



# Silchester Environs Project, Wood Farm Dyke, Silchester, Hampshire Report on Geophysical Survey, July 2015

Neil Linford, Paul Linford and Andrew Payne

Discovery, Innovation and Science in the Historic Environment



SILCHESTER ENVIRONS PROJECT,  
WOOD FARM DYKE,  
SILCHESTER, HAMPSHIRE

REPORT ON GEOPHYSICAL SURVEY,  
JULY 2015

Neil Linford, Paul Linford and Andrew Payne

NGR: SU 630 609

© Historic England

ISSN 2059-4453 (Online)

*The Research Report Series incorporates reports by the expert teams within the Investigation & Analysis Division of the Heritage Protection Department of Historic England, alongside contributions from other parts of the organisation. It replaces the former Centre for Archaeology Reports Series, the Archaeological Investigation Report Series, the Architectural Investigation Report Series, and the Research Department Report Series.*

*Many of the Research Reports are of an interim nature and serve to make available the results of specialist investigations in advance of full publication. They are not usually subject to external refereeing, and their conclusions may sometimes have to be modified in the light of information not available at the time of the investigation. Where no final project report is available, readers must consult the author before citing these reports in any publication. Opinions expressed in Research Reports are those of the author(s) and are not necessarily those of Historic England.*

*For more information write to [Res.reports@HistoricEngland.org.uk](mailto:Res.reports@HistoricEngland.org.uk)  
or mail: Historic England, Fort Cumberland, Fort Cumberland Road, Eastney, Portsmouth  
PO4 9LD*

## SUMMARY

A vehicle towed caesium magnetometer survey was conducted at Wood Farm Dyke, Silchester, Hampshire, as part of the University of Reading Silchester Environs Project. The site is close to a well preserved section of linear earthwork, forming part of an extensive system lying to the south and west of Calleva thought to be associated with the town's Iron Age precursor. The aim of the survey was to identify potential occupation activity, or other significant anomalies, associated with the linear earthwork in advance of intrusive investigations to recover dating evidence, and investigate the construction and use of these monuments. Results of the magnetic survey (4.3ha) appear to show largely geomorphological responses, indicative of river channel sediments, running 100m to the west approximately parallel to linear earthwork which may, perhaps, have influenced the positioning of the dyke. A sparse scatter of pit-type anomalies, located west of the river channel, may be of archaeological significance, but do not necessarily suggest a focus of Iron Age or Roman settlement activity.

## CONTRIBUTORS

The geophysical fieldwork was conducted by Neil Linford, Paul Linford and Andrew Payne.

## ACKNOWLEDGEMENTS

The authors are grateful to Oli Lambert of Wood Farm, Silchester, who kindly allowed access for the survey to take place.

## ARCHIVE LOCATION

Fort Cumberland, Portsmouth.

## DATE OF SURVEY

The fieldwork was conducted on the 22<sup>nd</sup> and 24<sup>th</sup> July 2015 and the report completed on 1<sup>st</sup> October 2016. The cover image shows the caesium magnetometer survey in progress with the linear earthwork running under the copse of trees to the right.

## CONTACT DETAILS

Andrew Payne, Geophysics Team, Research Group, Historic England, Fort Cumberland, Fort Cumberland Road, Eastney, Portsmouth PO4 9LD.  
Tel: 02392 856750. Email: [andy.payne@historicengland.org.uk](mailto:andy.payne@historicengland.org.uk)

## CONTENTS

Introduction .....	1
Method .....	2
Results .....	2
Conclusions .....	3
List of enclosed figures.....	4
References .....	4

## INTRODUCTION

A caesium magnetometer survey was conducted at Wood Farm Dyke, Silchester, Hampshire, as part of the Historic England contribution to the Silchester Environs Survey (RASMIS 7226), undertaken in partnership with the University of Reading (Barnett and Fulford 2015). This project aims to investigate the origins and early development of the Iron Age and Roman town at Calleva Atrebatum (Silchester, Hampshire), through a study of prehistoric settlement, activity and agriculture in the hinterland of the Iron Age *Calleva* to address the local context for the emergence of the *oppidum*.

The geophysical survey component of the project aims to test the magnetic and Ground Penetrating Radar (GPR) response over the varying gravel, clay and chalk geologies of the Silchester area, using a vehicle towed high sensitivity caesium vapour magnetometer array together with a high sample density multi-channel GPR system. It is hoped that this will complement the extensive fluxgate magnetometer and GPR coverage conducted by the University of Reading, particularly where the geophysical response has proved indistinct. Trial sites for ground based survey have been identified from aerial photography and lidar coverage within the project area (Figure 1), including the plough truncated remains of long, linear earthwork banks crossing the landscape where these survive in areas of woodland and may extend into the surrounding farmland (Linford 2015).

The aim of the geophysical survey was to investigate a linear earthwork, which survives well between Churchlane Copse and Early Bridge Copse, in the immediate vicinity of the well-preserved central section (NGR SU 6319 6095; SAM 1011956) surviving in a belt of tree cover south of Byes Lane, before it terminates abruptly on steeper ground north of the Silchester Brook. It was hoped that the survey might identify activity associated with the linear earthwork in advance of excavation to obtain archaeological and environmental evidence and better understand the construction and use of the monuments, and how they might contribute to territorial division and defence of the pre-Roman landscape.

The site is situated on Tertiary London Clay Formation (clay, silt and sand) deposits over which fine and coarse loamy over clayey soils of the Wickham 3 Association have developed (Geological Survey of Great Britain 1974; Soil Survey of England and Wales 1983). The field was under grass at the time of the survey and weather conditions during the field work were marred latterly by persistent rain.

## METHOD

The magnetometer data was collected along the instrument swaths shown on Figure 2 using an array of six high sensitivity Geometrics G862 caesium vapour magnetometer sensors mounted on a non-magnetic sledge. This sledge was towed behind a low impact, All Terrain Vehicle (ATV) which also provided the power supply and housed the data logging electronics. Five of the sensors were mounted in a linear array transverse to the direction of travel 0.5m apart and, vertically, ~0.2m above the ground surface. The sixth was fixed 1.0m directly above the central magnetometer in the array to act as a gradient sensor. The sensors were set to sample at a rate of 16Hz based on the typical average travel speed of the ATV (3.2m/s) giving a sampling density of ~0.2m by 0.5m along successive swaths. Each swath was separated from the last by approximately 2.5m, navigation and positional control being achieved using a Trimble R8 Global Navigation Satellite System (GNSS) receiver mounted on the sensor platform 1.75m in front of the central sensor and a second R8 base station receiver established using the Ordnance Survey VRS Now correction service. Sensor output and survey location was monitored during acquisition to ensure data quality and minimise the risk of gaps in the coverage due to the use of a grid-less system.

After data collection the corresponding readings from the gradient sensor were subtracted from the measurements made by the other five magnetometers to remove any transient magnetic field effects caused by the towing ATV. The median value of each instrument traverse was then adjusted to zero by subtracting a running median value calculated over a 60m 1D window. This operation corrects for slight biases added to the measurements owing to the diurnal variation of the Earth's magnetic field and any slight directional sensitivity of the sensors. A linear greyscale image of the combined magnetic data is shown superimposed over the base Ordnance Survey (OS) mapping on Figure 3 and minimally processed versions of the range truncated data ( $\pm 75\text{nT/m}$ ) are shown as a traceplot and a histogram equalised greyscale image on Figures 4 and 5 respectively.

## RESULTS

A graphical summary of the significant magnetic anomalies, [m1-10] discussed in the following text, is provided in Figure 6.

A series of weak alternating anomalies [m1-5] are interpreted as geomorphological responses, possibly related to a former river or drainage channels feeding into the Silchester Brook, running approximately parallel to the linear earthwork 100m to the east. It is possible that there may be a relationship between the position of the linear earthwork and the channels,

particularly to the south of the survey area where these appear to converge, but unfortunately access was prevented here by restrictions of modern land use.

A sparse scatter of pit-type anomalies [**m6**] to the west of the river channel may be indicative of limited archaeological activity and these are, perhaps, associated with some tentative, possibly natural, weak linear responses [**m7**]. Other localised positive anomalies [**m8-10**] fall within the area of the weaker magnetic response from the channel [**m1-4**] and therefore it is unclear if these relate to a natural or more significant archaeological origin.

## CONCLUSIONS

The magnetic results are dominated by geomorphological responses, most likely a river channel forming a tributary to the Silchester Brook, which appear to follow a course that converges with the linear earthwork to the south beyond the area available for survey. Some pit-type anomalies found to the west of the river channel may indicate some limited archaeological activity, but there is no obvious relationship to the linear earthwork or suggestion of any more formal settlement.

## LIST OF ENCLOSED FIGURES

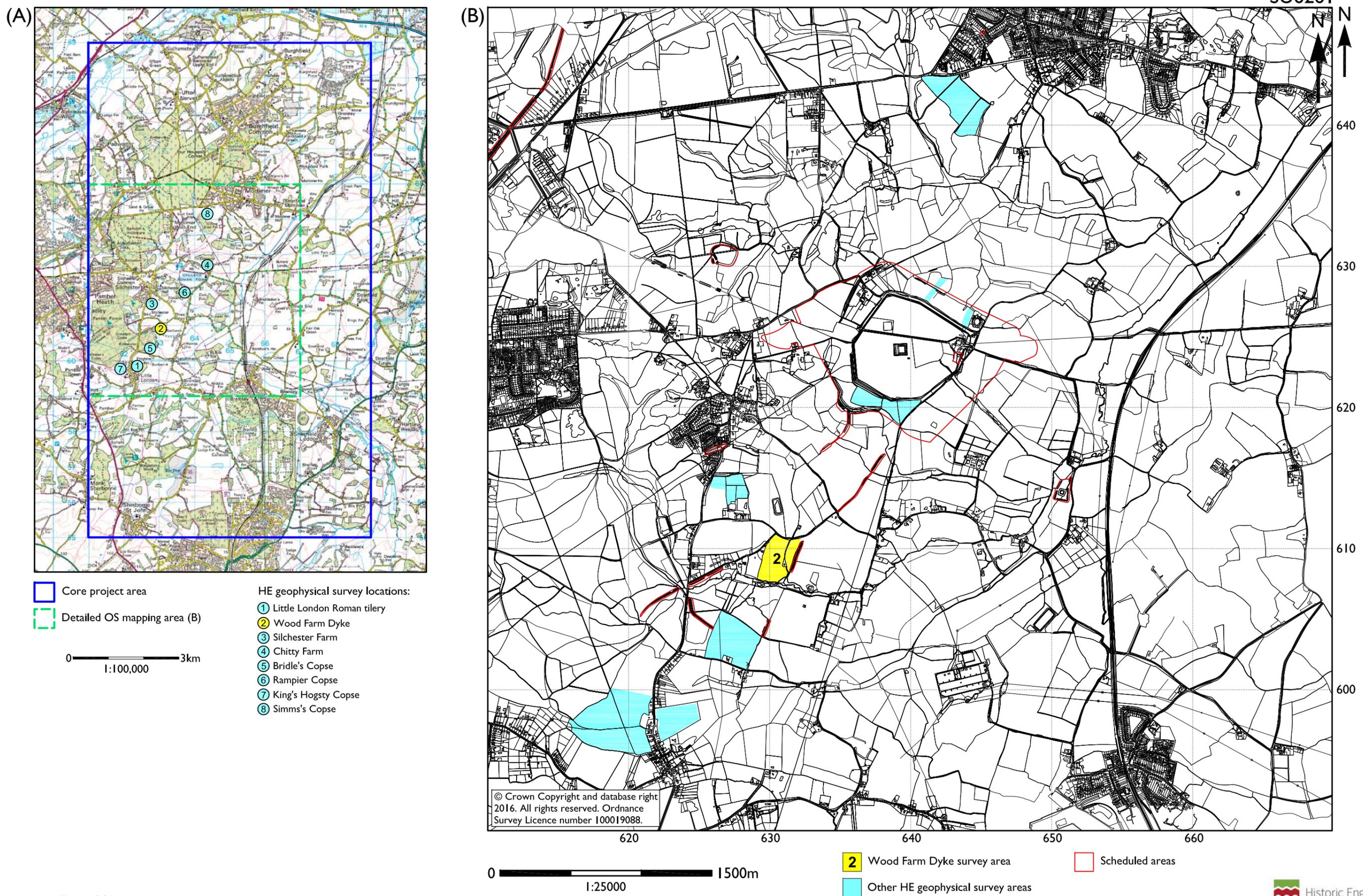
- Figure 1* Location of the geophysical surveys conducted to date as part of (A) the University of Reading core Silchester Environs Project study area (1:100,000) and (B) detail centred on Calleva Roman town (1:25,000).
- Figure 2* Location of the caesium magnetometer instrument swaths superimposed over the base OS mapping data (1:2500).
- Figure 3* Linear greyscale image of the caesium magnetometer data superimposed over base OS mapping (1:2500).
- Figure 4* Traceplot of the magnetic data after initial drift correction and reduction of extreme values outside the range -75 to +75 nT/m. Alternate lines have been removed to improve the clarity (1:1250).
- Figure 5* Equal area greyscale image of the magnetic data after initial drift correction (1:1250).
- Figure 6* Graphical summary of significant magnetic anomalies superimposed over the base OS mapping (1:2500).

## REFERENCES

- Barnett, C and Fulford, M 2015 Between Kennet and Loddon: The Silchester Iron Age Environs Project. Reading, University of Reading, School of Archaeology, Geography and Environmental Science (unpublished project design document).
- Geological Survey of Great Britain 1974 Basingstoke. England and Wales Sheet 284. Solid and Drift Geology, 1:50,000 scale geology map: Ordnance Survey for Institute of Geological Sciences, Southampton.
- Linford, P 2015 7226 Between Kennet and Loddon: The Silchester Environs Survey, HE Geophysical Survey contribution. Portsmouth, Historic England, Research Group (unpublished supplementary project design document).
- Soil Survey of England and Wales 1983 Soils of England and Wales, Sheet 5 - South West England, 1:250,000 scale soil map: Lawes Agricultural Trust, Harpenden.

# SILCHESTER ENVIRONS PROJECT, WOOD FARM DYKE, SILCHESTER, HAMPSHIRE

## Location of survey



# SILCHESTER ENVIRONS PROJECT, WOOD FARM DYKE, SILCHESTER, HAMPSHIRE

## Location of caesium magnetometer instrument swaths, July 2015



© Crown Copyright and database right  
2016. All rights reserved. Ordnance  
Survey Licence number 100019088.

0  90m  
1:2500

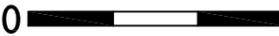
 Caesium magnetometer  
survey swaths  Scheduled areas

# SILCHESTER ENVIRONS PROJECT, WOOD FARM DYKE, SILCHESTER, HAMPSHIRE

## Location of caesium magnetometer survey, July 2015



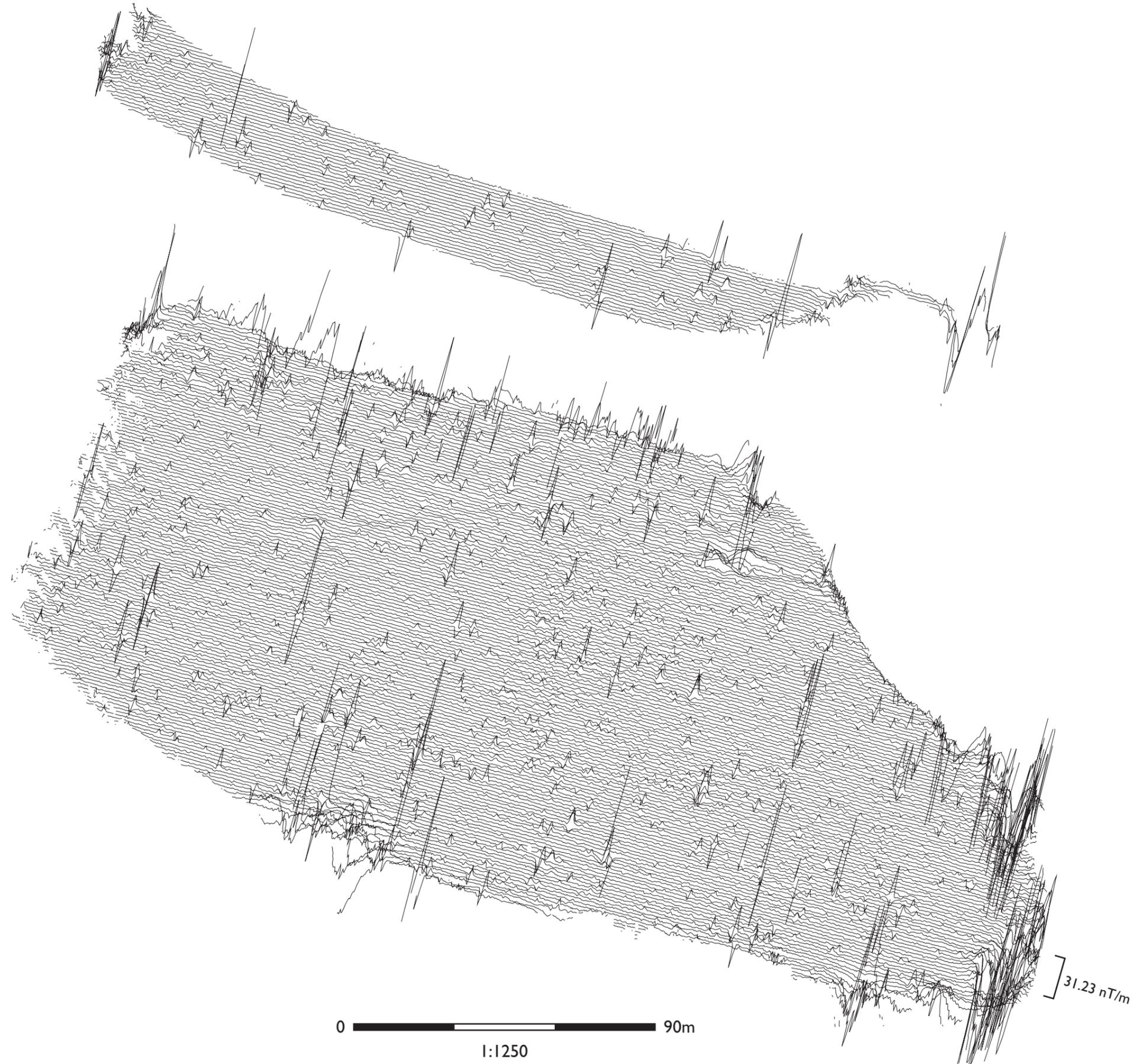
© Crown Copyright and database right  
2016. All rights reserved. Ordnance  
Survey Licence number 100019088.

0  90m  
1:2500

 Scheduled areas

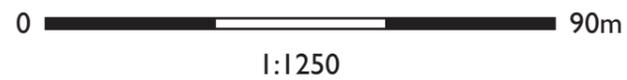
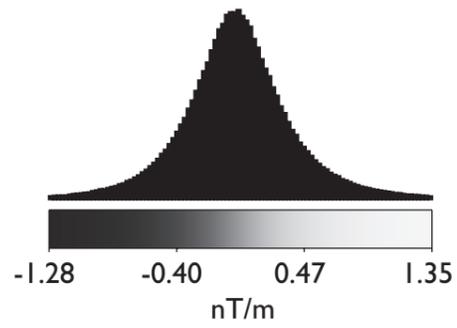
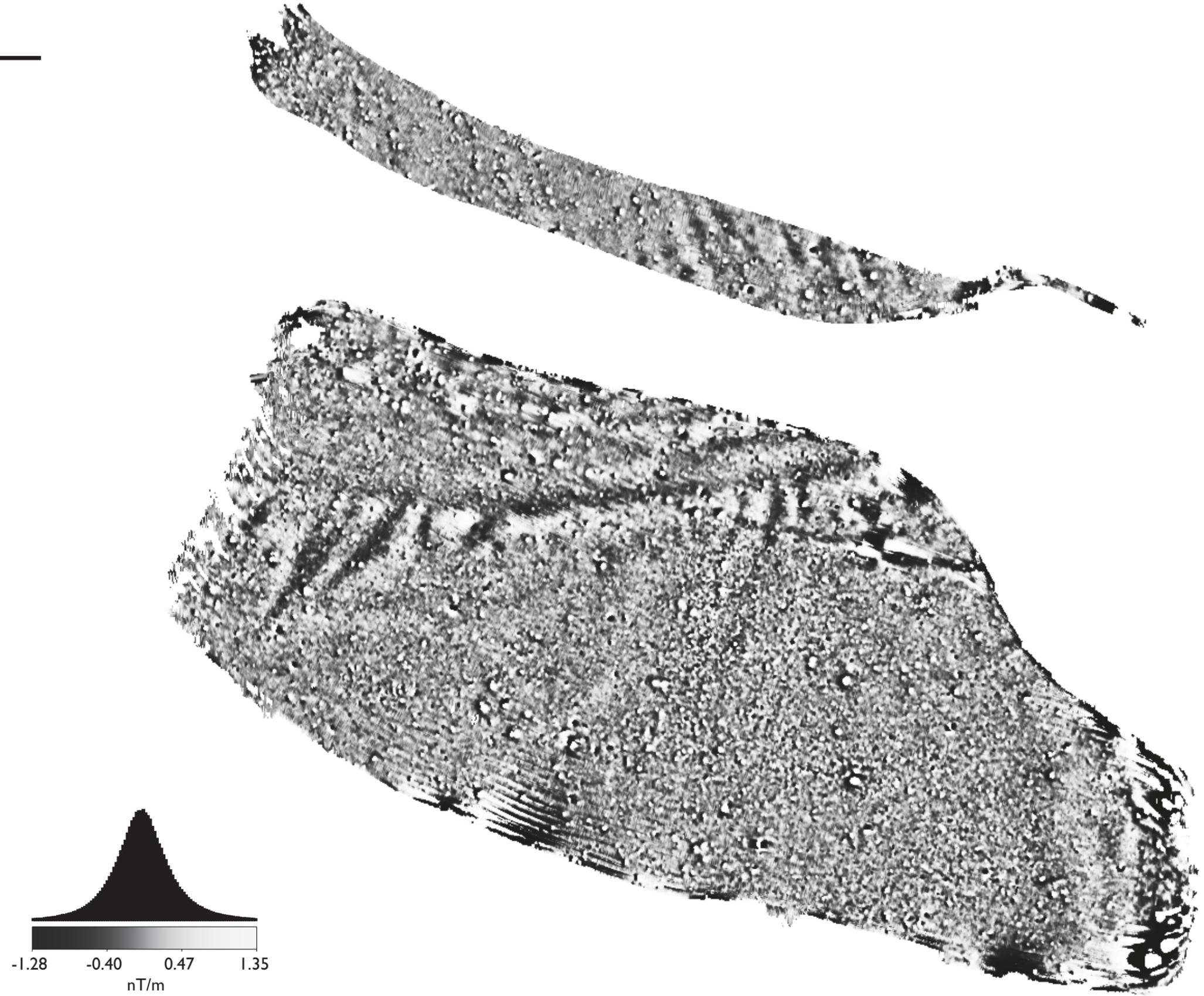
SILCHESTER ENVIRONS PROJECT, WOOD FARM DYKE, SILCHESTER, HAMPSHIRE  
Traceplot of minimally processed caesium magnetometer data, July 2015

Z ←



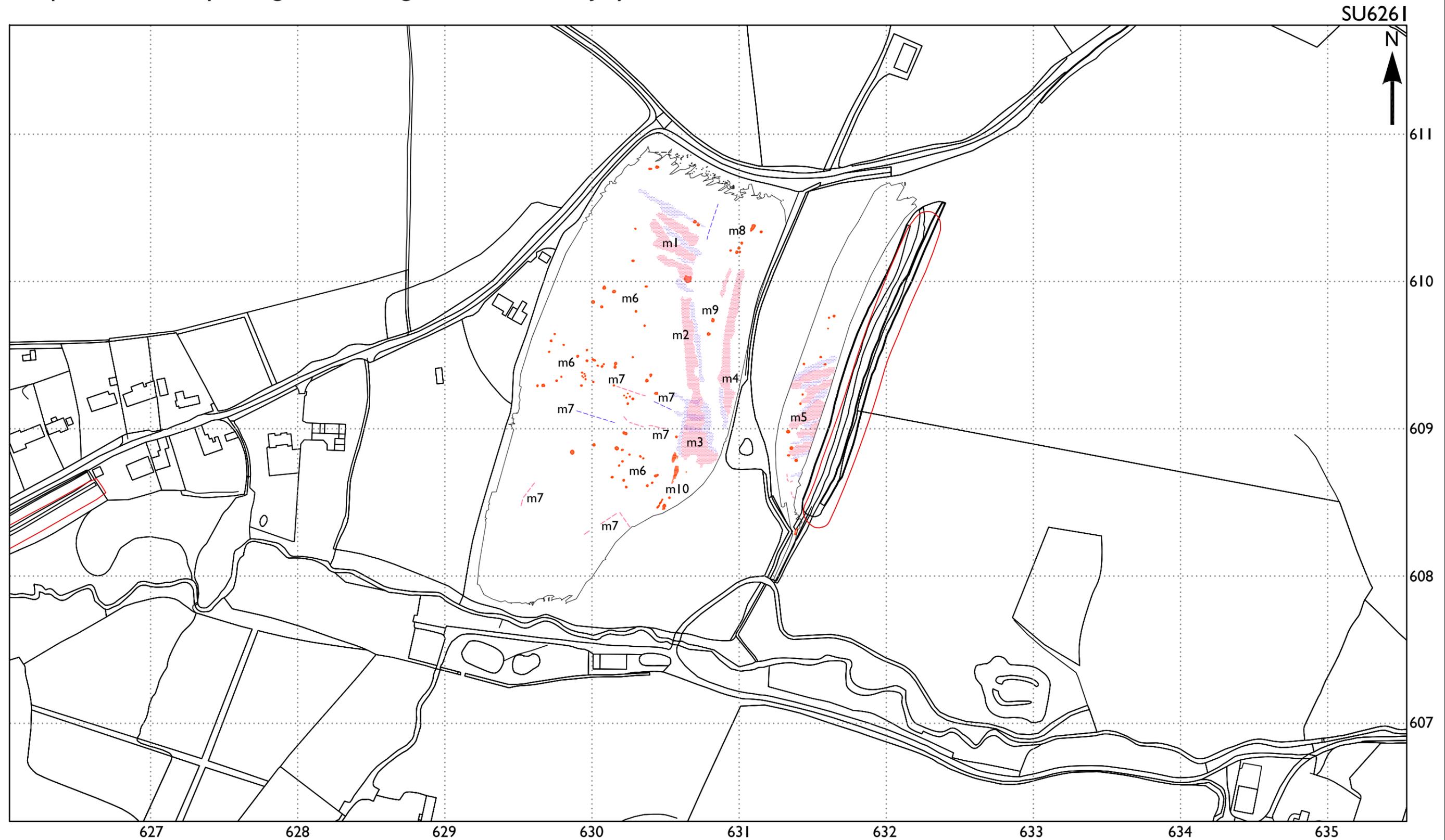
SILCHESTER ENVIRONS PROJECT, WOOD FARM DYKE, SILCHESTER, HAMPSHIRE  
Equal area greyscale image of minimally processed caesium magnetometer data, July 2015

Z ←



# SILCHESTER ENVIRONS PROJECT, WOOD FARM DYKE, SILCHESTER, HAMPSHIRE

## Graphical summary of significant magnetic anomalies, July 2015



© Crown Copyright and database right  
2016. All rights reserved. Ordnance  
Survey Licence number 100019088.

0 90m  
1:2500

- positive magnetic
- negative magnetic
- raised magnetic
- magnetic noise
- Scheduled areas



## Historic England Research and the Historic Environment

We are the public body that looks after England's historic environment. We champion historic places, helping people understand, value and care for them.

A good understanding of the historic environment is fundamental to ensuring people appreciate and enjoy their heritage and provides the essential first step towards its effective protection.

Historic England works to improve care, understanding and public enjoyment of the historic environment. We undertake and sponsor authoritative research. We develop new approaches to interpreting and protecting heritage and provide high quality expert advice and training.

We make the results of our work available through the Historic England Research Report Series, and through journal publications and monographs. Our online magazine Historic England Research which appears twice a year, aims to keep our partners within and outside English Heritage up-to-date with our projects and activities.

A full list of Research Reports, with abstracts and information on how to obtain copies, may be found on [www.HistoricEngland.org.uk/researchreports](http://www.HistoricEngland.org.uk/researchreports)

Some of these reports are interim reports, making the results of specialist investigations available in advance of full publication. They are not usually subject to external refereeing, and their conclusions may sometimes have to be modified in the light of information not available at the time of the investigation.

Where no final project report is available, you should consult the author before citing these reports in any publication. Opinions expressed in these reports are those of the author(s) and are not necessarily those of Historic England.

The Research Reports' database replaces the former:

Ancient Monuments Laboratory (AML) Reports Series  
The Centre for Archaeology (CfA) Reports Series  
The Archaeological Investigation Report Series and  
The Architectural Investigation Reports Series.