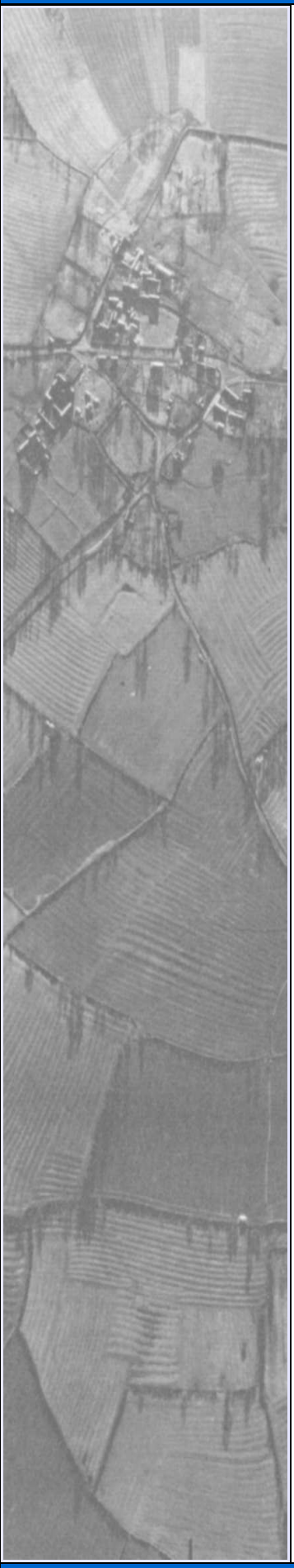

Molehill
Herne Bay
Kent

MAGNETOMETER SURVEY REPORT

for

Neo Environmental Ltd

David Sabin and Kerry Donaldson

March 2014

Ref. no. 532

ARCHAEOLOGICAL SURVEYS LTD

Molehill, Herne Bay, Kent

Magnetometer Survey Report

for

Neo Environmental Ltd

Fieldwork by David Sabin
Report by David Sabin BSc (Hons) MIFA and Kerry Donaldson BSc (Hons)

Survey dates – 12th to 21st March 2014
Ordnance Survey Grid Reference – **TR 14985 66510**

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SUMMARY

A detailed magnetometer survey was carried out by Archaeological Surveys Ltd, at the request of Neo Environmental Ltd, ahead of a development of a solar farm at Molehill near Herne Bay in Kent. The survey was conducted over 24.4ha within a single arable field, although some parts were inaccessible due to waterlogging and deep agricultural ruts. Although the general magnetic response was weak, the results reveal a number of positive linear, curvilinear and discrete anomalies. Two groups of these anomalies are evident in the southern part of the site, with a further group close to the north eastern edge. It is possible that these anomalies relate to cut features, such as ditches and pits and although they are weak and fragmented, an archaeological origin should be considered. The site contains several weakly positive linear and discrete anomalies; however, the majority of these lack a coherent morphology and their origin cannot be determined. Responses to a number of recently removed field boundaries, land drains and natural features are also evident within the results.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Neo Environmental Ltd to undertake a magnetometer survey of an area of land between Herne Bay and Whitstable in Kent. The site has been outlined for the proposed development of a solar farm and the survey forms part of an archaeological assessment of the site.

1.1.2 The geophysical survey was carried out after discussions between Paul Neary of Neo Environmental and Richard Cross, Archaeological Officer for Canterbury City Council. The London Clay geology is often associated with poor magnetic contrast between cut features and the material into which they are cut and a trial survey was initially carried out to see if any geophysical anomalies could be located. The initial data revealed magnetic debris and land drains; however, several weakly positive linear anomalies were also located and the survey was continued across the remainder of the development area.

1.2 Survey objectives and techniques

1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin, so that they may be assessed prior to development of the site. The methodology is considered an efficient and effective approach to archaeological prospection.

1.2.2 The survey and report generally follow the recommendations set out by: English Heritage (2008) *Geophysical survey in archaeological field evaluation;*

and Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations*. The work has been carried out to the Institute for Archaeologists (2011) *Standard and Guidance for Archaeological Geophysical Survey.*

1.3 Site location, description and survey conditions

1.3.1 The site is located at Molehill to the south west of Herne Bay in Kent. It is centred on Ordnance Survey National Grid Reference (OS NGR) TR 14985 66510, see Figures 01 and 02. The site lies between the A2990 to the north and Molehill Road to the south, with agricultural land to the east and west and woodland close to the north western corner of the site.

1.3.2 The geophysical survey covers approximately 24.4ha within a single arable field which contained oil seed rape stubble. The survey was undertaken within the main impact zone which includes the location of the solar arrays, cables, storage areas and maintenance tracks.

1.3.3 The ground conditions varied from waterlogged and boggy within the north western part of the field, to dry and deeply rutted. Self-set rape was also present close to the periphery of the field. The ground conditions impeded survey across some small parts of the site.

1.4 Site history and archaeological potential

1.4.1 The site lies 1km north east of of an area containing Bronze Age, Iron Age and Romano-British occupation. Medieval and post-medieval placenames and settlements are also known in the vicinity. The site was split between five fields until recently with land drains evident on aerial photographs.

1.4.2 Although the site does not contain any designated or undesignated heritage assets, it is possible that the magnetometer survey will locate buried cut features should they exist within the site.

1.5 Geology and soils

1.5.1 The underlying geology is clay and silt from the London Clay Formation with overlying head deposits along the eastern edge of the field (BGS, 2013).

1.5.2 The overlying soils across the site are from the Windsor association which are pelo-stagnogley soils. These consist of slowly permeable, seasonally waterlogged, clayey soils mostly with brown subsoils (Soil Survey of England and Wales, 1983).

1.5.3 Detailed magnetometry carried out over similar geologies and soils have provided variable results. Magnetic susceptibility can be suppressed, with often poor contrast between the fill of cut features and the material into which

they are cut. However, weak naturally formed features and anthropogenically formed features can be located where there is some magnetic contrast.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.

2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.

2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.

2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to 10^{-9} Tesla (T).

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers spaced 0.5m apart with readings recorded at 20 Hz. The gradiometers have a range of recording data between 0.1nT and 10,000nT. The gradiometers are linked to a Leica GS10 RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.

2.3 Data processing and presentation

2.3.1 Due to the large area surveyed, data were separated into three subsets in order to assist processing and presentation. Each subset was processed similarly and used to create separate composite files and associated graphics.

2.3.2 Magnetic data collected by the MAGNETO®MXPDA cart-based system are

initially prepared using SENSYS MAGNETO®DLMGPS software. Georeferenced data are then exported in ASCII format for compensation (destriping), interpolation and clipping using TerraSurveyor. Greyscale images are also produced using TerraSurveyor.

2.3.3 Appendix C contains specific information concerning the survey and data attributes and is derived directly from TerraSurveyor; this should be used in conjunction with information provided by Figure 02.

2.3.4 Only minimal processing is carried out in order to enhance the results of the survey for display. Raw data are always analysed, as processing can modify anomalies. The following schedule sets out the data and image processing used in this survey for the SENSYS MAGNETO data:

- clipping of processed data at ±10nT to enhance low magnitude anomalies,
- zero median traverse at 1.5SD is applied in order to balance readings along each traverse.
- a high pass filter is applied to smooth data and remove survey tracks.

2.3.5 An abstraction and interpretation is offered for all geophysical anomalies located by the survey. A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within each survey area.

2.3.6 Reference should be made to Appendix B for further information on the specific processes carried out on the data. Appendix C metadata includes details on the processing sequence used for each survey area.

2.3.7 The main form of data display prepared for this report is the 'processed' greyscale plot followed by an abstraction and interpretation plot. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.

2.3.8 Data captured with the SENSYS MAGNETO cart-based system are resampled to a resolution of effectively 0.5m between tracks and 0.18m along each survey track. A GeoTIFF file (OSGB36 datum) is produced by TerraSurveyor software.

2.3.9 The raster images are combined with base mapping using ProgeCAD Professional 2014 and AutoCAD LT 2007, creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. The survey results are georeferenced allowing relocation of features using GPS, resection method etc.

2.3.10 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

3 RESULTS

3.1 General assessment of survey results

3.1.1 The detailed magnetic survey was carried out over 24.4ha within a single arable field.

3.1.2 Magnetic anomalies located can be generally classified as positive and negative anomalies of an uncertain origin, anomalies relating to land management, areas of magnetic debris and disturbance and strong discrete dipolar anomalies relating to ferrous objects.

3.2 Statement of data quality

3.2.1 Data are considered representative of the magnetic anomalies present within the site. There are no significant defects within the dataset.

3.3 Data interpretation

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A basic explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross referencing to the abstraction and interpretation plot. CAD layer names are included to aid reference to associated digital files (.dwg/.dxf). Sub-headings are then used to group anomalies with similar characteristics.

Report sub-heading CAD layer names and plot colour	Description and origin of anomalies
Anomalies with an uncertain origin AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN AS-ABST MAG POS UNCERTAIN AS-ABST MAG NEG UNCERTAIN	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
Anomalies relating to land management AS-ABST MAG BOUNDARY AS-ABST MAG LAND DRAIN AS-ABST MAG PAT	Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates a ceramic land drain.
Anomalies associated with magnetic debris	Magnetic debris often appears as areas containing many small

AS-ABST MAG DEBRIS AS-ABST MAG STRONG DIPOLAR 	dipolar anomalies that may range from weak to very strong in magnitude. It often occurs where there has been dumping or ground make-up and is related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, or hearths and may therefore be archaeologically significant. It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin AS-ABST MAG DISTURBANCE 	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically and with hysteresis adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.
Anomalies with a natural origin AS-ABST MAG NATURAL FEATURES	Naturally formed magnetic anomalies are are caused by localised variability in the magnetic susceptibility of soils, subsoils and other drift or solid geologies. Anomalies may be amorphous, linear or curvilinear and may appear 'fluvial' or discrete; the latter are almost impossible to distinguished from pit-like anomalies with an anthropogenic origin. Fluvial, glacial and periglacial processes may be responsible for their formation within drift material and subsoil. Igneous and metamorphic activity can lead to anomalies within more solid geology.

Table 1: List and description of interpretation categories

3.4 List of anomalies

Area centred on OS NGR 614985 166510, see Figures 03 -10.

Anomalies with an uncertain origin

(1) – A group of positive linear and discrete anomalies are located close to the north eastern edge of the survey area. The linear anomalies are very weak (0.5nT) and the discrete anomalies are stronger at 4-6nT. It is possible that they relate to cut features, such as ditches and pits, although their origin is uncertain.

(2) – The survey area contains a number of positive linear and possible curvilinear responses. They are generally weak (<0.5nT) and indistinct and lack a coherent morphology. While some may relate to agricultural anomalies or naturally formed features, cut features cannot be ruled out for others.

(3) – A number of short positive linear and a curvilinear anomalies are located close to the south eastern corner of Purchas Wood. They are short, weak and indistinct and their origin cannot be confidently determined.

(4) – The site contains a number of positive linear anomalies which appear to extend towards former land boundaries. It is possible that these relate to former ditches or drains. They have a stronger response than the majority of anomalies within the site, at 2.5nT, making them more distinct within the data.

(5) – A possible rectilinear anomaly may relate to a cut feature in the central part of the site. It appears to extend towards former field boundary (12) and the short axes are parallel to land drains within this part of the site, and may be associated.

(6) – Located at the southern edge of the survey area are a group of positive linear and discrete anomalies. The linear anomalies have a response of 0.5nT and the discrete anomalies 3-6nT. The morphology of these anomalies suggests that they may relate to cut features, such as ditches and pits and they may have some archaeological potential.

(7) – A group of short or fragmented weakly positive linear, curvilinear and discrete anomalies are located in the southern part of the survey area to the north east of anomalies (6). Some of the responses are up to 2nT, with the majority very weak and fragmented; however, cut features with an archaeological origin should be considered.

(8) – A number of weakly positive linear anomalies are located in the southern part of the survey area. Several are located in the vicinity of, or appear to extend towards, anomalies (7); however, an origin and association cannot be confidently determined.

(9) – Several weakly positive responses are located in the south eastern part of the survey area. They may relate to natural features, although this is not certain.

(10) – The survey area contains a number of discrete positive responses that appear to relate to pit-like anomalies. However, it is not possible to determine if these relate to natural or anthropogenically formed features.

Anomalies relating to land management

(11-13) – The survey area contains a number of recently removed field boundaries. Anomaly (11) is located in the north western part of the site and is associated with magnetic disturbance at its southern end which is a response to ferrous material. Anomalies (12) and (13) are evident as a series of dipolar anomalies, rather than linear anomalies.

(14) – The survey area contains several sets of linear anomalies that relate to land drains. They are most distinct in the northern part of the survey area, while in other parts of the site they are very weak.

Anomalies with a natural origin

(15) – A number of magnetically variable responses can be seen in the northern part of the site, with others further to the south east, the majority of which have not

been abstracted. It is possible that these relate to natural variations in the underlying clay.

Anomalies associated with magnetic debris

(16) – The north western part of the survey area contains widespread magnetic debris, with only the strongest and densest concentrations abstracted. The response is generally confined to a former single field in the north west, with a small spread just to the north east. This is likely to be a response to relatively recent magnetically thermoremnant material such as brick and tile that has been spread across this part of the site.

(17) – Small patches of magnetic debris are located in the southern part of the site. It is not possible to determine if these relate to dumped material or to activity within the site that may have produced magnetically thermoremnant material.

(18) – The survey area contains widespread and numerous strong, discrete, dipolar anomalies which are a response to ferrous and other magnetically thermoremnant objects within the topsoil.

Anomalies with a modern origin

(19) – Magnetic disturbance has been caused by ferrous material associated with electricity poles that extend across the southern part of the survey area.

4 CONCLUSION

4.1.1 The detailed magnetometer survey located a number of positive linear and discrete anomalies in the southern part of the site which may relate to cut features, such as ditches and pits. Another group of responses are located close to the north eastern edge of the site. Generally the response to the linear anomalies is very weak and they appear indistinct and fragmented. The site contains other positive linear anomalies, but the majority of these are very weak and lack a coherent morphology preventing confident interpretation.

4.1.2 A number of recently removed field boundaries are evident as lines of strong discrete dipolar anomalies. Other positive linear anomalies appear to extend towards them and may relate to associated ditches or drains. The site also contains several sets of land drains, some are more distinct than others. Possible natural features are also evident, but they are most distinct in the northern central part of the site.

5 REFERENCES

British Geological Survey, 2014. *Geology of Britain viewer, 1:50 000 scale [online]* available from http://mapapps.bgs.ac.uk/geologyofbritain/home.html [accessed 25/3/2014].

English Heritage, 2008. *Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No.1.* 2nd ed. Swindon: English Heritage.

Institute for Archaeologists, 2002. *The use of Geophysical Techniques in Archaeological Evaluations*. IfA Paper No. 6. IfA, University of Reading.

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Soil Survey of England and Wales, 1983. *Soils of England and Wales, Sheet 6 South East England.*

Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material.

Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field.

Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature. If no enhanced feature is present the field measured by both sensors will be similar and the difference close to zero.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between ±5nT and ±1nT often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero Median/Mean Traverse

The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise slight differences between the set-up and stability of gradiometer sensors and can remove striping. The process can remove archaeological features that run along a traverse so data analysis is also carried out prior its application.

De-stagger

Compensates for small positional errors within data collection by shifting the position of the readings along each traverse by a specified amount. Data lost at the end of each traverse are extrapolated from adjacent value in the same row.

Deslope

Corrects for striping and distortion caused by metal objects/services etc.. The process calculates a curve based on a polynomial best fit mathematical function for each traverse. This curve is then subtracted from the actual data.

Edge Match

Calculates the mean of the 2 lines (rows or columns) of data either side of the edge to match. It then subtracts the difference between the means from all datapoints in the selected area.

FFT (Fast Fourier Transform) spectral filtering

A mathematical process used to determine the frequency components of a traverse. Repetitive features, such as plough marks, produce characteristic spectral zones that can be suppressed allowing greyscale images to appear clearer.

Appendix C – survey and data information

North

COMPOSITE
Path: D:\Business\Jobs\J532 Molehill\Data\Mag\comps\
Filename: J532-mag-proc.xcp
Description: Imported as Composite from: J532-mag.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 31U
Survey corner coordinates (X/Y):
Northwest corner: 614804.000744151, 166902.778671858 m
Southeast corner: 615306.020744151, 166651.318671858 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 1
Dummy Value: 32702

Source GPS Points: 2011300

Dimensions
Composite Size (readings): 2789 x 1397
Survey Size (meters): 502 m x 251 m
Grid Size: 502 m x 251 m
X Interval: 0.18 m
Y Interval: 0.18 m

Stats
Max: 11.05
Min: -11.00
Std Dev: 3.17
Mean: 0.16
Median: 0.03
Composite Area: 12.624 ha
Surveyed Area: 6.9547 ha

PROGRAM
Name: TerraSurveyor
Version: 3.0.23.0

Processes: 1
1 Base Layer

GPS based Proce6
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse: Threshold: 1.5 SDs
4 Clip from -10.00 to 10.00 nT
5 High pass Uniform (median) filter: Window dia: 300
6 Clip from -10.00 to 10.00 nT

Centre

COMPOSITE
Path: D:\Business\Jobs\J532 Molehill\Data\Mag\comps\
Filename: J532-mag2-proc.xcp
Description: Imported as Composite from: J532-mag2.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 31U
Survey corner coordinates (X/Y):
Northwest corner: 614747.037499256, 166716.030638313 m
Southeast corner: 615225.637499256, 166400.430638313 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 1
Dummy Value: 32702

Source GPS Points: 2273700

Dimensions
Composite Size (readings): 2393 x 1578
Survey Size (meters): 479 m x 316 m
Grid Size: 479 m x 316 m
X Interval: 0.2 m
Y Interval: 0.2 m

Stats
Max: 11.05
Min: -11.00
Std Dev: 2.74
Mean: 0.05
Median: -0.03
Composite Area: 15.105 ha
Surveyed Area: 7.6833 ha

Processes: 1
1 Base Layer

GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse: Threshold: 1.5 SDs
4 High pass Uniform (median) filter: Window dia: 300
5 Clip from -10.00 to 10.00 nT

South

COMPOSITE
Path: D:\Business\Jobs\J532 Molehill\Data\Mag\comps\
Filename: J532-mag3-proc.xcp
Description: Imported as Composite from: J532-mag3.asc
Instrument Type: Sensys DLMGPS
Units: nT
UTM Zone: 31U
Survey corner coordinates (X/Y):
Northwest corner: 614719.054921134, 166478.381950245 m
Southeast corner: 615084.094921134, 166093.181950245 m
Direction of 1st Traverse: 90 deg
Collection Method: Parallel
Sensors: 1
Dummy Value: 32702

Source GPS Points: 2631500

Dimensions
Composite Size (readings): 2028 x 2140
Survey Size (meters): 365 m x 385 m
Grid Size: 365 m x 385 m
X Interval: 0.18 m
Y Interval: 0.18 m

Stats
Max: 11.05
Min: -11.00
Std Dev: 2.65
Mean: 0.06
Median: 0.00
Composite Area: 14.061 ha
Surveyed Area: 9.9608 ha

Processes: 1
1 Base Layer

GPS based Proce5
1 Base Layer.
2 Unit Conversion Layer (Lat/Long to OSGB36).
3 DeStripe Median Traverse: Threshold: 1.5 SDs
4 High pass Uniform (median) filter: Window dia: 300
5 Clip from -10.00 to 10.00 nT

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire (see inside cover for address). Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site.

Surveys are reported on in hardcopy (recycled paper) using A4 for text and A3 for plots (all plots are scaled for A3). The distribution of both hardcopy report and digital data is considered the responsibility of the Client unless explicitly stated in the survey Brief, Written Scheme of Investigation or other contractual agreement.

This report has been prepared using the following software on a Windows XP platform:

- TerraSurveyor version 3.0.23.0 (geophysical data analysis),
- SENSYS MAGNETO®ARCH version 1.00-04 (geophysical data analysis),
- ProgeCAD Professional 2014 (report graphics),
- AutoCAD LT 2007 (report figures),
- OpenOffice.org 3.0.1 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

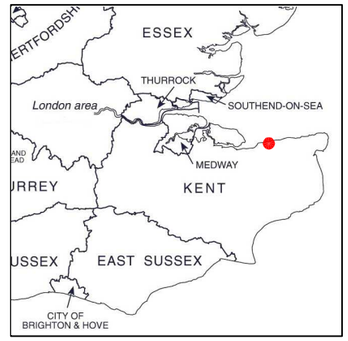
Digital data produced by the survey and report include the following files:

- TerraSurveyor grid and composite files for all geophysical data,
- CSV files for raw and processed composites,
- geophysical composite file graphics as Bitmap images,
- AutoCAD DWG files in 2000 and 2007 versions,
- report text as OpenOffice.org ODT file,
- report text as Word 2000 doc file,
- report text as rich text format (RTF),
- report text as PDF,
- PDFs of all figures.

Archaeological Surveys Ltd

Geophysical Survey
Molehill
Herne Bay
Kent

Map of survey area



● Survey location

Site centred on OS NGR
TR 14985 66510

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01

Archaeological Surveys Ltd

Geophysical Survey
Molehill
Herne Bay
Kent

Referencing information

Data collected at 20Hz and georeferenced to ETRS89 zone 30 with conversion to OSGB36 using OSTN02

Referencing grid to OSGB36 datum at 50m intervals

- 614800 106500

SCALE 1:5000

0m 100 200m

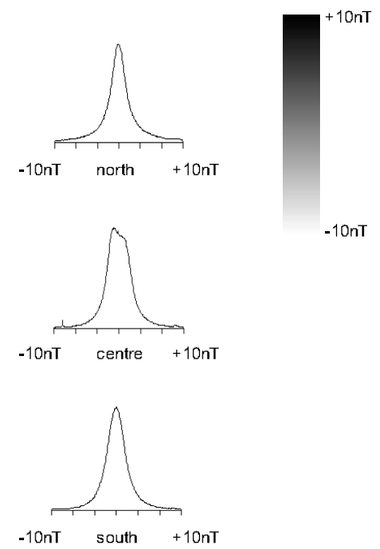
SCALE TRUE AT A3

FIG 02

Archaeological Surveys Ltd

Geophysical Survey
Molehill
Herne Bay
Kent

Greyscale plot of processed magnetometer data



N

West End

SCALE 1:3000

0m 20 40 60 80 100m

SCALE TRUE AT A3

FIG 03

Archaeological Surveys Ltd

Geophysical Survey
Molehill
Herne Bay
Kent

Abstraction and interpretation of magnetometer anomalies

- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - possible land drain
- Positive linear anomaly - possible former field boundary
- Discrete positive response - possible pit-like feature
- Positive anomaly - magnetically enhanced material
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:3000

0m 20 40 60 80 100m

SCALE TRUE AT A3

FIG 04

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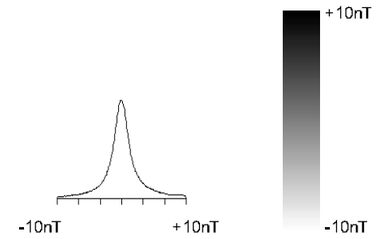
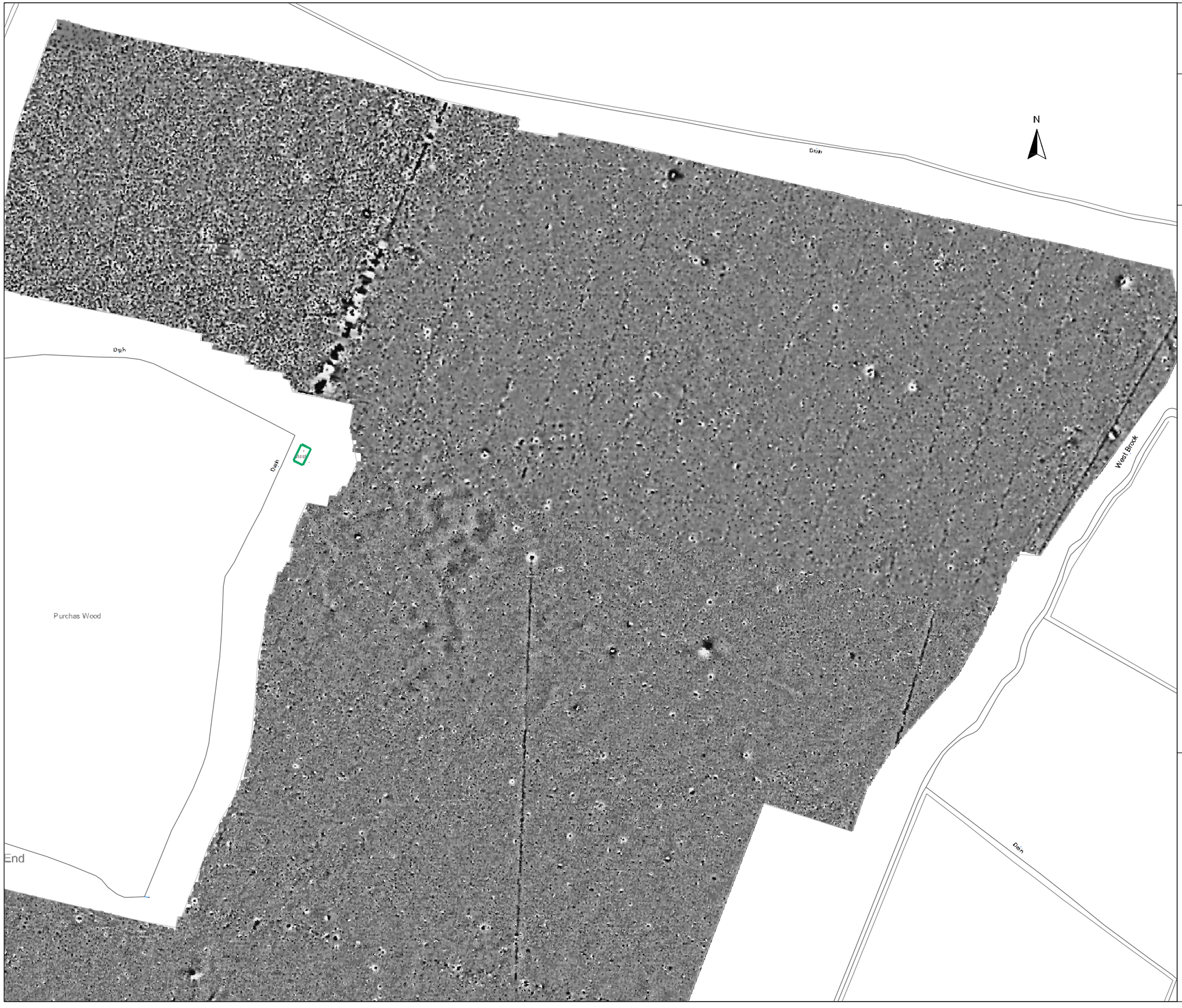
Kent

Greyscale plot of processed magnetometer data - north





SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 05

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Herne Bay
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Abstraction and interpretation of magnetometer anomalies

- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - possible land drain
- Positive linear anomaly - possible former field boundary
- Discrete positive response - possible pit-like feature
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 06

N

Drain

Drain

Drain

Drain

West Brook

Purchas Wood

End

16

2

11

10

14

2

4

1

15

2

4

3

4

12

5

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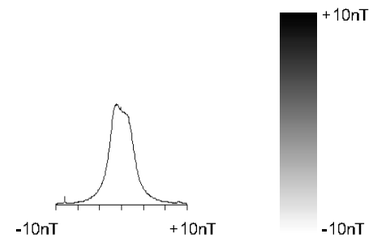
Molehill
Herne Bay
Kent

Greyscale plot of processed magnetometer data



Purchas Wood

West End

Ditch

Ditch

N

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 07

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Geophysical Survey
Molehill
Herne Bay
Kent

Abstraction and interpretation of magnetometer anomalies - centre

- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - possible land drain
- Positive linear anomaly - possible former field boundary
- Discrete positive response - possible pit-like feature
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 08

N

Purchas Wood

West End

Drain

Drain

Drain

10 15 2 4 3 4 12 5 18 2 10 2 17 19 4

Archaeological Surveys Ltd

Geophysical Survey
Molehill
Herne Bay
Kent

Greyscale plot of processed magnetometer data - south

+10nT

-10nT +10nT

-10nT

N

Red House

Pond

Drain

West Brook

Ash Plantation

West End

MOLEHILL ROAD

Drain

Drain

Co Const. ED & West Bry

CP

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 09

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Geophysical Survey
Molehill
Herne Bay
Kent

Abstraction and interpretation of magnetometer anomalies - south

- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - possible land drain
- Positive linear anomaly - possible former field boundary
- Discrete positive response - possible pit-like feature
- Positive anomaly - magnetically enhanced material
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 10

N

18
2
10
2
17
19
13
4
14
8
10
7
6
16
9

Red House
Drain
Pond
West Brook
Drain
Co Const, ED & Ward Bdy
CF
Ash Plantation
West End
Drain
MOLEHILL ROAD
11.6m