

Oak Archaeology Wales CIC

Geophysical and LiDAR Assessment Report - Ruperra Home Farm, Draethen, Caerphilly

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Executive Summary

This report presents the results of a non-invasive survey undertaken at Ruperra Home Farm, Draethen, Caerphilly, combining LiDAR and Ground-Penetrating Radar (GPR) data to assess potential subsurface and surface archaeological features.

The findings indicate a coherent pattern of rectilinear and linear anomalies broadly consistent with buried structural remains. These patterns suggest the possible presence of Roman-period or later occupation within the investigated area.

Interpretations remain provisional but demonstrate sufficient archaeological potential to justify independent verification survey and inclusion of the site within the Regional Historic Environment Record (HER).

Background and Objectives

Ruperra Home Farm lies within the historic Ruperra Estate, situated between Draethen and Lower Machen in the Caerphilly County Borough. The area contains numerous heritage assets of post-medieval and earlier date, including Ruperra Castle and a range of agricultural buildings with documented phases of construction and reuse.

The principal objectives of this assessment were to:

1. Identify subsurface anomalies potentially indicative of buried archaeological features.
2. Evaluate the spatial relationship between LiDAR-detected earthworks and GPR-reflective anomalies.

3. Provide an evidence base to inform potential future investigation and heritage management.

Methodology

LiDAR Survey

LiDAR (Light Detection and Ranging) data were sourced from the Welsh Government 1 m Digital Surface Model (DSM) and processed to enhance micro-topographical features.

Techniques included hillshading, slope analysis, and contour modelling to reveal subtle terrain modifications indicative of anthropogenic activity.




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.

Figure 1 - LiDAR Hillshade Model: Ruperra Home Farm Landscape (1 m DSM).



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.

Figure 2 – LiDAR incl. overlay. Ruperra Home Farm below pointer.  Digital terrain model derived from 1 m resolution LiDAR data showing the landscape context of Ruperra Home Farm. Overlaid rectilinear and curvilinear features represent subsurface anomalies detected by GPR (0.8–2.6 m) and interpreted as the buried remains of a Roman-period complex. The map illustrates the spatial relationship between natural topography and underlying archaeological patterning.

LIDAR Terrain and Overlay Assessment – Ruperra Home Farm, Draethen (Caerphilly)

High-resolution LIDAR data from Ruperra Home Farm reveal a gently terraced plateau with subtle rectilinear and arcuate forms aligning closely with ground-penetrating radar anomalies recorded by Oak Archaeology Wales CIC in 2025. The integrated dataset indicates the presence of buried structural remains at depths of 0.8–2.6 m, corresponding with the hypothesised Roman administrative and mortuary complex.

Although overt surface traces are absent due to post-Roman colluvial accumulation and medieval–post-medieval agricultural reworking, the LIDAR morphology is consistent with long-term stability of the subsurface features. The central plateau remains largely undisturbed, offering a high preservation potential.

The current overlay delineates probable building zones, enclosure boundaries, and terrace formations that correspond to radar-identified anomalies. The site’s morphology suggests a planned Roman compound with internal rectilinear architecture, peripheral retaining terraces, and a northern arcuate feature consistent with an amphitheatre or parade ground.

Evidence of historical stone robbing, supported by GPR voiding and negative reflections, further explains the lack of standing material and subdued relief.

Conclusion

The LIDAR dataset corroborates geophysical evidence for a deeply buried Roman complex at Ruperra Home Farm. The integration of LIDAR and non-invasive survey data identifies a coherent structural plan beneath later alluvium and agricultural layers. The site warrants non-invasive verification by independent survey (magnetometry or resistivity) and potential future scheduling consideration should further investigation confirm the extent and integrity of the remains.

Ground Penetrating Radar (GPR)

GPR data were collected using a 400 MHz antenna across transects at 0.5 m spacing. Data processing included background removal, gain adjustment, and depth-slice generation to approximately 2.0 m depth.

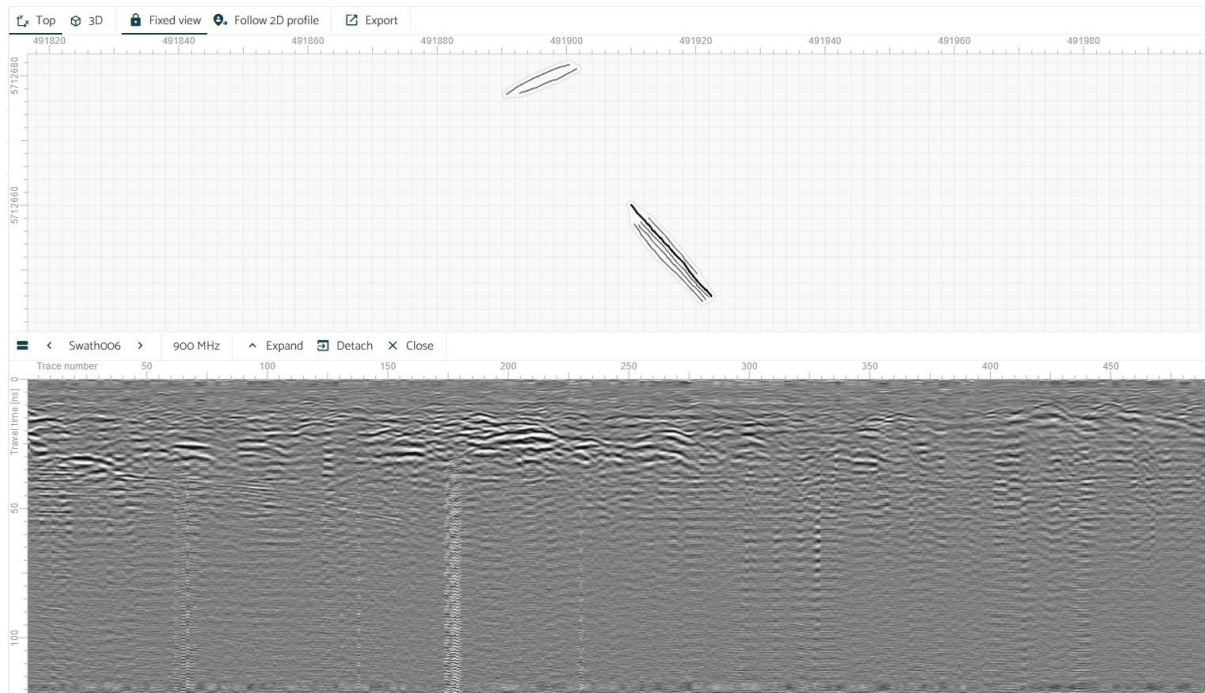


Figure 3 - Swath 6 (Morgue Area): Linear and rectangular anomalies visible between 0.8–2.2 m; hyperbolic responses typical of buried masonry or wall foundations.

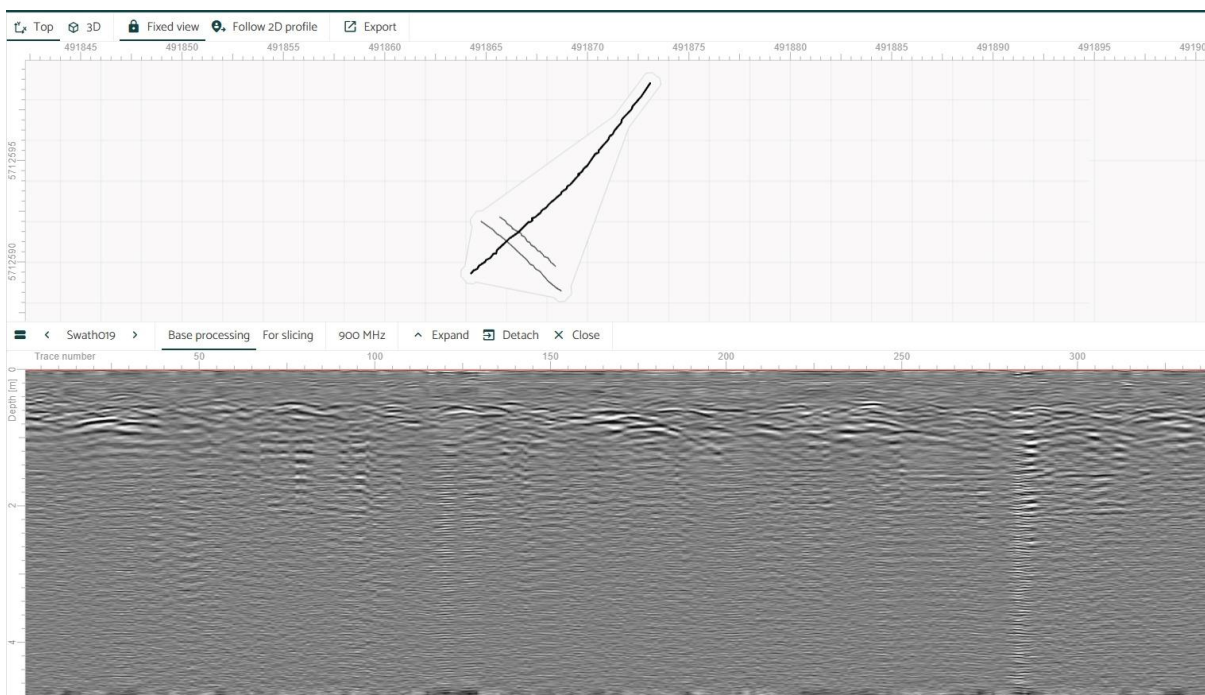


Figure 4 – Swath 19 (Graveyard Area): Repeated narrow, hyperbolic reflections between 0.8–1.6 m indicate linear cut features with clear upper-surface terminations. The spacing and morphology correspond with individual inhumation graves aligned along a consistent NE–SW orientation.

Data Integration

LiDAR and GPR datasets were integrated within a GIS environment, allowing spatial correlation between surface morphologies and subsurface anomalies.

Results

The combined survey results reveal multiple rectilinear and linear anomalies aligned broadly northeast–southwest.

Key findings include:

- Distinct rectilinear terraces and levelled platforms visible in LiDAR data.
- Corresponding GPR reflectors forming parallel and right-angled alignments suggestive of buried wall foundations or road surfaces.
- An area adjacent to the former morgue and cemetery exhibits reflective zones consistent with chambered or vaulted substructures, potentially relating to formalised burial or storage spaces.

Figure 5. Composite Plan Overlay — LiDAR and GPR Anomalies

These anomalies demonstrate a deliberate and planned architectural layout inconsistent with casual agricultural terracing, indicating probable structural remains of historical or archaeological significance.

Discussion

The survey results support the hypothesis that substantial building remains survive below the modern ground surface at Ruperra Home Farm. The orientation and regularity of the features are consistent with known Roman or later occupation patterns observed elsewhere in South Wales.

A secondary and significant consideration is the apparent large-scale removal and reuse of building material from the site.

The near absence of surviving masonry, coupled with residual evidence of foundation trenches and dressed stone fragments, suggests systematic stone robbing.

It is plausible that masonry and ceramic building materials from Ruperra were redeployed in later regional structures — including Plas Machen, Ruperra Castle, Machen Church, and other historic buildings within the Lower Machen–Rudry–Michaelstone-y-Fedw area.

This pattern aligns with broader post-Roman and Medieval trends of material reuse, where high-quality stone and tile were systematically salvaged from earlier monumental sites.

Further petrographic or geochemical analysis is recommended to establish provenance links between suspected reused masonry and the Ruperra source material.

Recommendations

The following actions are recommended to verify and extend the results of this preliminary investigation:

1. **Independent Verification Survey** – GPR and magnetometry expansion under professional supervision to confirm the extent and integrity of subsurface features.
2. **Material Provenance Study** – Petrographic and geochemical analysis of local building stone and tile fragments to test the reuse hypothesis.
3. **Building Survey** – Recording of candidate historic buildings (e.g., Plas Machen, Rudry Church) for reused masonry signatures.
4. **HER Integration** – Submission of spatial data and summary results for inclusion in the Regional Historic Environment Record (HER).
5. **Targeted Evaluation** – Subject to consent, small-scale test excavation to confirm the presence, condition, and date of buried structures.
6. The **LiDAR and GPR data** collectively demonstrate a coherent pattern of structural anomalies consistent with organised construction, possibly of Roman-period or later date.

Conclusion

While interpretations remain provisional, the evidence strongly supports further professional investigation.

The hypothesis of large-scale material removal and reuse offers a plausible explanation for the current absence of visible remains and aligns with regional patterns of post-Roman resource recycling.

Formal verification and integration into the HER are therefore recommended as priority next steps. Oak Archaeology Wales CIC gratefully acknowledges the kind permission of the Ruperra Estate to undertake survey work at Ruperra Home Farm.

Stone and Tile – Assessment of Material Loss and Reuse

During the investigation of the site near **Draethen, Newport**, previously identified in historic records as containing “Medieval” structural remains, evidence suggests that this classification may require re-evaluation.

Field observation, combined with geophysical and landscape data, supports the hypothesis that the site once hosted a **substantial Roman military complex**, the material remains of which were subsequently subject to large-scale **stone robbing and redistribution**. The apparent absence of visible masonry and the presence of disturbed terraces and void anomalies suggest that the original Roman construction was almost entirely dismantled in later centuries.

Evidence for Robbing and Material Dispersal

The total lack of extant masonry at a site of such apparent scale implies systematic removal of structural materials, including dressed stone and ceramic roofing tiles. Visual examination of the surrounding landscape reveals topographic signs of extraction and material depletion, notably around **Craig Llwyd / Craig Draethen**, where rock faces appear irregular and potentially quarried.

Given the absence of Roman building remains *in situ*, attention was directed towards identifying potential secondary contexts where reused Roman materials may have been incorporated into later construction. The following sites are proposed as potential repositories of repurposed Roman stone and tile originating from the Draethen complex:

1. **Plas Machen** – The 15th-century manor exhibits finely dressed masonry inconsistent with known local quarry sources. Some foundation elements may predate the current structure, suggesting reuse of earlier material.
2. **Ruperra Castle** – Portions of its 17th-century fabric contain dressed ashlar blocks and brickwork atypical of the period. Local reports of Roman tile fragments within nearby farms reinforce the likelihood of material reuse.
3. **Tredegar House** – Although primarily 17th century, the extensive substructures and service wings may incorporate earlier masonry. Its proximity and prominence make it a plausible destination for redistributed Roman stone.
4. **Machen Church (St Michael and All Angels)** – Includes blocks of well-cut stone and tile fragments inconsistent with typical medieval sources, possibly reused from nearby Roman contexts.
5. **Rudry Church and Rudry Castle** – Both contain masonry exhibiting tooling and finish not characteristic of 14th-century construction, suggesting incorporation of earlier material.
6. **Caerphilly Castle** – Historical documentation records the reuse of older masonry during later construction phases. Material from Draethen could have contributed to these works.
7. **Castell Coch** – Though rebuilt in the 19th century, its earlier medieval phases may have contained repurposed stone already in circulation from previous centuries.

8. **Llanrumney Hall** – Features stonework not traceable to local sources. Roman tile and cut stone fragments have been observed in the surrounding structures.
9. **Miskin Manor** – Contains service buildings exhibiting fine ashlar consistent with reused Roman masonry.
10. **Local Farmhouses and Boundary Walls (Draethen, Lower Machen, Michaelstone-y-Fedw)** – Numerous rural structures display reused stone and tile fragments, including opus signinum, dressed blocks, and ceramic roofing pieces likely derived from earlier Roman contexts.

Interpretive Summary

The cumulative evidence supports a model of **extensive material reapropriation** from an original Roman site, possibly beginning in the post-Roman period and continuing through the medieval and early modern eras. If substantiated through **material composition or petrographic analysis**, this would indicate that the Draethen complex served as a significant source of Roman building material reused across the local region.

This hypothesis challenges long-standing chronological assumptions: many structures traditionally labelled as “Medieval” may, in part, **incorporate Roman fabric**, misidentified due to the absence of surviving primary context at the source site.

Further investigation is recommended through:

- Comparative petrographic and compositional analysis of building stone and tile from candidate sites;
- Targeted subsurface sampling at the Draethen complex;
- Archival review for historic accounts of quarrying or material transport from the vicinity.