

NYCC HER	
SNY	686
ENY	1222
CNY	
Parish	8045
Rec'd	?/1993

NY5686  
NYE1222

ON

# **Kirk Smeaton Quarry Extension** **North Yorkshire**

## *Gradiometer Survey*

*immediately SW of Windhill Plantation.*

*August 1993*



**West Yorkshire**  
**Archaeology Service**

WYAS R154

© WYAS 1993

West Yorkshire Archaeology Service  
14 St John's North, Wakefield WF1 3QA

WYAS R154; 2nd August 1993

**Kirk Smeaton Quarry Extension,  
North Yorkshire  
SE509145**

***Gradiometer Survey***

**CONTENTS**

**1. Summary**

**2. Introduction**

**3. Instrumentation**

**4. Method**

**5. Results**

**6. Discussion**

**Bibliography**

**Acknowledgements**

# Kirk Smeaton Quarry Extension, North Yorkshire

## *Gradiometer Survey*

### 1. Summary

#### *Client*

Drinkwater Sabey Ltd., Cumberland House, Wintersells Road, Byfleet, Surrey KT14 7AZ. .

#### *Objectives*

To determine whether any significant archaeological features were present prior to an extension of the existing limestone quarry.

#### *Method*

Readings were taken at 0.5m intervals on traverses spaced 1m apart using a Geoscan FM36 Fluxgate Gradiometer and ST1 sample trigger.

#### *Conclusions*

The gradiometer survey successfully located features of potential archaeological importance. A number of linear anomalies caused by buried ditches suggest two phases of ancient activity in the southern part of the site. Flint tools collected from the field's surface imply that prehistoric activity is likely to be found on, or in the near vicinity, of the site.

It is possible that the geology in the northern part of the site is masking magnetic responses from buried features.

## **2. Introduction**

2.1 A gradiometer survey was carried out by five officers of the West Yorkshire Archaeology Service on behalf of Drinkwater Sabey Ltd. The fieldwork took place between 22nd July and 26th July 1993.

2.2 The site lies immediately east of the A1 road at Barnsdale Bar (SE50951455), on limestone, overlain in places by clay and sands (Simpson, 1991). The area surveyed measured roughly 4.5ha and is situated between 53m and 55m OD.

2.3 At the time of the survey the area had been cleared and set aside for quarrying.

2.4 Previous archaeological information about the site can be obtained from work carried out in the surrounding areas. Fluxgate gradiometer surveys were carried out to the north-east of the area in 1989 and 1990 (Abramson, 1989a and 1990). These identified linear anomalies which were shown by later excavation to be of possible Roman origin (Abramson, 1989b; Simpson 1991). A prehistoric crouched burial was also uncovered next to one of the field ditches (Abramson, 1989b).

## **3. Instrumentation**

3.1 The survey was carried out using a Geoscan FM36 Fluxgate Gradiometer combined with a ST1 sample trigger. The results were then transferred to a portable Compaq laptop computer and later processed on an Elonex PC-433.

3.2 The site grid was tied in using a Topcon DM-A2 Electronic Distance Meter in conjunction with a theodolite.

## **4. Method**

4.1 A base line was established on the western edge of the site and a 20m by 20m grid was surveyed from this after the base line had been tied-in to features marked on the 1:2500 Ordnance Survey map (Fig. 1). Magnetic readings were subsequently recorded at 0.5m intervals on W-E zig-zag traverses spaced 1m apart. This provided a total of 800 readings per 20m grid square.

4.2 For presentation purposes the computer software interpolated the data between the measured traverses so that 1600 readings per grid were obtained, and the spacing between readings effectively became 0.5m in both directions.

4.3 The whole (100%) of the site area was surveyed.



8175  
7-55

Windhill Plantation  
0572  
2-14

236  
5-11

9960  
9-77

BARNSDALE BAR QUARRY

7750  
5-80

8039  
6-71

9634  
15-49

1831  
6-45

9420  
5-92

4 ft RH

A1

0 100 200m



2511  
-49

Fig.1 Site location plan and grid layout

## **5. Results**

### **5.1 Presentation of the results**

The results are presented in Figure 2a as a colour plot with an interpretation below it (Fig. 2b). Three further figures have been included to show the southernmost half of the site in more detail. These comprise a colour plot in Figure 3, and greyscale and dot-density plots at 1:500 in Figures 4 and 5 respectively.

5.2 The anomalies detected in the survey can be divided into four categories.

1. Anomalies due to recent field boundaries.
2. Anomalies caused by ploughing.
3. Anomalies due to underlying archaeological features.
4. Spikes due to discrete buried iron objects.

The last of these are present across the site but no further mention is made of them as individual iron objects will, for the most part, be recent in origin.

5.3 Those anomalies due to recent field boundaries are marked on Figure 2b. The northernmost and easternmost of these appears on the Ordnance Survey 1:2500 map.

5.4 It is quite evident from striations running north-south along the site that the area has been subjected to a fairly intensive regime of arable agriculture. These striations run parallel to field boundaries marked on Ordnance Survey maps of the area and are probably created by the plough scratching the surface of the limestone.

5.5 A number of anomalies have been identified as being due to buried features of an archaeological nature. These appear to be long linear features (probably ditches). However, the form that they take is quite unusual. It would appear that there are at least two phases of linear feature present in the southern end of the site (Fig. 2b). These comprise a rectilinear layout coloured blue on Figure 2b, and a set of curved and meandering features as indicated in orange on Figure 2b.

Twenty pieces of struck flint (including blades, a core and other tools) and two sherds of heavily abraded Roman pottery were recovered from the surface in this part of the site.

5.6 A difference in the background levels of magnetic response is particularly evident on the dot-density plot in Figure 5. This change can be seen about 120m from the southern end of the site and is probably due to a variation in the subsoil such as a change from bedrock to bedrock



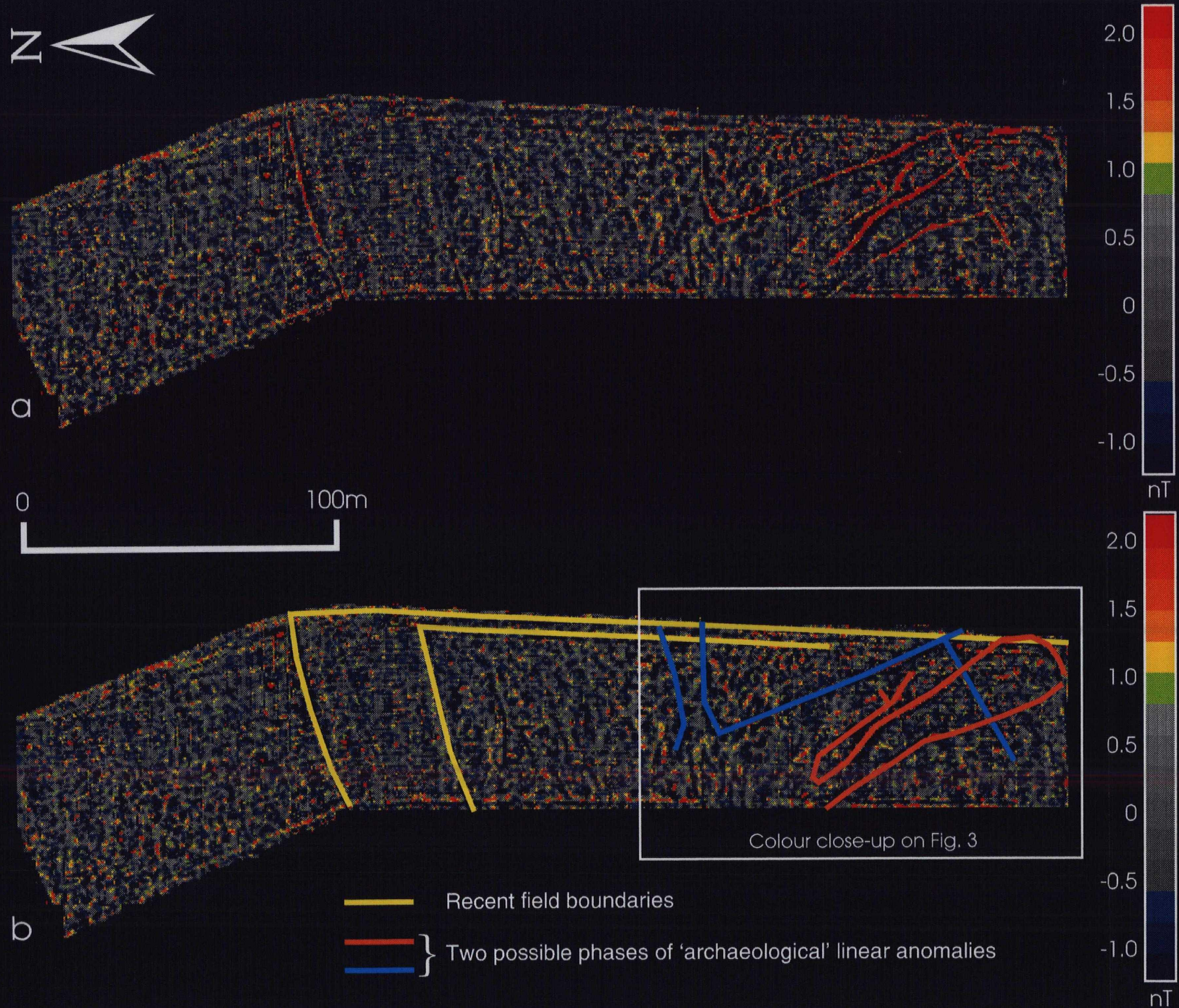
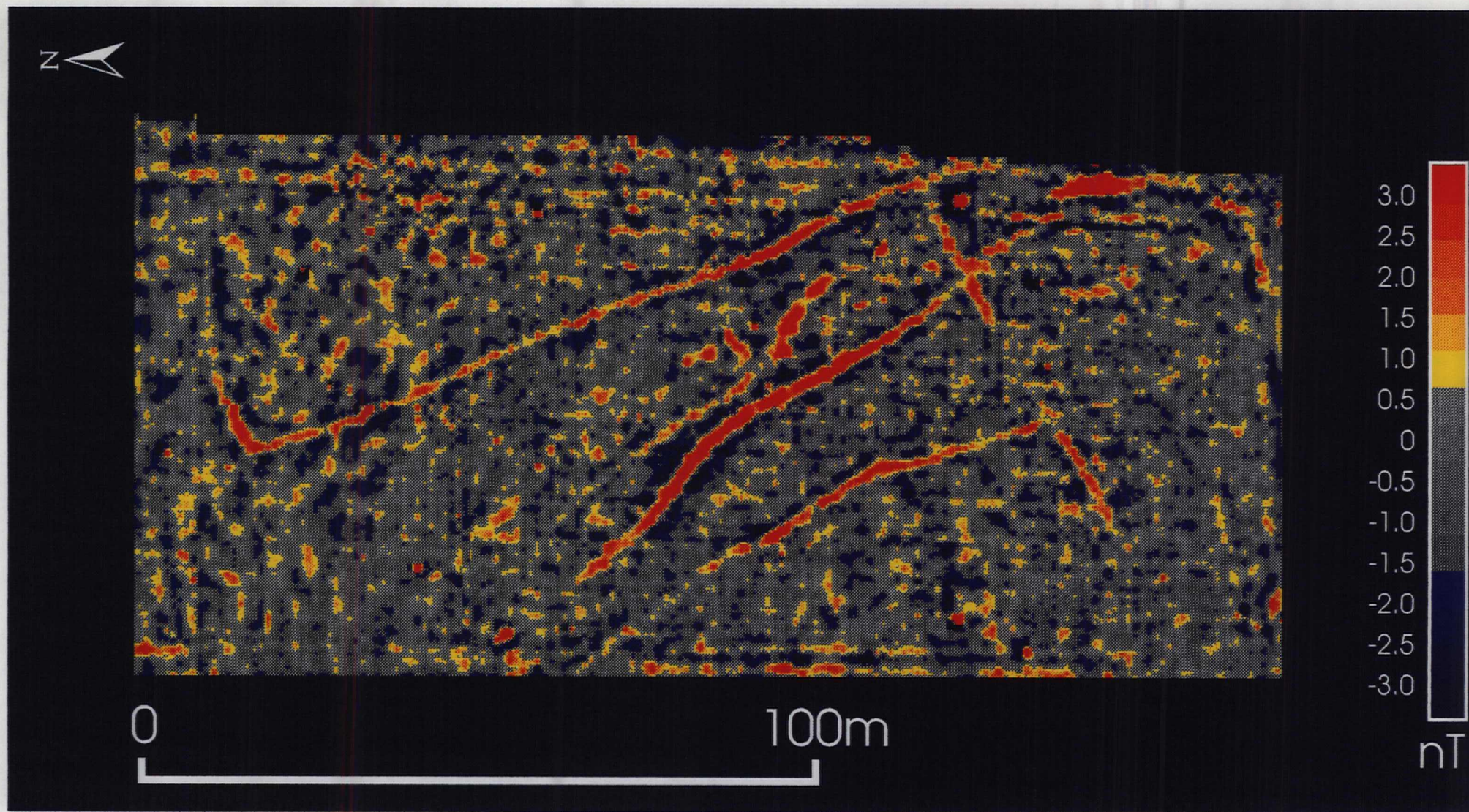


Fig. 2 Colour plot (a) and interpretation (b) of the results





*Fig. 3 Colour plot enlargement of linear anomalies*





0 50m

Fig.4 Grey scale enlargement of linear anomalies (-3nT to +3nT)



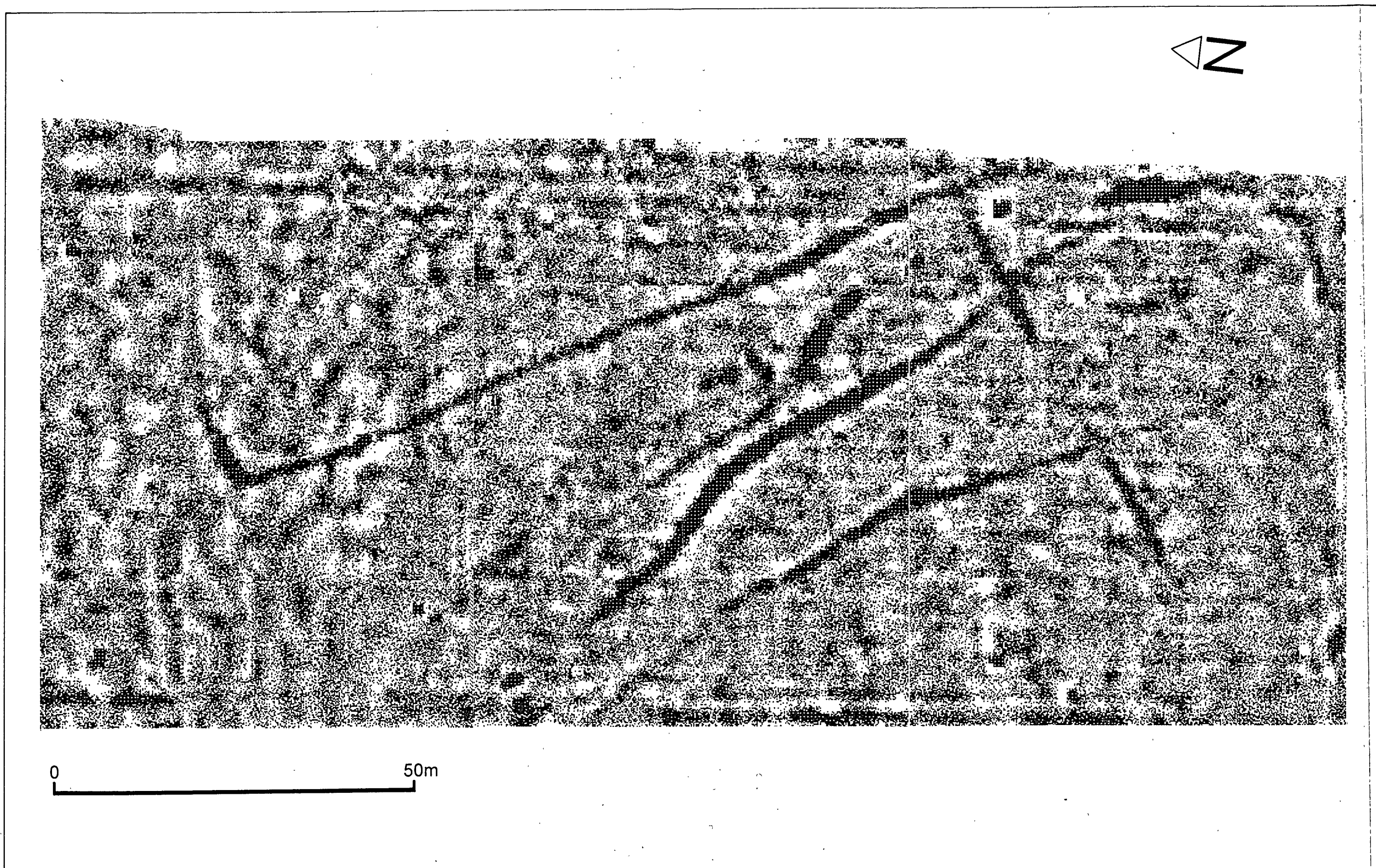


Fig.5 Dot density enlargement of linear anomalies (-3nT to +3nT)

overlain by sand.

## 6. Discussion

The linear anomalies suggest the presence of an enclosed, ancient agricultural landscape. The alignment of these at a different orientation to one another and their different alignment with respect to recent field boundaries would tend to imply that there is more than one phase of ancient landscape represented on the site.

The presence of flint artefacts on the surface of the site might imply that at least one of these phases of activity dates to the prehistoric period. A more thorough investigation would be required to identify the archaeological nature and dates of these features.

It is possible that other more discrete features such as pits would not be identified by the gradiometer. Moreover, the change in background response suspiciously coincides with the edge of the area where features have been identified. It may be that a change in the underlying soil conditions and geology is masking the magnetic response from buried archaeological features in the north of the site.

## Bibliography

Abramson, P., 1989a, "Kirk Smeaton Magnetometer Survey", West Yorkshire Archaeology Service Report.

Abramson, P., 1989b, "Trial Excavations at Kirk Smeaton Quarry Extension Site, North Yorkshire", West Yorkshire Archaeology Service Report.

Abramson, P., 1990, "A Geophysical Survey at Kirk Smeaton Quarry, Barnsdale Bar Phase II", West Yorkshire Archaeology Service Report.

Simpson, R., 1991, "Kirk Smeaton Quarry: Phase IV", *Roman Antiquities Section Bulletin*, 8, 1990-91, Yorkshire Archaeology Society.

## Acknowledgements

Fieldwork:

Andy Boucher BSc, Charlie Morris BA,  
Magda Staddon BA, Alistair Webb BA, Kath Keith.

Figures:

Paula White MAAIS, Andy Swann MAAIS.

Report:

Andy Boucher BSc.

July 1993