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Andrew Payne





ARCHAEOLOGICAL SCIENCE

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NGR SY 665887 & SY 604883

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SUMMARY

Geophysical surveys were carried out to investigate the remains of two probable Neolithic long barrows at Maiden Castle, Winterborne Monkton and Sheep Down, Winterbourne Steepleton, Dorset. The surveys, using both fluxgate magnetometer and earth resistance techniques, were conducted to provide training for a group of local volunteers working in conjunction with the Dorset Area of Outstanding Natural Beauty Partnership who had previously undertaken topographical recording of the monuments. The geophysical surveys successfully characterised both barrows suggesting that the two are rather different in size, construction and form; one probably representing a typical earthen long barrow with substantial in-filled side and rear quarry ditches; and the second lacking evidence of ditches, but with a possible stone construction surrounding the perimeter of the mound and an internal high resistance anomaly that may represent a stone chambered structure.

CONTRIBUTORS

Hazel Riley from the English Heritage Archaeological Investigation Team organised access to the sites and the volunteer involvement through the South Dorset Area of Outstanding Natural Beauty Partnership. The fieldwork and training was conducted by Andrew Payne and Paul Linford of the English Heritage Geophysical Survey Team assisted by Hazel Riley. The following local volunteers assisted with the survey and received training in the use of geophysical techniques: Phil Bardswell, Richard Breward, Hazel Dunning, Peter Emery, Roger Holehouse, Greg Rochfort, Ann Salter, Peter Sheaves, Nick Sturrock and William Whiting. The production of the digital terrain models and draped images was assisted greatly by Paul Linford.

The cover photograph shows earth resistance survey with a Geoscan RM15 resistance meter and twin electrode array in progress at the Sheep Down long barrow

ACKNOWLEDGEMENTS

English Heritage would like to thank the owners of the sites and all the volunteers from the local community for their enthusiastic involvement with the surveys.

ARCHIVE LOCATION

English Heritage, Research Department, Fort Cumberland, Portsmouth

DATE OF SURVEY

15-19 July 2007

CONTACT DETAILS

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INTRODUCTION

Geophysical surveys were conducted in July 2007 at two partially plough degraded linear mounds in the South Dorset Ridgeway area, both regarded as the remains of Neolithic long barrows. The surveys were carried out in support of a programme of archaeological investigation and recording of monuments in the area undertaken by Hazel Riley (English Heritage, Archaeological Investigation Team), with the assistance of a team of local volunteers recruited through the Dorset Area of Outstanding Natural Beauty (AONB) partnership. The purpose of the geophysical surveys was to augment previous topographical survey of the mounds and locate evidence of any additional features present, such as side ditches. A second objective was to provide training for the volunteers to enable the group to undertake further surveys in the future.

The first site (SAM 28338, NGR SY 665887) lies in an area of arable cultivation immediately to the north-west of Maiden Castle on a north-east facing slope of a chalk ridge overlooking the Frome valley (Figure 1). The barrow is now barely visible as a topographical feature due to regular ploughing, but was previously recorded as a prominent "narrow mound with unusually tapered ends" on aerial photographs taken by Major G. W. G. Allen dating from the time of Wheeler's excavations at Maiden Castle in the 1930s (Royal Commission on Historical Monuments (England) 1970).

The site at Sheep Down (SAM Dorset 70, NGR SY 604883) is situated near the Northfield Plantation on the side of a long arable slope falling north-east towards Winterbourne Steepleton (Figure 6). The barrow survives here as a substantial linear mound situated in an area of set-a-side grassland. It is described in the scheduling notes as "a perfect long barrow recently ploughed over" but with "no visible evidence of side ditches". There is also aerial photographic evidence to suggest that both barrow sites were incorporated into later Celtic field systems (Royal Commission on Historical Monuments (England) 1970).

The geology at the Maiden Castle site consists of Cretaceous Upper Chalk overlain by shallow well drained calcareous silty soils of the Upton I Association (Geological Survey of Great Britain (England and Wales) 1973; Soil Survey of England and Wales 1983). The Sheep Down site is located on Pleistocene drift deposits of pebbly clay and sand underlain by Cretaceous Upper Chalk or Tertiary Bagshot Beds (Geological Survey of Great Britain (England and Wales) 1974). The drift deposits are overlain by variably flinty well drained fine silty soils over clayey soils (Soil Survey of England and Wales 1983). Weather conditions at the time of the surveys were very mixed varying between bright warm sunny conditions and heavy rain showers.

METHOD

Over the course of the four days of training, practical tuition and hands on experience was given in the use of fluxgate magnetometer and twin electrode earth resistance survey techniques together with the use of a survey-grade differential Global Positioning System (GPS) to set out the grid squares. The Dorset AONB volunteers carried out some limited magnetometer survey at Maiden Castle using Geoscan FM36 fluxgate gradiometers, although as this data was collected as part of an initial training exercise the site was

resurveyed by the English Heritage Geophysics Team using Bartington Grad601 fluxgate gradiometers to acquire a more consistent data set. The English Heritage staff also collected magnetometer data at Sheep Down using Geoscan FM36 fluxgate gradiometers to demonstrate the technique to the volunteers. Earth resistance survey was conducted with the assistance of the volunteers at both barrow sites.

Magnetometer data collected with Bartington Grad601 fluxgate gradiometers (Maiden Castle) was recorded on the 200 nanotesla per meter (nT/m) range setting at 0.25m intervals along successive parallel traverses separated by 1.0m aligned approximately eastwest. Data was recorded with an identical sample interval using the Geoscan FM36 fluxgate gradiometers at Sheep Down along approximately north-south orientated traverses. Both magnetometer surveys were recorded at the maximum 0.1 nanotesla (nT) resolution of the instruments. The earth resistance data was collected at a 1.0m \times 1.0m reading interval using a Geoscan RM15 resistance meter and a PA5 electrode frame in the Twin-Electrode configuration with a mobile probe spacing of 0.5m.

The magnetometer data is presented in the form of linear greyscale and traceplots in Figures 2 and 4(a-c) for Maiden Castle and in Figures 7 and 9(a-b) for Sheep Down. Minimal post acquisition processing was applied to the data beyond the initial truncation of extreme values and the setting of each traverse to a zero mean, to remove any effects of directional sensitivity and instrument drift. Additional treatment was applied to remove periodic defects in the Sheep Down magnetometer data and the effects of near surface ferrous litter in the Maiden Castle magnetic data (Figure 4c) were reduced by means of a 2.0m radius thresholding median filter (Scollar *et al.* 1990, 190-1). The earth resistance data is presented in linear greyscale and traceplot form on Figures 3 and 4(d-f) for Maiden Castle and Figures 8 and 9(c-d) for Sheep Down. Minimal data processing has been applied to the earth resistance data beyond the suppression of spurious high value readings, caused by occasional poor probe contact, through the application of a 2.0m by 2.0m thresholding median filter (Scollar *et al.* 1990, 190-1). Figures 4(f) and 9(e) show the earth resistance data from Maiden Castle and Sheep Down after treatment with a 3.0m radius Gaussian high pass filter to remove background regional trends.

The geophysical data from both sites is presented as a draped surface superimposed over a Digital Terrain Model (DTM) of the barrows generated from topographical measurements recorded with a Trimble 4800 series GPS (Figures 5 (Maiden Castle) and Figures 10-11 (Sheep Down)).

RESULTS

Graphical summaries of significant geophysical anomalies discussed in the text are identified by the prefixes **[M]** and **[R]** on Figures 12 and 13 for the Maiden Castle and Sheep Down sites respectively.

Maiden Castle

Magnetometer survey (Figures 2, 4a-c and 12)

The magnetometer survey indicates the presence of two quarry ditches to either side of the long barrow mound in the form of broad, but relatively weak, positive linear magnetic

anomalies **[MI-2]**. The side ditches are open towards the southern or frontal end of the long barrow, but appear to be closed off by a short curvilinear disjointed section of ditch **[M3]** to the north. Unlike the side ditches of some other trapezoidal form long barrows, the magnetic anomalies at Maiden Castle do not appear to become appreciably wider towards the frontal end of the barrow.

The magnetic response to the quarry ditch at **[M2]** on the downhill side of the barrow is weaker than **[M1]** on the up-slope side (Figure 4b). This variation may be due to plough erosion and natural weathering of less magnetic chalky material from the barrow mound into the hollow of the ditch on the down-slope side (see earth resistance data below). The mound of the barrow is not visible in the magnetic data, presumably because it is constructed from weakly magnetic chalk. The overall extent of the monument would appear to be 30m long by 22m wide. To the south and southwest of the barrow, close to the modern field boundaries and a series of modern tracks, considerable quantities of ferrous debris have given rise to a disturbed magnetic response in this area.

Earth resistance survey (Figures 3, 4d-f, 5 and 12)

The ditches identified in the magnetic data [MI-3] (above) are replicated in the earth resistance data as linear low resistance anomalies [RI-3], with a similar more pronounced response [RI] occurring on the south-west (uphill) side of the barrow. There is an increased response over the barrow mound including two discrete high resistance anomalies [R4 and 5] towards the wider frontal south end of the barrow, perhaps indicative of internal mortuary structures. A further spread of increased resistance [R6], to the north and east beyond the raised barrow and ditches, may possibly suggest slumping or erosion of the chalk mound in this direction. The underlying sloping topography in this direction is apparent in the DTM displayed in Figure 5.

A pair of weak localised low resistance anomalies **[R7]** are found to the south east and may be indicative of further pit or quarry type features associated with the long barrow, although these do not appear within the magnetic data. A narrow low resistance linear anomaly **[R8]** running on an east-west alignment immediately north of the long barrow may be of archaeological significance. There is no equivalent response to **[R8]** in the magnetic data to suggest the presence of a ditched feature, such as a boundary earthwork ,and it is therefore most likely that **[R8]** is geological or related to cultivation activity.

Sheep Down

Magnetometer survey (Figures 7, 9a-b and 13)

The magnetic response recorded at Sheep Down was poor and only one tentative positive anomaly **[M4]** was detected around the outer perimeter of the barrow mound. In contrast to the Maiden Castle barrow there are no obvious magnetic anomalies due to any side ditches flanking the mound.

Earth resistance survey (Figures 8, 9c-e, 10, 11 and 13)

The earth resistance data also contains no evidence for the presence of any side ditches, although the survey has detected a weak curvilinear high resistance anomaly **[R9]** running

around the entire base of the barrow mound that suggests dimensions of 57m long by 35m wide for the monument. This may, perhaps, indicate the presence of a *peristalith* or stone kerb feature as found at some of the South Dorset long barrows such as the Grey Mare and her Colts, Long Bredy that incorporate megalithic stone chambers (Royal Commission on Historical Monuments (England) 1952). Another possible explanation could be a plough headland against the edge of the barrow mound causing a sharp break in topography that may have influenced the local resistance readings. The draped image of the earth resistance data over the DTM indicates that the enclosing high resistance curvilinear anomaly runs around the base or edges of the barrow mound (Figure 11).

A high resistance anomaly **[R10]** is found towards the eastern end of the barrow and may, possibly, be indicative of a stone burial chamber similar to the structures found at the nearby Grey Mare and Hell Stone megalithic barrows (Royal Commission on Historical Monuments (England) 1952; 1970). Further high resistance linear anomalies **[R11-12]** to the north-east may be related to **[R10]**, but are more likely to represent separate enclosure or field boundaries or even an additional structure adjoining the mound associated with later land use. Linear trends **[R13]** within the high resistance response over the mound emphasized by the high pass filtering (Figure 9(e)) appear to continue beyond the extent of the barrow suggesting that they are a product of ploughing or periglacial striping rather than features directly associated with the barrow structure.

CONCLUSIONS

The geophysical surveys have successfully detected evidence at both of the long barrows to provide an enhanced level of interpretation and information to support their future management. The magnetic and earth resistance results from Maiden Castle suggest a typical earthen long barrow of trapezoidal form with side quarry ditches diverging towards the frontal end of the monument, but with an additional ditch curving around to the rear of the barrow. In contrast, the geophysical results from Sheep Down appear to indicate a megalithic type structure, rather than an earthen long barrow, and this might well explain the apparent absence of side ditches together with the evidence for a possible stone peristalith and internal chamber revealed by the earth resistance survey. A stone chambered barrow at Sheep Down would also not be out of place in terms of both the local distribution pattern of these monuments (the Grey Mare and the Hell Stone are only 2.5 and 1.5km away respectively) and proximity to an obvious source of local sarsen in the Valley of Stones (NGR SY 597875).

An alternative interpretation of the geophysical results from Sheep Down, advanced on the basis of the unusual shape of the anomaly enclosing the perimeter of the mound (Hazel Riley, *pers. comm.*) is that this may represent two conjoined round barrows or a double round barrow. However, this would not easily explain the geophysical evidence suggesting the presence of an internal chamber at the south-east end of the long mound.

LIST OF FIGURES

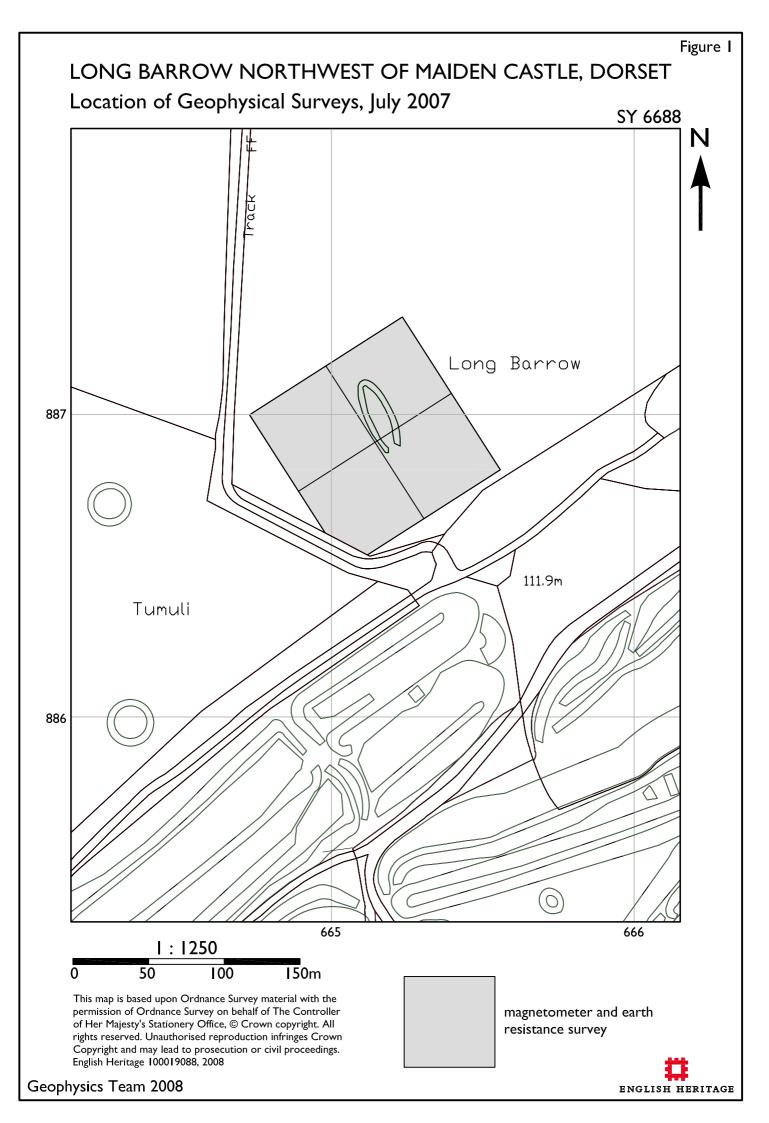
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- *Figure 2* Linear greyscale plot of the Maiden Castle long barrow magnetic survey data after initial drift correction and range truncation (values outside the range -50 to +50 nT/m) superimposed over the base OS map (1:1250).
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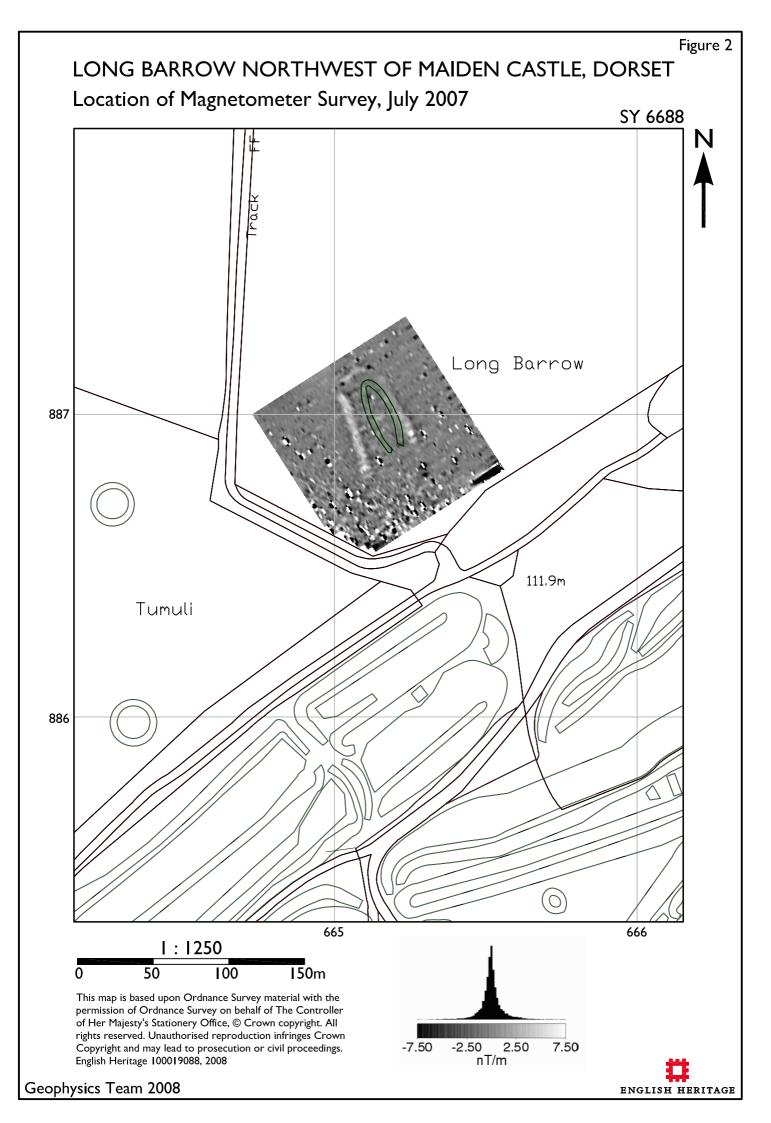
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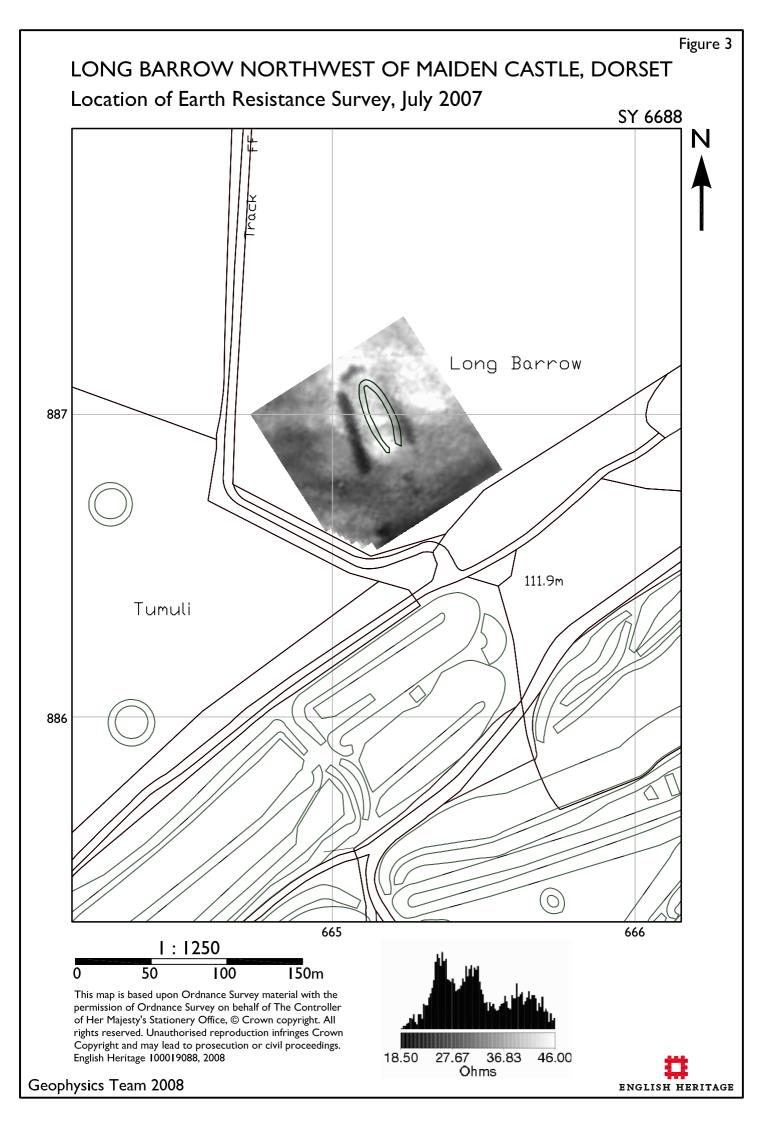
- *Figure 10* Contour plot (a) of the topography at the Sheep Down long barrow together with a DTM of the earthwork (b) viewed at a low elevation angle from the south-east illustrating the position of the barrow on a break of slope.
- *Figure 11* False perspective views of the earth resistance data from Sheep Down draped over the DTM, showing the relationship of the barrow earthwork to the enclosing high resistance curvilinear anomaly around the base of the mound. The data is viewed from a high (a) and low (b) elevation from the south-east.
- *Figure 12* Graphical summary of significant magnetic and earth resistance anomalies detected over the Maiden Castle long barrow site superimposed over the base OS mapping (1:1250).
- *Figure 13* Graphical summary of significant magnetic and earth resistance anomalies detected at the Sheep Down site superimposed over the base OS mapping (1:1250).

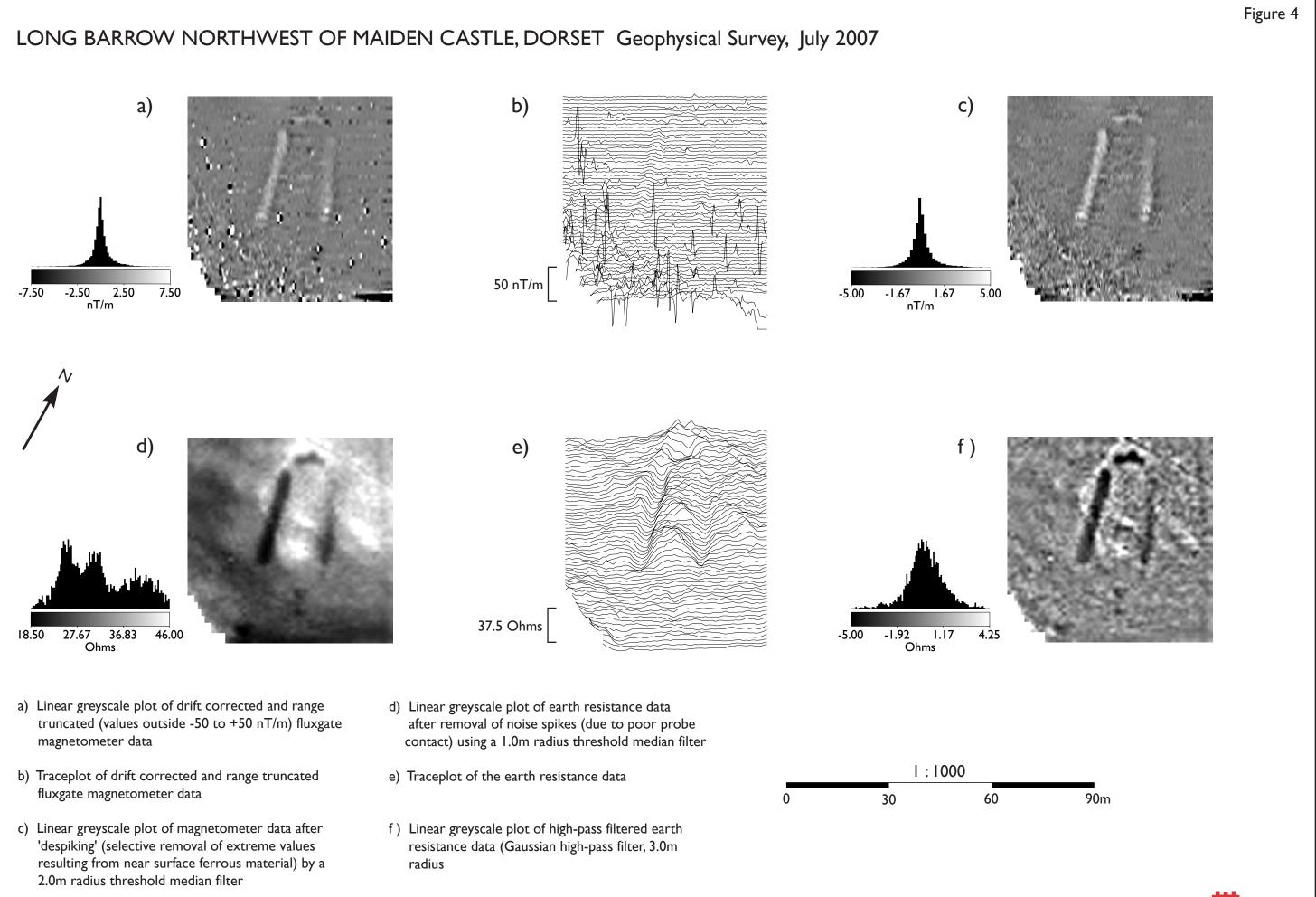
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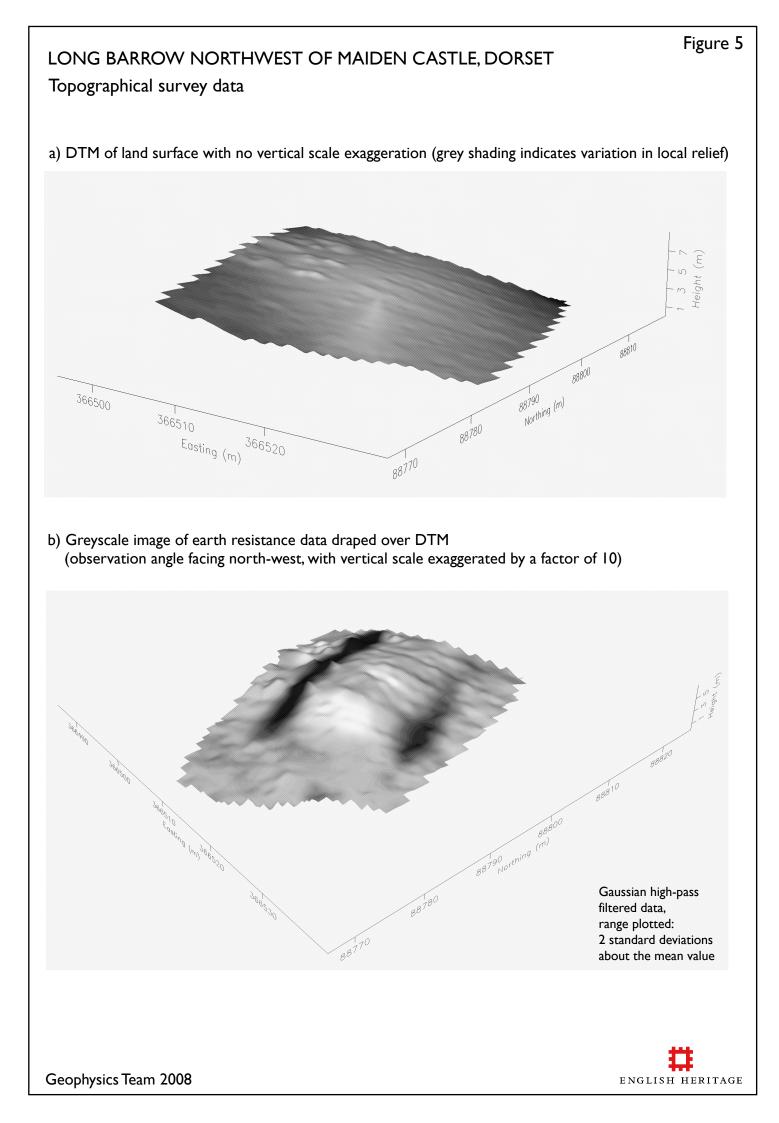


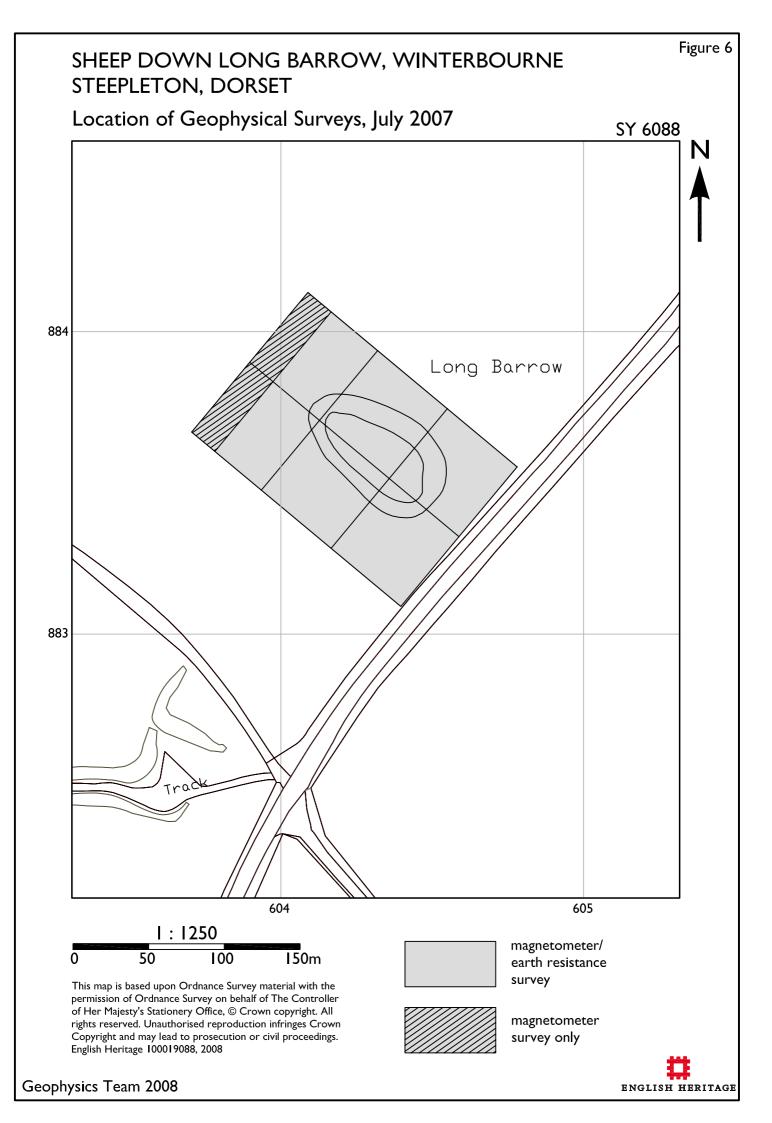


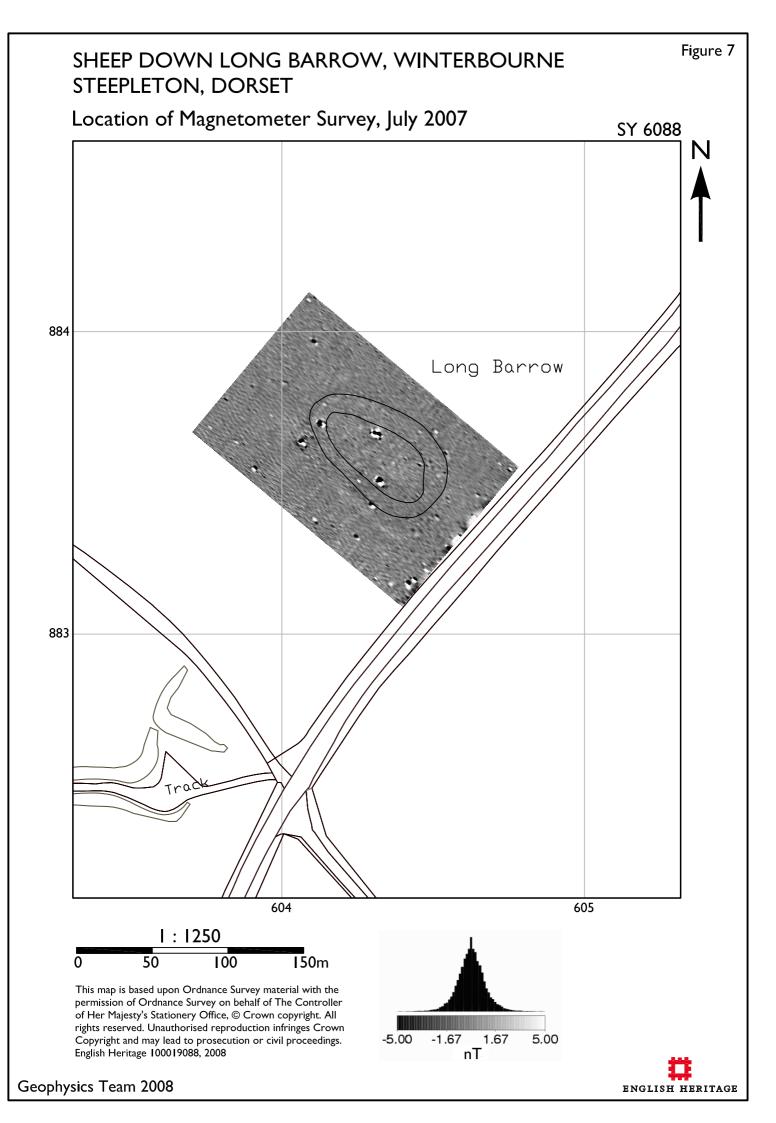


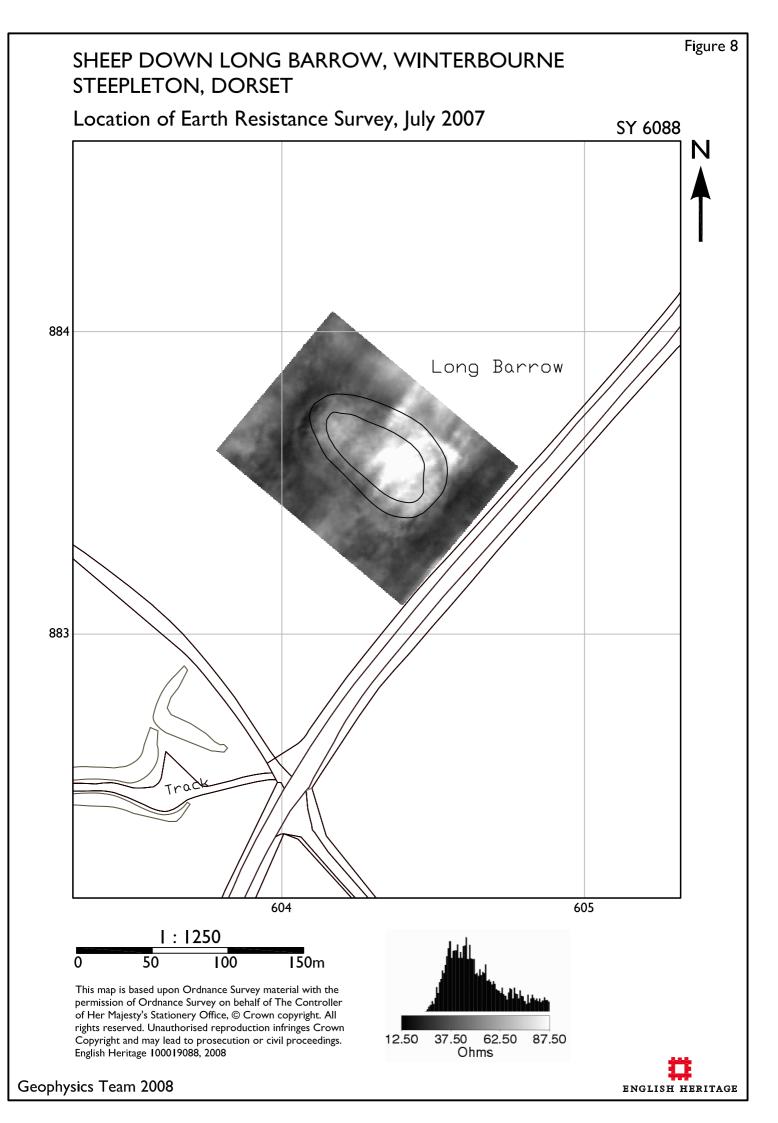


Geophysics Team 2008









SHEEP DOWN LONG BARROW, WINTERBOURNE STEEPLETON, DORSET Geophysical Survey, July 2007

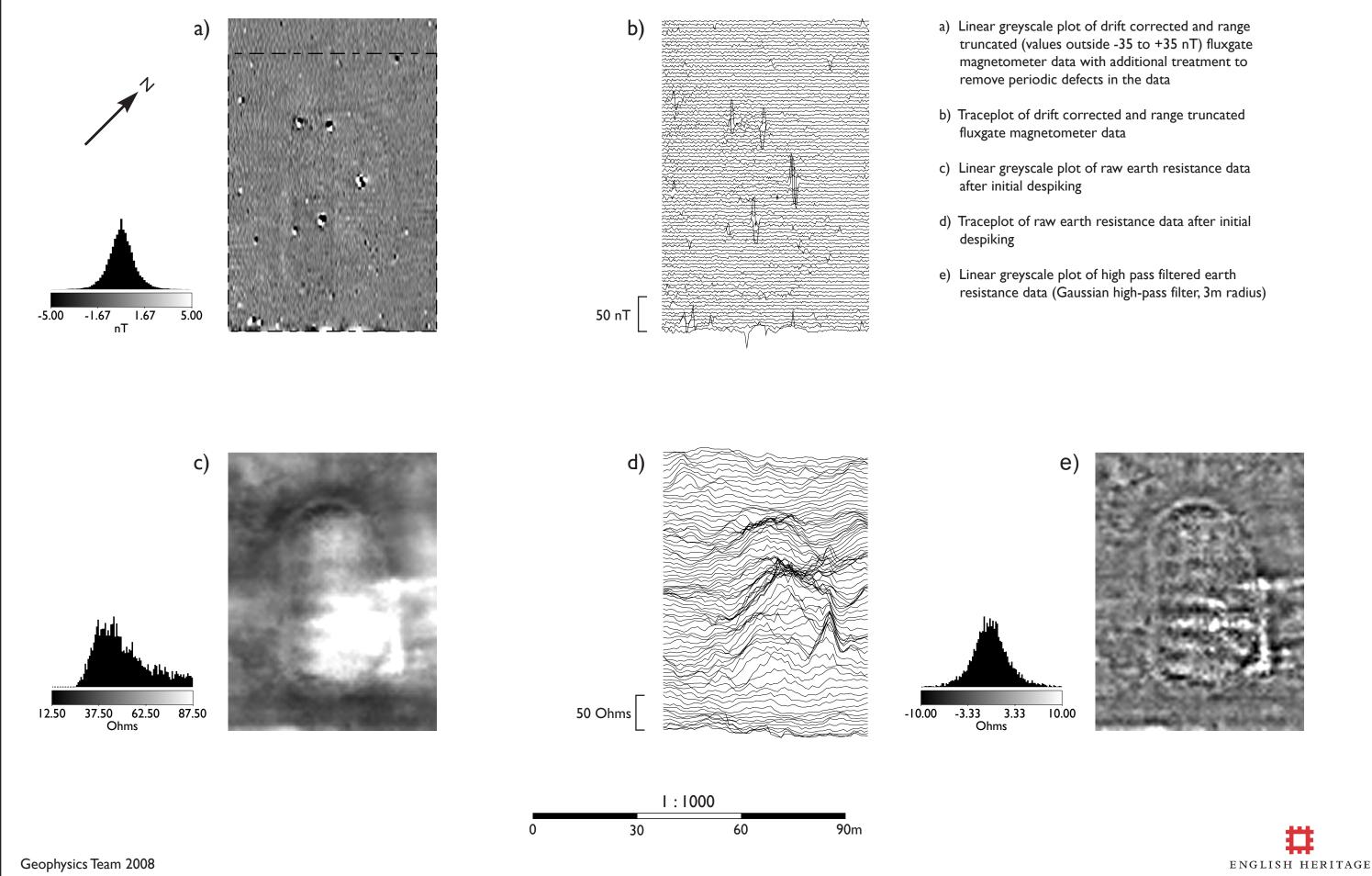
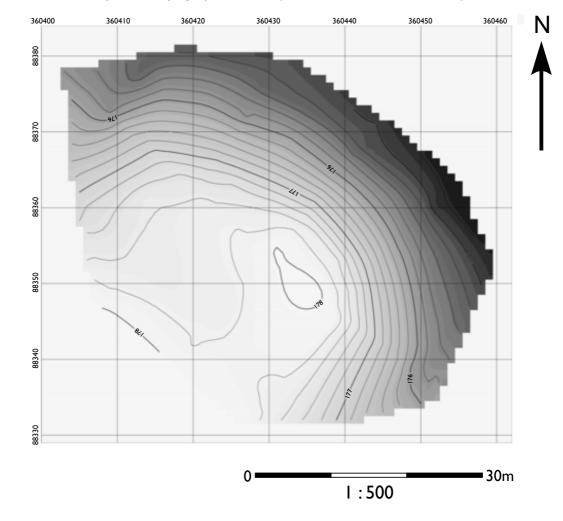
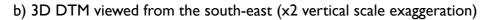


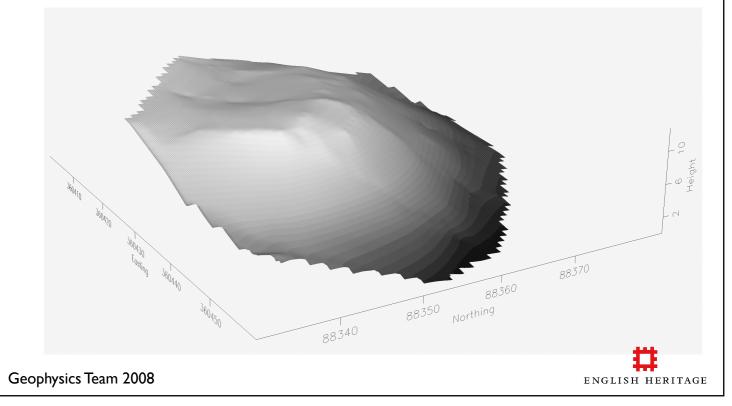
Figure 9

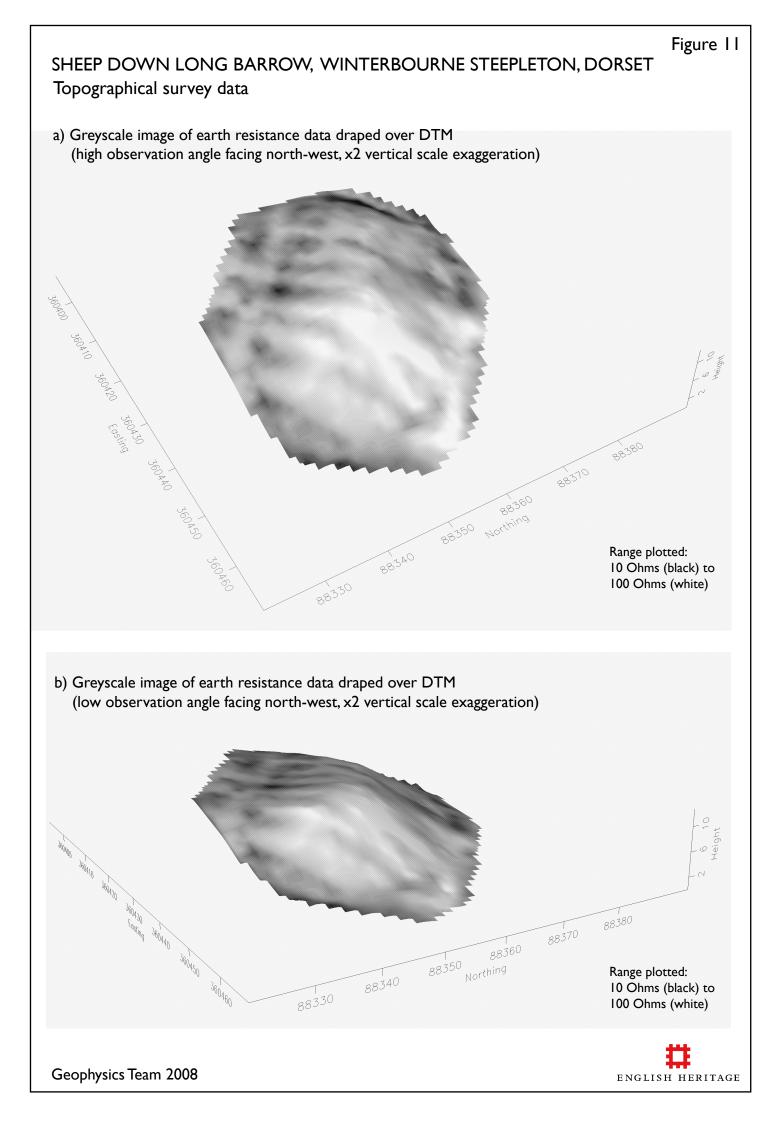
SHEEP DOWN LONG BARROW, WINTERBOURNE STEEPLETON, DORSET Topographical survey data

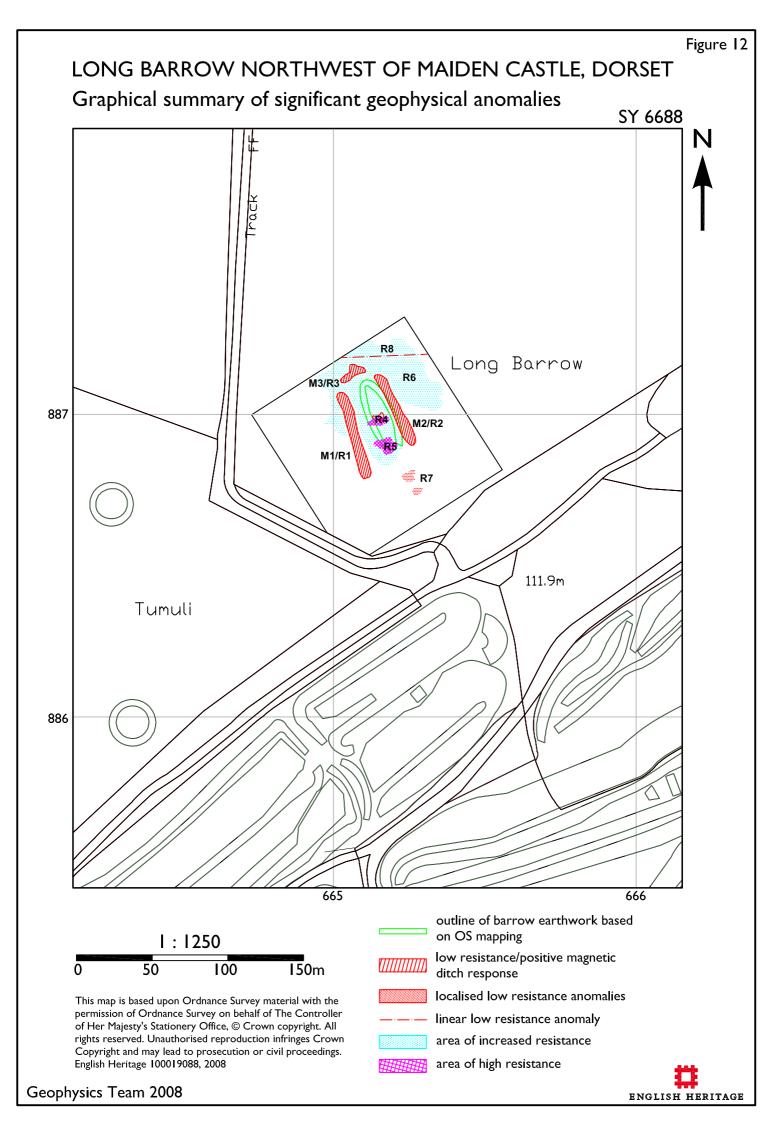


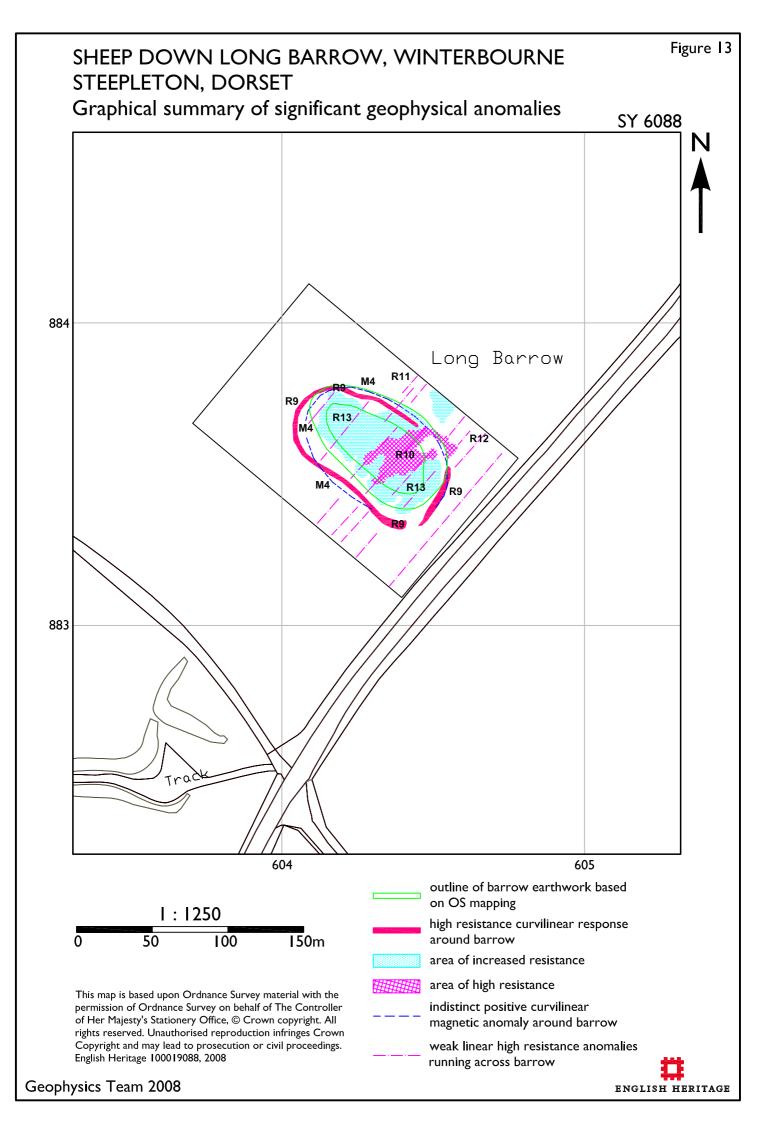
a) Shaded 2D contour plot of topographical data (contours at 0.25m intervals)













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