

GEOPHYSICAL SURVEY OF LAND AT SPRINGFIELD, ACLE, NORFOLK

on behalf of

NAU ARCHAEOLOGY

NGR TG 4062 1056

OASIS ID: northpen3-44382



Martin Railton BA (Hons), MA AIFA
North Pennines Archaeology Ltd
Nenthead Mines Heritage Centre
Nenthead
Alston
Cumbria CA9 3PD
Tel: (01434) 382045
Fax: (01434) 382294
Mobile: 07979617882
Email: m.railton@nparchaeology.co.uk



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SUMMARY

In June 2008, North Pennines Archaeology Ltd, commissioned by NAU Archaeology, undertook geophysical surveys of c.1.35ha of land to the north of Springfield, Acle, Norfolk (NGR TG 4062 1056). In July 2007, Acle High School discovered a number of Roman artefacts at the site, as well as a barbed and tanged arrowhead, dating to the Bronze Age. The Springfield site would have been on a prominent piece of high ground in the Roman period, and it is believed that this area could have been site of an important Roman trading port.

The objective of the geophysical surveys was to determine the presence/absence, nature and extent of any archaeological anomalies at the site. The results of the geophysical survey were to be used to inform the location of a series of archaeological test pits, which are planned to be excavated by Acle High School.

Potential archaeological features were found to be concentrated on the north side of the survey area, which is consistent with the topography of the site. These comprised a series of possible pits or ditches and a number of broad features, interpreted as soil-filled hollows, or geological features. The exact nature of these features is uncertain, due in part to the small size of the survey area, but it was evident that these features almost certainly continued outside of the survey area to the north, in the area now occupied by houses and gardens.

In addition, a small number of possible soil-filled ditches or land drains have been detected, which may be associated with the former agricultural use of the site. It is recommended that the features detected during the geophysical survey are investigated further through the excavation of a series of test pits or trenches, as part of the planned archaeological investigation of the site.

1 INTRODUCTION (*Figure 1*)

- 1.1 In June 2008, North Pennines Archaeology Ltd, commissioned by NAU Archaeology, undertook a geophysical survey of c.1.35ha of land on the east side of Acle, Norfolk. The survey was undertaken as part of a Heritage Lottery funded project, organised by Acle High School. The objective of the geophysical survey was to determine the presence/absence, nature and extent of any archaeological anomalies at the site. The work was conducted in accordance the relevant English Heritage and IFA guidelines.
- 1.2 The site is situated on high ground to the north of Springfield, on the east side of Acle. The survey area is bounded by the A1064 road to the east, and houses and gardens to the north, west and south. The site is centred on Ordnance Survey grid reference TG 4062 1056 (Figure 1).
- 1.3 In July 2007, Acle High School discovered a number of Roman artefacts at the site, as well as a barbed and tanged arrowhead, dating to the Bronze Age. The Springfield site would have been on a prominent spit of high ground in the Roman period. The surrounding marshland was then part of an estuary, known to the Romans as *Gariensis*. Land to the east of Acle did not exist at that time. Air photographs of the site show possible earthworks, which could potentially be Roman or earlier.
- 1.4 At the time of the survey the site comprised a single field of rough pasture. The northeast corner of the field had recently been annexed, and was being used as a private garden. The site was bounded by garden fences to the north, west and south, and a hedgerow to the east. A wood, known as Roman Wood, was situated to the east of the site. The solid geology of the area comprised Norwich Crag and Red Crag limestones, and Chillesford Clay, overlain by deposits of alluvium. The site occupies a sandbank, with the highest point located on the northern side of the survey area.
- 1.5 The objective of the geophysical survey was to determine the presence/absence, nature and extent of any archaeological anomalies within the proposed development area, and the presence/absence of any known modern anomalies within the study area, which may affect the results. The results of the geophysical survey are to be used to inform the location of a series of archaeological test pits, which are to be excavated by Acle High School.
- 1.6 The geophysical survey was conducted by Martin Railton and Kevin Mounsey between 17th June and 18th June 2008. This report was prepared and illustrated by Martin Railton, NPA Project Manager.

2 METHODOLOGY

2.1 *Standards*

2.1.1 The geophysical survey and reporting were conducted in accordance with English Heritage guidelines (English Heritage 1995), and the recommendations of the Institute of Field Archaeologists (IFA 2002).

2.2 *Technique Selection*

2.2.1 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.

2.2.2 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 study area was located in a single field of pasture. A 20m grid was established, and tied-in to known Ordnance Survey points using a Trimble 3605DR Geodimeter total station with datalogger.

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 1,600 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 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 for each area.

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

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

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

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.

2.5.2 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 land. These anomalies are indicated on the geophysical interpretation drawings, but not referred to again in the subsequent interpretations.

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 plan. A colour-coded geophysical interpretation diagram is provided, showing the locations and extent of positive, negative, dipolar, and diffuse magnetic anomalies.

2.6.2 An archaeological interpretation diagram is also 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 Trace plots of the unprocessed geophysical data are available if required.

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). The archive is currently held at the company offices at Nenthead, Cumbria.

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. The project is also registered with the Online Access to the Index of archaeological investigationS (OASIS). The OASIS reference for this project is **northpen3-44382**.

3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 Historical Background

- 3.1.1 The following provides a summary of the historical and archaeological background of the site. It is compiled from secondary sources, and intended only as a brief introduction to the survey area.
- 3.1.2 No known prehistoric sites are recorded in the immediate vicinity of the study area. However, the wider landscape was probably exploited during this period. The find of a flint tools by Acle High School in 2007, indicates that the area has been exploited from at least the Bronze Age period (see Section 3.2, below).
- 3.1.3 It is believed that the high ground at Acle was the site of an important Roman trading port. Roman activity in the area is represented by finds of Roman artefacts, including Roman occupation material, discovered in Roman Wood, during construction of the A47 bypass. The site is located at the highest point in Acle, and air photographs indicate the possible presence of earthworks, which could potentially be Roman or earlier.
- 3.1.4 Documentary evidence indicates that Acle was a fishing port in the Anglo-Saxon period. However, very little known archaeological evidence survives from this period.
- 3.1.5 Acle is mentioned in the Domesday Book, and in 1086 there were 23 villagers, 38 small holders and three slaves in the village. There has been a market in Acle since the 13th century, when it was an important trade centre for the surrounding area.
- 3.1.6 The 1886 Ordnance Survey map of Acle shows that the study area was situated within a single large field, on the east side of the town. The study area appears to have survived as agricultural land into the modern period, despite the encroachment of modern housing to the south, west and north.

3.2 Previous Archaeological Works

- 3.2.1 No known previous archaeological investigations have taken place within the study area prior to the discovery of Roman and Bronze Age artefacts by Acle High School in 2007. A total of ten test pits were excavated on the north side of the site (*pers. com.* Acle High School), one of which revealed a possible ditch.
- 3.2.2 The site produced a total of 204 fragments of Roman, Saxon, medieval and post-medieval pottery. The majority of the pottery was Roman and dated from the 1st to 4th centuries AD. A single sherd of Ipswich ware dating from the mid-7th to mid-9th century was also recovered. The medieval pottery was local unglazed wares, and dated from the 11th to 14th centuries. The remainder was post-medieval in date.
- 3.2.3 In addition to the ceramic material, a number of metal objects were recovered, including a medieval strap fastening. The remainder of the metal objects were dated from the post-medieval or modern periods.
- 3.2.4 Five prehistoric worked flints were recovered, including an early Bronze Age barbed and tanged arrow head.

4 SURVEY RESULTS (*Figures 2-4*)

4.1 *Introduction*

- 4.1.1 At the time of the survey the site comprised a field of rough pasture, situated on the periphery of the Springfield housing estate. A small area of ground on the south side of the study area had been excavated and left open, resulting in a spoil heap and two hollows, which could not be surveyed.
- 4.1.2 Small discrete dipolar magnetic anomalies were detected across the whole of the study area. These were almost certainly caused by fired/ferrous litter in the topsoil, which is typical for modern agricultural/suburban land. These anomalies are indicated on the geophysical interpretation drawing, but not referred to again in the subsequent interpretation.
- 4.1.3 A number of modern features were present, which produced very strong dipolar magnetic anomalies around the periphery of the survey area. These included a number of ferrous objects, concrete fence posts, brick/tile deposits, and an area of concrete hard standing at the entrance to the field. These anomalies are also indicated on the geophysical interpretation drawing, but excluded from the archaeological interpretation diagram.

4.2 *Geophysical survey*

- 4.2.1 A number of discrete positive and negative geomagnetic anomalies were detected on the high ground at the north side of the survey area. These included a chain of strong positive and negative geomagnetic anomalies, aligned approximately northeast to southwest, which are potentially archaeological in nature. It is possible that these anomalies indicate the presence of pits or ditches containing fired/burnt material.
- 4.2.2 A number of weak irregular positive and negative geomagnetic anomalies were also detected on the northwest side of the survey area. The nature of these anomalies is uncertain, but these may be interpreted as soil-filled hollows, or geological features.
- 4.2.3 A number of weak linear positive geomagnetic anomalies and a curvilinear positive geomagnetic anomaly were detected crossing the survey area, aligned approximately northwest to southeast and northeast to southwest. These anomalies may be interpreted as soil-filled ditches or possibly land drains, and may be associated with the former agricultural use of the site. It was noted that the most northern linear feature appears to dissect the chain of positive and negative geomagnetic anomalies, and is likely to be chronologically later.

4.3 *Discussion*

- 4.3.1 The results of the geophysical survey are difficult to interpret, given the small size of the survey area. However, the survey has indicated that potential archaeological features are concentrated on the higher ground on the north side of the survey area. The features detected by the survey, almost certainly continued outside of the survey area to the north, in the area now occupied by houses and gardens. It is possible that these features relate to the occupation of the high ground at Acle in the Roman or later periods, given the nature of the material recovered from the test pits previously excavated in this area.

5 CONCLUSIONS

- 5.1 Geomagnetic survey, covering *c.* 1.35ha of land, has been conducted on the north side of Springfield, Acle. The survey has been undertaken to investigate the possible presence of archaeological features on a prominent piece of high ground, which is believed to have been occupied in the Roman period.
- 5.2 Potential archaeological features were found to be concentrated on the north side of the survey area, which is consistent with the topography of the site. These comprised a series of possible pits or ditches and a number of broad features, interpreted as soil-filled hollows, or geological features. The exact nature of these features is uncertain, due to the small size of the survey area.
- 5.3 In addition, a small number of soil-filled ditches or possible land drains have been detected, which may be associated with the former agricultural use of the site. It is recommended that these features are investigated further through the excavation of a series of test pits, as part of the planned archaeological investigation of the site.

6 ACKNOWLEDGEMENTS

North Pennines Archaeology is grateful to David Whitmore of NAU Archaeology for commissioning the geophysical survey, and to Janice Austin and Paul Jones of Acle High School, for their assistance with the project. The digital mapping used during the survey was provided courtesy of NAU Archaeology.

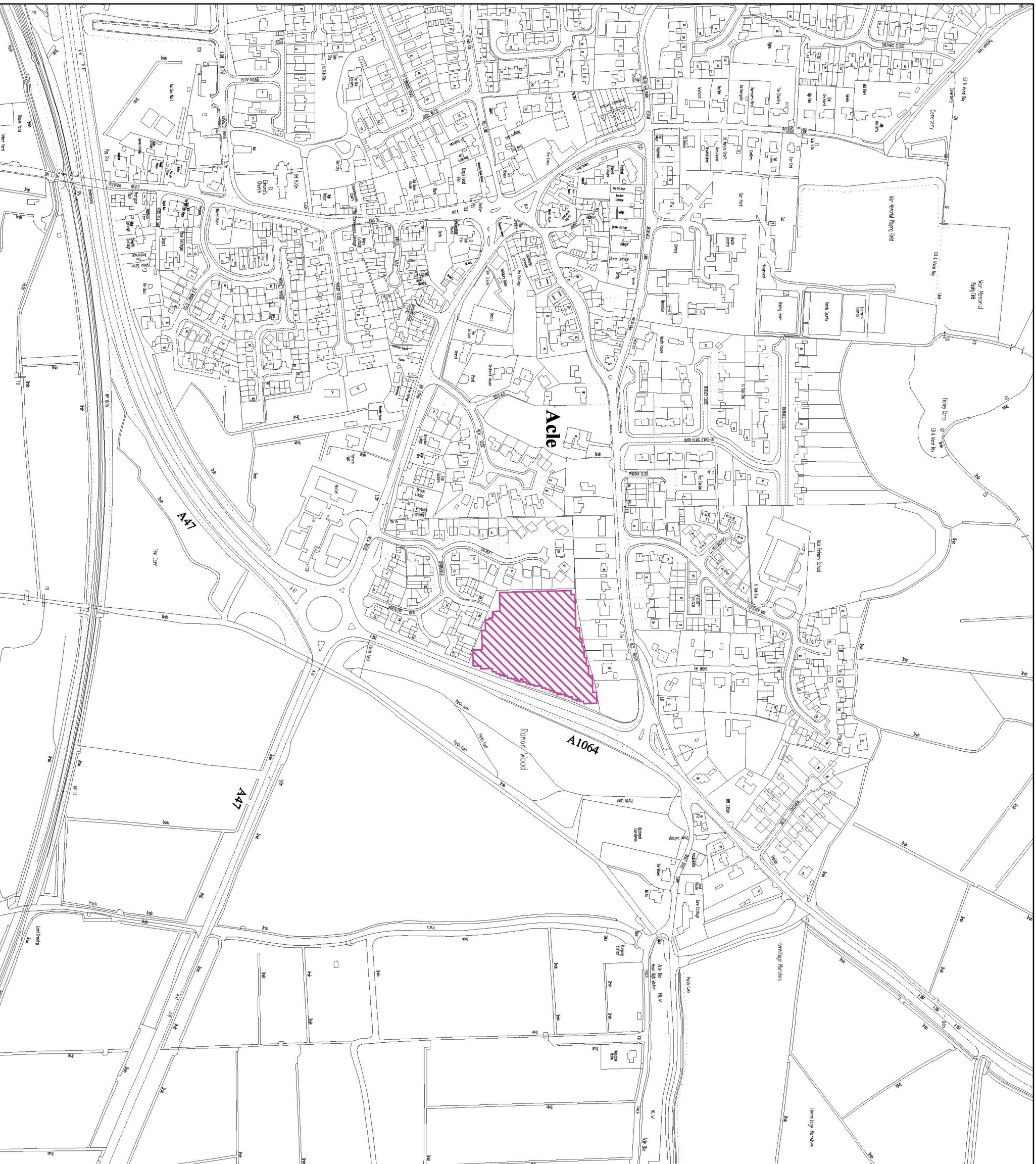
7 BIBLIOGRAPHY

Archaeology Data Service, 2001 *Geophysical Data in Archaeology: A Guide to Good Practice*, Arts and Humanities Data Service

English Heritage, 1995 *Geophysical survey in field evaluation*, Research and Professional Services Guideline No.1, London

Institute of Field Archaeologists, 2002 *The use of geophysical techniques in archaeological evaluations*, Paper No.6, IFA, Birmingham

APPENDIX I – ILLUSTRATIONS



NPA Geophysical Survey
2008
Land at Springfield, Acle,
Norfolk

COMMISSIONED BY:
NAU Archaeology

Scale
1:2500 at A3

DRAWN BY:
MDR
DATE:
June 2008

 **geophysical survey area**



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Report No:
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Figure No:
1

Figure 1 : Location of the geophysical survey area

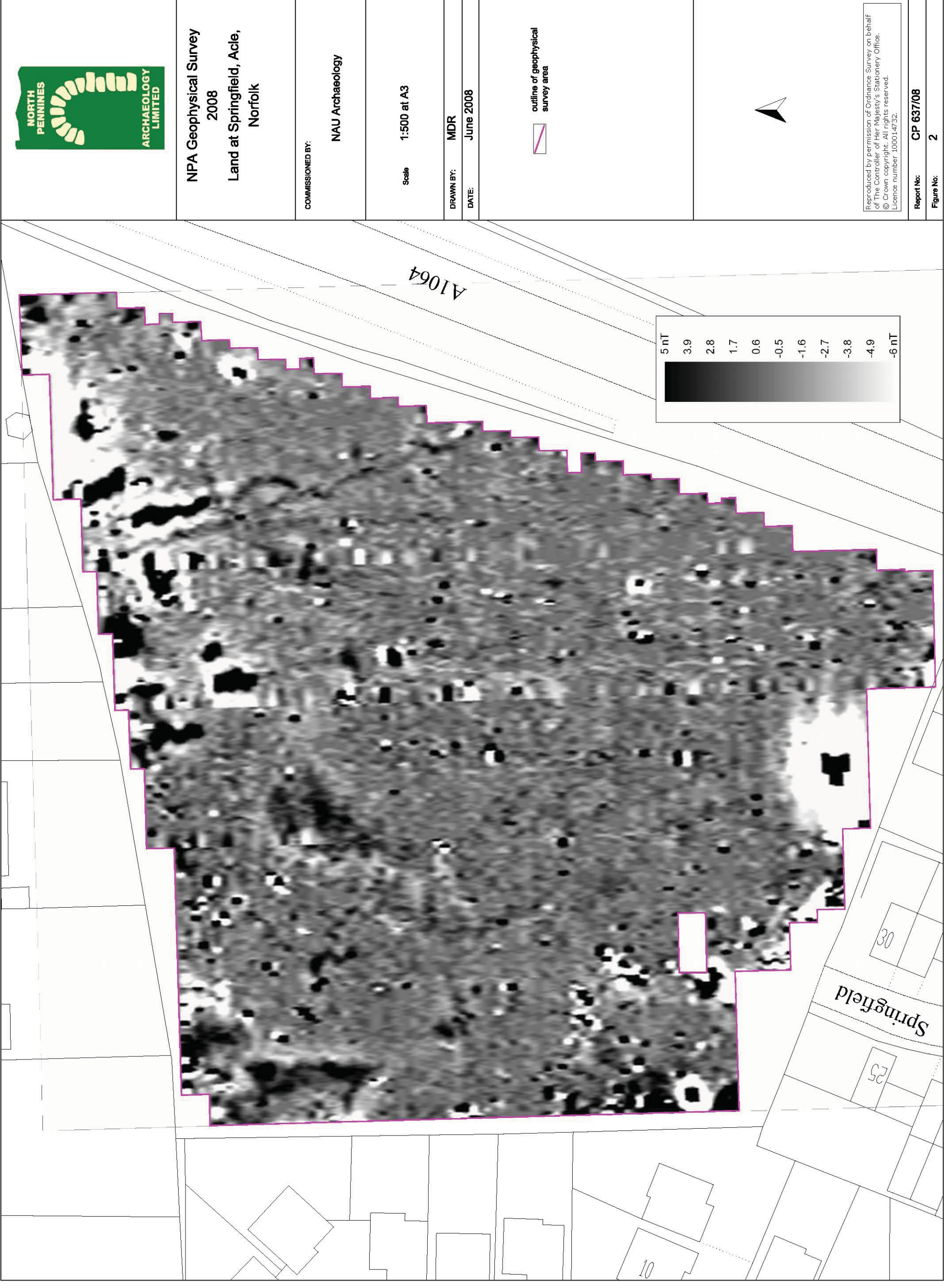
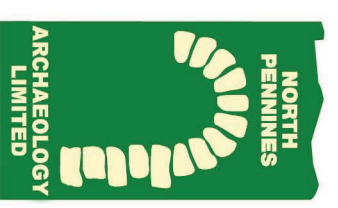
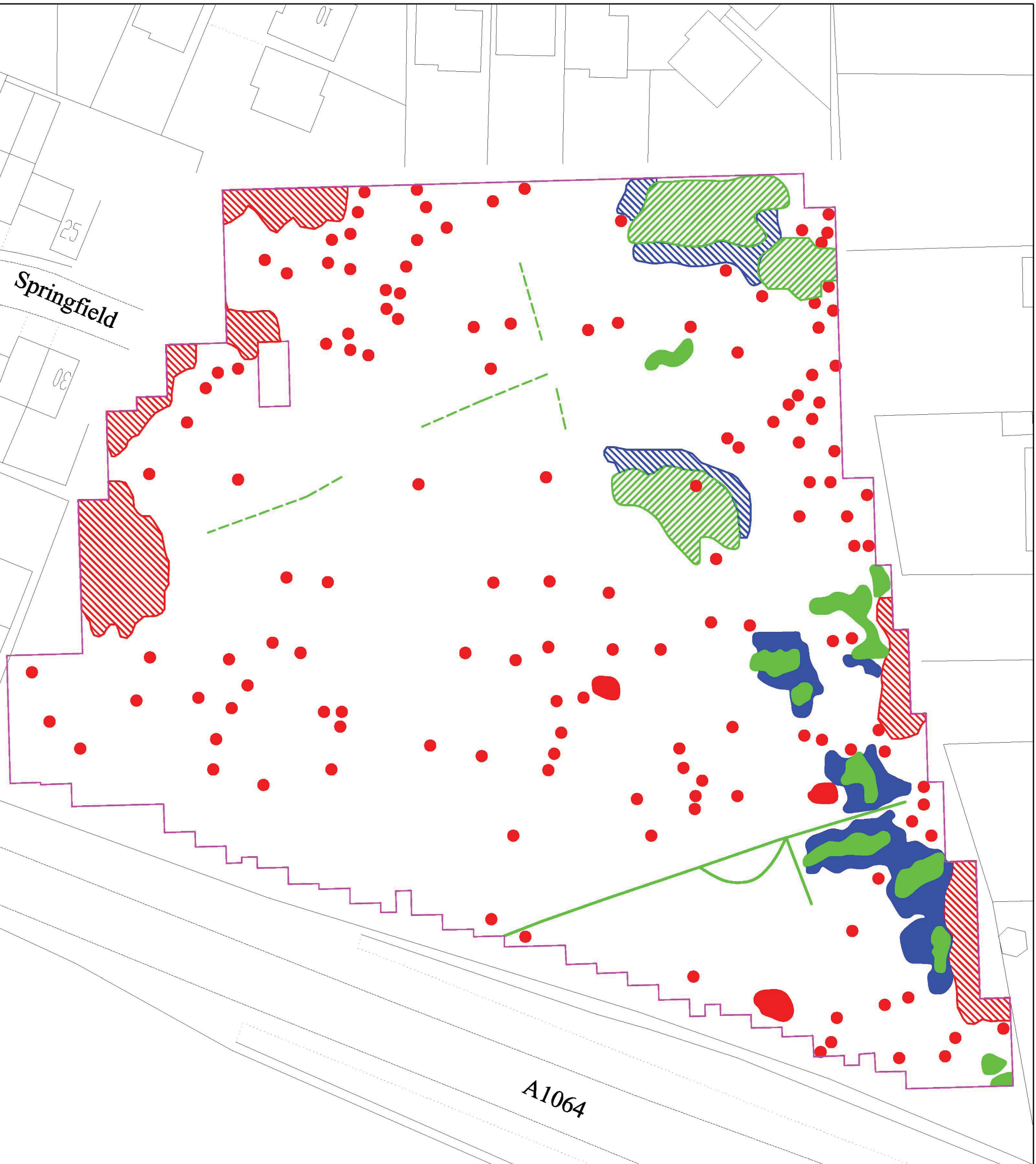


Figure 2 : Geophysical survey







NPA Geophysical Survey
2008
Land at Springfield, Acle,
Norfolk

COMMISSIONED BY:
NAU Archaeology

Scale 1:500 at A3

DRAWN BY: MDR
DATE: June 2008

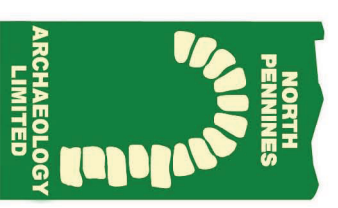
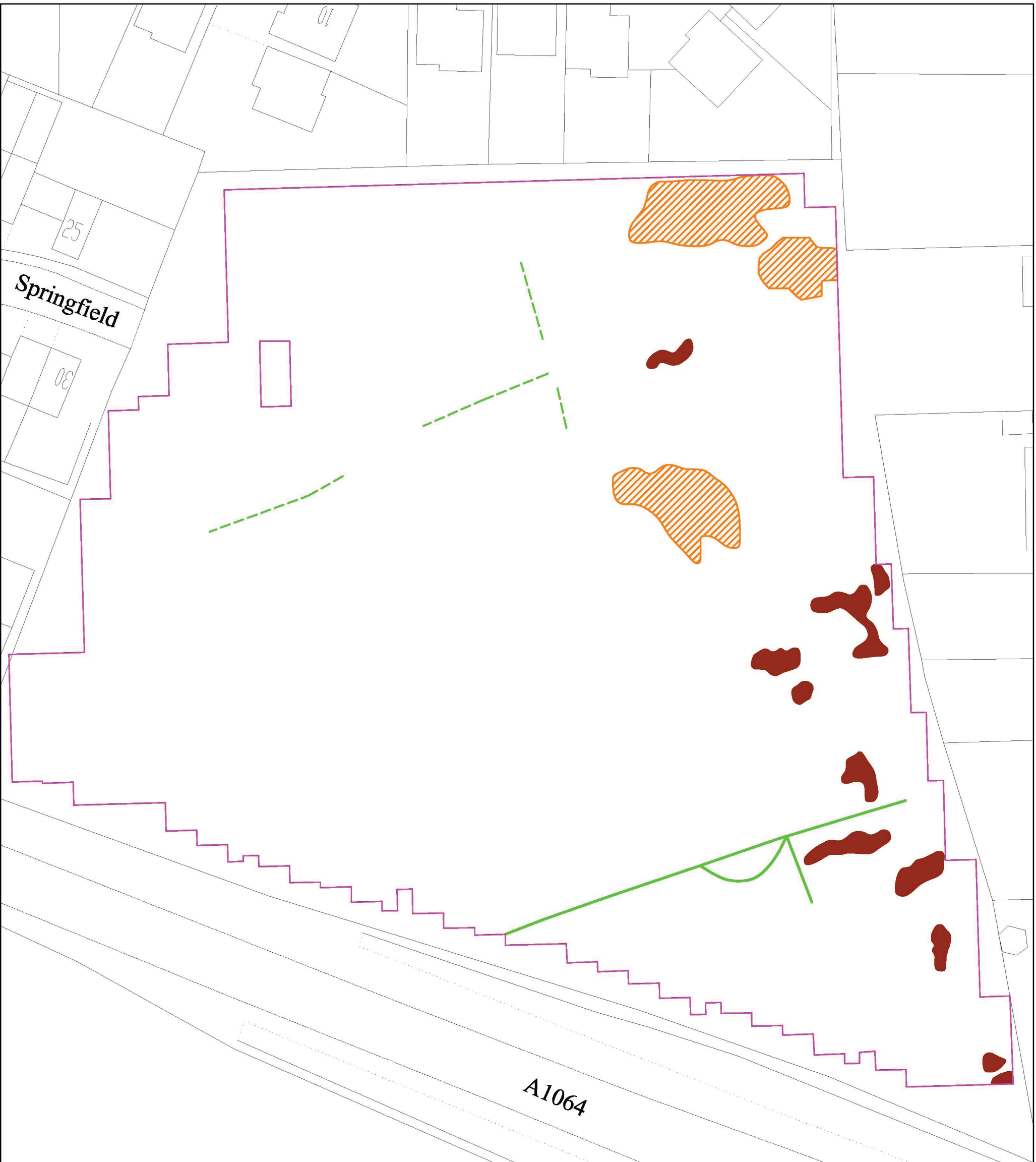
-  outline of geophysical survey area
-  positive magnetic anomaly
-  negative magnetic anomaly
-  dipolar magnetic anomaly



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Report No: CP 637/08
Figure No: 3

Figure 3 : Geophysical interpretation







**NPA Geophysical Survey
2008
Land at Springfield, Acle,
Norfolk**

COMMISSIONED BY:
NAU Archaeology

Scale
1:500 at A3

DRAWN BY: **MDR**
DATE: **June 2008**

-  outline of geophysical survey area
-  potential archaeology
-  ? archaeology
-  possible ditch/land drain



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Report No: **CP 637/08**
Figure No: **4**

Figure 4 : Archaeological interpretation