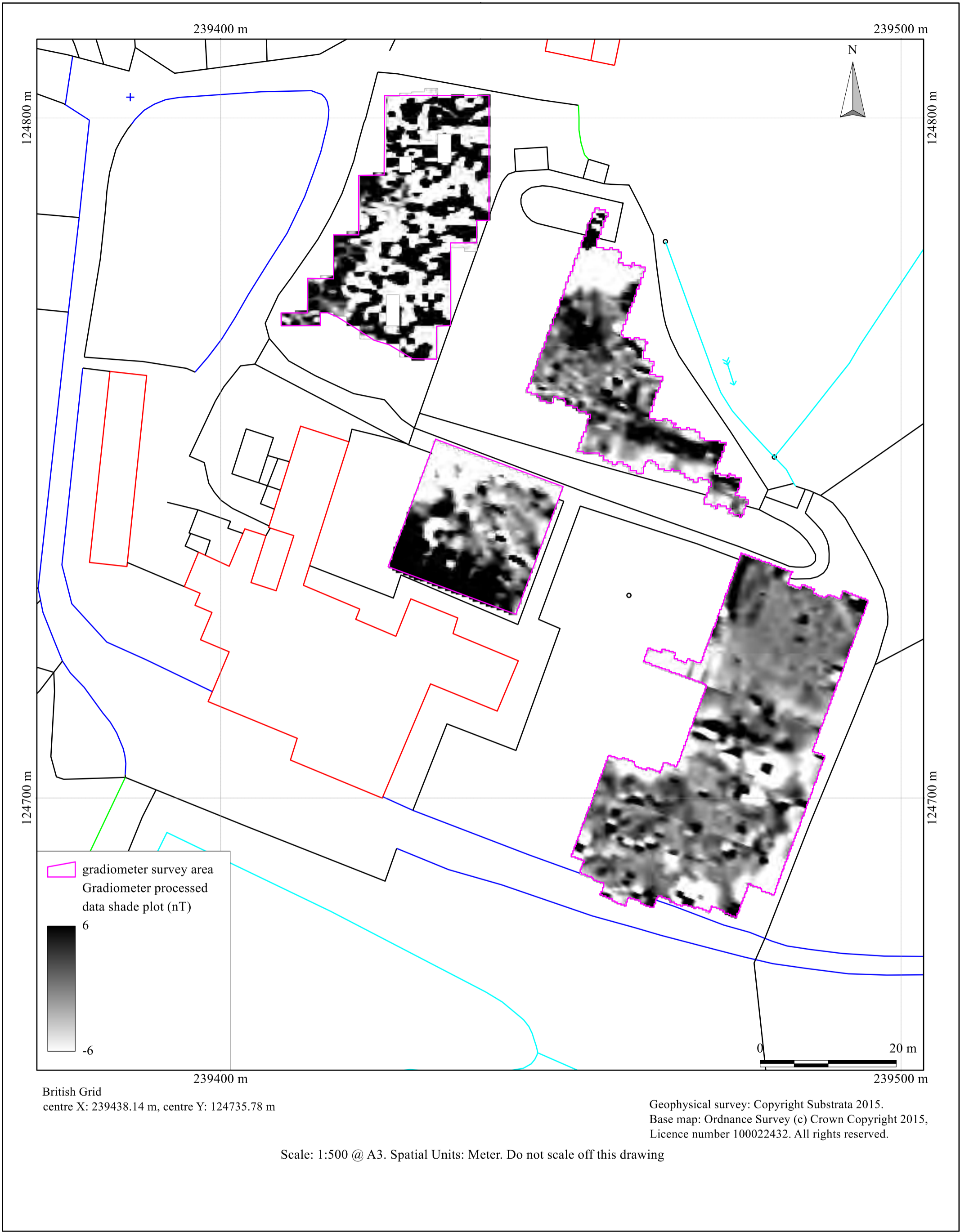


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Figure 4: contour plot of processed gradiometer data

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British Grid  
 centre X: 239438.14 m, centre Y: 124735.78 m

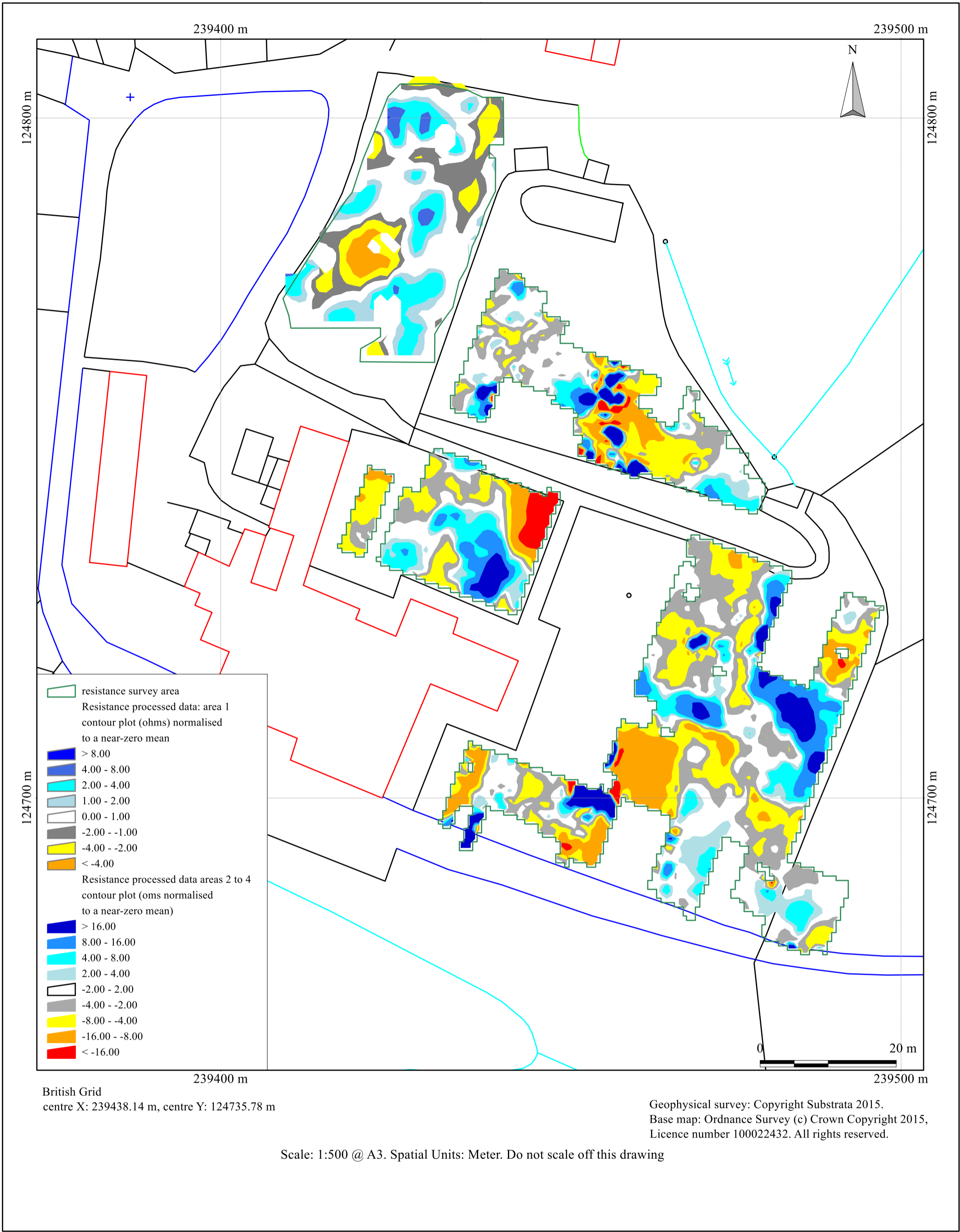
Geophysical survey: Copyright Substrata 2015.  
 Base map: Ordnance Survey (c) Crown Copyright 2015,  
 Licence number 100022432. All rights reserved.

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

An archaeological gradiometer and earth-resistance survey  
 Land at Portledge House, Fairy Cross, Alwington, Devon  
 Centred on NGR (E/N): 239470,124740 (point)  
 Report: 1504POR-R-1

Figure 5: shade plot of processed gradiometer data

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Figure 6: contour plot of processed earth-resistance data

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Land at Portledge House, Fairy Cross, Alwington, Devon  
Centred on NGR (E/N): 239470,124740 (point)  
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Figure 7: shade plot of processed earth-resistance data

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## Appendix 2 Methodology Summary

Table 2: methodology summary	
<p><b>Documents</b>            Brief: Dick (2015)            Survey methodology statement: Dean (2015)</p>	
<p><b>Methodology</b></p> <ol style="list-style-type: none"> <li>1. The work was undertaken in accordance with the survey methodology statement. The geophysical (gradiometer) survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014) and Archaeology Data Service/ Digital Antiquity Guides (undated).</li> <li>2. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system.</li> <li>3. Data processing was undertaken using appropriate software, with all anomalies being digitised and geo-referenced. The final report included a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology.</li> </ol>	
<p><b>Grid</b>  <i>Method of Fixing:</i> DGPS set-out using pre-planned survey grids and Ordnance Survey coordinates.  <i>Composition:</i> 30m by 30m grids  <i>Recording:</i> Geo-referenced and recorded using digital map tiles.  <i>DGPS used:</i> Spectra Precision PM5V2 GPS with external antenna and survey pole and DigiTerra Explorer 7 as the survey control program.</p>	
<p><b>Equipment</b>  <i>Instrument:</i> Bartington Instruments grad601-2  <i>Firmware:</i> version 6.1</p> <p><i>Instrument:</i> Geoscan Research RM15/MPX15 twin probes  <i>Firmware:</i> RM15 Adv. 30000 Version 2.00</p>	<p><b>Data Capture</b>  <i>Sample Interval:</i> area g4: 0.125m            areas g1 to g3: 0.25-metres  <i>Traverse Interval:</i> 1 metre  <i>Traverse Method:</i> zigzag  <i>Traverse Orientation:</i> areas g1 and r1: GN            remaining areas: GN20</p> <p><i>Sample Interval:</i> 1 metre  <i>Traverse Interval:</i> 1 metre  <i>Traverse Method:</i> zig-zag  <i>Traverse Orientation:</i> areas g1 and r1: GN            remaining areas: GN20</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>	

Appendix 3 Data processing

Table 3: gradiometer survey - processed data metadata	
<p>SITE</p> <p>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>PROGRAM</p> <p>Name: TerraSurveyor            Version: 3.0.25.0</p>	
<p><u>Area g1</u></p> <p>Stats</p> <p>Max: 56.10            Min: -55.71            Std Dev: 35.75            Mean: -0.34            Median: 0.00</p>	<p>Processes: 7</p> <ol style="list-style-type: none"> <li>1 Base Layer</li> <li>2 Clip at 1.00 SD</li> <li>3 Clip at 1.00 SD</li> <li>4 Clip at 1.00 SD</li> <li>5 De Stagger: Grids: All Mode: Both By: -2 intervals</li> <li>6 DeStripe Median Sensors: All</li> <li>7 Clip at 1.00 SD</li> </ol> <p>Note: exporting the processed data from TerraSurveyor into Manifold GIS for analysis imposes an 'x matches y' interpolation on the data which is reflected in the processed data figures.</p>
<p><u>Area g2</u></p> <p>Stats</p> <p>Max: 20.56            Min: -31.75            Std Dev: 11.97            Mean: 1.65            Median: 0.00</p>	<p>Processes: 5</p> <ol style="list-style-type: none"> <li>1 Base Layer</li> <li>2 Clip at 1.00 SD</li> <li>3 Clip from -22.00 to 28.41 nT</li> <li>4 De Stagger: Grids: All Mode: Both By: -2 intervals</li> <li>5 DeStripe Median Sensors: All</li> </ol> <p>Note: exporting the processed data from TerraSurveyor into Manifold GIS for analysis imposes an 'x matches y' interpolation on the data which is reflected in the processed data figures.</p>
<p><u>Area g3</u></p> <p>Stats</p> <p>Max: 201.73            Min: -183.69            Std Dev: 20.15            Mean: -2.38            Median: 0.06</p>	<p>Processes: 6</p> <ol style="list-style-type: none"> <li>1 Base Layer</li> <li>2 Clip at 1.00 SD</li> <li>3 Clip at 1.00 SD</li> <li>4 De Stagger: Grids: All Mode: Both By: -2 intervals</li> <li>5 DeStripe Median Traverse: Grids: All</li> <li>6 Interpolate: Match X &amp; Y Doubled.</li> </ol>
<p><u>Area g4</u></p> <p>Max: 42.59            Min: -36.43            Std Dev: 4.80            Mean: -0.92            Median: -0.23</p>	<p>Processes: 9</p> <ol style="list-style-type: none"> <li>1 Base Layer</li> <li>2 Clip at 1.00 SD</li> <li>3 Clip at 1.00 SD</li> <li>4 Clip at 1.00 SD</li> <li>5 De Stagger: Grids: All Mode: Both By: -2 intervals</li> <li>6 De Stagger: Grids: x4.xgd Mode: Both By: -1 intervals</li> <li>7 De Stagger: Grids: x1.xgd x2.xgd Mode: Both By: -3 intervals</li> <li>8 DeStripe Median Traverse: Grids: All</li> <li>9 Interpolate: Match X &amp; Y Doubled.</li> </ol>

Table 4: earth resistance survey - processed data metadata

<p>SITE</p> <p>Instrument Type: Research Machines RM15</p> <p>Units: ohms</p> <p>Direction of 1st Traverse: 0 deg</p> <p>Collection Method: ZigZag</p> <p>Sensors: 2 @ 0.50 m spacing.</p> <p>Dummy Value: 32702</p> <p>PROGRAM</p> <p>Name: TerraSurveyor</p> <p>Version: 3.0.22.1</p>	
<p><u>Area r1</u></p> <p>Stats</p> <p>Max: 10.96</p> <p>Min: -12.70</p> <p>Std Dev: 2.56</p> <p>Mean: 0.04</p> <p>Median: -0.03</p>	<p>Processes: 6</p> <p>1 Base Layer</p> <p>2 Move (Area: Top 17, Left 32, Bottom 19, Right 39) to X -12, Y 0</p> <p>3 Move (Area: Top 29, Left 0, Bottom 40, Right 4) to X 15, Y 0</p> <p>4 Despik Threshold: 1 Window size: 3x3</p> <p>5 High pass Gaussian filter: Window: 21 x 21</p> <p>6 Interpolate: X &amp; Y Doubled.</p>
<p><u>Areas r2, r3 and r4</u></p> <p>Stats</p> <p>Max: 615.91</p> <p>Min: -54.93</p> <p>Std Dev: 16.46</p> <p>Mean: 0.06</p> <p>Median: -1.78</p>	<p>Processes: 6</p> <p>1 Base Layer</p> <p>2 Despik Threshold: 1 Window size: 3x3</p> <p>3 Periphery Match ALL grids in the survey.</p> <p>4 Despik Threshold: 1 Window size: 3x3</p> <p>5 High pass Uniform (mean) filter: Window: 21 x 21</p> <p>6 Interpolate: X &amp; Y Doubled.</p>