GEOPHYSICAL SURVEY

REPORT

Barndarrig,

Ballinacor East,

County Wicklow

Date:
30/06/2020

Licence: 20R0096

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GEOPHYSICAL SURVEY SUMMARY SHEET
BALLINACOR EAST, BARNDARRIG, COUNTY WICKLOW

Site Name	Barndarrig	**Ref No.**	20024
Townland	Ballinacor East	**Licence No.**	20-R-0096
County	Wicklow	**Licence Holder**	Joanna Leigh
ITM (centre)	E727063, N686185	**Purpose**	Pre-planning
Client	IAC Ltd.	**Reference No.**	N/A

Ground Conditions	Survey was conducted within a single pasture field. The pasture was recently cut and ground conditions were excellent.
Survey Type	Detailed gradiometer survey c.1ha

Summary of Results

The data is dominated by parallel linear trends and responses indicative of ploughing activity. It is possible that these represent ridge and furrow cultivation.

Within the possible ridge and furrow, there is a faint circular trend measuring c.7m in diameter. It is possible that this represents the plough damaged remains of a circular ditched feature. However, the trend is barely discernible in the data and interpretation is cautious.

Some linear responses parallel and perpendicular with the ploughing trends may represent deeper plough furrows. However, it is equally possible that these represent former field divisions and boundaries associated with the ploughing activity.

Faint linear trends orientated east to west are interpreted as agricultural in origin, most likely representing field divisions. These do not appear to be associated with the ploughing activity.

Field Staff Joanna Leigh

Report Date 30/06/2020 **Report Author** Joanna Leigh

Contents

Geophysical Survey Report
Ballinacor East, Barndarrig, County Wicklow

1 Introduction

1.1 A geophysical survey has been conducted by J. M. Leigh Surveys at a site in the townland of Ballinacor East, Barndarrig, County Wicklow. The survey was requested by IAC Ltd. on behalf of Wicklow County Council. The survey forms part of a wider study as part of a pre-planning investigation.

1.2 The application area is contained within a single pasture field located to the west of the village of Barndarrig, with the R772 to the east and the L5656 to the south. Figure 1 presents the site and survey location at a scale of 1:1,000.

1.3 There are no recorded monuments within the application area. A 'ringfort - rath' (WI031-022) and a 'Font - present location' (WI031-067) are situated c. 200m to the west.

1.4 The main aim of the survey was to identify any responses which may represent previously unknown archaeological remains within the application area. It is the objective of the survey to identify the location, nature and extent of any responses of potential archaeological interest.

1.5 The detailed gradiometer survey was conducted under licence 20R0096 issued by the Department of Culture, Heritage and the Gaeltacht.

2 Survey ground conditions and further information

2.1 The survey area was contained within a single field which comprised of recently cut pasture. Ground conditions were excellent.

2.2 A post and wire fence along the eastern extent of the site produced magnetic disturbance evident in the data. However, this was localised to the eastern extent of the data and did not affect the overall interpretation of the results.

2.3 Along the western and southern extent of the application area tall vegetation prohibited survey.

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.

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 to facilitate the data display and interpretation. Data was collected with a sample interval of 0.25m and a traverse interval of 1m.

3.5 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) 'Guidelines for the use of Geophysics in Archaeology' (2016).

4 Data display

4.1 A summary greyscale image and accompanying interpretation diagram are presented in Figures 2 and 3, at a scale of 1:750

4.2 Numbers in parenthesis in the text 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 displayed as a greyscale image and xy-trace plot in Appendix A1.01 at a scale of 1:625. The archive plots are used to aid interpretation of the results and are used for reference only. The archive 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 & Conclusion

5.1 The survey data is dominated by parallel linear trends orientated north-east to south-west. These are indicative of ploughing activity. Although these may be more recent in origin, they do not appear to respect the existing field boundaries and it is possible that ridge and furrow cultivation is represented here.

5.2 Further linear responses (1) are parallel and perpendicular to the ploughing trends. Although these may result from deeper plough furrows, it is possible that they represent former field divisions perhaps associated with the potential ridge and furrow cultivation.

5.3 In the centre of the data there is a faint circular trend (2) of potential interest. The trend measures c.7m in diameter and it is possible that it represents a plough damaged circular ditched feature. However, this interpretation is cautious as the trend is barely discernible in the data. It is possible this further reflects the ploughing activity.

5.4 To the south of (2) there is a spread of increased magnetic response (3). This has no clear shape or form and it is speculated that this represents natural variations in the sub-soil. No clear archaeological interpretation can be provided.

5.5 Running across the dominant ploughing are faint linear trends (4). These are parallel with one another and appear to be perpendicular to the existing field boundary to the east. It is speculated that these represent former field divisions, dividing the field into five. These do not appear to be associated with the ploughing trends.

5.6 Magnetic disturbance along the eastern extent of the data results from the adjacent post and wire fence. This is not of archaeological interest.

5.7 Consultation with a licensed archaeologist and with the Department of Culture, Heritage and the Gaeltacht is recommended to establish if any additional archaeological works are required.

6 Technical Information Section

Instrumentation & Methodology

Detailed Gradiometer Survey

Detailed gradiometer survey can either be targeted across a specific area of interest or conducted as a blanket survey across an entire application area, often as a standalone methodology.

Sampling methodologies can vary but a typical survey is conducted with a sample interval of 0.25m and a traverse interval of 1m. This allows detection of potential archaeological responses. Data is often collected in grids measuring 40m x 40m, with the data displayed accordingly. A more detailed survey methodology may be applied where archaeological remains are thought likely. This can sometimes produce results with a more detailed resolution. A survey with a grid size of 20m x 20m and a traverse interval of 0.5m will provide a data set with high resolution.

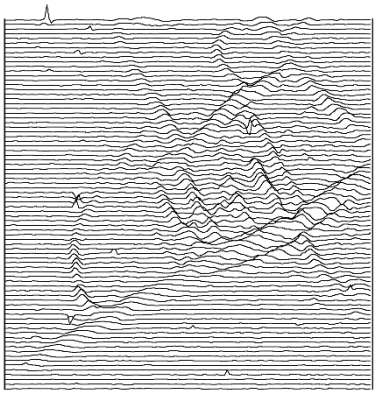
Bartington GRAD 601-2

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.

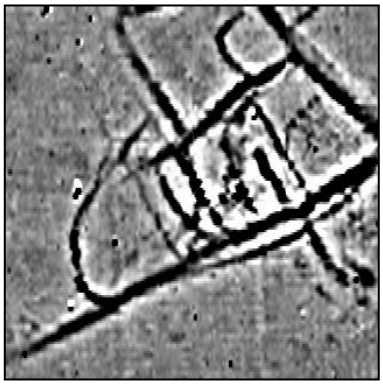
Gradiometer Data Display & Presentation

XY Trace



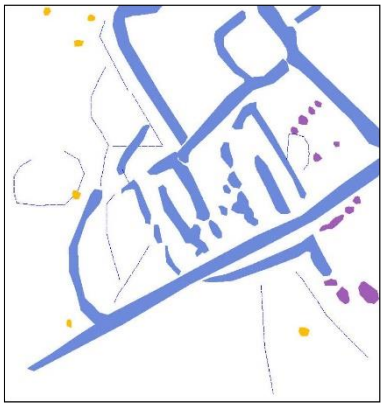
The data are presented as a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y-axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot 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. The archive plots are provided as PDF images upon request.*

Glossary of Interpretation Terms

Categories of responses may vary for different data sets. The list below are the most commonly used categories for describing geophysical responses, as presented in the summary interpretation diagrams.

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, 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.

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) (2016) '*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.

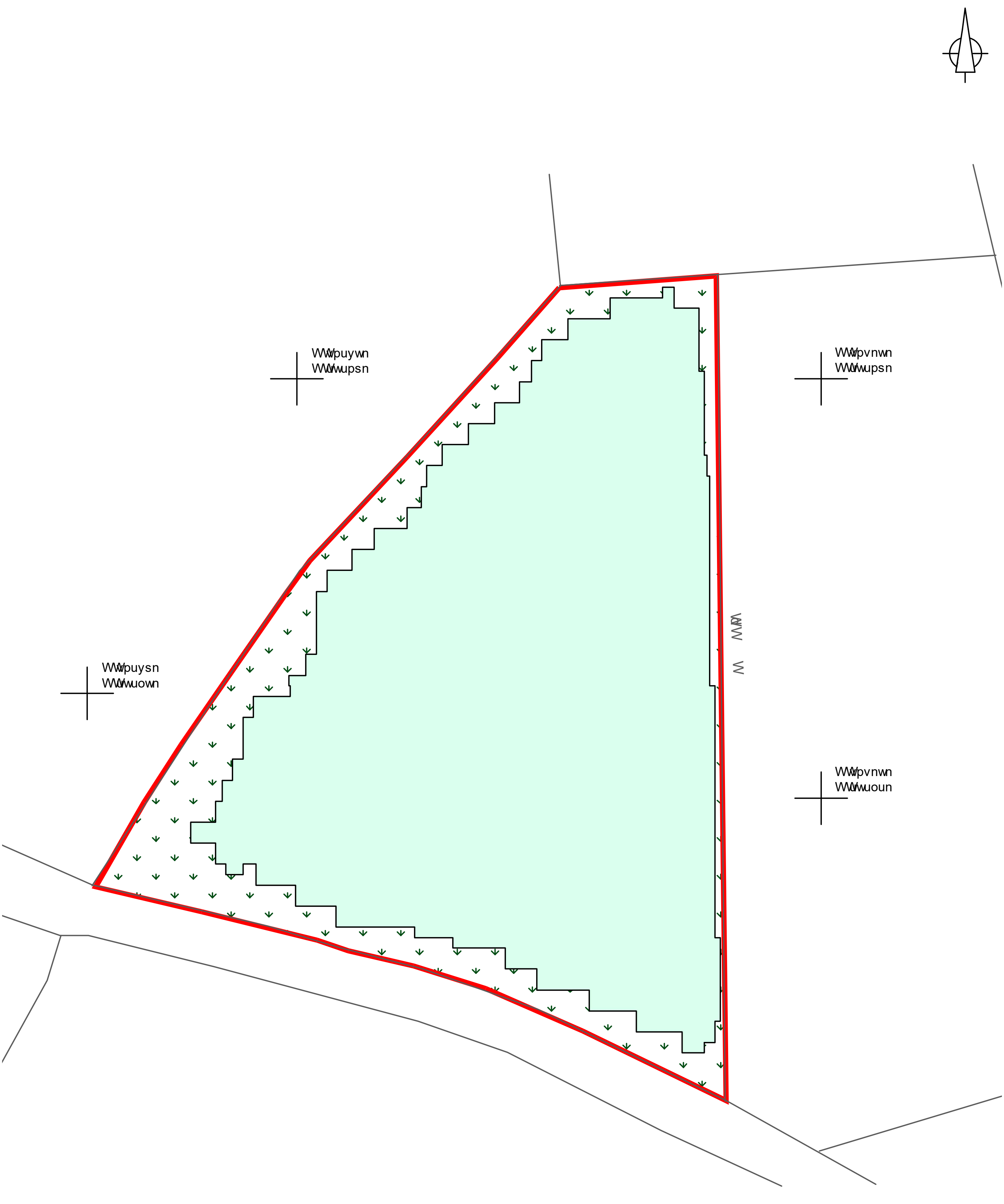
National Soil Survey of Ireland (1980) *General soil map second edition (1:575,000)*. An Foras Taluntais.

List of Figures

Figure	Description	Paper Size	Scale
Figure 1	Site & survey location diagram	A4	1:1,000
Figure 2	Summary greyscale image	A4	1:750
Figure 3	Summary interpretation diagram	A4	1:750

Archive Data Supplied as a PDF Upon Request

A1.01	Raw data XY-Trace plot & greyscale image	A2	1:625



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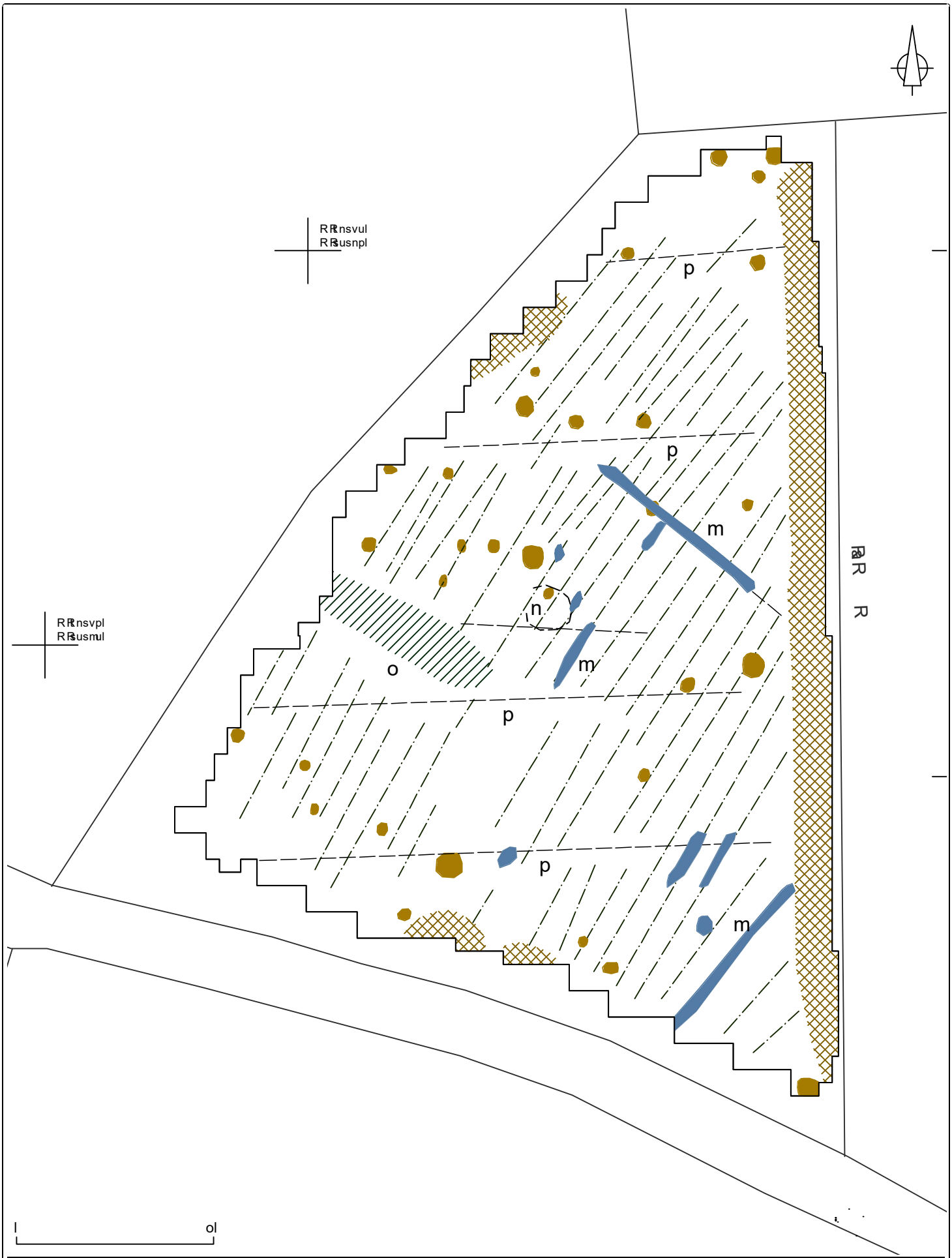
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