THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

Orchard House, Stratford Road, Stratford-sub-Castle, Salisbury, Wiltshire

Geophysical Survey (Magnetic)

by Tim Dawson

Site Code: OHS13/232

(SU 1334 3199)

Orchard House, Stratford Road, Stratford-sub-Castle, Salisbury, Wiltshire

Geophysical Survey (Magnetic) Report

For Hazeley Developments

by Tim Dawson

Thames Valley Archaeological Services Ltd

Site Code OHS 13/232

May 2014

Summary

Site name: Orchard House, Stratford Road, Stratford-sub-Castle, Salisbury, Wiltshire

Grid reference: SU 1334 3199

Site activity: Magnetometer survey

Date and duration of project: 2nd May 2014

Project manager: Steve Ford

Site supervisor: Tim Dawson

Site code: OHS 13/232

Area of site: 0.8ha

Summary of results: The area surveyed was subject to a large amount of magnetic disturbance around the perimeter and in the eastern part of the site. There was also a high level of scattered magnetic debris in the western and central areas, probably caused by landscaping and the removal of field boundaries and trees. Despite this a single positive anomaly was recorded aligned to an extant earthwork which may be archaeological in origin.

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 Preston✓ 08.05.14
	Andrew Mundin✓ 08.05.13

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Orchard House, Stratford Road, Stratford-sub-Castle, Salisbury, Wiltshire
A Geophysical Survey (Magnetic)

by Tim Dawson

Report 13/232b

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Orchard House, Stratford Road, Stratford-sub-Castle, Salisbury, Wiltshire (SU 1334 3199) (Fig. 1). The work was commissioned by Mr Luke Johnson of Hazeley Developments Ltd, Hazeley Road, Twyford, Hampshire, SO21 1QA.

Planning permission is to be sought from Wiltshire Council for the construction of five houses on the site.

The field investigation was carried out at the request of the client to clarify the results of a previous geophysical survey that was undertaken on the site but not fully published (WCAS 2005, 21). The fieldwork was undertaken by Tim Dawson and Anna Ginger on 2nd May 2014 and the site code is OHS 13/232.

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

Location, topography and geology

Stratford-sub-Castle lies to the south-west of Old Sarum and to the north of Salisbury (Fig. 1). The proposal site is a sub rectangular shaped plot with an area of *c*.0.8ha. To the north and south the site is bounded by residential buildings and to the east is Stratford Road. On the west side and to the south-west it is separated from fields by wooden fencing and a hedge. The development area is centred on NGR SU 1334 3199 and is at a height of *c*.49m above Ordnance Datum although the ground slopes gently downhill from east to west. The geology of the surrounding area is described as Valley Gravels and Alluvium with areas of upper chalk further from the site (BGS 1974).

Orchard House itself stands in the north-eastern corner of the site along with various outbuildings with gardens extending to the west (Fig. 2) bounded by hedgerows and wooden fences. In the immediate vicinity of Orchard House is a Grade II listed building which was previously a children's care home, but is now disused.

At the time of the survey the survey area was covered in long grass with the hedgerow to the west overgrowing out into the site. The ground was wet from previous rain but the weather throughout the survey period remained overcast but warm (Pls 1 and 2).

Site history and archaeological background

The archaeological potential of the site has been highlighted in a desk-based assessment (McNicoll-Norbury 2014). In summary the site in a zone with a wealth of Roman and medieval occupation. Previous geophysical survey (WCAS 2005, 21) has identified what has been interpreted as a large building on the site itself.

The Neolithic and Bronze Age are represented by clusters of small pits and barrows at Rocks Hill and Ende Burgh and settlement activity to the north of study area. The immediate area is dominated by the prehistoric hillfort of Old Sarum which lies to the northeast of the site. During the Iron Age the hillfort was the main focus of settlement in the area with an associated settlement to the southeast of the fort. Following the Roman conquest mention is made in the Antonine Itinerary of *Sorviodunum* (Borthwick and Chandler 1984), a settlement originally believed to be based on the hillfort at Old Sarum, but which more recent evidence has shown is concentrated around Stratford-sub-Castle (James 2002) with Old Sarum likely to have been abandoned during the Roman period. Archaeological work in the area has revealed a large number of Roman finds and indeed the settlement itself (Algar 2002). The settlement is believed to have occupied an area to the south of the site aligned southwest to northeast in line with the Roman road which excavation has dated between the 1st and 4th centuries.

Methodology

Sample interval

Data collection required a temporary grid to be established across the survey area using wooden pegs at 20m intervals with further subdivision where necessary. Readings were taken at 0.25m intervals along traverses 1m apart. This provides 1600 sampling points across a full 20m × 20m grid (English Heritage 2008), providing an appropriate methodology balancing cost and time with resolution. The grid was set out to cover as much of the open space to the west and south of the main buildings as possible. The western edge of the site was a large hedgerow which spread out into the site preventing survey from taking place in this 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 English Heritage (2008) and the Institute for Archaeologists (2002, 2011).

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 fast yet detailed survey of an area.

The detailed magnetometry survey was carried out using a dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometer. The instrument consists of two fluxgates mounted 1m vertically apart with a second set positioned at 1m horizontal distance. 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 seem 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.

A Trimble GeoXH 6000 handheld GPS system with sub-decimetre accuracy was used to tie the site grid 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 TerraSurveyorLite 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 -30.00 to 30.00 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-stagger: all grids, both by -1 intervals	Cancels out effects of site's topography on irregularities in the traverse speed.

Once processed, the results are presented as a greyscale plot shown in relation to the site (Fig. 3), followed by a second plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 4). Anomalies are shown as colour-coded lines, points and polygons. The grid layout and georeferencing information (Fig. 2) is prepared in EasyCAD v.7.22.01, producing a .FC7 file format, and printed as a .PDF for inclusion in the final report.

The greyscale plot of the processed data is exported from TerraSurveyorLite in 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 rotated to orientate it to north and combined with grid and site plans 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 geophysical survey of the site recorded several magnetic anomalies but only one of these is likely to be of archaeological origin. This anomaly gave a linear positive signal with related negative responses that form a rectangular shape enclosing an area *c*.35m long by 18m wide **[Fig. 4: 1]**. This positive and negative type of anomaly is usually the result of a buried bank and, in this case, this was still visible as an earthwork rising to *c*.0.15m above the surface of the field (Pl. 2). The northern end of the magnetic anomaly is somewhat obscured by scattered magnetic debris but the physical earthwork forms a definite rectangular shape with the return closing the area just to the south of the hedgerow (Fig. 2). This may represent an archaeological feature, particularly as it is not aligned to any of the modern or historic field boundaries or roads (McNicoll-Norbury 2014).

The remaining anomalies recorded by the survey either represent interference caused by nearby metallic objects, such as fences, services, manhole covers or the fire escape to the west of the main house, or scattered magnetic debris, probably disturbed ground or buried ferromagnetic objects. The latter occurs mainly in the north-western part of the site, an area where the field layout has undergone much alteration over time with the removal of some boundaries and the laying of others (McNicoll-Norbury 2014). In the centre of this area a series of magnetic spikes **[2]** may represent the location of an orchard mapped in this location in the 19th and early 20th century (McNicoll-Norbury 2014, figs 6–9). The area immediately to the south-east of the house contained

several concrete pads and manhole covers, all of which had a negative effect on the geophysical survey results in that area.

Conclusion

The geophysical survey of the grounds of Orchard House, Stratford-sub-Castle was undertaken successfully and recorded several magnetic anomalies although only one of these is likely to represent an archaeological feature. The north-western part of the site appears to have been subject to a large amount of disturbance as the magnetic signature of this area is a random mixture of very high and very low responses. The eastern area was subject to high interference from several concrete pads and services which, if they had not already destroyed any buried archaeology, would have a masking effect on any geophysical anomalies in this location. The survey results match those generated by the previous geophysical survey that was undertaken on the site in 2002 (WCAS 2005, 21).

References

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Borthwick, A and Chandler, J, 1984, *Our Chequered Past: The Archaeology of Salisbury*, Wiltshire Lib Mus Service, Salisbury

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WCAS, 2005, 'The Archaeology of Wiltshire's Towns, An Extensive Urban Survey: Old Sarum & Sorviodunum', Wiltshire County Archaeology Service, Trowbridge

Appendix 1. **Survey and data information**

Raw data

Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: Tim Dawson, Anna Ginger on 02/05/2014
Assembled by: Tim Dawson on 02/05/2014
Direction of 1st Traverse: 338.4611 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32000

Dimensions
Composite Size (readings): 320 × 100
Survey Size (meters): 80 m × 100 m
Grid Size: 20 m × 20 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 100.00
Min: -100.00
Std Dev: 35.19
Mean: -8.20
Median: -2.91
Composite Area: 0.8 ha
Surveyed Area: 0.43985 ha

PROGRAMME
Name: TerraSurveyor
Version: 3.0.25.1

Source Grids: 14
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:0 Row:2 grids\03.xgd
4 Col:0 Row:3 grids\04.xgd
5 Col:1 Row:0 grids\05.xgd
6 Col:1 Row:1 grids\06.xgd
7 Col:1 Row:2 grids\07.xgd
8 Col:1 Row:3 grids\08.xgd
9 Col:1 Row:4 grids\09.xgd
10 Col:2 Row:0 grids\10.xgd
11 Col:2 Row:1 grids\11.xgd
12 Col:2 Row:2 grids\12.xgd
13 Col:3 Row:0 grids\13.xgd
14 Col:3 Row:1 grids\14.xgd

Processed data

Stats
Max: 30.00
Min: -30.00
Std Dev: 14.96
Mean: -1.61
Median: -0.13

Processes: 5
1 Base Layer
2 DeStripe Median Sensors: All
3 De Stagger: Grids: All Mode: Both By: -1 intervals
4 DeStripe Median Sensors: 09.xgd
5 Clip from -30.00 to 30.00 nT

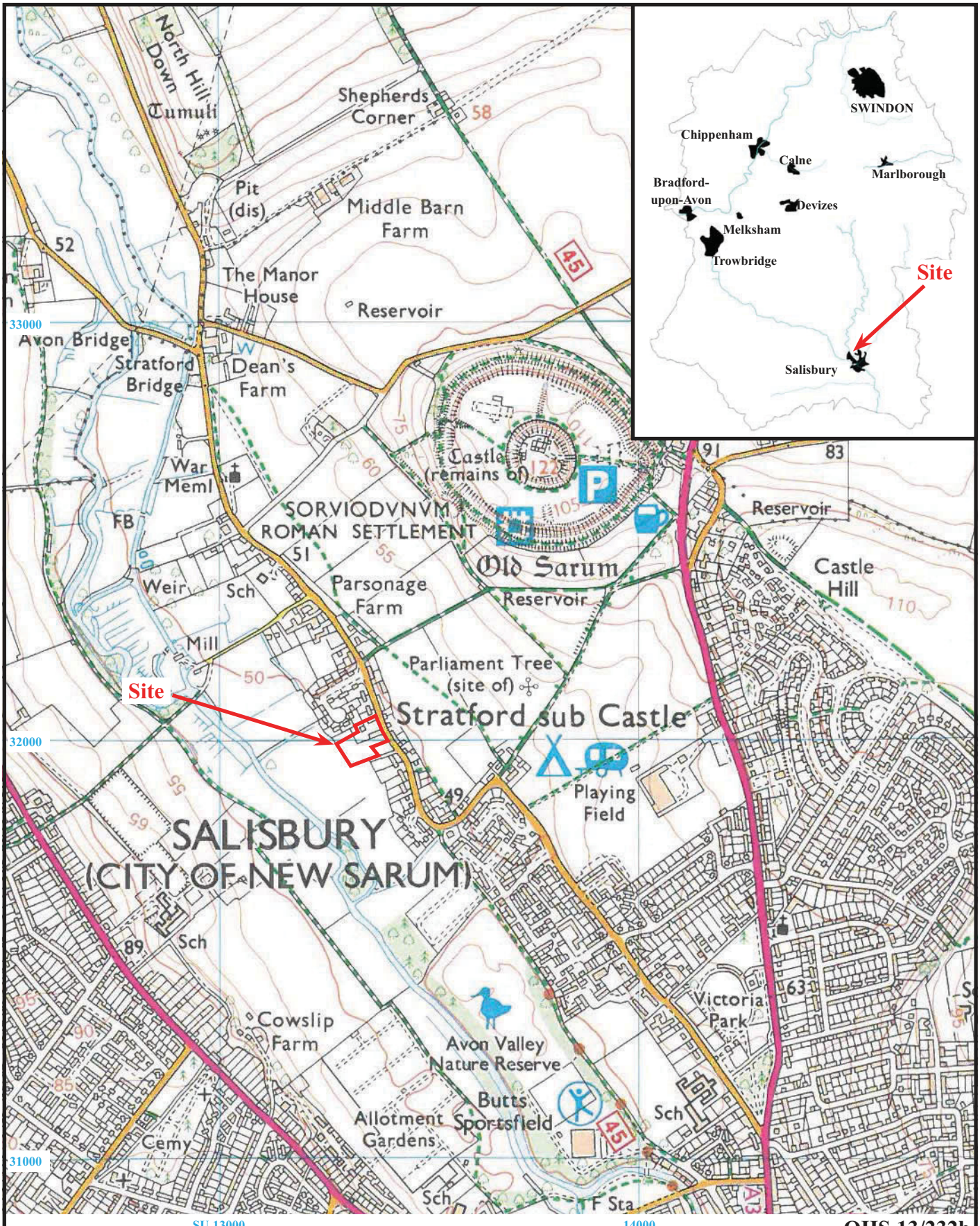

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Figure 1. Location of site within Stratford-sub-Castle and Wiltshire.

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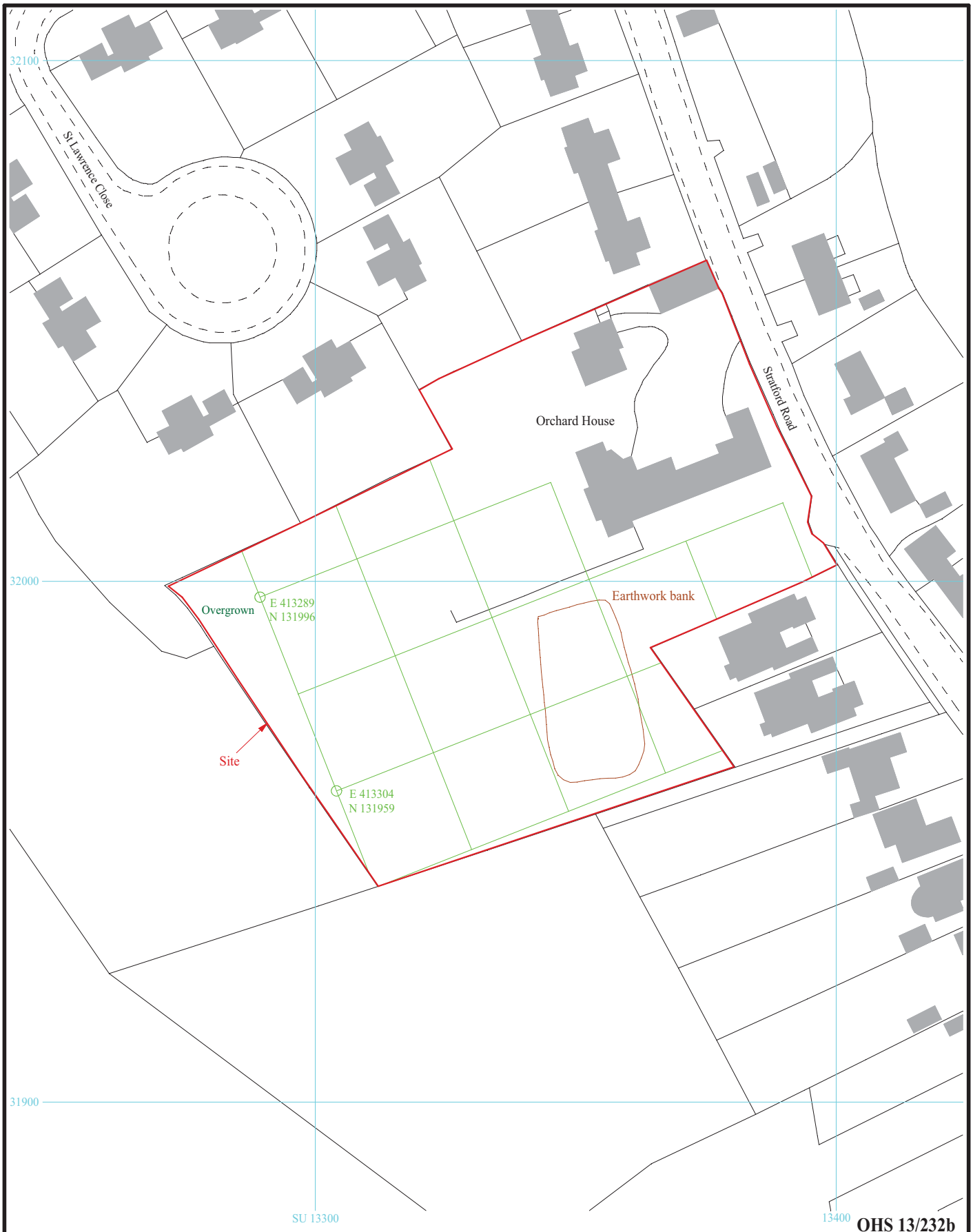

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Figure 2. Survey grid layout.

0 50m

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Figure 3. Plot of minimally processed gradiometer data.

+30 nT

-30 nT

0m 50m

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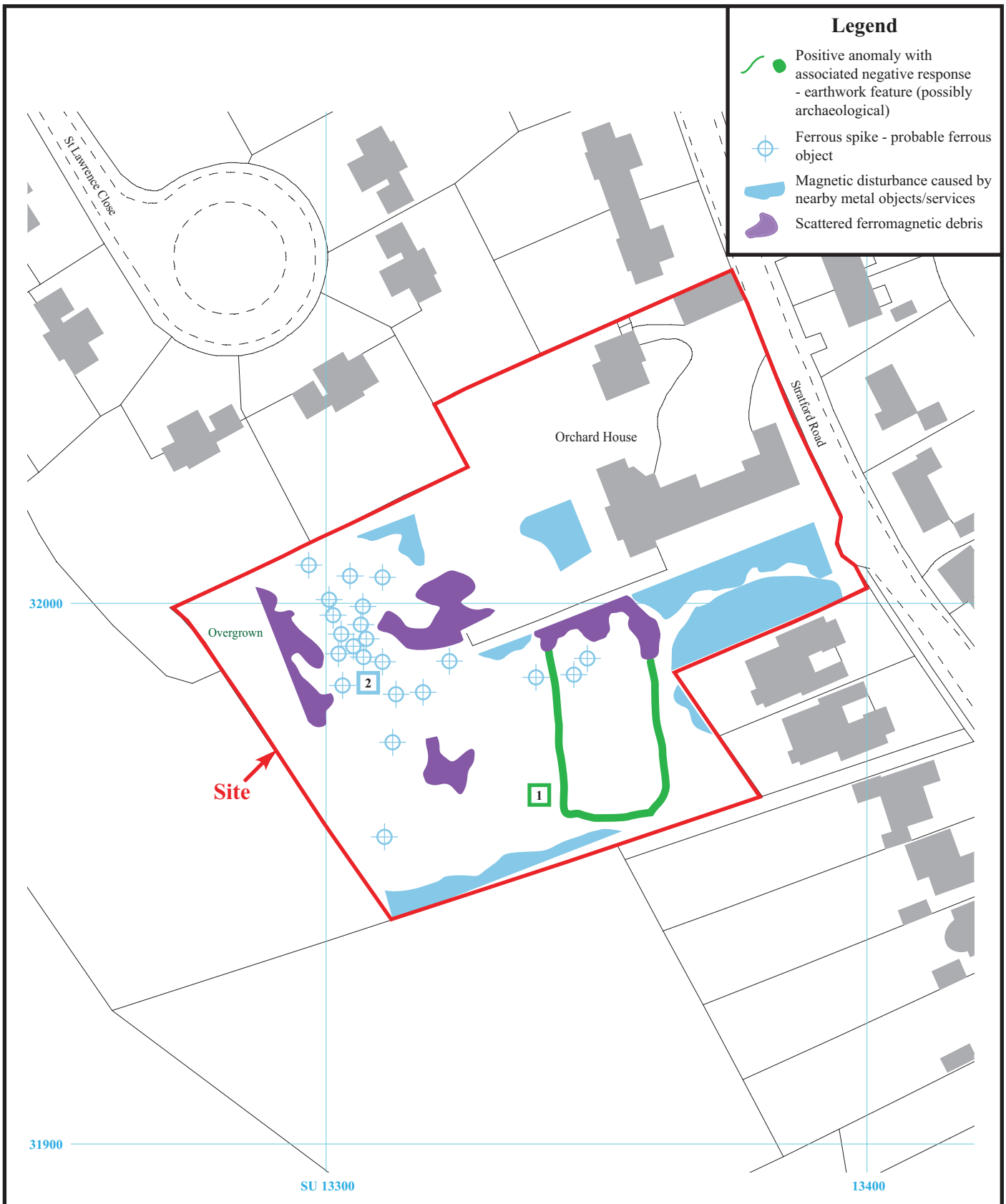

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Figure 4. Interpretation plot.

0m 50m

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Plate 1. The northern and western part of the site, looking north.

Plate 2. The southern part of the site, looking southwest, showing the concrete pads in the foreground and the earthwork bank in the centre (indicated).

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Plates 1 - 2.

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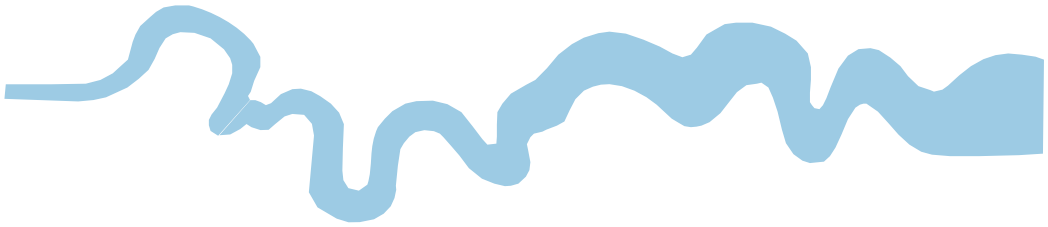
TIME CHART

	Calendar Years
Modern	AD 1901
Victorian	AD 1837
Post Medieval	AD 1500
Medieval	AD 1066
Saxon	AD 410
Roman	AD 43
Iron Age	BC/AD 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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