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# Land at Stoneham Farm, Tilehurst, Reading, West Berkshire

**Geophysical Survey**

**by Kyle Beaverstock**

**Site Code: SFT18/85**

**(SU 6560 7469)**

# Land at Stoneham Farm, Tilehurst, Reading, West Berkshire

**Geophysical Survey (Magnetic) Report**

**For Horstonbridge Thames Valley Limited**

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code SFT 18/85

**July 2019**

## Summary

**Site name:** Land at Stoneham Farm, Tilehurst, Reading, West Berkshire

**Grid reference:** SU 6560 7469

**Site activity:** Magnetometer survey

**Date and duration of project:** 4th July 2019

**Project coordinator:** Tim Dawson

**Site supervisor:** Kyle Beaverstock

**Site code:** SFT18/85

**Area of site:** 3.2ha

**Summary of results:** Although most of the site was represented by magnetic disturbance, debris and spikes as well as geological anomalies, a number of possible pits of possible archaeological interest were detected by 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✓ 26.07.19 |
| | Tim Dawson✓ 25.7.19 |




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# Land at Stoneham Farm, Tilehurst, Reading, West Berkshire
# A Geophysical Survey (Magnetic)

by Kyle Beaverstock

**Report 18/85**

## Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Stoneham Farm, Tilehurst Reading, West Berkshire (SU 6560 7469) (Fig. 1). The work was commissioned by Matthew Jeal of Country Estates Ltd. and Darcliffe Homes Ltd. on behalf of Horstonbridge Thames Valley Ltd. The Wine Store, 7 Brewery Court, Theale, RG7 5AJ.

Planning permission (16/01223/OUTMAJ) has been gained from West Berkshire Council for the development of a parcel of land of 3.2ha (2.8ha developable) at Stoneham Farm. The consent is subject to a condition (6) relating to archaeology. This is in accordance with the Ministry of Communities and Local Government's *National Planning Policy Framework* (NPPF 2018), and the County's policies on archaeology. The field investigation was carried out to a specification approved by Ms Sarah Orr, Senior Archaeologist for West Berkshire Archaeology. The fieldwork was undertaken by Kyle Beaverstock and Daniel Neal on the 4th of July 2019 and the site code is SFT18/85.

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 far western edge of Tilehurst 6km west of Reading, 1.6km southwest of the River Thames and 2km east of the River Pang (Fig. 2). The site is bounded by Long Lane in the south and southeast, residential property to the southwest and northeast and open farmland to the northwest. This irregular rectangular parcel of meadow land is currently not being utilised and the underlying geology is stated as Winter Hill Gravel (BGS 2000).

## Site history and archaeological background

The archaeological potential of the area stems from its location on the margins of the archaeologically rich Kennet Valley with a wealth of sites and finds recorded from the air, gravel extraction and development (Dils 2013; Gates 1975; Raymond 1997). However, few sites or finds of interest are recorded in the vicinity of the site.

The most significant site is that of Stoneham Farm itself. The farm is documented on Rocque's map of Berkshire in 1767 (and subsequent maps) and has early post-medieval origins. It is possible therefore that the site has late medieval origins.

## 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 southeast to northwest zig-zag orientation across the survey area. In the south-eastern area of the field and along the north-eastern boundary there was dense overgrowth cover, in the north-western corner a rectangular area had been marked out with earth bunds and used for storage, this prevented these areas from being surveyed. Conditions were dry and sunny.

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 -5.50 to 5.53 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

A range of magnetic anomalies were recorded across the survey area (Fig. 3). In the southern area of the site, running east to west, is a bipolar linear anomaly, most likely a service pipe or cable. To the northeast and northwest of this at the site boundary as well as in the northwest corner of the site is further magnetic disturbance most likely caused by interference from the metal fencing. On the northern side of the service is an area of magnetic debris, this consists of a number of dipolar anomalies spread over an area. Its relatively low amplitude suggests that this represents general ground disturbance. In the centre of the site are several large areas of low-level positive responses; their lack of form and size suggests they are geological in nature.

Across the site there are a number of magnetic spikes, these points have a relatively high amplitude and usually represent buried ferrous objects. In the northeast of the site are three dipolar positive responses of a low amplitude **[Fig. 4: 1]**, these therefore may represent pits or another discrete cut feature. In the west of the site is a rounded positive anomaly that most likely represents a pit **[2]**, and in the far south is a line of circular positive anomalies that may represent pits or possibly large postholes **[3]**.

## Conclusion

The majority of the site was successfully surveyed and within this were recorded several areas of magnetic disturbance most notably in the western and southern parts of the site. Across the site as a whole are several large positive anomalies which may indicate geological changes or quarry pits, as well as numerous magnetic spikes. Of a possible archaeological nature are a number of rounded dipolar and positive anomalies, a cluster of three near the north-eastern boundary, a larger one in the west and a line of three in the far south. These possibly represent pits or large postholes and may be archaeological in origin.

## References


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Raymond, F, 1997, 'The investigation of Roman and medieval settlements found during the construction of the Theale to Bradfield pipeline, *Berkshire Archaeol J* **75** (for 1994–7), 41–73

# Appendix 1. **Survey and data information**

**Programme:**
Name: TerraSurveyor
Version: 3.0.25.0

**Raw data**

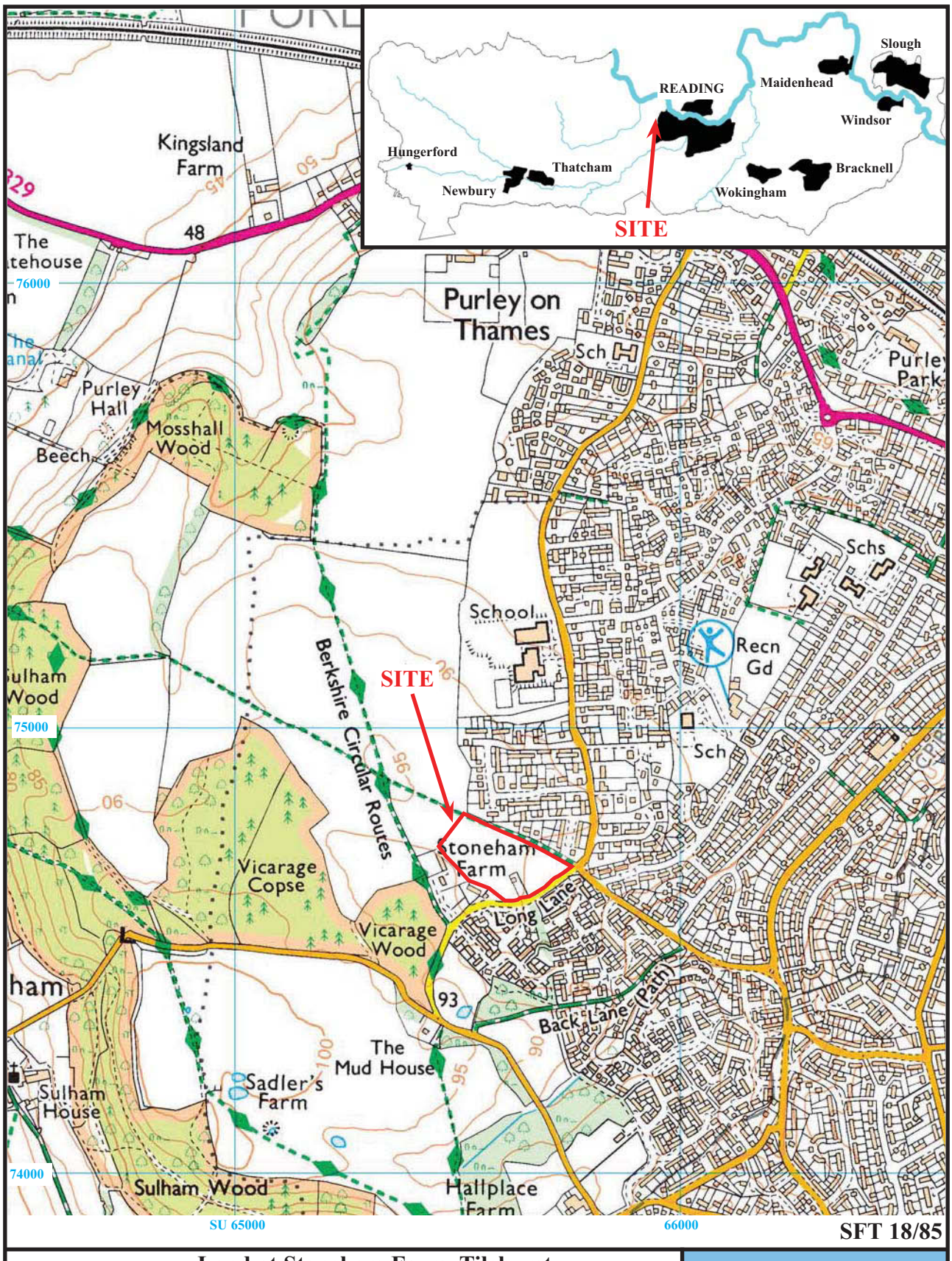
Filename: tilehurst RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 465482.27579949, 174804.165640573 m
Southeast corner: 465739.80579949, 174610.855640573 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions
Survey Size (meters): 258 m x 193 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 76423, Recorded: 76423

Stats
Max: 107.13
Min: -109.74
Std Dev: 9.32
Mean: -0.47
Median: -0.13
Composite Area: 4.9783 ha
Surveyed Area: 2.1506 ha

**Processed data**
Stats
Max: 5.53
Min: -5.50
Std Dev: 1.58
Mean: 0.09
Median: -0.02
Composite Area: 4.9783 ha
Surveyed Area: 2.1506 ha

GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to UTM).
3 DeStripe Median Traverse:
4 Despike Threshold: 1 Window dia: 3
5 Clip from -5.00 to 5.00




**Land at Stoneham Farm, Tilehurst,**
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Figure 1. Location of site within Tilehurst and Berkshire.



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Figure 2. Plot of raw gradiometer data.

0m 100m

+100
nT
-100

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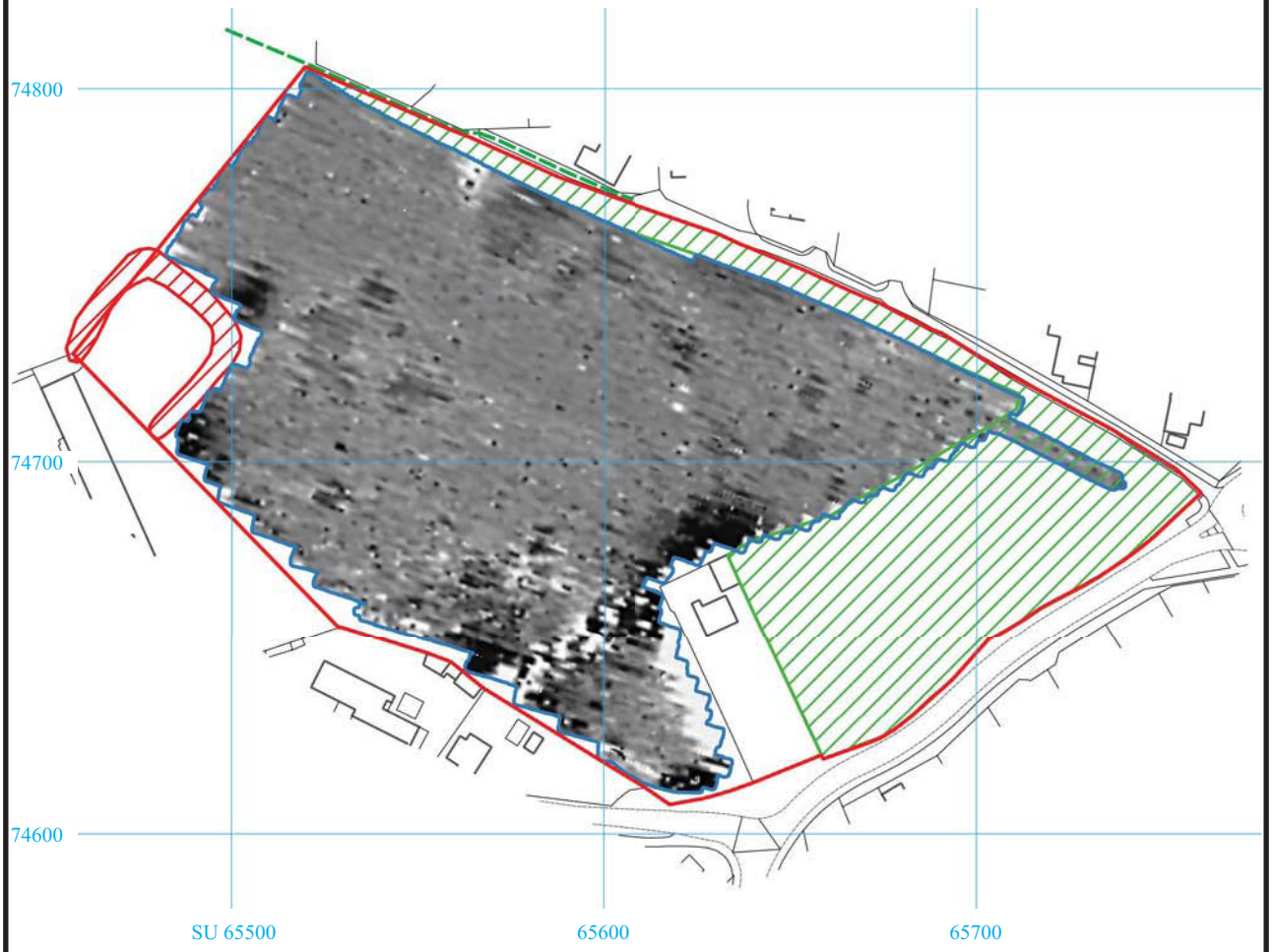


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Figure 3. Plot of minimally processed gradiometer data.

0m 100m

+5.5
nT
-5.5

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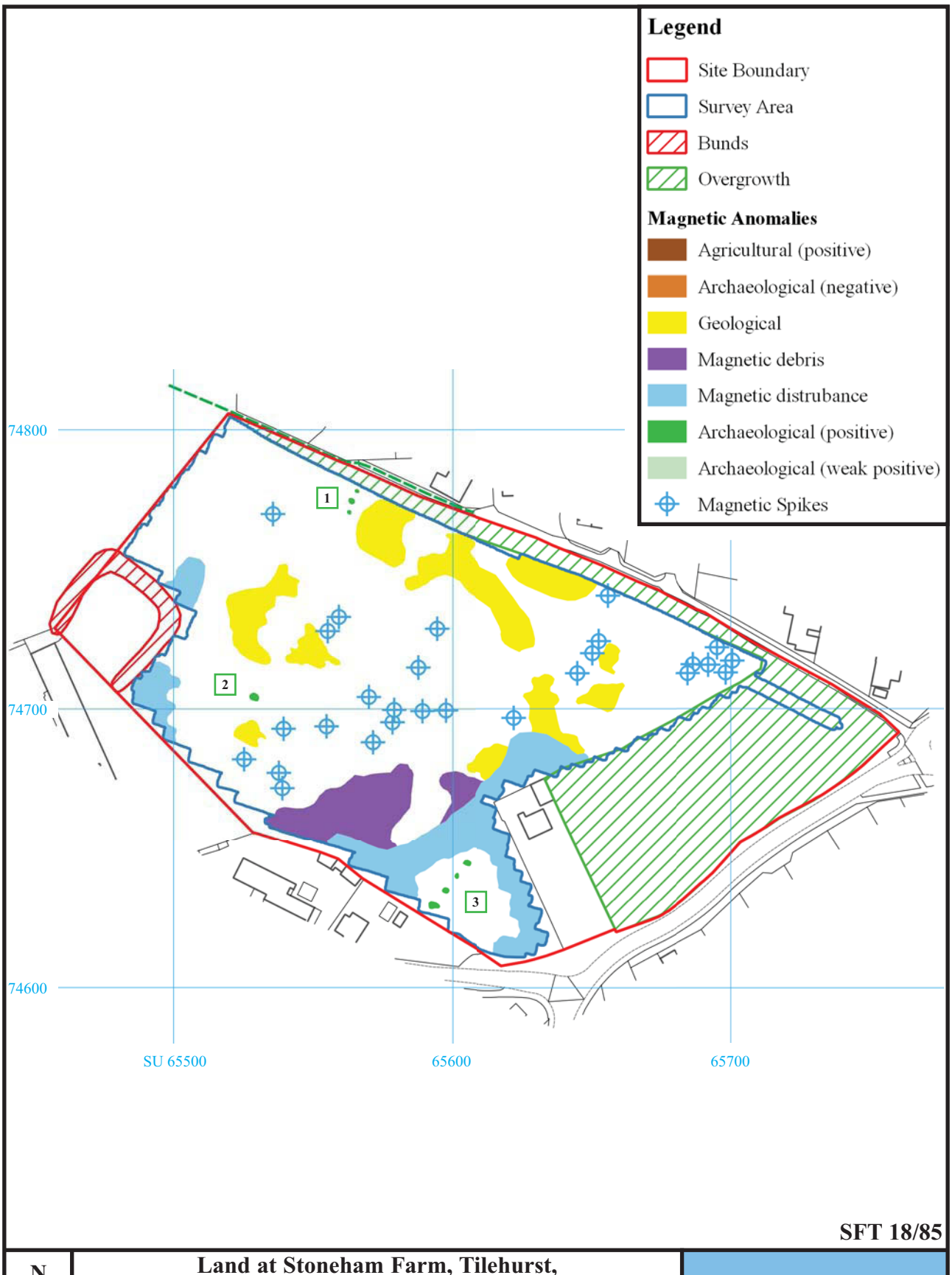


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Figure 4. Interpretation plot.

0m 100m

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Plate 1. Western part of survey area looking northwest

Plate 2. Eastern part of field looking southeast

Plate 3. Overgrown area in the south of the field looking southeast

Plate 4. Bund in northwest of field looking south

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**Land at Stoneham Farm, Tilehurst, Reading, West Berkshire, 2019**
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Plates 1 to 4.

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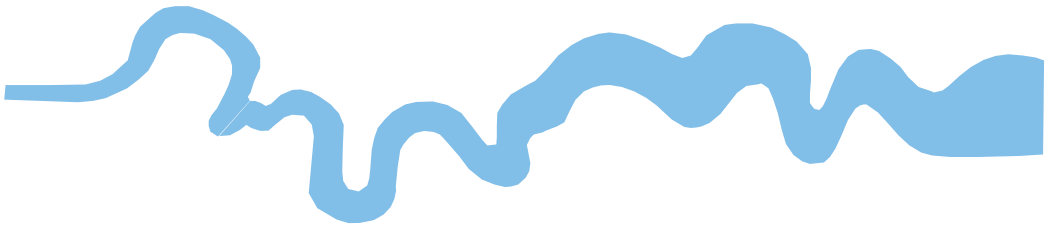
# TIME CHART

| | Calendar Years |
|---|---|
| Modern | AD 1901 |
| Victorian | AD 1837 |
| Post Medieval | AD 1500 |
| Medieval | AD 1066 |
| Saxon | AD 410 |
| Roman | AD 43 |
| | 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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