THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

Land opposite Ruscombe Church, Southbury Lane, Ruscombe, Berkshire

Geophysical Survey

by Ashley Kruger and Kyle Beaverstock

Site Code: SLR19/24

(SU 7975 7624)

Land opposite Ruscombe Church, Southbury Lane, Ruscombe, Berkshire

Geophysical Survey (Magnetic) Report

For Thames Valley Surveying

by Ashley Kruger and Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code SLR 19/24

February 2019

Summary

Site name: Land opposite Ruscombe Church, Southbury Lane, Ruscombe, Berkshire

Grid reference: SU 7975 7624

Site activity: Magnetometer survey

Date and duration of project: 21st February 2019

Project coordinator: Tim Dawson

Site supervisor: Kyle Beaverstock

Site code: SLR 19/24

Area of site: c. 0.26ha

Summary of results: No significant anomalies of archaeological interest were detected over the course of the survey.

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

Report edited/checked by:	Steve Ford✓ 12.03.19
	Tim Dawson✓ 12.03.19

Thames Valley Archaeological Services Ltd, 47–49 De Beauvoir Road, Reading RG1 5NR
Tel. (0118) 926 0552; Fax (0118) 926 0553; email tvas@tvas.co.uk; website: www.tvas.co.uk

Land Opposite Ruscombe Church, Southbury Lane, Ruscombe, Berkshire
A Geophysical Survey (Magnetic)

by Ashley Kruger and Kyle Beaverstock

Report 19/24

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at St James the Great Church, Southbury Lane, Ruscombe, Berkshire SU 7975 7624 (Fig. 1). The work was commissioned by Mr John Wren of Thames Valley Surveying, Greenbank, University of Reading, London Road Campus, London Road, Reading RG1 5AQ, on behalf of Wokingham Borough Council.

An application to extend the burial ground of the St James the Great Church, Ruscombe, onto an irregular parcel of land opposite the existing grounds, is to be submitted to the Berkshire County Council. The proposed extension presents the prospect of existing archaeological deposits to be either damaged or destroyed by the subsequent development. As a result of potential damaged to the underlying archaeology a geophysical survey has been requested in order to inform any future work carried out within the area of investigation. The fieldwork was undertaken by Kyle Beaverstock and Ashley Kruger, on the 21st February 2019 and the site code is SLR 19/24.

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 on the eastern edge of the village of Twyford, approximately 8.7 km east-north-east of Reading. The parcel of land itself is framed by residential properties to the west, Southbury Lane to the north and a principle route railway line at its most southern extent. The topography of the area of investigation is relatively flat and it is situated at a height of 57m above Ordinance Datum (OD); it is relatively well kept and populated with low lying brush and mature tree species along its border. The geological profile of the site is recorded as being bedrock comprised of the varying Lambeth Group (LMBE) types, which are indicative geologies across the London Basin; capped with a potential superficial layer of River terrace deposits (RTD) of unknown type (BGS 1974).

Site history and archaeological background

The area in which the site is located is considered to be of high archaeological potential, principally due to its proximity to the Loddon Valley. A number of fieldwalking surveys (Ford 1987) and aerial photography (Gates 1975) have since identified a number of sites and findspots across the surrounding areas. Most notable are excavations in advance of mineral extraction to the south which revealed a small volume of Late Bronze Age occupation followed by Iron Age and Roman enclosures (Manning and Moore 2011). A Mesolithic occupation site has also been excavated to the south (Harding and Richards 1993).

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 0.25m intervals along traverses 1m apart, providing an appropriate methodology balancing cost and time with resolution. Traverses were walked at an alternating east to west zig-zag orientation across the entirety of the site. With the exception of the mature trees established along the border of the area there were no noticeable obstructions that had an effect on the methodology of Survey. However, extensive metallic fencing on the borders of the site may have an impact on the quality of data attained; an issue that is undoubtedly compounded by the relatively small area of investigation.

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 Geo 7x 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 Geo7x 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 -11.00 to 11.05 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 3.4.4 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

No significant magnetic anomalies were detected over the course of the survey with exception of some magnetic disturbance primarily situated along the peripheries of the area, where metal fencing marks the extents of the property boundaries. In addition to the disturbance, several dipolar magnetic Spikes were detected across the area, most likely due to a number of buried ferrous objects or magnetic debris.

Conclusion

No significant anomalies of archaeological interest were detected over the course of the survey. However, magnetic disturbance and anomalous data spikes are evident across the survey area and may mask signals of more discreet features.

References

BGS, 1974, *British Geological Survey*, 1:50,000, Sheet 252, Solid and Drift Edition, Keyworth

CI*f*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

Ford, S, 1987, *East Berkshire Archaeological Survey*, Berkshire County Counc Dept Highways and Planning Occas Pap **1**, Reading

Gates, T, 1975, *The Thames Valley, An archaeological Survey of the River Gravels*, Berkshire Archaeol Comm Pubn 1, Reading

Harding, P and Richards, J C, 1993, 'Sample excavation of a Mesolithic flint scatter at Whistley Court Farm', *Berkshire Archaeol J* **74** (for 1991–3), 145

IFA, 2002, 'The Use of Geophysical Techniques in Archaeological Evaluation', IFA Paper No. 6, Reading

Manning, A and Moore, C, 2011, 'Excavations at Lea Farm, Hurst, 1998', *Berkshire Archaeol J* **80**, 31–71

NPPF, 2012, *National Planning Policy Framework*, Dept Communities and Local Government, London

Appendix 1. **Survey and data information**

Programme:
Name: TerraSurveyor
Version: 3.0.25.0

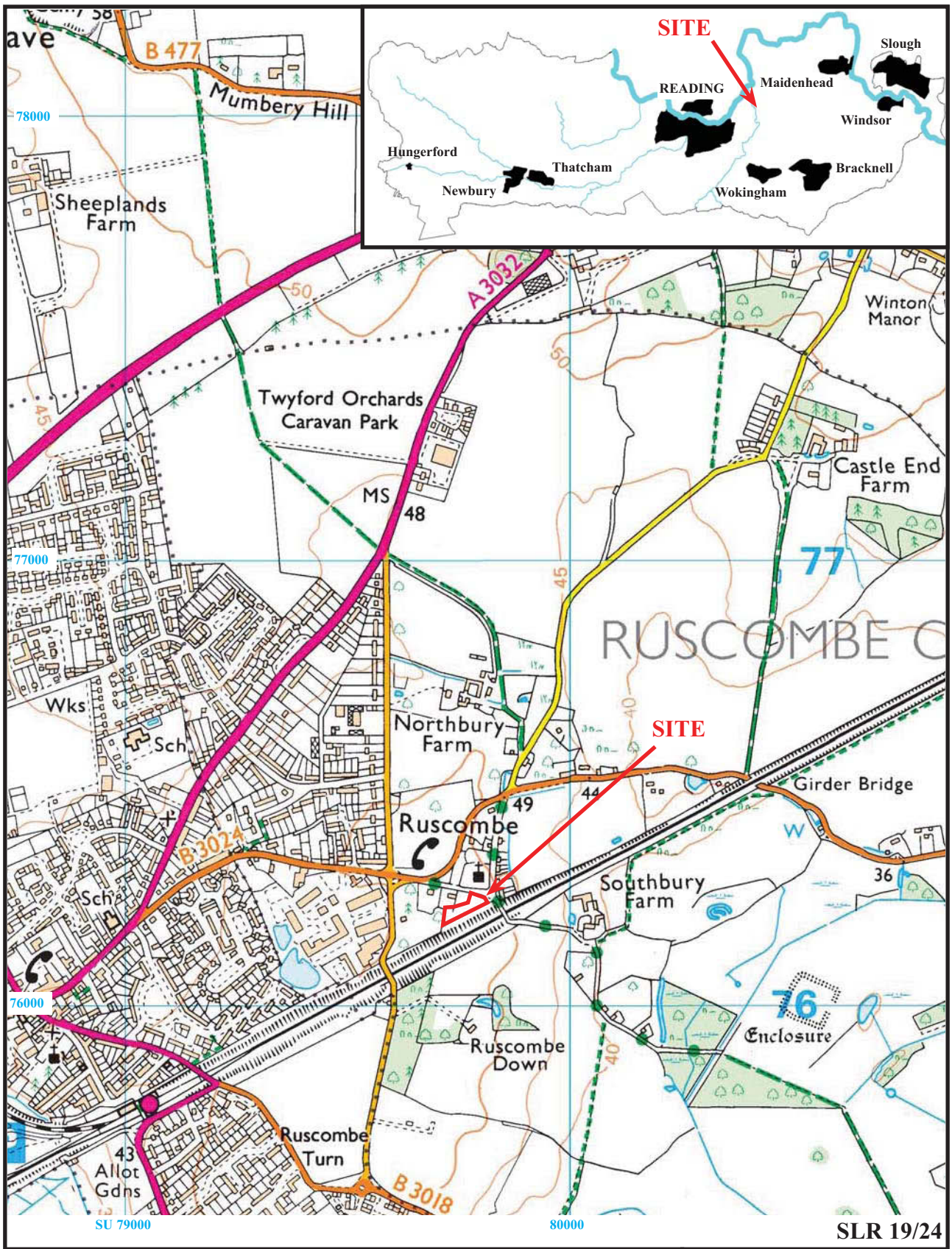
Raw data
Filename: Ruscombe 21_2_19 RAW.xcp
Instrument Type: MLgrad601 import
Units:
UTM Zone: 30U
Survey corner coordinates (X/Y):
Northwest corner: 649077.416477909, 5705353.19389765 m
Southeast corner: 649156.586477909, 5705295.21389765 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 0.5 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 79.2 m x 58 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 15519, Recorded: 15519

Stats
Max: 106.27
Min: -109.72
Std Dev: 24.12
Mean: -3.38
Median: 0.53
Composite Area: 0.45903 ha
Surveyed Area: 0.2363 ha

Processed data
Filename: Ruscombe21_2_19.xcp
GPS based Proce6
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Despike Threshold: 1 Window dia: 3
5 DeStagger by: 50.00cm, Shift Positions
6 Clip from -10.00 to 10.00

Stats
Max: 11.05
Min: -11.00
Std Dev: 4.26
Mean: -0.57
Median: -0.03
Composite Area: 0.45903 ha
Surveyed Area: 0.23294 ha



SLR 19/24

Land opposite, Ruscombe Church, Southbury Lane, Ruscombe, Berkshire, 2019
Geophysical Survey (Magnetic)

Figure 1. Location of site within Ruscombe and Berkshire.

THAMES VALLEY ARCHAEOLOGICAL SERVICES

SLR 19/24

N

Land opposite, Ruscombe Church, Southbury Lane, Ruscombe, Berkshire, 2019
Geophysical Survey (Magnetic)
Figure 2. Plot of raw gradiometer data.

0m 50m

+100
nT
-100

THAMES VALLEY ARCHAEOLOGICAL SERVICES

SLR 19/24

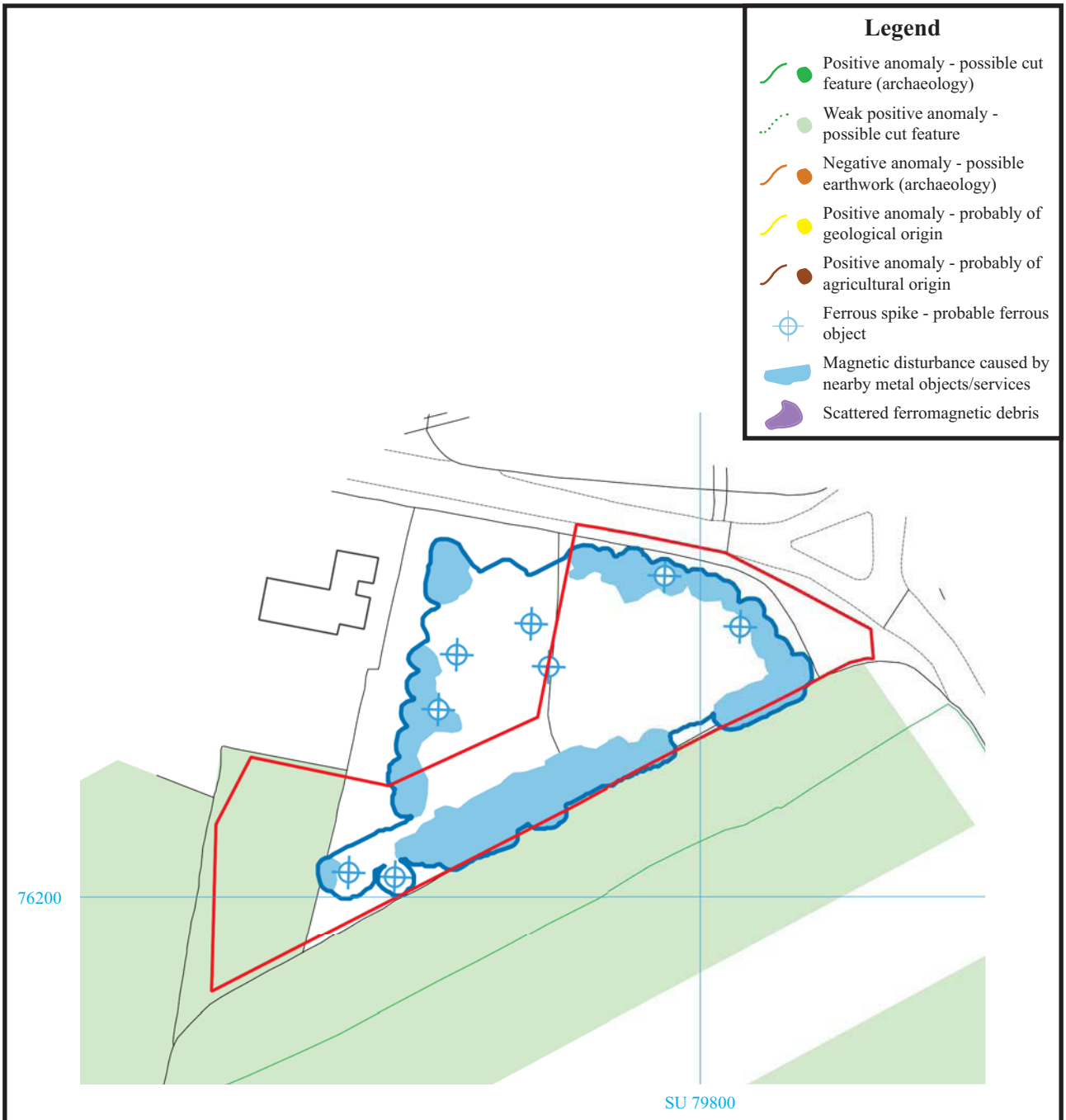
N

Land opposite, Ruscombe Church, Southbury Lane, Ruscombe, Berkshire, 2019
Geophysical Survey (Magnetic)
Figure 3. Plot of minimally processed gradiometer data.

0m 50m

+11
nT
-11

THAMES VALLEY ARCHAEOLOGICAL SERVICES



SLR 19/24

N

Land opposite, Ruscombe Church, Southbury Lane, Ruscombe, Berkshire, 2019
Geophysical Survey (Magnetic)
Figure 4. Interpretation plot.

0m 50m

THAMES VALLEY ARCHAEOLOGICAL SERVICES

Plate 1. Survey Area, Looking west

Plate 2. Mettalic fencing along western boundary, Looking south-west

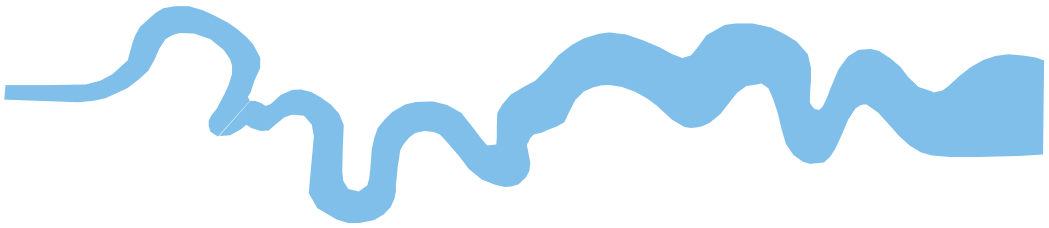
SLR 19/24

Land opposite Ruscombe Church, Southbury Lane, Ruscombe, Berkshire 2019
Geophysical Survey (Magnetic)
Plates 1 and 2.

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 and Ennis (Ireland)