THAMES VALLEY

ARCHAEOLOGICAL

SERVICES

Land at Braywick Park, Braywick, Maidenhead, Berkshire

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: BRM17/116

(SU 8935 7981)

Land at Braywick Park, Braywick, Maidenhead, Berkshire

Geophysical Survey (Magnetic) Report

For The Royal Borough of Maidenhead and Windsor

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code BRM 17/116

November 2017

Summary

Site name: Land at Braywick Park, Braywick, Maidenhead, Berkshire

Grid reference: SU 8935 7981

Site activity: Magnetometer survey

Date and duration of project: 9th - 10th of November 2017

Project manager: Steve Ford

Project coordinator: Tim Dawson

Site supervisor: Kyle Beaverstock

Site code: BRM17/116

Area of site: *c*. 3.4ha

Summary of results: Over the course of the geophysical survey several anomalies were detected, however all can be attributed to modern agricultural activity and the site's current land use.

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✓ 20.11.17
	Tim Dawson✓ 20.11.17

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Land at Braywick Park, Maidenhead, Berkshire
A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 17/116

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Braywick Park, Maidenhead, Berkshire (SU 89345 79806) (Fig. 1). The work was commissioned by Mr Richard Clayton of Burke Rickhards Ltd Devcor House, 91 North Hill, Plymouth, Devon PL4 8JT on behalf of The Royal Borough of Maidenhead and Windsor.

An application is to be made to the Royal Borough of Windsor and Maidenhead council for the construction of a new leisure centre on land at Braywick Park, Maidenhead, Berkshire. Due to the archaeological potential, conditions relating to archaeology are likely and, as such, a geophysical survey was requested in order to inform the application.

This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2012) and the Borough's policies on archaeology. The field investigation was carried out to a specification approved by Roland Smith, Archaeology Officer for Berkshire Archaeology. The fieldwork was undertaken by Kyle Beaverstock, Thomas Stewart, Ashley Kruger and Daniel Haddad between the 9th and 10th of November 2017 and the site code is BRM 17/116.

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 within Braywick Park to the south of Maidenhead and on the eastern side of Braywick Road. The site is bounded by fencing with Braywick Road to the west, Braywick Heath Nurseries and car park to the north Braywick Cemetery to the south and open land to the east. This rectangular parcel of land is currently being used as golf driving range and is largely flat at a height of *c*.26.5m above Ordnance Datum (Pl. 1-4). The underlying geology is recorded as Floodplain Gravel in the west and alluvium in the east (BGS 1981).

Site history and archaeological background

The archaeological potential of the site has been highlighted in a desk-based assessment (Baljkas 2017). In summary site lies within the archaeologically rich Thames Valley with a range of sites and finds recorded locally. The route of a suspected Roman road is thought to traverse the site and therefore any related deposits may be damaged by any subsequent groundworks,

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. Over the course of the geophysical Survey a number of obstacles were encountered as well as several objects that were likely to cause interference. A high fence along the western part of the northern boundary prevented any further surveying as well as causing significant interference due to its ferrous composition. A tree line running south-east to north-west in the east with accompanying overgrowth as well as several large trees in the south-west area of the site prevented surveying of these specific areas. There were also several ferrous meter marker points relating to the driving range running down the centre of the site which also caused some interference.

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 -1.80 to 2.20 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.

The raw data plot is presented as a greyscale plot shown in relation to the site (Fig. 3) with the processed data then presented as a second figure (Fig. 4), followed by a third plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 5). 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 2.16.2 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 considerable amount of magnetic disturbance was recorded across the site area (Figs. 3 and 4). These were largely associated with ferrous objects relating to the golf driving range and comprise strong bipolar or dipolar responses which may mask features. The north-eastern area of the site is shown to have magnetic debris, the strong dipolar response indicates that this is likely to be of ferrous origin and is probably the former sand and gravel quarry which was subsequently backfilled with landfill (Baljkas 2017). In the south eastern area of the site there is a circular area of magnetic debris, this is most likely due to a pit or hollow that has been filled with magnetically enhanced material. Along the southern edge of the site there is a positive linear anomaly with an associated negative response running from the south-west to the north-east. This is most likely related to a modern service as cut features or earthworks are generally magnetically weaker. Across the centre of the site there is a series of parallel linear positive anomalies running south-west to north-east **[Fig. 5: 1]**, these represent cut features, which, due to their layout, most likely indicate buried plough furrows.

Conclusion

In conclusion, although several magnetic anomalies were detected, all can be attributed to modern agricultural and industrial activity or the site's current use as a golf driving range. The eastern area of the site has been especially disturbed by the former sand and gravel quarry. However the magnetic disturbance from numerous

ferrous objects may be masking weaker or more subtle anomalies which could indicate the presence of buried archaeological features.

References

Baljkas, G, 2017, Braywick Leisure Centre, Braywick Park, Maidenhead, Berkshire, archaeological desk-based assessment, Thames Valley Archaeological Services report BRM17/116, Reading

BGS, 1981, *British Geological Survey*, 1:50,000, Sheet 269, Solid and Drift Edition, Keyworth

CI*f*A, 2002, *The Use of Geophysical Techniques in Archaeological Evaluation*, IFA Paper No. 6, Reading

CI*f*A, 2011, *Standard and Guidance: for archaeological geophysical survey*, Reading

CI*f*A, 2014, *Standard and Guidance: for archaeological geophysical survey*, Reading

English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*, English Heritage, Portsmouth (2nd edn)

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
Survey corner coordinates (X/Y):
Northwest corner: 489277.78, 179652.54 m
Southeast corner: 489457.78, 179352.54 m
Direction of 1st Traverse: 324.03264 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 2047.5

Dimensions
Composite Size (readings): 720 x 320
Survey Size (meters): 180 m x 320 m
Grid Size: 20 m x 20 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 97.66
Min: -100.00
Std Dev: 51.67
Mean: -10.70
Median: -1.62
Composite Area: 5.76 ha
Surveyed Area: 3.1287 ha

Source Grids: 105
1 Col:0 Row:2 grids\98.xgd
2 Col:0 Row:4 grids\113.xgd
3 Col:0 Row:5 grids\114.xgd
4 Col:0 Row:6 grids\115.xgd
5 Col:0 Row:7 grids\116.xgd
6 Col:0 Row:8 grids\117.xgd
7 Col:0 Row:9 grids\118.xgd
8 Col:0 Row:12 grids\70.xgd
9 Col:0 Row:13 grids\71.xgd
10 Col:1 Row:0 grids\95.xgd
11 Col:1 Row:1 grids\96.xgd
12 Col:1 Row:2 grids\97.xgd
13 Col:1 Row:3 grids\119.xgd
14 Col:1 Row:4 grids\99.xgd
15 Col:1 Row:5 grids\100.xgd
16 Col:1 Row:6 grids\101.xgd
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18 Col:1 Row:8 grids\103.xgd
19 Col:1 Row:9 grids\104.xgd
20 Col:1 Row:10 grids\105.xgd
21 Col:1 Row:12 grids\67.xgd
22 Col:1 Row:13 grids\68.xgd
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102 Col:7 Row:13 grids\34.xgd
103 Col:7 Row:14 grids\35.xgd
104 Col:8 Row:3 grids\01.xgd
105 Col:8 Row:4 grids\02.xgd

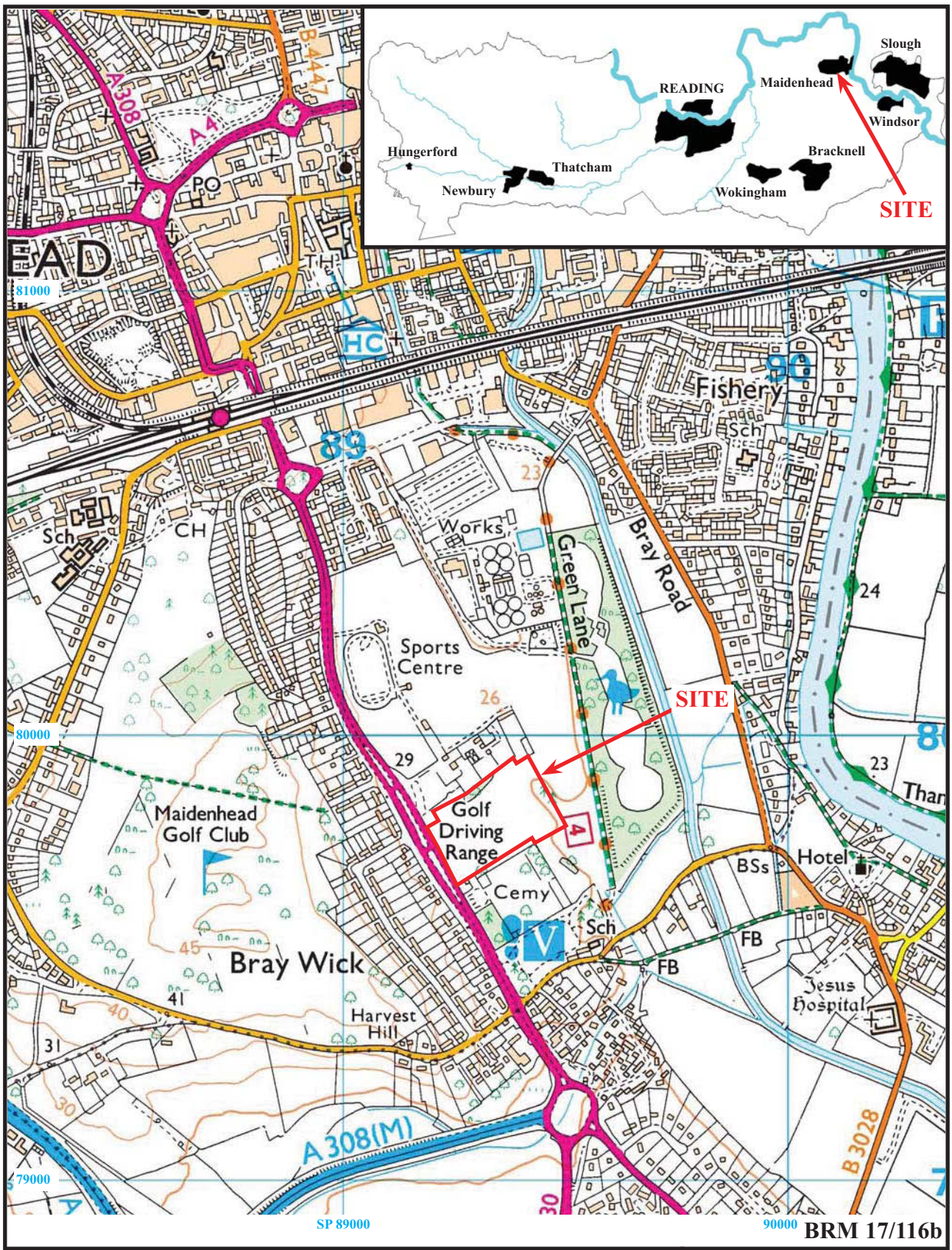
Processed Data

Stats

Max:	2.20
Min:	-1.80
Std Dev:	1.60
Mean:	0.10
Median:	0.00

Processes: 6

1 Base Layer
2 DeStripe Median Sensors: All
3 De Stagger: Grids: All Mode: Both By: -1 intervals
4 Despike Threshold: 1 Window size: 3x3
5 Interpolate: Y Doubled.
6 Clip from -1.80 to 2.20 nT



Land at Braywick Park, Braywick, Maidenhead, Berkshire, 2017
Geophysical Survey (Magnetic)

Figure 1. Location of site within Maidenhead and Berkshire.

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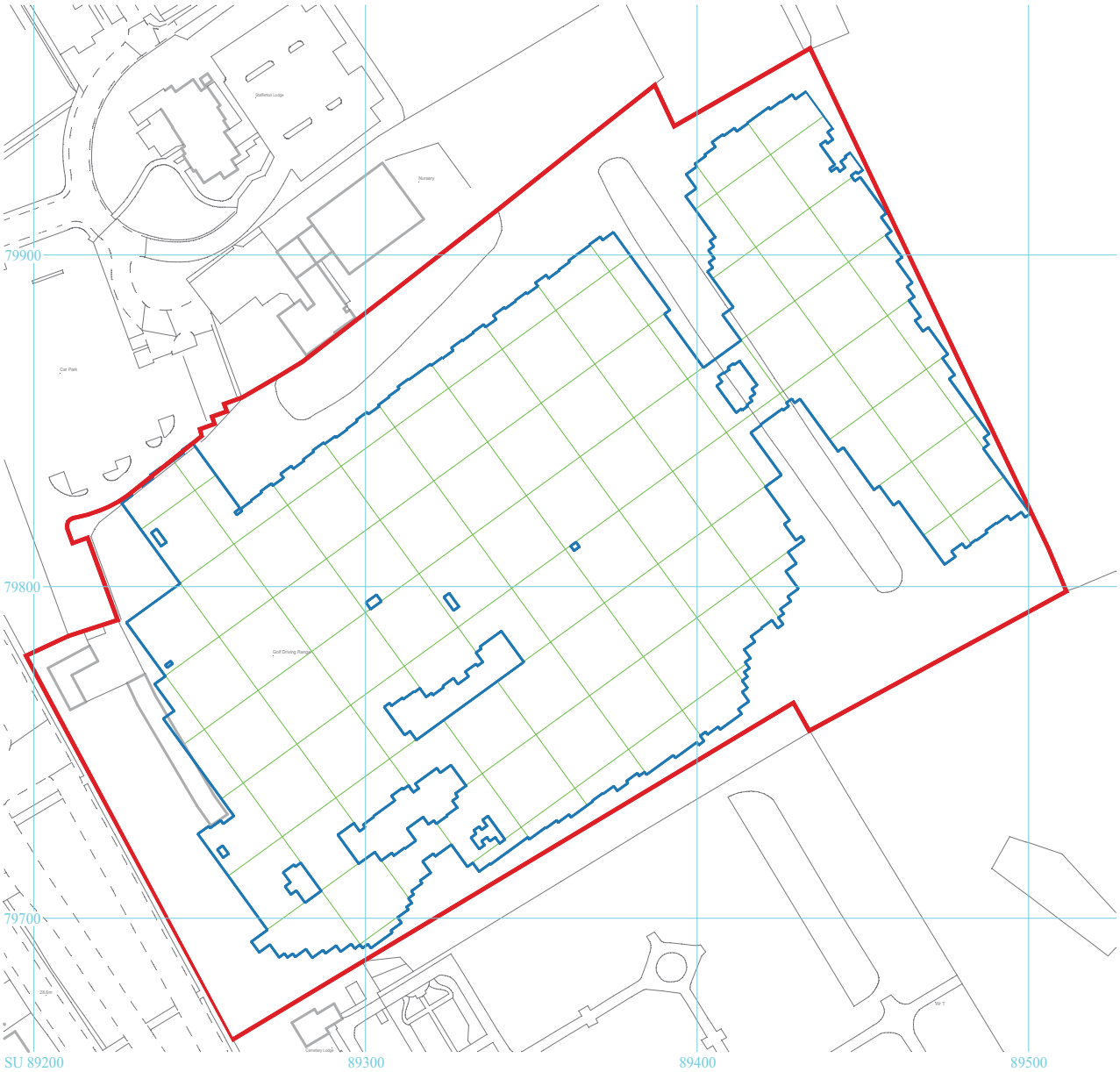

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Land at Braywick Park, Braywick, Maidenhead, Berkshire, 2017 Geophysical Survey (Magnetic)

Figure 2. Survey grid layout.

0 100m

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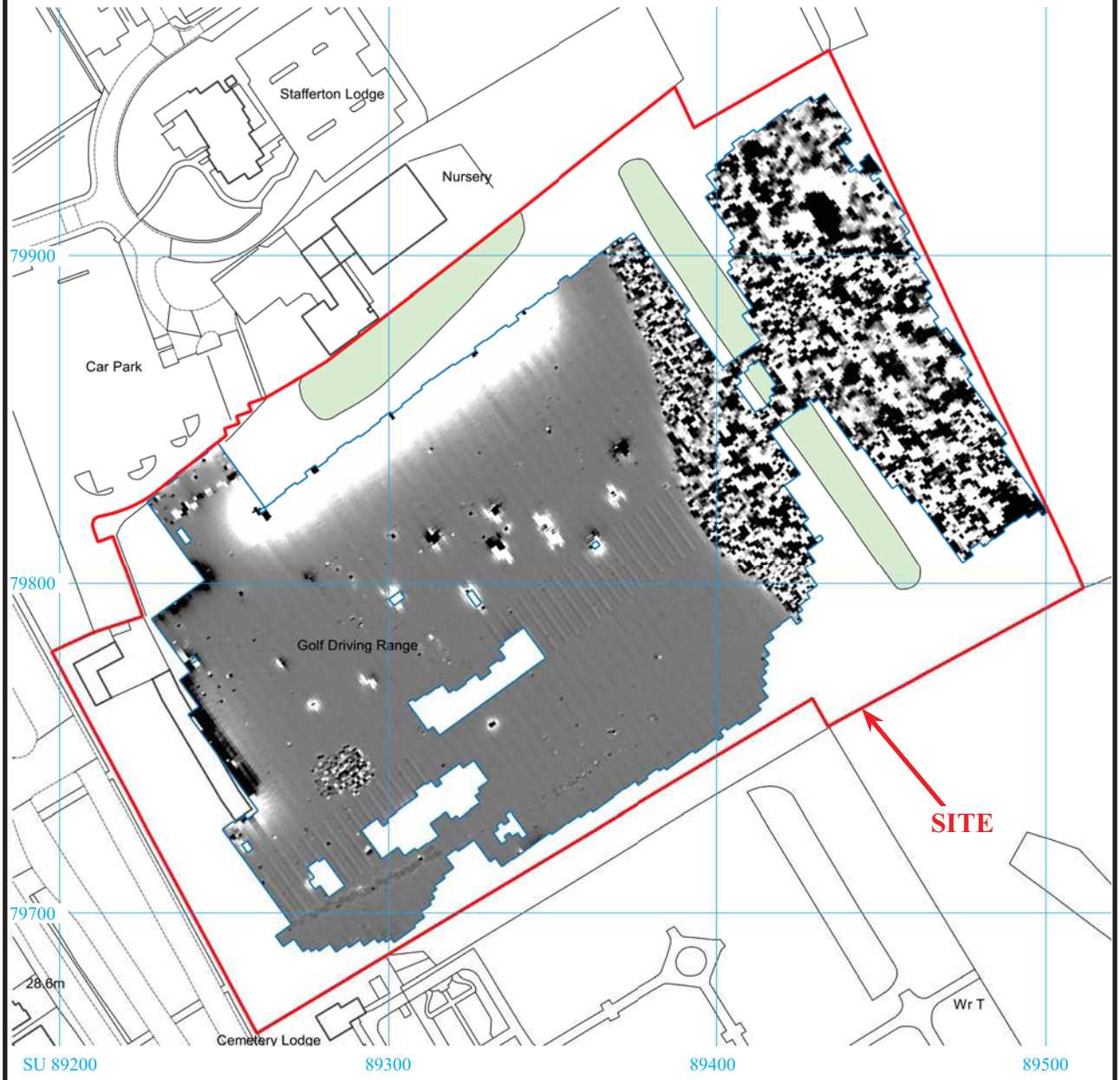

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Land at Braywick Park, Braywick, Maidenhead, Berkshire, 2017
Geophysical Survey (Magnetic)
Figure 3. Plot of raw gradiometer data.

0m 100m

+100
nT
-100

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N

Land at Braywick Park, Braywick, Maidenhead, Berkshire, 2017
Geophysical Survey (Magnetic)
Figure 4. Plot of minimally processed gradiometer data.

0m 100m

+2.2
nT
-1.8

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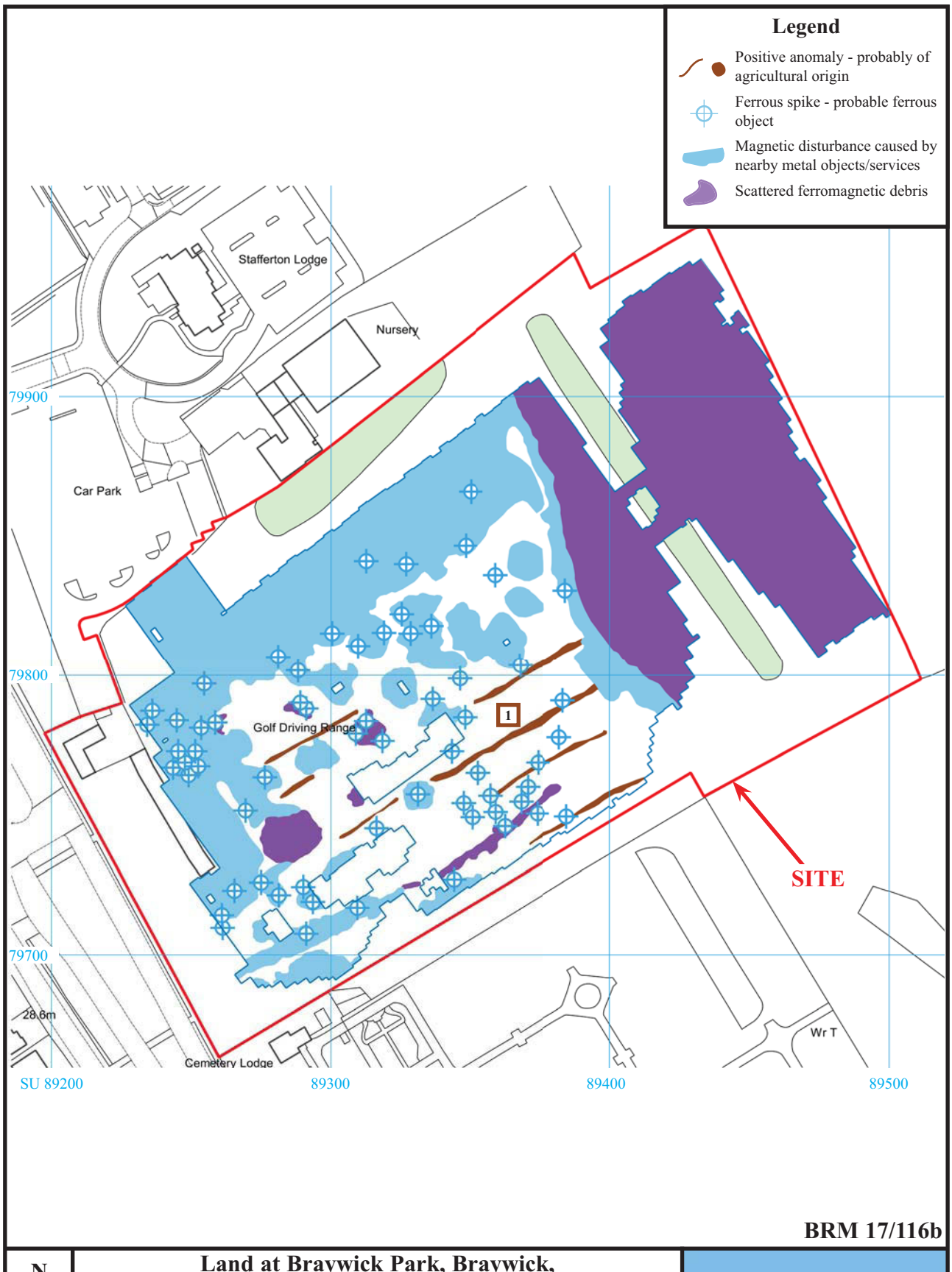

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Land at Braywick Park, Braywick, Maidenhead, Berkshire, 2017
Geophysical Survey (Magnetic)
Figure 5. Interpretation plot.

0m 100m

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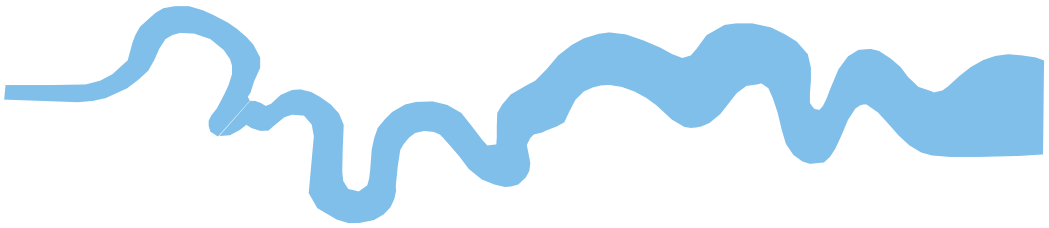
TIME CHART

	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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