Ruperra Home Farm – Possible Roman-Period Archaeological Complex

Preliminary Geophysical and LiDAR Assessment

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1. Executive Summary

This report presents the results of a preliminary non-invasive geophysical and topographic investigation undertaken by Oak Archaeology Wales CIC at Ruperra Home Farm, Draethen, Caerphilly.

The study aimed to identify potential subsurface and surface archaeological features within land surrounding the farmstead. Results derived from Ground-Penetrating Radar (GPR) and LiDAR datasets indicate the presence of multiple rectilinear and linear anomalies consistent with possible anthropogenic features, potentially representing the remains of a Roman-period or later organised complex.

Interpretations remain provisional and require independent professional verification through extended survey or targeted excavation under licence. The findings are, however, sufficiently coherent to justify further investigation and heritage consideration.

2. Site Location and Setting

The site is located north of Draethen village, Caerphilly County Borough, South Wales (centroid approx. 51.566°N, -3.118°W).
The area lies on undulating pastureland overlooking the River Rhymney valley. The immediate setting includes mixed farmland, hedgerows, and wooded slopes typical of this part of southeast Wales.

The field in question occupies a slight south-facing gradient — a position favourable for settlement and defence in both Roman and post-Roman contexts.

3. Aims and Objectives

- To assess whether LiDAR-identified surface features correspond with subsurface anomalies detected through GPR.
- To determine the extent and pattern of any potential archaeological features.
- To provide baseline data for future heritage protection and potential research excavation.

4. Methodology

4.1 Ground-Penetrating Radar (GPR)

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A 200 MHz IDS radar system was used over a **14 × 14 m grid**, divided into 21 swaths, with 0.5 m line spacing and a 0–100 ns time window (~0–4 m depth).
Processing included background removal, migration, and depth-slice generation at 0.2 m intervals.
AI-assisted analysis was utilised to highlight geometric anomalies and depth consistency.

4.2 LiDAR Analysis

1 m-resolution LiDAR data (Welsh Government terrain model) were processed in ArcGIS and QGIS using hillshade and contour visualisations.
These models were examined for artificial topographic forms and cross-referenced with GPR coordinates.

4.3 Field Observation

A walkover survey was conducted to observe ground conditions, visible features, and potential artefacts. No intrusive work was undertaken.

5. Results

5.1 GPR Findings

Two principal anomaly zones were identified:

(a) The "Morgue Area" (Swaths 1–18):

- A strong rectilinear anomaly measuring approximately **34 × 20 m**, with clear internal divisions at depths between 0.8–2.6 m.
- The geometry suggests possible **structural foundations or subfloor voids**, though natural causes cannot be excluded.

(b) The "Graveyard Corner" (Swaths 19–21):

- Repeating narrow hyperbolic reflections between 0.8–1.6 m depth, aligned NE 55°.
- These may represent **cut features** such as trenches or graves, but interpretation remains tentative pending verification.

5.2 LiDAR Results

- A **rectilinear platform** matching the GPR-defined anomaly is visible on the LiDAR model, aligned NE 55°.
- Surrounding **linear depressions and low embankments** appear to define a wider enclosure.
- Peripheral terracing and drainage features suggest **landscape engineering**, possibly connected to the main structure.

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6. Interpretation

When considered together, the GPR and LiDAR data imply a coherent anthropogenic complex, possibly incorporating:

- A central rectilinear structure or courtyard;
- Linear or cut features potentially associated with occupation or burial;
- Peripheral terraces indicative of site planning or adaptation.

The alignment, proportional layout, and correlation between datasets are **consistent with Roman-period architectural planning**, though a later (e.g. medieval or early post-medieval) origin cannot be ruled out.
No definitive dating evidence currently exists.

7. Discussion and Significance

The survey has identified a well-organised sub-surface feature set that aligns with classical Roman dimensions and site morphology.
If confirmed, this would represent a previously unrecorded archaeological complex within a landscape of known Roman and post-Roman activity.

The discovery is therefore of **potential regional significance** and warrants inclusion in the regional Historic Environment Record (HER) and consideration for **heritage protection** following independent corroboration.

8. Recommendations

1. **Extended professional geophysical survey:**
   Conduct wider-area GPR and magnetometry (1–2 ha) to define site extent and confirm anomaly integrity.
2. **GIS data integration:**
   Merge GPR, magnetometry, and LiDAR datasets into a single geospatial model for further analysis.
3. **Targeted test excavation:**
   If verified, undertake small-scale, licensed trenches on the anomaly's periphery to recover dating evidence.
4. **Archival submission:**
   Deposit the final dataset and reports with the **National Monuments Record of Wales (RCAHMW)** and **Glamorgan–Gwent Archaeological Trust (GGAT)** for permanent curation.

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5. **Community engagement:**
   Continue non-invasive outreach and educational activities under Oak Archaeology Wales CIC.

9. Acknowledgements

Survey and reporting were undertaken by **Daryn Groves**, *Oak Archaeology Wales CIC*, with AI-assisted data interpretation support.
Thanks are extended to the landowner for site access and to the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) for guidance on archival procedures.

10. References

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- Chartered Institute for Archaeologists (CIfA) (2020). *Standard and Guidance for Geophysical Survey.*

11. Figure Captions

Figure 1: GPR depth slice (Swath 6) showing rectangular anomalies between 0.8–2.2 m. Morgue area.

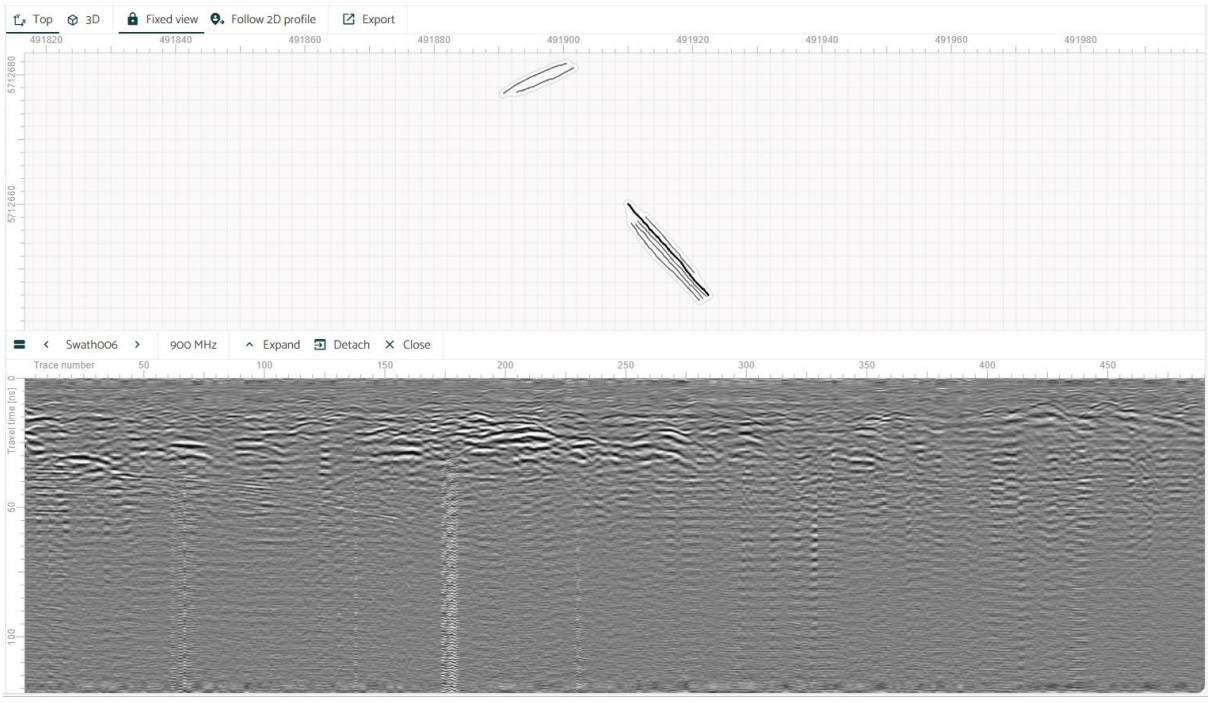


Figure 2: GPR profile (Swath 19) revealing internal divisions and subfloor reflections. Graveyard area.

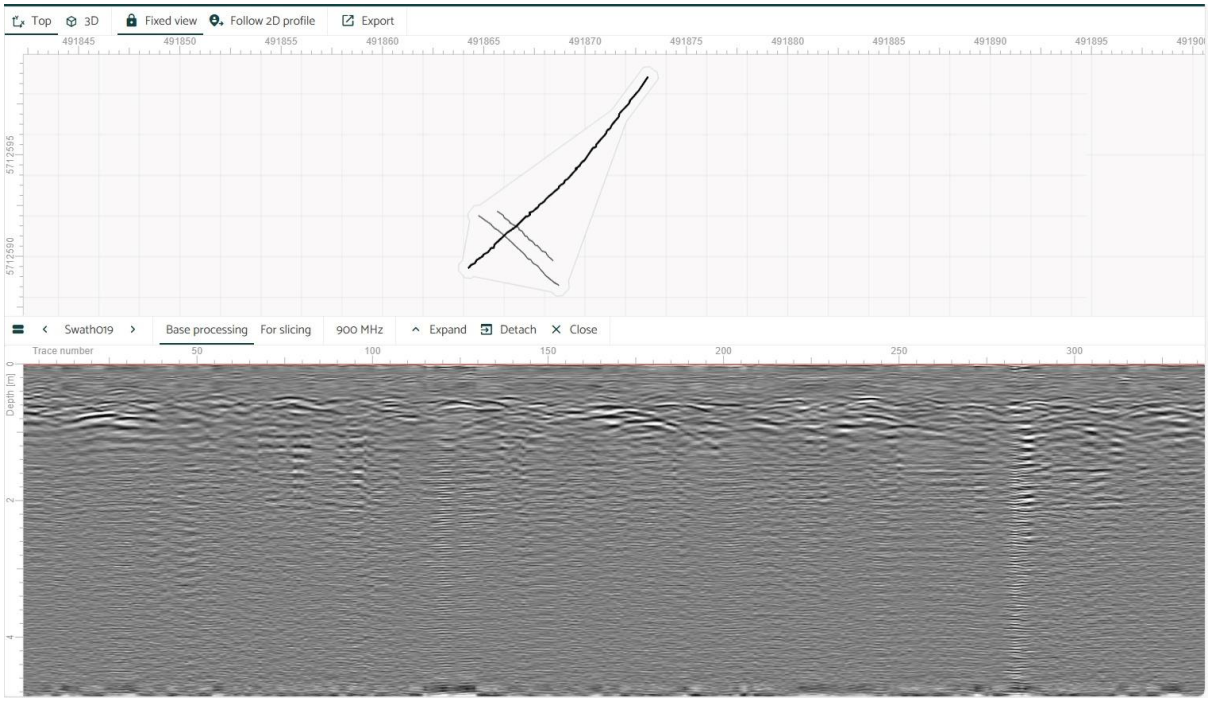
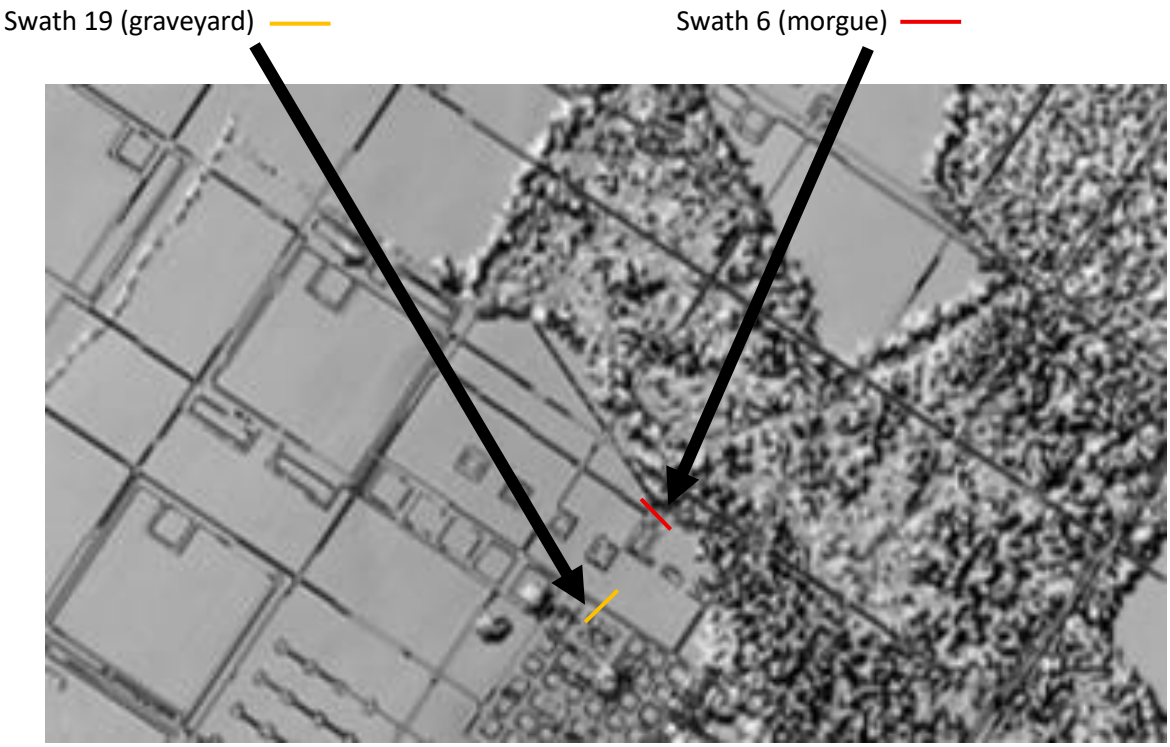


Figure 3: Overlay of GPR and LiDAR datasets showing correlation of features.



Digital Terrain Model (DTM) visualization showing topographic relief and features near Ruperra. Data derived from DataMapWales elevation data, © Welsh Government / licensed data. Contains public sector information licensed under the Open Government Licence v3.0. Image processed and annotated by Daryn Groves.

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Figure 5: LiDAR hillshade model highlighting rectilinear platform and linear embankments.

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