

T H A M E S V A L L E Y

ARCHAEOLOGICAL

S E R V I C E S

**Land at Grove Road, Wantage,
Oxfordshire**

Geophysical Survey (magnetic)

by Kyle Beaverstock

Site Code: GRW23/73

(SU 4015 8904)

Land at Grove Road, Wantage, Oxfordshire

Geophysical Survey (Magnetic) Report

For ADAS

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code GRW 23/73

April 2023

Summary

Site name: Land at Grove Road, Wantage, Oxfordshire

Grid reference: SU 4015 8904

Site activity: Magnetometer survey

Date and duration of project: 22 March 2023

Project coordinator: David Sanchez

Site supervisor: Kyle Beaverstock

Site code: GRW23/73

Area of site: c. 1ha

Summary of results: No anomalies of archaeological interest were detected by the geophysical survey

Location of archive: The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

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Report edited/checked by: Steve Ford✓ 14.04.23 David Sanchez✓ 14.04.23

Land at Grove Road, Wantage, Oxfordshire A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 23/73

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Grove Road, Wantage, Oxfordshire (SU 4015 8904) (Fig. 1). The work was commissioned by James McNicoll-Norbury of ADAS Ltd. d 11D Park House, Milton Park, Abingdon, OX14 4RS on behalf of Lidl, 77 Faringdon Road, London, EC1M 3JU.

Planning permission (P22/V0286/FUL) is to be sought from Oxfordshire County Council for the construction of a retail unit with associated facilities. This is subject to an archaeological condition and as such a geophysical survey has been requested to inform an evaluation. This is in accordance with the *National Planning Policy Framework* (NPPF 2021), and the County's policies on archaeology. The field investigation was carried out to a specification approved by Steven Weaver, Planning Archaeologist for Oxfordshire County Council. The fieldwork was undertaken by Kyle Beaverstock on 22nd March 2023 and the site code is GRW23/73.

The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

Location, topography and geology

The site is located to the north of Wantage (Fig. 1), bounded by Grove Road to the west and north, Industrial units to the east with a new road under construction to the south. The site slopes from 95m above Ordnance Datum (aOD) in the east and 85m aOD in the west. The land is currently under pasture and the underlying geology is stated as Lower Greensand (BGS 1971).

Site history and archaeological background

A detailed analysis of the archaeological background can be found in the desk-based assessment (ADAS 2018), to summarise, a number of Roman sites have been recorded in the vicinity including two Late Iron Age to Romano-British farmsteads to the east and south-east of the site and Grove Road forms part of the Roman road running from Alchester to Oxford.

Methodology

Sample interval

Data collection involved the traversing of the survey area along straight and parallel lines using two cart-mounted Bartington Grad601-2 fluxgate gradiometers. Even coverage was achieved with the use of regularly spaced markers at the ends of traverses and the real-time positional trace plot. Readings were taken at 0.13m intervals along traverses 1m apart, providing an appropriate methodology balancing cost and time with resolution. Traverses were walked at an alternating zig-zag pattern along a north-west to south-east orientation across the survey area. No significant obstructions were encountered by the geophysical survey. Conditions were dry and bright.

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferromagnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to 10^{-9} Tesla, the SI unit of magnetic flux density.

Equipment

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both European Archaeological Council (EAC 2015) and the Chartered Institute *for* Archaeologists (2002, 2014).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for the fast yet detailed surveying of an area.

The detailed magnetometry survey was carried out using two dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometers mounted upon a Bartington non-magnetic cart. A two-wheeled lightweight structure pushed by hand, the cart consisted a bank of four vertically-mounted Bartington Grad601-2 magnetic sensor tubes at 1m apart and a Trimble R2 Receiver, centimetre edition GPS. Readings were collected by two Bartington Grad601-2 loggers and collated using MLgrad601 software on a Linx 12x64 tablet running Windows 10 mounted at the rear of the cart. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are

calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high response as will buried ferrous objects. More subtle anomalies such as pits and ditches can be seen from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

The Trimble R2 Receiver, centimetre edition GPS system with centimetre real-time accuracy was used to tie the cart traverses into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data.

Data gathered in the field was processed using the TerraSurveyor software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

Process	Effect
Clip from -4.40 to 4.42 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
De-stripe: median, all sensors	Removes the striping effect caused by differences in sensor calibration, enhancing the visibility of potential archaeological anomalies.
De-spike: threshold 1, window size 3×3	Compresses outlying magnetic points caused by interference of metal objects within the survey area.
De-stagger: all grids, both by -1 intervals	Cancels out effects of site's topography on irregularities in the traverse speed.

The raw data plot is presented as a greyscale plot shown in relation to the site (Fig. 2) with the processed data then presented as a second figure (Fig. 3), followed by a third plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 4). Anomalies are shown as colour-coded lines, points and polygons.

The greyscale plot of the processed data is exported from TerraSurveyor in a georeferenced portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels, enabling it to easily be overlaid onto an existing site plan. The data plot is combined with grid and site plans in QGIS 2.18.15 and exported again in .PNG format in order to present them in figure templates in Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised they are exported in .PDF format for inclusion within the finished report.

Results

Surrounding the survey area is an area of magnetic disturbance [1], this is represented by high bipolar positive and negative responses. It is most likely caused by ferrous material in the surrounding fencing or possibly buried services. Across the site are a series of positive linears [2], these run parallel along a south-west to north-east alignment and is likely caused by agricultural features such as field drains.

Conclusion

No features of archaeological significance were detected by the geophysical survey.

References

- ADAS, 2018, Archaeological Desk-Based Assessment: Grove Road, Abingdon
- BGS, 1971, *British Geological Survey*, 1:63 360, Sheet 253, Drift Edition, Keyworth
- CI/A, 2014, 'Standard and Guidance for archaeological geophysical survey', Reading
- EAC, 2015, *EAC Guidelines for the use of Geophysics in Archaeology: Questions to Ask and Points to Consider*, EAC Guidelines 2, Namur
- IFA, 2002, 'The Use of Geophysical Techniques in Archaeological Evaluation', IFA Paper No. 6, Reading
- NPPF, 2021, *National Planning Policy Framework*, Ministry of Housing, Communities and Local Govt, London

Appendix 1. Survey and data information

Programme:

Name: TerraSurveyor
Version: 3.0.25.0

Raw data

Filename: Grove Road RAW.xcp
Description: Imported as Composite from: Grove Road.xyz
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 440080.547355434, 189114.298211119 m
Southeast corner: 440202.487355434, 188983.648211119 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions

Survey Size (meters): 122 m x 131 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 27375, Recorded: 27375

Stats

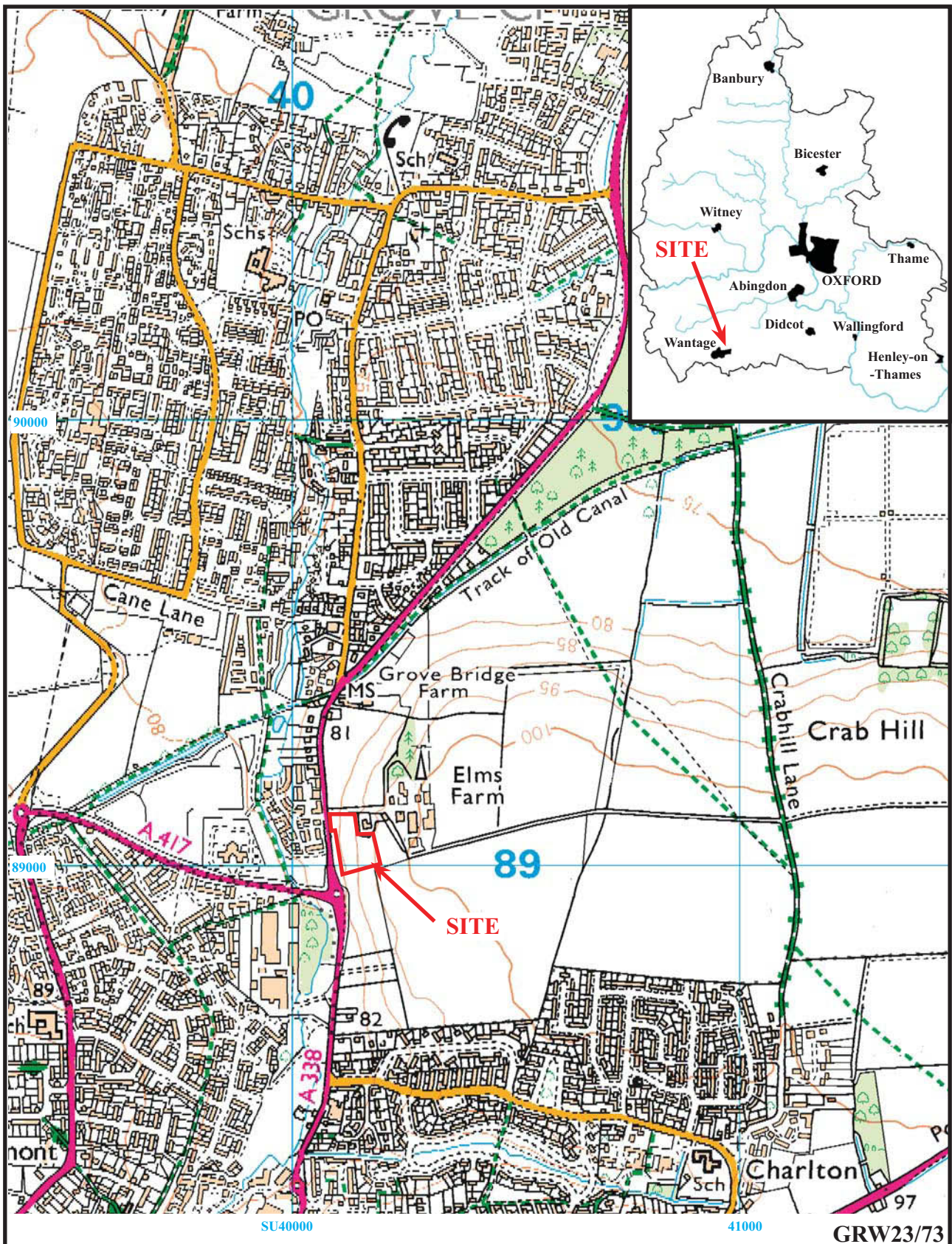
Max: 105.46
Min: -109.74
Std Dev: 16.86
Mean: -3.50
Median: -1.07
Composite Area: 1.5931 ha
Surveyed Area: 0.98387 ha

Processed data

Filename: Grove Road.xcp
Stats
Max: 4.42
Min: -4.40
Std Dev: 1.61
Mean: -0.15
Median: 0.01
Composite Area: 1.5427 ha
Surveyed Area: 0.92943 ha

GPS based Proce5

- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 Clip at 1.00 SD
- 5 Clip from -4.00 to 4.00



**Land at Grove Road, Wantage, Oxfordshire
Geophysical Survey (magnetic)**

Figure 1. Location of site within Wantage and Oxfordshire.

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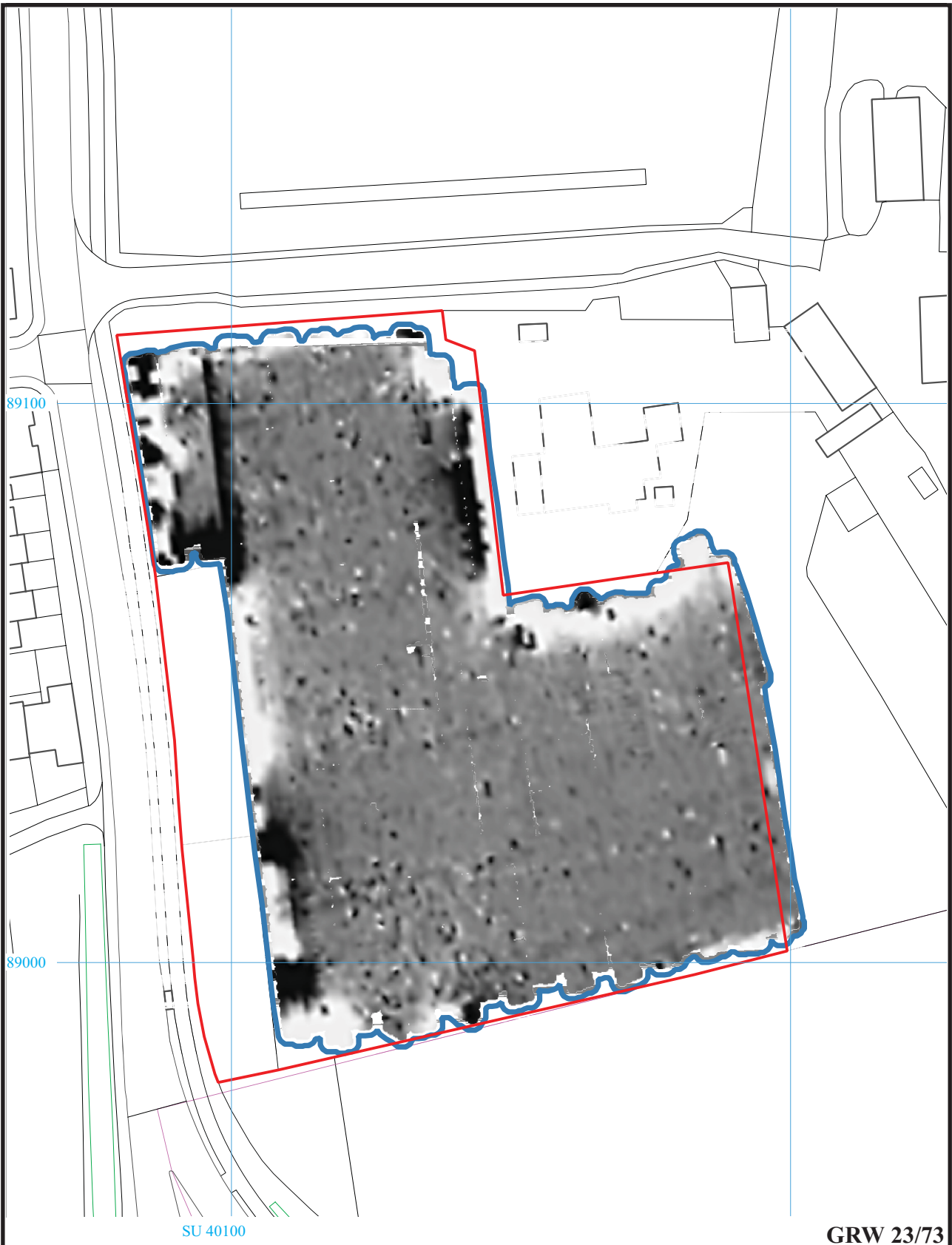
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**Land at Grove Road, Wantage,
Oxfordshire, 2023**
Geophysical Survey (Magnetic)
Figure 2. Plot of raw gradiometer data.

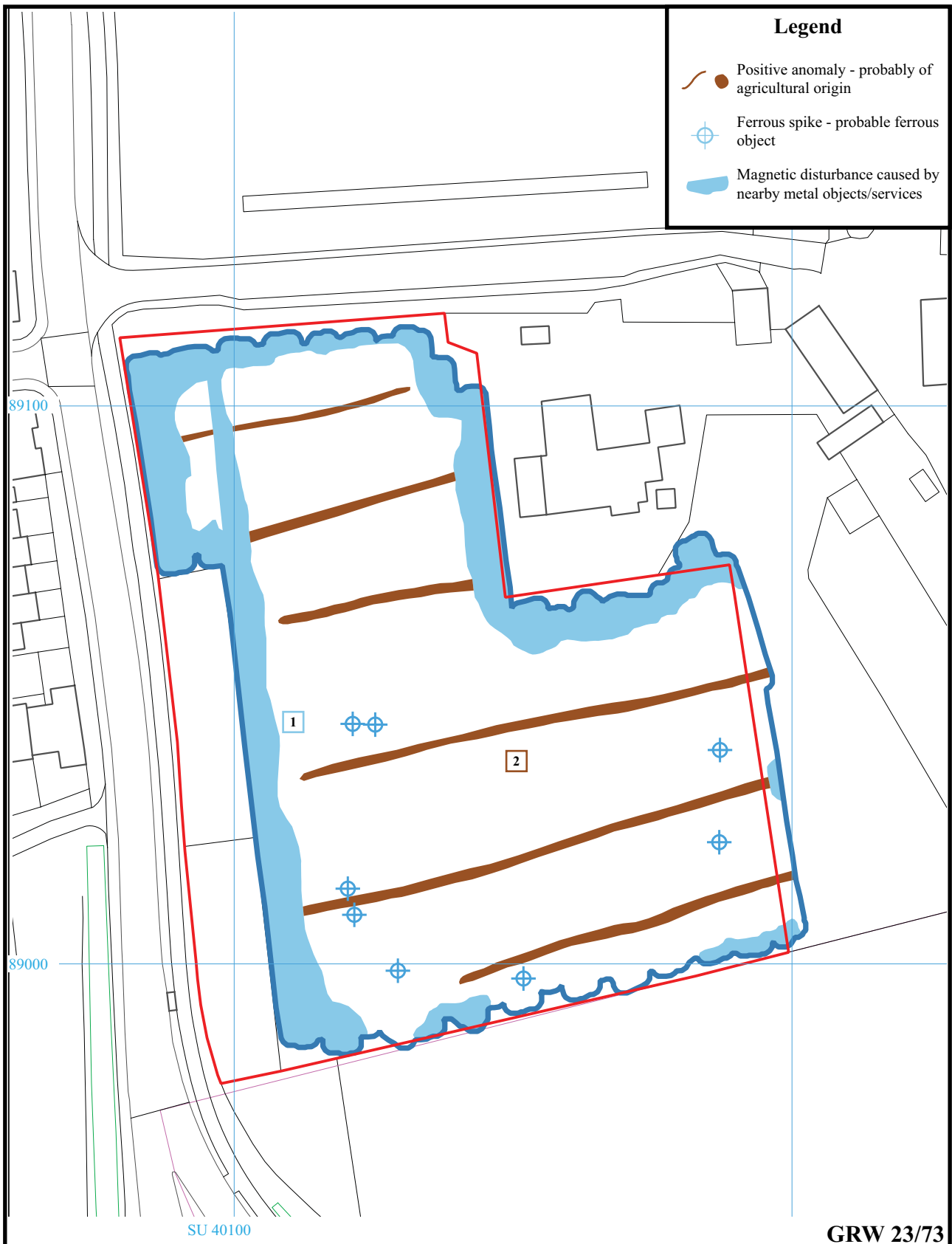
0m  50m

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**Land at Grove Road, Wantage,
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Geophysical Survey (Magnetic)
Figure 3. Plot of processed gradiometer data.

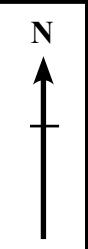




Legend

-  Positive anomaly - probably of agricultural origin
-  Ferrous spike - probable ferrous object
-  Magnetic disturbance caused by nearby metal objects/services

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**Land at Grove Road, Wantage,
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 Figure 4. Interpretation plot.





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**Land at Grove Road, Wantage,
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Figure 5. XY Plot of processed gradiometer data.

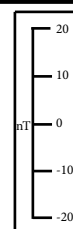




Plate 1. Survey area looking north-east



Plate 2. Survey area looking south-east

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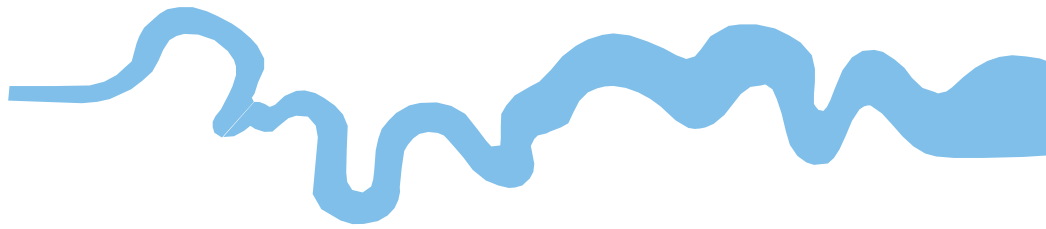
**Land at Grove Road, Wantage,
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Plates 1 and 2.**

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TIME CHART

	Calendar Years
Modern _____	AD 1901
Victorian _____	AD 1837
Post Medieval _____	AD 1500
Medieval _____	AD 1066
Saxon _____	AD 410
Roman _____	AD 43 AD 0 BC
Iron Age _____	750 BC
Bronze Age: Late _____	1300 BC
Bronze Age: Middle _____	1700 BC
Bronze Age: Early _____	2100 BC
Neolithic: Late	3300 BC
Neolithic: Early	4300 BC
Mesolithic: Late	6000 BC
Mesolithic: Early	10000 BC
Palaeolithic: Upper	30000 BC
Palaeolithic: Middle	70000 BC
Palaeolithic: Lower	2,000,000 BC





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