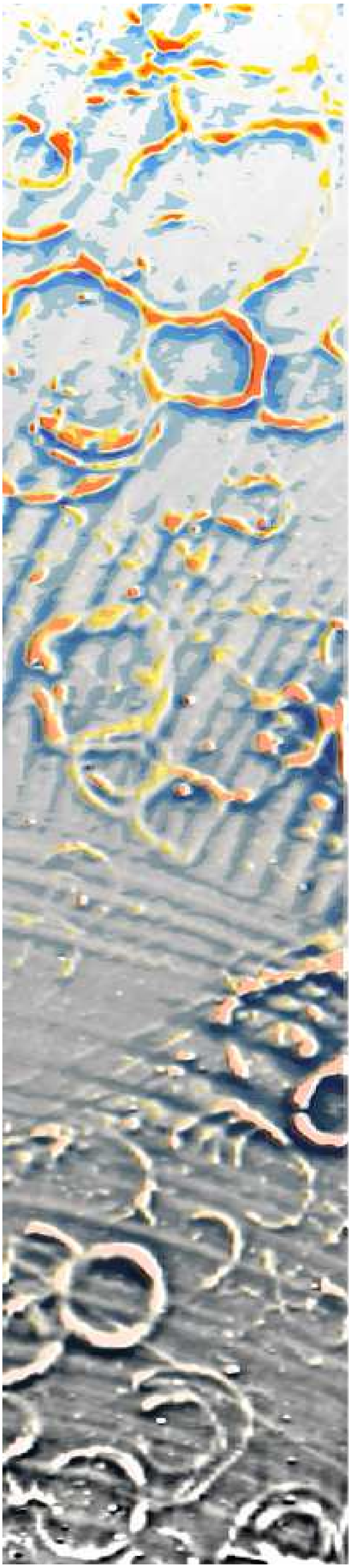


Land East Of Nobold Lane, Longden Road, Shrewsbury

Geophysical Survey Report

Produced for CgMs Consulting

Project code LSS141

4th July 2014

R Fry, Geophysicist BA(Hons) MSc
MJ Roseveare, Senior Geophysicist BSc(Hons) MSc MEAGE FGS MIfA

ArchaeoPhysica Ltd
Kitchener's, Home Farm, Harewood End, Hereford HR2 8JS
Tel. +44 (0) 1989 730 564 www.archaeophysica.com

Non-Technical Summary

A magnetic and earth resistance survey was commissioned by CgMs Consulting to prospect land at Land East Of Nobold Lane, Longden Road, Shrewsbury for buried structures of archaeological interest.

The geophysical surveys have identified a series of anomalies which may be of archaeological interest. To the south of the field, a series of shafts for coal mining, and an associated trackway and other industrial structures extending into the field to the east have been identified. Within and around the rectangular earthwork bank, further ditches and possible structures and also a possible continuation NE of further enclosures have also been tentatively identified.

Digital Data

Item	Sent to	Sent date
CAD – Vector Elements	Myk Flitcroft	4th July 2014

Audit

Version	Author	Checked	Date
Interim			
Draft Final	R Fry	MJ Roseveare	4th July 2014
Final			
Revision			
OASIS			

Table of Contents

1 Introduction

Land east Of Nobold Lane, Longden Road, Shrewsbury was surveyed to prospect for buried structures of archaeological interest.

1.1 Location

Country	England
County	Shropshire
Nearest Settlement	Shrewsbury
Central Co-ordinates	347550,310550

7.3ha of land was surveyed over a single pasture field.

2 Context

2.1 Archaeology

The following is taken verbatim from Roseveare (2014) 'Specification for Geophysical Survey':

"Mousecroft Lane, which forms the northern boundary, has been suggested to be of Roman origin.

A roughly rectangular double-ditched earthwork (approx. 60m x 80m on aerial photographs) lies adjacent to Nobold Lane within the survey area. This is recorded as HER 02492 and may form part of a complex with cropmarks HER 04730 which lie outside the area. The northwestern flank seems to have formed part of a (later) field boundary.

Coal mining workings are known within the southern part of the survey area (HER 06776), with two old shafts marked on OS mapping in the 1880s but disappearing between 1954 & 1967. On recent aerial photographs a paler area of grass contains these locations and probably indicates a zone of disturbed ground.

An archaeological assessment of the adjacent land to the east has been made. The desk-based assessment mentioned additional features that lie within the current survey area (circular mound and possible trackway), thought likely to be associated with the known coal mining activity."

2.2 Environment

Superficial 1: 50000 BGS	Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel - most of area (GFSDD); Alluvium - Clay, Silt, Sand And Gravel - E side (ALV); River Terrace Deposits, 3 - Sand And Gravel - small area SE corner (RTD3)
Bedrock 1:50000 BGS	Halesowen Formation - Mudstone, Siltstone And Sandstone - most of area (HA); Salop Formation - Mudstone, Sandstone And Conglomerate - N part (SAL)
Topography	Gently sloping down to NE
Hydrology	Unknown, potentially free draining to SW and less so near stream along NE side
Current Land Use	Pasture
Historic Land Use	Agricultural
Vegetation Cover	Short grass
Sources of Interference	Possible from overhead cable, otherwise none known

Magnetic susceptibility is likely to be low at the site and to vary locally dependant on the local soil chemistry. Sand, gravel and alluvium may create variable magnetic field anomalies, dependant on the overlying soil depth. The success of detecting features of potential archaeological interest may be consequently variable.

Resistance anomalies are likely to be relatively well defined within the area as free-draining loamy soils should provide a detectable sub-surface moisture contrast between soil variation and cut archaeological features.

3 Methodology

3.1 Magnetic Survey

3.1.1 Technical equipment

Measured variable	Magnetic flux density / nT
Instrument	Array of Geometrics G858 Magmapper caesium magnetometers
Configuration	Non-gradiometric transverse array (4 sensors, ATV towed)
Sensitivity	0.03 nT @ 10 Hz (manufacturer’s specification)
QA Procedure	Continuous observation
Spatial resolution	1.0m between lines, 0.3m mean along line interval

3.1.2 Monitoring & quality assessment

The system continuously displays all incoming data as well as line speed and spatial data resolution per acquisition channel during survey. Rest mode system noise is therefore easy to inspect simply by pausing during survey, and the continuous display makes monitoring for quality intrinsic to the process of undertaking a survey. Rest mode test results (static test) are available from the system.

3.1.3 Data Processing

All data processing is minimised and limited to what is essential for the class of data being collected, e.g. reduction of orientation effects, suppression of single point defects (drop-outs or spikes) etc. The processing stream for this data is as follows:

Process	**Software**	**Parameters**
Measurement & GNSS receiver data alignment	Proprietary	
Temporal reduction, regional field suppression	Proprietary	High pass 5s/nT, Low pass 0.3s nT
Gridding	Surfer	Kriging, 0.25m x 0.25m
Smoothing	Surfer	Gaussian lowpass 3x3 data
Imaging and presentation	Manifold GIS	

The initial processing uses proprietary software developed in conjunction with the multisensor acquisition system. Gridded data is ported as data surfaces (not images) into Manifold GIS for final imaging and detailed analysis. Specialist analysis is undertaken using proprietary software.

3.2 Earth Resistance Survey

3.2.1 Technical equipment

Measured Variable	Apparent electrical resistance (twin probe)
Instrument	Geoscan Research RM15A with MPX15
Configuration	Twin probe array, 0.5m AM spacing, current 1mA, gain x10
QA Procedure	Continuous observation
Resolution	1.0m x 1.0m

3.2.2 Monitoring & quality assessment

There is no dedicated quality management data available from this instrument but continuous observation throughout survey, examination of the sensitivity of the measurement to frame movement and monitoring of background resistance values between grids and days allows some measure of quality assurance.

A suitably qualified Project Geophysicist was in the field at all times and fieldwork and technical considerations were guided by the Senior Geophysicist.

3.2.3 Data Processing

All data processing is minimised and limited to what is essential for the class of data being collected, e.g. suppression of single point defects (drop-outs or spikes), etc. The process stream for this data is as follows:

Process	**Software**	**Parameters**
Spike reduction	Proprietary	5 x 5 datum median thresholding filter with the threshold set to 10 Ohm
Trend reduction	Proprietary	90m highpass filter
Interpolation	Proprietary	Bilinear interpolation (0.25m x 0.25m)
Imaging and presentation	Manifold GIS	Including interpolation to 25cm

General information on processes commonly applied to data can be found in standard text books and also in the 2008 English Heritage Guidelines "*Geophysical Survey in Archaeological Field Evaluation*" at http://www.helm.org.uk/upload/pdf/Geophysical_LoRes.pdf.

All archived data includes process metadata.

3.3 Interpretation resources

Numerous sources are used in the interpretive process which takes into account shallow geological conditions, past and present land use, drainage, weather before and during survey, topography and any previous knowledge about the site and the surrounding area. Old Ordnance Survey mapping is consulted and also older sources if available. Geological information is sourced only from British Geological Survey resources and aerial imagery from online sources. Topographic data is usually sourced from the Environment Agency (LiDAR) unless derived from original ArchaeoPhysica survey.

Information from nearby ArchaeoPhysica surveys is consulted to inform upon local data character, variations across soils and near-surface geological contexts. Published data from other contractors may also be used if accompanied by adequate metadata.

3.4 Interpretive classes

3.4.1 Introduction

Key to interpretation is separation of each anomaly into broad classes, namely whether caused by agricultural processes (e.g. ploughing, composting, drainage etc.), geological factors or whether a structure of archaeological interest is likely. Within these anomalies are in turn classified by whether they most likely represent a fill or a drain, or a region of differing data texture, etc. More detailed descriptions are included below.

The actual means of classification is based upon geophysical understanding of anomaly formation, the behaviour of soils, landscape context and structural form. For example, to consider just one form of anomaly: weakly dipolar discrete magnetic anomalies of small size are likely to have shallow non-ferrous sources and are therefore likely to be pits. Larger ones of the same class could also be pits or locally-deeper topsoil but if strongly magnetic could also be hearths. Strongly dipolar discrete anomalies are in all cases likely to be ferrous or similarly magnetic debris, although small repeatedly heated and in-situ hearths can produce similar anomalies.

3.4.2 Agriculture – boundaries

Coherent linear dipolar enhancement of magnetic field strength marking ditch fills, narrow bands of more variable magnetic field or changes in apparent magnetic susceptibility, are all included within this category if they correlate with boundaries depicted on the Tithe Map or early Ordnance Survey maps. If there is no correlation then these anomaly types are not categorised as a field boundaries.

Ditch-fills of former field boundaries are usually identified by having variable strength (usually) low resistance bands due to their increased capacity to retain moisture than surrounding soils. Occasionally former headlands can also be identified as high resistance linear bands due to the compact, less porous properties of headland structures.

3.4.3 Agriculture – cultivation

Banded variations in apparent magnetic susceptibility caused by a variable thickness of topsoil, depositional remanent magnetisation of sediments in furrows or susceptibility enhancement through heating (a by product of burning organic matter like seaweed) tend to indicate past cultivation, whether ridge-based techniques, medieval ridge and furrow or post medieval 'lazy beds'. Modern cultivation, e.g. recent ploughing, is not included.

Similar low resistance banded variations, caused by the deposition of more aggregated and generally more humic soils by historic ploughing (e.g. ridge and furrow), can also be indicators of historic cultivation.

3.4.4 Agriculture – drains

In some cases it is possible to identify drainage networks either as ditch-fill type anomalies (typically 'Roman' drains), noisy or repeating dipolar magnetic anomalies from terracotta pipes or reduced magnetic field strength anomalies from culverts, plastic or non-reinforced concrete pipes. In all cases identification of a herring bone pattern to these is sufficient for inclusion within this category. Earth resistance anomalies caused by such features are usually similar to narrow ditch-fills, usually identifiable from their patterning across the site.

3.4.5 Archaeology – fills

Any linear or discrete enhancement of magnetic field strength, usually with a dipolar character of variable strength, that cannot be categorised as a field boundary, cultivation or as having a geological origin, is classified as a fill potentially being of archaeological interest. Fills are normally earthen and include an often invisible proportion of heated soil or topsoil that augments local magnetic field strength. Inverted anomalies are possible over non-earthen fills, e.g. those that comprise peat, sand or gravel within soil. This category is subject to the 'habitation effect' where, in the absence of other sources of magnetic material, anomaly strength will decrease away from sources of heated soil and sometimes to the extent of non-detectability.

Former enclosure ditches that contained standing water can promote enhanced volumetric magnetic susceptibility through depositional remanence and remain detectable regardless of the presence of other sources of magnetic material.

Any linear or discrete (usually) low (but occasionally high) resistance anomaly, that cannot be categorised as a field boundary, cultivation or as having a geological origin, is classified as a fill potentially being of archaeological interest. Earthen fills normally tend to be more aggregated, porous and more moisture retentive than their surrounding soil contexts, producing an anomaly which is usually of low resistance. The presence of inverted (high resistance) anomalies are possible over non-earthen or more easily draining fills, e.g. soils with a large concentration of stone boulders, or gravel within soil.

3.4.6 Archaeology – other discrete

This category is secondary to fills and includes anomalies that by virtue of their character are likely to be of archaeological interest but cannot be adequately described as fills. Examples include strongly magnetic or high resistance bodies lacking ferrous character that might indicate hearths or kilns. In some cases anomalies of ferrous character may be included.

3.4.7 Archaeology – structures

On some sites the combination of plan form and anomaly character, e.g. rectilinear reduced magnetic field strength anomalies, might indicate the likely presence of masonry, robber trenches or rubble foundations. Other types of structure are only included if the evidence is unequivocal, e.g. small ring ditches with doorways and hearths indicating hearths. In some circumstances a less definite category may be assigned to the individual anomalies instead.

Within earth resistance data, walls from buildings and structures usually exhibit high resistance anomalies of varying strength which form a similar plan character. Robbed-out walls will create an anomaly similar to a ditch-fill, and may result in a high resistance anomaly.

3.4.8 Archaeology – zones

On some sites it is possible to define different areas of activity on the basis of the magnetic and/or earth resistance data character, e.g. texture and anomaly strength. These might indicate the presence of middens or foci within larger complexes. This category does not indicate a presence or absence of anomalies possibly of archaeological interest.

3.4.9 Geology – discrete

On some sites, e.g. some gravels and alluvial contexts, there will be anomalies that can obscure those potentially of archaeological interest. They may have a strength equal to or greater than that associated with more relevant sources, e.g. ditch fills, but can normally be differentiated on the basis of anomaly form coupled with geological understanding. Reduced earth resistance anomalies may also be an indication of weathering processes of the parent material. Where there is ambiguity, or relevance to the study, these anomalies will be included in this category.

3.4.10 Geology – zones

Not all changes in geology can be detected at the surface, directly or indirectly, but sometimes there will be a difference evident in the geological data that can be attributed to a change, e.g. from alluvium to tidal flat deposits, or bedrock to alluvium. It some cases the geophysical difference from either magnetic or earth resistance survey will not exactly coincide with the geological contact and this is especially the case across transitions in soil type.

3.4.11 Services

All overheard (OH) and underground (UG) services are depicted where these are detectable in the data or may influence aspects of the interpretation. Where ditches have been excavated to accommodate the utility cable or pipe, the earth resistance data may yield a similar anomaly to a ditch-fill.

3.4.12 Texture

Geophysical data varies in character across areas, due to a range of factors including soil chemistry, near surface geology, hydrology and land use past and present. Where these variations are of interest or relevance to the study they are included in this category.

3.5 Standards & guidance

All work was conducted in accordance with the following standards and guidance:

- David et al, "Geophysical Survey in Archaeological Field Evaluation", English Heritage, 2008.
- "Standard and Guidance for Archaeological Field Evaluation", Institute for Archaeologists, 2008.

In addition, all work is undertaken in accordance with the high professional standards and technical competence expected by the Geological Society of London and the European Association of Geoscientists and Engineers.

All personnel are experienced surveyors trained to use the equipment in accordance with the manufacturer's expectations. All aspects of the work are monitored and directed by fully qualified professional geophysicists.

4 Discussion

4.1 Introduction

The sections below first discuss the geophysical context within which the results need to be considered and then specific features or anomalies of particular interest. Not all will be discussed here and the reader is advised to consult the catalogue (ibid) in conjunction with the graphical elements of this report.

4.2 Principles – magnetic survey

In general, topsoil is more magnetic than subsoil which can be slightly more magnetic than parent geology, whether sands, gravels or clays, however, there are exceptions to this. The reasons for this are natural and are due to biological processes in the topsoil that change iron between various oxidation states, each differently magnetic. Where there is an accumulation of topsoil or where topsoil has been incorporated into other features, a greater magnetic susceptibility will result.

Within landscapes soil tends to accumulate in negative features like pits and ditches and will include soil particles with thermo-remanent magnetization (TRM) through exposure to heat if there is settlement or industry nearby. In addition, particles slowly settling out of stationary water will attempt to align with the ambient magnetic field at the time, creating a deposit with depositional remanent magnetization (DRM).

As a consequence, magnetic survey is nearly always more a case of mapping accumulated magnetic soils than structures which would not be detected unless magnetic in their own right, e.g. built of brick or tile. As a prospecting tool it is thus indirect. Fortunately, the mechanisms outlined above are commonplace and favoured by human activity and it is nearly always the case that cut features will alter in some way the local magnetic field.

4.2.1 Instrumentation

The use of the magnetic sensors in non-gradiometric (vertical) configuration avoids measurement sensitisation to the shallowest region of the soil, allowing deeper structures, whether natural or otherwise to be imaged within the sensitivity of the instrumentation. However, this does remove suppression of ambient noise and temporal trends which have to be suppressed later during processing. When compared to vertical gradiometers in archaeological use, there is no significant reduction in lateral resolution when using non-gradiometric sensor arrays and the inability of gradiometers to detect laminar structures is completely avoided.

Caesium instrumentation has a greater sensitivity than fluxgate instruments, however, at the 10 Hz sampling rate used here this increase in sensitivity is limited to about one order of magnitude.

The array system is designed to be non-magnetic and to contribute virtually nothing to the magnetic measurement, whether through direct interference or through motion noise. There is, however, some limited contribution from the towing ATV.

4.3 Principles – electrical resistance survey

Electrical resistance within soil is generally a measure of pore size and water content, large-pored materials having different dynamics than those with small pores. In addition, clays contribute significant electro-chemical effects through ion exchange at the surface of soil particles and tend to be significantly more conductive than silts and sands. The constant hydraulic cycle imposed by rainfall and drainage into deeper strata ensures that there is a significant temporal aspect to any survey of electrical resistance.

In general, significantly reduced electrical resistance can be associated with fills and wetter ground, although there are exceptions to this. Enhanced resistance is in general terms the converse situation, i.e. drier materials. These, however, are both relative terms and within small areas or complex archaeology the definition of 'background' may not be possible. In addition, the presence of shallow but variable geology can impart strong trends of equal or greater anomaly strength and a linear feature can produce an anomaly with strongly variable character along its length.

Detection of buried structures is seasonally dependent with the anomalies from structures changing and quite frequently disappearing as the seasons rotate. Anomaly polarity will often change alongside strength. A good season for detection of one class of structure may not be the best for another.

In addition to this, paradoxes are possible because the technique is dependent upon the strength and location of current flow in the ground, not the physical layout of structures. A very high resistance material close to the surface will force the majority of current to flow between it and the surface which produces, paradoxically, a low resistance anomaly. Similar effects can be observed where impervious materials retard the flow of soil moisture, thus the anomaly caused by a high resistance wall may be dwarfed by lower resistance next to it.

Finally, the temporal character of moisture flow in the ground has a huge effect upon electrical resistance. Surveys conducted after heavy rain will not produce the same results as ones conducted in dry weather.

4.3.1 Instrumentation

The measurement is called apparent electrical resistance because the numerical value and the shape of anomalies are dependent upon the configuration of probes in the array used. The technique, at least in this form, does not measure resistivity which is a volume and material specific measure not directly available from most planar surveys.

The twin probe array used for this survey is the archaeological norm, however, other arrays have their advantages and disadvantages. For all arrays, the relative separation of the different probes determines anomaly form. For the twin probe, increasing the separation of the mobile pair of probes increases the nominal depth of investigation by sensitising the measurement to deeper current flow.

4.4 Character & principal results

4.4.1 Archaeology

Within the magnetic field dataset, an enhanced, curved magnetic field anomaly [16] could represent an old boundary ditch, and may be similar in nature to the cropmarks of other ditches seen within the HER to the field to the west.

A high resistance anomaly surrounds the rectangular earthwork [17] and is associated with a bank still visible within the field.

Low resistance anomalies [18] & [19] appear to be internal ditches, however they may also represent the increased depth of soil accumulated by material ploughed off the bank.

Low resistance anomaly [19] may also form a curvilinear anomaly similar in size and form to [16], indicating that these two divisions may be part of the same field system.

Immediately outside of the bank, a low resistance anomaly [20] may indicate a further ditch exists, however the area covered by the earth resistance technique limits the explicit interpretation of this anomaly.

Within the earthwork, weak high resistance areas and linear anomalies may tentatively indicate the existence of a former structure [21]. No evidence of this was however detected by the magnetic survey.

An area of low resistance [22], may either relate to magnetic debris within the earthwork, or could be linked to a low resistance linear anomaly [26]. Both anomalies may be of archaeological interest.

Within the magnetic dataset, weakly reduced linear magnetic field anomalies may indicate the presence of a building or structure [23].

Two linear magnetic field anomalies have been identified within the northern extent of the survey [24] and may also be of archaeological interest as they could represent ditch fills.

A circular area of low resistance (diameter c.7m) may relate to a pit at the top of the bank as it curves to the north-west [25].

4.4.2 Coal Mining

Coal mining was known to exist on the site prior to survey, and old shafts depicted on the 1882 OS map of the area have been identified as [9] and [10]. Another shaft which appears only on the 1927 OS map of the area is also indicated [11]. An area of similar texture in the magnetic field dataset [12] may also be the location of a fourth shaft.

A relatively strong series of magnetic field anomalies appears to connect the location of the known coal mining shafts, and also continues north towards [12], implying the location of infrastructure surrounding the mining industry here [13], [14]. The bases of conveyors, tramlines and similar can be expected, as well as shaft head structures etc.

4.4.3 Land use

There is evidence of past land use across the field, and cultivation furrows which may relate to ridge and furrow exist [2] & [3] as weakly enhanced regular linear magnetic field anomalies in either a broad NW-SE or WSW-ENE alignment.

The magnetic field data has been affected by the influence of modern services such as underground cables or pipes. These are indicated by [5] & [6]. An overground cable extends through the survey area, connecting telegraph poles within the field [4].

Two linear enhanced magnetic field anomalies are identified as historic field boundaries and are depicted on historic OS mapping of the area between 1882-1994 [7], and between 1882-1971 [8].

A strongly enhanced magnetic field anomaly [15] is probably relatively modern in nature.

4.4.4 Geology

The geology of the survey area has provided soils with a quite weak magnetic susceptibility contrast for the detection of features of potential archaeological interest to be detected. Areas where mining activity are known to have existed are however clearly identified by much stronger magnetic field anomalies, likely due to accumulated brick and ferrous debris. The area of the rectangular earthwork, additionally surveyed using earth resistance, has benefited from the implementation of the extra technique and aided the interpretation of the magnetic data in this area.

Weakly enhanced magnetic field anomalies [1] are likely to represent subtle changes in soil material and / or depth.

4.5 Conclusions

The geophysical surveys have identified a series of anomalies which may be of archaeological interest. To the south of the field, a series of shafts for coal mining, and an associated trackway and other structures extending into the field to the east have been identified. Within and around the rectangular earthwork bank, ditches and possible structures have also been tentatively identified. It is possible that there is a further shaft or perhaps a bell pit [22] within this earthwork enclosure.

4.6 Caveats

Geophysical survey is a systematic measurement of some physical property related to the earth. There are numerous sources of disturbance of this property, some due to archaeological features, some due to the measuring method, and others that relate to the environment in which the measurement is made. No disturbance, or 'anomaly', is capable of providing an unambiguous and comprehensive description of a feature, in particular in archaeological contexts where there are a myriad of factors involved.

The measured anomaly is generated by the presence or absence of certain materials within a feature, not by the feature itself. Not all archaeological features produce disturbances that can be detected by a particular instrument or methodology. For this reason, the absence of an anomaly must never be taken to mean the absence of an archaeological feature. The best surveys are those which use a variety of techniques over the same ground at resolutions adequate for the detection of a range of different features.

Where the specification is by a third party ArchaeoPhysica will always endeavour to produce the best possible result within any imposed constraints and any perceived failure of the specification remains the responsibility of that third party.

Where third party sources are used in interpretation or analysis ArchaeoPhysica will endeavour to verify their accuracy within reasonable limits but responsibility for any errors or omissions remains with the originator.

Any recommendations are made based upon the skills and experience of staff at ArchaeoPhysica and the information available to them at the time. ArchaeoPhysica is not responsible for the manner in which these may or may not be carried out, nor for any matters arising from the same.

4.7 Bibliography & selected reference

Aspinall *et al*, 2008. "Magnetometry for Archaeologists", Geophysical Methods for Archaeology, Altamira Press

Blakely, 1996, "Potential Theory in Gravity and Magnetic Applications", Cambridge University Press

CgMs Consulting, 2014, "Archaeological Desk-Based Assessment, Land at Longden Road, Shrewsbury, Shropshire". CgMs Consulting, Newark.

David *et al*, 2008, "Geophysical Survey in Archaeological Field Evaluation", English Heritage

Gaffney *et al*, 2002, "Technical Note 6: The use of geophysical techniques in archaeological evaluations", Institute for Archaeologists

Milsom, 2003, "Field Geophysics", 3rd edition, The Geological Field Guide Series, Wiley

Roseveare, A., 2014, "Land East of Nobold Lane, Longden Road, Shrewsbury: Specification for Geophysical Suvey",ArchaeoPhysica Ltd.

Schmidt, A., 2013, "Geophysical Data in Archaeology: A Guide to Good Practice", ADS

Scollar, 1990, "Archaeological Prospecting and Remote Sensing", Topics in Remote Sensing 2, Cambridge University Press

Tarling *et al* (ed.), 1999, "Palaeomagnetism and Diagenesis in Sediments", Geological Society, London, Special Publications, 151

Telford *et al*, 1990, "Applied Geophysics", 2nd Edition, Cambridge University Press

5 Appendices

5.1 Project metadata

Project Name	Land east Of Nobold Lane, Longden Road, Shrewsbury
Poject Code	Lss141
Client	CgMs Consulting
Fieldwork Dates	25th - 30th June 2014
Field Personnel	R Fry, S Purvis
Data Processing Personnel	R Fry
Reporting Personnel	R Fry, MJ Roseveare
Draft Report Date	4th July 2014
Final Report Date	

5.2 Archiving

ArchaeoPhysica maintains an archive for all its projects, access to which is permitted for research purposes. Copyright and intellectual property rights are retained by ArchaeoPhysica on all material it has produced, the client having full licence to use such material as benefits their project. Access is by appointment only and some content is restricted and not available to third parties

Archive formation is in the spirit of Schmidt, A., 2013, "Geophysical Data in Archaeology: A Guide to Good Practice", ADS.

ArchaeoPhysica has a policy of contributing in time to the ADS Grey Literature library, usually after about six months post-dating release of the report. In addition, extracts of data images may be used, without reference to their source, in marketing and similar material. In these cases anything that might identify the project or client is removed.

5.3 ArchaeoPhysica

5.3.1 The company

ArchaeoPhysica has provided geophysical survey to archaeologists since 1998 and is consequently one of the oldest specialist companies in the sector. It has become one of the most capable operations in the UK, undertaking 1000 hectares of magnetic survey per annum. In addition 2D & 3D electrical, low frequency electromagnetic and radar surveys are regularly undertaken across the UK, also overseas. ArchaeoPhysica is the most established provider of caesium vapour magnetic survey in Europe, and holds probably the largest archaeological archive of total field magnetic data in the world. Unusually for the archaeological sector, key staff are acknowledged qualified geophysical specialists in their own right and regularly contribute to in-house and other research projects. For a number of years the company taught applied geophysics to Birkbeck College (London) undergraduate and post-graduate archaeology students, and developed a new and comprehensive course for the College.

All work is undertaken by qualified and experienced geophysicists who have specialised in the detection and mapping of near surface structures in archaeology and other disciplines using a wide variety of techniques. There is always a geophysicist qualified to post-graduate level on site during fieldwork and all processing and interpretation is undertaken under the direct influence of either the same individual or someone of similar qualifications and experience.

ArchaeoPhysica meets with ease the requirements of English Heritage in their 2008 Guidance "Geophysical Survey in Archaeological Field Evaluation" section 2.8 entitled "Competence of survey personnel". The company is one of the most experienced in European archaeological prospection and is a key professional player. It only employs people with recognised geoscience qualifications and capable of becoming Fellows of the Geological Society of London, the Chartered UK body for geophysicists and geologists.

5.3.2 Senior Geophysicist: Martin J Roseveare, MSc BSc(Hons) MEAGE FGS MIfA

Martin specialised (MSc) in geophysical prospection for shallow applications at the University of Bradford in 1997 and has worked in commercial geophysics since then. He was elected a Fellow of the Geological Society of London in 2009 and is also a full member of the Institute of Archaeologists. He has taught applied geophysics for Birkbeck College's archaeological degree students for a number of years. Professional interests outside archaeology include the application of geophysics to agriculture, also geohazard monitoring and prediction. He also has considerable practical experience of the improvement and integration of geophysical hardware and software. At ArchaeoPhysica Martin carries overall responsibility for all things geophysical and is often found writing reports or buried in obscure software and circuit diagrams. He was elected onto the EuroGPR and IfA GeoSIG committees in Autumn 2013.

5.3.3 Operations Manager: Anne CK Roseveare, BEng(Hons) DIS

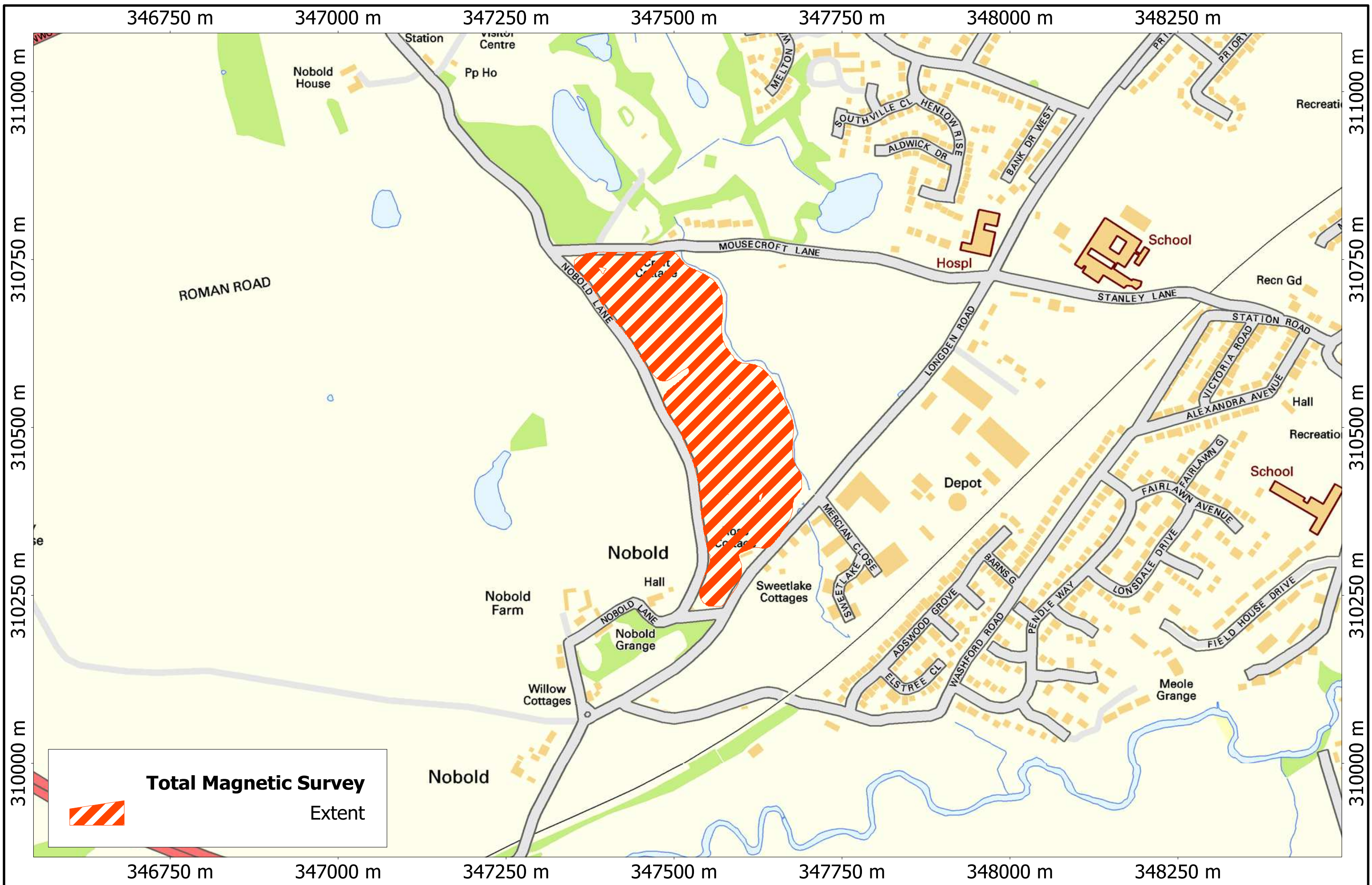
On looking beyond engineering, Anne turned her attention to environmental monitoring and geophysics and has since been applying specialist knowledge of chemistry & fluid flow to soils. She is member of the British Society of Soil Science and is interested in the use of agricultural applications of geophysics. Anne was the founding editor of the International Society for Archaeological Prospection (ISAP) and has spent many years walking fields in parallel lines. Much of her time now is spent managing complicated scheduling and logistics for ArchaeoPhysica, overseeing safety procedures and data handling, while dreaming of interesting places around the world to undertake surveys, including researching the urban archaeology of Asia.

5.3.4 Geophysicist: Robert Fry, MSc BA(Hons), PhD candidate

Rob studied Archaeology B.A.(Hons.) at the University of Reading from 2004-07 where his research was heavily influenced by geophysical techniques and work included organising and leading the magnetic survey of Silchester Roman Town. Following university, he joined the British School at Rome, conducting magnetic surveys in Spain, Italy and Libya. After working briefly as a geophysicist at Wessex Archaeology, Rob became Project Officer of The Silchester Mapping Project at the University of Reading. Since then, he has gained an MSc in Archaeological Prospection from the University of Bradford. He is now writing up his PhD thesis in time-lapse geophysical monitoring techniques and analysis as part of the DART Project. Rob is currently the editor of ISAP News. At ArchaeoPhysica Rob is normally found in the field or in the office besieged by colossal quantities of survey data.

5.3.5 Geophysical Technician: Samuel Purvis, MSc BSc(Hons)

Sam studied Archaeology at The University of Bradford before progressing to a Masters in Archaeological Prospection. His primary research focus is on electromagnetic methods of shallow survey and is an expert with the newest multicoil electromagnetic instrumentation. Sam's main role at ArchaeoPhysica is technical, collecting high quality data, maintaining systems and keeping the show on the road.



LSS141 Land East Of Nobold Lane, Longden Road, Shrewsbury
DWG 01 Location Map

ArchaeoPhysica Ltd

Orthographic Centre X: 347520.24 m Centre Y: 310473.87 m Scale: 1:10000 @ A4 Spatial Units: Meter. Do not scale off this drawing

LSS141 Land East Of Nobold Lane, Longden Road, Shrewsbury
DWG 02 Magnetic Survey: Full Extent

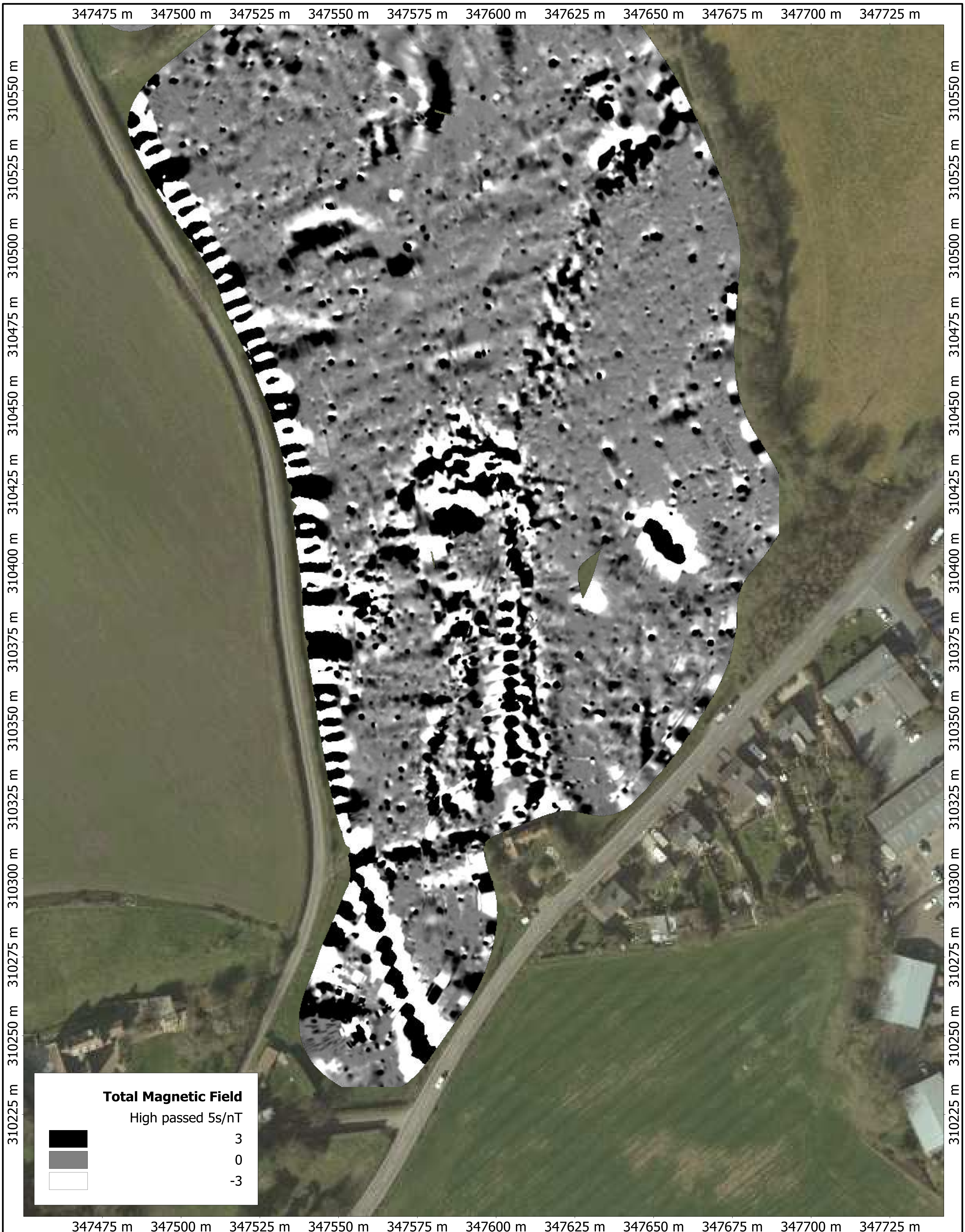
ArchaeoPhysica Ltd

Orthographic Centre X: 347511.24 m Centre Y: 310487.49 m Scale: 1:2500 @ A4 Spatial Units: Meter. Do not scale off this drawing
File: LSS141.map from DELHI 4/7/2014

LSS141 Land East Of Nobold Lane, Longden Road, Shrewsbury
DWG 03 Magnetic Data Plot North

ArchaeoPhysica Ltd

Orthographic Centre X: 347461.50 m Centre Y: 310631.03 m Scale: 1:1500 @ A4 Spatial Units: Meter. Do not scale off this drawing



LSS141 Land East Of Nobold Lane, Longden Road, Shrewsbury
DWG 04 Magnetic Data Plot South

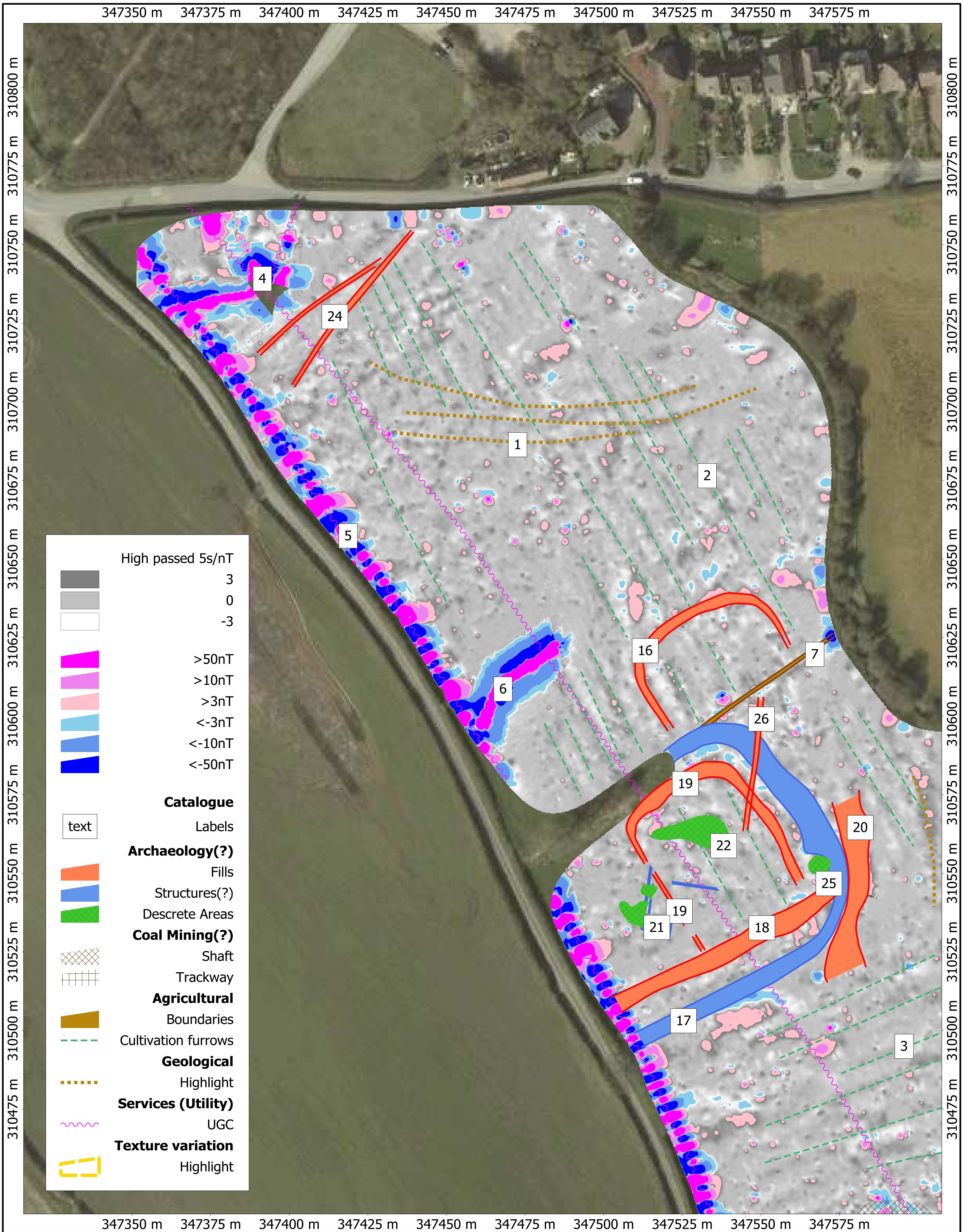
ArchaeoPhysica Ltd

Orthographic Centre X: 347596.04 m Centre Y: 310381.79 m Scale: 1:1500 @ A4 Spatial Units: Meter. Do not scale off this drawing

LSS141 Land East Of Nobold Lane, Longden Road, Shrewsbury
DWG 05 Resistance Data Plot

ArchaeoPhysica Ltd

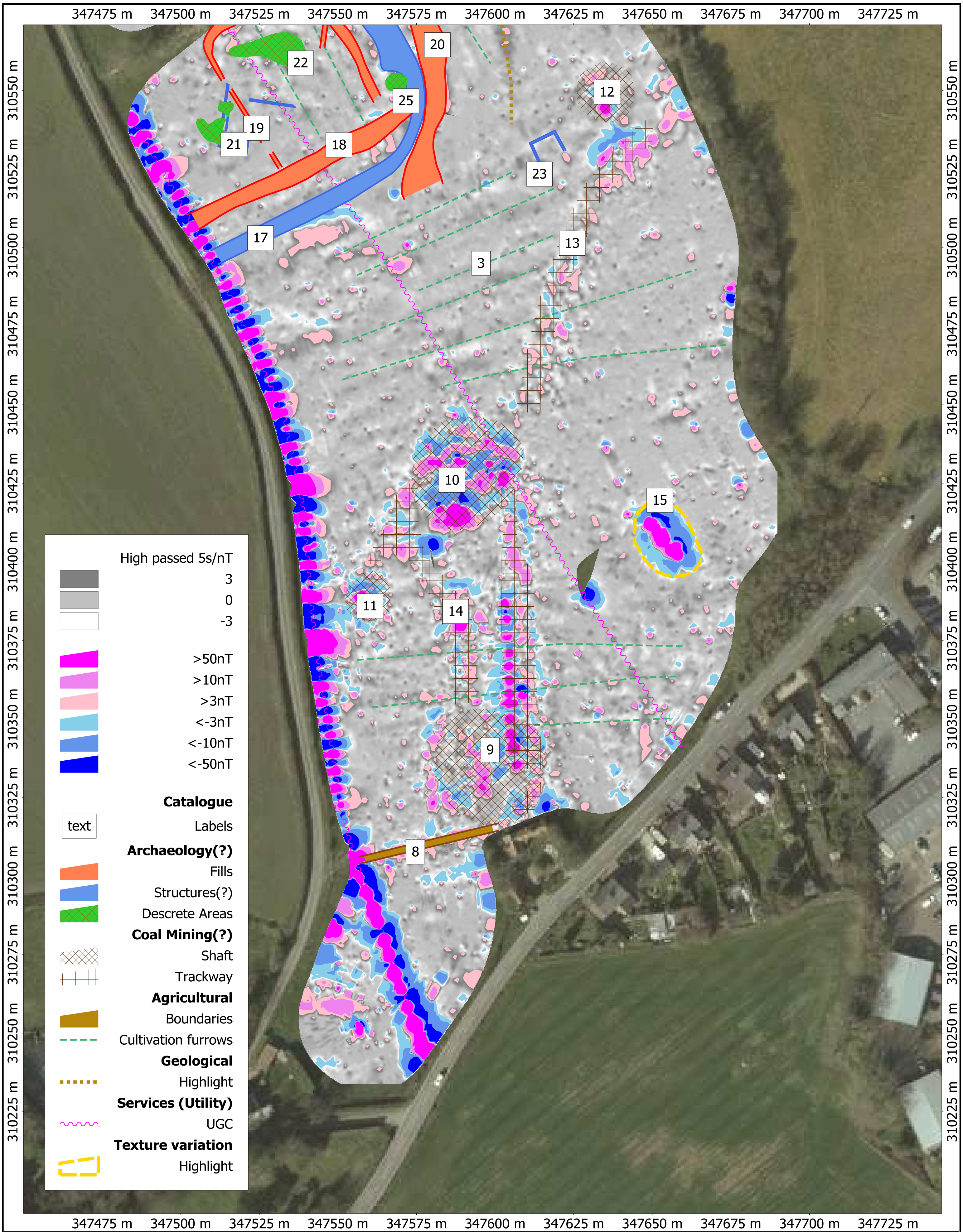
Orthographic Centre X: 347527.78 m Centre Y: 310536.18 m Scale: 1:1000 @ A4 Spatial Units: Meter. Do not scale off this drawing
File: LSS141.map from DELHI 4/7/2014



LSS141 Land East Of Nobold Lane, Longden Road, Shrewsbury
DWG 06 Catalogue Map North

ArchaeoPhysica Ltd

Orthographic Centre X: 347461.50 m Centre Y: 310631.03 m Scale: 1:1500 @ A4 Spatial Units: Meter. Do not scale off this drawing
File: LSS141.map from DELHI 4/7/2014



LSS141 Land East Of Nobold Lane, Longden Road, Shrewsbury
DWG 07 Catalogue Map South

ArchaeoPhysica Ltd

Orthographic Centre X: 347596.04 m Centre Y: 310381.79 m Scale: 1:1500 @ A4 Spatial Units: Meter. Do not scale off this drawing