Penrhyn Castle Renweable Heating Scheme

Post-Excavation Analysis Report MAP 2: Phase 4





Ymddiriedolaeth Archaeolegol Gwynedd Gwynedd Archaeological Trust

Penrhyn Castle Renewable Heating Scheme

Post-Excavation Analysis Report MAP 2: Phase 4

Project No. G2447

Report No. 1379

Prepared for: National Trust

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Front Cover : Southern Gate at Penrhyn Castle (photographic archive refrerence G2447_012)

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1 NON-TECHNICAL SUMMARY

Gwynedd Archaeological Trust was commissioned by National Trust to complete the postexcavation analysis of recovered ecofacts and artefacts following a programme of archaeological assessment, evaluation and mitigation undertaken during the construction of a renewable heating system at Penrhyn Castle, Llandygai, Gwynedd. The post-excavation analysis was undertaken in response to the identification of prehistoric archaeological activity within the footprint of the energy centre building and the subsequent identification of suitable samples for radiocarbon dating.

The artefact assessment for lithic material recovered from a prehistoric pit identified burnt and heat cracked shattered stone that bore evidence of prolonged heat exposure and three flint fragments suggested to be of late Mesolithic to early Neolithic date. The ecofact assessment of charred macroplant samples recovered from a prehistoric pit, identified fragments of oak, birch, alder and elm, which were interpreted as wood fuel deposited in the pit. Specialist recommendation was made for the submission of the birch, alder and elm for radiocarbon dating. The radiocarbon dates provided a calibrated date range between 2345– 2134 cal BC (SUERC 72569) and 1918-1743 cal BC (SUERC 72568), placing the feature within the Late Neolithic/Early Bronze Age rather than the late Mesolithic to early Neolithic. Similar pits were found within a Neolithic – Bronze Age settlement at Parc Bryn Cegin, Llandegai in 2005, located c.1.6km south-west and it is likely the pit was an earth oven – a simple method for cooking food, using a pit lined with clay filled with hot stones on which the food would be placed and the oven sealed with more clay. The earth ovens at both Penrhyn Castle and Parc Bryn Cegin suggest contemporary activity within a larger prehistoric landscape.

The artefact assessment of brick fragments recovered from the remains of a building featured on an 1803 Penrhyn estate map concluded that the bricks were handmade and were typical of late 18th to early 19th century. No further recommendations were made for analysing the bricks. It was not recommended that the heat cracked stone or bricks are accessioned to a museum for archiving, but they will be retained at the Gwynedd Archaeological Trust for reference. The flint recovered from the earth oven will be accessioned to Penrhyn Castle, Llandegai, Gwynedd for archiving.

2 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been commissioned by National Trust to complete a post-excavation analysis report (MAP2 Phase 4). This follows a programme of archaeological assessment, evaluation and mitigation undertaken during the construction of a renewable heating system at Penrhyn Castle, Llandygai, Gwynedd (NGR SH60277193; Figure 01). The post-excavation analysis has been undertaken in response to the identification of suspected prehistoric archaeological activity associated with the Penrhyn Estate and the recovery of associated ecofacts and artefacts.

The post-excavation is being undertaken as a phased process in accordance with guidelines specified in *Management of Archaeological Projects – MAP2* (English Heritage, 1991), and relevant guidelines from *Management of Research Projects in the Historic Environment* (Historic England 2015). Five project phases are specified in *MAP2* (English Heritage, 1991):

- MAP2 Phase 1: Project Planning
- MAP2 Phase 2: Fieldwork
- MAP2 Phase 3: Assessment of Potential for Analysis
- MAP2 Phase 4: Analysis Report
- MAP2 Phase 5: Dissemination

The analysis and report preparation specifically relates to the analysis of recovered artefacts and ecofacts (MAP2 Phase 4). The proposed methodology and nominated specialists are noted in Sections 3.1. Subsequent dissemination will be undertaken as part of MAP2 Phase 5.

Reference has also been made to the following guidelines:

- Campbell, G., Moffett, L. and Straker, V., 2011. *Environmental Archaeology: A guide* to the theory and practise of methods, from sampling and recovery to post-excavation (2nd edition). Historic England.
- Standard and Guidance for Archaeological Excavation (Chartered Institute for Archaeologists, 1995, rev. 2001, 2008 and 2014).
- Standard and Guidance for Archaeological Watching Brief (Chartered Institute for Archaeologists, 1995, rev. 2001, 2008 and 2014).
- Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (Chartered Institute for Archaeologists, 2009 and 2014).

- Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials (Chartered Institute for Archaeologists, 2008 and 2014).
- Royal Commission for Ancient and Historic Monuments Wales Guidelines for Digital Archives Version 1

NB. All phases of this project are being monitored by the Gwynedd Archaeological Planning Services (GAPS). The content of this and any future project designs and reporting must be approved by GAPS.

3 BACKGROUND

The renewable heating system included the erection of a biomass energy centre building, located next to the visitor car parking area at Penrhyn Castle, and a series of heat mains linking the energy centre building to the existing boiler rooms and services within the castle.

The groundworks comprised the following:

- Energy Centre Building A 14m by 11.7m structural base for the Energy Centre Building located in an area of scrubland and saplings to the north-east of the public car park;
- Heat Main Pipe 1 this comprised a 216m long, 402mm wide and 1002mm deep trench running north-west from the heat main to the west side of Penrhyn Castle;
- Heat Main Pipe 2 this comprised a 12m long spur, 326mm wide and 826mm deep trench running west-east from Pipe 1 to the castle keep;
- Heat Main Pipe 3 this comprised a 24m long section from the junction of Pipes1 and 2 heading north to the castle, 382mm wide and 882mm deep trench; and
- Heat Main Pipe 10 this comprised a 24m long trench, 362mm wide and 862mm deep trench across the outer courtyard at Penrhyn Castle, running west-east to the stable boiler.

3.1 Archaeological assessment, evaluation and mitigation

GAT completed an archaeological assessment for the scheme in 2015 (GAT Report 1286), which included recommendations for targeted evaluation for assessment Feature 6, a small rectangular building noted on the 1803 Penrhyn Estate map, positioned along the route of Heat Main Pipe 1. No archaeological evidence for Feature 6 was uncovered during the subsequent evaluation (GAT Report 1299). The watching brief was completed between June and September 2016 and monitored groundworks for the energy centre foundations, and the heat main trenches (GAT Report 1341). A small possible prehistoric pit (Feature 19) was identified in the footprint of the energy centre building that included burnt stone and lithic fragments. A number of features representing post-medieval activity associated with the Estate were also identified during the watching brief, including drainage features across the parkland and structural features close to the castle, including a redundant footpath. The

remains of Feature 6 were also identified along the route of Heat Main Pipe 1, further to the north than what was suggested by the assessment, and the area targeted by the evaluation.

The key features that requiring of potential for analysis are summarised below.

3.1.1 Feature 19 (fig 1 and 2, plates 1 -5)

A possible prehistoric fire pit was identified within the footprint of the Energy Centre Building, at NGR SH60407172. The feature has been designated within the regional historic environment record (HER) as Primary Reference Number (PRN) 62271.

The cut of the pit [04] was sub oval, 1.2m by 1m and 0.27m deep, and orientated northsouth. The pit contained fire cracked stones within a charcoal rich sandy silt (05), within which a small fragment of flint was located (Small Find 02). This deposit was 0.7m long, 0.42m wide and 0.16m deep within the pit. The deposit sealed a dark greyish brown silty clay with small to large rounded cobbles and sub angular stones, as well as about 2% charcoal (06).

A flint fragments (Small Find 03) was found on the south edge of the pit although this was not clearly within a stratified context (03). It can be suggested that the burnt material was placed in the pit rather than burnt *in situ* as there does not appear to be evidence of burning in the vicinity.

Further flint fragments (Small Find 08) were recovered from the coarse residues within soil sample <1> taken from the pit. It was assessed by George Smith during the MAP2 Phase 3 with a probable date of early Mesolithic to late Neolithic.

The pit is similar in character to pits have been uncovered in the excavation carried out at Parc Bryn Cegin and Deganwy, nearby and morphologically appears to be a prehistoric feature (Kenney, 2017). The results from the artefacts and ecofacts of this feature compliments and furthers the understanding of the welsh prehistoric landscape.

3.1.2 Feature 21 (Feature 6) (fig 1, plates 6 - 10)

Feature 21 (Feature 6) was located at NGR SH603571725, within Heat Main Pipe 1, at a depth of 0.48m and cut within a mid-orange brown silty clay subsoil (11). The feature has been designated within the regional HER as PRN 61223. Feature 21 consisted of a small brick structure [12^], with a breadth of less than 1m with the largest depth at 0.58m. The feature was interpreted as the building noted on the 1803 Penrhyn Estate map, which was previously targeted, but not encountered, during the evaluation phase (GAT Report 1299).

Brick fragments, similar to that used for Feature 21 (Feature 6) were identified in the spoil from the heat main trench excavation further along the route, suggesting that the building was lost during later landscaping in this area. It was not possible to determine the function of the building from the truncated remains.

3.2 MAP2 Phase 3: Assessment of Potential for Analysis

GAT completed the post excavation of potential for analysis in February 2017 (GAT Report 1353). The ecofacts from Feature 19 were assessed by AOC Archaeology (Appendix II in GAT Report 1353) no carbonised macroplant remains were recovered from either sample, but ten fragments of charcoal larger than 4mm were selected from both contexts for species identification, which were identified as alder, elm, birch and oak. The assortment of wood suggesting fuel debris that were disposed after use; AOC recommended the birch, alder and elm fragments for radiocarbon dating. The flint tools and fragments of burnt stone from Feature 19 were assessed by George Smith: the flint fragments were identified as late Mesolithic to early Neolithic microliths (Appendix III in GAT Report 1353); the burnt stone bore evidence of prolonged heat exposure, suggesting repeated use. No further specialist recommendations were made for the flint fragments or burnt stone. The ceramic building material from Feature 21 was assessed by Spencer Gavin Smith and identified as handmade brick that had been partially dried within a mould and then placed in a clamp during the firing process. Based on the bowing, slipping, and large inclusions within the brick, the morphology was deemed typical of late 18th to early 19th century brickwork. No further specialist recommendations were made (Appendix IV in GAT Report 1353).

4 METHODOLOGY – Post-Excavation Analysis Report

4.1 Ecofact Analysis

The aim of the ecofact analysis is to recover radiocarbon dates from selected charcoal fragments identified in Samples <1> and <2> during the ecofact assessment, in order to provide a date range for activity associated with Feature 19.

No carbonised macroplant remains were recovered from either sample during the assessment, but ten fragments of charcoal larger than 4mm were selected from both contexts for species identification. The results are presented in Table 1 below.

Sample	Context	Species	Name	Number	Weight(g)
1	5	<i>Betula</i> sp.	Birch	6	
1	5	<i>Ulmus</i> sp.	Elm	3	
1	5	Quercus sp.	Oak	1	35.6
2	6	Alnus glutinosa L.	Alder	4	
2	6	<i>Ulmus</i> sp.	Elm	5	
2	6	Q <i>uercu</i> s sp.	Oak	1	1.6

The assessment by Jackaline Robertson at AOC Archaeology recommended that the alder, birch and elm charcoal were suitable for radiocarbon dating. The SUERC Radiocarbon Dating Laboratory in East Kilbride was contracted to undertake the radiocarbon dating and the samples were analysed at the SUERC Accelerator Mass Spectrometry (AMS) Laboratory using its 5 MV and 250kV National Electrostatic Corporation AMS systems.

The results are presented in <u>para. 5.1.3</u> below; a copy of the radiocarbon dating report by SUERC laboratories is included within <u>Appendix II</u>.

4.2 Artefact Analysis

Artefact assessment was limited to the prehistoric flint and burnt stone recovered from Feature 19 and the post-medieval ceramic brick material (CBM) recovered from Feature 21 (fig.1, plates 6 -10).

Finds	Context			
No.	No.	Material	Description	Weight (g)
			Off white Flint tertiary blade	
02	05	Flint	found at the bottom of pit [04]	0.5
			Core rejuvenation flake found	
03	03	Flint	near surface of [04]	07
			Flint recovered from coarse	
			residue, sample <01>. Blade tip	
			fragment and blade butt	
08	05	Flint	fragment.	<0
			Small selection from 100%	
			sample (total weight 12.9kg) of	
09	06	Burnt stone	burnt stones.	2548

4.2.1 Feature 19 Artefacts (plates 01-05)

No recommendations have been made for the analysis of the flint and burnt stone from Feature 19, it has been agreed that the lithic artefacts will be transferred to Penrhyn Castle, Llandegai, Gwynedd in accordance with their guidelines during the MAP2 Phase 5 dissemination process for long term storage. The burnt stone will be retained at GAT for long-term storage and used as a reference.

4.2.2 Feature 21 Artefacts (plates 06 -10)

Finds	Context			
No.	No.	Material	Description	Weight (g)
			Large 'complete' red/orange	
04	11	Brick	brick	2759
05	11	Brick	Orange brick with mortar	1548
			Burgundy coloured brick with	
06	11	Brick	many inclusions - pebbles	1517
			Piece of grey-blue brick with	
07	11	Brick	several inclusions	1694

No recommendations have been made for the analysis of the ceramic building material and it is not recommended that they are accessioned to a museum but will be retained at GAT for long term storage and used as a CBM reference.

5 RESULT OF ECOFACT ANALYSIS

5.1 Radiocarbon Dating Results from Feature 19

5.1.1 Charred Macroplant Assessment Summary (MAP2: Phase 3)

The datable charred macroplant remains were sourced from the floatation process from samples <1> and <2>, which were previously assessed by Jackaline Robertson, a specialist in archeobotany, working on behalf of AOC Archaeology. Robertson recommended that the alder, birch and elm charcoal were suitable for radiocarbon dating in order to provide a date range for activity associated with Feature 19, following this recommendation the decision was made to submit the Birch *(Betula)* and Elm *(Ulmus)* from sample <1> context (05) for radio carbon dating.

5.1.2 Scottish Universities Environmental Research Centre Methodology

Derek Hamilton at the SUERC Radiocarbon Dating Laboratory in East Kilbride was approached to perform the radiocarbon dating. The samples have been analysed at the SUERC Accelerator Mass Spectrometry (AMS) Laboratory using its 5 MV and 250kV National Electrostatic Corporation AMS systems to undertake ¹⁴C, ¹⁰Be, ²⁶Al, ³⁶Cl and ¹²⁹I analyses. In addition, the 250 kV instrument is dedicated to ¹⁴C and positive ion measurements.

5.1.3 Radiocarbon Dates Analysis Results

As previously mentioned, the Birch and Elm charcoal from sample <1> deposit (05), were calibrated at SUERC's laboratory following the age ranges determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4). The radiocarbon date (¹⁴C) is quoted in conventional years BP, before 1950 AD. The results as follows:

5.1.3.1 Calibrated date: Birch (Betula) - SUERC 72568

The results taken from the birch (SUERC 72568) calibrated on SUERCs AMC facility gives date at Radiocarbon Age BP of 3502±33, at a 94.7% probability calibrated date to be within the Early Bronze Age 1918-1743 cal BC.



A copy of the radiocarbon dating report by SUERC laboratories is included within <u>Appendix</u> <u>II</u>.

5.1.3.2 Calibrated date: Elm (Ulmus) - SUERC-72569

The results taken from the elm (SUERC 72569) calibrated on SUERCs AMC facility gives date at Radiocarbon Age BP of 3795±33, at a 94.8% probability calibrated date to be within the Early Bronze Age 2345 – 2134 cal BC.



A copy of the radiocarbon dating report by SUERC laboratories is included within <u>Appendix</u> <u>II</u>.

6 CONCLUSION & INTERPRETATION

The archaeological mitigation during the renewable heating scheme at Penrhyn Castle identified prehistoric and post-medieval archaeological activity. This included Penrhyn Estate drainage features, which ran across the parkland, and structural features close to the castle including a redundant footpath. The remains of a post-medieval structure evident on an 1803 estate map were also identified within the main heat main pipe trench.

The most significant archaeological feature identified during the mitigation was an Early Bronze Age pit (Feature 19/Primary Reference Number (PRN) 62271; NGR SH60407172), which was identified within the footprint of the Energy Centre Building. The feature comprised a sub-oval pit that measured 1.2m wide and 0.27m deep, with steep sides and a concave base. The feature was filled with two deposits: a primary fill with frequent charcoal inclusions, heat-cracked stones and burnt cobbles; a secondary fill of burnt stone with a clay-rich deposit. Flint artefacts were recovered from the secondary fill, including blade fragments and a core rejuvenation flake. The two radiocarbon dates from the secondary fill provided calibrated date ranges of 2345–2134 cal BC (SUERC 72569), produced from a sample of elm, and 1918-1743 cal BC (SUERC 72568), produced from a sample of birch.

The calibrated radiocarbon dates do not overlap, which reflects that they are from different species. However, the date from the elm is within the Late Neolithic/Early Bronze Age and the birch within the Early Bronze Age, suggesting a general parity. The Late Mesolithic/Early Neolithic flint fragments recovered from the area do not fit in with the Early Bronze Age date, suggesting they may be residual artefacts from nearby Late Mesolithic/Early Neolithic activity.

Similar pits were found within a Neolithic – Bronze Age settlement at Parc Bryn Cegin, Llandegai (Kenney, 2008), located c.1.6km south-west from Feature 19/ PRN 62271. Pit 3139 from Pit Group VII at Parc Bryn Cegin (PRN 31756), was part of a group of seven pits situated within trench 3 (cf. Figure 04), which measured c. 0.76m wide and c.0.3m deep, with inclusions of heat cracked stone, burnt bone, flint and pottery. The pit contained two fills, the lower with very little charcoal, and the upper with fill rich in charcoal; a radiocarbon date from the upper fill (1317) of 1980–1770 cal BC (NZA-26690), placed it within the similar date range to Feature 19/PRN 62271. Pits 3314 and 3133 (PRN 31764), were examples of several small pits scattered across the site at Parc Bryn Cegin belonging to a distinct class of feature identified as earth ovens. These particular pits were circular or sub-circular, no more than 1.5m wide and 0.4m deep. Some had clay linings and all were filled with heat-cracked stone with limited evidence in-situ burning. Pit 3314 was oval in plan (though partly

cut by a land drain), with steep sides and flat base, filled entirely with charcoal and heat cracked stones (cf. Figure 05). This pit did not contain a clay lining as the feature was cut into the glacial horizon, similarly to Feature 19/PRN 62271. Some of the earth ovens at Parc Bryn Cegin, such as pit 3133, had a deposit of yellow-orange clay with burnt stones spread over the pit, possibly representing a sealing deposit, which is similar to the upper fill from Feature 19/PRN 62271. Pit 3314 was dated as Early Bronze Age (NZA-26840; 2290-1740 cal BC), whereas Pit 3133 was dated as Early Neolithic (NZA-26989; 3650-3380 cal BC). The other pits at Parc Bryn Cegin identified as earth ovens (contexts 1072, 1230 and 1510), also fall within the Bronze Age.

Given the similarities to the features at Parc Bryn Cegin, it is quite plausible that Feature 19/PRN 62271 is an earth oven, broadly contemporary with the Parc Bryn Cegin activity and part of a larger prehistoric landscape.

7 SOURCES CONSULTED

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- **9.** Standard and Guidance for Archaeological Watching Brief (Chartered Institute for Archaeologists, 1995, rev. 2001, 2008 and 2014).
- **10.** Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (Chartered Institute for Archaeologists, 2009 and 2014).
- **11.** Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials (Chartered Institute for Archaeologists, 2008 and 2014).

FIGURES



Figure 01: Reproduction of National Trust map of Penrhyn Castle estate, showing location of Dunster pipe scheme route along with noted Gwynedd Archaeological Trust features. Scale 1:2500@A4





Figure 03: Reproduction of 1803 Penrhyn Estate Map and location of proposed North and South Option routes and information from the Historic Environment Record and National Trust. Scale: 1:2500@A4. (Source: National Trust)



Figure 04: Plan of Pit Group VII in trench 3 from excavations at Parc Bryn Cegin (Kenney 2008)



Figure 05: Plan and section of earth oven 3314 in trench 3 from the excavation at Parc Bryn Cegin (Kenny 2008)

PLATES



Plate 01: Feature 19; South-west facing section through (05) and (06) in possible prehistoric pit feature [04]. Scale 1m (photographic archive ref. G2447_088).



Plate 02: Feature 19; Post-excavation view of pit [04], viewed from the north-east. Scale 1m (photographic archive ref G2447_092).



Plate 03: View of flint 02, Later Mesolithic or Early Neolithic thin tertiary blade. Scale 5cm (photographic archive ref. G2447_187).



Plate 04: View of flint 03, core rejuvenation flake showing triangular cross section. Scale 5cm (photographic archive ref. G2447_189).



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Plate 06: Feature 21; Small enclosure wall [12^] along Pipe-line 1, where CBM 04 - 07 was sourced. Scale 1m (photographic archive ref. G2447_107).



Plate 07: View of brick 04 showing slumping on top ridge and finger prints, and some mortar (photographic archive ref. G2447_175)



Plate 08: View of brick 06 showing very large inclusions along with a faint slump mark along top edge. Scale 10cm (photographic archive ref. G2447_180).



Plate 09: View of brick 05 showing curvature on horizontal plane caused by using a clamp during the firing process (photographic archive ref. G2447_179).



Plate 10: View of brick 07 vertical plane with evidence of bowing which is caused by contraction on t he sides from partially drying before firing (photographic archive ref. G2447_184)

APPENDIX I

Approved Project Design

PENRHYN CASTLE RHS (G2447)

PROJECT DESIGN FOR AN ASSESSMENT OF POTENTIAL FOR ANALYSIS: MAP2 PHASE 4

Prepared for

National Trust

March 2017

Ymddiriedolaeth Archaeolegol Gwynedd Gwynedd Archaeological Trust

PENRHYN CASTLE RHS

PROJECT DESIGN FOR AN ASSESSMENT OF POTENTIAL FOR ANALYSIS: MAP2 PHASE 4

Prepared for National Trust, March 2017

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	Role	Printed Name	Signature	Date	
Originated by	Document Author				
Reviewed by	Document Reviewer				
Approved by	Principal Archaeologist				

	Revision History				
Rev No.	Summary of Changes	Ref Section	Purpose of Issue		

All GAT staff should sign their copy to confirm the project design is read and understood and retain a copy of the specification for the duration of their involvement in this phase. On completion, the specification should be retained with the project archive:

Name

Signature

Date

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been commissioned by National Trust to complete the Post-Excavation Analysis and Report Preparation phase (MAP2 Phase 4) of archaeological works for the renewable heating scheme at Penrhyn Castle, Llandygai, Gwynedd (NGR SH60277193; Figure 01). This follows a programme of archaeological assessment, evaluation, mitigation and post-excavation assessment. The Post-Excavation Analysis and Report Preparation phase will be undertaken in response to the identification of prehistoric and post-medieval archaeological activity and the recovery of associated ecofacts and artefacts, which have been submitted for post-excavation assessment.

The post-excavation programme has been undertaken as a phased process in accordance with guidelines specified in *Management of Archaeological Projects – MAP2* (English Heritage, 1991), and relevant guidelines from *Management of Research Projects in the Historic Environment* (Historic England 2015). Five project phases are specified in *MAP2* (English Heritage, 1991):

- MAP2 Phase 1: Project Planning
- MAP2 Phase 2: Fieldwork
- MAP2 Phase 3: Assessment of Potential for Analysis
- MAP2 Phase 4: Analysis and Report Preparation
- MAP2 Phase 5: Dissemination

The current design specifically relates to the analysis of recovered ecofacts and the production of a final report (MAP2 Phase 4). The proposed methodology and nominated specialists are noted in Sections 3.1. On completion of the report, dissemination will be undertaken as part of MAP2 Phase 5.

Reference has been made to the following guidelines:

- Campbell, G., Moffett, L. and Straker, V., 2011. *Environmental Archaeology: A guide* to the theory and practise of methods, from sampling and recovery to post-excavation (2nd edition). Historic England.
- Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (Chartered Institute for Archaeologists, 2009 and 2014).
- Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials (Chartered Institute for Archaeologists, 2008 and 2014).

 Royal Commission for Ancient and Historic Monumnets Wales Guidelines for Digital Archives Version 1

NB. All phases of this project are being monitored by the Gwynedd Archaeological Planning Services (GAPS). The content of this and any future project designs and reporting must be approved by GAPS.

2 ARCHAEOLOGICAL RESULTS

The renewable heating system included the erection of a biomass energy centre building, located next to the visitor car parking area at Penrhyn Castle, and a series of heat mains linking the energy centre building to the existing boiler rooms and services within the castle.

The groundworks comprised the following:

- Energy Centre Building A 14m by 11.7m structural base for the Energy Centre Building located in an area of scrubland and saplings to the north-east of the public car park;
- Heat Main Pipe 1 this comprised a 216m long, 402mm wide and 1002mm deep trench running north-west from the heat main to the west side of Penrhyn Castle;
- Heat Main Pipe 2 this comprised a 12m long spur, 326mm wide and 826mm deep trench running west-east from Pipe 1 to the castle keep;
- Heat Main Pipe 3 this comprised a 24m long section from the junction of Pipes1 and 2 heading north to the castle, 382mm wide and 882mm deep trench; and
- Heat Main Pipe 10 this comprised a 24m long trench, 362mm wide and 862mm deep trench across the outer courtyard at Penrhyn Castle, running west-east to the stable boiler.

2.1 Archaeological assessment, evaluation and mitigation

GAT completed an archaeological assessment for the scheme in 2015 (GAT Report 1286), which included recommendations for targeted evaluation for assessment Feature 6, a small rectangular building noted on the 1803 Penrhyn Estate map, positioned along the route of Heat Main Pipe 1. No archaeological evidence for Feature 6 was uncovered during the subsequent evaluation (GAT Report 1299). The watching brief was completed between June and September 2016 and monitored groundworks for the energy centre foundations, and the heat main trenches (GAT Report 1341). A small possible prehistoric pit (Feature 19) was identified in the footprint of the energy centre building that included burnt stone and lithic fragments. A number of features representing post-medieval activity associated with the Estate were also identified during the watching brief, including drainage features across the parkland and structural features close to the castle, including a redundant footpath. The

remains of Feature 6 were also identified along the route of Heat Main Pipe 1, further to the north than what was suggested by the assessment, and the area targeted by the evaluation.

The key features are summarised below.

2.1.1 Feature 19

A prehistoric fire pit was identified within the footprint of the Energy Centre Building, at NGR SH60407172. The feature has been designated within the regional historic environment record (HER) as Primary Reference Number (PRN) 62271.

The cut of the pit [04] was sub oval, 1.2m by 1m and 0.27m deep, and orientated northsouth. The pit contained fire cracked stones within a charcoal rich sandy silt (05) within which a small fragment of worked flint was located (Small Find 02). This deposit was 0.7m long, 0.42m wide and 0.16m deep within the pit. The deposit sealed a dark greyish brown silty clay with small to large rounded cobbles and sub angular stones, as well as about 2% charcoal (06). A possible flint tool (Small Find 03) was found on the south edge of the pit although this was not clearly within a stratified context. It can be suggested that the burnt material was placed in the pit rather than burnt *in situ* as there does not appear to be evidence of burning in the vicinity.

The pit is similar in character to pits have been found in the excavation carried out at Parc Bryn Cegin nearby and morphologically appears to be a prehistoric feature. The results from further assessment of the ecofacts and artefacts recovered from the pit may help with dating the feature.

2.1.2 Feature 21 (Feature 6)

Feature 21 (Feature 6) was located at NGR SH603571725, within Heat Main Pipe 1, at a depth of 0.48m and cut within a mid-orange brown silty clay subsoil (11). The feature has been designated within the regional HER as PRN 61223. Feature 21 consisted of a small brick structure [12^], with a breadth of less than 1m with the largest depth at 0.58m. The feature was interpreted as the building noted on the 1803 Penrhyn Estate map, which was previously targeted, but not encountered, during the evaluation phase (GAT Report 1299). Brick fragments, similar to that used for Feature 21 (Feature 6) were identified in the spoil from the heat main trench excavation further along the route, suggesting that the building was lost during later landscaping in this area. It was not possible to determine the function of the building from the truncated remains.

2.2 MAP2 Phase 3: Assessment of Potential for Analysis

GAT completed the post excavation of potential for analysis in February 2017 (GAT Report 1353). The ecofacts from Feature 19 were assessed by AOC Archaeology: no carbonised macroplant remains were recovered from either sample, but ten fragments of charcoal larger than 4mm were selected from both contexts for species identification, which were identified as alder, elm, birch and oak. The assortment of wood suggesting fuel debris that were disposed after use; AOC recommended the birch, alder and elm fragments for radiocarbon dating. The flint tools and fragments of burnt stone from Feature 19 were assessed by George Smith: the flint tools were identified as late Mesolithic to early Neolithic microliths; the burnt stone bore evidence of prolonged heat exposure, suggesting repeated use. No further specialist recommendations were made for the flint tools or burnt stone. The ceramic building material from Feature 21 was assessed by Spencer Gavin Smith and identified as handmade brick that had been partially dried within a mould and then placed in a clamp during the firing process. Based on the bowing, slipping, and large inclusions within the brick, the morphology was deemed typical of late 18th to early 19th century brickwork. No further specialist recommendations were made.

3 METHODOLOGY

3.1 Ecofact Analysis

The aim of the ecofact analysis will be to recover radiocarbon dates from selected charcoal fragments identified in Samples <1> and <2> during the ecofact assessment, to provide a date range for activity associated with Feature 19, which is currently interpreted as a late Mesolithic to early Neolithic pit.

No carbonised macroplant remains were recovered from either sample during the assessment, but ten fragments of charcoal larger than 4mm were selected from both contexts for species identification. The results are presented in Table 1 below.

Sample	Context	Species	Name	Number	Weight(g)
1	5	<i>Betula</i> sp.	Birch	6	
1	5	<i>Ulmus</i> sp.	Elm	3	
1	5	Q <i>uercus</i> sp.	Oak	1	35.6
2	6	Alnus glutinosa L.	Alder	4	
2	6	<i>Ulmus</i> sp.	Elm	5	
2	6	Q <i>uercu</i> s sp.	Oak	1	1.6

The assessment recommended that the alder, birch and elm charcoal were suitable for radiocarbon dating. Derek Hamilton at the SUERC Radiocarbon Dating Laboratory in East Kilbride has been contacted to advise on the radiocarbon dating. The samples will be analysed at the SUERC Accelerator Mass Spectrometry (AMS) Laboratory using its 5 MV and 250kV National Electrostatic Corporation AMS systems.

3.2 Artefact Analysis

Artefact analysis has been limited to the prehistoric flint and burnt stone recovered from Feature 19 and the brick material recovered from Feature 21 (Feature 06).

Finds No.	Context No.	Material	Description	Weight (g)
02	05	Elipt	Possible flint tool found at	0.5
02	05		Possible flint tool found	0.5
03	05	Flint	near surface of [04]	07
			Pieces of flint recovered	
			from coarse residue,	
08	05	Flint	sample 01	<0
			Small selection from	
			100% sample (total weght	
09	06	Burnt stone	12.9kg) of burnt stones	2548

3.2.1 Feature 19 Artefacts

No recommendations have been made for the analysis of the flint and burnt stone from Feature 19, but it is recommended that they are accessioned to a museum for long term storage. GAT recommends that they are accessioned to STORIEL. GAT will contact the landowner for agreement regarding the transfer of artefacts, initially to GAT and subsequently to the museum. A GAT produced pro-forma will be issued to the landowner where they are given the option to donate the finds or to record that they want them returning to them. If donated, the artefacts will be transferred to STORIEL in accordance with their guidelines.

Finds No.	Context No.	Material	Description	Weight (g)
04	11	Brick	Large 'complete' red/orange brick	2759
05	11	Brick	Orange brick with mortar	1548
06	11	Brick	Burgundy coloured brick with many	1517
00		DIICK	Piece of grey-blue brick	1317
07	11	Brick	with several inclusions	1694

3.2.2 Feature 21 Artefacts

No recommendations have been made for the analysis of the ceramic building material and it is not recommended that they are accessioned to a museum but will be retained at GAT for long term storage and reference. GAT will contact the landowner for agreement regarding the transfer of artefacts, initially to GAT and subsequently to the museum. A GAT produced pro-forma will be issued to the landowner where they are given the option to donate the finds or to record that they want them returning to them.

3.3 Reporting

Following completion of the stages outlined above, a MAP2 Phase 4 report will be produced incorporating the following:

- 1. Non-technical summary
- 2. Introduction
- 3. Background
- 4. Methodology (including specialist methodology)
- 5. Results of Ecofact Analysis
- 6. Conclusions
- 7. Sources Consulted
- 8. Appendix I Approved Project Design
- 9. Appendix II Ecofact Analysis Report (Radiocarbon Dating)

The MAP2 Phase 4 report will be the final illustrated report that will review and contextualise the results of the ecofact and artefact assessment and analysis. The report will compare the results to other contemporary sites within the region, including those from Parc Cegin in Llandygai.

A full archive will also be prepared. A draft copy of the report will be sent to the regional curatorial archaeologist (GAPS) and to the client for review by **April 2017**. Once approved, a final report will be submitted to all parties as well as the Historic Environment Record; the archive will be sent to the *Royal Commission for Ancient and Historic Monuments Wales* (*RCAHMW*).

The following dissemination will apply:

- 1. A digital report will be provided to GAPS (draft report then final report).
- 2. A paper report plus a digital report will be provided to the regional Historic Environment Record, Gwynedd Archaeological Trust; this will be submitted within six months of report completion (final report only).
- 3. A digital report and archive (including photographic and drawn) data will be provided to *RCAHMW* (final report only). Submission of digital information to the Royal Commission on the Ancient and Historical Monuments of Wales shall be undertaken in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. Digital information will include the photographic archive and associated metadata
- 4. A digital report(s) plus paper report(s) (if requested) will be provided to the client (draft report then final report).
- 5. It is proposed ultimately to publish a summary of the work in *Archaeology in Wales*, the journal for the Council of British Archaeology Wales. This will be undertaken as part of MAP2 Phase 5.The MAP2 Phase 5 dissemination process will be confirmed with GAPS and client via correspondence once the MAP2 Phase 4 report is approved.

4 SOURCES CONSULTED

- Campbell, G., Moffett, L. and Straker, V. Environmental Archaeology: A guide to the theory and practise of methods, from sampling and recovery to post-excavation (2nd edition). (Historic England, 2011).
- 2. English Heritage, 1991, Management of Archaeological Projects
- 3. Evans, R. 2015. *Penrhyn Castle Renewable Heating Scheme Archaeological Assessment*. GAT Report 1286.
- 4. Evans, R. 2015. *Penrhyn Castle Renewable Heating Scheme Archaeological Evaluation.* GAT report 1299
- 5. Historic England 2015. *Management of Research Projects in the Historic Environment*
- 6. Jones, B. and Evans, R. with McGuinness, N. 2016 *Penrhyn Castle Renewable Heating Scheme: Archaeological Watching Brief.* GAT Report 1341.
- 7. Jones, B. 2017 Penrhyn Castle Renewable Heating Scheme Assessment of Potential for Analysis: MAP2 Phase 3. GAT Report 1353.
- 8. Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (Chartered Institute for Archaeologists, 2009 and 2014).
- 9. Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials (Chartered Institute for Archaeologists, 2008 and 2014).

5 Figure 01

5.1 Reproduction of National Trust map of Penrhyn Castle estate, showing location of Dunster pipe scheme route along with noted Gwynedd Archaeological Trust features. Scale 1:2500@A4

APPENDIX II

Radiocarbon Dating Report





Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride, Glasgow G75 0QF, Scotland, UK Director: Professor R M Ellam Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE 06 April 2017

Laboratory Code	SUERC-72568 (GU43317)
Submitter	Bethan Jones Gwynedd Archaeological Trust Craig Beuno Carth Baad
	Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2447_Penrhyn_Castle_RHS 5 1
Material	Charcoal : Betula
δ ¹³ C relative to VPDB	-25.8 ‰

Radiocarbon Age BP 3502 ± 33

N.B. The above ¹⁴C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email <u>Gordon.Cook@glasgow.ac.uk</u> or telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :-

Bayny

Date :- 06/04/2017

Checked and signed off by :-

P. Nayonto

Date :- 06/04/2017





Calibration Plot



Radiocarbon determination (BP)





Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride, Glasgow G75 0QF, Scotland, UK Director: Professor R M Ellam Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE 06 April 2017

Laboratory Code	SUERC-72569 (GU43318)
Submitter	Bethan Jones
	Gwynedd Archaeological Trust
	Craig Beuno
	Garth Road
	Gwynedd
	LL57 2RT
Site Reference	G2447_Penrhyn_Castle _RHS
Context Reference	5
Sample Reference	1
Material	Charcoal : Ulmus
δ ¹³ C relative to VPDB	-27.1 ‰

Radiocarbon Age BP 3795 ± 33

N.B. The above ¹⁴C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email <u>Gordon.Cook@glasgow.ac.uk</u> or telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :-

Bayny

Date :- 06/04/2017

Checked and signed off by :-

P. Nayonto

Date :- 06/04/2017





Calibration Plot



Calibrated date (calBC)





Craig Beuno, Ffordd y Garth, Bangor, Gwynedd. LL57 2RT Ffon: 01248 352535. Ffacs: 01248 370925. email:gat@heneb.co.uk