



An archaeological magnetometer and resistance survey

Langdon Farm, Dawlish, Devon

Centred on NGR (E/N): 295300,078160

Report: 1703LAN-R-1

Ross Dean BSc MSc MA MCifA

31 August 2017

Substrata Limited
Office 1, 5 Mill Street
Bideford, Devon EX39 2JT
Tel: 01273 273599
Email: geophysics@substrata.co.uk
Web: substrata.co.uk

Client
Devon County Council
Environment Group
Lucombe House
County Hall
Exeter
Devon EX2 4QD

Contents

1. Survey description and summary.....	1
2. Survey aims and objectives	2
3. Standards	2
4. Methodology.....	2
5. Site description	2
6. Archaeological background.....	3
7. Methodology, results, discussion and conclusions	4
8. Disclaimer and copyright	6
9. Acknowledgements	6
10. Bibliography	6
Appendix 1 Figures	7
Appendix 2 Tables.....	17

Figures

Figure 1: location map	8
Figure 2: find spots eastings/northings	9
Figure 3: magnetometer survey and resistance survey interpretation.....	10
Figure 4: shade plot of processed magnetometer data	11
Figure 5: contour plot of processed magnetometer data.....	12
Figure 6: shade plot of processed resistance data	13
Figure 7: contour plot of processed resistance data	14
Figure 8: shade plot of minimally processed magnetometer data.....	15
Figure 9: shade plot of unprocessed resistance data	16

Tables

Table 1: Historical Environment Entries thought relevant to geophysical survey	18
Table 2: data analysis.....	19
Table 3: methodology information.....	20
Table 4: magnetometer survey - processed data metadata	21
Table 5: resistance survey - processed data metadata	22

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: magnetometer; twin-sensor fluxgate gradiometer
twin-probe resistance
Date: 7 March 2017
Area: magnetometer survey: 1.7ha
resistance survey: 0.3ha
Lead surveyor: Mark Edwards
Author: Ross Dean

1.2 Client

Devon County Council Environment Group, Lucombe House, County Hall, Exeter, Devon EX2 4QD

1.3 Site information

Site: Langdon Farm
Civil Parish: Dawlish
District: Teignbridge
County: Devon
NGR: SX 953 782 (point)
NGR E/N: 295300,078160 (point)
Post code: EX7 0QX

1.4 Archive

OASIS number: substrat1-293996
Archive: At the time of writing, the archive of this survey will be held by Substrata. Depending on local authority policy, an archive of the unprocessed data may be deposited with the Archaeological Data Service

1.5 Introduction

This report was commissioned by the Devon County Council Environment Group. It presents the results of an archaeological magnetometer and resistance survey at the above site. The survey was commissioned after the reporting of finds by metal detectorists. The survey area is shown in Figure 1 and the location of the finds in Figure 2.

1.6 Summary

The magnetic and resistance responses were sufficient to be able to differentiate anomalies representing possible archaeological features. Six magnetic anomaly groups and six resistance anomaly groups were mapped as representing potential archaeological deposits and features.

Three resistance anomalies have some potential to represent archaeological pits but are more likely to represent natural deposits. They were mapped primarily because of their proximity to two find spots. There were no other clear relationships between the find spots and magnetic or resistance anomalies in the survey data sets.

The magnetic data contained evidence for a possible curvilinear feature such as a ditch and three linear deposits which coincide with the location of a former field boundary recorded on the 1840 tithe map but not on later maps. These anomalies may equally represent cultivation traces or natural deposits. The former field boundary was also represented in the resistance data with the same caveats. Two reasonably well defined areas of enhanced magnetic responses may indicate archaeological deposits such as filled pits or surfaces but natural origins are equally likely.

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 survey area.

2.2 Objectives

1. To identify any below ground archaeological feature (such as ditches, pits, burning activity, walling etc).
2. To ascertain the nature of the circular feature.
3. To identify any related archaeological features or potential features.
4. To build on the knowledge of surveying sites of this type on Exmoor.
5. To use modern remote sensing techniques including gradiometry and earth resistance.

3 Methodology

The work was undertaken in accordance with the survey methodology statement (Dean, 2017).

The survey grid location information and grid plan was recorded as part of the project in a suitable GIS system (Table 3).

Data processing was undertaken using appropriate software (Table 3), 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.

4 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).

5 Site description

5.1 Landscape and land use

The survey area lies within one field at Langdon Farm which was under pasture at the time of the survey. The field lies on the southern side of a shallow valley and slopes southwest to northeast from approximately 35m to 25m AOD. A stream and boggy land lie on the northern side of the survey area with Langdon Farm cottages and farm buildings further north. Fields lie beyond the field boundary to the east. Langdon Road runs along the western and southern edges. Within the survey area a small valley, dry at the time of the survey, runs south-southwest to north-north-east towards the stream to the north. Its width and trend can be clearly seen in the resistance data presented in Figure 6.

5.2 Geology

The solid geology across the survey area and surrounds are breccias of the Alphington Breccia Formation and the Heavitree Breccia Formation. The Heavitree Breccia comprises reddish brown, mainly fine-grained, breccia composed of clasts (mainly less than 8cm, some over 30cm) of Culm sandstone, vein quartz, hornfels lava, granite, and potassium feldspar (Murchisonite). The rocks are well cemented locally. The formation overlies the Alphington Breccia Formation which is defined by marked increase in amount of Murchisonite feldspar. The Heavitree basal beds form a prominent scarp over the less well cemented Alphington Breccia (British Geological Society undated).

The superficial geology over most of the survey area is not recorded in the source used but alluvium is mapped in the stream valley to the east of the site (ibid).

6 Archaeological background

6.1 Historic landscape characterisation

‘Former orchards’:

This area was once an orchard planted with fruit trees but these have been lost in the twentieth century.

6.2 Summary of heritage assets thought relevant to the survey

This section is not designed to provide a comprehensive understanding of the historic environment of the surrounding area and should not be used as a source for further work.

Consultation of the Heritage Gateway HER records (Historic England, undated) was undertaken to gain an appreciation of historic assets pertinent to the geophysical survey data within approximately 500m of the survey area perimeter (the ‘study area’).

There are no historic assets recorded within the survey area.

Three enclosures lie within the study area. One is of unknown date and uncertain archaeological provenance, one is double ditched and thought to date between the early bronze age to Roman periods, and one is a square enclosure again thought to date between the early bronze age to Roman periods. One prehistoric barrow and a field name thought to refer to the former presence of one or more barrows lies southwest of the site. Various other archaeological features are summarised in Table 1.

7 Methodology, results, discussion and conclusions

7.1 Scope and definitions

The two surveys were designed to record magnetic anomalies and resistance anomalies. The analysis of the data sets was designed to highlight anomalies and reflection patterns judged indicative of archaeological deposits, structures, features or past human activity.

The terms 'archaeological deposit', 'structure' and 'feature' refer to any artefacts, material deposits or disturbance of natural deposits thought to be the result of human activity, excluding recent land maintenance and farming.

The reader is referred to section 8.

7.1.1 Magnetometer survey

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

7.1.2 Resistance survey

A resistance anomaly is a local variation in the electrical resistance of a soil and is related to its porosity, permeability, saturation, and chemical nature of entrapped fluids (Heimmer and De Vore, 1995:30), all of which can be altered by past human activities. Higher concentrations of ions allow electrical current to pass more easily through the soil, creating a lower electrical resistance.

7.2 Results

The interpretations of the magnetometer and resistance surveys are summarised together in Figure 3 which includes the designations of the anomaly groups identified as possibly relating to archaeological and other deposits. Table 2 is an extract from the detailed analysis of the magnetometer and resistance survey data sourced from the attribute tables of the GIS project provided in the project archive.

Figure 3 and Table 2 comprise the analysis of the survey data.

Various plots of the processed data as specified in Tables 4 and 5 are provided in Figures 4 to 7.

Figures 8 and 9 are plots of the minimally processed magnetometer data and the unprocessed resistance data respectively.

7.3 Discussion

7.3.1 General points

Discussion scope

Not all magnetic and resistance anomaly groups or radar reflection patterns identified in the figures and tables specified in Section 7.2 are necessarily discussed below. All identified anomaly groups are recorded in the GIS project held the survey archive.

Data collection

There are boggy patches in the north-eastern section of the survey area prohibiting magnetic data collection in one area as shown in Figures 3, 4 and 5.

Data collection during the magnetometer survey was restricted as shown in the relevant figures due to the presence of relatively modern magnetic materials along boundaries and elsewhere within the survey area. Strong magnetic responses are likely to relate to these materials except where otherwise indicated in Figure 3.

Anomaly characterisation and mapping

There are a number of magnetic and resistance 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.

Anomalies thought to relate to natural features and recent man-made objects were only mapped where they comprised significant magnetic responses across the dataset that needed clarification.

Numerous dipole magnetic anomalies are scattered across the magnetometer data set. 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.

7.3.2 Discussion

Please refer to Figure 3 and Table 2.

Magnetic anomaly group m1 may represent an archaeological deposit, such as a filled ditch, or a natural linear deposit.

It is not clear whether groups m2 and m3, which have similar magnetic characteristics, represent archaeological or natural deposits. If they relate to archaeological deposits then they are most likely to be filled pits or former surfaces.

Resistance anomaly group r2 can be interpreted as a natural deposit or a former filled pit. It lies adjacent to two find spots within a small valley running southwest to northeast, the width and trend of which are clearly visible in the resistance data shown in Figure 6. Groups r1 and r3 have similar characteristics and lie within the same area. These groups are only recorded as potential archaeology because of their proximity to the find spots and do not otherwise stand out in the data set.

Magnetic anomaly groups m4 to m6 and resistance anomaly groups r4 to r6 approximately coincide with a former field boundary mapped on the 1840 tithe map but not on later Ordnance Survey maps. The anomaly groups and former field boundary also coincide with a change of slope. The field boundary ran along the western side of a long, narrow enclosure that was an orchard in 1840. It is not certain whether these anomaly groups represent deposits associated with the former field boundary, cultivation traces associated with the orchard or other phase of agricultural activity, or natural deposits associated with the change in slope.

7.4 Conclusions

The magnetic and resistance responses were sufficient to be able to differentiate anomalies representing possible archaeological features. Six magnetic anomaly groups and six resistance anomaly groups were mapped as representing potential archaeological deposits and features. Three resistance anomalies (r1 to r3 in Figure 3) have some potential to represent archaeological pits but are more likely to represent natural deposits. They were mapped primarily because of their proximity to two find spots. There were no other clear relationships between the find spots and magnetic or resistance anomalies in the survey data sets.

The magnetic data contained evidence for a possible curvilinear feature such as a ditch (m1) and three linear deposits (m4 to m6) which coincide with the location of a former field boundary recorded on the 1840 tithe map but not on later maps. These anomalies may equally represent cultivation traces or natural deposits. The former field boundary was also represented in the resistance data (r4 to r6) with the same caveats. Two reasonably well defined areas of enhanced magnetic responses (m2 and m3) may indicate archaeological deposits such as filled pits or surfaces but natural origins are equally likely.

8 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.

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.

9 Acknowledgements

Substrata would like to thank Bill Horner, County Archaeologist, Devon County Council Environment Group for commissioning Substrata to complete the survey.

10 Bibliography

Archaeology Data Service (undated) *Archaeology Data Service/Digital Antiquity Guides to Good Practice: Geophysical Data in Archaeology* [Online], Available: http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_Toc [May 2017]

British Geological Survey (undated) *Geology of Britain viewer, 1:50000 scale data*, [Online], Available: <http://www.bgs.ac.uk/discovering-Geology/geologyOfBritain/viewer.html> [August 2017]

Chartered Institute for Archaeologists (2014a) *Standard and guidance archaeological geophysical survey*. Reading: Author [Online], Available: http://www.archaeologists.net/sites/default/files/CifAS&GGeophysics_1.pdf [April 2017]

Chartered Institute for Archaeologists (2014b) *Code of conduct*. Reading: Author [Online], <http://www.archaeologists.net/sites/default/files/CodesofConduct.pdf> [April 2017]

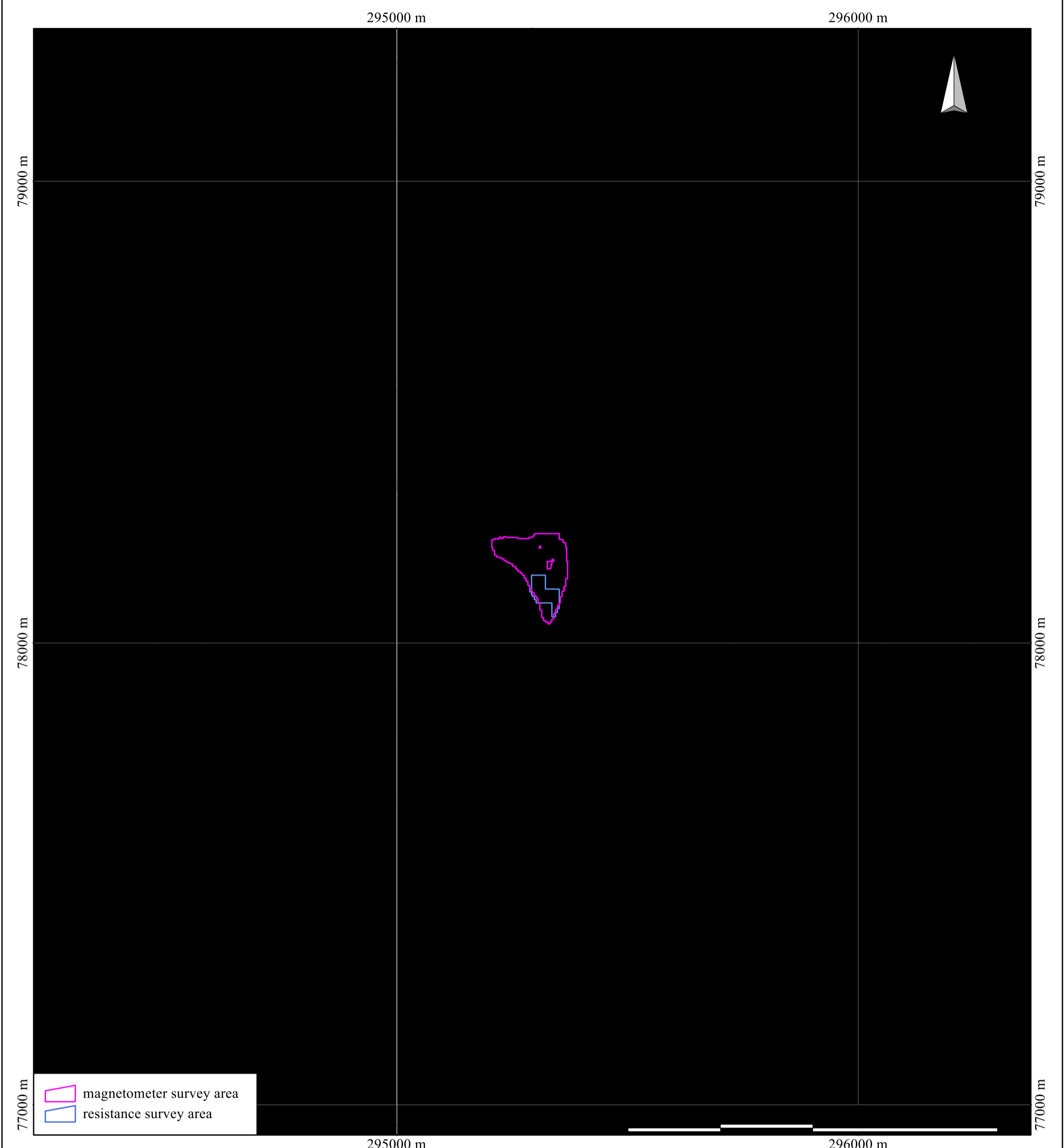
Dean, R. (2017) Methodology statement for an archaeological magnetometer and resistance survey, at Langdon Farm, Dawlish, Devon, Substrata Ltd unpublished document 1703LAN-T-1

Heimmer, Don H., and Steven L. DeVore (1995) *Near-Surface, High Resolution Geophysical Methods for Cultural Resource Management and Archaeological Investigations*. Revised edition. National Park Service, Denver, Colorado

Historic England (undated a) *Heritage Gateway* [Online], Available: <http://www.heritagegateway.org.uk/gateway/> [August 2017]

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/> [April 2016]

Appendix 1 Figures



British Grid
 centre X: 295293.84 m, centre Y: 78132.53 m

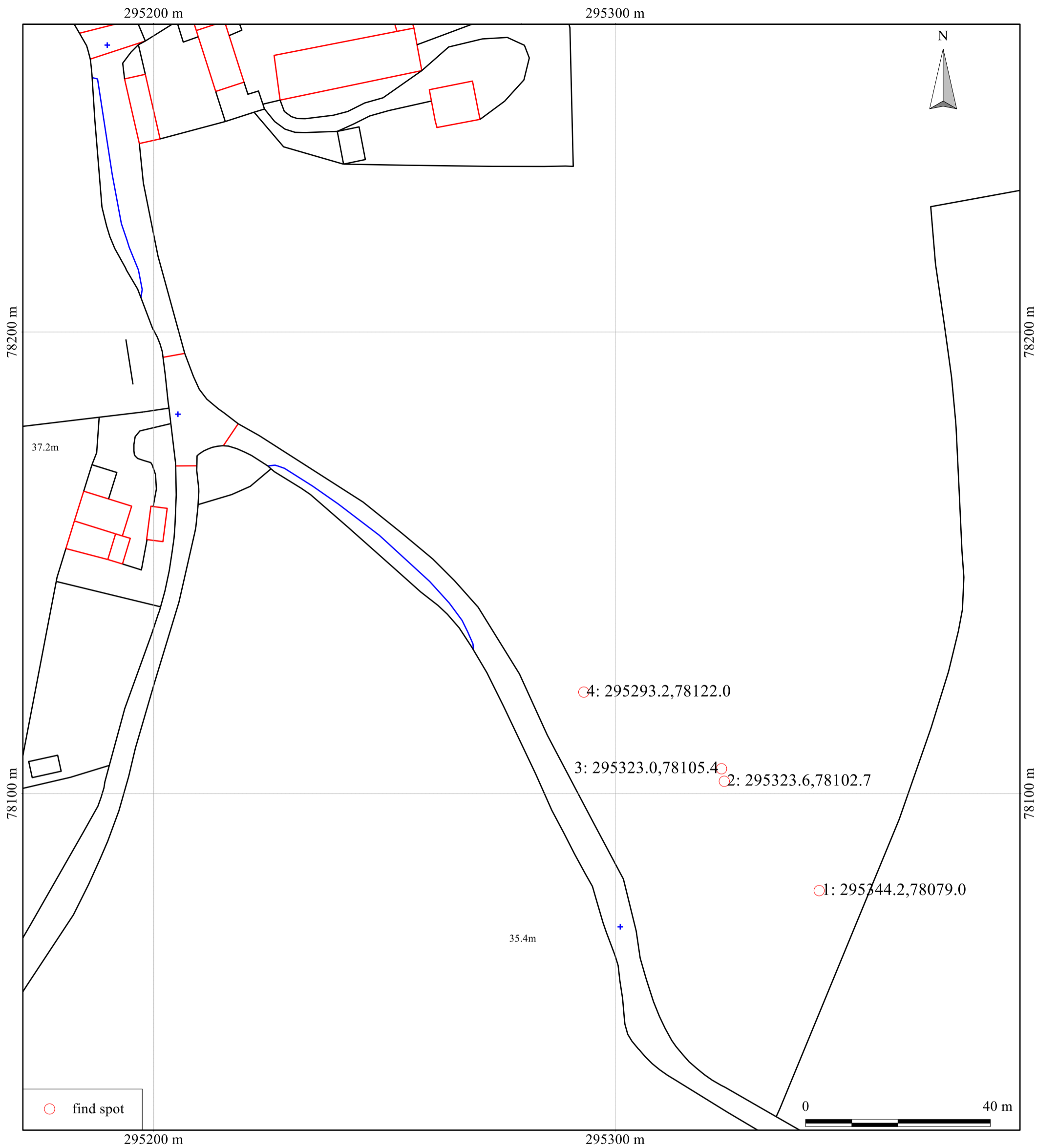
Geophysical survey: Copyright Substrata Limited.
 Base map: Ordnance Survey (c) Crown Copyright 2017.
 All rights reserved. Licence number 100022432

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

An archaeological magnetometer and resistance survey
 Langdon Farm, Dawlish, Devon
 Centred on NGR (E/N) 295300,078160
 Report: 1703LAN-R-1

Figure 1: location map

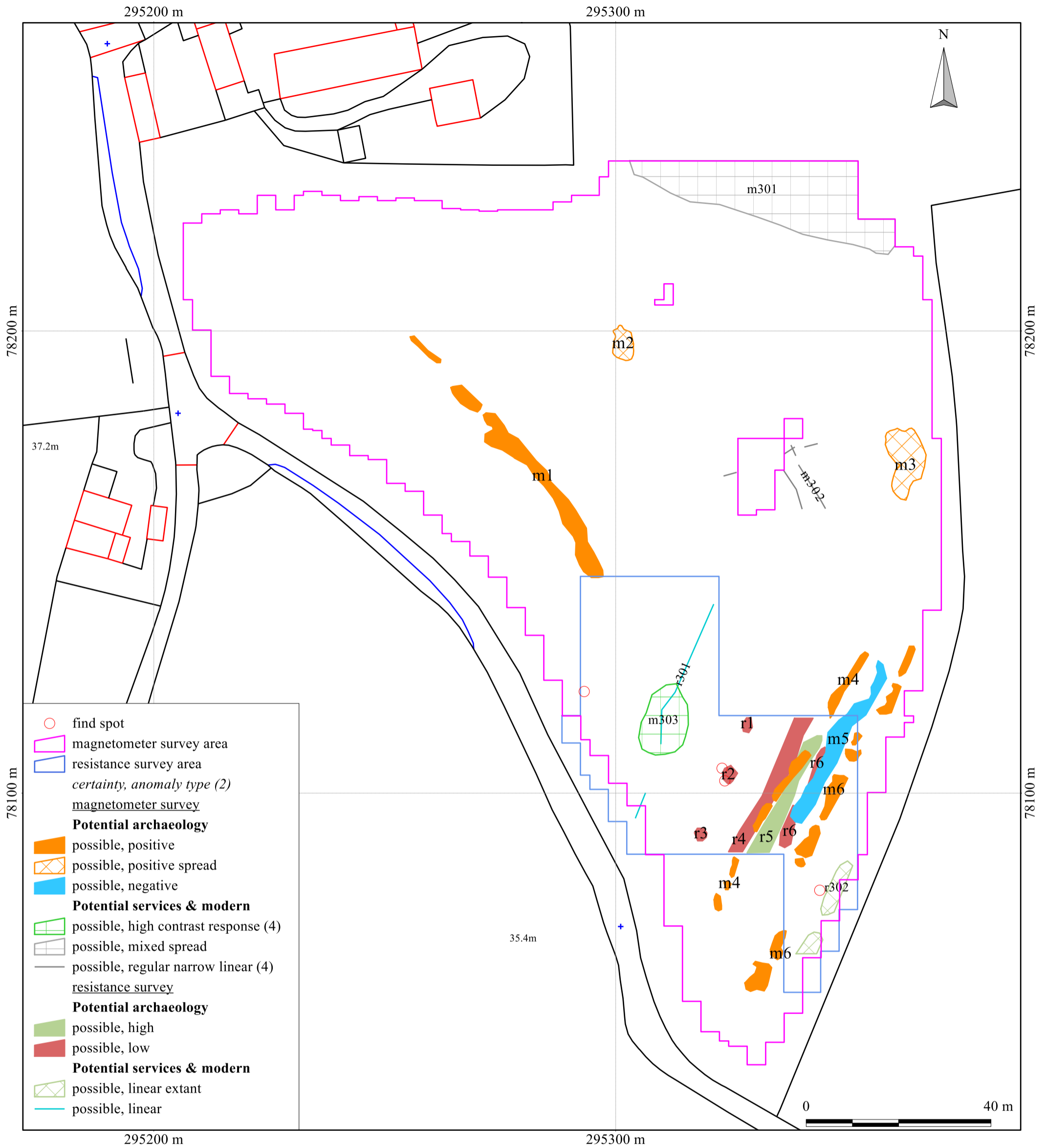
Substrata Limited
 Langstrath, Goodleigh
 Barnstaple, Devon EX32 7LZ
 Tel: 01271 342721
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



British Grid
 centre X: 295279.66 m, centre Y: 78146.89 m

Geophysical survey: Copyright Substrata Limited.
 Base map: Ordnance Survey (c) Crown Copyright 2017.
 All rights reserved. Licence number 100022432

Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing



British Grid
centre X: 295279.66 m, centre Y: 78146.89 m

Geophysical survey: Copyright Substrata Limited.
Base map: Ordnance Survey (c) Crown Copyright 2017.
All rights reserved. Licence number 100022432

Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing

Notes:

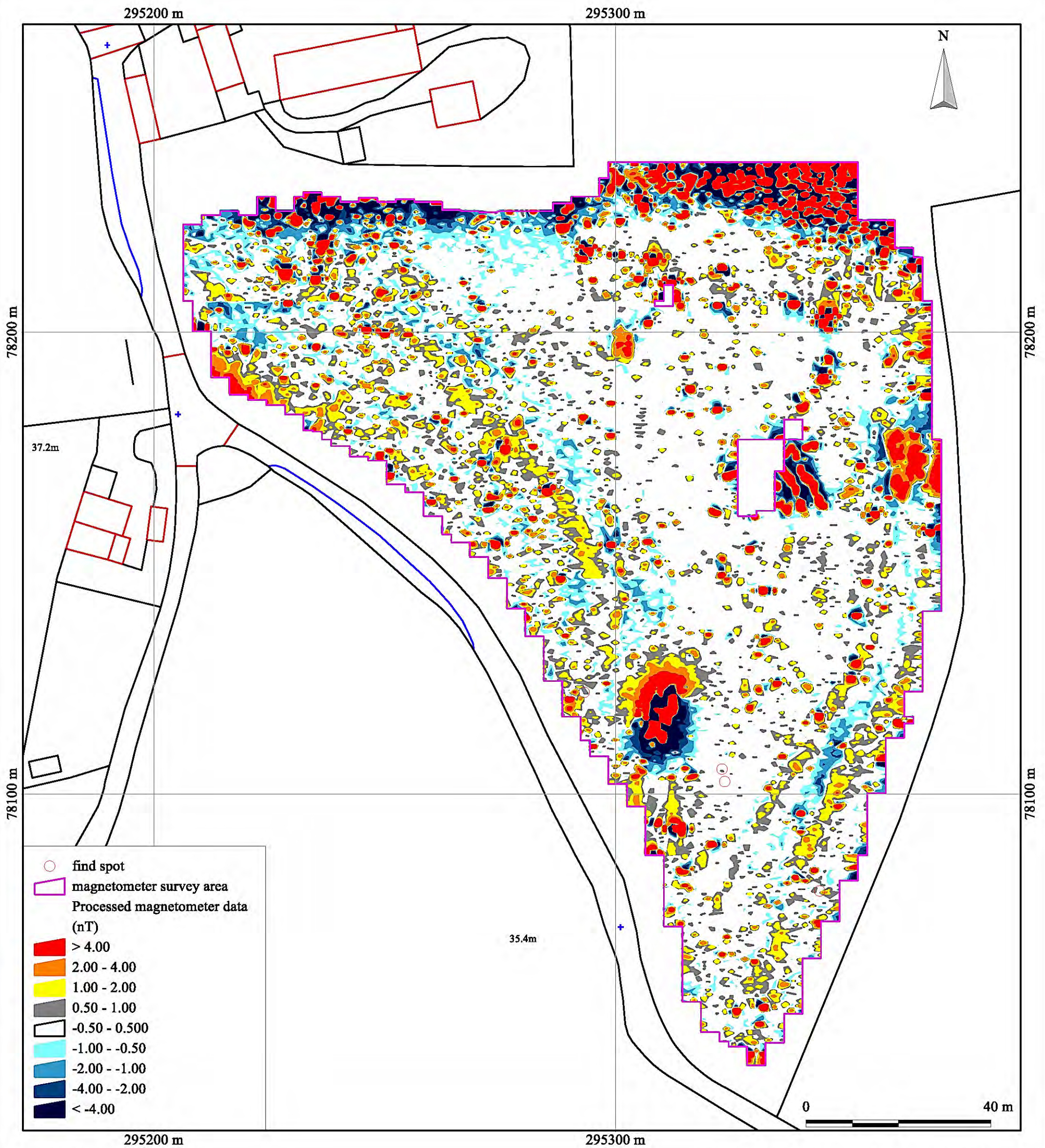
1. All interpretations are provisional and represent potential archaeological deposits.
2. 'Anomaly type' is a description of the magnetic anomaly. See the report text or GIS for an archaeological characterisation.
3. Anomalies designated "likely archaeology" have supporting evidence e.g. historical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



British Grid
 centre X: 295279.66 m, centre Y: 78146.89 m

Geophysical survey: Copyright Substrata Limited.
 Base map: Ordnance Survey (c) Crown Copyright 2017.
 All rights reserved. Licence number 100022432

Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing

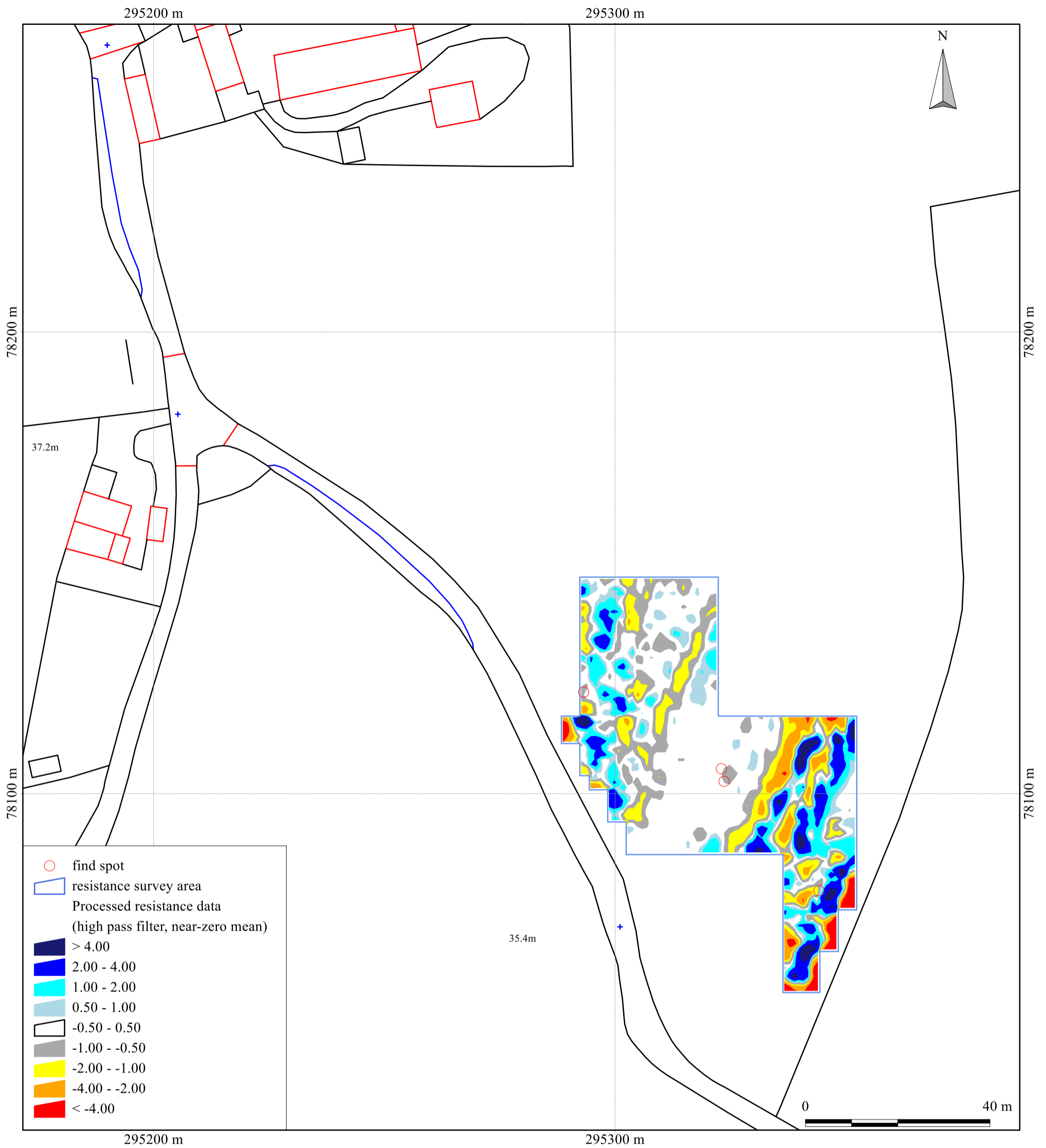




British Grid
 centre X: 295279.66 m, centre Y: 78146.89 m

Geophysical survey: Copyright Substrata Limited.
 Base map: Ordnance Survey (c) Crown Copyright 2017.
 All rights reserved. Licence number 100022432

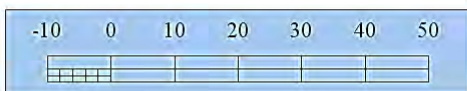
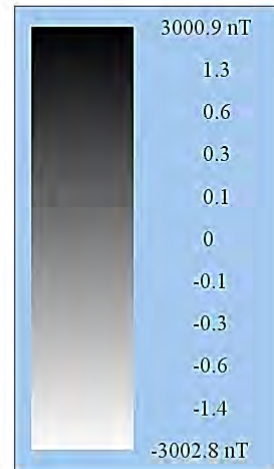
Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing



British Grid
 centre X: 295279.66 m, centre Y: 78146.89 m

Geophysical survey: Copyright Substrata Limited.
 Base map: Ordnance Survey (c) Crown Copyright 2017.
 All rights reserved. Licence number 100022432

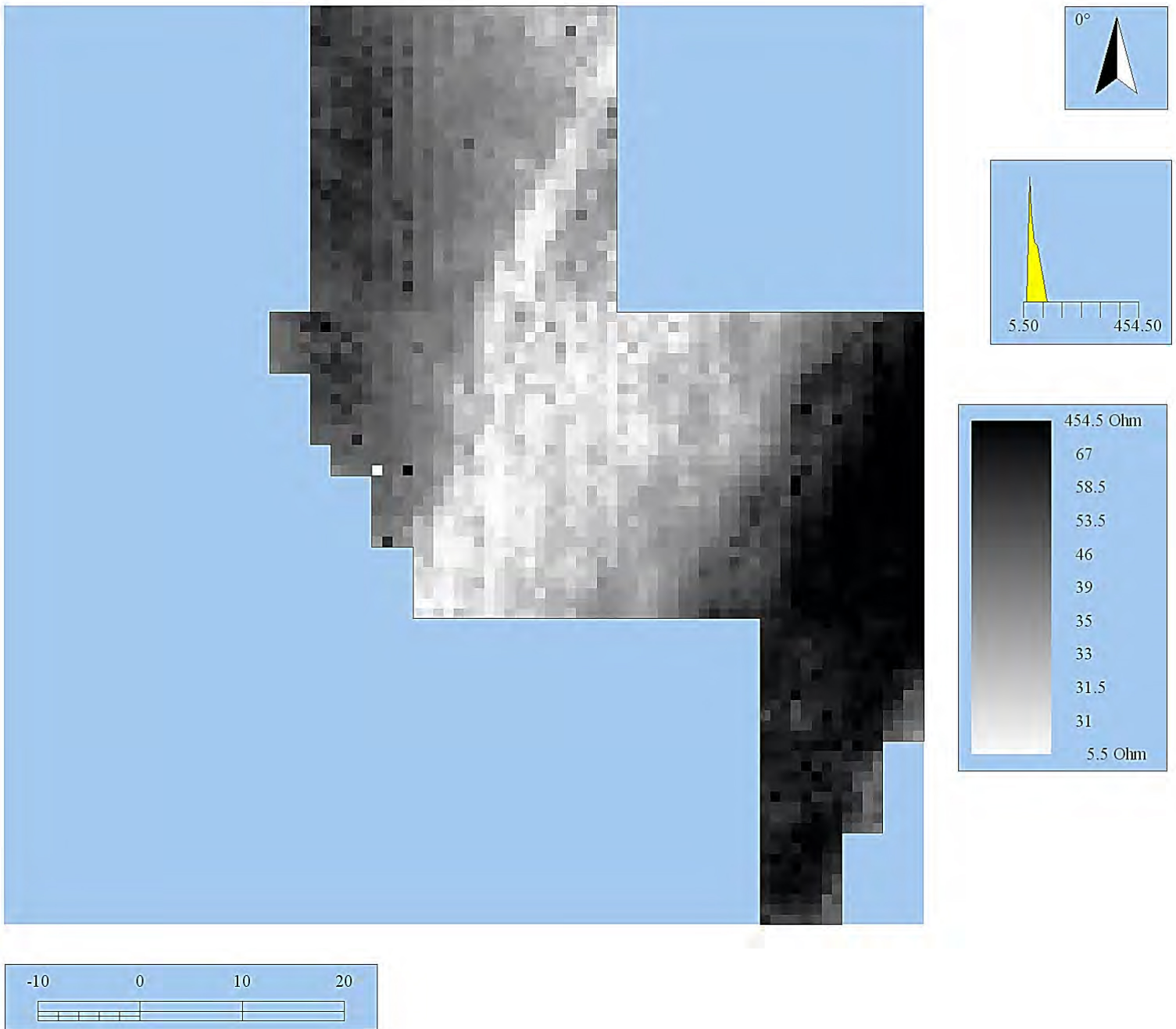
Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing



Instrument Type: Bartington Grad 601
 Units: nT
 Direction of 1st Traverse: 0 deg
 Collection Method: ZigZag
 Sensors: 2 @ 0.00 m spacing.
 Dummy Value: 32702
 Dimensions
 Grid Size: 30 m x 30 m
 X Interval: 0.25 m
 Y Interval: 1 m
 Stats
 Max: 3000.90
 Min: -3002.80
 Std Dev: 139.25
 Mean: 0.67
 Median: 0.00
 Surveyed Area: 1.6905 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.31.0

Processes: 2
 1 Base Layer
 2 DeStripe Median Sensors: Grids: All

Figure 8: shade plot of minimally processed magnetometer data



Instrument Type: GeoScan (Resistance)
 Units: Ohm
 Direction of 1st Traverse: 0 deg
 Collection Method: ZigZag
 Sensors: 1
 Dummy Value: 32702
 Dimensions
 Grid Size: 30 m x 30 m
 X Interval: 1 m
 Y Interval: 1 m
 Stats
 Max: 454.50
 Min: 5.50
 Std Dev: 18.67
 Mean: 47.33
 Median: 40.50
 Surveyed Area: 0.2978 ha
 PROGRAM
 Name: TerraSurveyor
 Version: 3.0.31.0

Processes: 1
 1 Base Layer

Figure 9: shade plot of unprocessed resistance data

Appendix 2 Tables

HER number	grid reference	designations	type	period	description	distance (m) from site centre	bearing (GN) from site centre
MDV16936	SX 956 786		ENCLOSURE?	Unknown	Two or three sides of a poorly defined possible rectangular enclosure are visible as cropmarks on aerial photographs of 1975, on a north-east facing slope overlooking a combe west of Dawlish Warren. The date and function of the possible enclosure are unknown and the cropmarks might be non-archaeological in origin.	533	34
MDV105498	SX 956 784		DITCH	Unknown	A short linear cropmark of a possible ditch is visible on aerial photographs of 1975. The date and function of the ditch are unknown. The cropmark does not correspond with any boundaries depicted on the tithe map for Dawlish.	384	51
MDV16935	SX 956 784	SHINE: Cropmark, Double Ditched Enclosure, west of Dawlish Warren	DOUBLE DITCHED ENCLOSURE	Early Bronze Age to Roman - 2200 BC to 409 AD (Between)	A double ditch-defined enclosure of probable later prehistoric to Roman period date is visible on aerial photographs of 1975 as two concentric cropmarks between Langdon Hospital and Hensford Road. The inner cropmark defines a roughly square enclosure 40 to 45 metres to a side. A more curvilinear cropmark defines the outer boundary, the visible extent of which is a minimum of approximately 60 metres across; extrapolating from the visible relationship between the two components, the outer enclosure probably measured closer to 75 metres across.	384	51
MDV61270	SX 955 783		TRACKWAY	Early Medieval to XXI - 1066 AD to 2009 AD (Between)	Trackway leading from langdon farm. May be of medieval origin as it leads away from Langdon Farm which was recorded as a place-name in 1244. Cuts through small double-ditched enclosure (MDV16935).	244	55
MDV105501	SX 961 786		CATCH MEADOW	Post Medieval to XX - 1540 AD to 1946 AD (Between)	Curvilinear ditches are visible on aerial photographs of 1946 as earthworks on combe slopes to the south of Langdon Hospital. The ditches are probably evidence of a small catch meadow of probable post-medieval to nineteenth century date. The earthworks are not visible on later aerial photographs and have probably been levelled.	913	61
MDV118050	SX 961 783		ARCHAEOLOGICAL FEATURE	Unknown	Groups of linear and curvilinear features recorded as anomalies on a geophysical survey. Some coincide with former field boundaries recorded on historic maps. The others are also likely to represent former ditches or banks associated with phases of past land management.	812	80
MDV118087	SX 960 782		ARCHAEOLOGICAL FEATURE NATURAL FEATURE	Unknown Unknown	Rubble with archaeological origins or natural bedrock.	701	87
MDV118047	SX 961 781		ARCHAEOLOGICAL FEATURE	Unknown	A group of features recorded as anomalies on a geophysical survey which have a particularly clear presence in the dataset. They may have archaeological significance such as industrial or craft deposits although a modern origin cannot be ruled out.	802	94
MDV105492	SX 957 779		SQUARE ENCLOSURE	Early Bronze Age to Roman - 2200 BC to 409 AD (Between)	An L-shaped cropmark visible on aerial photographs of 1989 might define the western corner of a small square ditch defined enclosure, immediately north-east of Langdon Road, north of Dawlish. The enclosure might be of later prehistoric date and potentially associated with linear ditched features located to the south-west (MDV56060).	477	123
MDV110068	SX 959 779		ARCHAEOLOGICAL FEATURE	Unknown	Geophysical survey 2014: linear and other possible archaeological deposits, possible pits, possible field and/or enclosure boundaries.	654	113
MDV56060	SX 956 779		BOUNDARY DITCH	Early Bronze Age to Roman - 2200 BC to 409 AD (Between)	Three linear cropmarks of parallel ditched features are visible on aerial photographs of 1989, immediately north-east of Langdon Road, north of Dawlish. They might be of later prehistoric to Roman date and potentially associated with a possible enclosure located to the north-east (MDV105492).	397	131
MDV105490	SX 956 776		CATCH MEADOW	XIX to XX - 1801 AD to 1950 AD)	A catch meadow of probable nineteenth or twentieth century date is visible on aerial photographs of 1950 as parallel earthwork ditches following the contours of a south-facing combe slope, between Langdon Lane and Langdon Road, Dawlish.	635	152
MDV56059	SX 954 778	SHINE: Prehistoric ring ditch north east of Peacock Haven	RING DITCH	Early Bronze Age to Roman - 2200 BC to 409 AD (Between)	A ring ditch of probable later prehistoric date is visible as a cropmark circa ten to eleven metres in diameter, on a gentle east facing slope near the head of a shallow combe between Langdon Lane and Langdon Road, Dawlish.	374	164
MDV111233	SX 954 776		KILN	Unknown	Plot 230 on the Dawlish Tithe Map of 1840 is recorded as 'Kiln Close' within the Tithe Apportionment. The field name indicates the presence of a kiln within the vicinity, although no features are depicted within this location on the Tithe Map or later First Edition 25 inch Ordnance Survey map.	569	170
MDV29046	SX 949 777		BARROW	Prehistoric - 698000 BC to 42 AD (Between)	Grass covered barrow surmounted by OS triangulation station. Described by Hutchinson as on Dawlish Water Hill, half a mile north of Dawlish. His drawing shows it in sheep's pasture. Diameter 13m in 1853, now (1982) 18m, height 3m.	610	221
MDV63929	SX 949 777		FIELD SYSTEM	Unknown	Tithe map field name 'landscare' given to the westernmost of 3 narrow fields aligned nw-se, parallel with Long Lane. This name has been explained as deriving from the old English 'land-scearu', meaning a boundary or landmark. Although there is a parish boundary immediately to the east, this relates to the relatively recent division of East and West Dawlish, in 1894. 'land-scearu' can also mean 'a share of land'. The fields in this area as shown on the Dawlish tithe map are generally quite narrow strips and may have resulted from the amalgamation of intermixed holdings.	610	221
MDV63928	SX 948 777		BARROW	Prehistoric - 698000 BC to 42 AD (Between)	Tithe map field name 'Old Burrows' may refer to the former existence of one or more barrows, perhaps within this field. Barrow in field to east (MDV29046).	679	227

Table 1: Historical Environment Entries thought relevant to geophysical survey

Site: An archaeological magnetometer and resistance survey
 Langdon Farm, Dawlish, Devon
 Centred on NGR (E/N) 295300,078160
 Report: 1703LAN-R-1

anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
m1		possible, positive	disrupted curvilinear	ditch or natural deposits		
m2		possible, positive spread	irregular oval	archaeological or natural deposits		
m3		possible, positive spread	irregular	archaeological or natural deposits		
m4	m5 m6 r4 r5 r6	possible, positive	disrupted curvilinear	deposits associated with a former field boundary or cultivation traces or natural deposits	anomaly group coincides with a former field boundary recorded on the 1840 tithe map but not on later maps	1840 Dawlish Tithe Map Part 1
m5	m4 m6 r4 r5 r6	possible, negative	disrupted curvilinear	deposits associated with a former field boundary or cultivation traces or natural deposits	anomaly group coincides with a former field boundary recorded on the 1840 tithe map but not on later maps	1840 Dawlish Tithe Map Part 1
m6	m4 m5 r4 r5 r6	possible, positive	disrupted curvilinear	deposits associated with a former field boundary or cultivation traces or natural deposits	anomaly group coincides with a former field boundary recorded on the 1840 tithe map but not on later maps	1840 Dawlish Tithe Map Part 1
m301		possible, mixed spread	irregular	relatively recent rubble and fill material		
m302		possible, regular narrow linear		field drain		
m303		possible, high contrast response		ferrous material		
r1		possible, low	irregular	natural or pit	anomaly group is mapped because of its proximity to two find spots	
r2		possible, low	irregular	natural or pit	anomaly group is mapped because of its proximity to two find spots	
r3		possible, low	irregular	natural or pit	anomaly group is mapped because of its proximity to two find spots	
r4	r5 r6 m4 m5 m6	possible, low	linear	deposits associated with a former field boundary or cultivation traces or natural deposits	anomaly group coincides with a former field boundary recorded on the 1840 tithe map but not on later maps	1840 Dawlish Tithe Map Part 1
r5	r4 r6 m4 m5 m6	possible, high	linear	deposits associated with a former field boundary or cultivation traces or natural deposits	anomaly group coincides with a former field boundary recorded on the 1840 tithe map but not on later maps	1840 Dawlish Tithe Map Part 1
r6	r4 r5 m4 m5 m6	possible, low	disrupted linear	deposits associated with a former field boundary or cultivation traces or natural deposits	anomaly group coincides with a former field boundary recorded on the 1840 tithe map but not on later maps	1840 Dawlish Tithe Map Part 1
r301		possible, linear		service trench?		
r302		possible, linear extant	disrupted linear	associated with extant field boundary or cultivation traces		

Table 2: data analysis

<p>Grid <i>Method of Fixing:</i> DGPS and RTK 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.</p>	
<p>Magnetometer Equipment <i>Instrument:</i> Bartington Instruments grad601-2 <i>Firmware:</i> version 6.1</p>	<p>Magnetometer Data Capture <i>Sample Interval:</i> 0.125-metres <i>Traverse Interval:</i> 1 metre <i>Data capture:</i> automatic data logger <i>Traverse Method:</i> zigzag <i>Traverse Orientation:</i> GN324</p>
<p>Resistance Equipment <i>Instrument:</i> Geoscan Research RM15 multi-probe resistance meter <i>Configuration:</i> twin probe <i>Mobile probe spacing:</i> 0.5-metres</p>	<p>Resistance Data Capture <i>Sample Interval:</i> 1 metre <i>Traverse Interval:</i> 1 metre <i>Data capture:</i> automatic data logger <i>Traverse Method:</i> zigzag <i>Traverse Orientation:</i> GN324</p>
<p>Data Processing, Analysis and Presentation Software QCAD Professional DW Consulting TerraSurveyor3 Manifold System 8 GIS Microsoft Corp. Office Excel 2013 Microsoft Corp. Office Publisher 2013 Adobe Systems Inc Adobe Acrobat 9 Pro Extended</p>	

Table 3: methodology information

Instrument	
Type:	Bartington Grad 601
Units:	nT
Direction of 1st Traverse:	0 deg
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	32702
Program	
Name:	TerraSurveyor
Version:	3.0.31.0
<u>Figures 4 and 5</u>	
Stats	Processes: 5
Max: 246.40	1 Base Layer
Min: -174.83	2 Clip at 1.00 SD
Std Dev: 8.99	3 DeStripe Median Traverse: Grids: All
Mean: 0.08	4 Range Match (Area: Top 0, Left 720, Bottom 89, Right 839) to
Median: -0.02	Left edge
Surveyed Area: 1.7ha	5 Interpolate: X & Y Doubled.

Table 4: magnetometer survey - processed data metadata

Instrument	
Type:	Geoscan Research RM15
Units:	resistance data (ohms) normalised about a near-zero mean
Direction of 1st Traverse:	0 deg
Collection Method:	ZigZag
Sensors:	2 @ 1.00 m spacing.
Dummy Value:	32702
PROGRAM	
Name:	TerraSurveyor
Version:	3.0.31.0
<u>Figure 6</u>	
Stats	Processes: 4
Max: 85.34	1 Base Layer
Min: 29.64	2 Despik Threshold: 1 Window size: 3x3
Std Dev: 16.03	3 Clip from 30.00 to 80.00 Ohm
Mean: 46.81	4 Interpolate: X & Y Doubled.
Median: 40.04	
Surveyed Area: 0.3ha	
<u>Figure 7</u>	
Stats	Processes: 5
Max: 8.49	1 Base Layer
Min: -12.51	2 Despik Threshold: 1 Window size: 3x3
Std Dev: 1.81	3 Clip from 30.00 to 80.00 Ohm
Mean: -0.09	4 High pass Gaussian filter: Window: 10 x 10
Median: -0.07	5 Low pass Gaussian filter: Window: 3 x 3
Surveyed Area: 0.3ha	

Table 5: resistance survey - processed data metadata