Appendix 16.1 Geophysical Survey Report

GEOPHYSICAL SURVEY

REPORT

Kilcarbery Grange Project,

Co. Dublin

Date:
02/05/2017

Licence: 17R0016

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GEOPHYSICAL SURVEY SUMMARY SHEET
KILCARBERY GRANGE PROJECT, CLONDALKIN
COUNTY DUBLIN

Site Name	Kilcarbery Grange Project	**Ref No.**	17003
Townland	Nangor, Kilcarbery and Deansrath	**Licence No.**	17-R-0016
County	Dublin	**Licence Holder**	Joanna Leigh
ITM (centre)	E705164, N730797	**Purpose**	Pre-planning investigation
Client	South Dublin County Council	**Reference No.**	N/A

Ground Conditions	Survey area was cut and cleared by South Dublin County Council to aid the survey.
Survey Type	Detailed gradiometer survey of the application area, totalling 35 hectares.

Summary of Results

The site was littered with modern ferrous debris, including areas of burnt out cars, prams and mattresses etc. The modern litter has resulted in a data set comprising of mostly modern ferrous responses.

Although modern disturbance dominates the data, some responses of interest were recorded. Linear responses and trends are indicative of former boundary features. In the south of the application area (Areas I & J), responses suggestive of former boundaries were also identified and it is possible that a former field system is represented here.

Report Date	02/05/2017	**Report Author**	Joanna Leigh

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Geophysical Survey Report

Kilcarbery Grange Project, Clondalkin,
County Dublin

1 Introduction

1.1 A geophysical survey has been conducted by J. M. Leigh Surveys at a site to the south of Corkagh Park, known as Kilcarbery Grange. The survey has been undertaken on behalf of South Dublin County Council for the Kilcarbery Grange Project. The site is located within the townlands of Nangor, Kilcarbery and Deansrath, to the west of Clondalkin village and to the north of Corkagh Park, County Dublin. South Dublin County Council proposes to develop the lands for housing and the proposed survey shall form part of a wider archaeological study by Dermot Nelis Archaeology. The location of the application area is presented in Figure 1, at a scale of 1:4,000.

1.2 There are no recorded monuments within the application area. Recorded monuments in the vicinity include a castle (DU017:037), located c.200m to the north-west, and a medieval field system (DU017:082) c.400m to the north-west. To the south of the application area, in the townland of Corkagh Demesne, lies a habitation site (DU021:012), identified during excavations for a gas pipeline. Within Corkagh Park there is a recorded castle (DU021:011001) and associated moated site (DU0210112).

SMR No.	Class	Townland	ITM (E)	ITM (N)
DU017-037----	Castle	NANGOR	704527	731166
DU017-082----	Field system	NANGOR	704328	731197
DU021-008----	Mill - unclassified	FAIRVIEW	705863	730828
DU021-009----	Well	FAIRVIEW	705955	730915
DU021-011001-	Castle	CORKAGH DEMESNE	705516	730212
DU021-011002-	Moated site	CORKAGH DEMESNE	705515	730215
DU021-011003-	Mill - unclassified	CORKAGH DEMESNE	705514	730212
DU021-012----	Habitation site	CORKAGH DEMESNE	705849	730324

1.3 The aim of the survey was to locate and identify any geophysical responses of potential archaeological origin. The results of the geophysical survey shall be used to inform the test trench excavation methodology.

2 Survey ground conditions and further information

2.1 Modern ferrous litter and debris was scattered across the application area. In addition, areas of burnt out cars, mattresses and other burnt material was encountered across the site. Although modern material was evident, the site had been cut and cleared of vegetation and, as such, ground conditions were suitable.

2.2 12 fields were contained within the application area, of which detailed survey in 10 fields was conducted (Areas A-J). The location of the survey areas is presented in Figure 1, at a scale of 1:4,000. The field in the north-west corner of the application area was unsuitable, with very uneven terrain. The field in the north-east corner was also unsuitable. No survey was completed where poor ground conditions prevailed.

2.3 All of the fields surveyed (Areas A-J) comprised of a level topography with dense hedgerow field boundaries on flat terrain. There were no topographic features noted during the fieldwork.

3 Survey Methodology

3.1 A detailed gradiometer survey detects subtle variations in the local magnetic field and measurements are recorded in nano-Tesla (nT). Some archaeological features such as ditches, large pits and fired features have an enhanced magnetic signal and can be detected through recorded survey.

3.2 Data was collected with a Bartington Grad 601-2 instrument. This is a specifically designed gradiometer for use in archaeological prospection. The gradiometer operates with a dual sensor capacity making survey fast and effective.

3.3 The instrument is calibrated in the field to ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.01nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions.

3.4 All data was collected in ‘zigzag’ traverses. Grid orientation remained constant throughout each field to facilitate the data display and interpretation.

3.5 Data was collected with a sample interval of 0.25m and a traverse interval of 1m, providing 6400 readings per 40m x 40m grid. The survey grid was set-out using a GPS VRS unit. Survey tie-in information is available upon request.

3.6 The survey methodology, data presentation and report content adheres to the European Archaeological Council (EAC) (2015) '*Guidelines for the use of Geophysics in Archaeology*'.

4 Data display

4.1 A summary greyscale image and accompanying interpretation diagram are presented in Figures 2 and 3, at a scale of 1:2,500.

4.2 Numbers in parenthesis in the test refer to specific responses highlighted in the interpretation diagram (Figure 3).

4.3 Isolated ferrous responses highlighted in the interpretation diagram most likely represent modern ferrous litter and debris and are not of archaeological interest. These are not discussed in the text unless considered relevant.

4.4 The raw gradiometer data is available upon request as a series of archive diagrams. The raw data is displayed as a greyscale image and xy-trace plot, both at a larger scale of 1:500. The archive plots are used to aid interpretation of the results and are for reference only. These plots are available as PDF images upon request.

4.5 The display formats referred to above and the interpretation categories are discussed in the summary technical information section at the end of this report.

5 Survey Results

5.1 Much of the data is dominated by magnetic disturbance resulting from modern activities. Although the magnetic disturbance complicates much of the data, some responses of potential interest, representing probable former agricultural activity, have been identified.

Areas A, B & C

5.2 Areas A, B and C comprise of significant magnetic disturbance. This is consistent with an overburden of modern material. No responses of potential interest can be identified within the magnetic disturbance.

Areas D, E & F

5.3 Area D does not have the magnetic disturbance present in Areas A, B and C. Some broad magnetic ferrous responses were identified, which result from modern material. However, faint linear trends and a ditch-type response (1) were recorded. These are typical of former field divisions and are thought to be agricultural in origin.

5.4 Further trends in Area D have no clear pattern or form and may represent natural variations in the sub-soil.

5.5 No responses of interest were recorded in Areas E and F. Modern ferrous responses and magnetic disturbance dominates the data.

Areas G & H

5.6 A linear response (2) in Area G is suggestive of a former boundary or drainage feature. A faint linear trend (3) is parallel with (2) and most likely represents the remains of a boundary ditch. Further parallel linear trends (4) in Area G may represent ploughing activity. These do not appear to correspond with the probable boundary features (2) and (3), and may represent a different phase of agricultural activity.

5.7 No responses or trends of potential interest were recorded in Area H.

Areas I & J

5.8 Areas I and J have several responses of interest which suggest former field divisions. A linear response (5) in Area I appears to continue into Area J and meets the responses (6) and (7). These are indicative of ditched boundary features. In Area I, a linear trend (8) is parallel with (5) and may represent an associated boundary ditch. These responses may represent a former field system, although this is speculative.

5.9 Further responses in Areas I and J may be of interest. A series of fragmented responses (9) forms a short linear pattern. A faint linear trend (10) is perpendicular with (9) and may be associated. These are suggestive of former field boundaries.

5.10 In the south-east of Area I there is a short linear response (11) and faint circular trend. Interpretation is tentative as the responses are at the limits of instrument detection. However, it is possible that plough damaged archaeological remains are located here.

5.11 In the south of Area J there is a large isolated response (12). Although it is likely that this represents further modern ferrous debris, the magnetic strength of the response is characteristic of a large pit feature. Interpretation is tentative but must be considered.

5.12 Responses resulting from modern activity are also present in Areas I and J. Along the north-east of Area J, magnetic disturbance (13) results from the remains of a boundary fence.

5.13 Along the southern edge of Area I, magnetic disturbance (14) results from a modern pipe and a spread of disturbance (15) may represent a ploughed out modern boundary or possible drainage ditch feature.

6 Conclusion

6.1 Much of the data is dominated by modern magnetic disturbance. Areas A, B and C suggest an overburden of modern material and no responses of interest can be discerned from the data. The magnetic disturbance here may mask any subtle responses.

6.2 Elsewhere, few responses of interest were recorded. Agricultural activity in the form of former field divisions and ploughing trends were recorded in Areas D and G.

6.3 The most interesting responses were recorded in Areas I and J. Linear responses and trends suggest possible former field boundaries and may represent a former field system, although this is speculative. The responses recorded are not indicative of habitation activity and it is most likely that agricultural practices are represented in the data.

6.4 Consultation with a licensed archaeologist and with the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs is recommended to establish if any additional archaeological works are required.

Technical Information Section

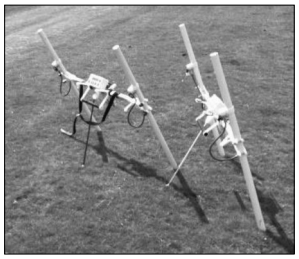
Instrumentation & Methodology

Detailed Gradiometer Survey

This is conducted to clearly define any responses detected during scanning, or can be applied as a stand-alone methodology. Detailed survey is often applied with a sample interval of 0.25m and a traverse interval of 1m. This allows detection of potential archaeological responses. Data is collected in grids 40m x 40m, and data is displayed accordingly. A more detailed survey methodology may be applied where archaeological remains are thought likely. A survey with a grid size of 10m x 10m and a traverse interval of 0.5m will provide a data set with high resolution.

Bartington GRAD 601-2

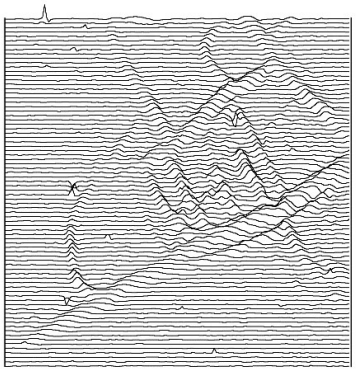
The Bartington Grad 601-2 instrument is a specifically designed gradiometer for use in archaeological prospection. The gradiometer operates with a dual sensor capacity making survey very fast and effective. The sensors have a separation of 1m allowing greater sensitivity.



Frequent realignment of the instruments and zero drift correction; ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.1nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions.

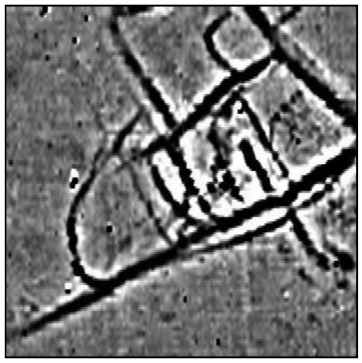
Gradiometer Data Display & Presentation

XY Trace



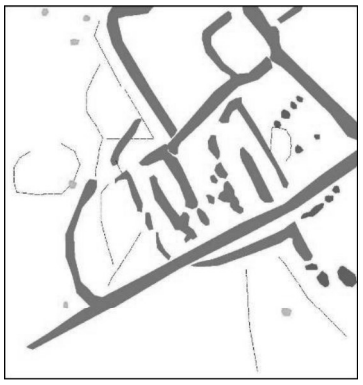
The data are presented as a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y-axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set.

*Greyscale**



As with dot density plots, the greyscale format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection. In the summary diagrams processed, interpolated data is presented. Raw un-interpolated data is presented in the archive drawings along with the xy-trace plots.

Interpretation



An interpretation of the data is made using many of the plots presented in the final report, in addition to examination of the raw and processed data. The project managers' knowledge and experience allows a detailed interpretation of the survey results with respect to archaeological potential.

**XY Trace and raw greyscale plots are presented in archive form for display of the raw survey data. Summary greyscale images of the interpolated data are included for presentation purposes and to assist interpretation.*

Glossary of Interpretation Terms

Archaeology

This category refers to responses which are interpreted as of clear archaeological potential, and are supported by further archaeological evidence such as aerial photography or excavation. The term is generally associated with significant concentrations of former settlement, such as ditched enclosures, storage pits and associated features.

? Archaeology

This term corresponds to anomalies that display typical archaeological patterns where no record of comparative archaeological evidence is available. In some cases, it may prove difficult to distinguish between these and evidence of more recent activity also visible in the data.

? Industrial

Such anomalies generally possess a strong magnetic response and may equate with archaeological features such as kilns, furnaces, concentrations of fired debris and associated industrial material.

Area of Increased Magnetic Response

These responses often lack any distinctive archaeological form, and it is therefore difficult to assign any specific interpretation. The resulting responses are site specific, possibly associated with concentrations of archaeological debris or more recent disturbance to underlying archaeological features.

Trend

This category refers to low-level magnetic responses barely visible above the magnetic background of the soil. Interpretation is tentative, as these anomalies are often at the limits of instrument detection.

Ploughing/Ridge & Furrow

Visible as a series of linear responses, these anomalies equate with recent or archaeological cultivation activity.

? Natural

A broad response resulting from localised natural variations in the magnetic background of the subsoil; presenting as broad amorphous responses most likely resulting from geological features.

Ferrous Response

These anomalies exhibit a typically strong magnetic response, often referred to as 'iron spikes,' and are the result of modern metal debris located within the topsoil.

Area of Magnetic Disturbance

This term refers to large-scale magnetic interference from existing services or structures. The extent of this interference may in some cases obscure anomalies of potential archaeological interest.

Bibliography

European Archaeological Council (EAC) (2015) '*Guidelines for the use of Geophysics in Archaeology*' by Armin Schmidt, Paul Linford, Neil Linford, Andrew David, Chris Gaffney, Apostolos Sarris and Jörg Fassbinder.

English Heritage (2008) '*Geophysical guidelines: Geophysical Survey in Archaeological Field Evaluation*.' Second Edition.

Gaffney, C. Gater, J. & Ovenden, S. (2006) '*The use of Geophysical Techniques in Archaeological Evaluations.*' IFA Paper No. 6.

Gaffney, C & Gater, J (2003). '*Revealing the buried past: Geophysics for Archaeologists*.' Tempus Publishing Limited.

National Soil Survey of Ireland (1980) *General soil map second edition (1:575,000)*. An Foras Taluntais.

List of Figures

Application area

Detailed gradiometer Survey

Unsuitable for survey Poor ground conditions

0 metres 160

Client: South Dublin County Council

Project: Kilcarbery Grange Project

Title: Site Location Diagram

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Scale @ A3:	1:4,000
Figure:	1
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0 metres 100

Client: South Dublin County Council

Project: Kilcarbery Grange Project

Title: Summary Greyscale Image

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Scale @ A3:	1:2,500
Figure:	2
Licence No's.:	17R0016
Issue Date:	02.05.2017

Client: South Dublin County Council

Project: Kilcarbery Grange Project

Title: Summary Interpretation

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Scale @ A3:	1:2,500
Figure:	3
Licence No's.:	17R0016
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