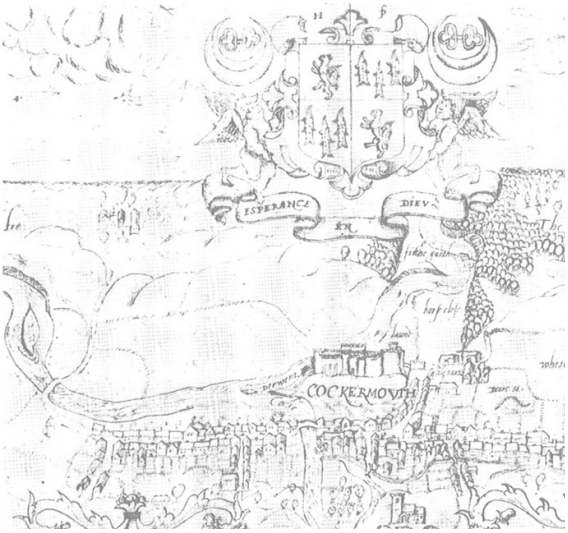
GEOPHYSICAL SURVEYS OF LAND AT THE GOAT COCKERMOUTH CUMBRIA



GEOPHYSICAL SURVEY REPORT
CP. NO: 1263/10
13/08/2010

MARTIN RAILTON BA (HONS), MA, AIFA
NORTH PENNINES ARCHAEOLOGY LTD
NENTHEAD MINES HERITAGE CENTRE,
NENTHEAD,
ALSTON,
CUMBRIA,
CA9 3PD
TEL/FAX: (01434) 382045/043
WWW.NPARCHAEOLOGY.CO.UK

NORTH PENNINES ARCHAEOLOGY LTD

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Quality Assurance

This report covers works as outlined in the brief for the above-named project as issued by the relevant authority, and as outlined in the agreed programme of works. Any deviation to the programme of works has been agreed by all parties. The works have been carried out according to the guidelines set out in the Institute for Archaeologists (IfA) Standards, Policy Statements and Codes of Conduct. The report has been prepared in keeping with the guidance set out by North Pennines Archaeology Ltd on the preparation of reports.

REVISION SCHEDULE			
	01	**02**	**03**
PREPARED BY: **POSITION:** **DATE:**	Martin Railton Project Manager 11/08/10		
EDITED BY: **POSITION:** **DATE:**	Matthew Town Project Manager 12/08/10		
APPROVED BY: **POSITION:** **DATE:**			

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SUMMARY

In July 2010, North Pennines Archaeology Ltd undertook geophysical surveys of land at The Goat, Cockermouth, Cumbria (centred on Ordnance Survey grid reference NY 1150 3095), to inform a planning application by The Environment Agency for flood defences at the site.

The objective of the geophysical surveys was to determine the presence/absence, nature and extent of potential archaeological features within the study area, and the presence/absence of any known modern features within the survey area, which may affect the results.

Geomagnetic surveys covering of *c*.2.6ha of land in total were conducted over three separate locations within the study area (Areas 1-3). The survey area comprised two small fields of pasture land (Area 1 and Area 2), and the area of The Goat Cricket Ground (Ares 3), situated to the north of the Cockermouth and south of Papcastle, in a loop of the River Derwent. It was bounded by the River Derwent to the west, and Goat Road to the east.

The results of the geophysical survey in Area 1 and Area 2 were dominated by the presence of fired/ferrous magnetic material resulting from modern activity. A number of modern services were detected by the geophysical surveys, including a probable drain in Area 2, and at least three services beneath the cricket pitch in Area 3. Information provided by the Environment Agency suggests that two of these services are electricity cables, and the third may be a water pipe.

The most notable features detected by the geophysical survey were a series of linear magnetic anomalies in Area 3, interpreted as the remains of medieval ridge and furrow cultivation, the furrows of which are believed to survive beneath the cricket ground. It is likely that the proposed development area was part of the agricultural land of either Cockermouth or Papcastle in the medieval period. Historic mapping suggests that the proposed development area remained agricultural land into the modern period, with a nursery being present on the east side of the site in the late 19th century. The cricket ground was present from at least 1900 and the pavilion appears to have been constructed in its present location by 1926. The cricket ground has remained largely unchanged until the present day, apart from the construction of two earthen banks on the west side later in the 20th century.

No potential archaeological features earlier in date than the medieval period were detected by the geophysical surveys. Although an extensive settlement of possible Roman date has recently been detected across the River Derwent to the west of the site, it is considered unlikely based on the present evidence that this continued into the proposed development area.

ACKNOWLEDGEMENTS

North Pennines Archaeology Ltd would like to thank Ed Wilson, The Environment Agency for commissioning the project, and Mark Jackson, The Environment Agency for all assistance throughout the project.

North Pennines Archaeology Ltd would also like to extend their thanks to Mr G Todhunter and Mr J Lawson of Cockermouth, for their assistance during the fieldwork.

The geophysical surveys were undertaken by Angus Clark and Don O'Meara. The report was written and illustrated by Martin Railton. The project was also managed by Martin Railton, Project Manager for NPA Ltd.

1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT (FIGURE 1)

1.1.1 Between 29th and 30th July 2010, North Pennines Archaeology Ltd, undertook geophysical surveys of *c*.2.6ha of land at The Goat, Cockermouth, Cumbria, at the request of The Environment Agency. This work was to inform a planning application for flood defences at the site.

1.1.2 The study area comprised two small fields of pasture land, and the area of The Goat Cricket Ground, situated to the north of the Cockermouth and south of Papcastle, in a loop of the River Derwent. It was bounded by the River Derwent to the west, and Goat Road to the east (Figure 1). The site is centred on Ordnance Survey grid reference NY 1150 3095.

1.1.3 This area lies east of a newly-discovered Roman settlement situated to the south of the River Derwent, which lies on the floodplain of the river south of Papcastle. It was believed that archaeological remains could potentially survive at The Goat, which may be associated with this settlement. The present study area also lies on the periphery of the medieval town. The remains of ridge and furrow earthworks of probable medieval date have been identified on air photographs of the Derwent Valley, although none have been recorded within the study area. The proposed development area has remained largely undeveloped up to the modern period. It is therefore possible that potential archaeological features could survive at the site sub-surface.

1.1.4 The objective of the geophysical surveys was to determine the presence/absence, nature and extent of potential archaeological features within the survey area, and the presence/absence of any known modern features within the survey area, which may affect the results.

1.1.5 This report outlines the results of the geophysical surveys undertaken, and includes an interpretation of the geophysical survey results, in light of the archaeological and historical background of the site, with recommendations for further work where necessary.

2 METHODOLOGY

2.1 STANDARDS

2.1.1 The survey work was consistent with the relevant standards and procedures of the Institute for Archaeologists (IfA 2002), and English Heritage Guidelines (English Heritage 2008).

2.2 GEOPHYSICAL SURVEYS

2.2.1 ***Technique Selection:*** geomagnetic survey was selected as the most appropriate technique, given the non-igneous environment, and the expected presence of cut archaeological features at depths of no more than 1.5m. This technique involves the use of hand-held gradiometers, which measure variations in the vertical component of the earth's magnetic field. These variations can be due to the presence of sub-surface archaeological features. Data were recorded by the instruments and downloaded into a laptop computer for initial data processing in the field using specialist software.

2.2.2 ***Field Methods:*** the geophysical study area measured *c*.2.6ha divided into three separate areas (Areas 1-3, Figure 2). A 30m grid was established in each area, and tied-in to known Ordnance Survey points using a Trimble 3605DR Geodimeter total station with datalogger.

2.2.3 Geomagnetic measurements were determined using a Bartington Grad601-2 dual gradiometer system, with twin sensors set 1m apart. It was expected that significant archaeological features at a depth of up to 1.5m would be detected using this arrangement. The survey was undertaken using a zig-zag traverse scheme, with data being logged in 30m grid units. A sample interval of 0.25m was used, with a traverse interval of 1m, providing 3600 sample measurements per grid unit. The data were downloaded on site into a laptop computer for processing and storage.

2.2.4 ***Data Processing:*** geophysical survey data were processed using ArchaeoSurveyor II software, which was used to produce 'grey-scale' images of the raw data. Positive magnetic anomalies are displayed as dark grey, and negative magnetic anomalies are displayed as light grey. A palette bar shows the relationship between the grey shades and geomagnetic values in nT.

2.2.5 Raw data were processed in order to further define and highlight the archaeological features detected. The following basic data processing functions were used:

Despike: to locate and suppress random iron spikes in the gradiometer data.

Clip: to clip data to specified maximum and minimum values, in order to limit large noise spikes in the geophysical data.

Interpolate: to match the traverse and sample intervals in the gradiometer data.

2.2.6 ***Interpretation:*** three types of geophysical anomaly were detected in the gradiometer data:

positive magnetic: regions of anomalously high or positive magnetic data, which may be associated with the presence of high magnetic susceptibility soil-filled features, such as pits or ditches.

negative magnetic: regions of anomalously low or negative magnetic data, which may be associated with features of low magnetic susceptibility, such as stone-built features, geological features, land-drains or sub-surface voids.

dipolar magnetic: regions of paired positive and negative magnetic anomalies, which typically reflect ferrous or fired materials, including fired/ferrous debris in the topsoil, modern services, metallic structures, or fired structures, such as kilns or hearths.

2.2.7 ***Presentation:*** the grey-scale images were combined with site survey data and Ordnance Survey data to produce the geophysical survey plans. Colour-coded geophysical interpretation diagrams are provided, showing the locations and extent of positive, negative and dipolar geomagnetic anomalies.

2.2.8 An archaeological interpretation diagram is provided, which is based on the interpretation of the geophysical survey results, in light of the archaeological and historical background of the site.

2.2.9 Trace plots of the raw data are available if required.

2.3 ARCHIVE

2.3.1 The data archive for the geophysical survey has been created in accordance with the recommendations of the Archaeology Data Service (ADS 2001). This archive is currently held at the company offices at Nenthead, Cumbria.

2.3.2 One copy of the final report will be deposited with the County Historic Environment Record, where viewing will be available on request. The project is also registered with the **O**nline **A**cces**S** to the **I**ndex of archaeological investigation**S** (**OASIS**), where a digital copy of the report will be made available.

2.3.3 The OASIS reference for this project is **northpen3-81017**

3 BACKGROUND

3.1 LOCATION AND GEOLOGICAL CONTEXT

3.1.1 Cockermouth lies on the eastern edge of the West Cumbria Coastal Plain, in a pastoral landscape with gently undulating topography (Countryside Commission 1998). The Goat lies on the northern edge of Cockermouth, and south of Papcastle, in a loop of the River Derwent. The Goa is the location of a cricket ground and pavilion, with an area of parkland close to the river. The Goat lies immediately to the west of Goat Road (A5086), and is bounded by the river to the east. The land to the west of the proposed development area is occupied by a number of houses, gardens and small paddocks. The proposed flood defences encompass the Cricket Ground and parkland, two small fields to the north, and the gardens of Bridge House to the south.

3.1.2 The underlying geology is primarily Carbeniferous limestone, which is part of a narrow band, with coal measures and millstone grit to the west, and Skiddaw slate to the east, with overlying Moraninic Drift (British Geological Survey North Sheet, First Edition Quaternary, 1977). The overlying soils of the area are known as Brickfield 2 soils, which are fine loamy soils, with deposits of alluvium close to the River Derwent (SSEW 1980).

3.2 HISTORICAL CONTEXT

3.2.1 *Introduction:* this historical background is compiled mostly from secondary sources, and is intended only as a brief summary of historical developments specific to the study area.

3.2.2 *Prehistoric and Roman:* during the Roman period, there was a heavy military presence in Cumbria, and there is considerable evidence for Roman military activity to the north of the study area during this period. The earliest known settlement is at Papcastle *c.*1km to the north of the proposed development area. This dates to the Romano-British period, and may be subdivided into the fort of *Devensio*, and the extramural settlement (*vicus*).

3.2.3 The fort and extramural settlement at Papcastle is well served by Roman roads. There were at least five major roads radiating from Carlisle, which served the whole of Cumbria. The road from Carlisle to Papcastle is well documented (Road 75, Margary 1973), from where it runs through the forts at Old Carlisle (Maglona) and Blennerhasset. The modern A595 road follows the original Roman road. From earlier observations it seems fairly clear that the main road 75, continued beyond Papcastle to the south-west. The fort occupies a strategic position on a hill overlooking a major crossing of the River Derwent. A number of Roman finds have previously been recovered

from fields immediately to the west of the present study area by metal detectorists.

3.2.4 The earliest evidence of past activity close to the study area is the Romano-British settlement in Fitz Woods (SAM 27706). This is a sub-rectangular earthwork enclosure, with rounded corners, inner bank, ditch and outer bank, measuring 44m by 38m internally. The site is interpreted as a native settlement of the Roman period; however this has not been confirmed by excavation, and it could have origins in an earlier period.

3.2.5 There are a number of other possible prehistoric earthworks in the Derwent Valley including 'Papcastle Dykes', which have been identified on air photographs of the area. None are known within the immediate vicinity of the study area.

3.2.6 *Medieval:* Cockermouth appears to have been one of a number of small urban communities which came into being in the 12th and 13th centuries as a result of deliberate town creation by large landholders. Documentary evidence suggests that Cockermouth was founded during the 12th century at the *capat* of the extensive estate of Alan son of Waldeve and his descendants, who were lords of the lordship of Allerdale and the honour of Cockermouth. The exact date of foundation is not known but the borough charter of *c*1210 shows that the town was in existence some years before the earliest reference to the castle in 1221 or the grant of a market in 1227. Evidence that an urban community was in existence at Cockermouth by *c*1200 comes from contemporary grants of land in the town to monastic houses and further points to a foundation in the 12th century (Winchester 1986, 109)

3.2.7 The first written record of the town occurred in *c*1150 when *Cokyrmoth* appeared in a Register of the Priory of St Bees. A deed of around 1195-1200 mentions a fulling mill and house and land at Cockermouth, so there must have been some form of settlement by this date (Bradbury 1981, 76). The earliest settlement has been suggested to have been located on the east side of the River Cocker, as indicated by the huddled burgage plots in Market Place and St Helen's Street, which contrasts markedly with the regular layout of Main Street, and the fact that the castle, church and market place are all located in this area. Winchester has therefore suggested that the area to the east of the Cocker, centred around the Market Place, represents an earlier core of settlement in the Bitter Beck valley, to which the planned Main Street element was added. Tentative interpretation of 13th century documents may suggest that Main Street, however, was in existence by the end of the 13th century (Winchester 1986, 117).

3.2.8 It is likely that the proposed development area was agricultural land during the medieval period. A pictorial map of the town dating to *c.*1600 shows the present study area as undeveloped land north of the river (see front cover). The remains of ridge and furrow earthworks of probable medieval date have been identified on air photographs of the Derwent Valley, although none have been recorded within the study area.

3.2.9 *Post-medieval and Modern:* the form of the medieval burgage plots in Cockermouth can be hinted at by descriptions of properties in 17th century deeds, and the pictorial map of the town dating to *c*1600. This evidence suggests that the urban core consisted of three land use elements at that time: dwelling houses fronting the street, burgage plots running back from these houses and containing both open space (gardens, yards etc) and buildings (workshops, outhouses); and a ring of barns and other ancillary agricultural buildings along the tail of the burgage plots and on the outskirts of the town (*Ibid*, 118). As well as dwellings, the medieval town also contained other buildings and structures which reflected other aspects of urban life. The market place contained several structures such as the Moot Hall, a stone building which was demolished in 1829. The Moot Hall stood in front of 27-31 Market Place, and in the 16th century it had shops on its ground floor, and the towns court house on the upper storey. A toll booth stood in the market place, apparently a building distinct from the Moot Hall but which also had shops on its lower level, and the Shambles was also located in this area. There are three recorded ecclesiastical sites recorded in medieval Cockermouth; All Saints' Church stands on the site of its medieval predecessor as suggested by the street names of Kirkgate and Kirkwent, although the exact date of its foundation is not known. The chapel of St Helen lay to the east of the town at the head of St Helens Street, and St Leonard's Chapel was located at the opposite side of the town in the vicinity of a field known as St Leonard's Close (*Ibid*, 119).

3.2.10 By the late 17th century there is evidence of considerable burgage infill from title deeds. For example, a description of property in High Sand Lane in 1682 gives an impression of the complex mixture of buildings and open space in one burgage plot: *'dwelling house..with a backside or yard and also a slated house or stable on the backside of the said dwelling house and a piece of ground near the said stable between an old dwelling house….on one side and a barn..on the other side'* (*Ibid* 118). Writing in 1582 William Camden noted that: *'Cockermouth a mercate town of good welth, and a castle of the Earles of Northumberland. The town is built fair enough, but standeth somewhat with the lowest between two hills; upon one of which the Church is seated, and upon the other right over against it, a very strong castle' (*Bradbury 1981, 79). Thomas Denton's description of the town at the end of the 17th century provides further information: *'No part of the*

castle is habitable, but the gate-house and court-house, where the Christmas Sessions are kept. The castle-yard is now a bowling-green. Rents – burgage and free rents within this burgh are yearly 11li. Customary rents, fine arbitrary, per annum 7li. Mills – there are two water corn mills, let for 30li. per year, and besides the weekly markets holden here on Mundays, there are two grand fairs kept every Whitson Munday and Michaelmas day and also a fortnight's fair for cattle, every other Wednesday from Mayday till Michaelmas' (Denton 1687-1688, 123).

3.2.11 An inspection of historic Ordnance Survey maps of the site has revealed that the proposed development area remained largely undeveloped until the 20th century. The first edition 1:2,500 Ordnance Survey map of 1866 shows the area to be agricultural land, with a nursery present on the east side of the site. Houses and garden were present along Goat Road by this time, and Derwent House was present in location of Bridge House to the south of the site. The cricket ground is shown on the 1:10,560 Ordnance Survey map of 1900 and the pavilion appears to have been constructed in its present location by 1926. The cricket ground has remained largely unchanged until the present day, apart from the construction of two earthen banks on the west side later in the 20th century. The small paddocks on the north side of the site were also created some time in the second half of the 20th century.

3.3 PREVIOUS GEOPHYSICAL SURVEYS

3.3.1 In June 2008, North Pennines Archaeology Ltd, undertook geophysical surveys of *c*.1.45ha of land to the north of Papcastle, Cockermouth, Cumbria (NGR NY 1115 3160), in advance of a proposed private development at the site. The results of the geophysical survey, on the north side of the survey area, were dominated by the igneous geological anomalies detected in this area. However, the survey successfully detected archaeological features over the remainder of the site. The majority of the features detected were associated with the medieval and post-medieval agricultural use of the site, including the remains of ridge and furrow cultivation, former field boundaries, and possible land drains (Railton 2008).

3.3.2 In October 2009, North Pennines Archaeology Ltd, undertook geophysical surveys of land adjacent at Fitz Park, Cockermouth, Cumbria (centred on Ordnance Survey grid reference NY 1063 3073), prior to the proposed development of the site by Lakeland Leisure Limited. This area borders the site of a Scheduled Ancient Monument (SAM 27706), which is believed to be the site of a Romano-British or earlier farmstead. Geomagnetic surveys covering *c*.5ha of land in total were conducted over two separate locations within the study area. The central part of the study area was not surveyed, due to the presence of a substantial depth of made-ground resulting from

the construction of the A66 carriageway. It is considered unlikely that this area would be responsive to a geophysical survey. The northern part of the study area was situated in an area of alluvial geology close to the River Derwent. The most notable features detected by the geophysical survey were a series of linear and curvilinear magnetic anomalies, which are interpreted as possible palaeochannels. Modern service pipes and a series of possible land drains were also detected. The southern part of the study area was considered to have high archaeological potential due to the close proximity of a Romano-British settlement in Fitz Woods. However, the results of the geophysical survey in this area were dominated by the presence of fired/ferrous magnetic material resulting from modern activity, making the value of the geophysical survey extremely limited (Railton 2009).

3.3.3 Cockermouth is prone to flooding, which affected the town in 2005 and more recently in November 2009. During the recent floods an area on the flood plain to the west of the study area was scoured of topsoil, revealing the foundations of a possible Roman Period settlement. In 2010 this area was the subject of a geophysical survey by Grampus Heritage (unpublished), which has revealed an extensive system of enclosures, roads and possible buildings at the site (Mark Graham *pers. comm.*). The site is currently the subject of a community excavation, which is expected to reveal further information about the site.

4 THE GEOPHYSICAL SURVEYS

4.1 INTRODUCTION (FIGURE 2)

4.1.1 The geophysical surveys were undertaken over two days between 29th and 30th July 2010 covering the major part of the cricket ground (Area 3) and two small paddocks to the north (Area 1 and Area 2). Each area was subdivided by field boundary fences. These fences can produce strong dipolar magnetic anomalies around the periphery of the survey areas and so were given a wide birth.

4.1.2 Small discrete dipolar magnetic anomalies were detected across the whole of the study area. These are almost certainly caused by fired/ferrous litter in the topsoil, which is typical for modern agricultural/utility land. These anomalies are indicated on the geophysical interpretation drawings, but not referred to again in the subsequent archaeological interpretation.

4.2 AREA 1 (FIGURES 3-4)

4.2.1 Area 1 comprised a small paddock immediately to the north of the cricket ground, which was subdivided by a wooded fence, making it necessary to survey the field in two parts (Area 1a and Area 1b). Strong dipolar magnetic anomalies were detected around the periphery of the survey area due to the presence of garden fences to the east and north.

4.2.2 A large concentration of small discrete dipolar magnetic anomalies was detected across the whole of Area 1. The density of these anomalies strongly suggests that the ground in Area 1 has been the subject of significant modern disturbance or dumping of fired/ferrous material. A number of larger discrete dipolar magnetic anomalies were also detected in the centre of this area, which are probably the result of ferrous objects in the topsoil. No archaeological features were discernable in Area 1.

4.3 AREA 2 (FIGURES 5-6)

4.3.1 Area 2 comprised another small paddock to the north Area 1, which was bounded by the River Derwent to the north. A modern drain was present on the north side of this area, leading to the river. A concentration of small discrete dipolar magnetic anomalies was detected in Area 2, similar to those in Area 1, suggesting this area contains further fired/ferrous material in the topsoil.

4.3.2 On the northwest side of Area 2 an area of very strong dipolar magnetic anomalies was detected, suggesting this may be an area modern made ground. A linear dipolar magnetic anomaly was also detected crossing Area

2, aligned east to west, which is indicative of a service pipe, probably part of the drain leading to the river. No archaeological features were detected in this area.

4.4 AREA 3 (FIGURES 7-8)

4.4.1 Area 3 covered the cricket ground, but excluded the central square, as this had recently been re-laid with turf and could not be walked upon. The cricket ground was bounded by houses and gardens to the east, fences to the north and south, and earthen embankments and a cricket pavilion to the west.

4.4.2 Small discrete dipolar magnetic anomalies were detected in Area 3, but were concentrated on the east side of the site. Again, these probably relate to fired/ferrous material in the topsoil. However, it was notable that these were less frequent on the west side of the cricket ground perhaps suggesting that this area was deliberately kept litter-free.

4.4.3 Strong dipolar magnetic anomalies were detected along the east side of Area 3, which were either due to the presence of garden fences or possibly due to the presence of a modern sewerage pipe in this location. Further strong linear dipolar magnetic anomalies were detected crossing the centre of Area 3, aligned north to south and east to west. These anomalies are almost certainly due to the presence of modern services or drains.

4.4.4 A parallel series of positive linear magnetic anomalies was detected across the whole of Area 3, aligned north to south, and spaced between 5.5m and 6.5m apart. These anomalies are typical of former ridge and furrow cultivation, and are likely to represent the soil-filled furrows, which evidently still survive beneath the cricket ground.

4.4.5 Two curving positive magnetic anomalies and corresponding negative magnetic anomalies were detected along the western edge of Area 3, which correspond to the locations of two earthen banks, situated to the north and south of the cricket pavilion. These were constructed in the 20th century.

4.4.6 A weak positive linear magnetic anomaly was also detected on the west side of the survey area, aligned northeast to southwest, which may be indicative of a soil-filled feature such as a land drain. However, this was uncertain.

4.5 DISCUSSION (FIGURE 9)

4.5.1 The results of the geophysical survey in Area 1 and Area 2 were dominated by the presence of fired/ferrous magnetic material resulting from modern activity. This magnetic material may have masked any potential archaeological features that may be present, making the value of the geophysical survey in these areas extremely limited.

4.5.2 The most notable features detected by the geophysical survey were a series of linear magnetic anomalies in Area 3, which are interpreted the furrows of former ridge and furrow cultivation. This form of cultivation was practiced in the medieval period using an open field system, but also continued into the post-medieval period. The results of the geophysical survey indicate that the proposed development area was almost certainly part of the agricultural landscape of Cockermouth and Papcastle in the medieval period.

4.5.3 A number of modern services were also detected by the geophysical surveys, including a probable drain in Area 2, and at least three services beneath the cricket pitch in Area 3. Information provided by the Environment Agency suggests that two of these services are electricity cables, and the third may be a water pipe.

5 CONCLUSIONS

5.1 CONCLUSIONS

5.1.1 Geomagnetic surveys covering *c*.2.6ha of land have been undertaken within The Goat, Cockermouth, covering two small paddocks (Area 1 and Area 2) and a cricket ground (Area 3). The surveys were undertaken on behalf of The Environment Agency in order to inform a planning application for flood defences at the site.

5.1.2 The geophysical surveys of the northern part of the study area (Area 1 and Area 2) were largely unproductive due to significant modern disturbance and the presence of made ground close to the River Derwent. A probable drain was revealed leading towards the river in Area 2, and a number of other service pipes were detected beneath the cricket ground in Area 3.

5.1.3 The most notable features detected by the geophysical survey were a series of linear magnetic anomalies in Area 3, interpreted as the remains of medieval ridge and furrow cultivation, the furrows of which are believed to survive beneath the cricket ground. It is likely that the proposed development area was part of the agricultural land of either Cockermouth or Papcastle in the medieval period. Historic mapping suggests that the proposed development area remained agricultural land into the modern period, with a nursery being present on the east side of the site in the late 19th century.

5.1.4 No potential archaeological features earlier in date than the medieval period have been detected by the geophysical surveys. Although an extensive settlement of possible Roman date has recently been detected across the River Derwent to the west of the site, it is considered unlikely based on the present evidence that this continued into the study area.

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APPENDIX 1: FIGURES

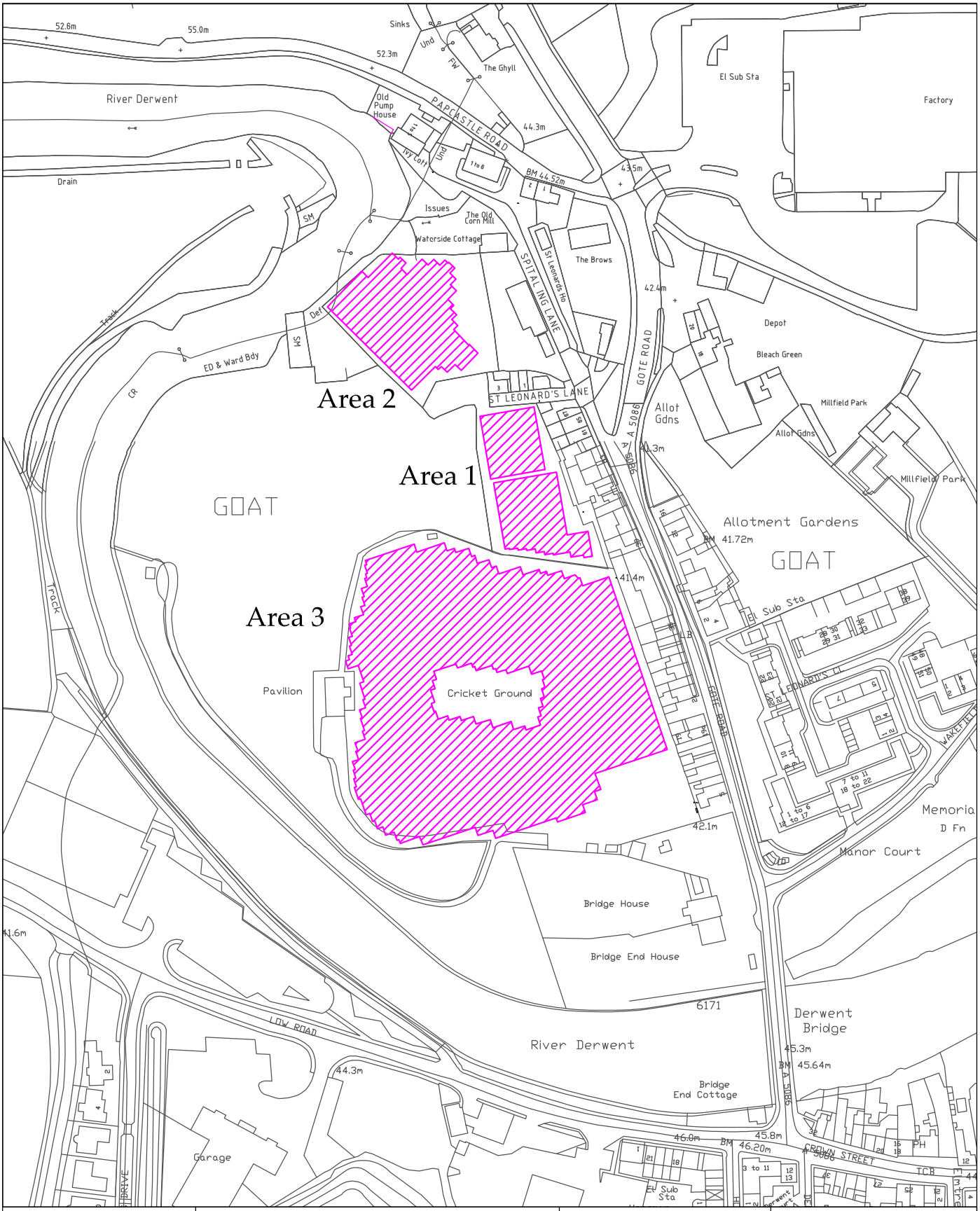
PROJECT:	The Goat, Cockermouth
SCALE:	1:15,000 at A4
REPORT No:	CP1263
CLIENT	The Environment Agency
DRAWN BY:	MDR
DATE:	August 2010
FIGURE:	1

KEY:

Site location

North Pennines Archaeology Ltd 2010

Figure 1 : Location map



PROJECT:	The Goat, Cockermouth
SCALE:	1:2,500 at A4
REPORT No:	CP1263
CLIENT	The Environment Agency
DRAWN BY:	MDR
DATE:	August 2010
FIGURE:	2

KEY:

survey area

NORTH PENNINES ARCHAEOLOGY LIMITED

North Pennines Archaeology Ltd 2010

Figure 2 : Location of the geophysical survey areas

PROJECT:	The Goat, Cockermouth
SCALE:	1:500 at A4
REPORT No:	CP1263
CLIENT	The Environment Agency
DRAWN BY:	MDR
DATE:	August 2010
FIGURE:	3

KEY:

outline of geophysical survey area

North Pennines Archaeology Ltd 2010

Figure 3 : Geophysical survey of Area 1

PROJECT:	The Goat, Cockermouth
SCALE:	1:500 at A4
REPORT No:	CP1263
CLIENT	The Environment Agency
DRAWN BY:	MDR
DATE:	August 2010
FIGURE:	4

KEY:

outline of survey area

dipolar magnetic anomaly

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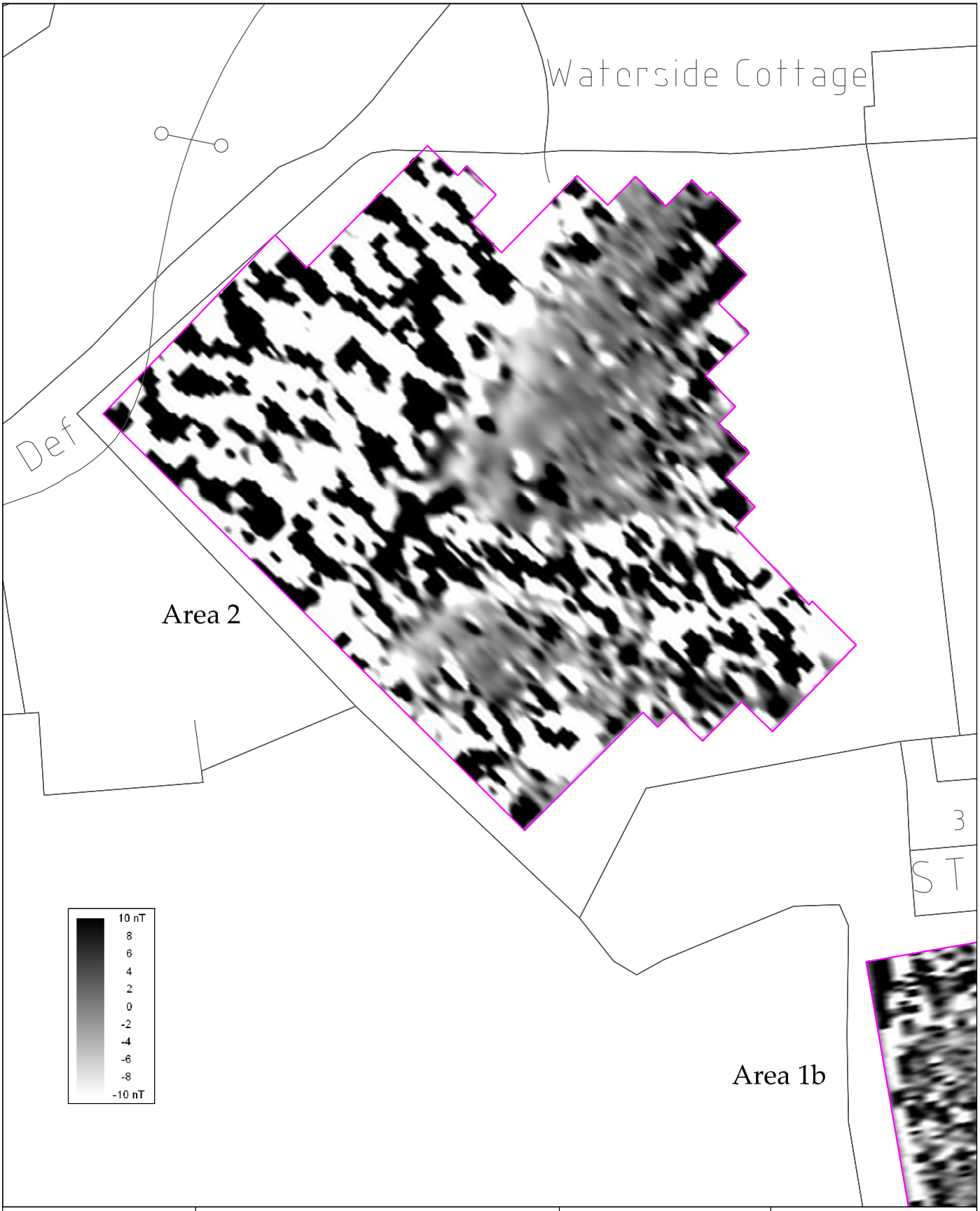
Figure 4 : Geophysical interpretation of Area 1



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CLIENT	The Environment Agency
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DATE:	August 2010
FIGURE:	5

KEY:

outline of geophysical survey area

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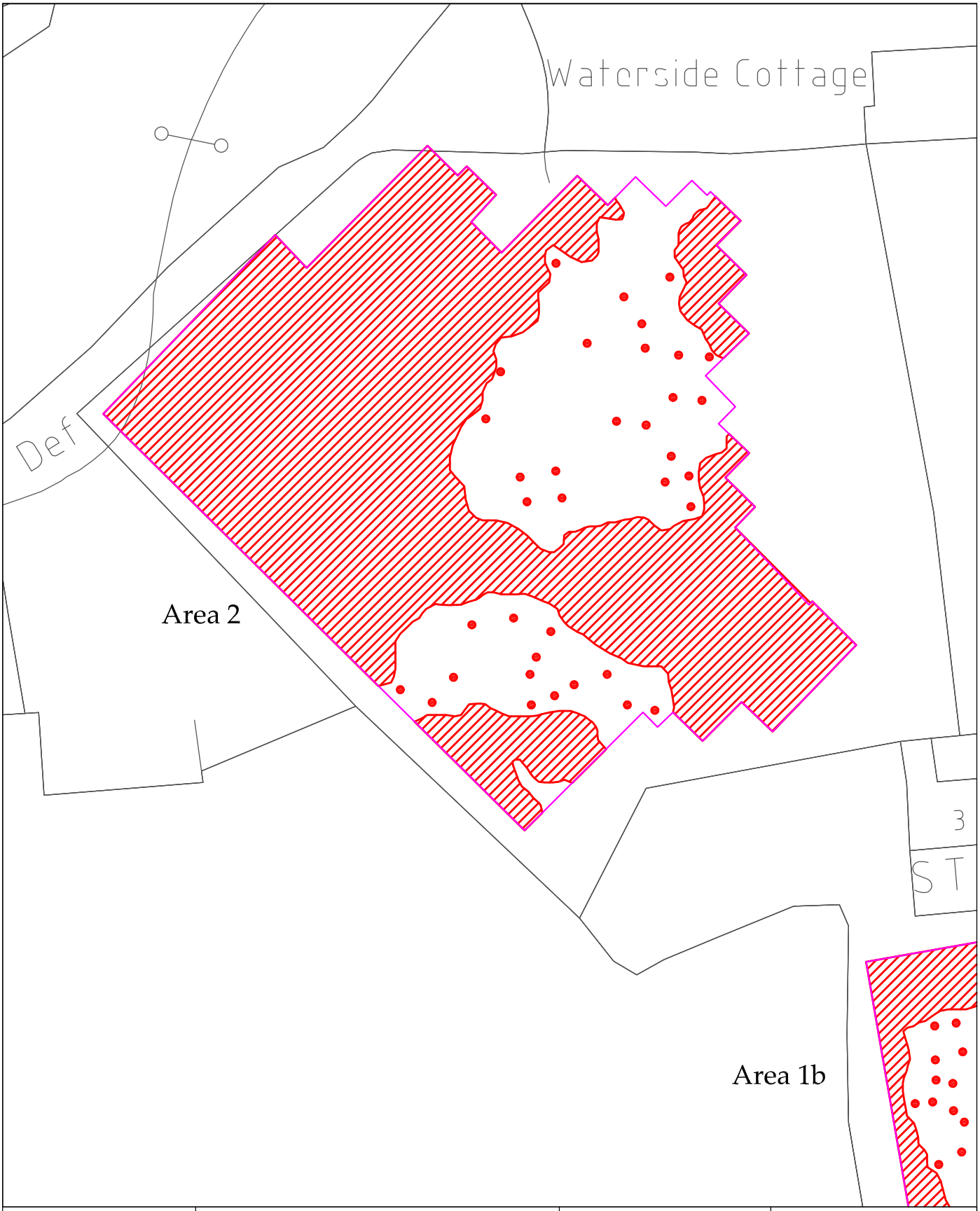
Figure 5 : Geophysical survey of Area 2



PROJECT:	The Goat, Cockermouth
SCALE:	1:500 at A4
REPORT No:	CP1263
CLIENT	The Environment Agency
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DATE:	August 2010
FIGURE:	6

KEY:

outline of survey area

dipolar magnetic anomaly

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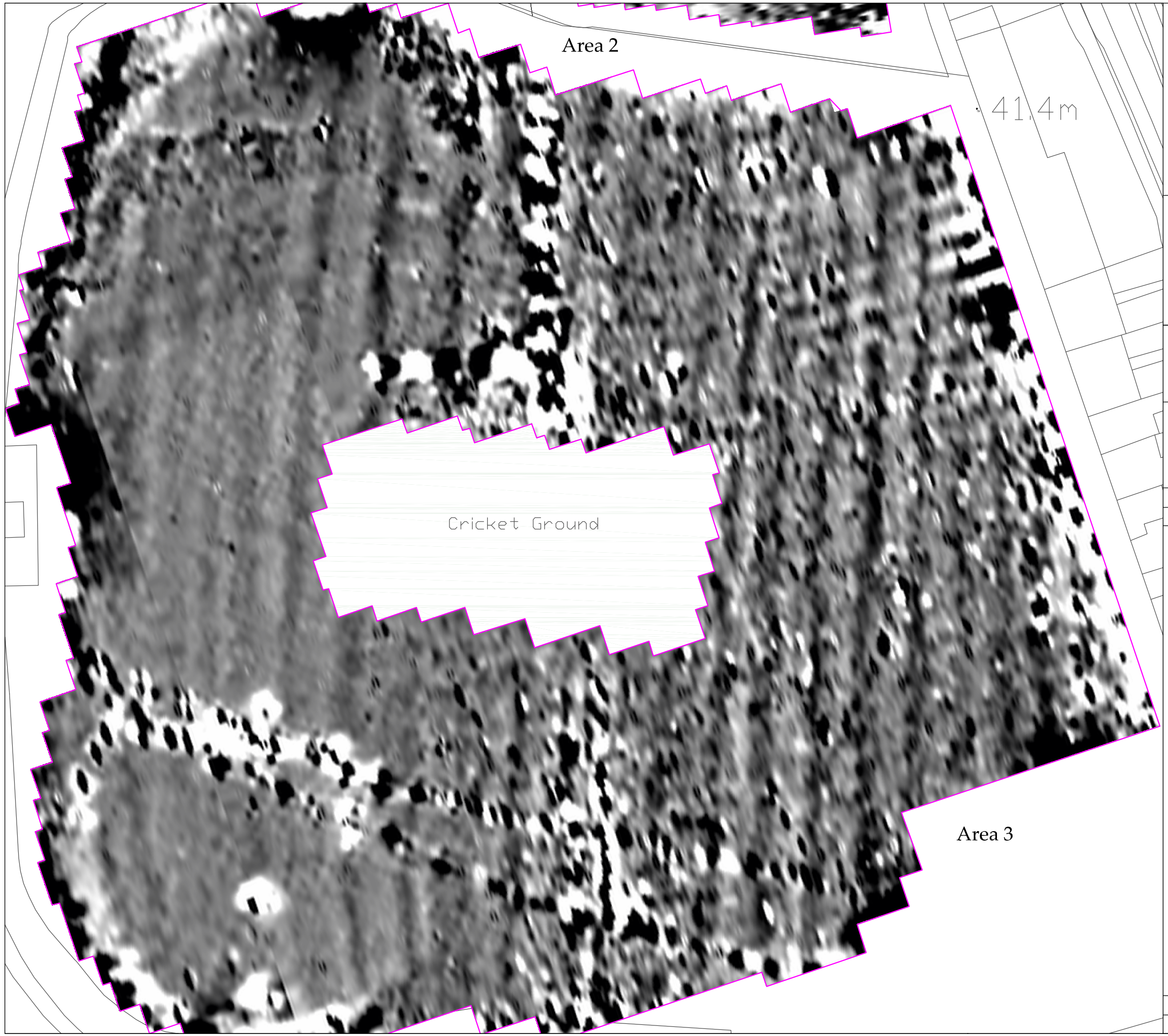
Figure 6 : Geophysical interpretation of Area 2



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outline of geophysical survey area

10 nT
8
6
4
2
0
-2
-4
-6
-8
-10 nT

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Figure No: 7

Figure 7 : Geophysical survey of Area 3

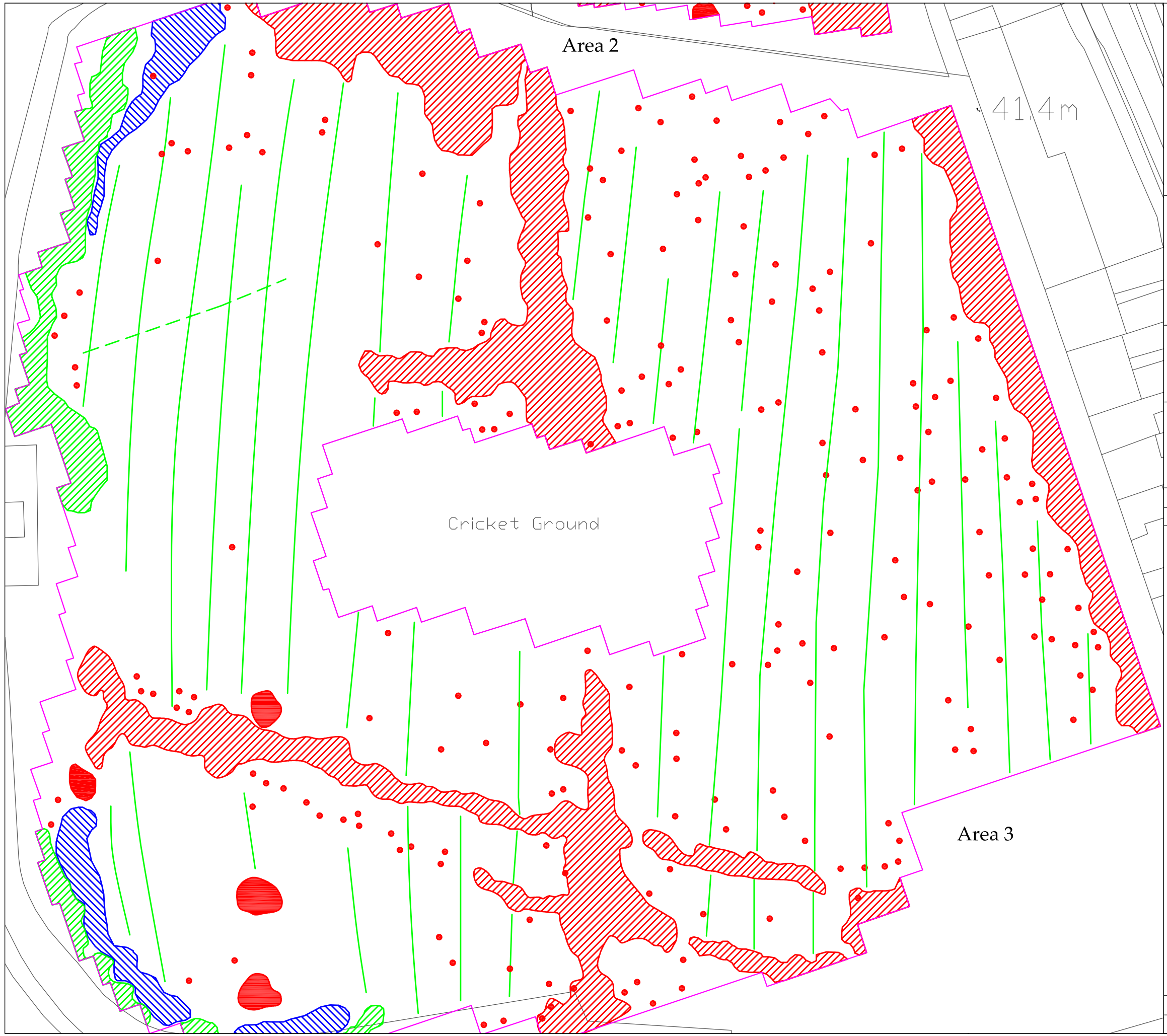

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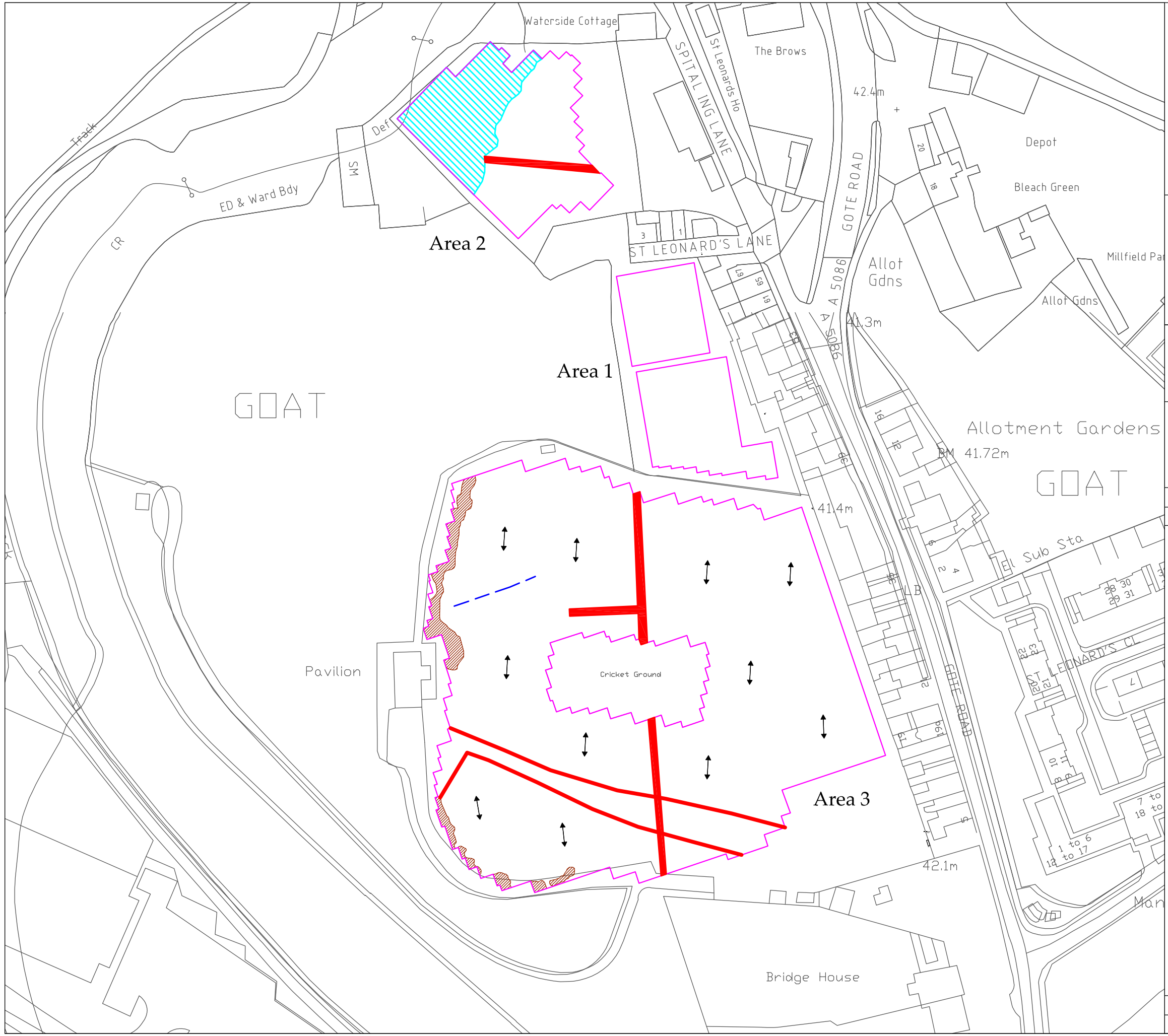
Figure No: 8

Figure 8 : Geophysical interpretation of Area 3



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DATE: August 2010

- outline of geophysical survey area
- possible land drain
- ridge & furrow
- service pipes
- earthwork bank
- made ground

Report No: CP1263

Figure No: 9

Figure 9 : Archaeological interpretation