81/2023

Historic England

Saddlescombe Farm, Newtimber, West Sussex

Report on Geophysical Surveys, September 2023

Andrew Payne and Megan Clements

Geophysics

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Summary

Earth resistance and fluxgate magnetometer surveys were conducted over the earthwork remains of a presumed Medieval settlement in a pasture field south of Saddlescombe Manor in the parish of Newtimber, West Sussex. The surveys were undertaken primarily to provide practical training in the use of archaeological geophysical techniques for volunteers linked to the National Trust led and Lottery Heritage funded Changing Chalk programme. The earth resistance survey (0.8ha) succeeded in mapping both the layout of the Medieval earthworks and additional anomalies within the complex that provide further definition and understanding of the archaeological evidence at Saddlescombe. In contrast, the magnetometer survey (0.8ha) was largely uninformative except for a few very marginal linear responses recorded over parts of the Medieval earthworks that are difficult to interpret with confidence.

Contributors

The geophysical fieldwork and training was conducted and supervised by Andrew Payne and Megan Clements with the assistance of Gary Webster (National Trust Changing Chalk project) working with a group of 17 volunteer trainees from the local area affiliated to the Changing Chalk partnership.

Acknowledgements

The authors are grateful for the help provided by colleagues from the National Trust and the tenant farmer at Saddlescombe Farm in coordinating access for the survey to take place. The cover image shows the complex of earthwork features at Saddlescombe viewed from the east and highlighted in late afternoon low sunlight conditions (photograph taken by Andrew Payne).

Archive location

The full digital project archive is held by the Geophysics Team, Historic England, Fort Cumberland, Fort Cumberland Road, Portsmouth, PO4 9LD.

Date of survey

The fieldwork was conducted between the 26th and 28th September 2023 and the report completed on 30th of November 2023.

Contact details

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Introduction

Earth resistance and fluxgate magnetometer surveys were conducted over the earthwork remains of a presumed Medieval settlement in a pasture field south of Saddlescombe Manor in the parish of Newtimber, West Sussex. The survey was undertaken primarily to provide practical training in the use of archaeological geophysical techniques for volunteers linked to the National Trust led and Lottery Heritage funded Changing Chalk programme. Changing Chalk includes a contribution from Historic England to supply training in specialist archaeological skills to members of the local community to help enable local active participation in heritage research and conservation in the part of the South Downs north of Brighton and west of Eastbourne (Payne 2023). The survey addresses Historic England corporate plan objective 2.5 “Expand engagement programmes which support under-represented communities to explore and share their heritage, creating more equitable opportunities for active involvement and participation with heritage” primarily falling under National Research Framework Theme 12: Public Engagement and Active Participation.

The earthwork remains at Saddlescombe (NRHE Monument Polygon 399218) extend over an area of about 2.5ha and consist of a series of terraces, platforms and sunken roadway features located on the slopes bordering a narrow dry valley or combe surrounded by higher chalk down-land. A hachured survey of the earthwork evidence was previously carried out by Archaeology South-East in 2002 (Johnson 2002) also shown in Figure 7 this report. The form of the earthworks is characteristic of an abandoned Medieval settlement indicating that the occupation at Saddlescombe was formerly more extensive. A previous, more limited, geophysical survey was also undertaken in 2013 (Dommett 2013).

The aim of the geophysical survey was to investigate the core area of the earthworks for traces of associated sub-surface archaeological evidence, such as structural remains of buildings or walls, that might not have a topographic expression, together with responses associated with the corresponding surface features.

The underlying geology at Saddlescombe consists of Cretaceous Upper and Middle Chalk undivided (or New Pit Chalk formation) with superficial head deposits recorded in lower lying valley bottom areas (British Geological Survey 1984). Soils are of the UPTON 1 association (map key 343h) defined as shallow well drained calcareous silty soils over chalk with deeper fine silty calcareous soils in combes and dry valleys (Soil Survey of England and Wales 1983). Weather conditions during the survey were generally dry and bright with some occasional light rain showers.

Method

Earth resistance survey

The earth resistance survey was conducted over a series of 30m grid squares set out to cover the central part of the complex of earthworks (Figure 1). The grid was established with a Trimble R8s series Global Navigation Satellite System (GNSS) using a base station receiver adjusted to the National Grid Transformation OSTN15 using the Trimble VRS Now Network RTK delivery service. This uses the Ordnance Survey's GNSS correction network (OSNet) and gives a stated accuracy of 0.01-0.015m per point with vertical accuracy being half as precise. Readings were collected at 1.0m intervals along traverses spaced 1.0m apart using a Geoscan RM15 resistance meter and a PA5 electrode frame in the 0.5m twin electrode configuration.

The earth resistance data is presented as a linear greyscale image superimposed over the Ordnance Survey (OS) mapping in Figure 2 after minimal post acquisition processing including the application of a 2m radius threshold median filter to remove occasional extreme readings caused by poor probe contact (Scollar *et al.* 1990, 492). A trace plot and greyscale images of the minimally processed and high-pass filtered data are presented in Figures 4(A), 4(B) and 4(C) respectively.

Magnetometer survey

Magnetometer data was collected over the same 30m grid squares used for the earth resistance survey and was carried out using a Geoscan FM36 fluxgate gradiometer with readings recorded on the 0.1 nanotesla (nT) resolution setting at 0.25m intervals along successive parallel traverses spaced 1.0m apart (Figure 1).

A linear greyscale image of the magnetometer data is presented in Figure 3 in superimposed over the OS mapping after minimal post acquisition processing including the suppression of any effects due to directional sensitivity and instrumental drift, by the setting of each traverse to a zero mean. Minimally processed versions of the magnetic data are shown as a trace plot in Figure 4(D) after truncation of extreme values outside the range of ±75 nT, and as a greyscale image in Figure 4(E).

Results

Earth Resistance Survey

A graphical summary of significant earth resistance anomalies [**r1-13]** discussed in the following text superimposed on the base OS mapping data is provided in Figure 5.

A pair of linear low resistance anomalies [**r1**], typical of bounding ditches, are found to the south of the survey area and correspond with the linear surface depression forming the main axial roadway through the earthwork complex. To the north in the lower lying part of the site towards Saddlescombe Manor the response to the roadway changes to a single broader higher resistance anomaly [**r2**] characteristic of a metalled or stone surfaced road. A further high resistance roadway anomaly [**r3**] joins [**r2**] from the west and again corresponds with a linear earthwork depression. A further possible roadway or linear embankment, detected as a broad high resistance linear anomaly at [**r4**], intersects and probably terminates at the roadway [**r1**] and [**r2**].

To the south of [**r4**] following a similar WSW-ENE alignment a probable low resistance boundary ditch [**r5**] appears to be cut by the main roadway [**r1**] and [**r2**] and may, therefore, be indicative of an earlier enclosure system. The linear ditch [**r5**] appears to turn sharply to the north-west to the west of [**r1**] and [**r2**] suggesting part of an enclosure or field system, but the response becomes very weak and indistinct at this point.

A rectilinear high resistance response [**r6**] is found immediately to the south of [**r3**], possibly defining a walled or embanked enclosure constructed in the angle of the two intersecting roadways [**r2**] and [**r3**], that may contain a partially resolved building structure [**r7**] although coverage was interrupted by the presence of tall nettles. A secondary sub-division of enclosure [**r6**] may be present as a weak high resistance response at [**r8**].

A narrow linear high resistance response at [**r9**] extends south from enclosure [**r6**] and may represent either a further sub-dividing boundary of the enclosure system or, perhaps, a water supply conduit of uncertain age. Higher upslope from the valley bottom, anomaly [**r9**] appears to cut through a series of broad but relatively weak parallel ESE-WNW aligned high resistance linear responses [**r10**] that may represent cultivation terraces.

Lower values of background resistance are found in the base of the valley to the north-east of the survey area where the earthworks suggest a series of former ponds or evidence for water management with one oval shaped depression vaguely resolved as a lower resistance anomaly at [**r11**]. A series of strongly resolved segmented high resistance anomalies [**r12**] may indicate further evidence for water management with potential similar examples known from earth resistance anomalies in chalkland water meadows near Silbury Hill in Wiltshire (Linford *et al.* 2009; Crosby and Hembrey 2011).

Anomaly [**r12**] abuts a pronounced earthwork embankment along the valley edge to the south where a rectilinear area of high resistance responses [**r13**] may indicate the presence of fragmentary building remains. It is possible that [**r13**] relates to water management in the valley bottom or a building terraced into the base of the southern valley slopes.

Magnetometer Survey

A graphical summary of significant magnetic anomalies [**m1**-**3**] discussed in the following text superimposed on the base OS mapping data is provided in Figure 6.

A mixed, noisy, magnetic response [**m1**] is observable over the southern section of the roadway [**r1**]. Poorly resolved linear positive responses [**m2**] are also present that possibly relate to ditched enclosure boundaries, but these are insufficiently clear to interpret with confidence and do not appear to correspond with the earth resistance survey. A strong positive and negative linear anomaly [**m3**] is a response to a probable electricity cable trending NW-SE through the northern part of the survey area approximately parallel to the modern farm track, potentially connecting to the pylon in the boundary of the field to the south.

Conclusions

The earth resistance survey succeeded in mapping both the layout of the Medieval earthworks, including roadways, ditches, scarps and a pond basin together with additional geophysical anomalies indicative of subsurface enclosures, possible building remains and a previously unrecognised segmented boundary, perhaps used for water management (Figure 7). With the exception of a weak but noisy response to the southern section of the main sunken roadway feature, the magnetometer survey was largely uninformative due to an apparent lack of magnetic contrast between the Medieval settlement activity and the natural soils on the site. This appears to be the case for both upstanding earthworks and anomalies due to subsurface features detected by the earth resistance survey. Some very marginal linear magnetic responses were recorded over limited parts of the Medieval earthworks, but these are extremely weakly defined and therefore difficult to interpret with any confidence.

Extending the current earth resistance coverage over and beyond the entirety of the earthwork remains is recommended to better explore their relationship with the complex of standing buildings around the site of Saddlescombe Manor. Based on positive feedback received from the group of volunteer trainees it is hoped that the current survey will help to enable on-going research at the site to further contribute to the Changing Chalk programme.

List of Enclosed Figures

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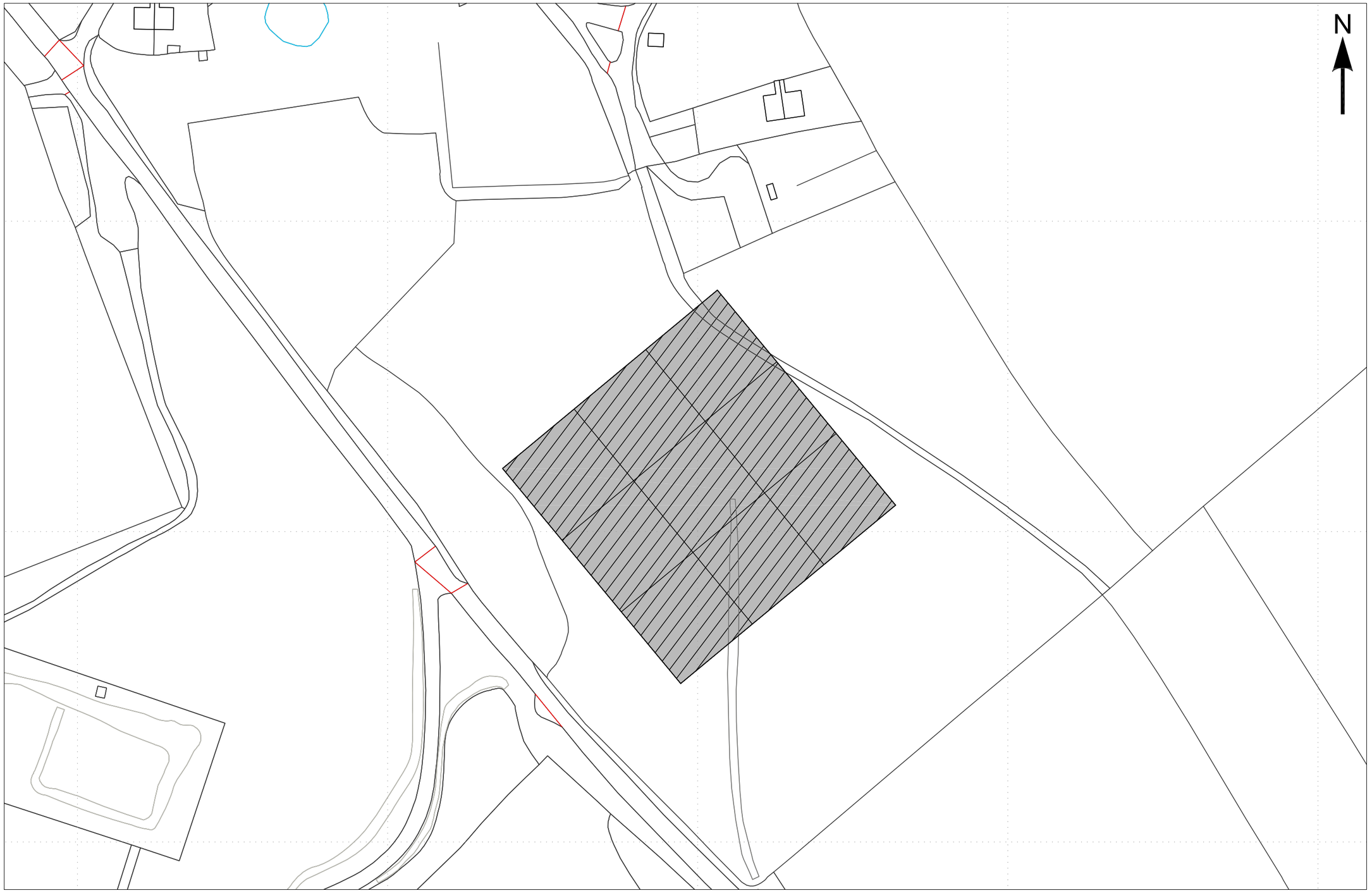
Figure 1

SADDLESCOMBE FARM, NEWTIMBER, WEST SUSSEX
Location of geophysical surveys, September 2023



0 90m

1:1250

Earth resistance survey

Magnetometer survey

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Figure 2

SADDLESCOMBE FARM, NEWTIMBER, WEST SUSSEX

Location of earth resistance survey, September 2023

TQ2711

N

114

113

112

271

272

273

274

275

20.00 27.33 34.67 42.00
ohms

0 90m

1:1250

National Trust Changing Chalk

Historic England

Figure 3

SADDLESCOMBE FARM, NEWTIMBER, WEST SUSSEX
Location of fluxgate magnetometer survey, September 2023

TQ2711

N

114

113

-5.00 -1.67 1.67 5.00
nT

271 272 273 274 275

0 90m

1:1250

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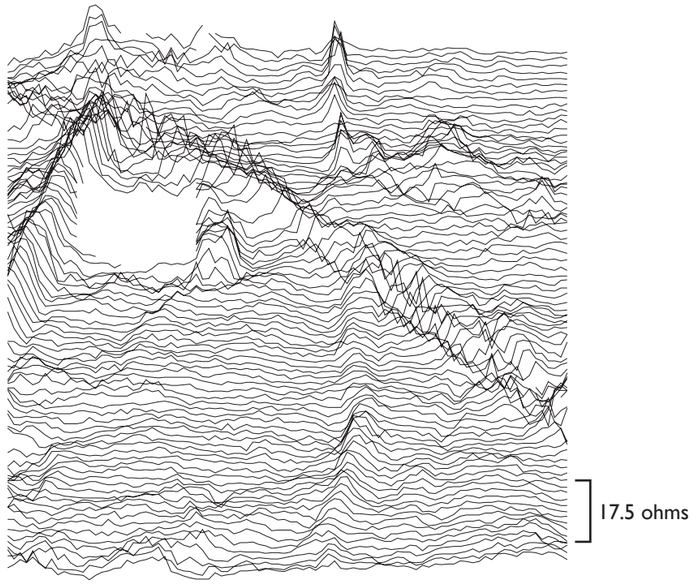
Figure 4

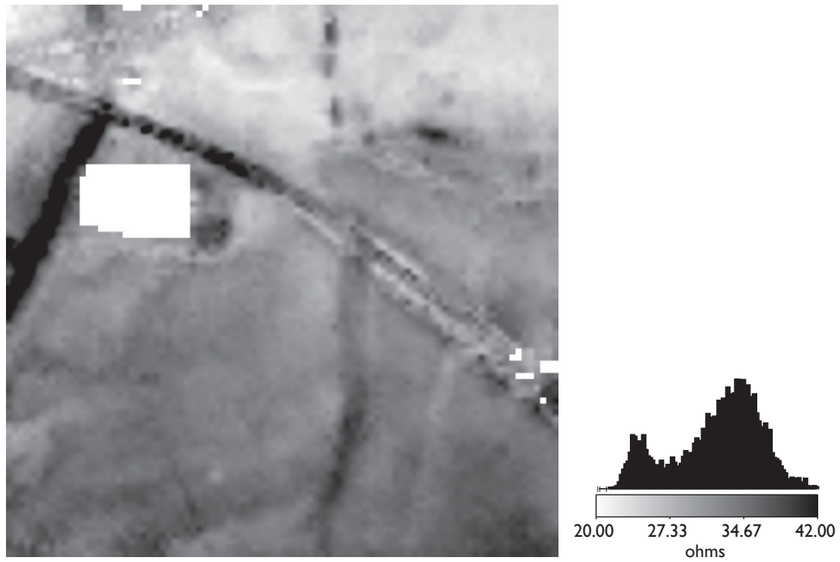
SADDLESCOMBE FARM, NEWTIMBER, WEST SUSSEX
Earth resistance and magnetometer surveys, September 2023

Earth resistance data

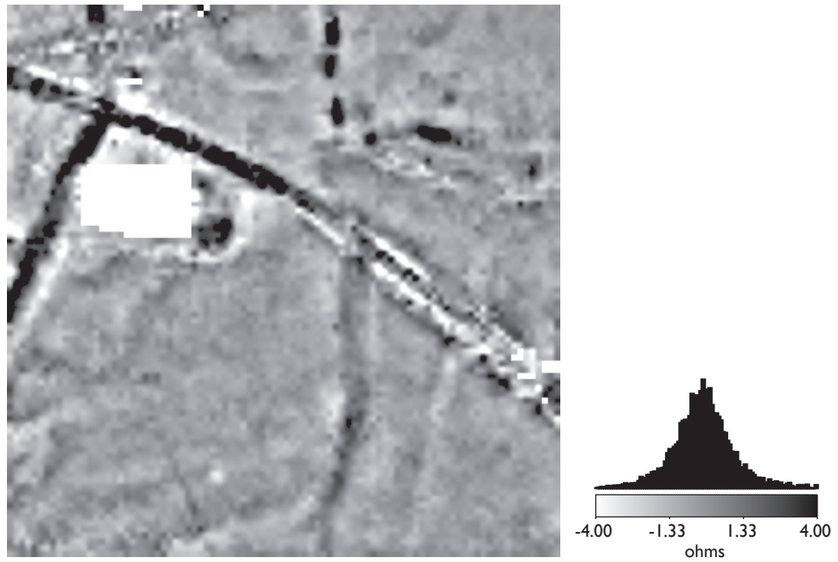
(A) Trace plot of minimally processed data



(B) Linear greyscale image of minimally processed data

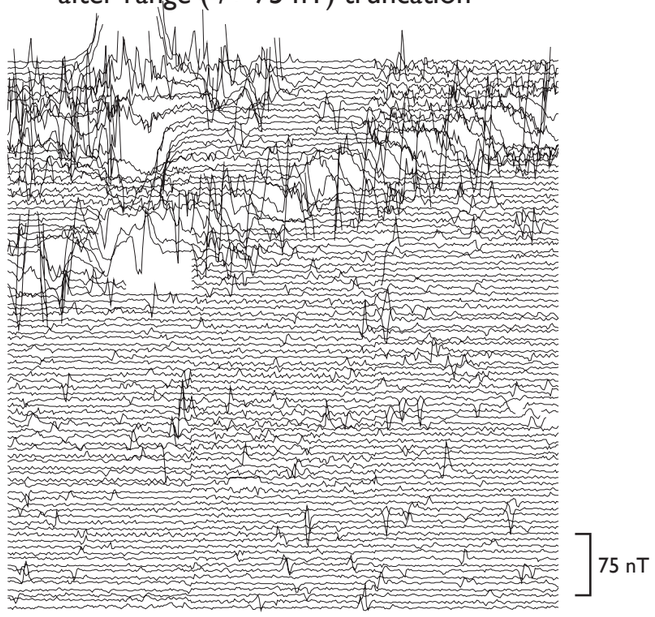


(C) Linear greyscale image of high-pass filtered data

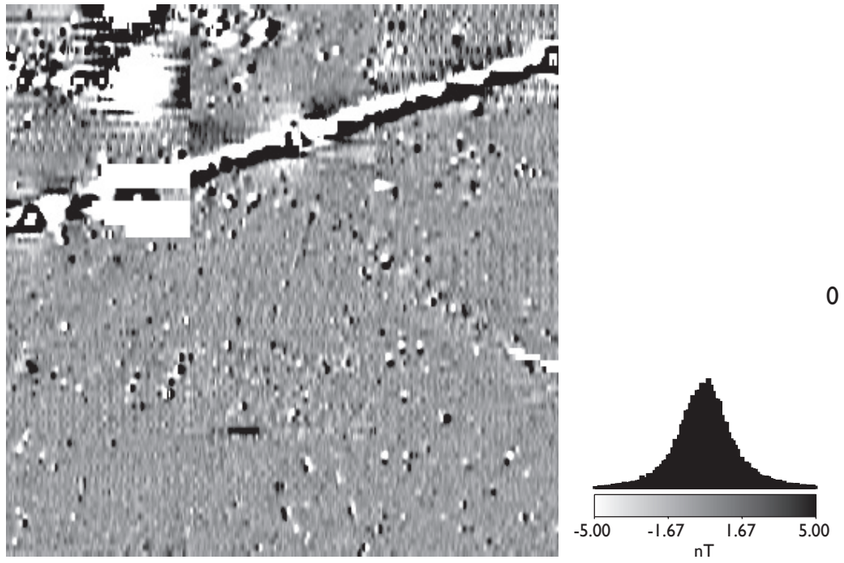


Fluxgate magnetometer data

(D) Trace plot of minimally processed data after range (-/+ 75 nT) truncation



(E) Linear greyscale image of minimally processed data



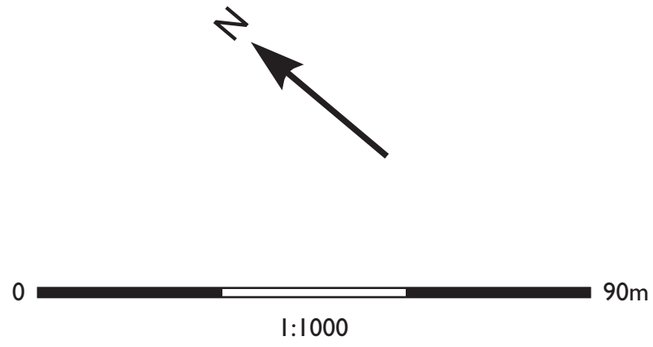


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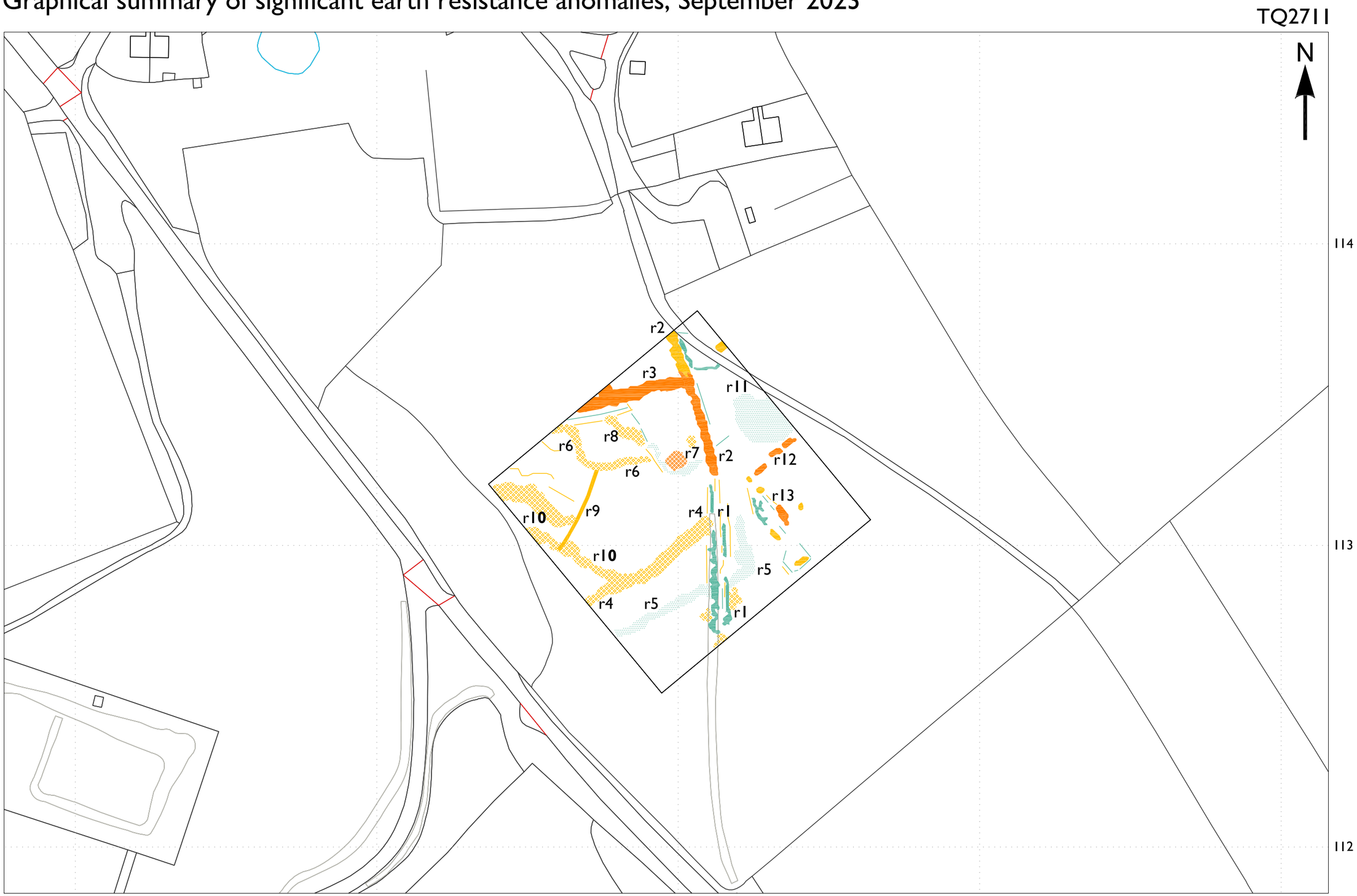
Figure 5

SADDLESCOMBE FARM, NEWTIMBER, WEST SUSSEX

Graphical summary of significant earth resistance anomalies, September 2023



0 90m

1:1250

very high resistance

high resistance

low resistance

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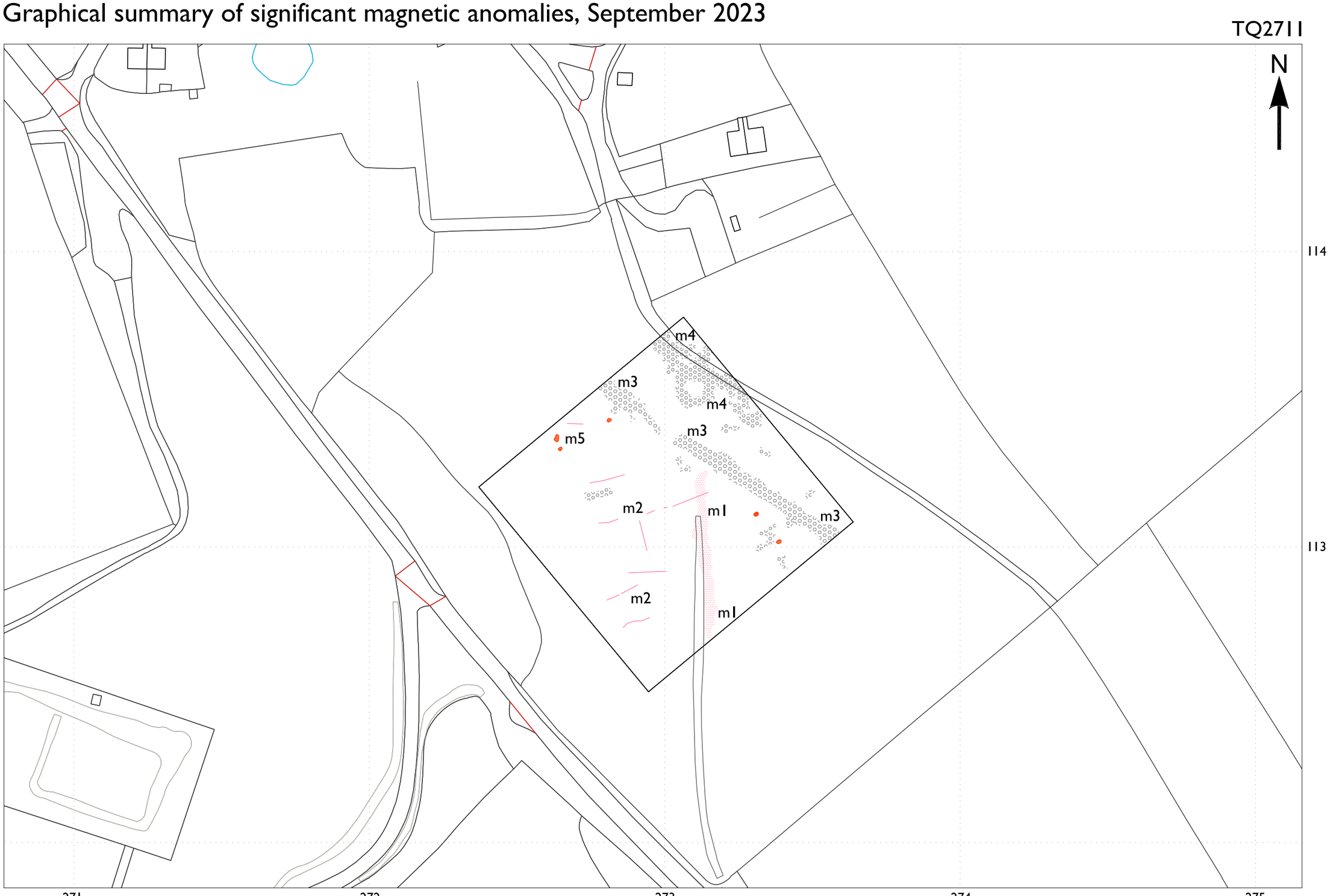
Figure 6

SADDLESCOMBE FARM, NEWTIMBER, WEST SUSSEX

Graphical summary of significant magnetic anomalies, September 2023



0 90m

1:1250

positive magnetic

raised magnetic

magnetic noise

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Figure 7

SADDLESCOMBE FARM, NEWTIMBER, WEST SUSSEX

Graphical summary of significant earth resistance anomalies superimposed over earthwork plan

TQ2711

N

114

113

112

271

272

273

274

275

r1 r2 r3 r4 r5 r6 r7 r8 r9 r10 r11 r12 r13

Earthwork survey plan reproduced by permission of Archaeology South-East

0 90m

1:1250

very high resistance

high resistance

low resistance

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