Northamptonshire County Council

Northamptonshire Archaeology

Archaeological Geophysical and Topographical Survey at Little Trees Hill, Magog Down Cambridgeshire

November 2009

Adrian Butler

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QUALITY CONTROL

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OASIS REPORT FORM

PROJECT DETAILS		
Project name	Archaeological Geophysical and Topographical Survey at Little Trees Hill, Magog Down, Cambridgeshire	
Short description	Northamptonshire Archaeology was commissioned to conduct magnetometer and topographical survey across a bowl barrow and causewayed enclosure at Little Trees Hill, Magog Down, Cambridgeshire. Survey detected a possible ring ditch / bank beneath the eroded sides of the barrow, together with a possible core to the feature. A single-ditched oval enclosure with 13 causeways was detected around the 65m contour	
Project type	Geophysical and topographical survey	
Site status	SAM 24422	
Previous work	None	
Current Land use	Pasture	
Future work	Unknown	
Monument type/ period	Neolithic Causewayed Enclosure & Bronze Age Bowl Barrow	
Significant finds	As above	
PROJECT LOCATION		
County	Cambridgeshire	
Site address	Babraham Road	
Study area	5.8ha	
OS Easting & Northing	5488 2529	
Height OD	54-76m	
PROJECT CREATORS		
Organisation	Northamptonshire Archaeology (NA)	
Project brief originator	English Heritage	
Project Design originator	English Heritage	
Director/Supervisor	Ian Fisher and Carol Simmonds	
Project Manager	Adrian Butler	
Sponsor or funding body	English Heritage	
PROJECT DATE		
Start date	28 October 2009	
End date	2 December 2009	
ARCHIVES	**Location**	**Content**
Physical	N/A	
Paper	NA	Site survey records
Digital	NA	Geophysical survey & GIS data
BIBLIOGRAPHY	Journal/monograph, published or forthcoming, or unpublished client report	
Title	Archaeological Geophysical and Topographic Survey at Little Trees Hill, Magog Down, Cambridgeshire	
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ARCHAEOLOGICAL GEOPHYSICAL AND TOPOGRAPHICAL SURVEY

AT LITTLE TREES HILL, MAGOG DOWN, CAMBRIDGESHIRE

DECEMBER 2009

ABSTRACT

Northamptonshire Archaeology was commissioned to conduct magnetometer and topographical surveys across a bowl barrow and causewayed enclosure at Little Trees Hill, Magog Down, Cambridgeshire. Survey detected a possible ring ditch / bank beneath the eroded sides of the barrow, together with a possible core to the feature. A single-ditched oval enclosure with 13 causeways was detected around the 65m contour

1 INTRODUCTION

Northamptonshire Archaeology was commissioned by English Heritage (EH) to conduct magnetic and topographical surveys at Little Trees Hill, Magog Down (SAM 24422; TL 488 529; Fig 1). This work was requested in order to investigate the extent of badger damage to a bowl barrow on the summit of the hill and to map the form and location of a causewayed enclosure which encircled the hilltop (EH 2009).

The fieldwork was allocated the Cambridgeshire County Council accession number, ECB 3292.

2 TOPOGRAPHY AND GEOLOGY

Magog Down is situated approximately 1.5km south-east of the edge of Cambridge. The villages of Great Shelford and Stapleford lie respectively 2km to the west and 1.5km to the south-west of the site. The Down is bounded to the north-east by the A1307 Babraham Road and by Haverhill Road to the north-west.

Little Trees Hill lies within the wider area of Magog Down and is one of the Magog Hills. It is a pronounced but rounded summit, somewhat elliptical in plan, which attains an elevation slightly in excess of 70m aOD. It is composed principally of Middle Chalk, with a superficial gravel cap (British Geological Survey 1952, in EH 2009, 7). An old quarry pit forms a deep scar on its south-eastern flank of the hill, just below the level of the summit.

The survey area encompassed an approximately 300m diameter sub-circular area on the top of Magog Down, to cover the circumference of the enclosure. At the time of the survey, the north-east to south-west orientated ridge that forms the top of the hill was covered by the trees of Magog Wood (Figs 1 and 2). A number of the trees had been

cleared from over the barrow, which exists as a prominent mound *c* 25m wide and 1.8m high. The mound was partially surrounded by the remains of a wire fence. Anti-badger appliances, such as one-way sett doors, had been installed on the mound adjacent to a large quarry cut into the ridge within the trees. The western slope was covered in rough downland pasture down to Cooks Wood. The eastern slope was covered by close-cropped sheep pasture and was divided into two fields by a fence. A track skirted the eastern edge of Magog Wood southwards to another stand of trees aligned towards the south-east.

3 ARCHAEOLOGICAL BACKGROUND

The interrupted ditch, or causewayed, enclosure, at Little Trees Hill has been identified from aerial photography. The monument description (SAM 24422) describes a circular enclosure of approximately 265m diameter, defined by a series of segmented ditches around the 60m contour. The bowl barrow is situated almost central to the enclosure atop Little Trees Hill and appears to conform to type. The EH Monument Protection Programme Monument Class Description states that,

> *"A bowl barrow is a roughly hemispherical mound (literally a small hill), of prehistoric date … typically between about 3m and 40m in diameter, from 0.3m to over 6m high … where later damage has occured they sometimes have a rather flattened cross-section. Some bowls barrows are surrounded by a ditch set tightly against the edge of the mound."*

The monuments of Little Trees Hill are situated 500m south-west of Wandlebury Hill Iron Age Hillfort (SAM 24406) and 900m west of Wormwood Hill tumulus (SAM CB12).

4 METHODOLOGY

4.1 Geophysical Survey

Magnetic survey of the barrow was carried out with a Geoscan Instruments FM256 fluxgate gradiometer within an area of 40m x 40m. The wider, enclosure, survey was conducted with Bartington Grad 601-2, twin sensor array, vertical component fluxgate gradiometers (Bartington and Chapman 2003). The enclosure survey covered an area of approximately 5.8ha, divided north-east to south-west by the wood and by a west to east

aligned fence on the eastern side. Therefore the enclosure survey was divided in three fields, *c* 4.3ha on the west of the trees (Field 1) and 1.5ha to the east (Fields 2 and 3). Both magnetometers are standard instruments for archaeological survey and can resolve magnetic variations as slight as 0.1 nanotesla (nT).

The enclosure site was divided into 30m x 30m grid squares, which formed the basic unit of survey. These were set out manually by tape measure and optical square from pre-calculated points established via electronic measured survey. Corner points were recorded by the topographic survey team. The gradiometers were carried at a brisk but steady pace through each grid; collecting data along 1m spaced traverse lines orientated roughly north-south. Measurements were automatically triggered every 0.25m along the traverses, giving a total of 3600 measurements per grid. The barrow area was subdivided into 20m x 20m grid squares utilising a total station. In this case the gradiometer was carried over the rough terrain as steadily as possible collecting data every 0.25m along north-south aligned traverses spaced at 0.5m intervals.

All fieldwork was carried out in accordance with the guidelines issued by English Heritage, and by the Institute for Archaeology (EH 2008; Gaffney, Gater and Ovendon 2002).

Data from the Geoscan instrument was downloaded and processed using Geoplot 3.00u software. That from the Bartington instruments was downloaded via Grad601 software before being imported into Geoplot for processing.

Where 'walking errors' were found in the data sets, the following processing steps were taken to correct them: Striping, caused by slight mismatches in sensor balance, was removed by careful use of the 'Zero Mean Traverse' function. Where the data was found to be offset between adjacent traverses, 'Destaggering' of the data was performed as necessary.

The processed data is presented in this report in the form of a greyscale plot (scale +2nT to -2nT black ~ white). This has been scaled, rotated and resampled (georectified) for display against the Ordnance Survey base mapping (Figs 2, 3 and 5). Interpretative diagrams have been produced in Figures 4 and 6. Raw data has been included as sets of greyscale and stacked trace plots for each area in Appendices 1 - 4.

4.2 Topographic Survey

As with the geophysical survey, the topographical survey was conducted in two phases: an intensive survey of the bowl barrow and an extensive survey of the wider enclosure area. Readings were collected at 1m intervals across the barrow and 2m intervals in the wider area of the enclosure.

Leica System 1200 Global Positioning System (GPS) operating using SMARTNET real-time corrections was utilised where tree cover allowed, operating to a 3D tolerance of +/- 0.05m. Where GPS survey was impracticable, a Leica TCR407 Electronic Total Station (ETS) was used. The position of the ETS was established from survey stations located using GPS.

Subsequent to the survey, data was downloaded and processed using Leica GeoOffice v7.0. Output of contour plots was achieved using Golden Software Surfer v.8.

5 GEOPHYSICAL SURVEY RESULTS

5.1 **Barrow** (Figs 5 & 6)

The entirety of the barrow earthwork was encompassed by a 40m x 40m survey area. Unfortunately, the survey was obstructed by dense woodland to the north-east and south-west and the quarry in the south-east. The fence curving through the north-west of the area, although denuded of most of its wire, included a buried section of chain-link. This was highly detectible in the magnetic data. A number of small dipolar anomalies were identified indicating likely ferrous objects in the topsoil on the western side of the mound.

A curving negative magnetic anomaly, 2 - 3m wide, was detected around the east, south and western edges of the barrow. This semi-circular anomaly was situated beneath the sharpest gradient of the slopes of the barrow (Fig 8) so apparently covered by mound material. A further negative area anomaly *c* 16m diameter was identified positioned centrally to the outer ring anomaly, although to the south-west of the highest point of the mound. It would appear possible that the inner negative anomaly reflects the core make-up of the mound construction. Considering the different forms that a bowl barrow can take, the curving negative anomalies potentially represent a ring ditch, formerly skirting the edge of the mound and cut into the gravel drift geology. This was subsequently filled with low magnetic susceptibility mound material (gravel, chalk?) as the barrow was

eroded or modified through time. Alternatively, the ring anomaly may indicate a surrounding bank (Parker Pearson 1999, 86).

Several small positive magnetic anomalies, no greater than *c* 1.5m diameter, were detected within the area of the barrow. The anomalies show no clear characteristics, but could easily indicate pits or topsoil-filled holes from removed tree boles.

5.2 **Enclosure, Field 1** (Figs 3 & 4)

An interrupted curving positive magnetic anomaly was identified in all three fields surveyed, in all likelihood describing the enclosure ditch. In Field 1 the ditch anomaly varied widely in intensity; from up to 18nT in the north-east and north, reducing to barely 0.5nT in the south-west; and in width between 2m and 0.5m. Interruptions to the ditch, the 'causeways', can be counted from the north-eastern end of the anomalies adjacent to Magog Wood. The first was identified approximately 14m along the circuit. After a gap of 4m the next ditch, possibly with an out-turned terminal, was 22m long, before a 2m interruption. A further 25m length of ditch extended westwards to a *c* 3m causeway.

Possibly through an effect of the sampling density, the subsequent north-east to south-west length of ditch did not appear to be interrupted for a distance of 114m. However slight narrowings of the anomaly may represent causeways. The next ditch to the south-west was identified as beginning to the east of the previous terminal. This ditch anomaly measured approximately 30m to a point where the magnetic anomaly became exceedingly tenuous. For approximately 55m the ditch anomaly was below 0.5nT, consequently any gaps were very difficult to discern. The enclosure anomaly rose in intensity to over 1nT for a length of *c* 18m on the south-eastern sector until a 4m causeway. The final 43m of anomalies in the south of Field 1 were detected close to magnetic disturbance caused by a fence on the edge of the field.

A positive anomaly was detected to the north-east of the second length of ditch in the north of the enclosure which, if archaeological, could indicate a wide segment of ditch, 15m long, or putatively several adjacent pits.

A band of positive magnetic anomalies was detected close to the northern extent of the Field 1 survey area. The inconsistency in strength and generally diffuse nature of the anomalies suggest that they represent a variation in geology across the base of the hill.

The north-west of the interior of the enclosure in Field 1 was found to contain a cluster of discrete positive magnetic anomalies, possibly reflecting pits. A larger 'pit-like' anomaly, 5-6m in diameter, in that location could also reasonably be interpreted as a solution pipe (*cf* Segsbury Camp in Corney and Payne 2006, 95). To the south of these anomalies a group of irregular positive anomalies were identified. Four of these on a roughly north-west to south-east alignment were relatively weak and considered more likely to be geological in origin. An asymmetrical positive anomaly, orientated north-east to south-west in the same area, may indicate an archaeological feature or features such as a close-set group of pits. A more discrete positive anomaly to the south-east possibly reflects a pit.

The western sector of the enclosure was found to contain a series of five parallel linear positive anomalies, orientated north-east to south-west along, and slightly sloping on the western side of the hill. The easternmost linear coincided with a discrete positive anomaly, a possible pit, towards the southern end, whereas the penultimate linear west was split in half by a dipolar ferrous anomaly. A second possible pit was identified between the two most eastern linears. No good explanation can be made for the five ditch-type anomalies other than as possible former agricultural features of unknown date. To the north of the linear anomalies a north-west to south-east aligned irregular weak positive anomaly was detected, possibly indicating a geological anomaly as to the north.

5.3 **Enclosure, Field 2** (Figs 3 & 4)

Positive magnetic anomalies likely to indicate the continued enclosure ditches were detected curving through the north-west of Field 2, from the woodland to the fence boundary with Field 3. Four interruptions to the curve could be discerned in the data.

A further four linear features were identified from positive anomalies, one aligned to the south-east from the wood while the other three were orientated parallel north-east from that. As these probable ditches do not appear to respect the causewayed enclosure, they may be assumed to be of much later date. The western ditch ended in a row of five dipolar anomalies indicating ferrous objects. The middle and eastern ditch features appeared to continue to the northern boundary of Field 2. A set of dipolar, ferrous, anomalies were detected in a group in the northern corner of Field 2. The anomalies were approximately equidistant at *c* 5m apart in three rows.

A positive anomaly, 7m wide, located south of the enclosure ditch, could reflect a large pit or possible solution pipe (as previously in Field 1).

5.4 **Enclosure, Field 3** (Figs 3 & 4)

The causewayed enclosure ditch was detected through the west of Field 3, indicated by two curving positive anomalies. At the northern end a possible in-turned terminal was identified. To the east of the causeway a discrete positive anomaly was detected, indicating a possible pit of diameter 3m.

Two linear positive anomalies were recorded orientated north-east from the southern fence boundary of Field 3. These were likely to represent the continuation of the ditches in from Field 2. At its northern end, the eastern ditch appears to turn sharply to the east, but at the same time halve the anomaly strength. A highly magnetic dipolar anomaly was located in the east of Field 3, almost certainly representing a large buried ferrous object. Three weakly positive elongated anomalies were detected orientated south-east to north-west through the north of Field 3. These features may be geological in origin if one considers the similar anomalies in the north of Field 1.

6 TOPOGRAPHIC SURVEY RESULTS

6.1 **Barrow** (Fig 8)

Contour survey of the bowl barrow demonstrated it to be oval in plan on a north-east to south-west alignment along the line of the ridge. The crown of the feature was found to be flattish and offset to the north-east. The slope of the sides was shallow to the south-west with an increased gradient on the southern and northern sides. In the north-east the barrow sloped gently to a flattish area *c* 75m AOD. The remaining circuit fell sharply below *c* 74.5m and then spread, presumably from erosion at the base.

6.2 **Enclosure** (Fig 7)

Assessment of the topographic data from Little Trees Hill shows a geographic feature that rises in the north-east to a promontory at *c* 76m AOD. The top of the Hill where the bowl barrow is situated would, but for the trees, overlook a sharp slope south away from Magog Down. Examination of the contour plot against magnetometer results indicates that the enclosure is situated on or about the 65m contour.

7 CONCLUSION

Magnetometer survey of the bowl barrow at Little Trees has suggested two main sets of anomalies: a possible ring ditch / bank beneath the edge of the mound; and indications of a 16m diameter core to the barrow. The flattish top of the barrow and shallow south-western side indicates a path along which the mound has eroded.

The causewayed enclosure was successfully detected by magnetometer survey and was found to comprise a single circuit of ditch segments, with a possible 13 interruptions. The ditch lies close to the 65m contour and encloses an oval area approximately 270m long by 200m wide. The long axis of the enclosure is orientated approximately north-east to south-west.

A number of apparently archaeological anomalies were detected within the area of the enclosure. It is not known whether these represent contemporary features or later activity. A rectilinear configuration of ditches which surrounds and partly overlies the eastern edge of the enclosure is thought to be of later date.

It is suggested that, in the light of these survey results, the scheduled monument record for the site requires several revisions. It is no longer tenable to describe the enclosure as 'roughly circular', and the elevation of the ditch is somewhat greater than previously recorded. The identification of an "80m wide gap, or major causeway" at the western end of the enclosure must be re-evaluated as the magnetometer data shows the ditch to continue through this area, albeit in a possibly denuded state.

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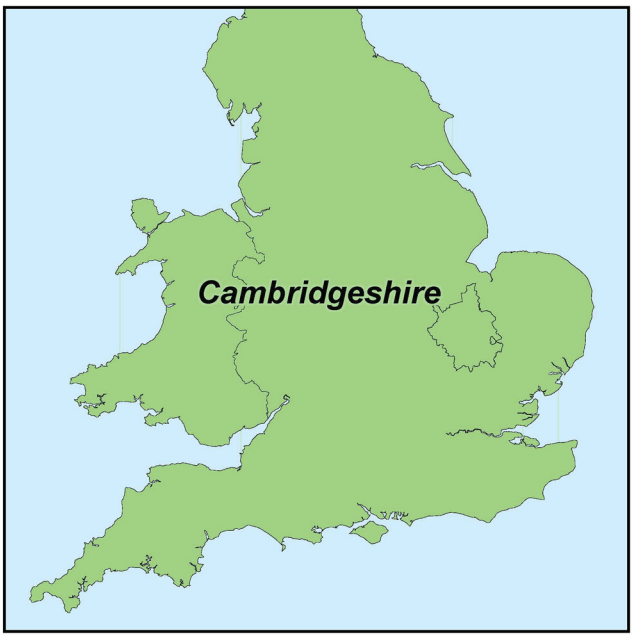

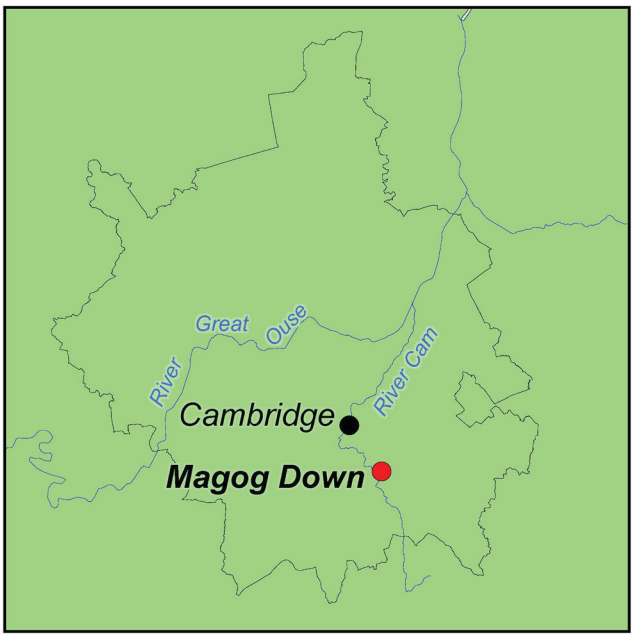

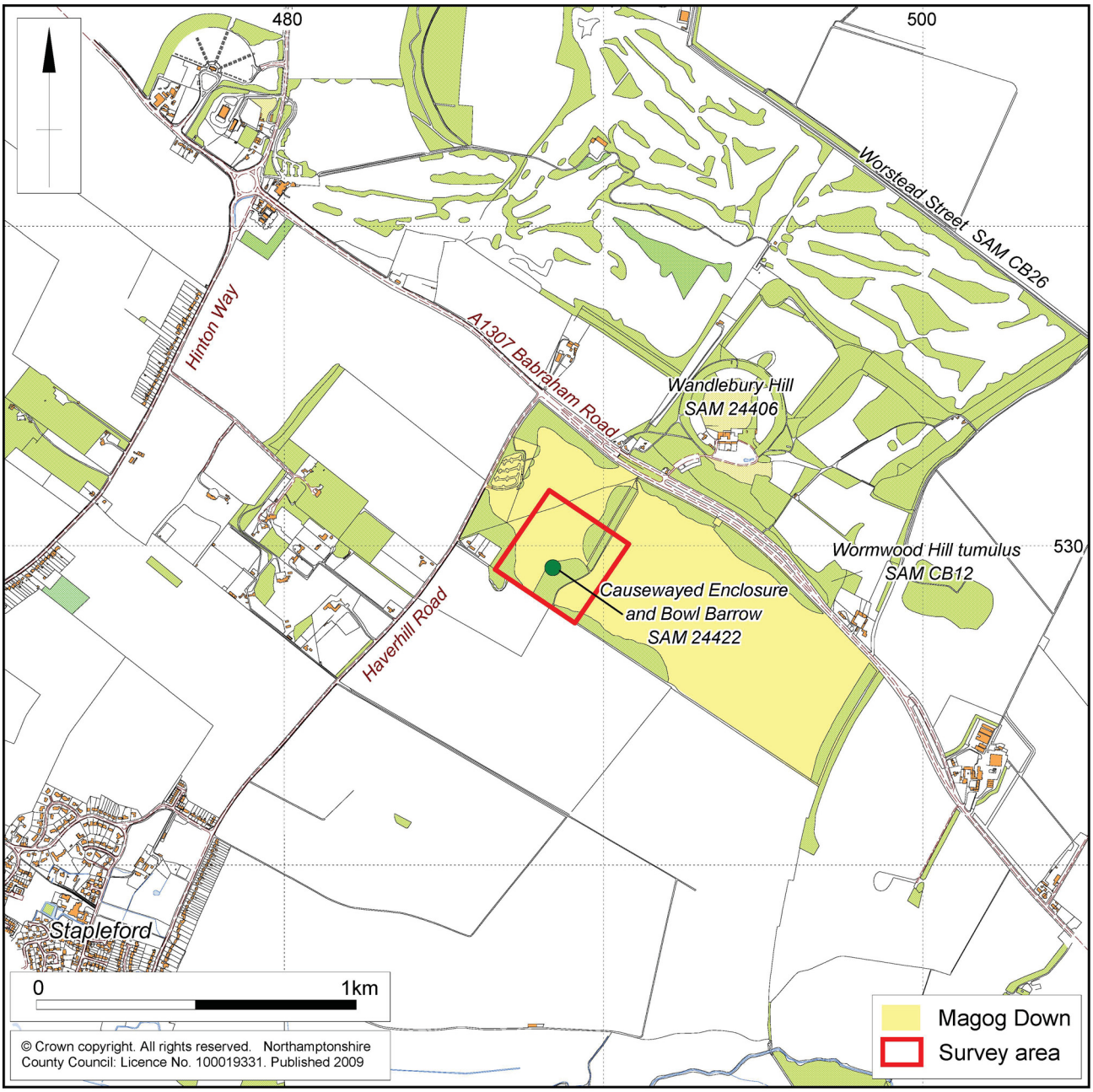

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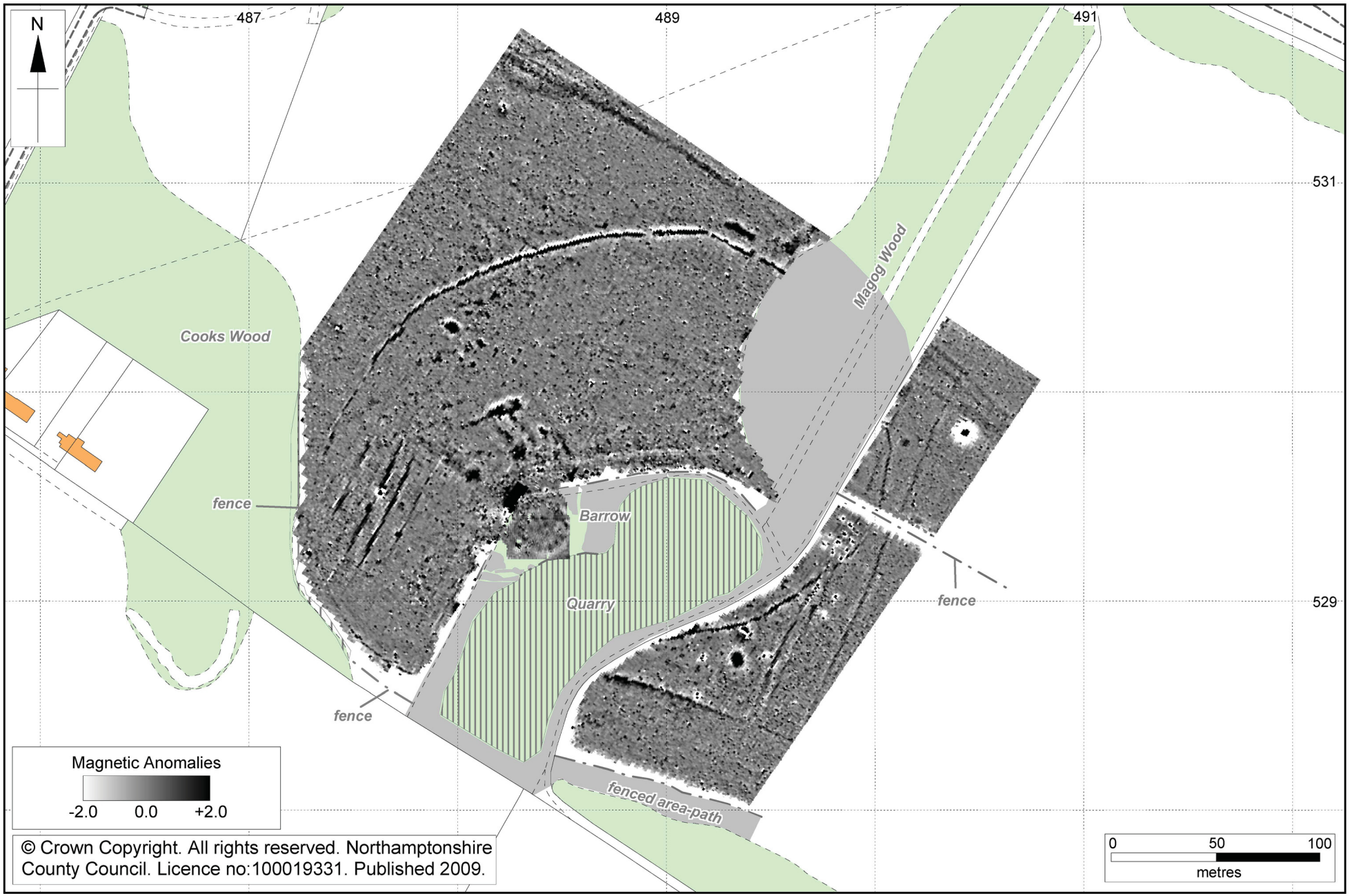

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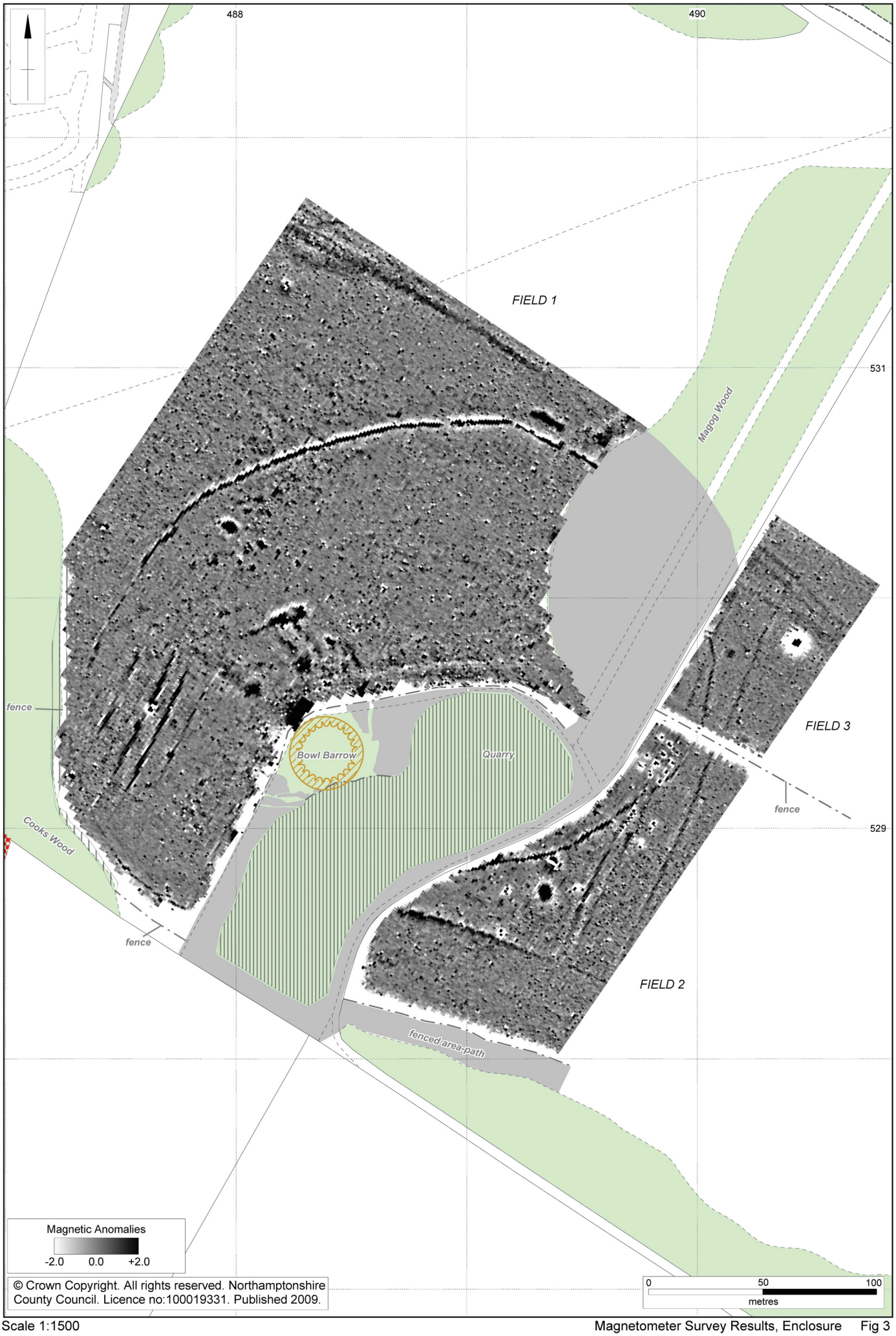
Magnetometer Survey Results at Little Trees Hill

Fig 2



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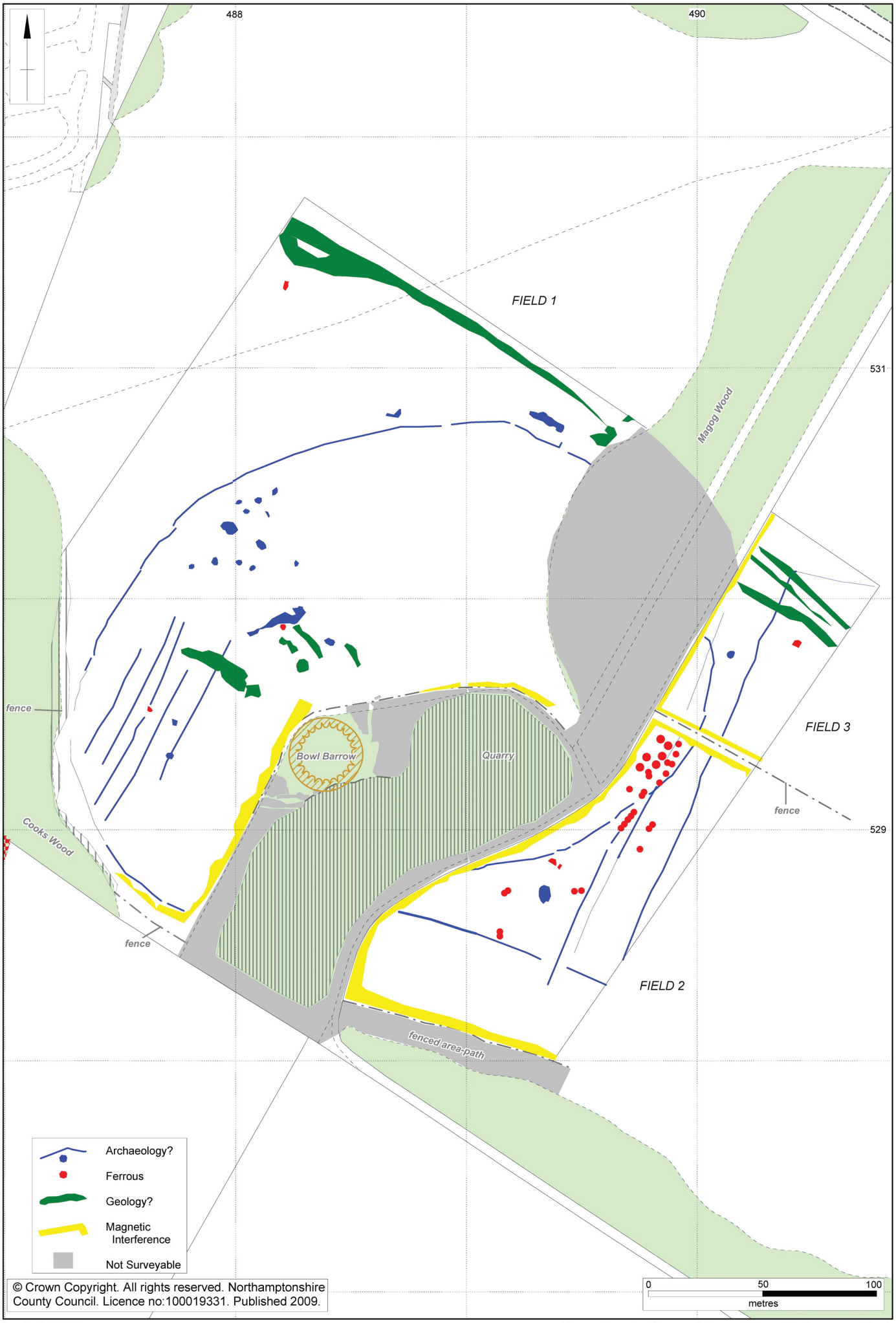
Magnetometer Survey Results, Enclosure Fig 3



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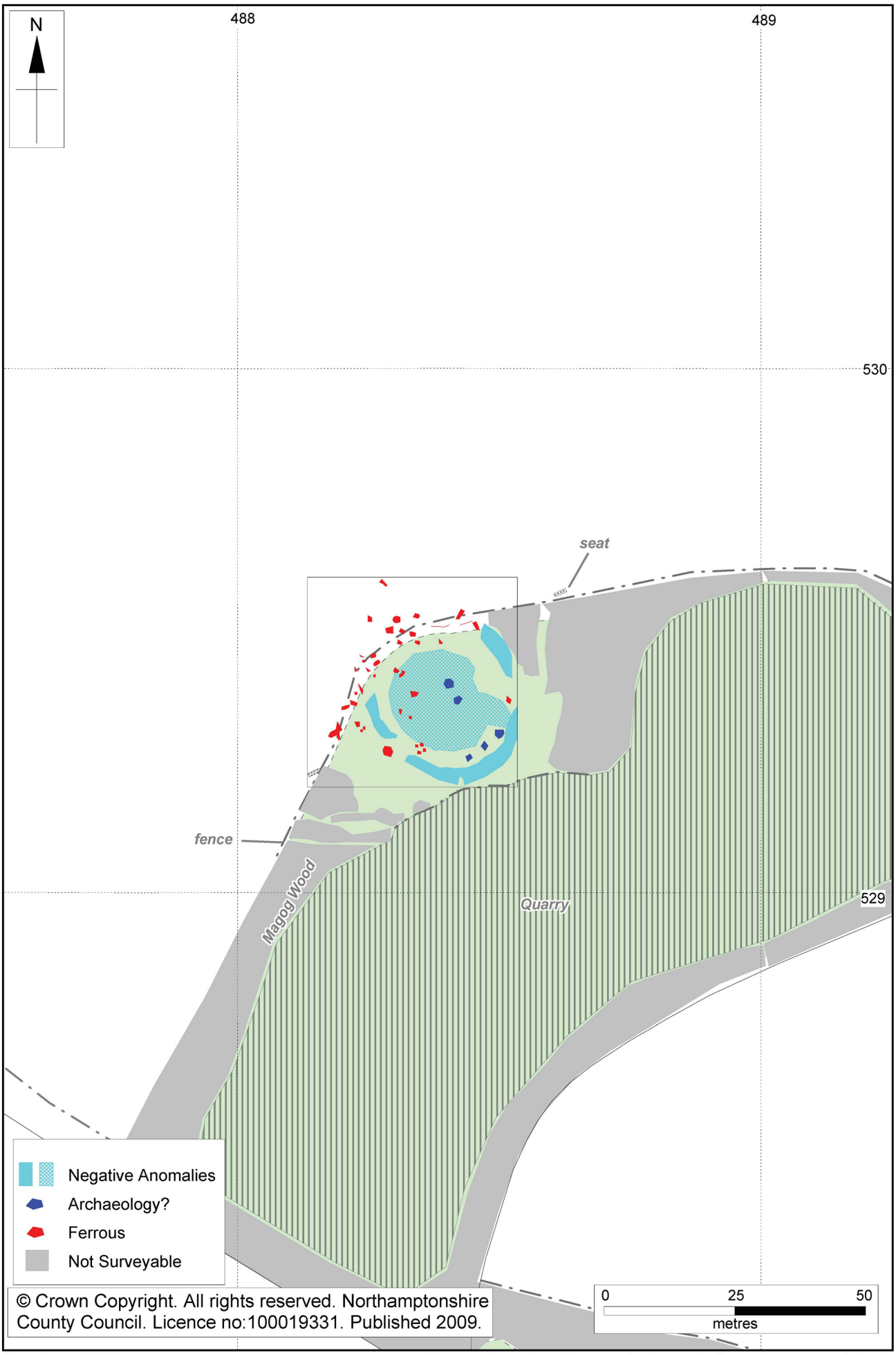
Magnetometer Survey Interpretation, Enclosure Fig 4

Scale 1:1000

Magnetometer Survey Results: Barrow Fig 5



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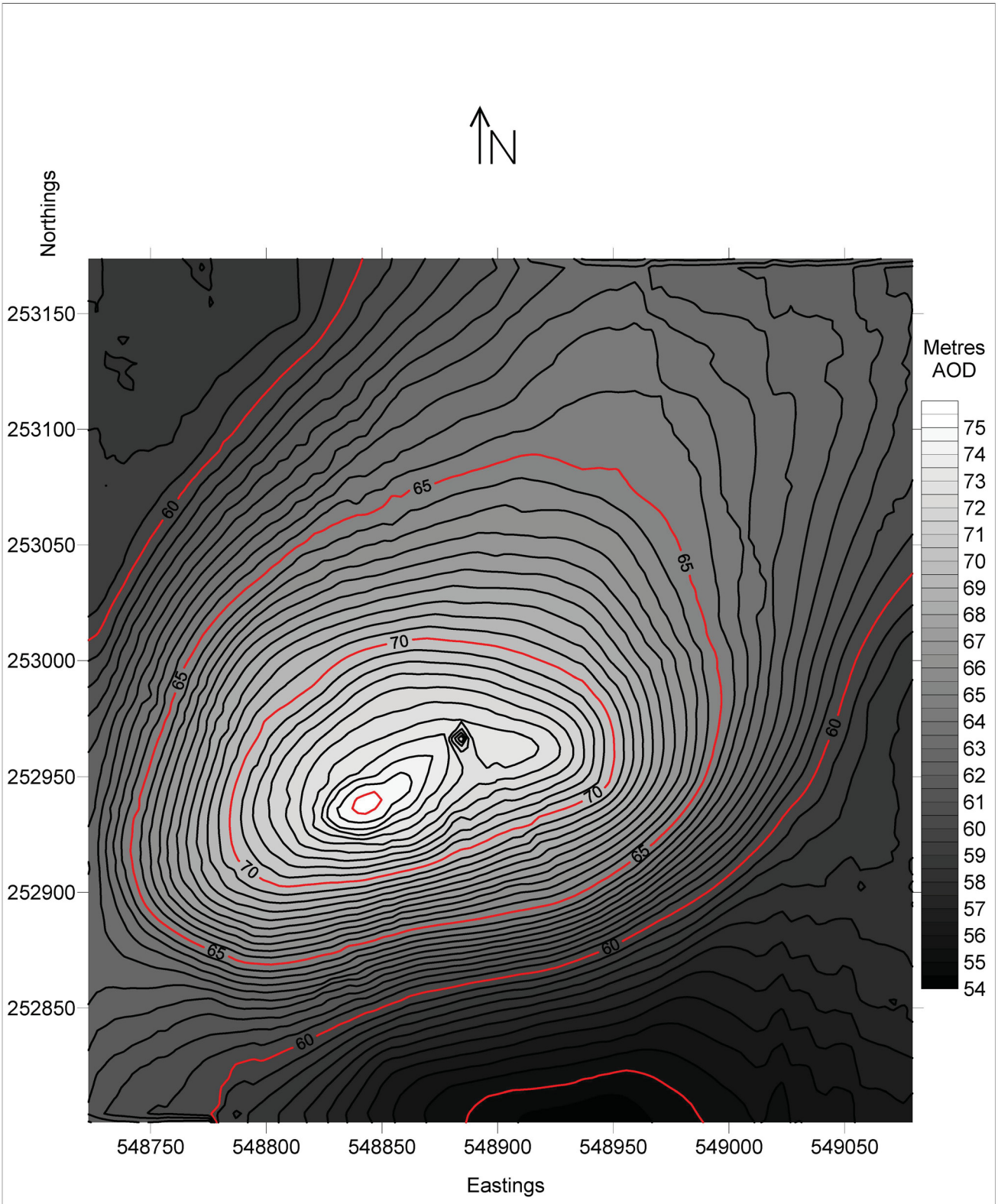
Magnetometer Survey Interpretation, Barrow Fig 6



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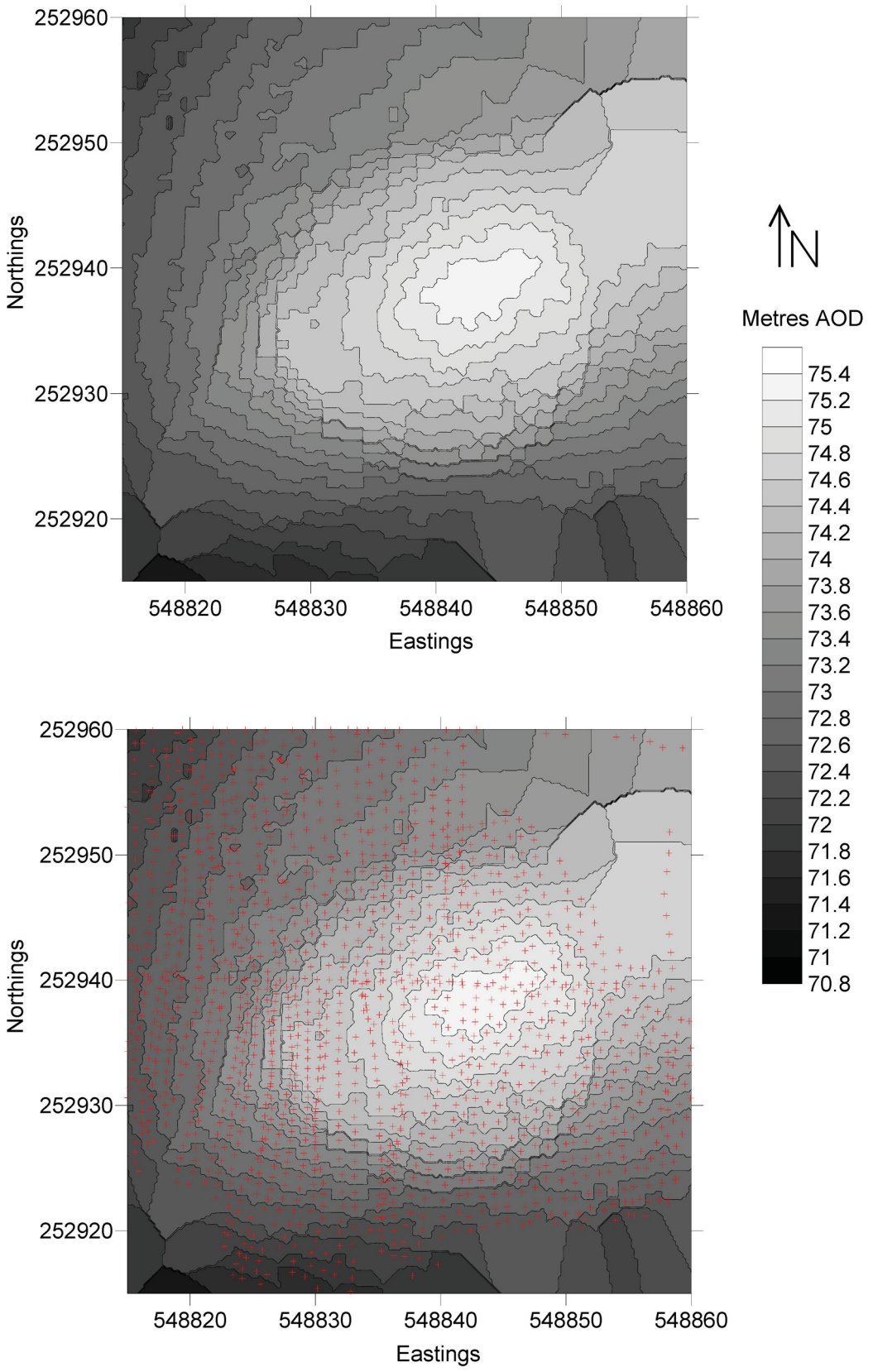
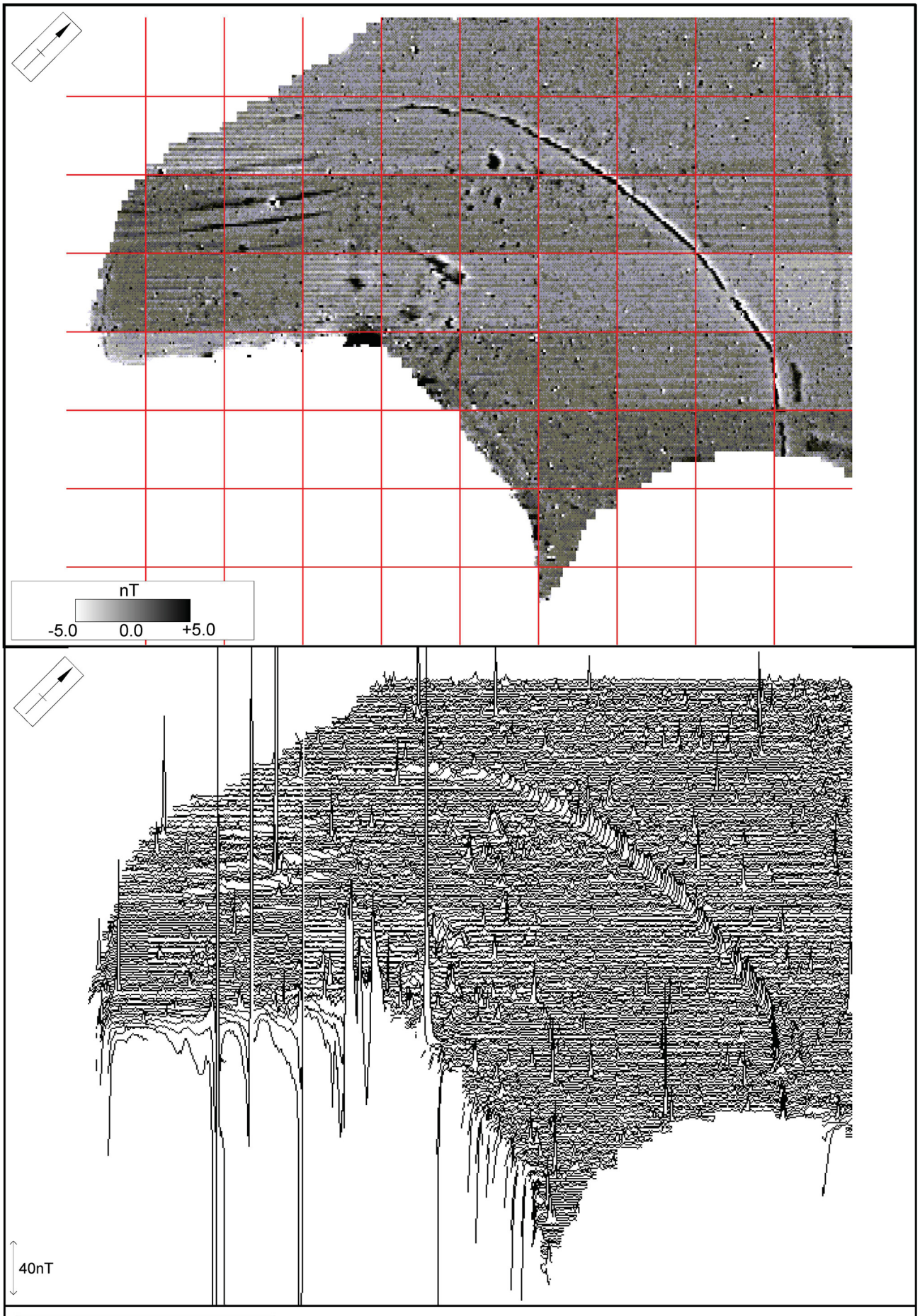
Topographic Survey, Enclosure Fig 7



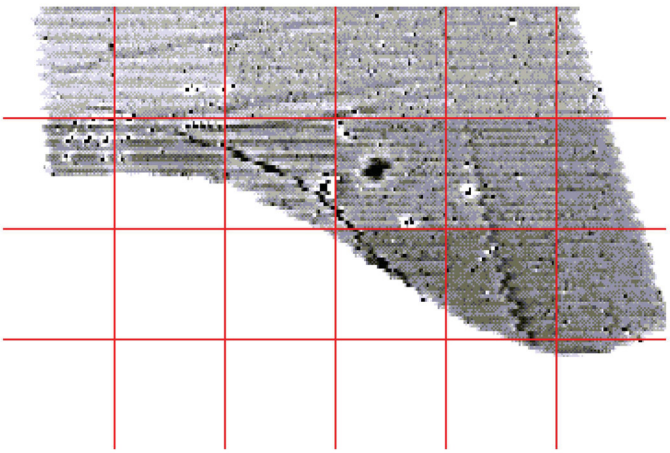
Top: Contour Plot
Bottom: Contours with Data Points

Scale 1:500

Topographic Survey, Barrow Fig 8



Raw Data, Enclosure Field 1 App.1



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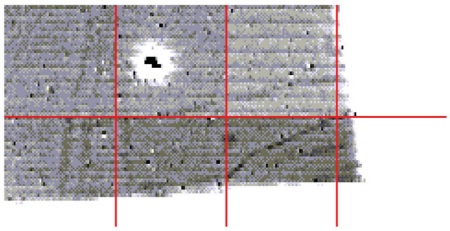

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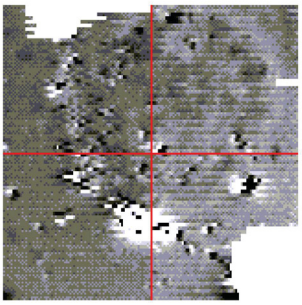

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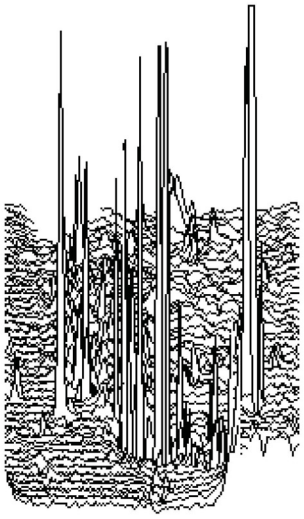

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