

GEOPHYSICAL SURVEY OF CASTRIGG ROMAN FORTLET, APPLEBY-IN-WESTMORLAND, CUMBRIA



CONTENTS

	Page
List of Figures.....	ii
Non-Technical Summary.....	iii
1 INTRODUCTION (<i>FIGURE 1</i>)	1
2 METHODOLOGY.....	2
2.1 Standards.....	2
2.2 Technique Selection.....	2
2.3 Field Methods	2
2.4 Data Processing.....	2
2.5 Interpretation.....	3
2.6 Presentation.....	3
2.7 Project Archive	3
3 SURVEY RESULTS (<i>FIGURES 2-5</i>)	4
4.1 Introduction.....	4
4.2 Geomagnetic Survey	4
4.4 Discussion.....	5
5 CONCLUSIONS	6
6 ACKNOWLEDGEMENTS.....	7
7 BIBLIOGRAPHY	7
APPENDIX I – TRACE PLOT	8
APPENDIX II – FIGURES.....	10

LIST OF FIGURES

Figure 1: Site location.....	Appendix II
Figure 2: Location of the geophysical survey area	Appendix II
Figure 3: Geophysical survey	Appendix II
Figure 4: Geophysical interpretation	Appendix II
Figure 5: Archaeological interpretation	Appendix II

SUMMARY

In July 2015, Appleby Archaeology Group, undertook a geophysical survey of land at Castrigg Farm, near Appleby-in-Westmorland, Cumbria, to investigate the site of Castrigg Roman fortlet, which is a Scheduled Monument (Monument No CU265, HA 1007174). The survey formed part of a wider community archaeology project, with the aim of investigating the history and archaeology of the Appleby-in-Westmorland area. The work was conducted in accordance a section 42 licence provided by Historic England as the site is a scheduled monument.

Castrigg Roman fortlet is situated *c.*2km to the north of Appleby-in-Westmorland, approximately mid-way between the settlements of Crackenthorpe and Brampton. The site is located within a field of pasture 200m to the south of Castrigg, immediately to the west of the Settle to Carlisle railway, and northeast of a public bridleway. The site is centred on Ordnance Survey grid reference NY 6749 2217.

The fortlet lies on the route of the High Street Roman Road (HER 1890), which follows the course of the public bridleway immediately to the southwest. The Castrigg Roman fortlet site (HER 1653) has been identified from air photographs, which show two structures, interpreted as; a Roman signal station on a circular platform surrounded by a ditch, and a small rectangular fort, defended by a ditch. Surface remains comprise a nearly ploughed-out rectangular platform, with a slight ditch visible on the northeast and northwest sides.

Geomagnetic survey, measuring just over *c.*2.4ha of land was conducted by members of the group. The survey has revealed the presence of a sub-rectangular enclosure, with possible entrances on three sides, and evidence for at least two round houses of different phases. A further phase of enclosure or annex to the main enclosure has also been identified to the southeast. The site is interpreted as an Iron Age or Romano-British farmstead, based on the morphology of the features identified.

No definite evidence was detected by the geophysical survey for Castrigg Roman fortlet, which is believed to be smaller than the enclosure site identified. Similarly evidence for the associated signal station has not been identified by the geophysical survey, calling into question the previous interpretation of the site.

1 INTRODUCTION (*Figure 1*)

- 1.1 In July 2015, Appleby Archaeology Group, undertook a geophysical survey of land at Castrigg Farm, near Appleby-in-Westmorland, Cumbria, to investigate the site of Castrigg Roman fortlet, which is a Scheduled Monument (Monument No CU265, HA 1007174). The survey formed part of a wider community archaeology project, with the aim of investigating the history and archaeology of the Appleby-in-Westmorland area. The work was conducted in accordance a section 42 licence provided by Historic England as the site is a scheduled monument.
- 1.2 Castrigg Roman fortlet is situated *c.*2km to the north of Appleby-in-Westmorland, approximately mid-way between the settlements of Crackenthorpe and Brampton (Figure 1). The site is located within a field of pasture 200m to the south of Castrigg, immediately to the west of the Settle to Carlisle railway, and northeast of a public bridleway. The site is centred on Ordnance Survey grid reference NY 6749 2217.
- 1.3 The fortlet lies on the route of the High Street Roman Road (HER 1890), which follows the course of the public bridleway immediately to the southwest. East of Appleby-in-Westmorland the Roman road follows the modern A66. However, to the north of the town the A66 diverges southwards, before re-joining the Roman road at the site of Redlands Bank Roman camp, east of Bolton. The Castrigg Roman fortlet site (HER 1653) has been identified from air photographs, which show two structures, interpreted as; a Roman signal station on a circular platform surrounded by a ditch, and a small rectangular fort, defended by a ditch. Surface remains comprise a nearly ploughed-out rectangular platform, with a slight ditch visible on the northeast and northwest sides.
- 1.4 The solid geology of the area comprises New Red Sandstone, overlain by glacial deposits of boulder clay (BGS 2001). The site occupies the crest of a slight ridge, which runs approximately northwest to southeast across the site, with a high point of 800m aOD. The land falls away more sharply to the north.
- 1.5 The objective of the geophysical surveys was to determine the presence/absence, nature and extent of any archaeological anomalies within the survey area, and the presence/absence of any known modern anomalies, which may affect the results. In particular, it was hoped that the surveys might reveal further evidence for archaeological features associated with the recorded Roman fortlet and signal station. The geophysical survey area covered *c.*2.4ha of land targeting the location of Castrigg Roman fortlet and the visible surface remains (Figure 2).

2 METHODOLOGY

2.1 *Standards*

- 2.1.1 The geophysical survey and reporting were conducted in accordance with Historic England guidelines (English Heritage 2008), and undertaken in accordance with the standard and guidance of the Chartered Institute for Archaeologists (CIfA 2014).
- 2.1.2 A licence was obtained from Historic England to carry out the geophysical survey (Case No SL00104224). This was necessary due to the fact that the Roman fortlet is a scheduled monument, and is protected by law under the Ancient Monuments and Archaeological Areas Act 1979 (as amended), Section 42.

2.2 *Technique Selection*

- 2.2.1 Geomagnetic survey was selected as an 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 involved 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.

2.3 *Field Methods*

- 2.3.1 The geophysical study area measured c.2.4ha and was located to incorporate the majority scheduled area targeting the site of Castrigg Roman fortlet. A 20m grid was established over this area, and tied-in to known Ordnance Survey points.
- 2.3.2 Geomagnetic measurements were determined using a Bartington Grad601-2 dual gradiometer system, with twin probes 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 20m 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 was downloaded on site into a laptop computer for processing and storage.

2.4 *Data Processing*

- 2.4.1 Geophysical survey data was processed using TerraSurveyor 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.
- 2.4.2 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 (despike was performed on all survey grids using a window of 11x3 and threshold of 2.0).

Destripe: to reduce the effect of striping in the gradiometer data, sometimes caused by misalignment of the twin sensors (zero mean traverse was performed on all survey grids using a threshold of 2 standard deviations).

Destagger: to reduce the effect of staggered gradiometer data, sometimes caused by difficult working conditions, topography, or operator error (destagger applied in both x directions by up to -4 readings).

Clip: to clip data to specified maximum and minimum values, in order to limit large noise spikes in the geophysical data (clipped from -2nT to 2nT).

2.5 *Interpretation*

2.5.1 Three types of geophysical anomaly were detected in the gradiometer data:

positive magnetic: regions of anomalously high or positive magnetic gradient, 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 gradient, 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-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.

2.6 *Presentation*

2.6.1 The grey-scale images were combined with site survey data and Ordnance Survey data to produce the geophysical survey plans. A colour-coded geophysical interpretation diagram is provided, showing the locations and extent of positive, negative and dipolar geomagnetic anomalies

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

2.6.3 A trace plots of the unprocessed geophysical data is included in Appendix I.

2.7 *Project Archive*

2.7.1 The data archive for this project has been created in accordance with the recommendations of the Archaeology Data Service (ADS 2001).

2.7.2 One copy of the survey report will be deposited with the County Historic Environment Record, where viewing will be available on request. A copy will also be deposited with Historic England, and the survey recorded on the Historic England database of geophysical surveys.

2.7.3 The project is also registered with the **Online Access to the Index of archaeological investigationS (OASIS)**. The OASIS reference for this project is **applebya1-220803**.

3 SURVEY RESULTS (*Figures 2-5*)

4.1 *Introduction*

- 4.1.1 The survey area was located within a larger field of pasture, and was located to target the recorded remains of Castrigg Roman fortlet (Figure 2). The survey area covered the highest part of the field, which occupied an east-west ridge of land. The geomagnetic survey was undertaken over an area measuring *c.*2.4ha in total, which covered the majority of the scheduled area, but excluded a slope to the north.
- 4.1.2 A slight earthwork ditch and bank were noted to survive on the northwest and northeast sides of ridge, which seemed to enclose a sub-rectangular area. However, these features could not be traced to the south. A dried-up pond was also noted on the northwest side of the survey area, which is reported to contain water for much of the year. No other obvious earthwork remains were observed.
- 4.1.3 The southwest side of the survey area was bounded by a wide hedgerow, with post and wire fence, beyond which was the public bridleway, which follows the course of the Roman road. The fence was given a wide berth to avoid magnetic interference. A railway embankment bound the east side of the survey area, which was also fenced, and did produce strong magnetic interference. A modern drain was also noted to follow the fence line, which also produced strong dipolar magnetic anomalies in this area.
- 4.1.4 Small dipolar magnetic anomalies were detected across the whole of the survey area. These were probably caused by fired/ferrous litter in the topsoil. These are indicated on the geophysical interpretation drawing, but not mentioned again in the subsequent archaeological interpretation.
- 4.1.5 Numbers in the text below refer to interpreted archaeological features, and correspond to numbers on the archaeological interpretation diagram (Figure 5).

4.2 *Geomagnetic Survey*

- 4.2.1 A curvilinear positive magnetic anomaly was detected crossing the north side of the survey area, aligned northwest to southeast, which corresponded to the location of a visible ditch on the north side of the ridge [1]. This almost certainly represents a soil-filled enclosure ditch, which curved southwards, at the northwest end. A second curvilinear positive magnetic anomaly was detected to the south, running north to south, which also corresponded to the location of a visible ditch [2]. Together these features appeared to form part of a sub-rectangular enclosure, measuring *c.*80m northwest to southeast and *c.*65m northeast to southwest. A possible entrance was detected between these two features on the northwest side of the survey area [3].
- 4.2.2 A further curvilinear positive magnetic anomaly was detected crossing the south side of the survey area, aligned northwest to southeast, curving northwards at the southeast end [4]. This is also interpreted as a soil-filled enclosure ditch, and this completed the south side of a sub-rectangular enclosure, although the anomaly was not as magnetically enhanced as those identified to the north. Another possible entrance to the enclosure was detected on the southwest side [5]. A partial linear positive magnetic anomaly was detected running to the southwest at this location, which may be associated with the entrance way.

- 4.2.3 Another linear positive magnetic anomaly was detected on the south side of the survey area, aligned north to south [6]. This is also interpreted as a soil-filled ditch, but lay outside of the enclosure and could be interpreted as tentative evidence for an associated field system, but this is uncertain.
- 4.2.3 The east side of the enclosure appeared to be somewhat disturbed, and a number of curvilinear positive magnetic anomalies were detected in this area, which may indicate another possible entrance [8] and either an annex or possibly a separate phase of enclosure [9]. The anomalies in this area appear to define a separate area measuring c.55m northeast to southwest, by c.12m northwest to southeast.
- 4.2.4 At the centre of the enclosure two distinct circular positive magnetic anomalies were detected, measuring approximately 15m and 20m in diameter. These are interpreted as the soil-filled gullies of two round houses [9]. A number of other discrete positive magnetic anomalies were detected in this area, which may represent further soil-filled gullies or pits, but the precise nature of these was unclear.
- 4.2.5 A number of other weak curvilinear and discrete positive magnetic anomalies were detected at the site, both within and without the detected enclosure, which may represent soil-filled features, but may also be geological features.
- 4.2.6 A series of parallel weak linear positive and negative magnetic anomalies were detected on the north and east sides of the survey area, aligned north to south, which are believed to represent past ploughing at the site. It is very probable that ploughing has also disturbed archaeological deposits on the top of the ridge.

4.4 *Discussion*

- 4.4.1 The geophysical survey has successfully detected the remains of a sub-rectangular enclosure, which encloses the top of an east-west ridge of land, comprising an inner bank and outer ditch, which is visible as an earthwork on the north and west sides. Possible entrances have been identified to the northwest, southwest and southeast, although the southwest entrance appears to lead towards the adjacent Roman road. The remains of at least two round houses have been identified within the enclosure, which overly each other and are clearing of different phases.
- 4.4.2 A further phase of enclosure has been identified to the southwest, which also appears to be a separate phase to the main enclosure, although it could also represent an annex. There is some tentative evidence for further soil-filled ditches outside the enclosure to the south, which could possibly represent part of an associated field system, but this is speculation.
- 4.4.3 The morphology of the features identified at the site, strongly suggest the presence of an Iron Age or Romano-British farmstead site, similar to those identified to the north and east of Appleby-in-Westmorland at Castle Hill, Dufton and The Druidical Judgment Seat at Brackenber Moor. No evidence was detected for the recorded Castrigg Roman fortlet site or signal station, which are recorded from cropmarks of the site.

5 CONCLUSIONS

- 5.1 Geomagnetic survey, measuring just over *c.*2.4ha of land, has been conducted near Appleby-in-Westmorland, Cumbria, targeting the site of Castrigg Roman fortlet. The survey has revealed the presence of a probable Iron Age or Romano-British farmstead, occupying a hilltop location to the north of the town.
- 5.2 The identified site comprises a sub-rectangular enclosure, with possible entrances on three sides, and evidence for at least two round houses of different phases. Parts of the enclosure are visible as an earthwork ditch, enclosing the hill top. A further phase of enclosure or annex to the main enclosure has also been identified to the southeast.
- 5.3 No evidence was detected by the geophysical survey for Castrigg Roman fortlet, which was identified as a cropmark on air photographs, and is believed to be smaller than the enclosure site identified. Similarly the associated signal station has not been identified by the geophysical survey.

6 ACKNOWLEDGEMENTS

The geophysical surveys were conducted by Appleby Archaeology Group members led by Martin Railton, with the assistance of Phyllis Rouston, Ian Holloway, Liz Cook, Carol Dougherty and Barbara Blenkinsip. This report was prepared and illustrated by Martin Railton.

Appleby Archaeology Group thank Andrew Davidson, Historic England, for granting a licence for the geophysical survey. We are also grateful to Mr Ken Stanley of Keld Farm for kindly providing permission to undertake the geophysical survey on his land.

7 BIBLIOGRAPHY

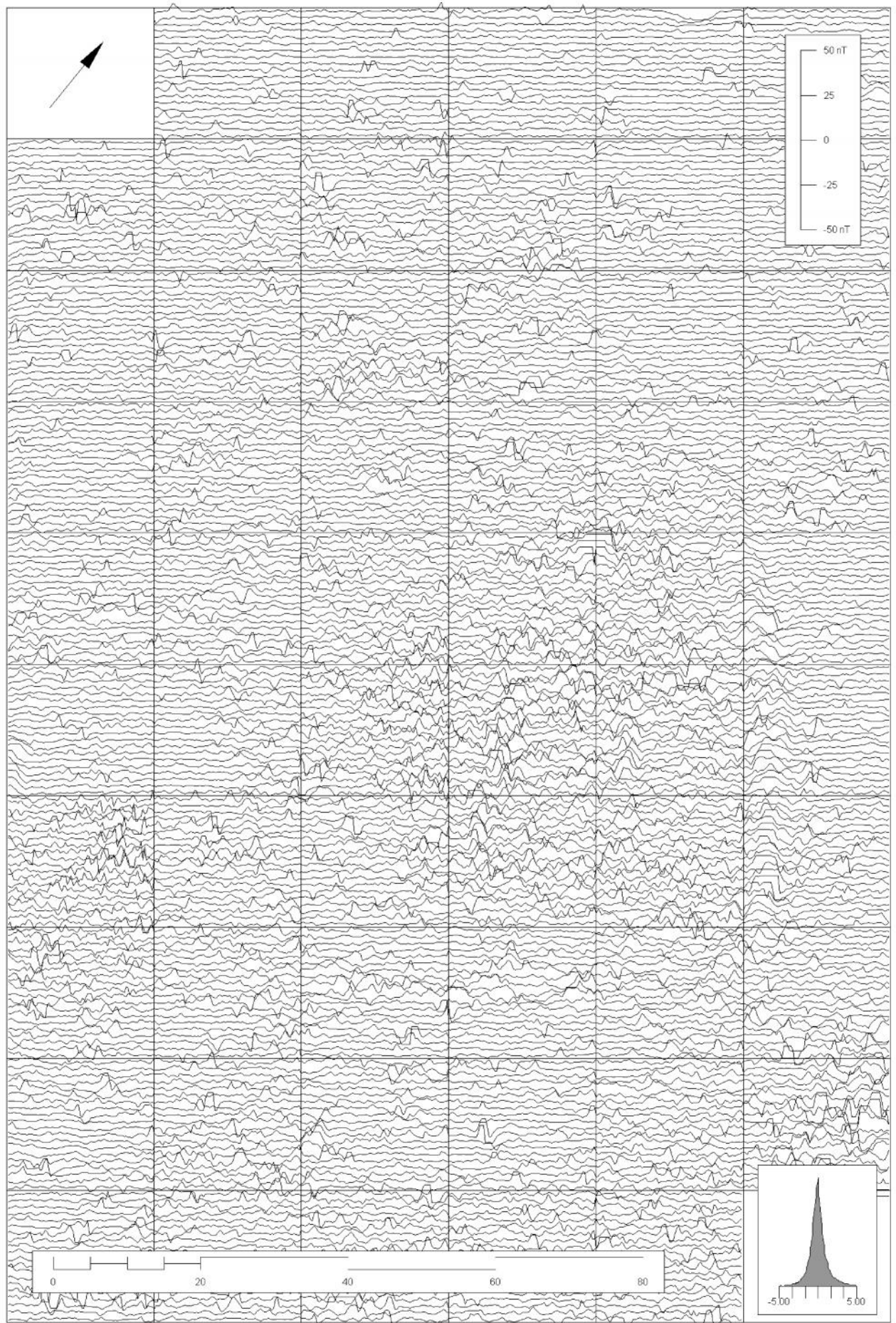
Archaeology Data Service (2012) *Geophysical Data in Archaeology: A Guide to Good Practice*, Arts and Humanities Data Service

British Geological Survey (2001) *Solid Geology Map: UK North Sheet*, 4th edition

CIfA (2014) Standard and guidance for archaeological geophysical survey, Institute for Archaeologists, Birmingham

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

APPENDIX I – TRACE PLOT



APPENDIX II – FIGURES

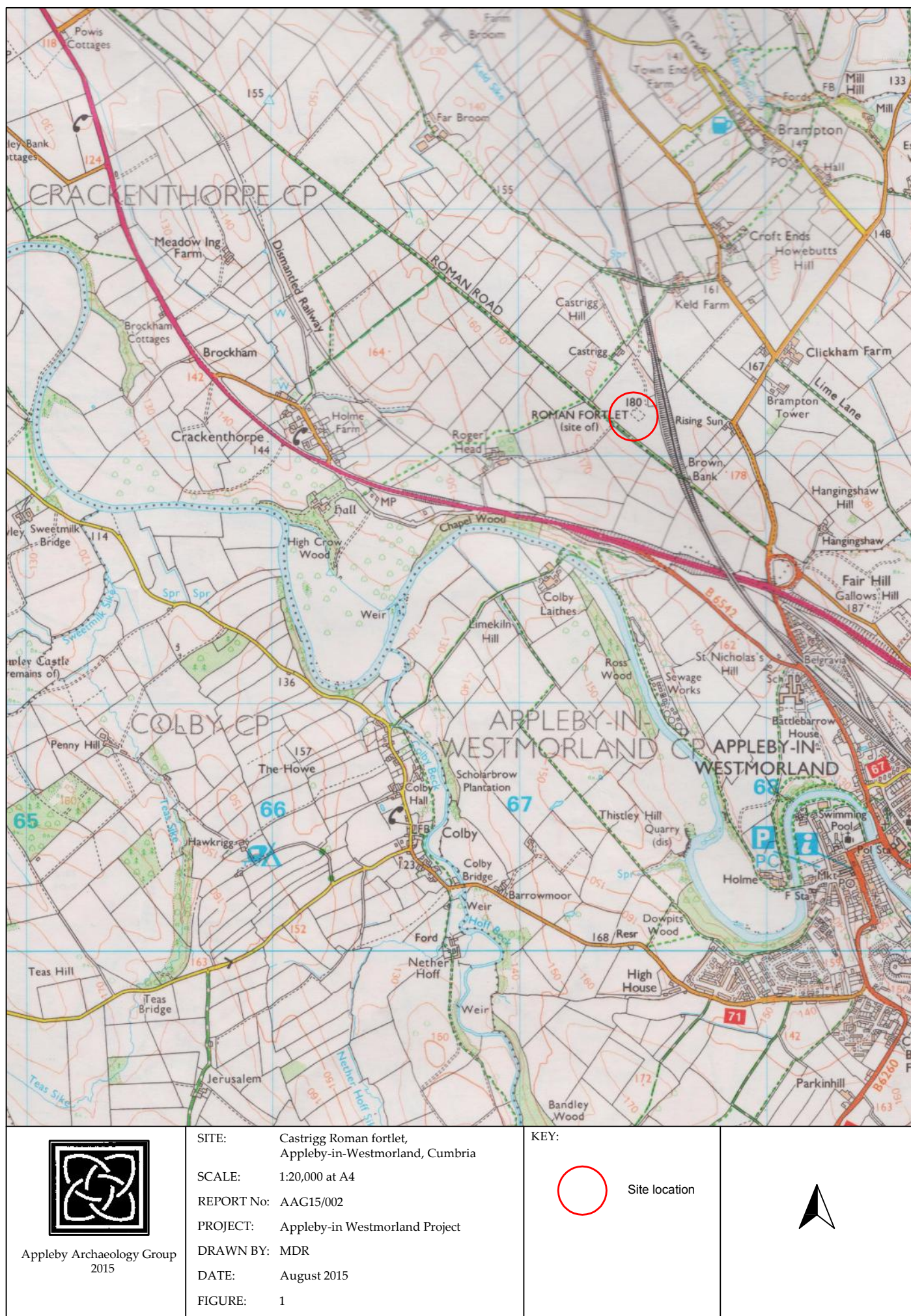


Figure 1: Site Location



Appleby Archaeology Group
2015

SITE:

Castrigg Roman fortlet,
Appleby-in-Westmorland, Cumbria

PROJECT:




Appleby-in-Westmorland Project

SCALE: 1:1000 at A3

DRAWN BY: MDR

DATE: August 2015

KEY:

-  Outline of geophysical survey area
-  Outline of scheduled area
-  Outline of Castrigg fortlet



REPORT No: AAG15/002

FIGURE: 2

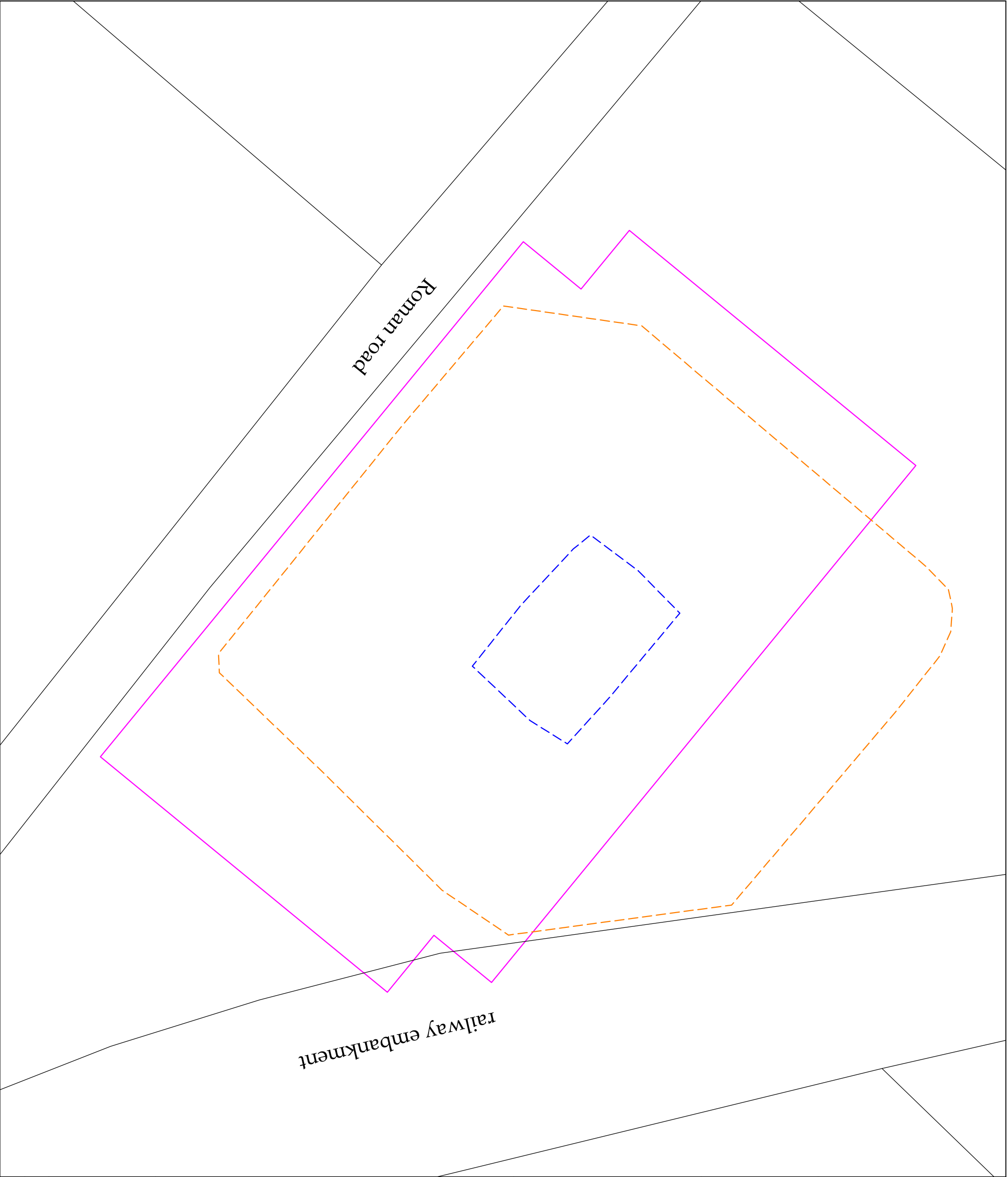


Figure 2: Location of the geophysical survey area.



Appleby Archaeology Group
2015

SITE:

Castrigg Roman fortlet,
Appleby-in-Westmorland, Cumbria

PROJECT:


Appleby-in-Westmorland Project

SCALE: 1:1000 at A3

DRAWN BY: MDR

DATE: August 2015

KEY:

 Outline of geophysical
survey area



REPORT No: AAG15/002

FIGURE: 3

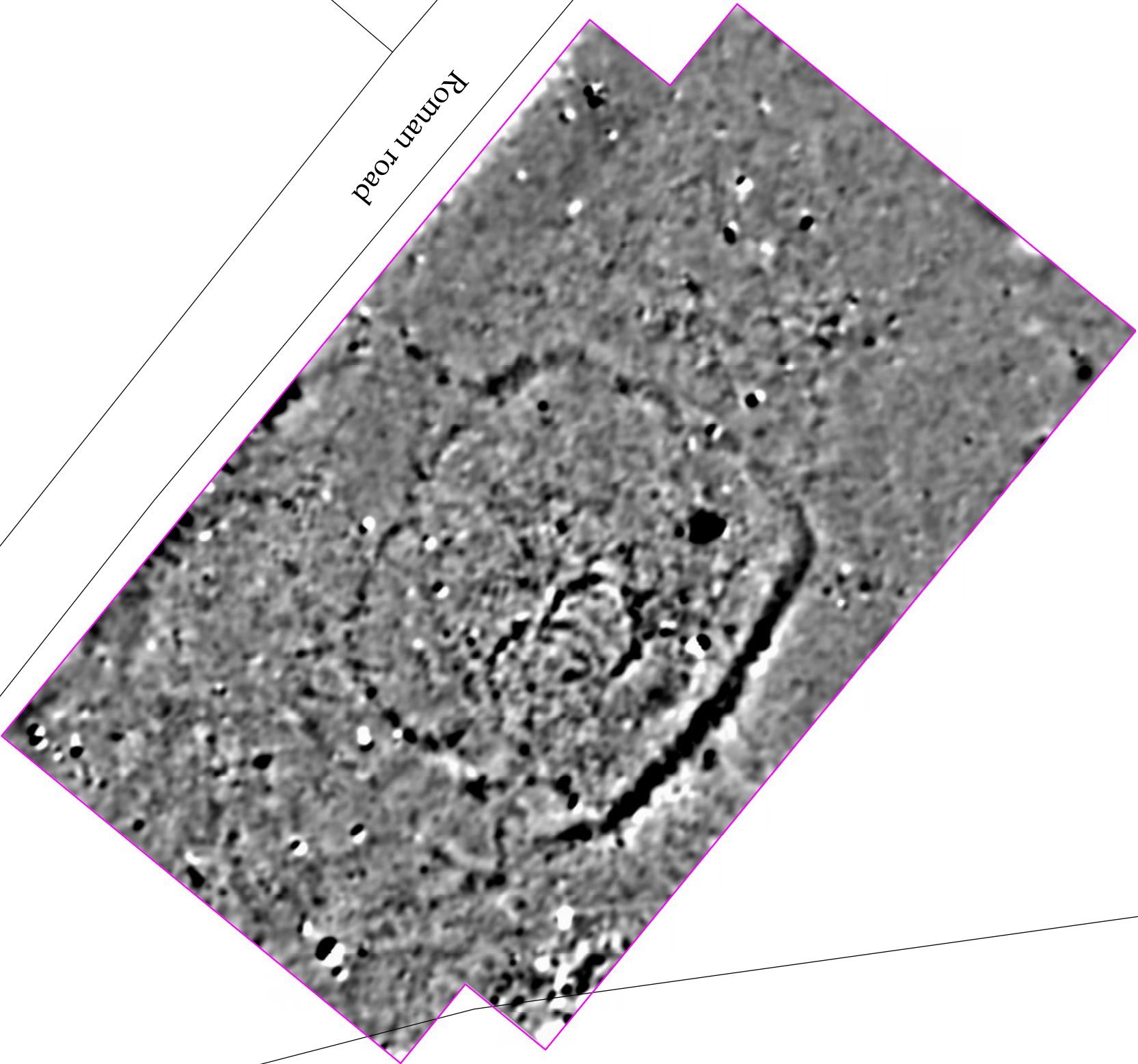


Figure 3: Geophysical survey.



Appleby Archaeology Group
2015

SITE:

Castrigg Roman fortlet,
Appleby-in-Westmorland, Cumbria

PROJECT:





Appleby-in-Westmorland Project

SCALE: 1:1000 at A3

DRAWN BY: MDR

DATE: August 2015

KEY:

-  Outline of geophysical survey area
-  Positive magnetic anomaly
-  Negative magnetic anomaly
-  Dipolar magnetic anomaly



REPORT No: AAG15/002

FIGURE: 4

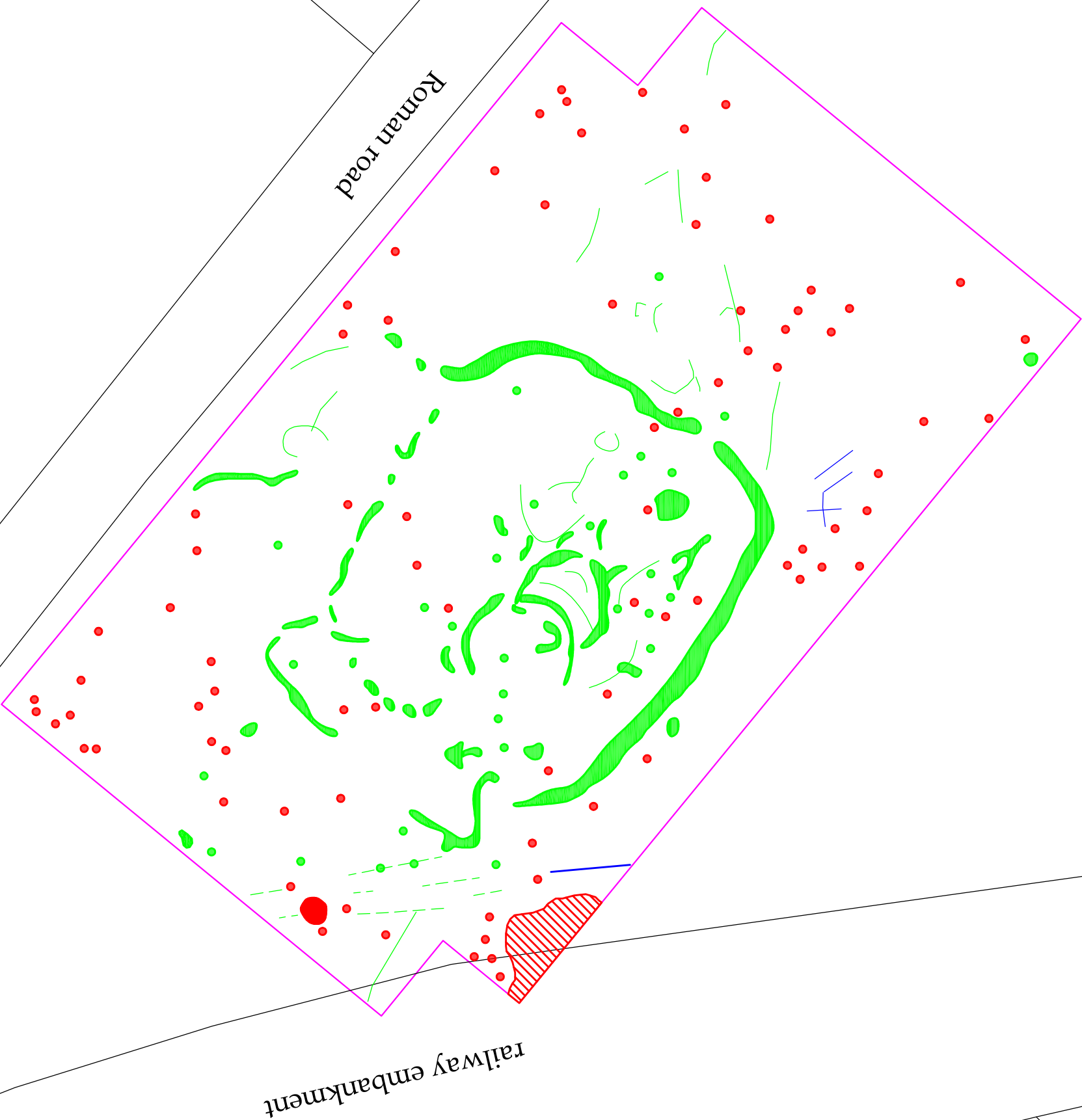


Figure 4: Geophysical interpretation.



Appleby Archaeology Group
2015

SITE:

Castrigg Roman fortlet,
Appleby-in-Westmorland, Cumbria

PROJECT:

Appleby-in-Westmorland Project

SCALE: 1:1000 at A3

DRAWN BY: MDR

DATE: August 2015

KEY:

-  Outline of geophysical survey area
-  Probable archaeology
-  Possible soil-filled features
-  Possible ploughing



REPORT No: AAG15/002

FIGURE: 5

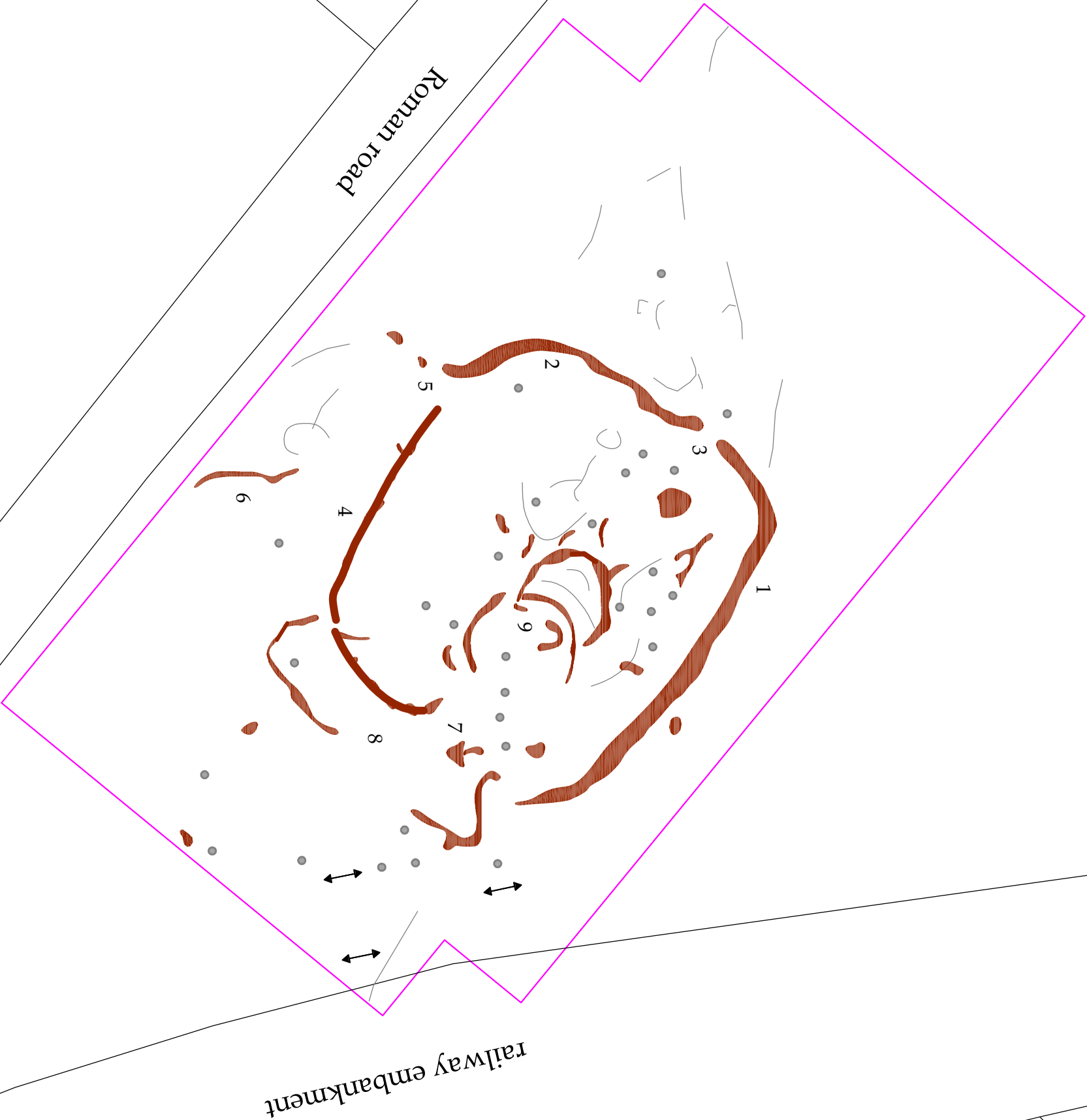


Figure 5: Archaeological interpretation.