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ARCHAEOLOGICAL SERVICES WYAS

Castle Hills & Highroyds Wood
Micklefield
Earthwork & Geophysical Survey

August 1998

Report No. 623

CLIENT

Leeds City Council Countryside Service

Earthwork & Geophysical Survey of Castle Hills & Highroyds Woods Micklefield

Contents

Summary

A fixed loop of survey stations was established around Castle Hills Wood and tied into the Ordnance Survey national grid. A large, sub-rectangular earthwork and a number of banks, mounds and hollows were identified and recorded. A geophysical survey in an adjoining field revealed the presence of a large complex of features apparently related to those within the wood.

Client

Leeds City Council Countryside Service, 218 Town Street, Middleton, LEEDS LS10 4TN

1. Introduction (Figs 1 & 2)

1.1 Castle Hills and Highroyds Woods were located immediately north-east of the A1 trunk road at New Micklefield. The site was bounded by agricultural land to the east and west and by the York to Selby railway line to the north.

1.2 Area A was a block of approximately 3.35ha centred at Castle Hills (SE 4451 4321). This area was chosen as the first to undergo analysis because it contained the largest visible earthwork, a sub-rectangular banked enclosure 36m across. It was also close to the eastern boundary of the wood and a well known crop mark site in the field beyond.

1.3 Area B was a block of approximately 0.29ha centred at SE 4452 4322. It was situated 65m north-west of Area A and contained a number of large earthworks including a number of linear and curvilinear ditches an oval mound and a linear bank.

1.4 Area C was a block of 4.64ha centred at SE 4455 4321 and was situated 50m east of Area A. It was subjected to detailed gradiometer survey and was positioned to cover a large crop mark site.

2. Archaeological Interest

2.1 Archaeological interest in the site lay in the fact that it contained a large number of prominent, extant earthworks which had never been examined or recorded in detail before.

2.2 Highfield to the east, contained a well known crop mark site which had been identified as a Butterwick type enclosure and was therefore of particular regional interest. Therefore, one of the project's aims was to identify any possible link between the two sites (See section 5; Yarwood 1990, 273).

2.3 The project was carried out to clarify and plot the nature and extent of the earthworks, towards providing a better historical and archaeological understanding of the site, so significantly enhancing the amenity value of the woodland.

3. Method (Fig. 3)

3.1 Earthwork Survey

3.1.1 A closed loop traverse of 15 stations was established around the Castle Hills area, to provide an accurate basis for the detailed earthwork survey. Their co-ordinates are given in Appendix II, (this volume). In addition, a number of additional permanent and temporary stations were established to the same level of accuracy as the main loop. This was to allow better access to the centre of the wood.

3.1.2 The earthworks and other topographic features were recorded using a Geodimeter 610 total station theodolite. All the survey data was processed using Blue Moon Systems' Landscape software. Final plots were processed using AutoCAD R14. The collected data was tied into the Ordnance Survey 1:2500 national grid using AutoCAD Map R2.

3.1.3 Each feature was examined and marked with bamboo canes to show the tops and bottoms of banks as well as other important details. The canes were then used as a guide for the total station and hachure surveys. Plastic tent pegs were positioned to allow accurate measurement during preparation of hachured plots in the field.

3.1.4 Additional detail, such as the positions of larger trees, trackways and the A1 trunk road was recorded. Spot levels were taken every 5 to 10m, to allow the construction of a three dimensional, digital terrain model.

3.1.5 Once processed, the data was plotted at a scale of 1:200 and hachured by hand in the field to allow accurate recording and interpretation of the features.

3.2 Geophysical Survey

3.2.1 A detailed fluxgate gradiometer survey was carried out on *Area C*. For technical and methodological data, see Appendix III.

3.2.2 At the time of the survey between 8th and 10th September 1997, the field was under cereal stubble and the ground surface was fairly flat. The site sloped gently to the north and south. The underlying geology is limestone.

4. Earthwork Survey Results (Fig. 4)

4.1 Area A

4.1.1 **A.** A sub-rectangular banked enclosure measuring 45m by 35m, and aligned from north north-east to south south-west, is the major feature in this area. It is well defined by substantial earth banks up to 12m wide and between 0.4m and 1.1m high. The bank was highest around the northern and eastern sides and it became gradually lower, although still well defined, on the southern side. The western side seemed not to be formed by a bank, but by a hollowing out of the hillside. There was a slight hollow through the north-western corner which may represent an entrance into the enclosure, although it could be indicative of more recent damage by motor vehicles, as there is evidence that the site has been visited by joyriders who have left behind a burnt out car and numerous car and motorcycle parts. The interior of the feature was mostly flat, sloping gently from south-east to north-west.

4.1.2 **Ai.** A shallow bank running north-east to south south-west for 14m from the north-western corner of **A** to the southern edge of **B** and sloping gently from north-west to south-east.

4.1.3 **B.** A broad, linear hollow aligned roughly south-east to north-west. This feature was observed to continue right through the wood and emerge on the west side of Castle Hills Wood in *Area B*. Only the eastern 180m was recorded in this area. The northern and southern edges of this feature are very different in magnitude and character. The southern edge is the best defined

and is a fairly steep and even bank between 0.75m and 1.7m high, apparently formed by cutting or wearing away the naturally sloping hillside. The northern edge was much more poorly defined, mostly by an irregular, low bank between 0.1m and 0.4m in height.

4.1.4 **C.** A steep sided, narrow, linear bank of 35m in length which is aligned north-east to south-west. Although very well defined for its entire length, this feature seems to peter out suddenly at each end.

4.1.5 **Ci.** A steeply sloping bank 0.6m high, which runs from north-east to south-west. The north-eastern end begins close to the south-western end of **C** (which runs at the same angle). It continues for 50m south-west until it passes out of the current area of investigation.

4.1.6 **Cii.** A steeply sloping bank 0.6m high. This feature begins close to the north-eastern end of **Ci** and the south-western end of **C** and runs from south-east to north-west for 25m before sweeping round to the north north-east for 30m. The feature continues further in this direction, beyond the limit of this phase of the investigation.

4.1.7 **Ciii.** A steeply sloping bank 0.9m high, which runs from north-east to south-west until merging with **Cii** at its north-eastern end. It is visible for 15m before it passes into an exceptionally dense area of ash and hawthorn and out of the current survey area.

4.1.8 **D.** A broad, moderately sloping bank 55m long and 1m high, aligned north-east to south-west. This bank is much narrower and shallower at the south-west and then sweeps outwards and back in again at the north-eastern end. It seems to form a terrace from the large, mostly flat area surrounding **A**, to another flat area to the east.

4.1.9 **E.** A broad, low, linear bank 40m long, 7m wide and 0.15m high. It runs north-east to south-west. Although broad and very low, it is easily visible on the ground. It peters out at both ends and no continuations of it were found. It was noticeably steeper on its north-western side.

4.1.10 **F.** A broad, low curvilinear bank 50m long, 10m wide and between 0.15m and 0.85m high. It is aligned east to west and seems to peter out at both ends. It was noticeably steeper on its southern side.

4.1.11 **G.** A shallow sloping bank 30m long, 4m wide and 0.3m high, aligned north-east to south-west. It slopes only from south-east to north-west and peters out at each end.

4.1.12 **H.** An irregular, shallow hollow 12m long and 5m wide, situated north-east of **G**. It was difficult to define the limits of this feature and it may be the product of a collapsed badger set/rabbit warren.

4.1.13 **J.** A shallow sloping, linear bank which runs from north-east to south-west for 15m and then turns south-east for another 10m. It forms part of a feature with **K**.

4.1.14 **K.** A shallow, curvilinear hollow formed by two low banks which run from north-west to south-east for 10m before turning south-west for another 10m.

4.1.15 **L.** A pronounced rise formed by a short bank 5m long and running from north-east to south-west, south of **J**.

4.1.16 **M.** A broad, shallow sloping linear bank aligned north-east to south-west and sloping from south-east to north-west.

4.1.17 **N.** An oval hollow 12m long, 8m wide and 0.4m deep.

4.2 Area B

4.2.1 **O.** A linear bank aligned from east to west, which was traced for *c.*35m during this survey phase. It continues to the west but due to the impenetrable nature of the undergrowth, it was impossible to follow it further at this stage. It is convex in profile, with the northern side being slightly shallower and longer in slope due to the natural incline of the hillside. It begins to broaden out at its western end.

4.2.2 **P.** A curvilinear ditch or hollow meandering from east to west, parallel to and *c.*3m north of **O**. A 30m length was surveyed. For *c.*8m in the middle of this section, there is no sign of a northern bank, merely a noticeable break of slope against the hillside.

4.2.3 **Q.** A linear ditch running from south-east to north-west for *c.*22m. This feature is well defined although, there is no sign of an accompanying bank on either side. It peters out at its western limit and becomes unclear. It butt ends at its east end and is also truncated by the forest track.

4.2.4 **R.** A large oval mound 8m by 10m and immediately north west of **Q**. There was no obvious source or cause for this feature.

4.2.5 **S.** A tightly curving ditch north of **Q** and south-west of **T**, cut by the forest track. There is no sign that it continued beyond the track and it is not immediately obvious what its purpose was.

4.2.6 **T.** A short length of a linear ditch immediately north of the forest track and **S**. It is aligned north-east to south-west and seems to be cut into the natural southward slope of the hill. It is possible that this feature is connected with the eastern end of **S** although this would make an unlikely formation.

5. Geophysical Survey Results (Figs. 5, 5a & Appendix IV)

5.1 A considerable amount of background magnetic noise was encountered across the whole site and this, coupled with the relatively small magnetic susceptibility contrast between the features and surrounding geology, means that it is difficult to obtain good resolution in the data plots. This is particularly noticeable in the X-Y trace plots, where increases in resolution tend to obscure the archaeological anomalies.

5.2 All of the anomalies show a stronger positive than negative magnetic response.

5.3 The survey revealed the presence of 22 enclosures and several linear anomalies located to the north and south of an axial positive anomaly (Anomaly 1). The anomalies interacted in such a complex fashion that it was impossible to determine whether there was any set pattern to the enclosure system. Many of

the anomalies were superimposed on one another and this may be indicative of a multiphase or migrating site.

5.4 Brief descriptions of the features are given in Table 1.

6. Discussion

6.1 Area A

6.1.1 The most obvious characteristic of the earthworks in *Area A* was the common alignment shared by the majority of them. The similarity in orientation suggests that the features respected each others' alignment, as part of a system of property or field boundaries.

6.1.2 One of the most important aspects of this area is the relationship with the features revealed within Highfield by the geophysical survey (section 5). It can be seen clearly that the central axial feature of the Highfield site is a continuation of **B**. This suggests that the features within *Area A* and probably those throughout Castle Hills Wood are the upstanding equivalent of those now erased by ploughing to the east.

6.1.3 The group of lynchets and banks forming group **C** may be the vestigial remains of a ancient field system, with lynchets marking the upper and lower boundaries on the hillside and low banks serving the same purpose on the flatter summit. It was suggested in correspondence from the forestry service that the linear banks may be the remains of post-medieval or later woodland management features, although little evidence could be found to back this up. The only true woodland earthwork was the "woodbank" which acted as a boundary marker and deterrent to livestock. Such features are usually medieval or later (Rackham 1986, 67, 99-100; Taylor 1975, 28-29; Yarwood 1995).

6.1.4 Feature **B**, a linear hollow marking the northern boundary of *Area A*, was already known to extend across the full width of Castle Hills wood on a north-west to south-easterly alignment. It respects the features mentioned in **4.1** (above), curving around the northern end of **A**. Its profile (a broad flattened 'U') suggests that it was a trackway rather than a ditch. There is also an almost complete absence of raised banks on the northern side, which would have resulted from the construction of such a large feature had it been excavated rather than worn.

6.1.5 Earthworks **H** and **N** were unusual in that they were concave, rather than convex features. The very irregular and shallow nature of **H** suggested that it was probably subsidence caused by a collapsed animal burrow of some kind. Rabbit and badger activity was widespread throughout Castle Hills and Highroyds woods and more recent collapsed burrows and setts were seen during the survey. Feature **N**, however, was a much more regularly shaped feature, although it was hard to suggest a function for it. At 12m by 8m, it was probably too large to be a crater left by a fallen tree or created by a collapsed burrow.

6.2 Area B

6.2.1 The features in *Area B* were not examined in quite as much detail as those in *Area A* due to the presence of a lot of dense undergrowth. The plan which was produced showed no clear definition of alignments amongst the features except that **O**, **P** and **Q** were roughly parallel. **P** is a continuation of **B** from *Area A* and therefore, of feature **1** from *Area C*.

6.2.2 It was not possible to put forward any definite suggestions for the purpose of the features in this area. Linear features **O**, and **Q** follow a similar alignment to **P** and may therefore, be related. The most likely explanation for **R** and **S** was that they were the product of some sort of industrial process, possibly quarrying.

6.3 Area C (Geophysical Survey)

6.3.1 The majority of the recorded features respect the line of trackway **1** (Table1). This suggests that as well as acting as a focus for the settlement, it was in use for a long period of time.

6.3.2 The overlapping of features suggested that the settlement had been occupied over a very long period of time and that individual enclosures had been allowed to fall into disuse for long enough periods for them to become insignificant obstacles to the construction of new features.

6.3.3 Feature **1** seemed to be a direct extension of feature **B** in *Area A*. This would suggest that the features in *Areas A* and *C* form part of a single, extensive complex of enclosures clustered around a central trackway. This same axial feature can also be seen to continue through the wood westwards until it joins feature **P** in *Area B*.

7. Conclusion

7.1 The earthworks in Area A seemed to represent the remains of an ancient field system as well as an enclosure and possible trackways. It was also possible to demonstrate that Area A was associated with the crop mark complex in Highfield and that by extending this link to Area B, it was shown that the three areas combined to form parts of the same monument.

7.2 Area B contains earthworks of a similar nature to those in Area A but with what appears to be considerable physical interference from later activity, most likely quarrying of the natural limestone.

7.3 The limited amount of work already undertaken has demonstrated the presence of what may be a site of considerable importance. Its size and apparent state of preservation make it unusual in this area. The trackway feature alone, was observed over a distance of nearly 800m from Highfield and the quarry in the east to Area B and the forest track in the west of Castle Hills Wood.

8. Suggestions for Further Work

8.1 Further work within the wood, once the thinning has progressed, should be able to reveal more earthworks and provide the opportunity to properly examine the relationships between those in different areas.

8.2 Further geophysical survey within the woods, may be able to reveal features invisible on the surface which could greatly enhance the interpretation of what is already visible.

8.3 Limited trial excavation of the earthworks could reveal more detail regarding the construction, function and, most importantly, the date of the features in Areas A and B.

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Yarwood, R.E., 1995, 'Castle Hills Wood, Micklefield-Management of Archaeological Sites' (Letter to Leeds City Council, Countryside Service 16.6.95 Ref.: P/FC/IS/AW), in: Lomas et al, 1995, (Appendix VII)

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Table 1

Dimensions and Descriptions of Geophysical Anomalies (See Figs 6 & 6a)

Anomaly	Dimensions (m)	Description	Relationships
1	400	Curvilinear feature aligned from east to west	
2	360	Curvilinear feature aligned from east to west	
3	(30)x20	Irregular sub-rectangular enclosure	Superimposed on 2
4	40x25	Sub-rectangular enclosure	Possibly superimposed on 5. Respects 2
5	30x20	Infill enclosure between 2, 4 & 6	
6	20x30	Rounded sub-rectangular enclosure	
7	20x20	Sub-rectangular enclosure	Possibly appended to 6
8	5x30	Parallel linear features aligned from north to south	
9	45x30	Irregular sub-rectangular enclosure	Superimposed on 10
10	30x20	Parallel sub-circular enclosure	Appended to 9
11	35x20	Sub-rectangular enclosure	Superimposed on 8. Appended to 2
12	40x20	Sub-rectangular enclosure	Superimposed on 11. Appended to 2
13	40x20	Sub-rectangular enclosure	Appended to 2
14	15x15	Sub-rectangular enclosure	Possibly infill between 2, 13 & 15
15	25x30	Sub-rectangular enclosure	Superimposed on 16. Appended to 2
16	25x30	Sub-rectangular (possibly D-shaped) enclosure	Superimposed on 2. ? Contemporary with 17
17	20x30	Sub-rectangular enclosure with possible internal division	Superimposed on 2 ? Contemporary with 16
18	25x20	Sub-rectangular enclosure	Superimposed on 19

Continued over

Anomaly	Dimensions (m)	Description	Relationships
19	60	Curvilinear feature aligned from east to west	Contemporary with 20
20	35x25	Sub-rectangular enclosure	Contemporary with 19
21	30	Curvilinear feature aligned from east to west	Contemporary with 22
22	60x20	Sub-rectangular enclosure	Contemporary with 21
23	10x40	Parallel linear feature aligned from north to south	
24	35x30	Multiphase sub-rectangular enclosure	Superimposed on 22
25	40x20	Sub-rectangular enclosure with curving northern side	Superimposed on 25
26	35x25	Sub-rectangular enclosure with curving northern side	Superimposed on 24
27	30x20	Sub-rectangular enclosure with curving northern side	Superimposed on 26
28	(30)x20	Sub-rectangular enclosure with possible internal division	
29	(30)	Linear feature running from north-west to south-east	Respects 2

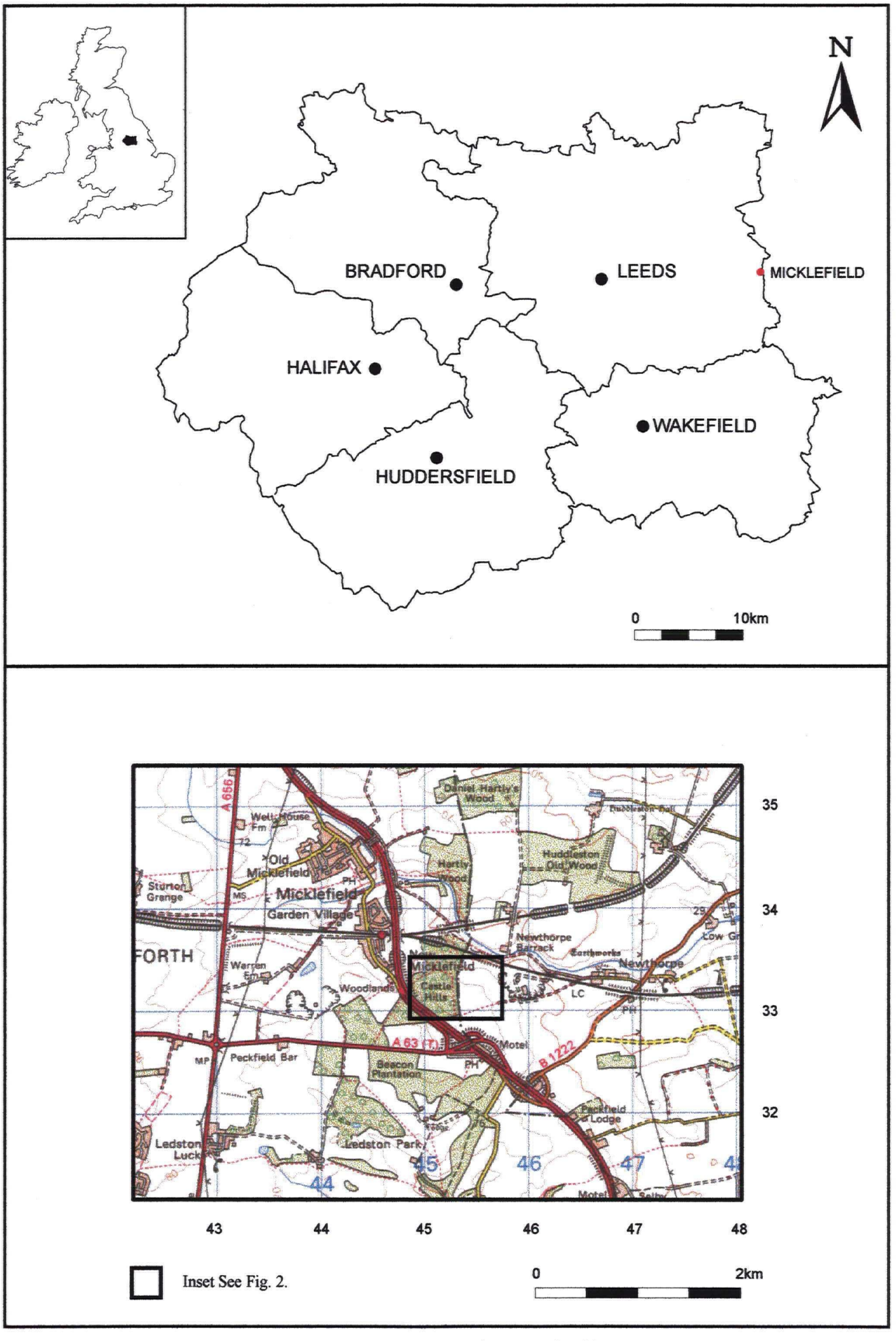


Fig. 1. Site Location

N

AREA B

Castle Hills

AREA A

Highfield

AREA C

Castle Plains

Micklefield Plantation

A1

A1

Highfield Lane

400

300

200

100

433000

900

900 445000 100 200 300 400 500 600 700 800

Top of Slope Bottom of Slope Route of Axial Trackway

0 100m

Fig. 2. Detailed Site Location Showing Relative Positions of Survey Areas and Features

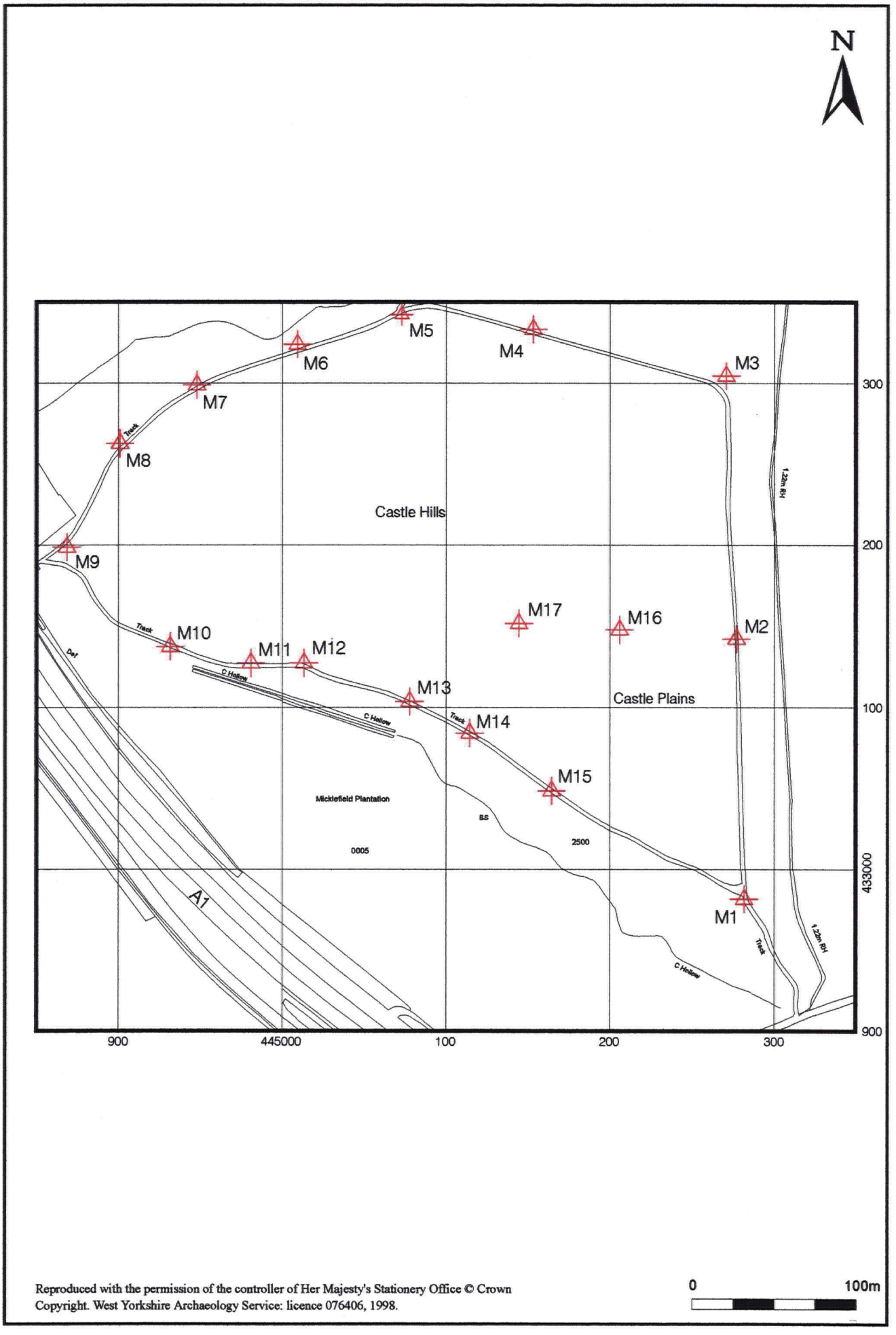


Fig. 3. Location of Survey Stations

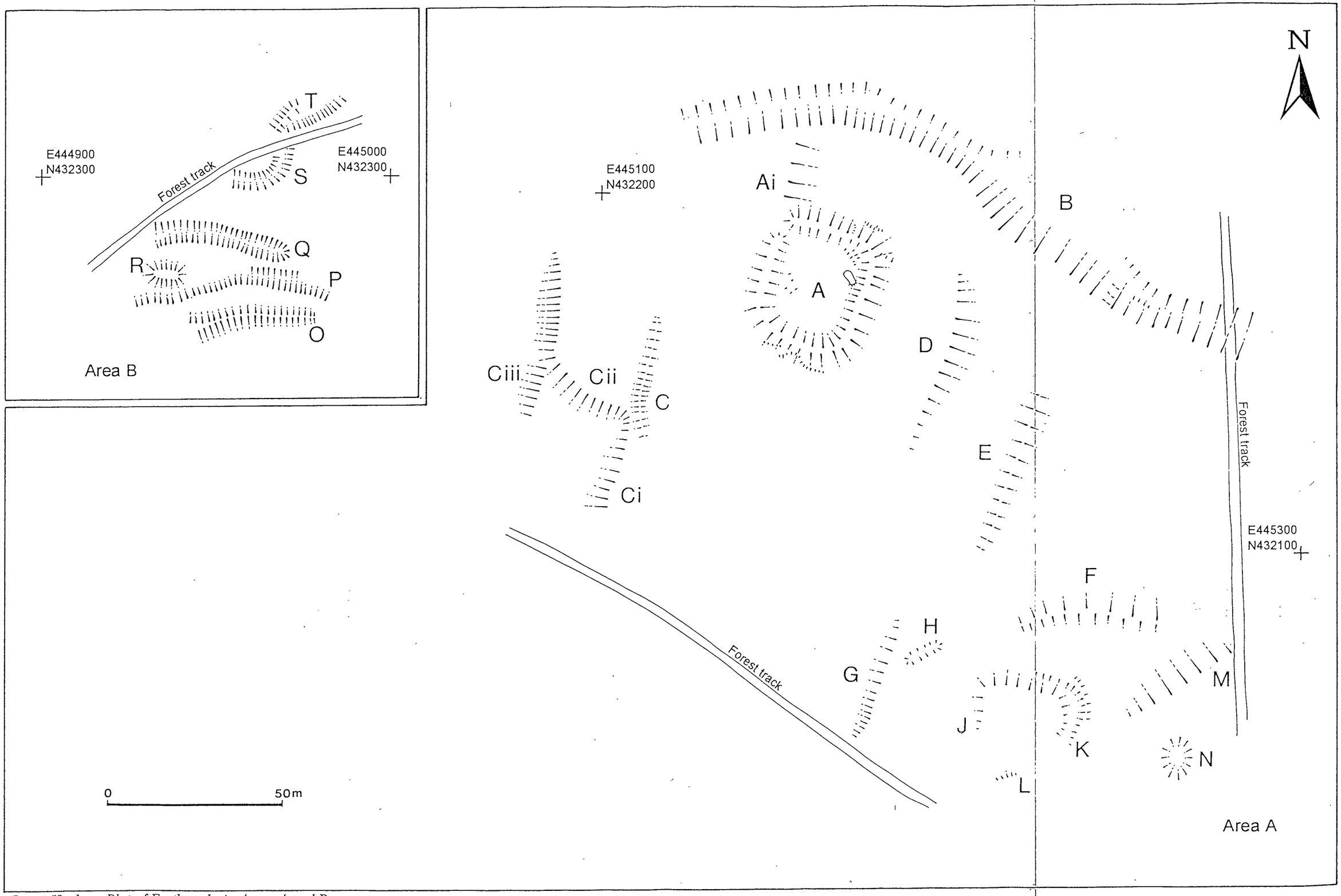
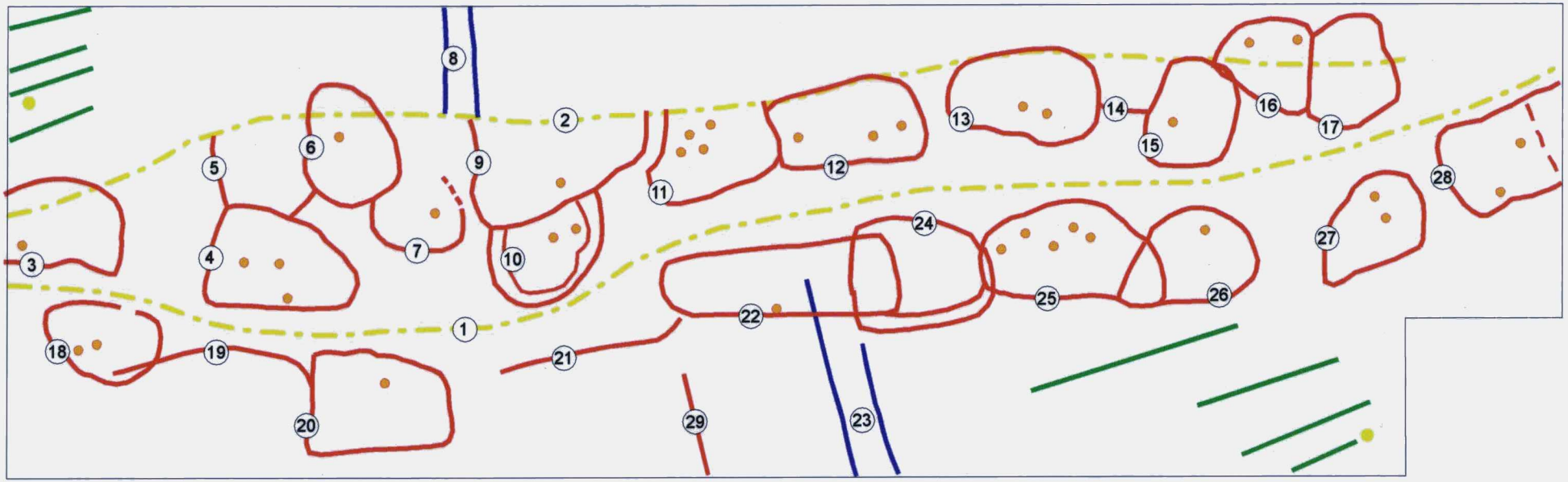


Fig. 4 Hachure Plot of Earthworks in Areas A and B



KEY

TYPE OF ANOMALY	INTERPRETATION
Isolated Dipolar	Ferrous Material In Topsoil
Positive Linear	Archaeological Trackway ?
Positive Linear	Archaeological Ditch ?
Positive Linear	Archaeological Ditch & Trackway ?
Positive Linear	Agricultural ?
Isolated Positive	Archaeological Pit or Burning ?

Fig. 5a. Gradiometer Data Interpretation Overlay

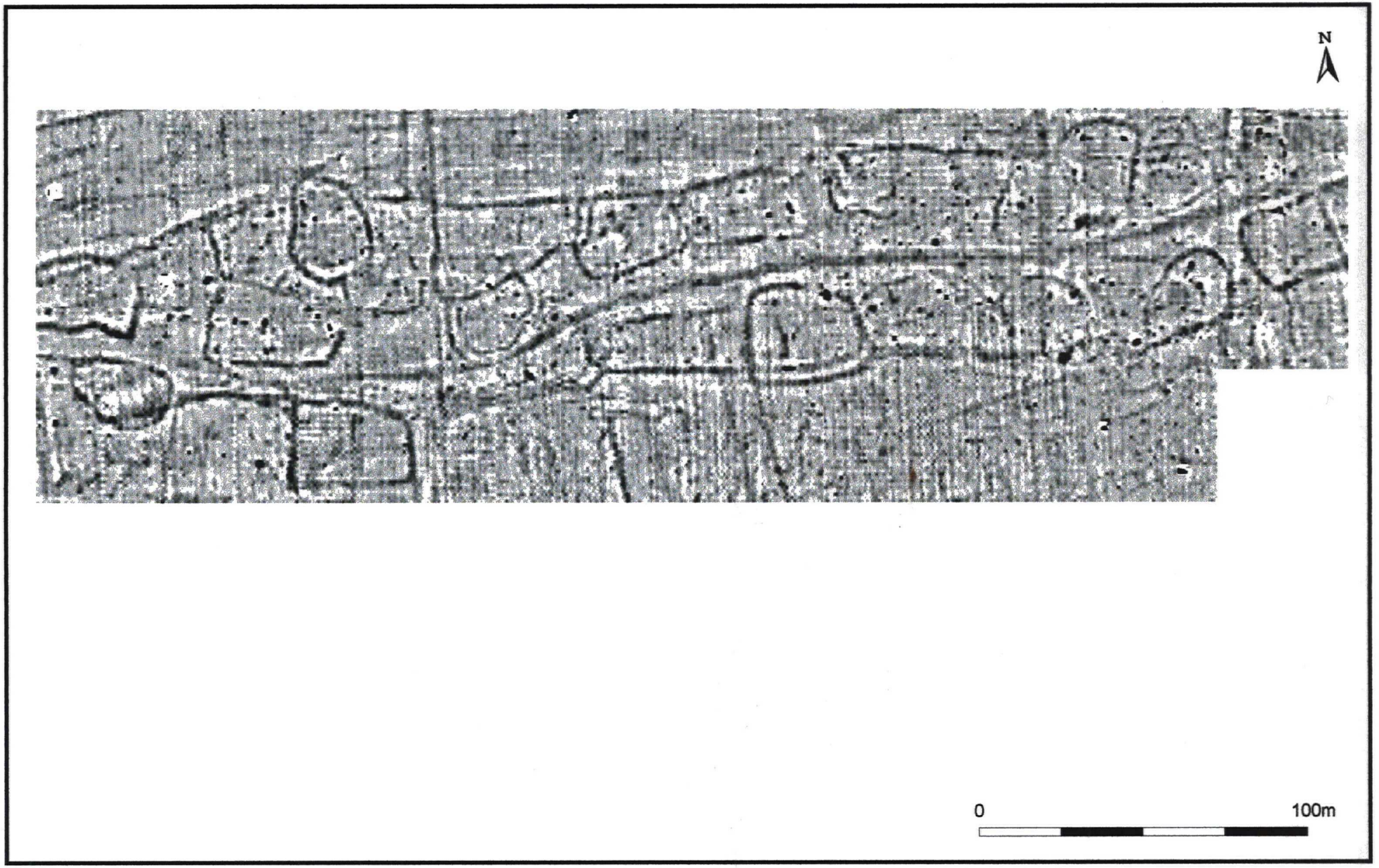


Fig. 5. Greyscale Plot of Gradiometer Data

Appendix I

Primary Archive Inventory

File	Contents	No. (of sheets)
I	Hachured field plots	16 (A3)
	Assorted detail plots	3 (A4) 6 (A3)
	Aerial photographs	4 (A4) 1 (20x25)
	Photocopied articles	13 (A4)
	Draft geophysics report	6 (A4)
	Survey notebook	5 (A4)
	Guidelines for coppice management at Castle Hills & Highroyds woods (Report)	1
	Management proposals for Castle Hills & Highroyds woods (Report)	1
II	Digital Ordnance Survey plots from Leeds Co.	4 (A4)
	1:2500 of Highfield	2 (A4)
	1:2500 Showing BM locations in Micklefield	1 (A3)
	1:2500 of Castle Hills & Highroyds	7 (A3)
	Old Ordnance Survey and estate maps	5 (A3) 7 (A4)
	Current land ownership map	3 (A4)
III	Faxes	7 (A4)
	Note from Bob Yarwood	1 (A4)
	Invoice for survey markers	1 (A4)

Appendix II

Permanent Survey Station Co-ordinates

Station	Easting	Northing	Height (m)
M1	445281.678	431981.757	100.000
M2	445277.521	432142.143	97.652
M3	445270.886	432304.434	89.451
M4	445153.860	432337.232	91.892
M5	445075.884	432351.498	91.764
M6	445009.374	432323.747	94.253
M7	444947.746	432300.334	93.793
M8	444901.075	432262.562	91.216
M9	444868.426	432198.930	83.657
M10	444931.890	432142.282	84.657
M11	444980.775	432133.117	89.518
M12	445013.734	432128.551	92.332
M13	445077.815	432106.647	97.491
M14	445115.099	432085.643	99.228
M15	445163.688	432047.482	101.868
M16	445215.032	432152.173	99.542
M17	445144.294	432151.875	100.853

All heights are arbitrary and relative to the origin station which was assumed to be 100m

Appendix III

Gradiometer Survey: Technical Information & Methodology

1. Technical information

1.1 Iron makes up 6% of the earth's crust mostly dispersed through soils, clays and rocks as chemical compounds that are weakly magnetic. Human activities can redistribute these compounds and change (enhance) others into more magnetic forms. These anthropogenic processes result in anomalies in the earth's magnetic field that are detectable by a gradiometer.

1.2 In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits and that of the topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic (iron) minerals to concentrate in the topsoil thereby making it more magnetic than the subsoil or bedrock. Linear features cut into the subsoil or solid geology, (e.g.: ditches, that have silted up or been backfilled with topsoil) will produce a positive magnetic response relative to the background soil levels. Discrete features such as pits can also be detected. Less magnetic material such as masonry or plastic service pipes which intrude into the topsoil will give a negative response relative to the general background level.

1.3 The magnetic susceptibility of the soil can also be enhanced significantly by heating. This can lead to the detection of features such as hearths or kilns.

1.4 The highest responses are usually due to iron objects in the topsoil. These produce a response characterised by a rapid change from positive to negative readings (iron "spikes").

1.5 Types of response generally detected on a site can be divided into five main categories which are described below:

1. Iron Spikes (Dipolar Anomalies)

These responses are referred to as dipolar and are caused by buried iron objects. Little emphasis is normally given to such responses as iron objects are normally recent in origin on agricultural sites.

2. Rapid, strong variations in magnetic response

Also referred to as areas of magnetic disturbance these can be due to a number of different features. They are usually associated with burnt material such as industrial waste or other strongly magnetic material. It is not always easy to determine their date of origin without supporting information.

3. Positive linear responses

In West Yorkshire these vary between 1.5nT and 30nT dependent on the underlying geology and are commonly caused by ancient ditches or more recent drains.

4. Isolated positive responses

These exhibit a magnitude of between 2nT and 300nT and, dependent on the strength of response, can be due to pits, hearths, ovens or kilns if archaeological in origin. It is very difficult in the former case to be certain of their archaeological nature without some more intrusive means of examining the features.

5. Negative linear anomalies

These are normally very faint and are commonly caused by features such as plastic water pipes that are much less magnetic than the surrounding soils and geology.

2. Methodology

2.1 There are two methods of using the fluxgate gradiometer. The first of these is referred to as scanning and requires the operator to visually identify anomalous responses on the instrument display whilst covering the site in widely spaced traverses, typically 10 - 15m apart. The instrument logger is not used and there is therefore no data collection. This method is used as a means of selecting areas for detailed survey when only a small percentage sample of the whole site is to be surveyed. Scanning can also be used to map out the full extent of features located during a sample detail survey.

2.2 The second method is termed detailed survey and this involves the use of a sample trigger to automatically take readings at predetermined points, typically at 0.5m intervals, on zig-zag traverses usually 1m apart. These readings are stored in the memory of the instrument and are later dumped to computer for processing and interpretation. This was the method employed during this survey.

2.3 In this survey a Geoscan FM36 fluxgate gradiometer and ST1 sample trigger was used to take readings at 0.5m intervals on zig-zag traverses 1m apart within grids measuring 20m by 20m. 800 readings are therefore taken within each grid square. In-house software (Geocon Version 9) was used to interpolate the "missing line" of data so that 1600 readings in total were obtained for each grid. Traverses were oriented east to west with the instrument pointing north.

SNY 11233 OVERSIZED PLOT NOT SENT FOR SCANNING - SEE ORIGINAL.