

# QUARRY REALIGNMENT PROJECT, PENRHYN QUARRY, BETHESDA, GWYNEDD

Archaeological Evaluation and Survey



Ymddiriedolaeth Archaeolegol Gwynedd  
Gwynedd Archaeological Trust



# QUARRY REALIGNMENT PROJECT, PENRHYN QUARRY, BETHESDA, GWYNEDD

## Archaeological Evaluation and Survey

Historic Environment Record Event Primary Reference Number 45187

Prosiect Rhif / Project No. G2534/G2556

Adroddiad Rhif / Report No.1423

Prepared for: Welsh Slate Limited

May 2018

Written by: Stuart Reilly

Front cover image: NNE Facing section of Trench 5 (Archive Image: G2534\_035)

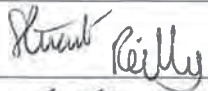


Cyhoeddwyd gan Ymddiriedolaeth Archaeolegol Gwynedd  
Ymddiriedolaeth Archaeolegol Gwynedd  
Craig Beuno, Ffordd y Garth,  
Bangor, Gwynedd, LL57 2RT

Published by Gwynedd Archaeological Trust  
Gwynedd Archaeological Trust  
Craig Beuno, Garth Road,  
Bangor, Gwynedd, LL57 2RT

Cadeiryddes/Chair - Yr Athro/Professor Nancy Edwards, B.A., PhD, F.S.A.  
Prif Archaeolegydd/Chief Archaeologist - Andrew Davidson, B.A., M.I.F.A.

Mae Ymddiriedolaeth Archaeolegol Gwynedd yn Gwmni Cyfyngedig (Ref Cof. 1180515) ac yn Elusen (Rhif Cof. 508849)  
Gwynedd Archaeological Trust is both a Limited Company (Reg No. 1180515) and a Charity (reg No. 508849)



Approvals Table				
	Role	Printed Name	Signature	Date
Originated by	Document Author	STUART REILLY		02/07/18
Reviewed by	Document Reviewer	JOHN ROBERTS		02/07/18
Approved by	Principal Archaeologist	JOHN ROBERTS		02/07/18

Revision History			
Rev No.	Summary of Changes	Ref Section	Purpose of Issue
01	Minor grammatical changes & Inclusion of AOC results	Throughout 4.4 & 5	For Andy Josephs Associates approval
02	Edit to Welsh translation of Non- technical summary	Non- technical summary	GAPS



# CONTENTS

Non-Technical Summary .....	4
1 INTRODUCTION .....	5
2 ARCHAEOLOGICAL BACKGROUND .....	7
3 METHODOLOGY .....	9
3.1 Fieldwork Methodology Archaeological Evaluation.....	9
3.2 Fieldwork Methodology Archaeological Survey .....	12
4 RESULTS .....	13
4.1 Introduction .....	13
4.2 Stage 1 Archaeological Evaluation .....	13
4.2.1 Trial Trenches .....	13
4.2.2 Test Pits .....	16
4.3 Stage 2 Archaeological Evaluation .....	17
4.4 Soil Assessment Results of Sample 3203 (AOC Report No. 24318 – Appendix VIII) .	
.....	18
4.5 Archaeological Survey of Extension Area .....	19
4.5.1 Archaeological Survey Data .....	19
5 CONCLUSIONS AND RECOMMENDATIONS.....	23
6 SOURCES CONSULTED .....	26
FIGURE 01 .....	
Proposed Quarry Realignment Zone with location of Evaluation Trenches & Test Pits and Geophysical Features. ....	28
FIGURE 02.....	
Extension Area of Penrhyn Quarry and location of archaeological features .....	29
FIGURE 03.....	
Quarry Realignment Zone and Archaeological Features (reproduced from GAT Report 1397) .....	30
FIGURE 04.....	
Reproduction of Tigergeo DWG04 depicting Archaeological Features.....	31
FIGURE 05.....	
North east facing section and plan of Trench 1.....	32
FIGURE 06.....	
North east facing section and plan of Trench 4.....	33
FIGURE 07 .....	
South west facing section, plan of Trench 6 and north west facing section of wall (604). ...	34
FIGURE 08.....	

East facing section and plan of Test Pit 32.....	35
FIGURE 09.....	
Survey plan of Features 3 - 5 (PRNs 69370-2) within Quarry Extension Area .....	36
FIGURE 10.....	
Survey plan of Features 1 & 2 (PRNs PRN 69368-9) within Quarry Extension Area .....	37
APPENDIX I .....	
Reproduction of approved Gwynedd Archaeological Trust WSI.....	38
APPENDIX II .....	
Reproduction of Gwynedd Archaeological Trust G2534 Evaluation photographic metadata .....	39
APPENDIX III .....	
Reproduction of Gwynedd Archaeological Trust Ecofact and Artefact Registers .....	40
Appendix IV .....	
Reproduction of Gwynedd Archaeological Trust Drawing Register .....	41
Appendix V .....	
Reproduction of Gwynedd Archaeological Trust Photographic Metadata for Project G2556 .....	42
Appendix VI .....	
Reproduction of Gwynedd Archaeological Trust Context Register .....	43
APPENDIX VII.....	
Reproduction of co-ordinates for all of the Evaluation trenches and test pits .....	44
Appendix VIII .....	
Reproduction of AOC Report No. 24318.....	45





## Figures

Figure 01: Proposed Quarry Realignment Zone with location of Evaluation Trenches & Test Pits;

Figure 02: Extension Area of Penrhyn Quarry and location of archaeological features;

Figure 03: Quarry Realignment Zone and Archaeological Features (reproduced from GAT Report 1397);

Figure 04: Reproduction of Tigergeo DWG04 depicting Archaeological Features;

Figure 05: North east facing section and plan of Trench 1;

Figure 06: North east facing section and plan of Trench 4;

Figure 07: South west facing section, plan of Trench 6 and north west facing section of wall (604);

Figure 08: East facing section and plan of Test Pit 32;

Figure 09: Survey plan of Features 3 - 5 (PRNs 69370-2) within Quarry Extension Area;

Figure 10: Survey plan of Features 1 & 2 (PRNs PRN 69368-9) within Quarry Extension Area.

## Plates

Plate 1: Pre-Ex shot of Trench 01; scale: 2x1m (archive reference: G2534\_060);

Plate 2: New access road located along SW edge of site; scale: 1m (archive reference: G2534\_007);

Plate 3: Oblique view of NE facing section of Trench 01; scale: 2x1m (archive reference: G2534\_080);

Plate 4: Wall [103] within Trench 01; scale: 2x1m (archive reference: G2534\_078);

Plate 5: Pre-Ex location shot of Trench 02; scale: 2x1m (archive reference: G2534\_052);

Plate 6: Pre-Ex view of the SE elevation of Paddock 3 wall; scale: 1x1m (archive reference: G2534\_053);

Plate 7: Post-Ex view of Paddock 3 wall; scale: 1x1m (archive reference: G2534\_056);

Plate 8: Post-Ex shot of Trench 03 - location; scale: 2x1m (archive reference: G2534\_013);

Plate 9: Post-Ex shot of Trench 03; scale: 2x1m (archive reference: G2534\_012);

Plate 10: Post-Ex shot of Trench 03 - close up of wall [304]; scale: 1x1m (archive reference: G2534\_014);

Plate 11: Post-Ex shot of Trench 04; scale: 2x1m (archive reference: G2534\_042);

Plate 12: Post-Ex shot of Trench 04; scale: 2x1m (archive reference: G2534\_043);

Plate 13: Close up of wall [404] - SE face; scale: 1x1m (archive reference: G2534\_045);

Plate 14: SW facing section of Trench 04 - NW end; scale: 1x1m (archive reference: G2534\_050);

Plate 15: NNE facing section of Trench 05; scale: 1x1m (archive reference: G2534\_035);

Plate 16: Post-Ex shot of Trench 05; scale: 2x1m (archive reference: G2534\_033);

Plate 17: Pre-Ex shot of Trench 06; scale: 2x1m (archive reference: G2534\_019);

Plate 18: Trench 06 excavated; scale: 1x1m (archive reference: G2534\_025);

Plate 19: NW face of [6004]; scale: 1x1m (archive reference: G2534\_039);

Plate 20: Detail of wall in Trench 06; scale: 1x1m (archive reference: G2534\_024);

Plate 21: Post-Ex shot of Test Pit 05; scale: 1x0.2m (archive reference: G2534\_070);

Plate 22: Post-Ex shot of Test Pit 13; scale: 1x0.2m (archive reference: G2534\_105);

Plate 23: Post-Ex shot of Test Pit 19; scale: 1x0.2m (archive reference: G2534\_112);

Plate 24: Post-Ex shot of Test Pit 18 - location shot; scale: 1x1m (archive reference: G2534\_097);

Plate 25: Post-Ex of Trench 08; scale: 2x1m (archive reference: G2534\_194);

Plate 26: Post-Ex of Trench 10; scale: 2x1m (archive reference: G2534\_204);

Plate 27: Post-Ex shot of Test Pit 31; scale: 1x1m (archive reference: G2534\_159);

Plate 28: East facing section of Test Pit 32, [3204]+(3203); scale: 1x0.3m (archive reference: G2534\_176);

Plate 29: View of Linear 01 from the trackway end where it has been cut through; scale: 1x1m (archive reference: G2556\_003);

Plate 30: View of Linear 01 from the bulbous SE terminus; scale: 1x1m (archive reference: G2556\_001);

Plate 31: General view along Linear 02; scale: 1x1m (archive reference: G2556\_009);

Plate 32: Angled shot showing waste make-up of linear 02; scale: 1x1m (archive reference: G2556\_010);

Plate 33: View of section through Linear 02 where cut by trackway; scale: 2x1m (archive reference: G2556\_008);

Plate 34: General view of linear 02 taken from the 'L' junction at SW end; scale: 1x1m (archive reference: G2556\_011);

Plate 35: General view of linear 03 taken from the haul road end; scale: 1x1m (archive reference: G2556\_013);

Plate 36: General view of linear 03 taken from the SW end; scale: 1x1m (archive reference: G2556\_015);

Plate 37: General view of modern drainage channel cut through Linear 03; scale: 1x1m (archive reference: G2556\_016);

Plate 38: View of slate linear 03 embankment; scale: 1x1m (archive reference: G2556\_019);

Plate 39: View of slate linear 04 from the SW; scale: 1x1m (archive reference: G2556\_018);

Plate 40: View of drystone wall 01; scale: 1x1m (archive reference: G2556\_022).



## **CRYNODEB ANNHECHNEGOL**

*Cafodd Ymddiriedolaeth Archeolegol Gwynedd (GAT) ei gontractio gan Welsh Slate Limited i ymgymryd â rhaglen o werthusiad archeolegol o adliniad posibl y chwarel, yn ogystal ac arolwg archeolegol o ardal estynedig ar hyd ymyl de-orllewinol Chwarel y Penrhyn, Bethesda.*

*Roedd y gwerthusiad yn cynnwys cyfuniad o ffosydd cloddio â llaw a phyllau prawf, a oedd yn ymchwilio y waliau a thu mewn i'r caeau a'r padogau sy'n gysylltiedig â'r anheddiad yn ogystal â nodweddion archeolegol posibl a nodwyd yn yr arolwg geoffisegol. Cadarnhaodd bresenoldeb a natur y waliau yn ogystal ag ardal o mwyndoddiad haearn a pentwr sorod cysylltiedig. Anfonwyd sampl o'r mwyndoddiad haearn i'w asesu i arbenigwyr a benderfynodd ei fod yn wastraff o ffwrnais gwaith pwdlo.*

*Canolbwyntiodd yr arolwg archeolegol ar nodweddion a nodwyd o fewn ardal estyniad ar hyd ymyl de orllewinol y gwaith chwarel gyfredol. Archwiliodd a dogfennodd bedwar llwybr llinellol sy'n gysylltiedig â phrofion craidd i asesu cronfeydd llechi ar ddiwedd yr 20fed ganrif a wal garreg sych o'r 19eg ganrif.*

## **NON-TECHNICAL SUMMARY**

*Gwynedd Archaeological Trust (GAT) was contracted by Welsh Slate Limited to undertake a staged programme of archaeological evaluation for a proposed quarry realignment and an archaeological survey of an extension area along the south west edge of Penrhyn Quarry, Bethesda.*

*The archaeological evaluation was conducted in stages and focused on a late prehistoric settlement on the southwestern edge of Penrhyn Quarry. The evaluation consisted of a combination of hand excavated trenches and test pits, that investigated the walls and interiors of the enclosures and paddocks associated with the settlement as well as potential archaeological features identified during the geophysical survey. It confirmed the presence and nature of the walls as well as an area of iron smelting and associated slag dump. A sample of the iron smelting was sent for assessment to specialists who determined that it was waste material from a bloomery furnace.*

*The archaeological survey focused on features identified within an extension area along the south western edge of the current quarry works. It surveyed and documented four linear trackways associated with core testing to assess slate reserves in the late 20<sup>th</sup> century and a 19<sup>th</sup> century drystone wall.*

# 1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was contracted by *Welsh Slate Limited* to undertake a staged programme of archaeological evaluation in advance of a planning application for a proposed quarry realignment project at Penrhyn Quarry, Bethesda. The proposed realignment comprises a c.6.4ha extension to the existing Penrhyn Quarry incorporating an area of upland to the south west of the current workings (centred on NGR SH61146396). The archaeological evaluation was conducted in two stages, interspersed by a geophysical survey conducted by Tigergeo:

- Stage 1 of the evaluation was conducted by GAT in August and September 2017. It consisted of the hand excavation of six 5m x 0.80m test trenches and 30 0.3m x 0.3m test pits;
- A magnetometer survey was undertaken by Tigergeo in October 2017 to locate possible iron production activity identified during the Stage 1 evaluation and buried features of archaeological interest; and
- Stage 2 of the evaluation was conducted by GAT in February 2018. It was comprised of the hand excavation of four 3m x 0.80m test trenches and five 0.50m x 0.50m test pits, that targeted potential archaeological features identified in the magnetometer survey (Figure 01). The methodology of this stage of the evaluation was outlined in the approved GAT WSI (Appendix I).

The archaeological evaluation coincided with a GAT archaeological survey of features identified within an extension area along the south western edge of the current quarry works. The extension area (shaded yellow on Figure 02) has an approximate length of 450m and width of 25m, centred on grid reference SH61076370. It incorporates an area previously mitigated by GAT in November 2017 (GAT Report 1410).

The archaeological evaluation and survey were monitored by the Gwynedd Archaeological Planning Services (GAPS) who are advising the Gwynedd Mineral Planning Authority (MPA) and Andrew Josephs Associates, who are advising Welsh Slate Limited. The aim of the evaluation and survey is to determine the archaeological nature of these features as well as assess the age and significance of the suggested prehistoric settlement and provide sufficient information to allow discussions to be held with the MPA and Cadw regarding the planning application and appropriate mitigation that could include preservation *in situ* and/or archaeological excavation.



All work was planned, managed and undertaken by GAT in accordance with the following standards and guidance:

- *Standard and Guidance for Archaeological Field Evaluation* (Chartered Institute for Archaeologists, 2014);
- *Standard and guidance for the collection, documentation, conservation and research of archaeological materials* (Chartered Institute for Archaeologists, 2014);
- *Management of Archaeological Projects* (English Heritage, 1991);
- *Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide* (Historic England, 2015);
- *Historic Environment Record (HER) Guidelines for Archaeological Contractors* (Version 1.3; draft) (Gwynedd Archaeological Trust, 2014); and
- *Guidelines for digital archives* (Royal Commission on Ancient and Historic Monuments of Wales, 2015).

Gwynedd Archaeological Trust is certified to ISO 9001:2008 and ISO 14001:2004 (Cert. No. 74180/A/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

## 2 ARCHAEOLOGICAL BACKGROUND

Penrhyn Quarry lies within the Dyffryn Ogwen Landscape of Outstanding Historic Interest: 28 (CCW, Cadw, ICOMOS 1998) and forms one of the most important elements of this landscape. Penrhyn Quarry was formalised during the 18<sup>th</sup> century when Richard Pennant acquired a number of small local workings but slate is thought to have been extracted in this area as early as the 13<sup>th</sup> century. Infrastructure including railways, quarrymen's cottages and a quay at Porth Penrhyn were constructed at the end of the 18<sup>th</sup> and start of the 19<sup>th</sup> centuries. The quarry dominated both the slate industry and the surrounding landscape throughout the 19<sup>th</sup> century. Today the quarry continues to be run as a commercial venture and markets a variety of slate products.

As well as the extensive industrial archaeological remains that exist within the locality, mainly associated with the extraction of slate, the uplands around Bethesda and Nant Ffrancon contain extensive and very well-preserved relict remains of prehistoric and later land use.

An archaeological assessment of the proposed realignment zone was undertaken by GAT in November 2009 (GAT report 837). The assessment identified a number of sites, the majority relating to a late prehistoric settlement (PRN 5380) and a post-medieval multi-cellular sheepfold (PRN 29,989). In order to better identify the significance of the archaeological remains and identify appropriate mitigation an archaeological survey and a phase of field evaluation was undertaken (GAT reports 880 and 899) in July and September 2010 respectively (Figure 03).

The programme of field evaluation examined four sites identified during the desk based assessment and archaeological survey. These included a cleared terraced area (Feature 20), a suspected prehistoric structure (Feature 16), a possible burial cairn (Feature 15), and a possible ruined hut circle with sheepfold rebuild (Feature 14). The results of the evaluation proved the suspected prehistoric structure as being of natural origin. Furthermore, it showed that there was no evidence that the sheepfold utilised an earlier hut circle and nor that there were any associated buried remains present on the cleared terrace area. It did however show that a relatively complex level of archaeology was revealed at the possible burial cairn site (Feature 15), and the evaluation indicated the presence of archaeological remains and archaeological excavation of the entire feature was recommended as appropriate mitigation prior to the extension works.

The excavation was completed in December 2012 (GAT report 1105), and revealed a roughly rectangular stone structure, measuring approximately 7m by 5m, and aligned east

west. The date and function of this structure was uncertain. However, given its shape and size, it was most likely the remains of a post-medieval peat and/ or hay drying platform. The report recommended an archaeological watching brief as appropriate mitigation during the extension works.

Two watching briefs were completed in areas to the northeast and southeast of Feature 12 in 2013 (GAT report 1131) and 2014 (GAT report 1266) respectively. The watching briefs confirmed that the natural topography of the site was fairly close to the surface, lying on average only 0.2m below ground level and consisting of a light orange sandy clay. A large number of natural sub-angular stones and boulders were located throughout the site, with only a few small patches being relatively stone free. No archaeological features or deposits were uncovered during either of the watching briefs.

A programme of detailed recording and targeted trenching was complete across Feature 12 in 2015 (GAT report 1238). Feature 12 (trackway) was surveyed and photographed prior to the excavation of a trial trench towards its southern end. No evidence of any surface was uncovered, and it is likely that the trackway was created by the removal of stones along its length, and that the depth was due to the general use of the trackway. No finds were uncovered during the excavation, and therefore a date for the trackway is uncertain. However, given the close proximity to the possible medieval Hafod (Feature 13) it is likely to be of a comparable date. Two further features (Feature 10 and 17) were fenced off so as to be avoided during the realignment works.

The most recent archaeological activity conducted on site has been the phased archaeological evaluation of the site conducted by GAT in September 2017 and February 2018 and by a magnetometer survey conducted of the site by Tigergeo during October 2017. The results of the evaluation are outlined in section 4.

### 3 METHODOLOGY

The archaeological evaluation was implemented in two stages. Stage 1 consisted of six hand excavated 5m x 0.80m test trenches and 30 0.3m x 0.3m test pits. The trenches were located within the enclosure complex represented by GAT Features 2 to 6 and 9 (Figure 03) and were complemented by a programme of test pitting within and around the enclosures, aimed at establishing the presence/absence of buried deposits. Stage 1 of the evaluation was conducted during August and September 2017.

Stage 2 comprised four hand excavated 3m x 0.80m test trenches and five 0.50m x 0.50m test pits. The trenches targeted the geophysical features 3, 4, 5, 6 and 9 that may represent structures in the form of a stony bank or wall footing, while the pits focused on a possible hearth (feature 7), an associated spread (feature 8) and to determine if strong background variation (feature 10) is of natural origin (Figure 04). Stage 2 of the evaluation was undertaken in February 2018.

The archaeological survey of the extension area was conducted in February 2018 and focused on potential archaeological features identified during a walkover undertaken earlier in the month.

#### 3.1 Fieldwork Methodology Archaeological Evaluation

- All attendances, subsurface activity, contexts records, registers of artefacts and ecofacts were recorded using GAT pro-formas;
- A record was made on GAT pro-formas of the topsoil and subsoil depths, as well as the composition of the glacial horizon. All encountered subsurface features were recorded on GAT pro-formas with detailed notations and were recorded photographically with an appropriate scale, located via GPS and a measured hand drawn survey completed;
- Photographic ID boards were used throughout and included information on project code, trench or test pit number, context number or numbers and orientation of image;
- Photographic images were taken using a digital SLR camera (Nikon D3000) set to maximum resolution (3872 × 2592 10 effective megapixels) in RAW format. The images were converted to TIFF for archiving using Adobe Photoshop; the photographic record was archived in *Microsoft Access* (archive reference G2534\_001 to G2534\_212; cf. [Appendix II](#));

- All archaeological features and deposits encountered were manually cleaned and examined to determine extent, function, date and relationship to adjacent features. Features, including pits and postholes, were subject to an initial 50% sample by volume, followed by a 100% sample for any deposits directly relating to domestic activity. A minimum of 10% of linear features were excavated to provide stratigraphic relationships, to characterise feature morphology and to recover artefactual and ecofactual material;
- A total of 2 ecofact samples were recovered from deposits deemed suitable for dating ([Appendix III](#)). The sampling strategy was 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). Bulk samples were taken from sealed contexts, based on no less than 40 litres from each context, or 100% from small/discrete features. Specific recommendations for post-excavation assessment and analysis will be included in a project design separate to this report. No waterlogged samples were recovered;
- A total of 2 diagnostic artefacts were recovered for assessment and analysis ([Appendix III](#)). Recovery was undertaken in accordance with 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. Artefacts will be processed in accordance with *Standard and guidance for the collection, documentation, conservation and research of archaeological materials* (CiFA, 2014). All finds remain the property of the landowner; however, it is recommended that access to finds is granted to the Trust for a reasonable period to allow for post-excavation assessment and analysis. Trust staff will undertake initial identification, but any additional advice would be sought from a wide range of specialist consultants used by the Trust. Based on the assessment and analysis results it is Trust policy to recommend that all finds are donated to an appropriate museum, in this case Storiell, Bangor, where they can receive specialist treatment and study. Specific recommendations for post-excavation assessment and analysis will be included in a project design separate to this report. No artefacts classed as treasure were identified;
- All sections were drawn at a minimum 1:10 scale and all plans at a minimum 1:20 scale using GAT pro-forma permatrace. A total of 21 drawings were completed ([Appendix IV](#));

- Following the completion of the fieldwork, a programme of fieldwork archiving was completed, based on the following:
  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;
  5. Plans: all cross referenced and complete;
  6. Artefacts: quantified and identified; register completed;
  7. Ecofacts: quantified and register completed;
  8. Context register: quantified and register completed.

### 3.2 Fieldwork Methodology Archaeological Survey

The archaeological mitigation comprised an initial walkover survey of the designated area, followed by a detailed survey of identified features. The mitigation included a photographic and written record of identified features, along with a survey of their layout and location using a GPS unit. The written record included feature type, construction and dimensions that will provide sufficient information to prepare a Historic Environment Record compliant Primary Reference Number entry.

- All attendances and contexts records were recorded using GAT pro-formas;
- Photographic ID boards were used throughout and included information on project code, trench or test pit number, context number or numbers and orientation of image;
- Photographic images were taken using a digital SLR camera (Nikon D3100) set to maximum resolution (4,608 × 3,072 14.2 effective megapixels) in RAW format. The images were converted to TIFF for archiving using Adobe Photoshop; the photographic record was archived in *Microsoft Access* (archive reference G2556\_001 to G2556\_27; cf. [Appendix V](#))
- All of the identified archaeological features were surveyed using a *Trimble R8 GPS* unit from which scaled plans have been produced.

## **4 RESULTS**

For the purposes of this section, context numbers within square brackets (e.g. [05]) represent cut features, such as the pits, ditches etc., and context numbers within round brackets (e.g. (08)) represent deposits and fills. For a complete list of contexts, see [Appendix VI](#).

### **4.1 Introduction**

The archaeological evaluation and survey were conducted in an area to the immediate south west of the existing quarry works. The area in question is situated on the southern side of Gwaen Gynfi, a large expanse of mostly unenclosed peat bog to the south of Mynydd Llandegai. The land rises from 275m OD at the north to around 400m at the south. The bog drains into the Afon Marchlyn Mawr which in turn runs into the Galedffrwd, a tributary of the Ogwen. The borders of the bog adjoining the quarry are better drained and consist of natural terraces and boulder fields.

### **4.2 Stage 1 Archaeological Evaluation**

During Stage 1 of the archaeological evaluation the trial trenches and test pits were hand excavated within Features 2 to 6 and 9. The features are enclosures and paddocks defined by the remnants of wandering drystone walls, the interior of which are partially cleared of stone that make up part of the prehistoric settlement PRN 5380.

#### **4.2.1 Trial Trenches**

Trench 1 was excavated across the northern tip of the dry stone wall that defined Feature 2 (Plate 01), the remnants of an enclosure or paddock positioned at the southwestern edge of PRN 5380. The majority of the wall that defined the western edge of Feature 2 had been removed by recent work undertaken by the quarry to insert a leat and adjacent quarry track (Plate 02). The trench was aligned northwest by southeast and had a maximum excavated depth of 0.22m. The underlying natural (104) consisted of predominantly light grey boulder clay mixed with moderate earthfast boulders that stuck up above the turf. The natural was overlaid by the remnants of a drystone wall [103] (Plate 03) and the subsoil (102) a mid greyish brown silty clay mixed with frequent small to medium sized angular and sub-angular stones, with a depth of 0.1m (Figure 05). The subsoil was sealed beneath (101) a mid to dark brown silty peaty clay topsoil mixed with and bonded by a tight mesh of plant roots. The remnants of the drystone wall (103) had a surviving height of 0.35m and width of 1.50m within the trench. It was made up of locally sourced medium (maximum of 0.25m x 0.2m) to large (0.2m x 0.52m) sub-angular and sub-rounded stones intermixed with smaller sub-



angular packing stones (Plate 04). The stones for the wall was most likely generated field clearance and were set between glacial erratic's to form a rough boundary. No foundation cut was discernible within the trench and the wall was built directly on top of the underlying natural (104). The lower courses of the wall, along the southeast face, were abutted by deposit (102) and largely covered by (101). Aside from the wall no archaeological deposits or features were uncovered within Trench 1. The location co-ordinates for Trench 1 and all of the excavated trenches and test pits can be found in [Appendix VII](#).

Trench 2 was excavated on a northwest by southeast axis along the northwestern edge of the drystone wall that defines Feature 3 (Plate 05), the remnants of an enclosure or paddock located at the western edge of PRN 5380. The trench had a maximum excavated depth of 0.25m. The underlying natural (202) was composed of a compact, cohesive silty clay that varied in colour from being bright orange to light grey and was mixed with very frequent small to large angular and sub-angular stones as well as the occasional large earthfast boulder (Plate 06). It was overlaid by (201) a soft, cohesive mid greyish brown silty peaty clay mixed with frequent plant roots and small to medium sized angular and sub-rounded stones. The trench incorporated and abutted the southeast face the remnants of the drystone wall (203) that had an approximate width of 0.85m and surviving height of 0.6m. The wall was built on top of and between earthfast boulders (Plate 07), with the stones being locally sourced most likely from field clearance. It was loosely built with no evident face within the trench. Aside from the wall no archaeological deposits or features were uncovered within Trench 2.

Trench 3 was positioned within a paddock, Feature 4, along the northeastern face of the remnants of a drystone wall that extends northwest from the multicellular sheepfold (Plate 08). It was orientated northeast by southwest with a maximum excavated depth of 0.3m. The underlying natural (303) consisted of a compact light brownish grey silty clay with orange mottling and was mixed with frequent sub-angular and rounded cobbles as well as moderate earthfast boulders (Plate 09). It was covered by a soft mid greyish brown silt deposit (302) concentrated at the southwestern end of the trench and by the topsoil (301) a soft dark greyish brown clayey silt mixed with moderately frequent sub-rounded cobbles. The drystone wall (304) survives as a sparse line of sub-rounded boulders projecting through the turf. Excavation revealed a greater concentration of stones preserved below the surface, built on top of earthfast boulders and the underlying natural (Plate 10), with no wall cut being evident. The wall had an approximate width of 1.1m and surviving height of 0.3m. It was loosely built with no evident face within the trench. Aside from the wall no archaeological deposits or features were uncovered within Trench 3.

Trench 4 was located within Feature 5, an oval shaped paddock, on fairly level turfed ground that slopes gently to the north. The northwestern end of the trench crossed the remnants of the northern boundary of this paddock (Plate 11). The trench was set on a northwest southeast axis with a maximum excavated depth of 0.25m. The underlying natural (403) comprised of a malleable light greyish brown with orange mottling silty clay mixed with occasional sub-rounded small to medium sized cobbles (Plate 12). It was overlaid by a soft dark brownish grey very organic silt subsoil (402) mixed with the occasional sub-rounded cobble. This in turn was covered by the topsoil (401) turf growing into a firm pale brownish grey gritty sand that contained occasional sub-rounded small cobbles (Figure 06). It is a modern colluvial deposit associated with run off from the quarry works, with a depth of between 0.1m and 0.2m. The drystone wall (404) survives in comparatively good condition with an approximate width of 1.0m and height of 0.65m. It was built on top of earthfast stones and the underlying natural, with a definite face on the southeastern side of the wall (Plate 13) and probable tumble on the northwest side (Plate 14). The southern half of the trench was notably free from stone, most likely as a result of field clearance. Aside from the wall no archaeological deposits or features were uncovered within Trench 4.

Trench 5 was located within Feature 6, a paddock located to the immediate north of Feature 5, on marginal boggy wet ground with a moderate southwesterly slope (Plate 15). The trench was orientated east southeast by north northwest, with a maximum excavated depth of 0.33m. The underlying natural (503) consisted of a firm, malleable light greyish brown silty clay mixed with frequent sub-rounded cobbles and boulders. It was sealed beneath (502) a layer of soft, dark brownish grey peaty silt mixed with moderately frequent sub-rounded small to large cobbles. This in turn was covered by a layer of turf and reeds growing into a firm light greyish brown gritty sand (501) that contained frequent inclusions of fine sub-angular gravel. Like in the adjacent Trench 4, this deposit is most likely a modern colluvial associated with the workings of the quarry. The trench was positioned to assess the drystone wall (504), within the western terminal. Given the stoney, boulder strewn make-up of Trench 5, the possible remnants of the drystone wall was indistinguishable from the surrounding, naturally deposited earthfast boulders and stones (Plate 16). It is highly probable that a drystone wall is absent in this trench and that only naturally deposited stones were evident both within and without the trench.

Trench 6 was excavated on a northwest by southeast axis across a drystone wall that defined the southern edge of Feature 9 (Plate 17) a cleared area or possible paddock located on the northern fringe of PRN 5380. The remnant of this drystone wall extends east-west from the edge of Feature 5, denoting the northern edge of Features 3 and 4. The trench

had a maximum excavated depth of 0.3m into the underlying natural (603) a malleable light grey silty clay mixed with frequent sub-rounded stones (Plate 18). It was sealed beneath (602) a soft mid greyish brown silt clay deposit mixed with the occasional small sub-angular stone. This in turn was covered by the topsoil (601) a soft, cohesive dark brown peaty silt mixed with a tight mesh of plant roots (Figure 07). The wall (604) within the trench was largely covered by the turf and once it along with the tumble had been removed from the northwest face it was evident that it was set on top of layer (602) and had a distinct face (Plate 19). The southeast face of the wall is present but less evident due to the concentration of stone, some of which were earthfast and others possible tumble (Plate 20). The wall had an approximate width of 0.9m and surviving height of 0.32m. There was no evidence for a foundation cut for the wall and aside from the wall no further archaeological deposits or features were uncovered within Trench 6.

#### 4.2.2 Test Pits

In total 30 test pits were excavated across the designated areas, namely Features 2 to 6 and 9, to supplement the understanding of the site. On the whole the test pits reflected the same ground conditions encountered in the trial trenches. The paddocks of Features 2 and 3 had broadly similar soil conditions, with a soft dark greyish brown peaty silt topsoil; overlying a firm light greyish brown clayey silt natural (Plate 21). Features 4 and 9 were similar to these paddocks except there was a distinctive subsoil comprised of soft mid to dark greyish brown peaty silt mixed with moderately frequent gravel and occasional cobbles (Plate 22). While the test pits in Features 5 and 6 highlighted the presence of quarry silt as the topsoil consisted of light greyish brown silt mixed with very frequent fine gravel that covered a more organic layer of mid to dark brown peaty silty clay (Plate 23). The underlying natural remained broadly the same as elsewhere in the site, a light grey silty clay. For more detail on the results of the test pits see [Appendix VI](#).

Only one of the test pits, 18, encountered archaeological remains. Test pit 18 was located to the immediate north of (within 1.5m of the outer wall) Feature 7, a suspected prehistoric structure (Plate 24), in Feature 5 a probable paddock. At the base of the subsoil (1802) there was a small quantity of *“bloomery iron smelting slags”* that are *“typical of smelting (particularly of slightly manganese-rich bog iron ores) in a non-slag tapping furnace”* (Tim Young pers. com). The layer was sampled for further analysis by the designated specialist. There was no indication of in-situ burning on the underlying natural, which would suggest that the iron working did not take place at this location and that when the slag was deposited it was either cold or not sufficiently hot to scorch the silty clay.

### 4.3 Stage 2 Archaeological Evaluation

Further to the magnetometer survey conducted by Tigergeo, a second round of trial trenches and test pits were excavated to verify the survey results and to gain a better archaeological understanding of PRN 5380. Trench 7 targeted geophysical Features 3 and 4 that were described as possible wall footings or stony/peat filled structures. Trench 8 targeted a possible linear Feature 5, while trenches 9 and 10 focused on possible stony banks or wall footings; Features 6 and 9 respectively. The ground conditions revealed during the excavation of these trenches were identical to that of the earlier stage of investigation. The trial trenches confirmed that none of the identified geophysical features were archaeological in nature rather they were naturally deposited earthfast boulders, typical of the site and the surrounding area (Plates 25 & 26). For more detail on the results of the Stage 2 trial trenches refer to Appendix VI.

The additional five test pits targeted geophysical features that had archaeological potential, for example Feature 7 within a suspected prehistoric structure was described as a hearth associated with the nearby spread (Feature 8) that coincided with the iron smelting slag recovered from test pit 18 in Stage 1. They also investigated Features 10 and 11 to confirm whether or not they were of natural origin or archaeological in nature.

Test pit 31 was excavated in the location of Feature 8 but no slag was identified and there was no indication of burning or charcoal within the layers present (Plate 27). Test pit 32 successfully identified a probable cut [3204] and associated fill (3203) set within the underlying natural a compact orangey red silty clay, most likely oxidised through the intensity of heat from a fire. The cut [3204] was roughly oval in plan, measuring 0.42m east – west by 0.3m north – south, with a depth of 0.08m, with an abrupt break of slope at the top and base of the cut, with steep sides and a flat bottom (Figures 08). It was filled by (3203) a coarse fine dark brown sandy silty clay mixed with a small quantity of slag and infrequent flecks of charcoal (Plate 28). A sample was taken of (3203) for further analysis. Given the nature of the fill it is highly likely that rather than a domestic hearth that this was an area of iron smelting set within a rough shelter or a smithy. The remaining test pits, 33 to 35, confirmed that the identified geophysical features were natural in origin, with no archaeological deposits or structures being present.

#### **4.4 Soil Assessment Results of Sample 3203 (AOC Report No. 24318 – Appendix VIII)**

The sample taken of (3203) was sent to *AOC Archaeology Group* to be assessed by Jackaline Robertson. The aim of the assessment was to establish the composition of the slag to better determine the nature of the metal working present on the site, as well as, dating this activity through a combination of identifying the method of iron working and if viable extract suitable ecofact material to obtain a radiocarbon date.

A total of 2.7kg of magnetic residues were recovered from the soil sample taken from fill (3203) which was produced as the result of iron smelting using a bloomery furnace. The material contained large quantities of small granules of roasted magnetic ore, partially vitrified waste, and a single fragment of dense runned slag, all of which was probably sourced from bog ore. The absence of any furnace lining fragments, larger fragments of runned slag or rake out material and large quantities of fuel debris suggests that this deposit represents a deliberate dump of waste resulting from iron smithing. Based on morphology alone this ironworking waste cannot be closely dated as bloomery smelting technology was in use from the 7<sup>th</sup> century BC and continued until the 16<sup>th</sup> century AD.

The sample was also processed to retrieve and identify any carbonised macroplant material and charcoal. The material recovered was limited to a single charred buttercup fruit (*Ranunculus* sp) which is unsuitable for dating and five fragments of oak (*Quercus* sp) were identified within the small charcoal assemblage. The oak was most likely the remnants of fuel debris.

Dr. Derek Hamilton of Scottish Universities Environmental Research Centre (SUERC) was approached for advice to determine if the oak fragments were viable for radiocarbon dating. He advised that it was not worthwhile to do so due to the small quantity and as oak is a slow growing species it is not ideal because of its longevity, in particular, as on this occasion none of the material was identified as a twig or sapwood which would have been more advantageous.

## 4.5 Archaeological Survey of Extension Area

During Stage 2 of the archaeological evaluation, GAT also undertook an archaeological survey of an extension area located along the southwestern edge of Penrhyn Quarry. Welsh Slate intends to topsoil strip this area in advance of extending the quarry works before the bird breeding season. GAT conducted an initial walkover of the extension area, during which a number of potential archaeological features were identified. Further to correspondence with Welsh Slate and GAPS, a survey of these features was conducted as outlined in the approved WSI. In total 5 features were identified, recorded and surveyed (Figures 09 & 10), the details of which are outlined below.

### 4.5.1 Archaeological Survey Data

#### **Feature 1 (PRN 69368; Plate 29 - 30)**

**Site Name:** Trackway (Linear 01), Penrhyn Quarry, Bethesda

**Grid Reference:** SH6112563607

**Period:** Modern

**Category:** C

**Impact:** Partially removed

**Description:** Linear feature with bulbous end, 5.2m wide along most of its length and about 0.5m high. It is constructed of loose slate waste slabs that measure a maximum of 0.7m x 0.4m. The significance of the bulbous terminus is unclear however it is likely be associated with trackways leading to quarry core testing during the late 20<sup>th</sup> century. Located to the immediate north west of the bulbous terminus are the remnants of a small dry stone wall constructed of slate slabs that protrude out of the gorse. It appears to have been have been truncated by the construction of Linear 01. The wall is located outside of the proposed extension area by a distance of approximately 6m.

**Recommendations for further assessment:** None for Linear 01

**Recommendations for mitigatory measures:** Avoidance of slate drystone wall during extraction of topsoil and slate quarrying.

**Feature 2 (PRN 69369; Plate 31 - 34)**

**Site Name:** Trackway (Linear 02), Penrhyn Quarry, Bethesda

**Grid Reference:** SH611363535

**Period:** Modern

**Category:** C

**Impact:** Partially removed

**Description:** The northeastern face of Linear 02, exposed through recent quarry activity, revealed the make-up of the feature. It is constructed of fine slate waste, buttressed by larger slabs of slate at the sides. Linear 02 was 5.5m wide and 0.8m high. The make-up of the feature is similar to the adjacent current quarry haul road, which would strongly indicate that it is relatively modern in construction. The linear is orientated northeast – southwest and terminates at a 'T'-junction where it connects with a trackway. Like the other linears surveyed, Linear 02 was most likely constructed to lead to a quarry testing area, as indicated by the occasional bore core and was later re-used as a trackway, as vehicular ruts are still visible on its surface.

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** None

**Feature 3 (PRN 69370; Plate 35 - 37)**

**Site Name:** Trackway (Linear 03), Penrhyn Quarry, Bethesda

**Grid Reference:** SH6104263675

**Period:** Modern

**Category:** C

**Impact:** Partially removed

**Description:** This linear trackway had the same characteristics as Linear 01 and 02 but it is approximately 6.4m wide at the base and is 0.6m high. Linear 03 is constructed in an identical manner as Linear 02, except it has a bulbous terminal at the southwest end. The linear trackway is built on a steep northwest facing slope and has been banked into the slope to make it level. Approximately 28m southwest of the haul road, Linear 03 has been truncated at 108° angle by a field drainage channel, 0.65m wide orientated northeast by southwest. It is most likely associated with quarry test coring during the late 20<sup>th</sup> century.

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** None



**Feature 4 (PRN 69371; Plate 38 - 39)**

**Site Name:** Trackway (Linear 04), Penrhyn Quarry, Bethesda

**Grid Reference:** SH6101163766

**Period:** Modern

**Category:** C

**Impact:** Removed

**Description:** The characteristics of this linear is the same as the others noted above, consisting of a slate rubble trackway leading to a bulbous terminus. However this terminus bulbous end is more pronounced than the other linears' and the edging stones along the embankment are comparatively overgrown, suggesting that this possible core-testing linear may be a fraction earlier in date than Linears' 01 – 03.

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** None

**Feature 5 (PRN 69372; Plate 40)**

**Site Name:** Drystone wall, Penrhyn Quarry, Bethesda

**Grid Reference:** SH6098463805

**Period:** Post - Medieval

**Category:** C

**Impact:** Partially removed

**Description:** Drystone wall 1.64m high and 0.65m wide of rubble fieldstone block construction up to 0.5m x 0.3m, with vertical capping stones. The wall likely precedes the quarry's construction and is used to divide upland pasture. A section of the wall was demolished in November 2017 during the initial stages of the topsoil strip of the extension area (GAT Report 1410).

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** None



## **Summary**

Four slate linear features (1 - 4) were identified, constructed of quarry shale over the natural boulder clay and rock outcrops. The linears had been truncated by recent quarry work and the exposed northeast facing sections revealed their slate waste make-up. All of the linears had bulbous ends. Linear 02's trackway had later been adapted into a track road linked to another track road via a 'T'-junction. Plastic pipes indicative of the presence of boreholes were noted near their south-west terminus, indicating that the linears' are trackways leading to core testing borehole points. A drystone wall (05) to the north west of the linears appears to predate the quarry. It was constructed of rough fieldstone cobbles, given its 19<sup>th</sup> century appearance it pre-date's this particular part of the quarry, used to divide upland pasture. No earlier features were noted. The survey area lay under a thick bed of gorse and cobbles with safe access gained from the pre-existing quarry haul road.

## 5 CONCLUSIONS AND RECOMMENDATIONS

Gwynedd Archaeological Trust (GAT) was contracted by *Welsh Slate Limited* to undertake a staged programme of archaeological evaluation in advance of a planning application for a proposed quarry realignment and an archaeological survey of features identified within an extension area along the south western edge of the current quarry works.

The archaeological evaluation focused on the potential late prehistoric settlement PRN 5380, in particular the walls and interiors of the paddocks/enclosures of GAT Features 2 to 6 and 9, as well as the investigation of possible features identified by the Tigergeo magnetometer survey.

Stage 1 of the evaluation confirmed the presence of drystone walls in Trenches 1 to 5 that uniformly consisted of locally sourced stones, most likely from field clearance, which were built on top of and between earthfast boulders to form rather sinuous, wandering boundaries that loosely defined paddocks/enclosures. There was no evidence for foundation cuts or any sealed horizons and in the majority of cases the basal stones were set directly on top of earthfast boulders and/or the underlying natural clay. The one exception to this was wall [604] which was built on top of the subsoil layer (602). No artefacts or ecofacts were retrieved from the trenches that could be used to aid the dating of these drystone walls. Indeed, aside from the walls, there were no archaeological features or deposits found within the trenches. The majority of the test pits hand excavated in the settlement also did not produce archaeological material, the exception being test pit 18, where a small quantity of iron smelting slag was recovered.

The subsequent magnetometer survey undertaken by Tigergeo identified a series of potential archaeological features, some of which, such as Features 7 and 8, were associated with the iron slag retrieved from test pit 18. The trenches and test pits hand excavated at the location of these potential archaeological features revealed that the possible linear or structural features were actually geological in nature, typically being seams or concentrations of earthfast boulders. Test pit 31 was located immediately adjacent to test pit 18 but did not produce additional iron slag or material associated with it. Test pit 32 within the nearby circular structure identified a probable cut with a fill that included charcoal and slag and the underlying natural clay had been oxidised. Given the nature of the fill and the oxidised natural it is highly likely that this was an area of iron smelting set within a rough shelter or a smithy.

The presence of a probable dump of iron slag to the immediate north of the circular structure Feature 7, as well as, evidence for iron smelting within it has broad parallels with other excavated upland sites in north west Wales, at enclosed and unenclosed settlements. Enclosed upland settlements would include hillforts, such as Bryn y Castell, Ffestiniog that was excavated by Peter Crew. It is a small stone-walled fort occupied during the late first millennium BC to the first century AD, abandoned and then re-used non-defensively for iron working during the second and third centuries AD (Smith 2008, 5). Inside the north west entrance of the fort, there was a *“circular structure with a central hearth and four internal post holes, later re-built in an unusual snail-shape and used for refining and smithing of iron”* (Crew 2008, 1). To the immediate north of the hillfort, outside of the defensive wall, there was another small stone structure associated with iron smelting and smithing. Associated with the hut there was *“a 650kg dump of slag, with many examples of plano-convex smithing hearth bottoms.”* (Crew 2008, 1).

To the south of Bryn y Castell, there is a broadly contemporary unenclosed settlement at Crawcwellt, Ffestiniog. The upland settlement is comprised of a series of large enclosures that cover an area of four hectares, defined by low wandering walls. Successive seasons of excavation conducted by Peter Crew revealed that Crawcwellt had been an iron production site, with at least five stake-wall round houses associated with iron working, with a sequence of smelting furnaces positioned within these structures. Outside of each structure there was an associated dump of slag (Crew 1998, 22-36). It has been estimated that over 6,000kg of slag was produced at the site (Crew 2008, 1).

The *Research Framework for the Archaeology of Wales* was consulted to help to provide context for the late prehistoric activity identified on the site during the phased evaluation. The current iteration of the research agenda does not include an update for Late Bronze Age and Iron Age Wales (1500 BC to 43 AD) but key areas were identified in earlier stages. In previous iterations it was determined that the following points should be focused on for research: *“Building Chronologies was key, settlement evidence, Palaeobotanical evidence, Social change and social processes, climate change and the impact on resource utilisation were identified as important.”* (A Research Framework for the Archaeology of Wales 2016, Late Bronze Age and Iron Age Wales, 2).

Based on what was outlined by the Research Framework and the need to better understand the site in advance of the client submitting planning application for a proposed quarry realignment, the sample retrieved from (3202) was sent to AOC for specialist assessment. While this determined that the slag was the result of ironworking from a bloomery furnace, it was most likely a dump of material similar to that identified in test pit 18, rather than the

location of said furnace. Given the nature of the material it was not possible to provide a concise date for it based on examination of the morphology alone. In addition, the limited charcoal recovered from the sample belonged to oak (*Quercus* sp), which is not viable for radiocarbon dating. As such, while the specialist assessment has provided more information about the type of iron smelting that took place on site, on this occasion it cannot produce a concise date for this activity and by association the settlement.

An archaeological survey of potential archaeological features identified in the adjacent extension area coincided with the evaluation work. The survey identified and recorded five features, of which four were linear trackways constructed of quarry slate waste to allow access for core testing to assess slate reserves that was conducted in the 1980s. The fifth identified feature is a 19<sup>th</sup> century drystone wall used to divide upland pasture. No further action is required now that the features have been documented and surveyed.

## 6 SOURCES CONSULTED

1. Brunning, R and Watson, J 2010, *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood* (3<sup>rd</sup> edition);
2. Chartered Institute for Archaeologists, 2014, *Standard and Guidance for Archaeological Excavation*;
3. Chartered Institute for Archaeologists, 2014, *Standard and guidance for the collection, documentation, conservation and research of archaeological materials*;
4. Crew P. 1998, *Excavations at Crawcwellt West, Merioneth, 1990-1998: A late prehistoric iron-working settlement*, Archaeology in Wales, Volume 38, 22-36;
5. Crew P. 2008, *Bryn Y Castell, Ffestiniog, Meirionnydd – An Excavated Hillfort Producing Iron* in Smith, G. H., *Iron Age Settlements in Wales: CADW Defended Enclosures Publication, Hillforts and Hut Groups in North-West Wales*, GAT unpub report #721;
6. English Heritage, 1991, *Management of Archaeological Projects (MAP2)*;
7. Gwynedd Archaeological Trust 2009 *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Archaeological Assessment*, GAT unpub report #837;
8. Gwynedd Archaeological Trust 2010a *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Archaeological Survey*, GAT unpub report #880;
9. Gwynedd Archaeological Trust 2010b *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Archaeological Evaluation*, GAT unpub report #899;
10. Gwynedd Archaeological Trust 2012 *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Excavation of suspected Bronze Age Cairn (Feature 15)*, GAT unpub report #1105;
11. Gwynedd Archaeological Trust 2013 *Proposed Quarry Realigning Project, Penrhyn Quarry, Bethesda Archaeological Watching Brief: Phase 1A - Interim Report*;

12. Gwynedd Archaeological Trust 2014 *Proposed Quarry Realingment Project, Penrhyn Quarry, Bethesda Archaeological Watching Brief Interim Report #1266*;
13. Gwynedd Archaeological Trust 2015 *Proposed Quarry Realingment Project, Penrhyn Quarry, Bethesda Archaeological Evaluation (Feature 12) Report #1238*;
14. Gwynedd Archaeological Trust 2017 *Penrhyn Quarry, Bethesda: Soil Strip, Archaeological Watching Brief Report #1410*;
15. Gwynedd Archaeological Trust, 2014, *Historic Environment Record (HER) Guidelines for Archaeological Contractors* (Version 1.3; draft);
16. Historic England, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*;
17. Research Framework for the Archaeology of Wales 2016, *Late Bronze Age and Iron Age Wales*;
18. Smith, G. H., 2008, *Iron Age Settlements in Wales: CADW Defended Enclosures Publication, Hillforts and Hut Groups in North-West Wales, GAT unpub report #721*.

## **FIGURE 01**

**Proposed Quarry Realignment Zone with Location of Evaluation Trenches & Test Pits and Geophysical Features.**

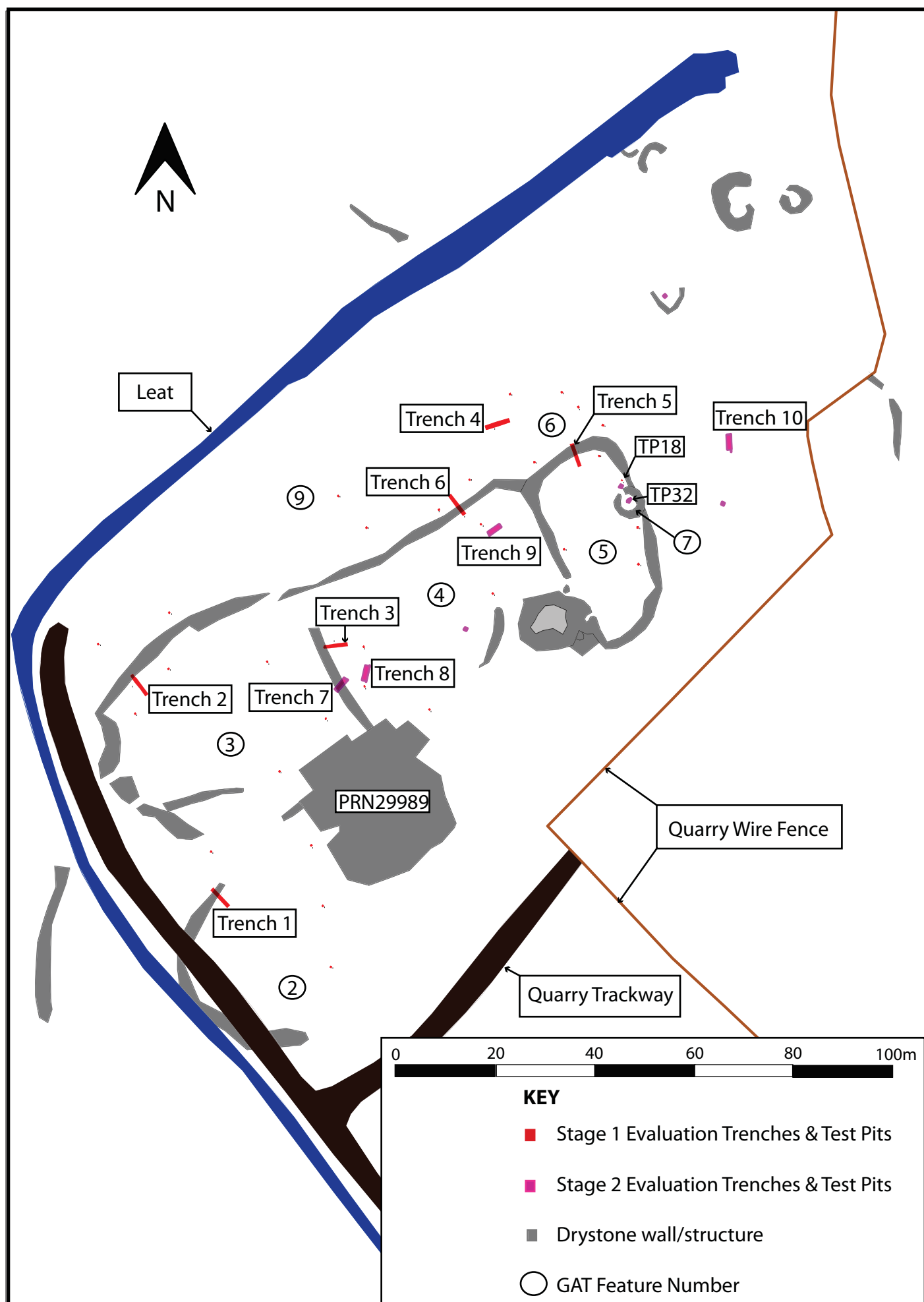


Figure 01: Proposed Quarry Realignment Zone with location of Evaluation Trenches & Test Pits. Scale 1:1000 @ A4



## **FIGURE 02**

**Extension Area of Penrhyn Quarry and location of archaeological features**

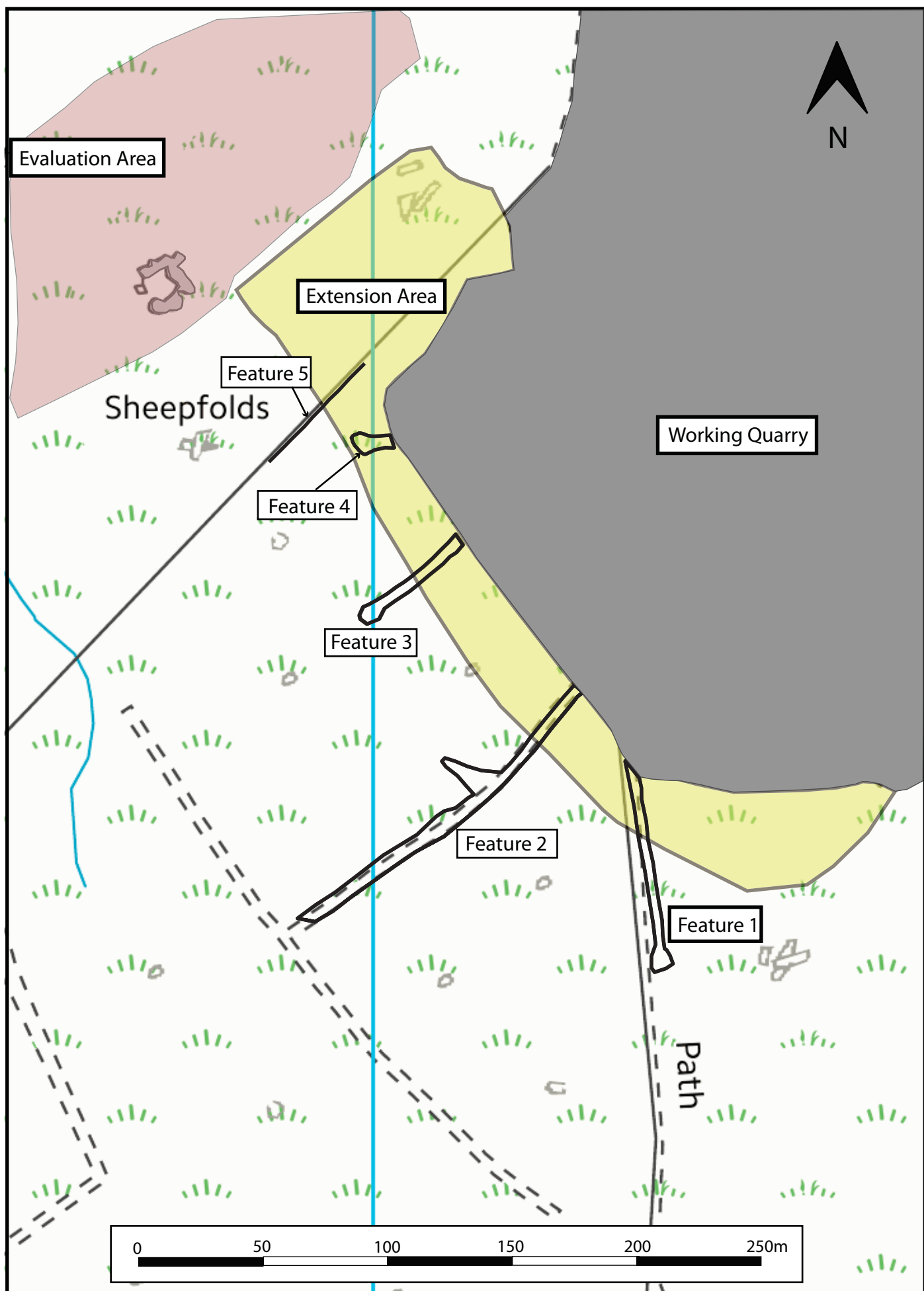


Figure 02: Extension Area of Penrhyn Quarry and location of archaeological features.  
Scale 1:2500 @ A4.

## **FIGURE 03**

**Quarry Realignment Zone and Archaeological Features (reproduced from GAT Report 1397)**

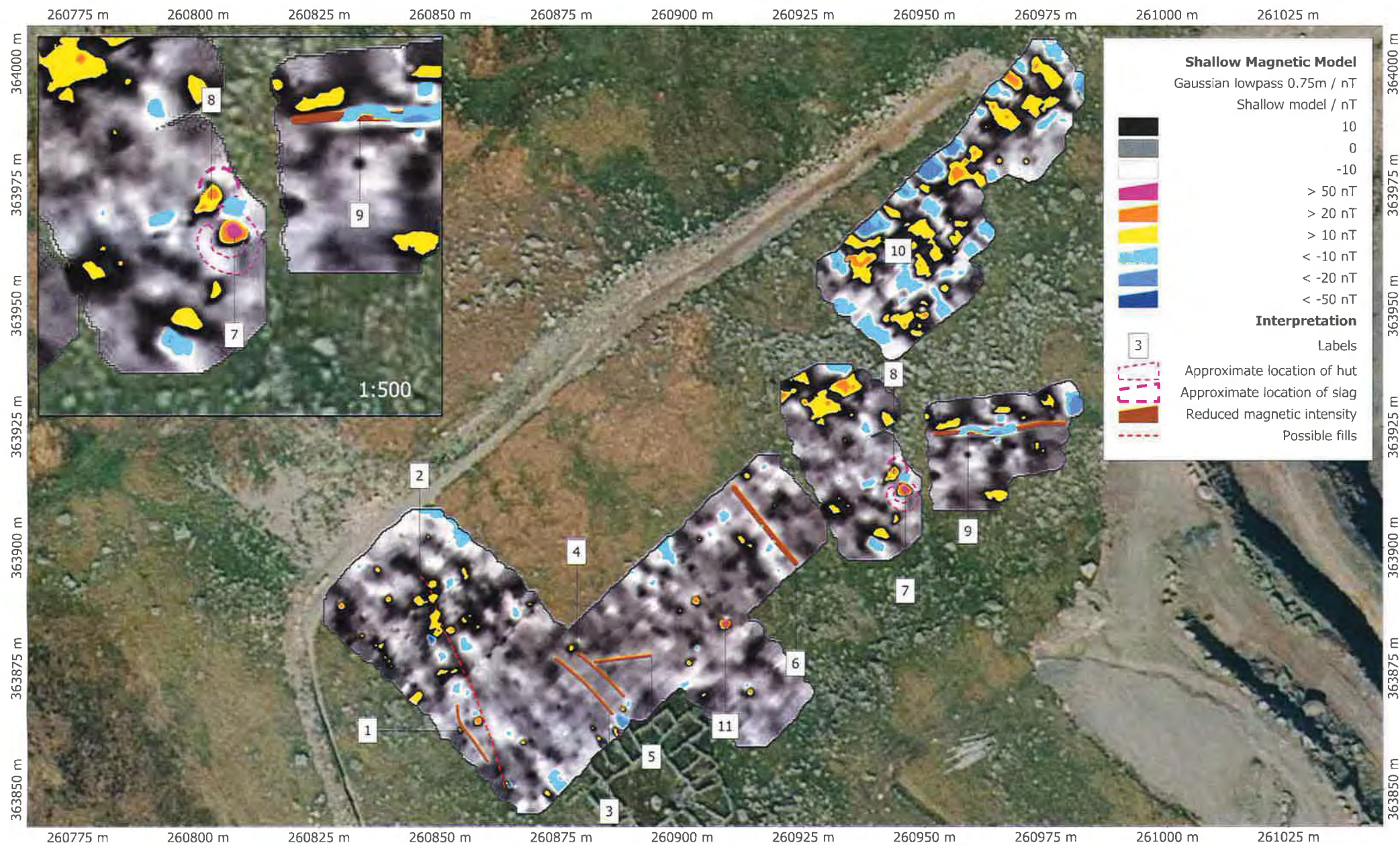


Figure 02 - Quarry Realignment Zone and Archaeological Features (reproduced from GAT Report 1397)

## **FIGURE 04**

**Reproduction of Tigergeo DWG04 depicting Archaeological Features.**





## PQG171 Penrhyn Quarry, Gwynedd, Wales

### DWG 04 Interpretation

Orthographic Scale: 1:1000 @ A4 Spatial Units: Meter. Do not scale off this drawing  
File: PQG171.map Copyright TigerGeo Limited 2017



## **FIGURE 05**

**North east facing section and plan of Trench 1**

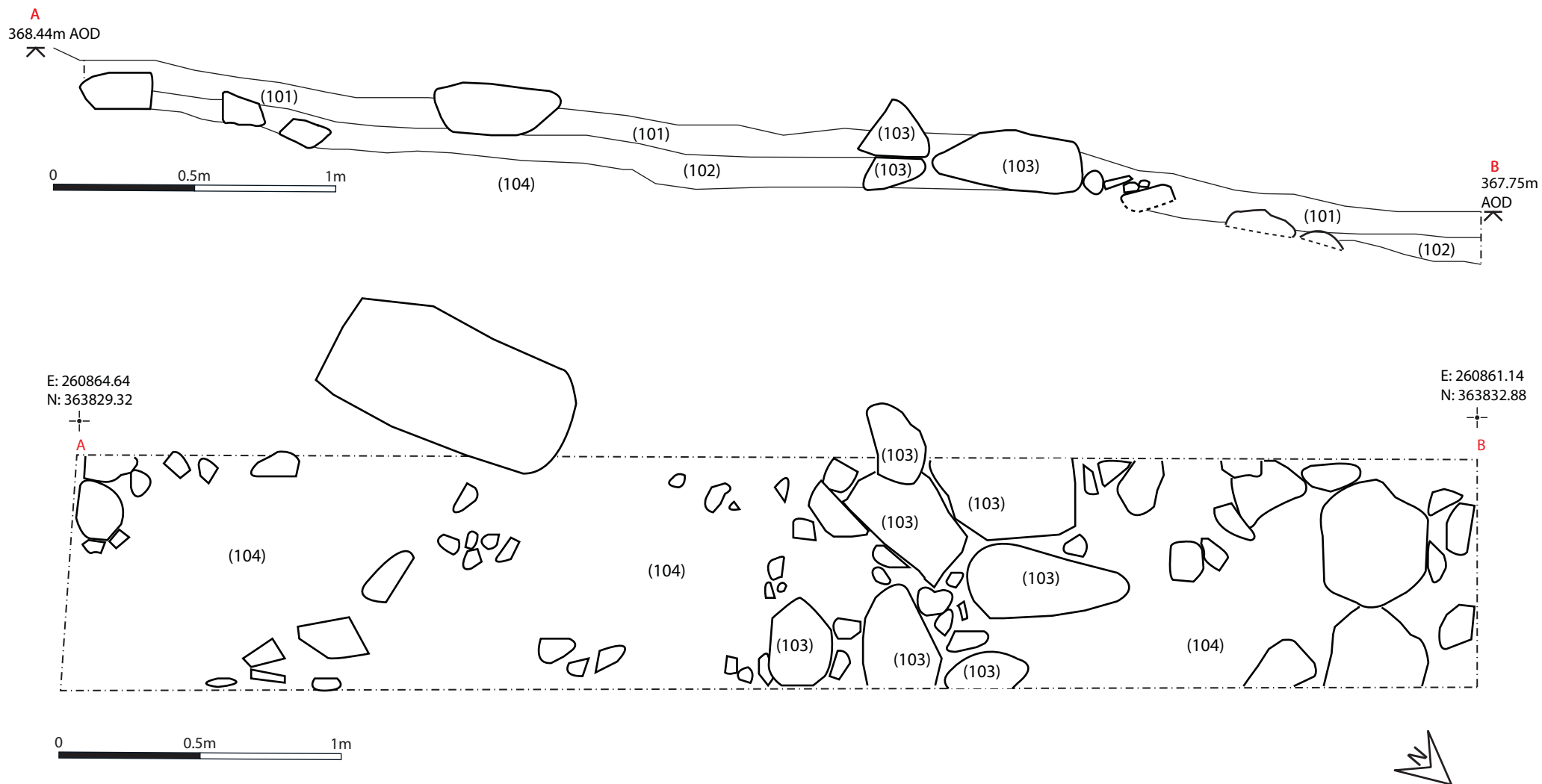


Figure 05: North east facing section and plan of Trench 1.



## **FIGURE 06**

**North east facing section and plan of Trench 4.**

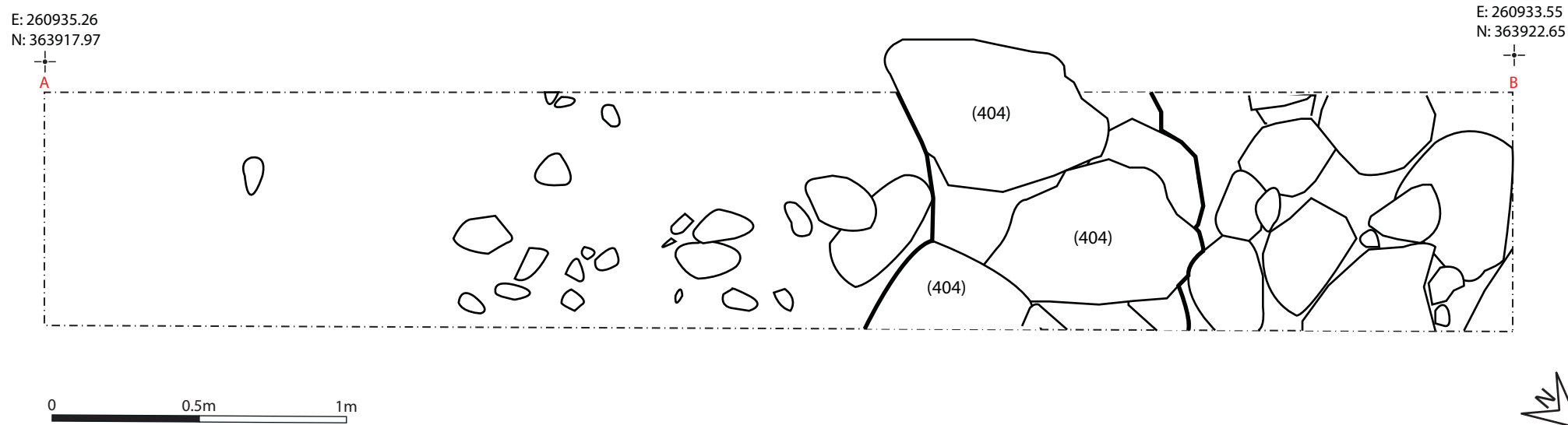
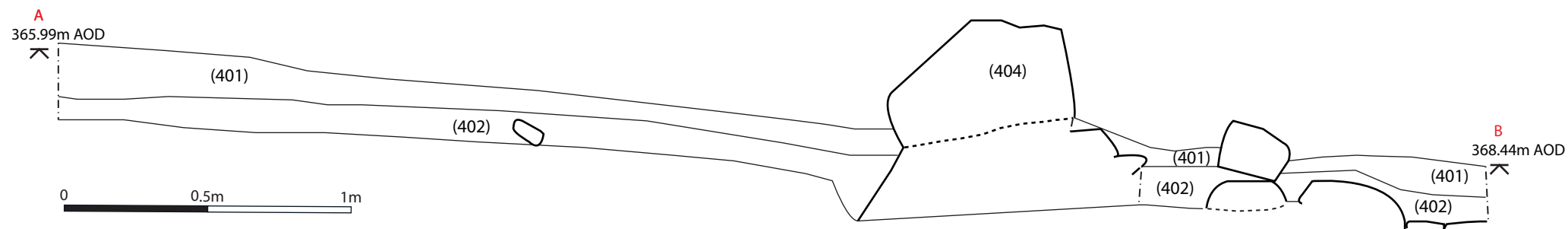


Figure 06: North east facing section and plan of Trench 4.

## **FIGURE 07**

**South west facing section, plan of Trench 6 and north west facing section of wall (604).**

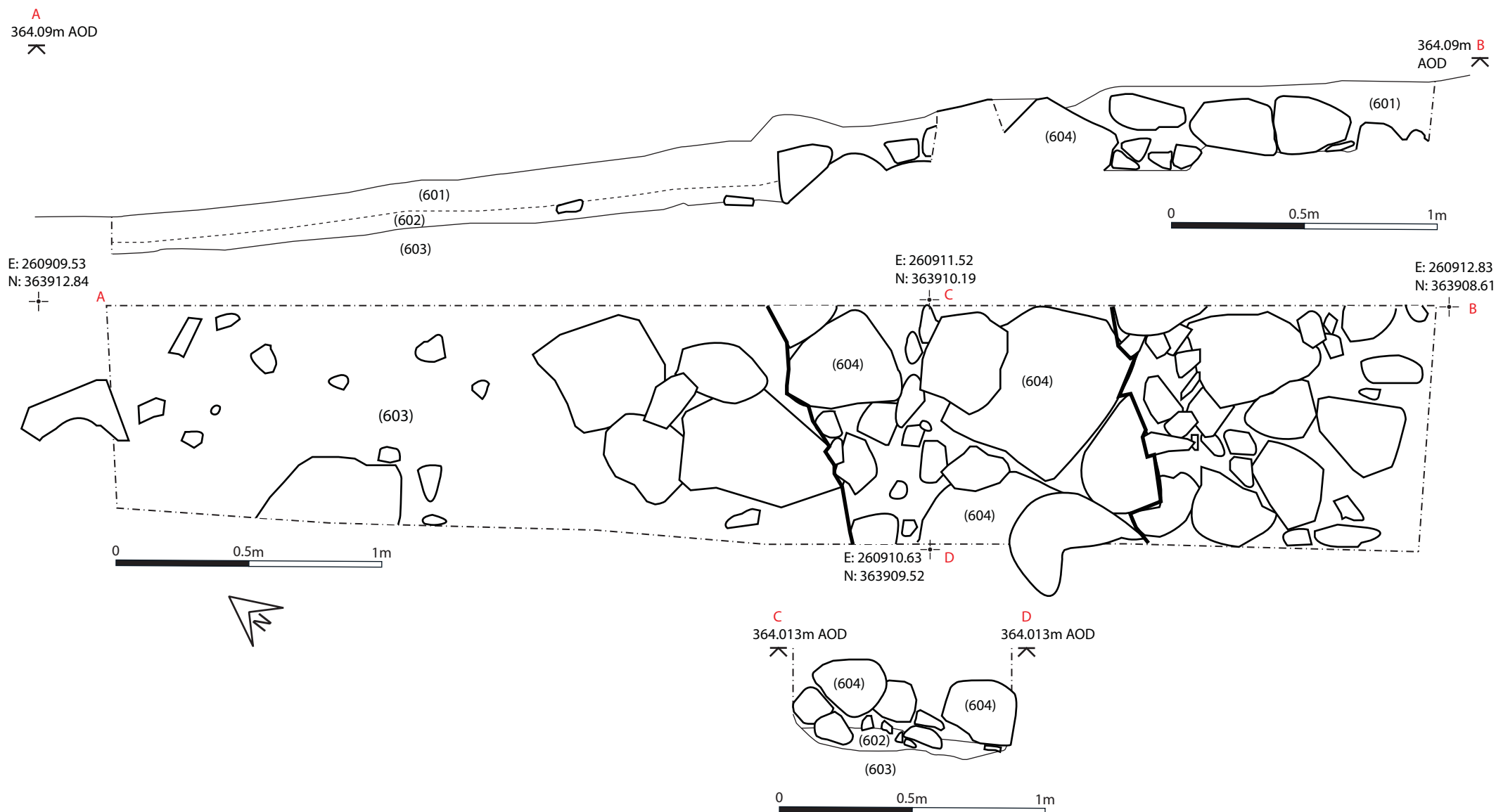


Figure 07: South west facing section, plan of Trench 6 and north west facing section of wall (604).

## **FIGURE 08**

**East facing section and plan of Test Pit 32.**

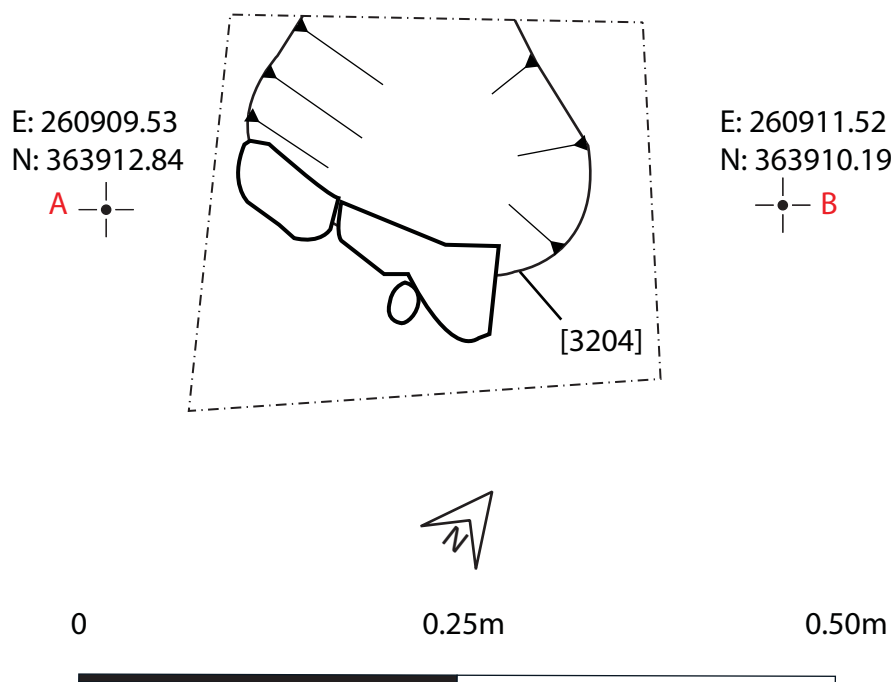
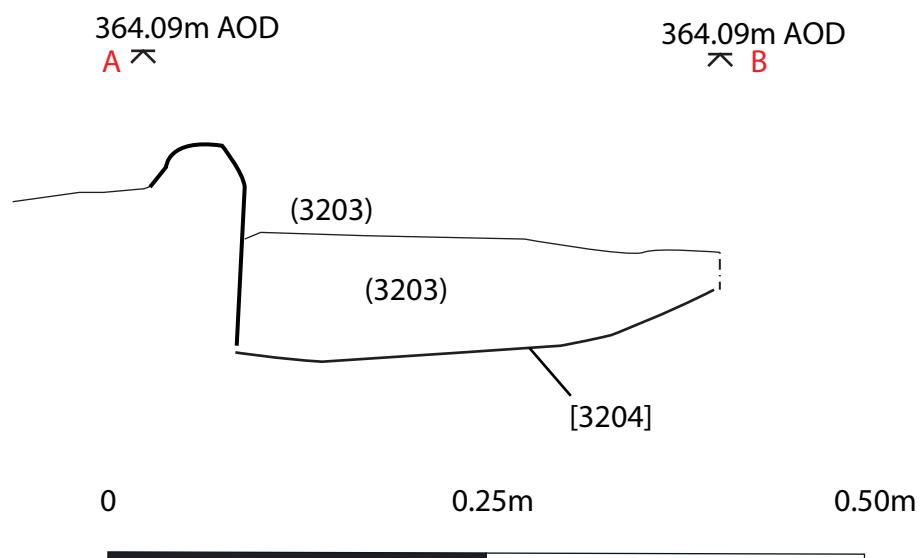


Figure 08: East facing section and plan of Test Pit 32.

## **FIGURE 09**

**Survey plan of Features 3 - 5 (PRNs 69370-2) within Quarry Extension Area**

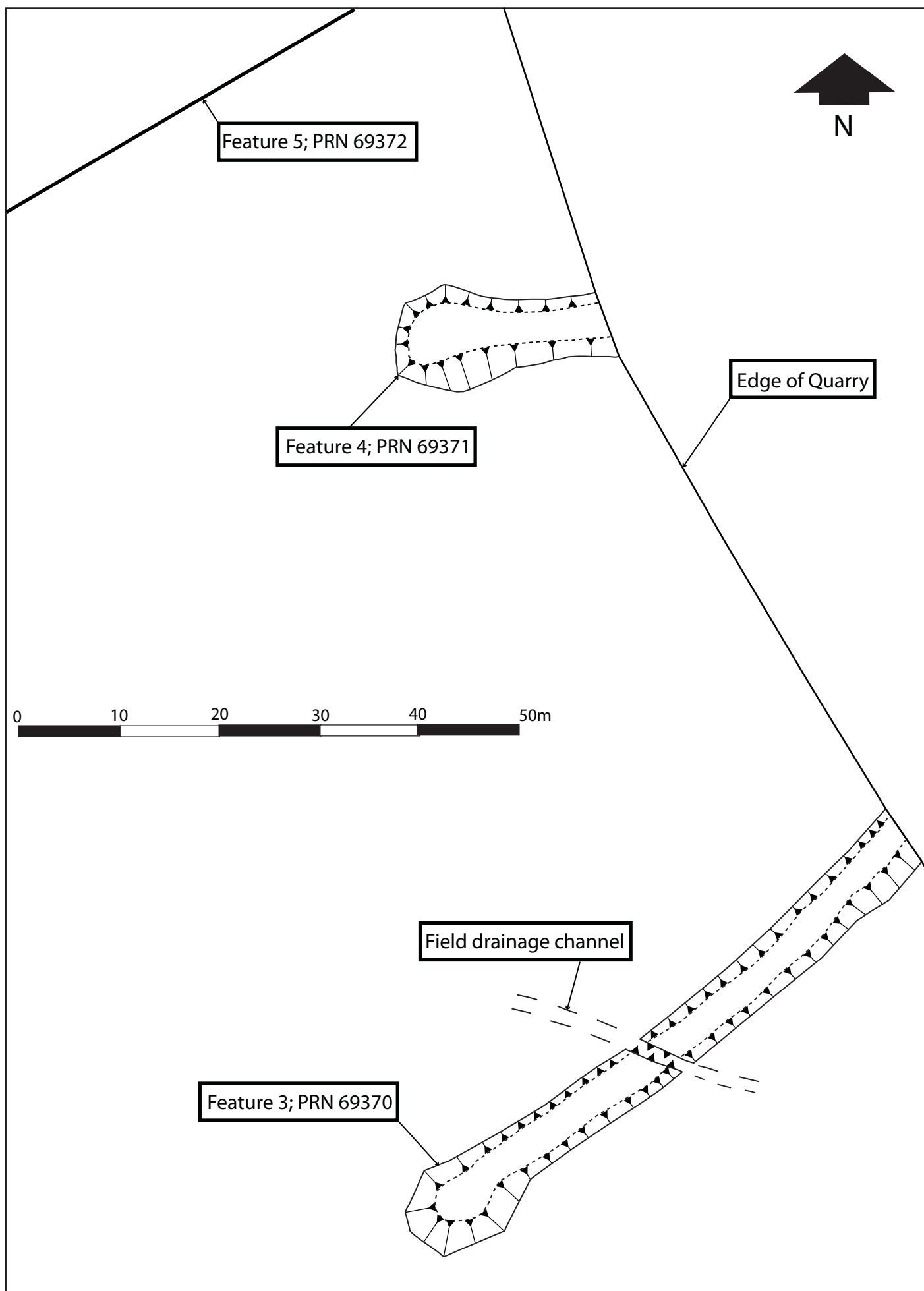


Figure 09: Survey plan of Features 3 - 5 (PRNs 69370-2) within Quarry Extension Area.  
Scale 1:500 @ A4.



## **FIGURE 10**

**Survey plan of Features 1 & 2 (PRNs PRN 69368-9) within Quarry Extension Area**

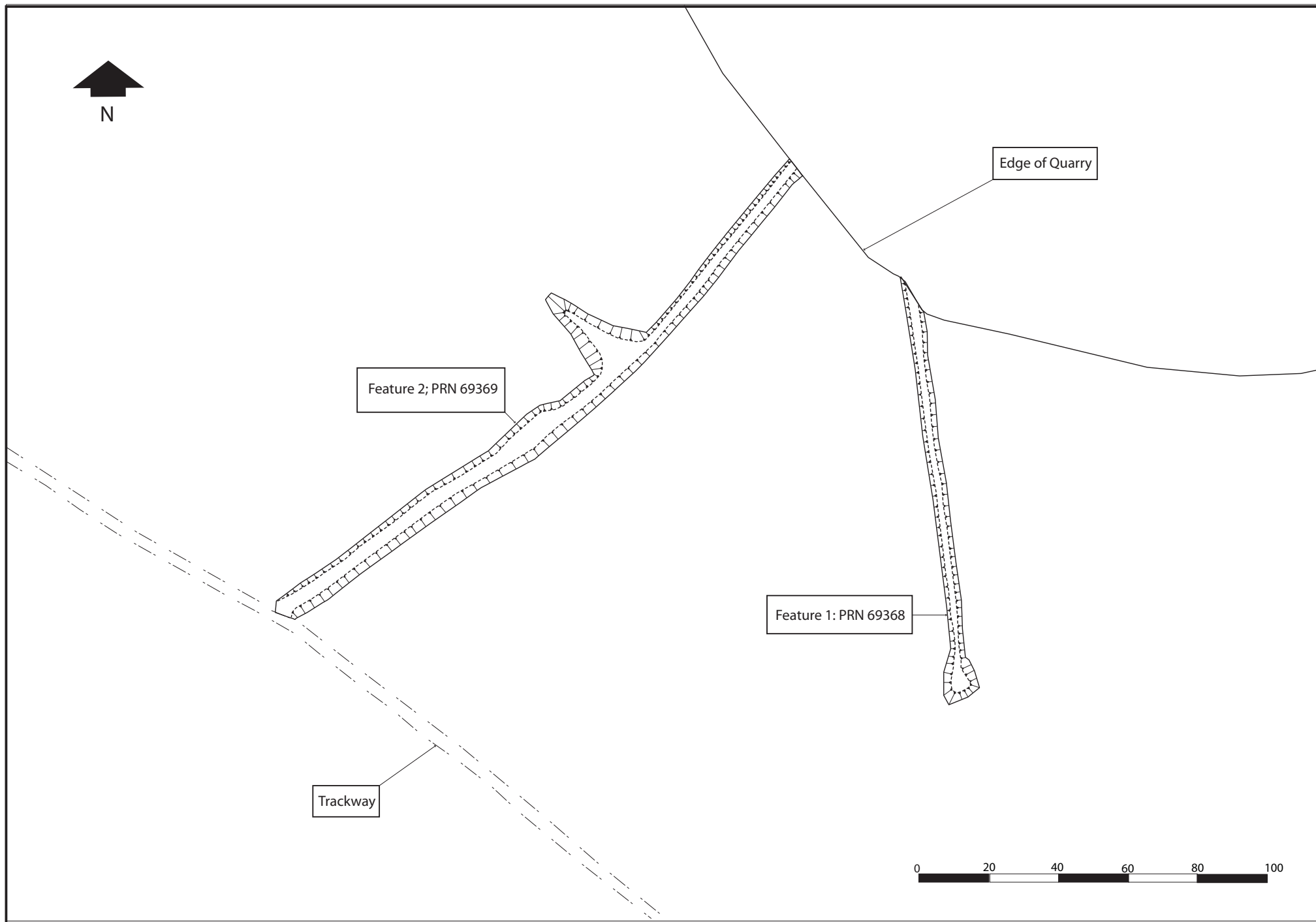


Figure 10: Survey plan of Features 1 & 2 (PRNs 69368 & 69369) affected by Quarry Extension Area. Scale 1:1000 @ A4.



Plate 1: Pre-Ex shot of Trench 01; scale: 2x1m (archive reference: G2534\_060).



Plate 2: New access road located along SW edge of site; scale: 1m (archive reference: G2534\_007).





Plate 3: Oblique view of NE facing section of Trench 01; scale: 2x1m (archive reference: G2534\_080).



Plate 4: Wall [103] within Trench 01; scale: 2x1m (archive reference: G2534\_078).





Plate 5: Pre-Ex location shot of Trench 02; scale: 2x1m (archive reference: G2534\_052).



Plate 6: Pre-Ex view of the SE elevation of Paddock 3 wall; scale: 1x1m (archive reference: G2534\_053).





Plate 7: Post-Ex view of Paddock 3 wall; scale: 1x1m (archive reference: G2534\_056).



Plate 8: Post-Ex shot of Trench 03 - location; scale: 2x1m (archive reference: G2534\_013).





Plate 9: Post-Ex shot of Trench 03; scale: 2x1m (archive reference: G2534\_012).



Plate 10: Post-Ex shot of Trench 03 - close up of wall [304]; scale: 1x1m (archive reference: G2534\_014).





Plate 11: Post-Ex shot of Trench 04; scale: 2x1m (archive reference: G2534\_042).



Plate 12: Post-Ex shot of Trench 04; scale: 2x1m (archive reference: G2534\_043).





Plate 13: Close up of wall [404] - SE face; scale: 1x1m (archive reference: G2534\_045).



Plate 14: SW facing section of Trench 04 - NW end; scale: 1x1m (archive reference: G2534\_050).





Plate 15: NNE facing section of Trench 05; scale: 1x1m (archive reference: G2534\_035).



Plate 16: Post-Ex shot of Trench 05; scale: 2x1m (archive reference: G2534\_033).





Plate 17: Pre-Ex shot of Trench 06; scale: 2x1m (archive reference: G2534\_019).



Plate 18: Trench 06 excavated; scale: 1x1m (archive reference: G2534\_025).





Plate 19: NW face of [6004]; scale: 1x1m (archive reference: G2534\_039).



Plate 20: Detail of wall in Trench 06; scale: 1x1m (archive reference: G2534\_024).





Plate 21: Post-Ex shot of Test Pit 05; scale: 1x0.2m (archive reference: G2534\_070).



Plate 22: Post-Ex shot of Test Pit 13; scale: 1x0.2m (archive reference: G2534\_105).





Plate 23: Post-Ex shot of Test Pit 19; scale: 1x0.2m (archive reference: G2534\_112).



Plate 24: Post-Ex shot of Test Pit 18 - location shot; scale: 1x1m (archive reference: G2534\_097).





Plate 25: Post-Ex of Trench 08; scale: 2x1m (archive reference: G2534\_194).



Plate 26: Post-Ex of Trench 10; scale: 2x1m (archive reference: G2534\_204).





Plate 27: Post-Ex shot of Test Pit 31; scale: 1x1m (archive reference: G2534\_159).

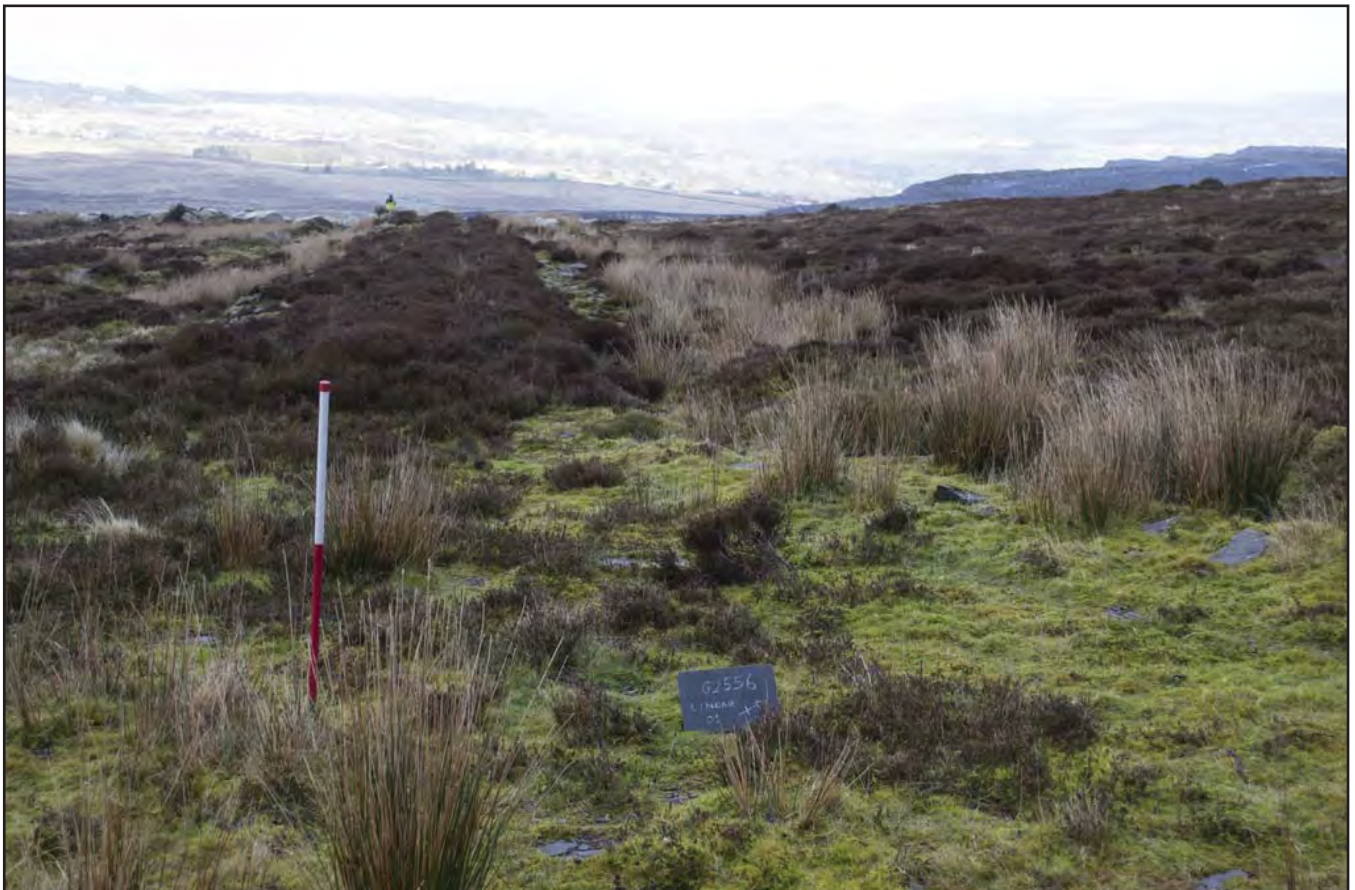


Plate 28: East facing section of Test Pit 32, [3204]+(3203); scale: 1x0.3m (archive reference: G2534\_176).





**Plate 29: View of Linear 01 from the trackway end; scale: 1x1m (archive reference: G2556\_003).**



**Plate 30: View of Linear 01 from the SE bulbous terminus; scale: 1x1m (archive reference: G2556\_001).**





Plate 31: Track road along Linear 02 with view of core testing terminus angled to the right in the background; scale: 1x1m (archive reference: G2556\_009).



Plate 32: View of slate slab rubble stone bank of Linear 02 ; scale: 1x1m (archive reference: G2556\_010).





Plate 33: View of section of Linear 02 trackway cut by the haul road; scale: 2x1m (archive reference: G2556\_008).



Plate 34: Linear 02 trackway taken from SW end T-junction, view of core testing terminus in the background on the left (indicated by white pipe) ; scale: 1x1m (archive reference: G2556\_011).





Plate 35: View of Linear 03 as seen from the haul road; scale: 1x1m (archive reference: G2556\_013).



Plate 36: Linear 03 bulbous terminus at SW end, with view of slate slab embankment; scale: 1x1m (archive reference: G2556\_015).





Plate 37: Field drainage channel cut through Linear 03 ; scale: 1x1m (archive reference: G2556\_016).



Plate 38: View of slate slab embankment of Linear 04; scale: 1x1m (archive reference: G2556\_019).





Plate 39: View of Linear 04 bulbous terminus, taken from the SW; scale: 1x1m (archive reference: G2556\_018).



Plate 40: View of drystone wall (Feature 05) from the NE; scale: 1x1m (archive reference: G2556\_022).

## **APPENDIX I**

**Reproduction of approved Gwynedd Archaeological Trust WSI**

QUARRY REALIGNMENT PROJECT, PENRHYN  
QUARRY, BETHESDA  
(G2534)

WRITTEN SCHEME OF INVESTIGATION FOR  
ARCHAEOLOGICAL EVALUATION: STAGE 2



*Prepared for*

*Welsh Slate Limited*

***January 2018***

Ymddiriedolaeth Archaeolegol Gwynedd  
Gwynedd Archaeological Trust



Approvals Table				
	Role	Printed Name	Signature	Date
Originated by	Document Author	STUART REILLY	Stuart Reilly	08/01/18
Reviewed by	Document Reviewer	JOHN ROBERTS		08/01/18
Approved by	Principal Archaeologist	JOHN ROBERTS		08/01/18

Revision History			
Rev No.	Summary of Changes	Ref Section	Purpose of Issue
01	Removed reproduction of Tigergeo Report as an appendix	Appendix I	For 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

# QUARRY REALIGNMENT PROJECT, BETHESDA, GWYNEDD

## WRITTEN SCHEME OF INVESTIGATION ARCHAEOLOGICAL EVALUATION: STAGE 2 (G2534)

Prepared for *Welsh Slate Limited*, January 2018

### CONTENTS

1	INTRODUCTION .....	6
1.1	Aims and Objectives .....	7
2	ARCHAEOLOGICAL BACKGROUND .....	8
3	METHOD STATEMENT .....	10
3.1	Fieldwork Methodology .....	10
3.2	Ecofacts .....	12
3.3	Human Remains .....	13
3.4	Artefacts .....	14
3.5	Monitoring Arrangements .....	16
3.6	Fieldwork Archiving .....	17
3.7	Processing Data, Illustration, Report and Archiving .....	18
4	DISSEMINATION AND ARCHIVING .....	19
5	PERSONNEL .....	20
6	HEALTH AND SAFETY .....	21
7	INSURANCE .....	22
	Public Liability .....	22
	Employers Liability .....	22
	Professional Indemnity .....	22
8	SOURCES CONSULTED .....	23
	FIGURE 01 .....	25
	Proposed Quarry Realignment Zone and Location of Targeted Features. ....	25
	FIGURE 02 .....	26
	Quarry Realignment Zone and Archaeological Features .....	26
	APPENDIX I .....	27
	Gwynedd Archaeological Trust photographic metadata pro-form .....	
	APPENDIX II .....	28
	Gwynedd Archaeological Trust context record pro-forma .....	
	APPENDIX III .....	29

## Gwynedd Archaeological Trust context trench record pro-forma

# 1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by *Welsh Slate Limited* to provide a written scheme of investigation to undertake a programme of archaeological evaluation to confirm the results of a recent geophysical survey in advance of a planning application for a proposed quarry realignment project at Penrhyn Quarry, Bethesda. The proposed realignment comprises a c.6.4ha extension to the existing Penrhyn Quarry incorporating an area of upland to the south west of the current workings (centred on NGR SH61146396). GAT has previously undertaken a staged programme of archaeological assessment, evaluation and mitigation at the location of the proposed realignment zone (GAT reports 837, 880, 899, 1105, 1131, 1266, 1238 and 1410).

This written scheme of investigation encompasses Tigergeo features 3, 4 and 6 to 11 as indicated on Figure 01. Features 3, 4, 6 and 9 may represent structures in the form of a stony bank or wall footing, while the remaining features to be investigated include a possible hearth (feature 7), an associated spread (feature 8) and to determine if strong background variation (feature 10) is of natural origin. The features are located within the remains of a probable late prehistoric settlement (PRN 5380).

The evaluation will be monitored by the Gwynedd Archaeological Planning Services (GAPS) who are advising the Gwynedd Mineral Planning Authority (MPA) and Andrew Josephs Associates, who are advising Welsh Slate Limited. It has been agreed with GAPS that up to 4No. 3 x 0.80m evaluation trenches and 5No. 0.50m x 0.50m evaluation pits will be hand dug. The trenches will target the possible structural features (Nos 3, 4, 6 and 9) while the pits will focus on the remaining feature types identified during the geophysical survey. The evaluation and subsequent report(s) will aim to determine the archaeological nature of these features as well as assess the age and significance of the suggested prehistoric settlement and provide sufficient information to allow discussions to be held with the MPA and Cadw regarding the planning application and appropriate mitigation that could include preservation *in situ* and/or archaeological excavation.

All work will be planned, managed and undertaken by GAT in accordance with the following standards and guidance:

- *Standard and Guidance for Archaeological Field Evaluation* (Chartered Institute for Archaeologists, 2014);

- *Standard and guidance for the collection, documentation, conservation and research of archaeological materials* (Chartered Institute for Archaeologists, 2014);
- *Management of Archaeological Projects* (English Heritage, 1991);
- *Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide* (Historic England, 2015);
- *Historic Environment Record (HER) Guidelines for Archaeological Contractors* (Version 1.3; draft) (Gwynedd Archaeological Trust, 2014); and
- *Guidelines for digital archives* (Royal Commission on Ancient and Historic Monuments of Wales, 2015).

The evaluation is scheduled to be undertaken in late January/early February 2018.

Gwynedd Archaeological Trust is certified to ISO 9001:2008 and ISO 14001:2004 (Cert. No. 74180/A/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

## **1.1 Aims and Objectives**

The key aims and objectives are to:

- establish the extent to which archaeological remains survive at the site;
- establish the date and nature of archaeological remains at the site and assess their implications for understanding the historical development of the area; and
- establish the depth of archaeological remains and the quality, value and level of preservation of any deposits.

## 2 ARCHAEOLOGICAL BACKGROUND

Penrhyn Quarry lies within the Dyffryn Ogwen Landscape of Outstanding Historic Interest: 28 (CCW, Cadw, ICOMOS 1998) and forms one of the most important elements of this landscape. Penrhyn Quarry was formalised during the 18<sup>th</sup> century when Richard Pennant acquired a number of small local workings but slate is thought to have been extracted in this area as early as the 13<sup>th</sup> century. Infrastructure including railways, quarrymen's cottages and a quay at Porth Penrhyn were constructed at the end of the 18<sup>th</sup> and start of the 19<sup>th</sup> centuries. The quarry dominated both the slate industry and the surrounding landscape throughout the 19<sup>th</sup> century. Today the quarry continues to be run as a commercial venture and markets a variety of slate products.

As well as the extensive industrial archaeological remains that exist within the locality, mainly associated with the extraction of slate, the uplands around Bethesda and Nant Ffrancon contain extensive and very well-preserved relict remains of prehistoric and later land use.

An archaeological assessment of the proposed realignment zone was undertaken by GAT in November 2009 (GAT report 837). The assessment identified a number of sites, the majority relating to a late prehistoric settlement (PRN 5380) and a post-medieval multi-cellular sheepfold (PRN 29,989). In order to better identify the significance of the archaeological remains and identify appropriate mitigation an archaeological survey and a phase of field evaluation was undertaken (GAT reports 880 and 899) in July and September 2010 respectively (Figure 02).

The programme of field evaluation examined four sites identified during the desk based assessment and archaeological survey. These included a cleared terraced area (Feature 20), a suspected prehistoric structure (Feature 16), a possible burial cairn (Feature 15), and a possible ruined hut circle with sheepfold rebuild (Feature 14). The results of the evaluation proved the suspected prehistoric structure as being of natural origin. Furthermore, it showed that there was no evidence that the sheepfold utilised an earlier hut circle and nor that there were any associated buried remains present on the cleared terrace area. It did however show that a relatively complex level of archaeology was revealed at the possible burial cairn site (Feature 15), and the evaluation indicated the presence of archaeological remains and archaeological excavation of the entire feature was recommended as appropriate mitigation prior to the extension works.

The excavation was completed in December 2012 (GAT report 1105), and revealed a roughly rectangular stone structure, measuring approximately 7m by 5m, and aligned east west. The date and function of this structure was uncertain. However, given its shape and size, it was most likely the remains of a post-medieval peat and/ or hay drying platform. The report recommended an archaeological watching brief as appropriate mitigation during the extension works.

Two watching briefs were completed in areas to the northeast and southeast of Feature 12 in 2013 (GAT report 1131) and 2014 (GAT report 1266) respectively. The watching briefs confirmed that the natural topography of the site was fairly close to the surface, lying on average only 0.2m below ground level and consisting of a light orange sandy clay. A large number of natural sub-angular stones and boulders were located throughout the site, with only a few small patches being relatively stone free. No archaeological features or deposits were uncovered during either of the watching briefs.

A programme of detailed recording and targeted trenching was complete across Feature 12 in 2015 (GAT report 1238). Feature 12 (trackway) was surveyed and photographed prior to the excavation of a trial trench towards its southern end. No evidence of any surface was uncovered, and it is likely that the trackway was created by the removal of stones along its length, and that the depth was due to the general use of the trackway. No finds were uncovered during the excavation, and therefore a date for the trackway is uncertain. However, given the close proximity to the possible medieval Hafod (Feature 13) it is likely to be of a comparable date. Two further features (Feature 10 and 17) were fenced off so as to be avoided during the realignment works.

The most recent archaeological evaluation conducted by GAT took place in September 2017. It involved the hand excavation of six trial trenches and 30 test pits that encompassed GAT features 2 to 6 and 9, a series of enclosures and paddocks (Figure 02). This was supplemented by a magnetometer survey and magnetic susceptibility survey conducted of the site by Tigergeo during the autumn of 2017. The results of the survey indicated several potential archaeological features and activity associated with iron smelting.



### 3 METHOD STATEMENT

#### 3.1 Fieldwork Methodology

- A total of 4No. 3 x 0.80m evaluation trenches and 5No. 0.50m x 0.50m test pits will be hand dug. The trenches will target the possible structural features (Nos 3, 4, 6 and 9) while the pits will focus on the remaining feature types identified during the geophysical survey. The proposed locations of the trial trenches and test pits are shown on Figure 01.
- All attendances, subsurface activity, contexts records, registers of artefacts and ecofacts will be recorded using GAT pro-formas ([Appendix I](#); [Appendix II](#); [Appendix III](#));
- A record will be made on GAT pro-formas of the topsoil and subsoil depths, as well as the composition of the glacial horizon. All encountered subsurface features will be recorded on GAT pro-formas with detailed notations and will be recorded photographically with an appropriate scale, located via GPS and a measured survey completed, either hand drawn or using a Trimble R8 GPS unit;
- Photographic ID boards will be used throughout and include information on project code, trench or test pit number, context number or numbers and orientation of image;
- Photographic images will be taken using a digital SLR camera (Nikon D40) set to maximum resolution (3008 x 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 I](#)) and digitised in Microsoft Access as part of the fieldwork archive and dissemination process. The archive numbering system will continue from G2534\_157;
- All archaeological features/deposits/structures encountered will be manually cleaned and examined to determine extent, function, date and relationship to adjacent features. Features, including pits and postholes, will be subject to an initial 50% sample by volume. A minimum of 10% of linear features will be excavated to provide stratigraphic relationships, to characterise feature morphology and to recover artefactual and ecofactual material. The focus of the excavation of linear features will be on terminals and interactions with other features. Specific feature strategies will be confirmed with GAPS and client during the works;

- All sections to be drawn at a minimum 1:10 scale using GAT A4 or A2 pro-forma permatrace;
- All plans to be drawn at a minimum 1:20 scale. Plans will be drawn on GAT A4 or A2 pro-forma permatrace; and
- Should dateable artefacts, human remains or ecofacts be recovered, an **interim report** will be submitted summarising the results, along with recommendations for any subsequent post-excavation assessment in line with the MAP2 process.

## 3.2 Ecofacts

Should any archaeological features be identified that include sealed deposits deemed suitable for dating, samples will be taken of not less than 40 litres for bulk samples (or 100% if the feature is smaller). 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* (Historic England, 2011).

Should any waterlogged/organic deposits/peat deposits be encountered, bulk samples will not be taken in the first instance by GAT, but the GAT archaeologist will monitor and record the depth and context of the deposit or deposits. Based on initial results and potential, e.g., an extensive depth or survival of organic deposits, recourse may be made to a specialist for advice on palaeoenvironmental assessment and analysis strategy. In this instance the specialist will be:

Lucy Whittingham

Project Manager (post-excavation)

AOC Archaeology

tel: 0208 843 7380

email: [lucy.whittingham@aocarchaeology.com](mailto:lucy.whittingham@aocarchaeology.com)

Any ecofact samples taken from human burials will be completed in accordance with an appointed osteologist's guidance.

### 3.3 Human Remains

No indication of the presence of human remains has been previously detected. If any human remains are identified and they cannot be preserved in situ, they will be excavated in line with the 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. In accordance with the Ministry of Justice licence, recovered remains will be reburied once the investigation and/or assessment/analysis are complete.

Non-fragmented skeletal remains will be excavated using wooden tools and collected and stored in polyethylene bags (with appropriate references for context, grave number, et al) and placed in a lidded cardboard archive box (note: separate boxes for each individual) and stored in a suitable manner within GAT premises. If significant quantities of human remains are encountered, a human osteologist will be contacted and appointed to advise the team during the fieldwork. The osteologist will be an external appointment:

Dr. Genevieve Tellier

Tel: 01286 238827

Email: [northwalesosteology@outlook.com](mailto:northwalesosteology@outlook.com)

The osteologist will assist in devising the excavation, recording and sampling strategy for features containing human remains. The osteologist will also help to ensure that adequate post-excavation processing of human remains is carried out so that the material is in a fit state for assessment during the post-excavation stage. For inhumations, this will involve washing, drying, marking and packing.

If human remains are recovered that are deemed suitable for further assessment/analysis, this will be completed in accordance with the osteologist's requirements and with *Human Bones from Archaeological Sites Guidelines for producing assessment documents and analytical reports* (Historic England, 2004).

### 3.4 Artefacts

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

Any waterlogged artefacts (e.g. wood or leather) that are to be recovered for post-excavation assessment and analysis will be processed in accordance with *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage, 2011) and specifically in accordance with Brunning and Watson (2010) for waterlogged wood and English Heritage (2012) for waterlogged leather. In such cases an external specialist will be contacted to agree an appropriate sampling and recovery strategy via:

Lucy Whittingham

Project Manager (post-excavation)

AOC Archaeology

tel: 0208 843 7380

email: [lucy.whittingham@aocarchaeology.com](mailto:lucy.whittingham@aocarchaeology.com)

All finds are the property of the landowner; however, it is Trust policy to recommend that all finds are donated to an appropriate museum (in this case STORIEL, Ffordd Gwynedd, Bangor LL57 1DT) where they can receive specialist treatment and study. Access to finds must be granted to the Trust for a reasonable period to allow for analysis and for study and publication as necessary. Trust staff will undertake initial identification, but any additional advice would be sought from a wide range of consultants used by the Trust, 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.

GAT will contact the landowner (Welsh Slate Limited) for agreement regarding the transfer of artefacts, initially to GAT and subsequently to the relevant museum (STORIEL, Ffordd Gwynedd, Bangor LL57 1DT). 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. If artefacts are transferred to STORIEL, this must be in accordance with their guidelines.

### **3.5 Monitoring Arrangements**

The GAPS Archaeologist will be informed of the project timetable 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. The curator contact details are:

- Jenny Emmett [jenny.emmett@heneb.co.uk](mailto:jenny.emmett@heneb.co.uk) | 01248 370926; and
- Ashley Batten [ashley.batten@heneb.co.uk](mailto:ashley.batten@heneb.co.uk) | 01248 370926

### 3.6 Fieldwork Archiving

Following the completion of the fieldwork, a programme of fieldwork 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. Survey data: downloaded using a Computer Aided Design package;
4. Sections: all cross referenced and complete – site matrix produced;
5. Plans: 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 of the targeted excavation programme.



### 3.7 Processing Data, Illustration, Report and Archiving

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

1. Non-technical summary
2. Introduction
3. Background
4. Methodology
5. Results
6. Conclusions and further recommendations
7. List of sources consulted.
8. Appendix I – approved GAT project specification
9. Appendix II – photographic metadata
10. Appendix III – context register
11. Appendix IV – ecofact register
12. Appendix V – artefact register

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

Illustrations will include plans of the location, site plans and sections. Historical maps, when appropriate and if copyright permissions allow, will be included. A draft copy of the report will be sent to GAPS and to the client prior to production of the final report.

## 4 DISSEMINATION AND ARCHIVING

A draft report (or interim report) will be submitted within one month of fieldwork completion; a final report will be submitted to the regional Historic Environment Record within six months of project completion (date tbc). If appropriate, accompanying digital data in the form of a project database, GIS table(s) and photographs will also be submitted to the regional Historic Environment Record simultaneously.

The following dissemination will apply:

- A paper report(s) plus digital report(s) will be provided to the client/consultant and GAPS (draft report then final report);
- 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 project completion (final report only);
- If appropriate, digital information such as the project database, GIS table(s) and photographs, will be submitted to the regional Historic Environment Record at Gwynedd Archaeological Trust within six months of project completion. All digital datasets submitted will conform to the required standards set out in Gwynedd Archaeological Trust's *Historic Environment Record (HER) Guidelines for Archaeological Contractors* (Version 1.3; draft);
- 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;
- Dependent on the results of the targeted excavation, 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 PERSONNEL**

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section with attendances on-site undertaken by a GAT Senior Archaeologist and GAT Project Archaeologists. The Senior Archaeologist and Project Archaeologists will be responsible for the targeted excavation programme, including all field management duties, e.g., GAPS/client/consultant liaison, osteologist or palaeo-environmentalist liaison (if relevant). The Senior Archaeologist and Project Archaeologists will be responsible for completing all on site pro-formas and the fieldwork archive itemised in Sec. 4.7. A Senior Archaeologist and a Project Archaeologist will also be responsible for submitting a draft final report (or interim report) for project manager review and approval. The report will then be submitted as per the arrangements defined in Sec. 5.

## **6 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 sub-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 GAT staff will be issued with required personal safety equipment, including high visibility jacket, steel toe-capped boots and hard hat. The Trust subscribes to the SCAUM (Standing Conference of Archaeological Unit Managers) Health and Safety Policy as defined in Health and Safety in Field Archaeology (2007).

## 7 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 22/06/2018

### **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 22/06/2018

### **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 23/07/2018

## 8 SOURCES CONSULTED

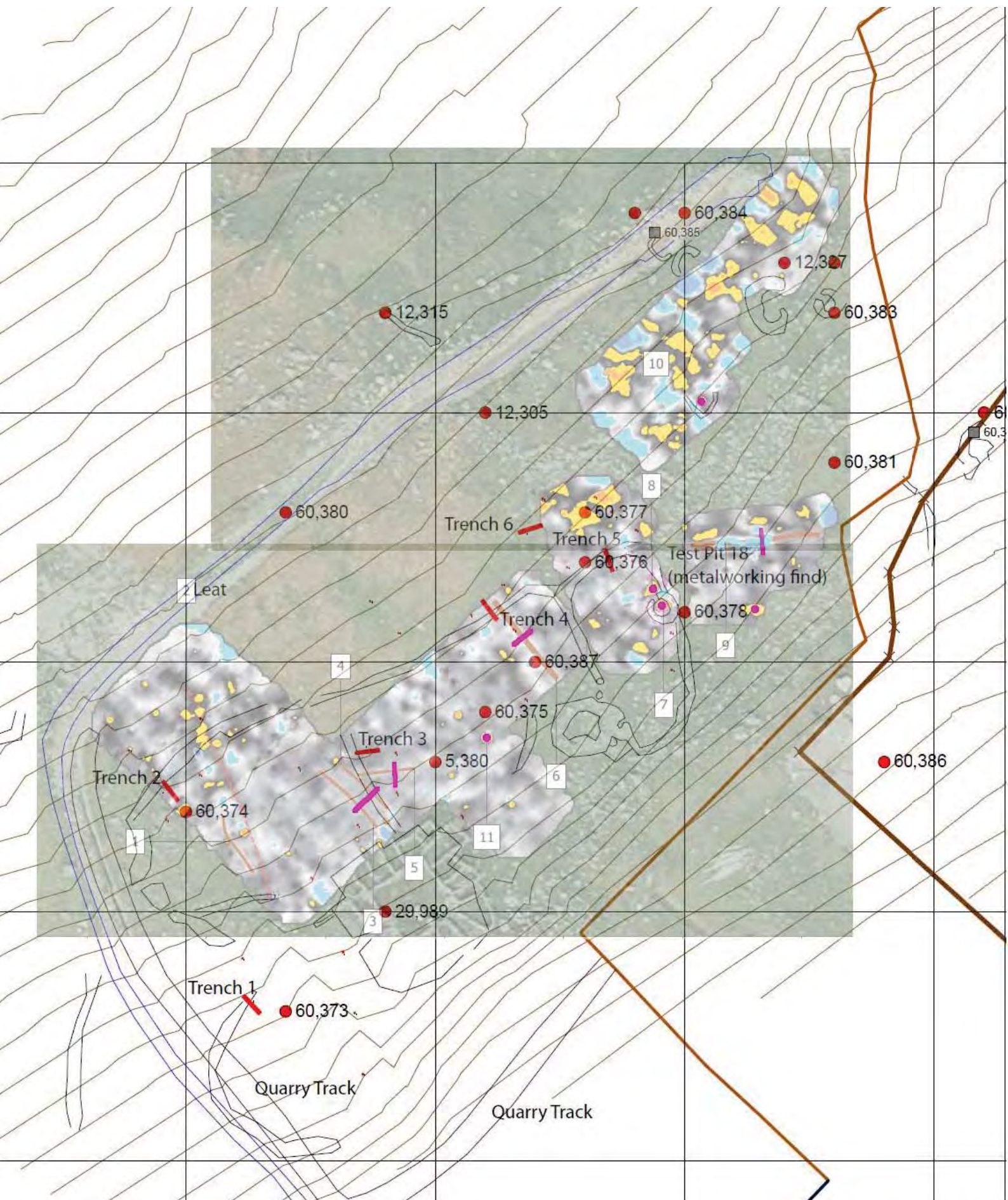
1. Brunning, R and Watson, J 2010, *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood* (3<sup>rd</sup> edition)
2. Chartered Institute for Archaeologists, 2014, *Standard and Guidance for Archaeological Excavation*
3. Chartered Institute for Archaeologists, 2014, *Standard and guidance for the collection, documentation, conservation and research of archaeological materials*
4. English Heritage, 1991, *Management of Archaeological Projects* (MAP2)
5. English Heritage, 2011, *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation*
6. English Heritage, 2012, *Waterlogged Organic Artefacts, Guidelines on their Recovery, Analysis and Conservation*
7. Gwynedd Archaeological Trust 2009 *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Archaeological Assessment*, GAT unpub report #837
8. Gwynedd Archaeological Trust 2010a *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Archaeological Survey*, GAT unpub report #880
9. Gwynedd Archaeological Trust 2010b *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Archaeological Evaluation*, GAT unpub report #899
10. Gwynedd Archaeological Trust 2012 *Proposed Quarry Realignment, Penrhyn Quarry, Bethesda: Excavation of suspected Bronze Age Cairn (Feature 15)*, GAT unpub report #1105
11. Gwynedd Archaeological Trust 2013 *Proposed Quarry Realignement Project, Penrhyn Quarry, Bethesda Archaeological Watching Brief: Phase 1A - Interim Report*



12. Gwynedd Archaeological Trust 2014 *Proposed Quarry Realingment Project, Penrhyn Quarry, Bethesda Archaeological Watching Brief Interim Report #1266*
13. Gwynedd Archaeological Trust 2015 *Proposed Quarry Realingment Project, Penrhyn Quarry, Bethesda Archaeological Evaluation (Feature 12) Report #1238*
14. Gwynedd Archaeological Trust 2017 *Penrhyn Quarry, Bethesda: Soil Strip, Archaeological Watching Brief Report #1410*
15. Gwynedd Archaeological Trust, 2014, *Historic Environment Record (HER) Guidelines for Archaeological Contractors* (Version 1.3; draft)
16. Historic England, 2004, *Human Bones from Archaeological Sites Guidelines for producing assessment documents and analytical reports*
17. Historic England, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*
18. Royal Commission on Ancient and Historic Monuments of Wales, 2015, *Guidelines for digital archives*
19. Watkinson, D and Neal, V, 2001, *First aid for finds* (3rd edition)

## **FIGURE 01**

**Proposed Quarry Realignment Zone and Location of Targeted Features.**



## **FIGURE 02**

**Quarry Realignment Zone and Archaeological Features (reproduced from GAT Report 1397)**



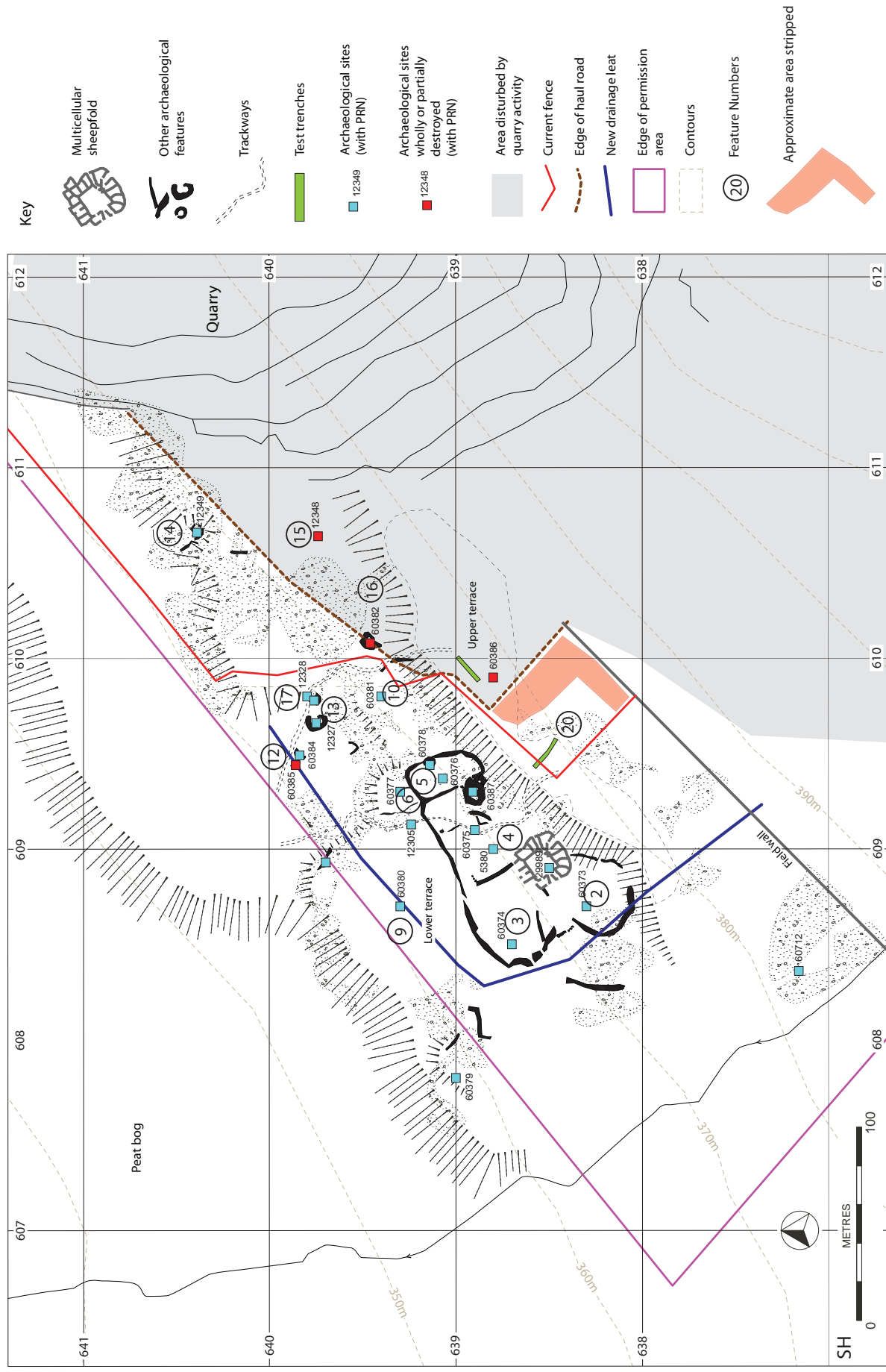


Figure 02 - Quarry Realignment Zone and Archaeological Features (reproduced from GAT Report 1397)

## **APPENDIX I**

### **Gwynedd Archaeological Trust photographic metadata pro-form**

Project Number:

[illegible]

## **APPENDIX II**

### **Gwynedd Archaeological Trust context record pro-forma**



## GWYNEDD ARCHAEOLOGICAL TRUST

## CONTEXT RECORD FORM

SITE CODE	GRID SQUARE	SITE SUB-DIV	CONTEXT NUMBER
CATEGORY/TYPE	PROVISIONAL DATE/PERIOD/PHASE		
LENGTH	BREADTH	DIAMETER	DEPTH/HEIGHT
DEPOSIT			CUT
1. Compaction			1. Shape in plan
2. Colour			2. Corners
3. Matrix Composition			3. Break of slope top
4. Inclusions			4. Sides
5. Clarity of Interface			5. Break of slope base
6. Other comments			6. Base
7. Methods & conditions			7. Orientation
			8. Truncated (if known)
			9. Other comments
			<b>Draw sketches overleaf</b>
FILLED BY	<div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div> <p>This <div></div> context</p> <div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>		
	Stratigraphic matrix		
PLANS		SECTIONS	
Sheet No.		Sheet No.	
Drawing No.		Drawing No.	
PHOTOGRAPHS - Film No./ Frame No.			
SAMPLE Nos.		FIND Nos.	
FEATURE No		GROUP No	CONSISTS OF
INTERPRETATION/DISCUSSION		SAME AS	
		CHECKED BY (initials/date)	INITIALS/DATE

**SKETCH**

**DESCRIPTION/INTERPRETATION CONTINUED**

## **APPENDIX III**

### **Gwynedd Archaeological Trust context trench record pro-forma**

## TRENCH SHEET

Project Name and Number		Trench number	
----------------------------	--	------------------	--

Trench size		Plans	
Max. trench depth		Sections	
Orientation		Photos	
Date/Initials		Area/chainage	

List of layers and/or features in trench (continue on back of sheet if necessary)

Context No.	Depth below surface	Brief description

General summary



[illegible]

## **APPENDIX II**

**Reproduction of Gwynedd Archaeological Trust G2534 Evaluation  
photographic metadata**

# **APPENDIX Reproduction of GAT Photo Metadata for Project G2534**

<b>PHOTO RECORD NUMBER</b>	<b>PROJECT NAME</b>	<b>DESCRIPTION</b>	<b>CONTEXT No (S)</b>	<b>VIEW FROM</b>	<b>SCALE(S)</b>	<b>CREATOR OF DIGITAL PHOTO*</b>	<b>DATE</b>	<b>ORIGINATING ORGANISATION</b>	<b>PLATES</b>
G2534_001	Penrhyn Quarry, Bethesda	Location of Trench 1 in Paddock 2 (pre-ex)	-	S	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	
G2534_002	Penrhyn Quarry, Bethesda	Location of Trench 1 in Paddock 3 (pre-ex)	-	WSW	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	
G2534_003	Penrhyn Quarry, Bethesda	Location of Trench 1 in Paddock 4 (pre-ex)	-	NW	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	
G2534_004	Penrhyn Quarry, Bethesda	Location of Trench 1 in Paddock 5 (pre-ex)	-	SE	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	
G2534_005	Penrhyn Quarry, Bethesda	Location of Trench 1 in Paddock 6 (pre-ex)	-	SW	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	
G2534_006	Penrhyn Quarry, Bethesda	Location of Trench 1 in Lower Terrace 9 (pre-ex)	-	SE	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	
G2534_007	Penrhyn Quarry, Bethesda	New access road located along SW edge of site	-	SE	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	Plate 02
G2534_008	Penrhyn Quarry, Bethesda	New access road located along SW edge of site	-	NW	1m	Stuart Reilly	03/08/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_009	Penrhyn Quarry, Bethesda	Pre-Ex shot of Trench 03	-	NE	2x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	
G2534_010	Penrhyn Quarry, Bethesda	Oblique shot of the SW facing section of Trench 02	-	SW	1x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	
G2534_011	Penrhyn Quarry, Bethesda	Mid-point of SW facing section of Trench 02	-	SW	1x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	
G2534_012	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 03	(301)(302)( 303)[304]	SE	2x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	Plate 09
G2534_013	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 03 - location	(301)(302)( 303)[304]	SW	2x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	Plate 08
G2534_014	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 03 - close up of wall [304]	(301)(302)( 303)[304]	SE	1x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	Plate 10
G2534_015	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 03 - close up of wall [304]	(301)(302)( 303)[304]	NW	1x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	
G2534_016	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 03	(301)(302)( 303)[304]	NW	2x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	



PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_017	Penrhyn Quarry, Bethesda	NE facing section of Trench 03	(301)(302)( 303)[304]	NE	1x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	
G2534_018	Penrhyn Quarry, Bethesda	SW facing section of Trench 03	(301)(302)( 303)[304]	SW	1x1m	Jess Davidson	29/08/2017	Gwynedd Archaeological Trust	
G2534_019	Penrhyn Quarry, Bethesda	Pre-Ex shot of Trench 06	-	SE	2x1m	Stuart Reilly	30/08/2017	Gwynedd Archaeological Trust	Plate 17
G2534_020	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 03	(301)(302)( 303)[304]	NE	2x1m	Jess Davidson	31/08/2017	Gwynedd Archaeological Trust	
G2534_021	Penrhyn Quarry, Bethesda	NE facing section	(301)(302)( 303)[304]	NE	1x1m	Jess Davidson	31/08/2017	Gwynedd Archaeological Trust	
G2534_022	Penrhyn Quarry, Bethesda	Pre-Ex shot of Trench 05	-	SW	2x1m	Jess Davidson	31/08/2017	Gwynedd Archaeological Trust	
G2534_023	Penrhyn Quarry, Bethesda	Trench 06 excavated	-	SE	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	
G2534_024	Penrhyn Quarry, Bethesda	Detail of wall in Trench 06	-	NE	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	Plate 20

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_025	Penrhyn Quarry, Bethesda	Trench 06 excavated	-	NW	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	Plate 18
G2534_026	Penrhyn Quarry, Bethesda	Trench 06 excavated	-	NW	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	
G2534_027	Penrhyn Quarry, Bethesda	Detail of wall in Trench 06	-	NW	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	
G2534_028	Penrhyn Quarry, Bethesda	SW facing section of Trench 06, from SE to NW end	-	SW	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	
G2534_029	Penrhyn Quarry, Bethesda	SW facing section of Trench 06, from SE to NW end	-	SW	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	
G2534_030	Penrhyn Quarry, Bethesda	SW facing section of Trench 06, from SE to NW end	-	SW	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	
G2534_031	Penrhyn Quarry, Bethesda	SW facing section of Trench 06, from SE to NW end	-	SW	1x1m	Jane Kenny	01/09/2017	Gwynedd Archaeological Trust	
G2534_032	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 05	(501)(502)( 503)[504]	WSW	2x1m	Jess Davidson	01/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_033	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 05	(501)(502)( 503)[504]	WSW	2x1m	Jess Davidson	01/09/2017	Gwynedd Archaeological Trust	Plate 16
G2534_034	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 05	(501)(502)( 503)[504]	ENE	2x1m	Jess Davidson	01/09/2017	Gwynedd Archaeological Trust	
G2534_035	Penrhyn Quarry, Bethesda	NNE facing section of Trench 05	(501)(502)( 503)[504]	NNE	1x1m	Jess Davidson	01/09/2017	Gwynedd Archaeological Trust	Plate 15
G2534_036	Penrhyn Quarry, Bethesda	NNE facing section of Trench 05	(501)(502)( 503)[504]	NE	1x1m	Jess Davidson	01/09/2017	Gwynedd Archaeological Trust	
G2534_037	Penrhyn Quarry, Bethesda	NNE facing section of Trench 05	(501)(502)( 503)[504]	NW	1x1m	Jess Davidson	01/09/2017	Gwynedd Archaeological Trust	
G2534_038	Penrhyn Quarry, Bethesda	SSW facing section of Trench 05	(501)(502)( 503)[504]	SSW	1x1m	Jess Davidson	01/09/2017	Gwynedd Archaeological Trust	
G2534_039	Penrhyn Quarry, Bethesda	NW face of [6004]	[6004]	NW	1x1m	Stuart Reilly	04/09/2017	Gwynedd Archaeological Trust	Plate 19
G2534_040	Penrhyn Quarry, Bethesda	NW face of [6004] and area cleaned of stone rubble	[6004]	NW	1x1m	Stuart Reilly	04/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_041	Penrhyn Quarry, Bethesda	Location shot for Trench 04	(401)(402)( 403)[404]	NE	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	
G2534_042	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 04	(401)(402)( 403)[404]	NW	2x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	Plate 11
G2534_043	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 04	(401)(402)( 403)[404]	SE	2x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	Plate 12
G2534_044	Penrhyn Quarry, Bethesda	Close up of wall [404]	(401)(402)( 403)[404]	SW	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	
G2534_045	Penrhyn Quarry, Bethesda	Close up of wall [404] - SE face	(401)(402)( 403)[404]	SE	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	Plate 13
G2534_046	Penrhyn Quarry, Bethesda	Close up of wall [404] - SE face	(401)(402)( 403)[404]	SE	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	
G2534_047	Penrhyn Quarry, Bethesda	Close up of wall [404] - SE face	(401)(402)( 403)[404]	SE	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	
G2534_048	Penrhyn Quarry, Bethesda	SW facing section of Trench 04	(401)(402)( 403)[404]	SW	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	



PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_049	Penrhyn Quarry, Bethesda	SW facing section of Trench 04 - SE end	(401)(402)( 403)[404]	SW	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	
G2534_050	Penrhyn Quarry, Bethesda	SW facing section of Trench 04 - NW end	(401)(402)( 403)[404]	SW	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	Plate 14
G2534_051	Penrhyn Quarry, Bethesda	NE facing section of Trench 04	(401)(402)( 403)[404]	NE	1x1m	Jess Davidson	04/09/2017	Gwynedd Archaeological Trust	
G2534_052	Penrhyn Quarry, Bethesda	Pre-Ex location shot of Trench 02	-	SE	2x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	Plate 05
G2534_053	Penrhyn Quarry, Bethesda	Pre-Ex view of the SE elevation of Paddock 3 wall	-	SE	1x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	Plate 06
G2534_054	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 02	-	SE	2x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	
G2534_055	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 02 - Portrait	-	SE	2x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	
G2534_056	Penrhyn Quarry, Bethesda	Post-Ex view of Paddock 3 wall	-	SE	1x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	Plate 07

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_057	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 02 with NW elevation of wall in foreground	-	NW	2x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	
G2534_058	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 02 with NW elevation of wall in foreground - Portrait	-	NW	2x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	
G2534_059	Penrhyn Quarry, Bethesda	Post-Ex of interior of Trench 02	-	NW	1x1m	Stuart Reilly	29/08/2017	Gwynedd Archaeological Trust	
G2534_060	Penrhyn Quarry, Bethesda	Pre-Ex shot of Trench 01	-	NW	2x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	Plate 01
G2534_061	Penrhyn Quarry, Bethesda	Location shot for Test Pit 04	(0401)(040 2)	SW	1x1m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_062	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 04	(0401)(040 2)	NW	1x0.2m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_063	Penrhyn Quarry, Bethesda	Location shot for Test Pit 03	-	SW	1x1m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_064	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 03	(0301)(030 2)	NW	1x0.2m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_065	Penrhyn Quarry, Bethesda	Location shot for Test Pit 02	-	SW	1x1m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_066	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 02	(0201)(020 2)	NW	1x0.2m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_067	Penrhyn Quarry, Bethesda	Location shot for Test Pit 01	-	SW	1x1m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_068	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 01	(0101)(010 2)	NW	1x0.2m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_069	Penrhyn Quarry, Bethesda	Location shot for Test Pit 05	-	NW	1x1m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	
G2534_070	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 05	(0501)(050 2)	SW	1x0.2m	Jess Davidson	06/09/2017	Gwynedd Archaeological Trust	Plate 21
G2534_071	Penrhyn Quarry, Bethesda	Post-Ex shot of Trench 01	[103]	SE	2x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	
G2534_072	Penrhyn Quarry, Bethesda	Wall [103] in SE face of Trench 01	[103]	SE	2x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_073	Penrhyn Quarry, Bethesda	SE face of wall [103] in Trench 01	[103]	SE	2x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	
G2534_074	Penrhyn Quarry, Bethesda	Post-Ex of Trench 01 with wall [103]	[103]	NW	1x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	
G2534_075	Penrhyn Quarry, Bethesda	NW face of wall [103] in Trench 01	[103]	NW	1x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	
G2534_076	Penrhyn Quarry, Bethesda	Trench 01 and wall [103] from an oblique angle showing the continuation of the wall	[103]	NNW	1x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	
G2534_077	Penrhyn Quarry, Bethesda	Wall [103] within Trench 01	[103]	NE	2x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	
G2534_078	Penrhyn Quarry, Bethesda	Wall [103] within Trench 01	[103]	NE	2x1m	Stuart Reilly	06/09/2017	Gwynedd Archaeological Trust	Plate 04
G2534_079	Penrhyn Quarry, Bethesda	NE facing section of Trench 01 - SE end	[103]	NE	2x1m	Stuart Reilly	07/09/2017	Gwynedd Archaeological Trust	
G2534_080	Penrhyn Quarry, Bethesda	Oblique view of NE facing section of Trench 01	[103]	N	2x1m	Stuart Reilly	07/09/2017	Gwynedd Archaeological Trust	Plate 03



PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_081	Penrhyn Quarry, Bethesda	NE facing section of Trench 01 - NW end	[103]	NE	2x1m	Stuart Reilly	07/09/2017	Gwynedd Archaeological Trust	
G2534_082	Penrhyn Quarry, Bethesda	Location shot for Test Pit 06	-	SW	1x1m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_083	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 06	(0601)(060 2)(0603)	NW	1x0.2m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_084	Penrhyn Quarry, Bethesda	Location shot for Test Pit 07	-	SW	1x1m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_085	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 07	(0701)(070 2)	NW	1x0.2m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_086	Penrhyn Quarry, Bethesda	Location shot for Test Pit 08	-	SW	1x1m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_087	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 08	(0801)(080 2)	NW	1x0.2m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_088	Penrhyn Quarry, Bethesda	Location shot for Test Pit 09	-	NW	1x1m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_089	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 09	(0901)(090 2)	W	1x0.2m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_090	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 08 - retake	(0801)(080 2)	NW	1x0.2m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_091	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 07 - retake	(0701)(070 2)	NW	1x0.2m	Jess Davidson	07/09/2017	Gwynedd Archaeological Trust	
G2534_092	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 16	-	SW	1x0.2m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	
G2534_093	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 16 - location shot	-	SW	1x1m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	
G2534_094	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 17	-	SW	1x0.2m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	
G2534_095	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 17 - location shot	-	SW	1x1m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	
G2534_096	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 18	-	NW	1x0.2m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_097	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 18 - location shot	-	NW	1x1m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	Plate 24
G2534_098	Penrhyn Quarry, Bethesda	Location shot for Test Pit 10	-	W	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_099	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 10	(1001)(100 2)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_100	Penrhyn Quarry, Bethesda	Location shot for Test Pit 11	-	N	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_101	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 11	(1101)(110 2)(1103)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_102	Penrhyn Quarry, Bethesda	Location shot for Test Pit 12	-	NW	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_103	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 12	(1201)(120 2)(1203)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_104	Penrhyn Quarry, Bethesda	Location shot for Test Pit 13	-	NW	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_105	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 13	(1301)(130 2)(1303)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	Plate 22
G2534_106	Penrhyn Quarry, Bethesda	Location shot for Test Pit 14	-	NW	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_107	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 14	(1401)(140 2)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_108	Penrhyn Quarry, Bethesda	Location shot for Test Pit 15	-	N	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_109	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 15	(1501)(150 2)(1503)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_110	Penrhyn Quarry, Bethesda	Location shot for Test Pit 22	-	N	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_111	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 22	(2201)(220 2)(2203)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_112	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 19	(1901)(190 2)(1903)	SSE	1x0.2m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	Plate 23



PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_113	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 19 - Location shot	(1901)(190 2)(1903)	S	1x1m	Stuart Reilly	08/09/2017	Gwynedd Archaeological Trust	
G2534_114	Penrhyn Quarry, Bethesda	Location shot for Test Pit 23	-	N	1x1m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_115	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 23	(2301)(230 2)(2303)	NW	1x0.2m	Jess Davidson	08/09/2017	Gwynedd Archaeological Trust	
G2534_116	Penrhyn Quarry, Bethesda	Location shot for Test Pit 20	-	NE	1x1m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_117	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 20	(2001)(200 2)(2003)	NNW	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_118	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 20	(2001)(200 2)(2003)	NNW	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_119	Penrhyn Quarry, Bethesda	Section of Test Pit 20	(2001)(200 2)(2003)	ENE	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_120	Penrhyn Quarry, Bethesda	Location shot for Test Pit 25	-	N	1x1m	Jess Davidson	12/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_121	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 25	(2501)(250 2)(2503)	NW	1x0.2m	Jess Davidson	12/09/2017	Gwynedd Archaeological Trust	
G2534_122	Penrhyn Quarry, Bethesda	Location shot for Test Pit 26	-	NE	1x1m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_123	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 26	(2601)(260 2)(2603)(26 04)	NE	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_124	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 26	(2601)(260 2)(2603)(26 04)	NE	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_125	Penrhyn Quarry, Bethesda	Section of Test Pit 26	(2601)(260 2)(2603)(26 04)	NE	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_126	Penrhyn Quarry, Bethesda	Location shot for Test Pit 27	-	E	1x1m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_127	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 27	(2701)(270 2)(2703)	NW	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_128	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 27	(2701)(270 2)(2703)	NW	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_129	Penrhyn Quarry, Bethesda	Section of Test Pit 27	(2701)(270 2)(2703)	NW	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_130	Penrhyn Quarry, Bethesda	Location shot for Test Pit 21	-	NW	1x1m	Jess Davidson	12/09/2017	Gwynedd Archaeological Trust	
G2534_131	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 21	(2101)(210 1)	NE	1x0.2m	Jess Davidson	12/09/2017	Gwynedd Archaeological Trust	
G2534_132	Penrhyn Quarry, Bethesda	Location shot for Test Pit 28	-	NE	1x1m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_133	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 28	(2801)(280 2)(2803)	N	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_134	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 28	(2801)(280 2)(2803)	N	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_135	Penrhyn Quarry, Bethesda	Section of Test Pit 28	(2801)(280 2)(2803)	E	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_136	Penrhyn Quarry, Bethesda	Location shot for Test Pit 24	-	NW	1x1m	Jess Davidson	12/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_137	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 24	(2401)(240 2)	NNW	1x0.2m	Jess Davidson	12/09/2017	Gwynedd Archaeological Trust	
G2534_138	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 30	(3001)(300 2)(3003)(30 04)(3005)	W	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_139	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 30	(3001)(300 2)(3003)(30 04)(3005)	W	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_140	Penrhyn Quarry, Bethesda	Section of Test Pit 30	(3001)(300 2)(3003)(30 04)(3005)	W	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_141	Penrhyn Quarry, Bethesda	Location shot for Test Pit 30	-	NE	1x1m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_142	Penrhyn Quarry, Bethesda	Location shot for Test Pit 29	-	NE	1x1m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_143	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 29	(2901)(290 2)(2903)	N	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_144	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 29	(2901)(290 2)(2903)	N	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	



PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_145	Penrhyn Quarry, Bethesda	Section of Test Pit 29	(2901)(290 2)(2903)	N	1x0.2m	Jane Kenny	12/09/2017	Gwynedd Archaeological Trust	
G2534_146	Penrhyn Quarry, Bethesda	General shot of new haul road	-	NW	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_147	Penrhyn Quarry, Bethesda	General shot of new haul road	-	NW	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_148	Penrhyn Quarry, Bethesda	General shot of new haul road	-	NW	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_149	Penrhyn Quarry, Bethesda	General view of new haul road	-	NW	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_150	Penrhyn Quarry, Bethesda	General view of new haul road	-	NW	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_151	Penrhyn Quarry, Bethesda	Shot of leat	-	SW	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_152	Penrhyn Quarry, Bethesda	Shot of leat	-	NE	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_153	Penrhyn Quarry, Bethesda	General site shot	-	SE	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_154	Penrhyn Quarry, Bethesda	General site shot	-	SE	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_155	Penrhyn Quarry, Bethesda	General site shot	-	SE	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_156	Penrhyn Quarry, Bethesda	Working shot	-	-	-	Jess Davidson	14/09/2017	Gwynedd Archaeological Trust	
G2534_157	Penrhyn Quarry, Bethesda	Pre-Ex of Test Pit 31	-	SSW	1x1m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_158	Penrhyn Quarry, Bethesda	Pre-Ex of Test Pit 32	-	S	1x1m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_159	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 31	-	E	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	Plate 27
G2534_160	Penrhyn Quarry, Bethesda	East facing section of Test Pit 31	-	E	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_161	Penrhyn Quarry, Bethesda	South facing section of Test Pit 31	-	S	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_162	Penrhyn Quarry, Bethesda	Pre-Ex of Test Pit 33; original survey location on top of boulder!	-	S	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_163	Penrhyn Quarry, Bethesda	Pre-Ex of Test Pit 31; relocated	-	S	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_164	Penrhyn Quarry, Bethesda	Mid-Ex of Test Pit 33 - interior of test pit	3203,3204, 3205,	S	1x0.3m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_165	Penrhyn Quarry, Bethesda	Mid-Ex of interior of Test Pit 32 showing detail of burning	[3204],(320 3)	S	1x0.3m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_166	Penrhyn Quarry, Bethesda	Mid-Ex of Test Pit 32	3203,3204, 3205,	S	1x1m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_167	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 33	3303	S	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_168	Penrhyn Quarry, Bethesda	East facing section of Test Pit 33	3301,3302, 3303	E	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_169	Penrhyn Quarry, Bethesda	North facing section of Test Pit 31	3301,3302, 3303	N	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_170	Penrhyn Quarry, Bethesda	Pre-Ex of Test Pit 34; surveyed location of test pit on top of boulder!	-	SW	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_171	Penrhyn Quarry, Bethesda	Pre-Ex of Test Pit 34; relocated	-	SW	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_172	Penrhyn Quarry, Bethesda	Mid-Ex of Test Pit 34	[3204],(320 3)	W	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_173	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 34	[3204],(320 3)	W	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_174	Penrhyn Quarry, Bethesda	West facing section of Test Pit 34	3301,3302, 3303	W	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_175	Penrhyn Quarry, Bethesda	North facing section of Test Pit 31	3301,3302, 3303	N	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_176	Penrhyn Quarry, Bethesda	East facing section of Test Pit 32, [3204]+(3203)	[3204],(320 3)	E	1x0.3m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	Plate 28

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_177	Penrhyn Quarry, Bethesda	Mid-Ex of Test Pit 32	3201,3202, 3203,3204	NW	1x1m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_178	Penrhyn Quarry, Bethesda	North and West facing sections of Test Pit 32	3201,3202, 3203,3204	NE	1x1m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_179	Penrhyn Quarry, Bethesda	Pre-Ex of Test Pit 35	-	W	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_180	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 35	3503	W	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_181	Penrhyn Quarry, Bethesda	West facing section of Test Pit 35	3501,3502, 3503	W	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_182	Penrhyn Quarry, Bethesda	South facing section of Test Pit 35	3501,3502, 3503	S	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	
G2534_183	Penrhyn Quarry, Bethesda	Post-Ex shot of Test Pit 32	3204,3205	NW	1x1m,1x0.3 m	Stuart Reilly	15/02/2018	Gwynedd Archaeological Trust	
G2534_184	Penrhyn Quarry, Bethesda	Pre-Ex of location of Trench 07	0703	W	1x1m	Ken Owen	15/02/2018	Gwynedd Archaeological Trust	



PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_185	Penrhyn Quarry, Bethesda	Post-Ex of southern half of Trench 07	0703	W	1x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_186	Penrhyn Quarry, Bethesda	Post-Ex of northern half of Trench 07	0703	W	1x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_187	Penrhyn Quarry, Bethesda	Post-Ex of Trench 07	0703	N	1x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_188	Penrhyn Quarry, Bethesda	Post-Ex of Trench 07	-	S	1x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_189	Penrhyn Quarry, Bethesda	Pre-Ex of Trench 08	-	W	1x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_190	Penrhyn Quarry, Bethesda	Pre-Ex of Trench 08	-	W	1x1m	Stuart Reilly	16/02/2018	Gwynedd Archaeological Trust	
G2534_191	Penrhyn Quarry, Bethesda	Post-Ex of Trench 09	0903	W	1x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_192	Penrhyn Quarry, Bethesda	Post-Ex of Trench 09	0903,0904	S	2x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_193	Penrhyn Quarry, Bethesda	Post-Ex of Trench 09	0903,0904	N	2x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_194	Penrhyn Quarry, Bethesda	Post-Ex of Trench 08	0803	N	2x1m	Stuart Reilly	16/02/2018	Gwynedd Archaeological Trust	Plate 25
G2534_195	Penrhyn Quarry, Bethesda	Post-Ex of Trench 08	0803	N	2x1m	Stuart Reilly	16/02/2018	Gwynedd Archaeological Trust	
G2534_196	Penrhyn Quarry, Bethesda	Post-Ex of Trench 08	0803	S	2x1m	Stuart Reilly	16/02/2018	Gwynedd Archaeological Trust	
G2534_197	Penrhyn Quarry, Bethesda	West facing section of Trench 08	0801,0802, 0803	W	2x1m	Stuart Reilly	16/02/2018	Gwynedd Archaeological Trust	
G2534_198	Penrhyn Quarry, Bethesda	West facing section of Trench 08, (northern edge)	0801,0802, 0803	W	2x1m	Stuart Reilly	16/02/2018	Gwynedd Archaeological Trust	
G2534_199	Penrhyn Quarry, Bethesda	West facing section of Trench 09, (southern edge)	0901,0902, 0903	W	2x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	
G2534_200	Penrhyn Quarry, Bethesda	West facing section of Trench 09, (northern edge)	0901,0902, 0903,0904	W	2x1m	Ken Owen	16/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_201	Penrhyn Quarry, Bethesda	Pre-Ex of location of Trench 10	-	W	2x1m	Ken Owen	19/02/2018	Gwynedd Archaeological Trust	
G2534_202	Penrhyn Quarry, Bethesda	Post-Ex of Trench 10	1003	S	2x1m	Ken Owen	19/02/2018	Gwynedd Archaeological Trust	
G2534_203	Penrhyn Quarry, Bethesda	Post-Ex of Trench 10	1003	N	2x1m	Ken Owen	19/02/2018	Gwynedd Archaeological Trust	
G2534_204	Penrhyn Quarry, Bethesda	Post-Ex of Trench 10	1001,1002, 1003	E	2x1m	Ken Owen	19/02/2018	Gwynedd Archaeological Trust	Plate 26
G2534_205	Penrhyn Quarry, Bethesda	Trench 07 backfilled	-	SE	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	
G2534_206	Penrhyn Quarry, Bethesda	Trench 08 backfilled	-	S	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	
G2534_207	Penrhyn Quarry, Bethesda	Test Pit 35 backfilled	-	NW	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	
G2534_208	Penrhyn Quarry, Bethesda	Trench 09 backfilled	-	SW	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	DESCRIPTION	CONTEXT No (S)	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE	ORIGINATING ORGANISATION	PLATES
G2534_209	Penrhyn Quarry, Bethesda	Test Pits 31+32 backfilled	-	NW	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	
G2534_210	Penrhyn Quarry, Bethesda	Test Pit 33 backfilled	-	W	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	
G2534_211	Penrhyn Quarry, Bethesda	Trench 10 backfilled	-	S	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	
G2534_212	Penrhyn Quarry, Bethesda	Test Pit 34 backfilled	-	SW	1x1m	Stuart Reilly	20/02/2018	Gwynedd Archaeological Trust	

## **APPENDIX III**

### **Reproduction of Gwynedd Archaeological Trust Ecofact and Artefact Registers**



**G2534 Penrhyn Quarry****Ecofact Register**

Sample No.	Sub Area	Context No.	Context description	Provisional Date	Purpose of sample	No. of Box/Bag	% of Deposited Sample	Drawing No.	Sheet No.
1	Test Pit 18	(1802)	Burnt deposit with iron slag	Prehistoric	Dating, Plant Macrofossils	1 box	100% within test pit	N/A	N/A
2	Test Pit 32	(3203)	Primary fill of [3204]	Prehistoric	Dating, Plant Macrofossils	1 box	100%	14 & 15	05

**G2534 Penrhyn Quarry****Artefact Register**

Finds No.	Context No.	Sub Area	Context type	Material	Description	Drawing No.	Sheet No.
01	(1802)	Test Pit 18	Area of probable iron slag dump	Iron slag	Globular, irregular shaped	N/A	N/A
02	(3203)	Test Pit 32	Iron slag from furnace	Iron Slag	Globular, irregular shaped	14 & 15	05

## **APPENDIX IV**

### **Reproduction of Gwynedd Archaeological Trust Drawing Register**

## G2534 Penrhyn Quarry – Drawing Register

Drawing No.	Sheet No.	Size	Scale	Description	Date	Initials
01	01	A2	1:10	SW facing section of Trench 2	29/08/17	SR
02	01	A2	1:20	Post-excavation plan of Trench 2	30/08/17	SR
03	01	A2	1:10	NW facing section of Trench 3	30/08/17	JD
04	01	A2	1:20	Post-excavation plan of Trench 3	30/08/17	JD
05	02	A2	1:20	Post excavation plan of Trench 6	01/09/17	JK
06	02	A2	1:10	SW facing section of Trench 6	01/09/17	JK
07	03	A2	1:10	ESE facing section of Trench 5	01/09/17	JD
08	03	A2	1:20	Post excavation plan of Trench 5	01/09/17	JD
09	02	A2	1:10	NW facing elevation of (604)	04/09/17	SR
10	03	A2	1:10	NE facing elevation of Trench 4	04/09/17	JD
11	03	A2	1:20	Post excavation plan of Trench 4	04/09/17	JD
12	04	A2	1:10	NE facing section through Trench 1	07/09/17	SR
13	04	A2	1:20	Post excavation plan of Trench 1	07/09/17	SR
14	05	A4	1:10	E facing section through [3204]	15/02/18	SR
15	05	A4	1:20	Post excavation plan of [3204]	15/02/18	SR
16	06	A2	1:20	Post excavation plan of Trench 7	16/02/18	KO
17	06	A2	1:10	W facing section through Trench 08	19/02/18	SR
18	06	A2	1:20	Post excavation	19/02/18	SR

<b>Drawing No.</b>	<b>Sheet No.</b>	<b>Size</b>	<b>Scale</b>	<b>Description</b>	<b>Date</b>	<b>Initials</b>
				plan of Trench 8		
19	06	A2	1:20	Post excavation plan of Trench 9	19/02/18	KO
20	06	A2	1:20	Post excavation plan of 10	19/02/18	KO
21	06	A2	1:10	W facing section through Trench 9	19/02/18	KO

## **APPENDIX V**

### **Reproduction of Gwynedd Archaeological Trust Photographic Metadata for Project G2556**



PHOTO RECORD NUMBER*	PROJECT NAME	PROJECT PHASE	SITE NAME*	SITE SUB- DIVISION	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	Plate
G2556_001	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 01	View of Linear 01 from the bulbous SE terminus	SE	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	30
G2556_002	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 01	View of slate waste bank of Linear 01	SW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_003	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 01	View of Linear 01 from the trackway end where it has been cut through	NW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	29
G2556_004	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 01	Angled view of linear 01 cut through track way	W	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_005	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 05	View of drystone wall at SE end of bulbous linear feature 04	WNW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_006	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 05	View of drystone wall terminus (beyond survey area)	NW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER*	PROJECT NAME	PROJECT PHASE	SITE NAME*	SITE SUB- DIVISION	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	Plate
G2556_007	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 02	General view of paddock area	NW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_008	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 02	View of section through Linear 02 where cut by trackway	NNW	2x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	33
G2556_009	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 02	General view along Linear 02	NNW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	31
G2556_010	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 02	Angeled shot showing waste make-up of linear 02	N	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	32
G2556_011	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 02	General view of linear 02 taken from the 'L' junction at SW end	SW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	34
G2556_012	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 03	View of section cut through linear 13 (good 90 degrees cut)	NE	2x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER*	PROJECT NAME	PROJECT PHASE	SITE NAME*	SITE SUB- DIVISION	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	Plate
G2556_013	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 03	General view of linear 03 taken from the haul road end	NE	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	35
G2556_014	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 03	View of slate linear 03 embankment	S	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_015	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 03	General view of linear 03 taken from the SW end	SW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	36
G2556_016	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 03	General view of modern drainage channel cut through Linear 03	ESE	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	37
G2556_017	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 03	Same as above, minus board, from the opposing side of cut through linear 03	WNW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER*	PROJECT NAME	PROJECT PHASE	SITE NAME*	SITE SUB- DIVISION	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	Plate
G2556_018	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 04	View of slate linear 04 from the SW	SW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	39
G2556_019	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 03	View of slate linear 03 embankment	NW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	38
G2556_020	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 04	View of slate linear 04 from the haul road end.	NNE	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_021	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 04	View of section cut by haul road of Linear 04	NNE	2x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_022	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 05	View of drystone wall 01	NE	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	40
G2556_023	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 05	View of drystone wall 01	SW	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER*	PROJECT NAME	PROJECT PHASE	SITE NAME*	SITE SUB- DIVISION	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	Plate
G2556_024	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry	Feature 05	View of drystone wall 01 showing section demolished for the quarry haul road	NE	1x1m	Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_025	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry		Interface between haulroad and upland	NW		Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_026	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry		Boundary of haul road showing boulders at boundary with upland ground	SE		Robert Evans	20/02/2018	Gwynedd Archaeological Trust	
G2556_027	Extension to Penrhyn Quarry	walkover survey	Penrhyn Quarry		General view showing haul road and cut through linears	NW		Robert Evans	20/02/2018	Gwynedd Archaeological Trust	



## **APPENDIX VI**

### **Reproduction of Gwynedd Archaeological Trust Context Register**

**G2534 Penrhyn Quarry****Context Register****TRENCHES**

<b>Context Number</b>	<b>Trench Number</b>	<b>Type</b>	<b>Description</b>
(101)	1	Topsoil	Mid-dark brown silty peaty clay mixed with and bonded by tight mesh of roots and small stones.
(102)	1	Subsoil	Mid greyish brown silty clay mixed with frequent small to medium sized angular and sub-angular stones.
(103)	1	Drystone Wall	Locally sourced medium to large sub-angular and sub-rounded stones intermixed with smaller sub-angular packing stones.
(104)	1	Natural	Light grey boulder clay.
(201)	2	Topsoil	Soft, cohesive mid greyish brown silty, loamy clay.
(202)	2	Natural	Compact orange and mid grey silty clay mixed with very frequent small to large angular and sub-angular stones and moderate earthfast boulders.
(203)	2	Drystone wall	Locally sourced medium to large sub-angular and sub-rounded stones intermixed with smaller sub-angular packing stones. Set between large earthfast boulders.
(301)	3	Topsoil	Soft, dark grey-brown clayey silt with moderately frequent poorly sorted sub-rounded cobbles and occasional charcoal flecks.
(302)	3	Subsoil	Soft mid brown grey silt containing frequent poorly sorted gravel. Concentrated at SW end of trench.
(303)	3	Natural	Compact pale brown-grey silt with orange mottling and frequent poorly sorted sub-angular and sub-rounded cobbles.
(304)	3	Drystone Wall	Locally sourced medium to large sub-angular and sub-rounded stones intermixed with smaller sub-angular packing stones. Set between large earthfast boulders.
(401)	4	Topsoil	Turf growing into a firm pale brown-grey gritty

Context Number	Trench Number	Type	Description
			sand containing occasional sub-rounded small cobbles. Modern caluvial deposit associated with run-off from the quarry.
(402)	4	Subsoil	Soft dark grey-brown very organic silt with occasional sub-rounded cobbles.
(403)	4	Natural	Malleable pale brown-grey with orange mottling silty clay with occasional sub-rounded small-medium cobbles.
(404)	4	Drystone Wall	Locally sourced medium to large sub-angular and sub-rounded stones intermixed with smaller sub-angular packing stones. Set between large earthfast boulders. Distinct SE face.
(501)	5	Topsoil	Turf growing into a firm pale brown-grey gritty sand containing occasional sub-rounded small cobbles. Modern caluvial deposit associated with run-off from the quarry.
(502)	5	Subsoil	Soft dark grey-brown organic peat-silt containing moderately frequent sub-rounded small-large cobbles.
(503)	5	Natural	Firm, malleable pale brown-grey silt-clay with frequent sub-rounded cobbles and boulders.
(504)	5	Drystone Wall	Possible wall, indistinct from surrounding earthfast boulders.
(601)	6	Topsoil	Highly organic very dark brown silt with turf.
(602)	6	Subsoil	Lower topsoil.
(603)	6	Natural	Pale grey malleable silty clay with numerous sub-rounded stones.
(604)	6	Drystone Wall	Locally sourced medium to large sub-angular and sub-rounded stones intermixed with smaller sub-angular packing stones. Set between large earthfast boulders. Distinct NW face.
(701)	7	Topsoil	Soft, fine mid-dark brown silty peaty clay.
(702)	7	Subsoil	Soft, cohesive mid-greyish brown silty clay mixed with frequent sub-rounded and sub-angular stones.

<b>Context Number</b>	<b>Trench Number</b>	<b>Type</b>	<b>Description</b>
(703)	7	Natural	Fine, coarse light grey sandy clay mixed with frequent stones.
(801)	8	Topsoil	Soft, fine mid-dark brown silty peaty clay.
(802)	8	Subsoil	Soft, cohesive mid-greyish brown silty clay mixed with moderate sub-rounded and sub-angular stones.
(803)	8	Natural	Cohesive, compact light grey clay mixed with frequent small to large sub-rounded and sub-angular stones, along with moderate earthfast boulders.
(901)	9	Topsoil	Soft, fine mid-dark brown silty peaty clay mixed with occasional small stone.
(902)	9	Subsoil	Cohesive, fine mid greyish brown silty clay mixed with moderate small to medium sized sub-rounded and sub-angular stones.
(903)	9	Natural	Cohesive, compact light grey clay mixed with moderate small to medium sized sub-angular and earthfast boulders; mainly at SE end.
(904)	9	Natural	Small deposit of light greyish brown sandy clay. Partially overlaid by (903).
(1001)	10	Topsoil	Soft, fine mid-dark brown silty peaty clay.
(1002)	10	Subsoil	Cohesive, fine mid greyish brown silty clay.
(1003)	10	Natural	Cohesive, compact light grey clay almost entirely obscured by very frequent medium to large sub-rounded stones and moderately frequent earthfast boulders.

## TEST PITS

Context Number	Test Pit Number	Type	Description
(0101)	1	Topsoil	Soft, dark grey-brown highly organic silt containing occasional sub-rounded pebbles.
(0102)	1	Natural	Firm pale brown-grey with orange mottling clay silt containing occasional sub-rounded pebbles.
(0201)	2	Topsoil	Soft, dark grey-brown highly organic silt containing moderately frequent sub-rounded poorly sorted pebbles and occasional cobbles.
(0202)	2	Natural	Firm mid orange brown clay-silt with frequent poorly sorted sub-rounded cobbles.
(0301)	3	Topsoil	Soft, dark grey-brown highly organic silt containing moderately frequent sub-rounded poorly sorted pebbles.
(0302)	3	Natural	Firm pale brown-grey clay-silt frequent poorly sorted sub-rounded pebbles and occasional cobbles.
(0401)	4	Topsoil	Soft, dark grey-brown highly organic silt containing moderately frequent sub-rounded poorly sorted cobbles.
(0402)	4	Natural	Firm pale brown-grey with orange mottling clay silt.
(0501)	5	Topsoil	Soft, dark grey-brown very organic silt containing moderately frequent sub-rounded poorly sorted pebbles.
(0502)	5	Natural	Firm mid brown-grey sand-clay-silt with moderately frequent moderately sorted medium cobbles.
(0601)	6	Topsoil	Soft, dark grey-brown highly organic silt.
(0602)	6	Subsoil	Soft mid brown-grey clay-silt with frequent sub-rounded cobbles, moderately sorted.
(0603)	6	Natural	Firm mid brown-grey clay-silt with frequent sub-rounded pebbles.
(0701)	7	Topsoil	Soft dark brown-grey, lenses of mid brown-grey silt with occasional poorly sorted sub-rounded pebbles & cobbles.
(0702)	7	Natural	Firm pale brown-grey clay-silt with moderately



Context Number	Test Pit Number	Type	Description
			frequent sub-rounded cobbles.
(0801)	8	Topsoil	Soft dark grey-brown highly organic silt containing moderately frequent sub-rounded poorly sorted pebbles and occasional cobbles.
(0802)	8	Natural	Firm pale brown-grey clay-silt containing frequent poorly sorted sub-rounded cobbles.
(0901)	9	Topsoil	Soft dark grey-brown highly organic silt containing moderately frequent sub-rounded poorly sorted pebbles.
(0902)	10	Natural	Firm pale brown-grey clay-silt with moderately frequent sub-rounded cobbles.
(1001)	10	Topsoil	Soft dark grey-brown highly organic silt containing moderately frequent sub-rounded poorly sorted pebbles.
(1002)	10	Natural	Firm pale brown-grey silt containing frequent sub-rounded and angular small cobbles & occasional large cobbles.
(1101)	11	Topsoil	Soft dark grey-brown highly organic silt.
(1102)	11	Subsoil	Soft mid brown-grey organic silt containing moderately frequent sub-angular and rounded poorly sorted pebbles.
(1103)	11	Natural	Firm pale brown-grey clay-silt with frequent sub-rounded small & medium cobbles.
(1201)	12	Topsoil	Soft dark grey-brown highly organic silt.
(1202)	12	Subsoil	Soft mid brown-grey silt containing frequent sub-angular/rounded poorly sorted gravel & moderately frequent cobbles & organic matter.
(1203)	12	Natural	Firm pale brown-grey clay-silt with very frequent sub-rounded small & medium cobbles.
(1301)	13	Topsoil	Soft dark grey-brown highly organic silt.
(1302)	13	Subsoil	Soft mid brown-grey organic silt containing frequent poorly sorted sub-angular/rounded gravel and cobbles.
(1303)	13	Natural	Firm pale brown-grey clay-silt with frequent poorly sorted sub-rounded cobbles.
(1401)	14	Topsoil	Soft dark grey-brown highly organic silt

Context Number	Test Pit Number	Type	Description
			containing moderately frequent sub-rounded poorly sorted pebbles.
(1402)	14	Natural	Firm pale brown-grey silt-clay containing occasional small sub-angular cobbles.
(1501)	15	Topsoil	Soft dark grey-brown highly organic silt.
(1502)	15	Subsoil	Soft dark grey-brown moderately organic silt with moderately frequent sub-angular/rounded poorly sorted gravel & occasional pebbles.
(1503)	15	Natural	Firm pale brown-grey clay silt.
(1601)	16	Topsoil	Light greyish brown gravelly silt mixed with very frequent fine gravel particles.
(1602)	16	Subsoil	Mid-dark brown peaty silty clay mixed with moderate small – large sub-angular and sub-rounded stones.
(1603)	16	Natural	Light grey silty clay with frequent small-large sub-rounded stones.
(1701)	17	Topsoil	Light greyish brown gravelly silt mixed with very frequent fine gravel particles.
(1702)	17	Subsoil	Mid-dark brown peaty silty clay mixed with moderate small – medium sub-angular and sub-rounded stones.
(1703)	17	Natural	Light grey silty clay with frequent small-large sub-rounded stones.
(1801)	18	Topsoil	Light greyish brown gravelly silt mixed with very frequent fine gravel particles.
(1802)	18	Subsoil	Mid-dark brown peaty silty clay mixed with moderate small – medium sub-angular and sub-rounded stones .At the base of the layer a small quantity of slag was recovered. A sample was taken.
(1803)	18	Natural	Light grey silty clay with frequent small-large sub-rounded stones.
(1901)	19	Topsoil	Light greyish brown gravelly silt mixed with very frequent fine gravel particles.
(1902)	19	Subsoil	Mid-dark brown peaty silty clay mixed with moderate small – medium sub-angular and sub-rounded stones.

Context Number	Test Pit Number	Type	Description
(1903)	19	Natural	Light grey silty clay with frequent small-large sub-rounded stones.
(2001)	20	Topsoil	Dark grey organic silt with numerous roots and few stones.
(2002)	20	Subsoil	Grey gritty silt with 50% small stones up to 60mm long, mostly angular and some sub-rounded stones.
(2003)	20	Natural	Pale grey silty clay with numerous stones up to 50mm, mostly sub-rounded. Boulder clay.
(2101)	21	Topsoil	Soft dark grey-brown highly organic silt.
(2102)	21	Natural	Firm pale brown-grey boulder clay containing moderately frequent poorly sorted sub-angular cobbles.
(2201)	22	Topsoil	Soft dark grey-brown highly organic silt.
(2202)	22	Subsoil	Soft mid grey-brown moderately organic silt containing occasional sub-angular gravel.
(2203)	22	Natural	Firm pale brown-grey clay-silt with moderately frequent sub-angular gravel & occasional small sub-rounded cobbles.
(2301)	23	Topsoil	Soft dark grey-brown highly organic silt.
(2302)	23	Subsoil	Soft mid grey-brown moderately organic silt.
(2303)	23	Natural	Firm pale brown-grey clay-silt with frequent small to medium sub-rounded cobbles.
(2401)	24	Topsoil	Soft dark grey-brown highly organic silt.
(2402)	24	Natural	Smooth rock, presumably earthfast.
(2501)	25	Topsoil	Soft dark grey-brown highly organic silt.
(2502)	25	Subsoil	Soft mid grey-brown clay-silt with very occasional sub-angular cobbles.
(2503)	25	Natural	Firm pale brown-grey clay-silt with occasional sub-rounded pebbles.
(2601)	26	-	Pale yellow brown silt with no inclusion; silt washed down from quarry.
(2602)	26	A Horizon	Dark grey organic silt generally with few stones but one stone 0.3m wide.
(2603)	26	B Horizon	Grey gritty silt with small angular & sub-rounded stones.
(2604)	26	Natural	Pale yellow brown silty clay with small &

Context Number	Test Pit Number	Type	Description
			medium stones and one larger stone in corner.
(2701)	27	A Horizon/Topsoil	Dark grey organic silt with numerous roots and no inclusions.
(2702)	27	B Horizon	Grey brown gritty silt with slate gravel and small stones.
(2703)	27	Natural	Dark grey brown silty clay with flakes of pale brown. Mixed with numerous slate fragments & small angular stones.
(2801)	28	A Horizon/Topsoil	Dark grey organic silt with numerous roots and no inclusions.
(2802)	28	B Horizon	Grey gritty silt with numerous small angular and sub-rounded stones.
(2803)	28	Natural	Pale grey silty clay with stone fragments and small-medium stones.
(2901)	29	-	Pale brown silt, no stones. Quarry silting.
(2902)	29	A Horizon	Dark grey organic silt with no stones.
(2903)	29	B Horizon	Grey gritty silt with small stones.
(2904)	29	Natural	Pale grey-brown silty clay with medium and large stones embedded in it; boulder clay.
(3001)	30	-	Pale grey-brown silt, no stones. Quarry silt.
(3002)	30	-	Pale grey sand and gravel – material washed down from quarry.
(3003)	30	-	Pale grey-brown silt, no stone. Quarry silt.
(3004)	30	A Horizon	Dark grey brown organic silt with few stones.
(3005)	30	B Horizon	Grey gritty silt with numerous small stones.
(3006)	30	Natural	Medium sized stones densely embedded in pale grey silty clay.
(3101)	31	-	Cohesive fine light grey silty clay. Quarry run-off.
(3102)	31	Topsoil	Cohesive fine mid-dark brown silty peaty clay.
(3103)	31	Natural	Compact mid grey/orangey clay.
(3104)	31	Natural	Outcrop of bedrock concentrated along western half of test pit.
(3201)	32	-	Cohesive fine light grey silty clay. Quarry run-off.
(3202)	32	Topsoil	Cohesive fine mid-dark brown silty peaty clay.
(3203)	32	Fill	Coarse, fine dark brown sandy silty clay mixed

Context Number	Test Pit Number	Type	Description
			with slag and infrequent charcoal.
(3204)	32	Cut	Oval shaped cut set within the centre of the test pit. Shallow (0.08m) feature cut into the underlying clay. Bordered along S. edge by two sub-angular stones set on side.
(3205)	32	Natural	Compact, cohesive orangey red silty clay; oxidised by intensity of heat of fire/furnace.
(3301)	33	-	Cohesive fine light grey silty clay. Quarry run-off.
(3302)	33	Topsoil	Cohesive fine mid-dark brown silty peaty clay.
(3303)	33	Natural	Concentration of grey coloured medium to large sub-angular stones. Natural deposit typical of area.
(3401)	34	-	Cohesive fine light grey silty clay. Quarry run-off.
(3402)	34	Topsoil	Cohesive fine mid-dark brown silty peaty clay.
(3403)	34	Natural	Compact mid greyish brown gravelly clay mixed with moderate small sub-rounded stones.
(3404)	34		Stone hole at western edge of test pit.
(3501)	35	Topsoil	Cohesive fine mid-dark brown silty peaty clay.
(3502)	35	Subsoil	Fine, cohesive mid grey silty clay mixed with occasional rounded pebble and large sub-angular stone.
(3503)	35	Natural	Coarse, compact light greyish brown sandy clay mixed with frequent small-medium sub-angular and sub-rounded stones.



## **APPENDIX VII**

**Reproduction of co-ordinates for all of the Evaluation trenches and test pits**

## Appendix VII – Reproduction of GAT Evaluation Trench and Test Pit Co-ordinates

<b>Trench/Test Pit Number</b>	<b>Co-ordinates</b>
Trench 1	260865.157 x 363829.812
Trench 2	260845.8 x 363876.106
Trench 3	260884.08 x 363882.191
Trench 4	260933.572 x 363922.632
Trench 5	260916.737 x 363925.575
Trench 6	260909.627 x 363912.674
Trench 7	260886.832 x 363872.85
Trench 8	260891.776 x 363875.167
Trench 9	260917.078 x 363904.941
Trench 10	260965.284 x 363921.565
Test Pit 1	260885.668 x 363817.455
Test Pit 2	260884.024 x 363829.707
Test Pit 3	260881.772 x 363841.89
Test Pit 4	260861.382 x 363840.438
Test Pit 5	260875.342 x 363856.783
Test Pit 6	260884.54 x 363867.62
Test Pit 7	260872.47 x 363878.915
Test Pit 8	260852.836 x 363877.629
Test Pit 9	260846.086 x 363868.638
Test Pit 10	260852.946 x 363888.952
Test Pit 11	260905.312 x 363869.442
Test Pit 12	260892.114 x 363882.086
Test Pit 13	260892.326 x 363874.08
Test Pit 14	260915.708 x 363906.695
Test Pit 15	260918.105 x 363892.788
Test Pit 16	260947.351 x 363898.732
Test Pit 17	260947.057 x 363906.057
Test Pit 18	260944.028 x 363915.57
Test Pit 19	260939.341 x 363920.461
Test Pit 20	260932.515 x 363901.725
Test Pit 21	260838.705 x 363882.614
Test Pit 22	260907.046 x 363909.518
Test Pit 23	260913.198 x 363915.47
Test Pit 24	260886.958 x 363912.421
Test Pit 25	260892.673 x 363906.049

<b>Trench/Test Pit Number</b>	<b>Co-ordinates</b>
Test Pit 26	260940.494 x 363926.504
Test Pit 27	260935.275 x 363929.867
Test Pit 28	260931.938 x 363932.861
Test Pit 29	260921.725 x 363932.585
Test Pit 30	260926.261 x 363919.16
Test Pit 31	260943.82 x 363914.479
Test Pit 32	260945.495 x 363910.936
Test Pit 33	260964.071 x 363910.508
Test Pit 34	260952.374 x 363952.464
Test Pit 35	260912.501363885.732

## **APPENDIX VIII**

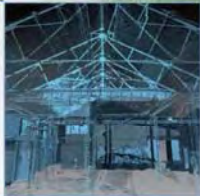
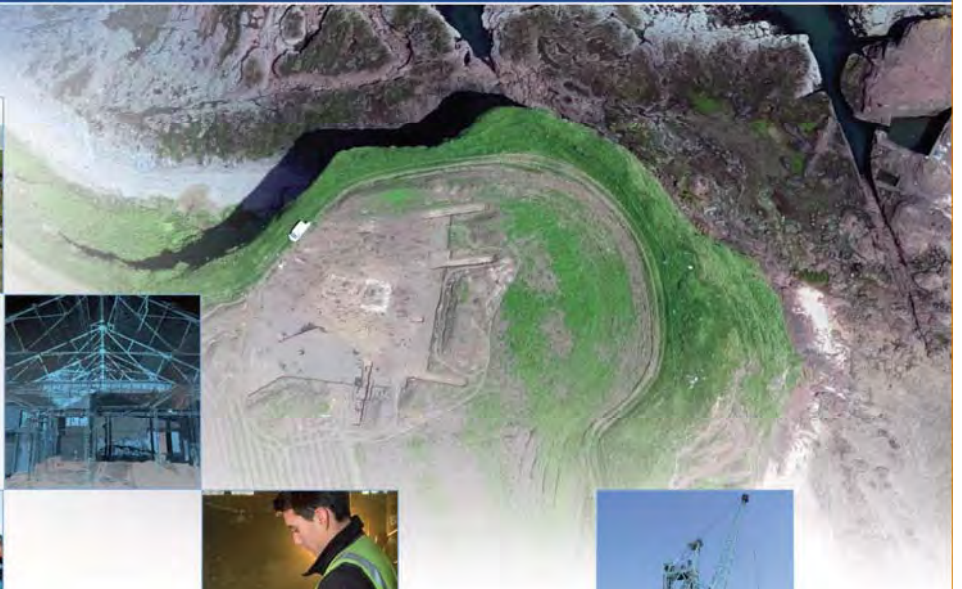
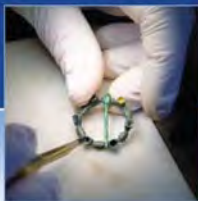
### **Reproduction of AOC Report No. 24318**

# Penrhyn Quarry, Bethesda, Gwynedd

## Report on soil sample (3203)

AOC project no 24318

12<sup>th</sup> April 2018





## Penrhyn Quarry, Bethesda, Gwynedd

### Report on soil sample (3203)

On Behalf of:

Gwynedd Archaeological Trust  
Craig Beuno  
Garth Road  
Bangor  
Gwynedd  
LL57 2RT

National Grid Reference (NGR): SH 6114 6396

AOC Project No: 24318

Prepared by: Dawn McLaren & Jackaline Robertson

Date of Report: 12<sup>th</sup> April 2018

This document has been prepared in accordance with AOC standard operating procedures.

Author: Dawn McLaren & Jackaline Robertson Date: 12<sup>th</sup> April 2018

Approved by: Ciara Clarke Date: 16/04/2018

Enquiries to: AOC Archaeology Group  
Edgefield Industrial Estate  
Edgefield Road  
Loanhead  
EH20 9SY

Tel. 0131 440 3593  
Fax. 0131 440 3422  
e-mail. [edinburgh@aocarchaeology.com](mailto:edinburgh@aocarchaeology.com)



## Contents

	Page
List of plates .....	1
Abstract.....	2
Introduction .....	3
The ecofact assemblage.....	3
Methodology .....	3
The carbonised macroplant .....	3
The charcoal .....	3
The metalworking waste.....	4
Introduction and methodology.....	4
Classification.....	4
Discussion .....	6
Recommendations.....	6
References.....	6

---

## List of plates

Plate 1: granular magnetic residue, probably roasted bog ore particles.

Plate 2: unclassified iron slag

Plate 3: fractured fragment of runned slag

## Abstract

---

A programme of test pitting, trial trenching and survey was undertaken by Gwynedd Archaeological Trust in advance of a proposed re-alignment of Penrhyn Slate Quarry, located at Bethesda, Gwynedd.

During this evaluation several archaeological features were investigated suggesting the presence of evidence of prehistoric settlement. In Test Pit 32, the cut and fill of an oval pit, provisionally interpreted as a metalworking feature, was excavated and a soil sample taken for further analysis.

The ecofacts recovered from the sample were composed of a single charred macroplant and a small quantity of charcoal. The plant remains belonged to a weed species which was intrusive, whereas the charcoal is probably fuel residue from metalworking.

Over 2.7 kg of magnetic residues were recovered from the soil sample retents. Assessment of these residues confirm that they are the biproduct of ironworking activities, probably iron smelting. Little in the way of 'diagnostic' debris was present, but enough evidence survives to hint at the waste deriving from a bloomery furnace. No trace of the furnace structure was recognised during excavation.

## Introduction

A programme of test pitting, trial trenching and survey was undertaken by Gwynedd Archaeological Trust in advance of a proposed re-alignment of Penrhyn Slate Quarry, located at Bethesda, Gwynedd.

During this evaluation several archaeological features were investigated suggesting the presence of evidence of prehistoric settlement. In Test Pit 32, the cut and fill of an oval pit, provisionally interpreted as a metalworking feature, was excavated and a soil sample taken for further analysis.

A single charred macroplant and a small quantity of charcoal were recovered from this sample. Preservation of these ecofacts was good, and they have been identified to species.

Over 2.7Kg of magnetic residues were recovered from the soil sample retents. Assessment of these residues confirm that they are the biproduct of ironworking activities, probably iron smelting. Little in the way of 'diagnostic' debris was present, but enough evidence survives to hint at the waste deriving from a bloomery furnace. No trace of the furnace structure was recognised during excavation.

## The ecofact assemblage

Jackaline Robertson

### Methodology

The bulk sample was processed in its entirety in laboratory conditions using a floatation method designed to retrieve both ecofacts and artefacts (cf. Kenward et al. 1980). The sediment consisted of a silty clay which did not require any pre-treatment. The dried retent and flot were scanned with a magnet to insure all metal working waste was retrieved. All plant macrofossils were subsequently examined at magnifications of x10 and up to x100 where necessary to aid identification. Identifications were confirmed using modern reference material and seed atlases stored at AOC Edinburgh (Cappers *et al* 2006). Nomenclature for plants follows Stace (2010). Charcoal larger than 4mm was collected for species identification.

### The carbonised macroplant

The macroplant assemblage was identified as a single charred buttercup fruit (*Ranunculus* sp) and preservation was good. This is a weed species which tends to favour damp grassland and is found throughout Britain. This species was probably growing on or near to the site and its inclusion within this feature is accidental. This material is unsuitable for dating and no further work is required.

### The charcoal

There was a small charcoal assemblage (1.0g) from which five fragments were identified as oak (*Quercus* sp). These fragments are likely residual fuel debris from the furnace. Oak is a slow growing species and although it can be used for radiocarbon dating it is not ideal because of its longevity. This material does not require any further work.



## The metalworking waste

Dawn McLaren

### Introduction and methodology

A total of 2709.3g of magnetic vitrified and heat affected waste was retrieved from the soil sample collected in the field from context 3203. Assessment of the waste was undertaken by visual analysis only, aided by examination with a binocular microscope. Visual examination allows the material to be categorised based on morphology, density, vesicularity, colour, as well as response to a magnet (Starley 2000, 337). No chemical or microstructural analysis was undertaken at this time.

During ironworking, a range of debris are produced although only a few, for example tapped slag and hammerscale are considered to be diagnostic (of smelting and smithing respectively). A significant amount of material within most assemblages is unclassifiable, making allocation of individual fragments to specific categories and processes difficult (Crew & Rehren 2002, 84).

### Classification

Three broad categories of magnetic waste were recognised amongst the sample examined. The first, which dominates the sample, are small sub-angular granules of highly magnetic heat-affected residues (Plate 1) which include occasional small sub-rounded grits of various lithologies. These stones are natural, but many have become magnetised as the result of exposure to intense heat. The individual granules are red-brown to orange-brown in colour, gritty in texture, granular in shape and are an average diameter of 1mm. Under magnification, most of this material has a greeny-tint and a powdery surface appearance suggesting moderate water erosion. Visually, this material is homogenous. No diagnostic micro-debris (e.g. hammerscale flakes or slag spheres) were present to suggest that this waste might have derived from bloom- or blacksmithing activities. Rather, it is probable that these granular magnetic residues are degraded pieces of roasted bog ore and small flecks of vitrified slag which have fallen to the base of a bloomery smelting furnace whilst in operation.



Plate 1: granular magnetic residue, probably roasted bog ore particles.



Plate 2: unclassified iron slag.

The second category of waste (Plate 2) consists of a handful of larger amorphous, fractured, fragments of partially vitrified conglomerates. These consist of fused heat-affected red-brown magnetic granules and dark brown-grey, partially molten material. Under magnification, most of this material has a greeny-tint and a powdery surface appearance suggesting moderate water erosion. Occasional small charcoal impressions and inclusions are observed alongside occasional inclusions of small sub-rounded natural grits. The largest of these fragments is 75 mm in length, 53 mm in width and 32 mm in thickness, and weighs 95.5g. These are considered to be accumulations of partially vitrified masses of roasted bog ore and are best described as unclassified iron slag.

The final category of waste consists of a single, small, fractured fragment of dense grey, runned or partially flowed slag. It is 45.5 mm in length, 33 mm in width and 16.5 mm in thickness and has a poor magnetic response. The fragment is too small to be classified as 'tapped' slag (considered to be diagnostic of smelting) and is instead classified here as 'runned slag' (not diagnostic of a particular stage in the ironworking process). Despite this, the morphology of the piece implies that it was the result of smelting.



Plate 3: Fractured fragment of runned slag.

## Discussion

The magnetic residues recovered from context 3203 are almost certainly waste produced as the result of iron smelting using a bloomery furnace. The waste consists of large quantities of small magnetic residues provisionally identified as granules of roasted magnetic ore which have fallen to the base of the furnace during smelting, larger accumulations of similar but partially vitrified waste, and a single fragment of dense runned slag. Small flecks of charcoal were embedded in some of the larger fragments of waste implying that the fuel used was wood charcoal.

A suggestion has been made here that the ore used was bog ore but this is purely conjectural in the absence of chemical analysis. This suggestion has been made due to the similarity in morphology to waste from an Iron Age/Early Historic assemblage from Aberdeenshire which was examined by the author and subjected to XRF and SEM analysis, confirming its composition.

As no furnace structure was identified during excavation, it is unclear whether this deposit represents a deliberate dump of waste resulting from iron smithing or the *in situ* basal pit of a truncated furnace. The absence of any furnace lining fragments, larger fragments of runned slag or rake out material and large quantities of fuel debris suggests the former scenario.

In the absence of radiocarbon dating of this deposit, the ironworking waste cannot be closely dated on the basis of morphology. Bloomery smelting technology was in use from the 7<sup>th</sup> century BC and continued until the 16<sup>th</sup> century AD and later in some areas (Bayley *et al* 2001, 9). Radiocarbon dating of associated charcoal or macroplant remains would be necessary to refine the chronology of production.

## Recommendations

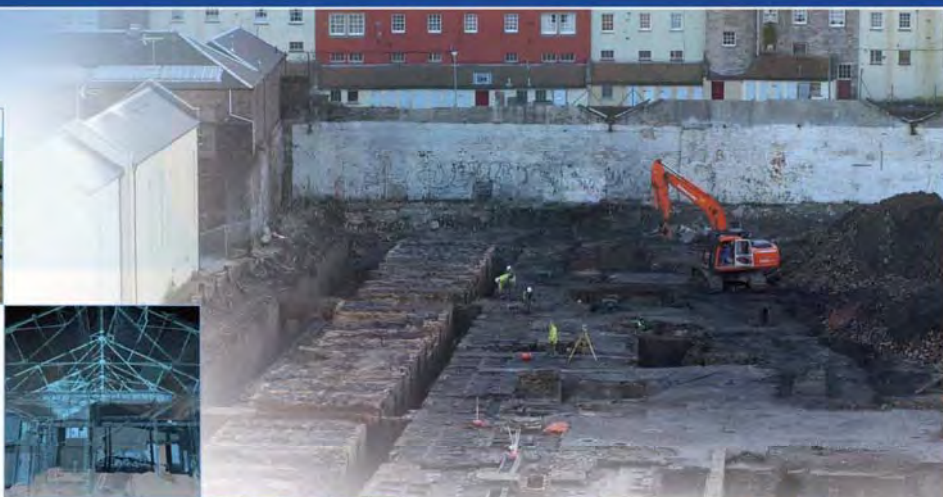
No further macroscopic examination of the ironworking residues is recommended. As an assessment, the materials were not subjected to any form of instrumental analysis. The identification and classification of the assemblage is therefore limited and should be considered provisional. Closer identification of the three broad categories of waste (e.g. chemical composition and microstructure) could be undertaken by XRF and SEM analysis, if required. This would allow closer comparison to other contemporary smelting assemblages, potentially, for example, from Bryn y Castell hillfort (Crew 1986) and Cefn Graianog (Young 2015) *inter alia*. Further analysis is only recommended if the feature can be closely dated.

## References

- Bayley, J, Dungworth, D and Paynter, S 2001 *Archaeometallurgy*. English Heritage (= CFA Guideline 2001: 01).
- Cappers R T J, Bekker R.M. and Jans J E A 2006 *Digital seed atlas of the Netherlands* (Barkhuis Publishing and Groningen University Library, Groningen).
- Crew, P 1986 Bryn y Castell hillfort — a late prehistoric iron working settlement in north-west Wales. In Scott, BG & Cleere, H (eds), *The Crafts of the Blacksmith*, 91–100. Belfast: Symposium of the UISPP Comite pour la Siderurgie Ancienne 1984.
- Crew, P & Rehren, T 2002 'High temperature workshop residues from Tara: iron, bronze and glass', in Roche, H 'Excavations at Raith na Rig, Tara, Co. Meath, 1997', *Discovery Programme Reports* 6, 83-102. Dublin: Royal Irish Academy.
- Kenward, H K, Hall, A R and Jones, A K G 1980 'A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits', *Science and Archaeology* 22, 3-15.
- Stace, C. 2010. *New Flora of the British Isles*. 3rd Edition. Cambridge University Press

- Starley, D 2000 'Metalworking debris', in Buxton, K & Howard-Davis, C (eds) *Bremetenacum: Excavations at Roman Ribchester 1980, 1989-1990*, 337-47. Lancaster (=Lancaster Imprints Ser, 9).
- Young, T P 2015 Assessment of archaeometallurgical residues from Cefn Graianog, G1598 (2014). Unpublished report produced by GeoArch. (On-Line Resource:<http://www.geoarch.co.uk/reports/2015-19%20Residues%20from%20Cefn%20Graianog%202014%20revised.pdf> accessed 12/04/2018).





**AOC Archaeology Group**, Edgefield Industrial Estate, Edgefield Road, Loanhead EH20 9SY  
tel: 0131 440 3593 | fax: 0131 440 3422 | e-mail: [edinburgh@aocarchaeology.com](mailto:edinburgh@aocarchaeology.com)

[www.aocarchaeology.com](http://www.aocarchaeology.com)





Gwynedd Archaeological Trust  
Ymddiriedolaeth Archaeolegol Gwynedd

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

