

Substrata

Archaeological Geophysical Surveyors

An archaeological gradiometer survey

Land north of Honiton Road, Clyst Honiton, Devon

Centred on NGR (E/N): 297775,093484 (point)

Report: 1601CLY-R-1

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26 January 2016

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Contents

1. Survey description and summary	1
2. Survey aims and objectives	1
3. Standards	2
4. Site description	2
5. Archaeological background.....	2
6. Results, discussion and conclusions	4
7. Disclaimer and copyright	6
8. Acknowledgements	6
9. Bibliography.....	6
Appendix 1 Supporting plots.....	7
Appendix 2 Methodology.....	12
Appendix 3 Data processing.....	13
Appendix 4 Unprocessed data plot.....	14

Figures

Figure 1: location map	8
Figure 2: survey interpretation.....	9
Figure 3: shade plot of processed gradiometer data.....	10
Figure 4: contour plot of processed gradiometer data.....	11
Figure 5: shade plot of unprocessed gradiometer data.....	14

Tables

Table 1: methodology summary	12
Table 2: gradiometer survey - processed data metadata	13

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

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: 19 January 2016
Area: gradiometer survey: 1ha
Lead surveyor: Mark Edwards BA
Author: Ross Dean BSc MSc MA MifA

1.2 Client

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

1.3 Location

Site: Land north of Honiton Road, Clyst Honiton
Civil Parish: Broad Clyst
District: East Devon
County: Devon
Nearest Postcode: EX5 2AL
NGR: SX 998 935
Ordnance Survey NGR (E/N): 297775,093484 (point)

1.4 Archive

OASIS number: substrat1-240213
Archive: At the time of writing, the archive of this survey will be held by Substrata.

1.5 Introduction

This report was commissioned by AC Archaeology Ltd on behalf of clients. The site location is shown in Figure 1.

1.6 Summary

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

Two magnetic anomaly groups were mapped with one of these possibly representing an archaeological deposit but it may equally represent recent ground disturbance or a service trench.

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 ensuing 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).

4 Site description

4.1 Landscape and land use

The site is situated between Blackhorse Lane to the north and Honiton Road to the south. To the west it is bound by a minor road and farmland and to the east by the Blackhorse estate as shown in Figure 1. Topographically, the site lies at approximately 30m AOD on a gentle slope descending west to east. At the time of the survey the land was under short grass with an area of parked vehicles on its eastern side.

4.2 Geology

The site has a solid geology comprising rocks of the Permian Dawlish Sandstone Formation. Generically these rocks are reddish brown cross-bedded sands and sandstones with intercalated thin lenses and beds of breccia and mudstone. The superficial geology is unrecorded (British Geological Survey, undated).

5 Archaeological background

5.1 Historic landscape characterisation

Modern settlement.

This is an area of modern settlement that was developed during the twentieth century. In this case, the settlement was developed over Barton fields which are relatively large, regular enclosures seem likely to have been laid out between the fifteenth and eighteenth centuries. Some curving boundaries may be following earlier divisions in the pre-existing medieval fields (Devon County Council, undated).

5.2 Historical and archaeological background

The following is a short summary of information obtained from the Devon Historic Environment Record (HER) via the Heritage Gateway (Historic England, undated). The heritage assets discussed below are within approximately 500m 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 500m of the site

The area has been subject to a number of archaeological investigations around Blackhorse associated with the construction of the A30 to the west, south and east of the site.

As many as six prehistoric (before 42 AD) ring ditches shown on aerial photographs and recorded on geophysical survey plots lie between Blackhorse Lane and Honiton Road (HER entry MDV64550 at national grid reference SX 973 934, west of the site). An excavation to the south of the site in 1997 prior to A30 improvement scheme revealed an iron age (between 700 BC and 42 AD) enclosed settlement consisting of a simple 50 metre square enclosure with a

slightly off centre single large round house, approximately 17.5m in diameter, and 3 four post-built structures either side of the entrance (MDV28620 at SX 977 933). An early-middle iron age post-built hut circle approximately 6.5m in diameter with a porched entrance facing south-east was also recorded (MDV62694) as was a middle to late iron age unenclosed settlement area (MDV62693).

An area of medieval (between 1066 AD to 1539 AD) strip fields shown on a 19th century map and in geophysical survey results between Blackhorse Lane & Honiton Road to the west of the site (MDV73806 at SX 974 934).

Possible orchard banks of post-medieval to modern date (1540 AD to 2013 AD) are visible as earthwork banks on aerial photographs of 1967, to the north of Blackhorse and east of the site. An orchard is depicted here on the First Edition Ordnance Survey map which was surveyed between the 1880's and early 1890's. The orchard banks appear to have been completely or largely levelled sometime after this date (MDV113558 at SX 982 936)

An anti-aircraft searchlight light battery (Searchlight Canopy Site A6), in existence between 1943 AD and 1945 AD, is visible as an earthwork pit and banked feature and vegetation marks on aerial photographs of 1945 southeast of the site at SX 982 933. By 1947 the site of the former searchlight battery has been completely levelled (MDV78529).

Three semi-circular anomalies were recorded during a geophysical survey on land at Mosshayne, Pinhoe (MDV112239 at SX 979 938, northeast of the site), two of which were later targeted during an archaeological evaluation. One was confirmed as a disrupted curvilinear feature of unknown date.

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 structures, features and 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. The following is an extract of the detailed analysis of the survey data which is sourced from the attribute tables of the GIS project provided in the project archive:

Anomaly group **1**: a magnetically positive, disrupted linear which anomaly group may represent an archaeological feature such as a ditch but could equally well represent recent ground disturbance or a service trench

Anomaly group **101**: a set of low contrast linear anomalies that are most likely to represent a recent service trench.

Figures 3 and 4 are plots of processed data as specified in Table 3. These plots represent different views of the data that were 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 site edges was restricted as shown in Figures 3 and 4 due to the presence of magnetic materials adjacent to the site and a group of vehicles on the eastern side of the survey area. Strong magnetic responses mapped close to survey boundaries are likely to relate to these materials except where otherwise indicated in Figure 2. An area of piled vegetation with brambles precluded a small area from the survey as shown.

Anomaly characterisation and mapping

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

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

Anomalies thought to relate to natural features were not mapped.

6.2.2 Data relating to historic maps and other records

No mapped anomaly groups related to historic maps or other records.

6.2.3 Data with no previous archaeological provenance

While anomaly group **1** may represent an archaeological feature such as a ditch, it is isolated in the data set and may equally well represent recent ground disturbance or a service trench.

6.3 Conclusions

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

Two magnetic anomaly groups were mapped with one of these possibly representing an archaeological deposit but it may equally represent recent ground disturbance or a service trench.

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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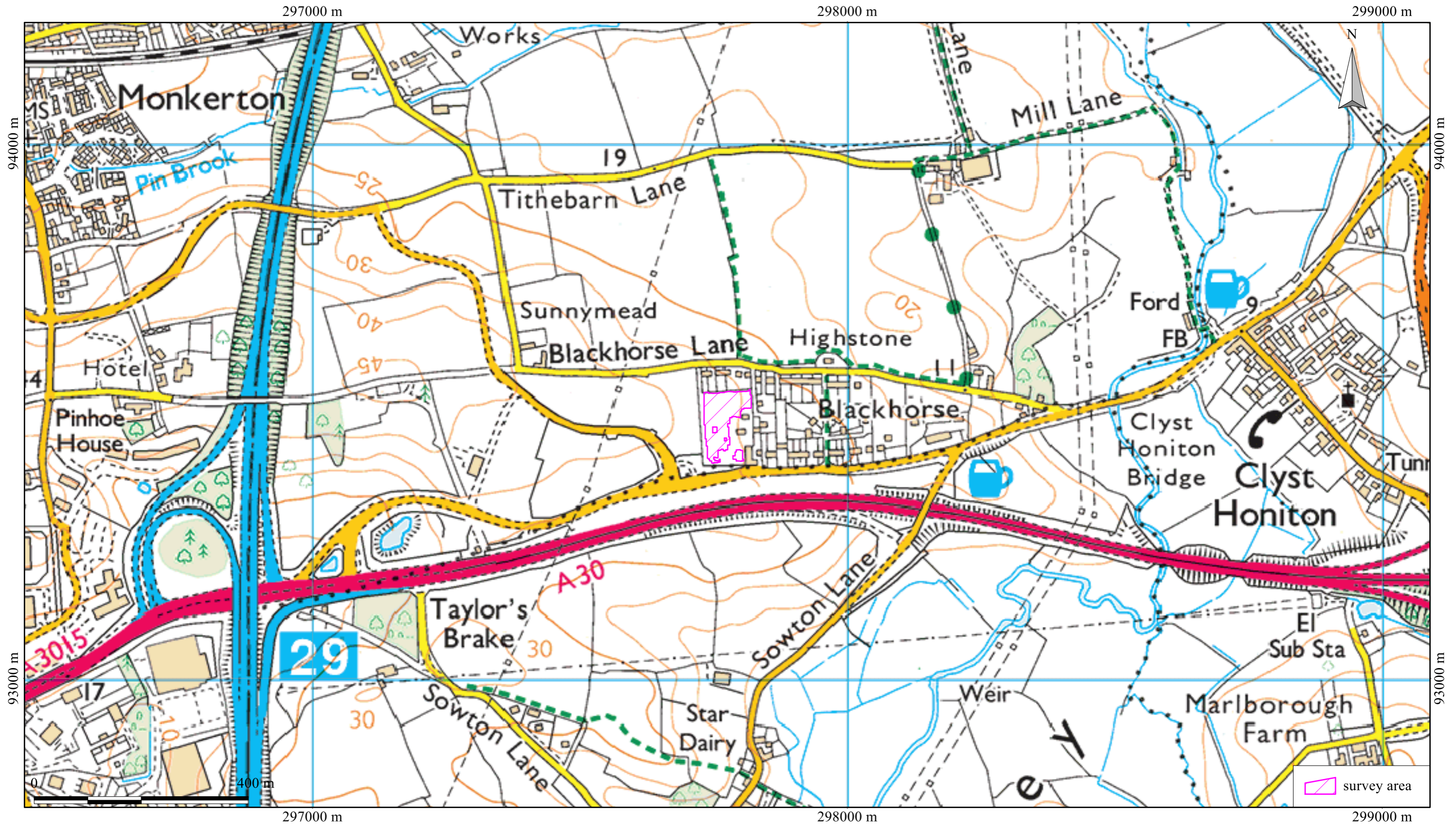
Historic England (2010) *Geophysical Survey in Archaeological Field Evaluation*, [Online], Available: <https://content.historicengland.org.uk/images-books/publications/geophysical-survey-in-archaeological-field-evaluation/geophysics-guidelines.pdf/> [January 2016]

Appendix 1 Supporting plots

General Guidance

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

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



British Grid
 centre X: 297775.34 m, centre Y: 93492.41 m

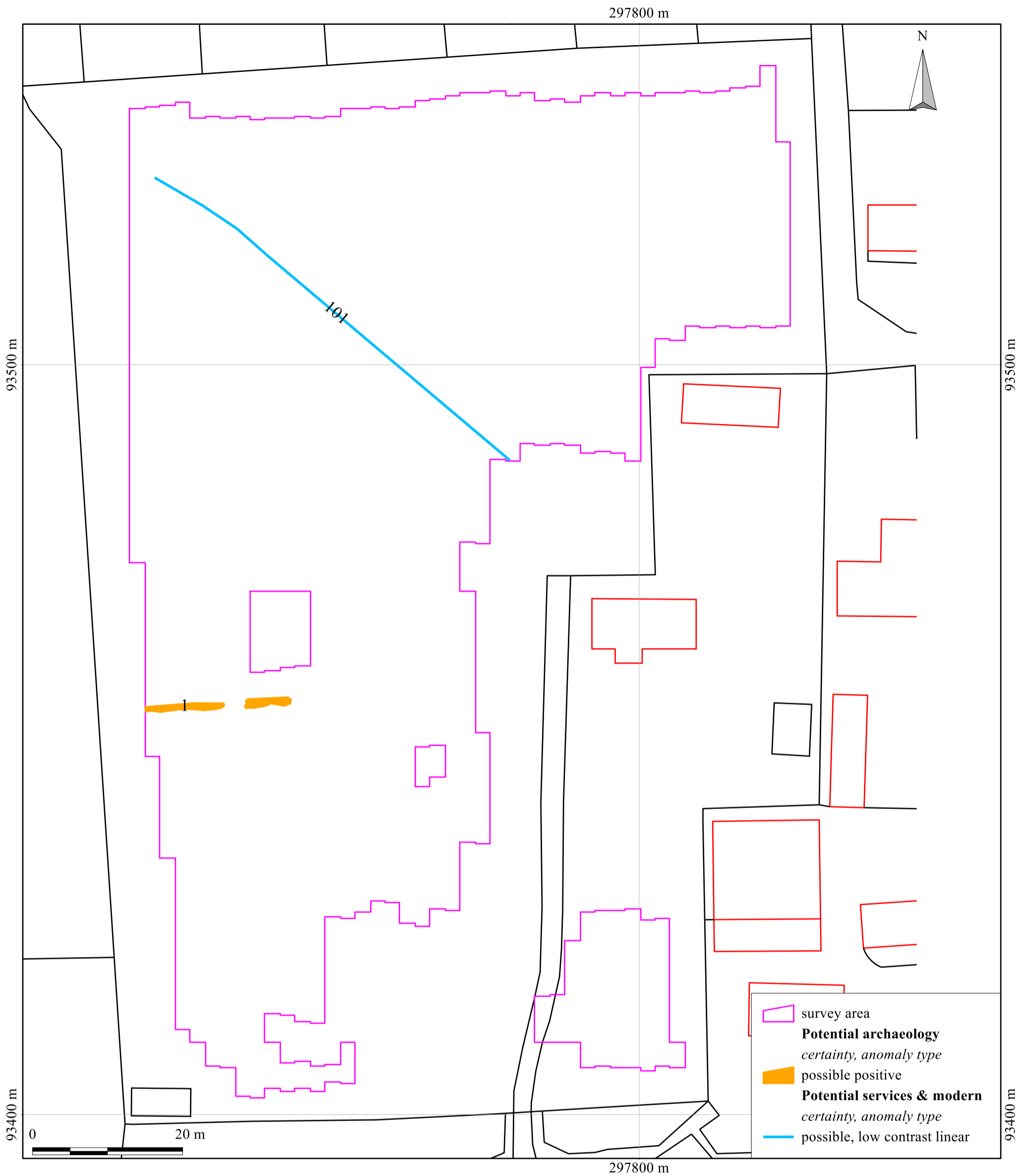
Geophysical survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
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Scale: 1:7000 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 1: location map

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British Grid
centre X: 297783.01 m, centre Y: 93469.79 m

Geophysical survey: Copyright Substrata 2016.
Base map: Ordnance Survey (c) Crown Copyright 2015,
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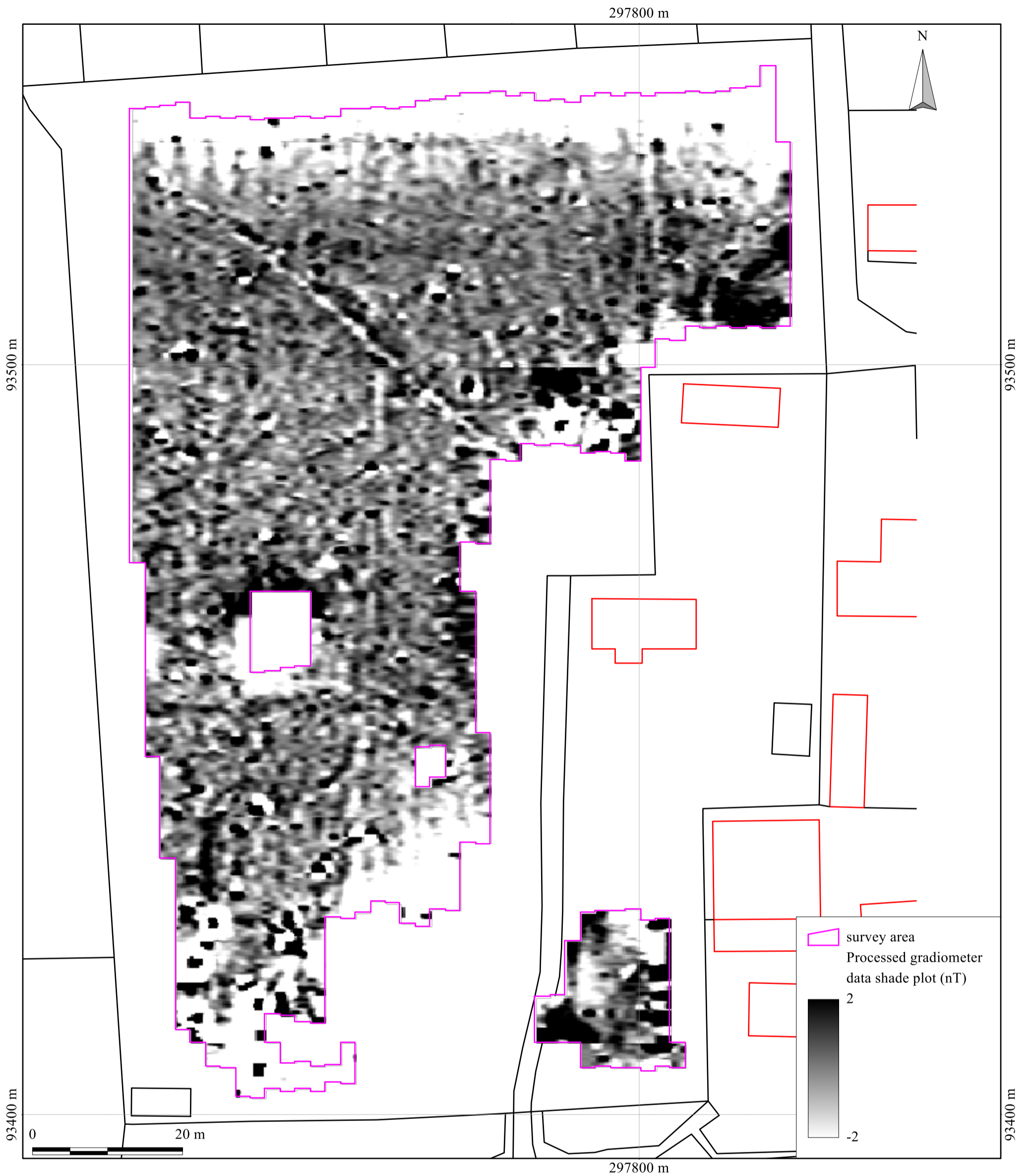
Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

- 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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Figure 2: survey interpretation

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British Grid
centre X: 297783.01 m, centre Y: 93469.79 m

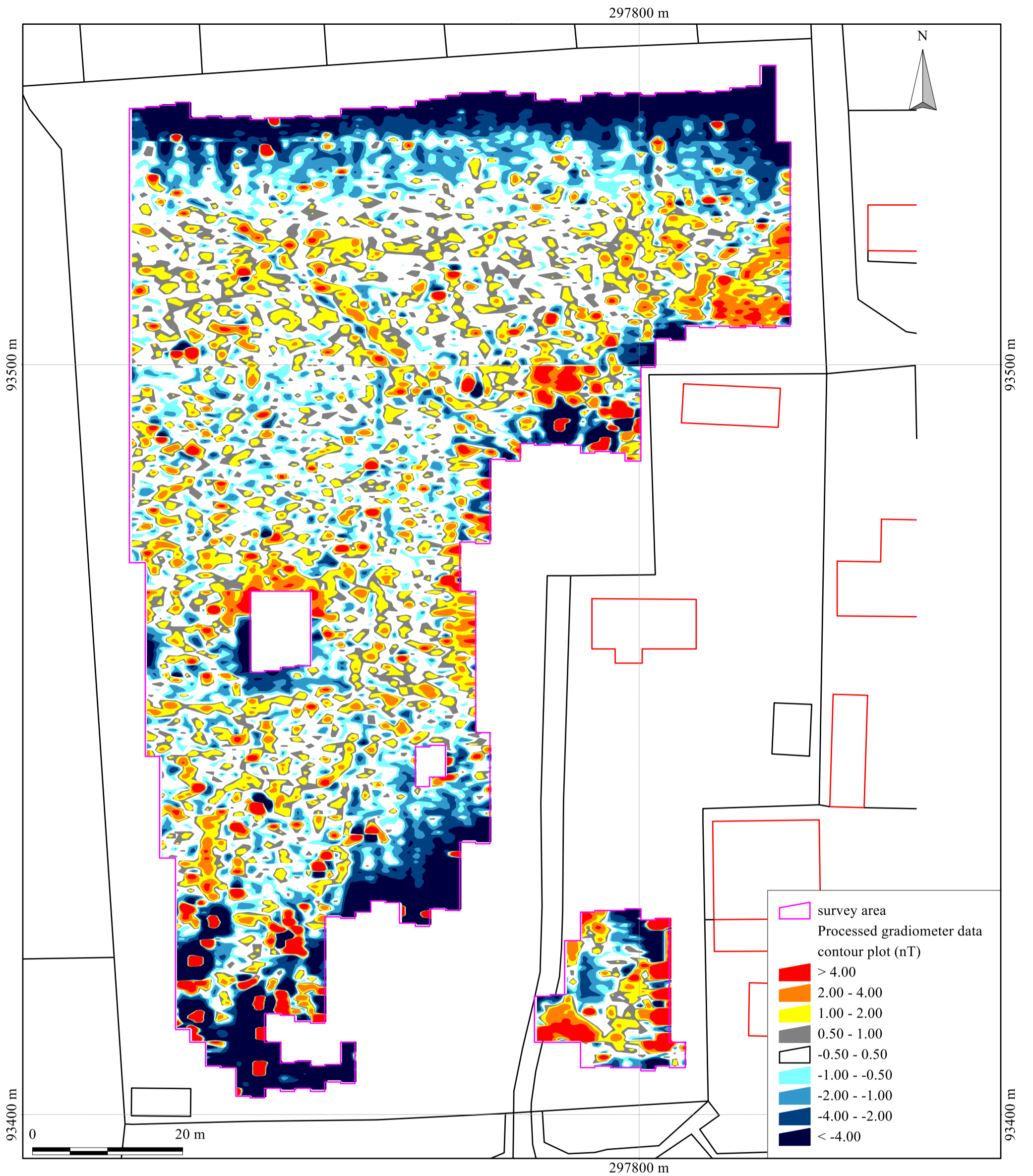
Geophysical survey: Copyright Substrata 2016.
Base map: Ordnance Survey (c) Crown Copyright 2016,
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Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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Figure 3: shade plot of processed data

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British Grid
 centre X: 297783.01 m, centre Y: 93469.79 m

Geophysical survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
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Scale: 1:500 @ A3. Spatial Units: Meter. Do not scale off this drawing

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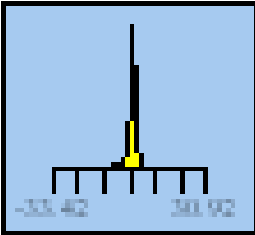
Figure 4: contour plot of processed data

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Appendix 2 Methodology Summary

Table 1: methodology summary	
<p>Documents Survey methodology statement: Dean (2016)</p>	
<p>Methodology</p> <ol style="list-style-type: none"> 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). 2. The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system. 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. 	
<p>Grid <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>Equipment <i>Instrument:</i> Bartington Instruments grad601-2 <i>Firmware:</i> version 6.1</p>	<p>Data Capture <i>Sample Interval:</i> 0.25m <i>Traverse Interval:</i> 1 metre <i>Traverse Method:</i> zigzag <i>Traverse Orientation:</i> GN</p>
<p>Data Processing, Analysis and Presentation Software 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 2: gradiometer survey - processed data metadata	
<p>SITE 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 Name: TerraSurveyor Version: 3.0.28.1</p>	
<p>Stats Max: 30.92 Min: -33.42 Std Dev: 3.77 Mean: -0.78 Median: -0.17</p> 	<p>Processes: 11</p> <ol style="list-style-type: none"> 1 Base Layer 2 Clip at 2.00 SD 3 De Stagger: Grids: All Mode: Both By: -1 intervals 4 DeStripe Median Traverse: Grids: a1.xgd a2.xgd a3.xgd a4.xgd a5.xgd 5 DeStripe Median Traverse: Grids: a10.xgd a9.xgd a8.xgd 6 DeStripe Median Traverse: Grids: a15.xgd a16.xgd 7 DeStripe Median Traverse: Grids: a13.xgd a14.xgd 8 Edge Match (Area: Top 30, Left 120, Bottom 59, Right 239) to Right edge 9 Edge Match (Area: Top 0, Left 600, Bottom 89, Right 719) to Left edge 10 Edge Match (Area: Top 0, Left 120, Bottom 29, Right 239) to Right edge 11 Edge Match (Area: Top 0, Left 0, Bottom 29, Right 119) to Right edge

Appendix 4 Unprocessed data plot

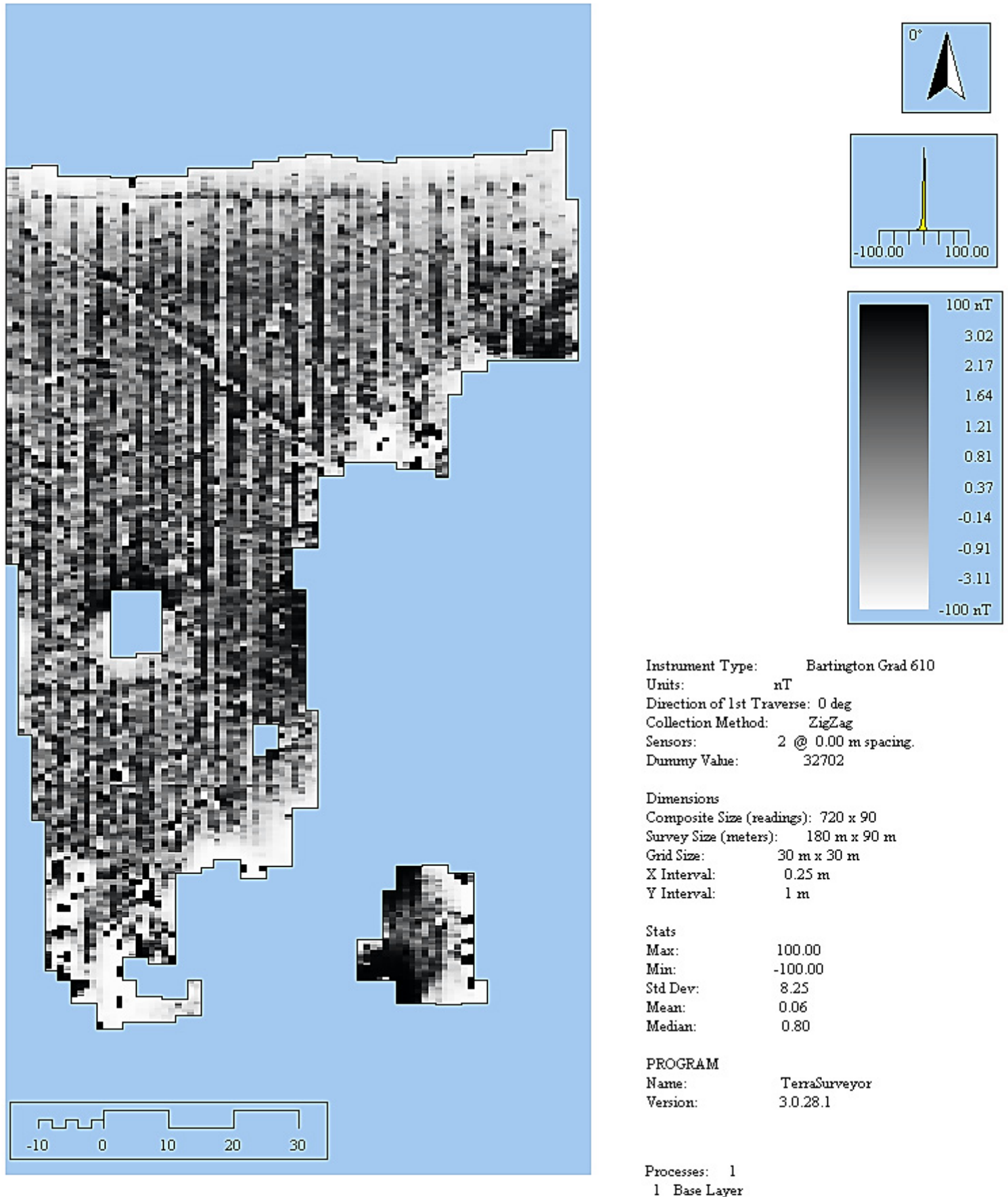


Figure 5: shade plot of unprocessed data