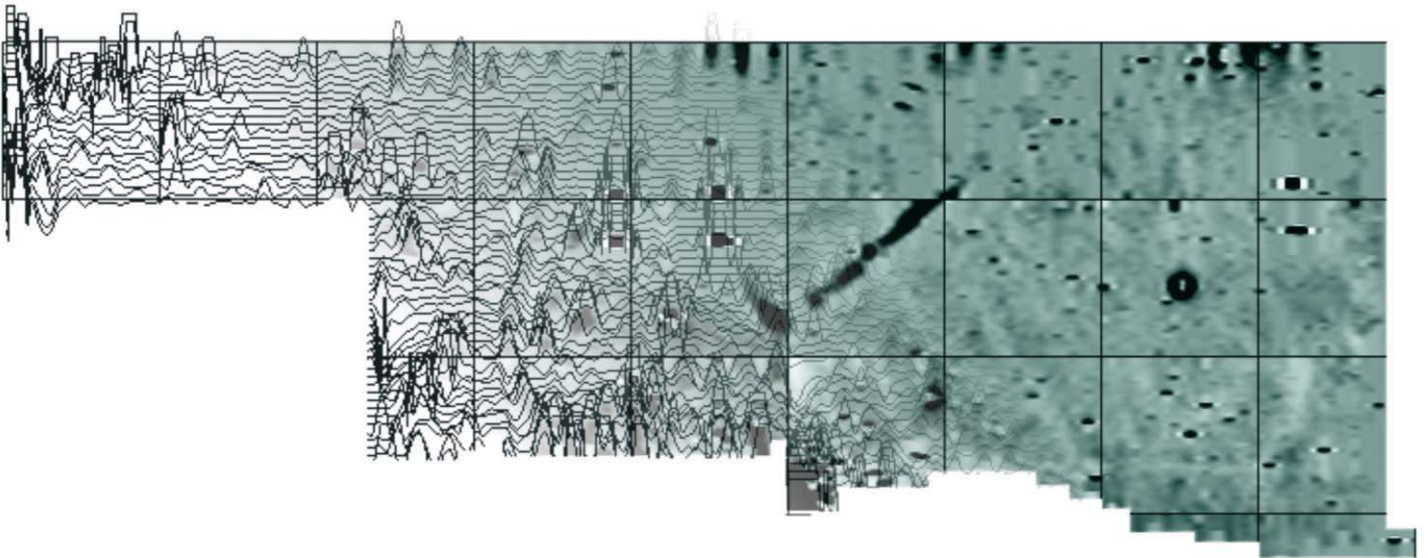




Shepherd's Spring & Roman Way Schools Andover, Hampshire

Archaeological Evaluation
of Geophysical Data





**SHEPHERD'S SPRING & ROMAN WAY SCHOOLS
ANDOVER**

Archaeological Interpretation of Geophysical Data

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SUMMARY

Wessex Archaeology was commissioned by Hampshire County Council to conduct detailed geophysical surveys over land at two school sites located near the A343 in the north of Andover. The survey area at Roman Way Primary School (Site 1), is centred on NGR 436610, 147794 whilst Shepherd's School (Site 2) is at NGR 436658, 147157. Hampshire County Council intends to redevelop elements of the sites, including the development of two areas of open space for housing.

A desk-based assessment undertaken in September 2007 (Wessex Archaeology 2007), identified a total of 50 archaeological sites, features and findspots within a 500m radius of the schools. These ranged in date from the Palaeolithic to the modern period. The two sites lie within an area of archaeological potential, close to the intersection of two major Roman roads; the Portway and the Ickniel Way. Previous archaeological investigations in the area have identified substantial remains of Iron Age and Romano-British date, in addition to remains of the Neolithic, Bronze Age, medieval and post-medieval periods resulting in the area being designated an Area of Archaeological Importance in the Local Plan.

The two areas were surveyed with a dual sensor Bartington 601 gradiometer system and the results identified the presence of archaeological features at both Sites. These generally comprised broad linear features, detected as positive anomalies. Anomalies of high ferrous or burnt content were also present at both locations, although only at Site 1 did they form any recognisable alignments, indicative of a particular use in the past, rather than being isolated features. Areas of increased magnetic response were located at across Site 2, although no archaeological association can be proposed at this stage. Given the limited extent of the survey areas, no particular origin or chronological period could be proposed for the anomalies and arrangement of features identified at either Site, although, based upon evidence presented in the desk-based assessment, an Iron Age or Romano-British date may be the most likely.

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These geophysical surveys were commissioned by Hampshire County Council, and Wessex Archaeology would like to thank Gary Carroll and Martin Shefferd for their assistance in this regard.

The project was managed on behalf of Wessex Archaeology by Rob Armour Chelu, with fieldwork was directed by geophysics manager Paul Baggaley. The fieldwork was conducted by Eamonn Baldwin and Benjamin Urmston. Cristina Serra processed and interpreted the geophysical data and compiled this report. All illustrations were prepared by Karen Nichols.

SHEPHERD'S SPRING & ROMAN WAY SCHOOLS ANDOVER

Archaeological Interpretation of Geophysical Data

1 INTRODUCTION

1.1 Project Background

1.1.1 Wessex Archaeology was commissioned by Hampshire County Council to undertake detailed geophysical investigations on land located at two school sites close to the A343 in the north of Andover. These geophysical surveys were undertaken subsequent to completion of an archaeological desk-based assessment undertaken in September 2007 (Wessex Archaeology 2007). The DBA, which assessed a total of three school sites in the area, identified areas at two locations where geophysical survey would be appropriate in order to further inform the planning process with regard to archaeological issues. Hampshire County Council intends to redevelop elements of the Sites, including the development of two areas of open space for housing.

1.1.2 This report presents a brief description of the methodology followed, the detail survey results and the archaeological interpretation of the geophysical data, and follows Written Schemes of Investigation, approved in advance by Hampshire County Council, for each of the two Sites.

1.2 Site location, geology and topography

1.2.1 Roman Way Primary School (Site 1) is located at National Grid Reference (NGR) 436582 147734 (**Figure 1**). It is bounded to the west, south and east by Newbury Road, Roman Way and Witan Close respectively, and to the north by housing. The Site is generally flat and lies at approximately 85m above Ordnance Datum (aOD). The underlying geology of the Site is Cretaceous Upper Chalk (Geological Survey of Great Britain 1974 sheet 283).

1.2.2 Shepherds Spring Infant and Junior Schools (Site 2) is located at NGR 436653 147133 (**Figure 1**). The boundary of the Site is defined by housing to the north and east and Newbury Road and Smannell Road to the west and south respectively. The Site is generally flat and lies at approximately 75m aOD. The solid geology is Cretaceous Upper Chalk (Geological Survey of Great Britain 1974 sheet 283).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1.1 The archaeological and historical background to the Site is covered in detail in the desk-based assessment (Wessex Archaeology 2007), and is thus presented below in summary form only.

2.1.2 The desk-based assessment identified a total of 50 archaeological sites, features and findspots within a 500m radius of the three schools, ranging in date from the Palaeolithic to the modern period. The schools lie in an Area of High Archaeological Importance, as defined in the Local Plan, within an area close to the junction of two major Roman roads.

3 GEOPHYSICAL SURVEY AREAS AND METHODOLOGY

3.1 Survey Areas

- 3.1.1 The project targeted two Sites for detailed survey using a Bartington 601-2 dual sensor gradiometer system. The survey areas were at Roman Way Primary School (Site 1) and Shepherd's Spring Infant and Junior School (Site 2). The geophysical investigation of the two areas covered a total of 87% of the total area proposed in the approved Written Schemes of Investigation. The remaining 13% was covered by modern ground surfaces and trees and therefore could not be surveyed.
- 3.1.2 Site 1 comprises a 110m x 60m flat area of grass, including clumps of shrubs and young trees, located in the northern part of the school grounds. It is bounded to the west, south and east by Newbury Road, Roman Way and Witan Close respectively and to the north by housing (**Figure 1**).
- 3.1.3 Site 2 comprises a 75m x 190m flat area of grass with some limited tree cover. Three areas in the south and south-west lay under tarmac. The boundary of the Site is defined by housing to the north and east and Newbury Road and Smannell Road to the west and south respectively (**Figure 1**).

3.2 Methodology

- 3.2.1 The methodology consisted of detailed gradiometer survey using a Bartington 601-2 dual magnetic gradiometer system in accordance with English Heritage Guidelines for Geophysical Surveys (1995).
- 3.2.2 The detailed survey was conducted by Wessex Archaeology staff on 4th December 2007. Survey grids were established at 20m x 20m using a Leica 1200 RTK GPS system, which was able to provide accurate locations in real-time to within 2cm.
- 3.2.3 Further details of the geophysical and other survey equipment, methods and processing used during this survey are described in **Appendix I**.

4 RESULTS

4.1 Introduction

- 4.1.1 The detailed gradiometer surveys were successful in identifying anomalies of anthropogenic origin at both sites, with the results presented as greyscale plot and XY trace plots in **Figures 2** and **3**.
- 4.1.2 The interpretation of the datasets highlights the presence of archaeological features, trends, ferrous/burnt or fired objects, and areas of general increased magnetic response. Full definitions of these terms are provided in **Appendix II**.

4.2 Detailed Survey

Site 1

- 4.2.1 The results and interpretation of the detailed survey for Area 1 revealed an arrangement of three features of probable archaeological origin (**Figure 2**). Two of these features are orientated south-west to north-east in the south-eastern part of the Survey Area. To their immediate west the data identified

a third feature, orientated approximately east-west. All three features are extended by weak linear trends and alignments of possible archaeological anomalies (4000).

Site 2

- 4.2.2 The results and interpretation of the detailed survey for Site 2 revealed a number of features of archaeological origin located in the central eastern part of the Site (**Figure 3**), with further features of possible or probable archaeological origin distributed throughout the area.
- 4.2.3 Anomalies considered to be of archaeological origin in the area comprised three linear features, orientated south-west to north-east, with a fourth feature lying perpendicular to these (4001). To the south-east of 4001 is an area of trends (4002) and possible archaeological anomalies lying perpendicular to 4001.
- 4.2.4 Weaker anomalies orientated north-south form a feature of probable archaeology which is extended further north by a weak linear trend (4003).
- 4.2.5 In the south of the Site are a number of areas of increased magnetic response, likely to be the result of modern disturbance (4004). Along the northern and western extents of the survey area, the data identified additional areas of increased magnetic response likely to be of modern origin, although the survey area did not cover them fully (4005).
- 4.2.6 Additional possible archaeological anomalies have also been identified (4006).
- 4.2.7 The arrangement of features of archaeological and probable archaeological origin (4001 and 4003) together with a concentration of trends (4002) form an area considered to be of high archaeological potential.

5 CONCLUSIONS

- 5.1.1 The geophysical investigation covered 87% of the proposed survey areas. The remaining 13% was covered by tarmac or vegetation and so could not be surveyed.
- 5.1.2 The results of the detailed geophysical surveys over the two sites under consideration revealed broad linear features detected as positive anomalies, probably ditches (4000, 4001 and 4003), with associated linear trends (4002).
- 5.1.3 Although the surveys are unable to provide any specific chronologies or chronological period for the features identified, it is suggested that, given data contained in the desk-based assessment, they are most likely to be of Iron Age and/or Romano-British date.

6 REFERENCES

English Heritage, 1995, Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No 1.

Wessex Archaeology 2007, Andover Schools, Andover, Hampshire. Archaeological Desk-based Assessment, unpublished client report WA ref 66821.01

Geological survey of Great Britain 1974, Sheet 283.

7 APPENDIX I: SURVEY EQUIPMENT AND DATA PROCESSING

Survey Methods and Equipment

The magnetic data for this project was acquired using a Bartington 601-2 Dual Magnetic Gradiometer System. This instrument has two sensor assemblies fixed horizontally 1m apart, allowing two traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers with a 1m vertical separation, and measures the vertical magnetic gradient as the difference between the total magnetic field at each fluxgate magnetometer. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The magnetometers have a resolution of 0.1nT and measurements are logged at intervals of 0.25m along traverses spaced 1m apart. All of the data were stored on an integrated data logger for subsequent post-processing and analysis.

WA undertakes two types of magnetic surveys: scanning and detailed.

Scanning surveys consist of recording transects of data at 10m line spacing filling the survey areas in full. The transects are subdivided at 20m. This survey mode provides large coverage in lesser time than detail. The recording of scanning surveys allows the geophysicist to analyse the data prior to detail survey and provides the client with tangible results. The detailed surveys consist of 20m x 20m grids. Data are collected at 0.25m intervals along scanning transects and the detail traverses, which are 1m apart. This gives at least 80 measurements per transect and 1600 measurements per grid and is the recommended methodology for archaeological surveys of this type (English Heritage, 1995).

The scanning transects and the detail survey grids are established using a Leica 1200 RTK GPS system and then extended using tapes. The Leica 1200 RTK GPS system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems allowing positions to be determined to an accuracy of 1-2cm in real-time and therefore exceed the level of accuracy recommended by English Heritage (1995) for geophysical surveys.

Post-Processing

The magnetic data collected during the reconnaissance stage are downloaded from the Bartington system using Grad601 software. The data are analysed in raw format using Magpick, which allows for the data to be visualised at different magnetic amplitudes. The data were analysed at $\pm 2\text{nT}$, $\pm 5\text{nT}$ and $\pm 10\text{nT}$.

The magnetic data collected during the detail survey were downloaded from the Bartington system for processing and analysis using Archaeosurveyor software. This software allows for both the data and the images to be processed in order to enhance the results for analysis, however it should be noted that minimal data processing is conducted so as not to distort the anomalies.

Typical data and image processing steps may include:

Destripe – Applying a zero mean traverse in order to remove differences caused by directional effects inherent in the magnetometer;

Destagger – Shifting each traverse forward or backward by a number of readings. This corrects for operator errors and is used to enhance linear features;

Clipping – Limiting the displayed range of the processed data to either $\pm 3nT$ or $\pm 3s.d.$ in order to enhance the appearance of smaller anomalies.

Despike – Filtering any datapoints that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings caused by modern, small ferrous objects at the surface

Typical displays of the data used during processing and analysis:

XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This image can include a hidden line algorithm to remove certain lines and enhance the image. This type of image is useful as it shows the full range and shape of individual anomalies.

Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.

8 APPENDIX II: GEOPHYSICAL INTERPRETATION

The interpretation methodology used by WA separates the anomalies into two main categories: archaeological and unidentified responses.

The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

Ditch / Pit – used when there is a clear geophysical response, possibly with corroborating evidence of the features presence.

Archaeology – used when there is a clear geophysical response and anthropogenic pattern.

Probable archaeology – used for features which give a clear response but which form incomplete patterns.

The unidentified category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

Possible archaeology – used for features which give a response but which form no discernable pattern or trend.

Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.

Trend – used for low amplitude or indistinct linear anomalies.

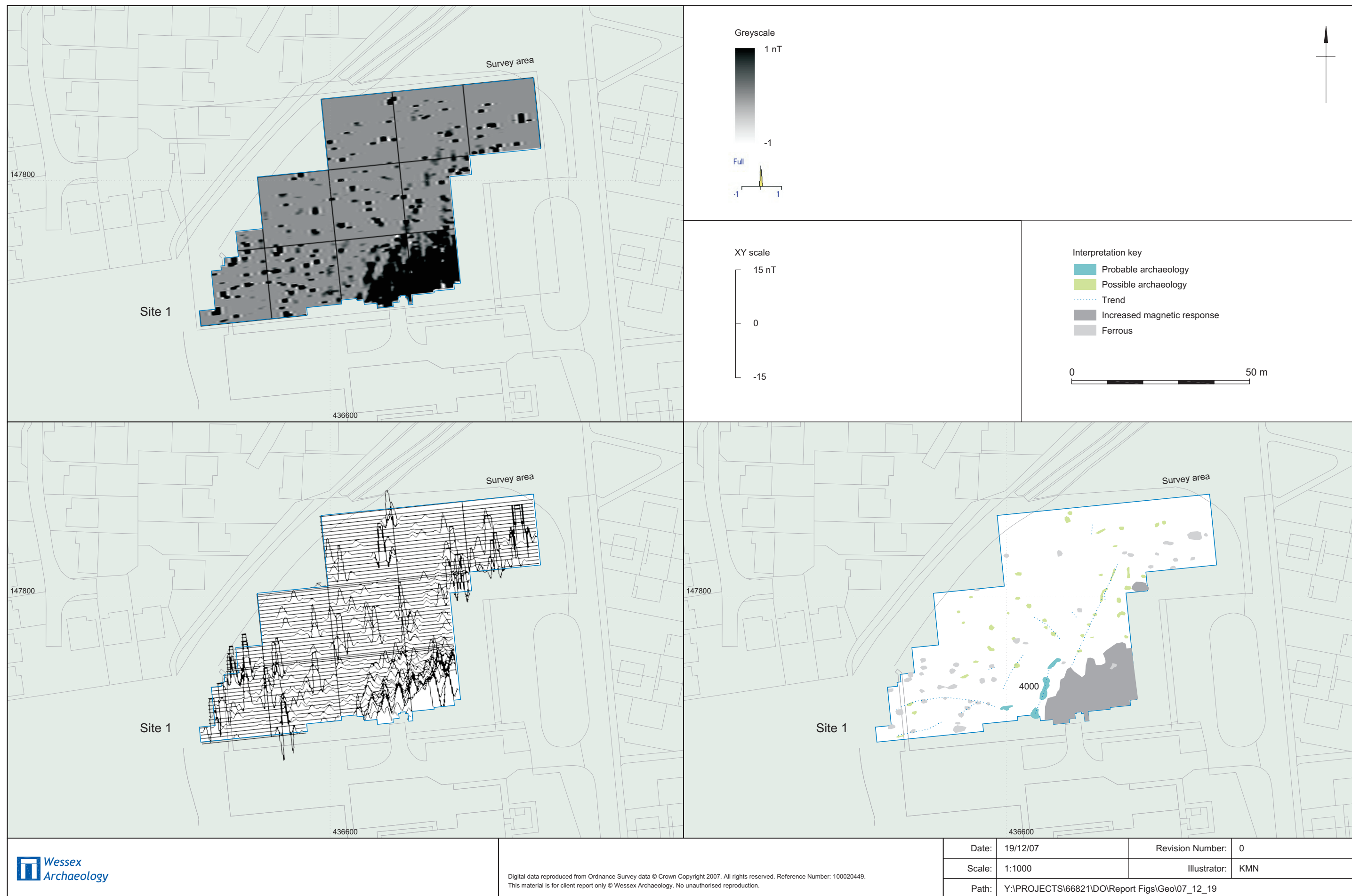
Ferrous – used for responses from small amounts of ferrous material. These anomalies are likely to be of modern origin.

Finally, services such as water pipes are marked where they have been identified.



Site location and survey coverage

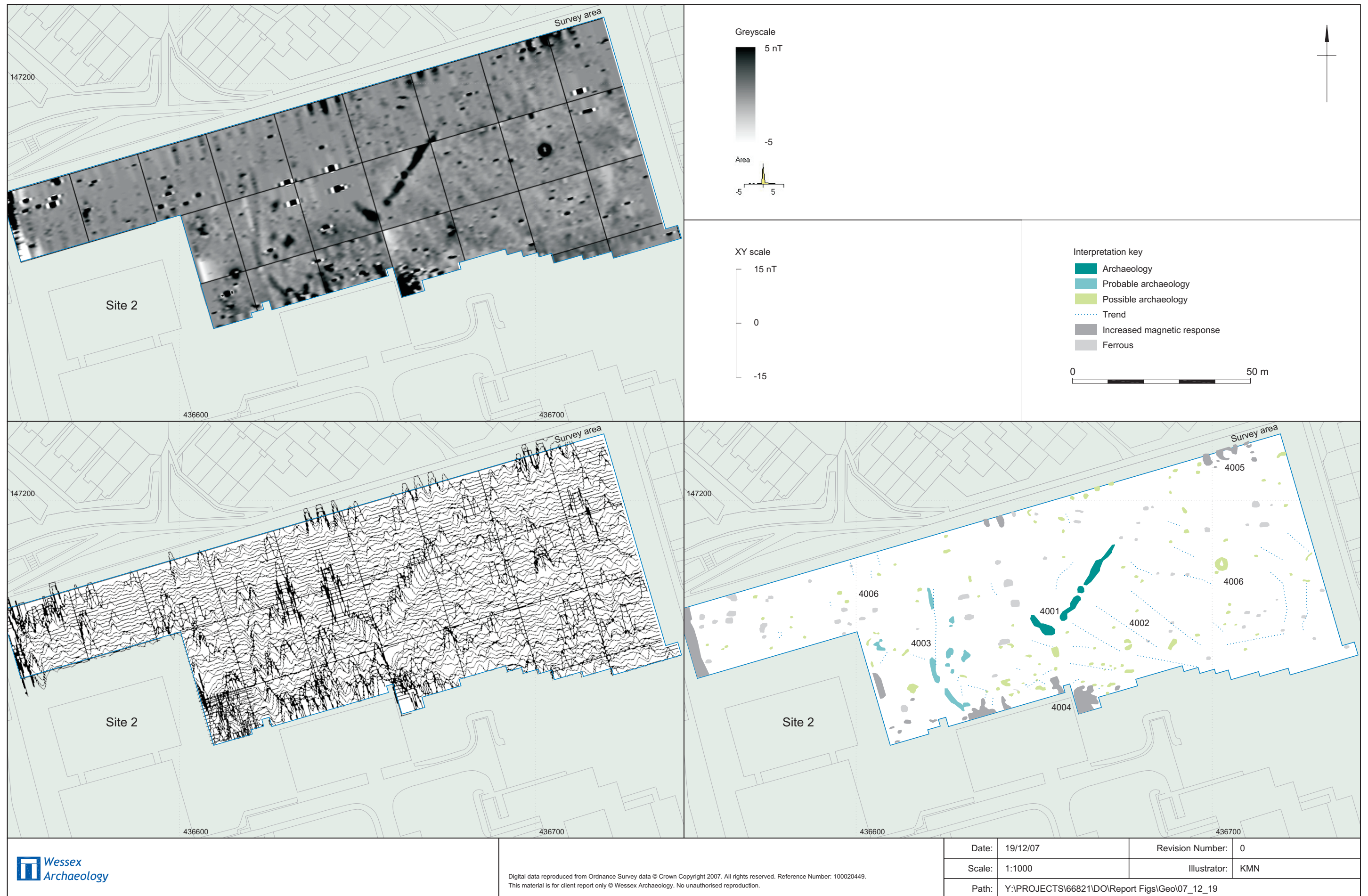
Figure 1



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Site 1: Greyscale plot, XY trace and archaeological interpretation

Figure 2



Site 2: Greyscale plot, XY trace and archaeological interpretation

Figure 3



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