THAMES VALLEY
ARCHAEOLOGICAL
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Land off Salisbury Road, Hungerford, West Berkshire

Geophysical Survey (Magnetic)

by Rebecca Constable

Site Code: SRH11/124

(SU 3355 6733)

Land off Salisbury Road, Hungerford, West Berkshire

Geophysical Survey (Magnetic) Report

For Cala Homes and Wates Homes

by Rebecca Constable

Thames Valley Archaeological Services Ltd

Site Code SRH
11/124

January 2016

Summary

Site name: Land off Salisbury Road, Hungerford, West Berkshire

Grid reference: SU 3355 6733

Site activity: Magnetometer survey

Date and duration of project: 11th-22nd January 2016

Project manager: Steve Ford

Site supervisor: Rebecca Constable

Site code: SRH 11/124

Area of site: 10.9 ha

Summary of results: The geophysical survey was successfully undertaken across the majority of the site. It recorded several anomalies which may represent buried features including a boundary ditch and a number of probable back-filled quarry pits. Overall, there are few anomalies that may be considered to be of archaeological interest.

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✓ 10.02.16
Andrew Mundin✓ 10.02.16

by Rebecca Constable

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Land off Salisbury Road, Hungerford, West Berkshire (SU 3355 6733) (Fig. 1). The work was commissioned by Paul McCann, of Cala Homes Limited, Riverside House, Hotspur Lane, Wooburn Green, High Wycombe, Buckinghamshire, HP10 0TJ on behalf of Cala Homes and Wates Homes.

Planning permission is to be sought from West Berkshire Council for residential development. This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2012), and the Council's policies on archaeology. The field investigation was carried out to a specification approved by Alex Godden, Archaeological Officer, Cultural and Environmental Protection, West Berkshire Council, Market Street, Newbury, RG14 5LD. The fieldwork was undertaken by Peter Banks, Rebecca Constable and Ellen McManus-Fry between 11th to 22nd January 2016 and the site code is SRH 11/124.

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

Location, topography and geology

The site consists of open agricultural land, 10.9 hectares in size, with a public footpath running along the edges of the site. The site is bounded along the western side by Salisbury Road, a housing development to the north and east, and agricultural land to the south. The site is mostly located on clay-with-flints and tertiary debris overlying chalk, with the possibility that the southern end lies on upper chalk (BGS 1971). Topographically, the land rises up from *c*.126m above Ordnance Datum (aOD) in the south-eastern corner to *c*.130m aOD in the north-western corner.

Site history and archaeological background

A desk-based assessment (Ford 2011) has previously highlighted the archaeological potential of the site. In summary, the archaeological potential of the Kennet Valley is very high, with finds and features from various

periods which have previously been well studied (Gates 1975; Lobb and Rose 1996). The valley floor between Thatcham and Hungerford is well known for its dense Mesolithic settlement (Froom 1971; Chisham 2006). Multi-period occupation was recorded at Charnham Park, north-west of Hungerford, with deposits representing the Upper Palaeolithic, Mesolithic, Bronze Age, Saxon and medieval periods (Ford 2002).

There are a number of circular and linear cropmarks just to the south of the site, visible from the air, which may be of archaeological origin. Aerial photographs of the site (Richards 1978; National Mapping Programme 1996) reveal cropmarks denoting two parallel linear features and irregular dark patches thought to have been small scale clay pits. The linears may not be of archaeological origin. Traces of cropmarks can be seen to show two possible ring ditches in the area; one of the possible ring ditches is located to the eastern side of the field.

Methodology

Sample intervals

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 up along the major axis of both the eastern and western fields, on alignment with the southern field boundary. Both fields were successfully laid out on the same grid alignment, with the only obstruction being a well-used public footpath running along the eastern boundary of the western field.

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 Chartered Institute *for* Archaeologists (2002, 2011, 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 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 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.

A Trimble Geo7x handheld GPS system with sub-decimetre real-time 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 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 -3.00 to 3.00 nT	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
Interpolate: y doubled	Increases the resolution of the readings in the y axis, enhancing the shape of 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.

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.7.58.00, 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 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 2.6.1 Brighton 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 geophysical survey produced a number of positive magnetic anomalies of archaeological interest in both the western and eastern fields (Fig. 4). Positive anomalies are commonly representative of cut or buried features, which can be of archaeological or agricultural origin.

The results from both fields display a number of ferrous spikes scattered across the entire site. However, there is a high concentration of spikes towards the eastern boundary of the eastern field. Ferrous spikes are usually indicative of surface debris, such as waste products or remnants of agricultural equipment. The eastern field is bounded to the east by a school and a housing development; it seems likely, then, that the concentration of ferrous spikes along this boundary is caused by waste products from the surrounding area.

West Field

The most striking result produced from the geophysical survey is a linear positive anomaly **[Fig. 4: 1, 5 and 6]** that seemingly stretches across both the western and eastern fields on a slight north-west to south-east alignment. This most likely represents a buried ditch of archaeological origin. The linear is truncated by the public footpath separating the two fields, but appears to continue into the eastern field.

Connected to the long buried ditch feature, in the eastern part of the field, are three small sub-circular anomalies **[2, 3, and 4]**. It is probable that these readings represent small buried pits, possibly associated with the buried ditch.

The northern half of the field contains a number of small clusters of small circular positive readings [7, 8 and 9]. These circular anomalies appear to be random in placement and do not appear to be associated in any way. It seems likely that they represent small buried pits, which could either represent quarry pits or clay pits.

There are also a number of larger, isolated circular anomalies present across the field, seeming to represent cut archaeological pits [10, 15, 16 and 17]. As with the small clusters, these larger anomalies do not appear to be associated, and likely also represent buried pits.

The western field contains two weak, sub-circular positive anomalies. The weak anomalies are larger than the strong results described above, and are more regular in shape. It is probable that these results are also representative of cut or buried archaeological features.

East Field

As previously mentioned, the long linear feature [1] appears to extend into the eastern field. The linear is disrupted approximately halfway across the field by a small cluster of positive and negative archaeological anomalies [20 and 21].

A relatively small, circular strong positive reading [18] along the western field boundary likely represents a cut or buried pit similar to those in the western field.

As is the case with the previous field, the eastern field also contains clusters of small, circular anomalies [11 and 12] that represent buried quarry or clay pits. These clusters are randomly placed and do not appear to be associated.

There are numerous weak positive circular readings present in the eastern field [19, 22, 23 and 26]. The weak anomalies are represented both in clusters and singularly, and differ significantly in size. They are likely buried pits of archaeological origin.

In the south-west corner of the field, there are two weak linear positive anomalies [24 and 25] on a slight south-west to north-east alignment. The linear anomalies are on a similar alignment, and seem similar in size. The upper linear [25] appears to be truncated by the long linear crossing both fields. These linear readings are probably buried ditches of archaeological origin.

Disrupting the long buried ditch is a cluster of positive sub-circular anomalies [20] surrounding a singular, irregularly shaped negative anomaly [21]. It is possible that the negative magnetic reading represents earthworks that are archaeological in nature. The sub-circular anomalies, presumably buried quarry or clay pits, conform to the shape of the negative anomaly, and as such could be associated.

To the east of the latter cluster, there are three small associated curvilinear anomalies **[27]**. These magnetic readings appear to be representative of very small enclosures.

|Finally along the eastern boundary of the eastern field is an area of magnetic disturbance. This disturbance is certainly caused by the presence of a metal fence surrounding a school to the east of the site.

Conclusion

A number of positive magnetic anomalies and numerous ferrous spikes were found across both fields. In the eastern field, a negative anomaly appearing to represent an earthwork can be seen, disrupting the main linear anomaly that stretches across both fields. The majority of positive magnetic anomalies appear to represent small quarry or clay pits. An exception to this is a small collection of curvilinear anomalies, possibly representing small enclosures. Also, two small linear readings are present in the south-west corner of the eastern field, which are likely to be associated and possibly of archaeological origin. There is also an area of magnetic disturbance paralleling a metal fence, surrounding a school, bordering the eastern boundary of the site.

The representation of a long linear and numerous buried pits supports the interpretation of crop marks discovered through the use of aerial photography, seeming to show two linear features, possibly archaeological in origin, and numerous dark, circular patches thought to be small scale clay pits.

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Appendix 1. Survey and data information

Programme:
Name: TerraSurveyor
Version: 3.0.25.0

Raw data-

Western Field

Direction of 1st Traverse: 0 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 2047.5

Dimensions
Composite Size (readings): 880 x 720
Survey Size (meters):   220 m x 360 m
Grid Size: 20 m x 20 m
X Interval: 0.25 m
Y Interval: 0.5 m (surveyed @ 1 m)

Source Grids: 172

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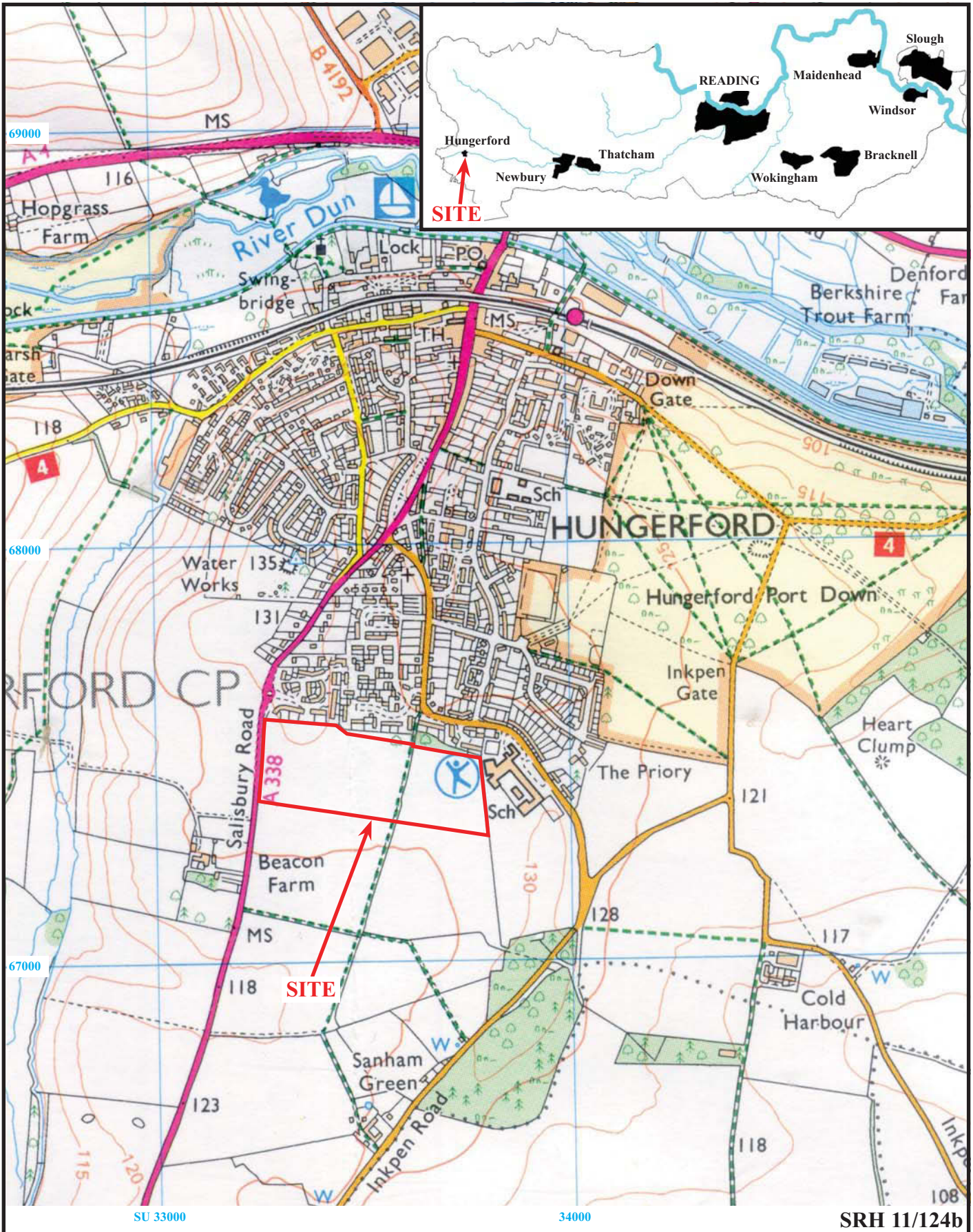
SITE

SITE

SRH 11/124b

Land off Salisbury Road, Hungerford,
West Berkshire, 2016
Geophysical Survey (Magnetic)

Figure 1. Location of site within Hungerford and West Berkshire.

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67500

67400

67300

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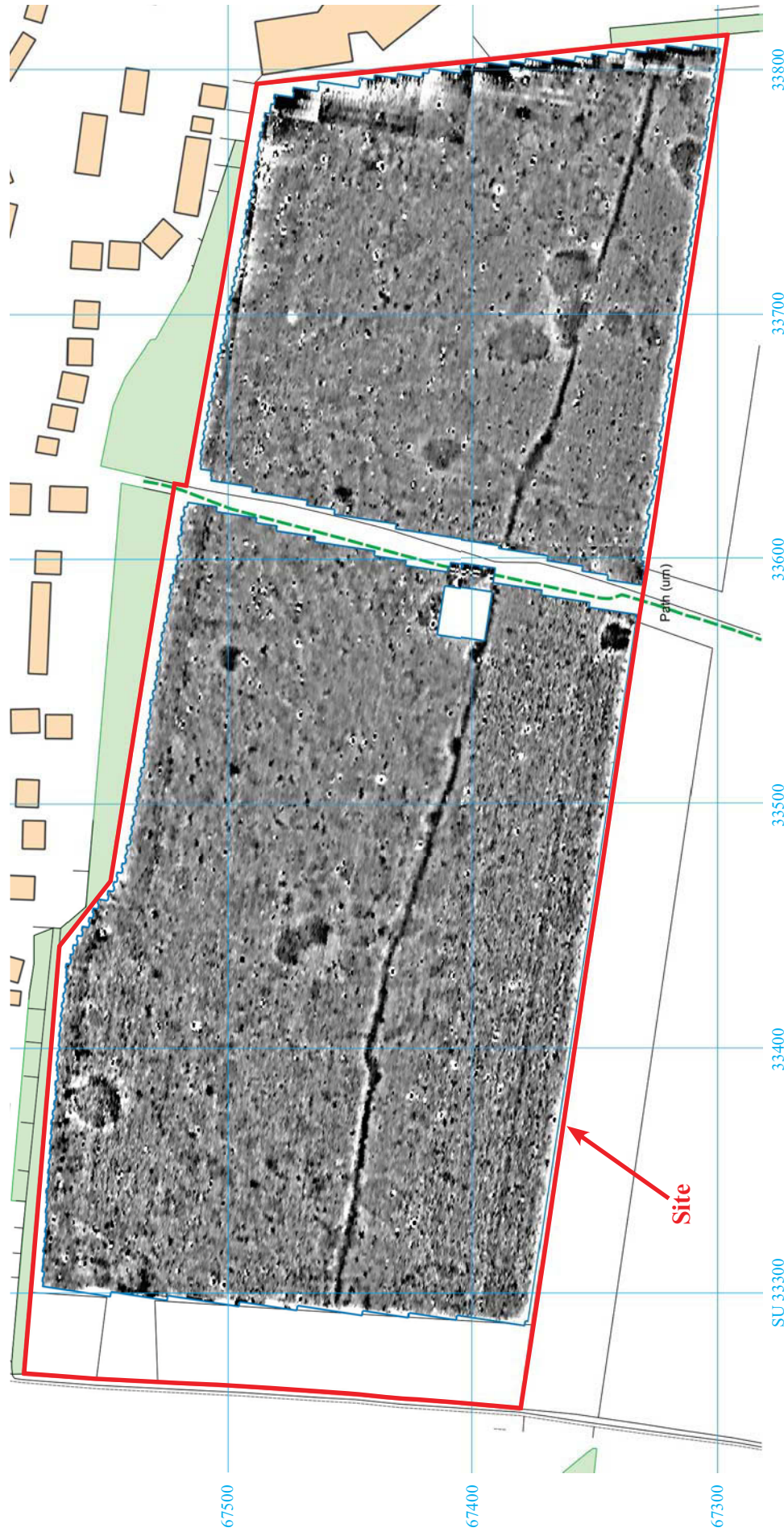
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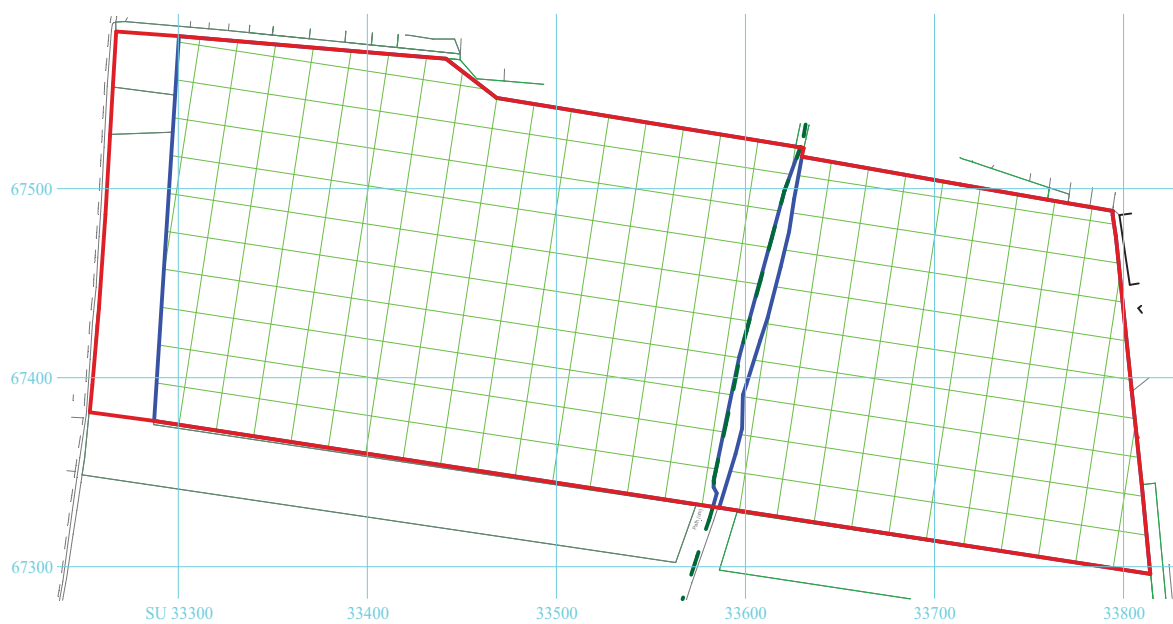
Land off Salisbury Road, Hungerford,
West Berkshire, 2016
Geophysical Survey (Magnetic)

Figure 2. Survey grid layout.
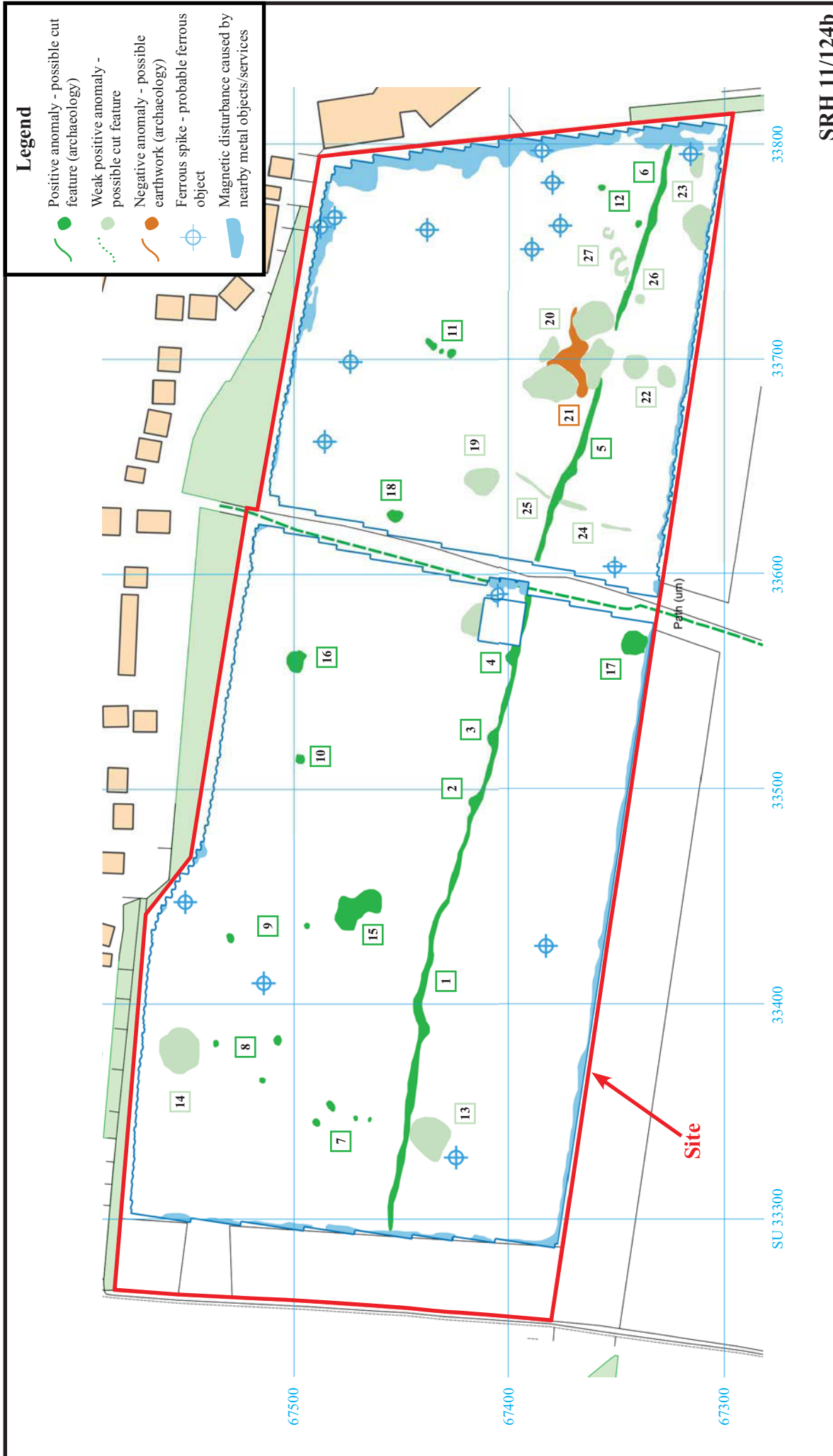
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Land off Salisbury Road, Hungerford,
West Berkshire, 2016
Geophysical Survey (Magnetic)
Figure 3. Plot of minimally processed gradiometer data.

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Legend

- Positive anomaly - possible cut feature (archaeology)
- Weak positive anomaly - possible cut feature
- Negative anomaly - possible earthwork (archaeology)
- Ferrous spike - probable ferrous object
- Magnetic disturbance caused by nearby metal objects/services

SRH 11/124b

Land off Salisbury Road, Hungerford, West Berkshire, 2016 Geophysical Survey (Magnetic)

Figure 4. Interpretation plot.

Site

Path (urn)

0m   100m

N

Plate 1. Eastern field, looking north-east. A school and housing development border the eastern and northern boundaries.

Plate 2. Western to eastern fields, facing north-west. The fields are separated by a public footpath and a hedgerow.

Plate 3. Western field, looking west. Bounded to the west and north by Salisbury Road and housing developments.

Plate 4. Western field, looking north-east. Showing very wet conditions.

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**Land off Salisbury Road, Hungerford,
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Geophysical Survey (Magnetic) Report**
Plates 1 - 4.

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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
	BC/AD
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
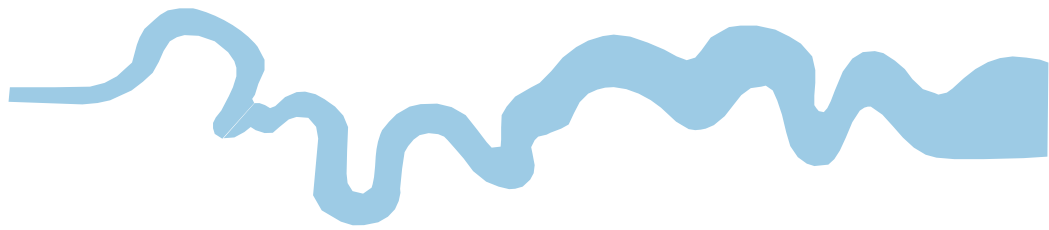
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