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Hawkesley Farm Moat, Longbridge, Birmingham

Geophysical Survey 2003

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Hawkesley Farm Moat, Longbridge, Birmingham (SMR 02014, SAM 22):

Geophysical Survey 2003

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Local Heritage *initiative*

Heritage Lottery Fund

Nationwide

The Countryside Agency

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Contents

List of Figures

Hawkesley Farm Moat, Longbridge, Birmingham
(SMR 02014, SAM 22):

Geophysical Survey 2003

Summary

A geophysical survey and training day for local schools was undertaken at Hawkesley Farm Moat (SMR 02014, SAM 22), Munslow Grove, Longbridge, Birmingham (NGR SP 017 776) in October 2003. The project was funded by the Heritage Lottery Fund, and commissioned by the Moat House Residents' Association, work was undertaken by Birmingham Archaeology. This element of fieldwork represents just one element of an ongoing programme of community-based research designed to raise the historical profile of one the best preserved moated sites in Birmingham. Students from the local Turves Green Boys and Turves Green Girls Schools were given training in a variety of remote sensing techniques and computer applications used by earth scientists and archaeologists. This provided a cross-curricular link between Geography and Science modules as well as promoting a greater sense of community and citizenship.

Three areas were targeted for survey using Resistivity Meter and Ground Penetrating Radar. In each area a horizon was identified at a depth of between 1.5m and 1.65m below the current ground surface level. However, the date of this horizon remains unclear. Several anomalies were observed at a similar depth suggesting that some archaeological deposits may survive across the site. The results of the survey will be used to contribute to the public presentation and interpretation of the monument, as well as assisting future management of the site at a planning level.

1.0 INTRODUCTION

This report outlines the results of a geophysical survey undertaken at Hawkesley Farm Moat (SMR 02014, SAM 22), Munslow Grove, Longbridge, Birmingham (NGR SP 017 776, Fig. 1) hereinafter referred to as the site. The work was commissioned by the Moat House Residents Association, and was funded using a Heritage Lottery Grant. The survey was undertaken in October 2003 by Birmingham Archaeology, and represents just one element of an ongoing programme of community-based research and events aimed at raising the profile of the site. The involvement of c.50 students from the local Turves Green Boys and Turves Green Girls Schools was important in furthering their sense of community and citizenship as well as giving them training in non-intrusive archaeological techniques. Other aims of the survey were to contribute to the public presentation and interpretation of the monument, as well as assisting future management of the site at a planning level.

1.1 General historical context

At a conservative estimate there are between five and a half and six thousand moated sites in Britain, in which three main concentrations, in Yorkshire, East Anglia and the Midlands, have been observed. This distribution pattern reflects obvious links with lowland areas and belts of heavy clay soil. Moated sites form probably one of the

most significant and numerous class of monument within the West Midlands, with around 200 known sites lying within the West Midlands conurbation. However, because this is mainly an urban area there has not been as much research here as in other geographical areas, so there is a real need to try redress this imbalance.

Hawkesley Farm Moat is situated on the outskirts of Birmingham, and was originally constructed during the 13th century when it lay within the manors of Bromsgrove and Kings Norton. While there were a significant number of manorial moats built by local lords, like the one under the open markets in the Bull Ring, built by Peter de Birmingham, most moats were built by yeomen between 1200 and 1350. This phase of building has been largely attributed to the population boom in the early centuries of the last millennium that increased pressure on land for agricultural use and resulted in the colonising of areas that had been waste; fens, moors, and woodland. The Black Death, and other environmental disasters such as consistent crop failure, brought a sharp reduction in the population and the practice of moat digging declined dramatically in the 1400s and had virtually stopped by 1500.

After 1500 many moated sites were abandoned as people chose to live in less constricted and more pleasant places. Of those sites that continued in use many had one or more arms of the moat in-filled in order to allow expansion of the area available for building. However, this was not the case with Hawkesley Farm which continued during the 16th century to be one of the principal residences of the Middlemore family estate. The Middlemores were one of the most prominent families in the area, who owned other moated residences in the vicinity including Bells Farm, Druids Heath, and Hazelwell Hall (Goodger 1990, 28).

During the English Civil War some moats were garrisoned with soldiers and became regional strong points. However, fortified moats seldom held out for very long, unlike the infamous sieges of castles or entire towns. During this period the manor house at Hawkesley Farm was laid siege to by Prince Rupert, a contemporary source tells how the besieged parliamentarians simply gave up when faced by the King's army, even though they had a months supply of food and ammunition. The house was subsequently burnt down at the end of the siege (ibid).

Agriculture was much improved in England in the 1700s and 1800s and many abandoned moats were in-filled to make level fields or had 'model' farmyards constructed over them. Remarkably, once again, the moat at Hawkesley Farm survived, and, following the destruction of the buildings during the Civil War, a farmhouse, and outbuildings, were re-established on the moat platform in the 18th century. These survived until they were demolished in the 1950s ahead of the construction of the tower block and bungalows that occupy the site today. Still, part of the moat survives today on the ground, the northeastern arm has been landscaped and is visible as a large waterfilled pond revetted by modern brick walls, and the northern arm of the moat survives as a substantial dry ditch.

1.2 Previous archaeological work

Cartographic evidence reveals that the moat was sub-rectangular in plan with a causewayed entrance across the eastern arm. On the Kings Norton Tithe Map, which

is the earliest depiction of the moat dating to 1840, all four arms of the moat are waterfilled, and the southern arm is not as wide as the other three.

Rescue excavation was undertaken on the site during the 1950s, during the construction of the present buildings. Excavation revealed that the moat itself dated to the 13th century and the remains of 14th-century timber-framed buildings were also excavated (Oswald 1960). Some of the buildings were constructed using vertical posts others rested on horizontal sill-beams or dwarf masonry walls. Other features that were noted were a series of hearths apparently within a separate cooking area, a common feature on sites of this period due to the risk of fire. A cluster of postholes, identified as the probable remains of a timber gatehouse in the vicinity of the causeway were also excavated.

As well as the excavations and salvage recording reported upon by Oswald (ibid), previous archaeological work on the site includes an archaeological desk-based assessment undertaken for Birmingham City Council by Worcestershire Archaeological Service (Griffin and Woodiwiss 2000). This suggested that the site had good potential for below-ground remains surviving in 'islands' across the platform and within the moat itself. A watching brief was also undertaken during the construction of porch canopies, fences and other associated works by Marches Archaeology (Tavener 2000). This revealed that the ground level had been raised across the majority of the moat platform between 0.2m and 0.6m which may have protected any surviving archaeological deposits.

1.3 Overall aims

The overall objectives were to:

- Try to locate areas of potential survival of archaeological remains, and to attempt to define the nature of these deposits.
- Provide training for Year 10 students of Science and Geology from Turves Green Boys and Turves Green Girls Schools in remote sensing techniques.
- Assist future management of the site.
- Contribute to the public interpretation and presentation of the site.

2.0 SURVEY

Three principal areas where geophysical survey was possible were identified (Fig. 2). Area A was situated to the west of the Moat House tower block, with Area B to the east, and Area C to the south. Areas A and B are open grassed areas, where Resistivity survey was possible. Area C is under tarmac and only Ground Penetrating Radar (GPR) could be applied. Due to the close proximity of the electrical sub-station on the adjacent plot the site was unsuitable for Magnetometer survey.

Area A measured 10m by 30m and was orientated approximately north-south both Resistivity and GPR were used on the area, however, only 10m by 20m of this area was surveyed with Resistivity due to difficulties with ground cover. Area B measured 10m by 20m and covered an irregular area of lawn and a footpath to the east of the Moat House, this area was also surveyed using both techniques. Area C

measured 10m by 10m and was located in the car park to the south of the Moat House, only GPR survey was possible here.

2.1 Aims

The objectives of the geophysical survey were to identify and characterise any archaeological features, also to identify areas of archaeological potential as well as areas of possible disturbance.

2.2 Methodology

2.2.1 Resistivity Survey (Areas A and C)

A Geoscan RM15 Resistivity Meter with twin-probe electrode array, was used to undertake the survey. Samples were recorded at 1.0m transect intervals with readings being taken every 0.5m. Sample transects were carried out adopting a 'zig-zag' traverse method starting in the northeast corner of each grid. Instrument settings were adjusted for specific site conditions, having a Gain of x1 and a current of 1mA. Information from the automatic data logger was downloaded into the Geoplot 300 software.

Data Processing

Data processing was carried out using Geoplot 300 software. The data was initially clipped to two standard deviations off the mean value in order to remove any outlying spurious readings. The Despike function was also applied to the data using the mean spike replacement option for the same purposes. The data was then treated to a High Pass filter (10 x 10 Gaussian weighting) to remove low frequency background (geological) responses common in Resistivity surveys. The filtered data was then interpolated to artificially increase the number of readings and thus create a smoother visual image. For presentation purposes the processed files were subsequently exported as ASCII files for use within Surfer 8 software (Figs 3 and 4).

2.2.2 Ground Penetrating Radar (GPR) Survey (All Areas)

Ground penetrating radar (GPR) survey was carried out over all three areas using the SIR 3000 digital pulse radar system produced by Geophysical Survey Systems Inc. The radar antenna is used to transmit and receive radar reflections along parallel profiles, and in this instance both the 400 MHz and 200 MHz antennae were employed. The former set-up allows penetration to a depth of up to four metres with a high level of sub-surface detail provided. The 200 MHz antenna gives a greater depth penetration but has a comparatively reduced detail capability. It was hoped that the utilisation of both units would provide the optimal combination of depth and detail.

Radar transects were collected at an interval of one metre with reflections along the transects recorded continuously across the ground at 16 scans per metre. All radar reflections within a 150 nano-second (ns) time window were recorded digitally in the field as 8 bit data and 512 samples per radar scan. Prior to survey the dialectric and gain settings on both units were adjusted to suit site conditions. This ensured that the radar reflections penetrated to an adequate depth and allowed an approximate estimation of feature depth to aid interpretation.

Data Processing
Processing of all the GPR data was undertaken using Radan 5.0 software and involved the amalgamation of each individual transect to form a three dimensional radar data cube. This enabled analysis to be undertaken on the x, y and z planes, and, in turn, permitted the approximate depth of features to be positioned in both relative and actual terms. Due to the nature of this radar survey the data was also treated to a time-zero adjustment procedure and hyperbolae migration. To aid interpretation the data is presented here in the form of time and depth slices, allowing the various attributes of each anomaly to be highlighted.

3.0 TRAINING DAY

The project was funded using a Heritage Lottery Fund Grant, and is part of a broader community-based research project led by the Moat House Residents themselves who wish to conserve and improve the monument, whilst raising the historic profile of the site within the local community.

3.1 Aims

The main aim of the training day was to give pupils from Turves Green Boys and Turves Green Girls Schools experience of on-site data collection through practical training in a variety of remote sensing techniques and computer applications used by earth scientists and archaeologists. This provided a cross-curricular link between Geography and Science modules as well as building a greater sense of community and citizenship.

3.2 Methodology

Students used the RM15 Resistivity Meter and the TerraSIRch, SIR 3000, Ground Penetrating Radar to undertake the fieldwork, training in the relevant associated computer-based applications was also given. As well as geophysical survey, the students also participated in a general walkover survey which was aimed at identifying earthworks and other landscape features associated with the site.

4.0 RESULTS

It is worth noting that the proximity of the electrical sub-station has led to interference within the GPR signal at various points. This has ultimately caused the appearance of banding in the lower depths of the radar cube and has thus prevented the identification of possible anomalies below a certain level.

4.1 Area A

The Resistivity Survey revealed several anomalies in Area A (Fig. 5). The most obvious feature was a large area of high resistance in the southwest corner of the grid (Feature A). A second high resistance linear anomaly (Feature B) was identified to the north of this. It was orientated northwest-southeast, and appears to be approximately 8m in length. Two other prominent high resistance anomalies can be

seen in the center of the survey area, both measure c.1m wide and are orientated on an east-west alignment (Features C and D). In addition, just within the northeast corner of the survey area was an arc of high resistance (Feature E). Of further interest was a linear anomaly of relatively low resistance (-2 to –10 Ohms) which formed an L-shape (Feature F).

Analysis of the data from the GPR survey revealed that the 400 MHz antenna detected a series of east-west orientated linear anomalies ranging from 1m to 4m in length. These are best illustrated in a two-dimensional time slice (Fig. 6a) taken from an approximate depth of 1.76m. An illustrative section through the radar cube (y slice, Fig. 6b) highlights the anomalies and their location within or just above a distinct layer. This layer (Fig. 6c) is the result of a change in the material properties of the soil at this depth.

The results of the 200 MHz antenna revealed further anomalies in this area, which appear at a shallower depth than those highlighted above. A time slice taken at an approximate depth of 1.5m (Fig. 7a) shows a series of distinct anomalies forming right angles. A slice taken through these anomalies (Fig. 7b) shows that they lie above a distinct surface, probably the same layer noted above.

4.2 Area B

The western section of the area is dominated by a high resistance anomaly (generally measuring 150 Ohms) which has no clear definition of shape (Feature A, Fig. 8). A second amorphous area of high resistance can be seen in the northeast corner of the grid (Feature B). There are also faint traces of a possible linear anomaly orientated southwest-northeast in the southern part of the area (Feature C).

Analysis of the 400 MHz GPR data from this area has led to the identification of a cluster of anomalies at an approximate depth of 1m (Fig. 9a). Viewed as a vertical slice it can be seen that these anomalies appear to lie below another distinct layer. Interestingly, there is an obvious hiatus in this layer coinciding with these anomalies (Figs. 9b and 9c) which suggests that they have been cut through that layer. The data from the 200 MHz antenna did not reveal any anomalies.

4.3 Area C

Examination of the 400 MHz antenna data has indicated the presence of two linear anomalies close to the surface, the largest of these runs throughout the survey area on a southeast-northwest orientation (Fig. 10). The second anomaly is on a southeast-northwest alignment and extends for approximately 4m. A third possible linear anomaly can be seen at a much greater depth, approximately 1.45m below the current ground level (Fig.11).

5.0 DISCUSSION

With regard to interpretation of the data, there are several events associated with the site that must be borne in mind. Firstly, the site has been occupied for several hundred years with many phases of construction work and related activity taking

place over this time. Secondly, it is difficult to judge what impact the 1950s construction work on the site had on the below-ground archaeological deposits, however, it is obvious that groundworks were extensive. Thirdly, geophysical survey, in isolation, cannot date anomalies that are detected. Only excavation may resolve this and it has thus been difficult to compare findings from the previous excavation with the results of the survey. Fourthly, due to the character of the site today, only three relatively small areas were identified as being suitable for geophysical survey, which makes it more difficult to interpret the overall results from the site.

Also, when comparing the two forms of geophysical data it should be noted that the Resistivity Meter can only penetrate to a maximum depth of 1m below the current ground surface. In addition to this, Resistivity Survey is fundamentally a technique used to measure the moisture content of the soil, and will thus highlight different types of anomalies to those detected by GPR. Although the GPR is able to detect anomalies at a greater depth to the Resistivity Meter, the actual depth values for GPR anomalies are based on an assumed (i.e. non-excavated) dialectric and are therefore only approximate.

Resistivity data collected in Area A revealed the presence of several high resistance anomalies that indicated relatively 'dry' areas, it may thus be assumed that these anomalies represent some form of buried feature that differ from the surrounding subsoil. Features A and E was only partially revealed in plan by the survey, however, given their amorphous nature, and the depth at which they occur, they may tentatively be interpreted as rubble spreads, perhaps deriving from the demolition of the farm house in the 1950s. However, it is also worthy of note that Oswald excavated several areas of skerry stone paving (Oswald 1960, 39) in the southeastern part of the site, which were dated to the late-16th-17th century. It was also noted at the time of the excavations that deposits within this area were generally of 17th century date, therefore, it is possible that the dry features identified here represent the remains of surfaces of similar character to those described by Oswald (ibid).

Features C and D are on the same alignment as the current pathway outside the moat house and probably represent the footings for a continuation of the pathway that has been buried during re-landscaping in latter years. Feature E is almost certainly a service trench, possibly a drain, running out of the site towards the causeway. Feature F is intriguing due its shape however it appears to be a relatively shallow feature and may be the remains of an area of hard standing which occur across the site.

Analysis of the radar data for Area A is more hopeful in terms of revealing possible below-ground archaeological deposits, as it has been possible to identify a distinct change in the underlying stratigraphy across the whole of the area. This horizon is almost certainly below the high resistance anomalies discussed above as it lies c.1.65m below the current ground surface. It is likely that this horizon represents the interface between the natural underlying geology and made up ground, however, the depth at which this occurs deserves further comment. During Oswald's excavations in 1957 it was noted that deposits survived at a depth of between 0.3-0.5m beneath the ground surface, with some negative features cut to a depth of at least 1.2m (Griffin and Woodiwiss 2000, 6). Thus features detected by both the 200 MHz and

the 400 MHz GPR survey may represent the remains of archaeological features, and, given their position, may represent the foundations of the farmhouse (known to have 17th century origins) although the features could equally be of an earlier period. The made up ground may represent dumping of spoil from the excavation of the moat on the platform, a common practice on moated sites. However, Oswald suggested that the area where this had occurred was to the north of the site, outside the moated enclosure. It may, therefore, be more likely that the whole site was levelled and bladed off, with the levels being built back up and restored with more stable overburden prior to the construction of the buildings that we see today. Thus, the whole of this horizon may in fact date to the 1950s.

In Area B the results of the Resistivity data appear to show two areas of disturbance, probably containing quantities of rubble (Features A and B). Feature B is probably the result of landscaping of the moat. The low resistance linear anomaly (Feature C) is likely to be a drain. As with Area A, the GPR survey for Area B indicated the presence of a distinct layer associated with high signature anomalies, however, the anomalies clearly cut through the horizon and probably represent modern services. The horizon in this area may also be modern and associated with re-landscaping of this arm of the moat.

In Area C the GPR data highlighted three linear features, unfortunately two of these correspond with service trenches evident on the surface of the car park. However, the third linear anomaly, was located at a similar depth to possible archaeological features identified in Area A and thus could conceivably be of archaeological interest.

6.0 ACKNOWLEDGEMENTS

The project was funded by the Heritage Lottery Fund, and commissioned by the Moat House Residents' Association. Thanks are due to all the residents, especially the Chair (Emily Warwicker), the Warden of Moat House (Gill Price) and to Sue Fenoughty, environmental education adviser for MHRA for their help during the project. Thanks also to Mike Hodder who monitored the project for Birmingham City Council, and we must also thank English Heritage. Thanks also to the staff and students of Turves Green Boys School, especially Mark Field, and Turves Green Girls School, especially Jan Meacham, and Jacquline Hall for her help in organising the training day. Jim Melling is also acknowledged for sharing his recent documentary research with the team. Work on site was carried out by Kate Bain, Tim Evans, Emma Hancox, Mark Kincey, Steve Litherland, Erica Macey and Kirsty Nichol. Tim Evans, Mark Kincey and Kirsty Nichol produced the written report, which was illustrated by John Halsted and edited by Kirsty Nichol who also monitored the project for Birmingham Archaeology.

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APPENDIX 1

Hawkesley Farm Moated Site, Longbridge, Birmingham (SMR 02014, SAM 22)

Training Day, Hawkesley Farm Moated Site: A Review

Training Day, Hawkesley Farm Moated Site: A Review

There were roughly 30 students from each school, which were subdivided into 6 groups of 10 containing a mixture of students from both schools. Each group was accompanied by a teacher and a member of the archaeology team who explained the background, purpose, and methodology of each of the archaeological techniques or activity. This included instruction in the use of remote sensing techniques such as Resistivity (which measures the ease in which electricity passes through soil), Ground Penetrating Radar, and Magnetometry (which measures the difference in the strength of magnetic fields within the earth). In addition to these students were also asked to make a descriptive site observation in a structured format, and took a series of levels across the profile of a section of the moat, and, finally, into the dry to do some artefact based work. In combination with the fieldwork opportunities there was also the opportunity to have a look at the processing of the raw data recovered by everyone in the field. This was done using laptop computers and the latest software packages. All of this activity was photographed by school technicians, and Peter Leather who writes historical articles for the Metro News also visited the site to see how the event was going.

The training day at Hawkesley Farm presented the opportunity for students to

- Develop local awareness
- Develop observation and investigative techniques, including scientific methods of enquiry
- Develop problem solving and communication skills
- Develop cross-curricular links between geography, geology and science modules

Local Awareness
Many of the pupils commented that they had no idea that the site existed prior to the training day, they were also generally surprised and interested about how the history of the site related to the development of Birmingham as an emergent town during the medieval period. Keen to learn more, many were proposing to visit the city display panels when they are erected. They were also interested to know of other sites in the immediate area, and were altogether surprised that they had survived in any number. Particular sites that were mentioned included Weoley Castle and Bells Farm, Druids Heath. Bells Farm provided a good visual comparison for what the 16^{th}-17^{th} century structure at Hawkesley may have looked like, as well as having links with the Middlemore family.

Observation and investigative techniques, including scientific methods of enquiry
We discussed with the students how we had identified the best areas for geophysical survey, and why we had chosen the apparatus we had to undertake the fieldwork. The general feeling amongst those teaching with the different pieces of equipment was that the students thoroughly enjoyed the hands-on approach. The level of interest and enthusiasm at having the opportunity to use the equipment highlighted the importance of having locally lead initiatives such as this.

One of the other activities on the day was designed to teach students how to identify and describe physical features, such as the ditch and bank, on the ground, and then to

attempt to place the site within its local context. This involved imagining the landscape prior to the building of the housing estate, and looking at other physical evidence, such as the age of trees and other vegetation, to try to identify and date periods of landscaping. An attempt was then made to compare them with the date of the surrounding buildings. This was un-trod ground for many, but was generally greeted with enthusiasm.

Problem solving and communication skills
I think it was particularly useful in combining students from both schools in each group. All the activities involved some degree of teamwork and collaboration, and the students handled this aspect of the day very well. The level of mixing between the two schools was good.

Cross-curricular links between geography, geology and science modules
One of the most important aspects of the day was for the students to understand that a multi-disciplinary approach is often the best way of looking at a site. Through proposing combinations, and discussing the different disciplines that they were studying many observed that there was a good deal of overlap between subjects. I think that this proved particularly useful in that it gave them a much broader overview of their subject, and its applications, in a fieldwork environment.

General comments
On balance, I think that it is fair to say that the day worked really well as a means of providing experience of archaeological techniques, more usually seen on television programmes such as Time Team, to an outside group of people who would not normally have direct experience of archaeology within the school curriculum. In addition, the pupils were generally well behaved, showed interest, and enjoyed actively participating in the fieldwork. Also, the day did not appear to unduly disturb the local residents, some of whom were very interested in, and supportive of, the project and who kindly made available the use of their community centre to house the indoor activities.

Feedback from the different members of the archaeological team was generally very good. Many students asked astute questions that appeared to show that they had a solid grasp of the concepts involved. I also think that they became increasingly aware that history is not just in textbooks, but could be found on their doorstep, in the local community, and even on a modern housing estate.

APPENDIX 2

Hawkesley Farm Moated Site, Longbridge, Birmingham (SMR 02014, SAM 22)

Written Scheme of Investigation for a Geophysical Survey (2003)

Hawkesley Farm Moated Site, Longbridge, Birmingham
(SMR 02014, SAM 22)

Written Scheme of Investigation for a Geophysical Survey (2003)

1.0 INTRODUCTION

1.1 Summary

This Written Scheme of Investigation is concerned with outlining the aims and methodology to be followed during a geophysical survey on the moat platform of the site formerly known as Hawkesley Farm (situated at NGR SP 017 776). The document outlines the aims of the archaeological investigations and the methods to be employed during the geophysical survey. An outline of the reporting procedures is also provided. The site is archaeologically sensitive, and adherence to this written scheme of investigation will ensure that the requirements of English Heritage scheduled monument consent and Local Planning Authority can be adequately discharged. Any changes to the methodology set down in this document will be discussed and agreed with Ian George on behalf of English Heritage, and Dr Mike Hodder, the Birmingham City Planning Archaeologist, before implementation.

1.2 Background

The site of Hawkesley Farm is situated on the outskirts of Birmingham, and was historically sited in the county of Worcestershire. The original medieval manor was within the manors of Bromsgrove and Kings Norton. The farm buildings, which were of 18th century date, were demolished in the 1950s ahead of the redevelopment of the area and the construction of a new tower block and bungalows that occupy the site today (VCH III). The demolition of the farm led to salvage recording and a small scale excavation that revealed that the moat dated to the 13th century (Oswald 1960). A phase of timber-framed building was also noted that dated to the beginning of the 14th century (ibid).

Cartographic evidence reveals that the moat was sub-rectangular in plan with a causeway entrance across the eastern arm. On the Kings Norton Tithe Map, which is the earliest depiction of the moat dating to 1840, all four arms of the moat are waterfilled, and the southern arm is not as wide as the other three. The north-eastern arm of the moat survives today as a large waterfilled pond revetted by modern brick walls, and the northern arm survives as a dry ditch. The results of a recent Dowser's report suggested that the pond, and possibly the earlier arm of the moat, may be fed by an underground spring (pers. comm. Fenoughty).

As well as the excavations and salvage recording reported upon by Oswald, previous archaeological work on the site includes an archaeological desk-based assessment undertaken for Birmingham City Council by Worcestershire Archaeological Service (Griffin and Woodiwiss 2000). This suggested that the site had good potential for

below-ground remains surviving in 'islands' across the platform and within the moat itself. A watching brief was also undertaken during the construction of porch canopies, fences and other associated works by Marches Archaeology (Tavener 2000). This revealed that the ground level had been raised across the majority of the moat platform between 0.2m and 0.6m which may have protected any surviving archaeological deposits.

1.3 Overall aims

The overall objectives will be to:

- Try to locate areas of potential survival of archaeological remains, and to attempt to define the nature of these deposits.
- Provide training for Year 10 students of Science and Geology from Turves Green Girls and Turves Green Boys Schools in remote sensing techniques.
- Assist future management of the site.
- Contribute to public interpretation and presentation of the site.

2.0 SURVEY

Three principal areas where geophysical survey is possible have been identified (Fig. 1). Areas 1 and 3 are open grassed areas, these will be assessed using resistivity survey. Area 2 is under tarmac and will be assessed using Ground Penetrating Radar (GPR). Due to the close proximity of an electricity sub-station, on the adjacent plot, the site is unsuitable for Magnetometer survey. All methods used during the survey will be non-intrusive.

2.1 Aims

The objectives of the geophysical survey will be to identify and characterise any archaeological features, also to identify areas of good archaeological potential as well as areas of possible disturbance.

2.2 Methodology

Resistivity Survey (Areas 1 and 3)

The resistivity survey will be conducted using a Geoscan RM15 resistance meter with a twin-probe electrode arrangement. The readings will be taken using a traverse spacing of 1m and a sample spacing of 0.5m, with a starting direction of north, and using the zig-zag method of traversing. The raw data taken by the RM15 meter will be downloaded into the Geoplot 3.0 software programme. Geoplot files will then be exported to the Surfer (Ascii) software programme for final analysis.

Ground Penetrating Radar (GPR) Survey (Area 2)

The system to be used is the TerraSIRch, SIR3000 Ground Penetrating Radar system from Geophysical Survey Systems, Inc. The GSSI antennas range from Multiple Low Frequency (MLF), borehole, 100 MHz to 1.5 GHz. Traverses will be a minimum of 1m apart. Data will be processed and imaged in RADAN NT and 3D QuickDraw, manufactured by GSSI.

3.0 TRAINING DAY

The project is being funded using a Heritage Lottery Fund Grant, and is part of a broader community-based research project led by the Moat House residents themselves who wish to conserve and improve the moat itself, whilst raising the historic profile of the site within the local community.

3.1 Aims

The main aim of the training day will be to give pupils from Turves Green Girls and Turves Green Boys Schools a wider experience of on-site data collection through practical training in a variety of remote sensing techniques and computer applications used by earth scientists and archaeologists. This will provide a cross-curricular link between Geography and Science modules as well as improving their sense of community.

3.2 Methodology

Students will use RM4 and RM15 Resistivity Meters and the TerraSIRch, SIR3000 Ground Penetrating Radar to undertake the fieldwork. Training in computer-based applications will also be given.

4.0 STAFFING

The project will be managed by Kirsty Nichol (AIFA) for Birmingham Archaeology. Overall supervision of the remote sensing surveys will be carried out by Meg Watters (Research Assistant, University of Birmingham), the fieldwork will be carried out by Mark Kincey and Tim Evans, second year MA students on the practical archaeology course who have had extensive training in all the techniques of survey and interpretation required for this project (for example remote sensing survey work at Halesowen Abbey, carried out for and with the permission of English Heritage West Midlands Region).

The training day will also include staff members from Turves Green Girls and Turves Green Boys School.

5.0 TIMETABLE

It is proposed to undertake the fieldwork part of the project on the 20th and 21st October, with the training day following on 22nd October.

6.0 REPORT

The results of the investigations will be described in a combined, illustrated report, which will contain the following:

1. Summary.
2. Aims and methodology.
3. Description of the archaeological background.

4. Methodology for each component of the work.
5. A narrative description of the results.
6. A discussion of the evidence, set in its local, regional and national context.
7. Plans at appropriate scales, related to OS base mapping.
8. A copy of the Written Scheme of Investigation.

Two copies of the report will be submitted to English Heritage and the Birmingham Sites and Monuments Record, and two to the Local Planning Authority. A summary of the work will be offered to West Midlands Archaeology and any other appropriate journal.

7.0 ARCHIVE

The site archive will conform to the guidelines set down in Appendix 3 of the Management of Archaeology Projects. Subject to the agreement of the client, the site archive will be deposited with the Department of Human History, Birmingham Museums and Art Gallery, within a reasonable time of completing the fieldwork and analysis. The archive will be prepared in accordance with the guidelines set out by the Society of Museum Archaeologists *'Transfer of Archaeological Archives to Museums'*. The archive will be stored in the standard-size boxes used by the Museum and will be accompanied by box lists.

8.0 HEALTH AND SAFETY

All current legislation, regulations and guidance will be complied with.

9.0 GENERAL

BUFAU is a Registered Archaeological Organisation with the Institute of Field Archaeologists. All staff will adhere to the Code of Conduct of the Institute.

The project will follow the requirements set down in the Standard and Guidance for Archaeological Geophysical surveys (Institute of Field Archaeologists 1994).

10.0 REFERENCES

Griffin, S. and Woodiwiss, S. 2000 *Archaeological Desk-based Assessment at Moat House, Longbridge, Birmingham.* Worcester Archaeological Service, Project P1850, Report 808.

Oswald, A.H. 1960 *Hawkesley Farm, Longbridge, Birmingham.* Transactions of the Birmingham Historic Society, Vol. 76.

Tavener, N. 2000 *Bramber House and Moat House, Longbridge, Birmingham: A Report on an Archaeological Watching Brief.* Marches Archaeology Series 143.

VCH 1913 *Victoria History of the County of Worcestershire*, Vol. III.


Site
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Fig.1

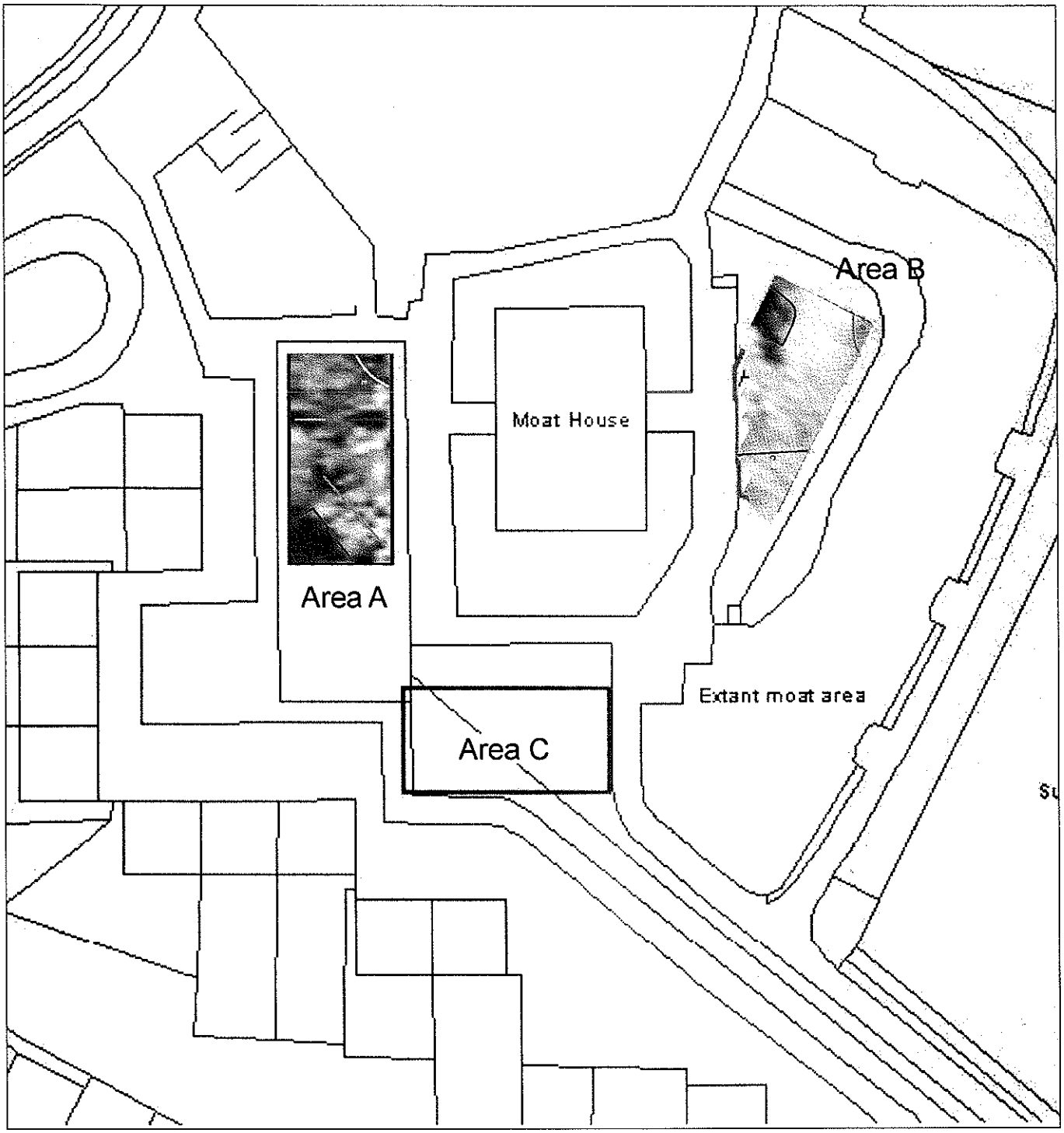


Fig.2

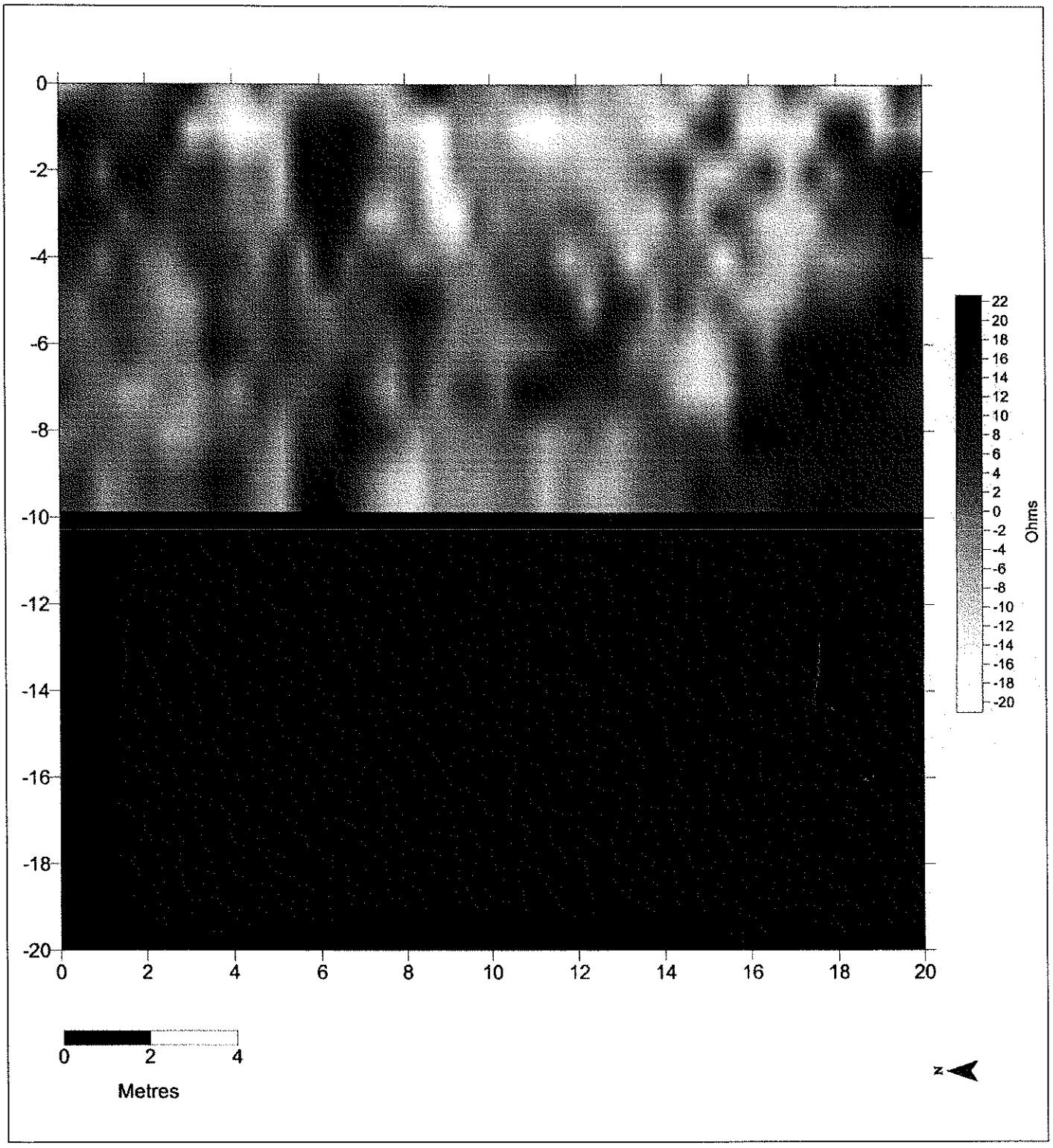


Fig.3 -Area A resistivity data: following clipping, despiking and a high pass filter

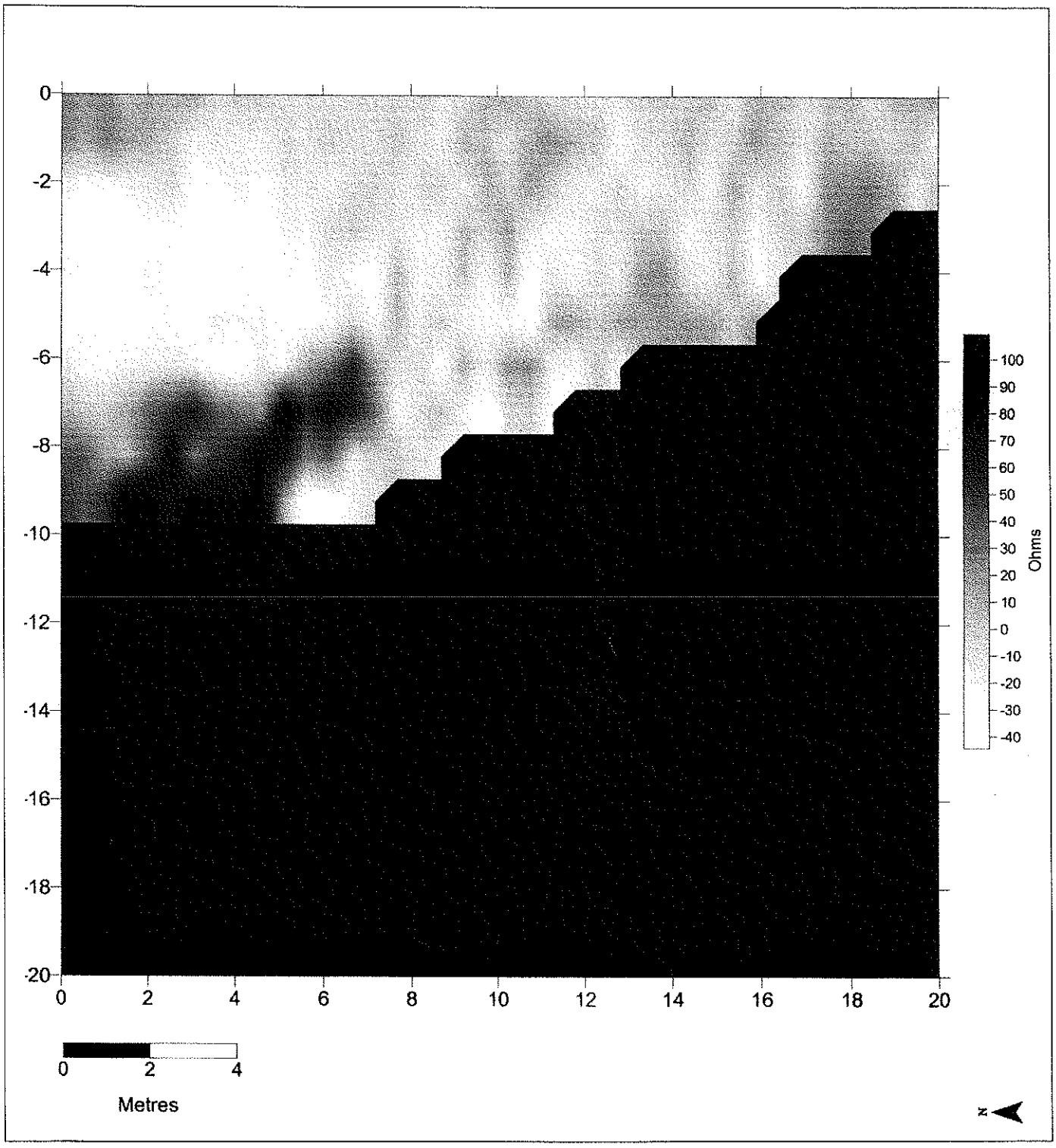


Fig.4 -Area B resistivity data:following clipping, despiking and a high pass filter

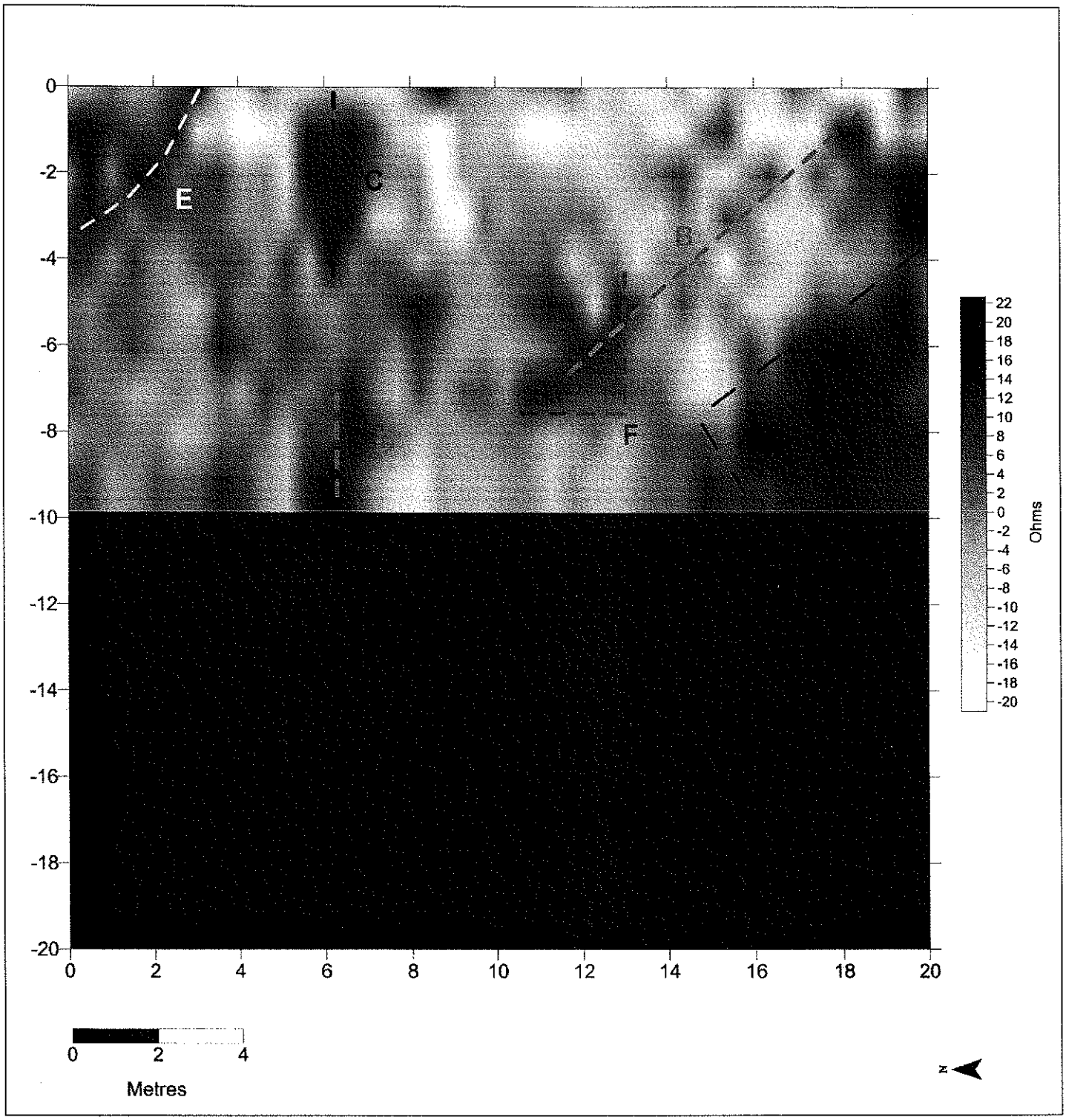
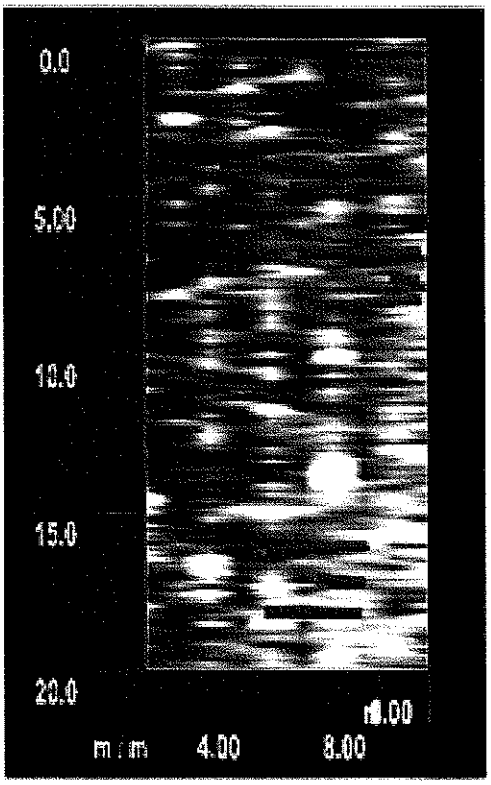
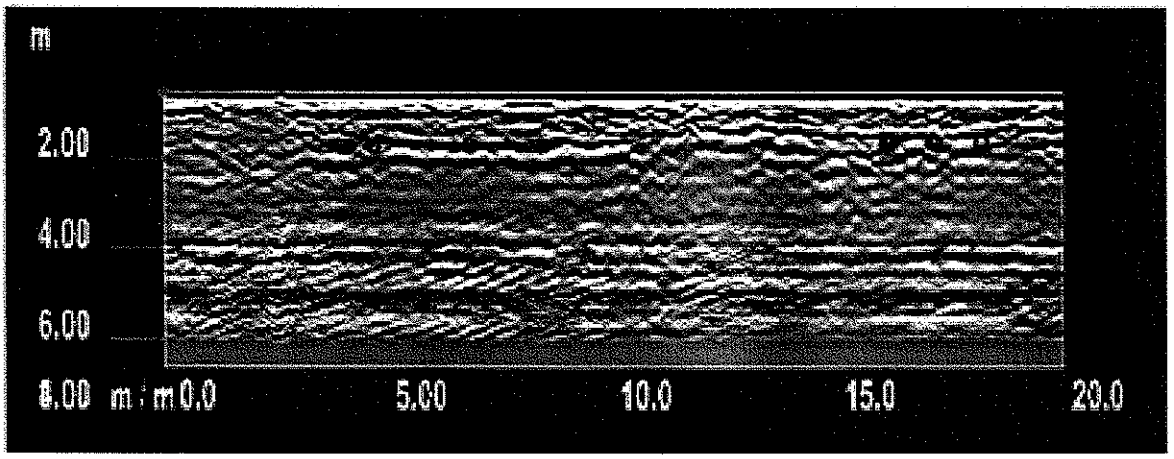


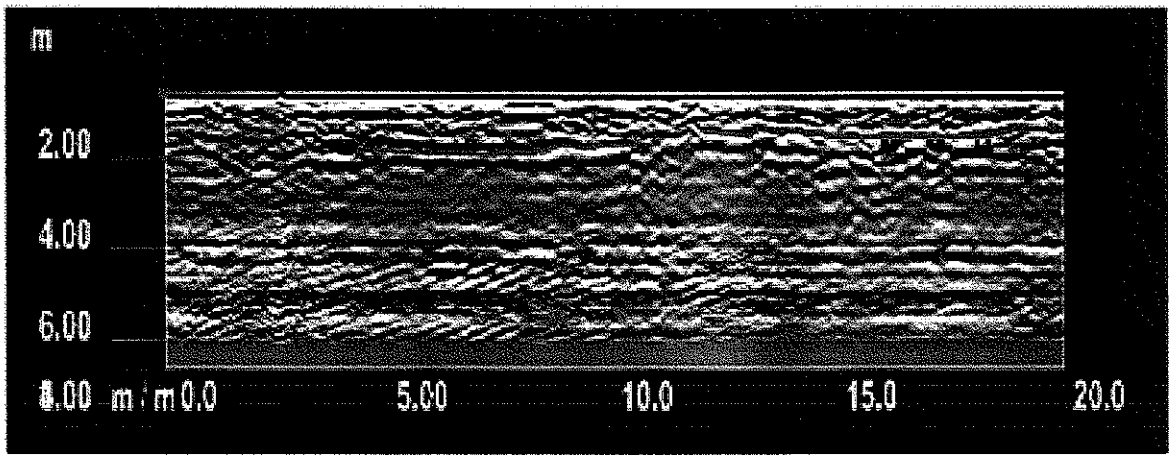
Fig.5 - Area A processed resistivity data: highlighted anomalies



a) Area A. Time slice at approximate depth of 1.65 metres (400 Mhz antenna)

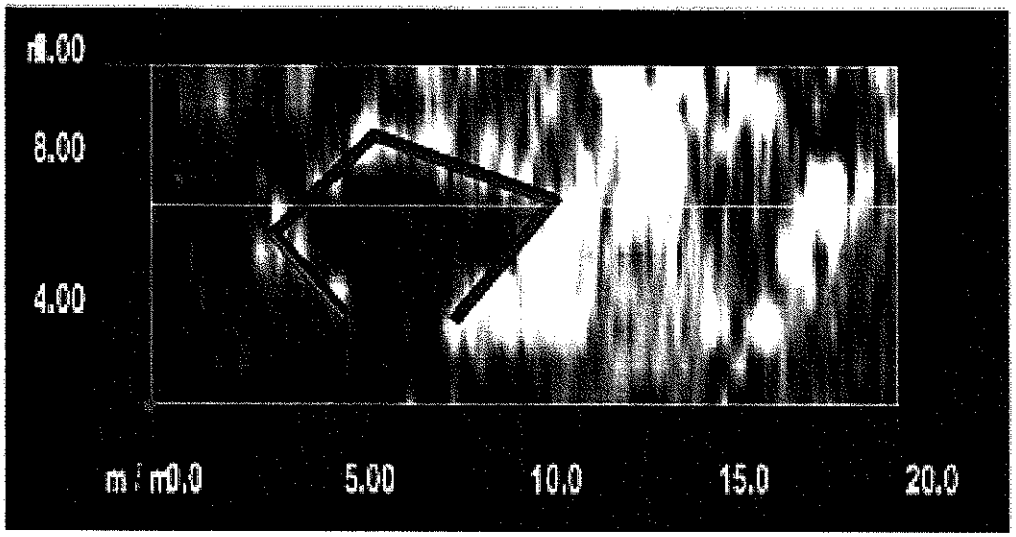


b) Area A. Y-slice (at 5 metres) through radar cube

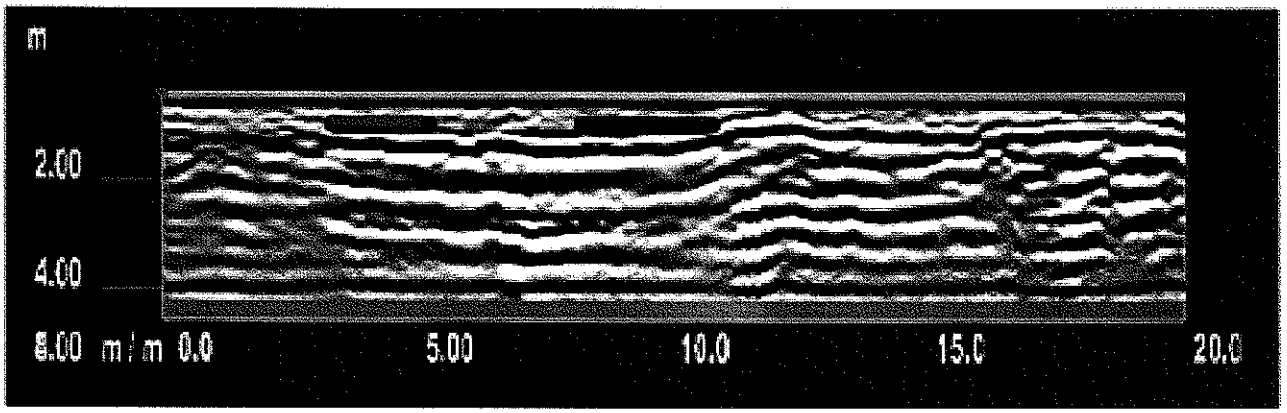


c) Area A. Y-slice (at 5 metres) through radar cube. Possible layer highlighted

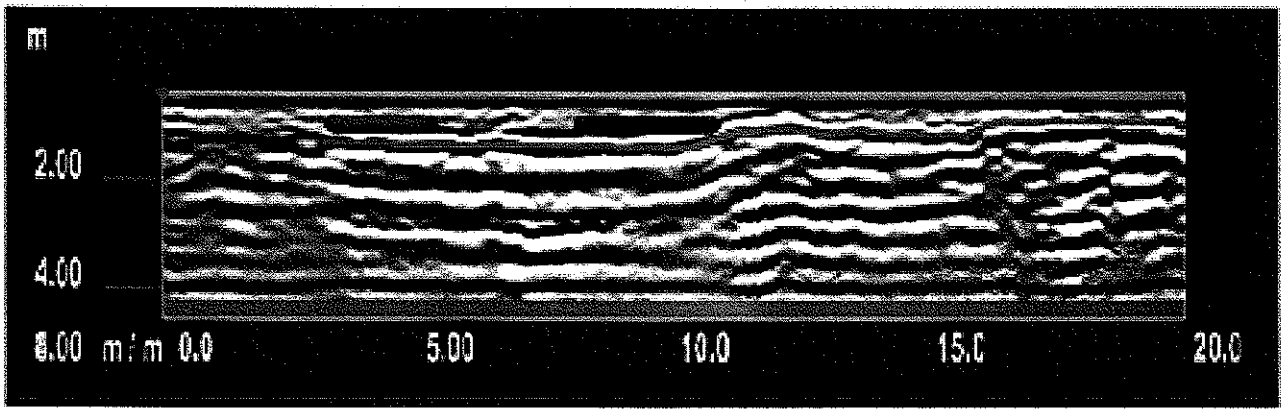
Fig.6



a) Area A. Time slice at approximately 1.5 metres (200 Mhz)



b) Area A. Y-slice across radar cube (at 5 metres)



c) Area A. Y-slice across radar cube (at 5 metres). Possible layer highlighted

Fig.7

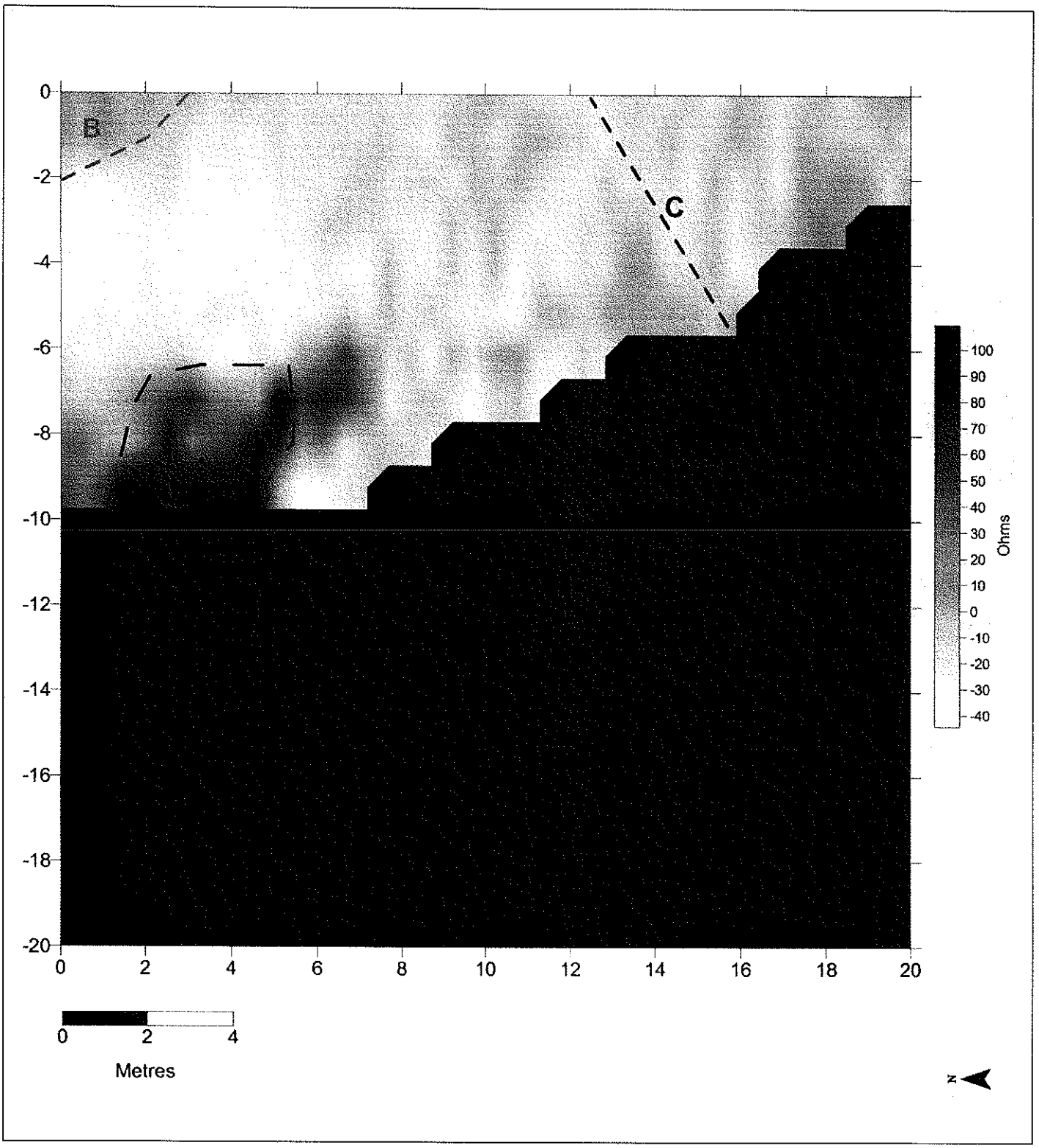
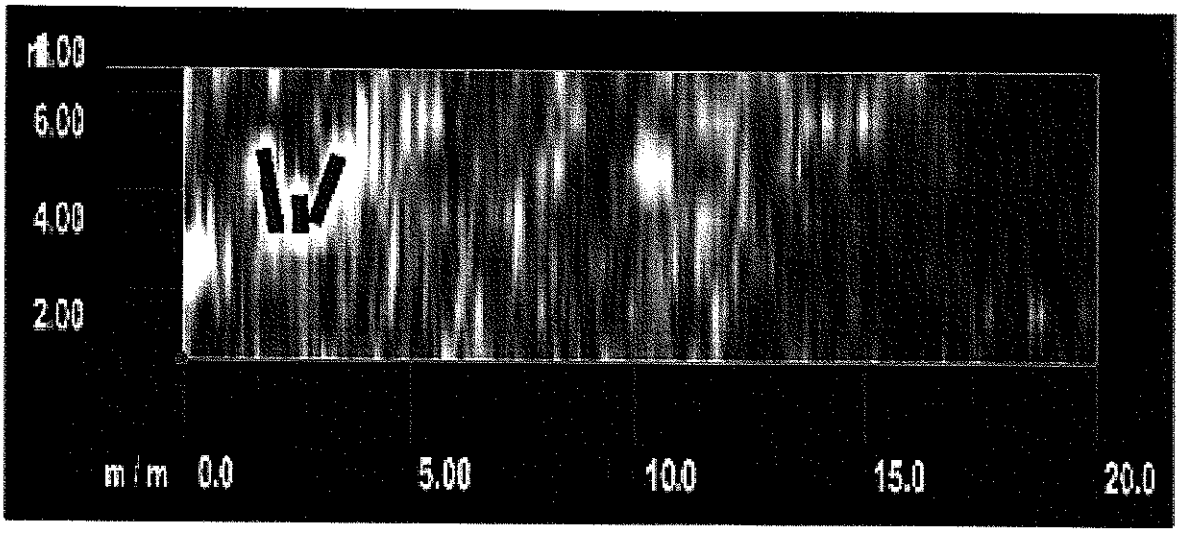
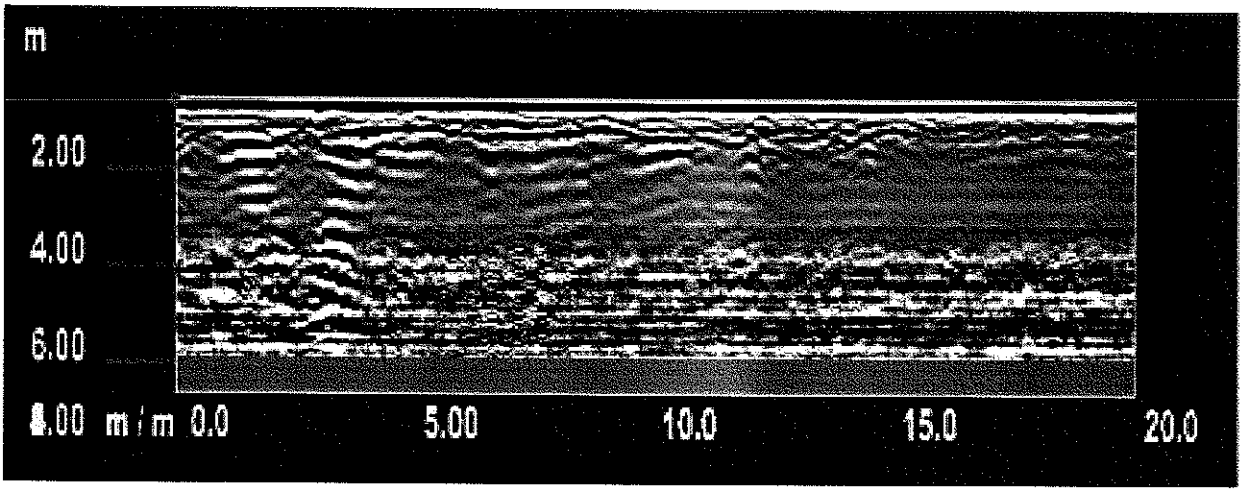


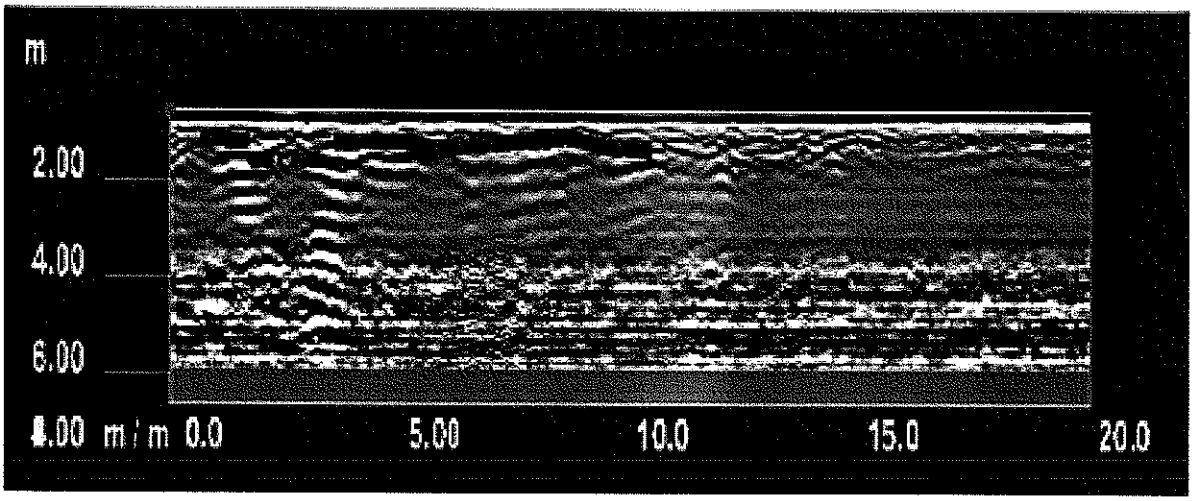
Fig.8 - Area B processed resistivity data: highlighted anomalies



a) Area B. Time slice at approximately 1 metre (400 Mhz antenna)

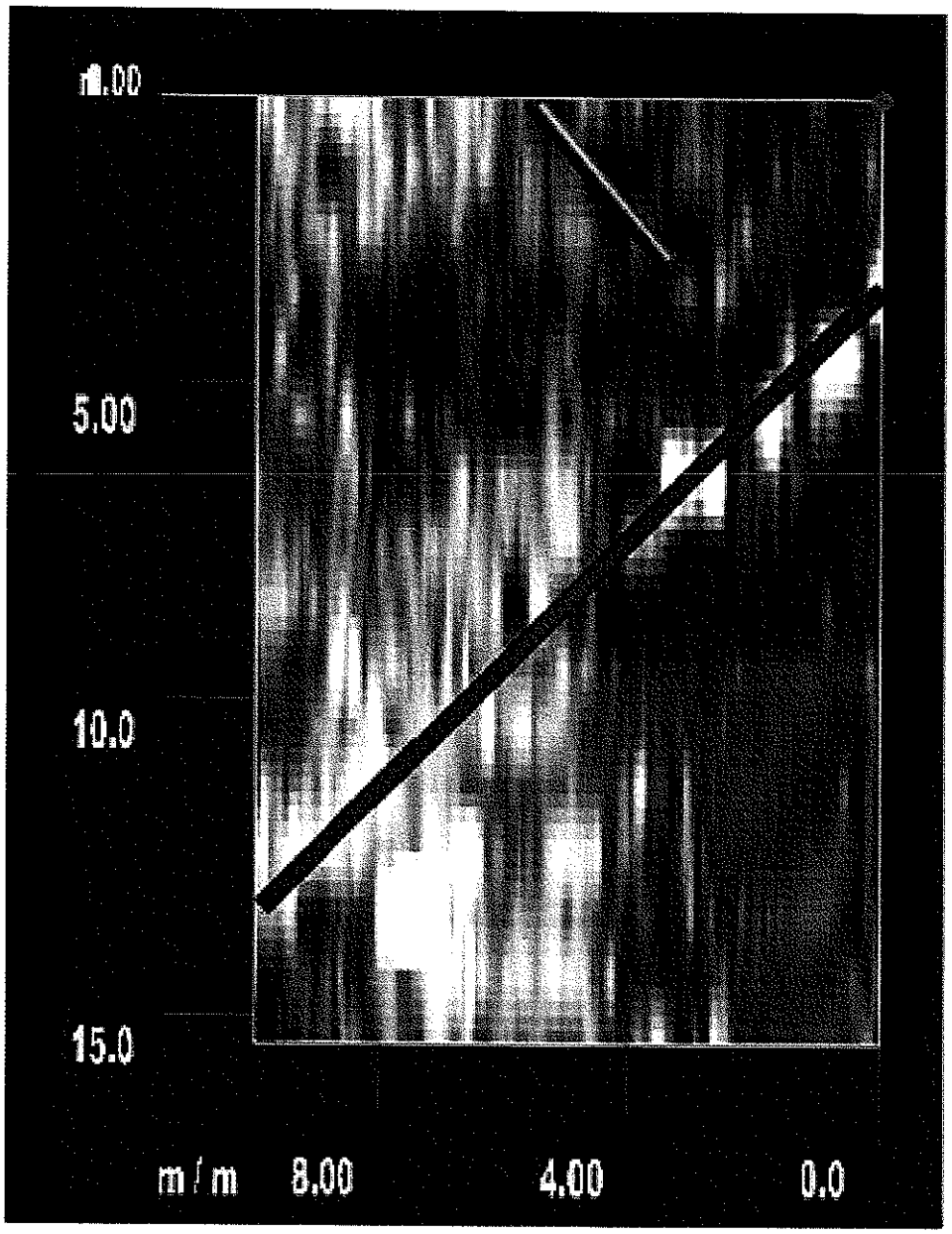


b) Area B. Y-slice (at 4 metres) through radar cube



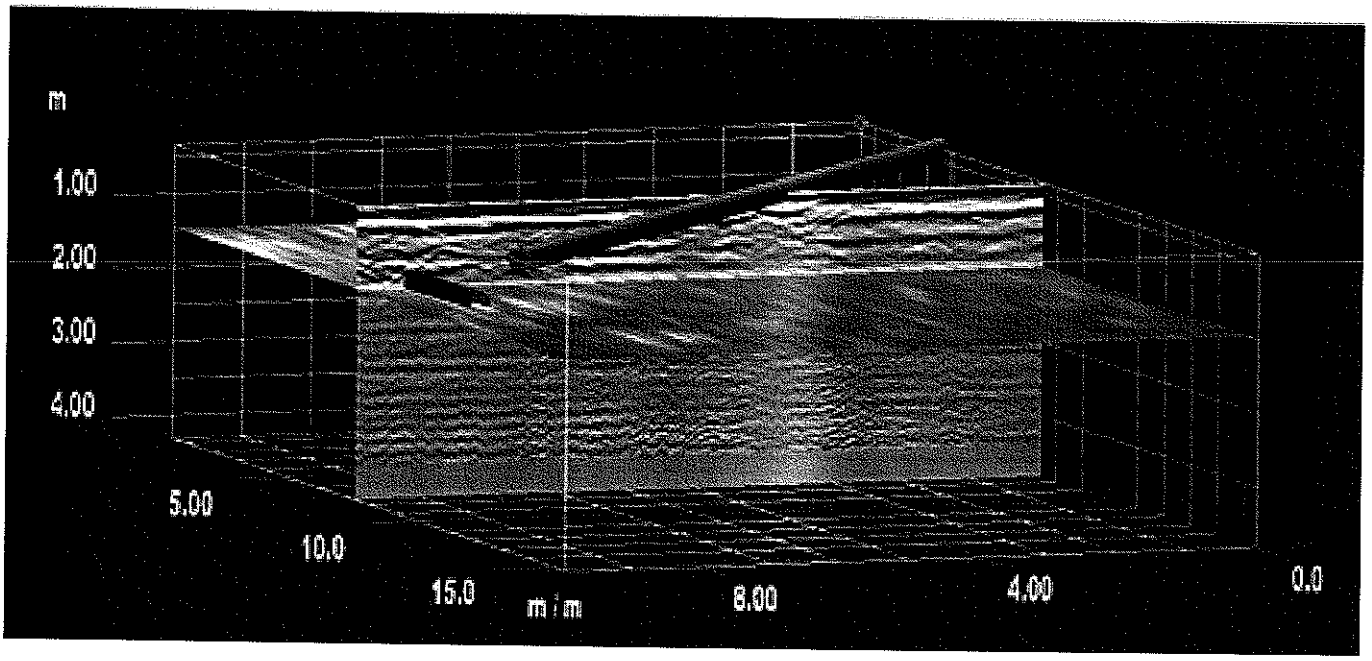
c) Area B. Y-slice (at 4 metres) through radar cube.Possible layer (in blue) and (in blue) and anomalies (in pink) highlighted.

Fig.9



Area C. Time slice at approximately 1 metre (400 Mhz antenna)
Possible anaomalies highlighted

Fig.10



Area C. Three-dimensional radar cube (400 Mhz). Time slice at approximate depth of 1.65 metres and Y-slice at 8 metres. Possible service trench highlighted in green and linear anomalies in pink

Fig.11