Dinas Dinlle
Llandwrog

Geophysical Survey

PN: GAT-19-DIN

August 2019

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Project reference	**GAT-19-DIN**
On behalf of	**Gwynedd Archaeological Trust**
Report prepared by	**Nigel Barker BA, MA**
GAT ref	**G2608**

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1 Contents

CAD Drawings: GAT-19-DIN

- Drawing GAT-19-DIN.01 (A3) Site Location & Survey Extents
- Drawing GAT-19-DIN.02 (A3) 1:400 Earth Resistance Data
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2 Summary

This report presents the results of a geophysical survey undertaken at Dinas Dinlle Hillfort, Llandwrog, Gwynedd.

The earth resistance survey covered approximately 1,567m^2 centred on NGR SH 4371 5639, and included the location of a circular mound in the northeast corner of the hillfort's interior as well as a section of the eastern defensive rampart.

The survey detected high resistance readings over the mound as well as the section of defensive rampart. The rampart and the southern section of the mound both yielded very high values, possibly inferring the presence of a higher concentration of resistive materials such as stone infill. Part of the mound interior proved to be of average resistance that could suggest that the resistive material in this area could have been excavated out at some point.

Several additional weak and low resistance anomalies have also been identified within the data. All have insufficient characteristics within the limited survey area to be readily identified as archaeological, however their context within the hillfort interior does make it a possibility.

3 Introduction

A geophysical survey was commissioned by Gwynedd Archaeological Trust as part of the Climate Change and Coastal Heritage (CHERISH) project. CHERISH is a five-year project between the Royal Commission on the Ancient and Historical Monuments of Wales; the Discovery Program, Ireland, Aberystwyth University: Department of Geography and Earth Sciences and Geological Survey Ireland.

3.1 Location and land use

The survey area was located at Dinas Dinlle Hillfort, Llandwrog and measured approximately 1,567m^2 centred on NGR SH 4371 5639, encompassing the location of a circular mound in the northeast corner of the hillfort's interior as well as a section of the eastern defensive rampart. The hillfort is a scheduled monument (Ref: CN048) and is built on an isolated hill. The fort was defended by two earth ramparts that are visible from the south and east, but which have been lost to costal erosion to the seaward side. A Second World War 'Seagull Trench' is sited in the north of the fort that provided defence for the former RAF Llandwrog located nearby. The area stood as grassed pasture at the time of the survey.

3.2 Site history

The site has never formally excavated but sherds of Roman pottery have been recovered suggesting occupation in the 2nd and 3rd centuries AD. In the 20th century the monument was part of the Dinas Dinlle golf course and the 'seagull trench' was incorporated into the northern defences during the Second World War.

Two gradiometer surveys have previously been undertaken over the hillfort. The surveys identified several possible roundhouses and stony banks within the interior.

3.3 Geology and soils

The underlying geology of the site comprises Pleistocene / Quaternary landform assemblage and associated subsurface which is of national importance and is a designated Site of Special Scientific Interest (SSSI), due to its unique sequence of glacial deposits.

3.4 Dates and additional information

The earth resistance survey was undertaken on 13th August 2019, under fine weather conditions. The work was undertaken with the assistance of volunteers as part of an outreach strategy.

4 Field Methodology

4.1 Geomatic referencing

The data was collected over 20m x 20m survey grids that were established by Gwynedd Archaeological Trust using a Trimble GPS system. Surface flags were used to define the corner points of the grid and measuring tapes were used for heading and positional markers.

4.2 Technique:

4.2.1 Earth Resistance Survey

Earth resistance surveys are undertaken to locate buried archaeological features such as walls, cists and roads as well as graves and ditches under favourable ground conditions. The survey was practiced in accordance with Historic England (2008) Guideline No 1, *Geophysical survey in archaeological field evaluation*, and the Charted Institute for Archaeologists (2014), *Standard and guidance for archaeological geophysical survey*.

4.2.1.1 Instrumentation

A Geoscan Research RM15 twin array resistance meter was used to undertake the earth resistance survey.

4.2.1.2 Data Collection

The earth resistance data was collected over the pre-determined grid using measuring tapes. Readings were taken at 0.5m increments spaced on 1m traverses using a zig-zag collection method. The electrode separation was 0.5m using a 0.1ohm sensitivity. The 0.5m twin array can detect structures at a depth of 0.5 to 1m, with only the more substantial features showing up at greater depth.

4.2.1.3 Post-processing

The data collected by the instrument was imported into TerraSurveyor software. Processing was kept to a minimum to prevent the creation of artificial artefacts in the data with a basic interpolation added to make the data plot less pixelated.

4.2.1.4 Data presentation

The data was clipped at a narrow range to show weaker features and at a wider range to isolate very strong responses. Both are presented as 1:400 plots in drawing GAT-19-DIN.02.

5 Results

The interpretation of the earth resistance data is shown in drawing GAT-19-DIN.03.

5.1 High and very high earth resistance anomalies

High resistance anomalies are often interpreted as buried features which have a low conductivity or moisture content, such as stone walls, concentrations of rubble or compacted trackways and mounds.

Anomaly A is located in the northeast corner of the survey area and correlates with the position of the defensive earth rampart. The values of anomaly A are very high in comparison to the background mean and could infer a high concentration of resistive materials such as a possible rubble core incorporated within the bank.

Anomaly B is a large area of high resistance located in the centre of the data and corresponds to the position of the circular mound present on the surface. The high values could be from the compacted nature of the mound but may also infer the presence of

resistive materials such as stone. The resistance values become very high in the south of anomaly and are comparable to those of Anomaly A. It is therefore possible that there could be a higher accumulation of resistive materials in this area. It is also of note that the centre of Anomaly A can be seen to produce levels of resistance relative the background values, possibly suggesting that this area has been excavated out.

Elsewhere within the data, isolated responses with high resistance values are present that are likely to be associated with near surface stone deposits.

5.2 Weak earth resistance anomalies

Several weak linear and curvilinear anomalies were identified within the data; however, they have insufficient shape and form within the limited survey area for them to be readily identified as archaeological.

5.3 Low earth resistance anomalies

Low earth resistance anomalies are usually associated with buried features with an enhanced moisture level such as cut ditches, graves and pits.

Three linear anomalies of low earth resistance were identified in the southeast of the survey area. All three have similar values to the background mean therefore it is unclear if they are derived from cut features.

6 Conclusions

The earth resistance survey produced strong resistance anomalies over the circular mound as well as the section of defensive rampart. The section of rampart and the southern section of the mound both yielded very high values possibly inferring the presence of a higher concentration of resistive materials. The interior of the mound proved to be of average resistance suggestive that this area could have been excavated out at some point.

Several weak linear and curvilinear anomalies have also been identified within the data along with three low resistance linear features. All have insufficient characteristics within the limited survey area to readily identify them as archaeological, however their context within the hillfort interior does make it a possibility.

7 References

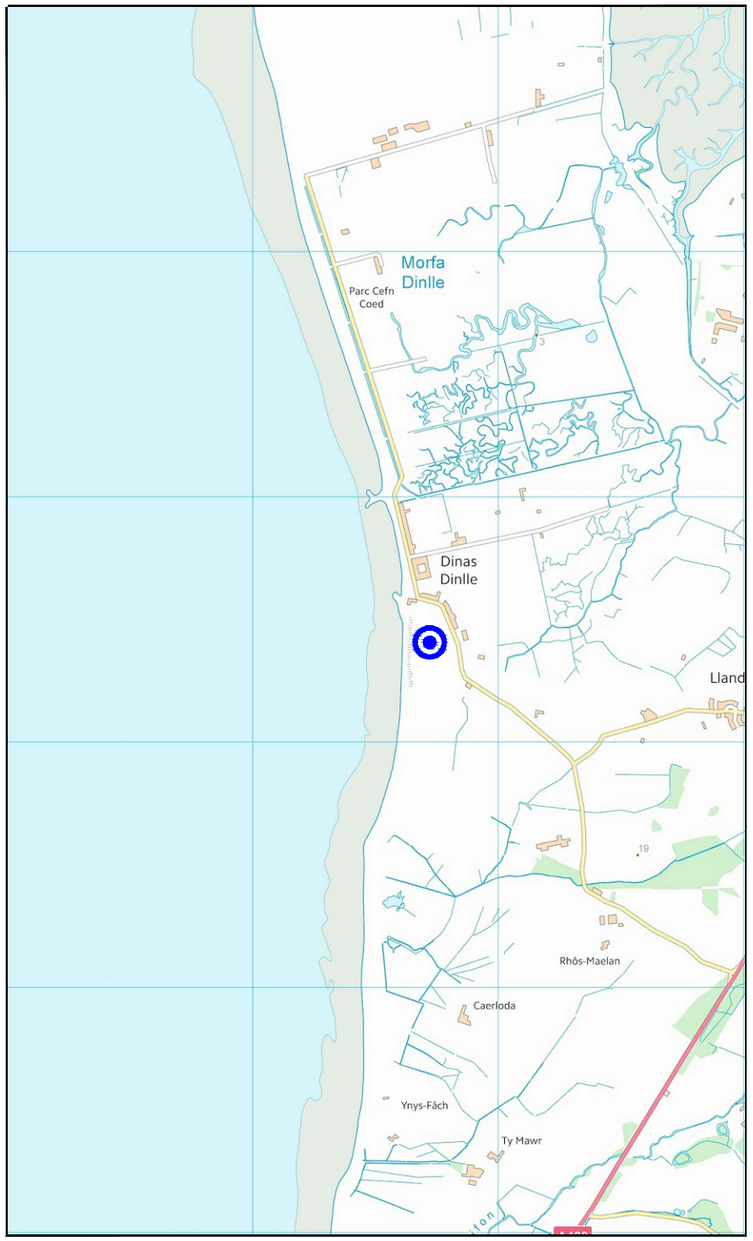
Historic England (English Heritage 2008) Geophysical Survey in Archaeological Field Evaluation. Research and Professional Services Guideline #1.

Institute of Field Archaeologists (2002) IFA Paper No 6, The use of geophysical techniques in archaeological evaluations.

Charted Institute of Archaeologists (2014) Standard and Guidance for Archaeological Geophysical Survey.

Hopewell, D (2018): Geophysical Survey at Dinas Dinlle Hillfort, Llandwrog, Gwynedd. GAT Report 1434

Natural Resources Wales: Dinas Dinlle Site of Special Scientific Interest: notification. https://naturalresources.wales/media/647627/SSSI_0616_SMS_EN001767f.pdf



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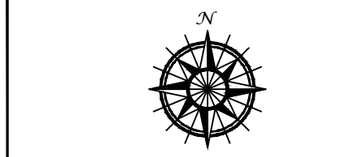

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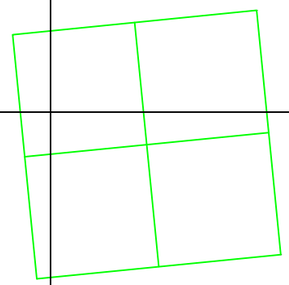

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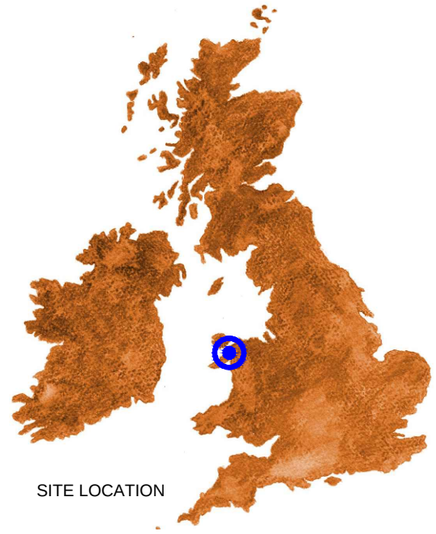

SITE LOCATION

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Client Name

Gwynedd Archaeological Trust

Job Title

Dinas Dinlle

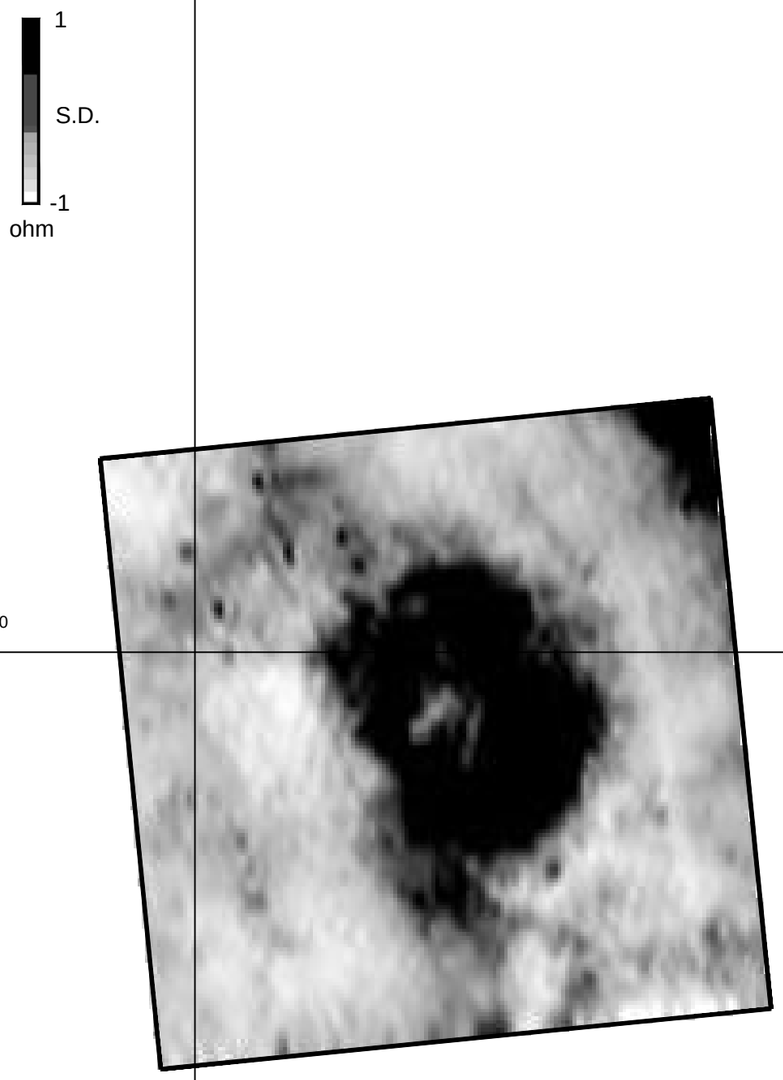
Drawing Title

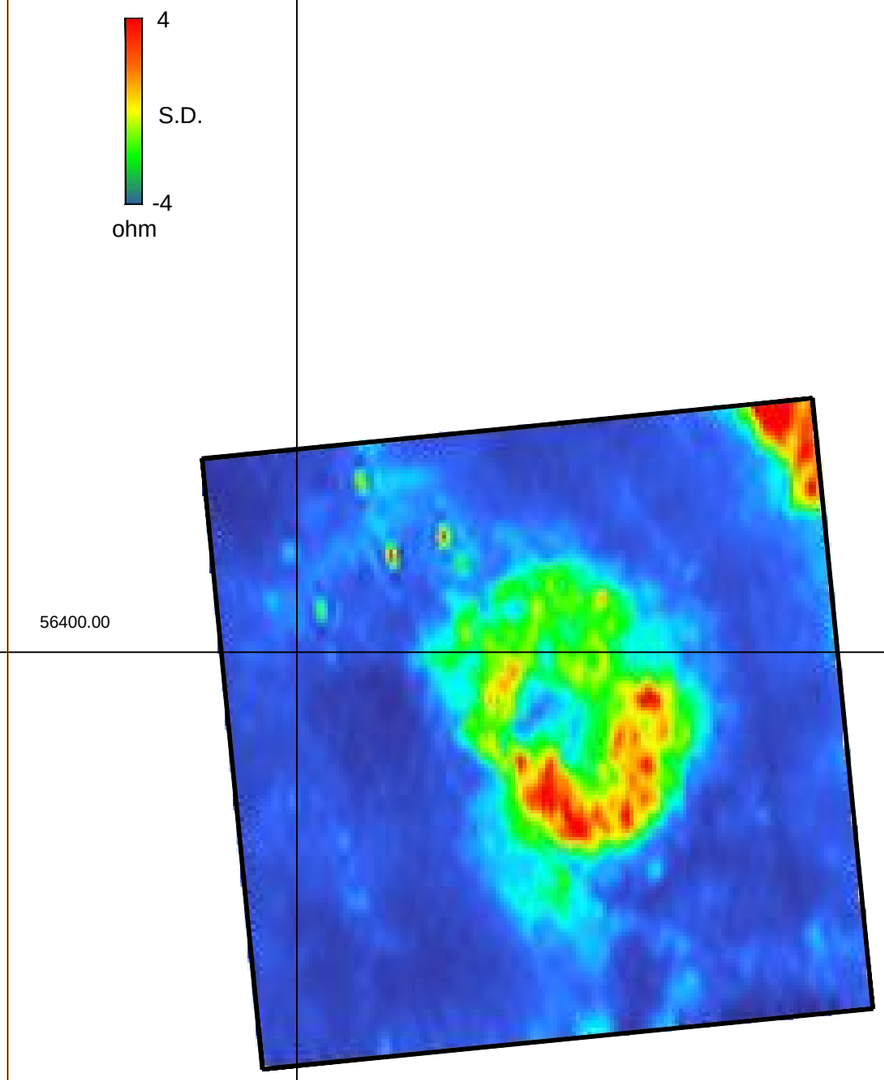
Site Location & Survey Extents

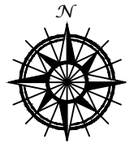
Scale	Drawn
As Shown	NB
Date	**Approved**
14/08/19	AP

Revision	Amendments		By	Checked

Project Number	Drawing No.	Revision	Status
GAT-19-DIN	01	A	Final







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Client Name

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Job Title

Dinas Dinlle

Drawing Title

Earth Resistance Data

Scale	Drawn
1:400 @ A3	NB
Date	**Approved**
14/08/19	AP

Revision	Amendments		By	Checked

Project Number	Drawing No.	Revision	Status
GAT-19-DIN	02	A	Final

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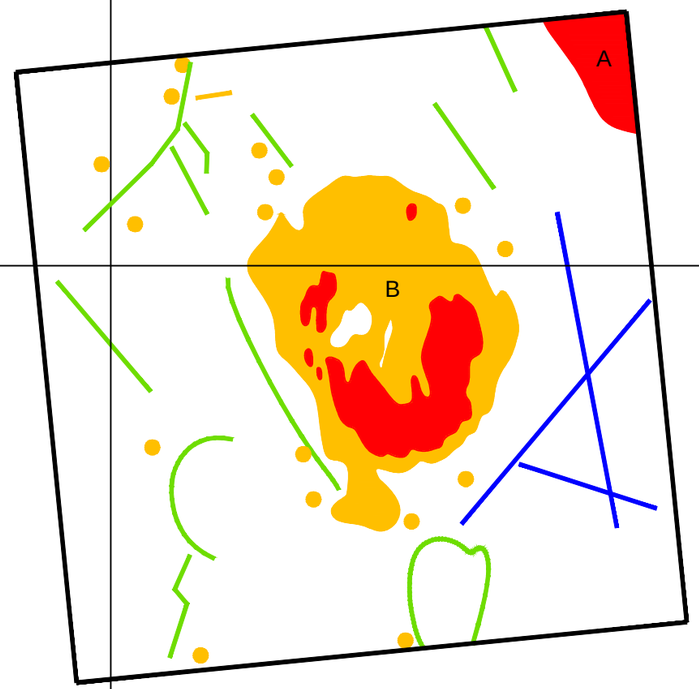

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Key

- High earth resistance anomalies. Probably associated with buried stone features or materials with low moisture content.
- Very high earth resistance anomalies. Probably associated with buried stone features or materials with low moisture content.
- Weak earth resistance anomalies. Possibly associated with buried stone features or materials with low moisture content.
- Low earth resistance anomalies. Possibly associated with ditches or conductive materials with enhanced moisture content.
- Extent of earth resistance data.

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Client Name

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Job Title

Dinas Dinlle

Drawing Title

Interpretation Drawing

Scale	Drawn
1:400 @ A3	NB
Date	**Approved**
14/08/19	AP

Revision	Amendments		By	Checked

Project Number	Drawing No.	Revision	Status
GAT-19-DIN	03	A	Final