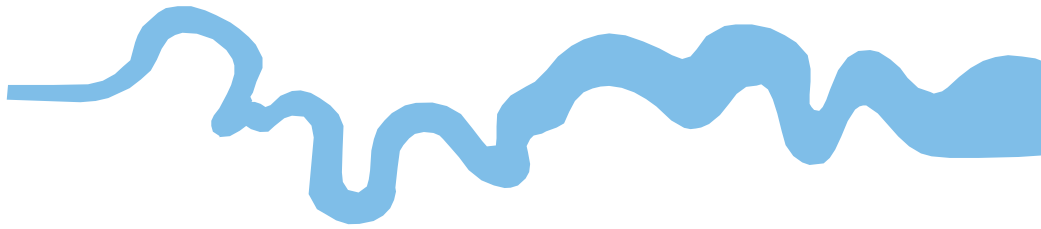


T V A S



SOUTH WEST

**Land at Herrison Road,
Charlton Down, Dorset**

Geophysical Survey (Magnetic)

by Kyle Beaverstock

Site Code: CDD21/19

(SY 6754 9439)

Land at Herrison Road, Charlton Down, Dorset

Geophysical Survey (Magnetic) Report For Land Allocation Limited

by Kyle Beaverstock

Thames Valley Archaeological Services Ltd

Site Code CDD 21/19

February 2021

Summary

Site name: Land at Herrison Road, Charlton Down, Dorset

Grid reference: SY 6754 9439

Site activity: Magnetometer survey

Date and duration of project: 8th February 2021

Project coordinator: Tim Dawson

Site supervisor: Kyle Beaverstock

Site code: CDD21/19

Area of site: c. 2.3ha

Summary of results: The geophysical survey revealed significant areas of magnetic disturbance from buried services. Archaeologically, there were only two features of possible interest including a short length of positive linear anomaly in the north east of the site and the second in the far north running south-west to north-east, although the latter is likely to represent the line of a former modern field boundary.

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

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www.tvas.co.uk/reports/reports.asp.*

Report edited/checked by: Steve Ford✓ 16.02.21 Tim Dawson✓ 16.02.21
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Land at Herrison Road, Charlton Down, Dorset A Geophysical Survey (Magnetic)

by Kyle Beaverstock

Report 21/19

Introduction

This report documents the results of a geophysical survey (magnetic) carried out at Herrison Road, Charlton Down, Dorset (SY 6754 9439) (Fig. 1). The work was commissioned by Lanpro Services Ltd, Brettingham House, 98 Pottergate, Norwich, NR2 1EQ on behalf of Land Allocation Limited.

A planning application has been submitted to Dorset County Council for a proposed residential development and this geophysical survey has been undertaken to inform the application. This is in accordance with the *National Planning Policy Framework* (NPPF 2019), and the County's policies on archaeology. The fieldwork was undertaken by Kyle Beaverstock on the 8th of February 2021 and the site code is CDD21/19.

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

Location, topography and geology

The study site comprises approximately 4.47ha on the south-western edge of Charlton Down, Charminster, Dorset (centred at SY 6750 9440; Fig. 1). It comprises part of a single field under arable cultivation bounded to the north-east by a recent housing development, beyond which are the 19th and 20th century buildings of the former Herrison Hospital. To the south-east is Herrison Road, and the rear gardens of houses fronting on to this, to the south-west is southern part of the field in which the study site is located, beyond which is the River Cerne, and to the north and north-west are further fields.

The study site occupies a south-westerly facing slope forming the northern side of the valley of the River Cerne. The ground level falls from a height of approximately 86m above Ordnance Datum (aOD) on its northern edge to around 74m aOD along its south-western boundary.

The recorded bedrock geology in the study site comprises chalk of the Newhaven Chalk Formation, with superficial deposits of Head clay, silt, sand and gravel along the study site's lower slopes, and a band of Head also crosses the site's south-eastern side (BGS 2020).

Site history and archaeological background

The archaeological background has been highlighted in detail in the desk-based assessment (Lanpro 2020). To summarise. There are no recorded heritage assets within the survey area however the site sits to the east of the former medieval settlement Herrison. Roman and prehistoric remains are also recorded within the wider surrounding area.

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 zig-zag pattern on a northwest to southeast orientation across the survey area. No obstructions were encountered however there was some interference to the GPS from the trees in the northeast of the site, the conditions were dry and bright.

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 -16.25 to 11.31 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	Cancel 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 number of magnetic anomalies were detected by the geophysical survey (Figs. 2 and 3). In the northeast of the site is a linear anomaly running northwest to the southeast [**Fig. 4: 1**] (pl. 1). This magnetic disturbance is represented by a bipolar response of high amplitude and is likely caused by a modern service. To the south of this is another linear of magnetic disturbance [**2**] running from the southwest to the northeast with another irregular area to the east of linear [**1**]. These are likely caused by buried ferrous objects probably related to services. To the northwest of [**1**] is another linear anomaly characterised by magnetic disturbance [**3**] running from the southwest to the northeast and is also an indication of a buried service.

Along the southwestern boundary of the survey area is a linear corridor of magnetic debris [**4**] running from the northwest to the southeast. This is represented by numerous positive and negative magnetic spikes over a large area of high amplitude and is most likely caused by ferrous debris and disturbance due to an old track or boundary.

In the north-eastern area of the site is a weak positive linear anomaly [**5**] which runs from the north-eastern boundary to the west before disappearing into the area of magnetic disturbance [**1**]. This may represent a buried linear feature such as a ditch. In the far north, parallel and to the north of magnetic disturbance [**3**] is a positive linear anomaly [**6**] which runs from the southwest to the northeast on the same alignment as a partial boundary to the north and is likely the remnant of the former field boundary as shown on the 1975 Ordnance Survey map.

Conclusion

The geophysical survey revealed a number of areas of magnetic disturbance indicating a significant amount of disturbance by modern services. Archaeologically there were only two features of possible interest including a

short length of weak positive linear anomaly in the north east of the site and the second in the far north running southwest to northeast, although the latter is likely to represent the line of a former modern field boundary.

References

- BGS, 2000, *British Geological Survey*, 1:50,000, Sheet 328, Solid and Drift Edition, Keyworth
- CI/A, 2014, 'Standard and Guidance for archaeological geophysical survey', Reading
- EAC, 2015, *EAC Guidelines for the use of Geophysics in Archaeology: Questions to Ask and Points to Consider*, EAC Guidelines 2, Namur
- IFA, 2002, 'The Use of Geophysical Techniques in Archaeological Evaluation', IFA Paper No. 6, Reading
- Lanpro, 2020, Land at Charlton Down, Charminster, Dorset, Archaeological Desk-based Assessment, report 1999/01
- NPPF, 2019, *National Planning Policy Framework (revised)*, Ministry for Housing, Communities and Local Government, London

Appendix 1. Survey and data information

Programme:

Name: TerraSurveyor
Version: 3.0.25.0

Raw data

Filename: Charlton Down RAW.xcp
Instrument Type: MLgrad Import
Units:
UTM Zone: 30
Survey corner coordinates (X/Y):
Northwest corner: 367408.917216961, 94509.5602535912 m
Southeast corner: 367623.807216961, 94246.3102535912 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 2 @ 1 m spacing.
Dummy Value: 32702

Dimensions

Survey Size (meters): 215 m x 263 m
X&Y Interval: 0.13 m
Source GPS Points: Active: 71799, Recorded: 71799

Stats

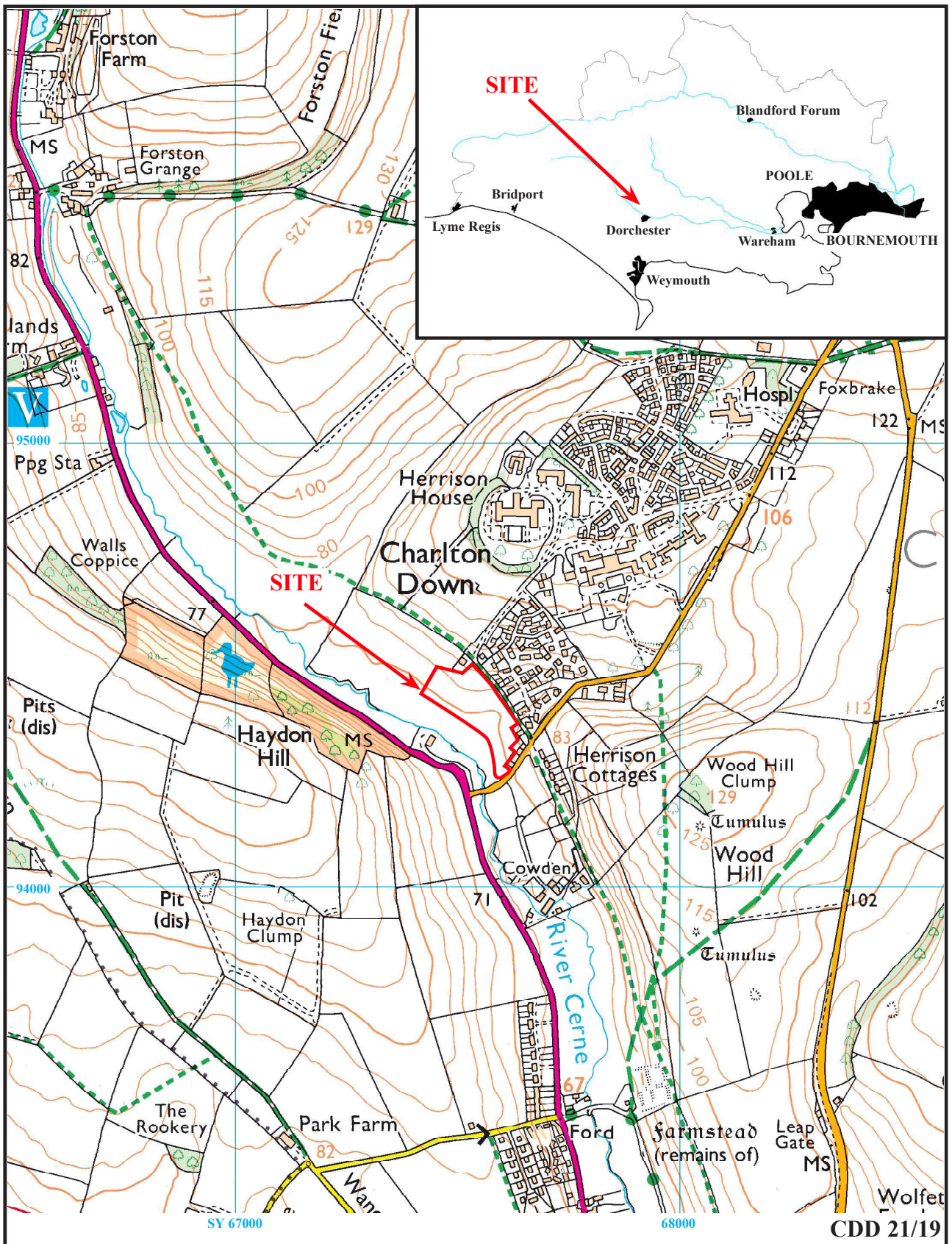
Max: 109.44
Min: -109.85
Std Dev: 15.44
Mean: -1.56
Median: -0.10
Composite Area: 5.657 ha
Surveyed Area: 2.349 ha

Processed data

Filename: Charlton Down.xcp
Stats
Max: 11.31
Min: -16.25
Std Dev: 4.86
Mean: -0.84
Median: 0.06
Composite Area: 5.657 ha
Surveyed Area: 2.349 ha

GPS based Proce7

- 1 Base Layer.
- 2 Unit Conversion Layer (Lat/Long to UTM).
- 3 DeStripe Median Traverse:
- 4 DeStagger by: 50.00cm, Shift Values
- 5 DeStagger by: 50.00cm, Shift Values
- 6 DeStagger by: 50.00cm, Shift Values
- 7 Clip from -15.00 to 10.00

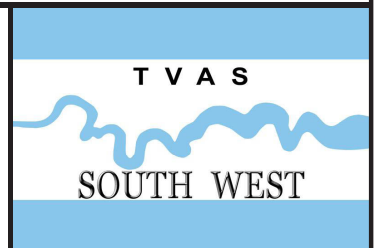


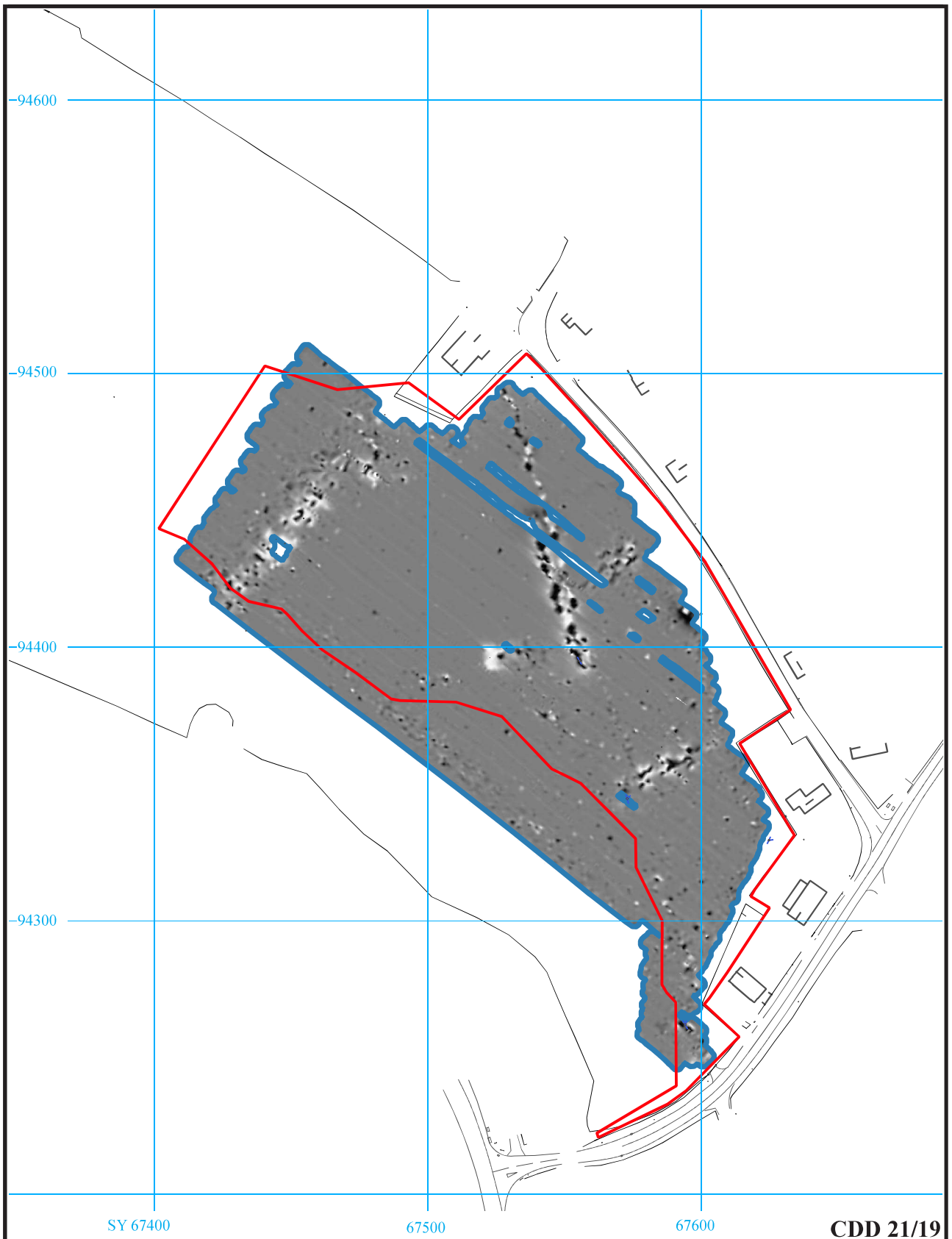
**Land at Herrison Road, Charlton Down,
Dorset, 2021**

Geophysical Survey (Magnetic)

Figure 1. Location of site within Charlton Down and Dorset.

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SY 67400

67500

67600

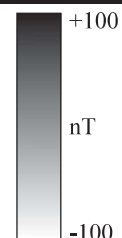
CDD 21/19

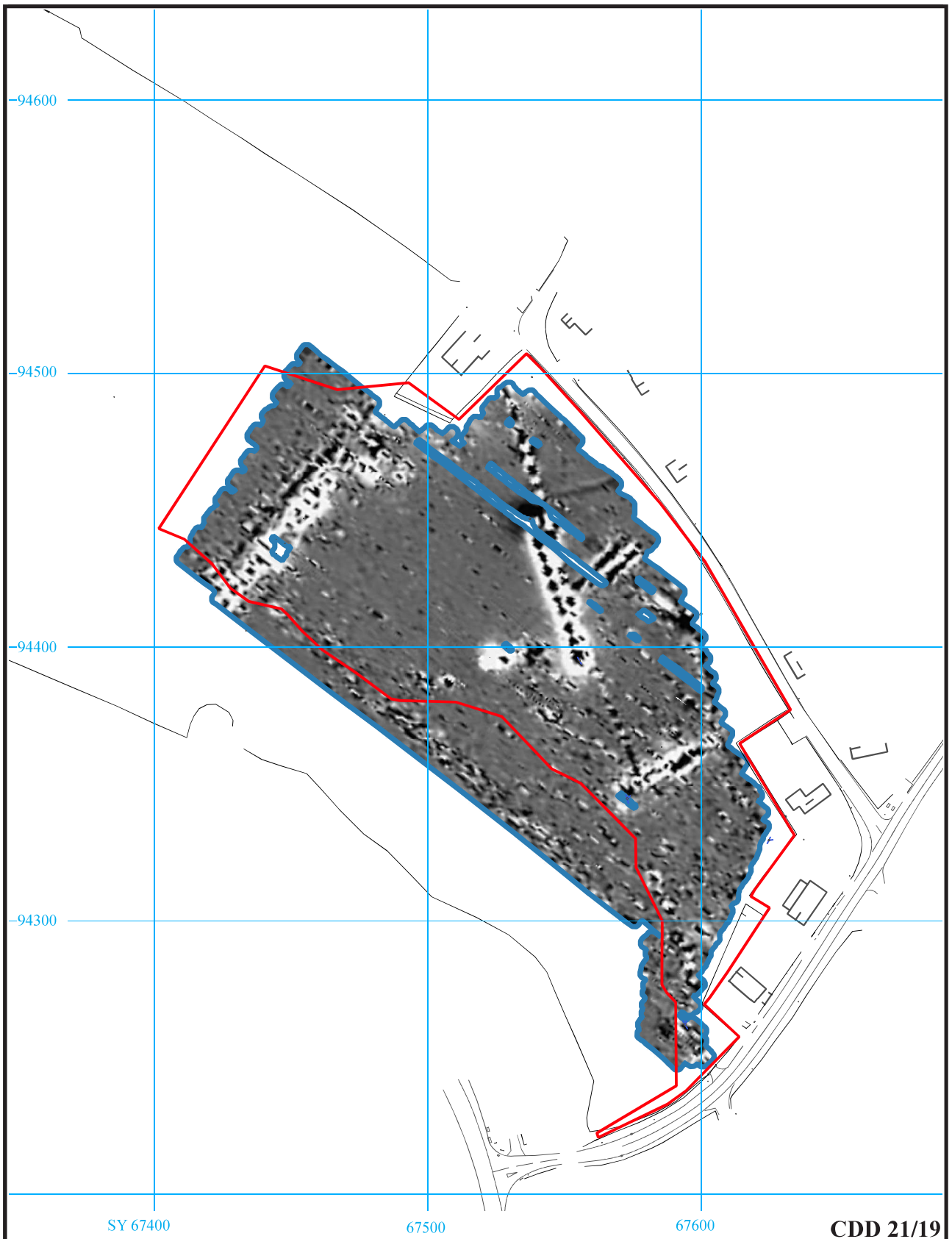


**Land at Herrison Road, Charlton Down,
Dorset, 2021**

Geophysical Survey (Magnetic)

Figure 2. Plot of raw gradiometer data.





SY 67400

67500

67600

CDD 21/19

N

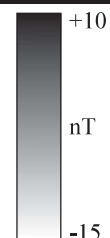


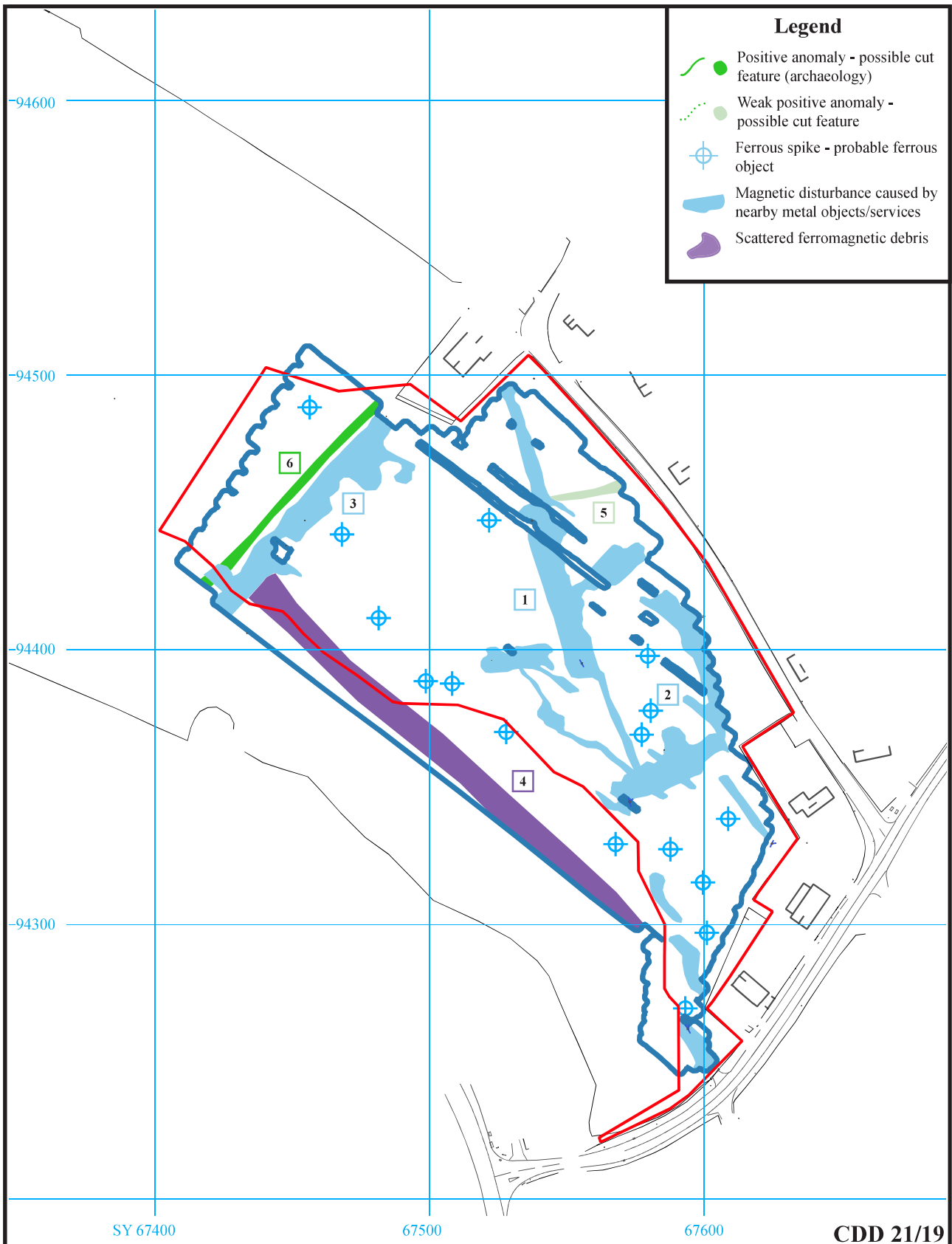
**Land at Herrison Road, Charlton Down,
Dorset, 2021**

Geophysical Survey (Magnetic)

Figure 3. Plot of processed gradiometer data.

0m 100m





**Land at Herrison Road, Charlton Down,
Dorset, 2021**
Geophysical Survey (Magnetic)
Figure 4. Interpretation plot.

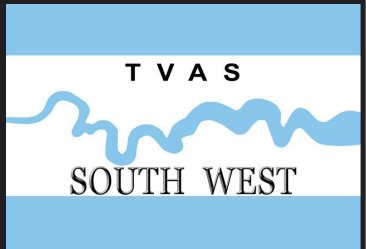




Plate 1. Markers showing line of service looking south



Plate 2. Survey area looking north

CDD 21/19

**Land at Herrison Road, Charlton Down,
Dorset, 2021
Geophysical Survey (Magnetic)
Plates 1 and 2.**

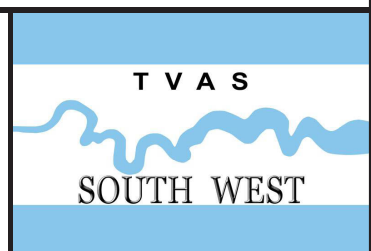




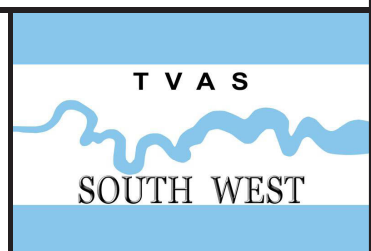
Plate 3. Western part of survey area looking south



Plate 4. Eastern part of survey area looking south

CDD 21/19

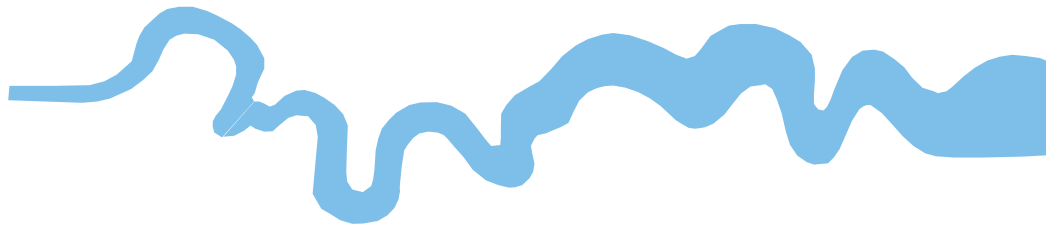
**Land at Herrison Road, Charlton Down,
Devon, 2021
Geophysical Survey (Magnetic)
Plates 3 and 4.**



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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