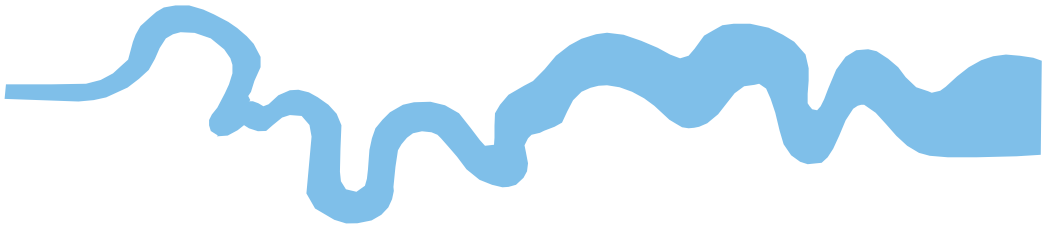
T V A S



SOUTH WEST

Land at Mells Road, Vobster Cross, Mells, Somerset

Geophysical Survey (Magnetic)

by Nicholas Dawson

Site Code: VCM17/106

(ST 7109 5109)

Land at Mells Road, Vobster Cross, Mells, Somerset

Geophysical Survey (Magnetic) Report

For CPM Group

by Nicholas Dawson

Thames Valley Archaeological Services Ltd

Site Code VCM 17/106

August 2017

Summary

Site name: Land at Mells Road, Vobster Cross, Mells, Somerset

Grid reference: ST 7109 5109

Site activity: Magnetometer survey

Date and duration of project: 14th -15th August 2017

Project manager: Agata Socha-Paszkiewicz

Site supervisor: Nicholas Dawson

Site code: VCM 17/106

Area of site: 2.9 ha

Summary of results: The survey was completed across the entire of the site but only magnetic anomalies that are most likely associated with agricultural activity were found.

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✓ 21.08.17
	Tim Dawson✓ 21.08.17

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Land at Mells Road, Vobster Cross, Mells, Somerset
A Geophysical Survey (Magnetic)

by Nicholas Dawson

Report 17/106

Introduction

This report documents the results of a geophysical survey (magnetic) carried out on Land at Mells Road, Vobster Cross, Mells, Somerset (ST 7109 5109 (Fig. 1). The work was commissioned by Daniel Bray of Ecus Limited, Unit 1, Woodland Business Village, Coronation Road, Basingstoke, RG21 4JX on behalf of CPM Group, Mells Road, Mells, Nr Frome, Somerset, BA11 3PD.

Planning permission (2017/0163/FUL) has been sought from Mendip District Council for the erection of a new production building with concrete batching plant as an expansion of the Mells CPM Works. This geophysical survey (magnetic) is intended to inform the planning application process. This is in accordance with the Department for Communities and Local Government's National Planning Policy Framework (NPPF 2012), and the District Council's policies on archaeology. The field investigation was carried out to a specification approved by Steven Membery, Senior Historic Environment Officer for the Somerset. The fieldwork was undertaken by Nicholas Dawson and Piotr Wrobel, on the 14th and 15th August 2017 and the site code is VCM17/106.

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 2.5 km to the northwest of the village of Mells with the larger towns of Radstock 4.2km to the northwest and Frome 7.3km to the southeast. Current land use of the survey area is as part of a larger field used for arable farmland, with the CPM precast concrete manufacturing plant to the north and east and further arable land on all other sides. Hatchet Hill lane runs down the western edge of the field (Fig. 2). The land has a gradual slope down from the southwest to the east with a height of approximately 134m above Ordnance Datum. The underlying geology is an Inferior Oolite group - Limestone, Ooidal, a sedimentary bedrock with no recorded superficial deposits (BGS 2000).

Site history and archaeological background

The archaeological potential of the site has been highlighted in a desk-based assessment (Bray 2017). In summary, the assessment indicated that the survey area lies within an area of known archaeological sites of Iron Age, Roman and medieval in date, although there is nothing recorded for the site itself. The eastern end of the site was crossed by the line of the Frome branch of the Dorset and Somerset Canal in the late 18th century although this was backfilled in the 1950s. Running almost parallel to this but just outside the site's eastern boundary is the remains of The Newbury Railway, which was opened in 1857 to connect the Frome to Radstock line with Newbury Colliery.

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 area was surveyed without issue, however hedges and trees around all but the southwest edge of the site prevented a small amount from being surveyed.

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 -2.80 to 3.20 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 2.18.2 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 number of magnetic anomalies were recorded across the site the majority being positive linear anomalies indicating buried cut features (Figs. 3 and 4). These linear anomalies appear to be plough marks, consisting of positive anomalies running parallel on either a north south or a northwest to southeast orientations **[Fig 5:1, 2]** with a pair of wider ones running parallel to the road **[3]**. The post-and-wire fences around the perimeter of the field created an area of magnetic disturbance along the western, northern and eastern boundaries of the survey area. A large number of strong magnetic spikes were detected across the whole site, these most likely represent ferrous objects or debris from agricultural activity. The south-eastern end of the site was unusually magnetically noisy though no cause for this was immediately obvious.

Conclusion

The survey was completed across the entirety of the site but the only magnetic anomalies of interest recorded are most likely associated with agricultural activity. The eastern end of the survey is characterised by a high level of magnetic noise. While there was nothing visible on site which may have accounted for this it is possible that it represents ground disturbance associated with the construction and/or backfilling of the canal which once cut across the eastern end of the field.

References

BGS, 2000, *British Geological Survey*, 1:50,000, Sheet 281, Solid and Drift Edition, Keyworth

Bray, D, 2017, 'Mells Road Works, Vobster Cross, Somerset: Historic Environment Desk-Based Assessment', ECUS report 9508, Basingstoke

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
Raw: Instrument Type: Bartington (Gradiometer)
Units: nT
Survey corner coordinates (X/Y):
Northwest corner: 370967.37, 151180.41 m
Southeast corner: 371087.37, 150840.41 m
Direction of 1st Traverse: 55.25241 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 2047.5

Dimensions
Composite Size (readings): 480 x 340
Survey Size (meters): 120 m x 340 m
Grid Size: 20 m x 20 m
X Interval: 0.25 m
Y Interval: 1 m

Stats
Max: 97.01
Min: -100.00
Std Dev: 11.07
Mean: 0.63
Median: 0.65
Composite Area: 4.08 ha
Surveyed Area: 2.7484 ha

Source Grids: 84
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2 Col:0 Row:2 grids\02.xgd
3 Col:0 Row:3 grids\03.xgd
4 Col:0 Row:4 grids\04.xgd
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81 Col:5 Row:9 grids\81.xgd
82 Col:5 Row:10 grids\82.xgd

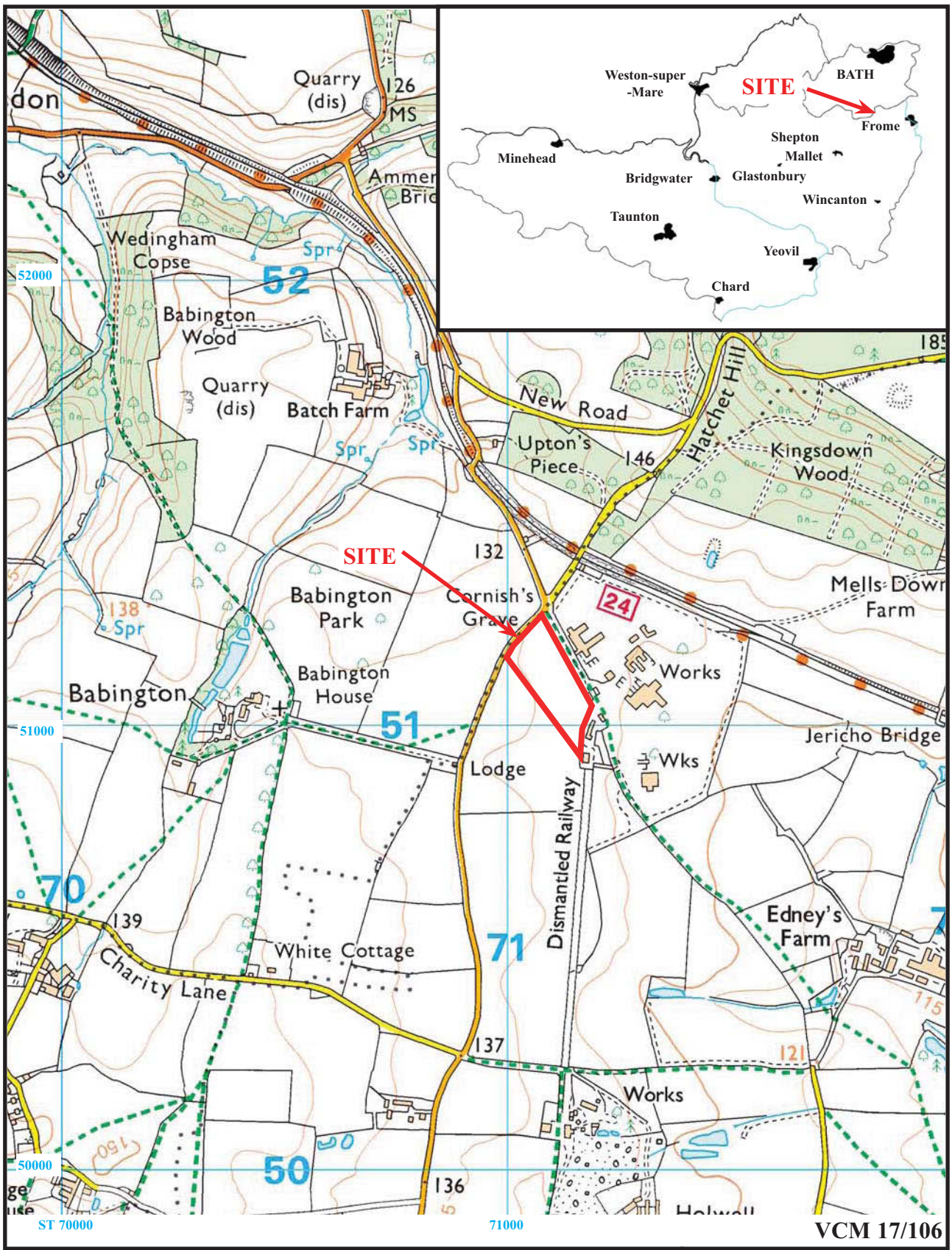
Processed data

Stats

Max:	3.20
Min:	-2.80
Std Dev:	1.65
Mean:	0.07
Median:	0.01

Processes: 6

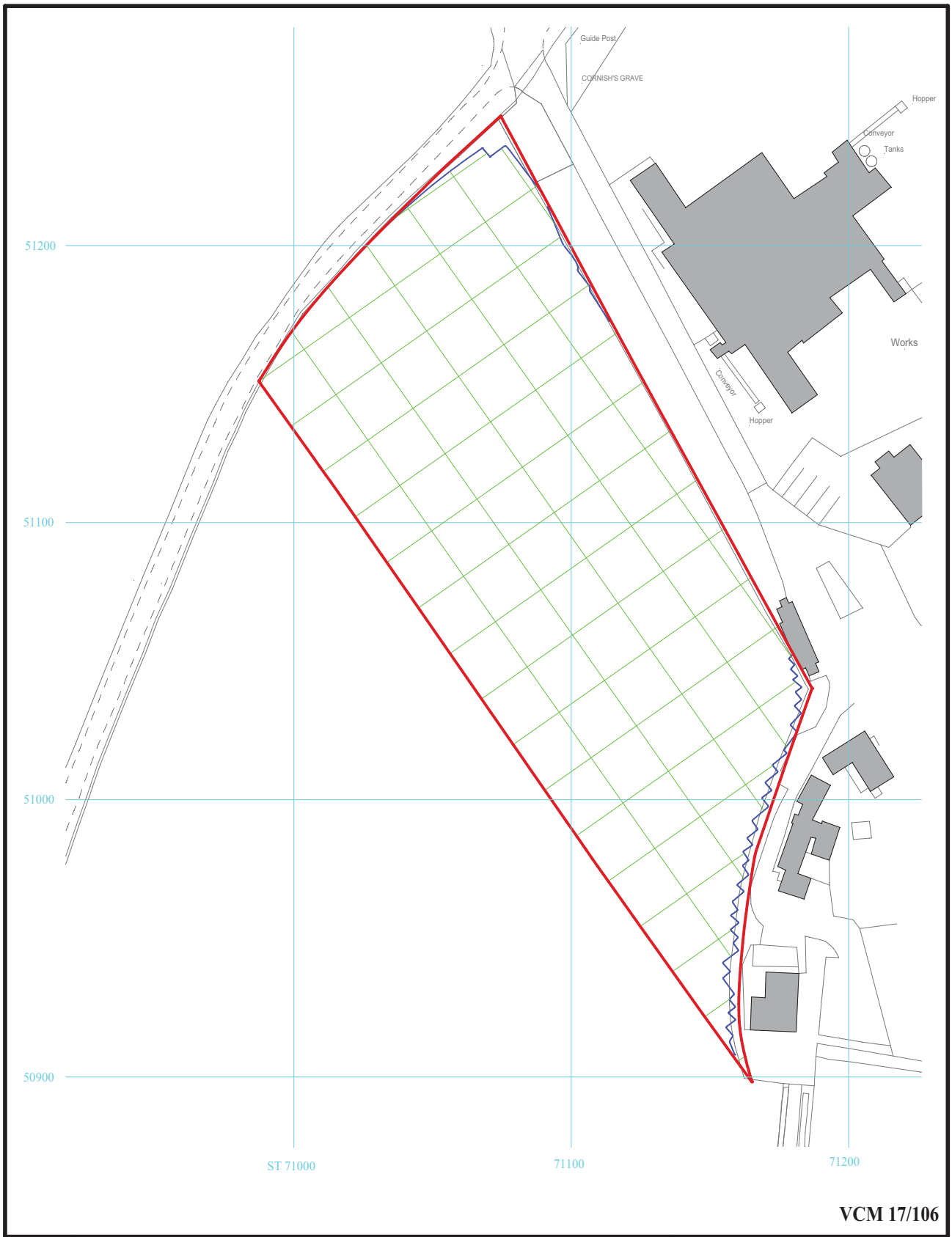
1 Base Layer
2 DeStripe Median Sensors: Grids: All
3 De Stagger: Grids: All Mode: Both By: -1 intervals
4 Despike Threshold: 1 Window size: 3x3
5 Interpolate: Y Doubled.
6 Clip from -2.80 to 3.20 nT



Land at Mells Road, Vobster Cross
Mells, Somerset, 2017
Geophysical Survey (Magnetic)

Figure 1. Location of site within Somerset.

TVAS SOUTH WEST



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Land at Mells Road, Vobster Cross, Mells, Somerset, 2017 Geophysical Survey (Magnetic)

Figure 2. Site plan.

0 100m

TVAS SOUTH WEST

N

Land at Mells Road, Vobster Cross, Mells, Somerset, 2017
Geophysical Survey (Magnetic)
Figure 3. Plot of raw gradiometer data.

0m 100m

+100
nT
-100

TVAS SOUTH WEST

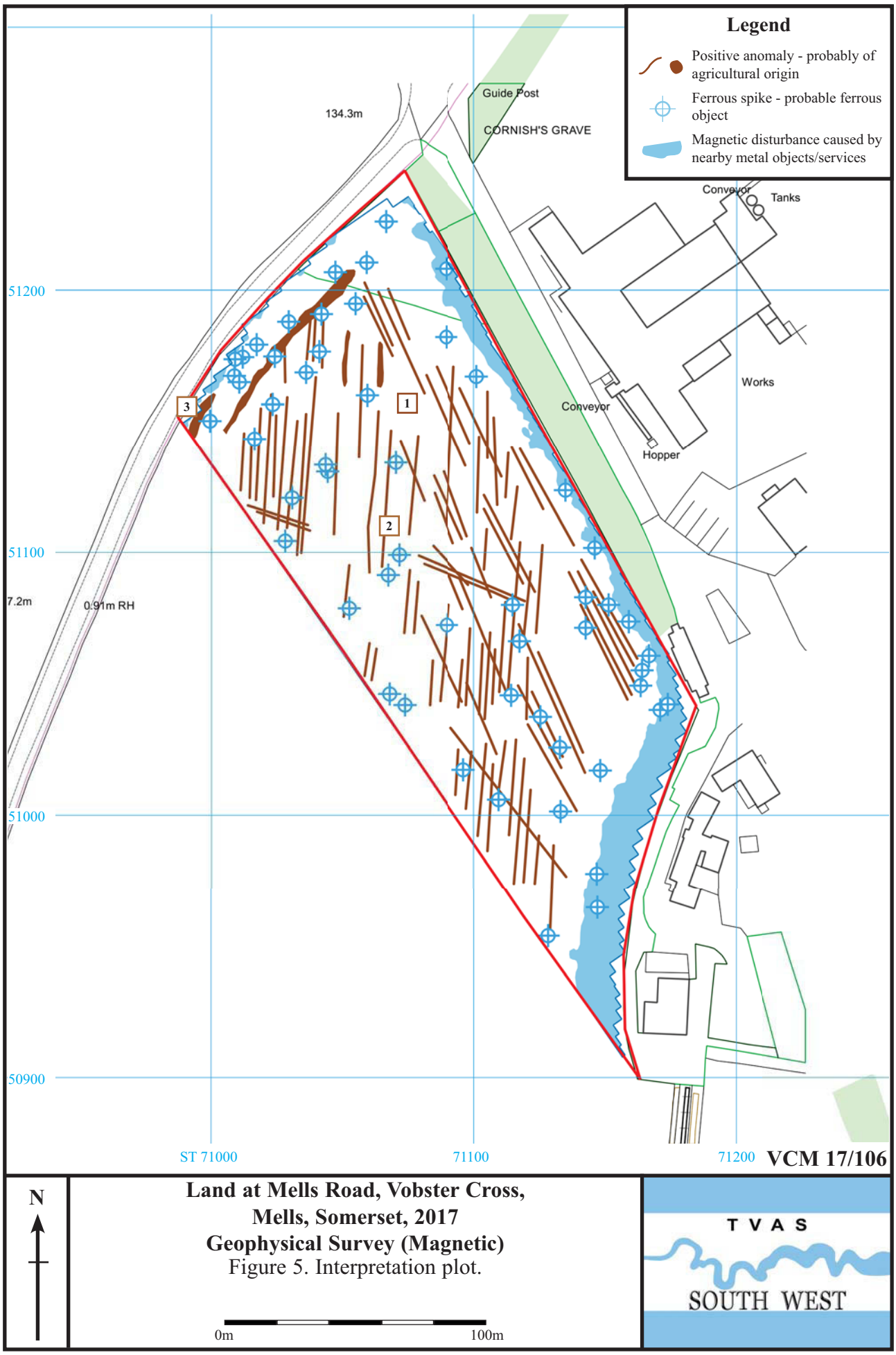
N

Land at Mells Road, Vobster Cross,
Mells, Somerset, 2017
Geophysical Survey (Magnetic)
Figure 4. Plot of processed gradiometer data.

0m 100m

+3.2
nT
-2.8

TVAS SOUTH WEST



Land at Mells Road, Vobster Cross, Mells, Somerset, 2017
Geophysical Survey (Magnetic)
Figure 5. Interpretation plot.

Plate 1. Gerneral view over site, looking south from the north corner

Plate 2. General view over site, looking west from south-east corner

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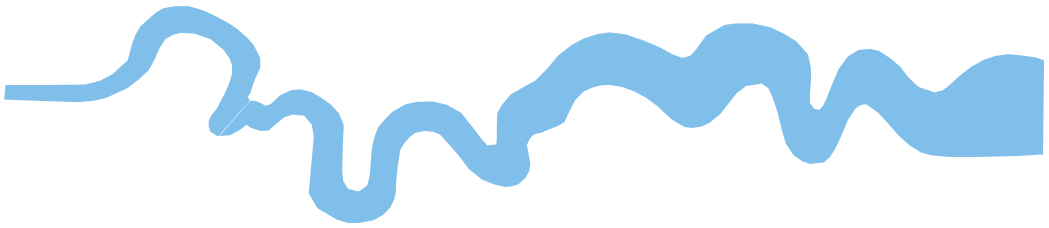
Land at Mells Road, Vobster Cross,
Mells, Somerset, 2017
Geophysical Survey (Magnetic)
Plates 1 and 2.

TVAS SOUTH WEST

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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