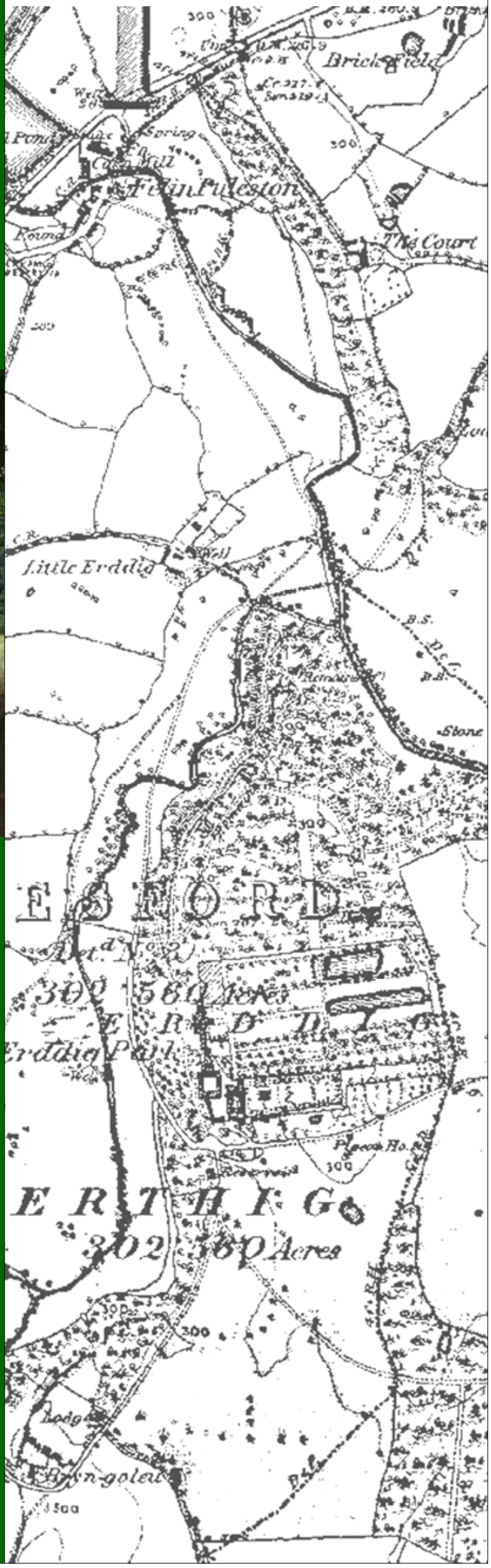
ERDDIG CASTLE,
ERDDIG, WREXHAM,
NORTH WALES
(NGR SJ 327 486)

A GEOPHYSICAL SURVEY OF THE BAILEY

Souterrain

Archaeological Services Ltd



M. Wilson & M. Planas

October 2009

Commissioned by:
L - P Archaeology

Erddig Castle, Erddig, Wrexham, North Wales
(NGR SJ 327 486)

A Geophysical Survey of the Bailey

by

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Souterrain Archaeological Services Ltd

October 2009

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SUMMARY

In September 2009 an archaeo-geophysical survey was carried out at Erddig Castle, a motte and bailey, near Wrexham in Wales (NGR SJ 327-486) by Souterrain Archaeological Services Limited. The survey was undertaken for L-P Archaeology, on behalf of The National Trust.

The geophysical survey, which focussed on the bailey, combined the techniques of Fluxgate Gradiometer and Resistance Meter.

The aim of the survey was to attempt to identify buried archaeological remains which would enable and informed approach to a community excavation project, and provide information that would assist in development of conservation needs at the park.

A quasi-rectangular area of medium to high resistance was located in the centre of the bailey, within which appear to be the foundations of least two buildings. A narrow linear feature, quite possibly a metalled pathway is seen to lead diagonally from the south corner of this central area to the foundations of another possible structure which was sited close to the southern perimeter of the bailey. It is uncertain as to whether these buried remains relate to the Norman garrison buildings or a mid-18th century bowling green which is known to have been built somewhere on the bailey.

The survey demonstrated that the use of complementary geophysical techniques, may significantly contribute to our understanding of the extent of and nature of buried archaeological remains within Erddig Park.

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1. INTRODUCTION

1.1 Subject of the Survey

On the 14th and 15th of September 2009, a geophysical survey (fluxgate gradiometer and resistance meter) was conducted by Souterrain at Erddig Castle, a motte and bailey earthwork which is situated within the grounds of Erddig Park, a National Trust property, 1.6km to the southwest of Wrexham at National Grid Reference SJ 327 486. The survey was carried out for L-P Archaeology, on behalf of The National Trust. The survey forms an initial part of a programme of archaeological research initiated by L-P Archaeology[1] which aims to increase our understanding of the motte and bailey earthwork. The site is a Scheduled Ancient Monument (SAM DE 17, NPRN 307144).

1.2 Brief Site Description Archaeological and Historical Background

The motte and bailey is situated within woodland to the north of Erddig House, which is located in the Community Council of Marchwiel, in the historic county of Denbighshire, the preserved county of Clwyd.

The site occupies a promontory south of the confluence of the River Clywedog (a tributary of the Dee) and the Black Brook.

The motte is entirely wooded, the bailey largely open, with the exception of an avenue of trees which crosses the centre of the site on an east-west alignment, and the encroachment of trees and shrubs on the periphery to the south, south-east and the north. The avenue was planted to 'landscape' the site in the 18th century.

Previous archaeological study at the site comprised a detailed contour survey undertaken by the Clwyd-Powys Archaeological Trust (CPAT) in January 1999 as an aid to management and visitor interpretation. The following description is taken from the Summary Report:

"Little is known of the history of the site, although it may be 'Wrislesham', referred to in the sheriff's annual accounts of 1161. The park and grounds were landscaped for John Mellor during the 1720s and 30s by Stephen Switzer, whose plans included a castellated tower on the motte, serving as a summer house, together with a series of tree-lined walks in part following the bailey ditch. A survey by Thomas Badeslade in 1739 shows the tower as well as a formal avenue within the bailey. However, no trace survives of the tower or any other landscape features.

The motte and bailey appears to have been constructed in part by utilising a natural promontory which was carved by deep ditches to form a defensive site. The motte survives to a height of c. 5.75m, with a diameter of 44m at the base and 17m at the top. This is separated from the bailey by a broad ditch 36m wide. The bailey has two entrances, one opposite the motte and the other at the south-west corner. Along the southern side the bailey is defended by a substantial ditch 34m wide and up to 8.5m deep. Rounded projections at the corners of the bailey and along the southern side may

[1] B Poole & J Young 'Outline for Archaeological Research Project at Erddig Motte and Bailey Castle, Wrexham' for L-P: Archaeology/National Trust, B Poole & J Young, Doc Ref: LP0741C-RPD-v2.3 Date: March 09

have been associated with towers. Wat's Dyke, which runs along the western side of the site, has been used as an additional defence forming a ditch up to 18m wide"[2].

The record sheet compiles by the Royal Commission on the Ancient and Historical Monuments of Wales[3] records:

"Winding earthen paths lead to the motte and bailey, and the centre of the top of the bailey has been cleared as a wide grass alley flanked by rows of beeches... …in a bird's eye view drawing by Thomas Badeslade, of 1740…formal walks and steps leading to the motte, on top of which is a circular battlemented building, and to the bailey, on top of which is a bowling green with ramps at the west end".

During the present survey an additional landscape feature, a part-sunken and mounded path, was observed, leading north-east from the steps (modern) on southern edge of bailey for a distance of about 20 metres.

1.3 Geology[4]

The local geology consists of some alluvial silt on top of Glacial Sand and Gravel (perhaps up to 5m thick). The Bedrock is Upper Carboniferous - red brown sandstones, with some calcareous conglomerate (of Halesowen Formation, Salop Formation and Clent Formation) with some silty mudstones. There is a lot or Iron Oxide in the cement, and quite a large fault runs north-south, just to the east of site. The glacial movement was from northwest to south-east and there are moraine mounds of Glacial Till just to the north of Wrexham. There is no mineralisation to speak of in the Upper Carboniferous. There may be some glacio-tectonically disturbed soil in the area, sand wedges in clay, or inversion or small folds in softer sediments - may result in soil creep on slopes.

1.4 Ground Conditions

The ground cover at the time of survey was predominantly short grass or rough tussock-like grass with occasional scrub and tree stumps. An avenue of trees passed through Grid Squares 3, 4 and 5. Grid Square 5 had been recently cleared of undergrowth, the stalks of which pervaded the area to a height of c.0.3m.

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[2] CPAT Project 803, 1998/99 http://www.cpat.org.uk/projects/recent/summary.htm#803 (accessed on 04/10/09)
[3] RCHMW, Ref No PGW (C) 62
[4] Pers. comm. A F Cook Eur. Ing. BSc CEng CGeol CSci FIMMM FGS

2. SURVEY OBJECTIVES

2.1 Fluxgate Gradiometer survey

The geophysical survey was conducted upon the bailey of the Norman earthwork. The purpose of the survey was to attempt to identify any sub surface features associated with the bailey.

The aim of the magnetic (gradiometer) survey was to detect changes, referred to as anomalies, in the Earth's magnetic field caused by underground archaeological features. The types of anomaly and how they relate to buried archaeological remains are explained in Section 3.3.2 below. The survey encompassed roughly 75% of the bailey, the limit of the survey grid to the north and south-east defined by shrubs and scrub. The gradiometer survey was undertaken of 2,200m^2.

The survey also aimed to clarify whether the ground conditions within the Erddig estate are suitable for a more intensive and geographically wider geophysical survey.

2.2 Resistance Meter survey

The resistance meter survey was undertaken of approximately 2,120m^2 of the bailey, covering an area to the north where vegetation inhibited rapid and accurate gradiometer survey. The results of the resistance survey are superimposed with the results of the gradiometer survey in order to gain a better understanding of possible archaeological remains.

The combined results of the two survey techniques would:

- Attempt to provide information to aid the development of archaeological excavation site strategies;

- Attempt to gain an understanding of possible *in situ* archaeological remains, such as the foundations of buildings, floors, walls and metalled surfaces and provide information that would increase understanding of the internal layout of the bailey

- Attempt to provide information to aid the development of conservation needs at the park;

3. GRADIOMETER SURVEY

3.1 Methodology

3.1.1 Survey Grid

A survey datum control point and grid consisting of four 20x20m squares and one 20x10m (the Y axis of the grid orientated on a 30 degree bearing to the northeast) was set out across the Study Area by L-P Archaeology staff in advance of the survey, each square being an individual geophysical data collection component. An additional grid square of 20x20m was placed on the east side of the site during the survey. The area of survey ultimately comprised an area of 2,200m^2 (Fig. 2).

3.1.2 Instrumentation and configuration

The instrumentation used for the survey was a *Geoscan Research* Fluxgate Gradiometer FM36 with an external digital encoder (*Geoscan Research* Sample Trigger Unit ST1). A tuning location and 'Zero Point' for the survey was selected where relatively uniform measurements were found, indicative of the background geology of the site. The 0.1ηT range was selected in order to provide greater resolution and to detect any weaker archaeologically magnetic responses. One sample reading was logged every 0.25m, on traverses set at 1m intervals. A total of 8,800 readings were logged.

3.1.3 Data processing

The results were downloaded periodically in the field to portable computer using Geoplot V.3 software (licensed user no. GP97150).

3.2 General

The weather at the time of survey was mostly a constant warm temperature, without wind. Due to this the survey results are deemed to unaffected by weather conditions. The following conditions and constraints were observed during fieldwork and data collection; these have been taken into consideration in the examination and interpretation of the survey data. Whenever possible, attempts to reduce unwanted affects were taken in the field.

- Uneven ground. Data collection traverses were subsequently walked at a moderately slow rate to reduce defects;

- Dead scrub vegetation and small shrubs were occasionally encountered in whereby the instrument had to be raised or offset during traverses; this was a particularly problematic on the south-east part of the bailey (Grid Square 5) where stalks of rosebay willowherb (c. 0.30-0.40m long) pervaded the area. High vegetation precluded surveying the northern reaches of the bailey.

- An avenue of trees crossed the survey area, causing localised deviation during traverses.

- Ferrous litter such as beer cans were occasionally encountered and removed, but indicated that similar debris may have been concealed in the vegetation.

3.3 Survey Results

3.3.1 Presentation of the data

The results of the survey of the Study Area are presented as a Shade Plot (Fig. 3), Trace Plot (Fig. 4) and an Interpretative Diagram (Fig. 5). Individual grid data was initially separately interrogated and compared with ground survey notes for each grid. The composite data is presented after smoothing and rectification of the variations in the zero drift and removal of high "noise" spikes caused by presumably modern magnetic disturbances/ ferrous litter.

Areas of high magnetism (positive anomalies) are presented on the grey scale plot as dark shades and areas of low magnetism (negative anomalies) as lighter shades. The intermediate shade represents the background geology.

3.3.2 Types of response

Magnetic anomalies fall into two categories, *induced* magnetism and *thermoremanent* magnetism. Induced magnetism is caused by magnetically susceptible material which is found in features cut into the subsoil, such as pits and ditches. Thermoremanent magnetism is caused by structures such as hearths, kilns, foundations and brick walls.

The interpretative diagrams assign geophysical anomalies to the following categories:

- *Positive linear responses.* These are the result of *induced* magnetism, which is caused by features that have been 'cut' into the natural geology and subsequently in-filled with magnetically susceptible material (i.e. rich in iron oxides). Features include archaeological-type responses such as ditches, gullies, foundation trenches, or in-filled ruts of track-ways. The strength of these features depends on sufficiency of the magnetically susceptible in the fill, to enable a contrast against the local background geology. Some of these are clearly visible whilst others merely ephemeral. Non-anthropogenic forms may comprise in-filled hollows where trees or substantial shrubs had formerly stood, or in-filled cavities caused by burrowing animals.

- *Discrete positive responses*. Dependent on the cause of these anomalies, the magnitude of the response will be of varying strength. Features of anthropogenic origin may include pits, hearths and ovens. A pit containing sufficient magnetically susceptible material (*induced* magnetism) will normally show as a localised gentle to moderate positive peak with a negative halo. A broad positive response with a negative return may indicate a possible hearth. Isolated areas of abrupt strong magnetic disturbance may include kilns, industrial activity or burnt material.

- *Negative responses*. These anomalies are caused by features that are less magnetic than the surrounding geology. They may result from track ways, natural features, or even banked material or building stone.

- *Discrete ferrous anomalies, or iron 'spikes'*. These are caused by buried ferrous objects. They are characterised by a sharp positive peak and a sharp negative return.

3.3.3 Discrete Anomalies

The magnetic survey reveals little in the way of recognisable archaeological patterning. There is an irregular distribution of discrete positive features (Fig.5), each between c.0.5 and 1m in size and most generally in the range of 2ηT to 5ηT, a few others up to 8ηT, and very occasionally, 20ηT. Although these have archaeological-type responses which are typical of dug features (i.e. pits containing magnetically-susceptible material), it is a type of response which might be expected in, what has perhaps been for centuries a woodland area, the anomalies, representing the earth-filled voids where trees once stood (i.e. throws). Although this does not preclude the possibility that some of the stronger discrete features represent pits, it is queried whether such features (particularly rubbish-filled pits) would be found within a fortified enclosure. A few of these stronger anomalies occur within the remains of suspected structures located by the resistance survey (see Section 4.3.2).

3.3.4 Negative responses and low frequency 'noise'

Areas of predominantly negative low frequency magnetic responses, showing as a dapple of lighter grey to white on the greyscale plot, may denote layers of stone. It is only when overlain with the resistance meter results that meaning is given to the some of the irregular patches of negative anomalies, and it is clear is that these areas do not always correspond with areas of high and medium resistance where the remains and structures and areas of stone are believed to be present (see Section 4.3.2). There is, however, a partial correlation in Grid Square 2 (Fig. 5: 1) and in the south-east corner of Grid Square 3 (Fig. 5: 2); both areas area generally -1ηT to -3ηT, the east side of the path (Section 3.3.5), <-4ηT. The low frequency negative and positive responses may be caused by sporadic thermoremanent material. In the north-east corner of Grid Square 5 (Fig. 5: 3) the ground appears to have been disturbed, with a dappling of low frequency positive and negative magnetic responses, which perhaps again may represent patches of stone and possibly scattered thermoremanent material.

On the west side of Grid 3 (Fig. 5: 4) there is a marked amorphous area of uneven magnetic positive and negative responses, generally in the range of -5ηT to 10ηT, which may denote ground disturbance and /or differential medium, together with occasional discrete anomalies of induced magnetism which could easily be of natural origin, and some ferrous litter. It is noted that the resistance survey reveals no archaeological-type responses, but moreover as representative of the background medium/geology.

3.3.5 Linear Anomalies

A faint linear feature is seen diagonally crossing the south-east part of Grid Square 2 (Fig. 5: 5). It appears as ragged, uneven positive responses (generally 1ηT to 3, rising occasionally to 5ηT, and occasionally 12ηT) and is 2 to 3 metres wide. This feature corresponds with a hollow pathway which appears to have been dug out to some extent, disturbing buried stone in part. Fragments of daub were noted were the roots of small trees had been cleared to the west of the path.

Other weak positive linear features appear as thin quasi-parallel striations to the east of the survey grid (Fig. 5: 6); aligned approximately north-east/south-west (Grid Square

4;<3ηT) and northeast-southwest (Grid Square 5; <5ηT). These could simply be result of ruts filled with magnetically susceptible material.

3.3.6 Strong Positive Anomalies

Of particular note is a quasi-linear form of strong positive anomalies (Fig. 5: 7) which occurs at the northern extent of an area of medium resistance (Section 4.3.2) which is understood to represent buried archaeology. The 'anomaly' spans four data collection traverses (i.e. 4 metres) and is aligned approximately east-west. Whilst on the grey scale plot this appears as a continuous linear form, the stacked trace plot reveals two strong positive anomalies (114.7ηT, W; 96.7ηT, E) separated by a low positive anomaly of weaker strength (1.8ηT). The signal of the westernmost anomaly seems to suggest that it is the result of intense burning such as with a hearth or similar.

3.3.7 Ferrous Objects

Very few buried ferrous objects were detected in the area surveyed, seen as noise 'spikes. An archaeological origin for these signals should not be precluded.

4. RESISTANCE METER SURVEY

4.1 Methodology

4.1.1 Survey grid

The resistance survey comprised area of approximately 2,120m^2. The area of survey differed to that of the gradiometer survey due to physical constraints. Grid Square 5 is thus omitted and Grid Squares 6 and 7 are additional (Fig. 2).

4.1.2 Instrumentation and set up

The instrumentation used for the survey was a *Geoscan Research* RM4 Resistance Meter with a Twin Electrode probe array of 0.5m separation. Data was captured by external data logger, *Geoscan Research* DL10. Samples were taken on the 2000 ohm full scale deflection range, allowing a resolution of 1 ohm. The settling time of the data logger was set to 1.4 seconds delay. Samples were taken every metre at 1m traverse intervals.

4.1.3 Data processing

The results were downloaded periodically in the field to portable computer using Geoplot V.3 software (licensed user no. GP97150).

4.2 Constraints and considerations

The weather at the time of survey was mostly a constant warm temperature, without wind. Ground conditions are understood to have remained fairly constant through the survey. Due to this the survey results are deemed to unaffected by weather conditions.

As with the gradiometer prospection, the survey was impeded in part by either live or cut vegetation mention above. It was however, possible to survey a larger area of the north part of the bailey with the resistance technique, by trampling down some of the vegetation, whereas, the presence of tall willow-herb stalks pervading the south-east part of the bailey precluded survey.

4.3 Results

4.3.1 Presentation of the data

The results of the resistance meter survey are presented as a Shade Plot and Trace Plot (Fig. 6), ‘clipped’ Grey scale plots with low pass filter over the data (Fig.7), and an Interpretative Diagram (Fig.8).

Individual grid data was initially separately interrogated and compared, first with ground survey observations, then with the gradiometer data.

The composite data is presented after removing or reducing defects in the data. Common defects in Twin Electrode resistance data are spurious ‘noise spikes’ and grid edge discontinuities. Low level ‘noise’ spikes are likely to have been the result of high contact resistances encountered in certain parts of the Study Area.

The data was moderately 'de-spiked', taking care not to lose feature definition during the process. Grid edge discontinuities were fairly negligible due to careful calibration when re-positioning the remote probes during the survey. Where grid edge discontinuity did occur it is probably due a variation in background resistance in the morning when ground conditions were wet (see section 3.2 above). In order to enhance the archaeological-feature visibility a Low Pass Filter has been used in Figure 7.

The archaeological response stands out against a background signal representative of the local geology. On the grey scale plot areas of high resistance (positive anomalies) are presented as dark shades and areas of low resistance (negative anomalies) as light shades. The strength of an anomaly depends upon the type of structure, its size and depth below the ground, the local soil type and geology, the contrast of feature with respect to its surroundings, and the climate.

4.3.2 Archaeological-type responses

In broad terms, an increase in resistance denotes buried remains that are physically elevated against the surrounding material/medium, such as walls, banks or metalled surfaces, which are generally poor electrical conductors. A decrease in resistance might signify the presence of a buried feature such as a ditch or a pit, retaining moisture and responding as an electrical conductor.

INCREASE IN RESISTANCE	DECREASE IN RESISTANCE
Example of positive feature type:	Example of negative feature type:
Walls Cobbled surfaces Rubble Paving Pits & ditches (filled with coarse rubble) Mounds/banks	Ditches (soil-filled) Foundation trenches Pits (soil-filled) Gullies Water holes

A negative feature such as a ditch will contrast most in the data set if the background geology type or medium, permits water to drain away easily. It is presumed that the bailey, steeply scarped on three sides, for the most part drains rapidly during rainfall. Inevitably, stone structures will have better contrast with soils that retain moisture. The generally dry conditions, thin topsoil (it appeared to be c.0.15m where exposed) and good drainage of the Study Area produced a background resistance generally between 1050 -1120 ohms.

Figures 6 and 7 show the results of the resistance survey. Anomalies were detected to a depth of about 1m. Most strikingly is a distinct zone of medium and high resistance in the centre of the bailey (Fig. 8: 8) which measures approximately 20m east-west by 30m north-south, below referred to as the 'central anomaly'.

To the south of this feature another zone of high resistance (Fig. 8: 8a) (generally 1220s to 1305 ohms) is partially revealed, connected to the central anomaly by a distinct linear of medium resistance (generally 1190 to 1120s), c 2m wide and 10m in length. It may be a paved or cobbled area.

Rectilinear forms are discernible in the resistance data and it tempting to interpret these as the foundations of buildings. In the Grid Square 3, a rather amorphous, area of medium-high resistance (generally, 1160 -1270 ohms) occupies the north-west corner of the central anomaly (Fig. 8: 8b), measuring about 5m x 10m and orientated approximately north-south.

Sub-rectangular areas of high resistance are seen in Grid Square 2 and Grid Square 4, respectively forming the south-west and north-west corners of the central anomaly.

Grid Square 2 has an area of high resistance (generally around 1350ohms) which forms an L-shape (Fig. 8: 8c), the upper part of the 'L' orientated north-south. Each arm of the L is *c.*5m in width and *c.*10m in length, and appears to resemble two structures forming the south-east angle the central anomaly. In Grid Square 4 there is a distinct sub-rectangular zone of high resistance (Fig. 8: 8d), measuring approximately 5 x 10m, which shares the alignment of the upper arm of the L, to which it appears to be joined. This has an irregular halo of medium resistance 3 – 4m in width, and on the east side there is distinct diagonal arm of medium resistance leading towards the north-east (Fig. 8: 8e).

The middle of the central anomaly is comprised of a sub-rectangular zone of fairly consistent strength medium resistance (generally between 1140 and 1190 ohms), which may denote a buried layer of dense material or a hard-packed surface.

Some of the areas of high resistance which show near-rectilinear and linear characteristics have show a correspondence with amorphous patches of low magnetic susceptibility and possible thermoremanent responses in the gradiometer data. This is particularly apparent in the south and central part of the survey grid (Grid Squares 2 and 3).

A faint line of lower resistance (Fig. 8: 9), generally 1020 – 1050 ohms, passes diagonally across the corner of Grid Square 1, curving north-eastwards through Grid Square 3, the northern part of Grid Square 4 and the south-east corner of Grid Square 7. This would appear to correspond with the course of the landscaped avenue and the path leading to it from the south-west corner of the bailey. The line appears to cut through an area of medium resistance (1140 -1180ohms) in the north-east part of Grid Square 3.

5. CONCLUSIONS

The purpose of the survey was to attempt to define the presence and layout of buried archaeological features associated with the bailey. Wherever possible the interpretation sought to filter out the background ‘noise’, and a grid-by-grid study was undertaken in the field to identify the surface phenomena and the effects that these may have the data.

Significantly, the resistance survey revealed a quasi-rectangular area in the centre of the bailey, part of which appears to resemble the foundations of least two buildings, showing as a distinct area of high and medium resistance. A narrow linear feature, quite possibly a metalled pathway, leads from the south corner of this central area to another area of high resistance on the southern perimeter of the bailey, which may be either a paved area, or the foundations of another structure.

The gradiometer survey revealed rather amorphous patches of predominantly negative low frequency magnetic responses, showing as a dapple of lighter grey to white on the greyscale plot, which may denote layers of stone. In some places, alternating low frequency positives and negatives, seem to indicate weak thermoremanent material. Occasional small pieces of fired clay were seen in recent areas of ground disturbance Grid Square 2 during the survey, which may have been either daub or extremely abraded fragments of brick rubble. When overlain with the resistance survey results, some of the irregular patches of negative anomalies showed a correspondence with the zone of high and medium resistance where the remains and structures and areas of stone are believed to be present.

The gradiometer survey revealed few strong positive anomalies in the survey. Notably, a strong positive linear anomaly, perhaps 4m in length, occurs along at the northern extent of the aforementioned quasi-rectangular area of medium to high resistance, the signal of which seems to suggest an area which has been subject to intense heat.

A number of discrete positive archaeological-type anomalies were detected across the survey area. Although these resemble dug features (such as pits) that have been subsequently filled with iron-oxide rich material, given the nature of the woodland location, it is likely that many of these are the former locations of trees. Positive linear responses of weak magnetic susceptibility may have been caused either by landscaping or rutting by wheeled vehicles. The surveys revealed Grid Square 1 to be a relatively ‘noise-free’ zone.

It is uncertain as to whether these buried remains relate to the Norman garrison buildings or a mid-18th century bowling green which is understood to have been built sometime during the 1720s and 30s by Stephen Switzer, and later depicted on an engraving by Thomas Badeslade in 1739 or 40. Either remains, if proved, present a significant episode in the history of the site.

The survey has shown that the use of complementary geophysical techniques, fluxgate gradiometer and resistance meter, has significantly contributed to our understanding of the extent of buried archaeological remains within Erddig Park. A broader aim of the survey was to attempt to clarify whether the ground conditions within the Erddig estate are suitable for a more intensive and geographically wider geophysical survey. Given that the promontory could easily represent differentiation in the local geology and that construction of the bailey is likely to have involved a considerable amount of ‘cut and fill’ to produce what is a fairly level area, it would be misleading to extrapolate conduciveness to magnetic susceptibility to other areas of the estate. In order to acquire a better understanding of the capabilities of magnetic survey in the locality, it would be useful to carry out trial surveys based on variable topography, past and present land-use, and especially in areas where buried archaeology is already known to exist (e.g. from aerial photographic data).

6. GENERAL

6.1.1 Statement of Indemnity

All statements and opinions presented in this report arising from the programme of investigation are offered in good faith and compiled according to professional standards. Whilst every effort has been made to ensure that interpretation of the survey presents a good indication of the nature of sub-surface remains, any conclusions derived from the results form an entirely subjective consideration of the data. Geophysical survey enables the collection of data relating to variations in the form and nature of buried soils. This may only reveal certain archaeological features, and may not record all. No responsibility can be accepted by the author of the report for any errors of fact or opinion resulting from data supplied by any third party, or for loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in any such report(s), howsoever such facts and opinions may have been derived.

6.1.2 Acknowledgements

Staff of the National Trust at Erddig Country Park are thanked for their hospitality and use of access throughout the survey.

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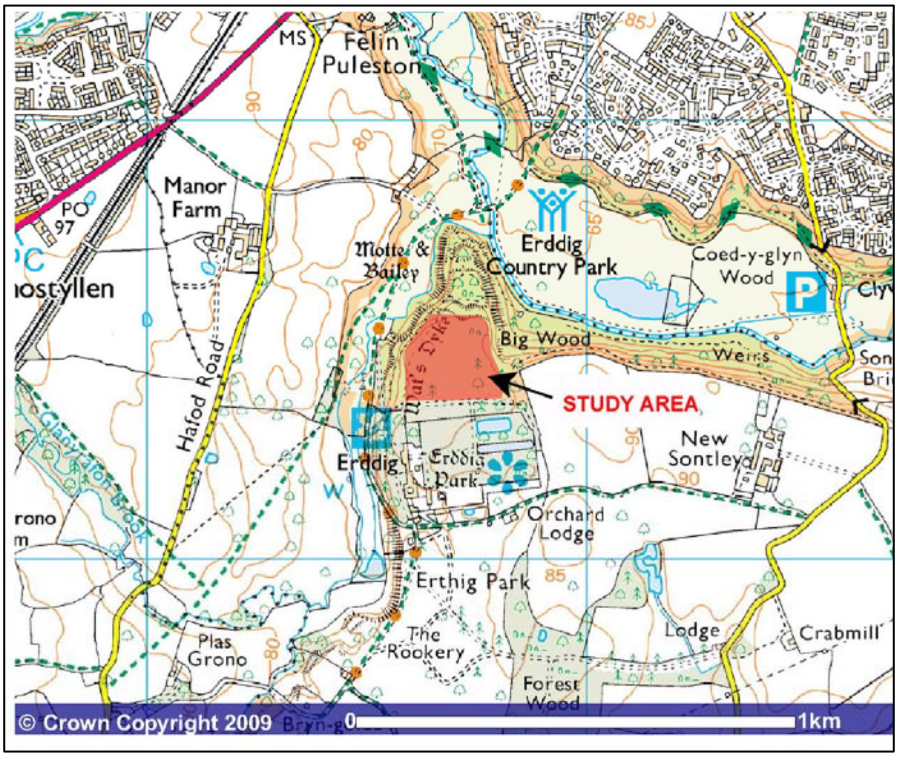
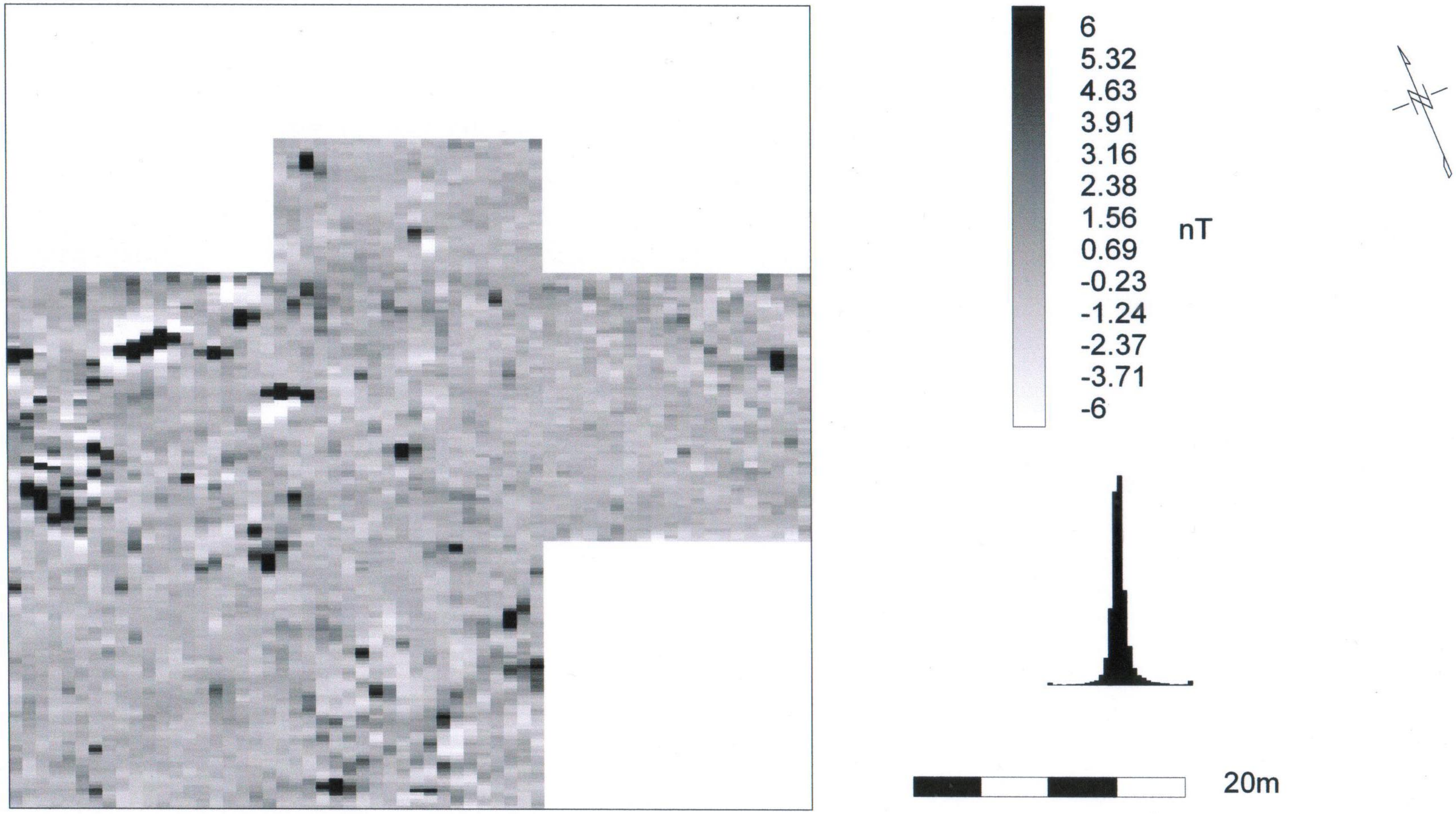


Figure 1 Location of Erddig Castle

Figure 2: Location of the survey grid

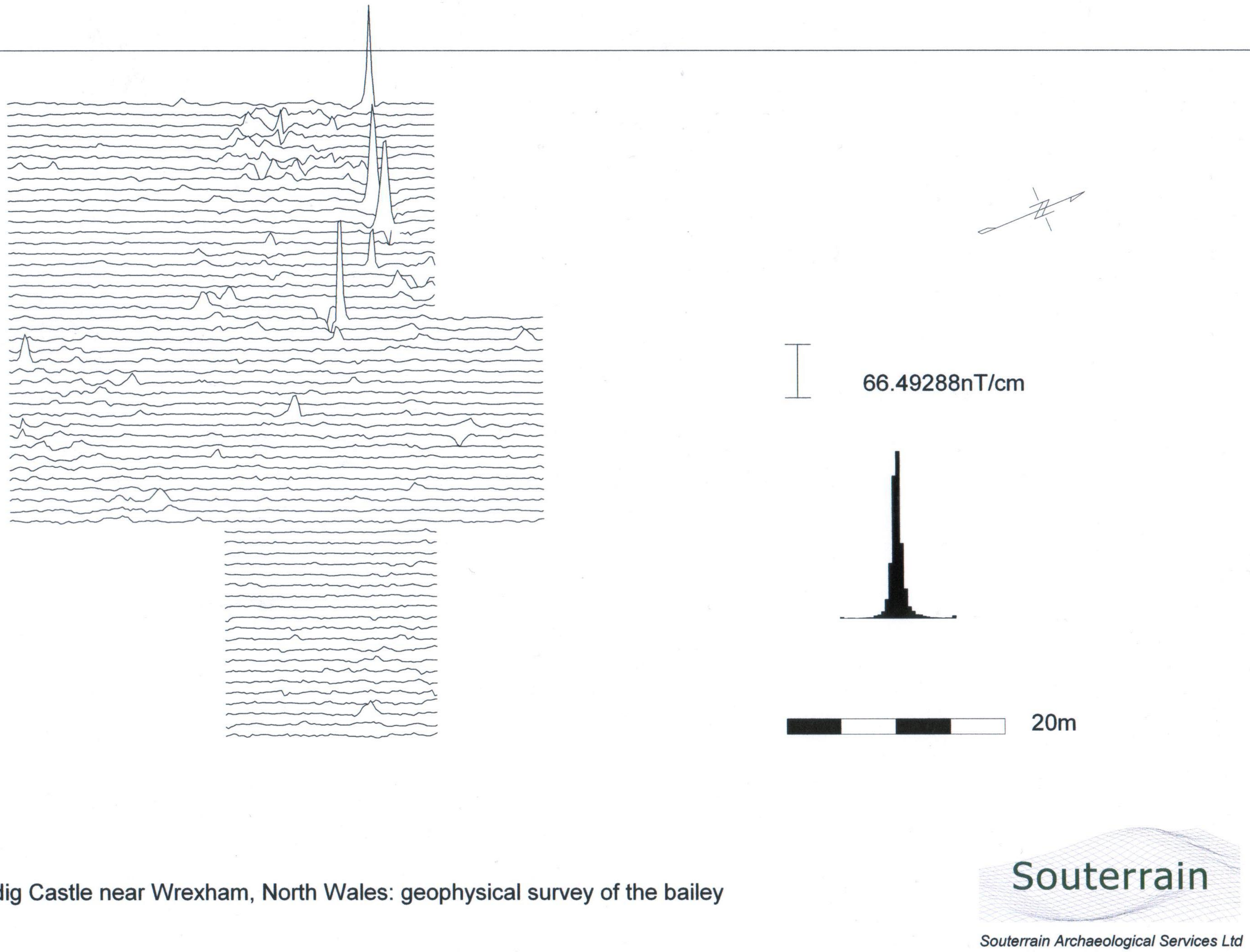


Souterrain

Erddig Castle, near Wrexham North Wales: geophysical survey of the bailey

Souterrain Archaeological Services Ltd 2009

Figure 3: Gradiometer survey grey scale plot



Erddig Castle near Wrexham, North Wales: geophysical survey of the bailey

Figure 4: Gradiometer survey, trace plot

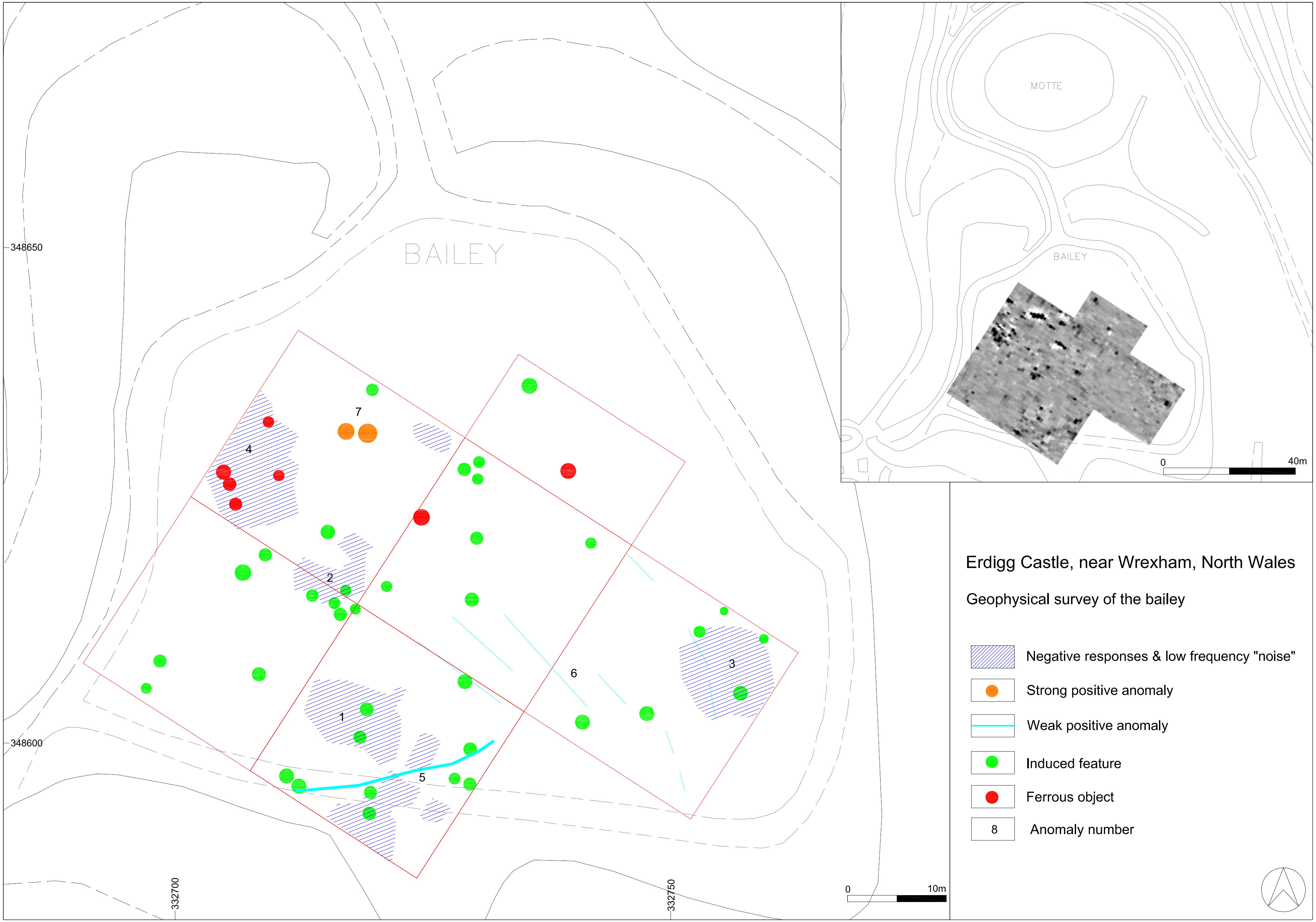


Figure 5: Gradiometer survey (grey scale plot): interpretative diagram

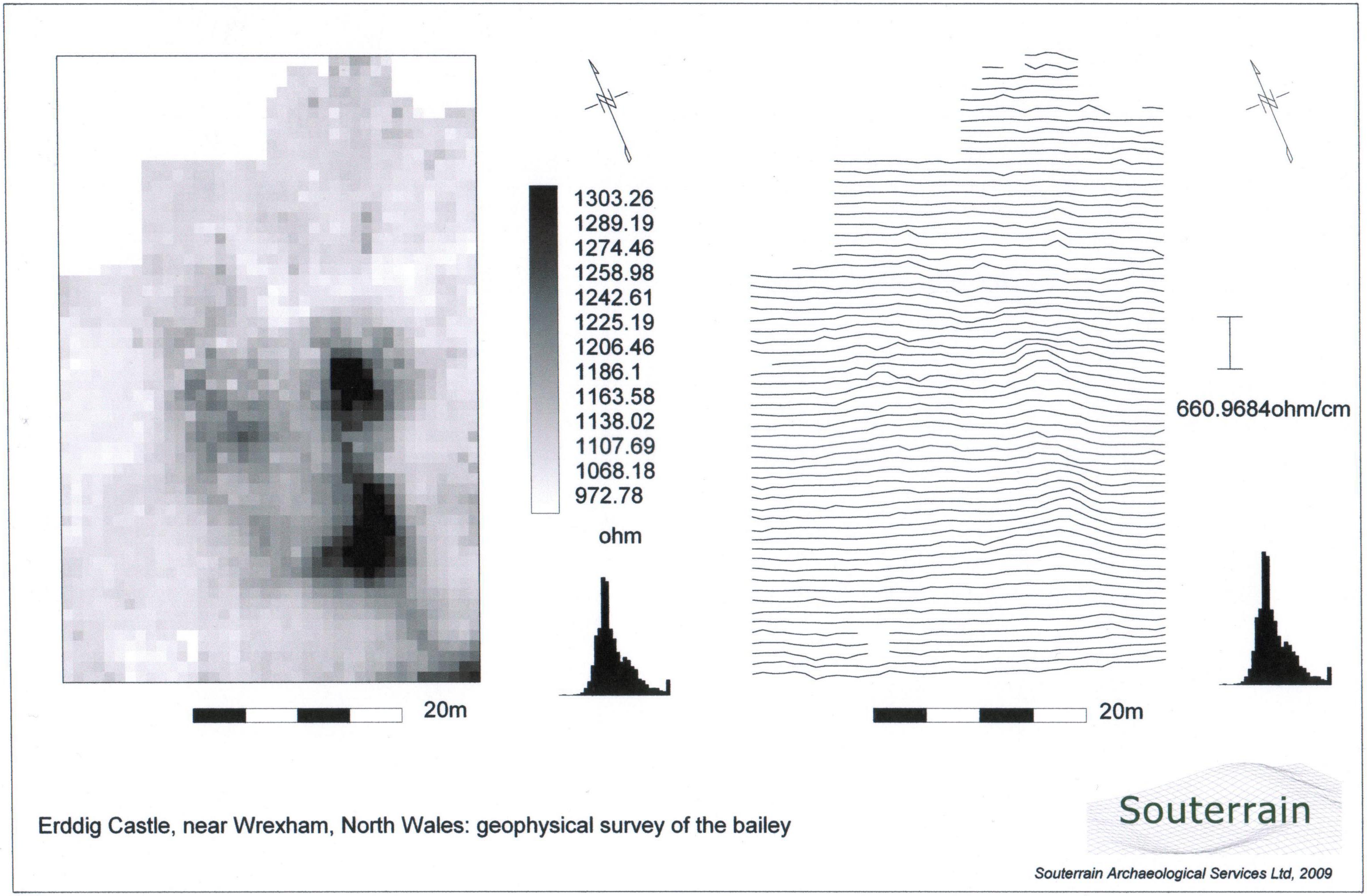


Figure 6: Resistance survey. Grey scale plot and Trace plot

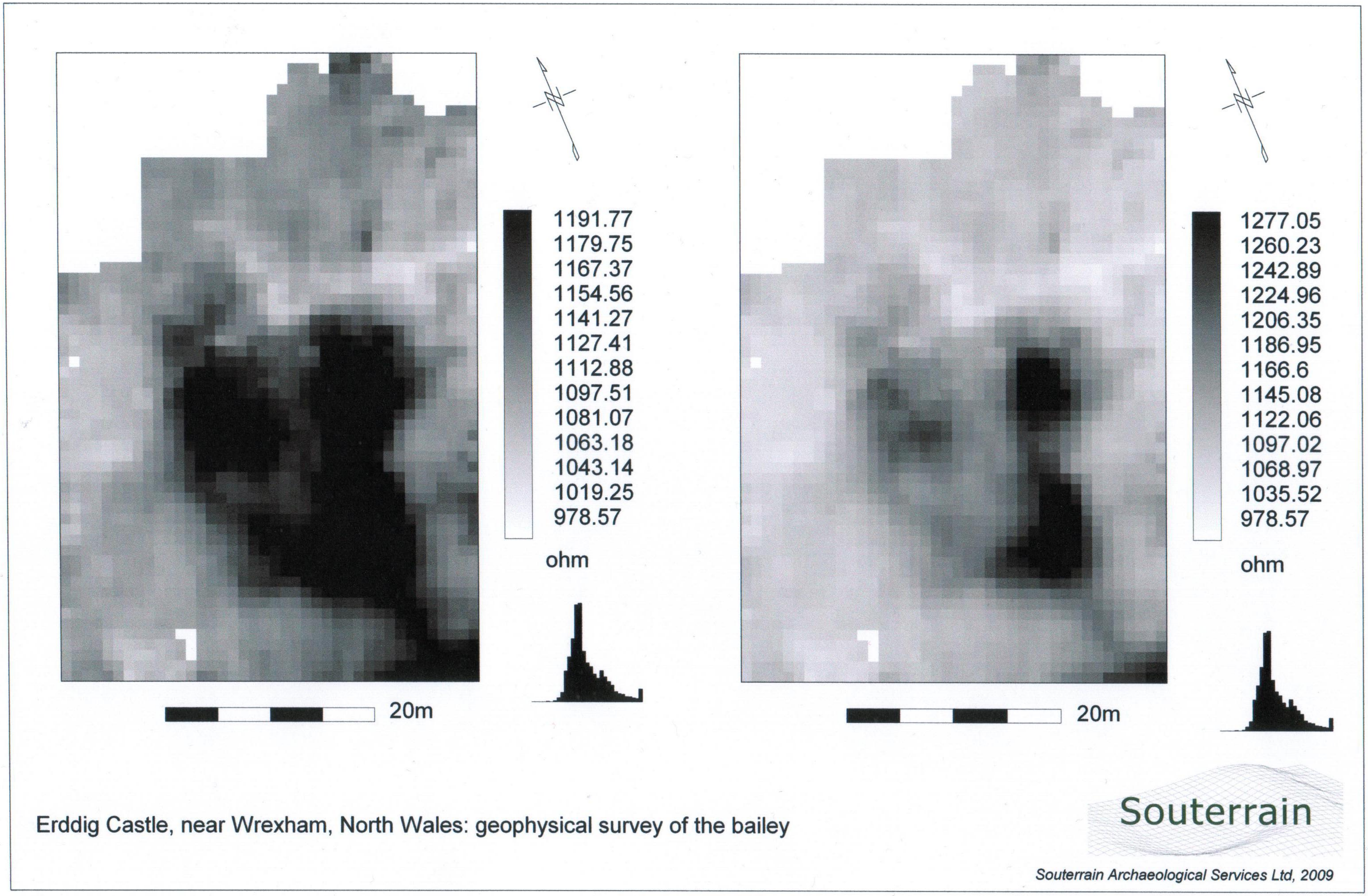
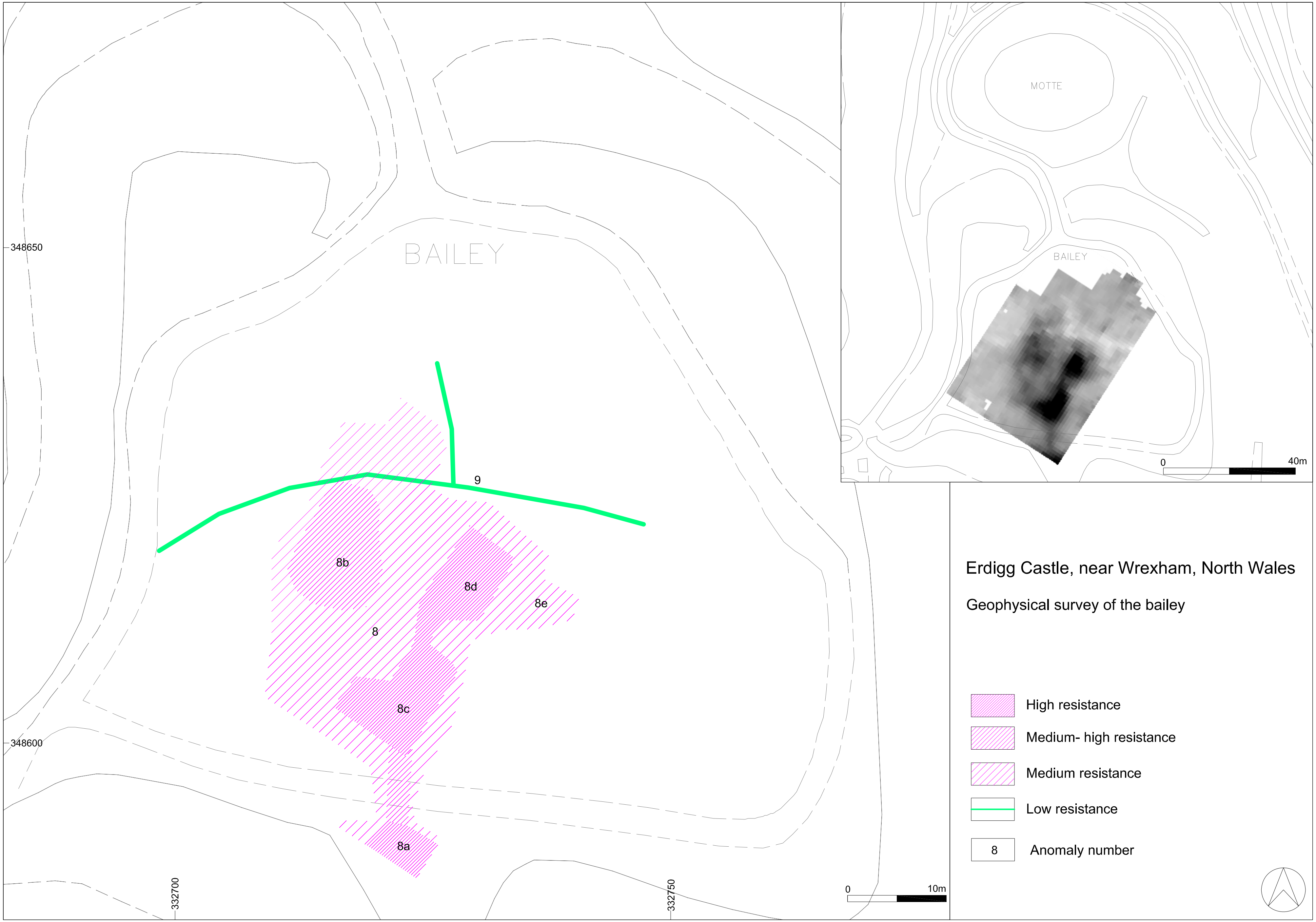


Figure 7: Resistance survey. Grey scale plots with low pass filter



Erdigg Castle, near Wrexham, North Wales

Geophysical survey of the bailey

	High resistance
	Medium- high resistance
	Medium resistance
	Low resistance
8	Anomaly number

Figure 8: Resistance survey: interpretative diagram