



Bron Lletty Ifan Hydro-electric Scheme, Arthog, Gwynedd.

Archaeological Assessment



By

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ARCHAEOLOGICAL ASSESSMENT

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Executive Summary

The following report presents the results of a rapid archaeological assessment undertaken by Heritage Recording Services Wales (HRS Wales), commissioned by Snowdonia Hydro in advance of an archaeological watching brief during groundwork for a proposed 99kw hydro-electric scheme, including construction of two intake weirs, turbine house and installation of underground and overground pipes and underground cabling to provide grid connection on land at Bron Lletty Ifan, Arthog, Gwynedd LL39 1LX.

The proposed works has 7 main parts: Intakes, Forebay tank, Pipeline, Powerhouse, Discharge point, Grid Connection and Access track.

In accordance with a design brief prepared by Snowdonia National Park Authority (SNPA), it was agreed that the archaeological dimension would include a rapid archaeological desk based assessment of the immediate landscape surrounding the scheme and a walkover of the proposed pipeline route in order to identify and confirm the existence and character of known and new sites in order to inform potential mitigation strategies in advance of ground work commencing for the scheme.

In summary, the rapid archaeological assessment undertaken along the route of the proposed scheme managed to identify a total of thirty (30) sites or features of archaeological interest. The greater part of these sites are post medieval dry-stone walls, structures, enclosures and tracks as marked on the early OS maps, Other modern 1920s industrial or water management features were also identified in the lower area of the scheme along the Afon Morfa watercourse. These modern features are all remnant and obsolete features associated with a former hydro-electric scheme attached to Bron Meirion house.

Other than these interests, perhaps the most significant feature identified from the walkover survey was the remains of a well preserved ancient lynchet (Site No. 13). This earthwork is very probably either Romano-British or else medieval in date and suggests ancient agricultural practices in the immediate area of the proposed scheme and as such the possibility of settlement remains. Prehistoric activity in the immediate area of the proposal is also evident from the discovery in antiquity of a Bronze Age palstave found in the area of Bron Lletty Ifan farmstead. Other designated Bronze Age, Romano-British and medieval sites in the immediate landscape surrounding Bron Lletty Ifan indicate the richness of archeology in this uplands landscape. Given the presence of these significant heritage interests, the potential for the discovery of significant buried remains associated with these periods during groundwork is considered to be high.

With regards to mitigation proposals in advance of groundwork commencing on the development, the assessment has advised that road irons and hazard tape are used to highlight the proposed working corridor, as well as to offer protection to a number of significant sites, both linear and individual features, in order to protect and preserve the historic character of this character area within the Mawddach Registered Historic Landscape. This mitigation strategy will be undertaken following a site meeting, consultation and supervision with the site contractors.

In accordance with the design brief prepared by SNPA, all penetrative groundwork on site will be undertaken under strict watching brief conditions. However, given the topography at the lower end of the scheme, below the point of the old weir (Site No. 23), it is recommended that the groundwork in this area is only monitored

intermittently rather than being supervised under full watching brief conditions, in order to undertake brief inspection and photographic recording during groundwork and following likely vegetation clearance.

1 Introduction

- 1.1 The following report presents the results of an archaeological assessment undertaken by Heritage Recording Services Wales (HRS Wales), commissioned by Snowdonia Hydro in advance of an archaeological watching brief during groundwork for a proposed 99kw hydro-electric scheme, including construction of two intake weirs, turbine house, the installation of underground and overground pipes, underground cabling to provide grid connection and a section of access track, on land at Bron Lletty Ifan, Arthog, Gwynedd LL39 1LX.
- 1.2 The specific objectives of the assessment were to:
- Identify the cultural heritage baseline immediately surrounding the proposed development (Designated sites up to 1km and Historic Environment Record (HER) sites up to 250m) ;
 - Consider the application site in terms of its archaeological and historic environment potential;
 - Propose measures, where appropriate, to mitigate against any predicted significant adverse effects on identified archaeology from construction of the proposed scheme.
- 1.3 The Technical Appendices for this Chapter contains the following information:
- *Appendix I:* Figures;
 - *Appendix II:* Photographs;
 - *Appendix III:* Gazetteer of all known designated sites that lie within a 1km buffer zone and all known HER sites that lie along the route of the proposed pipeline and infrastructure components.
 - *Appendix IV:* Archive Cover Sheet
- 1.4 Following the rapid desk based assessment, a walkover survey was also conducted along the route of the proposed pipeline, in order to identify previously unknown sites, confirm the existence and character of known sites, as well as to identify areas and sites that may warrant mitigation measures in order to protect heritage and archaeological interests.
- 1.5 All works were undertaken in accordance with the CIfA's Standards and guidance: for an *archaeological desk based assessment*.

The site (see Figures 1 and 2)

- 1.6 This proposed development aims to introduce a new hydro-electric power scheme on two unnamed tributaries of the Afon Morfa, beginning on land at Bron Lletty Ifan Farm, Arthog, in the county of Gwynedd (National Grid Reference SH 63660 13000). The proposed scheme is positioned in an upland area within the Snowdonia National Park and also lies within the Registered Historic Landscape of *Mawddach* (HLW (Gw) 14).
- 1.7 The scheme begins near to the farmstead of Bron Lletty Ifan farmstead at a height of approximately 210m AOD. Following the intake of water from two tributaries, the scheme then carries water along a

low pressure pipe to a forebay tank. From here the water will be carried downslope along a high pressure pipe to a powerhouse near Bron Meirion, where the water will then be discharged back into the watercourse (National Grid Reference SH 63290 13530).

Development Proposals (*see Figures 2 and 3*)

- 1.8 The development proposes building two new intake weirs at 263638, 312965 (Intake 1) and E 263798, N 313103 (Intake 2). From the intakes two 400mm low-pressure pipes will carry water to a forebay tank at E 263752, N 313119. From the forebay tank a single 400mm high-pressure penstock will carry the water to the powerhouse at E 263299, N 313510 and the water returned to the watercourse at E 263300, N 313512.
- 1.9 The low pressure pipes will be buried from the two intakes to the forebay tank. The low pressure pipe from Intake 1 is to be buried in the bank alongside an existing well maintained track using the cut and fill method. The low pressure pipe from Intake 2 will be buried across marshy grassland taking care to separate the top soil during construction so that the grassland can be returned to its original state.
- 1.10 The high-pressure penstock will be buried from the forebay tank, across open grazed fields and through a gateway in a stone wall. The land here is rocky and the penstock should avoid rock veins where possible. The penstock will then drop steeply downhill through the grazed fields which show possible evidence of prehistoric settlement activity. The pipe will then be buried across the bracken field to the left of the public footpath, avoiding the existing birch woodland; this area will be planted with new birch trees leaving a 3m wide grass-covered strip to the side of the buried penstock to provide access to the lower section of the penstock in the event of the penstock requiring maintenance in the future.
- 1.11 At the bottom of this field, there is evidence of an old track and a double stone wall. A section of this wall will need to be removed to allow the pipe to be buried under it and for machine access to the lower workstation. We propose to keep a permanent access track through this section to allow access in the future to the penstock for maintenance reasons and to aid woodland management.
- 1.12 After the wall at E 263547, N 313347 the landscape changes to mixed broadleaf woodland and scrub. There are some hazel which shall be coppiced or removed to create the access track, but no mature broadleaf trees will be affected. It has been proposed to continue the permanent track to the workstation at E 263465, N 313384.
- 1.13 The penstock will then enter some mature woodland at E 263552, N 313352, close to where there are remnants of an historic weir. From this point, the penstock enters mature unmanaged broadleaf woodland and will pass overland to ensure minimal impact on existing trees in accordance with the ecological assessment. It is proposed that the penstock will cross the river at the location of the old weir E 263450, N 313385 so that it may remain buried under the footpath. This route allows the pipe

to be laid unobtrusively into the river bed. From the far side of the stream the pipe will begin its overland journey through the woods. There are two footpaths marked on the map at this location passing through the woodland and over the penstock route. These appear to be disused and not public rights of way.

- 1.14 The penstock will terminate at a powerhouse at E 263289, N 313519. The water will be returned to the watercourse at E 263288, N 313522. The penstock will not be visible from any public right of way.
- 1.15 A small multi-core armoured cable will be buried alongside the penstock to connect the head level sensor at the forebay tank to the control unit in the Powerhouse. An armoured cable will run to Bron Meirion house to provide the site with electricity and export to the grid.
- 1.16 The client owns the development area and has right of access to all development areas. Existing, well maintained non-tarmac tracks already exist at the upper and lower ends of the development. These provide easy access to both the intake and powerhouse areas. This scheme does propose the introduction of a new permanent non-tarmac track. During construction this track is vital for the movement of materials within the site to provide access to the workstation in the middle of the site. It is proposed to keep the track there permanently in case of emergency leaks or breakages in the pipe, and for woodland management reasons. The track will be non-tarmac and visually low impact, but is considered necessary for the safe ongoing management of the site. A series of temporary workstations will also be positioned along the route of the pipeline area and the farm courtyard area as the work progresses.
- 1.17 The intake will be constructed during a period of dry weather when the stream's flow is lowest. During construction of the intake the water in the stream will be diverted past the construction point using sandbags, diversion channels and drainage pipes and released downstream. Sandbags or straw bales will also be used downstream of the construction to ensure that the stream is not contaminated in the event of any accidents.
- 1.18 Suitable means of demarcating the perimeter of the site using tape and warning signs will be erected. During the brief period while the work interacts with public footpaths alternative routes will be provided and clearly signed. The trench for the penstock will be dug and refilled using a mini-excavator. The trench will be no wider than 1000mm. Topsoil will be separated from subsoil during digging of trench in order to ensure that it is returned correctly when burying the penstock. The trench will pass close to or under three public footpaths, they will be returned to their original condition. In the area immediately below the old weir, digging for the pipeline trench may have to be undertaken by hand as the ground here maybe too steep for a mechanical excavator.
- 1.19 However, a mini-excavator will be used to excavate for the powerhouse foundation. The foundation will be constructed from reinforced concrete. The walls will be constructed from concrete blocks with

local-stone cladding. The roof will be constructed from timber with a waterproof membrane and slate finish.

Planning Background and Consultation

- 1.20 The proposed scheme (Planning Ref: NP5/52/367A) was approved by SNPA on 17th September 2015, with the following conditions stipulating:

Condition 10: 'Prior to any work commencing (including any ground disturbing works or site clearance) pursuant to this permission the applicant/developer shall submit to and receive written approval from the Local Planning Authority for an archaeological specification for a programme of works which must meet all relevant archaeological standards. The development shall subsequently be carried out in strict accordance with the approved programme of works unless otherwise agreed in writing by the Local Planning Authority.

Condition 11: The developer hereby approved shall be carried out in strict accordance with the archaeological specification for a programme of works as approved in condition 10 above unless otherwise agreed in writing by the Local Planning Authority.

- 1.21 In June 2016, the archaeologist for Snowdonia National Park Authority issued a design brief detailing the required archaeological work in accordance with the above conditions.
- 1.22 Heritage Recording Services Wales (HRS Wales) were commissioned by Snowdonia Hydro to undertake this work and duly submitted a project specification to Snowdonia National Park Authority (SNPA).

Geology

- 1.23 The geology along the route of the proposed scheme is generally of undifferentiated Llanvirn Rocks, consisting of mudstone, siltstone and sandstone. However, at the northwestern end alongside Bron Meirion, the geology changes to undifferentiated Tremadoc Rocks, but still mudstone, siltstone and sandstone types.

2 Methodology

Methodology of Baseline Survey

Aims and Objectives

- 2.1 In accordance with the ClfA's *Standards and guidance*, the purpose of a desk-based assessment is to gain information about the known or potential archaeological resource within a given area or site (including the presence or absence, character and extent, date, integrity, state of preservation and relative quality of the potential archaeological resource), in order to make an assessment of its merit in context, leading to one or more of the following:
- the formulation of a strategy to ensure the recording, preservation or management of the resource;
 - the formulation of a strategy for further investigation, whether or not intrusive, where the character and value of the resource is not sufficiently defined to permit a mitigation strategy or other response to be devised; and

- the formulation of a proposal for further archaeological investigation within a program of research.

2.2 The rapid desk-based assessment and field walkover established the following:

- Location of known archaeological sites and landscapes within the proposed development area.
- Potential for palaeo-environmental samples within the proposed development area.
- The density of designated archaeological sites within a 1km buffer zone along the route of the proposed pipe route and the density of undesignated archaeological sites within a 250m buffer zone along the route of the proposed pipe route, and the potential that comparable sites may continue along the immediate edge of the proposed working area.
- Previous disturbance or truncation on the site, which may have affected archaeological remains, including any significant changes in levels from those indicated on old Ordnance Survey maps.
- Where information is available, the physical impact of the proposed development including the full extent of ground-works associated with construction of the:

- 1.Intakes
- 2.Forebay tank
- 3.Penstock (pipeline)
- 4.Powerhouse
- 5.Discharge point
- 6.Export and grid connection
- 7.Access track

2.3 With the above in mind this rapid assessment looked at the following study areas:

- A rapid assessment of the proposed development area and the methodology.
- A rapid assessment of the known undesignated and designated archaeological sites within a 1km and 250m buffer zone around the route of the proposed development, with reference to the regional Historic Environment Record (HER) held by the Gwynedd Archaeological Trust (GAT), National Monuments Record (NMR) held by the RCAHMS and Cadw. The assessment considered the potential for comparable sites within the development area.
- Produce mitigation proposals for the preservation of sites *in situ*, or for the investigation, recording and recovery of remains and the publication of results.

2.4 In considering the above, the following repositories were consulted as part of the research assessment

- Gwynedd Archaeological Trust (GAT) – HER database;
- Central Register of Aerial Photography for Wales; RAF Vertical Aerial Photos
- National Library of Wales (NLW), Aberystwyth – maps, archives;

- Cadw – Scheduled Ancient Monuments (SAMs), Listed Buildings (LBs);

2.5 The following cartographic sources were included in the study:

- OS Surveyors drawing (1816);
- Tithe apportionment and parish map of Llangellynnin Parish (1841);
- Ordnance Survey 1st Edition map of 1886 (1:2500);
- Ordnance Survey 2nd Edition map of 1900 (1:2500);
- Ordnance Survey Edition map of 1939 (1:2500);
- Ordnance Survey Edition map of 1949(1:2500);
- Ordnance Survey Land Ranger (1:50,000).
- Ordnance Survey Explorer (1:25,000)
- RAF Aerial Photo 1946
- OS Aerial Photo 2014

Photographs

2.6 Aerial photos consulted spanned the years 1946 – 2014.

2.7 All photographs appropriated during the site walkover were undertaken using a digital SLR in RAW and SHQ JPEG format.

2.8 Following the results of the desk based assessment, the potential for further archaeological work was considered in order to assess the viability for further study of the assessment results and to provide an indication of the relative importance of the material in any subsequent mitigation strategies.

Rapid walk-over survey

2.9 The walkover set the context of the assessment, identifying:

- The location, character, form and condition of known and previously unknown archaeological sites and features within a 50m corridor along the proposed route of the scheme (25m either side of the pipeline).
- The current site condition.
- Photographic recording of all identified sites and features along the route

3 Baseline Conditions

3.1 Previous Archaeological Works

3.2 Other than general field work that has taken place in the wider landscape over the decades in the region and a desk based assessments for a water management scheme associated with the Fairbourne Waster Water Management Scheme undertaken in 2003, no previous archaeological work has been undertaken within the area of the proposed hydro scheme.

3.3 Snowdonia National Park Historic Landscape – LANDMAP (see Figure 13)

3.4 The proposed application area falls entirely within one (1) historic Landscape character area within the LANDMAP survey region of Snowdonia National Park. The Snowdonia National Park region survey was surveyed in 2006.

3.5 The Snowdonia National Park Historic Landscape was defined at Level 3 according to LANDMAP methodology (Ref 6). The application area falls within one (1) identified historic landscape area. This area is listed below followed by a detailed description of its characteristics and value to the Snowdonia National Park Historic Landscape as a whole.

Llynau Greggenan (LANDMAP Ref id: SNPHL196)

3.6 This character area was surveyed at Level 3 in 2006 and is described as a Snowdonia National Park rural agricultural environment, with other irregular fieldscapes, with woodland, marginal land, non-nucleated settlement and areas of extraction. *Llynau Greggenan* is a fairly large historic landscape character area covering approximately 1,768 hectares in extant, with dry-stone walls, forming the traditional boundary type. Significant archaeological interests are confined to relict earthworks, relic stone monuments and buildings of the prehistoric, medieval and post medieval periods. There are several Scheduled Ancient Monuments (SAMs) and Listed Buildings (LBs) within this historic landscape. There are no Registered Parks & Gardens, or Conservation Areas. However, the area does fall within the Registered Historic Landscape of Mawddach (HLW (Gw) 14).

3.7 The area is considered of *Outstanding* value historically whose condition and trend has not yet been fully assessed. The existing management of this area is considered to be generally appropriate being managed by Snowdonia National Park and the National Trust. The principle management of this landscape area is to support existing initiatives in the medium and long term.. According to LANDMAP evaluation, the landscape is considered to have outstanding integrity, outstanding survival, high rarity and is generally of outstanding value overall. The following table lists the principle evaluation criteria for this character area. The overall evaluation of this landscape concludes that it is an Outstanding value landscape, which scores outstanding in two categories and high in one other. The overall outstanding value is justified by the fact that the landscape is a diverse, complex and important historic landscape. The areas Condition and Potential criteria have not been assessed (Ref 1).

Table 2 - LANDMAP Evaluation Criteria (Ref id: SNPHL196)					
Integrity	Survival	Condition	Rarity	Potential	Overall Evaluation
<i>Outstanding</i>	<i>Outstanding</i>	-	<i>High</i>	-	<i>Outstanding</i>

3.8 Registered Historic Landscape – Mawddach (see Figure 14)

- 3.9 The proposed development falls directly within the Registered Historic Landscape (RHL) of *Mawddach*, an RHL that covers an area of over 8,522 hectares. The following section includes extracts from the *Register of Landscapes of Historic Interest in Wales*, extracts that are considered relevant to the proposed development area and therefore put the immediate landscape into historical context.

“The Mawddach estuary enjoys a justifiable reputation as one of the finest and most spectacular natural sights in Wales, and has attracted an increasing number of tourists since the beginning of the 18th century. The area comprises a river estuary and surrounding coastal slopes situated to the west of Cadair Idris in southern Meirionnydd. Underpinning this beauty, of course, is a long and complex land-use history which has shaped the landscape over a period of several thousand years.

On the higher ridges above southern side of the estuary is a complex relict landscape which contains some of the most important and extensive early prehistoric monuments in Wales (including groups of bronze age funerary and ritual monuments, the so-called Ffordd-ddu (prehistoric) trackway, settlements and field systems (including Llys Bradwen)) around Cyfannedd and on Bryn Seward, as well as medieval settlements and associated enclosures, particularly around Llynnau Gregennen.....

There is good evidence for the development of agricultural practices in the area, particularly in the complex relict landscape on the southern side of the estuary where there are series of earthwork and stone-built enclosures (some associated with prehistoric and medieval settlements), lynchets, field boundaries and an important series of field cow houses (associated with early farmhouses).

Land ownership

Straddling a major estuary as it does, the project area lies within three medieval parishes and two commotes Llanaber (in the commote of Ardudwy), Brithdir and Dolgellau and Llangelynnin (both in the commote of Tal-y-Bont) (Williams-Jones, 1976). In the Merioneth Lay Subsidy Roll of 1292-3, Llanaber is recorded as being relatively well-off (worth between 30 40 shillings per thousand acres), Brithdir and Dolgellau is relatively poor (worth between 20 and 30 shillings per thousand acres) while Llangelynnin is one of the richest parishes in Merioneth (worth between 40 60 shillings per thousand acres).

There are several deserted rural settlement sites around Llynnau Gregennan (eastern end of area 14), but again no work has been carried out to put these in a landscape or economic context. Further east (in area 18), however, we have excellent documentation for, and surviving evidence of, a number of 17th-century farmsteads which belong to a series of medieval townships (Cefn-yr-owen, Dolgledr and Dyffrydan) and are probably situated on the same sites.

Where evidence from early maps (mid-19th century) exists, it suggests that the present fieldscapes have not changed much over the past 150 years or so. The present regime consists entirely of pasture fields (sheep and cattle, plus some horses) and no arable fields were noted during fieldwork.

Agriculture

Although there is considerable evidence for prehistoric settlement and land-use in the area, much of this is in the form of ritual activity and there is little to attest to land division and agriculture. A number of hut circle settlements and associated enclosures exist on the southern uplands of the Mawddach, but there is a surprising lack of the associated

phenomenon known as wandering walls' (Bowen & Gresham, 1967). Only a single excavation (Crew, 1978) has been carried out here on a hut circle, which proved to be of 1st to 3rd century AD date. The Mawddach area did not have (and still hasn't) much decent arable land or other resources and was a marginal area, not heavily settled, with little to offer in the way of opposition to Roman authority or participation in the Romanised economy. It must have continued as a lightly-settled rural area with no real focus of settlement in the Roman period.

Around the top of Afon Gwynant there are several 17th-century farmsteads which documentary records show belonged to one of three medieval townships here (Cefn-yr-owen, Dolgledr and Dyffrydan). It is likely that the original names related to farmsteads on the present positions. Unfortunately, the 1840s Dolgellau tithe map which records them, contains just the names and approximate extent of the holdings so it is impossible to reconstruct field patterns of the period or say much about the type of agriculture being carried out, although the nature of the area today suggests that it has always been marginal.

Several of the field boundaries hereabouts (more so than in any other area around the Mawddach) consist of drystone walls on top of lynchets on the steeply-sloping ground which suggests some considerable period of use (elsewhere some might be considered prehistoric in origin if associated with contemporary settlement sites). There is no evidence for the distinctive pattern of quilleys within the area around any of the known townships. Where evidence from early maps (mid-19th century) exists, it suggests that the present fieldscapes have not changed much over the past 150 years or so.

The land immediately adjacent to the north side of the estuary is very steep in places, and is now largely covered by woodlands, interspersed with areas of open pasture, often grazed by horses and/or cattle, as well as sheep. Some of this woodland is ancient or semi-natural (although the best examples are to be found on the south side, e.g. area 19) but much of it is modern forestry. Most of the enclosures are large and irregular in shape, and suggest post-medieval land divisions, probably originally for some form of arable cultivation (most of the fields have been carefully cleared of stone in what is generally a very rock-strewn area, although in the upland areas they remain uncleared, although no arable fields exist today. Some of the land towards the inland end of the estuary have clearly been drained, although most of this evidence for this activity comes from across the water.

The area south of the estuary is more interesting. Here we have a landscape of great contrasts, which sweeps down from the inhospitable summit of the Cadair Idris ridge, across the relatively fertile fields surrounding the early farms around Afon Gwynant and around Llynau Gregennan, to the drained saltmarshes bordering the Afon Mawddach. Below the agriculturally-unimproved scree and above the steep, wooded slopes which extend down to the level of the estuary, there is an area running west east which comprises relatively good agricultural land. Although this is all currently down to pasture, the nature of many of the field boundaries here (either walls on top of substantial lynchets, or substantial consumption' walls (built to use as much stone from the surrounding fields as possible) suggests clearance for some form of arable cultivation (if only hay for fodder).

Some of the lynchets may have their origins in the prehistoric period (there is no associated settlement but their shape and appearance are typical), although the consumption walls are probably later. Further west in area 14 and in area 15 there is evidence for prehistoric land division in the form of curvilinear stone-built walls.....

As on the north side, the steep slopes on this side of the estuary are also largely wooded (this gives way to bare cliffs and fieldscapes as the slopes turn to face the sea). Much of this is important ancient or semi-natural woodland, although other sections are modern conifers or designed parkland.

Medieval background

Six townships are recorded within the area covered by this project in the medieval period (Williams-Jones, 1976), all but one on the southern side of the estuary. Llanaber is a modern settlement, now an extension of Barmouth along the main coast road to the north (area 01).

On the southern side were the townships of Dolgledr (now remembered in the name of a mountain area 08), Cefn-yr-Owen (remembered in both a hill and two modern farms, as well as other farmsteads here area 18), Cregennan (whose name is recorded today in both lakes and a farm area 14), Morfa Maenog (Morfa is a hill, but there is also an Afon Morfa area 15) and Llwyngwrl (a modern village area 22). However, the 1840s Dolgellau tithe map also records farmsteads near Cefn-yr-owen as belonging to another township, that of Dyffrydan (see area 18).

Non-nucleated settlements

Of the earlier vernacular landscape, the best evidence is in the two valleys which run down from the Diffwys upland into the Mawddach at Borthwnog and Bontddu (area 05), and the upland area immediately below the steep slopes of Cadair Idris (principally area 18). Both areas have seen some contraction of settlement, leaving behind a series of abandoned farmsteads. Building within a vernacular tradition continued until (roughly) the early nineteenth century when vigorous building programmes by estates introduced new styles and modes of building. This vernacular tradition is dominated by masonry in rough or quarry-dressed blocks, slate roofs (some earlier random slate roofs still survive), with gable copings to earlier buildings.

However, there is some evidence for a prior tradition of building in timber...

Building types and material

The area displays a very interesting and important age profile in terms of building: there is a long chronology here with examples from the late-16th right through to the mid-20th century. Settlement history in this area is more intricate than many parts of Meirionnydd, since the agricultural/vernacular settlement has an overlay of 'polite', gentry building associated with the development of the area as a fashionable venue in the nineteenth century; this may be linked with the romantic movement, valuing wild beauty in the landscape. Associated with this is the growth of tourism, a history which is very well documented in this area (see areas 01, 11 and 22 below).

On the north side of the Mawddach, there is evidence for a continuous vernacular building tradition from the late 16th century, working with local stone as rubble and with slate roofs (though the ubiquity of gable copings probably indicates that this is a later replacement of thatch). Storeyed houses were common from the end of the 16th century, but the varied social context of building also ensures the survival from a later period of single-storeyed of lofted houses. Local stone is ubiquitous, varying in the manner of its dressing, coursing and finish (the quality of finish is one of the key indicators of social status, though other changes may be the result of changing quarrying techniques).

On the southern side, there is an important cluster of 17th-century farmsteads in the medieval townships centred around the top of the Afon Gwynant.

Relict archaeology

This topographically-varied area encompasses coast, river estuary, upland plateau and hill slopes. There is no archaeological evidence of human activity here before the neolithic period in the fourth and third millennia BC but the same is true for most of Meirionnydd. By comparison with the rest of north-west Wales, activity before the neolithic period would have been concentrated around the coast and its absence here may be the result of the submergence of relevant sites by rising sea-levels in the post-glacial period. Peat-beds have been found below the present high tide line on the coast at Llanaber, just north of the Mawddach area and these have produced red deer antlers and cattle bones. Further south at Borth and Ynyslas, Cardigan, other coastal peat deposits are exposed for some 5km along the shore. They appear as outcrops on the beach from beneath the adjoining Borth raised bog, under which they must extend, and consist of fen, alder carr and forest beds overlying salt marsh clay (Heyworth and Kidson 1982, 102). Radiocarbon dates give a date of c. 6000 BP for the underlying salt marsh and dates of c. 5400 BP to 3900 BP, at its lowest for the forest bed (ibid.). A number of casual archaeological finds have been made from these peats

including a Mesolithic flint pick, flint flakes, an antler tool and a hearth which produced a date of c. 4000 BP from the surrounding peat (Sambrook and Williams 1996, 26) as well as bones of red deer and cattle. Buried peats and ancient forest beds have been identified on the coastal plain around the mouth of the Mawddach between Fairbourne and Arthog. These are as yet undated but are likely to be of a similar date to those at Borth and in future may produce evidence of human activity.

There are no neolithic chambered tombs in this area to indicate the presence of permanent settlement in the fourth and third millennia BC but there was certainly a human presence here as demonstrated by five finds of stone axes. In north-west Wales as a whole stray finds of axes occur much more widely than the distribution of chambered tombs, suggesting that they may derive from itinerant seasonal activity such as hunting, collecting or herding rather than permanent settlement.

The Mawddach area was certainly intensively used in the second millennium BC as demonstrated by the presence of two significant concentrations of funerary and ritual monuments typical of that period. One is on the south-facing slopes of Allt Llwyd, near Llwyngwrl, the other is on the plateau to the south of the Cregennan Lakes, Arthog. Both areas contain a variety of types of burial monument and the Cregennan area also has a number of standing stones and cup-marked stones. The two areas are linked by an ancient route, the Ffordd Ddu, and the Cregennan area is also approached by another route from the west which has been identified as a prehistoric route because it is marked by two rows of standing stones and several burial cairns (Bowen and Gresham 1967). No actual settlement of that period has yet been identified here and it seems likely that both areas are specialised foci of funerary and ritual activity. The associated settlement may not have been far away, either in the lowland of the coastal plain or valleys or on better-drained slopes just above the coastal plain. The latter location is supported by finds of a stone axe-hammer from Fegla Fawr, a hillock at the south side of the Mawddach, and two separate finds of bronze axes on the hill slopes between Fairbourne and Arthog. Just outside the area are two finds of bronze axes on the slopes south of Allt Llwyd, two on the slopes north of the Afon Dysynni and one from the beach at Llwyngwrl. A further relevant find, from Arthog, is that of a bronze bucket of a rare and imported Central European type belonging to the early first millennium BC (Hemp 1960). This was a chance find in the mid-19th century during peat-cutting. It may have been a ritual deposit but its location is close to the head of a navigable creek and so again may point to a link to routes rather than to settlement in the immediate vicinity.

The Mawddach area continued to be occupied but less intensively used during the first millennium BC. The estuary must have had some value for the access to the interior and the shelter it provided for ships on this open coast. There were three hillforts in the area, two overlooking the mouth of the estuary at Pared Cefn Hir and Craig y Castell and another above Llwyngwrl at Castell y Gaer. The hillforts were small and clearly rather local centres of power and the associated settlement likewise was light and scattered. This contrasts with the situation in the second millennium when the Cregennan area was a major focus of funerary and ritual activity. There are remains of settlement of this general period, both enclosed and open, as well as field systems and enclosures on the upland of Allt Llwyd and between Llwyngwrl and Islaw'r Dref. Excavation of one round house in advance of afforestation at Cyffanedd Fawr above Friog showed it to have been occupied between the 1st century BC to the 3rd century AD (Crew 1978, 1979, 1981) and most of the known settlement in the area can be expected to belong to this period. Another rectangular enclosure, possibly a settlement at Pant y Llan, Arthog has also produced a chance find of imported Roman pottery. The Mawddach area did not have much good arable land or other resources and was a marginal area, not heavily settled, with little to offer in the way of opposition to Roman authority or participation in the Romanised economy. It must have continued as a lightly settled rural area with no real focus of settlement in the Roman period.

Industrial

There is little of industrial archaeological interest in the area, and few, if any, major monuments. In about 1860, the owner of the copper mines above Bontddu (area 05) discovered gold, and the owners of the Figra and Clogau Copper Mining Company (actually

situated outside the character areas considered in this report) took out a licence to extract gold, and by May 1861 profits were sufficient to initiate a mini gold rush in the area. Gwynfynydd Gold Mine was also established at this time but serious mining ceased during the First World War. All of these mines were water-powered; although around 150 shafts and levels are known in the mountains to the north of Bontddu, the three main centres of activity were those listed above (Farr, 2001). At Clogau the mining was adit mining, centred on inclined tunnels which were dug by hand until the 1870s, when compressor drills were introduced. Figra Mine was powered by a waterwheel which had been built as a crushing mill for the copper mine and was adapted to its new use in 1862. A zig-zag track and incline connected it with the mine above. At the end of the 19th century a new mill powered by a turbine was built, and downstream a smaller mill was in use until the 1930s.

At more or less the same time, across the estuary, two slate quarries were opened up in Panteinon Valley. Henddol was started in the early 1860s, was in production by 1865 but ceased production in 1871 following a rockfall. Goleuwern quarry had been opened in 1867, and when Henddol was re-opened in 1892 the two traded together as Cambrian Estates Ltd, finally closing in 1920 (Richards, 1991). Another quarry, Bryngwyn had an even shorter and more erratic life. Both quarries shared joint facilities (mill, smithy etc.) relying on horse and carriage transport for moving the slate out. Further east, above Arthog, Ty'n y Coed quarry was opened in the mid 1860s, and its material was also taken by tramway across the morfa to a small jetty on the estuary below and thence to Barmouth. Ty'n y coed is still used today for some extraction and some dumping.

The Barmouth ferry, which crossed from Penrhyn point on Morfa Mawddach (area10), transported the slate across the estuary to Barmouth (area 01), whence it was shipped out, along with lead, silver, copper and manganese from Cyfannedd fawr (the remains of the mines and adits, which were initially opened in 1827 but mainly worked during the period 1851-63, lie to the north of the eponymous farm at the top of this area). The silver mine here, the only one in the district, was producing approximately 40oz of silver from a ton of ore at its height." (*Extracted and adapted from the Register of Landscapes of Historic Interest in Wales*).

- 3.10 The RHL of *Mawddach* is divided into twenty-four (24) historic landscape character areas (HLCAs). The proposed development is to be positioned within two of these areas, that of *Afon Morfa Wooded slopes* HLCA and *Llynnau Gereginnan* HLCA.

i) Afon Morfa Wooded slopes HLCA

- 3.11 Two slate quarries were opened up in Panteinon Valley in the 19th century. Henddol was started in the early 1860s, was in production by 1865 but ceased production in 1871 following a rockfall. Goleuwern quarry had been opened in 1867, and when Henddol was re-opened in 1892 the two traded together as Cambrian Estates Ltd, finally closing in 1920 (Richards, 1991). Another quarry, Bryngwyn had an even shorter and more erratic life. Both quarries shared joint facilities (mill, smithy etc.) relying on horse and carriage transport for moving the slate out. Further east, above Arthog, Ty'n y Coed quarry was opened in the mid 1860s, and its material was also taken by tramway across the morfa to a small jetty on the estuary below and thence to Barmouth. The Barmouth ferry, which crossed from Penrhyn point on Morfa Mawddach (area10), transported the slate across the estuary to Barmouth (area 01), whence it was shipped out, along with lead, silver, copper and manganese from Cyfannedd fawr (the remains of the mines and adits, which were initially opened in 1827 but mainly worked during the period 1851-63, lie to the north of the eponymous farm at the top of this area). The silver mine here, the only one in the district, was producing approximately 40oz of silver from a ton of ore at its height. In 1748, Cyfannedd-fawr was occupied by Morus Jones, a well-known poet and

winner of many bardic chairs.

Key historic landscape characteristics

17th century farmhouses, mining remains, woodlands

- 3.12 At the top of the area is 'The Blue Lake', a 40ft-deep quarry pit which was deliberately filled with water in 1901 by McDougall's engineer (see area 11) to act as a reservoir in a scheme to provide Fairbourne with electric lighting. Pipes were laid down to the village, but nothing came of the idea.
- 3.13 Arthog community contains a number of listed buildings which testify to the importance of the area over the last three hundred years or so. Arthog Hall is a country house built in a picturesque, castellated style in 1833 for Reginald Fourden, a Lancashire cotton-mill owner (on the site of the medieval Pwll-arthog) while the cottage and home farm nearby (both also grade II), has a range of agricultural outbuildings including a cart house, stable range and hay barn. The Old Lodge (built in 1835 to serve the hall) is also listed. Garth y Fog farmhouse (grade II*) is a small, two-storey, rubble-built vernacular farmhouse dated 1796, while Hen-ddol farmhouse (a late 17th/early 18th century farmhouse near the quarry) was the site of a notorious siege in 1780 when bailiffs went to arrest the owner for smuggling (it also has an interesting range of 19th century outbuildings). Adding to the 19th century stock of buildings along the estuary is Ty'n-y-coed, a small Victorian country house built in eclectic Gothic style in the 1860s by David Davies who had recently bought the estate and founded the eponymous quarry.
- ii) *Llynau Gereginnan HLCA.*
- 3.14 Ffordd Ddu is an ancient mountain route running from Llwyngwrl to Dolgellau, originating, according to some, in the neolithic period. The present minor road across the top, which predates the current main road which runs along the base of the cliff, was formerly a major route across the area, and served quite a number of farms, some of which are now either ruined or retirement' homes.
- 3.15 The eastern part of the area, around Llynau Gereginnan themselves, are literally covered with dozens of relict archaeological sites, including standing stones, cairns, hut circles and other more-ephemeral features from the prehistoric period. There are also considerable remains of deserted rural settlement sites from later periods (Cregennan is recorded as a free township in the medieval period). These sites, many of which are scheduled ancient monuments, testify to a long history of land-use which extends over several thousand years. Most of these sites lie within the area owned by the National Trust and were recorded during the Trust's archaeological survey of the area. Interestingly, the sites recorded on the regional SMR stop at the minor road which bisects the area from north to south, from Cregennan up towards Braich Ddu.
- 3.16 There are a number of minor farmsteads here, from the 17th 19th centuries, a couple of which are listed, including Cefn-hir uchaf (grade II a late 17th century vernacular single storey rubble cottage)

and Pant-Phylip, a one and a half storey, rubble-built vernacular farmhouse dated 1731, but nothing compared with those in area 18 to the east. Most of the area is shown on the 1839 Llangelynnin tithe map as comprising large, irregular enclosures, much as today.

Key historic landscape characteristics

Relict archaeological sites, irregular enclosures, farmsteads, trackways

- 3.17 A large area of complex field patterns, widely-scattered farms (some bearing the names of medieval townships) and one of the most significant landscapes of relict prehistoric sites in the region, as described above, form the main interest in the area. The land is of poor quality, and in between the rocky knolls there are patches of bog and pasture fields. The eastern part of the area, which contains the better land, is characterised by the dozens of relict archaeological sites; while the western part, which rockier, is bleaker and contains just a couple of inhabited houses.

3.18 Heritage Assets within 1km buffer zone (Historic Environment Record) (see Figures 10 and 11)

Prehistoric Periods (Palaeolithic, Mesolithic, Neolithic, Bronze Age)

- 3.19 Within the 1km buffer zone from the route of the proposed hydro-scheme there are a total of only one (1) known designated prehistoric site. This site is a pair of Bronze Age burial cairns between which there is a cup marked stone. This designated site is known as the *Bron Lletty Ifan Cairns and cup marked rock* (SAM Ref: ME242) and lies approximately 400m southwest of the proposed developments Intake No.1.
- 3.20 Within the 250m buffer zone from the proposed development, there is only one known Bronze Age HER record, this is a findspot where a Bronze Age Palstave was discovered in antiquity somewhere in the area of Bron Lletty Ifan farmstead (PRN: 3826). This palstave has no loop and is hollow below its stop-ridge. This find is presently in the ownership of the National Museum of Wales (NLW).
- 3.21 There are no designated scheduled prehistoric sites within the 250m buffer zone.

Iron Age and Romano-British period

- 3.22 There no known Iron Age or Romano-British period sites within the 250m buffer zone recorded within the regional HER, nor within the National Monuments Record database.
- 3.23 However, although this is the case, this doesn't mean that there are no buried archaeological remains associated with these time periods, especially as there is especially rich evidence for both Iron Age and Romano-British activity in the wider landscape within the 1km buffer zone, as is evident from the existence of two (2) designated Romano-British sites, a *round hut and cairns on the northwest slope*

of *Braich Ddu* (ME100) and an *enclosure and settlement area 400m east of Cyfannedd Fawr* (ME086), which would strongly suggest that the immediate landscape surrounding the proposed development area was probably very active during these periods.

Medieval Periods

- 3.24 Within the regional HER database there are no undesignated medieval sites within the 250m buffer zone from the proposed development. However, there is one (1) designated medieval site within the 1km buffer zone, that of a medieval platform house, known as *Cyfannedd-Fach Homestead* (ME101), which lies approximately 450m southwest of the proposed area of Intake No.1.

Post-Medieval periods

- 3.25 Within the 250m buffer zone, there are seventeen (17) known undesignated post medieval sites within the HER database.
- 3.26 As would be expected, this chronological period marks the greatest number of known sites within the 250m buffer zone. Site types include: 4 buildings, 1 Chapel, 1 field drain, 1 flagpole, 4 houses. 1 milepost, 2 sheepfolds, 2 structures and 1 terraced house. The greater part of these HER sites are all inevitably within the area of Athog village along the southern side of the A493.
- 3.27 Only three (3) known post medieval HER sites are located in the uplands area and these are fairly close to the proposed scheme. These sites include:
- 1) *Structure and Enclosure, SE of Afon Morfa* (PRN: 57918) – Stone built structure within stone enclosure, positioned approximately 30m east of the proposed pipeline.
 - 2) *Sheep Fold, S of Afon Morfa* (PRN: 57917) – Sheepfold identified using early OS maps. Positioned approximately 90m west of the proposed pipeline.
 - 3) *Sheepfold, Arthog* (PRN: 30504) - Sheepfold identified using early OS maps. Positioned approximately 230m southwest of the proposed pipeline.

- 3.28 Within the 1km buffer zone, there are two (2) designated Grade II listed structures. These include *Garth y Fog farmhouse* (LB No. 15586) in Arthog village, and a *milestone by Barmouth Bridge* on the southeast side of the A493 (LB No. 15591).

Modern Period

- 3.29 Within the HER database there are no modern sites recorded within the application area, nor within the prescribed 1km buffer zone.

Unknown Period

- 3.30 Within the HER database there are no sites of unknown periods recorded within the application area nor within the prescribed 1km buffer zone.

3.31 Cartographic Sources

OS Surveyors drawing (1816)(Figure 4)

- 3.32 This early Ordnance Survey drawing of 1816 gives very little useful information relating to the proposed development area apart from mention of the Afon Morfa and the position of Bron Lletty Ifan farmstead, then written as 'Bron Lletty Evan'.

Tithe Map and Apportionment of the parish of Llangellynnin Parish (1841) (Figure 5)

- 3.33 As with the earlier OS Surveyors drawing, this mid 19th century tithe map shows little useful information pertaining to the proposed development area. Even the farm of Bron Lletty Ifan is not marked on the map. The only interesting information gained is from the apportionment records, where it says that area No. 85 on the tithe map was owned by one Morris Pugh Esq., who tenanted the land out to one William Price.

OS First Edition map 1:2500(1886) (Figure 6)

- 3.34 The published first edition Ordnance Survey map now offers a great deal of useful information regarding the proposed development area. Marked is the farmstead of Bron Lletty Ifan, along with Hafod y garreg to the immediate southeast of Bron Lletty Ifan, Bron Meirion House and numerous farm tracks, field boundaries and small enclosures. The proposed pipeline will pass directly through a number of these linear features

OS second Edition map 1:2500 (1900) (Figure 7)

- 3.35 No great change from the earlier first edition map.

OS 1939 Edition map 1:2500 (Figure 8)

- 3.36 No great change from the earlier edition map.

OS 1949 Edition map 1:2500 (Figure 9)

- 3.37 No change from the earlier edition map.

Aerial Photos

- 3.38 Aerial photos investigated as part of the desk based assessment included vertical sheets from the RAF 1946 vertical photograph series. These early aerial photos show the application site much as it is today. No readily apparent crop-marks were identified on any of the aerial photos analysed.

Table 5. Vertical Aerial Photos consulted				
Sheet No.	Sortie	Frame No.	Date	Type
-	106G/UK/1468	6197	04/05/1946	RAF

3.39 Site Visit

- 3.40 The site visit was unfortunately undertaken in mid June and as such the bracken was very high and very dense, which hindered the walkover within the prescribed 25m buffer zone around the pipeline route slightly in a number of areas along the lower slopes and also hindered photographic recording work because of lack of light in the wooded areas..
- 3.41 The site walkover began around the areas of both of the proposed intakes (Intake No's 1 and 2) and the Forebay tank. In each of these areas, the only area where a number of interesting features were noted, was around the area of Intake No.2. Here, a boulder scatter (Site No.7) was noted on the northern bank of the stream, beside a dry-stone wall. The stones varied in size, from large irregular boulders some 0.60m to smaller irregular stones some 0.20m in size. The boulder spread covered an area of approximately 6m x 3m, with a small number of stones appearing to have been deliberately positioned and a small number laid one on top of the other to form a small clearance cairn feature, or else evidence of possible prehistoric settlement remains. The character, date and form of this boulder spread is uncertain as the stones are spread across the ground in too random a fashion to offer any conclusive interpretation. Also noted along this area of the stream, was the fact that the northern side of the stream had been retained by a small moss covered dry-stone retaining wall. Both these features (dry-stone retaining wall and boulder scatter) may be related and contemporary, but this is far from certain.
- 3.42 Following inspection and photographic recording work of the intake area, the walkover continued northwest along the route of the proposed pipeline, where the pipeline begins to drop downslope. Two significant features were immediately noted in the first 200m of this section, the first was a low stone bank with compacted stone track running parallel to it (Site No. 11). This track NE – SW running track leads to a now empty stone built agricultural building, some 220m to the northeast, still roofed but becoming ruinous. The name of this building is not marked on the OS first edition, nor on any of the later OS editions, which may suggest that it was once a large field barn attached to Bron Lletty Ifan farm, rather than a farmstead itself. The low stone bank (Site No. 11) is probably post medieval in date and likely contemporary in date with Bron Lletty Ifan. The other significant feature in this immediate area, is the remains of an ancient *lynchet* (Site No. 13). This *lynchet* runs north to south and the visible earthwork measures the length of the field, approximately 100m in length. To the west of the *lynchet* the ground drops steeply and changes to dense bracken and woodland. The *lynchet* does appear to continue further northwards beyond the 100m, but the length to the north is topped by post medieval dry-stone walling. Given its position, the *lynchet* suggests that the field area (Site No. 12) was once ploughed in either medieval or else during the Romano-British periods. Presently this field is flat and shows no obvious surface evidence of ancient ploughing such as ridge and furrow.
- 3.43 Given that the proposed pipeline continues down the steep southwest facing slope, no new features were noted in this immediate area. However, a further 100m or so along the proposed pipeline route,

the walkover survey, did identify and confirm the existence and character of a number of tracks and dry-stone built structures, whose positions and extent are shown on the early OS maps (Site No's 16, 17, 18, 19, 20, 21, 22 and 28). Each of these features appear to be contemporary in date with an unroofed dry-stone built structure and enclosure (Site No. 17) and each are likely late post medieval in date. The dry-stone structure (Site No. 17) appears to have once been roofed but no longer and does not appear to have had any former window openings. The stone for the build appears to have been quarried from an area immediately beside the structure itself, as have the stones for the surrounding dry-stone enclosure walls and walls that line the track. Given the character and form of this structure, it probably had a former agricultural use and given the number of known sheepfolds in this upland landscape, this structure probably served an associated purpose. Although the proposed pipeline will not affect this structure, or its immediate enclosure, it will have a direct impact on sections of a number of dry-stone walls, particularly one double section of walling that delineates an access track leading toward the stone structure and its enclosures. And another section that runs parallel with the stream (Site No's. 19 and 22).

3.44 Below this structure to the northwest, where the proposed pipeline crosses the stream, is a rather crude old weir feature (Site No. 23). All that remains of this feature now is a damming of stones and boulders and a vertically positioned small cast iron filter. This old weir is likely associated with the former but now obsolete 1920s Afon Morfa Hydro-electric scheme associated with Bron Meirion house. From this point, the walkover of the proposed pipeline route stopped given that the topography drops very steeply and runs through an area of rocky crags. Given the dense vegetation and the topographic conditions, it was deemed too hazardous to continue further and given the steepness of the topography, it is extremely unlikely that there are any heritage interests in this area.

3.45 In the area of the proposed Powerhouse and Discharge point, at the rear of Bron meirion House, the walkover investigated the immediate area and noted and recorded the remains of a former 1920s turbine pipe (Site No. 25), the remains of former 1920s shutting off valves positioned in the ground (Site No. 26) and the 1920s control and switching gear in the former Bron Meirion Coach-house/garage.

3.46 Sites noted within the Application Area

3.47 The cartographic study and site visit identified a total of thirty (30) new sites. The majority of these are dry-stone boundary walls or enclosure walls identified from both the cartographic work and the site visit. A list of all the new sites identified is given below in Table 6 below (see also Figure 12).

Table 6. Heritage Assets within 50m buffer zone along proposed scheme				
Site No.	Period	Site Type	Condition	Source & period
1	Post Medieval	Farm track	Still present	OS First Edition Map1886
2	Post Medieval	Bron Lletty Ifan farmstead	Still present	OS First Edition Map1886

Table 6. Heritage Assets within 50m buffer zone along proposed scheme				
Site No.	Period	Site Type	Condition	Source & period
3	Post Medieval	Bron Lletty Ifan farmstead byre building	Still present	OS First Edition Map1886
4	Post Medieval	Dry-stone building/shed	Still present	OS First Edition Map1886
5	Post Medieval	Dry-stone building/shed	Still present	OS First Edition Map1886
6	Unknown	Track	Turf covered	OS First Edition Map1886
7	Unknown	Boulder scatter/spread	Moss covered	Site Visit
8	Unknown	Drystone retaining wall alongside stream bank	Moss covered	Site visit
9	Post Medieval	track	Turf covered	Site visit and OS First Edition Map1886
10	Post Medieval	Dry-stone wall	Still present	Site visit
11	Post Medieval	Low stone field bank and track	Still present	OS First Edition Map1886
12	Unknown. Perhaps Medieval or else Iron Age	Field area identified from remains of lynchet.	Pasture land	Site visit
13	Unknown. Perhaps Medieval or else Iron Age	lynchet	Good	Site visit
14	Post Medieval	Dry-stone boundary wall	Still present	OS First Edition Map1886
15	Post Medieval; Medieval or Iron Age	Dry-stone wall overlying earlier lynchet (Site No. 13)	Still present	Site visit and OS First Edition Map1886
16	Post Medieval; Medieval?	Sunken track	Good	Site visit
17	Post Medieval	Dry-stone built unroofed structure and quarry area	Ruin	Site visit. Also shown on OS First Edition map of 1886
18	Post Medieval	Dry-stone enclosure	Ruin	Site visit. Also shown on OS First Edition map of 1886
19	Post Medieval	Dry stone wall	Ruin	Site visit. Also shown on OS First Edition map of 1886
20	Post Medieval	Dry stone wall	Ruin	Site visit. Also shown on OS First Edition map of 1886
21	Post Medieval	Dry stone enclosure wall	Ruin	Site visit. Also shown on OS First Edition map of 1886
22	Post Medieval	Dry stone wall	Ruin	Site visit. Also shown on OS First Edition map of 1886
23	Post Medieval	Old weir	Rusting away cast iron filter	Site visit
24	Victorian	Garden track	Overgrown	Site visit
25	Modern	Former 1920s hydro-electric pipework	Broken	Site visit
26	Modern	Former 1920s hydro-electric water valves	Good	Site visit
27	Modern	Former 1920s hydro-electric powerhouse complete with switching gear and control panel	Good	Site visit
28	Victorian	Platform area at rear of garden area delineated by boulders and garden	Overgrown	Site visit

Table 6. Heritage Assets within 50m buffer zone along proposed scheme				
Site No.	Period	Site Type	Condition	Source & period
		track.		
29	Victorian	Bron Meirion House	Good	Site visit and OS First Edition Map1886
30	Post Medieval	Footpath leading to Site No.17	Overgrown	Site visit and OS First Edition Map1886

4 Heritage Assets Affected

4.1 The desk based assessment and rapid walk-over survey identified several new archaeological sites of interest along the route of the proposed hydro scheme. Due to the intrusive nature of the proposed groundwork for the pipeline, the assessment has identified that there will be a direct physical impact from the proposals on sixteen (16) heritage interests. A list of these sites is given below.

1) Site No's. 1 and 6 (*Bron Lletty Ifan farm track*) – The proposed pipeline from Intake No. 1 will have a direct impact on part of this farm track.

2) Site No. 7 (*Boulder Spread/scatter*) - The proposed pipeline from Intake No. 2 will have a direct impact on this feature.

3) Site No. 8 (*Dry-stone stream bank retaining wall*) - The proposed pipeline from Intake No. 2 will have a direct impact on part of this feature.

4) Site No. 10 (*Dry stone wall*) - The proposed pipeline from Intake No. 2 will have a direct impact on part of this feature.

5) Site No. 11 (*Low stone bank and trackway*) - The proposed pipeline from the forebay will have a direct impact on part of this linear feature.

6) Site No. 12 (*Field area bounded by ancient lynchet*) - The proposed pipeline from the forebay will have a direct impact on part of this field.

7) Site No. 13 (*Ancient lynchet*) - The proposed pipeline from the forebay will have a direct impact on part of this linear earthwork feature

8) Site No. 19 (*Dry-stone wall*) - The proposed pipeline from the forebay will have a direct impact on part of this double dry-stone wall track feature

9) Site No. 22 (*Dry-stone wall*) - The proposed pipeline from the forebay will have a direct impact on part of this linear feature.

10) Site No. 23 (*Old Weir*) - The proposed pipeline will have a direct impact on part of this feature.

11) Site No. 24 (*Bron Meirion House garden track*) - The proposed pipeline and powerhouse foundation will have a direct impact on part of this feature.

12) Site No. 25 (*Bron Meirion old hydro-electric pipe work across stream*) - The proposed pipeline will have a direct impact on part of this feature.

13) Site No. 26 (*Bron Meirion old hydro-electric water valves*) - The proposed pipeline could potentially have a direct impact on part of this feature.

14) Site No. 27 (*Bron Meirion old hydro-electric powerhouse*) - The proposed pipeline could potentially have a direct impact on part of this feature.

15) Site No. 28 (*Bron Meirion garden platform area*) - The proposed powerhouse foundation will have a direct impact on part of this feature.

4.2 In total eight (8) of these identified sites are linear features (Site No's. 1, 6, 10, 11, 13, 19, 22 and 24), one (1) is an area feature (Site No.12), and the remaining seven (7) sites are individual features (Site No's. 7, 8, 23, 25, 26, 27 and 28).

4.3 The greater part of the linear features affected by the groundwork are either tracks or dry-stone walls and each of these may be considered to be medium value sites and are more than likely post medieval in date. However, one of these features is an ancient *lynchet* (Site No. 13) of unknown date, but potentially Iron Age or else Medieval in date. This linear earthwork may be considered to be an undesignated site of high value, especially given its potential age, good condition and its importance to its historic landscape character area and the Registered Historic Landscape of *Mawddach* as a whole.

4.4 Given that these features are all linear features, the proposed groundwork for the pipeline trench will effectively destroy only a small section of each feature as a whole and therefore because of this fact, it is considered that this direct impact will only be slight on each of these linear features.

4.5 With regards to the single area feature identified. (Site No. 12). This area is the field attached to the identified *lynchet* (Site No. 13). Given the presence of the *lynchet* immediately to the southwest of this field, suggests that this field has been ploughed repeatedly in ancient times and as such is a proven area of ancient activity, which offers supporting evidence for ancient settlement in the immediate area of the proposal. This field covers a fairly large area and the proposed groundwork for the pipeline will directly impact on part of the field only slightly, but given its potential age and character it may hide sub-surface archaeology.

4.6 The remaining individual sites directly affected by the proposal include a boulder spread in the area of Intake 2 (Site No. 7), a dry-stone retaining wall alongside the stream bank (Site No. 8) by Intake No.2, and a number of early 20th century modern industrial or water-management features associated

with the former 1920s Bron Meirion or Afon Morfa hydro-electric scheme.

- 4.7 With regards to the boulder spread (Site No.2) in the area of Intake No. 2, this large stone/boulder scatter covers an area of approximately 6m x 3m. The positioning of a number of these stones appears to possibly have formed part of a very small crudely built stone-built structure, possibly evidence of prehistoric settlement, but the spread of the stones is too random to be conclusive and it may be that they are merely associated with medieval or post medieval clearance or else associated with the dry-stone retaining wall at the side of the stream, the boulders being the remains of stone stock piles during construction of the wall. The date of these features is unknown, but it is more likely that the dry-stone retaining wall is early post medieval in date and contemporary with the earliest part of Bron Lletty Ifan farmstead. The proposed pipeline will directly impact on both these features, but will not destroy them completely and as such this impact will only be moderate.
- 4.8 With regards to the modern features associated with the former 1920s Bron Meirion or Afon Morfa Hydro-electric scheme, each of these features will potentially be directly affected by groundwork for both the pipeline and the powerhouse. Given that these features are modern, and the groundwork will only affect small elements of them however, the impact is considered to only be slight.
- 4.9 As well as the above heritage assets identified along the route of the proposed pipeline and powerhouse, that will be impacted upon by the proposals, there is also considerable evidence of prehistoric activity and medieval activity in the immediate landscape surrounding the proposed development. Given the presence of these sites, it cannot be ruled out that there aren't any buried archaeological remains, features or deposits relating to both the prehistoric and medieval periods present along the route of the proposed development that could become exposed or even damaged from the proposed groundwork.
- 4.10 However, as long as the proposed route of the penstock and the positions of the intake and turbine house do not deviate significantly from the proposed route and positions depicted on the site plan, then it is predicted that no further direct impact on any known or newly discovered sites will occur.
- 4.11 Also, as long as existing farm tracks from Bron Lletty Ifan and existing tracks and footpath areas and planned new access tracks around the woodland areas are used to gain access to the intake, forebay areas, then there will be no further direct impact on any known heritage assets.
- 4.12 However, It is recommended where possible to offer some protection to a number of sites, using road irons and hazard tape around a number of these features during the construction period, in order to avoid potential damage from any 4x4 vehicles or heavy and light plant.

4.13 Significance of the remains

- 4.14 In terms of rarity with regards to sites identified along the route of the proposed development, the

greater part of these are all either dry-stone walls, tracks or industrial features associated with the remains of the former 1920s Bron Meirion hydro-electric scheme and all post medieval in date.

- 4.15 The dry-stone walls and associated tracks are important features to the historic landscape character area and each are significant in terms of the post medieval history of the character area within the registered historic landscape. With regards to the network of dry-stone walls in the wooded area along the southwest slope of the development area, these structures are all very likely agricultural rather than industrial and all associated with sheep farming in and around the wooded slopes. Because these dry-stone walls are all in fairly poor condition, there is an increasing need to preserve what remains there are.
- 4.15 The walk-over also identified the presence of a significant ancient agricultural *lynchet* (Site No. 13). A number of these ancient earthwork features are also known in other character areas of the *Mawddach* RHL, and their presence suggests Iron Age or else Medieval farming practices and settlement in the immediate area.
- 4.16 Also, given the presence of several designated prehistoric, Romano-British and medieval sites in the immediate landscape surrounding Bron Lletty Ifan and the fact that a Bronze Age palstave was discovered somewhere around the farm in antiquity, the potential for the discovery of significant buried remains associated with these periods during groundwork is considered to be high.

5 Mitigation

- 5.1 The best mitigation for the impact of any development on the archaeological resource is to avoid direct physical impacts upon all known archaeologically significant sites and features. Where avoidance is not considered possible or where the existence, exact location or extent of a feature is uncertain, additional mitigation measures may be required. A number of mitigation measures can be undertaken in advance of a planning application that will both inform, and potentially reduce or remove the need for archaeological mitigation at a later date. These options are outlined below:

Preservation In situ

- 5.2 This is the preferred option for all significant cultural heritage features and can be achieved by avoiding direct physical impact upon known features through careful consideration at the design stage. In this instance, a number of linear features have been identified along the route of the proposed development that will be directly affected by the scheme. Given that these features are linear, then only small sections of them will be directly affected and therefore there is a need to preserve in situ the parts of the linear features that will not be affected. This may be undertaken by marking out the limits of the proposed 6m wide corridor and the 1000m wide trench in the immediate area of the linear feature directly affected. This can be done using road irons with hazard tape, which will offer some protection from straying heavy machinery and other vehicles potentially damaging features further than is necessary

Evaluation

- 5.3 If there is an unavoidable impact upon a known archaeological site, or where it is uncertain if there will be an impact because the existence, exact location or extent of the archaeology is not known, then an archaeological evaluation (before the submission of the development scheme for planning approval) may be advisable in order to assess the presence or absence of archaeological features and their vulnerability from the development. The results of the evaluation can then inform decisions as to whether to re-design the scheme in order to avoid the features or to mitigate the development impact through 'preservation by record' (see 'excavation' below). In this instance, the scheme has already been approved by the Snowdonia National Park Authority (SNPA).

Excavation

- 5.4 Where previously identified archaeological features cannot be avoided by the development, or are considered to be of insufficient importance to warrant preservation *in situ*, then 'preservation by record' can be undertaken to excavate and record archaeological deposits before development commences. Such mitigation may also be required as a condition of granting planning consent. In this instance, the scheme has already been approved by the Snowdonia National Park Authority (SNPA).

Watching brief

- 5.5 Development impact upon minor or medium value sites, or where the absence of archaeological features has not been established by other methods, can be mitigated against by undertaking an archaeological watching brief to record any unforeseen archaeological features that may be encountered during construction. This can however, result in delays during construction while archaeological recording is undertaken.
- 5.6 In this instance, the primary HER database records have shown that there are *known* significant undesignated sites within the immediate area and along the route of the proposed hydro scheme. Identified sites include a former findspot location around Bron Lletty Ifan where a Bronze Age palstave was discovered in antiquity, several post medieval dry-stone walls and enclosures, a number of contemporary tracks, the remains of several modern industrial features associated with the 1920s Afon Morfa or Bron Meirion hydro scheme, and an ancient *lynchet*, potentially Iron Age or else Medieval in date. The presence of these sites and features, especially the Bronze Age palstave and the ancient *lynchet*, clearly demonstrates that the area has a *high* potential for buried archaeological remains associated with the prehistoric, Romano British, medieval and post medieval periods. As such, in order to mitigate against the possibility that buried archaeological remains could be exposed and destroyed during construction of the scheme, it was recommended by SNPA that during all ground-works for the intakes, the forebay, the pipestock (pipeline) and the powerhouse, be undertaken under strict archaeological watching brief conditions.

- 5.7 Prior to this groundwork commencing however, and in accordance with the design brief prepared by SNPA, it is advised that a pre-commencement site meeting is made with the client and the contractors in order to discuss and highlight the heritage interests along the route of the proposed development where there will be predicted impacts, and as part of this meeting, discuss and undertake the marking out of the limits of the proposed 6m wide corridor and the 0.60m to 1m wide trench in the immediate area of each feature directly affected.
- 5.8 With reference to identified linear features, this marking out should be done by using road irons with hazard tape, which will offer some awareness protection from straying heavy machinery and other vehicles potentially damaging the features further than is necessary. To offer further mitigation on these linear features, it is advised that any removed sections of identified linear features not being reinstated because of continued use by the new permanent access track, be re-instated or restored back to their original state as best as is possible i.e. re-building sections of damaged dry-stone walls and landscape back sections of earthwork features affected.
- 5.9 With regards to other individual features affected by the proposal, there is only one other feature, where there is some concern in terms of the groundwork directly impacting the site negatively. This is the area of boulder scatter (Site No. 7). This feature is presently a site of unknown date, function and character. However, although the groundwork may offer up some evidence to answer a number of these questions about the feature, it would be advisable to avoid this boulder spread as much as is possible with reference to the development design and therefore it is recommended to highlight and protect this boulder spread with road-irons and hazard tape to protect the remaining parts of this feature from accidental damage from straying machinery etc.
- 5.10 Also, given that the photographic recording of sites and features during the walk-over survey was hindered somewhat in the areas of the bracken covered slopes and wooded areas, it is also proposed that further photographic recording of sites and features is undertaken on a number of sites post vegetation clearance work prior to initial groundwork being undertaken.

6 Conclusions

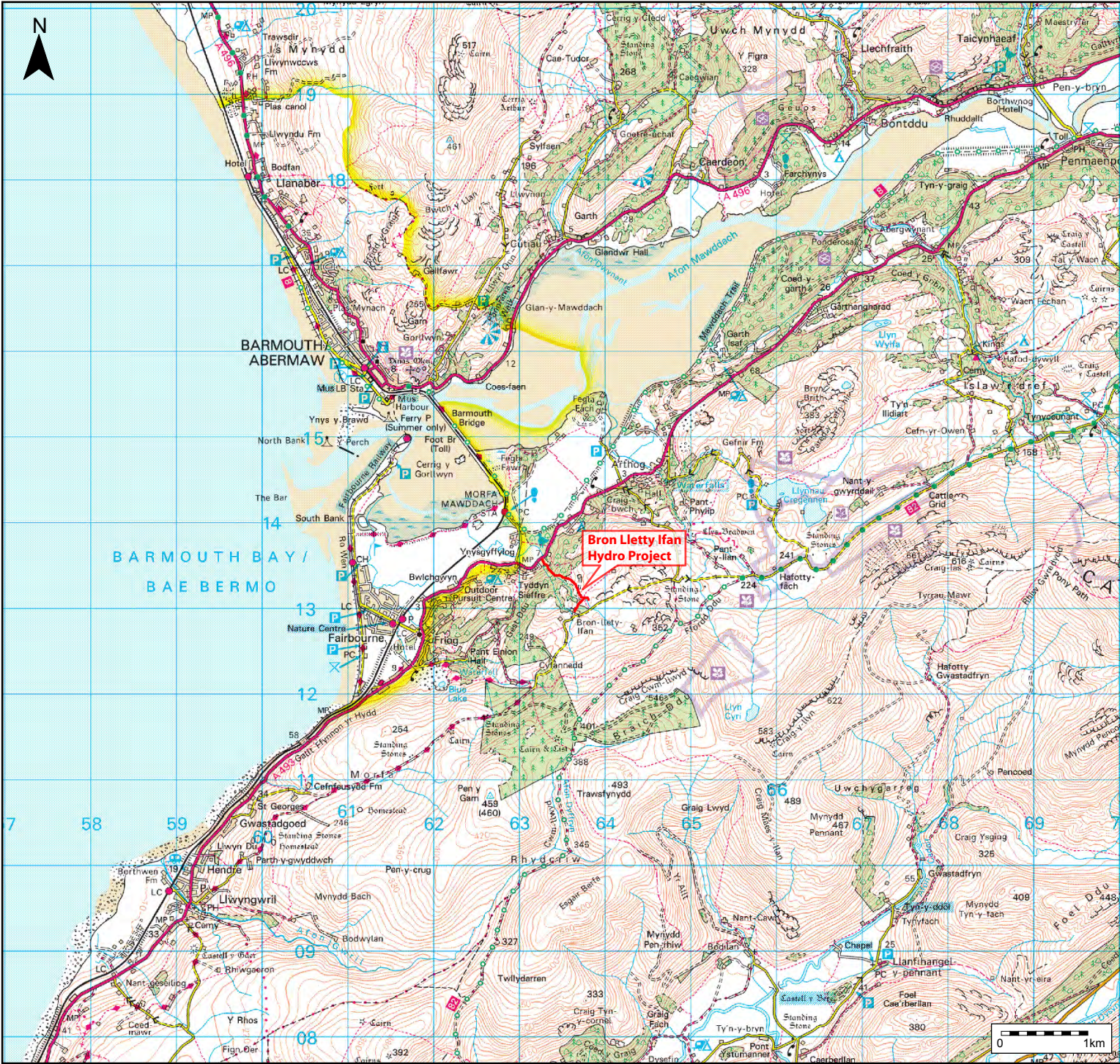
- 6.1 The rapid archaeological assessment undertaken along the route of the proposed Bron Lletty Ifan Hydro-electric Scheme managed to identify a total of thirty (30) sites or features of archaeological interest. The greater part of these sites are post medieval dry-stone walls, structures, enclosures and tracks as marked on the early OS maps, Other modern 1920s industrial or water management features were also identified in the lower area of the scheme along the Afon Morfa watercourse. These modern features are all remnant and obsolete features associated with a former hydro-electric scheme attached to Bron Meirion house.

- 6.2 Other than these interests, perhaps the most significant feature identified from the walkover survey was the remains of a well preserved ancient *lynchet* (Site No. 13). This earthwork is very probably either Romano-British or else medieval in date and suggests ancient agricultural practices in the immediate area of the proposed scheme and as such the possibility of settlement remains. Prehistoric activity in the immediate area of the proposal is also evident from the discovery in antiquity of a Bronze Age palstave found in the area of Bron Lletty Ifan farmstead. Other designated Bronze Age, Romano-British and medieval sites in the immediate landscape surrounding Bron Lletty Ifan indicate the richness of archeology in this uplands landscape. Given the presence of these significant heritage interests, the potential for the discovery of significant buried remains associated with these periods during groundwork is considered to be high.
- 6.3 With regards to mitigation proposals in advance of groundwork commencing on the development, the assessment has advised that road irons and hazard tape are used to highlight the proposed working corridor, as well as to offer protection to a number of significant sites, both linear and individual features, in order to protect and preserve the historic character of this character area within the Mawddach Registered Historic Landscape. This mitigation strategy will be undertaken following a site meeting with the site contractors.
- 6.4 In accordance with the design brief prepared by SNPA, all penetrative groundwork on site will be undertaken under strict watching brief conditions. However, given the topography at the lower end of the scheme, below the point of the old weir (Site No. 23), it is recommended that the groundwork in this area is only monitored intermittently rather than being supervised under full watching brief conditions, in order to undertake brief inspection and photographic recording during groundwork and following likely vegetation clearance.

7 References

- Ref 1 Snowdonia National Park LANDMAP Historic Landscape
Ref 2 The Register of Landscapes of Historic Interest in Wales

APPENDIX I:
Figures



Legend

Proposed Development

Approximate Scale (@ A4): 1:70,000

Date: June 2016

Prepared by:

Heritage
Recording Services Wales

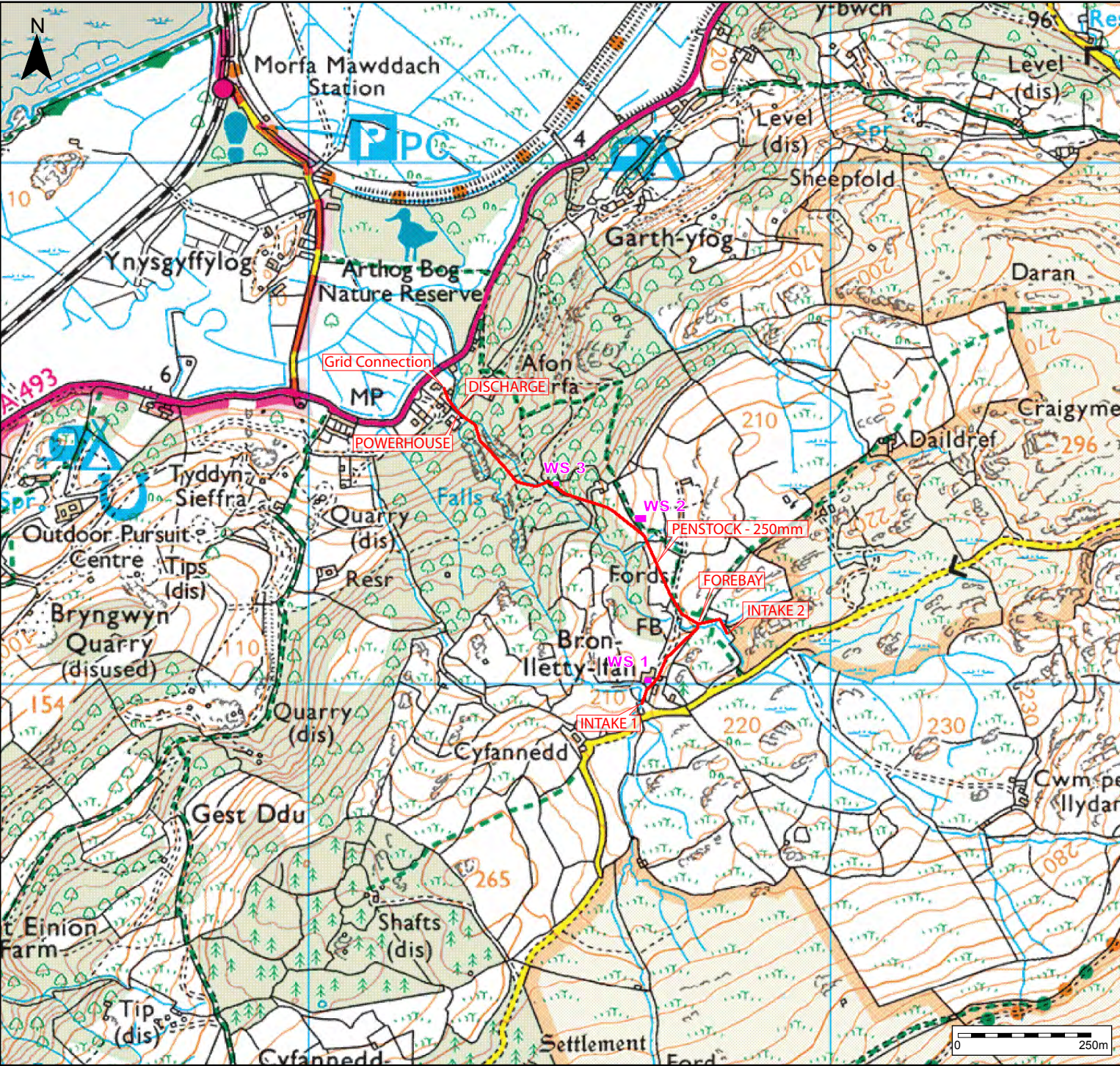
Client:

Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 1. Site Location



- Legend
- Pipeline route
 - Workstations

Approximate Scale (@ A4): 1:10,000

Date: June 2016

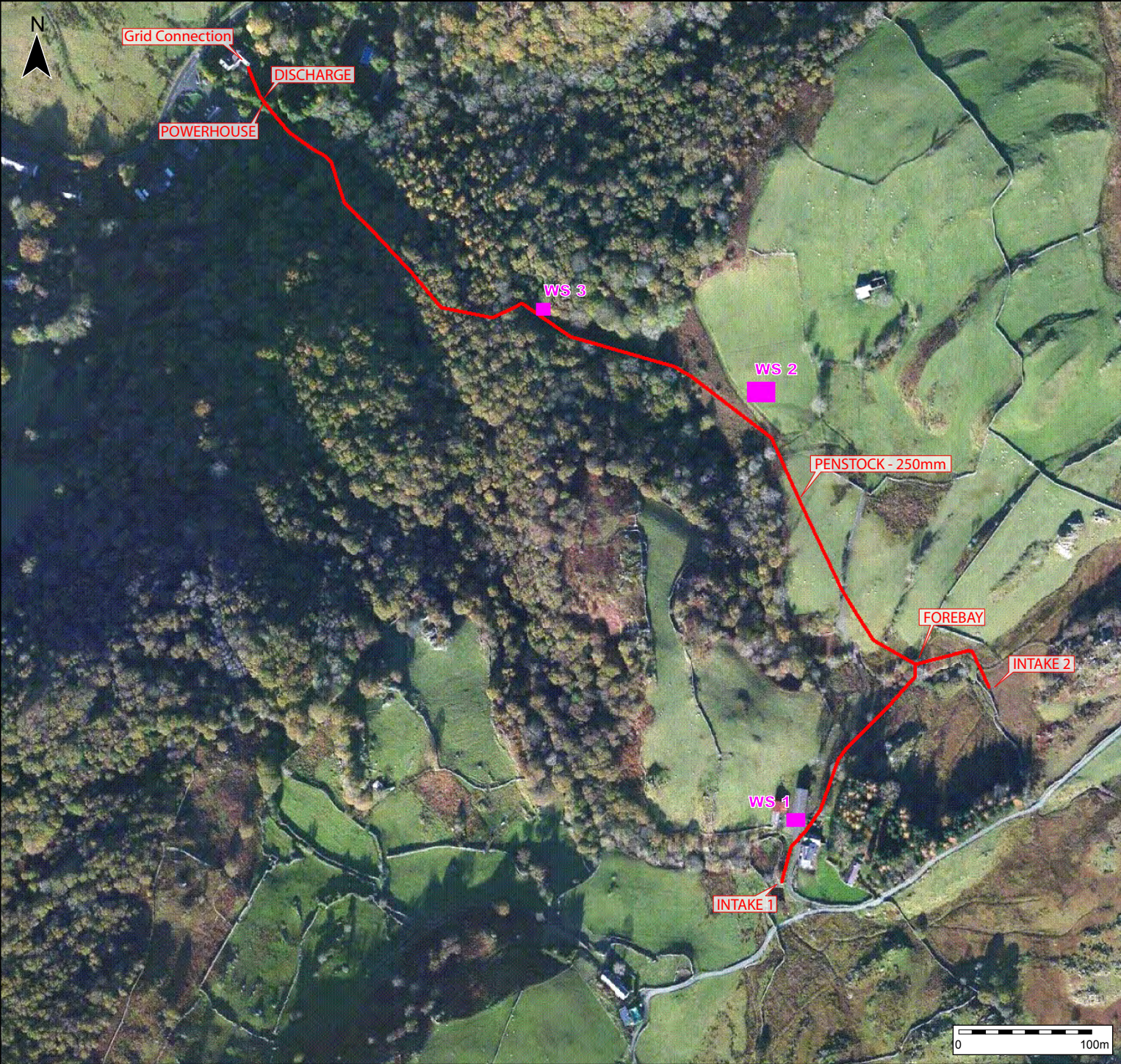
Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro


On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 2. Location Map and Site Design



- Legend
- Pipeline route
 - Workstations

Approximate Scale (@ A4): 1:4,000	
Date:	June 2016
Prepared by:	
Client:	Snowdonia Hydro
On behalf of:	
Project Title:	Bron Lletty Ifan Hydro Project
Figure 3.	OS Aerial Photo (2014)



Legend

 Pipeline route

Approximate Scale (@ A4): 1:20,000

Date: June 2016

Prepared by:

Heritage
Recording Services Wales

Client:

Snowdonia Hydro

On behalf of:

Project Title:	Bron Lletty Ifan Hydro Project
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Figure 4. OS Surveyors Drawing (1816)



Legend

Pipeline route

Tithe Apportionment details

No. 85 - Name = Bron Lletty Evan
Landowner = Morris Pugh Esq.
Occupier = William Price
Area = 250 acres

Approximate Scale (@ A4): 10,000

Date: June 2016

Prepared by:

Heritage
Recording Services Wales

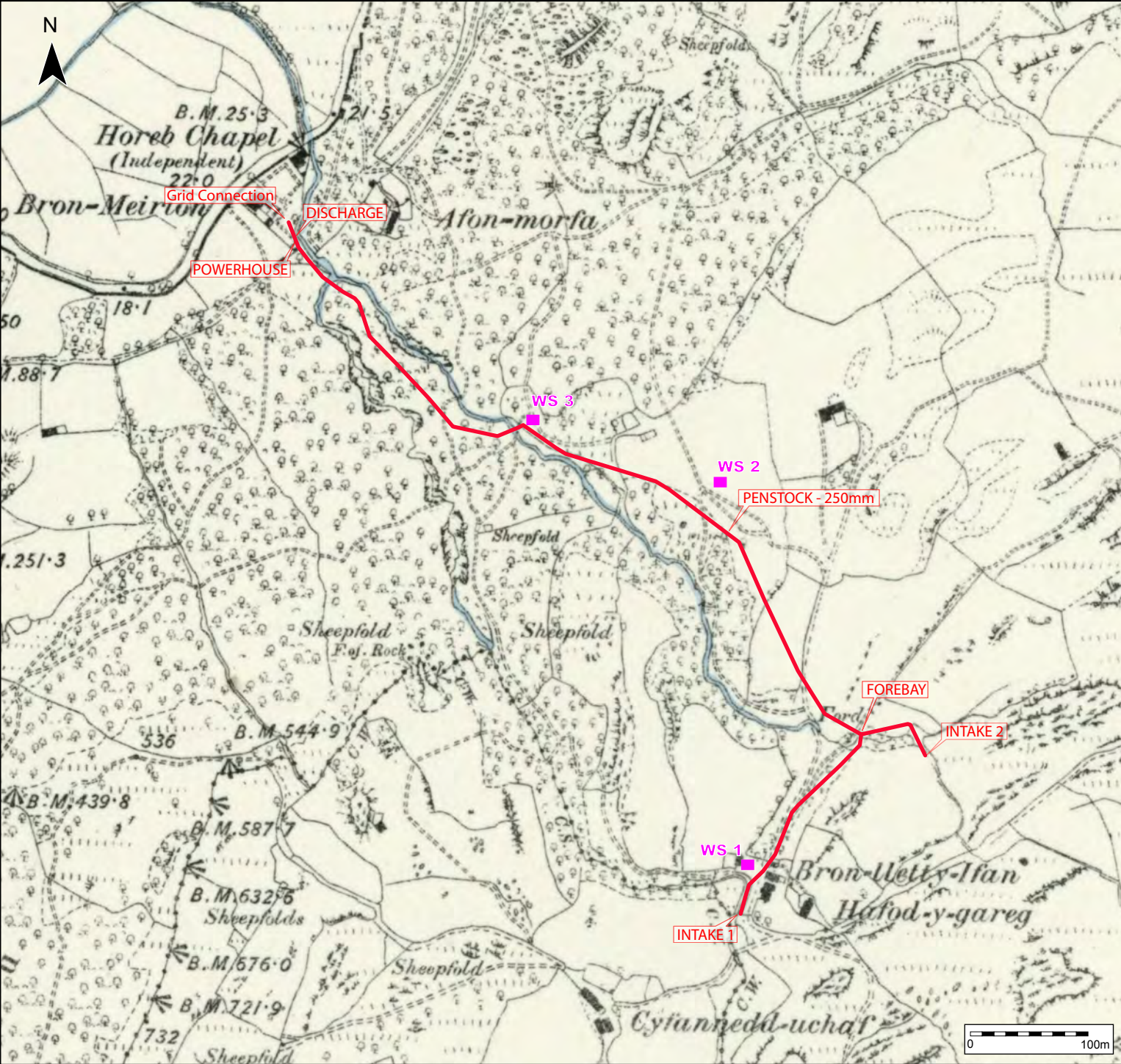
Client:

Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 5.
Tithe Map of Llangelynnin parish (1841)



Legend

Pipeline route

WS Workstations

Approximate Scale (@ A4): 1:5,000

Date: June 2016

Prepared by:

Heritage
Recording Services Wales

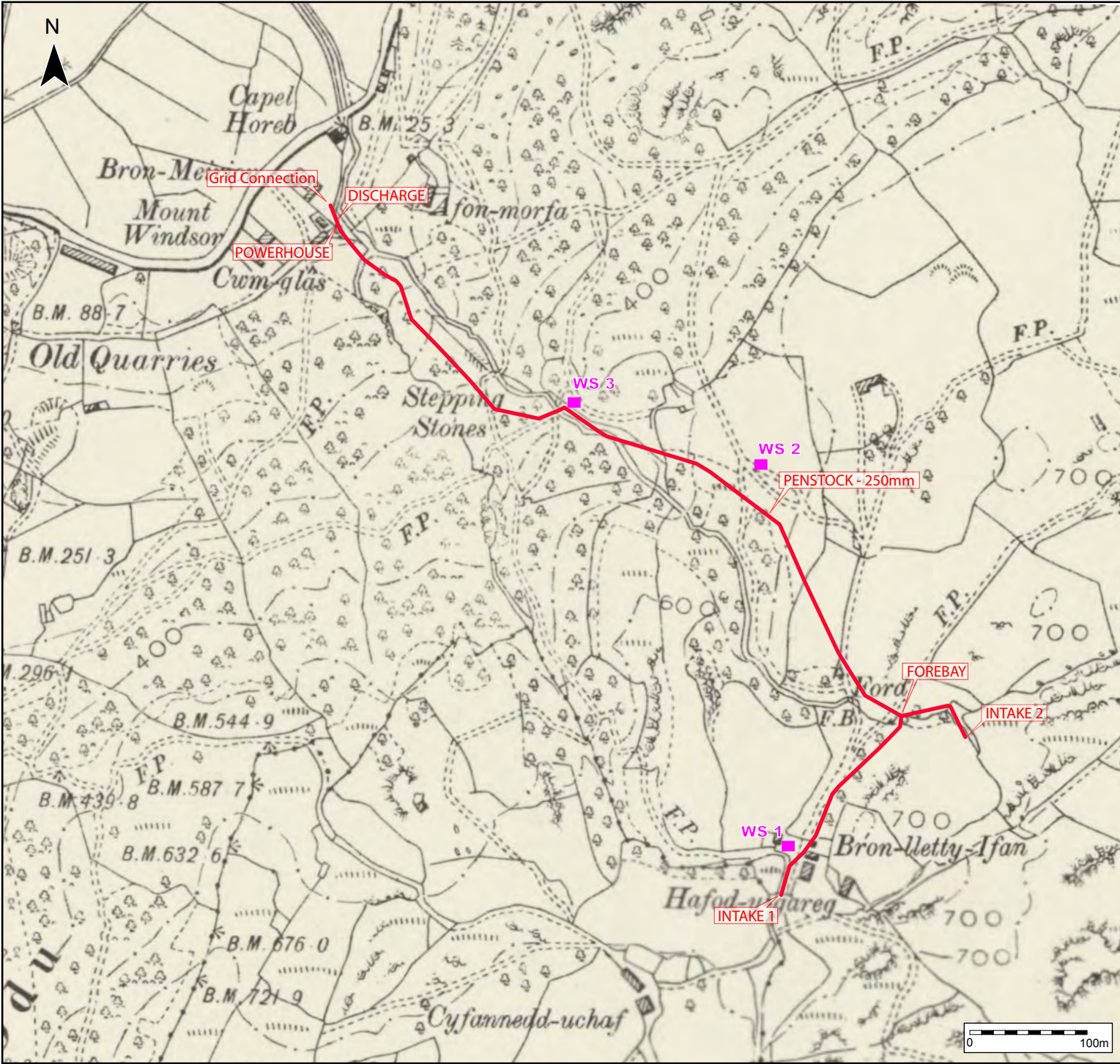
Client:

Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 6. OS First Edition Map (1886)

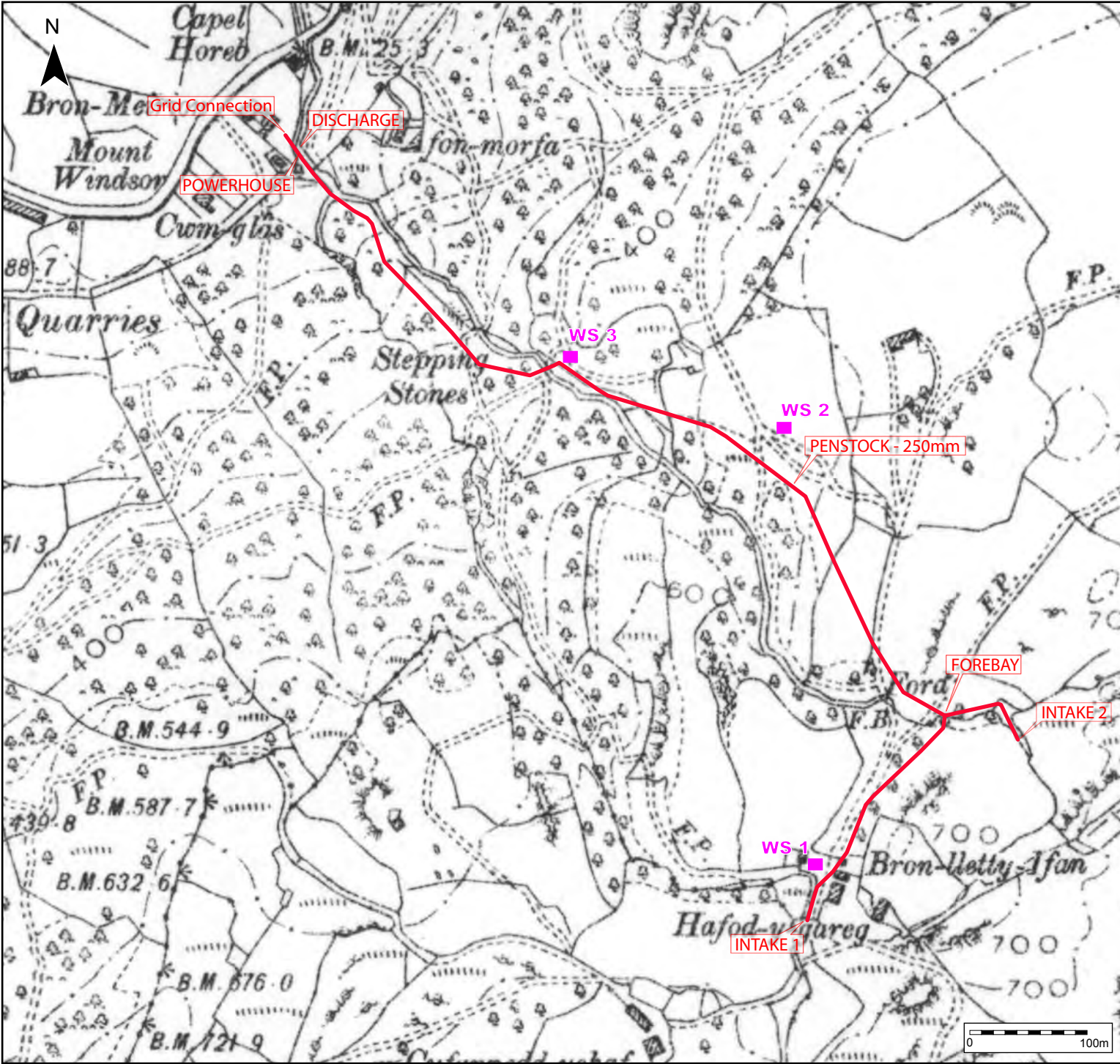


Legend

Pipeline route

WS Workstations

Approximate Scale (@ A4): 1:5,000	
Date:	June 2016
Prepared by:	<div>Heritage Recording Services Wales</div>
Client:	Snowdonia Hydro
On behalf of:	
Project Title:	Bron Lletty Ifan Hydro Project
Figure 7.	OS Second Edition Map (1900)



- Legend
- Pipeline route
 - Workstations

Approximate Scale (@ A4): 1:5,000

Date: June 2016

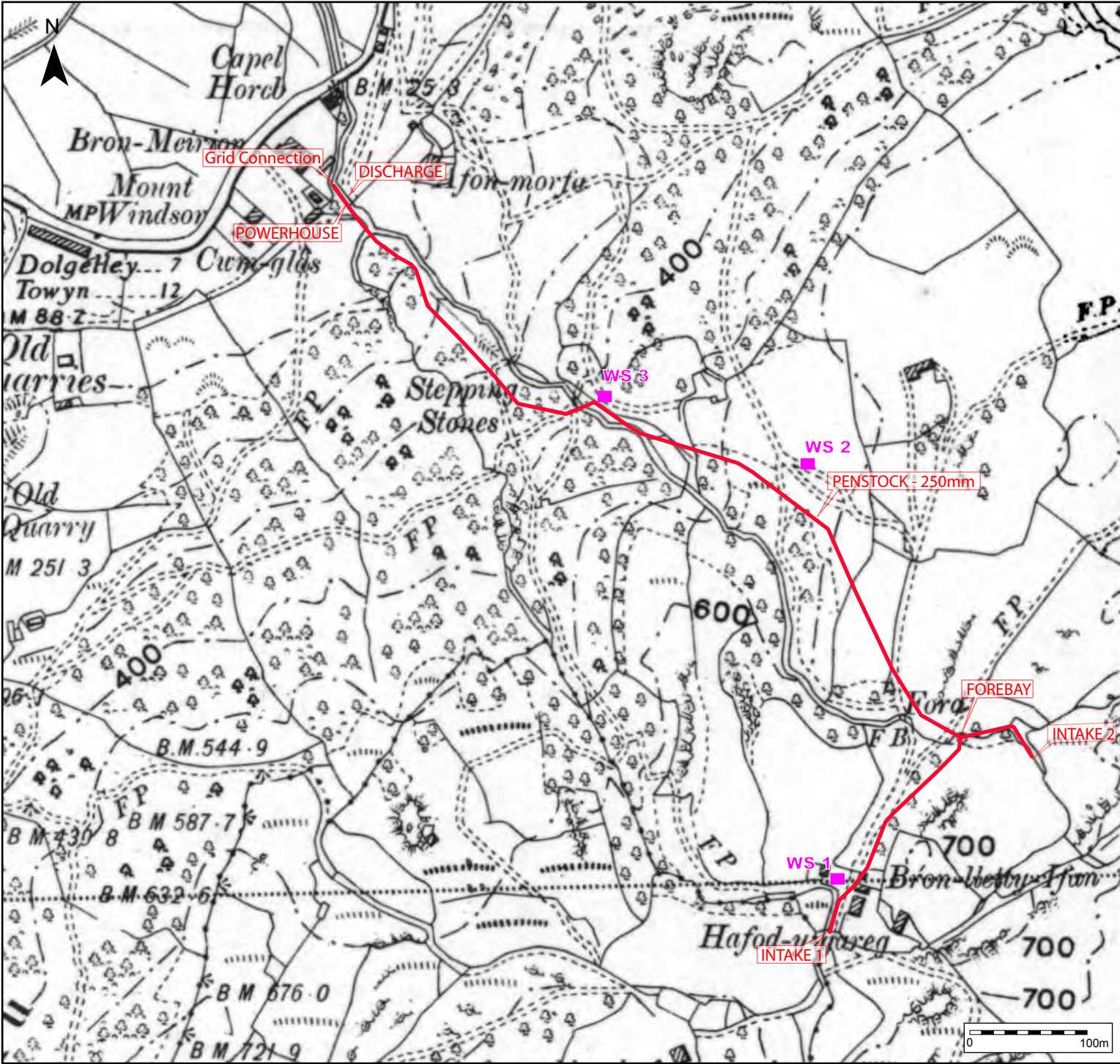
Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 8. OS 1939 Edition Map



- Legend
- Pipeline route
 - Workstations

Approximate Scale (@ A4): 1:5,000

Date: June 2016

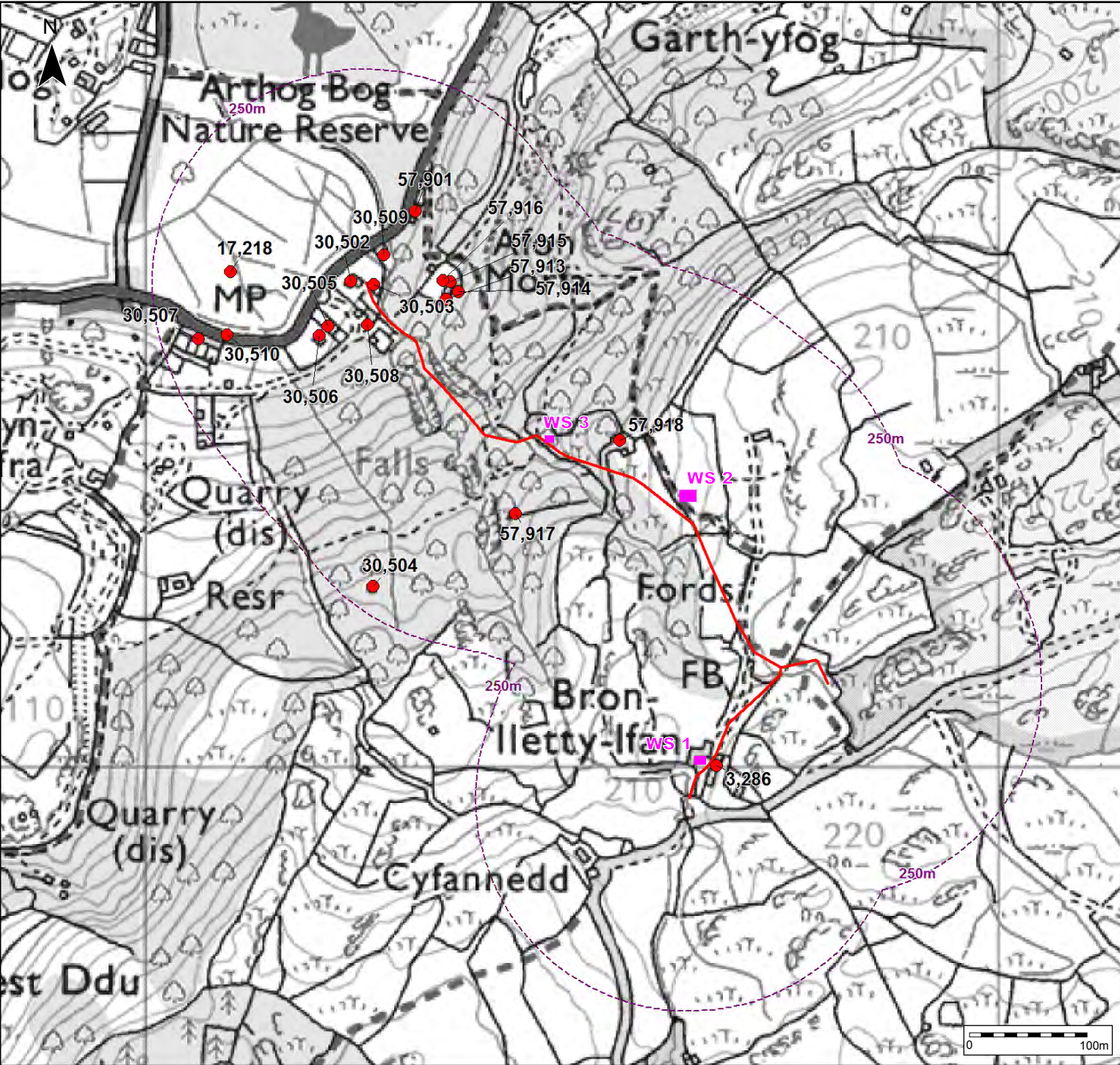
Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 9. OS 1949 Edition Map



- Legend
- Pipeline route
 - WS Workstation
 - Buffer Zone (250m)
 - Historic Environment Record (HER)

Approximate Scale (@ A4): 1:5,000

Date: June 2016

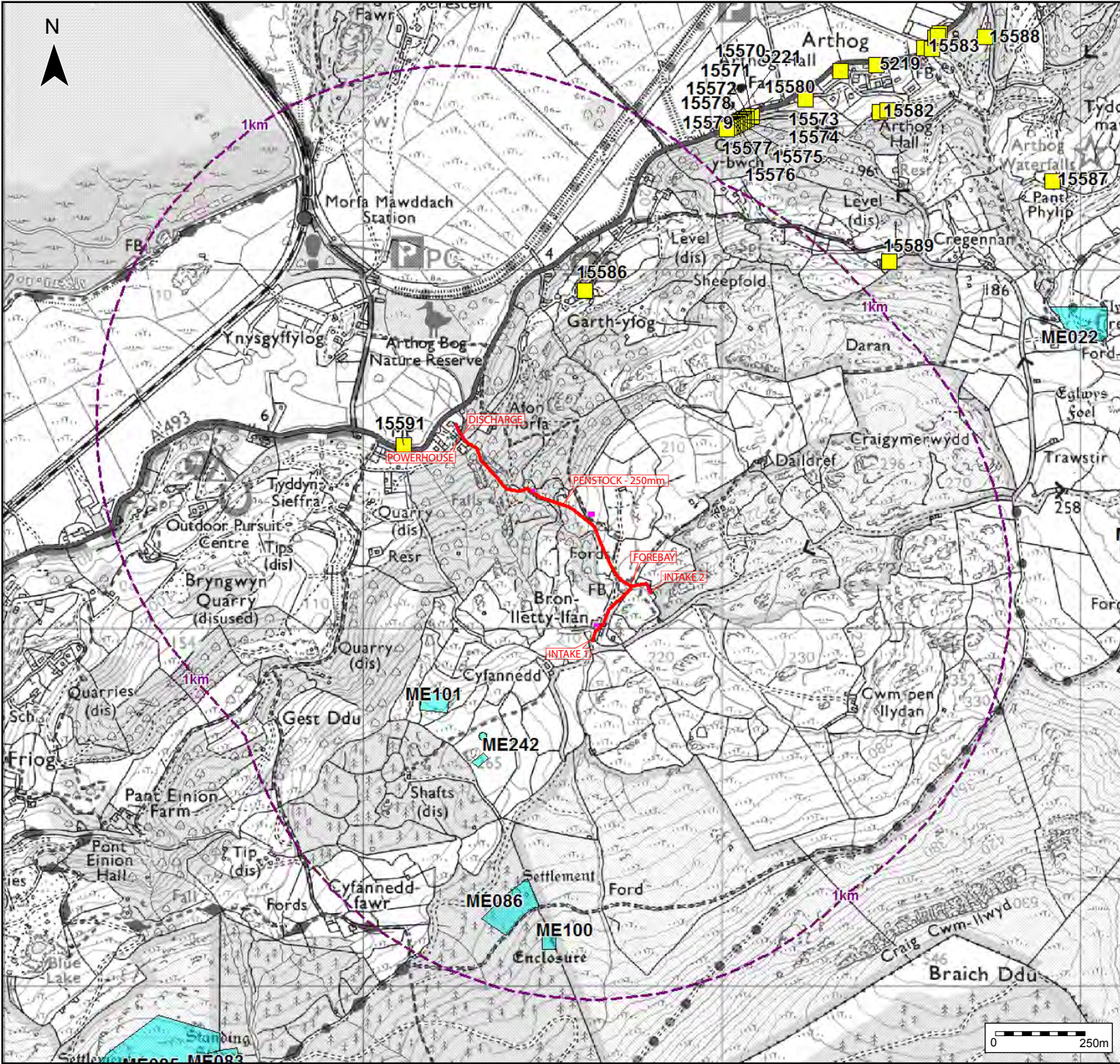
Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 10. HER Sites within 250m buffer zone



- Legend
- Pipeline route
 - Workstations
 - Buffer Zone (1km)
 - Scheduled Ancient Monument (SAM)
 - Listed Building (LB)

*Base Map: OS 1:25,000 Explorer Edition

Approximate Scale (@ A4): 1:15,000

Date: June 2016

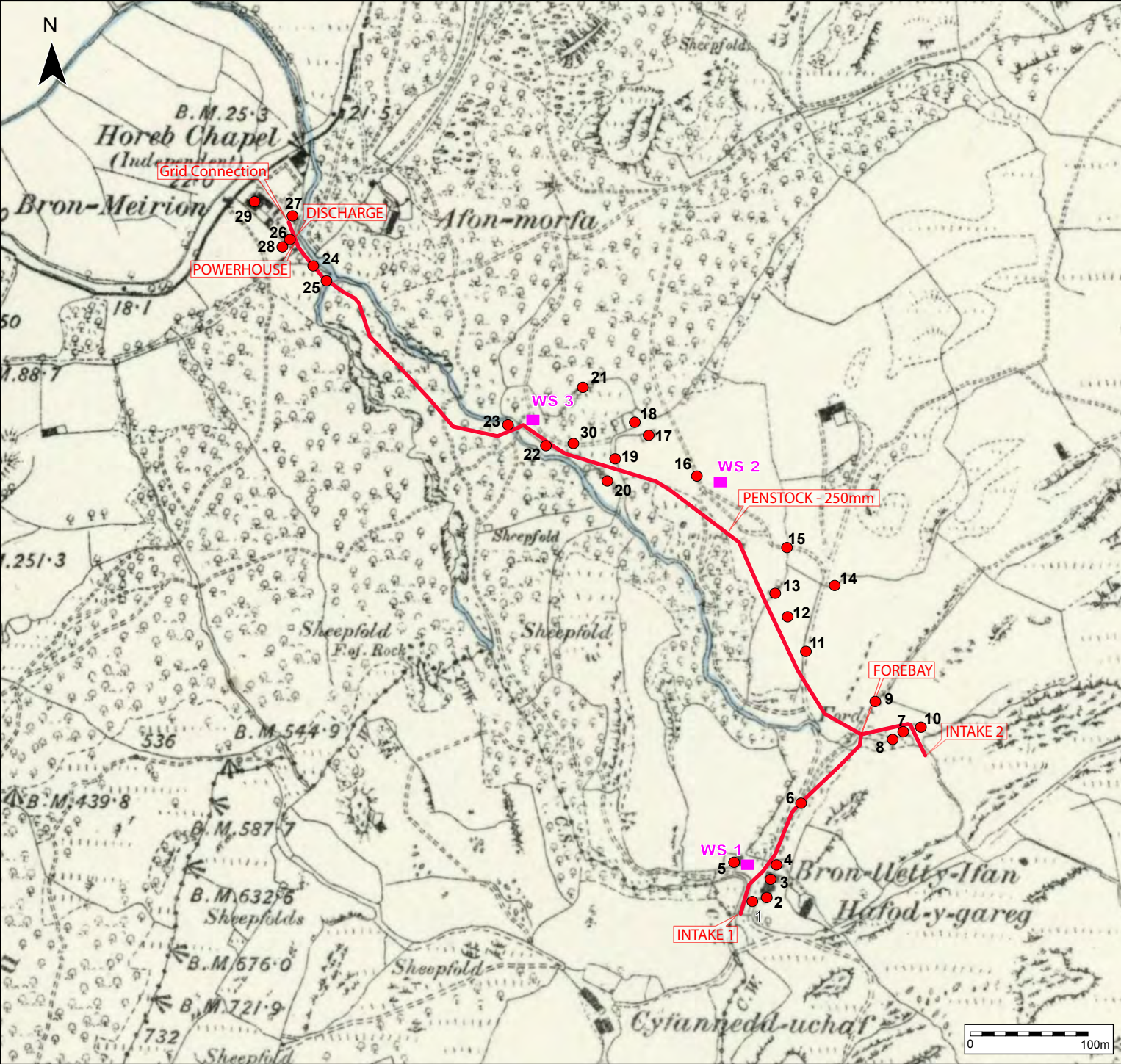
Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 11. Designated Sites within 1km radius



- Legend**
- Pipeline route
 - WS Workstations
 - Heritage Assets identified from Walkover and Cartographic Sources

*Base Map: OS First Edition 1886 Edition

Approximate Scale (@ A4): 1:5,000

Date: June 2016

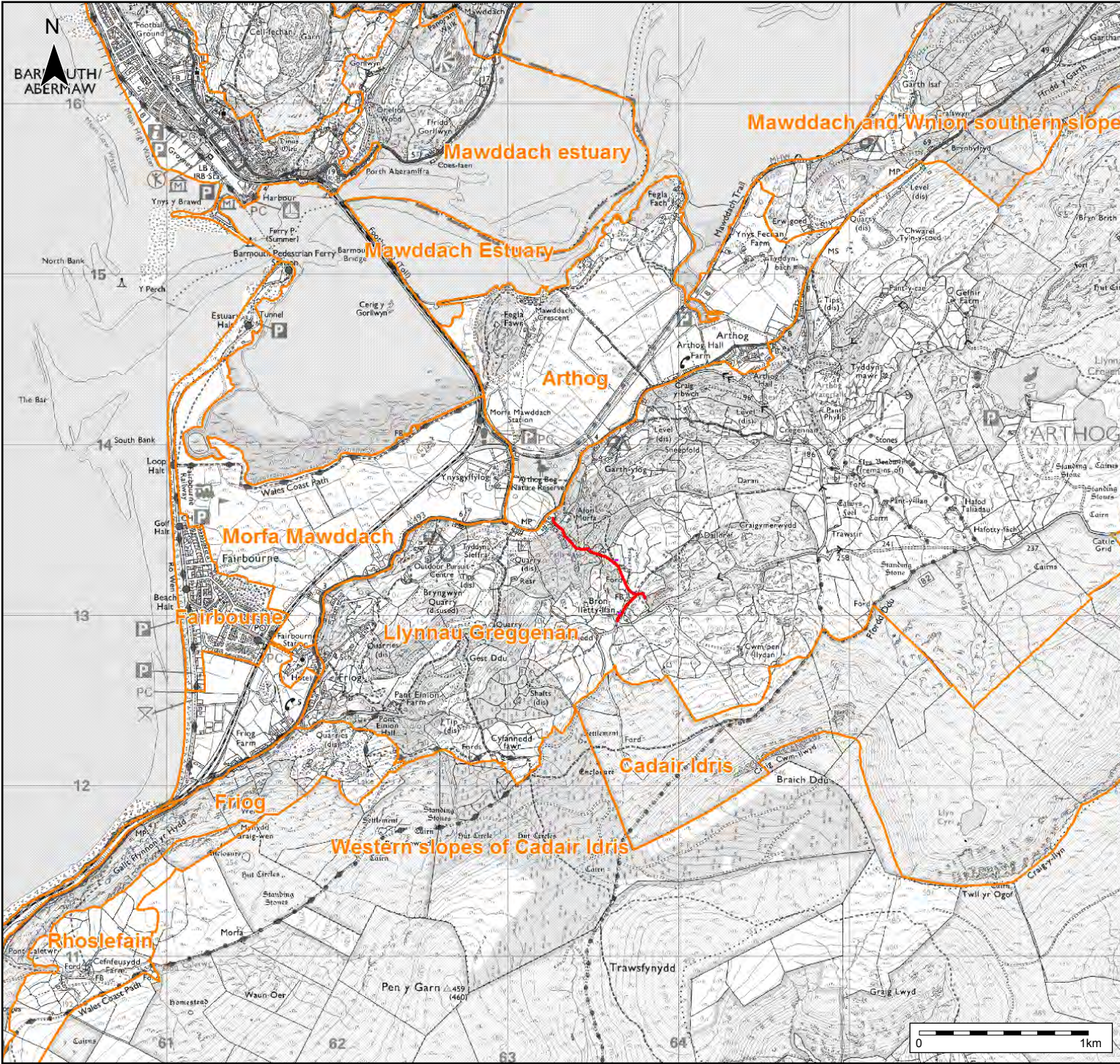
Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 12. Heritage Assets identified from Walkover and Cartographic Sources



- Legend**
- Pipeline route
 - Workstations
 - LANDMAP (Historic Landscape)

*Base Map: OS 1:25,000 Explorer Edition

Approximate Scale (@ A4): 1:40,000

Date: June 2016

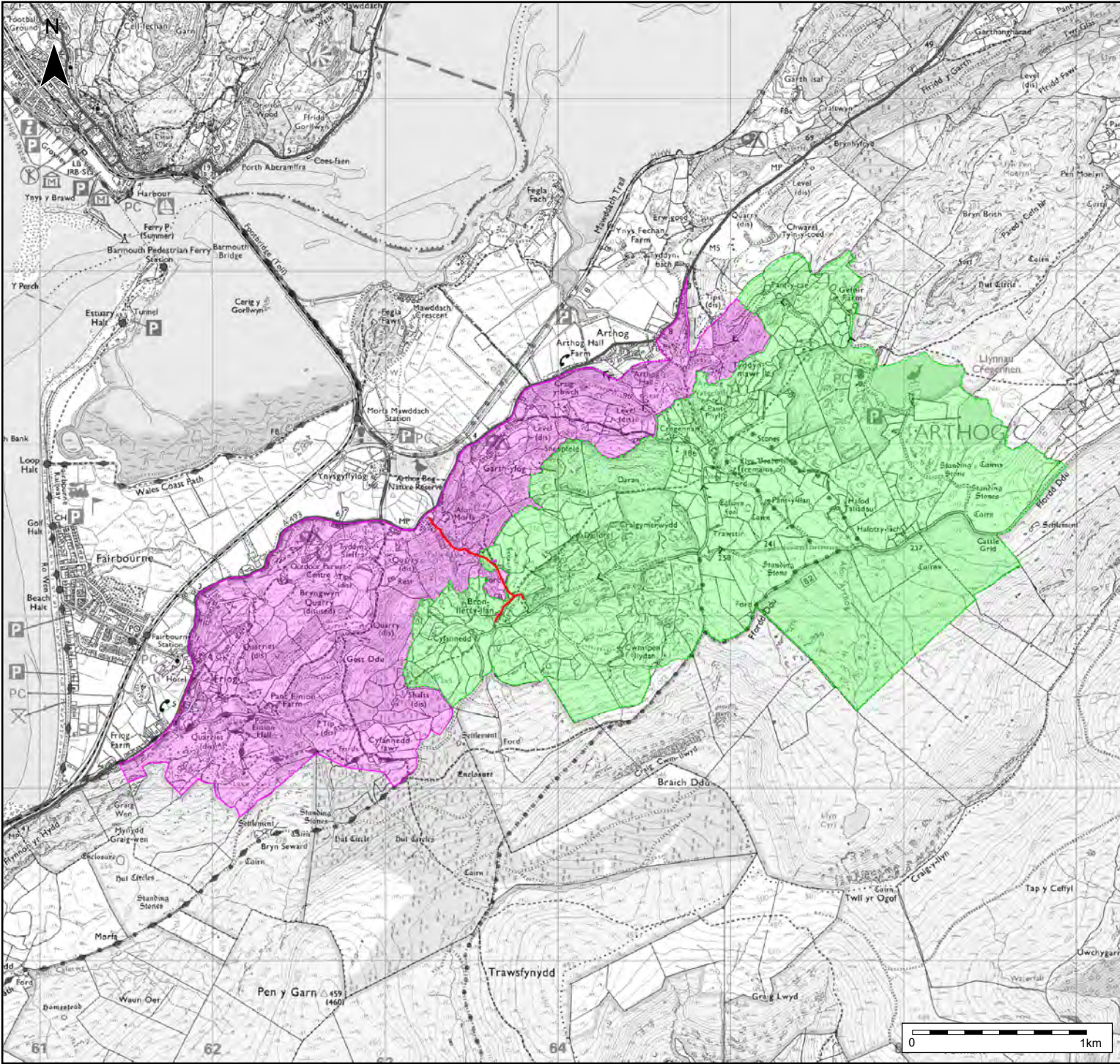
Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 13. LANDMAP (Historic Landscape)



Legend

- Pipeline route
- Workstation
- Llynnau Gregennan HLCA (Area 14)
- Wooded Slopes above Arthog HLCA (Area 15)

Approximate Scale (@ A4): 1:34,000

Date: June 2016

Prepared by:
Heritage
Recording Services Wales

Client:
Snowdonia Hydro

On behalf of:

Project Title: Bron Lletty Ifan Hydro Project

Figure 14. Historic Landscape Character Areas (HLCAs)

APPENDIX II:
Photo plates



Plate 1. Proposed area of Intake No.1. Looking southwest.



Plate 2. Proposed route of pipeline from Intake No.1 across Bron Lletty Ifan courtyard. Looking northwards.



Plate 3. Montage of pipeline route from Intake No.1. Looking northwards across Bron Lletty Ifan courtyard.

Project Title:	Bron Lletty Ifan Hydro Project	Photo Plate No's. 1 - 3	
Date taken:	June 2016		
Photographer:	Richard Scott Jones		



Plate 4. Proposed route of pipeline alongside barn at Bron Lletty Ifan. Looking northwards.



Plate 5. Proposed route of pipeline leading towards Forebay. Looking northwards.



Plate 6. Area of proposed Intake No.2. Looking eastwards.



Plate 7. Route of proposed pipeline in area of boulder scatter (Site No's. 7 and 8). Looking northwest.

Project Title:	Bron Lletty Ifan Hydro Project
Date taken:	June 2016
Photographer:	Richard Scott Jones

Photo Plate No's.
4 - 7



Plate 8. Boulder scatter (Site No. 7) and retaining wall (Site No. 8) alongside Intake No.1 and penstock area. Looking eastwards.



Plate 9. Proposed route of pipeline through trackway and low boundary bank (Site No. 11). Looking northwest.



Plate 10. Remains of medieval? agricultural lynchet (Site No. 13). Looking southwest.



Plate 11. Remains of medieval? agricultural lynchet (Site No. 13). Looking northwards.

Project Title:	Bron Lletty Ifan Hydro Project	Photo Plate No's. 8 - 11	
Date taken:	June 2016		
Photographer:	Richard Scott Jones		



Plate 12. Downslope immediately west of lynchet (Site No. 13). Looking northwest to north.



Plate 13. Route of proposed pipeline downslope through bracken. Looking northwest.

Project Title:	Bron Lletty Ifan Hydro Project	Photo Plate No's. 12 - 13	
Date taken:	June 2016		
Photographer:	Richard Scott Jones		



Plate 14. Remains of dry-stone ruined unroofed structure within stone enclosure (Site No. 17). Looking southwest.



Plate 15. Remains of dry-stone ruined unroofed structure within stone enclosure (Site No. 17). Looking southwest.



Plate 16. Remains of dry-stone ruined unroofed structure within stone enclosure (Site No. 17). Looking southwest.



Plate 17. Remains of dry-stone wall (Site No. 22) along route of proposed pipeline. Looking northwest.

Project Title:	Bron Lletty Ifan Hydro Project	Photo Plate No's. 14 - 17	
Date taken:	June 2016		
Photographer:	Richard Scott Jones		



Plate 18. Remains of dry-stone wall (Site No. 22) along route of proposed pipeline. Looking southeast.



Plate 19. Steep drop in slope alongside area of old weir (Site No. 23). Looking northwards.



Plate 20. Remains of old weir (Site No. 23). Looking northwest.



Plate 21. Remains of old weir (Site No. 23). Looking northwest.

Project Title:	Bron Lletty Ifan Hydro Project	Photo Plate No's. 18 - 21	
Date taken:	June 2016		
Photographer:	Richard Scott Jones		



Plate 22. Area of proposed Powerhouse. Platform area (Site No. 28). Looking southeast from area of Bron Meirion.



Plate 23. Area of proposed Powerhouse. Looking southeast from rear garden area of Bron Meirion.



Plate 24. Area of proposed Powerhouse and discharge point. Looking east from rear garden area of Bron Meirion.



Plate 25. Remains of old former 1920s hydro pipework (Site No. 25) across stream. Looking southeast.

Project Title:	Bron Lletty Ifan Hydro Project	Photo Plate No's. 22 - 25	
Date taken:	June 2016		
Photographer:	Richard Scott Jones		



Plate 26. Remains of former 1920s shut off valves from former hydro-electric in rear garden area of Bron Meirion.



Plate 27. Interior of part of former coach house/garage showing former hydro-electric switch gear and turbine at Bron Meirion.



Plate 28. Track leading to coach house/garage at rear of Bron Meirion house. Proposed grid connection area. Looking southeast.



Plate 29. Front facade of Bron Meirion house.

Project Title:	Bron Lletty Ifan Hydro Project
Date taken:	June 2016
Photographer:	Richard Scott Jones

Photo Plate No's.	26 - 29
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APPENDIX III:
Site Gazetteer

APPENDIX III

Gazetteer

of all

Historic Environment Record (HER) Sites within 250m and
Designated Sites within 1km buffer zone

from the proposed

Bron Lletty Ifan Hydro-electric Scheme, Arthog, Gwynedd.

1) HER Sites within 250m

PRN: 3286 **Site Type:** FINDSPOT **Period:** Bronze Age **NGR:** SH63671300
Site Name: Bronze Palstave - Findspot, Bronllety Ifan
Description: Bronze palstave. No loop, hollow below stop-ridge. In NMW.

Community: Arthog

PRN: 17218 **Site Type:** FIELD DRAIN **Period:** POST-MEDIEVAL **NGR:** SH63101358
Site Name: Stone-built Field Drains, Fairbourne
Description: There are numerous straight, parallel raised linear features in the fields here. By comparison with other similar features that have been exposed close to Arthog (Feature 18), these are stone-lined and capped field drains that have been raised above the

Community: Arthog

PRN: 30502 **Site Type:** HOUSE **Period:** POST MEDIEVAL **NGR:** SH6324113569
Site Name: Bron Meirion, House, Arthog
Description:

Community: Arthog

PRN: 30503 **Site Type:** FLAGPOLE **Period:** POST MEDIEVAL **NGR:** SH6326813565
Site Name: Flagstaff, Site of, Bron Meirion, Arthog
Description:

Community: Arthog

PRN: 30504 **Site Type:** SHEEP FOLD **Period:** POST MEDIEVAL **NGR:** SH6326713211
Site Name: Sheepfold, Arthog
Description:

Community: Arthog

PRN: 30505 **Site Type:** HOUSE **Period:** POST MEDIEVAL **NGR:** SH6321413516
Site Name: Glan Nant, House, Arthog
Description:

Community: Arthog

PRN: 30506	Site Type: HOUSE	Period: POST MEDIEVAL	NGR: SH6320413505
Site Name: Cwm Glas, House, Arthog			
Description:			
Community: Arthog			
PRN: 30507	Site Type: TERRACED OUSING	Period: POST MEDIEVAL	NGR: SH6306213501
Site Name: Glasfryn Terrace, Arthog			
Description:			
Community: Arthog			
PRN: 30508	Site Type: BUILDING	Period: POST MEDIEVAL	NGR: SH6326113518
Site Name: Building, Site of, South of Bron Meirion, Arthog			
Description:			
Community: Arthog			
PRN: 30509	Site Type: CHAPEL	Period: POST-MEDIEVAL	NGR: SH63281360
Site Name: Capel Horeb, Arthog			
Description:			
Community: Arthog			
PRN: 30510	Site Type: MILEPOST	Period: POST MEDIEVAL	NGR: SH6309613506
Site Name: Milestone, A493 (NW Side), Barmouth Bridge			
Description:			
Community: Arthog			
PRN: 57901	Site Type: BUILDING	Period: POST-MEDIEVAL	NGR: SH6331713651
Site Name: Two Buildings, NE of Ty Capel			
Description: Site identified using early Ordnance Survey Maps (McGuinness, 2014)			
Community: Arthog			
PRN: 57913	Site Type: HOUSE	Period: POST-MEDIEVAL	NGR: SH6335313548
Site Name: Afon Morfa, SE of Capel Horeb			
Description: Site identified using early Ordnance Survey Maps (McGuinness, 2014)			
Community: Arthog			
PRN: 57914	Site Type: STRUCTURE	Period: POST-MEDIEVAL	NGR: SH6336713556
Site Name: Structure, E of Afon Morfa			
Description: Site identified using early Ordnance Survey Maps (McGuinness, 2014)			
Community: Arthog			
PRN: 57915	Site Type: BUILDING	Period: POST-MEDIEVAL	NGR: SH6335813568
Site Name: Building, N of Afon Morfa			
Description: Site identified using early Ordnance Survey Maps (McGuinness, 2014)			
Community: Arthog			
PRN: 57916	Site Type: BUILDING	Period: POST-MEDIEVAL	NGR: SH6334913570
Site Name: Building, NW of Afon Morfa			

Description: Site identified using early Ordnance Survey Maps (McGuinness, 2014)

Community: Arthog

PRN: 57917 **Site Type:** SHEEP FOLD **Period:** POST-MEDIEVAL **NGR:** SH6343413296
Site Name: Sheep Fold, S of Afon Morfa
Description: Site identified using early Ordnance Survey Maps (McGuinness, 2014)

Community: Arthog

PRN: 57918 **Site Type:** STRUCTURE **Period:** POST-MEDIEVAL **NGR:** SH6355613382
Site Name: Structure and Enclosure, SE of Afon Morfa
Description: Site identified using early Ordnance Survey Maps (McGuinness, 2014)

Community: Arthog

2) Designated Sites within 1km

SAM No. ME086 **Site Type:** Hut circle settlement **Period:** Roman **NGR:** SH634122
SAM Name: Enclosure & Settlement 400m East of Cyfannedd Fawr

Community: Arthog

SAM No. ME100 **Site Type:** Ring cairn **Period:** Roman **NGR:** SH635121
SAM Name: Round Hut and Cairns on NW Slope of Braich Ddu

Community: Arthog

SAM No. ME101 **Site Type:** Platform house **Period:** Medieval **NGR:** SH631127
SAM Name: Cyfannedd-Fach Homestead

Community: Arthog

SAM No. ME242 **Site Type:** Kerb cairn **Period:** Prehistoric **NGR:** SH633126
SAM Name: Bron-Llety-lfan cairns and cup-marked rock

Community: Arthog

LB No. 15591 **Site Type:** Milepost **Period:** Post Medieval **NGR:** SH63111350
Site Name: Milepost on the NW side of the A493, Barmouth Bridge

Community: Arthog **Grade:** II

LB No. 15586 **Site Type:** Farmhouse **Period:** Post Medieval **NGR:** SH63111350
Site Name: GARTH Y FOG FORMER FARMHOUSE, A 493 (SE SIDE) ARTHOG

Community: Arthog **Grade:** II

APPENDIX IV:
SNPA Design Brief
& Project Specification

**DESIGN BRIEF FOR AN ARCHAEOLOGICAL ASSESSMENT AND WATCHING
BRIEF****Archaeologist, Snowdonia National Park Authority****Site:** Bron Llety Ifan, Arthog, LL39 1LX**Scheme:** Proposed 99kw hydro-electric scheme including construction of 2 intake weirs, turbine house and installation of underground and overground pipes and installation of underground cable to provide grid connection**National Grid Reference:** 264077 313480**Brief prepared for:** Snowdonia Hydro**Date:** 01 June 2016**Planning reference number:** NP5/52/367A

This design brief is only valid for six months after the above date. After this period the Archaeologist, Snowdonia National Park Authority, should be contacted.

It is recommended that the contractor appointed to carry out the archaeological mitigation programme visits the site of the proposed development and consults the Regional Historic Environment Record (HER) for north west Wales before completing their specification. The Archaeologist, Snowdonia National Park Authority (SNPA) cannot guarantee the inclusion of all relevant information in the design brief.

1.0 Archaeological and historical background

- 1.1 The application is an area of upland pasture (approx. the upper half of the scheme) and woodland (lower half).
- 1.2 The broader environs of the scheme are rich in known archaeological sites, particularly prehistoric and medieval settlement and field systems, and the scheme area is potentially archaeologically sensitive. A full assessment study of the impact of the scheme on the historic environment was not carried out in support of the planning application. The SNPA Archaeologist visited the scheme with Snowdonia Hydro staff on 29/01/2015 as part of the pre-application process.
- 1.3 The upper part of the scheme has a number of historic environment features of interest, including lynched relict and active field boundaries, terraces and

relict walls. The penstock crosses lynched boundary features at 263694,313173, 263669,313230 and possibly at c.263653,313265.

- 1.4 At 263562,313384 there is a small cluster of derelict buildings with attached walled enclosure and further associated walls including a double-walled track leading to the Afon Morfa. The group is recorded on the regional Historic Environment Record as PRN (Primary Record Number) 57918, but this is a record created from identification of the site from historic OS mapping and does not contain any descriptive information.
- 1.5 The only other entry on the HER in the immediate vicinity of the scheme is PRN 3286, bronze palstave (axe head) findspot allocated to the farmhouse; this is an approximate location indicating its discovery nearby and underlining potential for prehistoric archaeology in the area.
- 1.6 A historic hydro-electricity scheme was located on the Afon Morfa. The disused weir (at 263448,313385) of the historic scheme lies on the line of the new scheme and will be crossed by the penstock. Components of the generating equipment and instruments of an early twentieth century hydro-electricity scheme are present in an outbuilding (turbine room alongside garage/workshop) at Bron Meirion.
- 1.7 The scheme will impact upon a number of active and relict stone walls.
- 1.8 The SNPA Archaeologist felt that the potential impact of the scheme on the historic environment could be mitigated by a programme of archaeological works during construction and consequently a bi-partite archaeological condition was placed on the planning permission, requiring: a. submission and approval by SNPA of a specification (also known as a 'written scheme of investigation', WSI) for a programme of archaeological mitigation prior to any development works commencing on site and; b. the subsequent adherence to the programme laid out in the specification.

2.0 The nature of the development and archaeological requirements

- 2.1 The proposed development relates to the installation of a 99kw hydro-electric scheme including construction of 2 intake weirs, turbine house, installation of associated pipes and cables for grid connection.
- 2.2 It is proposed to create a compound/workstation area at 263465,313384 with a permanent access and maintenance track leading to it from the east.
- 2.3 Beyond the old weir at 263448,313385 the penstock runs through mature unmanaged broadleaf woodland and will be installed over-ground.
- 2.4 There is potential for the scheme to impact upon known and hitherto unknown historic environment features, particularly in the upper part of the scheme (i.e. approx. above the old weir at 263448,313385).
- 2.5 On this basis it is considered that the proposed development represents a potential threat to archaeological remains. A mitigation programme is required comprising:
 - i. a pre-construction archaeological record by **walk-over survey supplemented by a basic review of existing archaeological and historical records**;
 - ii. the **marking/fencing** out of sensitive archaeological areas in the proximity of the working corridor, and;
 - iii. an **archaeological watching brief** on potentially archaeologically sensitive portions of scheme.

3.0 Outline of archaeological requirements, submission of specification

- 3.1 This is a design brief for a programme of archaeological mitigation, including a pre-construction archaeological record by **walk-over survey** supplemented by a basic review of existing archaeological and historical records, **marking/fencing out** and an **archaeological watching brief**, to be undertaken according to guidelines set out in Welsh national planning guidance (*Planning Policy Wales 2016, chapter 6, Conserving the Historic Environment*), Welsh Office Circular 60/96 (*Planning and the Historic Environment: Archaeology*) and the Chartered Institute for Archaeologists' (CIfA) 2014 'Standard and Guidance for Historic Environment Desk-based Assessment', 'Standard and Guidance for Archaeological Field Evaluation' and 'Standard and Guidance for an Archaeological Watching Brief'. Other Standards and Guidance documents of the CIfA (e.g. excavation, archives and treatment of finds) should be followed as required.
- 3.2 The object of this programme of archaeological works is to minimise the potential for damage to archaeological remains and to create an archive record of any archaeological deposits or structures present on site and any that that may be revealed through on-site construction activity.
- 3.3 Archaeologically sensitive areas identified in the immediate proximity of the development footprint during the walk-over survey will be **marked out** under archaeological direction prior to the commencement of any works in those areas so as to prevent inadvertent damage.
- 3.4 This *design brief* should be used by the archaeological contractor as the basis for the preparation of a detailed written archaeological *specification*. **The specification must be submitted to the SNPA Archaeologist for approval before the construction scheme commences.**
- 3.5 The *specification* should contain, as a minimum, the following elements:
- i. Non-technical summary.
 - ii. Details of the proposed works as precisely as is reasonably possible, indicating clearly on a plan their location and extent.
 - iii. **Details of the watching brief methodology should include a statement acknowledging that the archaeological contractor must be capable of stopping works at any point to check features of possible archaeological interest and that in the event of the discovery of archaeologically significant remains work must cease until the remains have been fully investigated, recorded and recovered (as appropriate) to the satisfaction of the archaeological contractor. Further, it should be specifically noted that these procedures may have implications for costs and timetable of the development.**
 - iv. A statement of the site-specific objectives of the archaeological works.
 - v. Reference to the relevant legislation.
 - vi. Health and Safety considerations.
 - vii. Monitoring procedures.
 - viii. Field methodology.
 - ix. Methods of recording, including the collection and disposal strategy for artefacts and ecofacts.

- x. Arrangement for immediate conservation of artefacts.
- xi. Post-fieldwork methodology.
- xii. The level and grade of all key project staff.
- xiii. Details of all proposed specialists.
- xiv. A timetable for the proposed works including contingency costs (if appropriate).
- xv. The intended method of publication.
- xvi. Proposed arrangements for archive deposition.

4.0 Pre-construction archaeological record by walk-over survey supplemented by basic review of archaeological and historical records, detail

- 4.1 Basic review of archaeological records: the regional Historic Environment Record (held by Gwynedd Archaeological Trust) and the National Monument Record (held by RCAHMW) should be consulted in order to confirm the known archaeological record for the area.
- 4.2 Basic review of historic records: the first edition of both the Ordnance Survey 6" to the mile and 25" to the mile (if the latter exists) mapping should be checked, together with the tithe apportion map for the area (if exists).
- 4.3 The route of the penstock and a 25m corridor to either side of it (i.e. 50m total width centred on the penstock) will be walked to determine the archaeological potential of the scheme and its immediate environs and to define areas for: a. marking out, b. avoidance by construction machinery, and c. for watching brief. All historic environment features (including all walls/boundary features and the components of the historic hydro-electricity scheme as per para 1.16 above) will be recorded photographically and by written description.
- 4.4 Photographs should include a scale and should be taken with a high quality digital SLR camera, set to highest image resolution in RAW or TIFF with images presented as both TIFF and high resolution JPEGs in the archive.
- 4.5 It is unlikely that the lower, very steep, portion of the route (i.e. approx. below the old weir at 263448,313385) will require a watching brief. The penstock is to be installed over-ground beyond this point (as it runs through mature broad leaf woodland), reducing the likelihood of disturbance. Furthermore, the steepness of the ground means that potential for the presence of significant historic environment features is low. **However, the need for a watching brief in this lower area should be reviewed by the archaeological contractor in the light of the walk-over survey and the supplementary desk-based assessment of records and the SNPA Archaeologist informed of their recommendation with respect to whether or not the watching brief should be extended into this area.**
- 4.6 A brief written statement (supported by photographs and mapping as required) of findings and recommendations concerning the archaeological potential of the scheme footprint and areas to be impacted by associated works, together with that of the 50m walk-over survey corridor, should be provided to the SNPA so that areas where marking out, avoidance and watching brief are required can be determined, agreed and approved by the SNPA Archaeologist **in advance of construction works commencing on site.**

5.0 Briefing of construction team and marking out

- 5.1 The archaeological contractor will attend a pre-commencement meeting with key representatives of the construction team at which all known archaeological constraints will be outlined. The route will be walked with the construction team representatives and known sensitive areas identified. This will include establishing the positioning of any marking out (e.g. by temporary barriers/fencing) required to protect archaeologically sensitive locations along the route.
- 5.2 Care must be taken to ensure that in identifying sensitive areas with potential to be affected by the development, all of the scheme activities, including vehicle movements and location of works/lay-down compounds, not just the construction works, are considered.

6.0 Watching brief detail

- 6.1 On the basis of the information currently available, it is considered that a watching brief should be carried out on all intrusive excavation works in the upper portion of the scheme (i.e. approx. above the old weir at 263448,313385). However, the extent of the watching brief may vary following the walkover survey and review of archaeological and historical records, as per paragraph 4.5 above.
- 6.2 The watching brief is to be carried out by a suitably qualified archaeologist.
- 6.3 The monitoring of works is to be undertaken in a manner that allows for the immediate cessation of development for the recording of archaeological evidence. Agreement must be reached between the archaeological contractor and developer/agent in order that this is achieved. The level of response to any archaeological features or deposits encountered will initially be assessed by the archaeologist carrying out the mitigation works. The Snowdonia National Park Authority Archaeologist must be informed by the archaeological contractor of any significant archaeological features or deposits as soon as possible after they are encountered.
- 6.4 The watching brief shall be carried out in accordance with the Chartered Institute for Archaeologists' standard and guidance (as per paragraph 3.1 above). Recording will include written descriptions, photographs and appropriate plans and elevations.
- 6.5 Note that recording should include photographs, section drawings and written descriptions of all historic linear features (walls, bank, terraces etc) that are breached by the construction scheme.
- 6.6 Photographs should be taken with a high quality digital SLR camera, set to highest image resolution in RAW or TIFF with images presented as both TIFF and high resolution JPEGs in the archive.
- 6.7 The archaeological contractor will ensure that sufficient resource is made available for a post-excavation programme (including any specialist analysis such as dating and of finds and samples that might be required to understand the findings) to result in an archive report.

7.0 Reporting

- 7.1 The report should include details of the full mitigation programme including the results of both the walk-over survey (including supplementary basic assessment of archaeological and historical records) and the watching brief. It should specifically include the following:

- i. Non-technical summary.
 - ii. Introduction to the project.
 - iii. A location plan.
 - iv. Aims and objectives of the work.
 - v. Methodology adopted.
 - vi. Archaeological results including descriptions of any archaeological features or deposits encountered.
 - vii. Maps, plans and section drawings at suitable scales.
 - viii. Photographs illustrating the results.
 - ix. Archaeological and historical context of the site and findings of the work.
 - x. Conclusions.
 - xi. Recommendations for further work if appropriate.
 - xii. References and bibliography.
 - xiii. Appendices including a copy of this design brief and agreed specification.
- 7.2 The SNPA Archaeologist should be sent a draft version of the report prior to preparation of the final report as this will enable any comments to be addressed before finalized versions are produced for the various archive destinations.
- 7.3 Hard copies of the finalized report should be sent to the Snowdonia National Park Authority (3 copies), the regional Historic Environment Record held by the Gwynedd Archaeological Trust and the National Monument Record of the RCAHMW. These bodies will also be sent digital copies of the report together with the archive on optical digital disc.
- 7.4 The involvement of the SNPA Archaeologist should be acknowledged in any report generated by this project.
- 8.0 Archiving and dissemination**
- 8.1 The regional Historic Environment Record (maintained by Gwynedd Archaeological Trust) will be contacted for any PRN (primary record number) identifiers required and to discuss compatibility of any outputs (databases, spreadsheets, and image and document archives) with the HER.
- 8.2 Arrangements for the long-term storage and deposition of all artefacts and ecofacts must be agreed with the landowner and the SNPA Archaeologist. The Gwynedd Museum and Art Gallery (Storiell), Bangor, is the preferred storage location.
- 8.3 A full archive including plans, photographs, written material and any other material resulting from the project should be prepared in accordance with standard guidance. All plans, photographs and descriptions should be labelled and cross-referenced. The complete archive should be lodged in an appropriate place (probably with the National Monument Record of the RCAHMW; to be agreed with the SNPA Archaeologist) within six months of the completion of the project.
- 8.4 The full digital record should be archived according to best practice (following the digital data standards of the RCAHMW) and lodged in an appropriate

place (probably with the National Monument Record of the RCAHMS; to be agreed with the SNPA Archaeologist) within six months of the completion of the project.

- 8.5 The results of the work should be published, as a minimum, through the preparation of a submission to Archaeology in Wales.
- 8.6 The involvement of the SNPA Archaeologist should be acknowledged in any publication generated by this project.

9.0 General requirements including

- 9.1 This archaeological mitigation programme must be undertaken by an appropriately qualified individual or organisation, experienced in work of this character.
- 9.2 Details, including the name, qualifications and experience of the project director and all other key project personnel (including specialist staff) should be communicated to the SNPA Archaeologist and all written work attributed to an author(s).
- 9.3 Contractors and subcontractors are expected to conform to the standard professional guidelines of the Chartered Institute for Archaeologists.
- 9.4 The archaeological contractor must satisfy themselves that all constraints to groundworks have been identified, including the location of live services, Tree Preservation Orders and public footpaths. The SNPA bears no responsibility for the inclusion or exclusion of such information within this brief.
- 9.5 Any changes to the specifications that the archaeological contractor may wish to make after approval by this office should be communicated to the SNPA Archaeologist and are subject to approval in writing by the SNPA Archaeologist.
- 9.6 Care must be taken in dealing with human remains and the appropriate environmental health regulations followed. The SNPA Archaeologist and the local Coroner must be informed immediately human remains are discovered and all work must stop until the appropriate permissions have been obtained.

10.0 Curatorial monitoring

- 10.1 The project will be monitored by the SNPA Archaeologist to ensure fulfilment of the brief and specification. The SNPA Archaeologist may inspect site works and will normally review the progress of excavation reports and archive preparation. The archaeological contractor must inform the SNPA Archaeologist in writing of the proposed start dates for the project.

11.0 Further information

- 11.1 This document outlines best practice expected of an archaeological assessment by walk-over survey and watching brief but cannot fully anticipate the conditions that will be encountered as work progresses. If requirements of the brief cannot be met they should only be excluded or altered after gaining written approval of the SNPA Archaeologist.
- 11.2 Further details or clarification of any aspects of the brief may be obtained from the SNPA Archaeologist, contact details as below.
- 11.3 Contact details for regional Historic Environment Record: Gwynedd Archaeological Trust, Craig Beuno, Ffordd y Garth, Bangor, Gwynedd LL57 2RT / nsteele@heneb.co.uk / 01248 366963.

- 11.4 Contact details for RCAHMW/National Monuments Record: the RCAHMW and NMR is moving to the National Library of Wales, Aberystwyth at the time of writing. Check website details for latest contact information. Email: nmr.wales@rcahmw.gov.uk

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Project Specification

Archaeological Assessment and Watching Brief

relating to the construction of a

‘Proposed 99kw hydro-electric scheme including construction of 2 intake weirs, turbine house and installation of underground and overground pipes and installation of underground cable to provide grid connection on land at Bron Lletty Ifan, Arthog, Gwynedd LL39 1LX’

Planning Ref:

NP5/52/367A

Prepared for:

Snowdonia National Park Authority

On behalf of:

Snowdonia Hydro

HRS Wales Project No: 182

Date: 10th June 2016

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Non Technical Summary

This document is a project specification for an Archaeological Assessment and Watching Brief relating to the construction of a Proposed 99kw hydro-electric scheme including construction of 2 intake weirs, turbine house and installation of underground and overground pipes and installation of underground cable to provide grid connection on land at Bron Lletty Ifan, Arthog LL39 1LX.

The specification details the aims, objectives and methodology to be used when undertaking the assessment and the watching in accordance with a design brief from the Snowdonia National Park Authority archaeologist, aided by a design and access statement provided by Snowdonia Hydro following approval of the scheme on 17th September 2015.

1 Introduction

- 1.1 This document is a project specification for an Archaeological Assessment and Watching Brief relating to the construction of a Proposed 99kw hydro-electric scheme including construction of 2 intake weirs, turbine house and installation of underground and overground pipes and installation of underground cable to provide grid connection on land at Bron Lletty Ifan, Arthog LL39 1LX.
- 1.1 The program of archaeological work will comprise of three main elements:
 - 1) *A pre-construction archaeological record by walk-over survey, supplemented by a basic desk based review of existing archaeological and historical records.*
 - 2) *The marking/fencing out of sensitive archaeological areas in the proximity of the working corridor, and;*
 - 3) *An archaeological watching brief on potentially archaeologically sensitive portions of scheme.*
- 1.3 This project specification has been prepared by Richard Scott Jones of Heritage Recording Services Wales (henceforth HRS Wales) for Snowdonia National Park Authority (henceforth SNPA) on behalf of Snowdonia Hydro. The specification has been prepared in accordance with a Design Brief supplied by SNPA on 1st June 2016.

2 Site Location and Description

- 2.1 This proposed development aims to introduce a new hydro-electric power scheme on two unnamed tributaries of the Afon Morfa, beginning on land at Bron Lletty Ifan Farm, Arthog, in the county of Gwynedd (National Grid Reference SH 63660 13000). The proposed scheme is positioned in an upland area within the Snowdonia National Park and also lies within the Registered Historic Landscape of *Mawddach* (HLW (Gw) 14).
- 2.2 The scheme begins near to the farmstead of Bron Lletty Ifan farmstead at a height of approximately 210m AOD. Following the intake of water from two tributaries, the scheme then carries the water along a low pressure pipe to a forebay tank. From here the water will be carried downslope along a high pressure pipe to a powerhouse near Bron Meirion, where the water will then be discharged back into the watercourse (National Grid Reference SH 63290 13530).

2.3 *Planning Background*

- 2.4 The proposed scheme (Planning Ref: NP5/52/367A) was approved by SNPA on 17th September 2015, with the following conditions stipulating:

Condition 10: 'Prior to any work commencing (including any ground disturbing works or site clearance) pursuant to this permission the applicant/developer shall submit to and receive written approval from the Local Planning Authority for an archaeological specification for a programme of works which must meet all relevant archaeological standards. The development shall subsequently be carried out in strict accordance with the approved programme of works unless otherwise agreed in writing by the Local Planning Authority.

Condition 11: The developer hereby approved shall be carried out in strict accordance with the archaeological specification for a programme of works as approved in condition 10 above unless otherwise agreed in writing by the Local Planning Authority.

3 **Development Proposals**

- 3.1 The development proposes building two new intake weirs at 263638, 312965 (Intake 1) and E 263798, N 313103 (Intake 2). From the intakes two 400mm low-pressure pipes will carry water to a forebay tank at E 263752, N 313119. From the forebay tank a single 400mm high-pressure penstock will carry the water to the powerhouse at E 263299, N 313510 and the water returned to the watercourse at E 263300, N 313512.
- 3.2 The low pressure pipes will be buried from the two intakes to the forebay tank. The low pressure pipe from Intake 1 is to be buried in the bank alongside an existing well maintained track using the cut and fill method. The low pressure pipe from Intake 2 will be buried across marshy grassland taking care to separate the top soil during construction so that the grassland can be returned to its original state.
- 3.3 The high-pressure penstock will be buried from the forebay tank, across open grazed fields and through a gateway in a stone wall. The land here is rocky and the penstock should avoid rock veins where possible. The penstock will then drop steeply downhill through the grazed fields which show possible evidence of prehistoric settlement activity. The pipe will then be buried across the bracken field to the left of the public footpath, avoiding the existing birch woodland; this area will be planted with new birch trees leaving a 3m wide grass-covered strip to the side of the buried penstock to provide access to the lower section of the penstock in the event of the penstock requiring maintenance in the future.
- 3.4 At the bottom of this field, there is evidence of an old track and a double stone wall. A section of this wall will need to be removed to allow the pipe to be buried under it and for machine access to the lower workstation. We propose to keep a permanent access track through this section to allow access in the future to the penstock for maintenance reasons and to aid woodland management.
- 3.5 After the wall at E 263547, N 313347 the landscape changes to mixed broadleaf woodland and scrub. There are some hazel which shall be coppiced or removed to create the access track, but no mature broadleaf trees will be affected. It has been proposed to continue the permanent track to the workstation at E 263465, N 313384.
- 3.6 The penstock will then enter some mature woodland at E 263552, N 313352 close to where there are remnants of an historic weir. From this point, the penstock enters mature unmanaged broadleaf woodland and will pass overland to ensure minimal impact on existing trees in

accordance with the ecological assessment. It is proposed that the penstock will cross the river at the location of the old weir E 263450, N 313385 so that it may remain buried under the footpath. This route allows the pipe to be laid unobtrusively into the river bed. From the far side of the stream the pipe will begin its overland journey through the woods. There are two footpaths marked on the map at this location passing through the woodland and over the penstock route. These appear to be disused and not public rights of way.

- 3.7 The penstock will terminate at a powerhouse at E 263289, N 313519. The water will be returned to the watercourse at E 263288, N 313522. The penstock will not be visible from any public right of way.
- 3.8 A small multi-core armoured cable will be buried alongside the penstock to connect the head level sensor at the forebay tank to the control unit in the Powerhouse. An armoured cable will run to Bron Meirion house to provide the site with electricity and export to the grid.

4 Historical & Archaeological Background

- 4.1 The development site is located within the Registered Historic Landscape (RHL) of *Mawddach* (HLW (Gw) 14). The proposed development site is not within any Conservation Area. The proposed development will not be within any Registered Park and Garden (P&G). There are also no Scheduled Ancient Monuments (SAMs), nor any Listed Buildings (LBs) along the route of the proposed scheme. The nearest SAM sites to the proposed scheme are two prehistoric cairns SAM sites, known as the *Bron-Llety-lfan cairns and cup-marked rock* (ME242). These two SAM sites are positioned between approximately 400m – 440m southwest of the approved scheme. A further medieval Platform House SAM site is also positioned approximately 430m southwest of the scheme, known as *Cyfannedd-Fach Homestead* (ME101). The nearest Listed Building (LB) to the scheme is a Grade II milepost (LB No.15591) positioned on the northwest side of the A493. This LB lies approximately 160m west of the proposed discharge point.
- 4.2 As well as these designated sites, the wider landscape of the scheme is rich in known archaeological sites, particularly prehistoric and medieval settlement and field systems, and the scheme area is potentially archaeologically sensitive. A full assessment study of the impact of the scheme on the historic environment was not carried out in support of the planning application. The SNPA Archaeologist visited the scheme with Snowdonia Hydro staff on 29/01/2015 as part of the pre-application process.
- 4.3 The upper part of the scheme has a number of historic environment features of interest, including lynched relict and active field boundaries, terraces and relict walls. The penstock crosses lynched boundary features at E 263694, N 313173, E 263669, N 313230 and possibly at c. E 263653, N 313265.
- 4.4 At E 263562, N 313384 there is a small cluster of derelict buildings with attached walled enclosure and further associated walls including a double-walled track leading to the Afon Morfa. The group is recorded on the regional Historic Environment Record as PRN: 57918, but this is a record created from identification of the site from historic OS mapping and does not contain any descriptive information.
- 4.5 The only other entry on the HER in the immediate vicinity of the scheme is PRN: 3286, bronze palstave (axe head) findspot allocated to the farmhouse; this is an approximate location indicating its discovery nearby and underlining potential for prehistoric archaeology in the area.

- 4.6 An historic hydro-electricity scheme was located on the Afon Morfa. The disused weir (at E 263448, N 313385) of the historic scheme lies on the line of the new scheme and will be crossed by the penstock. Components of the generating equipment and instruments of an early twentieth century hydroelectricity scheme are present in an outbuilding (turbine room alongside garage/workshop) at Bron Meirion.
- 4.7 The scheme will impact upon a number of active and relict stone walls.
- 4.8 The SNPA Archaeologist felt that the potential impact of the scheme on the historic environment could be mitigated by a programme of archaeological works during construction and consequently a bi-partite archaeological condition was placed on the planning permission, requiring: *i) submission and approval by SNPA of a specification for a programme of archaeological mitigation prior to any development works commencing on site and; ii) the subsequent adherence to the programme laid out in the specification.*

5 Aims and research objectives

- 5.1 The proposed development relates to the installation of a 99kw hydro-electric scheme including construction of 2 intake weirs, turbine house, installation of associated pipes and cables for grid connection.
- 5.2 It is proposed to create a compound/workstation area at E 263465, N 313384 with a permanent access and maintenance track leading to it from the east.
- 5.3 Beyond the old weir at E 263448, N 313385 the penstock runs through mature unmanaged broadleaf woodland and will be installed over-ground.
- 5.4 There is potential for the scheme to impact upon known and hitherto unknown historic environment features, particularly in the upper part of the scheme (i.e. approx. above the old weir at E 263448, N 313385).
- 5.5 On this basis it is considered that the proposed development represents a potential threat to archaeological remains. As such, a mitigation programme is required. In summary, this will comprise the following elements of work:
 - *A pre-construction archaeological record by walk-over survey supplemented by a basic review of existing archaeological and historical records;*
 - *The marking/fencing out of sensitive archaeological areas in the proximity of the working corridor, and;*
 - *An archaeological watching brief on potentially archaeologically sensitive portions of scheme.*
- 5.6 **A pre-construction archaeological record by walk-over survey supplemented by a basic review of existing archaeological and historical records**
- 5.7 This rapid piece of work will make a review of archaeological records by consulting with the regional Historic Environment Record (HER), held by Gwynedd Archaeological Trust (GAT) and the National Monument Record (held by RCAHMW), in order to confirm the known archaeological record for the area. With reference to the HER data, all known sites that lie within a 250m buffer zone around the route of the proposed scheme will be consulted. As well

as giving information relating to known sites along the route of the penstock, these sites will also help inform the watching brief of the character and form of archaeological sites within the immediate vicinity of the scheme.

- 5.8 A basic review will also be made of readily available documentary records, including cartographic sources. These will include a review of the early OS Surveyors drawing, the Tithe Map, the OS First Edition map (1:10560 and 1:2500), the OS Second Edition map (1:10560 and 1:2500), and any later OS map editions relevant to the scheme. Aerial photographs will also be inspected.
- 5.9 With regard to the walk-over survey, the route of the penstock and a 25m corridor to either side of it (i.e. 50m total width centred on the penstock) will be fully walked to determine the archaeological potential of the scheme and its immediate environs, as well as to define potential areas for marking out, in order to avoid possible damage by construction machinery and in order to inform the watching brief archaeologist.
- 5.10 In order to create a lasting record, all historic environment features (including all walls/boundary features and the components of the historic hydro-electricity scheme) will be recorded photographically accompanied by written description. All photographs will include a scale and will be appropriated using a high quality digital SLR camera, set to highest image resolution in RAW or TIFF format, with images presented as both TIFF and high resolution JPEGs in the archive.

5.11 The marking/fencing out of sensitive archaeological areas in the proximity of the working corridor

- 5.12 It is proposed that the contracted archaeologist (Richard Scott Jones) will attend a pre commencement meeting with key representatives of the construction team, at which all known archaeological constraints will be outlined.
- 5.13 The route will be walked with the construction team representatives and known sensitive areas identified. This will include establishing the positioning of any marking out (e.g. by temporary barriers/fencing) required to protect archaeologically sensitive locations along the route. Care will be taken to ensure that in identifying sensitive areas with potential to be affected by the development, all of the scheme activities, including vehicle movements and location of works/lay-down compounds, not just the construction works, are considered.

5.14 Archaeological Watching Brief

- 5.15 On the basis of the information currently available, it is considered that a watching brief should be carried out on all intrusive excavation works in the upper portion of the scheme (i.e. approx. above the old weir at E 263448, N 313385). However, the extent of the watching brief may vary following the results of the walkover survey and review of archaeological and historical records.

Methodology and Sources

- 5.16 The aims of the watching brief, as defined by the ClfA (2014) are:
 - to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established

with sufficient accuracy) in advance of development or other potentially disruptive works;

- to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.

5.17 A watching brief is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

5.18 The objective of a watching brief is to establish and make available information about the archaeological resource existing on a site.

General

5.19 It is understood that the archaeological watching brief will be undertaken by HRS Wales staff using current best practice from July/August 2016.

5.20 All work will be carried out by a suitably qualified archaeologist (Richard Scott Jones) with relevant level membership of the Chartered Institute for Archaeologists (CIfA) and will follow the CIfA Standard and Guidance for an archaeological watching brief (CIfA 2014).

Detailed

5.21 All proposed groundwork will be undertaken under close and constant archaeological supervision.

5.22 If archaeological features, finds or deposits are uncovered, work will be stopped in the area of the exposed material in order that the supervising archaeologist can clean and identify the extent and nature of the material and for a degree of excavation and recording to take place.

5.23 All archaeological deposits or features that are identified will be cleaned, recorded and fully excavated. The developer will provide a safe working area and sufficient time to record and excavate all features to the satisfaction of the SNPA archaeologist. Full excavation and recording of identified features will not be compromised by the construction program.

Contingency Arrangements

5.24 In the event of significant archaeological features being discovered all activities in this area of the site will be temporarily suspended. This will allow a period of consultation with the client, the regional archaeological trust, the council and any potential specialists.

5.25 Following such consultation, recommendations will be presented to the Developer and the Local Planning Authority.

5.26 The methodology and timescale of additional archaeological work to investigate such features will be presented and included in the Developers Program, the feature will be made secure thus allowing the site program to continue.

Recording

- 5.27 Recording will be carried out using HRS Wales recording systems (pro-forma context sheets etc), using a continuous number sequence for all contexts.
- 5.28 Plans and sections will be drawn to a scale of 1:50, 1:20 and 1:10 as required and related to Ordnance Survey datum and published boundaries where appropriate.
- 5.29 All features identified will be tied in to the both the OS National Grid and all local site and ground plans.
- 5.30 Photographs will be taken in digital format, using either a 14 mega-pixel DSLR camera with photographs stored in both RAW and high resolution JPEG formats. Should significant remains be identified that require comprehensive excavation, photographs may also be appropriated in black and white and colour slide (35mm film).

Artefacts

- 5.31 Archaeological artefacts recovered during the course of the work will be cleaned and labelled using an accession number, which will be obtained from the local museum. A single number sequence will be allocated to all finds. The artefacts will be stored appropriately until they are deposited with a suitable local museum.
- 5.32 All finds of gold and silver will be removed to a safe place and the Environment Agency, the SNPA archaeologist and the local coroner informed, within the guidelines of the Treasure Act 1996.
- 5.33 Any finds which are considered to be in need of immediate conservation will be referred to a UKIC qualified conservator.

Human remains

- 5.34 In the event of burials or cremations being found all work will be halted in the area of the burials and their extent and nature established. The client, the SNPA archaeologist and the Ministry of Justice will be informed and a methodology of excavation agreed which will adhere to Ministry of Justice Guidelines.

Environmental and technological samples

- 5.35 Samples will be taken where necessary if significant deposits are located.

Specialists

- 5.36 In the event of certain finds/features etc. being discovered, the site archaeologist may have to seek specialist opinion for assistance. Such specialists will be accessed either internally within HRS Wales itself or from an external source.

6 Post-Fieldwork Programme

Conservation

- 6.1 After agreement with the client, arrangements will be made for the long term conservation and storage of all artefacts in an appropriate local or county museum.

Archive

- 6.2 The site archive will be prepared in accordance with MAP 2, Appendix 3 (English Heritage 1991). It will comprise all the data recovered during the fieldwork and shall be quantified, ordered and indexed and will be internally consistent. The archive will be deposited with the finds in a suitable local museum.

Reporting

- 6.3 The results will be submitted in an illustrated and bound report, which will include the following material:

The report will contain the following:

- Site code/project number; dates of fieldwork visit; grid reference; location plan; and a plan showing the limits of the study area.
- Non technical summary.
- Introduction.
- Aims and objectives of the study.
- Methodology and sources consulted.
- Results of pre-commencement desk based assessment and walk-over
- Summary and synthesis of the archaeological results.
- Mitigation strategies
- Results of Watching Brief
- Conclusions and recommendations
- Appendices. To include Figures (maps, plans, drawings), Photo Plates, Gazetteer of all known HER sites within 250m buffer, copy of the SNPA design brief and the approved specification.
- References to all primary sources.

Monitoring

- 6.4 Any changes to this written scheme of investigation that the contractor may wish to make after approval will be communicated to SNPA archaeologist for approval on behalf of the Local Planning Authority.
- 6.5 Representatives of SNPA will be given access to the site so that they may monitor the progress of the watching brief. The SNPA archaeologist will be kept regularly informed about developments, both during the site works and subsequently during any potential post-excavation.

Archive Format & Deposition

- 6.7 The full site archive will be deposited within one month of the completion of the client report.

- 6.8 The paper/drawing/digital archive will be deposited at the offices the Royal Commission on Ancient and Historical Monuments of Wales (RCAHMW) with the finds being deposited with the appropriate local museum. HRS Wales will agree the location and timing of the deposition of the archive before the contract commences.
- 6.9 The archive will include all site notes, finds, documents, drawings, photographs, digital data and a copy of the final report and any prior draft versions. All of these items will be clearly quantified in tabular form in an 'archive deposition statement' located at the rear of the clients report, and their ultimate location and proposed date of deposition stated.

7 Resources and timetable

Standards

- 7.1 The watching brief will be undertaken by HRS Wales staff using current best practice.
- 7.2 All work will be undertaken to the standards and guidelines of the ClfA.

Staff

- 7.3 The project will be undertaken by suitably qualified HRS Wales staff. In this instance Richard Scott Jones will be managing the project.

Equipment

- 7.4 The project will use existing HRS Wales equipment.

Timetable of archaeological works

- 7.5 It is anticipated that the ground work for the construction for the development will start in July/August 2016.

Health and safety

- 7.6 All members of staff will adhere to the requirements of the *Health & Safety at Work Act, 1974*, and the Health and Safety Policy Statement of HRS Wales.

Insurance

- 7.7 HRS Wales presently holds Public Liability Insurance up to £5,000,000 and Professional Indemnity Insurance up to £250,000.



Richard Scott Jones (BA, MA, MCIfA)

Date: 10th June 2016

APPENDIX V:
Archive Cover Sheet

ARCHIVE COVER SHEET
Bron Lletty Ifan Hydro-electric Scheme,
Arthog, Gwynedd.

ARCHIVE DESTINATION – HRS Wales

Site Name:	Bron Lletty Ifan Hydro-electric Scheme
Site Code:	BLI/2016/AA
PRN:	
NPRN :	N/A
SAM:	N/A
Other Ref No:	HRSW Report No. 182
NGR:	SH 6364 1297 to SH 8326 1357
Site Type:	Multi Period uplands landscape
Project Type:	Archaeological Assessment
Project Manager:	Richard Scott Jones
Project Dates:	June 2016
Categories Present:	N/A
Location of Original Archive:	HRS Wales
Location of duplicate Archives:	Snowdonia National Park Authority (SNPA)
Number of Finds Boxes:	N/A
Location of Finds:	N/A
Museum Reference:	N/A
Copyright:	HRS Wales
Restrictions to access:	None



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