# Archaeological Desk-Based Assessment
# Targeted Exploratory Excavations and Structural Investigation

**Ruperra–Machen Landscape**
**South-East Wales**

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Oak Archaeology Wales CIC

**Investigation and Report Author:**
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## Executive Summary

This report presents the results of a targeted exploratory investigation undertaken within the Ruperra–Machen landscape of south-east Wales. The investigation sought to evaluate a series of structural anomalies observed during landscape assessment and preliminary survey work.

Four small exploratory trenches were excavated in order to investigate predicted subsurface features associated with a south-west to north-east aligned infrastructure system. The trenches targeted a suspected roadway, associated drainage infrastructure, and structural remains interpreted as part of a building complex incorporating a heating installation.

The investigation revealed multiple structural features including road metalling, ceramic drainage pipes, masonry construction, heating-related deposits, and a stone arch structure interpreted as a possible air-intake installation. Additional masonry remains were identified within the adjacent waterway, including dressed stone and brickwork suggestive of substantial construction.

The spatial alignment and functional relationship of these features suggest the presence of a coordinated infrastructure system incorporating transportation, drainage engineering and heating technology. While definitive identification of the structural complex cannot be confirmed without further investigation, the evidence indicates that the site possesses significant archaeological potential.

Further geophysical survey and controlled archaeological investigation are recommended in order to determine the full extent and nature of the structural remains identified.

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## Targeted Exploratory Excavations and Structural Investigation

## Ruperra–Machen Landscape, South-East Wales

**Prepared by:** Oak Archaeology Wales CIC
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### 1. Introduction

This report presents the results of a targeted programme of exploratory trenching and observational investigation undertaken within the Ruperra–Machen landscape of south-east Wales. The work forms part of an ongoing research initiative aimed at understanding a series of structural anomalies previously identified across the site.

Initial observations suggested the presence of a coherent infrastructure system potentially associated with Roman-period activity. These observations included possible road alignments, engineered drainage systems, water management structures, and architectural remains consistent with bathhouse-type heating installations.

To test these observations, a small number of carefully targeted exploratory trenches were excavated at locations predicted to contain structural remains. The trench locations were selected based on landscape analysis, surface indicators, and structural alignment observations made during the initial site reconnaissance.

Four exploratory trenches were opened in order to investigate:

- a predicted Roman road alignment
- associated drainage infrastructure
- a suspected bathhouse structure
- a possible hypocaust heating system including furnace and air intake components

The investigation sought to establish whether subsurface structural remains were present and whether these features formed part of a coherent engineered system.

The results demonstrate the presence of multiple structural elements including road metalling, ceramic drainage pipes, masonry construction, heating-related deposits, and an air-intake structure aligned with a possible furnace installation.

These findings suggest the presence of a complex engineered installation with strong similarities to Roman infrastructure systems.

## 2. Investigator Background

The investigation was undertaken by Daryn Groves of Oak Archaeology Wales CIC. The work forms part of a wider community-led heritage initiative aimed at documenting previously unrecorded archaeological features within the Ruperra–Machen landscape.

The investigator brings a combination of practical landscape experience and observational field skills developed through years of outdoor work, site surveying, and heritage exploration. Particular strengths include landscape interpretation, structural observation, and practical ground investigation.

Initial anomaly identification was assisted through a process of intuitive landscape reading supported by traditional dowsing techniques. Within this investigation these methods were used as a hypothesis-generation tool to identify potential subsurface anomalies requiring further investigation.

Importantly, the locations identified through these methods were subsequently tested through direct exploratory excavation, allowing physical verification of the predicted structural features.

The results presented in this report therefore rely primarily upon documented excavation evidence, photographic recording, and structural analysis.

## 3. Site Location and Landscape Setting

The investigated area lies within the Ruperra–Machen landscape of south-east Wales. The terrain consists of gently sloping agricultural land intersected by a managed waterway or drainage channel running broadly through the centre of the site.

The area is characterised by:

- a shallow valley landscape
- managed agricultural fields
- historic water management features
- nearby woodland and rising ground

The waterway forms a natural focal point within the landscape and appears to have played an important role in historic drainage and water control.

Observations made during the initial survey indicated that several structural features appeared to align along a south-west to north-east (SW–NE) orientation, including a linear feature interpreted as a roadway crossing the waterway.

Downslope from this crossing point lies an area previously interpreted as a possible amphitheatre location based on landscape morphology and earlier survey observations.

The exploratory trenches described in this report were therefore positioned in order to investigate structural elements associated with this SW–NE aligned infrastructure.

**4. Investigation Methodology**

The investigation employed a targeted exploratory excavation approach designed to minimise disturbance while testing specific structural hypotheses.

The methodology consisted of:

- visual landscape assessment
- identification of potential structural alignments
- targeted trench placement over predicted features
- careful manual excavation using hand tools
- photographic documentation of all structural remains
- recording of trench dimensions and depths
- retention of structural material in situ wherever possible

Four small exploratory trenches were excavated during the investigation.

Each trench measured approximately 1 m × 1 m, with depths extending to approximately 0.9 m where structural features were encountered.

Where structural integrity appeared at risk, excavation was halted and the trenches were subsequently backfilled to preserve the features for future professional investigation.

Recovered materials such as charcoal, mortar fragments, and heat-affected stone were retained for documentation purposes.

All structural elements were photographed in situ, including scale indicators and directional orientation markers.

## 5. Site Plan

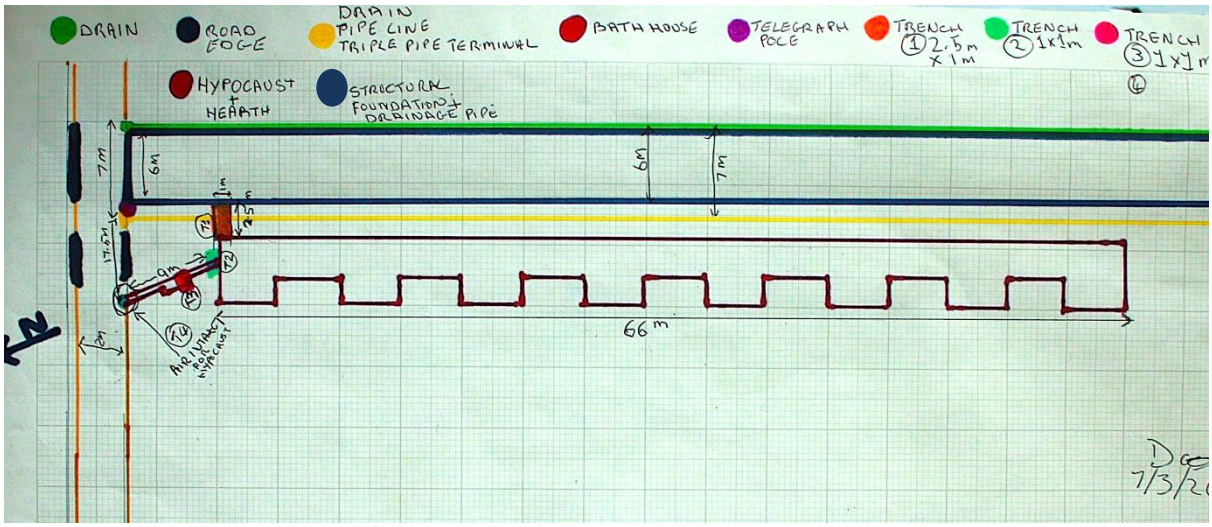



Figure 1: Simplified Site Plan (not to scale) showing trench locations, Roman road alignment, waterway, drainage infrastructure and bathhouse heating system.

Figure 1 presents a simplified site plan illustrating the principal structural features investigated during the project.

The plan shows:

- the SW–NE aligned roadway crossing
- the central waterway
- the location of trenches 1–4
- the alignment of the suspected hypocaust heating system
- the position of the triple drainage pipe terminal
- the location of additional structural remains within the waterway

Although simplified, the plan demonstrates the clear spatial relationship between the investigated features.

## 6. Trench Investigations

A series of four targeted exploratory trenches were excavated in order to investigate predicted subsurface structural features associated with the SW–NE aligned infrastructure observed within the landscape.

The trenches were positioned to investigate the relationship between a suspected roadway, associated drainage systems, and structural remains interpreted as part of a bathhouse heating installation.

### 6.1 Trench 1 – Roadway Edge, Drainage Pipe and Structural Correlation

Trench 1 was initially opened as a 1 m × 1 m exploratory trench positioned over the predicted alignment of a subsurface pipeline and roadside edge associated with the SW–NE aligned roadway.

The trench location is illustrated in Figure 2.

Excavation proceeded to a depth of approximately **0.9 m**, at which point several structural elements became visible.

Following the initial exposure of features, the trench was extended:

- 0.5 m west to further expose structural stonework associated with the pipe alignment and road interface
- **1 m east** to reveal additional roadside metalling and structural correlation

These extensions are shown in **Figures 3a, 3b and 4**.

Within the trench, the following structural components were identified:

• a ceramic drainage pipe aligned toward the waterway
• structural stone packing associated with the pipe
• foundation stone deposits on the bathhouse-facing side of the trench
• compacted metalled layers interpreted as road construction material

The drainage pipe appeared to run toward the nearby waterway, where further drainage infrastructure was subsequently identified.

The trench demonstrated a clear spatial relationship between the ceramic drainage pipe, structural masonry elements, and the adjacent road construction.

The combined evidence suggests that the pipe formed part of a drainage system associated with the roadway and nearby structural building remains.

Figure 2: Location of Trench 1 positioned to investigate the predicted pipeline, roadside edge and bathhouse foundations.

Figure 3A: Trench 1 extended west showing foundation stone adjacent to drain pipe and road correlation.

Figure 3B: Close-up view showing structural intent and stone placement.

Figure 4: Eastern trench extension revealing further roadside edge and metalling deposits.

### 6.2 Road Crossing and Triple Pipe Drainage Terminal

Directly downslope from Trench 1, the predicted roadway was observed to cross the waterway.

This crossing is illustrated in Figures 5–7.

The exposed face of the road revealed several construction elements including:

- roadside edge definition
- a stone bearing support layer
- compacted road metalling
- evidence of drainage activity on the downslope side of the road

Approximately 1 m from the roadside edge, a triple ceramic pipe drainage terminal was identified exiting the waterway bank.

This feature is shown in Figures 7 and 8.

The three ceramic pipes appear to have been deliberately arranged within a protective stone packing formation, forming a consolidated drainage outlet structure.

The alignment of these pipes corresponds directly with the ceramic pipe identified within Trench 1, strongly suggesting that the trench feature forms part of the same drainage system.

The positioning of the drainage outlet in relation to the road indicates a deliberate engineering solution designed to control water flow associated with the roadway and adjacent structures.

Figure 5: Exposed road face at waterway crossing showing roadside edge and metalling.

Figure 6: Road support structure and bearing stones.

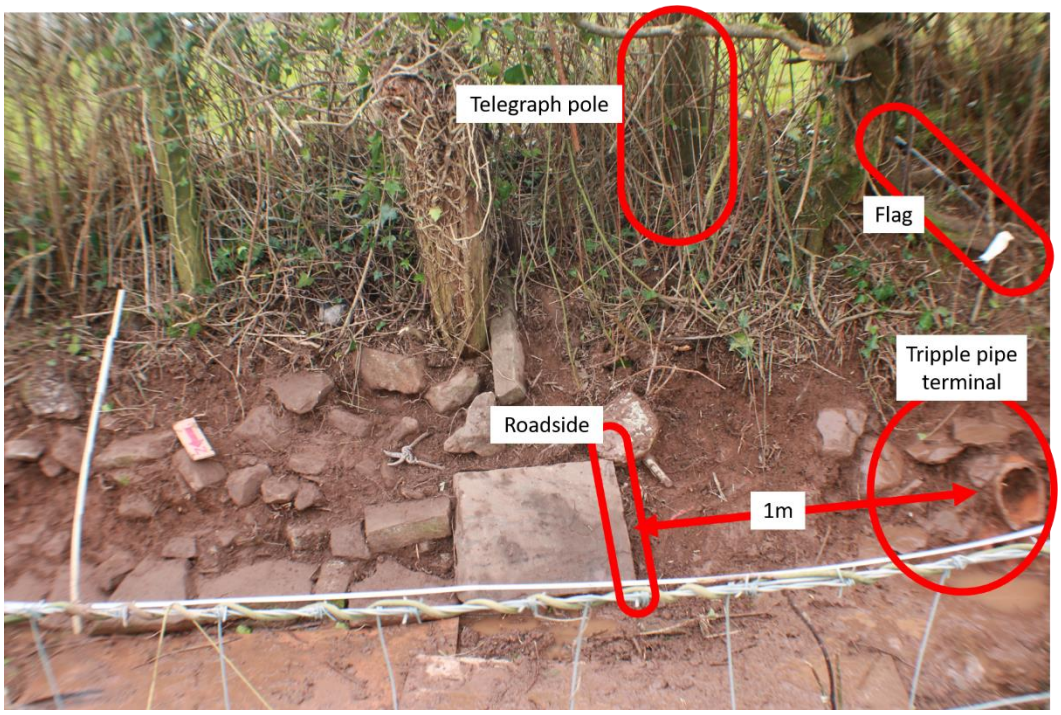



Figure 7: Road alignment showing position relative to the telegraph pole marker and triple pipe terminal.

Figure 8: Triple ceramic pipe drainage terminal exiting the waterway bank with measurement scale.

### 6.3 Trench 2 – Bathhouse Edge and Flue Terminal

Trench 2 was positioned over the predicted location of a structural interface interpreted as the north-eastern edge of a bathhouse structure.

The trench location is illustrated in Figure 9.

Excavation was carried out to a depth of approximately 0.9 m, at which point a number of structural features became visible.

The finished trench is shown in Figure 11.

Within the trench a distinctive fan-shaped stone arrangement was identified, interpreted as a terminal interface associated with a flue or heating conduit entering the bathhouse structure.

This feature is illustrated in Figure 12.

The stone configuration suggests the presence of a heat buffer zone at the building interface, potentially associated with a hypocaust heating system.

Material recovered from the lower layers of the trench included:

- mortar fragments
- charcoal
- heat-reddened clay
- burnt stone
- calcified material

These materials are illustrated in Figure 13.

The presence of heat-affected materials within the structural layers strongly suggests that the area experienced sustained exposure to elevated temperatures consistent with furnace or heating activity.

Figure 9: Position of trench 2 and predicted hypocaust route heading north.

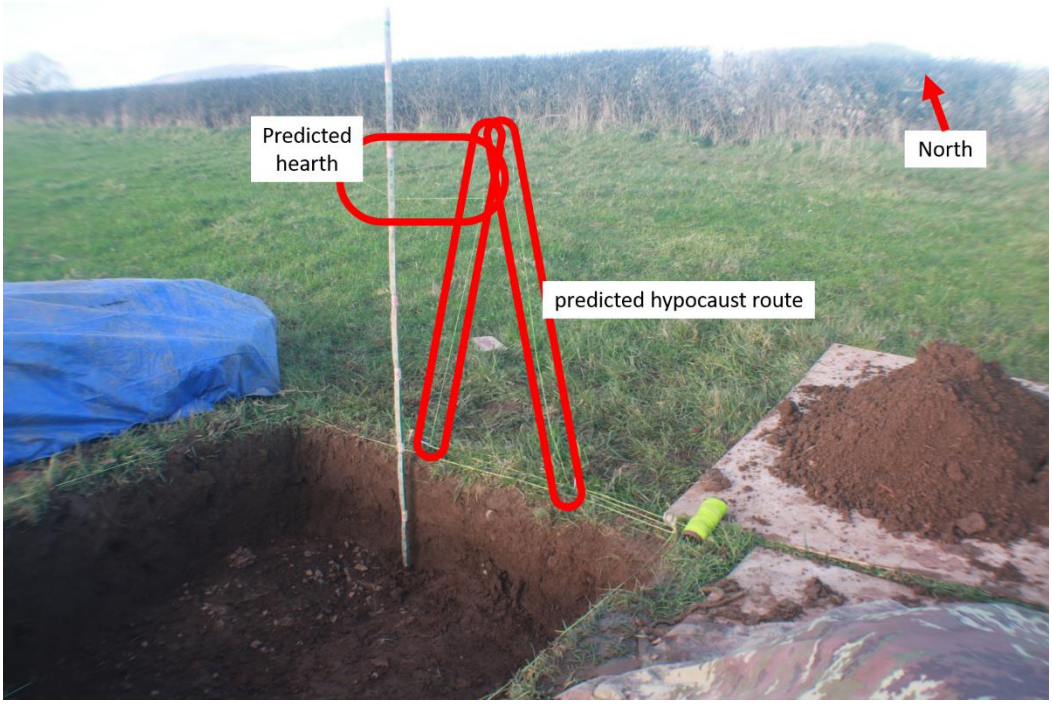



Figure 10: Showing trench 2 and the predicted hypocaust route heading north to its predicted inlet terminal (see trench 4) at water way SW face. Please note mid-way along route the predicated hearth.

Figure 11: Completed trench 2.

Figure 12: Flue terminal interface in trench 2.

Figure 13: Recovered heat affected materials from trench 2.

### 6.4 Trench 3 – Hearth / Furnace Installation

Trench 3 was positioned midway along the predicted flue route between the bathhouse and the suspected air intake structure.

The trench location is illustrated in Figures 14 and 15.

The trench measured approximately 1 m × 1 m, with excavation reaching a depth of approximately 1 m.

The completed excavation is shown in Figure 16.

Within the trench, structural deposits consistent with a hearth or furnace installation were identified.

These included:

- collapsed stonework
- compacted structural material
- heat-affected deposits

Possible structural collapse associated with the hearth structure is visible in Figures 17 and 18.

Material recovered from the lower layers included:

- mortar fragments
- charcoal
- burnt stone
- reddened clay deposits
- calcified material

These materials are illustrated in Figure 19.

The distribution and condition of the materials indicate exposure to sustained high temperatures, consistent with furnace operation.

Figure 14: Trench 3 location.


Figure 15: Alignment view of trench 3.

Figure 16: Completed trench 3.

Figure 17: Structural collapse and hearth remains.

Figure 18: Structural collapse and hearth remains.

Figure 19: Recovered hearth materials.

**6.5 Trench 4 – Hypocaust Air Intake Structure**

Trench 4 was excavated along the predicted continuation of the flue alignment toward the waterway.

The predicted route of this alignment is shown in Figures 20 and 21.

The trench was positioned on the south-west facing bank of the waterway, approximately 17.5 m upstream from the triple pipe drainage terminal.

Excavation revealed a stone-built arch structure containing a hollow internal chamber, interpreted as a potential air intake structure associated with the furnace system.

The completed trench is shown in Figure 22.

A close-up view of the structure is presented in Figure 23.

The form and position of the arch suggests that it functioned as a controlled airflow intake supplying oxygen to the furnace or hearth installation identified in Trench 3.

To preserve the integrity of the structure, excavation was halted and the trench was backfilled following documentation.

Figure 20: Predicted intake alignment

Figure 21: Predicted intake alignment


Figure 22: completed trench 4

Figure 23: Air intake arch close-up

### 6.6 Additional Structural Remains within the Waterway

Further structural remains were identified approximately 3 m upstream from the telegraph pole marker along the waterway.

These remains are illustrated in Figure 24.

The features include:

- stone-built drainage elements
- structural masonry
- ceramic brickwork
- dressed stone blocks

Of particular interest is the presence of a pale chalk or bath stone block exhibiting a curved face and dressed surfaces, potentially representing a component of an arch construction.

This feature is highlighted in Figures 26 and 27.

The masonry appears to form part of a structure crossing the waterway, illustrated in Figure 25.

Possible interpretations include:

- a revetment or retaining structure
- a bridge base or crossing platform associated with the roadway

## 7. Structural Interpretation and System Integration

The structural evidence recorded during the exploratory trenching programme indicates the presence of a coherent engineered infrastructure system extending across the investigated area.

The principal structural elements identified include:

- a metalled roadway aligned SW–NE
- a ceramic drainage pipe system connected to a triple outlet terminal
- structural masonry associated with a building complex
- evidence of a furnace or hearth installation
- a flue or conduit connecting the furnace to a structural building
- an air intake arch structure supplying airflow to the heating system
- additional masonry elements within the adjacent waterway

When considered together, these features suggest the presence of a planned structural complex incorporating transportation infrastructure, drainage engineering, and heating technology.

Figure 24: Masonry remains in waterway

Figure 25: Masonry remains in waterway

Figure 26: Bath stone arch block

Figure 27: Bath stone arch block

### 7.1 Roman Road Infrastructure

Evidence from Trench 1 and the exposed waterway crossing indicates the presence of a constructed roadway running along a south-west to north-east alignment.

The road appears to include:

- compacted metalled layers
- defined roadside edges
- structural bearing stones
- associated drainage infrastructure

The road is observed crossing the waterway at a location where additional masonry structures are present, suggesting the existence of a controlled crossing point or engineered roadway support structure.

The approximate width of the exposed road surface (approximately 6 metres) is consistent with known Roman road construction widths for secondary or regional routes.

### 7.2 Drainage Infrastructure

The discovery of the ceramic pipe within Trench 1 and the triple pipe terminal within the waterway demonstrates the presence of a deliberately engineered drainage system associated with the roadway and nearby structures.

The system appears to function as follows:

- water is collected within the roadside drainage zone
- the water is directed through ceramic pipes
- the pipes discharge through a triple terminal outlet into the waterway

The positioning of the outlet approximately 1 m from the roadside edge suggests that the drainage system was designed to remove water from the roadway and surrounding structural areas while preventing erosion of the road foundation.

The protective stone packing around the pipe outlets further supports the interpretation that the drainage installation was deliberately engineered to manage water flow.

### 7.3 Bathhouse Structure and Heating Installation

Evidence from Trenches 2 and 3 indicates the presence of structural remains associated with a heating installation likely connected to a building complex.

The fan-shaped stone arrangement identified within Trench 2 appears to represent the terminal interface of a flue or heating conduit entering the building structure.

Material recovered from the trench layers included mortar, charcoal, burnt stone, heat-reddened clay, and calcified material, all of which are consistent with environments exposed to sustained high temperatures.

Further evidence was obtained from Trench 3, where deposits consistent with a hearth or furnace installation were identified.

The presence of heat-affected materials and structural collapse within this trench suggests that the furnace area experienced prolonged heating activity.

### 7.4 Hypocaust Air Intake System

The discovery of the arch structure within Trench 4 provides further evidence supporting the interpretation of a heating system.

The arch contains a hollow internal chamber aligned with the flue route extending toward the furnace location identified in Trench 3.

This configuration strongly suggests that the structure functioned as an air intake supplying oxygen to the furnace installation.

Air intake structures of this type are known components of Roman heating systems, particularly those associated with bathhouses and hypocaust installations.

The alignment of the intake structure with the furnace and flue terminal supports the interpretation that these features formed part of a single integrated heating system.

### 7.5 Waterway Structural Features

Additional masonry elements identified within the waterway may represent structural remains associated with the roadway crossing or adjacent buildings.

The presence of dressed stone blocks and ceramic brick fragments suggests that significant masonry construction once existed at this location.

The chalk or bath stone block exhibiting a curved face may represent part of an arch structure, possibly associated with a bridge, culvert, or drainage installation.

Further investigation would be required to determine the full extent and function of these remains.

### 7.6 Integrated Infrastructure System

When the structural elements identified during the investigation are considered together, they suggest the presence of a coordinated infrastructure system consisting of:

- a roadway and crossing point
- a drainage network
- a building complex
- a heating installation
- water management features

The spatial alignment of these features, together with the presence of engineered masonry and heating-related deposits, indicates that the site may represent part of a substantial structural complex within the wider landscape.

Further professional investigation would be required in order to determine the full extent, date, and function of these features.

## 8. Conclusions

The targeted exploratory investigation undertaken at the site has identified a number of structural features that together indicate the presence of a coherent engineered infrastructure within the landscape.

Evidence recorded during the investigation includes:

- a constructed roadway aligned broadly south-west to north-east (SW–NE)
- associated drainage infrastructure incorporating ceramic pipework and a triple outlet terminal
- structural masonry consistent with building foundations
- deposits indicating sustained heat exposure including charcoal, burnt stone, mortar fragments and heat-reddened clay
- a structural installation interpreted as a hearth or furnace
- a flue alignment linking the furnace location to the edge of a structural building
- a stone arch structure interpreted as a possible air intake associated with the heating installation
- additional masonry structures located within the adjacent waterway

The spatial alignment of these features suggests that they form part of an integrated system rather than isolated elements.

The roadway, drainage infrastructure and waterway crossing demonstrate characteristics consistent with engineered transport and water management systems. The presence of heating-related deposits, together with the structural features interpreted as a furnace, flue terminal and air intake structure, indicate that the investigated building may have incorporated a heating installation comparable to those associated with Roman bathhouse structures.

While definitive identification of the structural complex cannot be confirmed without further archaeological investigation, the evidence recorded during this investigation demonstrates a level of engineering, structural organisation and material evidence that warrants serious consideration.

The investigation therefore confirms that the area possesses significant archaeological potential, and that the structural features identified form part of a broader landscape system requiring further study.

## 9. Recommendations for Further Investigation

The exploratory trenches described within this report were deliberately limited in scale in order to minimise disturbance to potentially significant archaeological remains. As a result, the investigation should be regarded as an **initial stage of site assessment** rather than a full excavation.

In light of the structural evidence recorded, several further investigative steps are recommended.

### Geophysical Survey

A targeted geophysical survey across the immediate area surrounding the investigated trenches would allow the extent of the structural complex to be mapped without intrusive excavation. Such a survey may help to identify additional building remains, road alignments, drainage systems and associated infrastructure.

### Controlled Archaeological Excavation

Should geophysical survey confirm the presence of further structural remains, controlled archaeological excavation would be required in order to determine the full extent, function and date of the structures identified during the exploratory investigation.

### Structural Conservation and Site Protection

Given the presence of potentially significant archaeological remains, care should be taken to avoid disturbance of the identified features. The backfilling of trenches undertaken during

this investigation was carried out specifically to protect exposed structures pending further professional assessment.

**Archival Documentation**

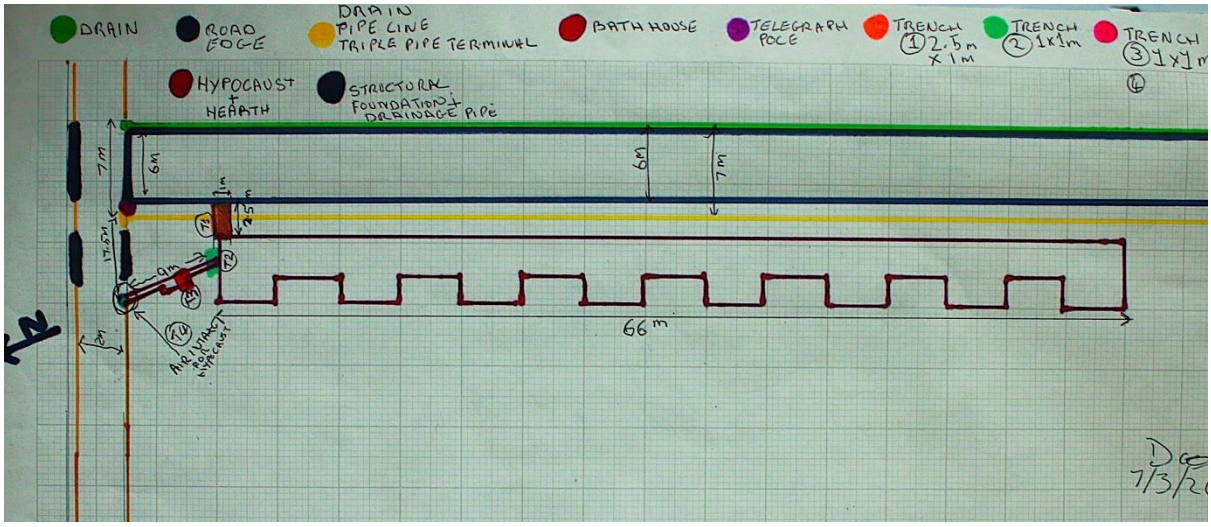
All photographic records, trench data and material observations recorded during the investigation should be retained as part of the developing site archive. Continued documentation of the site will assist future archaeological research and heritage management decisions.

**Closing Statement**

The exploratory investigation has demonstrated the presence of multiple structural features forming part of a coordinated infrastructure system within the landscape. The combination of roadway construction, drainage engineering, structural masonry and heating-related deposits indicates the potential presence of a substantial archaeological complex.

Further professional investigation will be required in order to determine the precise nature, date and extent of these remains.

# List of Figures

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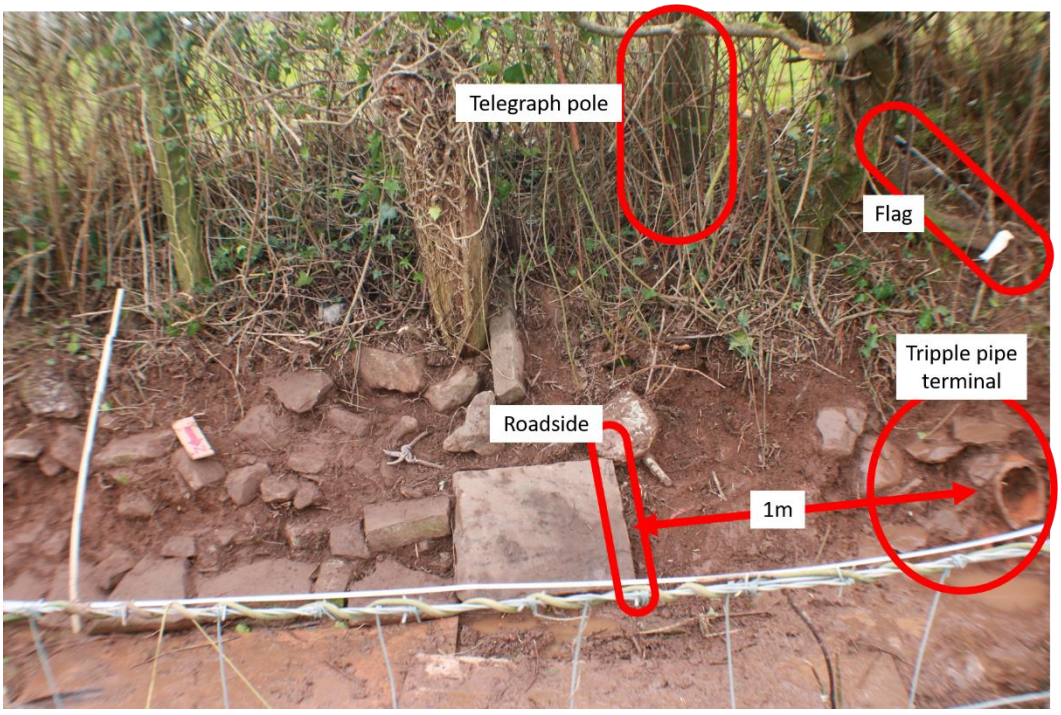


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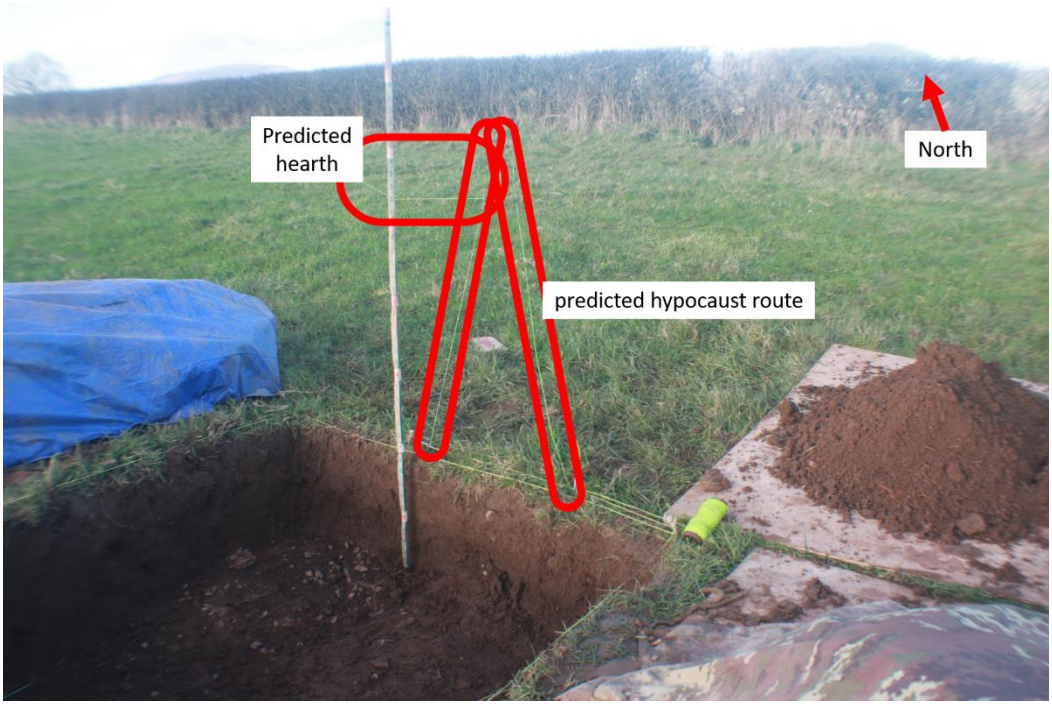


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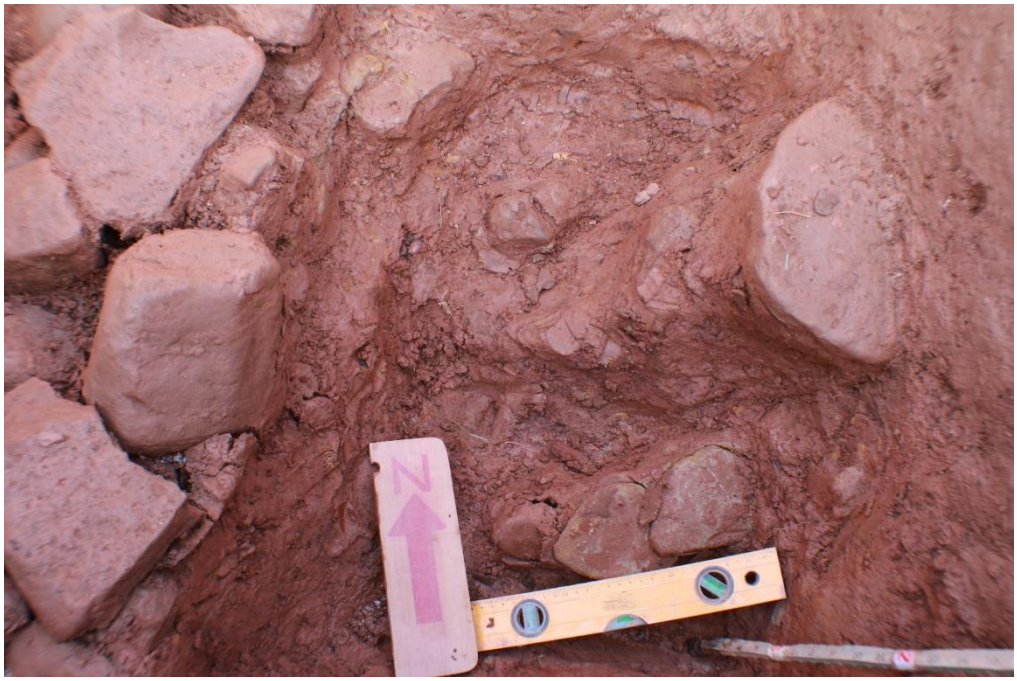


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