

**BECKFOOT FARM,
ALLONBY,
CUMBRIA**

**GEOPHYSICAL SURVEY REPORT
CP. No: CP10691
08/01/2014**



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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.

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SUMMARY

In November 2013, Wardell Armstrong Archaeology, commissioned by Maryport and District Archaeological Society, undertook geophysical surveys on seven areas of pastoral land immediately to the north of Beckfoot Roman Fort (*Bibra*), on the west coast of Cumbria (centred on Ordnance Survey grid reference NY 092 492). It was believed that these areas contained the sub-surface remains of the northern civilian settlement (*vicus*) associated with the fort. Beckfoot Fort and the associated cemetery are Scheduled Ancient Monuments (SM CU255 and CU258 respectively).

The survey work formed part of an archaeology project to investigate the extent of the *vicus* associated with Beckfoot Roman Fort. A survey of the northern *vicus* was to form the first phase of this project. It was believed that a geomagnetic survey over seven defined areas immediately north of the fort was the best method of achieving this aim.

The western coast of Cumbria lay in close proximity to the Scottish border and is likely to have been an area under threat of incursion during the Roman period. Rome needed a defensive system along the coastline. Beckfoot Roman fort formed part of this Roman coastal defensive system, an extension of the Roman defences from the west end of Hadrian's Wall at Bowness on Solway. The coastal defences consisted of a series of forts, of which Beckfoot was one, mile fortlets and towers interspersed along the coastline. Unlike Hadrian's Wall these were not connected by a defensive wall. Debate still surrounds exactly how far south along the Cumbrian coastline the defensive system extended.

The objective of the geophysical survey 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.

The geomagnetic survey was carried out over seven areas in six fields and successfully detected archaeological magnetic anomalies in six of these areas. Area 1a and 2 revealed the northern wall and defensive ditch, along with the northern gateway of the Roman fort. Areas 1b and 2 showed the line of the Roman Road running due north from the northern gate of the fort. To the east and west of this road, within Areas 1a, 1b, 2 and Area 3 was a dense concentration of buildings forming a large northern *vicus* settlement. At the northern end of Area 3 a road appeared to run off in a north-eastern direction toward the surveyed Areas 5 and 6. In the north-western corner of Area 6, adjacent to the stream, was a large anomaly which partially entered Area 5. This has been interpreted as a possible bath house building, although this may be largely robbed out. Area 4 contained no archaeological features.

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Wardell Armstrong Archaeology would like to thank Walter Longcake, Maryport and District Archaeological Society, for commissioning the project, and for his help throughout the survey. Wardell Armstrong Archaeology would also like to thank John Murray for all his help during the survey.

Wardell Armstrong Archaeology would also like to extend their thanks to the owner of Beckfoot Farm and all the other land owners who gave permission for the survey to be carried out.

The geophysical survey was, supervised by Kevin Mounsey who was assisted by Kevin Horsely and Cat Peters. The project was managed by Martin Railton BA (Hons) MA MIfA, Senior Project Manager for WAA. The report was written by Kevin Mounsey and the drawings were produced by Martin Railton and Adrian Bailey.

1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

- 1.1.1 During December 2013, Wardell Armstrong Archaeology carried out a geomagnetic survey of seven areas of land immediately to the north of Beckfoot Roman fort, Allonby, Cumbria, at the request of Maryport and District Archaeological Society. The survey was carried out as part of a project to establish the nature and extent of the Roman *vicus* surrounding Beckfoot fort. This phase of the project was concentrated on an area immediately to the north of the fort.
- 1.1.2 The archaeological work was undertaken in accordance with the Wardell Armstrong Archaeology Method Statement for a Geomagnetic Survey (Railton 2012). The geophysical survey was carried out and the report written in accordance with English Heritage guidelines (English Heritage 2008), and in accordance with the procedures of the Institute for Archaeologists (IFA 2011).
- 1.1.3 The study area comprised seven areas within six fields of pastureland immediately to the north of Beckfoot Roman Fort (*Bibra*) Allonby, Cumbria, measuring 6.0ha in total. The seven surveyed areas were bounded by the B5300 coast road to the west and fields of farmed pasture to the east. To the south lay the scheduled monument of Beckfoot fort itself (SM CU255) and 'Romanway' bungalow. To the north lay Beckfoot Farm and an east-west stream fed by the Wolsty Springs. The seven areas are centred on Ordnance Survey grid reference NY 092 492.
- 1.1.4 It was known from aerial photographs and small exploratory trenches that sub-surface archaeological remains of a *vicus* settlement were likely to survive in Areas 1a, 1b and 2. Apart from this no known excavations are believed to have taken place over the site of the northern *vicus* since 1879-80 when Joseph Robinson carried out some limited excavation works (Robinson 1881). These revealed a large building to the north-east of the fort but outside the current survey area. The site of the Beckfoot Roman fort is marked on old and current Ordnance Survey maps.
- 1.1.5 The objective of the geophysical survey was to determine the presence/absence, nature and extent of archaeological features within the survey areas, and the presence/absence of any known modern features within the survey area, which may affect the results. In particular it was hoped that the survey might lead to a further understanding of and delimit the northern *vicus* associated with Beckfoot Fort.

1.1.6 This report outlines the results of the geophysical survey 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 INTRODUCTION

2.1.1 Wardell Armstrong Archaeology was requested and subsequently commissioned by Maryport and District Archaeological Society for a geophysical survey of the study area. The work was consistent with English Heritage guidelines (English Heritage 2008), and in accordance with the standard guidance of the Institute for Archaeologists (IfA 2011).

2.2 GEOPHYSICAL SURVEY

2.2.1 *Technique Selection:* geomagnetic surveying was selected as the most suitable technique for all seven survey areas.

2.2.2 Geomagnetic survey is suitable in non-igneous environments and is capable of revealing the presence of cut archaeological features at depths of no more than c.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 was recorded by the instruments and downloaded into a laptop computer for initial data processing in the field using specialist software.

2.2.3 *Field Methods:* the defined geophysical study area measured 7.2ha of which 6.0ha were surveyed. The survey was divided into seven different areas across six separate fields (Areas 1-6). 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.

2.2.4 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 1600 sample measurements per grid unit, with measurements being recorded at the centre of each grid cell. The data was downloaded on site into a laptop computer for processing and storage.

2.2.5 *Data Processing:* geophysical survey data was processed using ArchaeoSurveyor II software, which was used to produce 'grey-scale' images of the raw data. On the geomagnetic survey 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 (Figures 3 and 5).

- 2.2.6 Raw data was 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.

Destagger: to reduce the effect of staggered gradiometer data, sometimes caused by difficult working conditions, topography, or operator error.

- 2.2.7 **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.

- 2.2.8 **Presentation**: the grey-scale images were combined with site survey data and Ordnance Survey data to produce the geophysical survey figures (Figures 3 and 5).

- 2.2.9 Colour-coded geophysical interpretation diagrams are provided, showing the locations and extent of positive, negative and dipolar, geomagnetic anomalies (Figures 4 and 6).

- 2.2.10 An archaeological interpretation is also provided (Figure 7), which is based on an interpretation of the results of the geophysical survey in light of the archaeological and historical background of the site.

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 2013). This archive is currently held at the company offices at Carlisle, Cumbria. A copy of the data will also be deposited with the County Historic Environment Record.
- 2.3.2 A copy of the final report will be forwarded to Mike Collins (Inspector of Ancient Monuments Hadrian's Wall) and one copy of the final report will be deposited with the County Historic Environment Record in Kendal, where viewing will be made available on request. The project is also registered with the Online Access to the Index of archaeological investigations (OASIS), where a digital copy of the report will be made available.
- 2.3.3 The OASIS reference for this project is **wardella2-167390**.

3 BACKGROUND

3.1 LOCATION AND GEOLOGICAL CONTEXT

- 3.1.1 Beckfoot Roman Fort (*Bibra*) is located on the southern outskirts of the small village of Beckfoot (NY 089 489) (Figure 1). Of linear form the village lies 5 miles to the north of Allonby and 3 miles to the south of Silloth on the west Cumbrian coast overlooking the Solway Firth. The B5300 road runs south-west to north-east through the village.
- 3.1.2 The site of the fort and any potential *vicus* settlement lies immediately adjacent and to the east of the B5300 coastal road. Overlying the north-west corner of the fort is the modern bungalow 'Romanway' and to the north of the fort and *vicus* is Beckfoot Farm. Immediately south of the farm, running east-west is a stream whose source is the Wolsty Springs. West of the coastal road an area of sand dunes leads to an expanse of mudflats forming part of the Solway Firth estuary. East of the road the fort is situated in an area of flat pastoral farmland which extends south-east to the high mountains of the Lake District. The site of the fort and *vicus* lies in intensively managed pastoral fields of medium size which are enclosed by windswept hedgerows and stone-faced hedgebanks (Countryside Commission 1998). Nothing remains to be seen of the fort and *vicus* above ground as it has been subject to severe stone robbing and intense ploughing. Aerial photography has revealed cropmarks within the fort boundary and its immediate environs suggesting considerable archaeological activity in the area.
- 3.1.3 The underlying geology of the area comprises mudstones and sandstones of the Permo-Triassic age ('New Red Sandstone'). Erosion of these comparatively weak rocks reduced most of the Solway Basin to an area of low relief prior to the onset of the last glaciation. This glaciation resulted in vast quantities of boulder clay (till) being deposited over the landscape. Sea level changes, which occurred toward the end of the last glacial period, resulted in the development of raised beaches in the area. Remains of a submerged forest, occasionally exposed at low tide in Allonby Bay, testify to this (*ibid.* 1998).

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 *Place Name Evidence*: the sole geographical source of the Roman name for Beckfoot fort (*Bibra*) is the *Bibra* entry in the Ravenna Cosmology, which appears between the list entries for *Alauna* (Maryport) and *Maglona* (Wigton) (roman-britain.org)

3.3 PREVIOUS ARCHAEOLOGICAL WORK

3.3.1 Only one reported excavation and investigation is known to have been carried out on the site of Beckfoot Roman fort and *vicus* and this took place in the late 19th century. More recent work has been carried out on the site of the fort's cemetery and the predicted site of Milefortlet 15 due to the rapid erosion of the area by the sea.

3.3.2 In 1879-80 Joseph Robinson of Maryport carried out excavation work mainly on the site of the fort itself but also in a very limited area of the *vicus*. Robinson traced the entire circuit of walls defining the fort, forming an irregular quadrilateral. He believed that there were three entrances to the fort on the northern, southern and eastern sides each with two guard chambers. No gateway existed on the western side for defensive reasons. He also located the remains of towers on each of the four corners of the fort. Foundations of a building were uncovered within the fort but these were insufficiently excavated as to ascertain its function. A plan of the fort and the results of the excavation were produced by John B Harvey. Finds from the fort included an uninscribed altar, a figure of Diana as Luna Lucifera, a partial figure of Victory, three quern stones, some copper beads, two coins (Trajan and Constantius) and an assemblage of pottery (Robinson 1881).

3.3.3 It was also in 1880 that the only inscription to be recovered from Beckfoot fort, being used as a gate-post, was re-discovered by Robinson (Bellhouse 1992). It provides the name of one of its garrison units; *cohors II Pannoniorum*, a five hundred strong infantry unit from the province of Pannonia, the region of the modern Czech Republic (roman-britain.org).

3.3.4 During the same season of excavations Robinson carried out very limited excavations on the site of the *vicus*. North-east of the fort he identified a building measuring 60 feet long by 30 feet wide. At varying distances on the west, south and east sides of the fort he discovered rough stone pavements along with one or two isolated pieces of building near the south-west corner (Collingwood 1936).

3.3.5 In 1935 R. G. Collingwood presented a review of the excavations carried out by Joseph Robinson in 1879-80. He described Robinson as 'an able field archaeologist and a zealous and efficient excavator' and

'a man to whom all students of Roman remains in west Cumberland owe a great debt' (Collingwood 1936).

- 3.3.6 In 1954 Richard Bellhouse sank a series of test pits at the conjectured site of Milecastle 15. He proposed that this lay within the site of Beckfoot fort cemetery which lies 365m to the south-west of the fort site in the sand dunes. He proved unsuccessful in finding the site of the milefortlet (Bellhouse 1954). Returning to the site in 1956 Bellhouse located what he believed to be some possible ditch-upcast from the milefortlet but concluded that most of the site had succumbed to coastal erosion (Bellhouse 1957).
- 3.3.7 It is not until the 21st century that any further serious archaeological investigation work is carried out at Beckfoot and this was concentrated on the site of Roman cemetery.
- 3.3.8 In 2005 English Heritage Geophysics Team carried out geophysical surveys of the predicted site of Milefortlet 15 and the Beckfoot Roman cremation cemetery. Both geomagnetic and earth resistance surveys were carried out over an area measuring approximately 1.4 hectares ahead of a planned series of trial trenches across the dunes (Martin, L 2006). The results were largely inconclusive with both surveys unable to define any cemetery boundary limits or the exact location of Milefortlet 15, assuming it had not been eroded away by the sea. The geomagnetic survey did record a few discrete positive anomalies, as might be expected on a cremation site (*ibid.* 2006).
- 3.3.9 In 2006 Oxford Archaeology (North) carried out an evaluation of Beckfoot Roman cemetery and the predicted site of Milefortlet 15 (Healey 2007). The evaluation established that there was no evidence for inhumations and that the cremation rituals carried out were highly varied. There was evidence for pit burials, burials within ditches, burials within ring ditches and burials within pyre dumps. Material collected during the evaluation suggested that the use of cremation continued into the 4th century. Finds from the excavation were limited to nails and hobnails (*ibid.* 2007) This contrasts to the 1948 excavation of a burial containing a sword, shield and spear, a very unusual type of burial in Roman Britain (Hogg 1949). No evidence of the site for Milefortlet 15 was recovered.
- 3.3.10 In 2011 a three trench evaluation was carried out in the grounds of 'Romanway' bungalow, situated over the south-west corner of the fort. This recorded two phases of occupation within the fort (Martin, G 2011).

4 THE GEOPHYSICAL SURVEY

4.1 INTRODUCTION

- 4.1.1 The geophysical survey was undertaken between 4th and 9th December 2013 over four non-consecutive days.
- 4.1.2 Geomagnetic survey was undertaken over seven separate areas (Areas 1-6) within six fields within the study area (Figure 2). Apart from Area 1 which was divided into two areas (area 1a and Area 1b) for ease of surveying, each area consisted of a single field in its own right with boundaries consisting of stone-faced hedgebanks, most of which incorporated post and wire fences. These fences occasionally resulted in strong dipolar magnetic anomalies around the periphery of the survey areas. The fields all contained grass pasture with a small area of cabbage and swede in Area 1b.
- 4.1.3 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 land. These anomalies are indicated on the geophysical interpretation drawings, but not referred to again in the subsequent interpretations.
- 4.1.3 Numbers in the text refer to interpreted features (or groups of similar features) detected during the survey. These features are labelled on the archaeological interpretation figures.

4.2 GEOMAGNETIC SURVEY

- 4.2.1 *Area 1a (Figures 3-4):* the geomagnetic survey was undertaken over an area of 0.33ha, one part of two areas in a whole field. This area formed the western limit of the survey and was bounded on the western side by the B5300 coastal road (Figure 2).
- 4.2.2 The whole area was covered by a series of strong positive and negative, magnetic anomalies some of which were linear and rectilinear in form **(1)**. They can be attributed to a part of the Roman civilian settlement (*vicus*) associated with Beckfoot fort. The positive magnetic anomalies suggest the existence of sub-surface archaeological remains in the form of boundary features, foundation trenches or beam slots for Roman strip buildings, pits, and the result of possible stone robbing. The negative, magnetic anomalies may represent the foundation walls of buildings.
- 4.2.3 In the south-east corner of the survey area a large strong positive magnetic anomaly **(2)** represents the defensive ditch at the north-west corner of the fort. Along the western edge of the survey a weak, positive magnetic,

semi-circular feature was detected **(3)**. Possibly part of what was a full circular feature it measures c.30.0m in diameter. The function of this feature is unknown.

- 4.2.4 The survey in this area was constrained by the B5300 coastal road. There is no evidence to suggest that the *vicus* ceased here in the Roman period and may well have extended under the modern road toward the sea only to succumb to coastal erosion as did Milefortlet 15.
- 4.2.5 *Area 1b (Figures 3-4)*: the geomagnetic survey was undertaken over an area of 0.91ha. This area formed the north-western part of Area 1. To the west it was bounded by the B5300 coastal road and to the north by an east-west stream and Beckfoot Farm (Figure 2).
- 4.2.6 The survey detected a series of weak, linear magnetic, anomalies attributed to post-medieval ridge and furrow **(4)** in the eastern part of the area. The western part of the area was dominated by a prominent linear alignment of weak positive and strong negative magnetic anomalies representing the route of the Roman road **(5)** running north from the fort.
- 4.2.7 A series of strong linear negative and positive rectangular magnetic anomalies were detected to the west of the road **(6)**, which are indicative of Roman strip buildings with stone foundation walls, together with pits and boundary ditches. A grid of strong positive and negative magnetic anomalies was detected to the east of the road, but was much less regular in form **(7)** and contained a greater amount of strong linear negative magnetic features **(8)**, probably representing ditches whose purpose is uncertain.
- 4.2.8 *Area 2 (Figures 3-4)*: the geomagnetic survey was undertaken over an area of 1.03ha consisting of a whole field immediately to the south of Beckfoot Roman fort (Figure 2). This area was again dominated by a prominent linear alignment of weak positive and strong negative magnetic anomalies, representing the Roman road **(9)** running north from the fort.
- 4.2.9 At the southern end of this area a series of strong positive and negative, linear magnetic anomalies **(10)** represent the northern defensive ditches of the fort. A north-south gap in these linear features represents the northern entrance of the fort **(11)**.
- 4.2.10 Either side of the road further negative linear and positive rectangular anomalies were detected, representing Roman strip buildings, their walls and interiors, along with boundary ditches and pits **(12)**. Some of these anomalies may be representative of stone robbing. Adjacent to the fort defences in the south-east corner of the survey area was a series of positive and negative anomalies **(13)** which appeared to be perpendicular to those

on either side of the road **(9)**. These may represent buildings fronting onto a road or track **(14)** running parallel and adjacent to the forts northern defences. Strong, dipolar anomalies toward the southern end of this area **(15)** are likely to be the result of intense heat produced from ovens or kilns used in industrial processes.

4.2.11 *Area 3 (Figures 3-4)*: the geomagnetic survey was undertaken over an area of 0.98ha consisting of a whole field north-east of the fort (Figure 2).

4.2.12 The survey of this area showed, in the eastern half, a series of parallel weak linear positive magnetic anomalies **(16)**, which are attributed to ridge and furrow cultivation. The western area of the field again produced positive and negative, magnetic anomalies consistent with a Roman *vicus* **(17)**. At the north-western part of Area 3 parallel strong positive and negative magnetic anomalies were detected **(18)**, which are indicative of a large ditch and bank.

4.2.13 Running north-east, at the top end of Area 3, were two parallel, strong positive, linear, magnetic anomalies **(19)**. The distance between these suggests that they are roadside ditches. They are orientated toward the surveyed areas 4 and 6.

4.2.14 *Area 4 (Figures 5-6)*: the geomagnetic survey was undertaken over an area of 1.07ha consisting of a whole field immediately north of the east-west stream and east of Beckfoot Farm (Figure 2).

4.2.15 The survey detected a series of parallel, weak linear, positive magnetic anomalies **(20)** attributed to ridge and furrow produced by post-medieval ploughing. Along the northern edge of this area was a strong dipolar, linear magnetic anomaly **(21)**. This is believed to be a buried BT cable (John Murray *pers. comm.*). An area of strong, dipolar magnetic anomalies **(22)**, approximately half way along the northern edge of the area can be attributed to farm rubble dumped at the site of a field entrance to provide traction. No significant archaeological features were detected in this area.

4.2.16 *Area 5 (Figures 5-6)*: the geomagnetic survey was undertaken over an area of 1.05ha consisting of a part field north-east of the fort (Figure 2).

4.2.17 The survey shows a string of dipolar magnetic anomalies **(23)** along the south-western edge of the field which can be attributed to modern wire fencing. It is uncertain as to what the three strong, positive, magnetic anomalies **(24)** toward the centre of the field relate to. On the eastern edge of the survey area a positive, magnetic anomaly **(25)** appears to be part of a much larger positive, magnetic anomaly **(26)** detected in Area 6. No linear features, possible roadside ditches, observed on aerial photographs as crop marks, were recorded in this area.

4.2.18 **Area 6 (Figures 5-6):** the geomagnetic survey was undertaken over an area of 0.62ha consisting of a part field north-east of the fort (Figure 2).

4.2.19 The geomagnetic survey in this area recorded a large, sub-rectangular, positive magnetic feature measuring c.40.00m in length and c.15.00m in width and possibly divided into two halves **(26)**. The site is close to the east-west stream fed by the Wolsty Springs and in line with the road **(19)** leading from Area 3. These combined factors might indicate that this is the site of the former Roman bath house, which may have been robbed out/removed.

4.3 DISCUSSION

4.3.1 The geomagnetic survey was very effective in detecting a substantial amount of archaeological features most of which relate to the Roman civilian settlement (*vicus*) on the northern side of the Roman fort. The interpreted results of the geophysical survey are illustrated in Figure 7.

4.3.2 The survey revealed that to the north of the Roman Fort, significant concentration of Roman archaeology is likely to exist. However, the survey results also indicate that many of the areas may have been adversely affected by post-medieval ploughing.

4.3.3 Area 4 exhibited modern features in the form of a BT cable and modern farming rubble. This area, along with Area 5 and Area 6 appear to be outside of the area of the Roman settlement, and was presumably largely agricultural land in this period.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

- 5.1.1 A geomagnetic survey covering 6.0ha of land was conducted within six pastoral fields situated on the southern outskirts of Beckfoot village immediately to the north of Beckfoot Roman fort on the west Cumbrian coast. This was carried out on behalf of Maryport and District Archaeological Society as part of a project to establish the nature and extent of the Roman civilian settlement (*vicus*) surrounding the fort. To this end the geomagnetic survey, constrained to land over the northern *vicus*, at this stage, proved to be highly successful.
- 5.1.2 The geomagnetic survey established that a *vicus* of considerable size existed to the north of Beckfoot Roman fort. The survey revealed that it existed in four of the seven survey areas and covered c.2.50ha. On the western side the survey was constrained by the B5300 road. It is very possible that the *vicus* once extended across this area and may possibly have been subject to coastal erosion the same as Milefortlet 15. To the north the *vicus* does not appear to have extended across the small east-west stream fed by the Wolsty Springs.
- 5.1.3 Dividing the *vicus* into two distinctive halves was the Roman road leading north through Areas 1b and 2 from the northern gate of the fort. The survey distinctly recorded the northern wall and defensive ditch of the fort in Areas 1a and 2.
- 5.1.4 To the east of the road the *vicus* appears to have covered a considerably larger area than to the west. It is highly probable that the unsurveyed area between Areas 2 and 3 is likely to contain substantial sub-surface archaeological evidence of the *vicus* as well.
- 5.1.5 The survey of Area 3 showed evidence of a Roman road leading off in a north-east direction toward surveyed Areas 4 and 5. This appears to run directly toward the large anomaly detected between Areas 5 and 6 and which may tentatively be interpreted as the location of the Roman bath house. However, the nature of the anomalies in this area may suggest that the majority of the structure has been robbed out.
- 5.1.6 The Area 4 survey revealed no archaeological evidence of sub-surface archaeological features apart from post-medieval ridge and furrow ploughing. Evidence of post-medieval ridge and furrow ploughing was also detected on the eastern sides of surveyed Areas 1b and 3.

5.2 RECOMMENDATIONS

- 5.2.1 Aerial photographs have provided some evidence for additional sub-surface archaeological features to exist on both the east and south side of Beckfoot fort. It is highly likely that these are also part of the *vicus* settlement surrounding the fort. Further geophysical surveys of these areas, in the future, are recommended in order to establish both its full extent and to provide a greater understanding of its relationship with Beckfoot fort, part of a significant Roman coastal defensive system.

6 BIBLIOGRAPHY

6.1 SECONDARY SOURCES

Bellhouse, R. L. (1954) *Roman sites on the Cumberland coast, 1954*. Transactions of the Cumberland and Westmorland Archaeological and Antiquarian Society: New Series 54, 47. Titus Wilson and Son Ltd: Kendal

Bellhouse, R. L. (1957) *Roman sites on the Cumberland coast, 1956*. Transactions of the Cumberland and Westmorland Archaeological and Antiquarian Society: New Series 57, 21-22. Titus Wilson and Son Ltd: Kendal

Bellhouse, R.L. (1992) *Joseph Robinson of Maryport: Archaeologist extraordinary*. Smith Settle: Otley

Collingwood, R. G. (1936) *The Roman Fort at Beckfoot*. Transactions of the Cumberland and Westmorland Archaeological and Antiquarian Society: New Series 36, 76-84. Titus Wilson and Son Ltd: Kendal

Countryside Commission (1998) *Countryside Character, Volume 2: North West*. Countryside Commission: Walgrave, Northampton

English Heritage (2008) *Geophysical survey in Archaeological Field Evaluation, Research and Professional Services Guideline No.1, 2nd Edition*, London

Healey, C. (2007) *Beckfoot Roman Cemetery and Milefortlet, Cumbria*. Unpublished report by Oxford Archaeology (North) for English Heritage.

Hogg, R. (1949) *A Roman cemetery site at Beckfoot, Cumberland*. Transactions of the Cumberland and Westmorland Archaeological and Antiquarian Society: New Series 49, 32-37. Titus Wilson and Son Ltd: Kendal

IfA (2011) *Standard and guidance for archaeological geophysical survey*, Institute for Archaeologists, Birmingham

Martin, G. (2011) *Romanway, Beckfoot*. Unpublished Archaeological Report (Report No. 83) by Gerry Martin Associates Ltd

Martin, L. (2006) *Beckfoot, Cumbria: Geophysical Survey Report*. Unpublished report by English Heritage Geophysics Unit

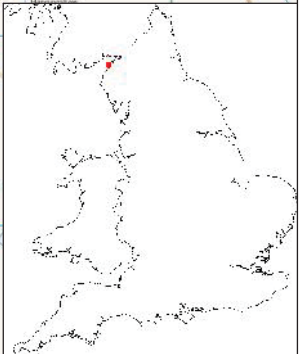
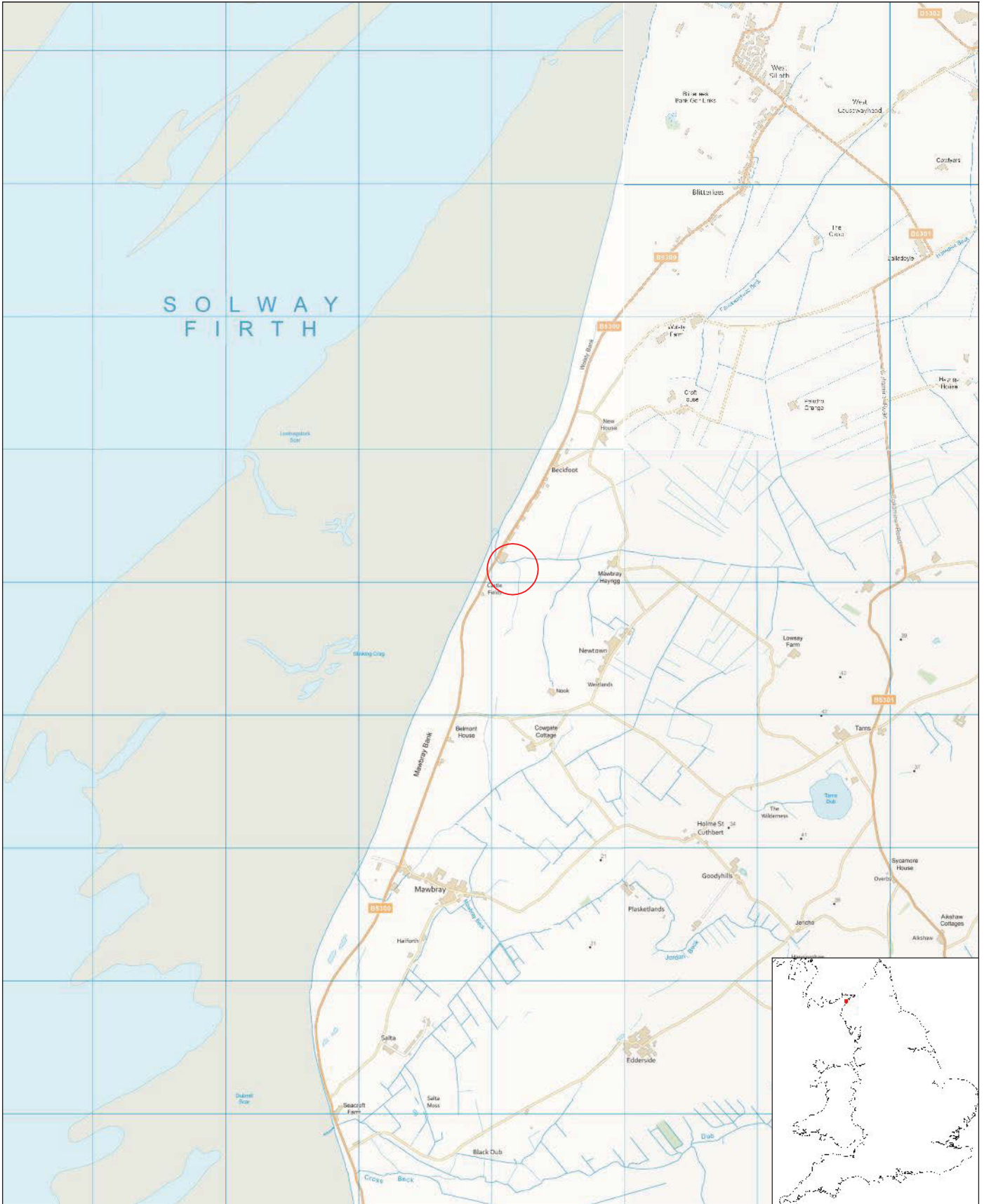
Railton, M. (2012) *General Methods Statement for Geomagnetic Geophysical Survey*. Unpublished Document by Wardell Armstrong Archaeology.

Robinson, J. (1881) *The Roman camp near Beckfoot (Mowbray), Cumberland*. Transactions of the Cumberland and Westmorland Archaeological and Antiquarian Society: Old Series 5, 136-48. Titus Wilson and Son Ltd: Kendal

6.2 INTERNET REFERENCES

<http://www.roman-britain.org/places/bibra.htm>

APPENDIX 1 FIGURES






 <p>Wardell Armstrong Archaeology 2013</p>	<p>PROJECT: Beckfoot Farm, Allonby, Cumbria</p> <p>SCALE: 1:40,000 at A4</p> <p>REPORT No: CP10691</p> <p>CLIENT: Maryport and District Archaeological Society</p> <p>DRAWN BY: AB</p> <p>DATE: December 2013</p> <p>FIGURE: 1</p>	<p>KEY:</p> <p> Site location</p>	 <p>Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence number 100019512</p>
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Figure 1: Location of Beckfoot Roman Fort.

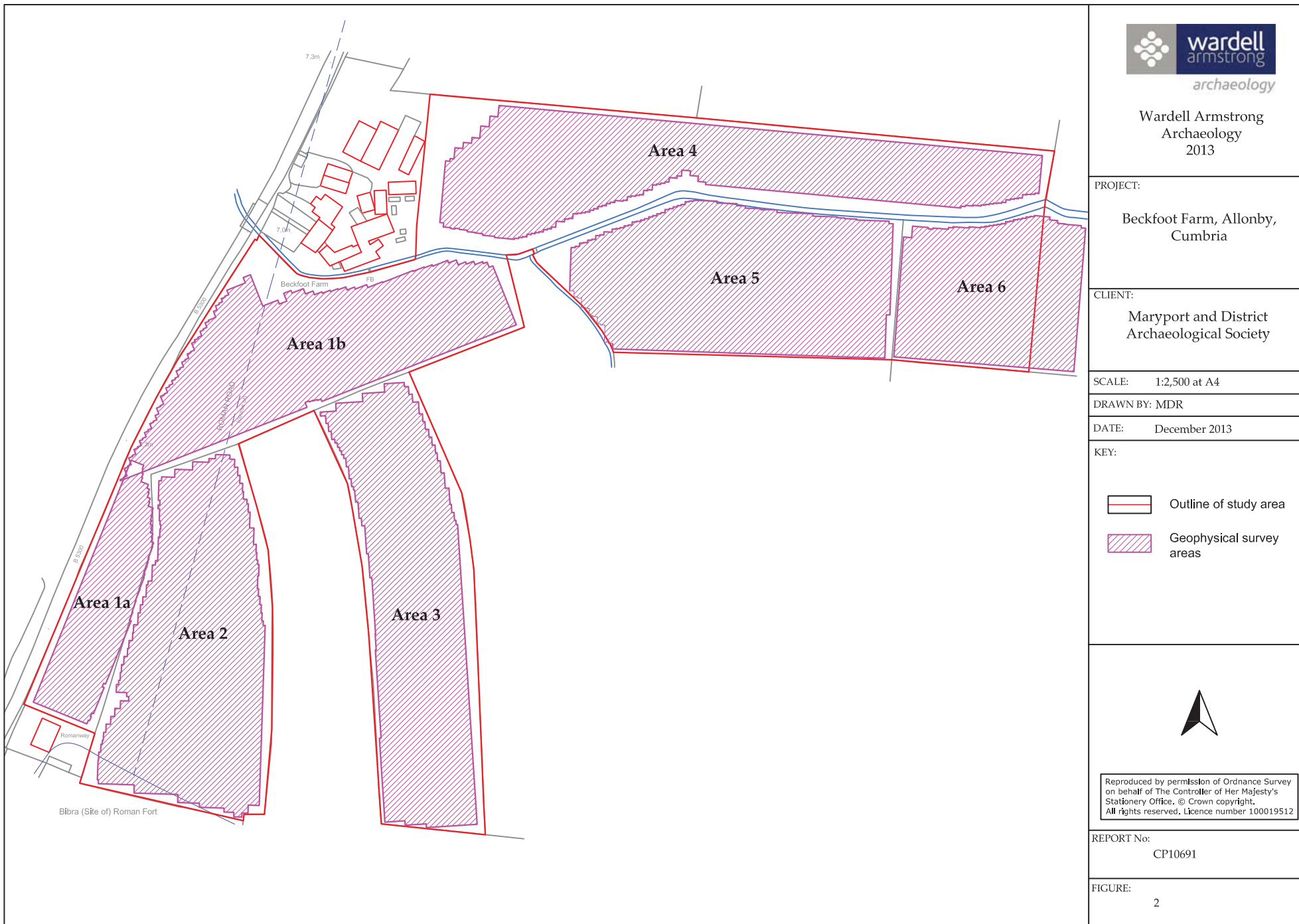


Figure 2: Location of the geophysical survey areas (Areas 1-6)

PROJECT:

Beckfoot Farm, Allonby,
Cumbria

CLIENT:



Maryport and District
Archaeological Society

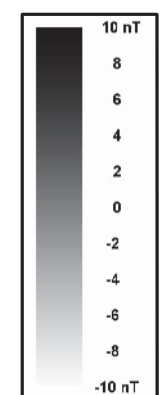
SCALE: 1:1,000 at A3

DRAWN BY: MDR

DATE: December 2013

KEY:

-  Outline of geophysical study area
-  Outline of geophysical survey area



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REPORT No: CP10691

FIGURE: 3



Figure 3: Gradiometer survey: Areas 1, 2 and 3.

PROJECT:

Beckfoot Farm, Allonby,
Cumbria






CLIENT:

Maryport and District
Archaeological Society

SCALE: 1:1,000 at A3

DRAWN BY: MDR

DATE: December 2013

- KEY:
-  Outline of geophysical study area
 -  Outline of geophysical survey area
 -  Positive magnetic anomalies
 -  Negative magnetic anomalies
 -  Dipolar magnetic anomalies



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REPORT No: CP10691

FIGURE: 4



Figure 4: Geophysical interpretation: Areas 1, 2 and 3.

PROJECT:

Beckfoot Farm, Allonby,
Cumbria

CLIENT:



Maryport and District
Archaeological Society

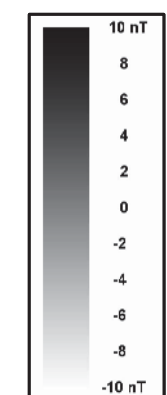
SCALE: 1:1,000 at A3

DRAWN BY: MDR

DATE: December 2013

KEY:

-  Outline of geophysical study area
-  Outline of geophysical survey area



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FIGURE: 5

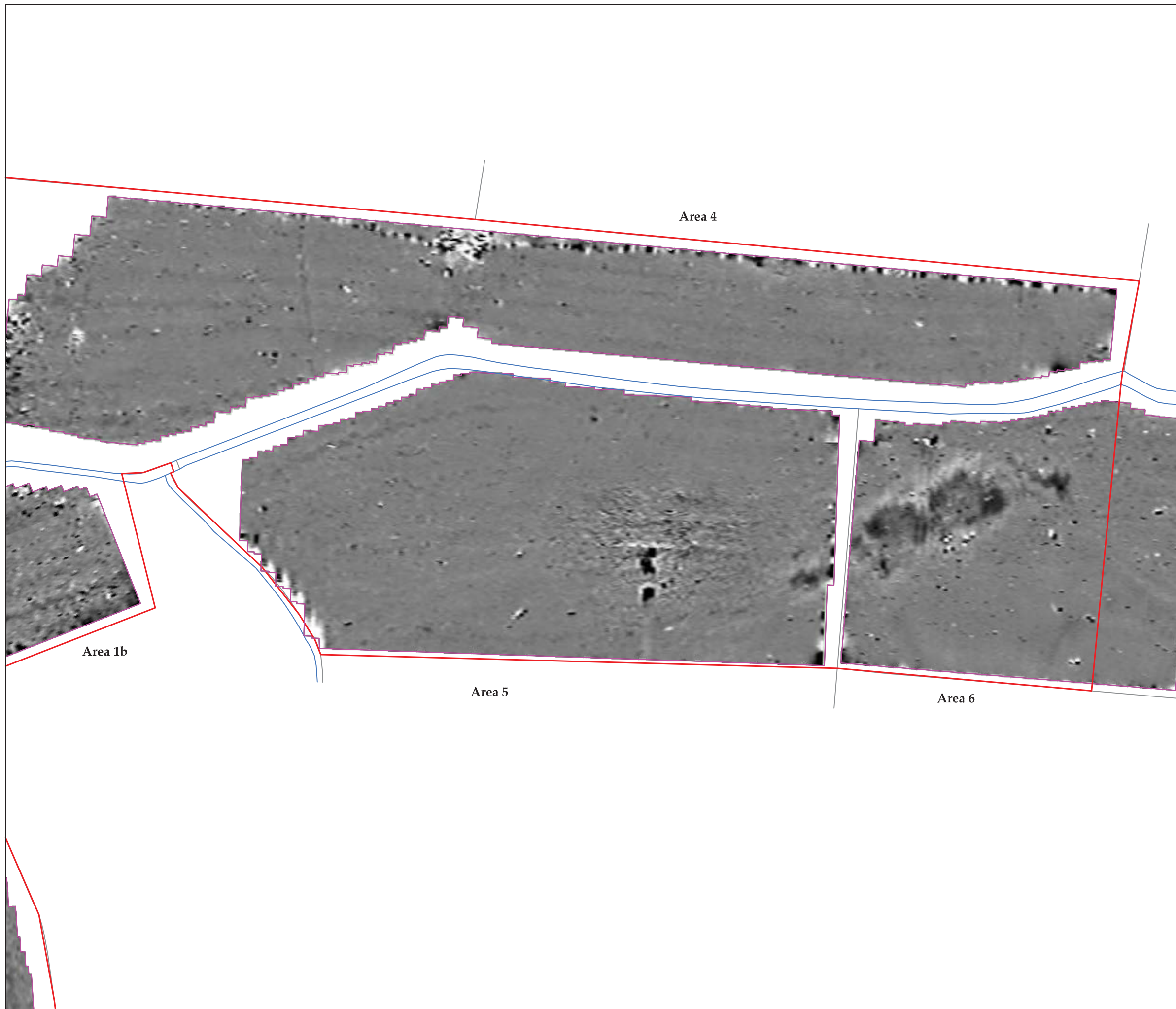


Figure 5: Gradiometer survey; Areas 4, 5 and 6.

PROJECT:

Beckfoot Farm, Allonby,
Cumbria

CLIENT:





Maryport and District
Archaeological Society

SCALE: 1:1,000 at A3

DRAWN BY: MDR

DATE: December 2013

KEY:

-  Outline of geophysical study area
-  Outline of geophysical survey area
-  Positive magnetic anomalies
-  Dipolar magnetic anomalies



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REPORT No: CP10691

FIGURE: 6



Figure 6: Geophysical interpretation: Areas 4, 5 and 6.

PROJECT:

Beckfoot Farm, Allonby,
Cumbria

CLIENT:








Maryport and District
Archaeological Society

SCALE: 1:1,750 at A3

DRAWN BY: MDR

DATE: December 2013

KEY:

-  Outline of geophysical study area
-  Outline of geophysical survey area
-  Direction ridge & furrow
-  Modern services
-  Soil-filled ditches
-  Possible fired structures
-  Remains of vicus structures



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FIGURE: 7

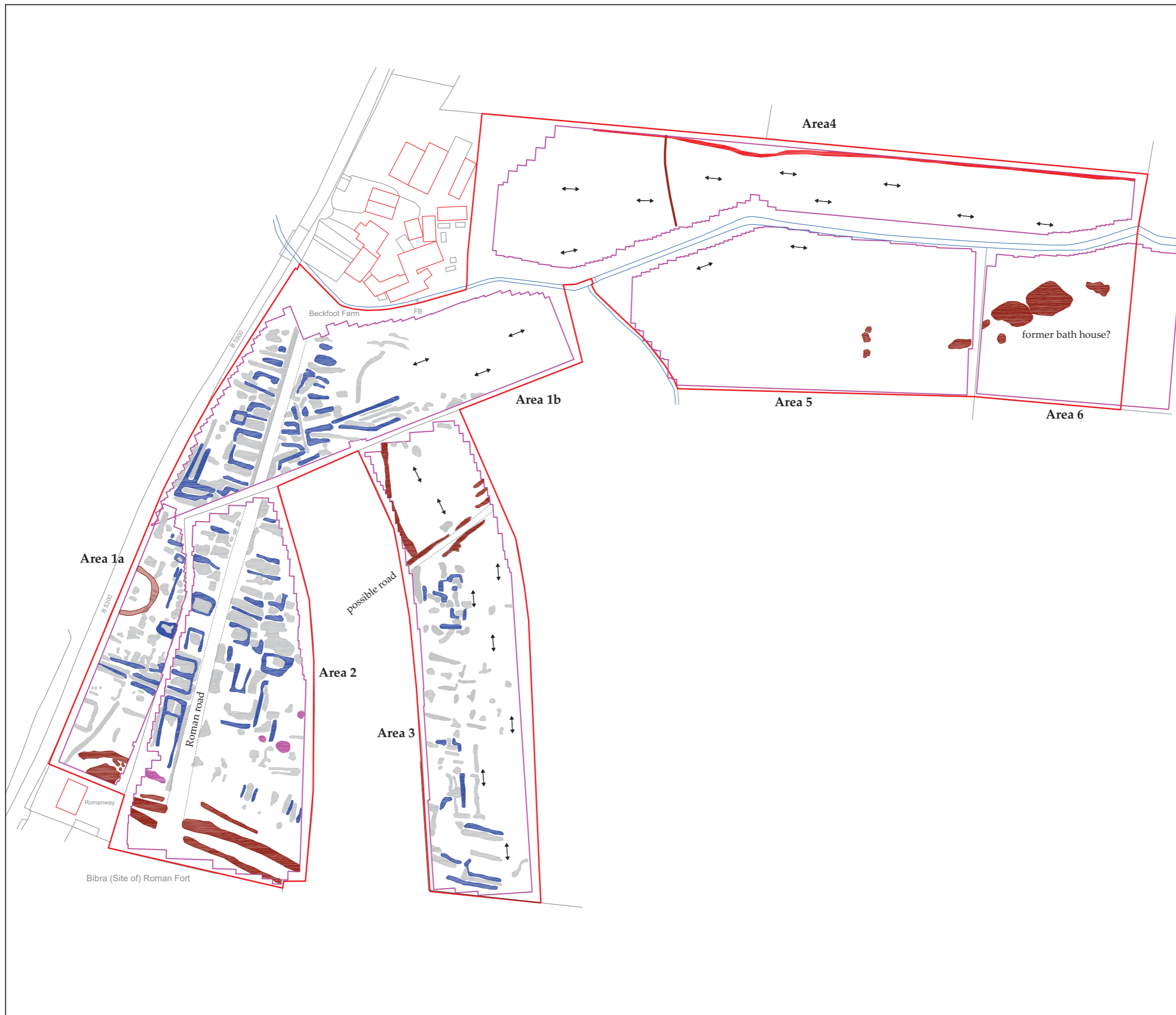


Figure 7: Archaeological interpretation