REPORT ON GEOPHYSICAL SURVEY

Site: Scots Dyke, Richmond, North Yorkshire

Date: June 1988

NGR: NZ 186 014

Location and Topography:
The site under investigation lies to the east of Richmond, near to Whitefields Farm (Figure 1). At the time of the survey the fields were under grass and grazed by sheep and cattle

Archaeology:
Scots Dyke, a Scheduled Ancient Monument, survives as a major linear earthwork running in a north-south direction at the point of the survey Ridge and furrow ploughing is apparent in the field to the west of the dyke and there are several features of potential interest visible on the ground

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Aim of survey:
Geophysical techniques were employed to check for potential archaeological features surviving adjacent to Scots Dyke, in an area where it is proposed to plant trees

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Instrumentation:

Magnetometer: Geoscan FM18 Fluxgate Gradiometer

Resistance Meter: Geoscan RM4 linked to DL10 data logger
Twin-probe configuration, 0 5m probe separation

Survey Method:
Readings were recorded at 1 0m intervals over the survey grid and the data were transferred to an Amstrad PPC1640 computer, which processes the readings and stores them on magnetic disc Further analysis was carried out back at base

Duplicates of the data were stored on magnetic tape

The grids were laid out as shown in Figure 2

Introduction

The geophysical survey work at Scot's Dyke, Richmond, was carried out in advance of a tree planting scheme adjacent to the Scheduled remains. Both magnetometry and resistivity techniques were employed in an attempt to verify whether archaeological features are likely to be found within the area of proposed development.

The results of the survey work are displayed as dot-density presentations and these are described in more detail in Appendix 2 For those unfamiliar with geophysical techniques in archaeology, a general introduction is provided in Appendix 1

Results

The results of the magnetic and resistance survey are displayed alongside each other in Figure 3 (Plots A-D), and features of potential interest are outlined in red The following numbers in brackets relate to this interpretation

There are several conspicuous magnetic anomalies on plot A which are likely to be caused by past agricultural practises and which may be associated with archaeological features. Although the anomalies are not visually striking, their strength and position in relation to the resistance features (Plots B - D) adds significance to their origin

There is a series of of fairly broad magnetic bands (1) running at right angles to the dyke and these presumably relate to the ridge and furrow visible in the field to the west The bands terminate at the base of the bank where there is a broad anomaly of less magnetic soil (2) The high resistance anomalies (3), also at the bottom of the bank, could be associated with the marked depression at this point (D on Figure 2), reflecting either a related feature or merely slumped material

The slightly higher magnetic readings at (4) are particularly interesting in that they are associated with a low resistance anomaly, and the combined evidence suggests a large (shallow?) pit / depression containing magnetically enhanced material

At the northern end of the survey there is a marked change in both the resistance and magnetic anomalies There is a curving band (5) of higher magnetic readings surrounding a generally quieter area which coincides with a region of higher resistance readings (6) These anomalies are associated with a slight platform, containing low banks and depressions, and clearly relate to former features in the corner of the field The different resistance plots (C-D) show attempts to identify any wall-lines within the readings, but the picture remains somewhat confused The higher resistance readings may just be a reflection of the raised platform, but all the evidence points to archaeological features (of unknown date)

Scanning with the magnetometer over a wide area of the field, beyond the immediate area of interest, showed several regions of major magnetic disturbance in addition to smaller areas of noise The strength of some of the anomalies was of the order that would normally be associated with industrial activity (metal-working areas, kilns and ovens) but, and this point must be stressed, it is difficult to be confident about any such interpretation on the basis of a scan Detailed work would be necessary to ascertain whether modern ferrous debris was responsible The same is true for the less noisey areas which, could reflect occupation deposits, pits and ditches, or, just as easily, waste material scattered over the fields during ploughing in medieval times

Conclusions

Geophysical techniques responded well at the Scot's Dyke site and several anomalies of potential interest have been identified Unfortunately, due to the small area of the site examined in detail, it is not possible to be 100% confident that the anomalies are associated with archaeological features adjacent to the dyke, but when all the evidence is taken into account (visible earthworks, detailed geophysical results and magnetic scanning), it would be surprising if the there were no archaeological remains surviving in situ

[This report is prepared and submitted on the basis that whilst it is based on a thorough survey of the site, no responsibility is accepted for any errors or omissions whether now or to become apparent]

Appendix 2: Presentation of results

In the dot-density presentation each survey station is alloted a fixed area within which a number of dots proportional to the magnitude of the instrument reading is plotted at random in this way a pictorial image is created of the variation in reading over the survey area and anomalies can be recognised quite easily Strong positive anomalies / high resistance readings are displayed as dense concentrations of dots whereas negative anomalies / low resistance readings are shown as blank areas

In the pseudo-grey scale, low readings are shown as pale areas and high readings are shown as dark areas

With reference to the plots, the minimum cut-off is the reading corresponding to zero dots and the maximum cut-off is the reading corresponding to the maximum number of dots The contrast factor (CF) determines the relationship between the reading and the number of dots This may range from a linear relationshio (CF=1) to a power law relationship (CF=2,3 etc), which gives extra emphasis to readings nearer the maximum

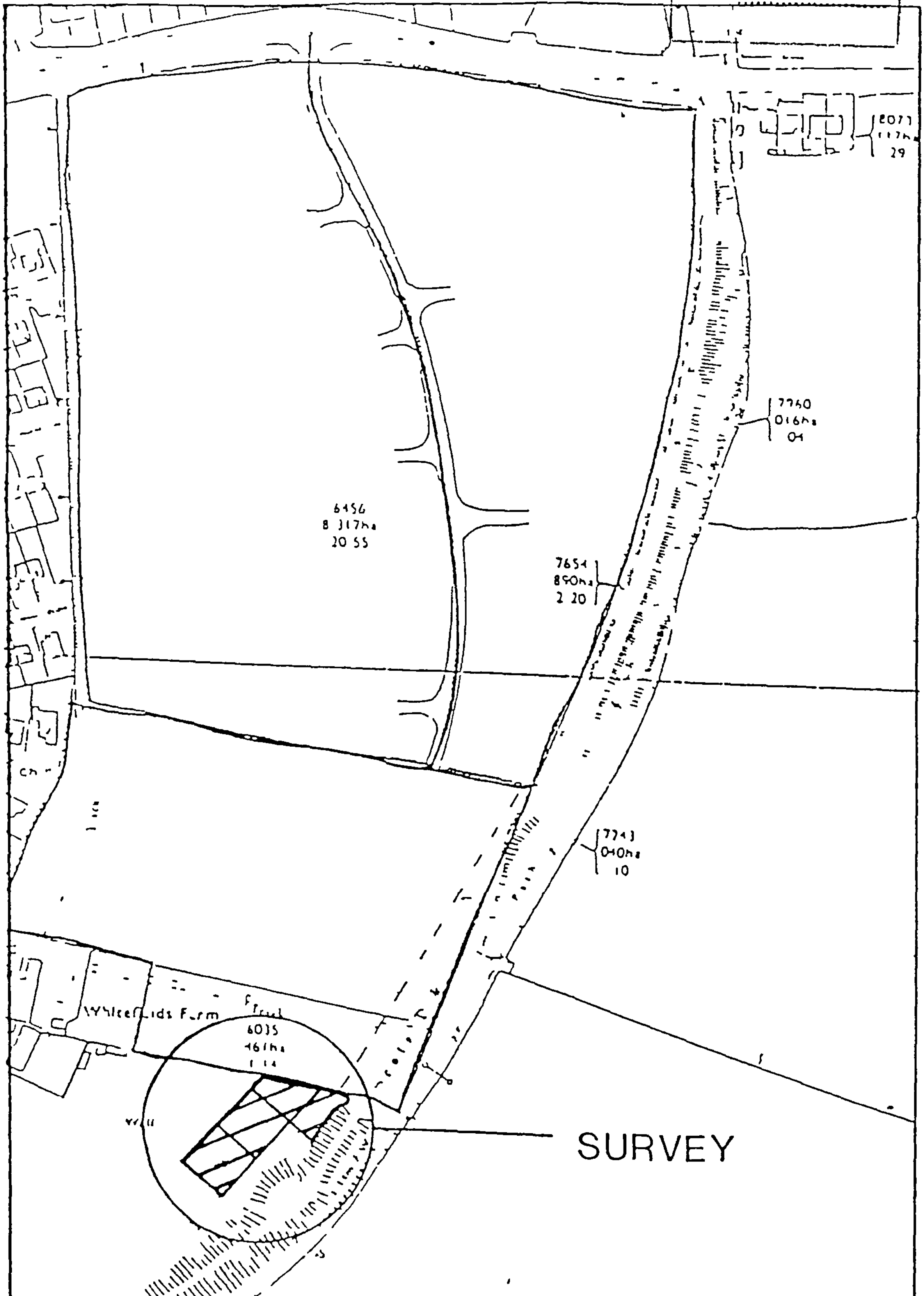

Figure 1: Survey Location

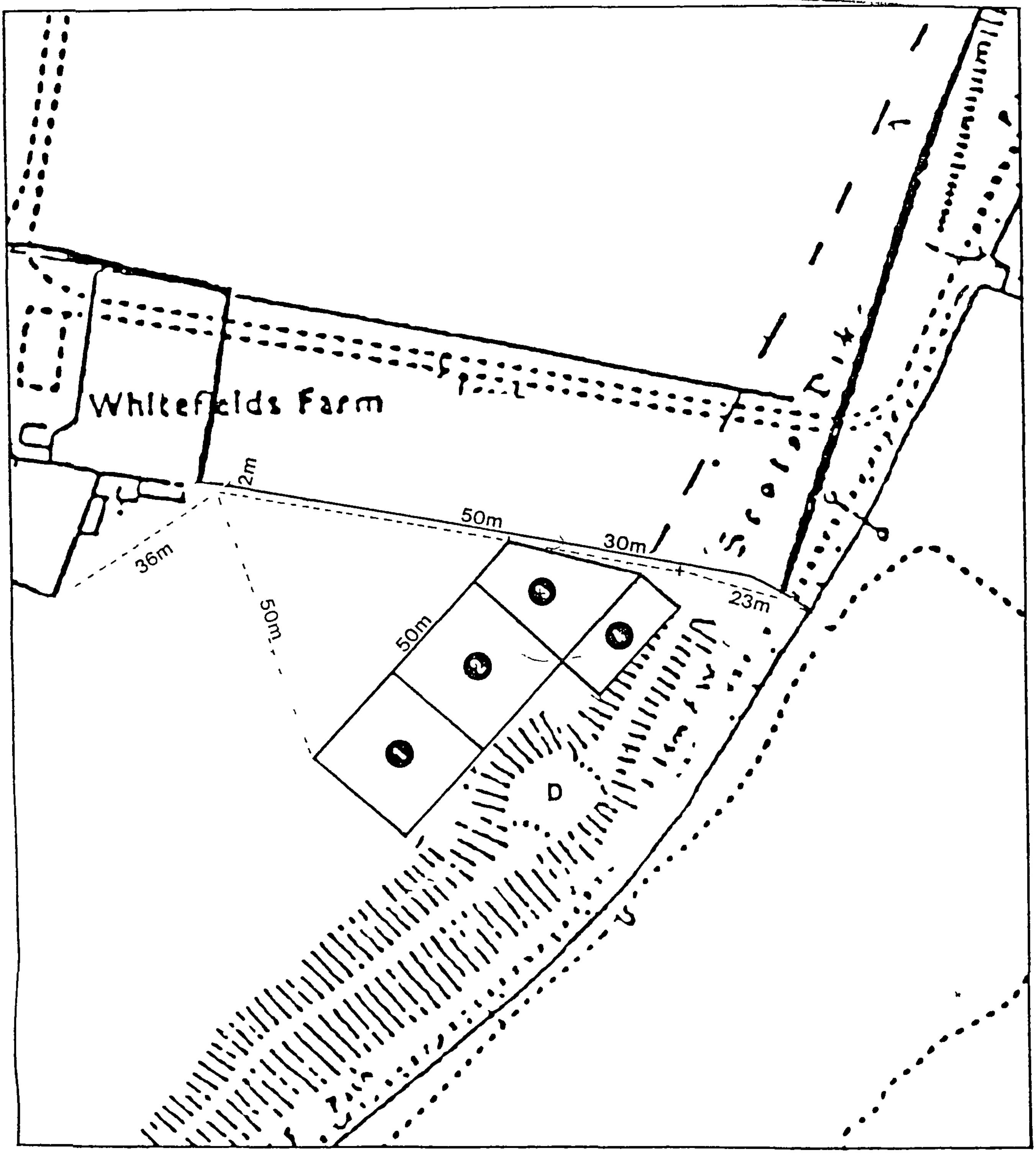

Figure 2: Grid Location

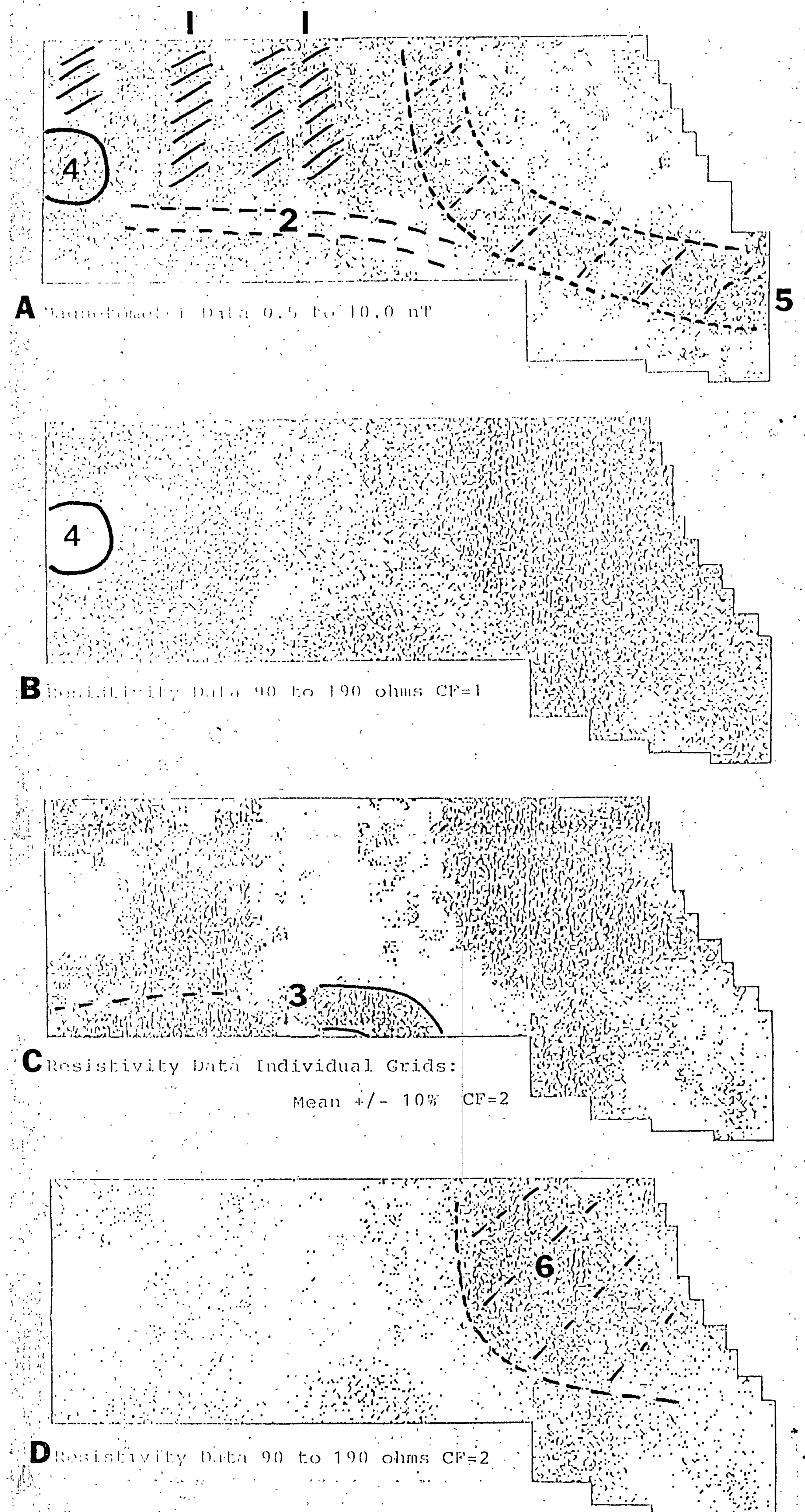

Figure 3: Survey Data