

Substrata

Archaeological Geophysical Surveyors

An archaeological magnetometer survey

Berry Castle, Huntshaw Torridge, Devon

Centred on NGR (E/N): 249488,122283 (point)

Report: 1603BER-R-1

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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: between 27 June and 1 July 2016
Area: 1.6ha
Lead surveyor: Mark Edwards BA
Author: Ross Dean BSc MSc MA MfA
with contributions from Mark Edwards

1.2 Clients

Friends of Berry Castle, c/o Knockworthy Farm, Huntshaw, Torrington, Devon EX38 7HJ

1.3 Location

Site: Berry Castle
Civil Parish: Huntshaw
District: Torridge
County: Devon
Nearest Postcode: EX38 7HB
NGR: SS 49488 22283 (point)
Ordnance Survey NGR (E/N): 249488,122283 (point)
Section 42 licence: Case number SL00127777
Monument number: 1013225
Licence period: 12 April 2016 to 12 July 2016

1.4 Archive

OASIS number: substrat1-259960
Archive: At the time of writing, the archive of this survey will be held by Substrata.

1.5 Introduction

This report presents the results of an archaeological magnetometer survey at the above site, hereafter referred to as the survey area. It has been prepared for the Friends of Berry Castle as part of an ongoing programme of research and conservation. The survey area location is shown in Figure 1. The survey area includes a Scheduled Monument comprising the bulk of Berry castle and the relevant licence to carry out a geophysical survey was obtained by The Friends of Bury Castle as summarised above.

1.6 Summary

The magnetic responses across the survey area were sufficient to be able to differentiate between anomalies representing possible archaeological features and background magnetic responses. Thirty-three magnetic anomaly groups were mapped as representing possible archaeological deposits or features.

Refer to Figure 2 for the locations of Areas 1 to 4.

Within Area 1, three anomaly groups representing the extant ramparts were characterised as representing an outer ditch, a stony element of the ramparts on the outer side and an earthen element of the ramparts on the inner side. These three anomaly groups were present on all sides of the monument. The northern-most of two previously identified locations for potential entrances on the western side of the monument is most likely to be a true entrance and not a decoy as originally described in 1906. The magnetic anomaly group representing an earthen element of the ramparts on the inner side at the second proposed western entrance is continuous which implies that this is not an entrance or that the structure of ramparts underwent changes after an entrance was constructed. A third previously identified potential entrance on the eastern side was discounted as the anomaly group representing a stony element of the rampart was continuous at this location. A alternative entrance sited centrally on the eastern side was identified, again with reservations concerning the anomalies

representing an earthen element of the ramparts on the inner side. Within the main body of the monument, potential inner divisions were mapped that mirrored the main ramparts in shape and a potential charcoal production platform was tentatively identified.

Two linear anomalies representing potential archaeological deposits were identified in Area 2 but not characterised further. Anomalies representing possible agricultural terraces were identified in Area 3 and on the southern side of Area 1. No conclusions were reached about a previously mapped surface deposit of stones in Area 3. Linear anomaly groups representing stony and earthen deposits were identified in Area 4 that may represent previously recorded earthworks external to the main monument.

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. Specifically (refer to Figure 2):

1. Within Area 1, understand the constituents and construction of the monument;
2. Within Area 2, examine the apparent slight earthworks running across the current track;
3. Within Area 3, examine the surface deposit of stones;
4. Within Area 4, examine a section of the banks external to the main monument within current tree cover.

2.2 Survey objectives

1. Complete a magnetometer survey across agreed parts of the survey area.
2. Identify any magnetic anomalies that may be related to archaeological deposits, structures or artefacts.
3. Within the limits of the 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 survey area 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 (undated).

4 Site description

4.1 Landscape and land use

The survey area comprises Berry Castle hill fort and three adjacent parcels of land. As shown in Figure 1, the hill fort lies on a relatively flat area towards the western end of an east to west trending spur between approximately 85m to 107m AOD. Steep, wooded valley sides lie to the north, west and south. To the east, the spur rises towards an upland area cut by steep-sided valleys. Referring to Figure 2, at the time of the survey the area, formally extant forest plantation had been cleared in Area 1 leaving only tree stumps. The brush and long vegetation had also been cleared. Area 2, had been cleared of long vegetation to the limits shown in Figure 2. Area 3 had been partially cleared over the area of stones with knee-deep vegetation surrounding. Area 4 was an area of woodland with the undergrowth cleared back into small piles.

4.2 Geology

The survey area has a solid geology of sandstone of the Carboniferous Bude Formation. These rocks are grey thick-bedded, somewhat argillaceous and silty sandstones, in laterally discontinuous internally massive beds 1-5m thick and commonly amalgamated into units up to

10m thick. When weathered the sandstones become buff and friable. Very thick beds of slumped and de-stratified strata are also present. Grey mudstones occur as interbeds up to 1m thick but locally packets of darker mudstone up to 20m thick with thin ironstone beds and bundles of thin sandstones, especially in the upper part of the Formation (British Geological Survey, undated).

The superficial geology is not recorded in the source used (ibid).

5 Archaeological background

5.1 Definitions

5.1.1 Heritage assets

Archaeological sites, buildings, historic parks and gardens, conservation areas, registered battlefields and other aspects of the historic environment that are 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.

5.1.2 Historic Environment Records (HERs) are sources of, and signposts to, information relating to landscapes, buildings, monuments, sites, places, areas and archaeological finds spanning more than 700,000 years of human endeavour. Based mainly in local authorities, they are used for planning and development control but they also fulfil an educational role (Historic England, undated b).

5.1.2 Archaeological periods

Archaeological periods use in this report are defined as follows:

Prehistoric: before AD 43

Palaeolithic: 500,000 BC to 10,000 BC

Mesolithic: 10,000 BC to 4,000 BC

Neolithic: 4,000 BC to 2,200 BC

Bronze Age: 2,200 BC to 700 BC

Iron Age: 00 BC to AD 43

Romano-British: AD 43 to AD 410

Early Medieval: AD 410 to AD 1066

Medieval: AD 1066 to AD 1540

Post-Medieval: AD 1540 to AD 1901

Modern: AD 1901 onwards

5.1.3 Grid references, distances and bearings

The centre of the survey area is provided in Section 1 as a twelve figure National Grid easting/northing (E/N) and as a ten figure National Grid reference (NGR), both of which define a 1m square with its south-western corner on the reference point. Eight figure NGRs define a 10m square. Six figure NGRs a 100m square and so on. Bearings and distances between points defined by NGRs as used below are between the south-western corners of these squares.

5.2 Historic landscape characterisation

Other woodland.

Broad-leaved plantations, re-planted ancient woodland or secondary woodland that has grown up from scrub (Devon County Council, undated).

5.3 Historical and archaeological background

The following is a short summary of information obtained from Alimo (2012) and from the Devon HER within approximately 1000m of the survey area and relevant to the understanding of the geophysical survey. Except where specifically cited, this information was obtained using the Heritage Gateway portal (Historic England, undated).

5.3.1 Heritage assets within the survey area

Berry Castle Camp is the remains of an Iron Age hillfort in Huntshaw Wood¹. The hillfort has been under cultivated woodland for perhaps many hundreds of years, over which, the banks have been broken down due to either re-seeding, planting or felling, and the ditches have become filled with tree debris and undergrowth generally. The site has now been cleared of trees and undergrowth in areas 1 and 3 (Figure 2). The shape of the fort is a fairly regular parallelogram with a well-defined bank and ditch to the north and well defined banks to the east and west. The bank to the south however, is considerable less defined and has been possibly flattened. Evidence of quarrying in the ditch at the north west corner of the site is recorded from 1922, which also states that stones were used from the site for road mending.

Two banks, external to the scheduled area of Berry Castle are located to the north-east corner of the site. It is speculated that they may have been unfinished eastern defences, as this would have been the most vulnerable side of the fort during any attack. Similar outer defences are seen on other hillforts².

A possible stone circle or cairn lies 20 metres to the south-west of Berry Castle, it has been exposed due to logging of the area and appears to have been disturbed³.

Alimo (2012) has summarised the possible entrances to the monument:

The earliest written records of Berry Castle are found in the Victoria County History for Devonshire (Wall, 1906) where reference was made to two entry points with a simple opening in the east (point C in Figures 3 to 6 of this report) and a entrance in the west (point B) and a decoy entrance (point A). Alimo (2012: Section 4.7.4 and Figure 21) describes the site of the original eastern entrance is a gap of around two metres in the rampart adjacent to a quarry scoop with an apparent causeway leading up to the gap.

Field Investigators comments from 1953 note an earthwork straddling an east to west ridge that slopes to the west. A glacis-type bank 1.0 metre high was found on the south side with no ditch. Remaining defences consisted of a stony bank with an outer ditch. The strongly defended north-west corner is mentioned along with a counter-scarp bank beyond the ditch. A single entrance at the north-west corner of the hillfort is described and this was associated with an oval depression lying immediately inside. It is claimed that the entrances indicated by Wall were modern gaps in the bank made for tracks through the wood.

Field Investigators comments from 1980 refer to a defended settlement with only the eastern and western sides being relatively complete. A modern track was found to cross east/west through the settlement and this was clear of the original in turned entrance. It was claimed that the “hollow” through the entrance was dug to create the in turning banks (sourced from Alimo, 2012).

Historic Environment Notes

Record entries listed below in order: Devon Historical Environment Record, National Grid Reference, Scheduled monument number (if present), National Monuments Record (if present)

1. MDV5627, SS 495 222, 1016225, 33126
2. MDV107285, SS 495 223
3. MDV107284, SS 494 222

5.3.2 Heritage assets within 1000m of the survey area

Several undated enclosures are recorded in the wider area. An enclosure is recorded at Castle Field, a simple defensive enclosure that occupies a ridge 600m N180 from site. The enclosure has been destroyed by cultivation, although some remains are still traceable through crop marks⁴. An enclosure east of Southcott Barton is recorded 906m N264 from the survey area, formed of a double ditched rectangular enclosure visible on RAF photography. The outer enclosure is approximately 64m by 44m, and the inner enclosure is approximately 30m by 20m⁵. A near circular enclosure visible as cropmarks from aerial photography is recorded 1300m N180 from the survey area, north of Southcott Barton. The enclosure is roughly 45m diameter with no visible entrance⁶

A 1947 aerial photograph suggests the presence of pits 990m N315 from the site, although the 1842 Tithe Apportionment records the field as 'Lower Moor' which is not suggestive of any particular activity⁷

Evidence of modern quarrying is recorded 728m N16 from site, east of Fair oak⁸, 860m N54 from site⁹ and 922m N13 from the site to north of Fair oak¹⁰.

Historic Environment Notes

Record entries listed below in order: Devon Historical Environment Record, National Grid Reference, Scheduled monument number (if present), National Monuments Record (if present)

4. MDV11842, SS495 216
5. MDV73888, SS 486 221
6. MDV16675, SS 482 222
7. MDV65515, SS 488 229
8. MDV34103, SS497 229
9. MDV67699, SS 502 277
10. MDV34104, SS 497 231

6 Results, discussion and conclusions

6.1 Scope and definitions

This survey was designed to record magnetic anomalies. A magnetic anomaly is a local variation in the Earth's magnetic field. Such variations can result from variations 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 artefacts can also create magnetic anomalies.

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.

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

The analysis presented below identifies and characterises anomalies and anomaly groups that may relate to archaeological deposits, structures and features (see also Section 7).

6.2 Results

Figure 4 shows the interpretation of the survey data. It includes the anomaly groups identified as possibly relating to archaeological deposits along with their identifying numbers. Table 1 is an extract of the detailed analysis of the survey data sourced from the attribute tables of the GIS project provided in the project archive.

Figure 4 and Table 1 comprise the analysis of the survey data.

The current Ordnance Survey map of the area displays an accuracy typical for such a rural setting but could not provide the accuracy necessary for the interpretation. Substrata undertook a quick earthworks survey to act as a guide during the interpretation and to aid in presentation of the results as presented in Figure 2 and other figures. Its northing and easting accuracy is no better than +/- 0.5m. No vertical measurements were recorded.

Figure 3 provides a comparison of the Substrata quick survey with an earthworks survey produced in 1906 (Wall, 1906) along with the entrances proposed by Wall. While the condition of the landscape will have changed since 1906, we consider the quick survey to be a better representation of the shape and position of the monument as extant in 2016. Figures 5 and 6 present the survey interpretation with the Substrata and Wall surveys respectively.

Figures 7 and 9 are plots of processed data as specified in Table 3. Figure 8 is a plot of the processed data presented with the Substrata quick survey.

Figures 10 to 13 are shade plots of the survey data prior to processing.

6.3 Discussion

6.3.1 General points

Discussion scope

Anomalies groups identified in Table 1 as possibly representing archaeological deposits or features but which cannot be further characterised are not discussed below. All identified anomaly groups are recorded in the GIS project held the survey archive.

Data collection

Data collection within the survey area was restricted as shown in Figure 2 and elsewhere due to the presence of steep ground (Area 1), vegetation (Areas 1, 2 and 4) and standing trees (Areas 1 and 4).

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. Not all are discussed below.

Anomalies thought to relate to natural features were not mapped.

Numerous dipole magnetic anomalies are scattered across the data set. These are likely to represent recent ferrous objects, some of which are mapped in Figure 4 to aid in interpretation (constituents of group 206 and groups 211 and 212 in Figures 4 and 5).

6.3.2 Data relating to historic maps, other records and/or extant earthworks

Magnetic anomaly groups **3**, **4** and **5** in Area 1 coincide with the previously mapped extant earthworks of Berry Castle (Figures 5 and 6). This scheduled monument (number 1016225) is recorded in the Devon Historical Environment Record (entry MDV5627) and the National Monuments Record (entry 33126). Group 3 approximately coincides with the outer edge of a negative earthwork visible on the northern edge of the monument that is likely to be a partial surface expression of the ditch. Sections of what is likely to be the same ditch are represented by fragments of the anomaly group on the west, east and south edges of the extant earthworks. Group 4 coincides with the outer face of extant banks of the monument and is likely to represent a rubble core of the monument bank which, from the position of the anomaly group in relation to the visible earthworks as recorded in Figure 5, appears to have partially collapsed into the ditch. Anomaly group 5 coincides with the inner face of the extant banks and with the top of the relatively low southern bank. This implies that either the inner face is of earthen construction or that earthen material has been deposited subsequent to construction.

Excluding the three relatively recent quarry pits (Figure 2 and other figures), and other sections of the earthworks too steep to survey safely, groups 4, 5 and 6 show only one distinct gap in their collective pattern which is situated to the northern end of the western side and corresponds to the decoy entrance described by Wall (1906) (location A in Figures 3 to 6). Whilst some of the anomalies in this area have here been characterised as relatively recent (see the discussion of 201 and 202 below), the fact that all three anomaly groups break here suggests that this is the site of an original entrance (see Section 5.3.1 for a discussion of this entrance). Two other entrances have been proposed by Wall at points B and C in Figures 3 to 6) although these were not identified as entrances in two later studies (see Section 5.3.1). Group 5 is continuous across point B although groups 3 and 4 are interrupted. This implies that either this is not the site of an entrance, that group 5 was deposited after this entrance fell from use. Group **15** may represent fragments of a former track coinciding with this gap in groups 3 and 4 but no inference can be drawn as to the dates of the possible track. Point C is the third entrance proposed by Wall. The analysis of the anomalies is complicated by the presence of a quarry pit but here group 4, interpreted above as representing a stony constituent of the rampart, appears continuous so making this proposed entrance far less likely than the other two.

Group **14**, which may represent a ditched track or raised earthwork such as a causeway, could point to an alternative eastern entrance. As with point B, groups 3 and 4 are discontinuous and group 5 is continuous in the vicinity of group 14. While the analysis is complicated by the presence of a likely quarry pit, the same argument can be made as for point B.

Groups **201** and **202** in Area 1, whilst recorded by Wall (1906) as earthworks associated with a false or decoy entrance, the magnetic response in conjunction with a visual assessment by the Substrata surveyors suggests that these groups represent relatively recent ground disturbance, possibly the quarrying recorded in this vicinity from 1922 onwards (Section 5.3.1). This does not negate the existence of an entrance, decoy or otherwise (see above) but does suggest that these anomalies are not associated with such an entrance.

Anomaly group **13** in area 1 coincides with a faintly visible platform. Similar anomaly patterns encountered in other surveys by the author have been found to represent charcoal production platforms and, although not certain, this explanation seems the most likely in this case.

Anomaly groups **203**, **204** and **205** in area 1 approximately coincide with the current track (204) and previous expression of that track recorded in 1906 (203 and 205) as shown in Figures 5 and 6.

Groups **27**, **28**, **29** and **30** in Area 4 are in the vicinity of two banks which have been identified as possible unfinished eastern defences associated with the main monument. These anomaly groups, and perhaps groups **31**, **32** and **33**, do appear to represent linear structures although no further archaeological characterisation is possible without extending the area of survey into currently dense woodland.

6.3.3 Data with no previous archaeological provenance

Magnetic anomaly groups **8**, **9**, **10**, **17** and **19** appear to represent internal divisions parallel to the current extant earthworks (Figure 5). Speculatively, they could be expressions of further defences or an earlier structure possibly later expanded to the current monument but no conclusions can be drawn from the survey data.

Group **20**, south of the southern rampart in area 1, may represent part of the monuments earthworks but equally may represent more recent disturbance or agricultural terracing of unknown period. Groups **23**, **24** and **25** in Area 3 may also represent agricultural terracing.

Groups **21** and **22** in Area 2 may represent linear archaeological deposits.

6.4 Conclusions

Within Area 1, three anomaly groups representing the extant ramparts were characterised as representing an outer ditch, a stony element of the ramparts on the outer side and an earthen element of the ramparts on the inner side. These three anomaly groups were present on all sides of the monument. The northern-most of two previously identified locations for potential entrances on the western side of the monument is most likely to be a true entrance and not a decoy as originally described in 1906. The magnetic anomaly group representing an earthen element of the ramparts on the inner side at the second proposed western entrance is continuous which implies that this is not an entrance or that the structure of ramparts underwent changes after an entrance was constructed. A third previously identified potential entrance on the eastern side was discounted as the anomaly group representing a stony element of the rampart was continuous at this location. An alternative entrance sited centrally on the eastern side was identified, again with reservations concerning the anomalies representing an earthen element of the ramparts on the inner side. Within the main body of the monument, potential inner divisions were mapped that mirrored the main ramparts in shape and a potential charcoal production platform was tentatively identified. Two linear anomalies representing potential archaeological deposits were identified in Area 2 but not characterised further. Anomalies representing possible agricultural terraces were identified in Area 3 and on the southern side of Area 1. No conclusions were reached about a previously mapped surface deposit of stones in Area 3. Linear anomaly groups representing stony and earthen deposits were identified in Area 4 that may represent previously recorded earthworks external to the main monument.

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 The Friends of Berry Castle for commissioning us to complete this survey.

The Friends of Bury Castle would like to thank Clinton Devon Estates, Historic England, the Coastal Recycling Community Fund, Alverdiscott and Huntshaw Parish Council, Weare Giffard Parish Council, the Great Torrington Cavaliers, the North Devon Archaeological Society, and the Torrington, Holsworthy and Bideford Cadets for their assistance in making this survey possible.

The Friends of Berry Castle are grateful for the permissive rights granted by Clinton Devon Estates.

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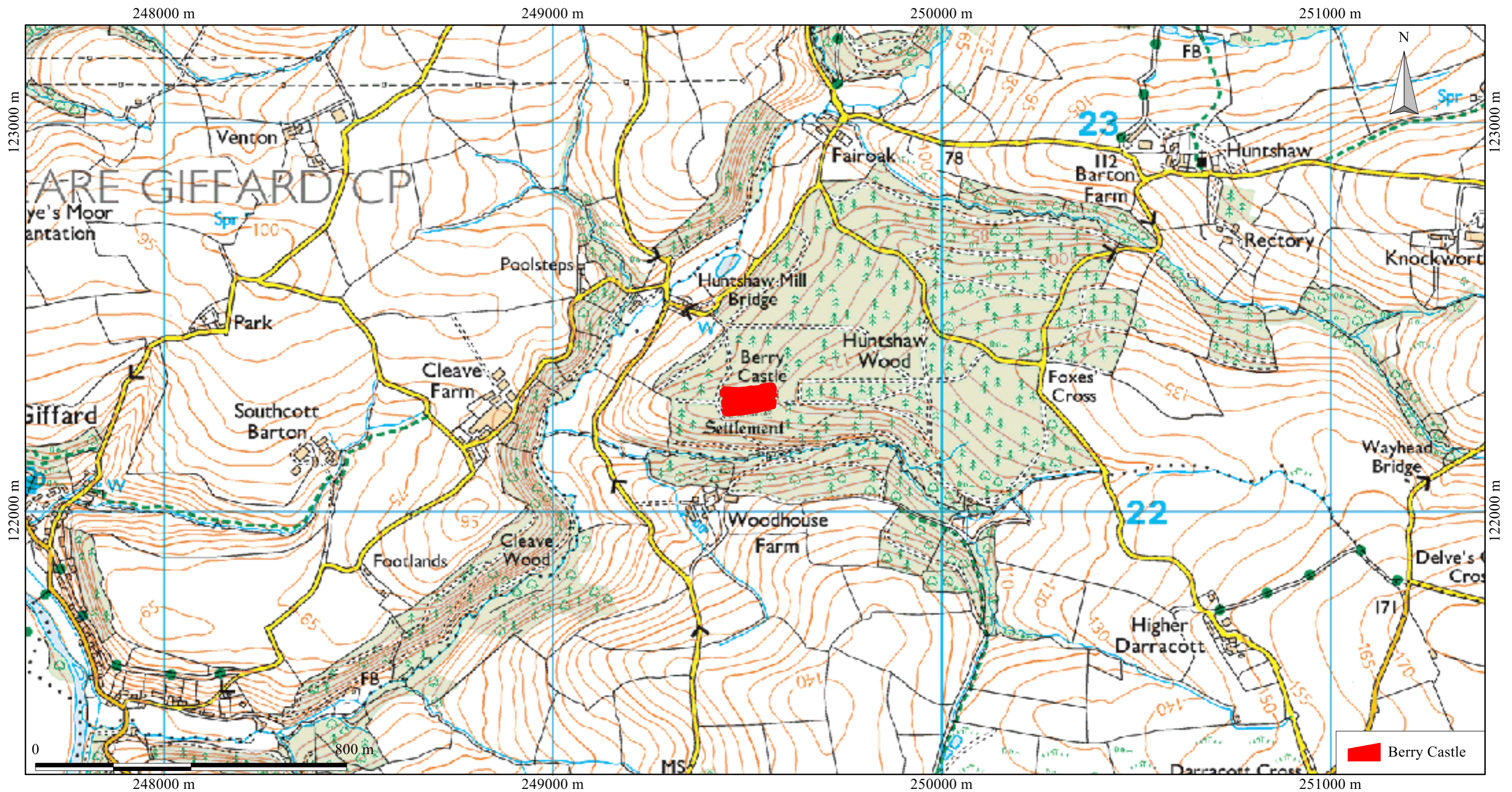
Wall, T. C. (1906) 'Ancient Earthworks', in Page, W. (ed.) *The Victoria County History of the Counties of England: Devonshire*, vol. 1: Archibald Constable and Co. Ltd., London

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 (see Section 6.1).

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: 249520.64 m, centre Y: 122286.13 m

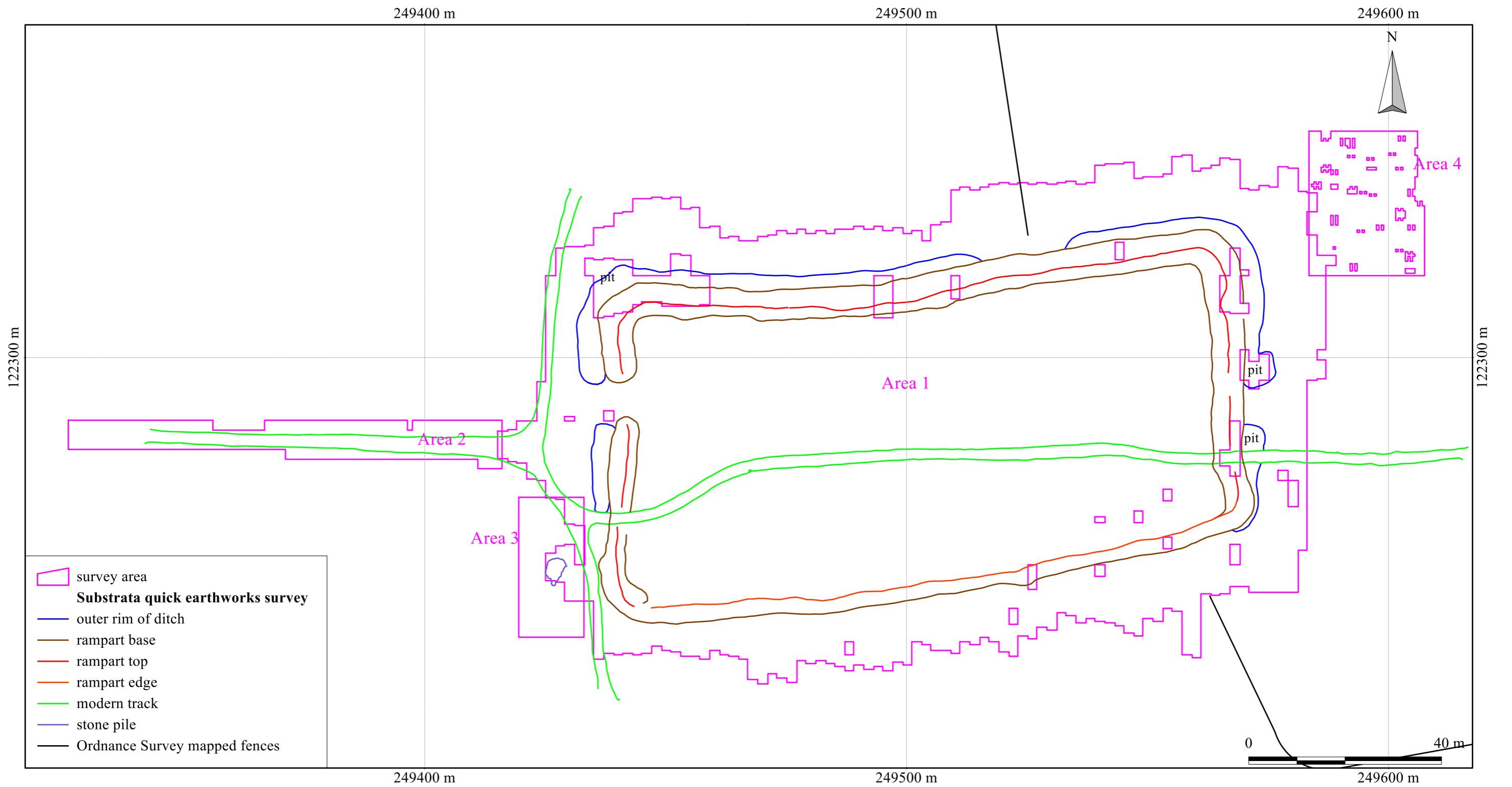
Scale: 1:10000 @ A3. Spatial Units: Meter. Do not scale off this drawing

Geophysical survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
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An archaeological magnetometer survey
 Berry Castle, Huntshaw, Torrridge, Devon
 Centred on NGR (E/N): 249488,122283 (point)
 Report: 1603BER-R-1

Figure 1: location map

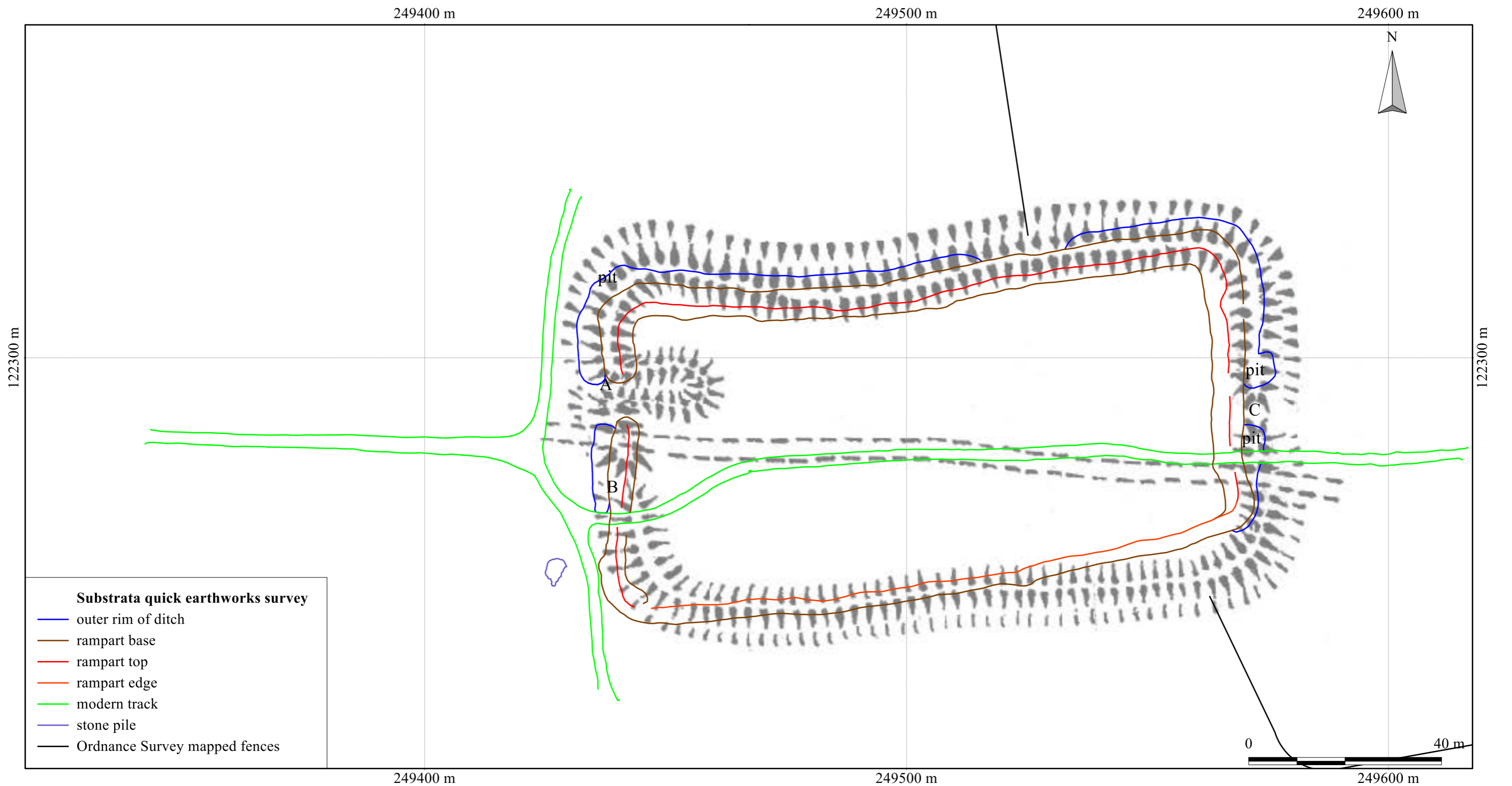
Substrata
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 Tel: 01273 273599
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



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

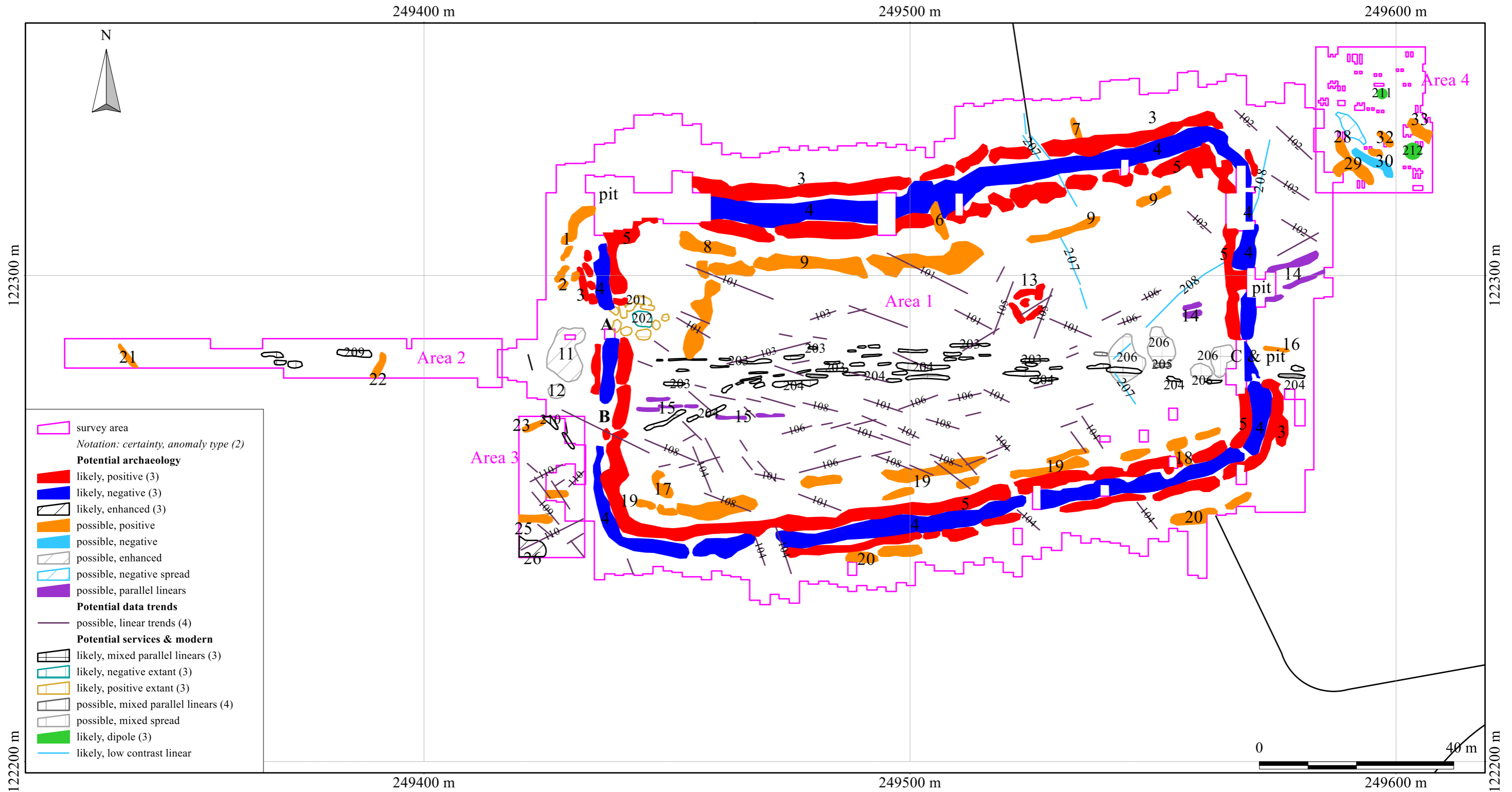
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Figure 2: survey areas over a quick earthworks survey by Substrata



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 Base map: Ordnance Survey (c) Crown Copyright 2016,
 1906 survey:
 Wall, T. C. (1906) 'Ancient Earthworks', in Page, W. (ed.) The Victoria County History of the Counties of England: Devonshire, vol. 1: Archibald Constable and Co. Ltd., London
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Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing



British Grid
 centre X: 249468.15 m, centre Y: 122274.80 m

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

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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. Representative; 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.

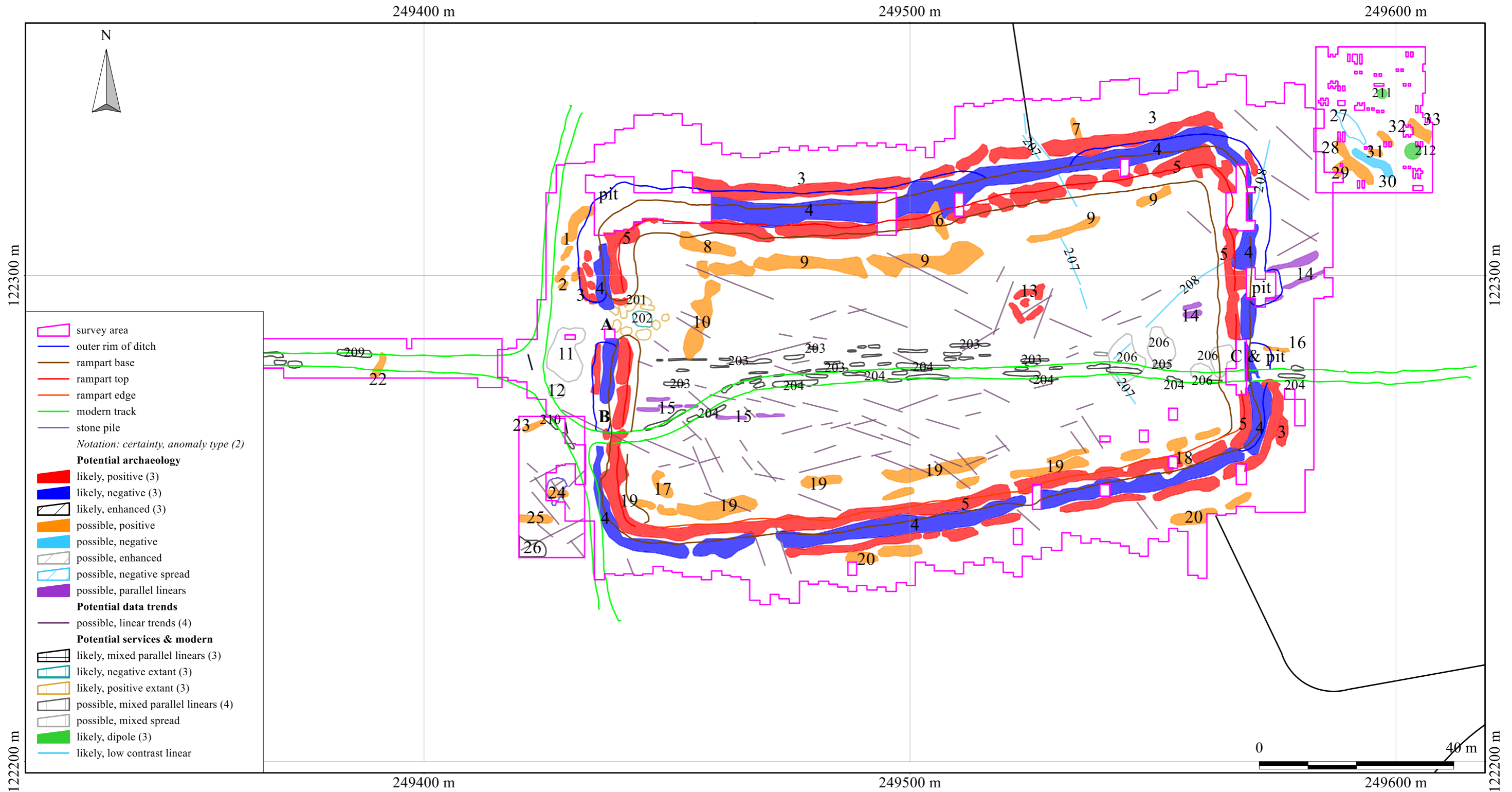
An archaeological magnetometer survey
 Berry Castle, Huntshaw, Torrridge, Devon
 Centred on NGR (E/N): 249488,122283 (point)
 Report: 1603BER-R-1

Figure 4: survey interpretation

Substrata
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 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk

area number	anomaly group	associated anomalies	anomaly characterisation certainty & class	anomaly form	additional archaeological characterisation	comments	supporting evidence
1	1		possible, positive	disrupted linear			
	2		possible, positive	disrupted linear			
	3		likely, positive	disrupted sub-rectangular	ditch deposits	anomaly group approximately coincides with the outer edge of a negative earthwork visible on the northern edge of the monument	earthworks
	4		likely, negative	disrupted sub-rectangular	stony bank deposits	anomaly group coincides with the outer face of extant banks of the monument	earthworks
	5		likely, positive	disrupted sub-rectangular	bank deposits	anomaly group coincides with the inner face of extant banks	earthworks
	6		possible, positive	linear			
	7		possible, positive	linear			
	8		possible, positive	linear			
	9	10	possible, positive	disrupted linear			
	10	9	possible, positive	disrupted linear			
	11		possible, enhanced	irregular	stony deposit	anomaly group is most likely to represent rubble of unknown deposition date	
	12		possible, enhanced	irregular	stony deposit	anomaly group is most likely to represent rubble of unknown deposition date	
	13		likely, positive	complex	area of archaeological activity - possible charcoal platform	anomaly group coincides with faint earthworks defining a platform of some kind	earthworks
	14		possible, parallel linears		routeway		
	15		possible, parallel linears		routeway	anomaly group is on-line with a proposed former entrance to the monument	
	16		possible, positive	linear			
	17		possible, positive	curvilinear			
	18		possible, positive	linear			
	19		possible, positive	disrupted linears			
	20		possible, positive	disrupted linear		anomaly group corresponds with a faint earthwork	
	101	102	possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	102	101	possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	103		possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	104		possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	105		possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	106		possible, linear trends		ground disturbance of unknown origin and period; possible former routeway	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging although the distribution is tight and may indicate a former routeway	
	107		possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	108		possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	201		likely, positive extant	sub-circular		anomaly group represents an observed earthen bank of uncertain origin but likely to be relatively recent; anomaly group indicates the presence of tree bowls within the deposit	surveyor observation
	202		likely, negative extant	oval		anomaly group represents an observed stony deposit of uncertain origin but likely to be relatively recent	surveyor observation
	203	204 205 206	likely, mixed parallel linears		former track	the anomaly group coincides with the route of a track recorded on an earthworks map	Wall (1906)
	204	204 205 206	likely, mixed parallel linears		current track	the anomaly group coincides with a modern track as recorded by a Substrata GPS survey; the eastern half also corresponds with a track recorded in 1906 (group 203)	surveyor observation
	205	204 205 206	possible, mixed parallel linears		former track	anomaly group likely to be associated with group 204	
	206		possible, mixed spread	irregular	relatively recent rubble and iron fragments	anomaly group indicated a mix of rubble with iron or steel fragments from, more than likely, a former fence	
	207		likely, low contrast linear		recent fence line	anomaly groups match an extant fence to the north and south	surveyor observation and current OS digital tile (2016)
	208		likely, low contrast linear		recent fence line	anomaly groups are an extension an extant fence to the north	surveyor observation of fence line ground disturbance
2	21		possible, positive	linear			
	22		possible, positive	linear			
	209		likely, mixed parallel linears		current track	the anomaly group coincides with a track recorded in a Substrata GPS survey	surveyor observation
3	23		possible, positive	linear			
	24		possible, positive	linear	terracing?		
	25		possible, positive	linear	terracing?		
	26		likely, enhanced	irregular	surface and near-surface stony deposit	anomaly group coincides with a deposit of relatively large stones within dense vegetation	surveyor observation
	109		possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	110		possible, linear trends		ground disturbance of unknown origin and period	anomaly group represents distinct linear trends in the data that may represent ground disturbance, possibly from logging	
	210		likely, mixed parallel linears		current track	the anomaly group coincides with a track recorded in a Substrata GPS survey	
4	27		possible, negative spread	linear	stony deposit		
	28		possible, positive	linear	ditch?		
	29		possible, positive	return	ditch?		
	30		possible, negative	linear	stony bank		
	31		possible, positive	linear			
	32		possible, positive	linear	ditch?		
	33		possible, positive	linear	ditch?		
	211		likely, dipole		ferrous material: fencing debris		surveyor observation

Table 1: data analysis



British Grid
 centre X: 249468.15 m, centre Y: 122274.80 m

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

Geophysical survey: Copyright Substrata 2016.
 Earthworks survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
 All rights reserved.

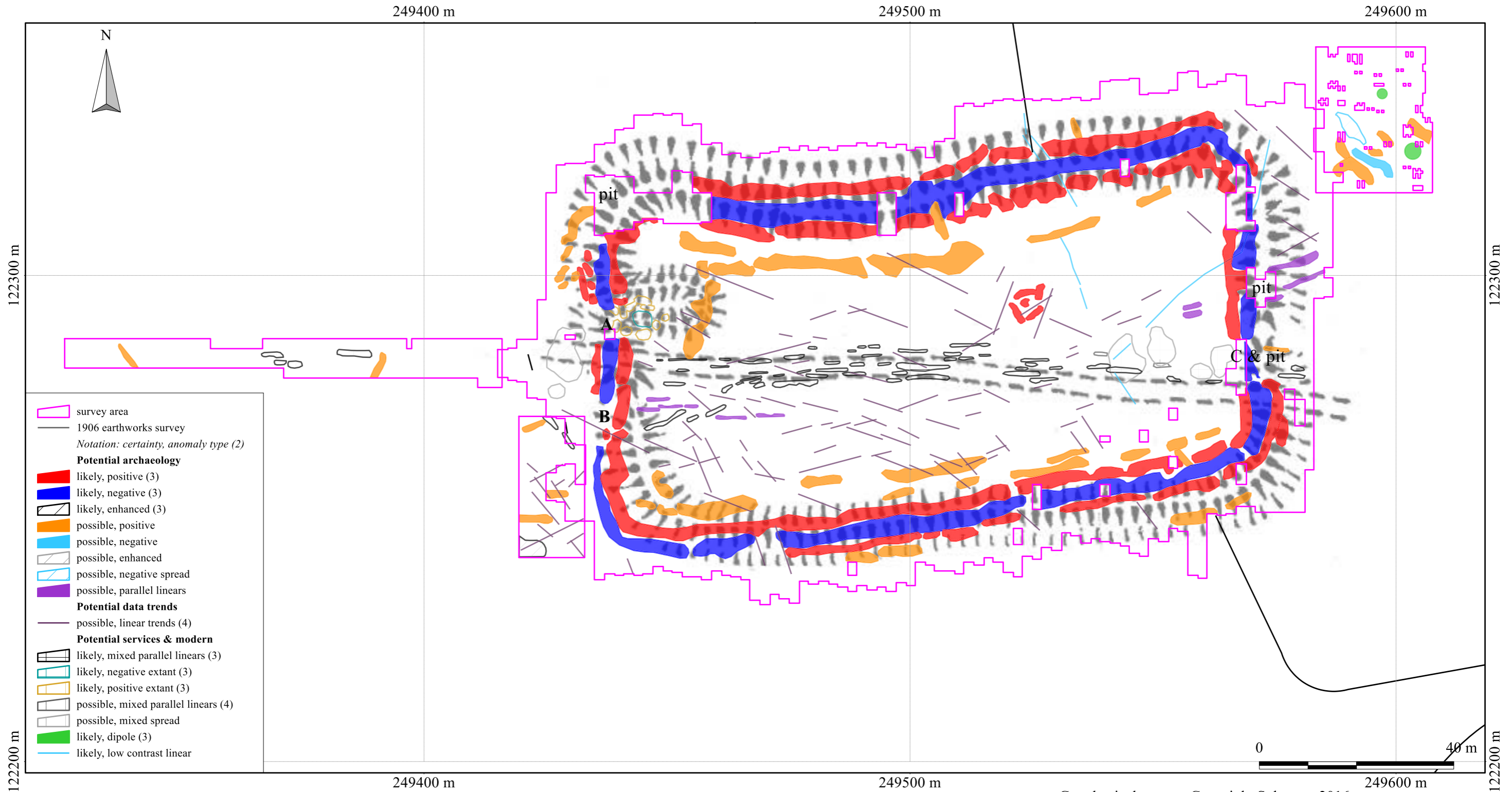
Notes:

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. Representative; 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.

An archaeological magnetometer survey
 Berry Castle, Huntshaw, Torrridge, Devon
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 Report: 1603BER-R-1

Figure 5: survey interpretation over quick earthworks survey by Substrata

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 Web: substrata.co.uk



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

Geophysical survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
 1906 survey:
 Wall, T. C. (1906) 'Ancient Earthworks', in Page, W. (ed.)
 The Victoria County History of the Counties of England:
 Devonshire, vol. 1: Archibald Constable and Co. Ltd., London
 All rights reserved.

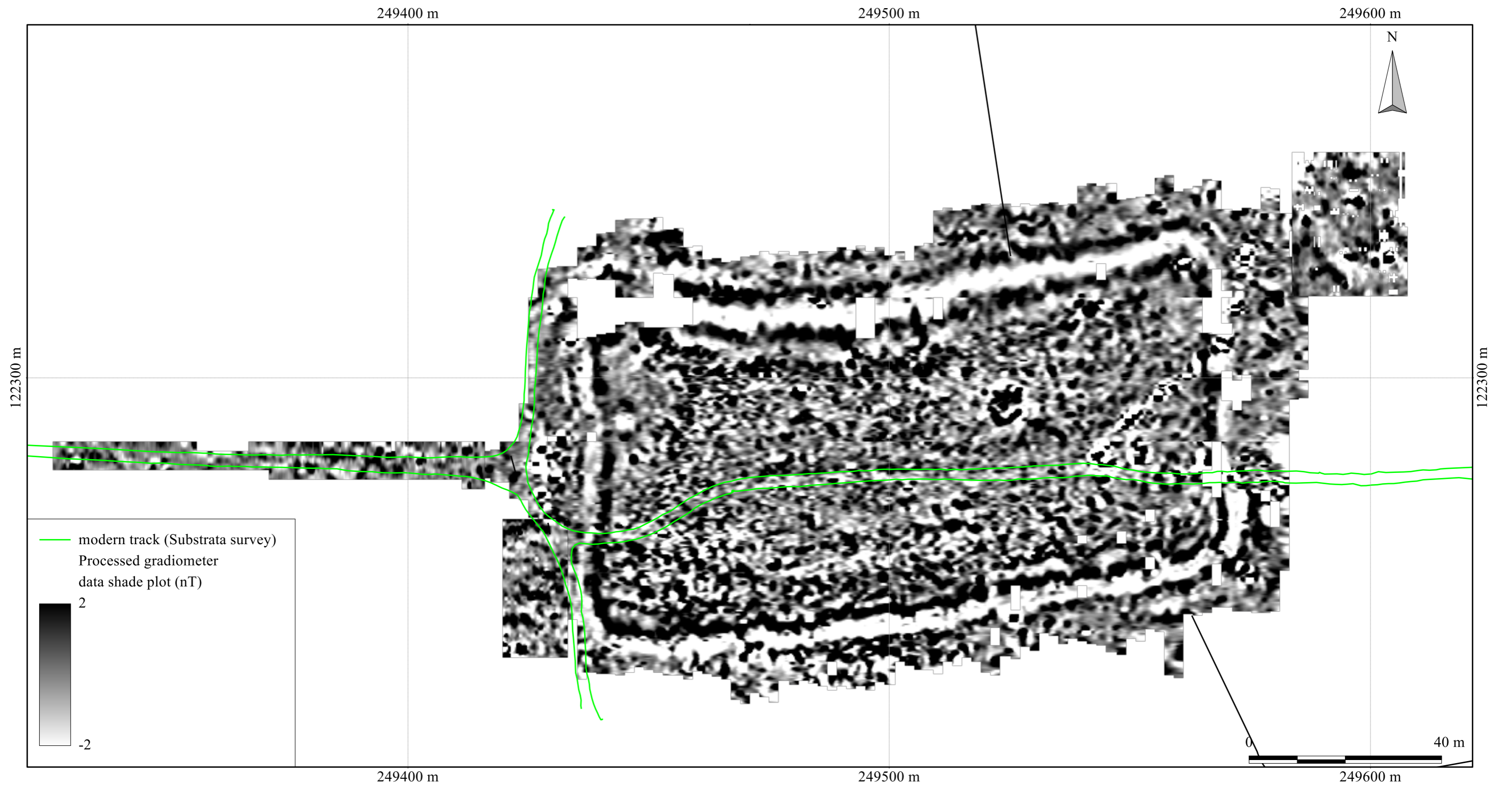
Notes:

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. Representative; 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.

An archaeological magnetometer survey
 Berry Castle, Huntshaw, Torrridge, Devon
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Figure 6: survey interpretation over a 1906 earthworks survey

Substrata
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 Web: substrata.co.uk



British Grid
 centre X: 249471.04 m, centre Y: 122296.24 m

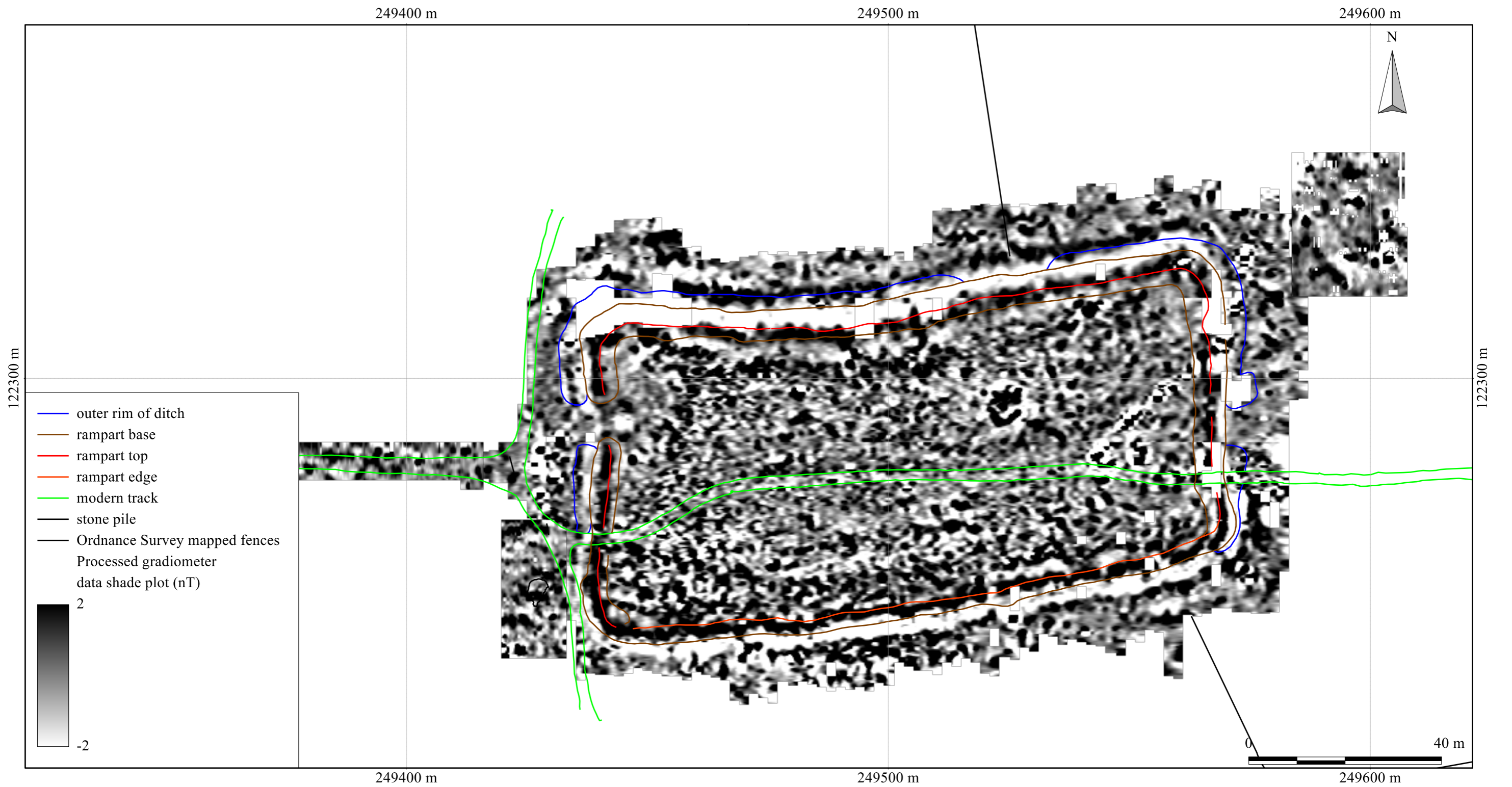
Scale: 1:800 @ A3. Spatial Units: Meter. Do not scale off this drawing

Geophysical survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
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An archaeological magnetometer survey
 Berry Castle, Huntshaw, Torrridge, Devon
 Centred on NGR (E/N): 249488,122283 (point)
 Report: 1603BER-R-1

Figure 7: shade plot of processed data

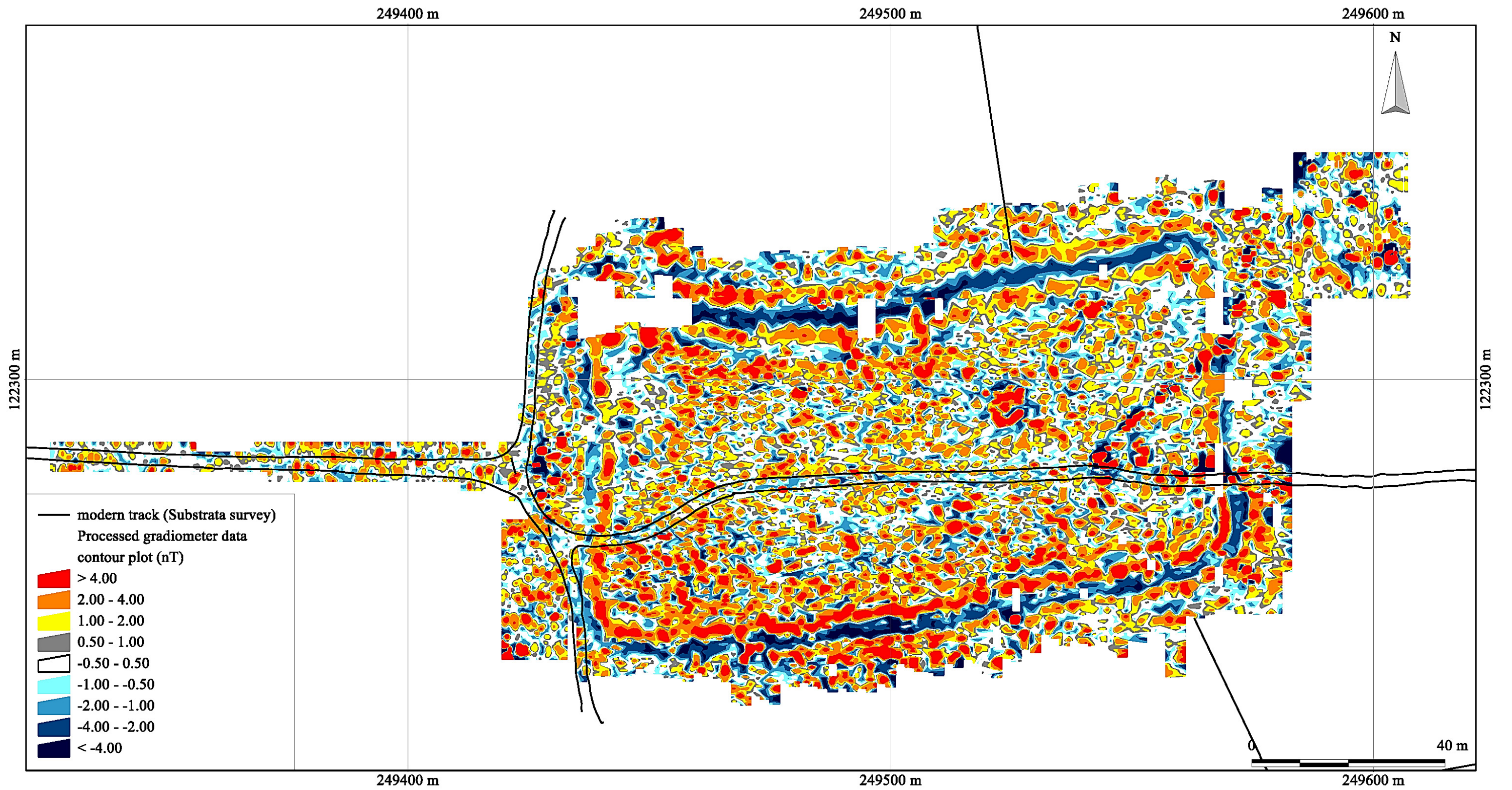
Substrata
 Office 1, 5 Mill Street
 Bideford, Devon EX39 2JT
 Tel: 01273 273599
 Email: geophysics@substrata.co.uk
 Web: substrata.co.uk



British Grid
 centre X: 249471.04 m, centre Y: 122296.24 m

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

Geophysical survey: Copyright Substrata 2016.
 Earthworks survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
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British Grid
 centre X: 249471.04 m, centre Y: 122296.24 m

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

Geophysical survey: Copyright Substrata 2016.
 Base map: Ordnance Survey (c) Crown Copyright 2016,
 All rights reserved.

Figure 9: contour plot of processed data

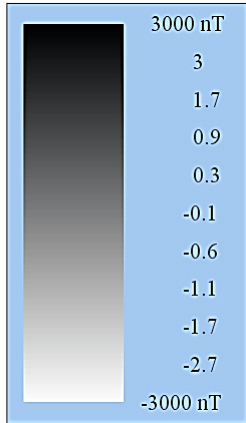
Appendix 2 Methodology Summary

Table 2: 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 (magnetometer) survey was undertaken with reference to standard guidance provided by the Chartered Institute for Archaeologists (2014) and Archaeology Data Service (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> Areas 1, 3 and 4: GN Area 3: W</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 3: magnetometer survey - processed data metadata	
<p>SITE Instrument Type: Bartington Grad-601 gradiometer Units: nT Collection Method: ZigZag Sensors: 2 @ 1.00 m spacing. Dummy Value: 32702</p> <p>PROGRAM Name: TerraSurveyor Version: 3.0.29.3</p>	
<p>Area 1 Stats Max: 101.82 Min: -93.40 Std Dev: 3.73 Mean: 0.18 Median: 0.02</p>	<p>Processes: 16 1 Base Layer 2 Clip at 1.00 SD 3 De Stagger: Grids: a1.xgd a2+a3.xgd a4.xgd a5.xgd Mode: Both By: -2 intervals 4 De Stagger: Grids: a9.xgd a8.xgd Mode: Both By: -6 intervals 5 De Stagger: Grids: a10.xgd Mode: Both By: -6 intervals 6 De Stagger: Grids: a11.xgd Mode: Both By: -4 intervals 7 De Stagger: Grids: a12.xgd a13.xgd Mode: Both By: -6 intervals 8 De Stagger: Grids: a14.xgd Mode: Both By: -4 intervals 9 De Stagger: Grids: a16.xgd Mode: Both By: -2 intervals 10 De Stagger: Grids: a17.xgd Mode: Both By: -6 intervals 11 De Stagger: Grids: b1.xgd b2.xgd Mode: Both By: -4 intervals 12 De Stagger: Grids: b4.xgd Mode: Both By: -4 intervals 13 De Stagger: Grids: b7.xgd b6.xgd b5.xgd Mode: Both By: 2 intervals 14 DeStripe Median Sensors: Grids: All 15 De Stagger: Grids: a6.xgd Mode: Both By: -2 intervals 16 Interpolate: X & Y Doubled.</p>
<p>Area 2 Stats Max: 14.44 Min: -9.69 Std Dev: 1.52 Mean: 0.19 Median: 0.03</p>	<p>Processes: 4 1 Base Layer 2 Clip at 3.00 SD 3 DeStripe Median Traverse: Grids: All 4 Interpolate: Match X & Y Doubled.</p>
<p>Area 3 Stats Max: 78.83 Min: -31.55 Std Dev: 3.66 Mean: 0.55 Median: 0.03</p>	<p>Processes: 4 1 Base Layer 2 DeStripe Median Traverse: Grids: All Threshold: 2 SDs 3 Interpolate: X & Y Doubled. 4 Interpolate: X & Y Doubled.</p>
<p>Area 4 Stats Max: 3000.95 Min: -2999.90 Std Dev: 131.55 Mean: 1.59 Median: 0.00</p>	<p>Processes: 2 1 Base Layer 2 DeStripe Median Traverse: Grids: All</p>

Appendix 4 Unprocessed data plots



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
Grid Size: 30 m x 30 m
X Interval: 0.125 m
Y Interval: 1 m

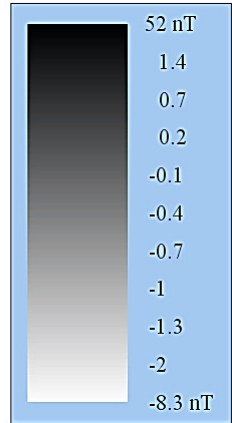
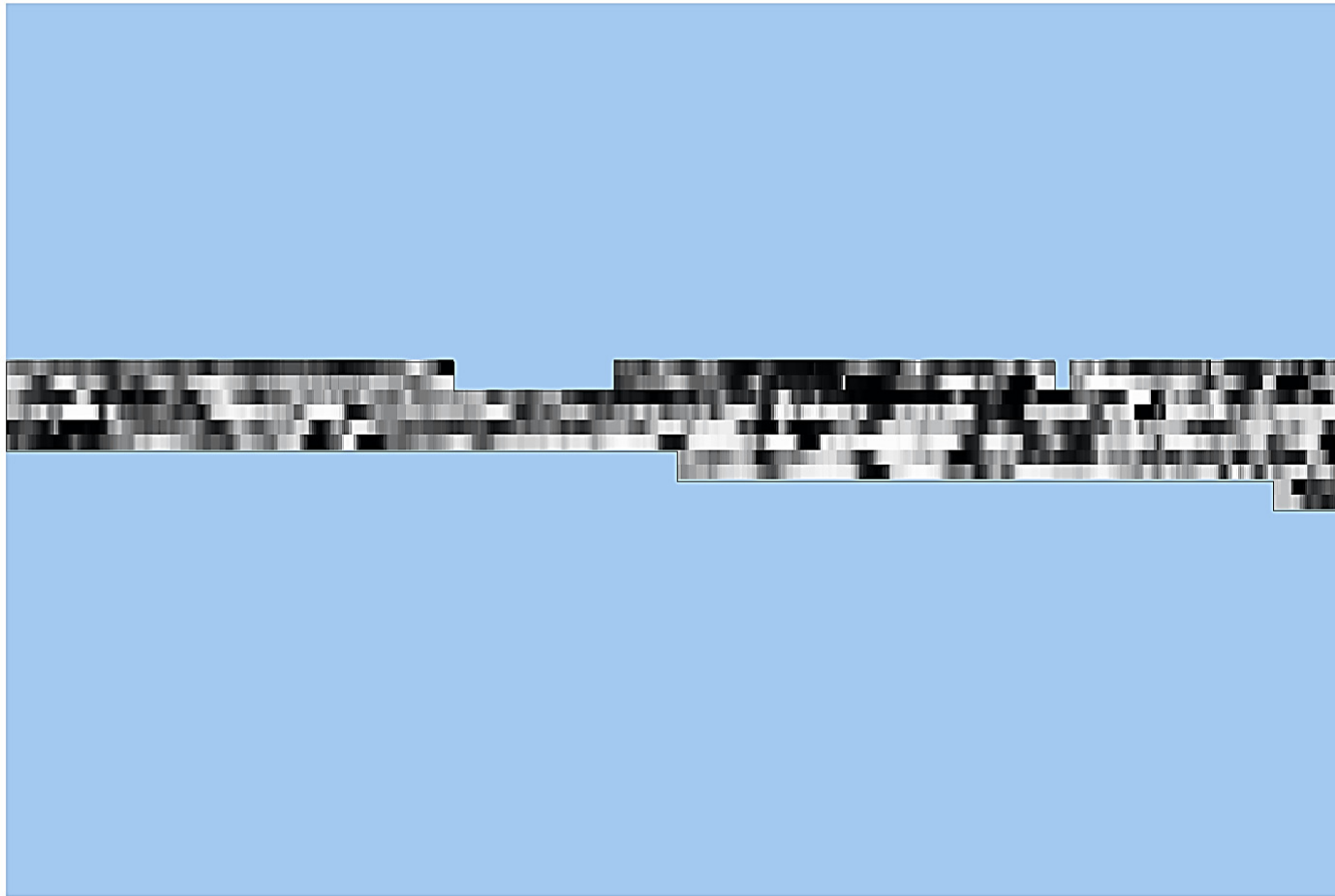
Stats
Max: 3000.00
Min: -3000.00
Std Dev: 48.72
Mean: -0.36
Median: -0.10
Surveyed Area: 1.3981 ha

PROGRAM
Name: TerraSurveyor
Version: 3.0.29.3

Processes: 1
1 Base Layer



Figure 10: shade plot of unprocessed data, area 1



Instrument Type: Bartington Grad 601
 Units: nT
 Surveyed by: on 30/12/1899
 Assembled by: on 30/12/1899
 Direction of 1st Traverse: 270 deg
 Collection Method: ZigZag
 Sensors: 2 @ 1.00 m spacing.
 Dummy Value: 32702
 Grid Size: 30 m x 30 m
 X Interval: 0.125 m
 Y Interval: 1 m

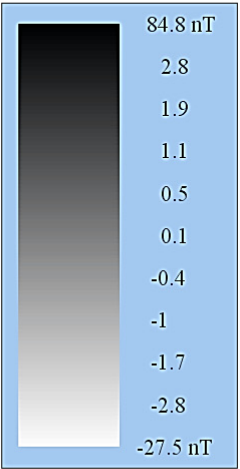
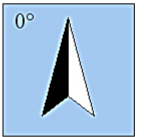
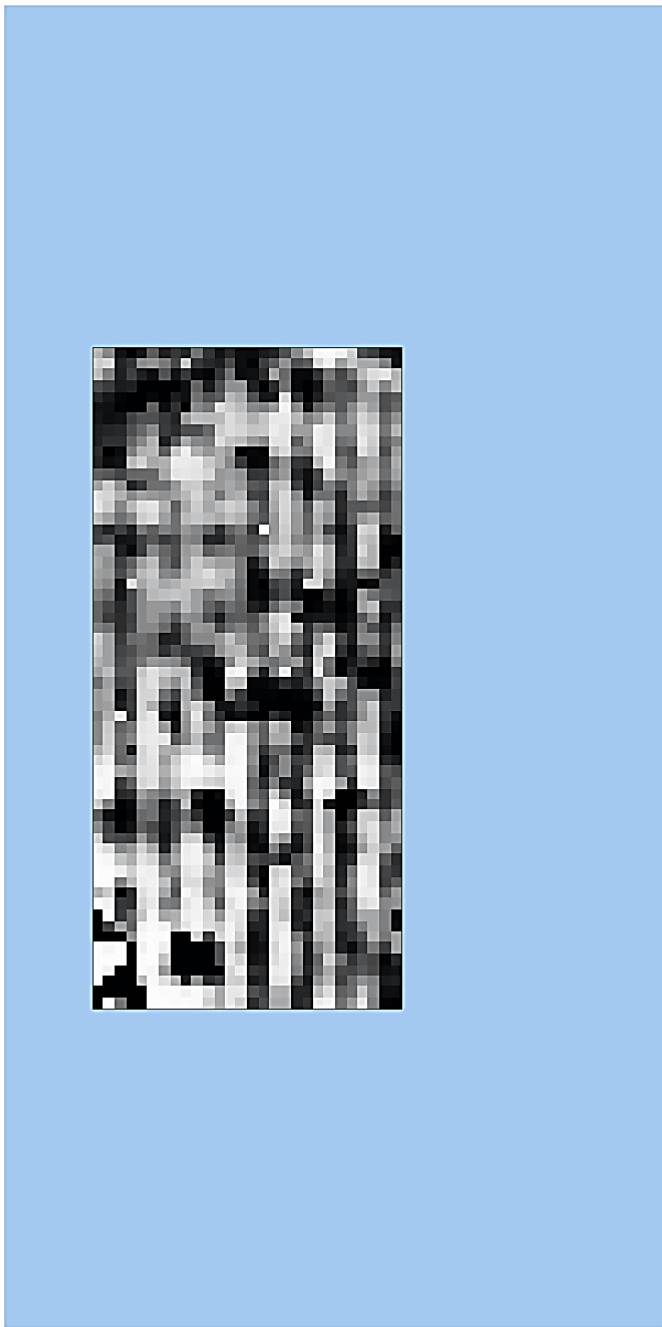
Stats
 Max: 52.00
 Min: -8.30
 Std Dev: 2.08
 Mean: -0.13
 Median: -0.30
 Surveyed Area: 0.06165 ha

PROGRAM
 Name: TerraSurveyor
 Version: 3.0.29.3

Processes: 1
 1 Base Layer



Figure 11: shade plot of unprocessed data, area 2



Instrument Type: Bartington Grad 601
 Units: nT
 Direction of 1st Traverse: 0 deg
 Collection Method: Parallel
 Sensors: 2 @ 1.00 m spacing.
 Dummy Value: 32702
 Grid Size: 30 m x 30 m
 X Interval: 0.5 m
 Y Interval: 0.5 m

Stats
 Max: 84.80
 Min: -27.50
 Std Dev: 4.26
 Mean: 0.55
 Median: 0.20
 Surveyed Area: 0.042 ha

PROGRAM
 Name: TerraSurveyor
 Version: 3.0.29.3

Processes: 1
 1 Base Layer

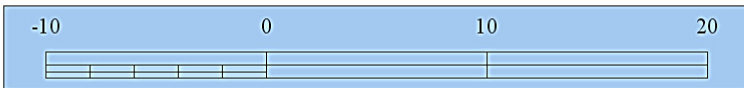
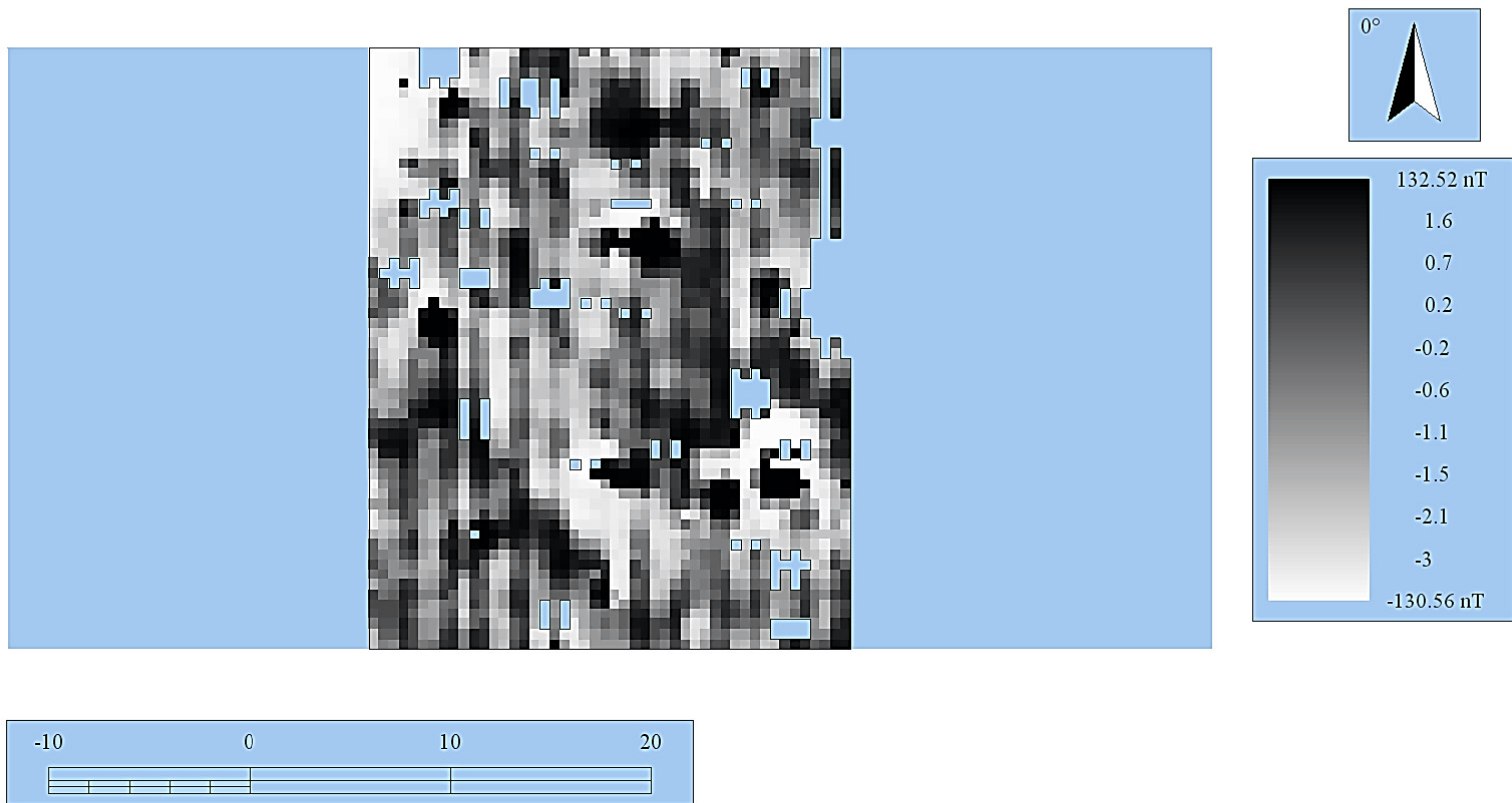


Figure 12: shade plot of unprocessed data, area 3



Instrument Type: Bartington Grad 601
 Units: nT
 Direction of 1st Traverse: 0 deg
 Collection Method: Parallel
 Sensors: 2
 Dummy Value: 32702
 Grid Size: 30 m x 30 m
 X Interval: 0.5 m
 Y Interval: 0.5 m

Stats
 Max: 132.52
 Min: -130.56
 Std Dev: 9.40
 Mean: -0.52
 Median: -0.60
 Surveyed Area: 0.066025 ha

PROGRAM
 Name: TerraSurveyor
 Version: 3.0.29.3

Processes: 1
 1 Base Layer

Figure 13: shade plot of unprocessed data, area 4