

Penmaenmawr Reservoir Discontinuance, Gwynedd

Archaeological Assessment



Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Penmaenmawr Reservoir Discontinuance, Gwynedd

Archaeological Assessment

Historic Environment Record Event Primary Reference Number 45397

Prosiect Rhif / Project No. G2594

Adroddiad Rhif / Report No.1475

Prepared for: Stillwater Associates Limited

March 2019

Written by: Carol Ryan Young, Robert Evans & John Roberts

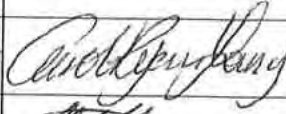
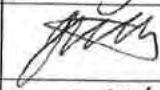

Front cover image: View over reservoir from South bank adjacent to natural lake (archive reference: G2594_012)

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	CAROL RYAN YOUNG		08/05/19
Reviewed by	Document Reviewer	JOHN ROBERTS		08/05/19
Approved by	Principal Archaeologist	JOHN ROBERTS		08/05/19

Revision History			
Rev No.	Summary of Changes	Ref Section	Purpose of Issue
1.0	Expansion of conclusion	4	GAPS Approval

Figures

Figure 01: Location map based on Ordnance Survey 1:10000 County Series Map Sheets SH77SW; Scale 1:5000 @ A4. © Crown Copyright. All Rights Reserved; licence number AI100020895.

Figure 02: Ordnance Survey 1st Edition 1-inch to 25-mile County Series Map Sheets VIII.2, VIII.3 and VIII.7; Published in 1889. Scale: 1 to 2000@A4.

Figure 03: Ordnance Survey 2nd Edition 1-inch to 25-mile County Series Map Sheets VIII.2, VIII.3 and VIII.7; Published in 1900. Scale: 1 to 2000@A4.

Figure 04: Ordnance Survey 3rd Edition 1-inch to 25-mile County Series Map Sheets VIII.2, VIII.3 and VIII.7; Published in 1913. Scale: 1 to 2000@A4.

Figure 05: Section of the Tithe map of the Parish of Dwygyfylghi, 1839 (National Archives); Scale: 1 to 5000@A4.

Figure 06: Penmaenmawr Mountain Reservoir Photographic Survey Location Map – Part 1; Scale 1:1000@A4.

Figure 07: Penmaenmawr Mountain Reservoir Photographic Survey Location Map – Part 2; Scale 1:500@A4.

Figure 08: Gazetteer of Features Location Map based on Ordnance Survey 1:10000 County Series Map Sheets SH77SW; Scale 1:6000 @ A4. © Crown Copyright. All Rights Reserved; licence number AI100020895.

Plates

Plate 01: View along NW embankment; scale 1x1m (archive reference: G2594_001)

Plate 02: Terraced areas below main embankment; no scale (archive reference: G2594_050)

Plate 03: Lack of gorse covering on mad-made ground; scale 1x1m (archive reference: G2594_008)

Plate 04: NW slope showing access route; scale 1x1m (archive reference: G2594_009)

Plate 05: Reservoir pipework; no scale (archive reference: G2594_051)

Plate 06: Large bank between natural lake and reservoir; scale 1x1m (archive reference: G2594_014)

Plate 07: Spillway from the natural lake to the Afon Gyrach; scale 1x1m (archive reference: G2594_030)

Plate 08: Sluice gate to reservoir from spillway; scale 1x1m (archive reference: G2594_028)

Plate 09: Drain from unnamed stream joining spillway; no scale (archive reference: G2594_032)

Plate 10: Sluice gate to the W of reservoir; scale 1x1m (archive reference: G2594_042)

Plate 11: Gate missing in sluice; scale 1x1m (archive reference: G2594_043)

Plate 12: Obsolete overflow from sluice gate on the right; no scale (archive reference: G2594_052)

Plate 13: Mechanism for control of sluice gate; scale 1x1m (archive reference: G2594_041)

Plate 14: View of sheepfold (PRN 39191); no scale (archive reference: G2594_059)

Plate 15: Quarry area (PRN 21035); no scale (archive reference: G2594_061)

Plate 16: Access gate adjacent to sheepfold (PRN 39191); scale 1x1m (archive reference: G2594_056)

CONTENTS

CRYNODEB ANNHECHNEGOL.....	3
NON-TECHNICAL SUMMARY	3
1 INTRODUCTION.....	4
2 METHODOLOGY.....	6
2.1 Assessment (Desktop Study).....	6
2.2 Walkover Survey	7
2.3 Gazetteer	8
3 RESULTS	9
3.1 Location and Geological Summary	9
3.2 Statutory and Non-Statutory Designations	10
3.3 Environmental Remains and Soil Morphology	11
3.4 Historical and Archaeological Background	12
3.4.1 Introduction.....	12
3.4.2 Prehistoric and Roman Background	12
3.4.3 Medieval Background	12
3.4.4 Post Medieval and Modern	13
3.5 Cartographic Evidence	14
3.6 Artefact Potential.....	15
3.7 Aerial Photographs and Lidar	16
3.8 The Walkover Survey.....	17
3.9 Gazetteer of Features.....	19
4 CONCLUSION	35
4.1 Table of Features and Recommendations.....	36
5 ACKNOWLEDGEMENTS	37
6 SOURCES CONSULTED.....	38
6.1 Primary Sources.....	38
6.2 Secondary Sources.....	38
APPENDIX I	40
Reproduction of Gwynedd Archaeological Trust written scheme of investigation	40
APPENDIX II	41
Gwynedd Archaeological Trust photographic metadata	41
APPENDIX III	42
Categories of Importance	42

CRYNODEB ANNHECHNEGOL

Ar ran Dŵr Cymru gofynnodd Stillwater Associates Limited i Ymddiriedolaeth Archaeolegol Gwynedd (YAG) i baratoi asesiad archeolegol fel rhan o astudiaeth dichonolrwydd gan edrych ar y posibilrwydd o gael gwared ar argae presennol (amharad ar) ar fynydd Penmaenmawr.

Mae Cronfa Ddŵr Penmaenmawr wedi'i lleoli o fewn ardal Cymeriad Tirwedd Hanesyddol Creyddyn ac Arllechwedd, ardal sy'n cynnwys llawer iawn o dystiolaeth ar gyfer anheddiad dynol o'r Oes Efydd hyd at yr 20fed ganrif.

Ni nodwyd unrhyw nodweddion newydd yn ystod yr asesiad wrth desg a chwblhawyd cofnod ysgrifenedig a ffotograffig manwl o seilwaith y gronfa ddŵr.

NON-TECHNICAL SUMMARY

Gwynedd Archaeological Trust (GAT) was asked by Stillwater Associates Limited on behalf of Dŵr Cymru to prepare an archaeological assessment as part of a feasibility study looking into the possible removal of an existing dam (reservoir discontinuance) on Penmaenmawr mountain.

The Penmaenmawr Mountain Reservoir is located within the Historic Landscape Character area of Creyddyn and Arllechwedd, an area which contains a large amount of evidence for human settlement from the Bronze Age through to the 20th Century.

No new features were identified during the desk based assessment and a detailed written and photographic record of the reservoir infrastructure was completed.

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was asked by Stillwater Associates Limited on behalf of Dŵr Cymru to prepare an archaeological assessment as part of a feasibility study looking into the possible removal of an existing dam (reservoir discontinuance) on Penmaenmawr mountain, 2.6km south-east of Penmaenmawr (NGR SH73537434; Figure 01).

As specified in data supplied by Stillwater Associates Limited Penmaenmawr Mountain reservoir consists of two bodies of water, the upper an enlarged natural lake and the lower artificially created. The lake has an uncontrolled inlet from an unnamed stream and an 8m wide spillway leading to the Afon Gyrach. The lower reservoir has an earthfill embankment that is 4.5m high and 40m in length to the north, a 75m embankment to the west and a 30m embankment separating the reservoir from the enlarged natural lake to the south. It has a diversion channel from the upper reservoir overflow channel and a 450mm diameter pipe spillway to the Afon Gyrach. The construction date of the reservoir is unknown but must date to the period between 1889 and 1900 as it does not feature on the 1st Edition 25 inch map but does on the 2nd and 3rd Editions (Figures 02, 03 & 04). The reservoir measures c. 30m long East to West and 75m wide North to South. The preferred removal strategy includes the complete removal of the embankment, all appurtenant structures (outlet pipes, supply pipes, spillway structures etc) and the re-use of embankment material where possible within the reservoir basin area. Access to the reservoir would be via the B5106 and then a track across the heath land for 1.2km.

The assessment conforms to the guidelines specified in the Chartered Institute for Archaeologists *Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014) and requirements of section 2.3 of MoRPHE (English Heritage 2015) and MAP2 (English Heritage, 1991, *Management of Archaeological Projects*). Submission of digital archive information to the Royal Commission on the Ancient and Historical Monuments of Wales will be undertaken in accordance with the RCAHMS Guidelines for Digital Archives Version 1 (2015). The assessment was completed in February and March 2019.

The project was monitored by Gwynedd Archaeological Planning Service (GAPS).

In line with the Gwynedd Historic Environment Record (HER) requirements, the HER was contacted at the onset of the project to ensure that any data arising is formatted in a manner

suitable for accession to the HER and follows the guidance set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (The Welsh Archaeological Trusts, 2018). The HER was informed of the project start date, location including grid reference, estimated timescale for the work, and further relevant information associated with the project. The GAT HER enquiry reference number for this project is GATHER1067 and the Event Primary Reference Number for this project is 45397.

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

2 METHODOLOGY

2.1 Assessment (Desktop Study)

A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage....Significance is to be judged in a local, regional, national or international context as appropriate” (ClfA 2014, 4).

The desk-based assessment involved a study of the following resources:

1. The regional Historic Environment Register ((HER) Gwynedd Archaeological Trust, Craig Beuno/Garth Road, Bangor, LL57 2RT) will be examined for information concerning the study area. This will include an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held within the HER. All identified assets will be mapped, described and added to a gazetteer of sites and the relative importance of any assets defined;
2. The National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be checked for assets additional to the HER;
3. Aerial photographs from the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be examined for potential assets;
4. An on-line catalogue search of the National Library of Wales (Penglais Rd, Aberystwyth SY23 3BU) will be completed;
5. Archive data, including primary and secondary sources, historic maps and estate maps will be examined at the regional archives (The Old Board School, Lloyd Street, Llandudno, Conwy, LL30 2YG). The examination of the archive data will include historic mapping including the local tithe map and schedule;
6. If available for the assessment area, Light Detection and Ranging (LiDAR) data will be examined from the Lle Geo-Portal at <http://lle.gov.wales/home> for information on potential surface features using digital terrain modelling and digital surface modelling.

2.2 Walkover Survey

A walkover survey was undertaken on the 14/02/2019 that incorporated the reservoir area and access track as located on Figure 01. All known and new archaeological assets identified within close proximity to the study area were located and described on GAT proformas. The features were then added to the overall gazetteer and their relative importance defined.

A photographic record was maintained in RAW format using a digital SLR set to maximum resolution (Nikon D5100; resolution: 4928 × 3264 [16.2 effective megapixels]) and a photographic metadata table has been completed (G2594_001 to G2594_064; cf. Appendix II), with images archived in TIFF format.

2.3 Gazetteer

A gazetteer has been compiled for all known and new sites within and within proximity to the specified route; the gazetteer includes the following:

1. Feature Number
2. Site name
3. PRN number
4. Grid reference
5. Period
6. Site type
7. Assessment category
8. Description
9. Recommendation for further assessment/evaluation
10. Recommendation for mitigatory measures

3 RESULTS

3.1 Location and Geological Summary

The Penmaenmawr Mountain Reservoir is located on Penmaenmawr mountain, 2.6km south-east of Penmaenmawr, within the Historic Landscape Character area of Creyddyn and Arllechwedd, area 24 unenclosed mountains (north), PRN 15810.

The bedrock geology in the study area is Conwy Rhyolite Formation – Rhyolite which is an igneous bedrock formed during the Ordovician Period in an environment that was subject to silica-rich magma eruptions. This is overlain by Devensian till – Diamicton which was formed in the Quaternary Period. These are a wide range of deposits and geomorphologies typical of the glacial and inter-glacial periods during the Quaternary (British Geological Survey, 2019).

3.2 Statutory and Non-Statutory Designations

There are no Scheduled Monuments (SM) within the buffer area which is defined as a 0.5km radius around the reservoir and a 25m buffer around the access route. However, there are seven SM's within 1km of the reservoir all dating to the prehistoric period.

The first and largest SM is situated to the west north west of the study area and is Penmaenmawr Stone Circle (SM CN024, NGR SH7211474606) which is an area of upland containing a dense concentration of burial and ceremonial sites including 5 stone circles, 7 cairns and an enclosure. To the north west of the reservoir are the Maen Crwn Standing Stone (PRN 4678, SM CN340, NGR SH7310174991) and the Bryn Derwydd Stone Circle (PRN 728, SM CN0339, SH7322675055) both dating to the Bronze Age. The Cefn Llechen cairns (PRN 4686, SM CN353, NGR SH7430175126) are situated to the north east of the study area and are both circular in plan with a 5m diameter. The final three SM's are Maen Penddu Standing Stone (PRN 562, SM CN126, NGR SH7390073574), Cefn Maen Amor Stone Circle (PRN 5066, SM CN355, NGR7387173590) and Cefn Maen Amor cairn (PRN 575, SM CN354, NGR SH7384473599) all monuments dating to the Bronze Age (Cadw, 2019).

There are no Listed Buildings located within the buffer area around the Penmaenmawr Mountain reservoir. The closest listed building is the Grade I listed St Celynin's Old Church, Henryd (PRN 1581, CADW LB 3193, NGR SH7611873726), which dates to the 15th Century.

Ref Number	Name	PRN	Easting	Northing	Grade
CN024	Penmaenmawr Stone Circle	-	272114	374606	SM
CN340	Maen Crwn Standing Stone	4678	273101	374991	SM
CN339	Bryn Derwydd Stone Circle	728	273226	375055	SM
CN353	Cefn Llechen Cairns	4686	274301	375126	SM
CN126	Maen Penddu Standing Stone	562	273900	373574	SM
CN355	Cefn Maen Amor Stone Circle	5066	273871	373590	SM
CN354	Cefn Maen Amor Cairn	575	273844	373599	SM
3193	St Celynin's Old Church	1581	275118	373726	I

3.3 Environmental Remains and Soil Morphology

The potential for the recovery of environmental remains is thought to be **low** as the discontinuance scheme only includes the removal of the reservoir structures and not large scale disturbance to otherwise untouched ground.

Full detail of the soil morphology is unknown at this stage but it is likely to consist of a sandy, silty clay typical of glacial deposits.

3.4 Historical and Archaeological Background

3.4.1 Introduction

The Penmaenmawr Mountain Reservoir is located within the Historic Landscape Character area of Creyddyn and Arllechwedd, area 24 unenclosed mountains (north), PRN 15810. This area, which extends from Conwy Mountain (Mynydd y Dref) in the north-east to the uplands around Bwlch y Ddeufaen in the south-west, contains evidence for human settlement from the Bronze Age through to the 20th Century (Gwyn & Thompson, 1999).

3.4.2 Prehistoric and Roman Background

Bronze Age monuments in the area include the embanked stone 'Druid's' Circle immediately to the south east of Penmaenmawr, which lies at the centre of a group of ritual/ceremonial monuments and near to a possible Bronze Age trackway. This trackway extends from the Afon Ddu Valley in the west to the Conwy Valley in the east and intersects with a small cemetery of ruined barrows. Another trackway from the same period links Aber and the Conwy Valley via Bwlch y Ddeufaen. There are also two north-south orientated routes across the valleys, the most westerly of which runs adjacent to the cairn field at Bryniau Bugeilydd where there is also evidence for enclosed and unenclosed roundhouse settlements and field systems. (Gwyn & Thompson, 1999).

As detailed in section 3.2 there are seven Scheduled Monuments dating to the prehistoric period within 1km of the reservoir. The most expansive of these, Penmaenmawr Stone Circle (SM CN024, NGR SH7211474606), contains a concentration of burial and ceremonial sites including 5 stone circles, 7 cairns and an enclosure which is of national importance. This area has the potential to improve our understanding of prehistoric ritual and funerary activities and it is highly likely that significant archaeological features and deposits remain in the area which are as yet undocumented. (Cadw, 2019).

3.4.3 Medieval Background

The assessment area is situated in the uplands which would have been used as summer pasture land during the medieval period. There is also some evidence for peat extraction and small scale mineral extraction near to Penmaenbach (Gwyn & Thompson, 1999).

3.4.4 Post Medieval and Modern

The most prevalent archaeological asset in proximity to the assessment area is the Post-Medieval Sheepfold or Sheep shelter (PRN's 38585, 38586, 38587, 38578, 38583, 38582, 38588). The closest of these, PRN 38585, is situated 250m to the North of the reservoir and is marked on the 1st edition 25 inch to 1 mile Ordnance Survey map (Caernarfonshire VIII.3, published 1989). At the eastern end of the access route are the remains of a Medieval Long Hut (PRN 4715, NGR SH74347469). The stone walls of this building are described as grass-covered and in a poor condition on the HER (Historic Environment Record). There is also a Post-Medieval Quarry (PRN 21035, NGR SH74407460; Schofield, 2004) and another Post-Medieval Sheepfold (PRN 39191, NGR SH744207460) at the eastern end of the access track.

In 2014 Gwynedd Archaeological Trust undertook a large scale study of the Medieval and Post-Medieval agricultural features of North-West Wales in order to inform any possible scheduling enhancement. (Kenney, J. 2014). This study included a detailed evaluation of sheepfolds and sheep pen structures including those within the assessment area. It also notes that although sites may be recorded as used for sheep "the terminology used depends largely on the individual carrying out the recording" and "shelters for people and shelters for sheep or goats" are not distinguished between in the records.

3.5 Cartographic Evidence

The tithe map of the Parish of Dwygyfylghi (sic), surveyed in 1839 (National Archives; Figure 05), shows the study area is situated on common land. According to the apportionment that accompanies this map the landowner is the Rectorial Glebe and the Occupier is David Davies. It is likely that this upland area, given the topography and its remote nature, has been common pasture for a long period of time.

The Ordnance Survey 1st edition 25 inch Caernarvonshire County Series map of 1890. Sheets VIII.2, VIII.3 & VIII.7 (Figure 02) shows the Afon Gyrach to the west and an unnamed stream to the East converging and joining to the North of the present reservoir. On the 1900 2nd edition we see the first reservoir created on the site (Figure 03). A sluice gate has been erected over the Afon Gyrach and a drainage channel connects the two streams. There is no sign of the natural lake forming during this period and it looks like the reservoir is supplied by a pipe. The reservoir is marked 'Penmaenmawr U.D.C. Water Works'. The Penmaenmawr Urban District Council was created in 1897 and, amongst other things, was responsible for sewerage and water supply works in the local area (Conwy Archive Service). The 3rd edition from 1913 shows the reservoir in its current layout. The 'natural lake' has formed between the unnamed stream and the reservoir and this 'lake' is joined to the Afon Gyrach by a spillway. The 'Penmaenmawr U.D.C' is still noted on the map as the owner of the reservoir and a border has been drawn around the major sections of the site. There is no evidence for this border ever having been a physical entity and it may just demark this land from the common land surrounding it.

3.6 Artefact Potential

The potential for the recovery of artefacts is thought to be **low** as the discontinuance scheme only includes the removal of the reservoir structures and not large scale disturbance to otherwise untouched ground. There is one find spot located within the buffer area, an arrow stone (PRN 4603, NGRSH74307470) measuring 2ft 2ins by 1ft 8ins was found between Waen Gyrach and Tyddyn Grased. Whilst the overall potential for the recovery of artefacts is considered low, the movement of heavy plant to and from the reservoir site and the disturbance associated with these activities must be carefully considered.

3.7 Aerial Photographs and Lidar

Three aerial photographs were examined dating to 1942 and 1986. The first of these, RAF AC31:H13:140 frame 5 taken on the 16th of April 1942 shows the sheepfold (PRN 39191) and the post-medieval quarry (PRN 21035) at the eastern end of the access route, but not the reservoir itself. The layout of the sheepfold appears to be unchanged from that which appears on the Ordnance Survey 1st edition 25 inch Caernarvonshire County Series map of 1890 and survives in this layout to present day.

The second aerial photograph was taken by BKS Surveys Ltd on behalf of R Travers Morgan and Partners, Job number 3918, image 635144 taken Oct-Nov 1969. This image clearly shows the reservoir layout in its current format as shown on the Ordnance Survey 3rd edition 25 inch Caernarvonshire County Series map of 1913 (Figure 04) and the most recent edition (Figure 01). The sheepfold (PRN 38585) 250m to the north of the reservoir is visible and also seems to be unchanged from the historic mapping.

The final photograph, SNP 54_86_037, was taken by J.A.S. Photographic for the survey of the Snowdonia National Park in Oct/Nov 1986. Like the second photograph it shows both the reservoir and the sheepfold (PRN 38585) are unchanged.

No new archaeological assets were identified from examining the aerial photography.

Light Detection and Ranging (LiDAR) data was examined, obtained from the Lle Geo-Portal at <http://lle.gov.wales/home>, for information on potential surface features using digital terrain modelling and digital surface modelling at 1m interval. The reservoir infrastructure is clearly visible on both the DTM and DSM models as is the access track. The sheepfold (PRN 38585) 250m to the north is seen on the surface model but not the terrain model. No new archaeological features were identified on the images.

3.8 The Walkover Survey

The detailed photographic and written survey was undertaken on the 14th February 2019. Two photograph location plans have been completed, Figure 06 for the reservoir area and Figure 07 for the entrance gate adjacent to the sheepfold (PRN 39191).

The main reservoir is kidney shaped and has been constructed by building a large c.4.5m high embankment at the NW end (Plate 01) with two terraced areas below it to the NW (Plate 02). The height of the embankment lessens to the SW and the reservoir has been cut into the natural sloping hillside. The areas of man-made ground are clearly discernible by the lack of gorse covering (Plate 03). The banks of the reservoir are steeply sloping and lined with stone apart from the NW bank which has an approximately 45 degree slope (Plate 04). There is evidence that this is where access is gained to the reservoir as the stone work here has become worn and patchy at the NW corner. This corner is where the pipework for the reservoir is situated (Plate 05).

The natural lake has been formed to the SE of the reservoir by the creation of a large bank (Plate 06). The flow from the natural lake leads down a c.4m wide spillway, which is stone lined with vertical sides, and runs into the Afon Gyrach (Plate 07). Approximately 10m NW of the natural lake along the spillway is a sluice gate and channel that leads to the reservoir (Plate 08). This channel is kept closed as the reservoir is no longer in use. The drain from the unnamed stream joins the spillway c.15m before its NW end (Plate 09). The construction of the drain is the same as the spillway.

To the W of the reservoir there is a sluice gate on the Afon Gyrach constructed mainly from concrete (Plate 10). The gate has been removed (Plate 11) and the water from the Afon Gyrach freely flows through. There is an overflow channel leading from the sluice to the Afon Gyrach but this has clearly been out of use for some time (Plate 12). To the immediate N of the sluice gate there are some remnants of the mechanism used to control it (Plate 13).

At the Eastern end of the access track to the reservoir the sheep pen (PRN 39191) and the quarry area (PRN 21035) are situated. The sheep pens appear in generally good repair and are still in use by the local farmers (Richard Williams (DCWW), pers comm; Plate 14). The quarry area adjacent to the sheep pens is clearly visible (Plate 15). On the E side of the sheep pens is an access gate, the W side of the gate is formed from the outer wall of the sheep pen (Plate 16). During any improvement or discontinuance works at the reservoir it

may be necessary to widen the access gate which could affect the archaeological asset. During previous large scale works at the site, plant was moved to the reservoir from the north rather than the access route used for the walkover survey although this possible route was unknown (Richard Williams (DCWW), pers comm).

No evidence of the Tyddyn Grasod Long Hut (PRN 4715) was seen during the walkover survey and no new archaeological assets were identified.

3.9 Gazetteer of Features

A 0.5km radius search centred on the reservoir (NGR SH7355074320) and a 25m buffer around the access route were used to source records from the GAT HER for this assessment which returned 16 results in total.

All the features noted below are shown on Figure 08 with red circles numbered (gazetteer of features). All the recommendations are based on the current understanding of the scheme proposals and their impact on the features. In the event of alterations to the scheme, the recommendations might have to be revisited.

Feature Number	01
Site Name	Arrow Stone, Findspot, Nr Tyddyn Grased
PRN Number	4603
Grid Reference	SH74307470
Period	Unknown
Site Type	Incised Stone
Assessment Category	B
Description	An arrow stone discovered between Waen Gyrach and Tyddyn Grased. The stone is 2ft 2ins and 1ft 8ins in its longest and widest parts. The surface is very smooth and there are narrow incisions on both sides. These incisions are supposed to be the results of arrow sharpening.
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	None

Feature Number	02
Site Name	Long Hut, Tyddyn Grasod
PRN Number	4715
Grid Reference	SH74347469
Period	Medieval
Site Type	Long Hut
Assessment Category	B
Description	<p>The remains of a long hut. Stone walls are grass covered (OS, 1969)</p> <p>This site was not seen on the walkover survey</p>
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	03
Site Name	Long Hut, W of Cefn Maen Amor
PRN Number	533
Grid Reference	SH73397396
Period	Unknown
Site Type	Long Hut
Assessment Category	B
Description	Long hut orientated NE-SW and with walls faced with slabs. Well constructed house platform measuring c.7m by 5m (Schofield, 2004).
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	04
Site Name	Sheep Shelter, Cefn Maen Amor
PRN Number	38582
Grid Reference	SH7390574097
Period	Post Medieval
Site Type	Sheep Shelter
Assessment Category	B
Description	Sheep shelter noted on 25 inch OS County Series maps (Kenney, 2014)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	05
Site Name	Sheep Shelter, Maen Crwn
PRN Number	38586
Grid Reference	SH7367074660
Period	Post Medieval
Site Type	Sheep Shelter
Assessment Category	B
Description	Sheep shelter not on OS 25 inch County Series Maps (Kenney, 2014).
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	06
Site Name	Sheep Shelter, Maen Crwn
PRN Number	38587
Grid Reference	SH7377074710
Period	Post Medieval
Site Type	Sheep Shelter
Assessment Category	B
Description	Sheep shelter not on OS 25 inch County Series Maps (Kenney, 2014).
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	07
Site Name	Sheepfold, Cefn Maen Amor
PRN Number	38583
Grid Reference	SH7382474065
Period	Post Medieval
Site Type	Sheepfold
Assessment Category	B
Description	On OS 25 inch County Series Maps. (Kenney, 2014).
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	08
Site Name	Sheepfold, Cerrig Gwynion
PRN Number	38575
Grid Reference	SH7305074280
Period	Post Medieval
Site Type	Sheepfold
Assessment Category	B
Description	Sheepfold not on OS County Series Maps (Kenney, 2014)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	09
Site Name	Sheepfold, Cerrig Gwynion
PRN Number	38576
Grid Reference	SH7298074250
Period	Post Medieval
Site Type	Sheepfold
Assessment Category	B
Description	Sheepfold on OS County Series Maps from 1889 (Kenney, 2014)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	10
Site Name	Sheepfold, Cerrig Gwynion
PRN Number	38578
Grid Reference	SH7322074110
Period	Post Medieval
Site Type	Sheepfold
Assessment Category	B
Description	Sheepfold not on early 1:10560 maps (Kenney, 2014)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	11
Site Name	Sheepfold, Maen Crwn
PRN Number	38585
Grid Reference	SH7347074570
Period	Post Medieval
Site Type	Sheepfold
Assessment Category	B
Description	<p>On 1889 25 inch County Series maps, Extensive remains still standing which include a washpool (Kenney, 2014).</p> <p>This site was not visited during the walkover survey but was clearly visible to the north of the study area.</p>
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	12
Site Name	Shelter, Cefn Maen Amor
PRN Number	38579
Grid Reference	SH7340073860
Period	Post Medieval
Site Type	Shelter
Assessment Category	B
Description	Shelter not on early 1:10560 maps (Kenney, 2014)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	13
Site Name	Shelter, Cefn Maen Amor
PRN Number	38584
Grid Reference	SH7364073910
Period	Post Medieval
Site Type	Shelter
Assessment Category	B
Description	Shelter not on OS 25 inch County Series maps (Kenney, 2014)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	14
Site Name	Shepherds Hut, Cerrig Gwynion
PRN Number	38577
Grid Reference	SH7324074060
Period	Medieval
Site Type	Shepherds Hut
Assessment Category	B
Description	Shepherds hut not on early 1:10560 maps (Kenney, 2014)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	15
Site Name	Quarry, Tyddyn Grasod
PRN Number	21035
Grid Reference	SH74407460
Period	Post Medieval
Site Type	Quarry
Assessment Category	C
Description	A Quarry measuring c.40 in diameter containing five scoops up to 2m deep (Scholfield, 2004)
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

Feature Number	16
Site Name	Sheepfold, Tyddyn Grasod
PRN Number	39191
Grid Reference	SH7442074620
Period	Post Medieval
Site Type	Sheepfold
Assessment Category	B
Description	<p>Good example of a sheepfold still in use today (Richard Williams (DCWW), pers comm). On OS 25 inch County Series Map from 1889 (Kenney, 2014).</p> <p>On the E side of the sheepfold is an access gate, the W side of the gate is formed from the outer wall of the sheep pen (Plate 16). This gate is not wide enough for large plant.</p>
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

4 CONCLUSION

The desk based assessment noted that there is only one known archaeological asset likely to be directly affected by any discontinuance works undertaken at the site of the Penmaenmawr Mountain Reservoir, the sheepfold (PRN 39191) which is situated at the eastern end of the access track to the reservoir. This conclusion is assuming the access route used during the walkover survey is the same route any plant will use to access the reservoir to undertake the discontinuance work. However, although no assets were identified during the walkover survey this does not mean that they do not exist and some may currently be obscured from view by vegetation. For example, Feature 02 - Tyddyn Grasod should lie within the access route buffer but was not seen during the walkover survey. In the event of another access route being selected, any recommendations in this assessment will have to be revisited.

The landscape surrounding the reservoir is rich in archaeology dating from the prehistoric period through to the 20th Century with 16 features noted within the buffer area and 7 Scheduled Monuments situated within 1km of the reservoir. It is therefore possible that other unknown archaeological assets could exist under the embankments and be covered by vegetation along the access route. By examining the cartographic evidence it has become evident that the reservoir was constructed between 1890 and 1900 by the Penmaenmawr Urban District Council to supply clean water to the local area. A full written and photographic survey of the existing reservoir structures and the access route has been completed as part of this assessment.

4.1 Table of Features and Recommendations

Asset_No	PRN	Site_Name	Period	NGR	Recommendations for Further Assessment	Mitigation Recommendations
01	4603	Arrow Stone, Findspot, Nr Tyddyn Grasod	Unknown	SH74307470	None	None
02	4715	Long Hut, Tyddyn Grasod	Medieval	SH74347469	None	Avoidance
03	533	Long Hut, W of Cefn Maen Amor	Unknown	SH73397396	None	Avoidance
04	38582	Sheep Shelter, Cefn Maen Amor	Post Medieval	SH7390574097	None	Avoidance
05	38586	Sheep Shelter, Maen Crwn	Post Medieval	SH7367074660	None	Avoidance
06	38587	Sheep Shelter, Maen Crwn	Post Medieval	SH7377074710	None	Avoidance
07	38583	Sheepfold, Cefn Maen Amor	Post Medieval	SH7382474065	None	Avoidance
08	38575	Sheepfold, Cerrig Gwynion	Post Medieval	SH7305074280	None	Avoidance
09	38576	Sheepfold, Cerrig Gwynion	Post Medieval	SH7298074250	None	Avoidance
10	38578	Sheepfold, Cerrig Gwynion	Post Medieval	SH7322074110	None	Avoidance
11	38585	Sheepfold, Maen Crwn	Post Medieval	SH7347074570	None	Avoidance
12	38579	Shelter, Cefn Maen Amor	Post Medieval	SH7340073860	None	Avoidance
13	38584	Shelter, Cefn Maen Amor	Post Medieval	SH7364073910	None	Avoidance
14	38577	Shepherds Hut, Cerrig Gwynion	Medieval	SH7324074060	None	Avoidance
15	21035	Quarry, Tyddyn Grasod	Post Medieval	SH74407460	None	Avoidance
16	39191	Sheepfold, Tyddyn Grasod	Post Medieval	SH7442074620	None	Avoidance

5 ACKNOWLEDGEMENTS

Thanks must go to Richard Williams from DCWW who in, addition to some excellent off-roading skills, provided the author with valuable information regarding how the study area is used today. Thanks must also go to the National Library of Wales and the Conwy Archive Service who provided archive and cartographic material in support of this project.

6 SOURCES CONSULTED

6.1 Primary Sources

Conwy Archives, Llandudno

Ordnance Survey 1st edition 25 inch Caernarvonshire County Series map of 1890. Sheets VIII.2, VIII.3 & VIII.7

Ordnance Survey 2nd edition 25 inch Caernarvonshire County Series map of 1900. Sheets VIII.2, VIII.3 & VIII.7

Ordnance Survey 3rd edition 25 inch Caernarfonshire County Series map of 1913. Sheets VIII.2, VIII.3 & VIII.7

Register of Aerial Photography, Welsh Assembly Government, Cardiff

Vertical Images

RAF AC31: H13:140 Frame 5 taken 16th April 1942

BKS Surveys Ltd, Job: 3918, Image 635144 taken Oct-Nov 1969

J.A.S. Photographic, SNP 54_86_037 taken Oct-Nov 1986

6.2 Secondary Sources

British Geological Survey, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>.

Cadw, 2019, Cof Cymru – National Historic Assets of Wales, accessed online <https://cadw.gov.wales/historicenvironment/recordsv1/cof-cymru/?lang=en>

English Heritage, 1991, Management of Archaeological Projects

English Heritage, 2015, Management of Research Projects in the Historic Environment (MoRPHE). *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1)

Gwyn, D. & Thompson, D. 1999. Historic Landscape Characterisation – Creuddyn & Arllechwedd. *Gwynedd Archaeological Trust Report No. 318*

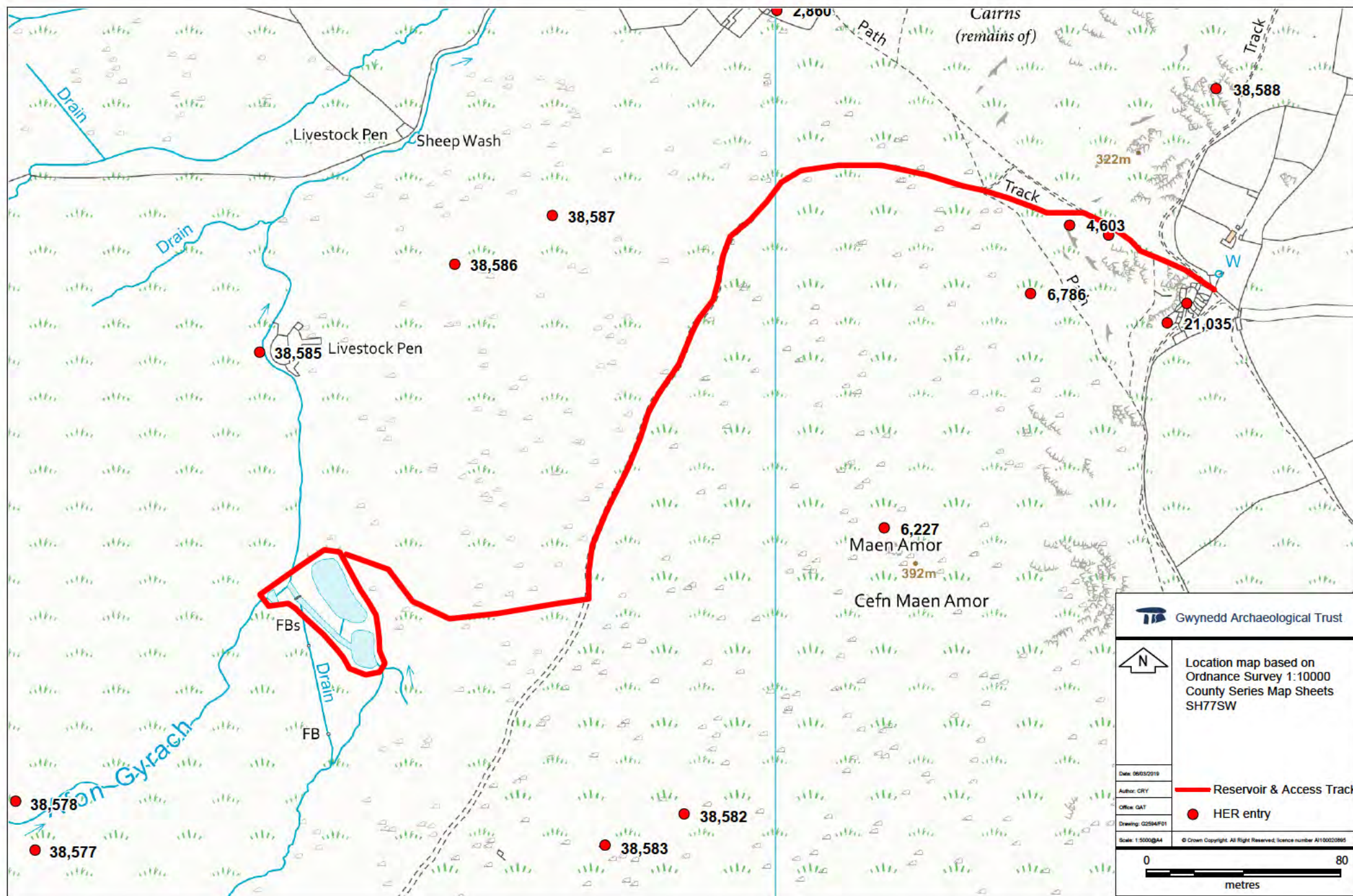
Kenney, J., 2014 , Medieval and Post-Medieval Agricultural Features in North-West Wales. Report on Scheduling Enhancement Study. Part 1: Report and Gazetteer.

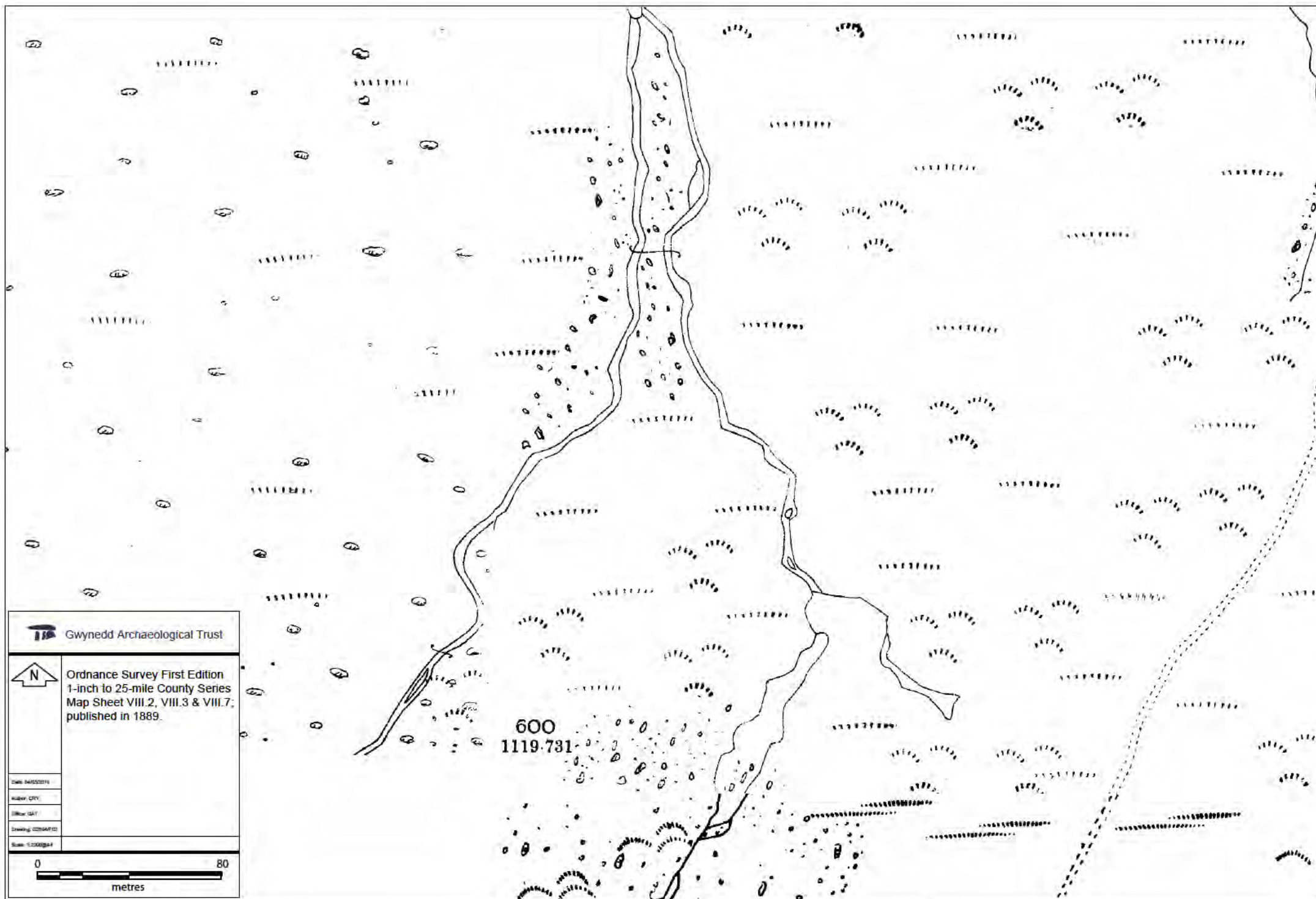
National Library of Wales, Index of Penmaenmawr Urban District Council Records, https://webcache.googleusercontent.com/search?q=cache:7mDPOR9VO0oJ:https://archiveswales.llgc.org.uk/anw/get_collection.php%3Finst_id%3D46%26coll_id%3D1858%26expand%3D1858A+&cd=1&hl=en&ct=clnk&gl=uk

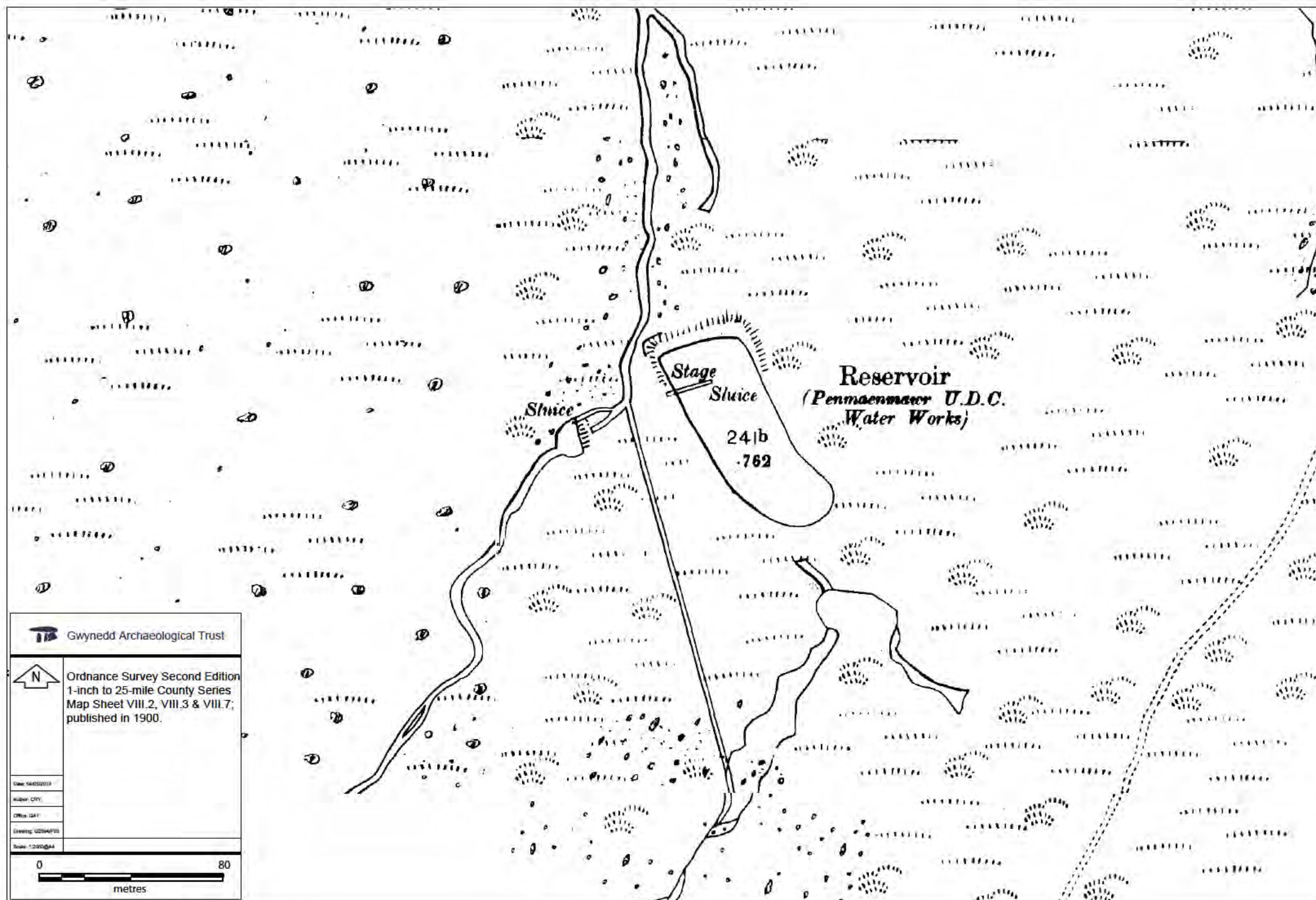
Royal Commission on Ancient and Historic Monuments of Wales 2015 *Guidelines for digital archives*

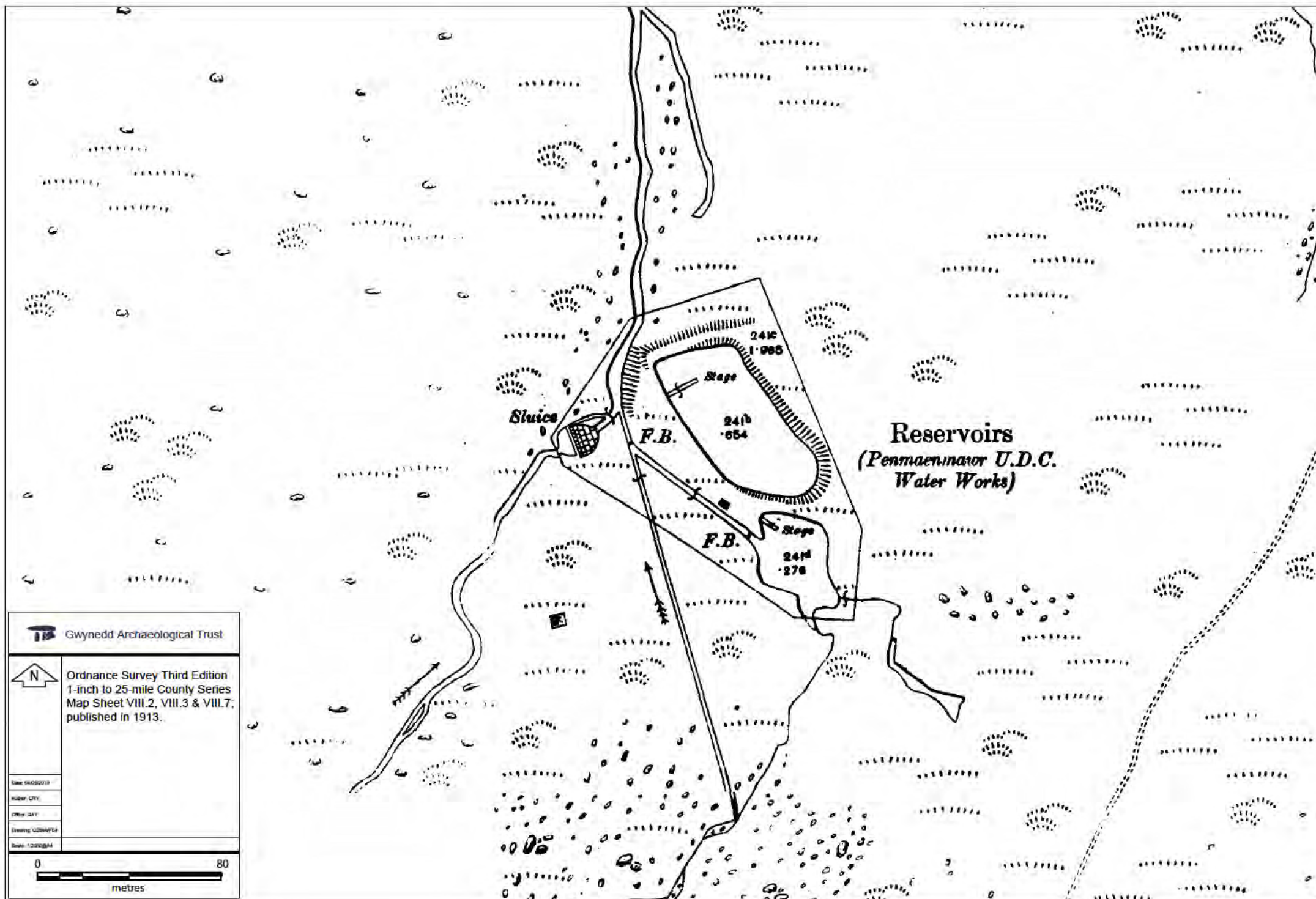
Schofield, P., 2004 , Uplands Initiative Field Projects 2003-4 Eastern Snowdonia Survey Area, Penmaenmawr to Rowen

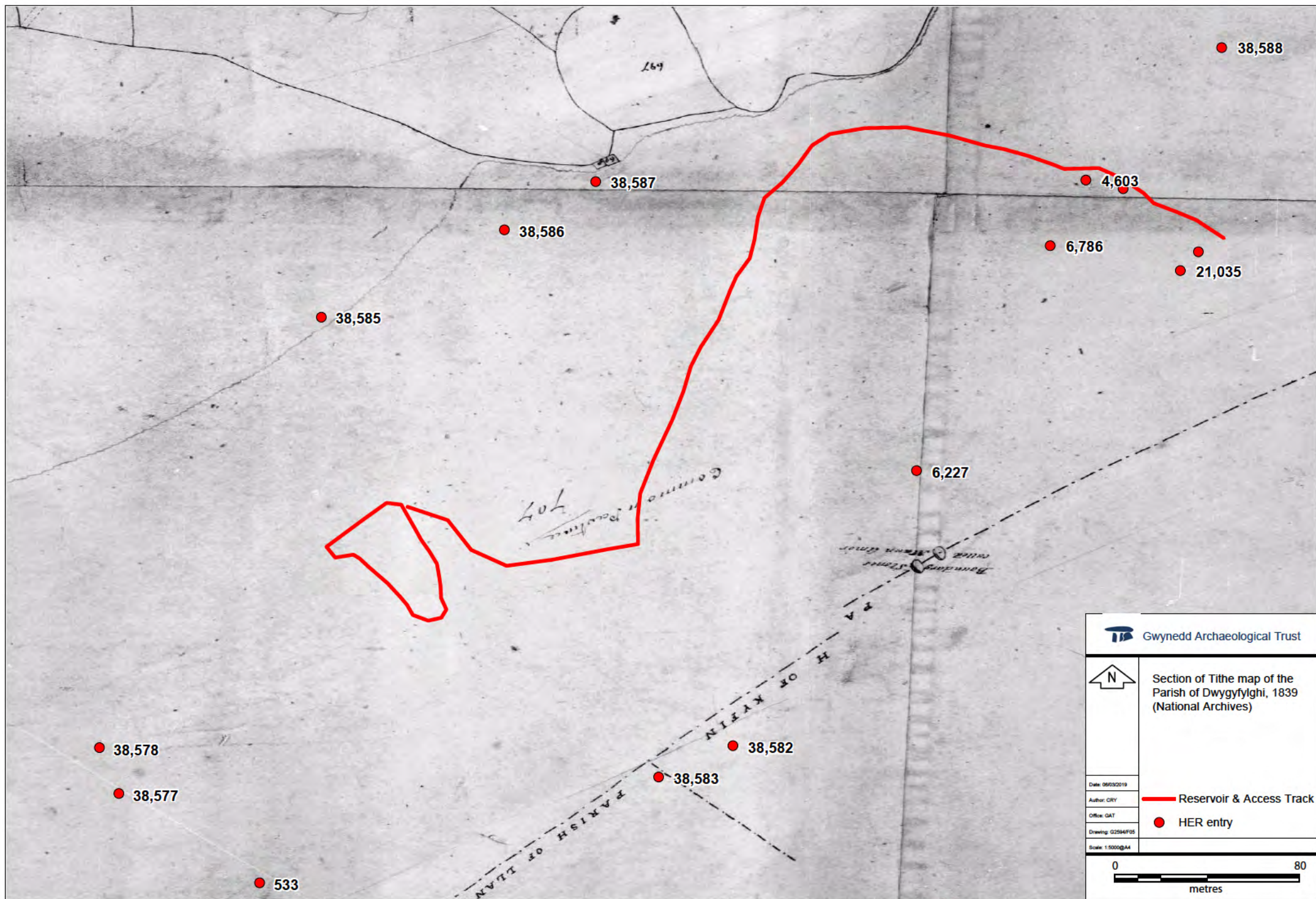
Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists, 2014).

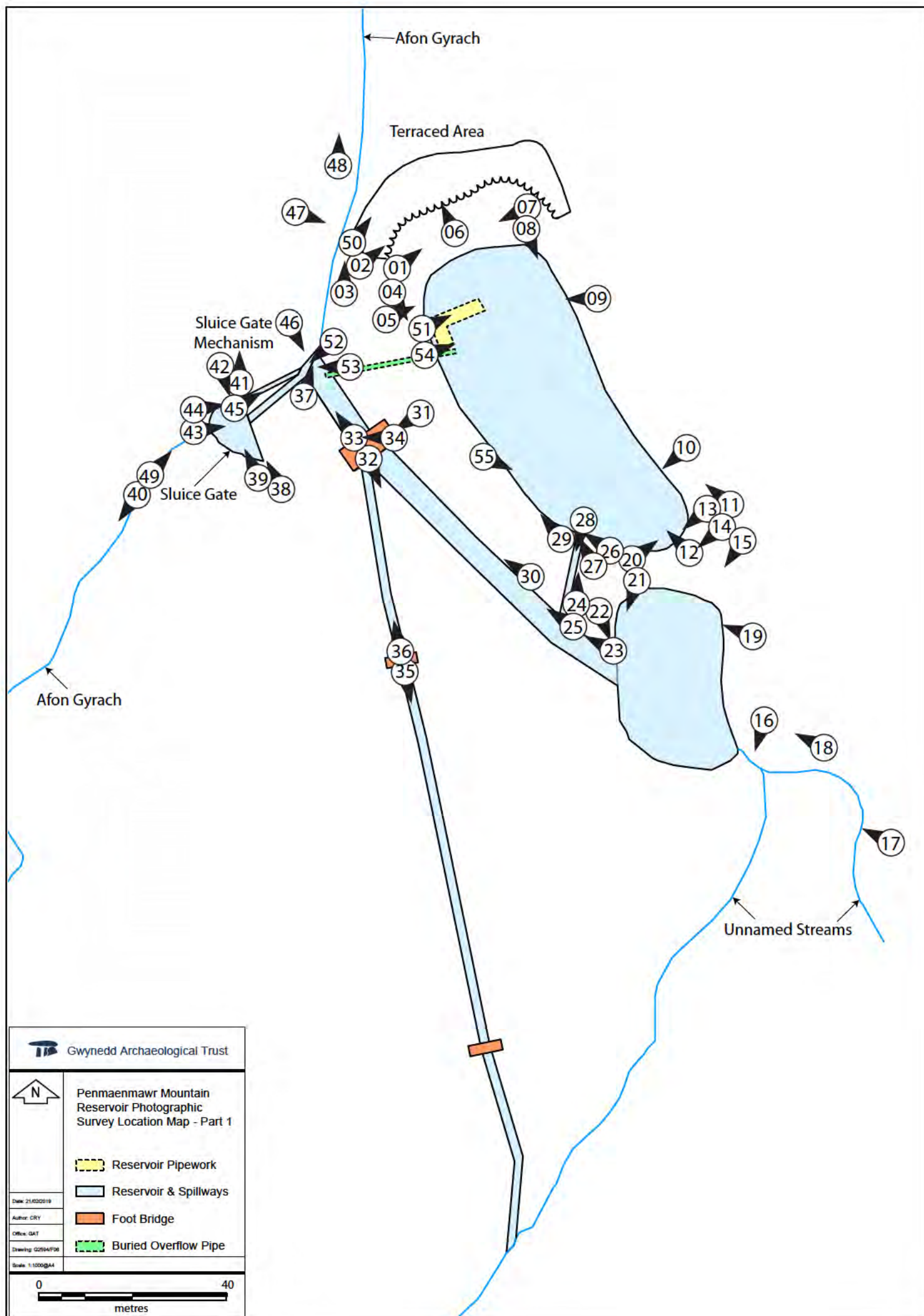


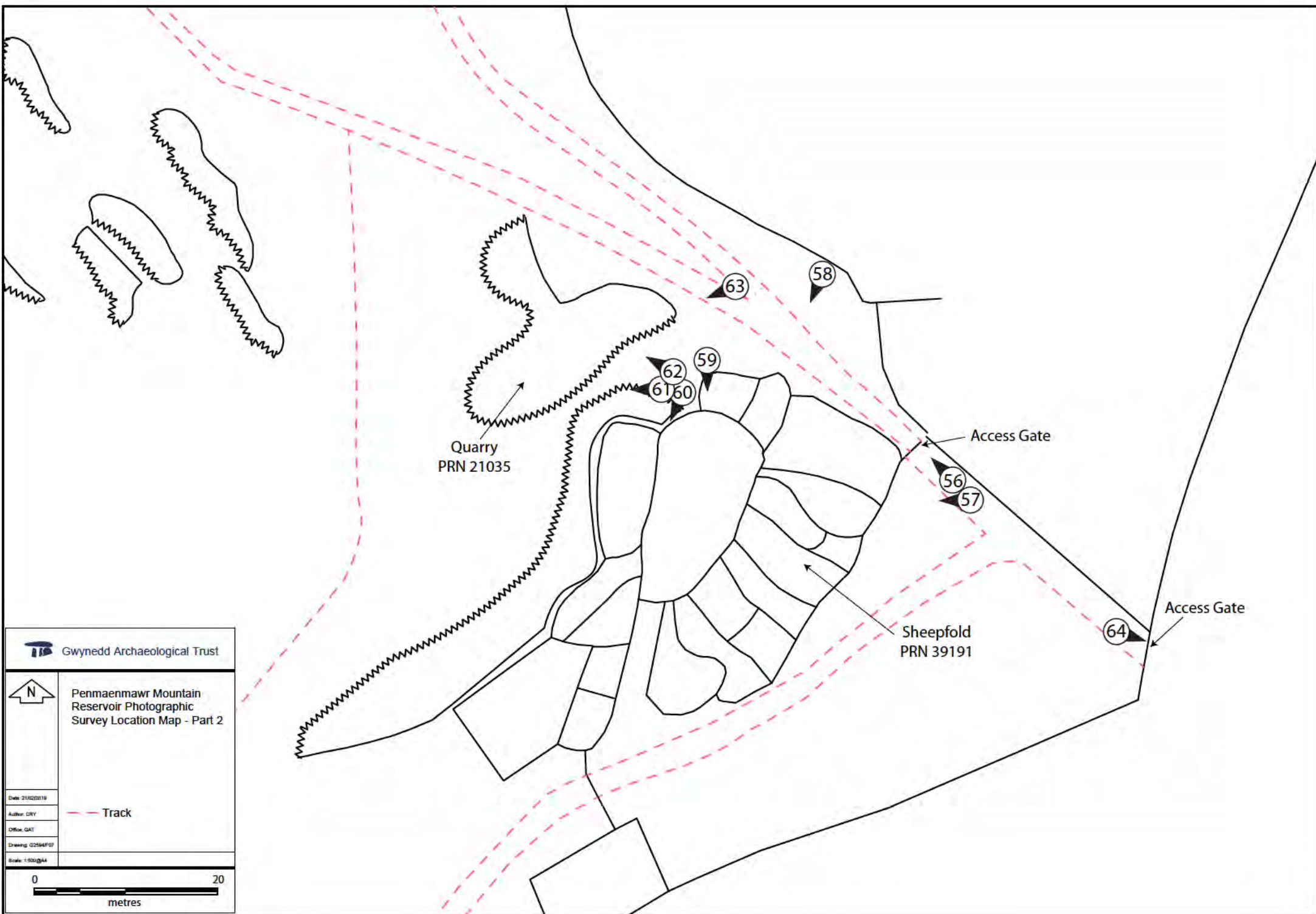












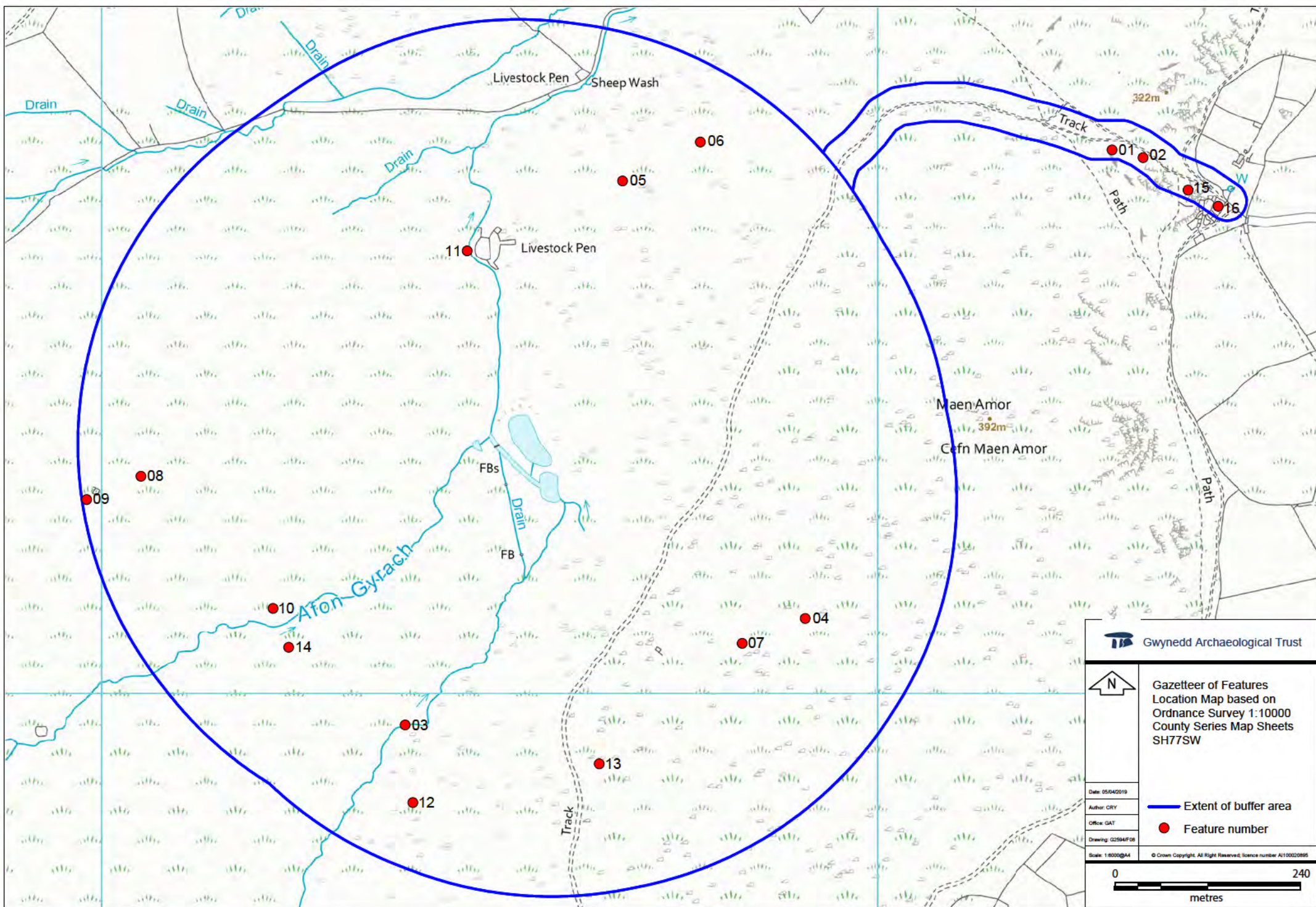




Plate 01: View along NW embankment; scale 1x1m (archive reference: G2594_001)



Plate 02: Terraced areas below main embankment; no scale (archive reference: G2594_050)



Plate 03: Lack of gorse covering on man-made ground; scale 1x1m (archive reference: G2594_008)

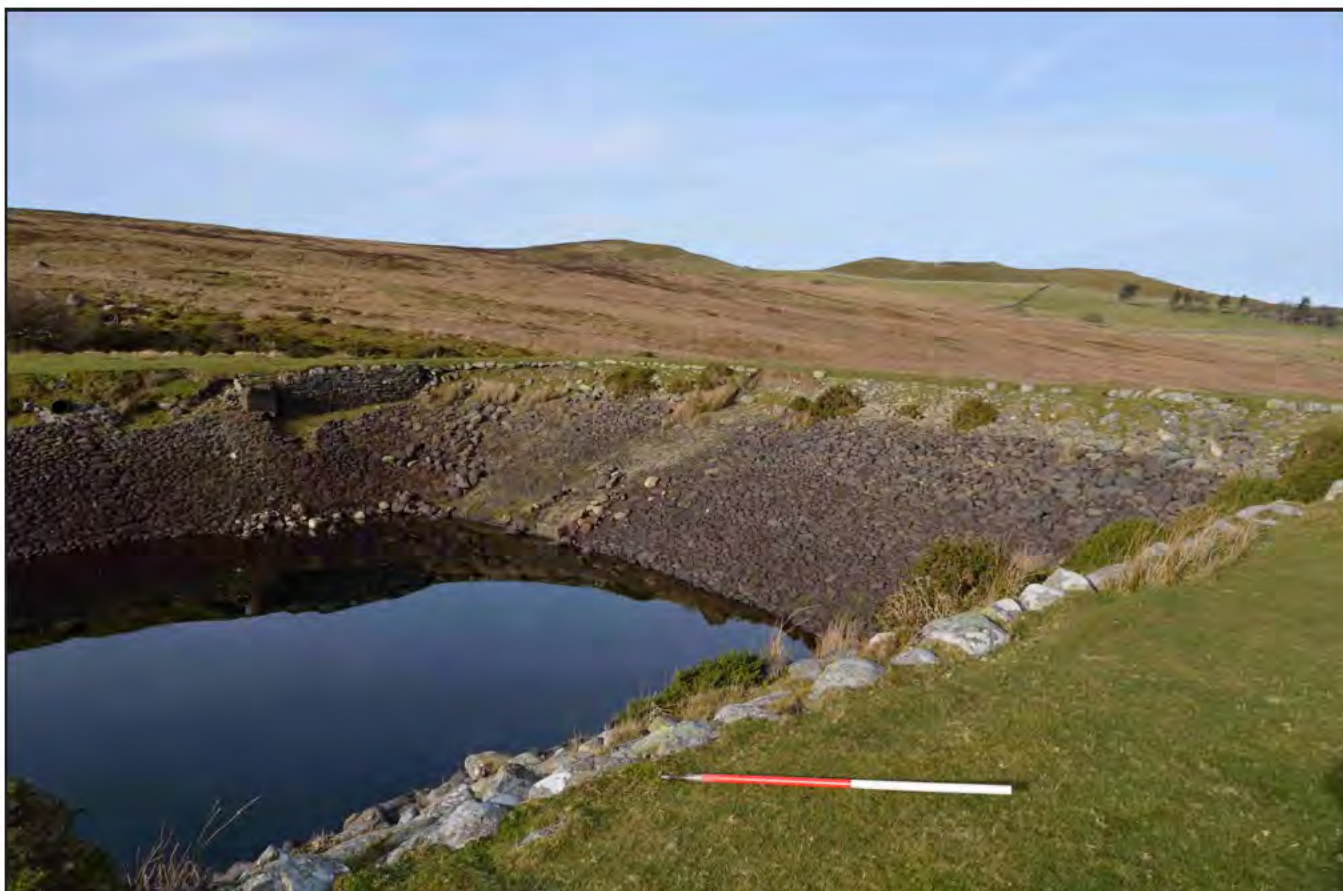


Plate 04: NW slope showing access route; scale 1x1m (archive reference: G2594_009)



Plate 05: Reservoir pipework; no scale (archive reference: G2594_051)



Plate 06: Large bank between natural lake and reservoir; scale 1x1m (archive reference: G2594_014)



Plate 07: Spillway from the natural lake to the Afon Gyrach; scale 1x1m (archive reference: G2594_030)



Plate 08: Sluice gate to reservoir from spillway; scale 1x1m (archive reference: G2594_028)



Plate 09: Drain from unnamed stream joining spillway; no scale (archive reference: G2594_032)

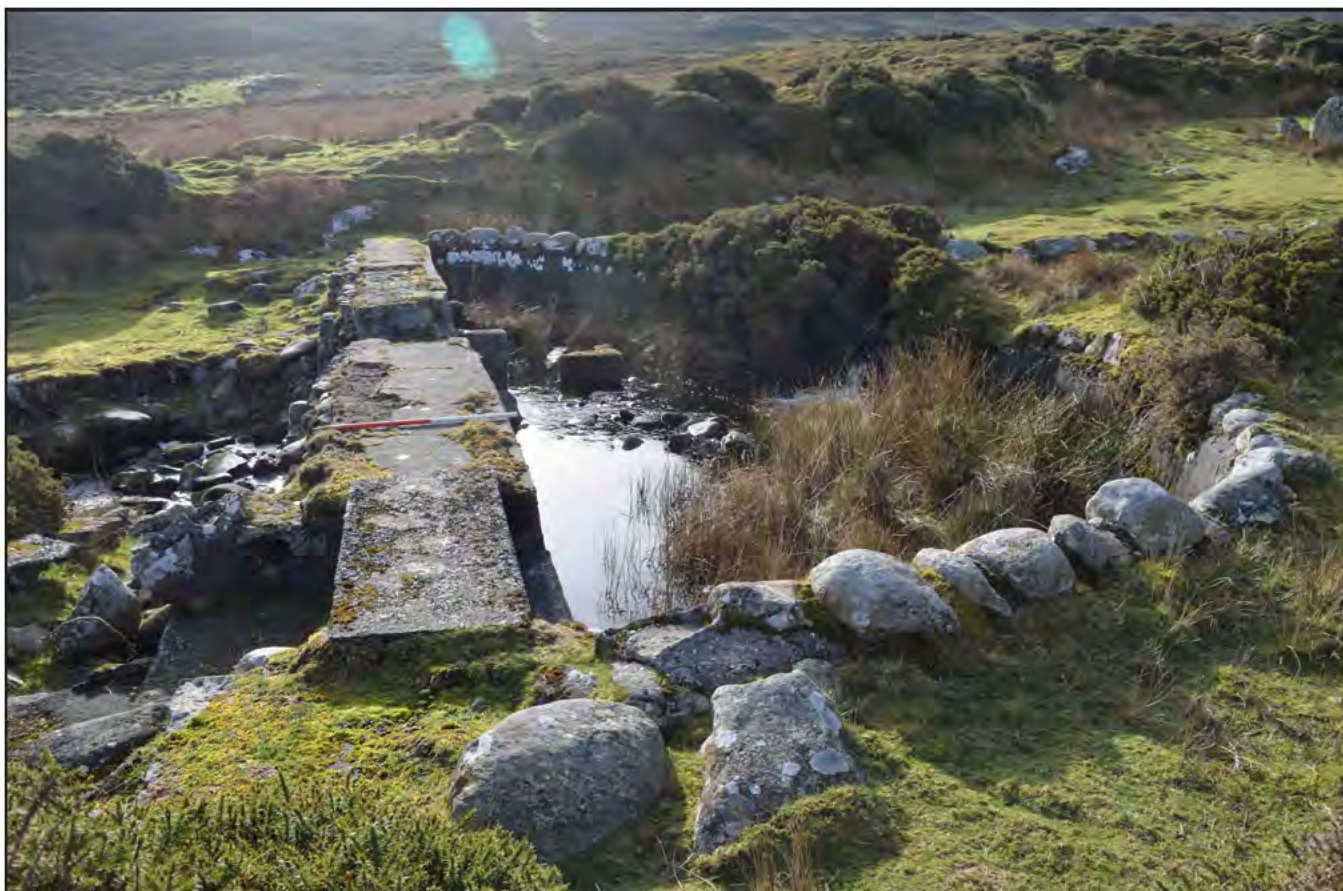


Plate 10: Sluice gate to the W of reservoir; scale 1x1m (archive reference: G2594_042)



Plate 11: Gate missing in sluice; scale 1x1m (archive reference: G2594_043)

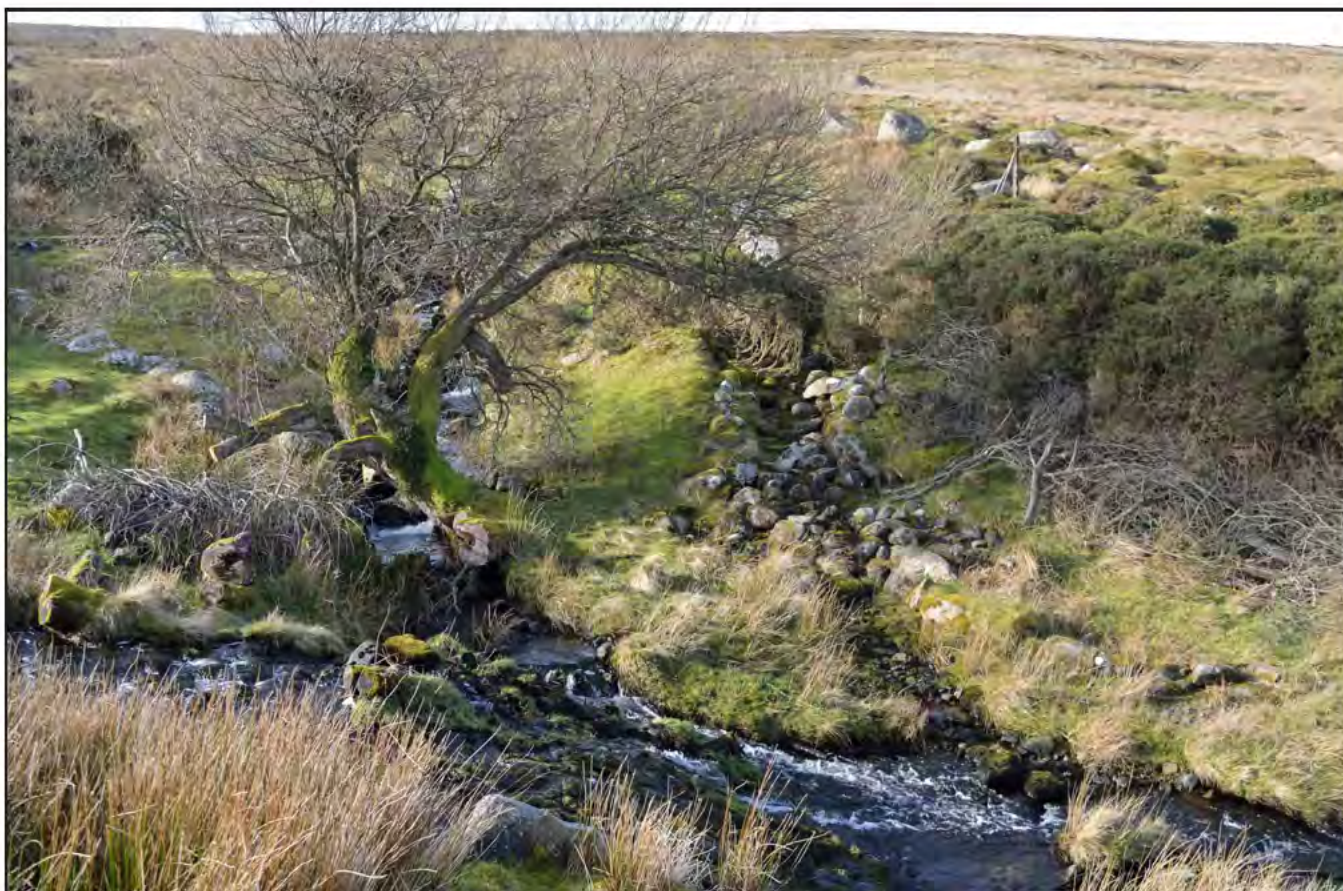


Plate 12: Obsolete overflow from sluice gate on the right; no scale (archive reference: G2594_052)



Plate 13: Mechanism for control of sluice gate; scale 1x1m (archive reference: G2594_041)



Plate 14: View of sheepfold (PRN 39191); no scale (archive reference: G2594_059)



Plate 15: Quarry area (PRN 21035); no scale (archive reference: G2594_061)



Plate 16: Access gate adjacent to sheepfold (PRN 39191); scale 1x1m (archive reference: G2594_056)

APPENDIX I

Reproduction of Gwynedd Archaeological Trust written scheme of investigation

PENMAENMAWR MOUNTAIN RESERVOIR (G2594)

WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL ASSESSMENT

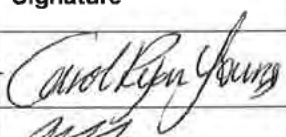

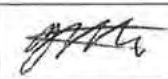
Prepared for

Stillwater Associates Limited

April 2019



Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Approvals Table				
	Role	Printed Name	Signature	Date
Originated by	Document Author	CAROL RYAN YOUNG		4/4/19
Reviewed by	Document Reviewer	JOHN ROBERTS		04/04/19
Approved by	Principal Archaeologist	JOHN ROBERTS		04/04/19

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

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

PENMAENMAWR MOUNTAIN RESRVOIR (G2594)

WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL ASSESSMENT

Prepared for *Stillwater Associates Limited*, April 2019

1	INTRODUCTION.....	5
2	ARCHAEOLOGICAL BACKGROUND.....	7
3	METHOD STATEMENT	9
3.1	Assessment (Desktop Study)	9
3.2	Photographic and Descriptive Survey.....	10
3.3	Gazetteer	11
3.4	Data processing and report compilation	13
4	HISTORIC ENVIRONMENT RECORD.....	15
5	PERSONNEL	16
6	INSURANCE	17
6.1	Public/Products Liability	17
6.2	Employers Liability	17
6.3	Professional Indemnity	17
7	SOURCES CONSULTED.....	18
	Figure 01.....	19
	Location Map with the reservoir highlighted red and in buffer area in blue. Based on Ordnance Survey 1:10000 County Series Map Sheets SH77SW. Scale 1:5000@ A4. © Crown Copyright. All Right Reserved; licence number AI100020895.	19
	Figure 02.....	20
	Reproduction of Ordnance Survey First Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published 1889. Scale 1:2500@ A4.....	20
	Figure 03.....	21
	Reproduction of Ordnance Survey Second Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published 1900. Scale 1:2500@ A4.....	21
	Figure 04.....	22
	Reproduction of Ordnance Survey Third Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published 1914. Scale 1:2500@ A4.....	22

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by Stillwater Associates Limited on behalf of Dŵr Cymru to prepare a written scheme of investigation for an archaeological assessment as part of a feasibility study looking into the possible removal of an existing dam (reservoir discontinuance) on Penmaenmawr mountain, 2.6km south-east of Penmawnmawr (NGR SH73537434; Figure 01).

As specified in data supplied by Stillwater Associates Limited Penmaenmawr Mountain reservoir consists of two bodies of water, the upper a natural lake and the lower artificially created. The lake has an uncontrolled inlet from an unnamed stream and an 8m wide spillway leading to the Afon Gyrach. The lower reservoir has an earthfill embankment that is 4.5m high and 30m in length, an inlet from an unnamed stream and a 450mm diameter pipe spillway to the Afon Gyrach. The construction date of the reservoir is unknown but must date to the period between 1889 and 1900 as it does not feature on the 1st Edition 25 inch map but does on the 2nd and 3rd Editions (Figures 02, 03 & 04). The reservoir measures c. 120m long East to West and 120m wide North to South. The preferred removal strategy includes the complete removal of the embankment, all appurtenant structures (outlet pipes, supply pipes, spillway structures etc) and the re-use of embankment material where possible within the reservoir basin area. Access to the reservoir would be via the B5106 and then a track across the heath land for 1.2km.

The assessment will conform to the guidelines specified in the Chartered Institute for Archaeologists *Standard and Guidance for Historic Environment Desk-Based Assessment* and *Standard and Guidance for the archaeological investigation and recording of standing buildings or structures* (Chartered Institute for Archaeologists, 2014). The format of this written scheme of investigation corresponds to the requirements of section 2.3 of MoRPHE (English Heritage 2015) and to MAP2 (English Heritage, 1991, *Management of Archaeological Projects*). The assessment is scheduled to be completed in April 2019.

The assessment will be monitored by the Development Control Archaeologist, Gwynedd Archaeological Planning Service (GAPS); the content of this written scheme of investigation and all subsequent reporting by GAT must be approved by GAPS prior to final issue.

The Historic Environment Record enquiry reference number for this project is GATHER1067 and the Event Primary Reference Number for this project is 45397.

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

2 ARCHAEOLOGICAL BACKGROUND

The Penmaenmawr Mountain Reservoir is located within the Historic Landscape Character area of Creyddyn and Arllechwedd, area 24 unenclosed mountains (north), PRN 15810. This area, which extends from Conwy Mountain (Mynydd y Dref) in the north-east to the uplands around Bwlch y Ddeufaen in the south-west, contains evidence for human settlement from the Bronze Age through to the 20th Century.

Bronze Age monuments in the area include the embanked stone 'Druid's' Circle immediately to the south east of Penmaenmawr, which lies at the centre of a group of ritual/ceremonial monuments and near to a possible Bronze Age trackway. This trackway extends from the Afon Ddu Valley in the west to the Conwy Valley in the east and intersects with a small cemetery of ruined barrows. Another trackway from the same period links Aber and the Conwy Valley via Bwlch y Ddeufaen. There are also two north-south orientated routes across the valleys, the most westerly of which runs adjacent to the cairn field at Bryniau Bugeilydd where there is also evidence for enclosed and unenclosed roundhouse settlements and field systems. (Source: <http://www.heneb.co.uk/hlc/creuddyn-arllechwedd.html>)

The assessment area is situated in the uplands which would have been used as summer pasture land during the Medieval and Modern periods. There is also some evidence for peat extraction and small scale mineral extraction near to Penmaenbach. (Source: <http://www.heneb.co.uk/hlc/creuddyn-arllechwedd.html>)

The most prevalent archaeological asset in proximity to the assessment area is the Post-Medieval Sheepfold or Sheep shelter (PRN's 38585, 38586, 38587, 38578, 38583, 38582, 38588). The closest of these, PRN 38585, is situated 250m to the North of the reservoir and is marked on the 1st edition 25 inch to 1 mile Ordnance Survey map (Caernarfonshire VIII.3, published 1989). At the eastern end of the access route are the remains of a Medieval Long Hut (PRN 4715, NGR SH74347469). The stone walls of this building are described as grass-covered and in a poor condition on the HER (Historic Environment Record). There is also a Post-Medieval Quarry (PRN 21035, NGR SH74407460) and another Post-Medieval Sheepfold (PRN 39191, NGR SH744207460) at the eastern end of the access track.

In 2014 Gwynedd Archaeological Trust undertook a large scale study of the Medieval and Post-Medieval agricultural features of North-West Wales in order to inform any possible scheduling enhancement. (Kenney, J. 2014). This study included a detailed evaluation of sheepfolds and sheep pen structures including those within the assessment area. It also notes that although sites may be recorded as used for sheep “the terminology used depends largely on the individual carrying out the recording” and “shelters for people and shelters for sheep or goats” are not distinguished between in the records.

3 METHOD STATEMENT

3.1 Assessment (Desktop Study)

A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage....Significance is to be judged in a local, regional, national or international context as appropriate” (ClfA 2014, 4).

The desk-based assessment will involve a study of the following resources:

1. The regional Historic Environment Register ((HER) Gwynedd Archaeological Trust, Craig Beuno/Garth Road, Bangor, LL57 2RT) will be examined for information concerning the study area. This will include an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held within the HER. All identified assets will be mapped, described and added to a gazetteer of sites and the relative importance of any assets defined;
2. The National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be checked for assets additional to the HER;
3. Aerial photographs from the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be examined for potential assets;
4. An on-line catalogue search of the National Library of Wales (Penglais Rd, Aberystwyth SY23 3BU) will be completed;
5. Archive data, including primary and secondary sources, historic maps and estate maps will be examined at the regional archives (The Old Board School, Lloyd Street, Llandudno, Conwy, LL30 2YG). The examination of the archive data will include historic mapping including the local tithe map and schedule;
6. If available for the assessment area, Light Detection and Ranging (LiDAR) data will be examined from the Lle Geo-Portal at <http://lle.gov.wales/home> for information on potential surface features using digital terrain modelling and digital surface modelling.

3.2 Photographic and Descriptive Survey

A detailed photographic and descriptive record will be undertaken that will incorporate the reservoir area as located on Figure 01. All known and new archaeological assets identified within close proximity to the reservoir will be located and described on GAT pro-formas and a written description and photographic record of the visible reservoir infrastructure will be completed. The potential for sub-surface archaeology will be estimated and defined.

A photographic record will be maintained in RAW format using a digital SLR set to maximum resolution (Nikon D3000; resolution: 3,872 × 2,592 [10.2 effective megapixels]) and a photographic metadata table will be completed and included in the report. Photographic images will be archived in TIFF format; the archive numbering system will start from **G2594_001**. A handheld GPS unit will also be used during the photographic survey.

3.3 Gazetteer

A gazetteer will be compiled for any identified sites within 0.5km of the reservoir and within a 25m buffer of the access route based on information sourced from the regional HER. The gazetteer will include:

1. Feature Number
2. Site name
3. PRN number
4. Grid reference
5. Period
6. Site type
7. Assessment category
8. Description
9. Recommendation for further assessment/evaluation
10. Recommendation for mitigatory measures.

The following categories will be used to define the assessment category of the archaeological asset:

Category A - Sites of National Importance.

Scheduled Monuments, Listed Buildings of grade II* and above, as well as those that would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both. Sites that are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected *in situ*.

Category B - Sites of regional or county importance.

Grade II listed buildings and sites which would not fulfil the criteria for scheduling or listing, but which are nevertheless of particular importance within the region. Preservation *in situ* is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

Category C - Sites of district or local importance.

Sites which are not of sufficient importance to justify a recommendation for preservation if threatened. Category C sites nevertheless merit adequate recording in advance of damage or destruction.

Category D - Minor and damaged sites.

Sites that are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category. For Category D sites, rapid recording, either in advance of or during destruction, should be sufficient.

Category E - Sites needing further investigation.

Sites, the importance of which is as yet undetermined and which will require further work before they can be allocated to categories A - D are temporarily placed in this category, with specific recommendations for further evaluation. In this report several sites of unknown potential have been allocated to this category.

3.4 Data processing and report compilation

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

1. Front cover;
2. Inner cover;
3. Figures and Plates List
4. Non-technical summary;
5. Introduction;
6. Methodology
 - a. Desk-based assessment
7. Results
 - a. Desk based assessment
 - i. Location and geological summary
 - ii. Statutory and non-statutory designations
 - iii. Environmental remains and soil morphology
 - iv. Historical and archaeological background
 - v. Cartographic evidence
 - vi. Artefact potential
 - vii. Aerial photographs and LiDAR;
 - viii. The Walkover Survey
 - b. Gazetteer of Features
8. Conclusions & Recommendations
9. Acknowledgements
10. Bibliography
 - a. Primary sources
 - b. Secondary sources
11. Figures; inc.:
 - location plan;
 - historic mapping;
 - location plan with identified features
12. Appendix I (approved written scheme of investigation)
13. Appendix II (Sites listed on GAT Historic Environment Record)
14. Appendix III (Definition of mitigation terms)
15. Appendix IV Photographic metadata (walkover survey)

Illustrations will include plans of the location of the study area and archaeological sites. Historical maps, when appropriate and if copyright permissions allow, will be included.

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. The archaeological assessment outlined in this written scheme of investigation will be submitted in draft format in April 2019; a final report will be submitted to the Historic Environment within six months of submitting the draft report (October 2019).

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), along with any relevant, digital information such as the project database, GIS table(s) and photographs. All digital datasets submitted will conform to the required standards set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1);
- 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), in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. Digital information will include the photographic archive and associated metadata;

4 HISTORIC ENVIRONMENT RECORD

In line with the regional Historic Environment Record (HER) requirements defined in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1), the HER has been contacted at the onset and a HER Enquiry Form has been completed and submitted. The Historic Environment Record enquiry reference number for this project is GATHER1067 and the Event Primary Reference Number for this project is 45397.

Prior to submission of data to the HER on completion of the project, a bilingual event summary document will be prepared in *Microsoft Word* based on the format defined in section 4.2 of *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1).

5 PERSONNEL

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section. The assessment will be completed by a project archaeologist who will have responsibility for completing the desk based assessment, maintaining the site archive, liaising with GAPS and *Stillwater Associates Limited* and submitting the draft report and final report. The project manager will be responsible for reviewing and approving the report prior to submission.

6 INSURANCE

6.1 Public/Products 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/UN/000375

EXPIRY DATE 21/06/2019

6.2 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 24765101 CHC / UN/000375

EXPIRY DATE 21/06/2019

6.3 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 9446015

EXPIRY DATE 22/07/2019

7 SOURCES CONSULTED

1. Chartered Institute for Archaeologists, 2014, Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures
2. Chartered Institute for Archaeologists, 2014, Standard and guidance for the collection, documentation, conservation and research of archaeological materials
3. English Heritage, 1991, Management of Archaeological Projects (MAP2)
4. Historic England, 2015, Management of Research Projects in the Historic Environment (MoRPHE)
5. Historic England, 2016. *Understanding Historic Buildings: A Good to Good Recording Practice*
6. <http://www.heneb.co.uk/hlc/creuddyn-arllechwedd.html>
7. Kenney J, 2014. Medieval and Post-Medieval Agricultural Features in North-West Wales. GAT Report 1162.
8. Ordnance Survey First Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published in 1889.
9. Ordnance Survey First Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published in 1900.
10. Ordnance Survey First Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published in 1914.
11. Royal Commission on Ancient and Historic Monuments of Wales, 2015, Guidelines for digital archives
12. The Welsh Archaeological Trusts, 2018. *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* Version 1.1.

FIGURE 01

Location Map with the reservoir highlighted red and in buffer area in blue. Based on Ordnance Survey 1:10000 County Series Map Sheets SH77SW. Scale 1:* 000@ A4. © Crown Copyright. All Right Reserved; licence number AI100020895.

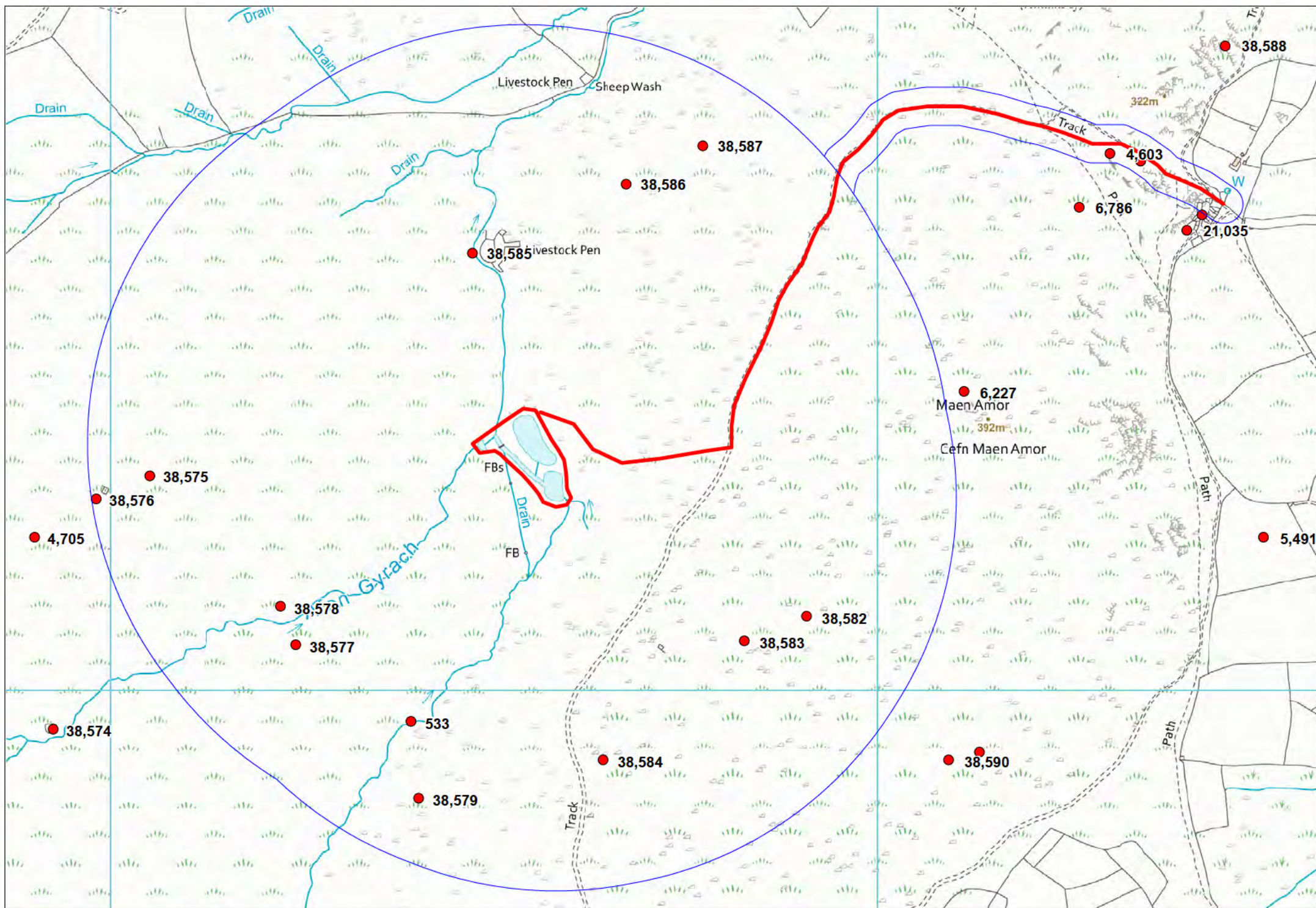


FIGURE 02

Reproduction of Ordnance Survey First Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published 1889. Scale 1:2500@ A4.

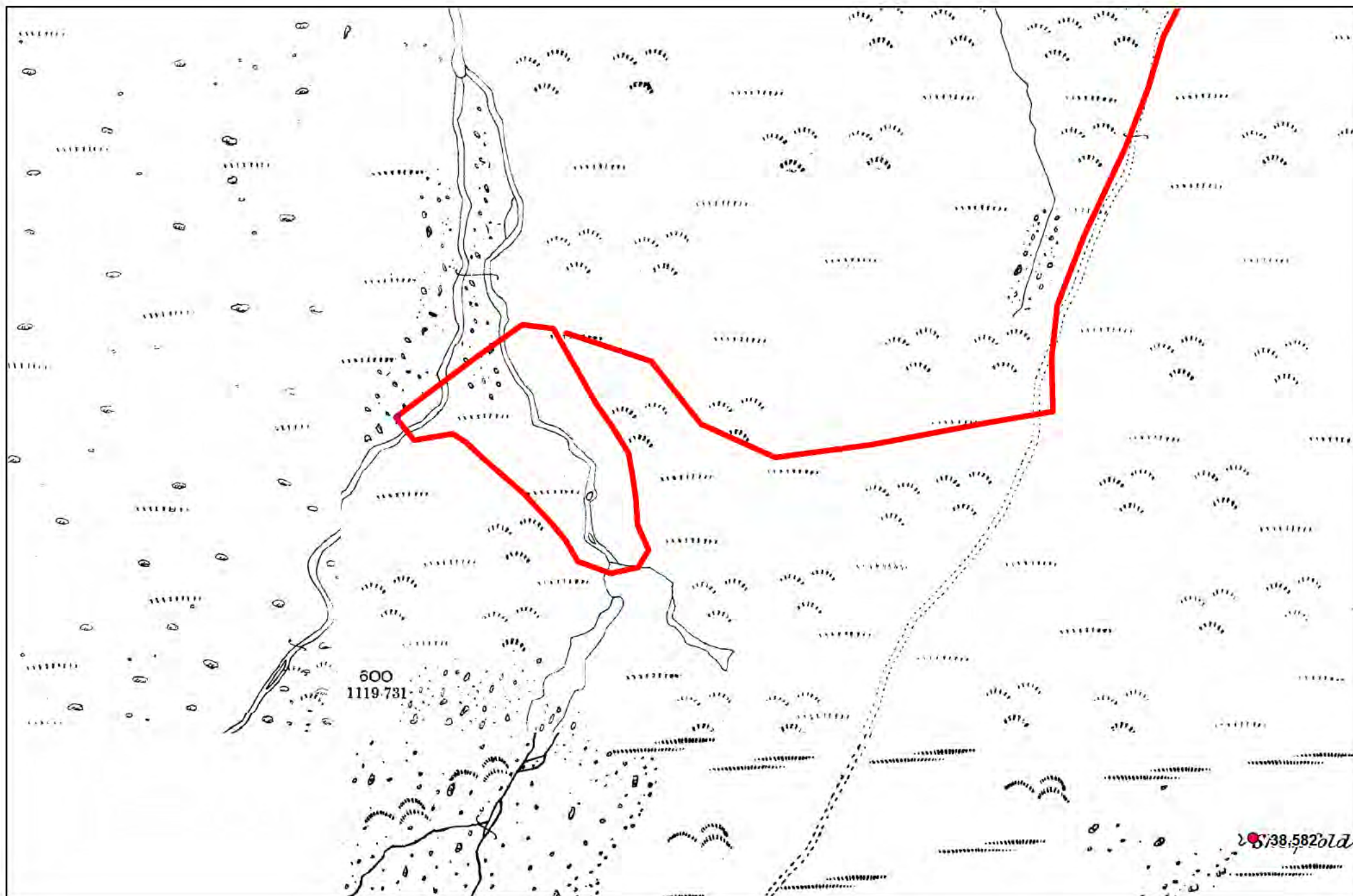


FIGURE 03

**Reproduction of Ordnance Survey Second Edition 1-inch to 25-mile
County Series Map Sheet VIII.3; published 1900. Scale 1:2500@ A4.**

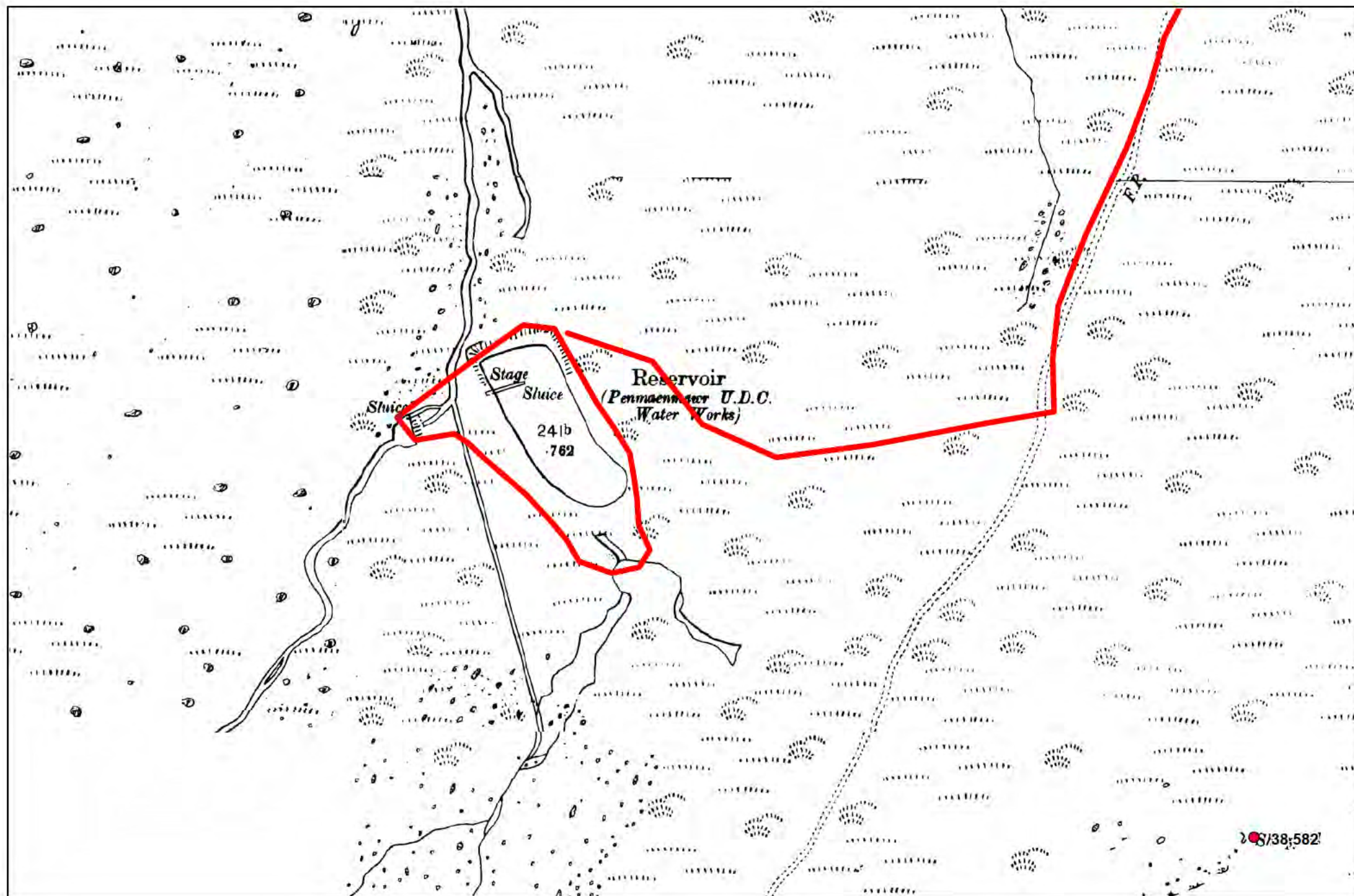


FIGURE 04

Reproduction of Ordnance Survey Third Edition 1-inch to 25-mile County Series Map Sheet VIII.3; published 1914. Scale 1:2500@ A4.

APPENDIX II

Gwynedd Archaeological Trust photographic metadata

PHOTO RECORD NUMBER*	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	PLATE
G2594_001	View along NW retaining bank of reservoir	SW	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	01
G2594_002	View along NW retaining bank of reservoir showing slope to terrace	SW	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_003	View from bank along Afon Gyrach	SW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_004	View over reservoir from NW bank	NW	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_005	View of internal revetment of reservoir - NW bank	SW	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_006	View over terrace below NW bank	SSE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_007	View of internal revetment of reservoir - NW bank	ENE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_008	NE internal revetment and bank	NNW	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	03
G2594_009	NW end of reservoir viewed from NE bank	ESE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	04
G2594_010	SE end of reservoir viewed from SE bank	NE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_011	View over reservoir from S end	SE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_012	View over reservoir from S end	SE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	Cover
G2594_013	SE revetment from SE bank	ESE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_014	Bank between reservoir and natural lake	E	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	06

PHOTO RECORD NUMBER*	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	PLATE
G2594_015	Natural lake from dividing bank	NE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_016	Stream entering natural lake	NNE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_017	Stream entering natural lake	SE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_018	Natural lake viewd from streams	SE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_019	Natural lake, bank and reservoir from natural lake	SE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_020	View of SE end of Reservoir from SW bank	SW	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_021	Natural lake leading to spillway - concrete steps	NE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_022	Spillway access - natural lake	NNW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_023	Spillway	SE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_024	Spillway inlet to reservoir	SSW	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_025	Spillway sluice to reservoir	SE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_026	SW revetment of reservoir	SE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_027	Spillway inlet to reservoir	SSE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_028	Spillway and sluice inlet to reservoir	NNE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	08

PHOTO RECORD NUMBER*	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	PLATE
G2594_029	Overview of reservoir from inlet area	SSE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_030	Spillway to foot bridge	SE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	07
G2594_031	Foot bridge over spillway	NE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_032	Spillway and drain from foot bridge	NNW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	09
G2594_033	Spillway to sluice exit and Afon Gyrach	SE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_034	Sluice viewed from foot bridge	E	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_035	Drain from small bridge	NNW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_036	Drain from small bridge	SSE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_037	Spillway and sluice outlet to Afon Gyrach	SSW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_038	Sluice	SSE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_039	Sluice showing internal brickwork	SE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_040	Afron Gyrach inlet to sluice	NE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_041	Sluice controls	S	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	13
G2594_042	Sluice	N	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	10

PHOTO RECORD NUMBER*	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	PLATE
G2594_043	Sluice - destroyed position of gate	W	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	11
G2594_044	Sluice overflow	W	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_045	Route of sluice overflow	WSW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_046	Spillway exit to Afon Gyrach	N	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_047	Revetment to NW corner of NW bank	NW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_048	View down Afon Gyrach to asset PRN 38585	S	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_049	Afon Gyrach inlet to sluice	SW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_050	Terraced area below NW bank	SSW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	02
G2594_051	Pipework exposed by low water level	SW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	05
G2594_052	Two outlets from sluice	NE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	12
G2594_053	Pipe overflow to Afon Gyrach	E	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_054	Pipe overflow to Afon Gyrach	W	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_055	SE end of reservoir viewed from W bank	WNW	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_056	Access gate adjacent to PRN 39191	SE	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	16

PHOTO RECORD NUMBER*	DESCRIPTION*	VIEW FROM	SCALE(S)	CREATOR OF DIGITAL PHOTO*	DATE OF CREATION OF DIGITAL PHOTO*	ORIGINATING ORGANISATION	PLATE
G2594_057	PRN 39191 - Sheepfold	E	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_058	PRN 39191 - Sheepfold	NNE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_059	PRN 39191 - Sheepfold	N	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	14
G2594_060	PRN 39191 - Sheepfold	N	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_061	Quarry Scoops - PRN 21035	E	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	15
G2594_062	Quarry Scoops - PRN 21035	E	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_063	Quarry Scoops - PRN 21035	ENE	-	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	
G2594_064	Main Access Gate	W	1x1m	Carol Ryan Young	14/02/2019	Gwynedd Archaeological Trust	

APPENDIX III

Categories of Importance

The following categories will be used to define the assessment category of the archaeological asset:

Category A - Sites of National Importance.

Scheduled Monuments, Listed Buildings of grade II* and above, as well as those that would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both. Sites that are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected *in situ*.

Category B - Sites of regional or county importance.

Grade II listed buildings and sites which would not fulfil the criteria for scheduling or listing, but which are nevertheless of particular importance within the region. Preservation *in situ* is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

Category C - Sites of district or local importance.

Sites which are not of sufficient importance to justify a recommendation for preservation if threatened. Category C sites nevertheless merit adequate recording in advance of damage or destruction.

Category D - Minor and damaged sites.

Sites that are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category. For Category D sites, rapid recording, either in advance of or during destruction, should be sufficient.

Category E - Sites needing further investigation.

Sites, the importance of which is as yet undetermined and which will require further work before they can be allocated to categories A - D are temporarily placed in this category, with specific recommendations for further evaluation. In this report several sites of unknown potential have been allocated to this category.



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

