

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

ARCHAEOLOGICAL

S E R V I C E S

**Popham Lane, North Waltham,
Hampshire**

Geophysical Survey (Magnetic)

by Luciano Cicu

Site Code: PLNW22/254

(SU 5674 4556)

Popham Lane, North Waltham, Hampshire

Geophysical Survey (Magnetic) Report

For Donnington Homes

by Luciano Cicu

Thames Valley Archaeological Services Ltd

PLNW 22-254

November 2022

Summary

Site name: Popham Lane, North Waltham, Hampshire

Grid reference: SU 5674 4556

Site activity: Magnetometer survey

Date and duration of project: 10th November 2022

Project coordinator: Kyle Beaverstock

Site supervisor: Luciano Cicu

Site code: PLNW 22/254

Area of site: 0.5ha.

Summary of results: A very small number of anomalies were detected by the geophysical survey and these appear to be from magnetic disturbance caused by ferrous material in the surrounding fencing and as stray objects in the topsoil. No anomalies were recorded which were thought to be of archaeological origin.

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

This report may be copied for bona fide research or planning purposes without the explicit permission of the copyright holder. All TVAS unpublished fieldwork reports are available on our website: www.tvas.co.uk/reports/reports.asp.

Report edited/checked by: Steve Ford✓ 24.11.22
--

Kyle Beaverstock✓ 23.11.22

Popham Lane, North Waltham, Hampshire A Geophysical Survey (Magnetic)

by Luciano Cicu

Report 22/254

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Popham Lane, North Waltham, Hampshire (SU 5674 4556) (Fig. 1). The work was commissioned by Jason Kindlon, Donnington Group, New Warren Farm, Warren Road, Newbury, Berkshire, RG14 6NH.

Planning permission (19/02422/FUL) has been gained from Basingstoke and Deane Borough Council for a residential development. Due to the potential disturbances of below ground archaeological features, a geophysical survey was requested to inform the planning process. This is in accordance with the Ministry of Housing, Communities and Local Government's National Planning Policy Framework (NPPF 2021), and the County's policies on archaeology. The fieldwork was undertaken by Luciano Cicu and Lara Cook, on 10th November 2022,. The site code is PLNW22/254. 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 c. 650 south of North Waltham (Fig. 1). It comprises a rectilinear parcel of land of 0.5ha extent on the south west side of Popham Lane with houses to the north west and south east. The land does not appear to have been developed at any time in the last century, and currently is untended at the time of the survey. The site is almost flat and lies at a height of c. 132m above Ordnance Datum. The underlying geology of the site is upper chalk, with possible overlying clay-with-flints (BGS 1981)

Site history and archaeological background

The archaeological potential of the site has been highlighted in a briefing document prepared by Mr. Neil Adam, formerly of Hampshire County Archaeology Service. In summary, the survey area is located within an archaeologically rich area of the Hampshire chalklands, with many sites recorded as cropmarks from the air, and during construction of the nearby M3 (eg Fasham and Whinney 1991). In particular a Roman villa is recorded c. 180m to the north west, as well as other Roman buildings located 70m to the south east. Two Iron Age pits

Roman cropmark complexes lie 700m to the west (Ford 1992). The Medieval settlement of North Waltham itself has late Saxon origins and is documented in Domesday Book of 1086 (Williams and Martin 2002).

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 north-west to south-east zigzag orientation in the area of survey. Furthermore, previous to the survey, it seems that coring samples have been taken at a previous date. These have left the remains of coring pillars, these are likely associated with magnetic spikes in the results. Towards the south-east of the survey area dense number of trees lead us to being unable to survey the full area

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 ferro-magnetic 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 -15.44 to 16.21 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	Cancel 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

The survey was carried out as intended but few well defined magnetic anomalies were recorded. The survey showed that along the perimeters of the field in the north-east and in the south-west an area of magnetic disturbance was detected [Fig 4] [1]. This consists of the various bipolar anomalies which are typically associated with magnetic interference, from ferrous materials, most likely from surrounding fencing. A number of magnetic spikes [2] also appeared across the survey, these are a dipolar anomaly which is represented by a spike with a high positive and negative response, and these anomalies are typically caused by ferrous objects that may be associated with the coring pillars. (see plate 1).

Conclusion

A very small number of anomalies were detected by the geophysical survey over this small site. The majority of these appear to be from magnetic disturbance caused by ferrous material in the surrounding fencing or as stray finds in the topsoil. No anomalies were recorded which were thought to be formed by archaeological deposits.

References

- BGS, 1981, *British Geological Survey*, 1:50, Sheet **284**, 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
- Fasham, P J and Whinney, R J B, 1991, *Archaeology and the M3*, Hampshire Fld Club Archaeol Soc Monogr **7**, Stroud
- Ford, S. 1992. 'Manor Farm, North Waltham, Basingstoke, Hampshire, An archaeological evaluation in advance of proposed construction of a golf course'. Thames Valley Archaeological Services, report 92/14, Reading
- IFA, 2002, 'The Use of Geophysical Techniques in Archaeological Evaluation', IFA Paper No. 6, Reading
- NPPF, 2021, *National Planning Policy Framework (revised)*, Ministry for Housing, Communities and Local Government, London
- Williams, A and Martin, G H, 2002, *Domesday Book, a complete translation*, London

Appendix 1. Survey and data information

Programme:

Name: TerraSurveyor
Version: 3.0.25.0

Raw data

Name: Popham Lane
Instrument Type: MLgrad Import
Units:
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 456702.187715528, 145592.143012113 m
Southeast corner: 456767.707715528, 145531.823012113 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions

Survey Size (meters): 65.5 m x 60.3 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 7463, Recorded: 7463

Stats

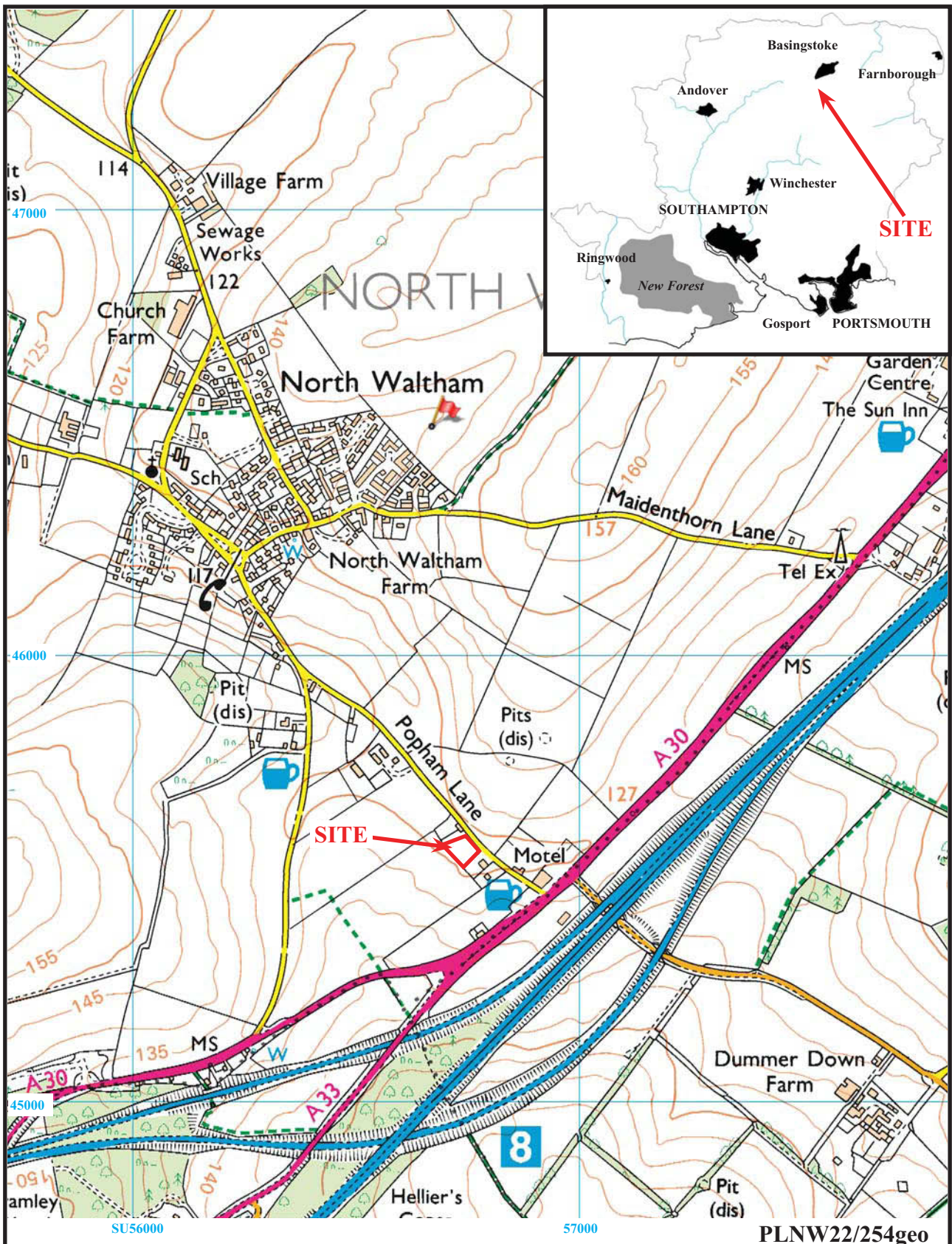
Max: 99.98
Min: -107.77
Std Dev: 6.30
Mean: -0.94
Median: -0.11
Composite Area: 0.39522 ha
Surveyed Area: 0.20815 ha

Processed data

Name: Popham Lane
Stats
Max: 6.14
Min: -6.98
Std Dev: 2.14
Mean: -0.31
Median: -0.02
Composite Area: 0.39522 ha
Surveyed Area: 0.20815 ha

GPS based Proce4

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

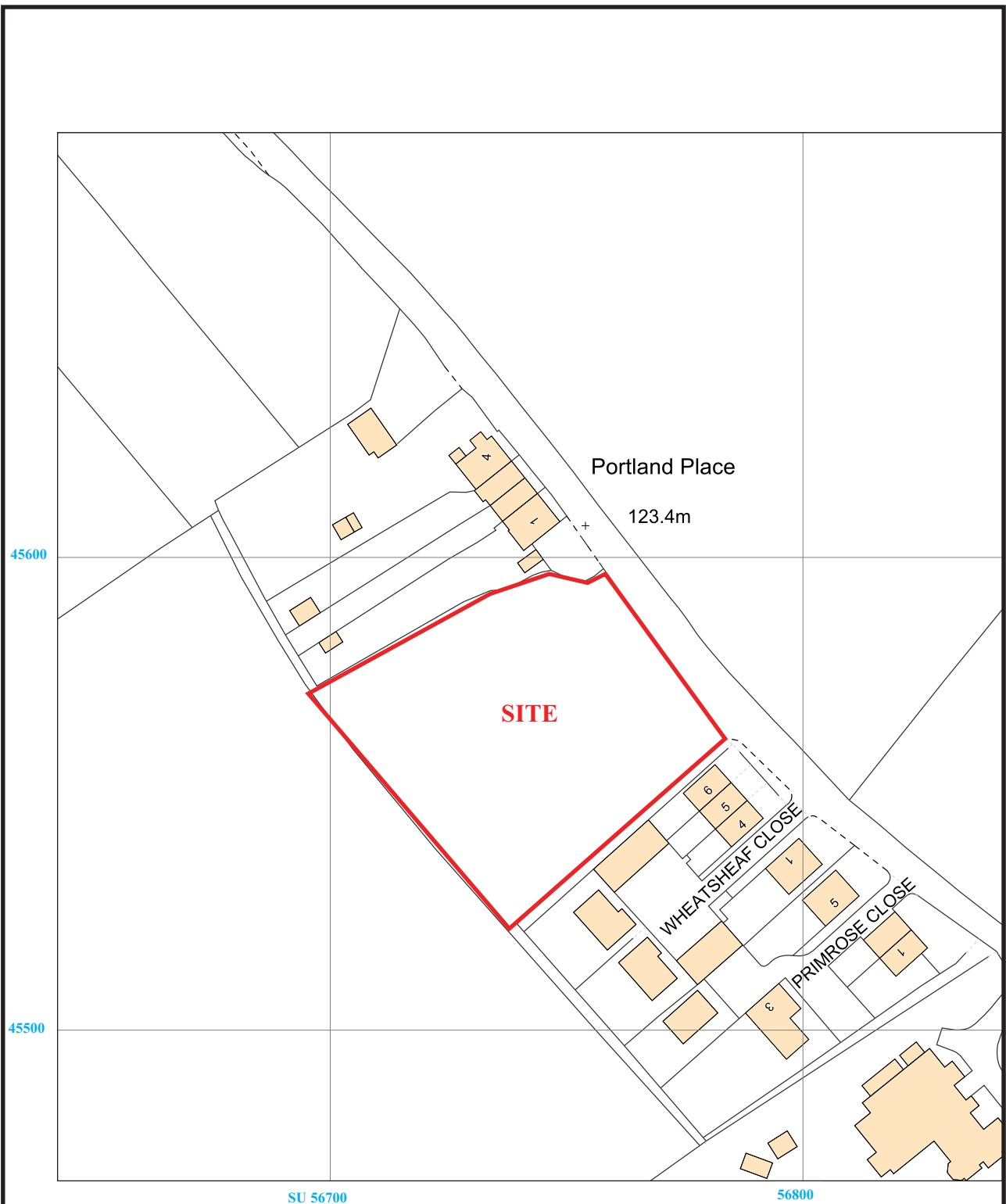


**Popham Lane, North Waltham,
Hampshire, 2022
Geophysical Survey**

Figure 1. Location of site within North Waltham and Hampshire.

Reproduced under licence from Ordnance Survey Explorer Digital mapping at 1:12500
Crown Copyright reserved

THAMES VALLEY
ARCHAEOLOGICAL
SERVICES



PLNW 22/254

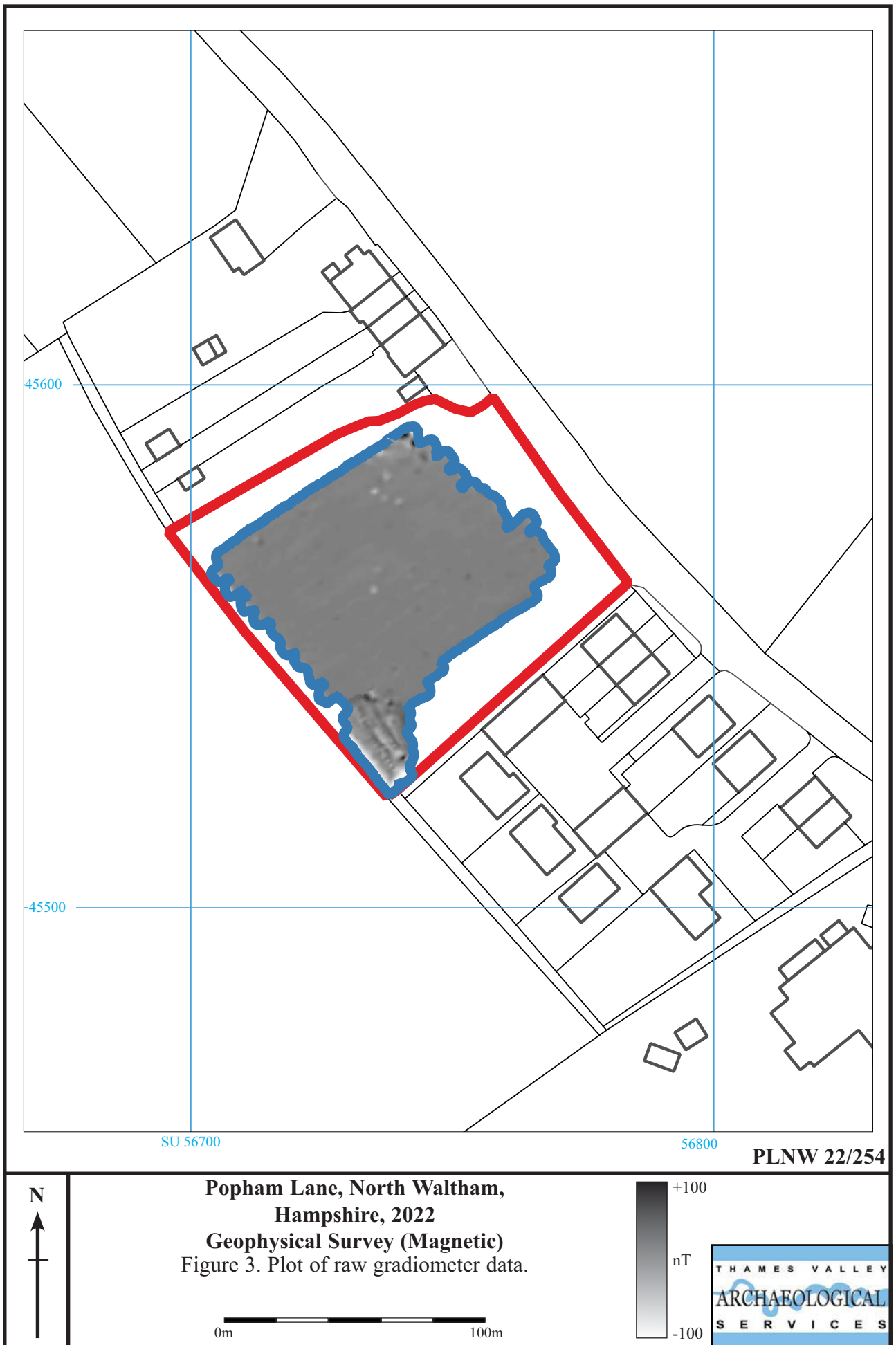


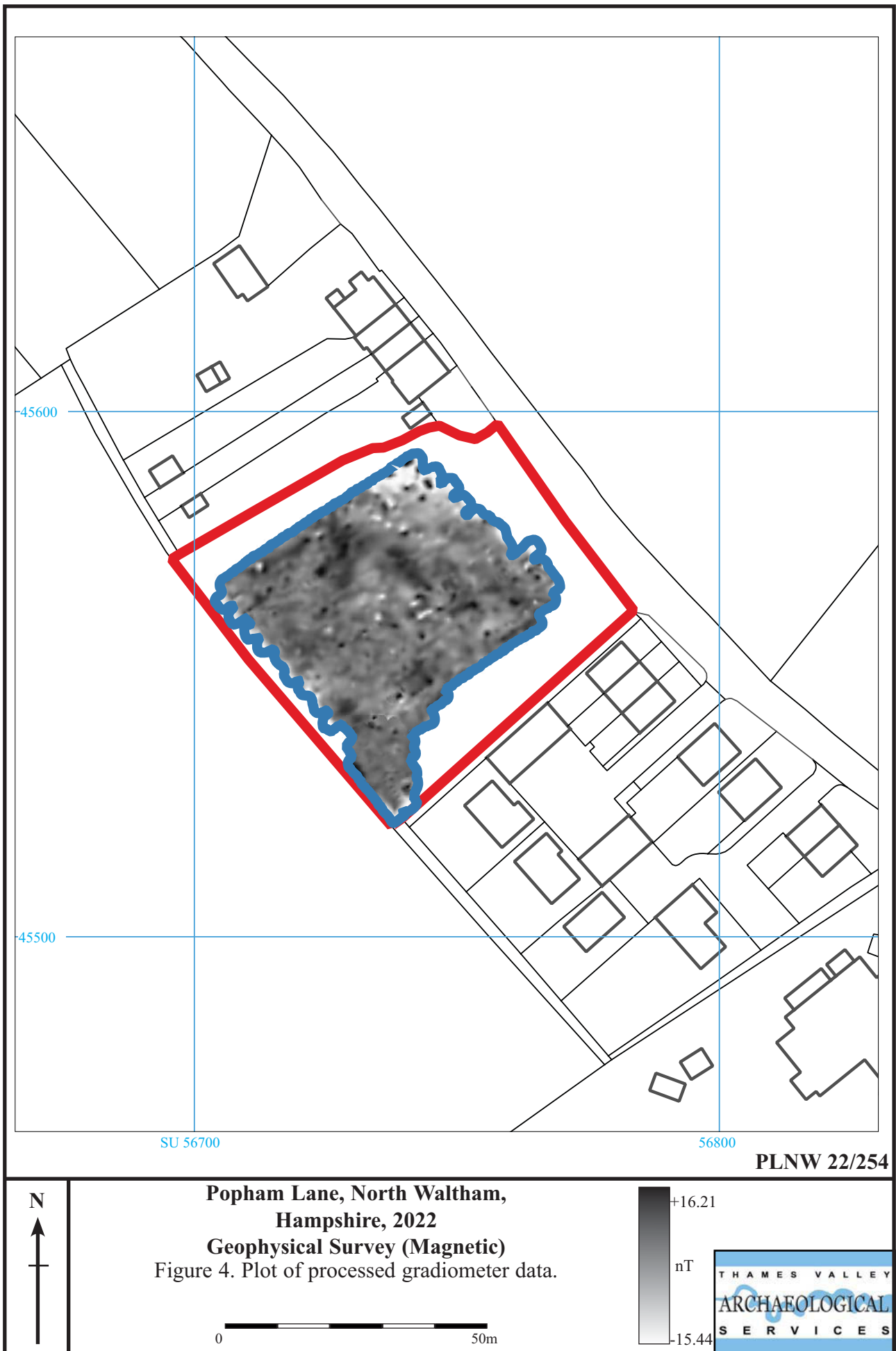
**Popham Lane, North Waltham,
Hampshire, 2022
Geophysical Survey**

Figure 2. Detailed location of site off Popham Lane.

Reproduced from Ordnance Survey Digital Mapping under licence.
Crown copyright reserved. Scale 1:1250

THAMES VALLEY
ARCHAEOLOGICAL
SERVICES





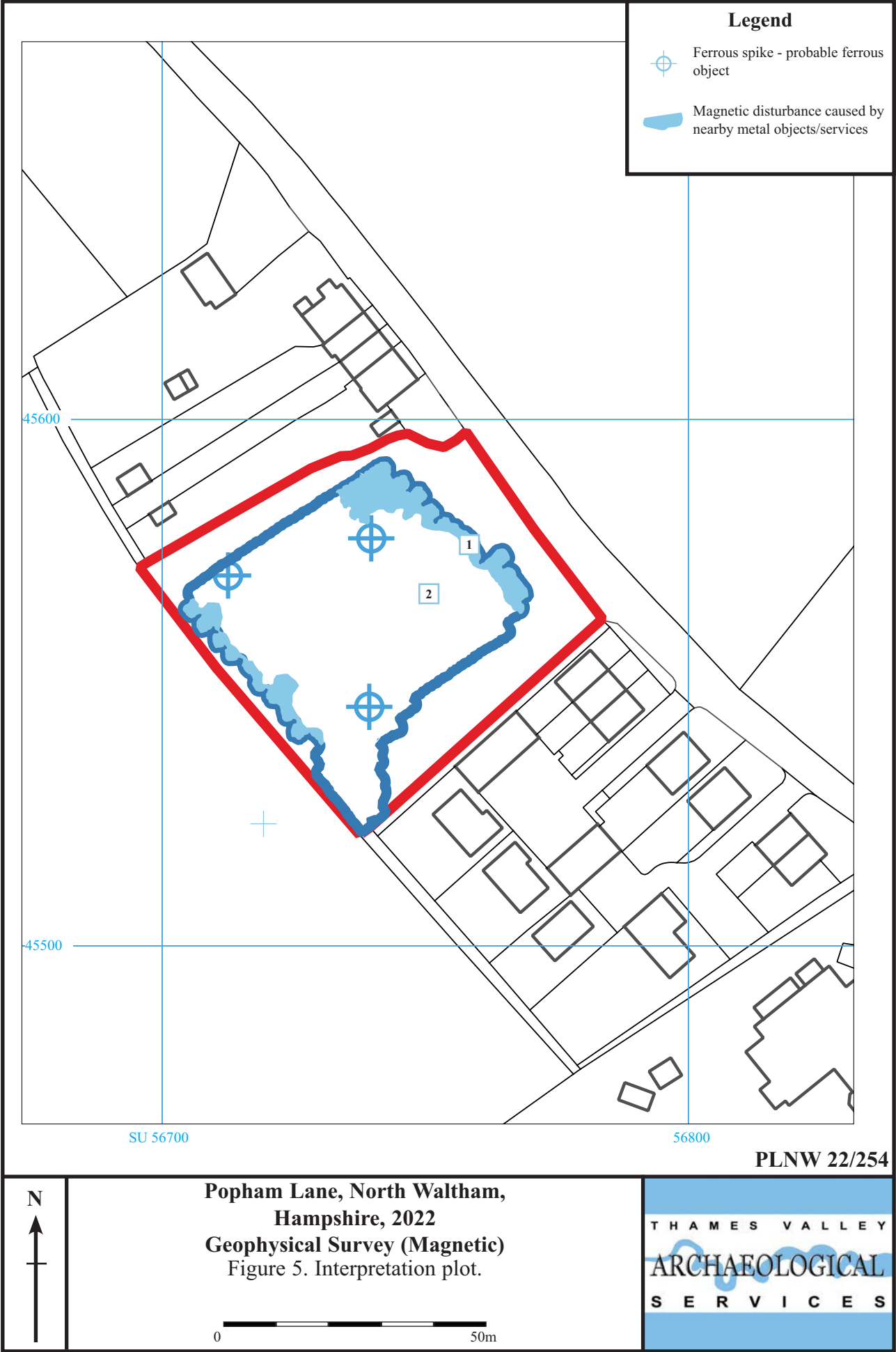




Plate 1. Survey area, south east facing north west



Plate 2. Survey area, north east facing south west.



Plate 3. Survey area, north west facing south east



Plate 4. Survey area, south west facing north east.

PLNW 22/254

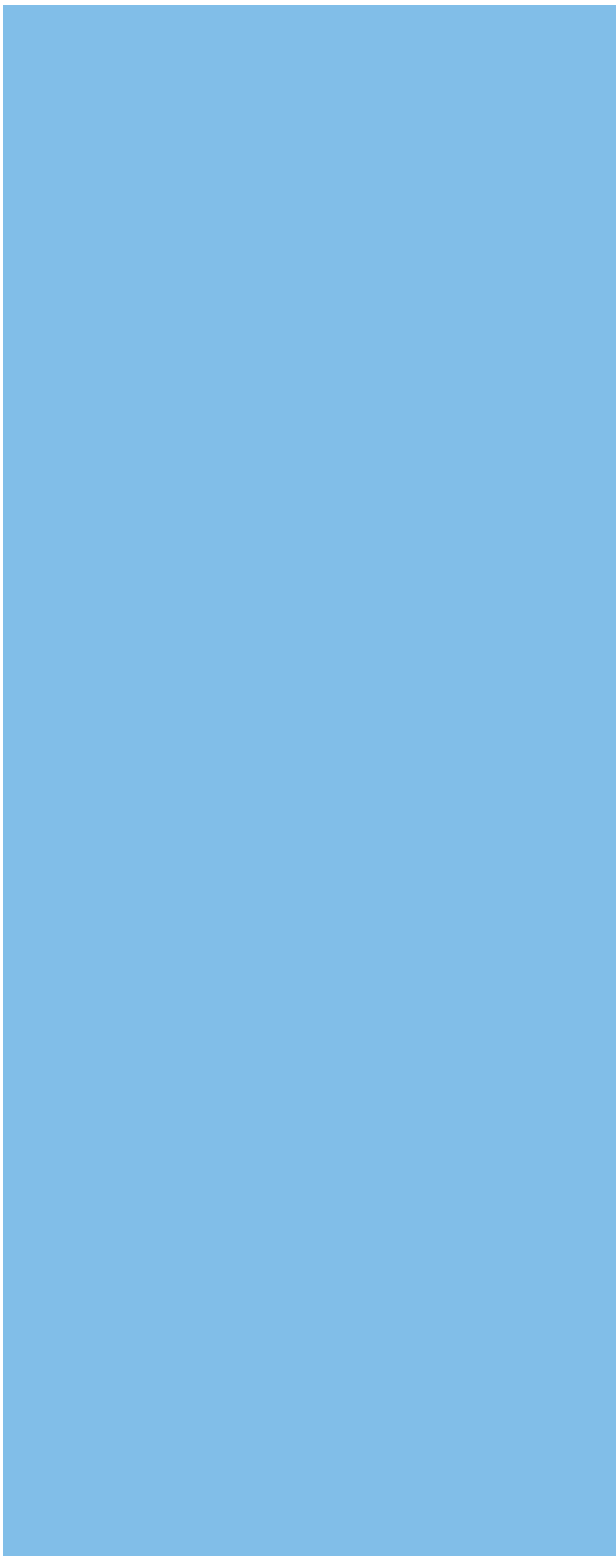
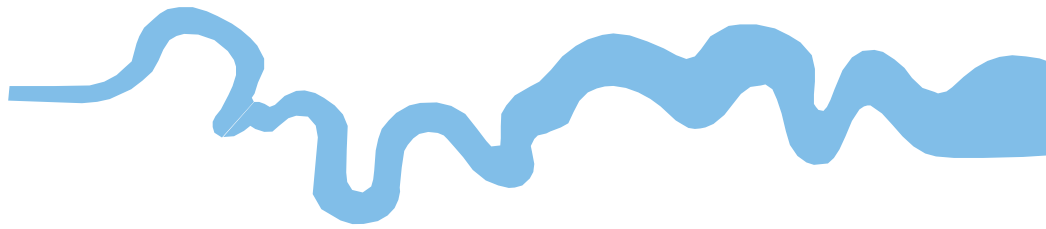
**Popham Lane, North Waltham,
Hampshire 2022
Geophysical Survey
Plates 1 to 4.**

THAMES VALLEY
ARCHAEOLOGICAL
SERVICES

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





**Thames Valley Archaeological Services Ltd,
47-49 De Beauvoir Road,
Reading RG1 5NR**

**Tel: 0118 9260552
Email: tvas@tvas.co.uk
Web: www.tvas.co.uk**

***Offices in:
Brighton, Taunton, Stoke-on-Trent, Wellingborough
and Ennis (Ireland)***