LAND TO THE SOUTH OF LOW BORROWBRIDGE ROMAN FORT,

LOW BORROWBRIDGE,

CUMBRIA

Geophysical Survey Report

Oxford Archaeology North

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SUMMARY

Lunesdale Archaeological Society (LAS) has conducted a number of investigations at Low Borrowbridge Roman Fort (NGR NY 6094 0127) in recent years, including the excavation of a high status building to the south of the fort. As a result of this excavation and due to the lack of knowledge about the associated extra-mural settlement at Low Borrowbridge, LAS requested that Oxford Archaeology North (OA North) carry out a programme of geophysical survey within a field to the south of the fort (NGR NY 6106 0099). Most of the area of the fort is a scheduled monument (SM 13265); therefore the survey was carried out in the area of the field outside of the scheduled area.

OA North and LAS agreed that the two complimentary techniques of magnetometry and electrical resistance be used, which OA North carried out over two separate visits on 2nd April and 18th and 19th July 2014. An important element of the survey was to involve members of LAS and a number of volunteers both assisted with the survey and carried out data collection.

Both geophysical survey techniques revealed several responses suggestive of buried archaeological remains. A great number of the responses were only visible in either one but not both data plots. There were several linear responses suggestive of two differently aligned field systems, as well as features potentially associated with an extra-mural settlement. There was also an alignment of ditched features that coincided with the orientation of Low Borrowbridge fort to the north. One of the field systems was visible in both data sets and was clearly later than features potentially associated with the extra-mural settlement. A putative connection to the fort in the form of a possible holloway was also visible. Several responses suggestive of buried structures of potential archaeological origin were present in both data sets. Whether some of these are associated with either Low Borrowbridge Roman Fort and associated settlement or the cemetery to the south is open to conjecture but given the location of the field it cannot be discounted.

Further non-invasive investigation of the remainder of the field containing the survey area, as well as additional fields, was recommended in order to try to gain additional information as to the nature and extent of features of archaeological potential. Ground truthing, in the form of trenching was recommended in order to fully characterise the nature of the responses. The responses indicative of field systems, buried structural remains, banks and ditches were suggested as being obvious candidates, as well as the potential extra-mural settlement features.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Graham Hooley for commissioning the project and for his support and assistance during course of the survey. Also due thanks is Jackie Hooley for her generous hospitality. OA North would also like to thank the enthusiastic volunteers of the Lunesdale Archaeology Society (LAS) who took part in the survey.

The magnetometer survey was undertaken by Mike Birtles and the electrical resistance survey by Karl Taylor. Volunteers from LAS also assisted with the surveys and collected data. The report and drawings were produced by Karl Taylor. The project was managed by Karl Taylor and Alan Lupton edited the report.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

1.1.1 Lunesdale Archaeological Society (LAS) have conducted a number of investigations at Low Borrowbridge Roman Fort (NGR NY 6094 0127) over the last few years, including the excavation of a high status building to the south of the fort. As a result this excavation and due to the lack of knowledge about the associated extra-mural settlement at Low Borrowbridge, LAS requested that Oxford Archaeology North (OA North) carry out a programme of geophysical survey within a field to the south of the fort (NGR NY 6106 0099). Most of the area of the fort is a scheduled monument (SM List Entry Number 1007240), therefore the survey was carried out in the area of the field outside of the scheduled area (Fig 1).

1.1.2 During a meeting between Graham Hooley of LAS and OA North it was agreed that the two techniques of magnetometry and electrical resistance be used on the same area. Following this, OA North was commissioned by LAS and the survey was carried out over two separate visits on 2nd April and 18th and 19th July 2014. An important part of the survey was to involve members of LAS and a number of volunteers both assisted with the survey and carried out data collection.

1.1.3 This report sets out the results of the geophysical survey and provides an interpretation of the results, along with recommendations for further work.

1.2 LOCATION AND BACKGROUND TO THE AREA

1.2.1 ***Location, Geology and Topography:*** the site is situated within the Tebay Gorge, formed as the River Lune carved its way through an ancient fault line between the Lake District fells of Jefferies Mount and Whinfell on the west and the glacial rounded Tebay and Howgill Fells to the east. The survey area is situated in a field to the south of Low Borrowbridge Farm and adjacent Roman Fort (NGR NY 6106 0099, Fig 1). The fort is positioned at the confluence of the River Lune and Borrow Beck forming the junction of Borrowdale and the Upper Lune Valley. The field extends to approximately 3.9ha however, the actual area surveyed was 1.3ha of magnetometry and 1ha of electrical resistance (Fig 2).

1.2.2 The underlying bedrock comprises the Coniston Group consisting of sandstone, siltstone and mudstone. The overlying superficial deposits being alluvium (clay, slit, sand and gravel) over the south end of the site, with river terrace deposits (silt, sand and gravel) over the north end (www.bgs.ac.uk). The soils are slowly permeable seasonally wet acid loamy and clayey (www.landis.org.uk).

1.2.3 The survey field sloped gently from north to south, the field boundaries comprising dry stone walls and post wire fencing, the latter mainly making up the north, south and east boundaries of the field. Only the east field boundary abutted the survey area. An overhead power line crossed the survey area from north-east to south-west.

1.2.4 ***Background:*** the pass of Tebay Gorge is an historic north/south thoroughfare between the mountains of the eastern Lake District and the Howgill Fells. There has been a succession of transport routes through the area, including a prehistoric trading route, a Roman road, drovers and pack horse routes as well as latterly, the west coast main line railway and the M6 motorway (ACTion with Communities in Cumbria, 2013).

1.2.5 ***Prehistoric period:*** the main prehistoric site within the surrounding area is a putative Bronze Age/Iron Age settlement at High Carlingill on the lower slopes of the eastern side of the Lune valley (OA North 2013). Other sites in the area are a Bronze Age cairn at Tebay Gill, and the findspot of a Bronze Age spearhead approximately 1km to the south of the cairn. A further possible cairn is located on Gibbet Hill. Three worked flints were found during the excavation of Powsons Farmstead and interpreted as being deposited as a result of hillwash from the fells (Lamber 1996).

1.2.6 There appears to have been a partial abandonment of the uplands in the early Iron Age, possibly due to a deterioration of the climate (Quartermaine and Leech 2012). This put pressure on the better lowland agricultural land, and, s a result, hillforts and enclosed settlements were established to protect these areas. Multivallate hillforts, with possible Iron Age origins, are known from the surrounding region including the Wasdale Foot settlement, to the north of the area on the Shap Fells, and at Scarside Plantation, to the north-west of Shap (SM 22511). Enclosed settlements were characterised by having prominent outer enclosing walls or banks, typically topped with a palisade, and containing a series of grouped round houses. Approximately 5km to the north of the study area is an example of an enclosed settlement at Castlefolds, Orton (SM 23634) which occupies a flat-topped limestone knoll close to the summit of Great Asby Scar (OA North 2013)

1.2.7 ***Roman period:*** the Roman fort (SM 13265) and associated bath house, *vicus* and cemetery are located at Low Borrowbridge, at the junction of the river Lune and Borrow Beck (*ibid*). The fort is on Wicker Street, the Roman road from Manchester to Carlisle which runs through the eastern part of the Lake District and was the primary north/south communication line through North West England for the substantial Roman forces stationed on Hadrian's Wall (OA North 2005a and b; Lambert 1996, 48). Remains of the bridge, which took the road over the river Lune to the north of the fort, have been found at Low Borrowbridge.

1.2.8 Despite the considerable presence of the Roman army throughout the region, the cultural impact on the native population was slight (OA North 2013). The settlements occupied during this period were developments of the enclosed settlements prevalent during the Iron Age. They incorporated outer defensive banks even though the presence of the Roman army, maintaining local peace, made them somewhat redundant (OA North 2003; 2005a).

1.2.9 The cemetery, located to the south of the survey area, was excavated in 1991 and 1992 during the installation of the North West Ethylene Pipeline (NWEP) (Lambert 1996) within which two large pits and seventeen ditched enclosures were found (*ibid*). The pipeline route skirted the banks of the Lune and cut across the lower part of the survey field and also revealed part of the Roman road heading south. Pottery found during the excavation suggested that the cemetery was in use from the mid third to fourth centuries (ACTion with Communities in Cumbria, 2013). A tombstone of Aelia Sentica also found during the excavations is the only surviving

inscription to have been discovered in association with the fort. There was however, no mention of the fort or date (*ibid*). A findspot of a possible tombstone was discovered in the 1940s and reported as being approximately 1 mile to the south of the fort. The tombstone may, therefore, have been part of the cemetery associated with the fort (OA North 2013).

1.2.10 ***Medieval Period:*** Low Borrowbridge fort may have remained a stronghold in the period immediately following the withdrawal of Roman occupation of Britain, although this was probably short lived, as there is little evidence for continued occupation of the known Romano-British sites in the area with the exception of a settlement to the east of the fort (Lambert 1996, 48).

1.2.11 Evidence for early medieval activity from excavations and surviving remains is extremely limited (OA North 2013). Following the cessation of organised Roman military occupation in Britain, most of Cumbria became part of the rapidly fluctuating early medieval kingdoms in the region: firstly Rheged in the sixth and seventh centuries and then the expanding and conflicting kingdoms of Northumbria and Strathclyde (Higham 1986; Bingham 1995). The Lune valley was a focal point of this conflict (Lambert 1996, 48). Settlement in the valley appears to have discontinued for sometime in the early medieval period (*ibid*). Analysis of pollen samples from upland peat deposits at Carlingill (SD 6275 9980), and Archer Moss (NY 6330 0062) indicate a phase of woodland clearance in the Roman period, followed by a long period of woodland regeneration.

1.2.12 The Lune valley was an important drove-way from Galloway to London for several centuries (OA North 2013). A twelfth century charter mentions a drove-way named Galwaithegate (the Galloway Road), which ran south-west from Low Borrowbridge towards Lambrigg Park (Hindle 1998, 103 and 109). A drove-way noted during the archaeological work for the NWEP appears to be located on this route (Lambert 1996). Southwards from Low Borrowbridge cattle were driven either south-south-west along the Galwaithegate or south-south-east along the former Roman road to Sedburgh, named Howgill Lane on its route southwards from Carlingill Bridge (Hindle 1998, 109; Lambert 1996, 67). To the north, Lune's Bridge is first mentioned in documents of 1379, and took the Kendal to Appleby road across the river Lune (OA North 2013).

1.2.13 The growth of settlement in Tebay may have from suffered repeated Scottish raids following the wars of Independence. However, settlement spread south, west and east from Tebay in the later fourteenth century, and extended along the Lune valley to include Borrowbridge, Brockholes and Carlingill (Lambert 1996, 55).

1.2.14 ***Post-medieval period:*** post-medieval sites close to the survey area are of a very similar range to those which have been attributed to the medieval period (OA North 2013). Lynchets which appear to predate land enclosure were probably associated with the seventeenth/eighteenth century farmhouse of Tebaygill. A farmhouse, named Roundthwaite (Grade II Listed), has a date stone of 1730 over its upper byre door. There is also a ruined barn at Low Carlingill, a sheep fold or stack stand at High Carlingill; and sheep folds shown on the first edition OS map (OA North 2013).

1.2.15 Trackways in the form of hollow ways and terraces ascend from the Lune Valley to the peat cutting areas on Blease Fell (*ibid*). A pair of hollow ways run from the road between Low Carlingill and High Carlingill farms to the west side of Grains

Gill; and a track runs from Brockholes Wood on the north side of Cleugh Gill (*ibid*). The valley farms are thought to be of eighteenth/nineteenth century date and the peat cutting is likely to be of roughly the same date, which would also provide a date for the trackways (*ibid*).

1.2.16 Salterwath Bridge was ruinous in 1811 and rebuilt in 1824 (Lambert 1996, 69), but it is unknown when the original bridge was built, and it may in fact have been another Roman crossing point of the Lune (OA North 2013).

1.2.17 ***Industrial period:*** the arrival of the railways represents the first major change in this area of the Lune valley for several centuries (Lambert 1996, 63). The Lancaster and Carlisle Railway, was opened in 1846 and now serves as the West Coast main line. During conduction of the railway, it was proposed that the line run directly through the fort but following a review, the route was shifted to the west.

1.2.18 To the west of the railway, the M6 Motorway was constructed in 1967 (ACTion with Communities in Cumbria, 2013). Any extra-mural settlement that may have been present to the west of the fort would undoubtedly have been destroyed. Similarly, the field immediately to the south of the fort was drained and levelled to provide a temporary camp for the construction workers (*ibid*).

2. METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 The following methodology was used as the basis for the survey, and the work was consistent with the relevant standards and procedures of English Heritage (English Heritage 2008) and the Institute for Archaeologists (IfA 2011), and generally accepted best practice. Two techniques were used for the survey, magnetometry and electrical resistance.

2.2 GEOPHYSICAL SURVEY

2.2.1 ***Magnetometer Survey:*** the preferred geophysical technique in the detection of many archaeological remains is a magnetometer area survey, which is effective in locating 'positively magnetic' material, such as iron-based (or 'ferrous') features and objects, or those subjected to firing, such as kilns, hearths, and even the buried remains of brick walls. This technique is also widely used to locate more subtle magnetic features associated with settlement and funerary remains, such as boundary or enclosure ditches and pits or post-holes, which have been gradually infilled with more humic material. The breakdown of organic matter through micro-biotic activity leads to the humic material becoming rich in magnetic iron oxides when compared with the subsoil, allowing the features to be identified by the technique. In addition, variations in magnetic susceptibility between the topsoil, subsoil and bedrock have a localised effect on the Earth's magnetic field. This enables the detection of features, such as silted-up or backfilled pits, due to the fact that the topsoil has more magnetic properties than the subsoil or bedrock, resulting in a positive magnetic anomaly. Conversely, earthwork or embankment remains can also be identified with magnetometry as a 'negative' feature due to the action in creating the earthwork of depositing the relatively low magnetic subsoil on top of the more magnetic topsoil. In this way, magnetometry is a very efficient technique and is recommended in the first instance by English Heritage (2008) for such investigations.

2.2.2 ***Magnetometry Equipment:*** the strength of the present geomagnetic field in Great Britain is approximately 50,000nT (nanoTesla). Most buried archaeological features usually result in very weak changes of less than 1nT to the magnetic field (Clark 1990, 65). The instrument used for this survey was a *Bartington* Grad 601-2 dual sensor fluxgate gradiometer, which has a sensitivity of 0.1nT when used in the 100nT range setting.

2.2.3 ***Electrical Resistance or Resistivity:*** the use of electrical resistance area survey is often seen as being complementary to magnetometry and is recommended by English Heritage where there is a strong presumption that buried structures or buildings are present that are not easily identifiable with magnetic methods. The technique requires injecting a small electric current into the ground via steel probes, and measuring the response with an earth resistance meter. The technique relies on the variable ability of the soil to resist an applied electrical current by the resistance meter from a pair of mobile probes to a corresponding pair of remote, static probes. The resulting resistance measurements (in ohms) can be used identify to buried features, which often have either a higher or lower resistance to the current than the background soil. Cut features that have been subsequently infilled, tend to be less

resistant to the current flow and appear as low-resistance anomalies, whereas solid features such as structural remains tend to more resistant to the current flow and appear as high-resistance anomalies. One of the main disadvantages of the technique, when compared with magnetometry, is that data collection over the same size of area is a much slower process.

2.2.4 ***Resistivity Equipment:*** the instrument used for this survey was a Geoscan Research RM15-D resistance meter with PA20 frame system and MPX15 Multiplexer. The 0.5m twin mode allows two parallel survey traverses to be collected simultaneously, the twin arrays being separated by 1m.

2.2.5 ***Sampling Interval***: the survey area was divided into 30m x 30m grids. Magnetometry sampling was at 0.25m intervals, with inter-transect distances of 1m, equating to 3600 sample readings per grid. The survey was carried out in 'zigzag' mode, with precautions to minimise any heading error during the magnetometry survey. In total, an area of approximately 1.3ha was surveyed with magnetometry (Fig 2). Resistivity sampling was at 1m intervals with inter-transect distances of 1m, equating to 900 sample readings per grid. In total, an area of 1ha was surveyed resistivity (Fig 2). All survey grid nodes were staked out with canes using a Leica 1200 series RTK GPS system. Survey guidelines and traverse canes were then staked out.

2.2.6 ***Data Capture and Processing:*** magnetometry and resistance data were captured in the internal memories of the instruments and downloaded to a portable computer on-site and backed-up on to a USB drive. The individual grids were combined to produce an overall plan of the surveyed area, or 'composite'. The results were analysed and basic initial processing was carried out on-site using the software programme 'Geoplot' by *Geoscan Research*.

2.2.7 Final minimal processing of magnetometry raw data was undertaken off site in accordance with English Heritage guidelines (English Heritage 2008) to remove any instrument error or survey effects in order to enhance more subtle anomalies normally associated with archaeological features:

- Zero median traverse (ZMT) was applied to correct slight baseline shifts between adjacent survey lines;
- The data were selectively 'de-staggered' where necessary, to remove any displacement caused by surveying in zigzag mode. This is sometimes required when surveys are carried out on boggy, wet, overgrown or steeply-sloped areas;
- The data were de-spiked in order to remove random spikes. Random spikes are usually caused by erroneous small ferrous objects.

2.2.8 Final processing of the resistivity data was undertaken in accordance with English Heritage guidelines (*ibid*).

- The data were de-spiked in order to remove high contact readings;
- A high pass filter was applied which removes variations in the background geological response
- The grids were periphery matched in order to correct for changes in the position of the remote probes

2.2.9 ***Presentation of the results and interpretation:*** the presentation of the data for the site involves a print-out of the processed data as a grey-scale plot for each of the magnetometry surveys (Figs 3 and 4), together with interpretation plots (Figs 5, 6 and 7).

2.3 ARCHIVE

2.3.1 A full professional archive has been compiled in accordance with current IfA and English Heritage guidelines. The project archive represents the collation and indexing of all the data and material gathered during the course of the project.

2.3.2 The deposition of a properly ordered and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the IfA in that organisation's code of conduct. OA North conforms to best practice in the preparation of project archives for long-term storage. OA North practice is to deposit the original record archive of projects with the appropriate repository.

2.3.3 The Arts and Humanities Data Service (AHDS) online database project *Online Access to index of Archaeological Investigations* (OASIS) will be completed as part of the archiving phase of the project.

2.3.4 The geophysical survey data will be archived with the Archaeology Data Service (ADS) in accordance with the guidelines published by the ADS (Schmidt 2002)

3. SURVEY RESULTS

3.1 GENERAL OBSERVATIONS

3.1.1 In general, the data sets are complex but have identified anomalies of several different origins, including potentially significant archaeological features. There are number of linear responses and linear trends that are indicative of field systems of at least two phases, as well as anomalies that are suggestive of features associated with an extra-mural settlement of the Roman fort. Interestingly, the data sets differ considerably, with many responses visible in one data set that are not present in the other. There is, however, some correlation as set out in the results section below. The following section will outline the results of the survey, describing the types of features that are potentially present within the survey area, commencing with the most obvious.

3.2 RESULTS (FIGS 5, 6 AND 7)

3.2.1 ***Field systems:*** there are two potential field systems on different alignments within the survey area (F1 and F2, Fig 7). One of these is only visible with any certainty in the magnetometry data as a series of linear responses indicative of ditches (F1, Fig 7). There appears to be three or four defined enclosures in the north-west part of the survey area that are aligned along the same axis as clearly visible parallel positive and negative magnetic linear responses. These parallel responses are indicative of agricultural activity, such as ploughing, and seem to respect the field system boundaries. There are some faint responses on a similar alignment visible in the resistance data that may also be related to this activity.

3.2.2 The second system of field boundaries is on different alignment on the eastern side of the survey area (F2, Fig 7). The responses visible in the magnetometer data are similar to those for field system F1 but, in addition, there are low resistance linear responses visible (indicative of ditches) in the resistance data that line up almost perfectly with the magnetic responses, particularly at the northern end.

3.2.3 ***Earthworks:*** lying almost perpendicular to feature F1 are a series of at least three parallel low resistance fairly wide, linear trends running across the survey area (F3, Fig 7). Responses like these, particularly when arranged in such a fashion may be indicative of features such as 'ditches', but further investigation is needed to explore this theory. There is a corresponding high resistance area in-between the ditches at the western end that may be evidence of bank-type structures, but this is all conjectural. All of these features lie on a similar orientation to the main fort which may or may not be co-incidental. The potential field system F2 appears to be later than these possible defences, as the linear responses can clearly be seen to cut across the line of the 'ditches'.

3.2.4 ***Extra-mural settlement:*** located mainly within the northern part of the survey area lying perpendicular to features F3, are several fairly wide low resistance linear areas (F4, Fig 7), as well as a wider area of low resistance (F5, Fig 7). These were not detected at all in the magnetometry data. From their characteristics it is suggested that these may represent features such as sunken internal roads or pathways of an extra-mural settlement. They are perhaps not of Roman military

origin as these are typically high resistance due to the metalling material. Response F5 is mainly visible in the northern part of the resistance survey area but may extend down through the southern half of the survey area although it appears to be fragmentary here. This response may be evidence of a road leading toward the fort to the north as the projection of the line of this feature leads directly to it. The low resistance response suggests that the road was possibly a hollow way or became sunken during use.

3.2.5 Other responses related to a possible extra-mural settlement appear in the form of areas of magnetic disturbance (F6, Fig 7) and higher resistance discrete areas (F7, Fig 7). Areas of magnetic disturbance have varying origins, but given the potential archaeological nature of this area they may be associated with occupation or settlement, and discrete responses of high resistance may represent surviving traces of structures. Of particular interest is a circular area of magnetic disturbance in the centre of the western half of the magnetometry survey data which coincides with some discrete areas of high resistance. There is also a curving band of high resistance responses along its southern edge (F8, Fig 7) that may be of archaeological significance. There are no recognisable characteristics to provide information about its function or origin however. Some of the high resistance discrete areas exhibit dragging of material by responses of agricultural origin indicating that they are earlier than the agricultural activity (*Section 3.2.10*).

3.2.6 ***Buildings:*** there are several responses visible in both data sets that are indicative of former buildings. The resistance data in particular exhibits several rectilinear high resistance responses reminiscent of buried structures (F9, Fig 7). Some of these have corresponding positively magnetic linear responses. In the north of the survey area, within the area of features F5, are a series of linear magnetic responses that are also very suggestive of buried structures (F10, Fig 7). Other evidence of the possible presence of former structures is present in the form of a number of magnetic 'spikes' arranged in a rectangular pattern on the eastern side of the survey area (F11, Fig 7). Magnetic spikes are almost always present in magnetic survey data and are often due to individual metallic objects or debris of no particular significance, but when they are arranged in such a pattern and are of similar amplitude to those present here, they are sometimes indicative of features, such as post holes, filled with burnt material.

3.2.7 A rectilinear low resistance response is present in the south-east corner of the survey area (F12), and is on the same alignment as the possible defence features already described (F3). It has a high resistance response in its centre and some areas of magnetic disturbance in the surrounding area. This may also be evidence of a former building. It is probably earlier than field system F2.

3.2.8 ***Other features:*** there are several areas of quite high amplitude magnetic spikes that may be evidence of industrial processes including the use of hearths or furnaces. In particular, an alignment of three such features in the north-west corner of the survey area is of interest (F13). A further such response is present in the southern part of the survey area and has a similar explanation (F14).

3.2.9 A low resistance response can be seen following a sinuous north/south route through the centre of the resistance survey (F16, Fig 7). Its appearance is reminiscent of a feature such as a palaeochannel. However, it overlies most of the

anomalies in the resistance data suggesting that it is later in date than the field systems and ditches. Its origin remains unknown.

3.2.10 Numerous parallel responses visible in both the magnetic and resistance data are reminiscent of agricultural practices, such as ploughing that probably, are of recent origin. Some of these show evidence of the 'dragging' of earlier features particularly in the north-west corner of the survey area.

3.2.11 Finally, there are many discrete responses suggestive of pits as well as small linear responses reminiscent of ditches and banks. Most of these do not exhibit any distinctive patterns but, given the location and nature of the site, they may be of archaeological potential. An area of strong magnetic response along the eastern boundary of the survey area is due to the field boundary and is of no archaeological potential.

4. CONCLUSIONS

4.1 DISCUSSION

4.1.1 Both geophysical survey techniques have revealed several responses that are suggestive of buried archaeological remains. It is interesting to note that a great number of the responses are only visible in one and not both data plots. This highlights the fact that it is advantageous when trying to evaluate an area for its archaeological potential to use more than a single geophysical technique. In this instance, the magnetometry and electrical resistance surveys have successfully characterised the survey area as thoroughly as possible and have produced data of some complexity.

4.1.2 There are several linear responses suggestive of two differently aligned field systems, as well as features potentially associated with an extra-mural settlement and an alignment of ditched features that coincides with the orientation of Low Borrowbridge fort to the north. One of the field systems (F2) is visible in both data sets and clearly is later than features potentially associated with the extra-mural settlement. Areas of magnetic disturbance with high resistance responses may be indicative of areas of occupation and a rectangular arrangement of magnetic 'spikes' (F11) is suggestive of post holes. Also visible are several responses suggestive of buried structures of potential archaeological origin. Whether some of these are associated with either Low Borrowbridge Roman Fort and associated settlement or the cemetery to the south is open to conjecture but given the location of the field it cannot be discounted.

4.2 RECOMMENDATIONS

4.2.1 Further non-invasive investigation of the remainder of the field containing the survey area may add further information as to the nature and extent of the features of archaeological potential. Some of the features may also continue into adjacent fields, therefore survey of additional areas may also be beneficial. Ground truthing, in the form of trenching is also recommended in order to fully characterise the nature of the responses, those responses indicative of field systems (F1 and F2), buried structural remains (F9), banks and ditches (F3) being obvious candidates, as well as the potential extra-mural features, such as F6 and F7.

4.2.2 Further investigation will help to clarify some of the interpretations put forward in this report, in particular the nature of the relationship between this field, the fort and the cemetery.

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ILLUSTRATIONS

LIST OF FIGURES

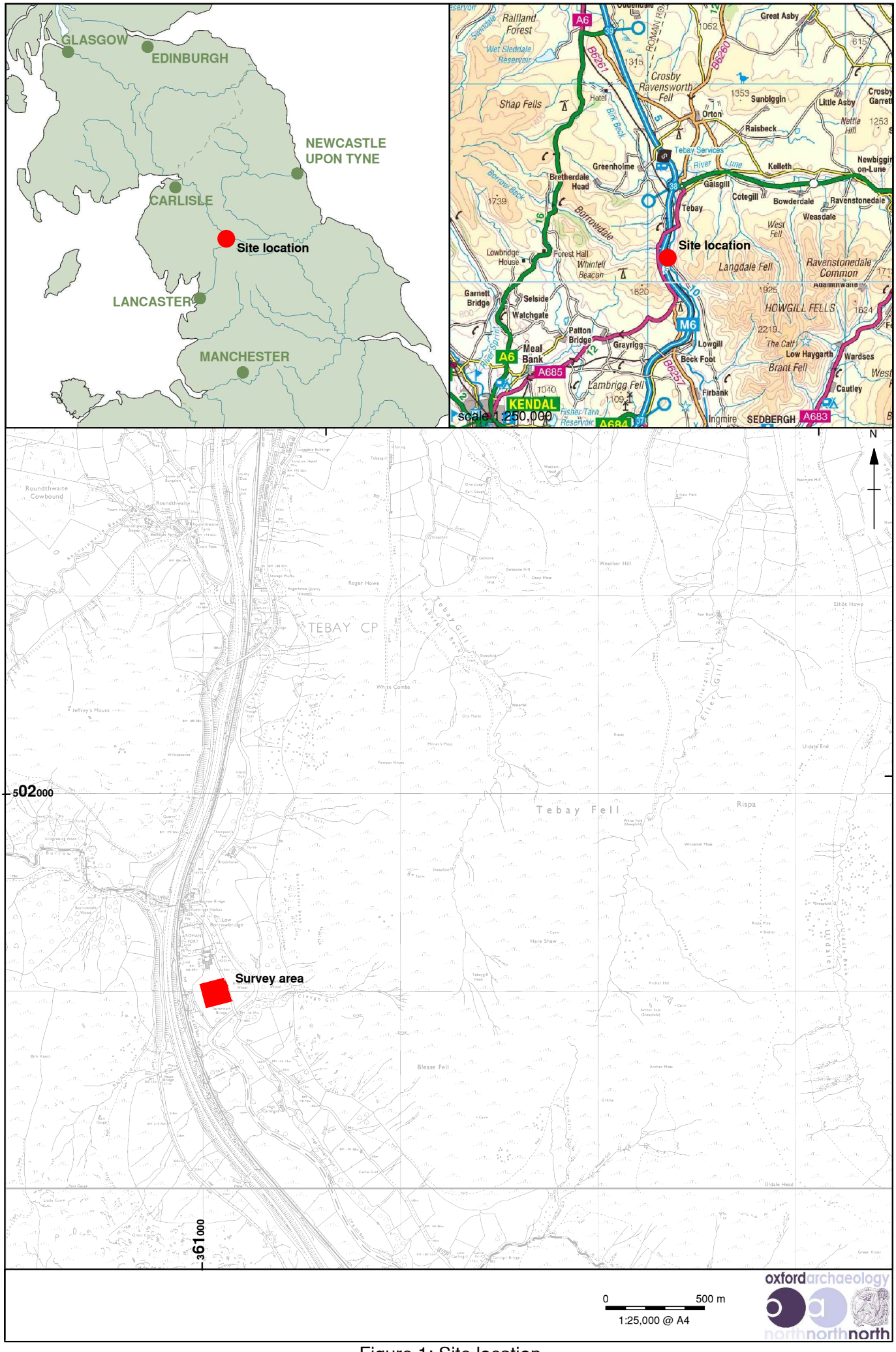

Figure 1: Site location

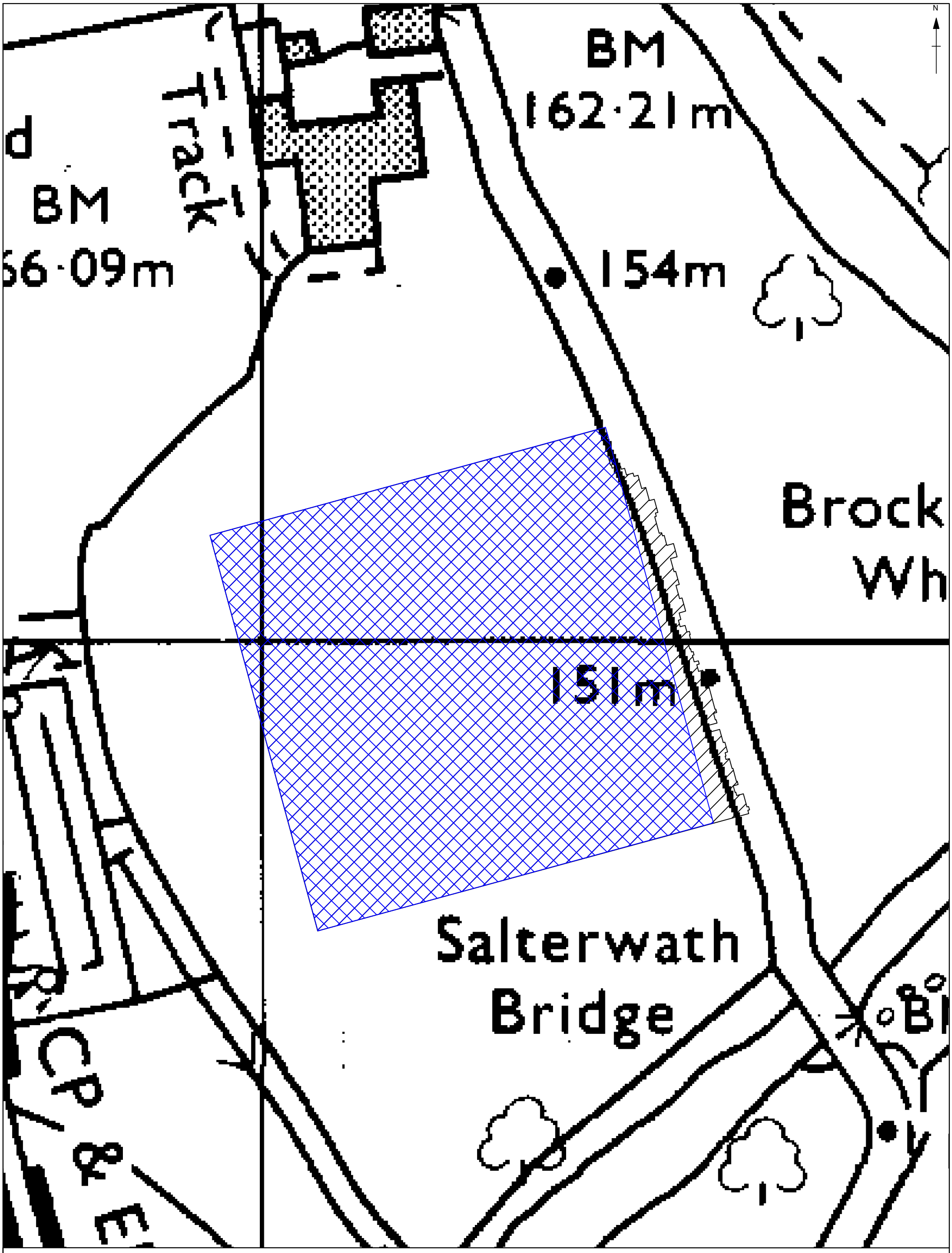

Figure 2: Extent of area surveyed by geophysical survey

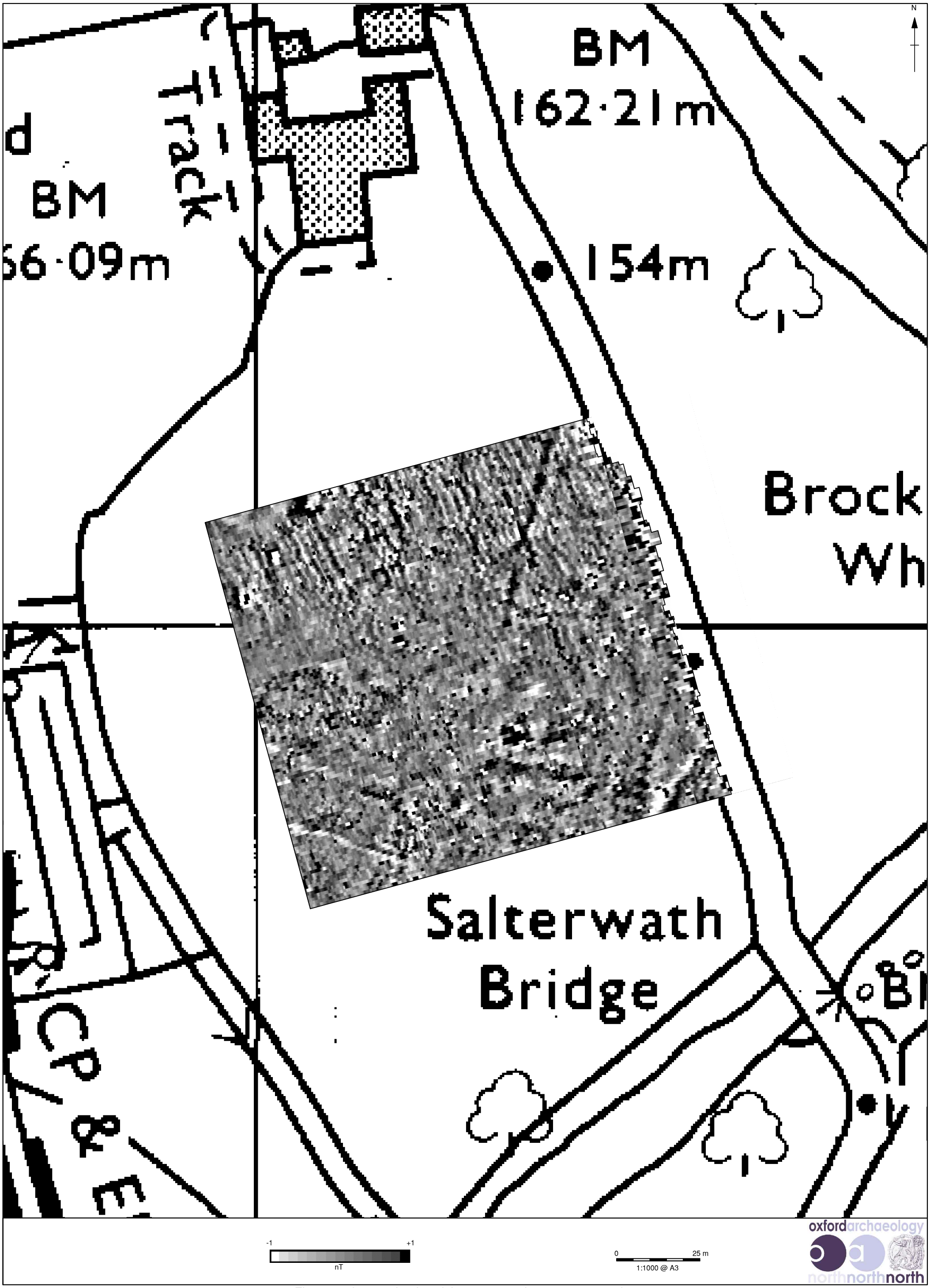

Figure 3: Grayscale plot of the processed magnetometer data

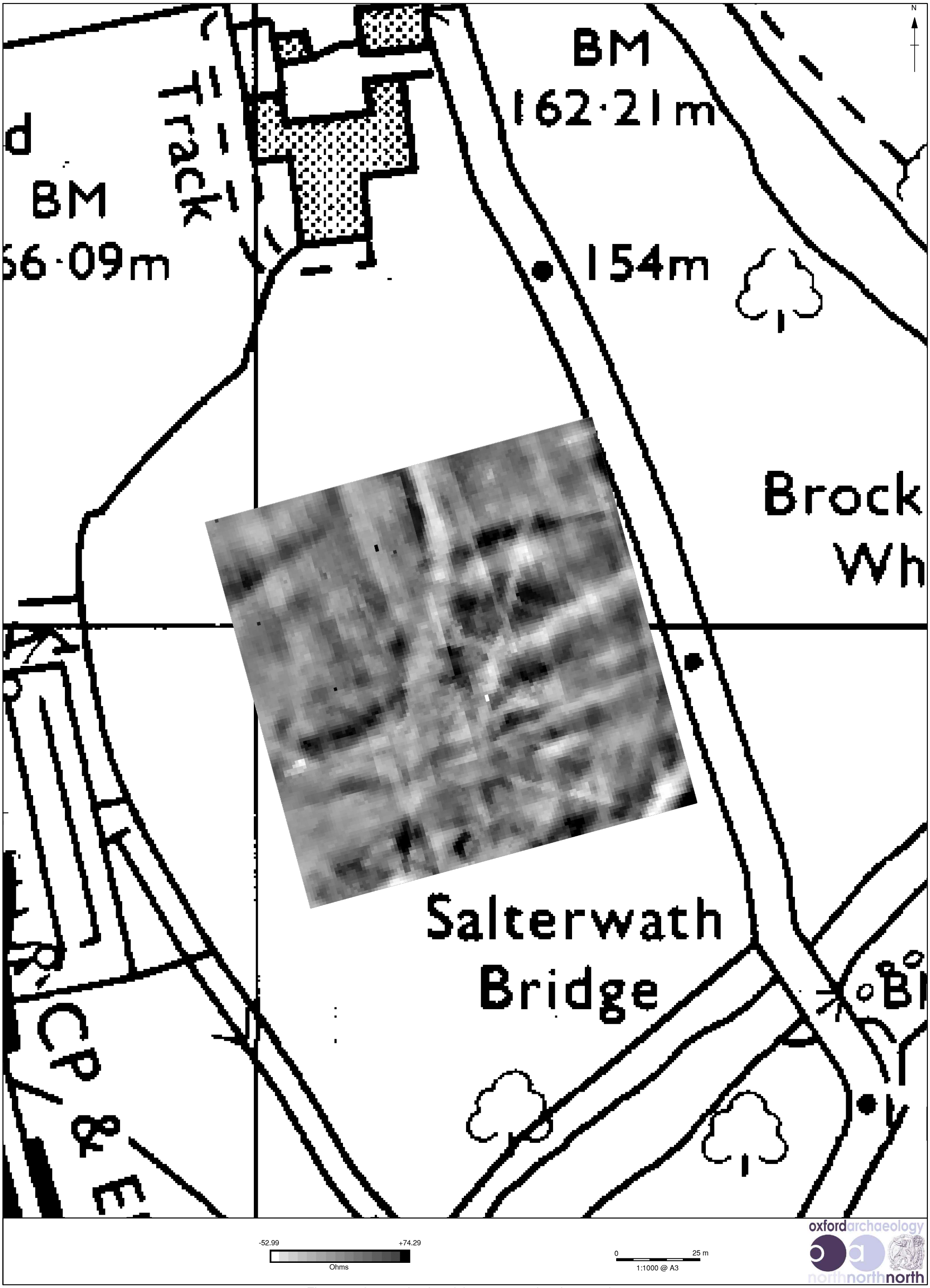

Figure 4: Grayscale plot of the processed resistance data

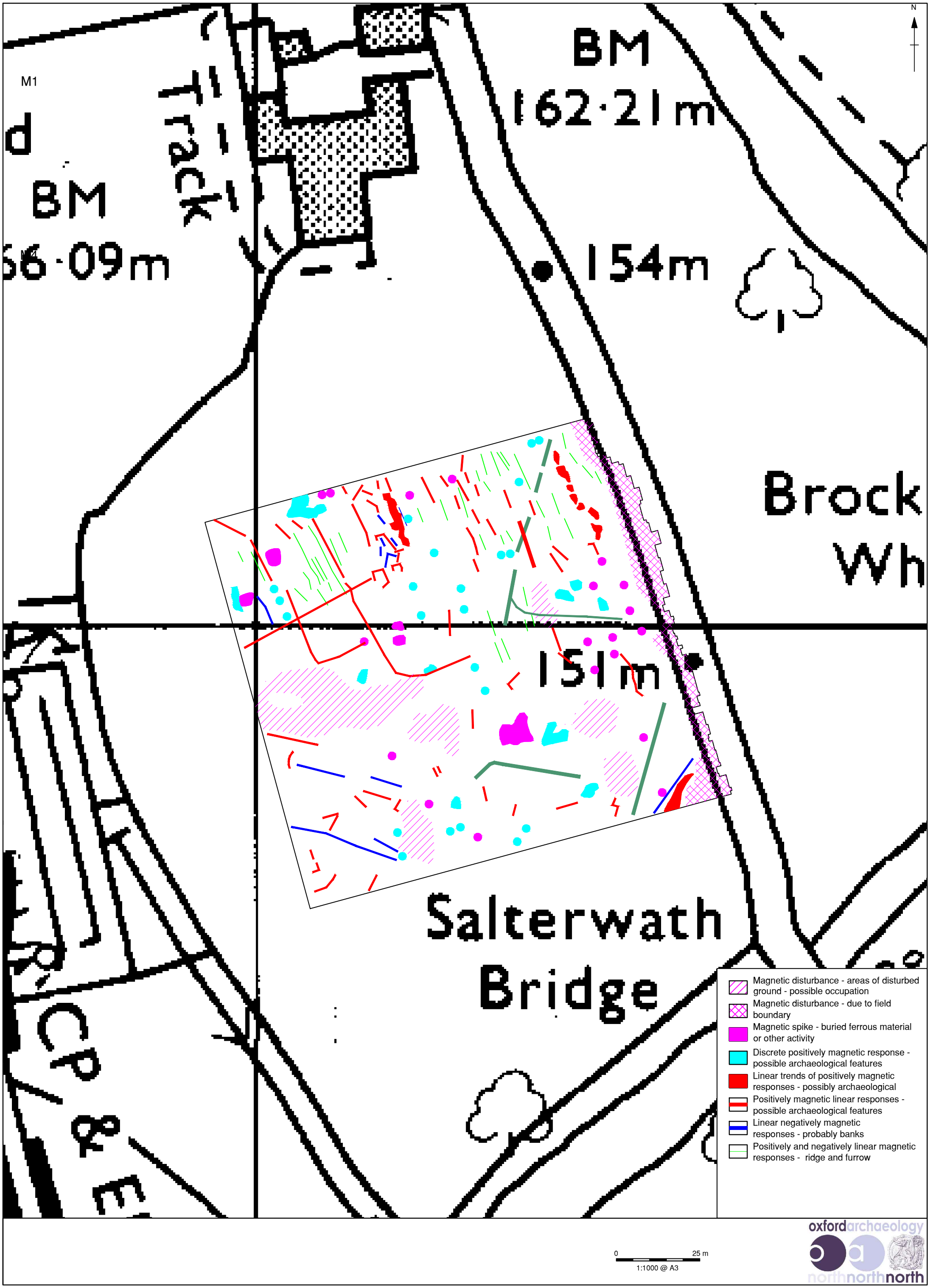

Figure 5: Interpretation plot of the magnetometer survey

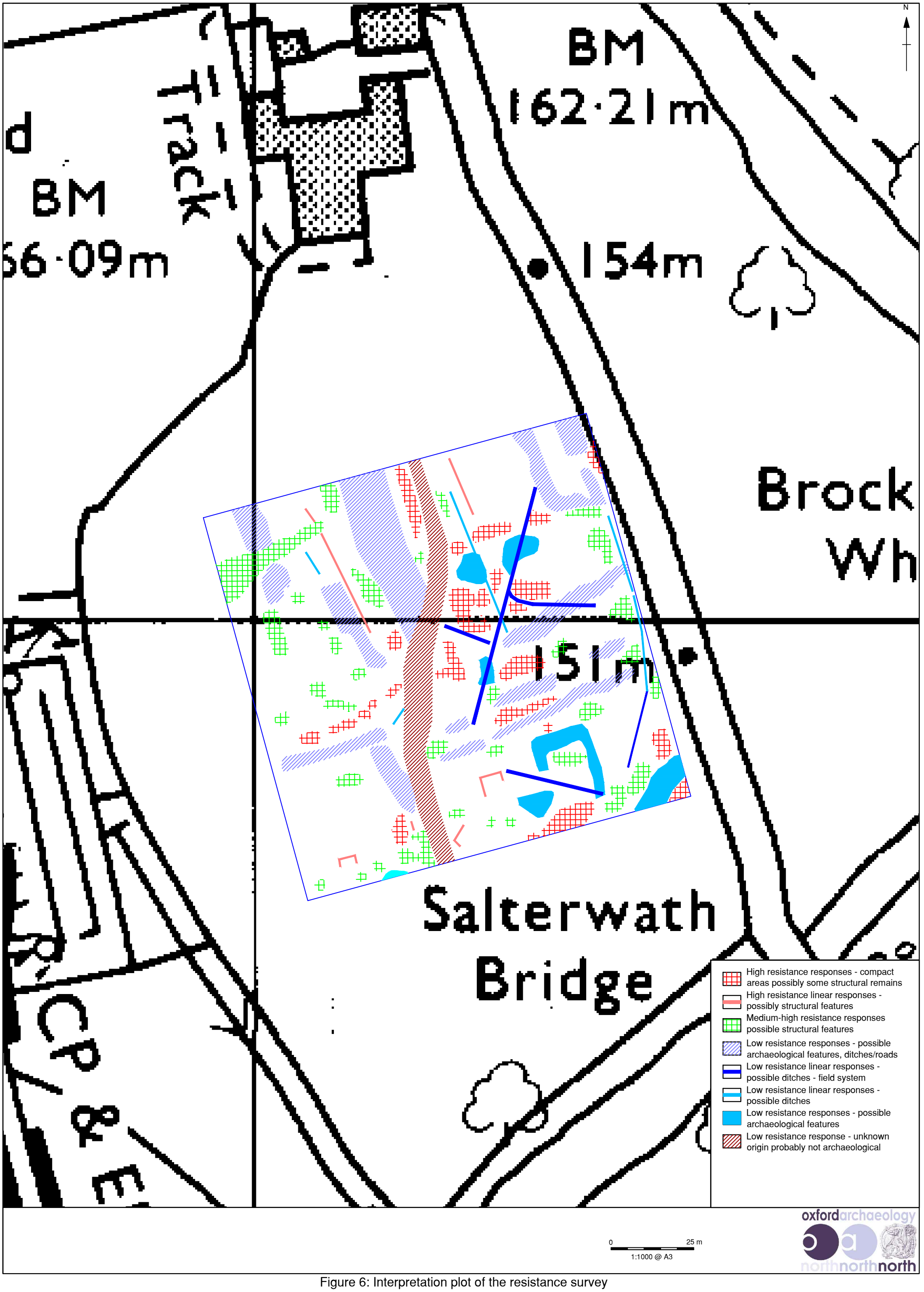

Figure 6: Interpretation plot of the resistance survey

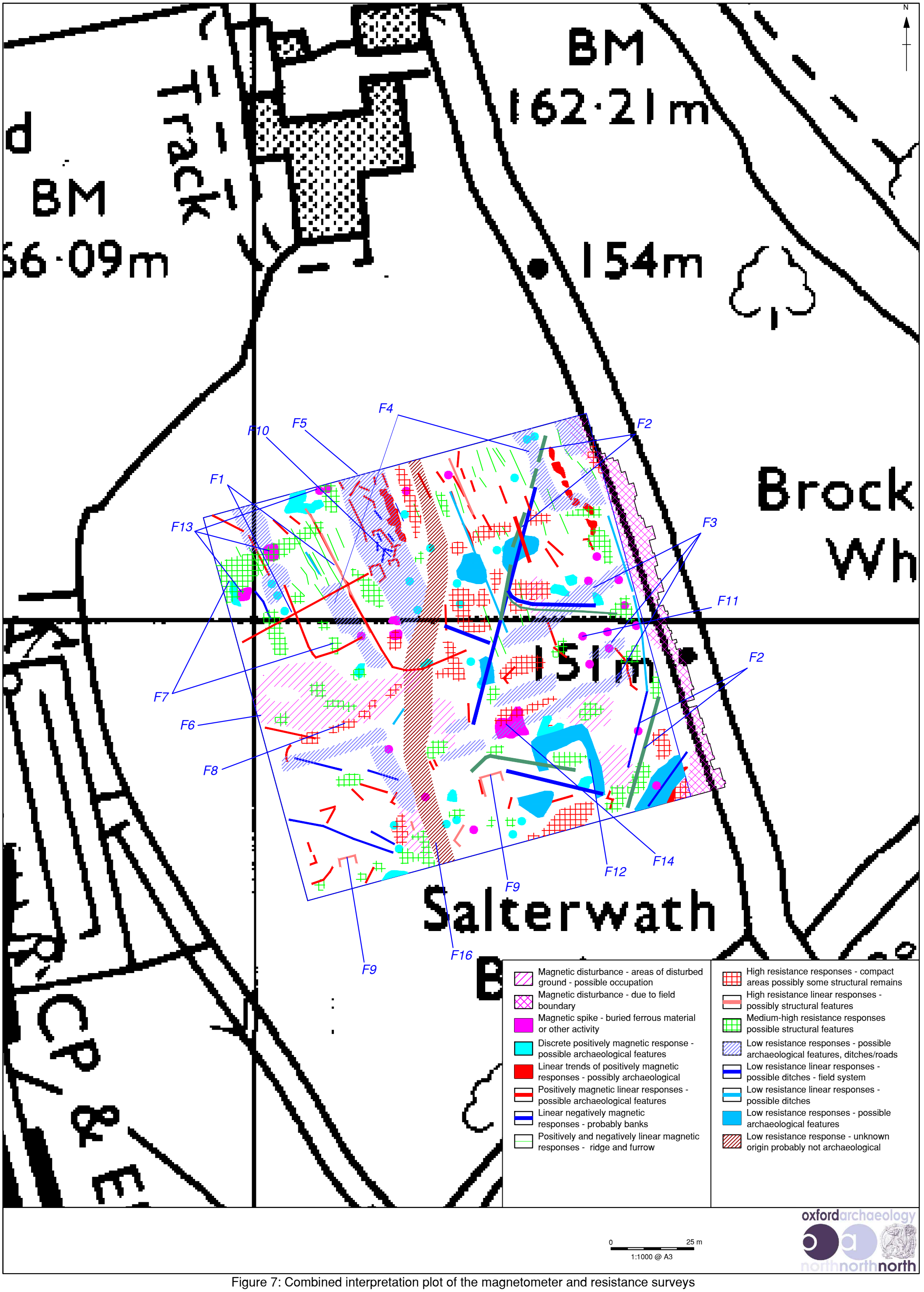

Figure 7: Combined interpretation plot of the magnetometer and resistance surveys