

**Ropsley Quarry,
Lincolnshire**

**Report on Archaeological Geophysical Survey
2011**

Surveyed by:

**Bartlett-Clark Consultancy
25 Estate Yard, Cuckoo Lane,
North Leigh,
Oxfordshire OX29 6PW
01865 200864**

for:

**Archaeologica Ltd
7 Fosters lane
Bradwell
Milton Keynes MK13 N4D**

on behalf of:

David Jarvis Associates Ltd and Johnston Quarry Group

Ropsley Quarry, Lincolnshire

Report on Archaeological Geophysical Survey 2011

Introduction

This geophysical survey was carried to test for evidence of archaeological features or remains adjacent to the previously worked (but now closed) Ropsley Quarry. The survey covers an area of ground which may be required for a future extension to the quarry. The survey was commissioned by Archaeologica Ltd on behalf of David Jarvis Associates Ltd and Johnston Quarry Group Ltd. Fieldwork for the survey was done on 5-6 May 2011.

The Site

Location and Topography

The survey area is bounded to the west by a minor road, Chain Lane, and to the east by a track known as Long Hollow. The site is located at NGR TF 002365 to the NE of Ropsley village, and about 8km east of Grantham.

The areas specified for investigation consisted of two strips of arable land to the north and south of the disused quarry, as indicated on the survey location plan (figure 1). At the time of the survey the southern strip was sown with a rape crop, which was too dense and fully grown to be walked through with magnetometers. It was possible therefore only to survey the area to the north of the quarry. The survey coverage as actually achieved amounted to 3.3ha (out of c. 4.8ha originally proposed).

The underlying geology is Jurassic Limestone. The site is located on a boundary between Inferior Oolite to the west and Great Oolite to the east. No overlying drift geology appears to be present. The western side of the field is relatively flat (at an elevation which reaches 85m OD at the western boundary), but the ground falls away steeply in the east down to the track in the hollow (at 68m OD). Sites on a bedrock of Jurassic Limestone usually respond well to magnetometer surveying.

Archaeological Background

Previous archaeological findings at the site (as notified to us by Archaeologica Ltd) include an apparent Bronze Age site (Lincolnshire HER no. 34937) located immediately to the north of the existing quarry pit, and near the centre of the survey (NGR TF 0020 3644). This is defined by cropmarks suggesting an enclosure and ring ditch, and also by Early Bronze Age pottery sherds, which have been recovered from the site.

The line of a Roman road to the east and north of the site is also indicated by cropmarks. It crosses Long Hollow at the NE corner of the survey, but the road itself probably does not intersect the survey. Roman sherds have been found within the application site and to the north.

Survey Procedure

The method used for this geophysical investigation was recorded magnetometer surveying, supplemented by background magnetic susceptibility testing. The survey followed standard procedures for these methods, as follows:

Magnetometer survey

The magnetometer readings were collected along transects 1m apart using Bartington 1m fluxgate gradiometers, and are plotted at 25cm intervals along each transect. The results of the survey are presented as a grey scale plot (figure 1), and as a graphical (x-y trace) plot at 1:1250 scale in figure 2. An interpretation of the findings is shown superimposed on figure 2, and is reproduced separately to provide a summary of the findings (figure 3).

The survey plots show the magnetometer readings after standard treatments which include adjustment for irregularities in line spacing caused by variations in the instrument zero setting, and slight linear smoothing. Additional 2D low pass filtering has been applied to the grey scale plot to reduce background noise levels.

Colour coding has been used in the interpretation to distinguish different effects. The interpretation is intended to be schematic and illustrative, and not to reproduce the detail of the grey scale plots. Features are indicated by coloured outlines, or broken lines.

A small number of magnetic anomalies which are not of clearly recent or natural origin are outlined in red. Features of uncertain, and probably natural, origin are shown in a light brown. Strong magnetic disturbances which are likely to be of recent origin are shown in dark brown. Linear markings representing cultivation effects are indicated by broken green lines. Strong magnetic anomalies which appear to represent iron objects are in blue.

Magnetic susceptibility tests

The magnetometer survey was supplemented by a background magnetic susceptibility survey based on readings taken at 30m intervals with a Bartington MS2 meter. Susceptibility readings can (sometimes) be used to provide a broad indication of previously occupied or disturbed areas in which burning associated with past human occupation has enhanced the magnetic susceptibility of the topsoil, although the readings are usually affected also by non-archaeological factors, including geology and land use. A background survey of the kind done here is unlikely to provide any direct evidence for the presence or otherwise of archaeological features, but is undertaken to test the (largely) geologically determined magnetic properties of the soil. This information

provides an indication of the strength of magnetic response to be expected from the site, and can be of help when interpreting the magnetometer survey. Readings are shown on a plot inset in figure 3.

Survey location

The survey grid was set out and tied to the OS grid using a differential GPS system. The plans are therefore geo-referenced, and OS co-ordinates of map locations can be read from the AutoCAD version of the plans which can be supplied with this report.

Results

Cropmarks (copied from a plan supplied to us by Archaeologica Ltd) are indicated (as blue/grey lines) on figure 3 for comparison with the survey findings.

The survey has detected a number of clearly defined findings, as well as ground disturbances of recent or non-archaeological origin, but these only correlate in part with the cropmarks. The survey results confirm that conditions at the site should be favourable for the magnetic detection of archaeological features, as expected on Jurassic limestone. This is demonstrated both by the strength of the magnetic response to apparently minor subsurface disturbances, and also by the magnetic susceptibility readings taken during the survey. These have a mean value of 40 ($\times 10^{-5}$ SI), which is towards the upper end of the range of values commonly found on sedimentary bedrock, and indicates there is a magnetically responsive topsoil.

Findings which are identifiable in the survey plots include a distinct but narrow ditch-like linear feature (labelled A on figure 3). This in part appears (in the grey scale plot) to be slightly discontinuous, as is often the case for magnetic anomalies caused by sections of clay land drain, but towards the north it resembles a continuous ditch. It could perhaps therefore be a former boundary or ditch. It does not correspond to a cropmark, but appears to connect to the north with other linear cropmarks, which continue from the edge of the survey.

Additional linear features towards the east of the survey area at B and C follow the curve of the adjacent hollow way, and may represent a continuation of the western boundary of the hollow way. This survives alongside the quarry and further to the south, but is no longer extant within the survey area and to the north. It is probable therefore that B and C could represent former trackways or ditches relating to the hollow way. The magnetic susceptibility readings are higher in this part of the site than elsewhere (as seen on the plot inset in figure 3), but this is probably a topographic effect reflecting an increased depth of topsoil on the lower ground at the east of the site.

The metalling of a Roman road is unlikely to be detected in a magnetic survey, but side ditches are sometimes detectable. No suitably aligned linear features are visible in the survey, and so it is probable that the road lies immediately outside the survey, as is indicated by the cropmarks.

Various other irregularly distributed magnetic anomalies are marked (in brown) near to both the

eastern and western edges of the survey. These are likely to indicate recent ground disturbances near the field boundaries.

A number of linear markings are visible in the grey scale plot, and are marked on figure 3 in green. Some align with field boundaries, and are likely to be caused by current or recent cultivation (D). Others (E, F) are outlined in red in case (given the presence of nearby cropmarks), they could be of archaeological interest. They are perhaps too indistinct to represent silted ditches, and they do not combine to form a plan suggesting the presence of well preserved ancient ditched enclosures. It is possible therefore that they represent either traces of past cultivation on various alignments, or slight natural variations in the depth of topsoil, perhaps reflecting fissures or irregularities in the surface of the bedrock. We are told that former hand quarrying has taken place around the site, but none of the detected features appear to represent deliberately backfilled pits (which usually contain strongly magnetic debris in the fill). Any such pits are perhaps small, and contain only clean silted fill.

There are also no survey findings to correspond to the ring ditch and other cropmarks which form HER site 34937, which suggests perhaps that the cropmark features could be heavily eroded. [Such features have often previously been detected in surveys on strongly magnetic limestone soils.]

The remaining findings marked on figure 3 are individual magnetic anomalies outlined in red. These can be seen (in the graphical plot, figure 2) to have rounded profiles, and so may indicate silted pits, as are often found at ancient settlement sites. In this case the anomalies are weak and widely dispersed across the site. Some (e.g. G, H) are reasonably distinct, but others are not conclusively distinguishable from the background magnetic activity (as indicated in light brown). It is unlikely therefore that any dense concentrations of archaeological features have been detected by the survey.

Conclusions

The survey has detected a distinct linear magnetic anomaly, perhaps representing a former ditch or boundary at A. The line of this feature is continued by cropmarks to the north of the survey. Other linear features (B, C) which could indicate the former western limit of the hollow way were also detected. There is no evidence of features associated with the Roman road, which lies immediately to the NE of the survey. Other linear markings may relate to cultivation or geology, or could indicate fragmentary traces of enclosures, as suggested by nearby cropmarks. The ring ditch and other cropmarks at site 34937 were not detected, which suggests they are not well preserved. There are no groups or clusters of magnetic anomalies which would suggest the presence of any other concentrations of archaeological features within the area surveyed.

Report by:

A.D.H. Bartlett BSc MPhil

with:

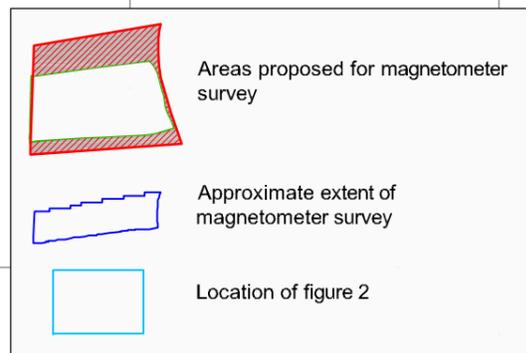
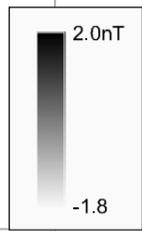
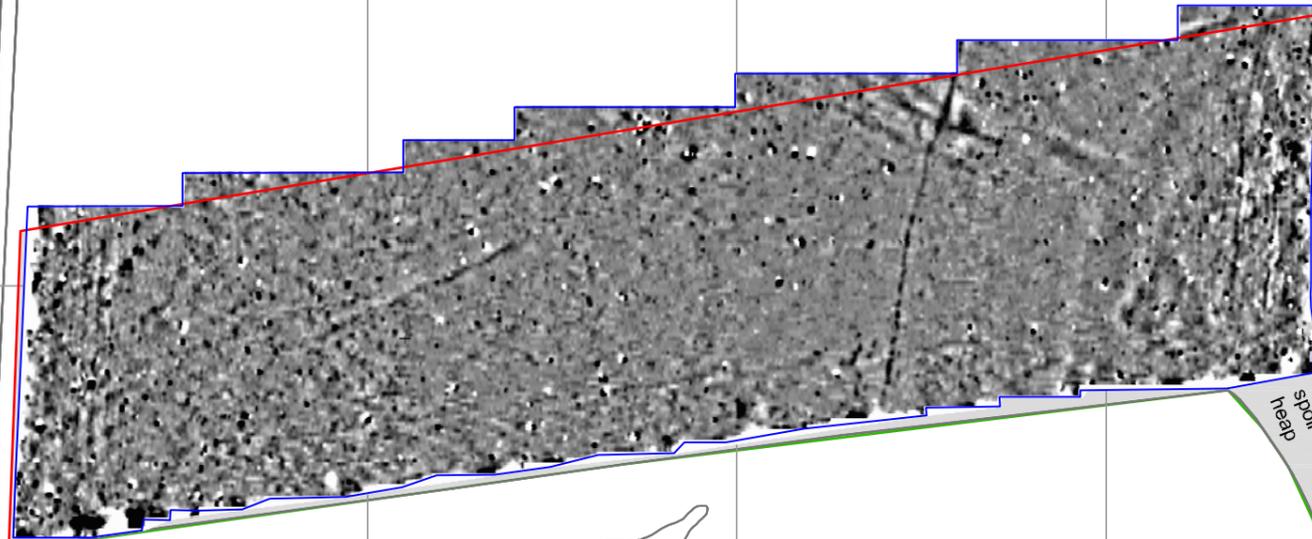
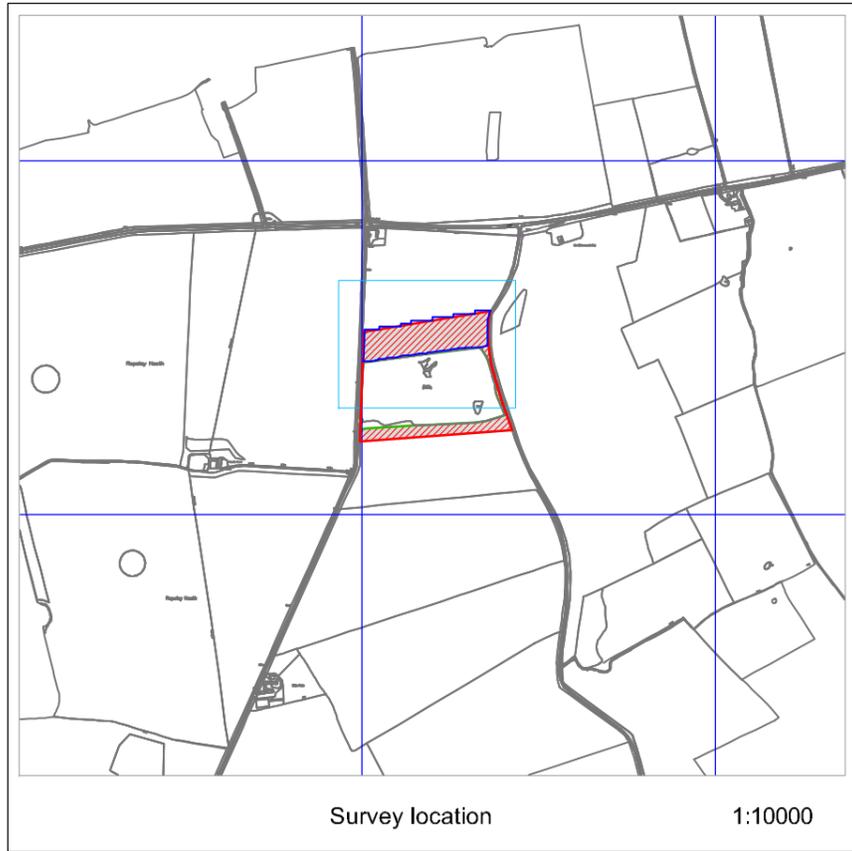
P. Cottrell BA MA

Bartlett - Clark Consultancy
Specialists in Archaeogeophysics
25 Estate Yard
Cuckoo Lane
North Leigh
Oxfordshire
OX29 6PW

01865 200864

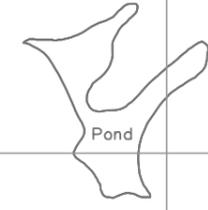
19 May 2011
Revised 22 May 2011

The fieldwork for this project was done by P. Cottrell and C. Oatley.

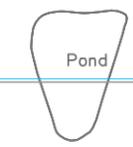


86.5m

80.8m



Quarry (disused)

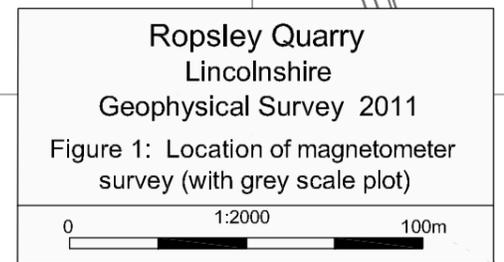


spoil heap

Rape crop - unsurveyable

336400N

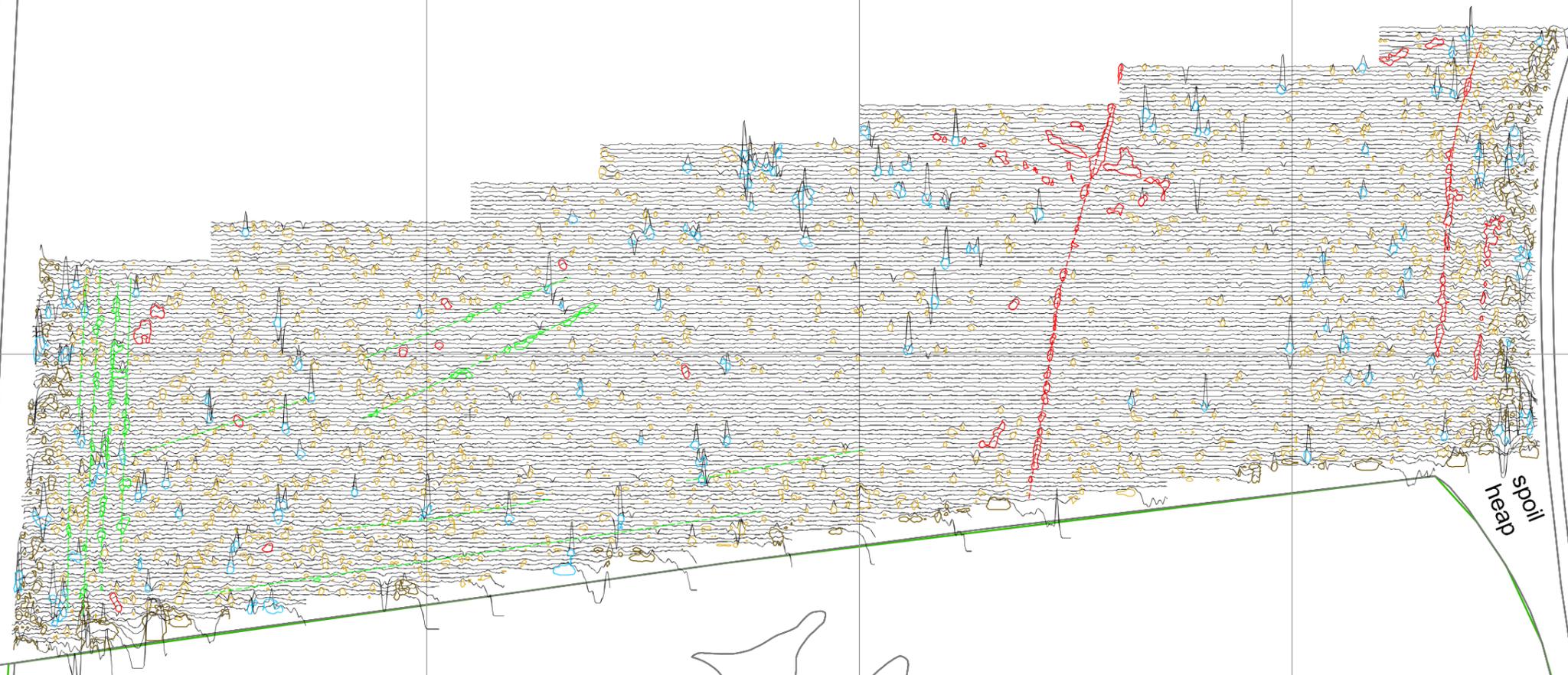
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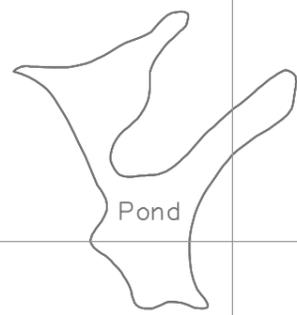
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50 nT

86.5m

-  magnetic anomalies (archaeological ?)
-  magnetic disturbances (recent / non-archaeological)
-  background magnetic activity (natural / non-archaeological ?)
-  cultivation ?
-  strong (ferrous) magnetic anomalies



Pond

Quarry (disused)

spoil heap

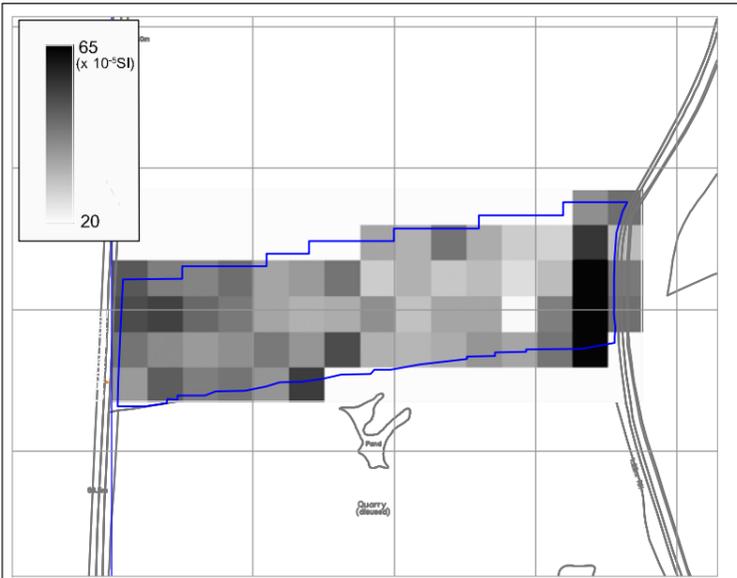
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Ropsley Quarry
Lincolnshire
Geophysical Survey 2011
Figure 2: Magnetometer survey
(with interpretation)



Pond

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Magnetic susceptibility survey

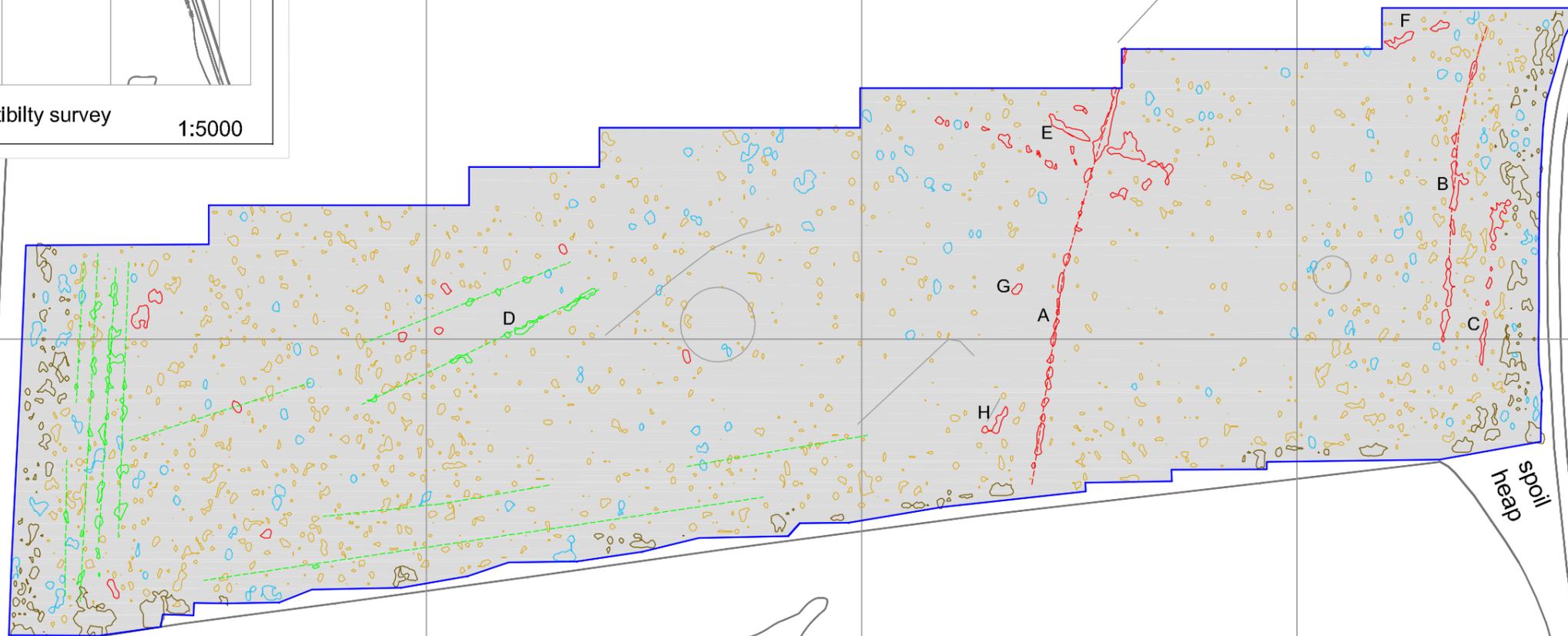
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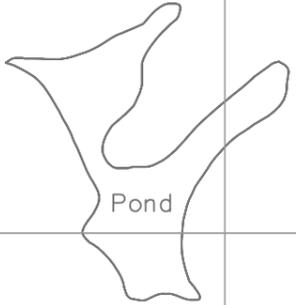
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86.5m



-  magnetic anomalies (archaeological ?)
-  magnetic disturbances (recent / non-archaeological)
-  background magnetic activity (natural / non-archaeological ?)
-  cultivation ?
-  strong (ferrous) magnetic anomalies
-  cropmarks (from plan supplied by Archaeologica Ltd)



Quarry (disused)

spoil heap

A22m Rht

Ropsley Quarry
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Geophysical Survey 2011
Figure 3: Summary of Findings

