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REPORT ON GEOPHYISCAL SURVEY

SHEER BARROW
Salisbury Plain Training Area

Report number 95/05

Work commissioned by :

ROYAL COMMISSION ON THE HISTORICAL MONUMENTS OF ENGLAND

SITE SUMMARY SHEET

95 / 05 Sheer Barrow, Wiltshire

NGR: SU 1686 4822

Location, topography and geology

The presumed site of Sheer Barrow lies within the Salisbury Plain Training Area 2km northeast of the village of Figheldean, adjacent to the Netheravon Airfield Camp. The survey occupied a level arable field that was rolled at the time of survey. The site consists of well drained calcareous soils overlying chalk.

Archaeology

The presence of a possible long barrow (SPTA 941) was first noted on Ordnance Survey aerial photographs. An earthwork survey was later undertaken by the **Royal Commission on Historic Monuments, England (RCHME)** over a slight rise visible in the field.

Aims of Survey

A gradiometer survey was undertaken with the aim of ascertaining if the earthwork noted by **RCHME** was in fact due to the presence of a ploughed out long barrow. It was hoped that other features associated with the presumed barrow would also be located, should they exist.

Summary of Results *

The gradiometer survey has clearly located a ditch type anomaly confirming the presence of a long barrow. There are suggestions of other isolated responses that may be of archaeological interest. There is also an extremely weak suggestion of a curvilinear anomaly. While this may be archaeologically significant, such an interpretation is tentative.

*** It is essential that this summary is read in conjunction with the detailed results of the survey.**

SURVEY RESULTS

95 / 05 Sheer Barrow, Wiltshire

1. **Survey Areas** (Figure 1)

1.1 An area of 60m by 80m over the postulated long barrow was investigated by gradiometry. A smaller area 60m by 60m was subjected to a volume magnetic susceptibility survey. The relative locations of both these surveys are shown in Figure 1 at a scale of 1:1000.

1.2 The survey areas were established by **Geophysical Surveys of Bradford** and tied-in by **RCHME**.

2. **Display** (Figures 2 - 7)

2.1 Figure 2 shows a summary interpretation of the gradiometer data together with the results of a topographic survey carried out by **RCHME** at a scale of 1:1000.

2.2 The data from the detailed gradiometry survey are displayed as an X-Y trace, a dot density plot and a grey scale image. These and the accompanying interpretation diagram have been produced at a scale of 1:500.

2.3 The data from the volume magnetic susceptibility survey are represented as a dot density plot and a grey scale image at a scale of 1:1000 in Figure 6. The location of the gradiometer anomaly is superimposed on the dot density plot.

2.4 These display formats are discussed in the *Technical Information* section, at the end of the text.

3. **General Considerations - Complicating factors**

3.1 Conditions were suitable for gradiometry and volume magnetic susceptibility survey with the ground being generally level with rolled soil.

4. **Results of Gradiometer Survey**

4.1 The data are dominated by the clear responses from the long barrow, with two clear breaks in the south indicating an entrance.

4.2 It is noteworthy that there is a slight discrepancy between the gradiometer data and the earthwork survey. This may be due to erosion of the mound by ploughing particularly in the vicinity of the entrances where the bank will not have been as well pronounced.

4.3 Towards the north of the survey area there is a suggestion of a curvilinear anomaly. While this may be of archaeological significance, any further interpretation can only be speculative.

4.4 Other isolated ditch and pit type responses have also been located. While some or all of these may be significant it is difficult to formulate a precise archaeological interpretation.

4.5 Numerous isolated ferrous type responses are apparent in the data and these are most likely to be due to modern ferrous debris in the soil. The most prominent of these are indicated on the interpretation plan.

5. Results of Volume Magnetic Susceptibility Survey

5.1 A Bartington field coil was used to take volume magnetic susceptibility readings at 10m intervals over an area of 60m by 60m. It was known that a clear picture of the buried remains of the barrow had been obtained by the gradiometry and that a magnetic susceptibility survey at 10m intervals would only provide a generalised pattern of susceptibility variations. However, it was hoped that this would provide information regarding the level of archaeological activity.

5.2 As the field coil has an operational depth of penetration of approximately 10cm, only the topsoil variations, as opposed to the topsoil/subsoil contrast, are measured. In addition, the topsoil, especially when it is ploughed, is subject to modification, redistribution and contamination, consequently, patterns of magnetic susceptibility tend to be blurred. This distortion is compounded by the coarser sampling interval compared to the gradiometry and leads to more generalised survey results.

5.3 While the volume magnetic susceptibility data show some variation although there is no coherent pattern emerging. It seems most likely that the data reflect near-surface susceptibilities, possibly in part from enhanced materials from the ploughed out bank.

6. Conclusions

6.1 The gradiometer survey has clearly located the 'lost' barrow and shows two clear breaks indicating an entrance.

6.2 A few additional ditch and pit type responses have been noted, although these may be due to deeply buried modern ferrous debris or natural/agricultural variations.

6.3 The volume magnetic susceptibility survey has not detected any activity associated with the barrow. Although variations are apparent in the data these appear to reflect generally natural/modern variations.

Project Co-ordinator: Dr S Ovenden-Wilson
Project Assistants: Dr C F Gaffney, J Gater, N Nemcek, A Shields and D Weston

TECHNICAL INFORMATION

The following is a description of the equipment and display formats used in **GEOPHYSICAL SURVEYS OF BRADFORD** reports. It should be emphasised that whilst all of the display options are regularly used, the diagrams produced in the final reports are the most suitable to illustrate the data from each site. The choice of diagrams results from the experience and knowledge of the staff of **GEOPHYSICAL SURVEYS OF BRADFORD**.

All survey reports are prepared and submitted on the basis that whilst they are based on a thorough survey of the site, no responsibility is accepted for any errors or omissions.

Magnetic readings are logged at 0.5m intervals along one axis in 1m traverses giving 800 readings per 20m x 20m grid, unless otherwise stated. Resistance readings are logged at 1m intervals giving 400 readings per 20m x 20m grid. The data are then transferred to portable computers and stored on 3.5" floppy discs. Field plots are produced on a portable Hewlett Packard Thinkjet. Further processing is carried out back at base on computers linked to appropriate printers and plotters.

Instrumentation

(a) Fluxgate Gradiometer - Geoscan FM36

This instrument comprises of two fluxgates mounted vertically apart, at a distance of 500mm. The gradiometer is carried by hand, with the bottom sensor approximately 100-300mm from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is conventionally measured in nanoTesla (nT) or gamma. The fluxgate gradiometer suppresses any diurnal or regional effects. Generally features up to one metre deep may be detected by this method.

(b) Resistance Meter - Geoscan RM4 or RM15

This measures the electrical resistance of the earth, using a system of four electrodes (two current and two potential.) Depending on the arrangement of these electrodes an exact measurement of a specific volume of earth may be acquired. This resistance value may then be used to calculate the earth resistivity. The "Twin Probe" arrangement involves the paring of electrodes (one current and one potential) with one pair remaining in a fixed position, whilst the other measures the resistance variations across a fixed grid. The resistance is measured in Ohms and the calculated resistivity is in Ohm-metres. The resistance method as used for area survey has a depth resolution of approximately 0.75m, although the nature of the overburden and underlying geology will cause variations in this generality. The technique can be adapted to sample greater depths of earth and can therefore be used to produce vertical "pseudo sections".

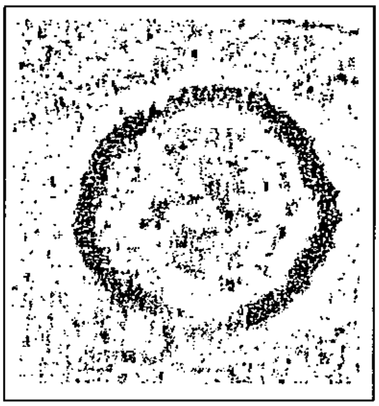
(c) Magnetic Susceptibility

Variations in the magnetic susceptibility of subsoils and topsoils occur naturally, but greater enhanced susceptibility can also be a product of increased human/anthropogenic activity. This phenomenon of susceptibility enhancement can therefore be used to provide information about the "level of archaeological activity" associated with a site. It can also be used in a predictive manner to ascertain the suitability of a site for a magnetic survey. The instrument employed for measuring this phenomenon is either a field coil or a laboratory based susceptibility bridge. For the latter 50g soil samples are collected in the field.

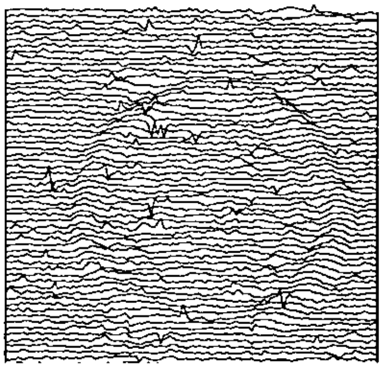
Display Options

The following is a description of the display options used. Unless specifically mentioned in the text, it may be assumed that no filtering or smoothing has been used to enhance the data. For any particular report a limited number of display modes may be used.

(a) Dot-Density

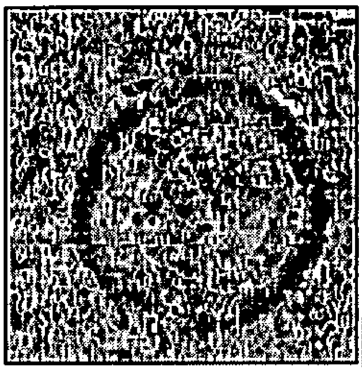


In this display, minimum and maximum cut-off levels are chosen. Any value that is below the minimum cut-off value will appear white, whilst any value above the maximum cut-off value will appear black. Any value that lies between these two cut-off levels will have a specified number of dots depending on the relative position between the two levels. The focus of the display may be changed using different levels and a contrast factor (C.F.). Usually the C.F. = 1, producing a linear scale between the cut-off levels. Assessing a lower than normal reading involves the use of an inverse plot, This plot simply reverses the minimum and maximum values, resulting in the lower values being presented by more dots. In either representation, each reading is allocated a unique area dependent on its position on the survey grid, within which numbers of dots are randomly placed. The main limitation of this display method is that multiple plots have to be produced in order to view the whole range of the data. It is also difficult to gauge the true strength of any anomaly without looking at the raw data values. This display is much favoured for producing plans of sites, where positioning of the anomalies and features is important.



(b) X-Y Plot

This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. Advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the indiviual anomalies. Results are produced on a flatbed plotter.



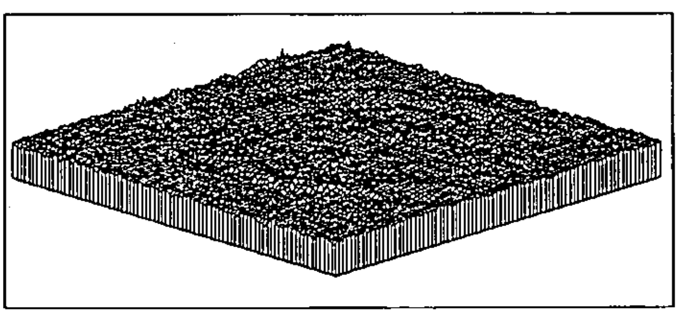
(c) Grey-Scale

This format divides a given range of readings into a set number of classes. These classes have a predefined arrangement of dots or shade of grey, the intensity increasing with value. This gives an appearance of a toned or grey scale.

Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. While colour plots can look impressive and can be used to highlight certain anomalies, grey-scales tend to be more informative.

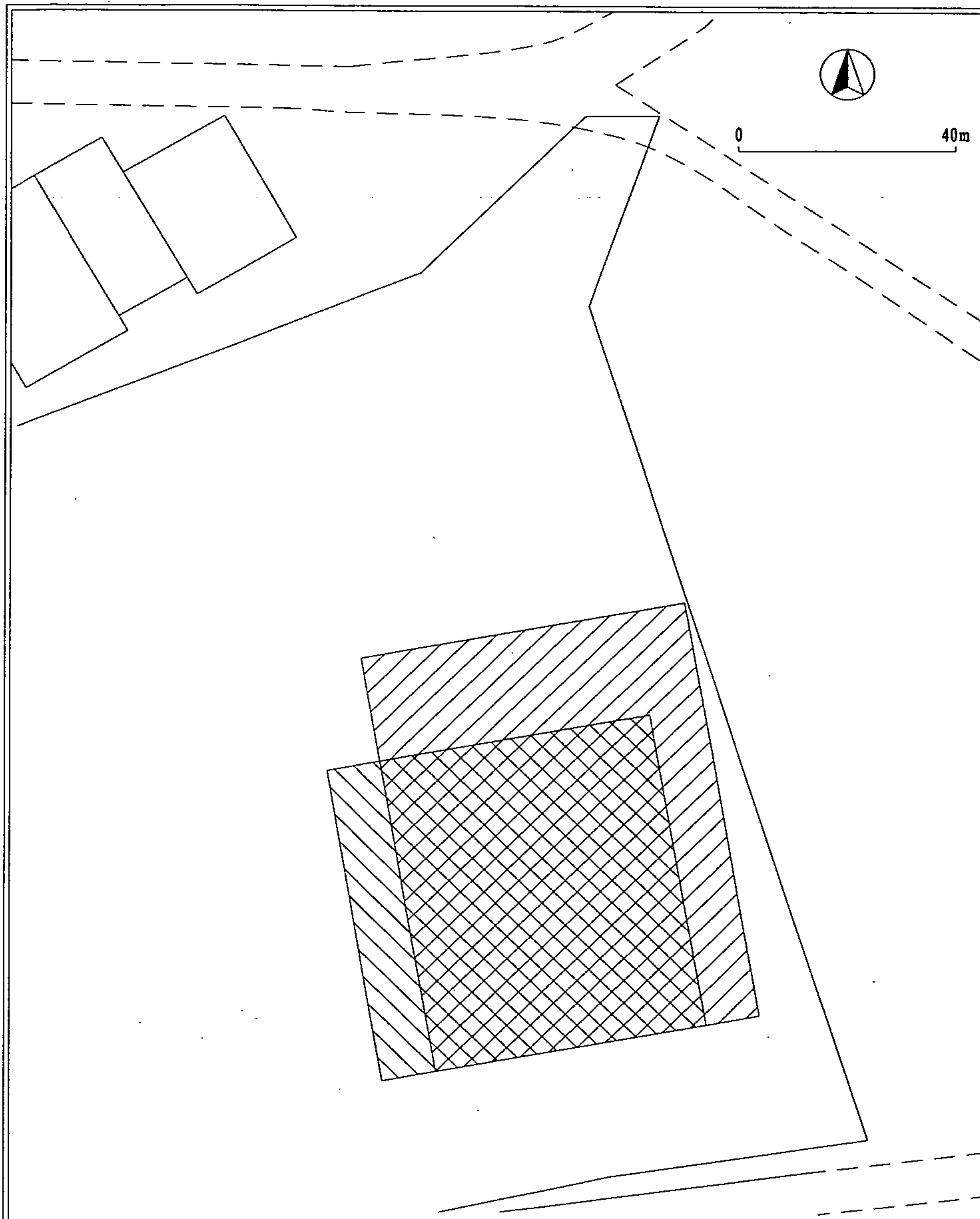
(d) Contour

This display format is commonly used in cartographic displays. Data points of equal value are joined by a contour line. Closely packed contours indicate a sharp gradient. The contours therefore highlight an anomalous region. The range of contours and contour interval are selected manually and the display is then generated on the computer screen or plotted directly on a flat bed plotter / inkjet printer.



(e) 3-D Mesh

This display joins the data values in both the X and Y axis. The display may be changed by altering the horizontal viewing angle and the angle above the plane. The output may be either colour or black and white. A hidden line option is occasionally used (see (b) above).



Gradiometer Survey

Gradiometer & Magnetic Susceptibility Survey

Magnetic Susceptibility Survey

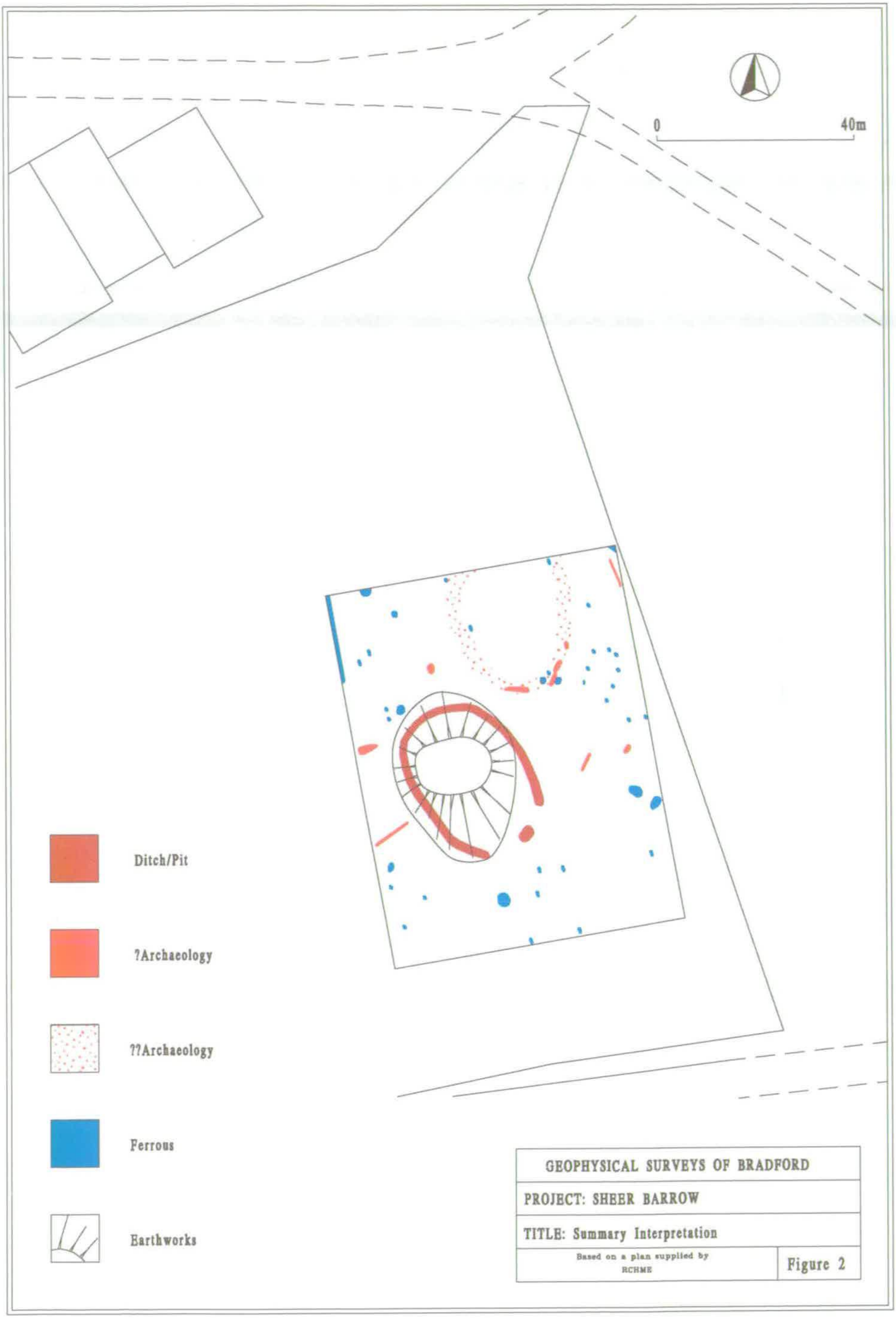
GEOPHYSICAL SURVEYS OF BRADFORD

PROJECT: SHEER BARROW

TITLE: Location Diagram

Based on a plan supplied by RCHME

Figure 1


0
40m
Ditch/Pit
?Archaeology
??Archaeology
Ferrous
Earthworks
GEOPHYSICAL SURVEYS OF BRADFORD
PROJECT: SHEER BARROW
TITLE: Summary Interpretation
Based on a plan supplied by
RCHME
Figure 2

SHEER BARROW
Wiltshire

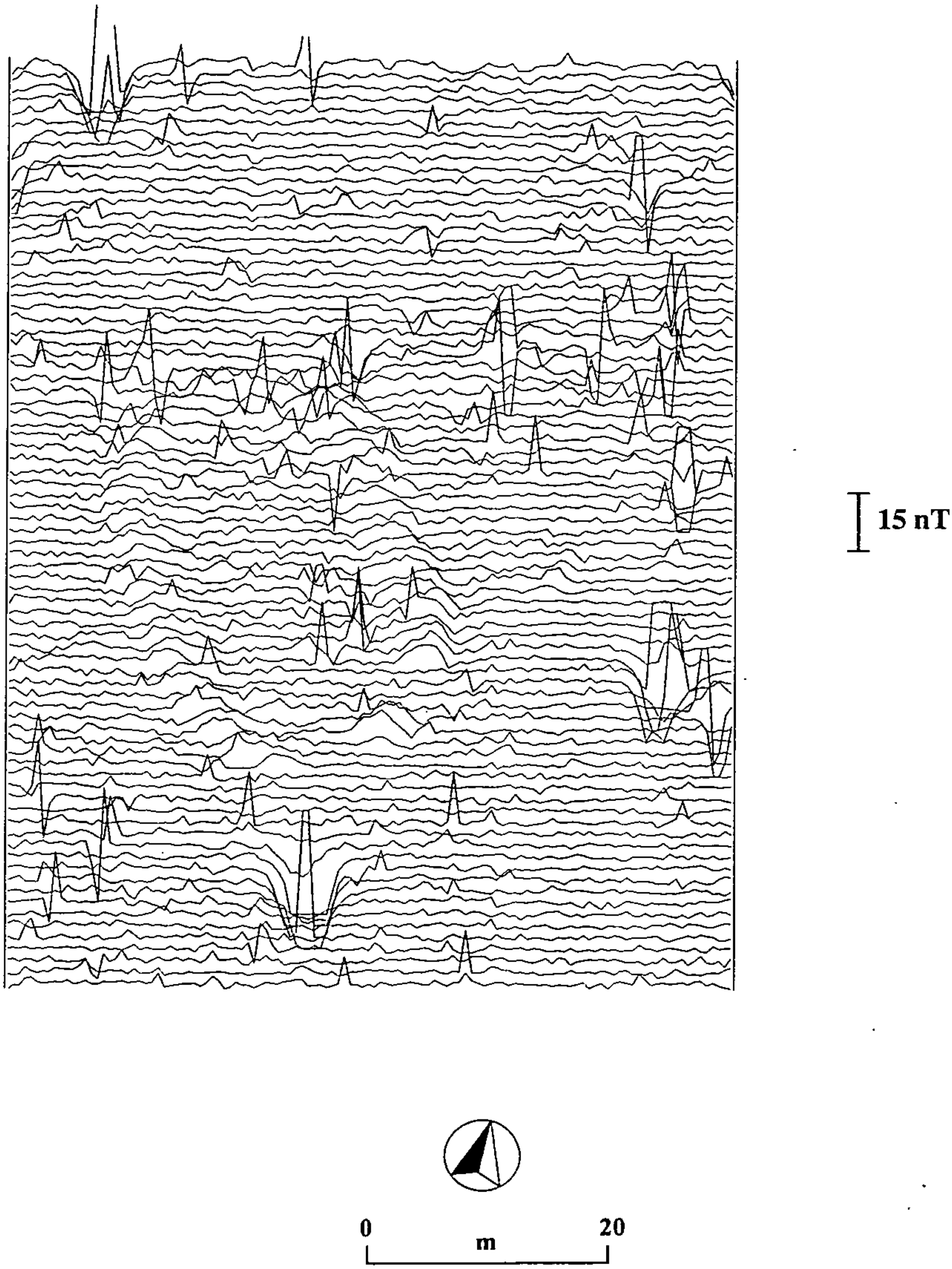
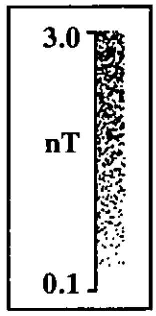


Figure 3

SHEER BARROW
Wiltshire



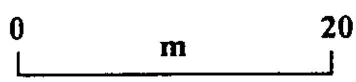
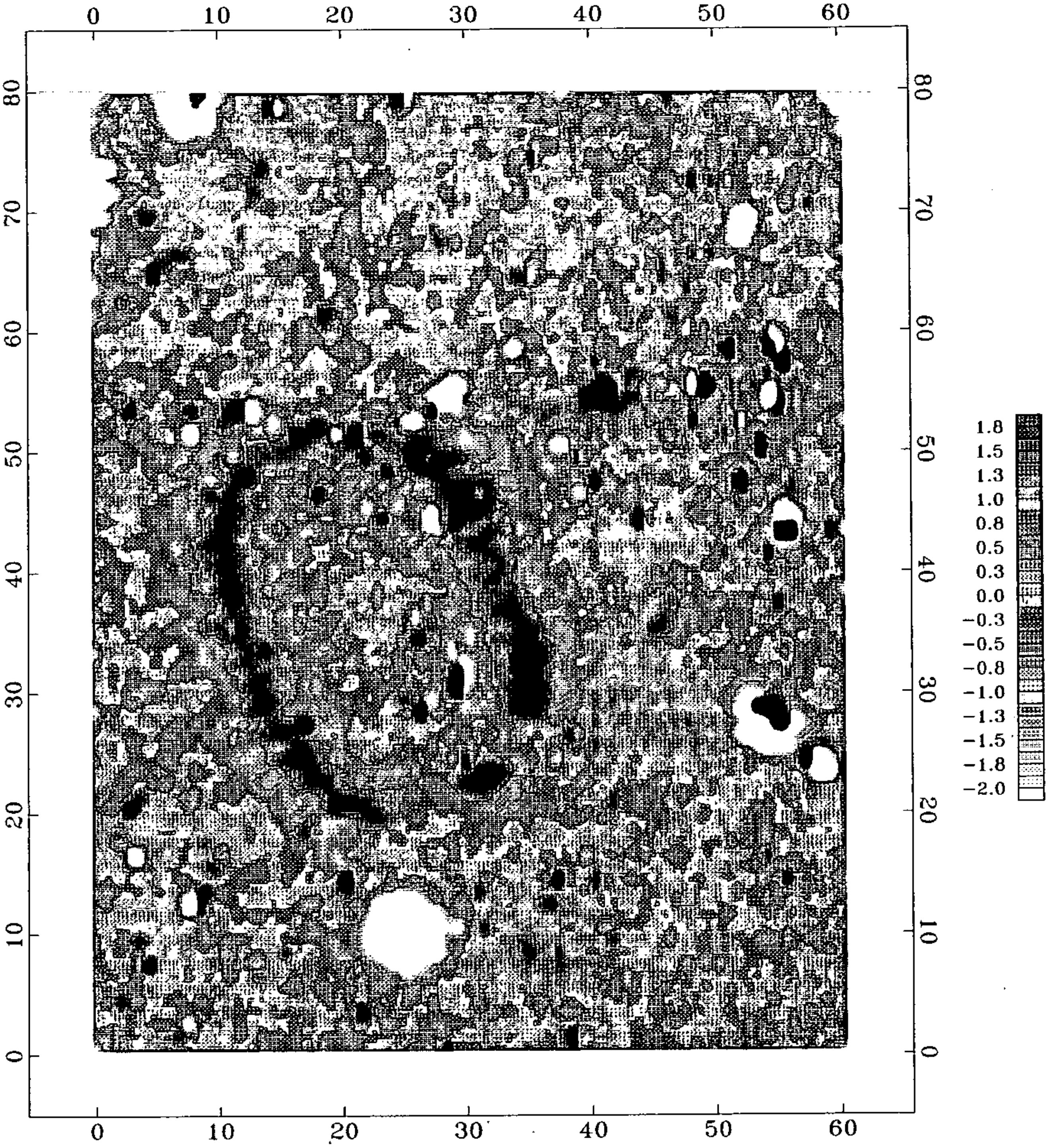
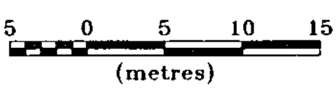


Figure 4



SHEER BARROW

Gradiometer Data



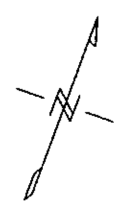
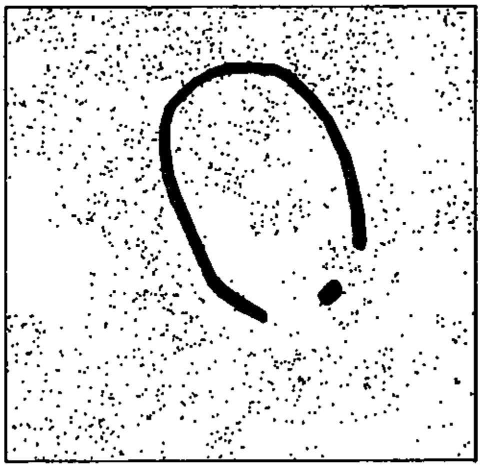
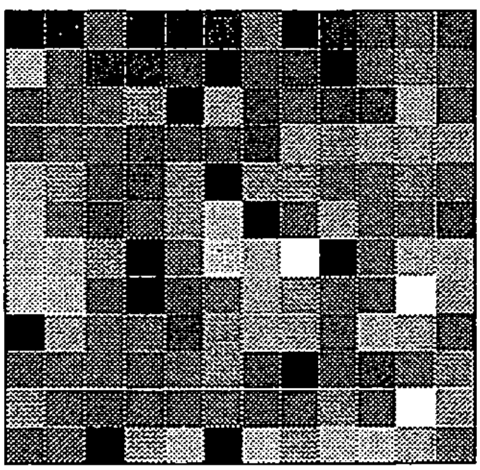


Figure 5

SHEER BARROW
Wiltshire
Volume Magnetic Susceptibility



25-40 SI Units



15-50 SI Units

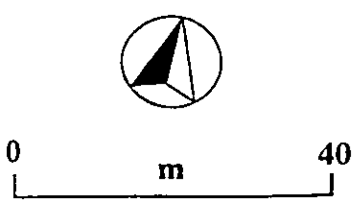


Figure 6

SHEER BARROW
Wiltshire

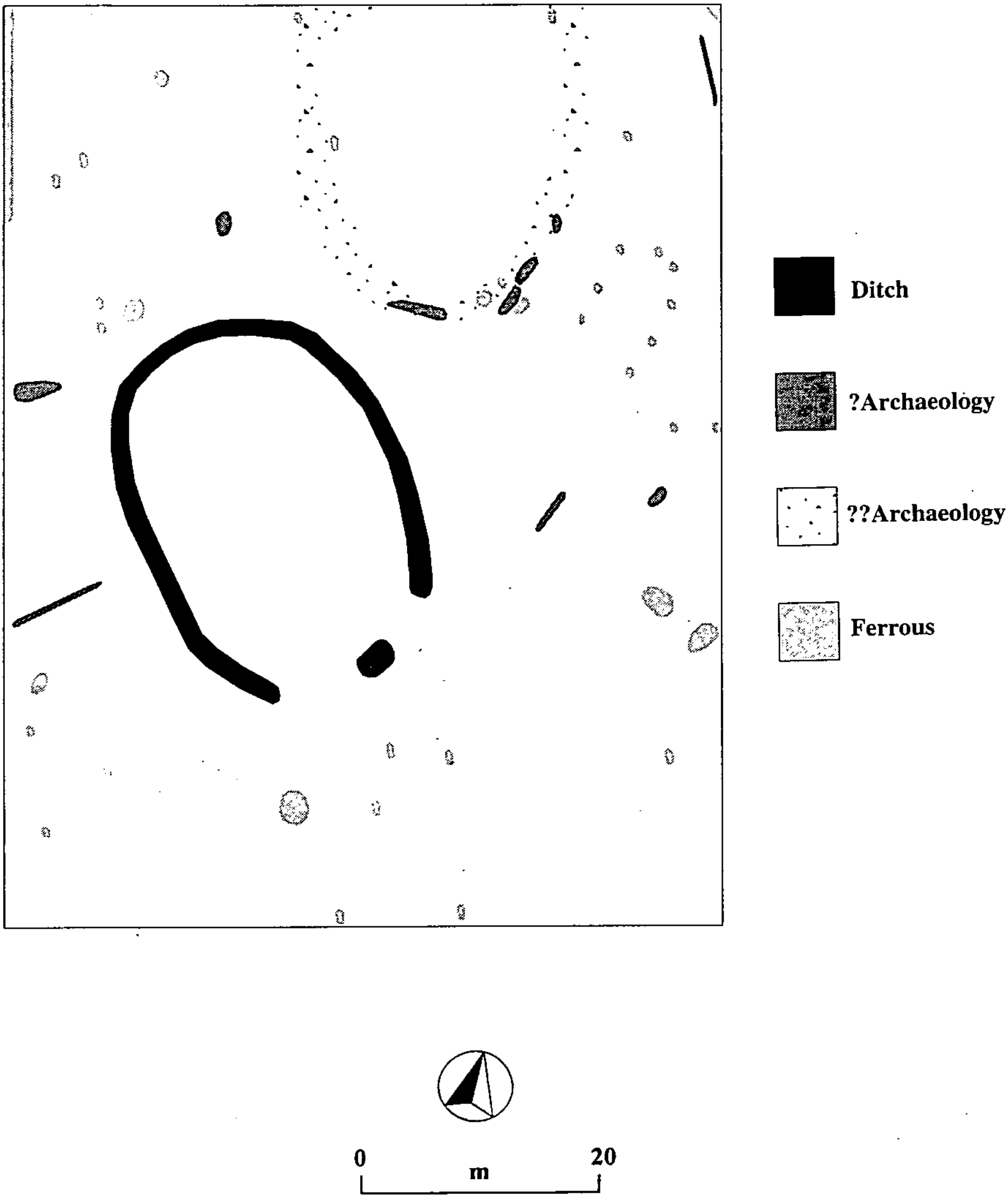


Figure 7

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