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Penrhyn Castle Renewable Heating Scheme

Archaeological Watching Brief

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Penrhyn Castle Renewable Heating Scheme

Archaeological Watching Brief

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CONTENTS

Non- technical summary 7
1 INTRODUCTION 8
2 Project Background 10
2.1 Historical Background 10
2.2 Gwynedd Archaeological Trust Assessment and Evaluation Reports 11
3 METHODOLOGY 12
4 Watching Brief RESULTS 14
4.1 Biomass Energy Centre Building 14
4.1.1 Feature 19 14
4.1.2 Feature 20 14
4.2 Heat Main Pipe 1 15
4.2.1 Feature 21 15
4.2.2 Feature 22 15
4.2.3 Feature 23 16
4.2.4 Feature 24 16
4.3 Heat Main Pipe 2 17
4.4 Heat Main Pipe 3 17
4.5 Heat Main Pipe 10 17
4.5.1 Feature 25 17
4.5.2 Feature 26 18
5 Conclusions 19
6 Sources Consulted 20
Appendix I 21
Reproduction of Gwynedd Archaeological Planning Service (GAPS) correspondence to the Local Planning Authority (ref: 0403je01/D2090; 4th March 2016) 21
Appendix II 22
Reproduction of Gwynedd Archaeological Trust specification for an archaeological watching brief (March 2016) 22
Appendix III 23
Reproduction of Gwynedd Archaeological Trust photographic metadata 23
Appendix IV 24
Context Register 24

FIGURES

Figure 01: Location Map (based on 1:10000 Ordnance Survey County Series map sheets SH57SE & SH67SW.Scale: 1:3000@A4. Crown Copyright. All Rights Reserved. License number AL100020895.

Figure 02: 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 03: Reproduction of 1890 First Edition 1 inch to 25 mile Carnavonshire County Series Map Sheets VII.9 and VII.10and location of heat main routes. Scale: 1:2500@A4.

Figure 04: 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 05: Plan and section through pit [04]. Scale 1:20/1:10

Figure 06: Plan and section through cut feature [07]. Scale 1:20/1:10

Figure 07: Elevation section drawing of 19th Century lead pipe and brick service tunnel [18^]. Scale 1:10

PLATES

Plate 01: Energy Centre Building: General view of undergrowth removal at the Energy Centre site. View from the west south west
(archive image: G2447_064)

Plate 02: Energy Centre Building: Topsoil stripping at Energy Centre site, viewed from the east; scale 1m
(archive image: G2447_066)

Plate 03: Energy Centre Building: South-west facing section through (05) and (06) in possible prehistoric pit feature [04]; scale 1m
(archive image: G2447_088)

Plate 04: Energy Centre Building: Post-excavation view of pit [04], viewed from the north-east; scale 1m
(archive image: G2447_092)

Plate 05: Pipeline 1: end of day shot showing area where ground was cut from woodlands across tarmac; scale: 1m
(archive image: G2447_111)

Plate 06: Pipeline 1: Pipe line bricks in section. Possible small enclosure wall of feature 6 in Evaluation. 1m scale
(archive image: G2447_108)

Plate 07: Pipeline 1: Shot of tarmac road showing cobbles in N facing trench section
(archive image: G2447_110)

Plate 08: Pipeline 1: Shot of Iron rust staining below slate chips, where find no. 10 and 11 were recovered; scale 1m
(archive image: G2447_120)

Plate 09: Pipeline 1: Shot along trench during excavation of pipe trench showing previously backfilled area near woodlands
(archive image: G2447_123)

Plate 10: Pipeline 1: Portrait shot showing traces of modern service pipe along with 19th century debris and shale deposit
(archive image: G2447_130)

Plate 11: Pipeline 1: Deposit of marine shells (16) in NE facing corner of pipeline 1 trench edge, lying above bedrock (17); scale 1m
(archive image: G2447_131)

Plate 12: Pipeline 1: Lead pipe and brick tunnel [18^] from within Pipe line 1 as it first appeared at SH 60238 71203
(archive image: G2447_133)

Plate 13: Pipeline 1: Shot of E edge of trench better displaying [18^] tunnel, along with sawn lead pipe; scale 1m
(archive image: G2447_ 138)

Plate 14: Pipeline 1: Close-up view of E edge of trench better displaying [18^] tunnel, along with sawn lead pipe; scale 1m
(archive image: G2447_ 138)

Plate 15: Pipeline 1: Portrait shot of c.30cm x 30cm mortared area - likely to have been [18^] tunnel terminal, along with appearance of lead pipes
(archive image: G2447_144)

Plate 16: Pipeline 3: View of entire length of excavated Pipe 3 trench; scale 1m
(archive image: G2447_167)

Plate 17: Pipeline 3: View of entire length of excavated Pipe 3
trench; scale 1m (archive image: G2447_167)

Plate 18: Pipeline 2: Terminal of Pipe 2 trench, beside the tower; scale 1m
(archive image: G2447_163)

Plate 19: Pipeline 10: Shot of trench leading to N end of castle with damaged bricks and modern services; scale 1m
(archive image: G2447_160)

Plate 20: Pipeline 10: Small double-layered brick structure [22^] W facing edge of trench; scale 1m
(archive image: G2447_150)

Plate 21: Pipeline 10: Brick service tunnel [23^] with cobbled surface in shot within S end corner of trench; scale 1m
(archive image: G2447_155)

Plate 22: Pipeline 10: Brick service pipe [23^] with lead pipe modern service pipes; 1m scale
(archive image: G2447_153)

Approvals Table				
	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**

NON- TECHNICAL SUMMARY

Gwynedd Archaeological Trust was commissioned by National Trust to carry out an archaeological watching brief during the construction of a renewable heating system at Penrhyn Castle, Llandygai, Gwynedd. This followed a phased programme of archaeological assessment and evaluation along the scheme route that identified the potential for surviving archaeological activity associated with the Penrhyn Estate.

The watching brief monitored the excavation of the footprint for an Energy Centre Building as well as trenches for four heat main pipes between the Energy Centre Building and Penrhyn Castle.

A number of features representing post-medieval activity associated with the Estate were 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 a redundant post-medieval structure evident on an 1803 estate map were also identified within the main heat main pipe trench.

A small possible prehistoric pit was identified in the footprint of the Energy Centre Building. The pit included burnt and lithic fragments. The date range of the feature was unclear but may represent transient domestic activity. It is recommended that the recovered ecofacts and artefacts are assessed and analysed as part of a post-excavation programme to determine their origin.

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was asked by *National Trust* to carry out an archaeological watching brief during groundworks for a renewable heating scheme development at Penrhyn Castle, Llandygai, Gwynedd (NGR SH60277193; Figure 01). The watching brief was completed as a condition of planning application C16/0107/16/LL (conditions 6 and 7). The watching brief was completed between June and September 2016 and monitored groundworks in advance of the construction of the structural base for the energy centre, and four lengths of trenching for the heat main. The aim of the archaeological watching brief was to identify any archaeological activity within the designated areas.

The development included the erection of a biomass energy centre building, located next to the visitor car parking area at Penrhyn Castle, and a heat main linking the energy centre building to the existing boiler rooms and services within with the castle.

The groundworks comprised the following:

- A 14m by 11.7m structural base for the energy centre, located at NGR SH 60407170;
- 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. The pipe itself for this section extends for 40m, 16m of which will be through the castle cellars; 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.

GAT completed an archaeological assessment for the proposed scheme in 2015 (GAT Report 1286), which included recommendations for targeted evaluation for specific features (cf. para. 2). In response to the results, GAT evaluated Feature 6, which comprised a small rectangular building noted on the 1803 Penrhyn Estate map that was located along the proposed heat main route. No archaeological evidence was uncovered during the evaluation (GAT Report 1299).

In response to the results of the assessment and evaluation, Gwynedd Archaeological Planning Service (GAPS) stated in communication with the planning officer for Cyngor Gwynedd Council that 'The archaeological mitigation should take the form of an *archaeological watching brief*, to be carried out on an *intensive* basis, during intrusive groundworks associated with pipeline construction, followed by production of a report and specialist analysis if applicable' (reference: 0324je03/D2090; dated 24th March 2016;

reproduced as Appendix I). GAT completed a project design for the watching brief that was approved by GAPS in advance of works (cf. Appendix II). The scheme was subsequently monitored by GAPS.

The watching was completed in accordance with the following guidelines:

- *Standard and Guidance for an archaeological watching brief* (Chartered Institute for Archaeologists, 2014);
- *Management of Research Projects in the Historic Environment* - MoRPHE (English Heritage 2015);
- *Management of Archaeological Projects* - MAP2 (English Heritage, 1991); and
- *Guidelines for Digital Archives Version 1* (Royal Commission on the Ancient and Historical Monuments of Wales)

2 PROJECT BACKGROUND

2.1 Historical Background

The current Penrhyn Castle was, built in 1822-38 for George Hay Dawkins Pennant and designed by Thomas Hopper. The castle was constructed in a neo-Norman style with a keep, courtyards, barbican and towers, built using stone from Ynys Mon. The castle remains very little changed since construction and has been in the hands of the National Trust since 1951, open to the public since 1952. The present house replaces a late eighteenth-century Gothic 'castle' of yellow brick, on the same site, designed by Samuel Wyatt, which probably retained the plan and part of the chapel of the previous medieval house. The medieval house is thought to have been built in the fifteenth century. The Wyatt-designed house was subsumed by the later Penrhyn Castle but the great hall survives in the present drawing-room.

Penrhyn Castle is reputed to occupy the site of Roderic Malwynog's palace who is considered to have been an 8th century King of Gwynedd, grandson of Cadwalader the last king of the Britons. The land became the property of the Gruffydd family who after advantageous marriage alliances had established a substantial estate in the area by the 14th century. In the early 15th century a Hall House with two end wings was built for Gwilym ap Gruffydd, a house that was to stand until the late 18th century. In 1684 when Sir Gruffydd William died without an heir the estate passed through various hands, until between 1765 and 1785 it was acquired by Richard Pennant. The medieval house, with additional buildings of possibly later date, is shown on an estate map of 1768 surveyed by G. Leigh (GAT Report 1286 Figure 4). This shows the medieval house set in a landscape of small enclosures, some clearly agricultural, some planted with trees. The approach to the house is shown striking off at right angles to the drive across an outer courtyard, through the stable block and up to the front door of the house (National Trust 1991, 76). Aerial photographs from the National Monuments Record show extensive parching of the land in the vicinity of the former medieval house, and this may reflect the survival of buried remains below the ground relating to the pre 1781 occupation of the area (Gee and Laws 2015, 24-25).

In 1781 a new house began to be constructed at Penrhyn that was designed by Benjamin Wyatt and built in a form of castellated gothic of yellow brick on the same site of and incorporating some elements of the previous house. The estate map of 1803 (GAT Report 1286 Figure 5) shows parkland, woodland and a garden demonstrating that development of the parkland was well underway. The Wyatt designed house was short lived, as the considerable profits that were being returned by the Pennant's slate quarries by the early 19th century enabled the current Penrhyn Castle to be constructed.

2.2 Gwynedd Archaeological Trust Assessment and Evaluation Reports

The Gwynedd Archaeological Trust completed an archaeological assessment of the proposed scheme in December 2015 (Evans, R. 2015: GAT Report 1286). The assessment examined two possible options, to the north and to the south of Penrhyn Castle, respectively.

The report identified eighteen post-medieval sites relating to the Penrhyn Estate and included former buildings and field boundaries. These sites were mainly identified on historic mapping, specifically the estate maps from 1768, 1803 and 1828 and the Llandygai Parish Tithe Map of 1841. Fourteen sites were identified on the northern route, and four on the southern route. GAT recommended that in the event of the northern option being chosen, that five of these sites, representing former buildings, were evaluated by archaeological trenching in order to assess their potential survival and to inform a mitigation strategy, with the remaining possible sites, consisting of field boundaries, recorded as part of the evaluation during groundworks. For the southern option, archaeological trenching was recommended for a former building extant on the 1803 estate map (GAT Report 1286 Feature 6) that appeared to be on the route of the proposed heat main, with the rest of the route mitigated via a watching brief.

The National Trust subsequently proposed the southern option as the chosen route in their application. As a result, the GAT recommendations for the northern route are no longer relevant, with the recommendations limited to the southern route; with Feature 6 the only site targeted pre-determination. Feature 6 was assigned Historic Environment Record Primary Reference Number 61232 as part of the assessment process. The archaeological evaluation noted that the ground in the vicinity of Feature 6 had been landscaped as part of the development of the parkland, and no evidence of the building was found (GAT Report 1299).

The GAT assessment report also concluded that the surrounding area is rich in prehistoric and medieval archaeology and although none had been identified in this part of the park at Penrhyn, its presence was considered a strong possibility.

3 METHODOLOGY

The watching brief was completed on an intensive basis, and comprised:

- Observation of all non-archaeological excavation and intrusive groundworks within the development site, as far as the glacial horizon or limit of excavation (whichever is encountered first);

- A comprehensive drawn, written and photographic record of any significant archaeological features, structures and deposits that are revealed; and

- Preparation of a full archive report.

The monitored groundworks were completed between June and September 2016 and were undertaken by *Dunster Heating* for *National Trust.* The foundation for the energy centre building was excavated using a 5 tonne *Hitachi Zaxiz 48U-5* mini excavator. A toothed bucket was used to remove tree stumps subsequent to felling, whilst a toothless bucket was used for all subsequent excavation.

All attendances and identified features were recorded using GAT watching brief pro-formas, with subsurface stratigraphy recorded photographically, along with notations and a measured survey.

Photographic images were taken using a digital SLR (Nikon D3000) camera set to maximum resolution (3872 × 2592; 10 effective megapixels) in RAW format and were converted to TIFF format for archiving using Adobe Photoshop. The photographic record was digitalised in *Microsoft Access* as part of the fieldwork archive and dissemination process, with a total of 120 images taken (archive references G2447 _052 to G2447 _172; cf. Appendix III);

All archaeological features/deposits encountered were manually cleaned and examined to determine extent, function, date and relationship to adjacent features.

All sections were drawn at 1:10 scale; a total of two section drawings were completed (Sheet 01/Drawing 02 and Drawing 03).

All plans were drawn at a scale of 1:20 scale; a total of four section drawings were completed (Sheet 01/Drawing 01 and Drawing 04, Sheet 02/Drawing 04 and Drawing 06, Sheet 03/Drawing 05).

Deposits deemed suitable for dating were taken in accordance with the principles set out in *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage, 2011).

A total of two ecofacts were recovered from sealed contexts (Contexts (05 and 06)) associated with a pit (Context [04]). Recommendations are made for specialist assessment of both ecofacts .

Diagnostic artefacts were recovered in accordance with guidelines issued by the UK Institute of Conservation (Watkinson and Neal 2001). A total of fourteen artefacts were recovered:

1. An 18th/19th century blue and white china sherd (Find Number 01/Context (03));
2. A possible flint tool (Find Number 02/Context (05));
3. A possible flint tool (Find Number 03/Context (03))
4. Large complete orange brick (Find number 04/Context (11))
5. Orange colored brick with mortar (Find number 05/Context (11))
6. Burgundy colored brick (Find number 06/Context (11))
7. Piece of grey-blue brick (Find number 07/Context (11))
8. Pieces of flint recovered from course residue (Find number 08/Context (05))
9. A selection of heat cracked stones (Find number 09/Context (06))
10. An 18th/19th century white glaze base sherd (Find number 10/Context (13))
11. Slate chips from possible 19th century foot path (Find number 11/Context (13))
12. Two fragments of Buckley ware (Find number 12/Context (11))
13. Selection of shells recovered from deposit above bedrock (Find number 13/Context (11))
14. Complete brick with mortar recovered from feature [18^] (Find number 14/Context [18^])

Recommendations are to be made for specialist assessment of artefacts 2, 3, 8 and 9. The remaining artefacts have quantified as part of the archive process, but will not be retained for further assessment.

4 WATCHING BRIEF RESULTS

4.1 Biomass Energy Centre Building

The 14m by 11.7m footprint area of the new Energy Centre Building and access track, which was located in an area of scrubland and saplings to the north-east of the public car park at Penrhyn Castle was cleared of vegetation, which involved the removal of a substantial quantity of tree roots, and soil stripped to a depth of up to 1.05m, on to the natural glacial subsoil (Figure 04; Plates 1-2). A loose silty dark brown topsoil (01), up to 0.68m deep, was noted to overlie a mid yellowish orange silty clay subsoil (02), about 0.12m deep, which overlay a glacial light brown boulder clay (03). Truncation as a result of the construction of the National Trust car park in the 1990s was noted towards the west south west edge of the site. The woodland slope to the north east of the Energy Centre footprint can be suggested to have formed part of the Wyatt landscape park as there is evidence of historic scraping in the area and a lack of subsoil. A find of a late 18th or early 19th century blue and white pottery sherd (Small Find 1) possibly suggests activity at this time.

4.1.1 Feature 19

A possible fire pit was identified within the footprint of the Energy Centre Building, at NGR SH60407172 (Figure 04 and 05, Plates 3-4), PRN 62271.

The cut of the possible pit [04] was sub oval, 1.2m by 1m and 0.27m deep, and orientated north-south. 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.

4.1.2 Feature 20

A large shallow irregular feature was identified within the footprint of the Energy Centre Building, at NGR SH60407170 (Figure 04 and 06).

The feature measured 5.4m long, 1.6m wide and 0.13m deep [07] and contained a single fill of mid greyish brown sandy silt with clusters of rounded cobbles and occasional charcoal flecks (08). The shallow irregular nature of this feature suggested it may be caused by bioturbation.

4.2 Heat Main Pipe 1

Heat Main 1 comprised a 216m long, 0.4m wide and 1.002m deep trench running north-west from the heat main area of new Energy Centre to the west side of Penrhyn Castle, located next to the Castle's keep (Figure 04). The majority of the trench was cut using a toothless JCB 48Z-I mini excavator, switching to a smaller JCB 8014CTS digger upon reaching Pipe line 1 terminus by the castle's keep.

The trench commenced from the Energy Centre Building, uphill through dense woodlands, likely to have been planted during Wyatts landscaping. The topsoil (10) had been previously disturbed and redeposited by Dunster's removal of tree's in this area in order to make the moist ground conditions stable to carry the weight of JCB 48Z-I mini excavator. Topsoil (10) consisted of a light mid-grey brown loose clay with broken roots and cobbled inclusions, measuring up to 0.37m. Below the previously existing topsoil (10) was still intact measuring up to 0.25m, of a darker medium grey brown clay.

Along the majority of heat main pipe 1, beyond the woodlands and into the parkland, the topsoil (10) lay roughly at a depth of 0.23m below surface, interspersed with a layer of shale and building debris belonging to the current castle (15) at 0.29m below (10), with a the subsoil (11) at depth of c.0.33m. The characteristics of the soil remain the same as that within the woodlands; however, the colour changes from the grey-hues to a milder-dark brown.

4.2.1 Feature 21

Feature 21 was identified at NGR SH603571725, Feature 21 (Figure 04, Plate 06) was encountered at a depth of 0.48m and cut within a mid-orange brown silty clay subsoil (11).

Feature 21 consisted of a small brick structure [12^], with a breadth of less than 1m with the largest depth at 0.58m. It is likely that the breadth of this structure maybe smaller due to the dislodgment of bricks during pipeline trenching. There's a strong possibility that this structure may have belonged to 'Feature 06' PRN 61223 agricultural building noted on 1803 Penrhyn Estate map (Figure 02), which was previously targeted, but not encountered, during the evaluation phase (Evans 2015). The feature was actually 15m southeast of the evaluation trench. The brick structure may have been truncated by a later cobbled surface identified 5m to the southeast of brick structure. It was noted that the occasional brick, similar to that used for the brick structure was identified in the spoil from the heat main trench excavation 39m to the southwest suggesting that the remainder of the structure may have been lost during later landscaping in this area.

4.2.2 Feature 22

Feature 22 was identified at NGR SH60357172, *c.*49m from the main access road (Figure 04), near the southern face of the castle's keep, PRN 62272.

The feature was identified at 0.76m below ground surface and was interpreted as to a slate-chip footpath (13) that varied in thickness from 0.3m – c.0.7m, with the depth increasing with

the uphill gradient. The path was extant for a length of 12m and chippings of fairly consistent in size with lengths of 0.03m and breadth of 0.02m (Small Find 11).

The path was sealed by subsoil (11) and a thin shale deposit (15). Beneath the path were patches of rust (14), c.0.5m in size, which stained the glacial horizon at base of heat main trench, along heavily degraded/non-diagnostic metal item (Plate 08). A small 18th/19th century white ceramic base sherd (Small Find 10) was recovered atop the path. This path may correspond with Feature 07/PRN 613233 identified in assessment stage (Evans, 2015), identified as a possible field boundary an 1803 estate map (Figure 02), but as a footpath on the 1890 Caernarvonshire County Series first edition Ordnance survey (Figure 03). This may suggest, that footpath may have succeeded the boundary along this alignment; the degraded metal could be remnants of boundary material.

4.2.3 Feature 23

Feature 23 was identified at NGR SH60247182 (Figure 04), where the heat main curved around the southwest corner of the keep.

The feature consisted of a 0.16m thick deposit of broken and complete marine shells (16), atop the glacial bedrock (17). The deposit was sealed by the topsoil at a depth of 0.26m and was extant for a length of 1.1m within the heat main trench (Plate 11).

Slightly further along the trench two sherds of Buckley ware pottery were identified (small find 12) in the subsoil (11). One example included a metallic manganese black glaze, which was introduced in the 1790s, paralleling time of current Castle's construction (Mostyn Art Gallery, 1983). Given the appearance of the shells, Buckley ware, and close distance to the castle's keep, this could suggest that raw building materials were brought to the estate and mortar was made on site.

4.2.4 Feature 24

Feature 24 was identified at NGR SH 60247182 (Figure 04), near the west face of the keep, PRN 62273.

The feature comprised a truncated 19th century brick tunnel [18^] (Figure 07), identified within the east facing section of the heat main trench. The feature was sealed by a 0.17m thick topsoil, which sealed a 0.14m thick subsoil (11), which in turn sealed a 0.25m thick mixed deposit (19) of shale, clay and building material representing later disturbance from more recent activity. Beneath the tunnel was further disturbance related to modern services (21) that cut diagonally across, further truncating the feature (Figure 07; Plate 13).

The tunnel measured 0.36m in diameter and sloped towards the southwest and was cut into dense shale/bedrock (20) and was constructed of gauged/ribbed red brick (Haslam, Orbach & Voelcker. 2009: 178), bonded with lime mortar (Small Find 14). The tunnel was not infilled and was void of silt, suggesting that it may have been in recent use. The appearance of excess mortar within the tunnel interior, suggest that may have been repaired at some point (see Plate 14). Lying directly to the south of the tunnel was a lead pipe with a diameter of 0.07m (see Plate 12 to 14). Both the brick tunnel and lead pipe appear to lead directly into the basement of the castle's keep.

A small inspection of the keep basement was attempted to establish the terminus of the tunnel. In the southwest part of the basement a patch of mortar on the wall with a length and width of c.0.34m was noted along the west wall, with lead pipes similar to that in the heat main trench was identified (Plate 15). It is a possibility that this may have been the terminus of the tunnel. Blocked opening relating to other similar tunnels were also identified within the basement along the western wall. The tunnel was likely a 19th century drainage feature associated with the current castle.

4.3 Heat Main Pipe 2

Heat Main Pipe 2 measured 12.5m long, 0.75m deep and 0.5m wide, leading from the terminus of Heat Main Pipe 1 to the castle's keep.

A 2.3m wide slate pavement (28), which ran alongside the keep wall, was uplifted to accommodate the trench (Plate 18). The pavement was built from machined rectangular slabs of blue grey slate, which that ranged from 0.65m x 0.55m to 1.25m x 0.95m in size, with a typical thickness of 0.15m pavement. The slabs sat above a foundation deposit of large angular stones and coarse lime mortar (29), c. 0.35m deep, which sealed the glacial horizon, a coarse light brown gravelly clay and bedrock.

No other features were identified with the trench.

4.4 Heat Main Pipe 3

Heat Main Pipe 3 measured 26m long, 0.85m deep and 0.5m wide. Heat Main Pipe 3 continued from Heat Main Pipe 1 and was orientated north-south, to the west of the keep (Figure 04).

The heat main trench was composed predominantly of topsoil (10) reaching a depth of 0.35m that sealed the glacial horizon (Plates 16 and 17). The main included heavy disturbance from modern services near the castle wall.

No features were identified with the trench.

4.5 Heat Main Pipe 10

Heat Main Pipe 10 was located within the outer courtyard at the northern end of the castle (Figure 04). The pipe trench measured 24m long, 0.86m deep and 0.4m to 1.0m wide. The trench was cut at a north-south axis, turning into the castle at the southwest corner.

4.5.1 Feature 25

Feature 25 was identified at NGR SH60217098, on the southwest turning of the pipe trench, PRN 62274.

The feature comprised a red brick-built tubular structure [23^] lying on a north-south axis, with a lead pipe lying directly above on the western end. A small depression was pierced into the structure by Dunster workmen, which proved to be hollow inside, with a diameter of 0.3m. Upon this discovery it was apparent that this was another 19th century drainage tunnel, baring a striking resemblance to Feature 24 along Heat Main Pipe 1. This exposed length was 0.94m with a breadth of 0.34m and a height of 0.36m, more or less paralleling the dimensions of Feature 24.

A cobbled path was also identified within the trench at the southwest turning that appeared similar to that identified near Feature 21. The cobbles were sealed by a 0.1m thick gravelled concrete (Plate 21) and comprised two phases of cobbles: the initial phase (26) was identified at a depth of 0.3m and comprised medium rounded cobbles (c.0.1m), which sealed a compacted sandy grey-brown loamy deposit (27), with sparse inclusions; the second phase included cobbles (24) set into a deposit of dark-grey sandy silt (0.24m deep) with frequent shale-like inclusions (25). The later cobbles were larger in size (c.0.24m). The two cobble deposits represent succeeding phases of paving, with the second phase interpreted as later repair in order to withstand an influx of heavier traffic entering and exiting the castle.

4.5.2 Feature 26

Feature 26 was located at NGR SH60217098 along the eastern edge of the pipe trench, PRN 62275 (Figure 04).

The feature comprised a small 0.78m thick double layered brick structure [22^] sealed by the current cobbled concrete surface. The brick structure was exposed along the pipe trench edge for a length of 1.3m, at a depth of 0.12m (Plate 20). The bricks appeared later than those previously uncovered in Features 21, 24 and 25, most likely from the 20th century, bonded with cement mortar using a stretcher bond. An L-shaped lead jamb was identified, separating a small slate slab from the structure. The full depth of the structure was not exposed but it is most likely a modern basement extension feature possibly in use for services.

5 CONCLUSIONS

The watching brief for the Energy Centre Building and four heat main pipe trenches identified a variety of features across the Penrhyn Estate landscape. The majority of these features represented post-medieval activity associated with the Estate, including drainage features across the parkland leading from the castle and structural features close to the castle including a redundant footpath. The remains of a redundant post-medieval structure evident on an 1803 estate map were also identified within the main heat main pipe trench, which had previously eluded the evaluation stage. The function of this structure could not be confirmed within the confines of the trench.

Probable prehistoric activity was identified in the footprint of the Energy Centre Building, extant as small pit which included burnt stone. The provenance of the feature is unclear but what this feature does signify is the survival of prehistoric activity despite extensive landscaping. It may represent transient domestic activity associated with a lighting a fire. Ecofacts and artefacts have been recovered and it is recommended that these are assessed and analysed as part of a post-excavation programme.

6 SOURCES CONSULTED

Chartered Institute for Archaeologists 2014 *Standards and Guidance for Archaeological Watching Brief*;

English Heritage 1991. *Management of Archaeological Projects*.

English Heritage, 2011. *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation*

English Heritage 2015. *Management of Research Projects in the Historic Environment* – MoRPHE.

Evans, R. 2015. *Penrhyn Castle Renewable Heating Scheme Archaeological Assessment*. GAT Report 1286.

Evans, R. 2015. *Penrhyn Castle Renewable Heating Scheme Archaeological Evaluation.* GAT report 1299

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Haslam, Orbach and Voelcker 2009 *Buildings of Wales: Gwynedd*

Mostyn Art Gallery. *Buckley Pottery: The craft and history of Buckley potters from 1300s to the 1940s*. Mostyn Art Gallery 1983

National Trust Design and Access Statement, February 2016 - *Installation of biomass energy centre building, fuel storage building, heat main connection, landscaping and associated works.*

Royal Commission on Ancient and Historic Monuments of Wales 2015 *Guidelines for digital archives*

Watkinson and Neal 2001. *First Aid for Finds*

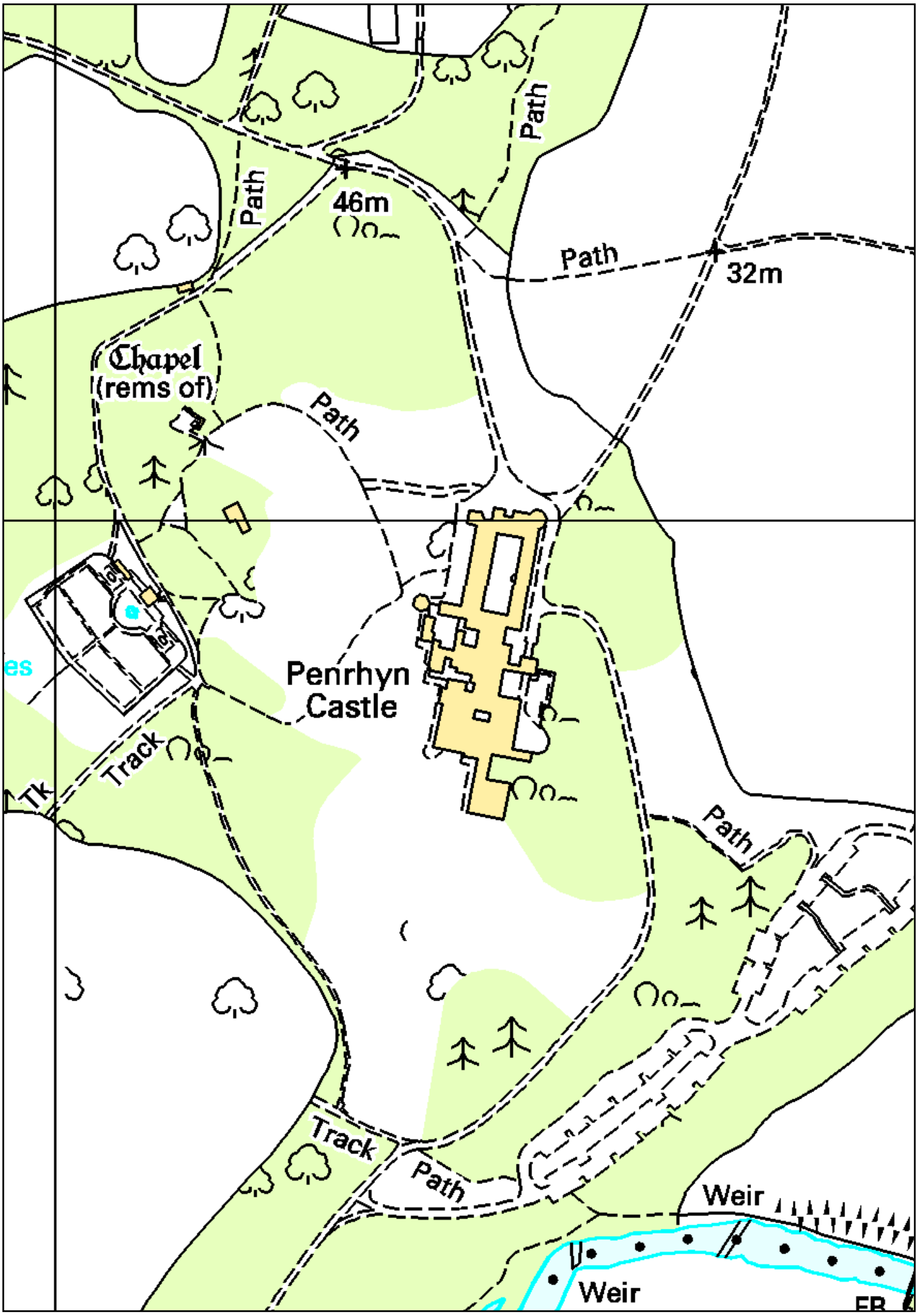


Figure 01: Location Map (based on 1:10000 Ordnance Survey County Series map sheets SH57SE & SH67SW. Scale: 1:3000@A4. Crown Copyright. All Rights Reserved. License number AL100020895.

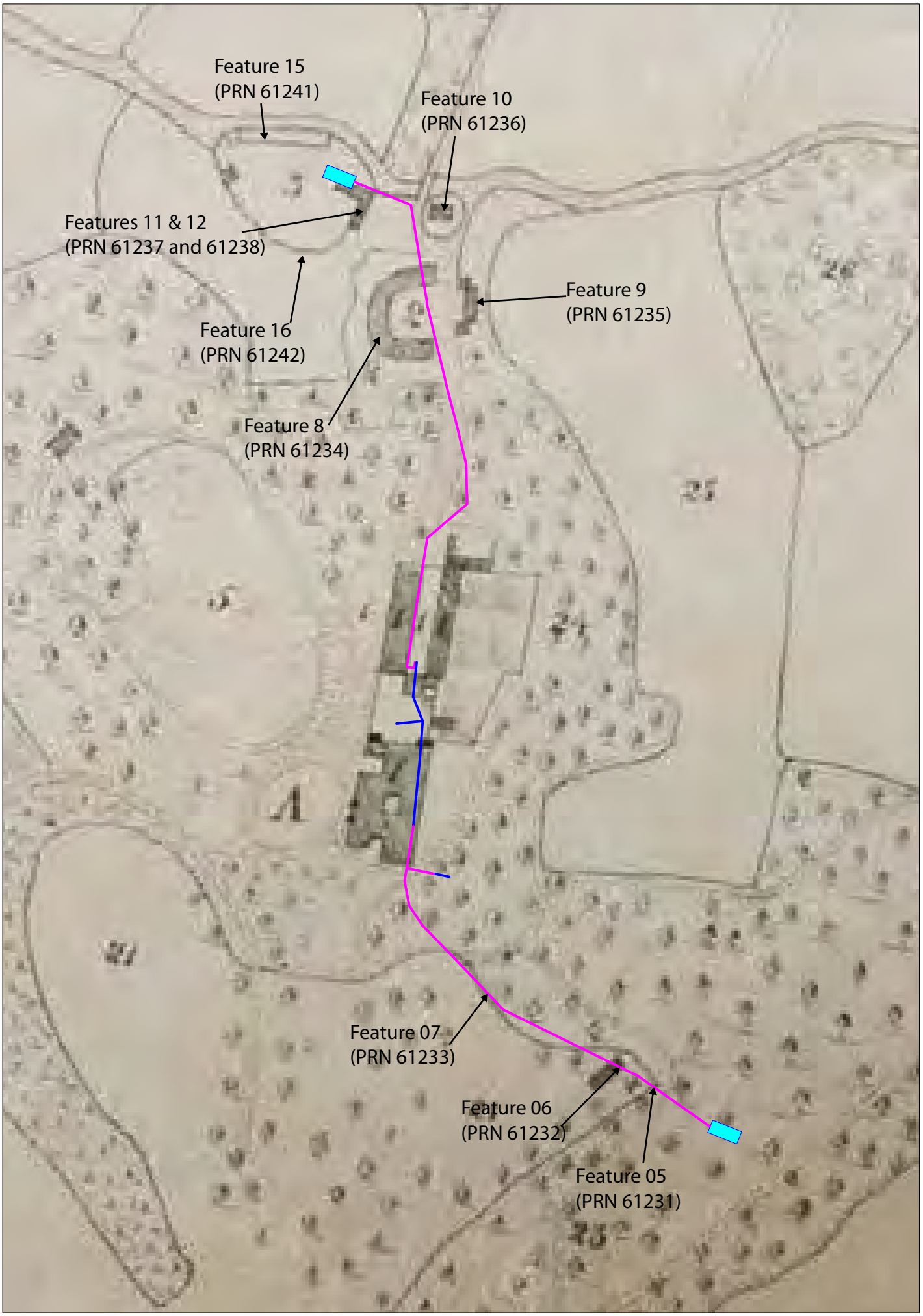


Figure 02: Reproduction of 1803 Penrhyn Estate Map and location of proposed North and South Option routes and information from the Historic Environment Record and National Trust. Scale: 1:2500@A4. (Source: National Trust)

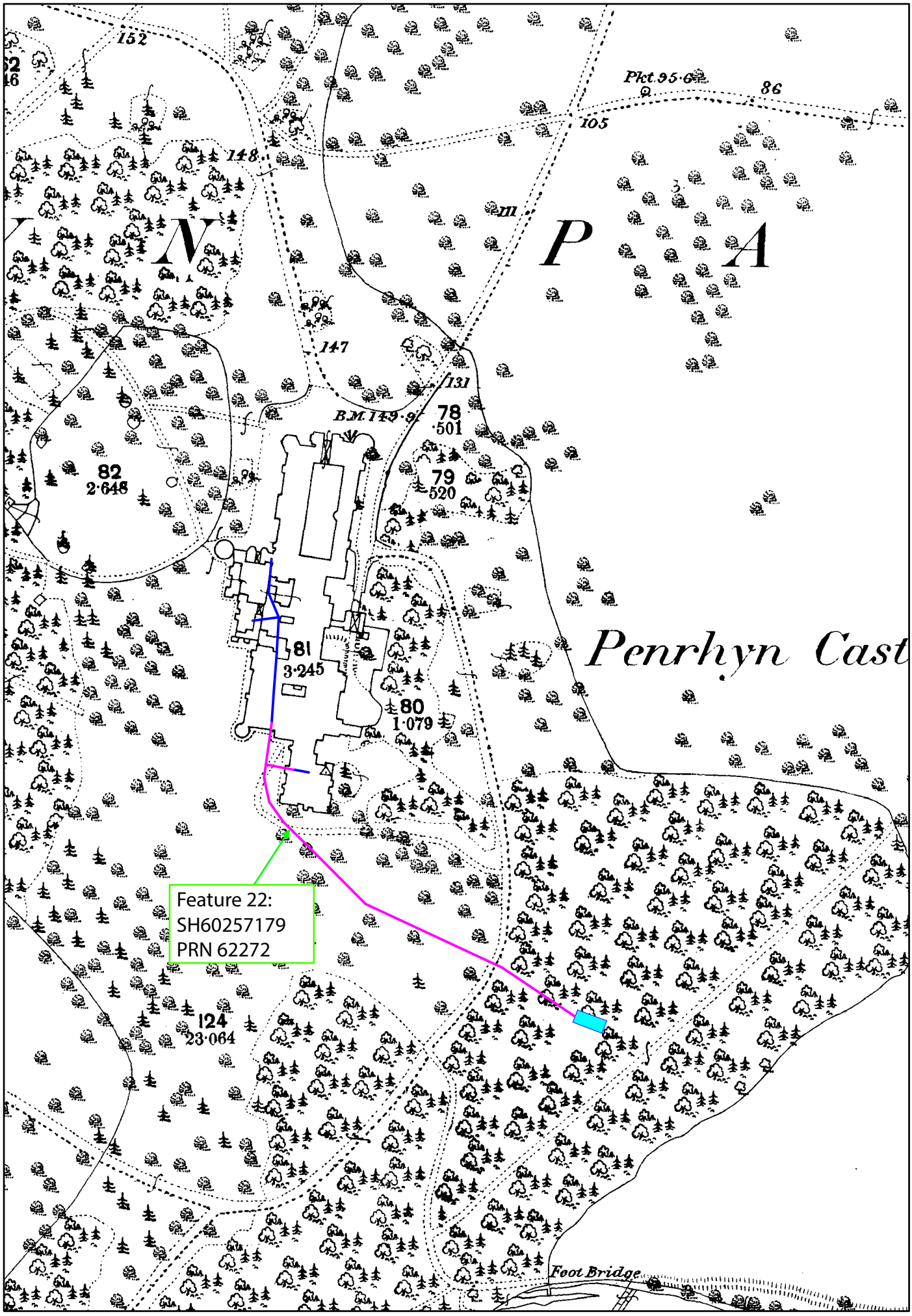


Figure 03: Reproduction of 1890 First Edition 1 inch to 25 mile Carnavonshire County Series Map Sheets VII.9 and VII.10 and location of heat main routes along with location of Feature 22. Scale: 1:2500@A4.

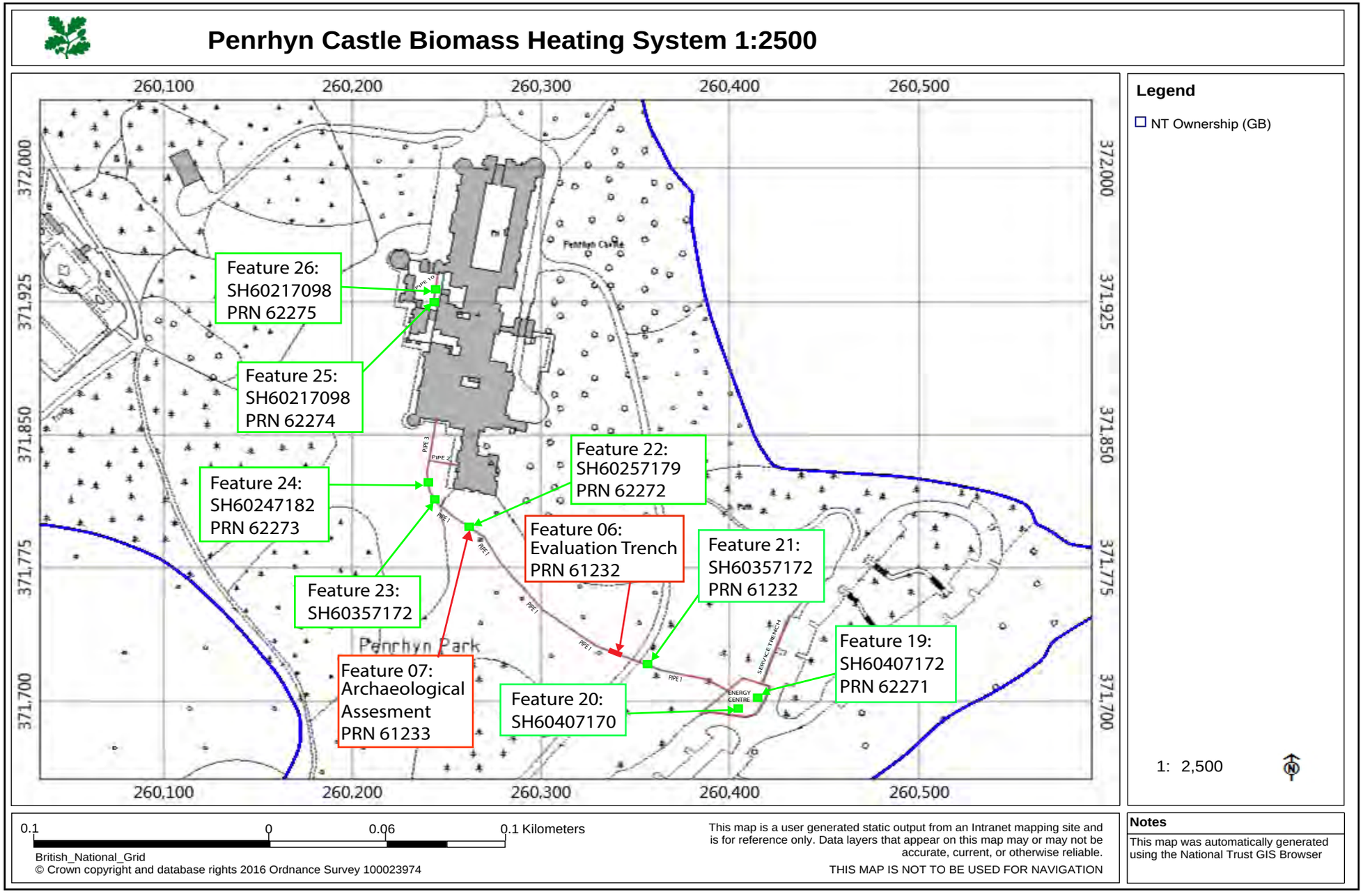
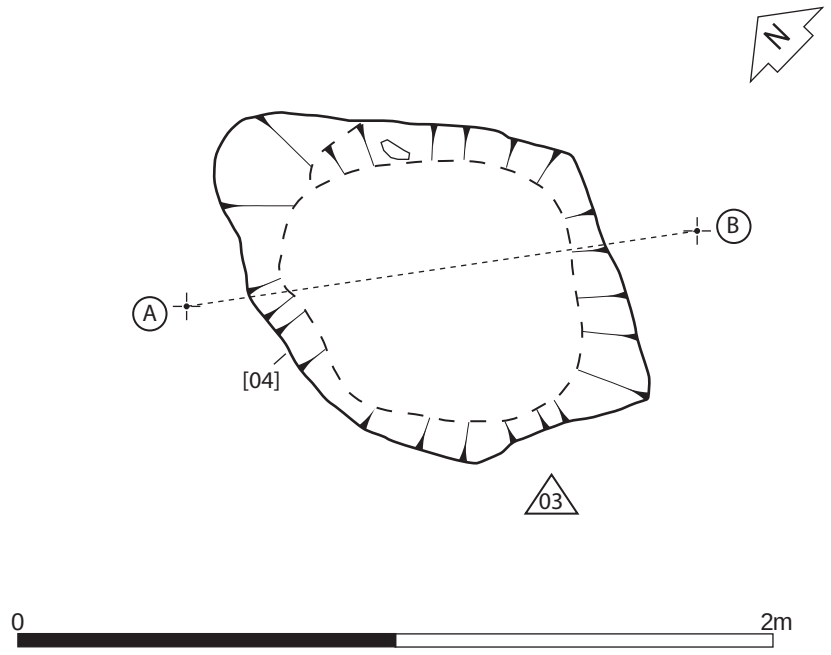
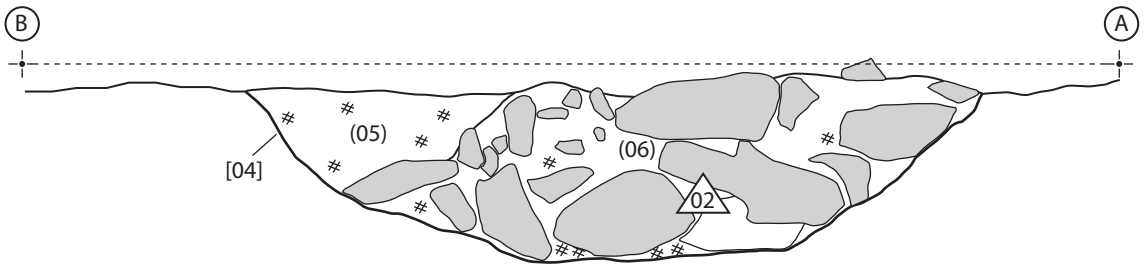


Figure 04: Reproduction of National Trust map of Penrhyn Castle estate, showing location of Dunster pipe scheme route along with noted Gwynedd Archaeological Trust features. Scale 1:2500@A4

Plan of pit [04]
Scale 1:20@A4



NE facing section through pit [04]
Scale 1:10@A4



Gwynedd Archaeological Trust

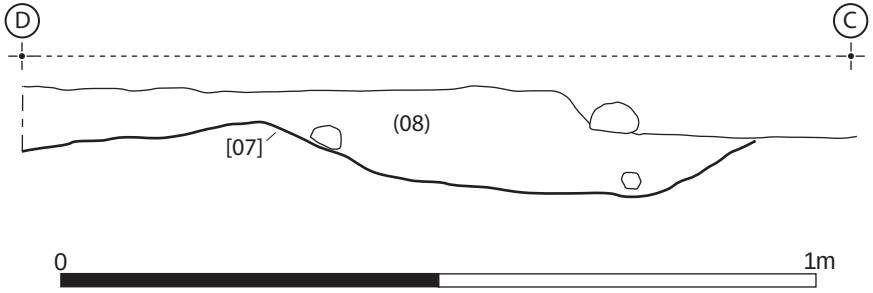
Figure 05: Plan and section through pit [04]

Charcoal
Burnt stone
Stone
02 Find number and location
A E260404.68 / N371706.33
B E260405.81 / N371705.58

Date: 13/07/2016	
Author: NMC	
Office:	
Drawing: G2247/F4	
Scale: 1:20 / 1:10@A4	

Plan of cut feature [07]
Scale 1:20@A4

SE facing section through cut feature [07]
Scale 1:10@A4



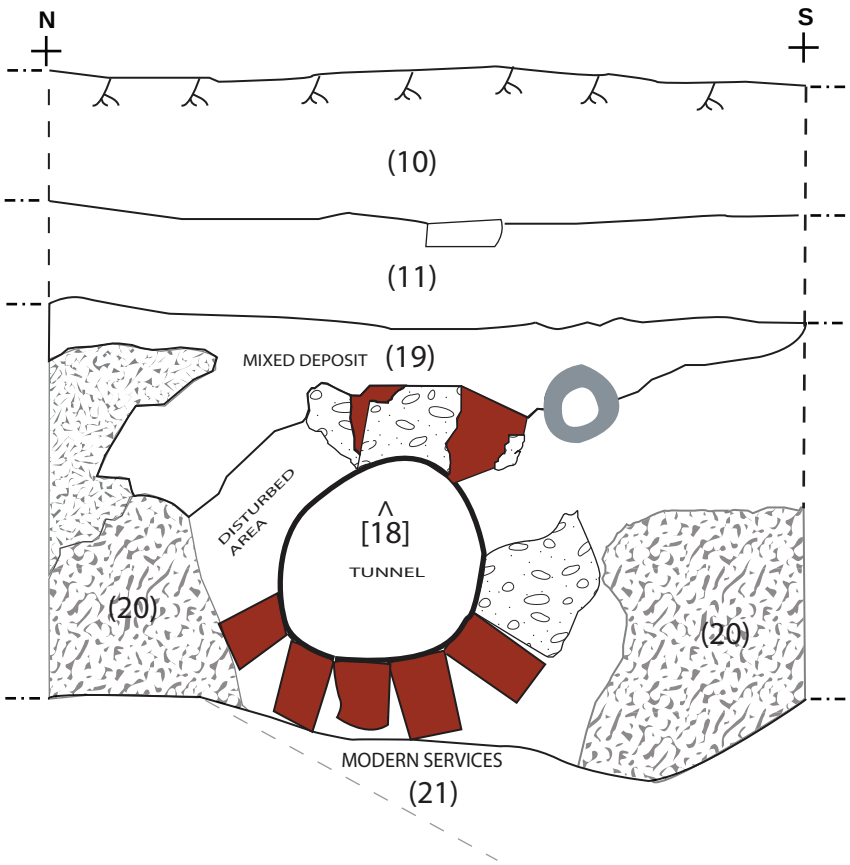
Gwynedd Archaeological Trust

Figure 06: Plan and section through cut feature [07]

Charcoal

Stone

Date: 13/07/2016	
Author: NMC	
Office:	
Drawing: G2247/F7	
Scale: 1:20/1:10 @A4	



0 1m

Gwynedd Archaeological Trust

Figure 07: Elevation section drawing of 19th Century lead pipe and brick service tunnel [18]

Brick
Mortar
Shale
Lead Pipe
Stone slab

Date: 18/10/2016
Author: BMJ
Office: GAT
Drawing: G2447/F6
Scale: 1:10@A4

Plate 01: Energy Centre Building: General view of undergrowth removal at the Energy Centre site. View from the west south west (archive image: G2447_064)

Plate 02: Energy Centre Building: Topsoil stripping at Energy Centre site, viewed from the east; scale 1m (archive image: G2447_066)

Plate 03: Energy Centre Building: South-west facing section through (05) and (06) in possible prehistoric pit feature [04]; scale 1m (archive image: G2447_088)

Plate 04: Energy Centre Building: Post-excavation view of pit [04], viewed from the north-east; scale 1m (archive image: G2447_092)

Plate 05: Pipeline 1: end of day shot showing area where ground was cut from woodlands across tarmac; scale: 1m (archive image: G2447_111)

Plate 06: Pipeline 1: Pipe line bricks in section. Possible small eclosure wall of feature 6 in Evaluation. 1m scale (archive image: G2447_108)

Plate 07: Pipeline 1: Shot of tarmac road showing cobbles in N facing trench section (archive image: G2447_110)

Plate 08: Pipeline 1: Shot of Iron rust staining below slate chips, where find no. 10 and 11 were recovered; scale 1m (archive image: G2447_120)

Plate 09: Pipeline 1: Shot along trench during excavation of pipe trench showing previously backfilled area near woodlands (archive image: G2447_123)

Plate 10: Pipeline 1: Portrait shot showing traces of modern service pipe along with 19th century debris and shale deposit (archive image: G2447_130)

Plate 11: Pipeline 1: Deposit of marine shells (16) in NE facing corner of pipeline 1 trench edge, lying above bedrock (17); scale 1m (archive image: G2447_131)

Plate 12: Pipeline 1: Lead pipe and brick tunnel [18^] from within Pipe line 1 as it first appeared at SH 60238 71203 (archive image: G2447_133)

Plate 13: Pipeline 1: Shot of E edge of trench better displaying [18^] tunnel, along with sawn lead pipe; scale 1m (archive image: G2447_ 138)

Plate 14: Pipeline 1: Close-up view of E edge of trench better displaying [18^] tunnel, along with sawn lead pipe; scale 1m (archive image: G2447_ 138)

Plate 15: Pipeline 1: Portrait shot of c.30cm x 30cm mortared area - likely to have been [18^] tunnel terminal, along with appearance of lead pipes (archive image: G2447_144)

Plate 16: Pipeline 3: View of entire length of excavated Pipe 3 trench; scale 1m (archive image: G2447_167)

Plate 17: Pipeline 3: View of entire length of excavated Pipe 3 trench; scale 1m (archive image: G2447_167)

Plate 18: Pipeline 2: Terminal of Pipe 2 trench, beside the tower; scale 1m (archive image: G2447_163)

Plate 19: Pipeline 10: Shot of trench leading to N end of castle with damaged bricks and modern services; scale 1m
(archive image: G2447_160)

Plate 20: Pipeline 10: Small double-layered brick structure [22^] W facing edge of trench; scale 1m
(archive image: G2447_150)

Plate 21: Pipeline 10: Brick service tunnel [23^] with cobbled surface in shot within S end corner of trench; scale 1m (archive image: G2447_155)

Plate 22: Pipeline 10: Brick service pipe [23^] with lead pipe modern service pipes; 1m scale (archive image: G2447_153)

APPENDIX I

Reproduction of Gwynedd Archaeological Planning Service (GAPS) correspondence to the Local Planning Authority (ref: 0403je01/D2090; 4th March 2016)

Gwasanaeth Cynllunio Archaeolegol Gwynedd
Gwynedd Archaeological Planning Service

Craig Beuno/Ffordd y Garth/Bangor/Gwynedd/LL57 2RT Ffon.Tel 01248 370926 Ffacs.Fax 01248 370925 ebost. email jenny.emmett@heneb.co.uk

24th March 2016 Our Ref: 0324je03/D2090

Eryl Williams
Gwasanaeth Cynllunio
Swyddfa'r Cyngor
Ffordd y Cob
Pwllheli
Gwynedd
LL53 5AA

Dear Eryl,

Planning application: C16/0107/16/LL
Penrhyn Castle, Llandygai

Thank you for forwarding the report on the archaeological trial trenching carried out in connection with the above application (Gwynedd Archaeological Trust report 1299, March 2016). I confirm that the work has been carried out in accordance with the relevant professional standards. The trial trench sought to locate a building recorded on early 19th century mapping in accordance with my recommendations of 4th March 2016 (0403je01/D2090), in order that they could be investigated in advance of development and the route altered to avoid it if necessary. The trial trench proved negative, implying loss of any archaeological deposits as a result of landscaping.

Following receipt of this information, I am able to confirm my previous recommendation that should planning consent be granted, the local authority requires an appropriate scheme of archaeological mitigation to address the relatively low potential for previously unrecorded archaeology to be affected by the scheme, in accordance with national planning policy (*Planning Policy Wales 2016*) and Welsh Office Circular 60/96 (*Planning and the Historic Environment: Archaeology*). This could be secured through a standard condition, such as the following:

(a) No development (including groundworks, clearance or stripping-out) shall take place until a specification for a programme of archaeological work has been submitted to and approved in writing by the Local Planning Authority.

(b) The development shall be carried out and all archaeological work completed in strict accordance with the details submitted and approved under part (a).

Reasons: 1) To ensure the implementation of an appropriate programme of archaeological mitigation in accordance with the requirements of Planning Policy Wales 2016 and Welsh Office Circular 60/96 *Planning and the Historic Environment: Archaeology*.

2) To ensure that the work will comply with *Management of Archaeological Projects* (MAP2) and the Standards and Guidance of the Chartered Institute for Archaeologists (CIfA).

The archaeological mitigation should take the form of an *archaeological watching brief*, to be carried out on an *intensive* basis, during intrusive groundworks associated with pipeline construction, followed by production of a report and specialist analysis if applicable. This work will need to be carried out by an appropriately qualified professional archaeological organisation.

Please contact me with any queries regarding the above.

Yours sincerely

Jenny Emmett
Development Control Archaeologist

APPENDIX II

Reproduction of Gwynedd Archaeological Trust specification for an archaeological watching brief (March 2016)

PROJECT SPECIFICATION FOR AN ARCHAEOLOGICAL WATCHING BRIEF (G2447)

Installation of Biomass Energy Centre Building, Fuel Storage Building, Heat Main Connection, Landscaping and Associated Works at Penrhyn Castle

Prepared for

National Trust

April 2016

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

BIOMASS ENERGY CENTRE BUILDING, FUEL STORAGE BUILDING, HEAT MAIN CONNECTION, LANDSCAPING AND ASSOCIATED WORKS AT PENRHYN CASTLE

PROJECT SPECIFICATION FOR AN ARCHAEOLOGICAL WATCHING BRIEF (G2447)

Prepared for National Trust, April 2016

CONTENTS

1 INTRODUCTION 5
2 Project Background 7
2.1 Historical Background 7
2.2 Gwynedd Archaeological Trust Assessment and Evaluation Reports 8
3 METHODOLOGY 9
3.1 Watching Brief 9
3.2 Basic watching brief methodological procedures 10
3.3 Environmental Samples 11
3.4 Human Remains 12
3.5 Small Finds 13
3.6 Further Archaeological Works 14
3.7 Monitoring Arrangements 15
3.8 Fieldwork Archiving 16
4 Report 17
5 DISSEMINATION AND ARCHIVING 18
5.1 Historic Environment Record 19
6 PERSONNEL 20
7 HEALTH AND SAFETY 21
8 INSURANCE 22
9 REFERENCES 23
FIGURE 01 24
Reproduction of Sustainable Energy Drawing S0603_GA_PR01 24
APPENDIX I 25
Reproduction of Gwynedd Archaeological Planning Services Project Letter Ref: 0324je03/D2090 dated 24th March 2016 25
APPENDIX II 26
Reproduction of Gwynedd Archaeological Trust watching brief pro-forma 26
APPENDIX III 27
Reproduction of Gwynedd Archaeological Trust photographic record pro-forma 27

Approvals Table				
	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**
1	Trench widths revised	1	GAPS approval
2	Addition of reference to a toothless bucket	3.1	GAPS approval
3	Revision of text defining feature sampling strategy	3.2	GAPS approval
4	Removal of erroneous text	3.2	GAPS approval
5	Clarification of the term Trust	3.5	GAPS approval

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

Name	Signature	Date

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by *National Trust* to provide a project specification for undertaking an archaeological watching brief in advance of proposals for a renewable heating scheme at Penrhyn Castle, Llandygai, Gwynedd (NGR SH60277193; Figure 1). The watching brief is a requirement as a condition of planning application C16/0107/16/LL.

According to the submitted Design and Access Statement (National Trust, February 2016), the applicaiton is for the erection of a biomass energy building with a building to store fuel, and associated works and landscaping. The biomass energy building is proposed at a location adjoining the visitor car parking area at Penrhyn Castle. A heat main will be installed underground from the energy centre up to the castle keep in its own trench. The heat main would then link up with existing boiler rooms and services within the property after entering the keep, utilising existing services ducts and voids. The proposed fuel for the biomass scheme is wood chip with HGV vehicle access provided to the fuel store.

The proposed works are detailed on *Sustainable Energy* drawing number S0603_GA_PR01 (Figure 01).

- A structural base for the energy centre at NGR SH 60407170; 14m by 11.7m (448m^2).

Four sections of trenching for the heat main:

- A 216m long, 402mm wide and 1002mm deep trench running north-west from the heat main to the west side of Penrhyn Castle (Pipe 1).

- A 12m long spur, 326mm wide and 826mm deep trench running west-east from Pipe 1 to the castle keep (Pipe 2).

- A 24m long section from the junction of Pipes1 and 2 heading north to the castle, 382mm wide and 882mm deep trench. The pipe itself for this section will extend for 40m, 16m of which will be through the castle cellars (Pipe 3).

- A 24m long trench, 362mm wide and 862mm deep trench across the outer courtyard at Penrhyn Castle, running west-east to the stable boiler (Pipe 10).

GAT has completed an archaeological assessment for the proposed scheme (GAT Report 1286), which included recommendations for targeted evaluation for specific features (cf. para. 2). In response to the results, GAT evaluated Feature 6, which comprised a small rectangular building noted on the 1803 Penrhyn Estate map that was located along the proposed heat main route. No archaeological evidence was uncovered during the evaluation, and any evidence of the former building appears to have been destroyed (GAT Report 1299).

In response to the results of the assessment and evaluation, Gwynedd Archaeological Planning Service (GAPS) have stated in communication with the planning officer for Cyngor Gwynedd Council that 'The archaeological mitigation should take the form of an *archaeological watching brief*, to be carried out on an *intensive* basis, during intrusive groundworks associated with pipeline construction, followed by production of a report and specialist analysis if applicable' (reference: 0324je03/D2090; dated 24th March 2016; reproduced as Appendix I).

The intensive watching brief will monitor groundworks in advance of the construction of the structural base for the energy centre, and four lengths of trenching for the heat main. The aim of the archaeological watching brief will be to identify if there is any archaeological activity along the heat main route and in the area of the structural base of the energy centre.

It is proposed that the work will be completed between June and September 2016 (Elgan Roberts *pers. comm.*). An initial report on the works will be produced by GAT the end of October 2016, and the report will be submitted to the Gwynedd HER within six months of the completion of the project.

The scheme will be monitored by GAPS and will conform to the guidelines specified in *Standard and Guidance for an archaeological watching brief* (Chartered Institute for Archaeologists, 2014). This specification must be approved by GAPS in advance of any work on site; all subsequent reporting must also be approved by GAPS and the National Trust Archaeologist prior to final issue

The archaeological works will conform to the guidelines specified in the Chartered Institute for Archaeologists *Standard and Guidance for Archaeological Evaluation* (Chartered Institute for Archaeologists, 2014). Gwynedd Archaeological Trust is a Chartered Institute for Archaeologists *Registered Archaeological Organisation*. The format of this design corresponds to the requirements of section 2.3 of MoRPHE (English Heritage 2015) and to MAP2 (English Heritage, 1991, *Management of Archaeological Projects*).

2 PROJECT BACKGROUND

2.1 Historical Background

The current Penrhyn Castle was, built in 1822-38 for George Hay Dawkins Pennant and designed by Thomas Hopper. The castle was constructed in a neo-Norman style with a keep, courtyards, barbican and towers, built using stone from Ynys Mon. The castle remains very little changed since construction and has been in the hands of the National Trust since 1951, open to the public since 1952. The present house replaces a late eighteenth-century Gothic 'castle' of yellow brick, on the same site, designed by Samuel Wyatt, which probably retained the plan and part of the chapel of the previous medieval house. The medieval house is thought to have been built in the fifteenth century. The Wyatt-designed house was subsumed by the later Penrhyn Castle but the great hall survives in the present drawing-room.

Penrhyn Castle is reputed to occupy the site of Roderic Malwynog's palace who is considered to have been an 8th century King of Gwynedd, grandson of Cadwalader the last king of the Britons. The land became the property of the Gruffydd family who after advantageous marriage alliances had established a substantial estate in the area by the 14th century. In the early 15th century a Hall House with two end wings was built for Gwilym ap Gruffydd, a house that was to stand until the late 18th century. In 1684 when Sir Gruffydd William died without an heir the estate passed through various hands, until between 1765 and 1785 it was acquired by Richard Pennant. The medieval house, with additional buildings of possibly later date, is shown on an estate map of 1768 surveyed by G. Leigh (GAT Report 1286 Figure 4). This shows the medieval house set in a landscape of small enclosures, some clearly agricultural, some planted with trees. The approach to the house is shown striking off at right angles to the drive across an outer courtyard, through the stable block and up to the front door of the house (National Trust 1991, 76). Aerial photographs from the National Monuments Record show extensive parching of the land in the vicinity of the former medieval house, and this may reflect the survival of buried remains below the ground relating to the pre 1781 occupation of the area (Gee and Laws 2015, 24-25).

In 1781 a new house began to be constructed at Penrhyn that was designed by Benjamin Wyatt and built in a form of castellated gothic of yellow brick on the same site of and incorporating some elements of the previous house. The estate map of 1803 (GAT Report 1286 Figure 5) shows parkland, woodland and a garden demonstrating that development of the parkland was well underway. The Wyatt designed house was short lived, as the considerable profits that were being returned by the Pennant's slate quarries by the early 19th century enabled the current Penrhyn Castle to be constructed.

2.2 Gwynedd Archaeological Trust Assessment and Evaluation Reports

The Gwynedd Archaeological Trust completed an archaeological assessment of the proposed scheme in December 2015 (Evans, R. 2015: GAT Report 1286). The assessment examined two possible options, to the north and to the south of Penrhyn Castle, respectively.

The report identified eighteen post-medieval sites relating to the Penrhyn Estate and included former buildings and field boundaries. These sites were mainly identified on historic mapping, specifically the estate maps from 1768, 1803 and 1828 and the Llandegai Parish Tithe Map of 1841. Fourteen sites were identified on the northern route, and four on the southern route. GAT recommended that in the event of the northern option being chosen, that five of these sites, representing former buildings, were evaluated by archaeological trenching in order to assess their potential survival and to inform a mitigation strategy, with the remaining possible sites, consisting of field boundaries, recorded as part of the evaluation during groundworks. For the southern option, archaeological trenching was recommended for a former building extant on the 1803 estate map (GAT Report 1286 Feature 6) that appeared to be on the route of the proposed heat main, with the rest of the route mitigated via a watching brief.

The National Trust subsequently proposed the southern option as the chosen route in their application. As a result, the GAT recommendations for the northern route are no longer relevant, with the recommendations limited to the southern route; with Feature 6 the only site targeted pre-determination. Feature 6 was assigned Historic Environment Record Primary Reference Number 61232 as part of the assessment process. The archaeological evaluation noted that the ground in the vicinity of Feature 6 had been landscaped as part of the development of the parkland, and no evidence of the building was found (GAT Report 1299).

The GAT assessment report also concluded that the surrounding area is rich in prehistoric and medieval archaeology and although none has been identified in this part of the park at Penrhyn, its presence has to be considered a strong possibility. It recommended

- An archaeological watching brief, to be undertaken on an intensive basis, addressing all intrusive groundworks (topsoil strip, excavation of service trenches foundations, levelling groundworks etc.) at the site.

3 METHODOLOGY

3.1 Watching Brief

(Reproduced from Chartered Institute for Archaeologists 2014, *Standard and Guidance for an Archaeological Watching Brief*)

The definition of an archaeological watching brief is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

An archaeological watching brief is divided into four categories according the Institute for Archaeologists *Standard and Guidance for an archaeological watching brief*:

- comprehensive (present during all ground disturbance)
- intensive (present during sensitive ground disturbance)
- intermittent (viewing the trenches after machining)
- partial (as and when seems appropriate).

The GAPS requirement states that an **intensive** watching brief is undertaken for this scheme, to include:

- Observation of all non-archaeological excavation and intrusive groundworks within the development site, as far as the glacial horizon or limit of excavation (whichever is encountered first);
- A comprehensive drawn, written and photographic record of any significant archaeological features, structures and deposits that are revealed; and
- Preparation of a full archive report.

The groundworks will be completed between June and September 2016

The groundworks monitored by GAT will need to be completed using a TOOTHLESS bucket; the monitoring of works is to be undertaken in a manner that allows for the immediate cessation of development for the recording of archaeological evidence.

3.2 Basic watching brief methodological procedures

- All attendances and identified features will be recorded using GAT watching brief pro-formas (Appendix II).

- Photographic images will be taken using a digital SLR (Nikon D40) camera set to maximum resolution (3008 × 2000 6.1 effective megapixels) in RAW format and will be converted to TIFF and JPEG format for archiving using Adobe Photoshop; a photographic record will maintained on site using GAT pro-formas (Appendix III) and digitised in *Microsoft Access* as part of the fieldwork archive and dissemination process;

- Any subsurface remains will be recorded photographically, with detailed notations and a measured survey.

- All archaeological features/deposits encountered will be manually cleaned and examined to determine extent, function, date and relationship to adjacent features. If any features are encountered, e.g., pits, postholes or ditches, the following will excavation strategy will generally apply: 50% sample of each sub-circular feature, 10% sample of each linear feature. However, if discrete features are identified within the narrow heat main trench, these will be 100% excavated as will any exposed segments of linear features. Any large-scale or more detailed excavation required will be detailed in an appropriate **Further Archaeological Works Design**.

- All sections to be drawn at a minimum 1:10 scale.. Sections will be drawn on GAT pro-forma permatrace.

- All plans to be at a minimum 1:20 scale. Plans will be drawn on GAT pro-forma permatrace.

- Should dateable artefacts and ecofacts be recovered, an interim report will be submitted summarising the results, along with an assessment of potential for analysis specification (in line with the MAP2 process).

3.3 Environmental Samples

Any deposits deemed suitable for dating will be taken from sealed contexts, with bulk samples from ditches and pit fills proposed as not less than 10 litres from each context. The sampling strategy will be undertaken in accordance with the principles set out in Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation (English Heritage, 2011). Recourse will be made to relevant specialists for palaeoenvironmental analysis and dating. Any required specialists will be consulted during the watching brief to advise GAT on a sampling strategy.

3.4 Human Remains

Should any finds of human remains be encountered, they will be left *in-situ*, covered and protected, and both the coroner and the GAPS Archaeologist informed. If removal is necessary it will take place under appropriate regulations and with due regard for health and safety issues. In order to excavate human remains, a Ministry of Justice licence is required under Section *25* of the Burials Act 1857 for the removal of any body or remains of any body from any place of burial. This will be applied for should human remains need to be investigated or moved.

3.5 Small Finds

Diagnostic artefacts will be treated according to guidelines issued by the UK Institute of Conservation (Watkinson and Neal 2001) in particular the advice provided within *First Aid for Finds* (Rescue 1999) and Historic England. *Pottery sherds of 19th and 20th century date will be examined on site and the context from which they were retrieved noted but the sherds will not be retained.*

All finds are the property of the landowner; however, it is GAT policy to recommend that all finds are donated to an appropriate museum, in this case *Storiel, Bangor*, where they can receive specialist treatment and study; alternatively, the finds may be donated to National Trust for display at Penrhyn Castle. Access to finds must be granted to GAT for a reasonable period to allow for analysis and for study and publication as necessary. GAT staff will undertake initial identification, but any additional advice would be sought from a wide range of consultants used by GAT, including National Museums and Galleries of Wales at Cardiff.

All finds of treasure must be reported to the coroner for the district within fourteen days of discovery or identification of the items. Items declared Treasure Trove become the property of the Crown, on whose behalf the National Museums and Galleries of Wales acts as advisor on technical matters, and may be the recipient body for the objects.

The National Museums and Galleries of Wales will decide whether they or any other museum may wish to acquire the object. If no museum wishes to acquire the object, then the Secretary of State will be able to disclaim it. When this happens, the coroner will notify the occupier and landowner that he intends to return the object to the finder after 28 days unless he receives no objection. If the coroner receives an objection, the find will be retained until the dispute has been settled.

Note: the landowner is the client. GAT will contact the landowner for agreement regarding the transfer of any artefacts, initially to GAT and subsequently to the relevant museum (Storiel, Bangor). 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 once analysis and assessment has been completed.

3.6 Further Archaeological Works

The identification of significant archaeological features during the watching brief may necessitate the production of a new project specification and the submission of new cost estimates to the contractor.

The application of a further archaeological works design (FAWD) will be dependent on the initial identification, interpretation and examination of an archaeological feature and the identification of activity that cannot be addressed within the provisions of the current design, e.g., structures. The requirement for an FAWD will be determined in conjunction with GAPS through established communication lines and the monitoring process.

The FAWD will be instigated through a GAT produced document that will include:

- feature specific methodologies;
- artefact specialist requirements, with detail of appropriate specialist analysis;
- timings, staffing and resourcing;
- additional costs.

The FAWD document will need to be approved by GAPS and any additional resourcing/costs agreed with the client.

3.7 Monitoring Arrangements

The GAPS Archaeologist will need to be informed of the project start date and of the subsequent progress and findings. This will allow the GAPS Archaeologist time to arrange monitoring visits and attend site meetings (if required) and enable discussion about the need or otherwise for FAWDs (if required) as features of potential archaeological significance are encountered.

3.8 Fieldwork Archiving

Following the completion of the fieldwork, a programme of field work archiving will be completed based on following task list;

1. Pro-formas: all cross referenced and complete;
2. Photographic Metadata: completed in *Microsoft Access* and cross-referenced with all pro-formas;
3. Sections: all cross referenced and complete;
4. Survey data: downloaded using a Computer Aided Design package imported into a GIS shapfile;
5. Plans (if relevant): all cross referenced and complete;
6. Artefacts (if relevant): quantified and identified; register completed;
7. Ecofacts (if relevant): quantified and register completed;
8. Context register (if relevant): quantified and register completed;

All data will be processed, final illustrations will be compiled and a report will be produced which will detail and synthesise the results. Location drawings and a sample of relevant photographs will be used to illustrate the reports.

4 REPORT

Following completion of the stages outlined above, a draft report will be produced within one month incorporating the following:

1. Non-technical summary
2. Introduction
3. Aims and purpose
4. Specification
5. Methods and techniques, including details and location of project archive
6. Watching Brief Results
7. Summary and conclusions
8. List of sources consulted.
9. Appendix I – approved project design

Illustrations will include plans of the location of the study area and archaeological sites. Historical maps, when appropriate and if copyright permissions allow, will be included. Photographs of relevant sites and of the study area where appropriate will be included. A draft copy of the report will be sent to the regional curatorial archaeologist (GAPS) and to the client for review. Once approved, a final report will be submitted.

Note: if diagnostic artefacts or ecofacts are recovered during the watching brief an interim report that will be submitted in the first instance, along with an assessment of potential summary. The interim report will summarise the results of the fieldwork and the assessment of potential summary will discuss the scope and costs for analysing and assessing any artefacts and ecofacts recovered from site, and for producing a final report and a publication document

5 DISSEMINATION AND ARCHIVING

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. The archaeological mitigation outlined in this project specification will be completed in September 2016. A draft report or interim report (if relevant) will be submitted within one month of fieldwork completion (October 2016); a final report will be submitted to the Historic Environment within six months of submitting the draft report (April 2017).

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 Royal Commission on Ancient and Historic Monuments, Wales (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. Note: due to the current relocation of the RCAHMW premises, the RCAHMW Archive and Library Team Leader has requested that any new accessions are deferred until June 2016 (email correspondence: 01/03/2016).

4. A digital report(s) plus paper report(s) (if requested) will be provided to the client (draft report then final report).

5. Artefacts recovered from the site during the watching brief will be transferred in accordance with the protocols and guideline defined in para. 3.5.

6. Dependent on the results of the watching brief a summary note or a specific article will be included in the Council for British Archaeology Wales publication *Archaeology in Wales*. This shall be agreed with GAPS, and client in advance of publication along with all publication content. GAPS involvement in the project will be acknowledged therein.

5.1 Historic Environment Record

In line with the regional Historic Environment Record (HER) requirements, the HER must be contacted at the onset of the project to ensure that any data arising is formatted in a manner suitable for accession to the HER. At the onset, the HER Enquiry Form provided by the HER, will be completed and submitted.

6 PERSONNEL

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section and attended by a Project Archaeologist. The project archaeologist will be responsible for completing the watching brief and all field management duties, e.g. liaison with GAPS and client. The project archaeologist will be responsible for completing day record sheets (Appendix III) as well as all other on site pro-formas and the fieldwork archive itemised in para. 3.9. The project archaeologist will also be responsible for submitting a draft final report (or interim report/assessment of potential document, if relevant) for project manager review and approval. The report will then be submitted as per the arrangements defined in para. 5.

7 HEALTH AND SAFETY

The GAT Project Archaeologist(s) will be CSCS certified. Copies of the site specific risk assessment will be supplied to the client and site contractor prior to the start of fieldwork. Any risks and hazards will be indicated prior to the start of work via a submitted risk assessment. All staff will be issued with required personal safety equipment, including high visibility jacket, steel toe-capped boots and hard hat.

8 INSURANCE

Public Liability

Limit of Indemnity- £5,000,000 any one event in respect of Public Liability

INSURER Aviva Insurance Limited

POLICY TYPE Public Liability

POLICY NUMBER 24765101CHC/000405

EXPIRY DATE 22/06/2016

Employers Liability

Limit of Indemnity- £10,000,000 any one occurrence.

The cover has been issued on the insurers standard policy form and is subject to their usual terms and conditions. A copy of the policy wording is available on request.

INSURER Aviva Insurance Limited

POLICY TYPE Employers Liability

POLICY NUMBER 24765101CHC/000405

EXPIRY DATE 22/06/2016

Professional Indemnity

Limit of Indemnity- £5,000,000 in respect of each and every claim

INSURER Hiscox Insurance Company Limited

POLICY TYPE Professional Indemnity

POLICY NUMBER

HU PI 9129989/1208

EXPIRY DATE 23/07/2016

9 REFERENCES

1. Chartered Institute for Archaeologists 2014 Standards and Guidance for an archaeological watching brief;
2. English Heritage 1991 Management of Archaeological Projects.
3. English Heritage, 2011. Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation, 2nd Edition;
4. Evans R. 2015 Penrhyn Castle Renewable Heating Scheme. Archaeological Assessment. Unpublished GAT Report No. 1286
5. Evans R 2016 Penrhyn Castle Renewable Heating Scheme. Archaeological Evaluation. Unpublished GAT Report No. 1299
6. Leigh D & D. Watkinson. 1998. First Aid for Finds: Practical Guide for Archaeologists.
7. Leigh D & D. Watkinson. 2001. UK Institute for Conservation: Excavated Artefacts and Conservation.
8. Royal Commission on Ancient and Historic Monuments of Wales 2015 Guidelines for digital archives

FIGURE 01

Reproduction of Sustainable Energy Drawing S0603_GA_PR01

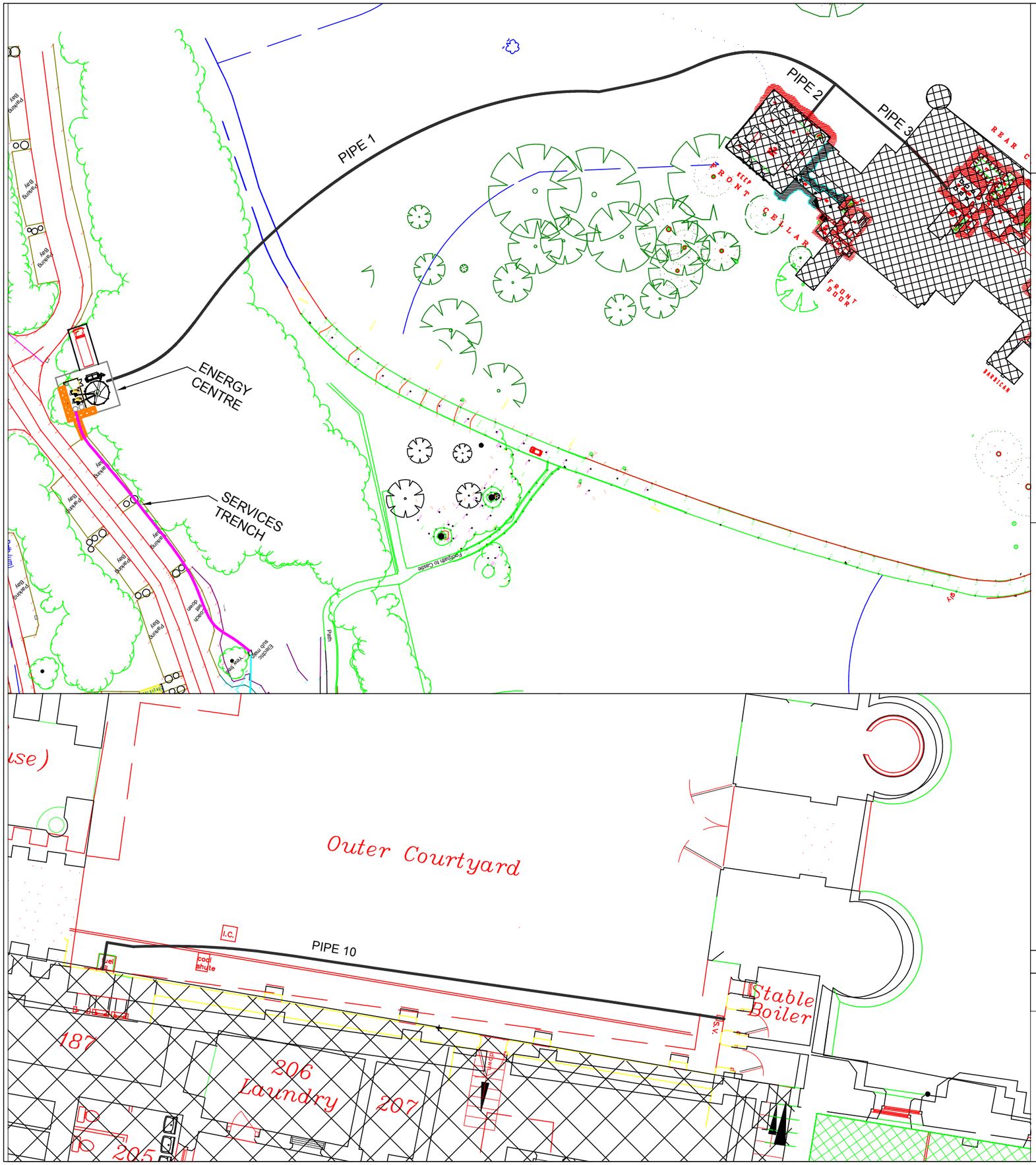
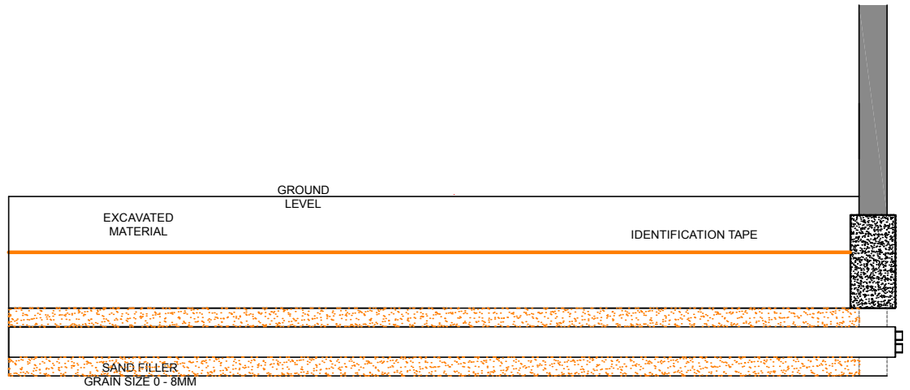


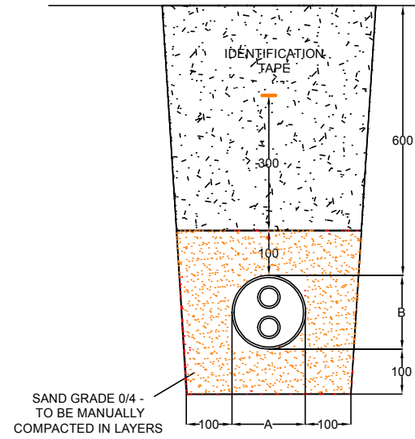
TABLE OF PIPE/TRENCH DETAILS

PIPE	TYPE	TRENCH (m)	PIPE LENGTH (m)	PIPE SIZE	A	Base Width (mm)	Depth (mm)
1	DUO	216	216	75+75/202	202	402	1002
2	DUO	12	12	40+40/126	126	326	826
3	DUO	24	40	63+63/182	182	382	882
10	DUO	24	24	50+50/162	162	362	862

DETAILS OF PRE-INSULATED PIPE BUILDING ENTRY



TRENCH DETAIL B



DUO PRE-INSULATED
PLASTIC HEATING PIPE INSTALLED AS PER
MANUFACTURERS DRAWINGS

NOTES

PIPE/TRENCH ROUTE SUBJECT TO DETAILED INVESTIGATION OF SERVICES

sustainable energy limited
www.sustainable-energy.co.uk
Sustainable Energy Ltd
2 Alexandra Gate
Ffordd Pengam
Cardiff
CF24 2SA
Tel: 02920 894940

ISSUE:	PROVISIONAL
DRAWN BY: RJM DATE:	29/01/16
CHECKED BY: SEL DATE:	29/01/16
PROJECT:	Penrhyn Castle
SCALE:	NTS
TITLE:	Trench and Building Entry Details
SHEET:	A3
DRAWING NUMBER:	S0603_GA_PR01
REVISION NUMBER:	P02

APPENDIX I

Reproduction of Gwynedd Archaeological Planning Services Project Letter Ref: 0324je03/D2090 dated 24th March 2016

Gwasanaeth Cynllunio Archaeolegol Gwynedd
Gwynedd Archaeological Planning Service

Craig Beuno/Ffordd y Garth/Bangor/Gwynedd/LL57 2RT Ffon.Tel 01248 370926 Ffacs.Fax 01248 370925 ebost. email jenny.emmett@heneb.co.uk

24th March 2016 Our Ref: 0324je03/D2090

Eryl Williams
Gwasanaeth Cynllunio
Swyddfa'r Cyngor
Ffordd y Cob
Pwllheli
Gwynedd
LL53 5AA

Dear Eryl,

Planning application: C16/0107/16/LL
Penrhyn Castle, Llandygai

Thank you for forwarding the report on the archaeological trial trenching carried out in connection with the above application (Gwynedd Archaeological Trust report 1299, March 2016). I confirm that the work has been carried out in accordance with the relevant professional standards. The trial trench sought to locate a building recorded on early 19th century mapping in accordance with my recommendations of 4th March 2016 (0403je01/D2090), in order that they could be investigated in advance of development and the route altered to avoid it if necessary. The trial trench proved negative, implying loss of any archaeological deposits as a result of landscaping.

Following receipt of this information, I am able to confirm my previous recommendation that should planning consent be granted, the local authority requires an appropriate scheme of archaeological mitigation to address the relatively low potential for previously unrecorded archaeology to be affected by the scheme, in accordance with national planning policy (*Planning Policy Wales 2016*) and Welsh Office Circular 60/96 (*Planning and the Historic Environment: Archaeology*). This could be secured through a standard condition, such as the following:

(a) No development (including groundworks, clearance or stripping-out) shall take place until a specification for a programme of archaeological work has been submitted to and approved in writing by the Local Planning Authority.

(b) The development shall be carried out and all archaeological work completed in strict accordance with the details submitted and approved under part (a).

Reasons: 1) To ensure the implementation of an appropriate programme of archaeological mitigation in accordance with the requirements of Planning Policy Wales 2016 and Welsh Office Circular 60/96 *Planning and the Historic Environment: Archaeology*.

2) To ensure that the work will comply with *Management of Archaeological Projects* (MAP2) and the Standards and Guidance of the Chartered Institute for Archaeologists (CIfA).

The archaeological mitigation should take the form of an *archaeological watching brief*, to be carried out on an *intensive* basis, during intrusive groundworks associated with pipeline construction, followed by production of a report and specialist analysis if applicable. This work will need to be carried out by an appropriately qualified professional archaeological organisation.

Please contact me with any queries regarding the above.

Yours sincerely

Jenny Emmett
Development Control Archaeologist

APPENDIX II

Reproduction of Gwynedd Archaeological Trust watching brief pro-forma

YMDDIRIEDOLAETH ARCHAEOLEGOL GWYNEDD ARCHAEOLOGICAL TRUST		
WATCHING BRIEF DAY RECORD		*Date*
Project name	*Project number*	*Compiler*
Location		
Description		
Times of travelling and on-site		
Drawn record details		
Photographic record details		

APPENDIX III

Reproduction of Gwynedd Archaeological Trust photographic record pro-forma

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Digital Photographic Record

Include main context numbers for each shot, drawing numbers for sections and any other relevant numbers for cross referencing.
Delete any unwanted photos **immediately** from the camera. Regularly upload photographs to computer.

Project Name:			Project Number:				
Photo No.	**Trench**	**Description**	**Contexts**	**Scales**	**View From**	**Initials**	**Date**

APPENDIX III

Reproduction of Gwynedd Archaeological Trust photographic metadata

File reference	Project name	PRN	Project phase	Site Subdivsion	Description	Context	Scale (s)	View from	Date	Originating person	Originating organisation
G2447_052	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Diggers clearing woodland for levelling		-	NNW	28/06/16	Bethan Jones	GAT
G2447_053	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Diggers clearing woodland for levelling		-	W	28/06/16	Bethan Jones	GAT
G2447_054	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing tree clearance		-	SW	28/06/16	Bethan Jones	GAT
G2447_055	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing tree clearance		-	S	28/06/16	Bethan Jones	GAT
G2447_056	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Shot taken following the tree clearance		-	SW	28/06/16	Bethan Jones	GAT
G2447_057	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Trial trench for topsoil depth		1x1m	ESE	28/06/16	Bethan Jones	GAT
G2447_058	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing tree root removal using an excavator with a toothless bucket		-	ESE	28/06/16	Bethan Jones	GAT
G2447_059	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing an excavator with a toothed bucket clearing at the SW end of the area		-	S	28/06/16	Bethan Jones	GAT
G2447_060	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing an excavator with a toothed bucket clearing at the NE end of the area		-	W	28/06/16	Bethan Jones	GAT
G2447_061	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-med pottery in amongst tree roots		1x1m	SW	28/06/16	Bethan Jones	GAT
G2447_062	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-med pottery in amongst tree roots		1x1m	N	28/06/16	Bethan Jones	GAT
G2447_063	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	View of cleared woodland area		-	WNW	28/06/16	Bethan Jones	GAT
G2447_064	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	View of cleared woodland area		-	ESE	28/06/16	Bethan Jones	GAT
G2447_065	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing tree stump removal - 0.79m deep		-	W	28/06/16	Bethan Jones	GAT
G2447_066	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-ex shot following tree stump removal		1x1m	SW	29/06/16	Bethan Jones	GAT
G2447_067	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Shot of levelled area		1x1m	ENE	29/06/16	Bethan Jones	GAT
G2447_068	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Shot of levelled area showing recently removed roots		1x1m	WNW	29/06/16	Bethan Jones	GAT
G2447_069	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Shot of levelled area (reduced be c. 0.5m)		1x1m	NW	29/06/16	Bethan Jones	GAT
G2447_070	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Representitive section showing redeposited natural		1x1m	SW	29/06/16	Bethan Jones	GAT
G2447_071	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Shot of levelled area showing spray paint outline of proposed		1x1m	WNW	30/06/16	Bethan Jones	GAT

File reference	Project name	PRN	Project phase	Site Subdivsion	Description	Context	Scale (s)	View from	Date	Originating person	Originating organisation
					ground to be cut						
G2447_072	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Area being levelled showing natural at the base of tree stump holes		1x1m	N	30/06/16	Bethan Jones	GAT
G2447_073	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Area from carpark revealing natural		1x1m	SW	30/06/16	Bethan Jones	GAT
G2447_074	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Gravel from levelled area in carpark - evidence from landscaping		1x1m	WNW	30/06/16	Bethan Jones	GAT
G2447_075	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	General view of gravelled area		1x1m	NW	30/06/16	Bethan Jones	GAT
G2447_076	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt deposit (03)		1x1m	E	30/06/16	Bethan Jones	GAT
G2447_077	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt deposit (03)		1x1m	E	30/06/16	Bethan Jones	GAT
G2447_078	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Pre-ex shot of burnt feature [04]		1x1m	ESE	30/06/16	Bethan Jones	GAT
G2447_079	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Pre-ex shot of burnt feature [04]		1x1m	S	30/06/16	Bethan Jones	GAT
G2447_080	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	South facing section through feature [04]		1x1m	N	30/06/16	Bethan Jones	GAT
G2447_081	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	South facing section through feature [04]		1x1m	N	30/06/16	Bethan Jones	GAT
G2447_082	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt feature [04] following the removal of (05)		1x1m	S	30/06/16	Bethan Jones	GAT
G2447_083	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt feature [04] following the removal of (05)		1x1m	N	30/06/16	Bethan Jones	GAT
G2447_084	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt feature [04] following the removal of (05)		1x1m	N	30/06/16	Bethan Jones	GAT
G2447_085	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt stones removed from deposit (05)		1x1m	SW	01/07/16	Bethan Jones	GAT
G2447_086	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt feature [04] following the removal of (05)		1x1m	NE	01/07/16	Bethan Jones	GAT
G2447_087	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Burnt feature [04] following the removal of (05)		1x1m	NE	01/07/16	Bethan Jones	GAT
G2447_088	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Southwest facing section through feature [04]		1x1m	NE	01/07/16	Bethan Jones	GAT
G2447_089	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Southwest facing section through feature [04]		1x1m	NE	01/07/16	Bethan Jones	GAT
G2447_090	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Shot showing flint (find no.3) in situe, in relation to pit [04]		1x0.2m	S	01/07/16	Bethan Jones	GAT
G2447_091	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-ex shot of feature [04]		1x1m	S	01/07/16	Bethan Jones	GAT
G2447_092	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-ex shot of feature [04]		1x1m	NE	01/07/16	Bethan Jones	GAT

File reference	Project name	PRN	Project phase	Site Subdivsion	Description	Context	Scale (s)	View from	Date	Originating person	Originating organisation
G2447_093	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-ex shot of feature [04]		1x1m	S	01/07/16	Bethan Jones	GAT
G2447_094	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing feature [04] in relation to the carpark			W	01/07/16	Bethan Jones	GAT
G2447_095	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing the removal of the sub-soil down to the natural			SW	05/07/16	Jess Davidson	GAT
G2447_096	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Pre-excavation shot of feature [07]		1x1m	SW	05/07/16	Jess Davidson	GAT
G2447_097	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Pre-excavation shot of feature [07]		1x1m	NW	05/07/16	Jess Davidson	GAT
G2447_098	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-excavation shot of 0.5m wide slot cut through feature [07]		1x1m	SE	05/07/16	Jess Davidson	GAT
G2447_099	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-excavation shot of 0.5m wide slot cut through feature [07]		1x1m	SE	05/07/16	Jess Davidson	GAT
G2447_100	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-excavation shot of 0.5m wide slot cut through feature [07]		1x1m	SW	05/07/16	Jess Davidson	GAT
G2447_101	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Post-excavation shot of 0.5m wide slot cut through feature [07]		1x1m	SE	05/07/16	Jess Davidson	GAT
G2447_102	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing the continued removal of the sub-soil down to the natural			SE	06/07/16	Jess Davidson	GAT
G2447_103	G2447 Penrhyn Castle		Watching Brief	Energy Centre Building	Working shot showing the continued removal of the sub-soil down to the natural			S	06/07/16	Jess Davidson	GAT
G2447_104	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of trench cut in the morning 23/08/16		1x1m	SE	23/08/16	Bethan Jones	GAT
G2447_105	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Pipe line bricks in section. Poss small eclosure wall of feature 6 in Evaluation	12	1x1m	S	23/08/16	Bethan Jones	GAT
G2447_106	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Pipe line bricks in section. Poss small eclosure wall of feature 6 in Evaluation	12	1x1m	N	23/08/16	Bethan Jones	GAT
G2447_107	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Pipe line bricks in section. Poss small eclosure wall of feature 6 in Evaluation	12	1x1m	S	23/08/16	Bethan Jones	GAT
G2447_108	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Pipe line bricks in section. Poss small eclosure wall of feature 6 in Evaluation	12	1x1m	N	23/08/16	Bethan Jones	GAT
G2447_109	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of digger cutting into tarmac			SE	23/08/16	Bethan Jones	GAT
G2447_110	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of tamac showing cobbles pm N facing trench section			S	23/08/16	Bethan Jones	GAT
G2447_111	G2447 Penrhyn Castle		Watching Brief	Pipe Line	End of day shot showing area where ground was cut		1x1m	W	23/08/16	Bethan Jones	GAT

File reference	Project name	PRN	Project phase	Site Subdivsion	Description	Context	Scale (s)	View from	Date	Originating person	Originating organisation
G2447_112	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of workmen backfilling the exposed pipeline		1x1m	W	24/08/16	Bethan Jones	GAT
G2447_113	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of workmen extending pipe trench		1x1m	E	24/08/16	Bethan Jones	GAT
G2447_114	G2447 Penrhyn Castle		Watching Brief	Pipe Line	End of day shot - too much shadow cast by sun in trench		1x1m	E	24/08/16	Bethan Jones	GAT
G2447_115	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of intervention of 5/09/13 - pipe like extension upon arrival at site		1x1m	W	05/09/16	Bethan Jones	GAT
G2447_116	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of digger, pipes & castle. COVER SHOT			SW	05/09/16	Bethan Jones	GAT
G2447_117	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of deposit of slate chips, poss. Foot path - too bright	13	1x1m	NE	05/09/16	Bethan Jones	GAT
G2447_118	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of deposit of slate chips, poss. Foot path - too bright	13	1x1m	NE	05/09/16	Bethan Jones	GAT
G2447_119	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot showing depth of slate chip deposit within trench section	13	1x1m	SW	05/09/16	Bethan Jones	GAT
G2447_120	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of Iron rust staining below slate chips	14	1x1m	SW	05/09/16	Bethan Jones	GAT
G2447_121	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of slate chips showing depth of 0.7m in parts	13	1x1m	SW	05/09/16	Bethan Jones	GAT
G2447_122	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of slate chips showing depth of 0.7m in parts	13	1x1m	SW	05/09/16	Bethan Jones	GAT
G2447_123	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot along trench during excavation of pipe trench			SE	07/09/16	Spencer Smith	GAT
G2447_124	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot along trench during excavation of pipe trench			SE	07/09/16	Spencer Smith	GAT
G2447_125	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of pipe lime trench showing decayed stone and slate chip surface - part of penrhyn constuction debris	13	1x1m	W	13/09/16	Bethan Jones	GAT
G2447_126	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of slate chip deposit where find10+11 was recovered	13	1x1m	W	13/09/16	Bethan Jones	GAT
G2447_127	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Oblique shot showing building debris within trench - portrait			SW	13/09/16	Bethan Jones	GAT
G2447_128	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Oblique shot showing building debris within trench - landscape			SE	13/09/16	Bethan Jones	GAT
G2447_129	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of modern slate surface and shale outcrop		1x1m	SW	13/09/16	Bethan Jones	GAT
G2447_130	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Portrait shot showing traces of modern service pipe & 19th Cen debris and shale			SE	13/09/16	Bethan Jones	GAT
G2447_131	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Deposit of marine shells (16) in NE facing trench edge, lying above bedrock (17)	16 17	1x1m	NW	13/09/16	Bethan Jones	GAT

File reference	Project name	PRN	Project phase	Site Subdivsion	Description	Context	Scale (s)	View from	Date	Originating person	Originating organisation
G2447_132	G2447 Penrhyn Castle		Watching Brief	Pipe Line	E edge of trench showing lead pipe and brick w/ mortar. Previously disturbed by electrical services. Alongside brick tunnel [18^]	18	1x1m	W	13/09/16	Bethan Jones	GAT
G2447_133	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Lead pipe and brick tunnel from within trench 53`13'10"N 4`5'41"W	18		N	13/09/16	Bethan Jones	GAT
G2447_134	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of brick tunnel leading to Keep [18^]	18		W	13/09/16	Bethan Jones	GAT
G2447_135	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of brick tunnel [18^] - showing length	18		W	13/09/16	Bethan Jones	GAT
G2447_136	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of brick tunnel [18^] - with 'scale'	18		W	13/09/16	Bethan Jones	GAT
G2447_137	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of lead pipe showing cleared area with read beick in-situ	18	1x1m	W	13/09/16	Bethan Jones	GAT
G2447_138	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot of E edge of trench, better displaying [18^] along with sawn lead pipe	18	1x1m	W	14/09/16	Bethan Jones	GAT
G2447_139	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Close-up shot from within [18^]'s tunnel displaying with spirit level	18	0.075 (spirit level)	W	14/09/16	Bethan Jones	GAT
G2447_140	G2447 Penrhyn Castle		Watching Brief	Pipe Line	[18^] close-up with spirit level & lead pipe	18	0.075	W	14/09/16	Bethan Jones	GAT
G2447_141	G2447 Penrhyn Castle		Watching Brief	Pipe Line	[18^] close-up with 1m ranging rod & lead pipe	18	1x1m	W	14/09/16	Bethan Jones	GAT
G2447_142	G2447 Penrhyn Castle		Watching Brief	Pipe Line	[18^] close-up with 1m ranging rod & lead pipe	18	1x1m	W	14/09/16	Bethan Jones	GAT
G2447_143	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Portrait shot showing [18^] in relation to castle's keep	18	1x1m	W	14/09/16	Bethan Jones	GAT
G2447_144	G2447 Penrhyn Castle		Watching Brief	Keep Basement	c.30cm x 30cm mortared area-poss [18^] terminal - showing bricks. Portait			E	14/09/16	Bethan Jones	GAT
G2447_145	G2447 Penrhyn Castle		Watching Brief	Keep Basement	Mortared patch wuth 1m scale trying to display height. Portait		1x1m	E	14/09/16	Bethan Jones	GAT
G2447_146	G2447 Penrhyn Castle		Watching Brief	Keep Basement	Shot showing exposed bricks (similar to [18^]) along with lead pipes & modern drains			E	14/09/16	Bethan Jones	GAT
G2447_147	G2447 Penrhyn Castle		Watching Brief	Keep Basement	Close-up of interior brick work for [18^] comparison, along with modern services			S	14/09/16	Bethan Jones	GAT
G2447_148	G2447 Penrhyn Castle		Watching Brief	Keep Basement	Shot of old (now filled) drainage tunnel, perhaps similar to [18^] terminus			E	14/09/16	Bethan Jones	GAT

File reference	Project name	PRN	Project phase	Site Subdivsion	Description	Context	Scale (s)	View from	Date	Originating person	Originating organisation
G2447_149	G2447 Penrhyn Castle		Watching Brief	Keep West Wall	Shot of old lead pipe drain similar to that in photo 146 - perhaps once associated to [18^]			W	14/09/16	Bethan Jones	GAT
G2447_150	G2447 Penrhyn Castle		Watching Brief	Court Yard	Small double-layerd brick structure [22^] W facing	22	1x1	W	22/09/16	Bethan Jones	GAT
G2447_151	G2447 Penrhyn Castle		Watching Brief	Court Yard	Cobbled surface with SW corner trench	24 -27	1x1	NE	22/09/16	Bethan Jones	GAT
G2447_152	G2447 Penrhyn Castle		Watching Brief	Court Yard	Intermittent cobbled surface - digger obstructing view	24/25		NW	22/09/16	Bethan Jones	GAT
G2447_153	G2447 Penrhyn Castle		Watching Brief	Court Yard	Brick service pipe with lead pipe modern service pipes	23	1x1	W	22/09/16	Bethan Jones	GAT
G2447_154	G2447 Penrhyn Castle		Watching Brief	Court Yard	Brick service pipe with lead pipe modern service pipes - close-up	23	1x1	W	22/09/16	Bethan Jones	GAT
G2447_155	G2447 Penrhyn Castle		Watching Brief	Court Yard	Brick service pipe [23^] with cobbled surface in shot	23 24-27	1x1	NE	22/09/16	Bethan Jones	GAT
G2447_156	G2447 Penrhyn Castle		Watching Brief	Court Yard	Close-up shot of brick tunnel to demonstrate bottom - lead pipe in shot			WNW	22/09/16	Bethan Jones	GAT
G2447_157	G2447 Penrhyn Castle		Watching Brief	Court Yard	Slate slope + service pipes leading into castle basement			W	22/09/16	Bethan Jones	GAT
G2447_158	G2447 Penrhyn Castle		Watching Brief	Court Yard	Shot of brick surface - broken - similar to brick work [23^]		1x1	N	22/09/16	Bethan Jones	GAT
G2447_159	G2447 Penrhyn Castle		Watching Brief	Court Yard	E edge of trench showing bricks and modern sercive pipes		1x1	W	22/09/16	Bethan Jones	GAT
G2447_160	G2447 Penrhyn Castle		Watching Brief	Court Yard	Shot of trench leading to N end of castle with damaged bricks		1x1	S	22/09/16	Bethan Jones	GAT
G2447_161	G2447 Penrhyn Castle		Watching Brief	Court Yard	Stones lining main-route to castle, similar to that found near (24) - (27)			E	22/09/16	Bethan Jones	GAT
G2447_162	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Terminal of Pipe 2 trench, beside the tower.		1m	NW	27/09/16	Stuart Reilly	GAT
G2447_163	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Terminal of Pipe 2 trench, beside the tower (except ranging rod inside the trench).		1m	NW	27/09/16	Stuart Reilly	GAT
G2447_164	G2447 Penrhyn Castle		Watching Brief	Pipe Line	NE facing section of Pipe 2 trench to show paving slabs (28) and foundation (29).	28 and 29	1m	NE	27/09/16	Stuart Reilly	GAT
G2447_165	G2447 Penrhyn Castle		Watching Brief	Pipe Line	NE facing section of Pipe 2 trench with bedrock.	30	1m	NE	27/09/16	Stuart Reilly	GAT
G2447_166	G2447 Penrhyn Castle		Watching Brief	Pipe Line	View of excavated Pipe 2 trench.		1m	NW	27/09/16	Stuart Reilly	GAT
G2447_167	G2447 Penrhyn Castle		Watching Brief	Pipe Line	View of entire length of excavated Pipe 3 trench.		1m	SW	27/09/16	Stuart Reilly	GAT
G2447_168	G2447 Penrhyn Castle		Watching	Pipe Line	Close-up of excavated length of		1m	SW	27/09/16	Stuart Reilly	GAT

File reference	Project name	PRN	Project phase	Site Subdivsion	Description	Context	Scale (s)	View from	Date	Originating person	Originating organisation
			Brief		Pipe 3 trench.						
G2447_169	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Section face of Pipe 3 trench.		1m	W	27/09/16	Stuart Reilly	GAT
G2447_170	G2447 Penrhyn Castle		Watching Brief	Pipe Line	View of entire length of excavated Pipe 3 trench.		1m	NE	27/09/16	Stuart Reilly	GAT
G2447_171	G2447 Penrhyn Castle		Watching Brief	Pipe Line	View of terminal of Pipe 3 trench and holes drilled trhough wall.		1m	SW	27/09/16	Stuart Reilly	GAT
G2447_172	G2447 Penrhyn Castle		Watching Brief	Pipe Line	Shot modern services in vicinity of Pipe 3 trench.		1m	E	27/09/16	Stuart Reilly	GAT

APPENDIX IV

Context Register

Context No.	Site Sub-Division	Description
01	ECB	Topsoil
02	ECB	Subsoil
03	ECB	Glacial Horizon
04	ECB	Cut of irregular stony feature
05	ECB	Fill of [04]
06	ECB	Grey brown fill north of [04] burnt feature
07	ECB	Shallow curvilinear feature at the SW limit of area
08	ECB	Fill of [07]
09	PL 1	Woodland topsoil: Re-Deposited (by Dunster) grey light brown clay
10	PL 1	Woodland topsoil: Grey brown clay with cobbled inclusions
11	PL 1	Woodland subsoil: Yellow brown grey glacial clay
12	PL 1	Small red brick structure (with large inclusions in bricks)
13	PL 1	Deposit of slate chips, possibly a footpath
14	PL 1	Patch of rust below slate chip path
15	PL 1	Decayed stone (shale) lying below topsoil near tower keep (south end)
16	PL 1	Deposit of assortment of marine shells lying between topsoil and bedrock (17)
17	PL 1	Dark grey-blue bedrock near castle keep's north west corner
18	PL 1	Red brick tunnel leading towards keep, diameter of 0.3m
19	PL 1	Mixed deposit of shale, mortar and clay with cobbled inclusions, above [18^]
20	PL 1	Shale bedrock surrounding base of trench and both sides of [18^]
21	PL 1	Grey sand used to cover modern services pipes (electrical)
22	PL 10	Small brick structure with mortar bonding and double skin wall
23	PL 10	Red brick service tunnel similar to that of [18^]
24	PL 10	Large cobbled surface, cobbles 0.2m x 0.16m
25	PL 10	Dark grey sandy silt with 50% shale inclusions - used as possible bonding
26	PL 10	Smaller cobbled surface c.0.1m x 0.7m below (24) and (25)
27	PL 10	Deposit in between and below (26) - pressed grey-brown silty sand
28	PL 2 & 3	Slate paving slabs along edge of castle
29	PL 2	Sone and mortar deposit used as foundation for (28)

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