

# *Archaeology Wales*

## **Hydro Scheme, Afon Croesor Brondanw Estate, Croesor, Gwynedd**

Desk Based Assessment



By  
Irene Garcia Rovira BA MA PhD

Report No. 1430


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
# Archaeology Wales

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Desk Based Assessment

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**O ctej 2016**

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## **NON-TECHNICAL SUMMARY**

*In November 2015, Archaeology Wales (AW) was commissioned by Renewables First Ltd to carry out an Archaeological Desk-Based Assessment for an application for a 175KW Hydro-Electric scheme on Afon Croesor just to the southwest of the settlement of Croesor, Gwynedd.*

*The site lies within the important historic landscape areas classified as Dyffryn Ffestiniog in which Parc (GD35) is located. The area is particularly rich in later medieval and post-medieval archaeology. This is due to the significance of and development of Parc and to the agricultural and industrial significance that the area had during post-medieval times. While part of the penstock will cut across the Historic Park and Garden of Parc (GD35), it is expected that the pipe will be almost in its entirety buried underground and therefore the penstock will have a negligible visual impact on these landscapes.*

*No Scheduled Ancient Monuments (SAM) will be affected by the hydroelectric scheme. The closest SAM is the Unenclosed Hut Circle Settlement East of Garth-y-Foel (ME170) which is located c. 140m northwest from the proposed intake area. Due to the topography and vegetation of the area, there will be no intervisibility between the site and the Scheduled Ancient Monument.*

*No Listed Buildings will be directly affected by the scheme. The penstock route is proposed to pass 50m west from the Grade II building of Beudy Newydd (4815); however it is expected that this pipe line will be almost in its entirety installed underground. The temporary access track is proposed to cut across Parc (GD35), running close to the L-shaped Agricultural Range at Parc (4816) and Barn at Parc (19842) during the development of the scheme. During this period, a direct visual impact upon the Listed Buildings is expected. The proposed turbine house will have slight visual impact on the sub-medieval structure of Gelli-Cornwydydd (NPRN 406470) and on Gelli Mill (NPRN 6399).*

*Due to the moderate potential of encountering archaeological remains, it is recommended that an archaeological watching brief, with contingencies, is conducted during relevant ground work within the proposed development area. A photographic record is also recommended at sections of the historic field boundaries affected by the penstock route.*

*The penstock route will intersect the Croesor incline in two places. Suitable mitigation would be for archaeological excavation of these two sections. This will provide preservation by record but also provide important information regarding the design, construction and preservation of the incline. This will allow for local, regional, national and international comparisons as well as local temporal comparisons. Importantly this will also go some way to addressing at least two priorities as set by the Research Framework for the Archaeology of Wales (Version 02, Final Paper February 2011).*

## **1 INTRODUCTION**

- 1.1 Archaeology Wales (AW) have been commissioned by Renewables First Ltd to carry out an Archaeological Desk-Based Assessment for an application for a 175KW Hydroelectric scheme, including the construction of an intake weir, a turbine house, the installation of underground cabling to provide grid connection, the excavation of a trench for the penstock pipe and a temporary access track.
- 1.2 The proposed development is located within Snowdonia National Park which itself lies within the county of Gwynedd. The whole scheme is on land known as Brondanw Estate which is owned by the Clough Williams-Ellis Foundation charitable trust. The proposed HEP scheme is to be located on the Afon Croesor just to the southwest of the settlement of Croesor. The penstock runs northeast to southwest for approximately 1.7km. The intake of the proposal will be located at national grid reference SH 62545 44192 and the outfall will be located at national grid reference SH 61890 43545 (Figure 1 and 2).
- 1.3 The local planning authority is Snowdonia National Park Authority (henceforth – SNPA). A specification of the Desk-Based Assessment was produced by AW in November 2015 and approved by John Roberts of SNPA (see Appendix II).
- 1.4 The purpose of the Desk-Based Assessment, which is detailed in the following report, is to provide SNPA with the information they are likely to request in respect of the proposed development, the requirements for which are set out in the Welsh Assembly Government, Planning Policy Wales: Chapter 6 (Edition 7, July 2014) and Welsh Office, Circular 60 / 96 (December 1996). The work is to highlight and assess the impact upon standing and buried remains of known and potential archaeological interest and to ensure that they are fully investigated and recorded if they are disturbed or revealed as a result of subsequent activities associated with the development.

## **2 SITE DESCRIPTION**

- 2.1 The proposed development is located within Snowdonia National Park which itself lies within the county of Gwynedd. The whole scheme is on land known as Brondanw Estate which is owned by the Clough Williams-Ellis Foundation charitable trust. The proposed HEP scheme is to be located on Afon Croesor just to the southwest of the settlement of Croesor. The penstock runs northeast to southwest for approximately 1.7km. The intake of the proposal will be located at national grid reference SH 62545 44192 and the outfall will be located at national grid reference SH 61890 43545.
- 2.2 An intake structure will be constructed taking water through a buried penstock pipe to the turbine house / outfall location. The penstock runs across open fields generally covered by grass pasture and/or bracken with stone walls separating the fields and a stone track. The ground across the penstock route is rocky and fairly steep in sections, flattening out at the intake. There are sections which will require deeper trench excavation where the



ground surface undulates to ensure the penstock maintains a requisite fall. The path will generally follow the natural contours of the valley. A buried 11kV line will run parallel to the penstock from a pole mounted transformer at the turbine house to the nearest available pole on the existing HV line.

2.3 The geology of the area is characterised as the Nant Ffracncon Subgroup, composed of silty mudstones and sandstones and bioturbated graptolitic rock. An Unnamed Igneous Intrusion of Ordovician-Felsite cuts across the site. Superficial deposits are characterised as Unsorted or poorly sorted Diamicton Till of Devensian date. (BGS 2015).

### **3 METHODOLOGY**

#### **3.1 Introduction**

3.1.1 The assessment has been carried out in accordance with the Standard and Guidance for Historic Environment Desk-Based Assessment issued by the Chartered Institute for Archaeologists (CIfA 2014).

3.1.2 The primary objective is to assess the potential impact of the development proposals on the historic environment by means of a detailed desk-based assessment and site visit. The assessment is intended to identify the extent and character of the known and potential archaeological resource and provide an assessment of the impact of the proposed hydro scheme on the known and potential archaeological remains within the development area.

3.1.3 This report aims to provide information of sufficient detail to allow informed planning decisions to be made which can safeguard the archaeological resource. Preservation *in situ* has been advocated where at all possible, but where engineering or other factors may result in the loss of archaeological deposits, preservation by record has been recommended.

3.1.4 The archaeological and historic records have been considered within a Study Area with a radius of 1.2km centred on the centre of the proposed hydro scheme. The visual impact of the scheme on scheduled ancient monuments has been considered within 5km of the location of the turbine house (SH 61890 43545).

#### **3.2 Resources**

As part of the desk-based assessment, the following repositories were consulted for readily available information:

- The list of Scheduled Monuments, Listed Buildings, Registered Parks/Gardens and Registered Battlefields held by Cadw.

- The regional Historic Environment Record (HER) database for the locations of all known heritage assets held by Gwynedd Archaeological Trust.
- The Royal Commission on the Ancient and Historic Monument of Wales (RCAHMW) for PRN data.
- Aerial photographs were viewed at the Central Registry for Aerial Photographs in Wales.
- County archives for all material relating to local studies, historic documents and historic mapping.
- Online services for relevant information, historic mapping, portable antiquities, geological/geotechnical information and satellite imagery.
- Lidar imagery supplied by Natural Resources Wales.

### 3.3 Walkover Survey

- 3.3.1 This involved walking systematically over the proposed development area. The aims of the site survey were:
- To assess the present condition of the known heritage assets identified through the assessment.
  - To identify heritage assets not included on the HER.
  - To assess the proposed development area for its potential to contain buried archaeological remains.
  - To assess the visual impact of the scheme upon significant heritage assets in the surrounding landscape.

### 3.4 Visual Impact Analysis

- 3.4.1 The methodology will consider the Zone of Theoretical Visibility (ZTV) in order to define those areas from which the development may potentially be visible by reference to surrounding topography.

## 4 **RESULTS**

### 4.1 The Historic Landscape

- 4.1.1 The hydroelectric scheme falls within the historic landscape of Vale of Ffestiniog. The Registered Park and Garden of Parc (GD35) lies within the boundaries of this Historic Landscape. The penstock route is will pass through the southwest boundary of Parc,

while the temporary track will pass through the central area of the estate. Both the turbine house and the intake location lie within an area categorised as essential setting belonging to Parc (GD35) (see section 7.4; Figure 3).

4.1.2 The Vale of Ffestiniog is located within the former medieval commote of Arduwy Uwch Artro. The topography varies from the mountainous areas reaching more than 700 AOD at the summit of Moelwyn Mawr to the sea-level areas around the estuary of Traeth Mawr (Gwyn 2015). Much of the area is unsuitable for agriculture.

A number of pre-modern field patterns are recorded in nearby Cwm Bowydd and at the bottom of Cwm Teigl, sometimes associated with sub-medieval settings such as Gelli-Cornwydydd (406470). However, the present agricultural landscape was largely created in post-medieval times resulting from the activity of small estates. Gentry estates included Wynne of Peniarth, the Annwyl family of Parc, the Williams family of Brondanw, Madocks of Tremadoc, the Oakeley family of Plas Tan y Bwlch as well as a number of industrialists of the 19<sup>th</sup> century who became landowners and developers (e.g. Samuel Holland and David Williams of Castell Deudraeth). Generally, the scattered farms are large, stone-built concentrations of buildings mostly dating to the 18<sup>th</sup> and 19<sup>th</sup> centuries.

4.1.3 During the 18<sup>th</sup> century, the felling of timber became one of the most significant economies of the area. Timber was exported from Ffestiniog and Maentwrog and also from the parishes of Llanfrothen and Llandecwyn. By the end of the 18<sup>th</sup> century, the Vale of Ffestiniog had suffered much deforestation.

A feature of the landscape is the survival of sub-medieval settings which had been the centres of small states in areas largely untouched during industrialisation. Examples include Dduallt (SH 6731 4182), the house associated with the small Dduallt estate, Dol y Moch (SH 6840 4191), between Maentwrog and Rhyd y Sarn, Parc (SH 6266 4397), Pengwern Old Hall (SH 6991 4302) and Plas Bondanw. There is also substantial archaeological evidence for a pre-industrial dispersed settlement within the uplands (Gresham 1973). Furthermore, it is significant to note that much of the area is defined by dispersed farmsteads, mostly dating to the 19<sup>th</sup> century and currently used by farming families.

4.1.4 Settlements known from the medieval period are Llanfrothen, Penrhyndeudraeth and Maentwrog.

4.1.5 Llanfrothen is one of a number of very small settlement in the area. Llanfrothen and Penmorfa churches (SH 6223 4117 and SH 5412 4028) are similarly situated on what would have been the edge of the estuary of the Afon Glaslyn.

4.1.6 Penrhyndeudraeth owes its origins to the fishing population which also came to be involved in the pre-railway slate-boating business. The introduction of passenger services on the railway in 1865 turned it increasingly into a Ffestiniog dormitory village. Maentwrog's origin is probably due to the fact that it lies at the highest navigable point

on the River Dwyryd. For this reason, from the 18<sup>th</sup> century the area became the entrepôt for the valley, with the export of timber, attested from 1739, but particularly after the development of the slate industry from the 1760s onwards.

Tremadoc is an outstanding example of a planned urban community, created by William Alexander Madocks on land recovered from the Traeth Mawr by the first embankment, of 1800. Tan yr Allt, built by William Alexander Madock later home to the poet Percy Shelley and to several generations of local quarry-owners, is a regency adaptation of an existing building, and recently functioned as the Steiner-Waldorf school. Sir Kyffin Williams lived at the house for two years. An active local regeneration group, Cyfeillion Cadw Tremadoc, has been instrumental in preserving the village's architectural character.

There are two nucleated urban settlements within the study area, Blaenau Ffestiniog (SH 6980 4592) and Porthmadog (Portmadog) (SH 5686 3869). Both are entirely creations of the 19<sup>th</sup> century, the one the result of quarrying, the other the results of shipping slate. Porthmadog is built largely on land reclaimed from Madocks's sea wall – the cob - of 1808-1813.

- 4.1.7 The area is rich in formal gardens. Examples are: Tan yr Allt, Plas Tan y Bwlch, Plas Brondanw, Portmeirion, Wern, and Parc all appear in the Cadw Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales Part 1: Parks and Gardens.

The oldest is Parc, dating to the 16<sup>th</sup> century. Tan-yr-Allt and Tan-y-Bwlch are 19<sup>th</sup> century gardens, although Tan-yr-Allt was laid out by William Madocks right at the beginning of the century in the 'Romantic' style and Tan-y-Bwlch has more of the 'Picturesque' characters typical of the other end of the century, though elements date back to the 18<sup>th</sup> century. Wern is a garden of the turn of the 19<sup>th</sup> and 20<sup>th</sup> centuries, incorporating elements designed by Thomas Manson. Portmeirion and Plas Brondanw are both 20<sup>th</sup> century gardens designed by Clough Williams-Ellis. The former was laid out to provide a suitably romantic setting for the fantasy village, and the latter was Williams-Ellis's own garden, made for his own pleasure and taste. The six gardens thus cover a broad temporal spectrum as well as being of unusually high quality.

- 4.1.8 The chief industry of the study area was the quarrying of slate, centred on Blaenau Ffestiniog, the third most productive slate-producing area in Wales. There were also significant quarries in Cwm Croesor and smaller workings around Tremadoc and Portreuddyn.

The fact that the Ordovician veins lie at an angle of approximately 30° to the horizontal has had a profound effect on the industrial landscape, obliging quarrymen and managers to exploit the rock in underground chambers, at least until the advent of substantial earthmoving equipment in the 1970s, which led to a reversion to open-air workings (Carter 1989). A number of quarries survive in the landscape. For instance Oakeley quarry tip which is associated to a number of inclines, drumhouses and zig zag steps. Slate mills also survive, including Ffatri Rhyd y Sarn which has at various times been a woollen mill, a timber saw-mill and one of the very earliest slate-slab mills.

There are a number of lead and copper mines within the study area. The Pen yr Allt or Catherine and Jane Consols copper mine above Penrhyndeudraeth survives as a varied mid-19th century industrial landscape including wheel-pits and dwellings, and a rotative engine-house of 1859-1860, largely demolished in 1965 (Jones 1994).

The extensive Bwlch y Plwm lead mine is attested in Llwyd's Parochialia of 1577, but may be much earlier. The area known as 'Gwaith Romans' (Roman Work) above the mine area includes a smelting hearth and a large lump of metallic lead, discovered in 1850. At the lower end of the workings, on what would have been the shoreline until 1813, are traces of modern workings, which went on until 1921. The area preserves a number of important textile sites. The woollen mill at Pant yr Ynn, near Blaenau Ffestiniog (SH 7088 4538), was originally built in 1845-6 by George and William Casson, William Turner and Hugh Jones in lease from the Tan y Manod estate as a slate mill for Diffwys quarry and was converted into a woollen mill in 1873. This was latterly worked in conjunction with pandy (fulling mill) Moelwyn (SH 6905 4547) and erected in c. 1864 by John Williams of Garn Dolbenmaen, the only pandy in Gwynedd to preserve its fulling stocks.

The largest single surviving textile mill, however, is Maddocks's woollen factory at Tremadoc. Its history has been very little researched, but it appears to contain some at least of the original structure of c. 1805-7.

Power generation is another important theme in the area, and there are several power stations including Dolwen (SH 6940 4387), Cwm Croesor (SH 6484 4594) and its syenite dam (SH 6543 4664), Llyn Stwlan (SH 6600 4442) and Llyn Ystradau power station (SH 6792 4441) (area 17) as well as Pant yr Afon (SH 6971 4687), and Maenofferen booster station (SH 7139 4660) and hydro-station (SH 7090 4691).

- 4.1.9 The construction of the Cob, which was the port at Ynys Cyngar designed by William Maddocks, had significant consequences for the development of transport in the area, bringing into being a transport system which eventually took a worldwide effect. By creating a deep-water channel at the new mouth of the Glaslyn, the building of the Cob brought about the harbour of Porthmadog, which now survives as an excellent example of an industrial harbour from the western seaboard of Britain. By displacing Ynys Cyngar as the place where sea-going ships were loaded with slate, and by providing a ready-made alignment across the Traeth Mawr, it made possible the construction between 1832 and 1836 of the Festiniog Railway, now active as a visitor attraction. The Festiniog in the period 1863 to 1872 not only demonstrated how the civil engineering of the unimproved horse tramway could be taken forward into the age of steam – and thereby provided a cheap and effective method of transport for the British empire, the USA and beyond – but also proved the practicality of articulated locomotives and rolling stock such as are now standard world-wide. Much of its Victorian infrastructure survived not only the period of closure from 1946 to 1955, but also the over-enthusiastic modernisation of the railway in the 1960s and 1970s by its present management.

The feeder quarry railways in some cases form impressive landscape features. The incline from the Ffestiniog Railway to Wrysgan Quarry (SH 6781 4549 to SH 6806 4496)

and the inclines to the Blaenau quarries themselves (e.g. SH 6937 4672 to SH 6941 4644) are particularly noteworthy.

Other narrow gauge railways made their way to the port – a line to Tremadoc originally built in 1841 to carry ironstone was more than once rebuilt and ultimately extended to the far recesses of Cwm Pennant. The trace survives a horse-worked line built in the 1860s to connect the harbour with the slate quarries beyond Croesor. This includes the rake of inclines at Parc, where the upper drumhouse was converted into a banqueting house for Lady Aberconway by Clough Williams-Ellis (SH 6362 4411). The buttressed embankments and slab bridges along its course between here and its terminus at Blaen y Cwm illustrate the persistence of early railway civil engineering in the context of the 1860s. The various inclines connecting it to the quarries are also spectacular features, including the scheduled 'Jacob's ladder' to Rhosydd Quarry (SH 6541 4610 to SH 6577 4635).

At Porthmadog a 19<sup>th</sup> century dock landscape survives largely intact; this includes the original public quays of 1824, and the extensive slate quays established from the 1830s to the 1860s (SH 569- 383-). It is in many respects typical of the slate-exporting havens of the 19<sup>th</sup> century – largely void of buildings and cranes, and making use of labour-intensive hand-loading methods. Maisonettes which won a Cic Trust Award were constructed on Holland's wharf (SH 5709 3844) and on the opposite wharf (SH 5701 3828) in the 1960s, and at much the same time the unusual slate storage sheds on the Greaves wharf were demolished, all apart from one range which now forms the Porthmadog Maritime Museum (SH 5697 3845). The smaller slate-exporting quays on the River Dwyryd survive in varying states of preservation. The most impressive is Tyddyn Isa at SH 6292 3945, a Scheduled Ancient Monument (ME108), with its rows of steps to down to the mooring points and its pyramid-roofed powder magazines at each end.

Small quays or docking-places for the export of slate or for landing of consumer perishables are evident at a great many locations, such as at Ty Gwyn y Gamlas (SH 5992 3550), at Portmeirion (SH 5893 3696) and at Ynys Cyngar (SH 5543 3654), as well as at several locations on the tidal Traeth Bach.

The study area also, unusually for north-west Wales, contains two canals; one is the very short Cemlyn canal which connects the River Dwyryd to the former Diffwys quarry quay at Maentwrog, the other the 'cyt' from Porthmadog to Tremadoc. This is believed to have functioned as a transport artery, and even to have dispatched a steam-boat to New York sometime in the 1830s. There is certainly a building which may have been a warehouse on the site of its Tremadoc basin (now filled in), and it passed the ironstone mine at Pen Syflog. However, it is more likely that it was intended as a drain, even if it occasionally carried vessels.

Locations traditionally considered to be the sites of smaller quays and landing places are evident at locations now well inland, such as at the Brondanw Arms, Garreg.

## 4.2 Scheduled Ancient Monuments (Figure 4 and 5)

4.2.1 A 5km radius search area was centred on the proposed location for the Turbine House (SH 61890 43545). This was undertaken to investigate the visual impact that this structure will have with regards to the surrounding Scheduled Ancient Monuments.

4.2.2 A total of seventeen Scheduled Ancient Monuments are located within 5km of the proposed turbine House location, of which twelve are of prehistoric date, one of medieval date and three of post-medieval date. The results are summarised below:

<b>SAM NO</b>	<b>SAM NAME</b>	<b>SITE TYPE</b>	<b>PERIOD</b>	<b>BROADCLASS</b>
CN051	Pen y Gaer Camp	Hillfort	Prehistoric	Defence
CN246	Hut circle settlement near Oerddwr Uchaf	Hut circle settlement	Prehistoric	Domestic
CN247	Hut circle settlement above Afon Goch	Hut circle settlement	Prehistoric	Domestic
CN253	Hut Circle Settlement in Cwm Gelli Iago (West)	Unenclosed hut circle settlement	Iron Age	Domestic
CN254	Hut Circle Settlement in Cwm Gelli Iago (South)	Unenclosed hut circle	Iron Age	Domestic
CN255	Hut Circle Settlement in Cwm Gelli Iago (North)	Unenclosed hut circle	Iron Age	Domestic
CN272	Hut Circle Settlement at Bwlch Cwm Ystradllyn	Unenclosed hut circle	Iron Age	Domestic
CN303	Gorseddau Slate Quarry	Railway	Post-Medieval/Modern	Transport
ME096	Ty'n y Berllan Settlement	Enclosed hut circle	Romano-British	Domestic
ME108	Cei Tyddyn Isa	Quay	Post-Medieval/Modern	Industrial

ME142	Rhosydd Incline, Drumhouse & Tramway	Industrial monument	Post- Medieval/Modern	Transport
ME149	Coed Cae Fali Hut Circle Settlement	Enclosed hut circle	Romano-British	Domestic
ME170	Unenclosed Hut Circle Settlement East of Garth-y-Foel	Unenclosed hut circle	Iron Age/Romano- British	Domestic
ME178	Unenclosed Hut Circle Settlement at Bryn Derw	Hut circle settlement	Iron Age/Romano- British	Domestic
ME193	Pont Maesgwm Deserted Rural Settlement	Deserted Rural Settlement	Medieval	Domestic
ME265	Defended Settlement 150m NW of Plas Ynysfor	Enclosure - Defensive	Iron Age	Defence

4.2.3 The results obtained testify the presence of late prehistoric and Romano-British activity in the area. Archaeologically, this activity is materialised in the form of hut circles and defensive structures. While they appear to be one of the most common type of prehistoric/early historic monuments of the Welsh uplands, it is significant to note that, unlike other remains of similar chronologies, they have had a visible impact upon the landscapes.

### Hut circles

***Hut circle settlement near Oerddwr Uchaf (CN246):*** A group of adjacent huts located in a low crag between rocky outcrops. Two huts are known and separated by a gap of c. 1.5m. On the hillside to the immediate south-east of the site are a number of circular depressions in the ground that might well represent the site of a further group of prehistoric dwellings.

***Hut Circle Settlement in Cwm Gelli Iago (CN253-5):*** A Group of huts – two are isolated and three are interconnected structures. They are located on the eastern slopes of Cwm Gelli. Three other nearby robbed structures may have been round or rectilinear huts. These are thought to be the remains of an Iron Age settlement, today they are defined by isolated stone spreads. A series of field boundaries are included within Hut Circle Settlement in Cwm Gelli Iago (North) (CN255).



**Hut Circle Settlement at Bwlch Cwm Ystradllyn (CN272):** A well-preserved group of huts probably of Iron Age or Romano/British date represented by three well-built stone huts enclosed by a paddock.

**Ty'n y Berllan Settlement (ME096):** A Roman enclosed settlement located at the end of the Garth. It is defined by four rooms and a central courtyard. The site is well-preserved.

**Coed Cae Falli Hut circle enclosure (ME149):** A group of ruined enclosures interpreted as the remains of hut dwellings located in the lower region of Coed Cae Falli. It is assumed that this group is Romano-British in date.

**Unenclosed Hut Circle Settlement East of Garth-y-Foel (ME170):** Group of four hut circles located on two level platforms ground above Afon Croesor. Three huts are associated with a series of yards and paddocks, whilst one is located to the north of the upper level platform.

**Unenclosed Hut Circle Settlement at Bryn Derw (ME178):** A group of huts located adjacent to the old trackway that runs from Bryn Derw to Garreg Fawr. Three of the huts are located on the north-west side of the track and are in a ruinous state. A single hut is built on a level platform and the other two are located further to the north. This group is dated to Iron Age/Romano-British period.

#### **Hillforts / defensive enclosures**

**Pen y Gaer Camp (CN051):** An irregular enclosure (approximately 46m x 36m) characterised by a wall and located on an isolated knoll.

**Defended Settlement 150m NW of Plas Ynysfor (ME265):** A small defensive enclosure located on an isolated geological outcrop enclosing an area of approximately 1225 square meters. A small hollow located inside the bank might be interpreted as the imprint of a hut.

- 4.2.4 Medieval activity in the area is testified by a deserted rural settlement which is Scheduled Ancient Monument.

**Pont Maesgwm Deserted Rural Settlement (ME193):** A medieval long house built over a stone platform. An orthostat marks the entrance and evidence suggests the existence of a fireplace at the east end of the structure. The remains of field walls are present around the structure and between it and the river there is a level terraced area.

- 4.2.5 During the 19<sup>th</sup> century, North Wales became one of the leading regions for the extraction of slate; a material mostly used for the construction of building and other structures. The volume of activity relating to this industry has clearly been imprinted into the researched landscape (Gwyn 2005).

**Rhosydd Tramway (ME142):** Opened in 1864, connecting Rhosydd Quarry to Croessor Tramway which ran to Porthmadog port. This tramway was powered by horses and gravity powered the 1500ft long incline. Rhosydd Quarry was opened in 1853 and used until production was discontinued in 1930.

**Gorseddau Tramway (CN303):** Built in 1856 to connect Gorseddau Slate Quarry to Porthmadog port, Ynys-y-Pandy Mill, and Treforys Workers Village. Gorseddau Slate Quarry was first opened 1807 until production was discontinued in 1867.

**Cei Tyddyn quarry (ME108):** Stone built quay located c. 200m north of Afon Dwyrdd. This Scheduled Ancient Monument is thought be an example of engineering from the early period of the slate industry. The remains include the quay, two roofed buildings and a row of hitching posts for pannier ponies and cart horses. While one of the buildings appears to be nineteenth century, the other is probably more recent. Neither is contemporary with the construction of the quay itself.

4.2.6 No Scheduled Ancient Monuments are found within the bounds of the site. However, the Unenclosed Hut Circle Settlement East of Garth-y-Foel (ME170) lies c. 140 northwest to the intake area located at SH 62545 44192. No intervisibility exists between the monument and the intake.

4.2.7 A ZTV model (Figure 5) produced to examine the visual impact of the hydroelectric scheme upon Scheduled Ancient Monuments found within 5km radius of the location for the turbine house has concluded that the scheme will have no visual impact upon any designated asset. These results have been further corroborated during the site visit (see section 10).

#### 4.3 Listed Buildings (Figure 6 - 7)

4.3.1 A 1.2km radius search area centred on the centre of the scheme (SH62492 43796) has recorded seventeen listed buildings, of which four are Grade II\* and thirteen are Grade II. The results of the search are summarised below:

<b>NUMBER</b>	<b>NAME</b>	<b>GRADE</b>
19805	Pont Garreg-Hylldrem	II
19806	Limekiln	II
19837	Cae Glas	II
19838	Barn 25m SE of Cae Glas	II
19839	Barn 100m NE of Cae Glas	II
19842	Barn at Parc	II
19843	Walls and Revettments to Upper Terrace Garden at Parc	II

NUMBER	NAME	GRADE
19844	Revetment Walls to Terracing at Parc including Walls and Revettments to Enclosure adjoining to SE	II
19845	Boulder-built Boundary Walls above the Upper Drive at Parc	II
19846	Bridge at Parc	II
19847	Walls to Enclosure adjoining L-shaped Agricultural Range at Parc	II
20505	Ceunant-y-Parc	II
4773	Parc	II*
4815	Beudy Newydd	II
4816	L-shaped Agricultural Range at Parc	II*
4817	Middle Parc including Fountain Basin adjoining to W	II*
4818	Gattws Parc including Boulder Wall adjoining to NW	II*
5246	Hafodty	II

## Parc

Parc was the ancient seat of the Anwyls, one of the most notable families of the Meirionedd area in the Tudor and Stuart periods. A junior branch of the Clenneny family, they were settled at Parc by at least the mid- 16<sup>th</sup> century and possibly earlier. Robert ap Morris (d.1576) was responsible for the first of a series of unit-planned ranges which, by the late 17<sup>th</sup> century comprised a large complex of four domestic blocks and a gatehouse, as well as associated stable and agricultural ranges. Robert's grandson, William Lewis Anwyl was the first of the family to hold the office of High Sheriff (Meirionedd 1610 and 1623, and Caernarvonshire 1636). He is known to have greatly extended Parc in the early 17<sup>th</sup> century and his will mentions the newly-built plas (mansion). A cywydd (strict meter poem) by the poet Huw Machno speaks of 'his new house of great construction,' as well as mentioning gardens, orchards, walls, parks and 'fair towers.' It is likely that the primary house was rebuilt or remodelled during this period and that the large revetted terrace which now survives was a contemporary addition (Haslam et al 2009). As such it is the earliest of the various garden structures on the site, and presumably relates to the early 17<sup>th</sup> century gardens described by Machno. In its cyclopean, boulder-built construction, it is paralleled by similar structures at the neighbouring sites of Y Wern, and Plas Newydd. The house itself (Parc 1), which would have faced the terrace and stood immediately above it, has long since been demolished, though its platform remains visible.

The following structures and decorative elements from the Parc are listed:

***Barn at Parc (19842):*** The barn forms one of three surviving agricultural or service components within the site's important unit-planned complex; it is likely to be of

second-half 17<sup>th</sup> century date. The barn is listed as a Grade II building and located some 40m northwest of Parc, facing a farmyard to the southeast and set against a slope to the northwest.

***Walls and Revetments to Upper Terrace Garden at Parc (19843):*** It is likely that the primary house was rebuilt or remodelled during the 17<sup>th</sup> century and that the large revetted terrace which now survives was a contemporary addition. As such it is the earliest of the various garden structures on the site, and presumably relates to the 17<sup>th</sup> century gardens described by Machno. The house itself (Parc 1), which would have faced the terrace and stood immediately above it, has long since been demolished, though its platform remains visible. The walls and revetments are Grade II and are located some 50m east of Parc, facing the valley and in front of the site of the (now demolished) primary house at Parc.

***Revetment Walls to Terracing at Parc including Walls and Revetments to Enclosure adjoining to SE (19844):*** An associated rubble-walled and revetted enclosure, perhaps relating to an earlier or contemporary walled orchard. The revetment walls are Grade II listed and are located within the Parc drive down to the Afon Maesgwm, between Parc Cottages and Gattws Parc.

***Boulder-built Boundary Walls above the Upper Drive at Parc (19845):*** It is probable that these boundary walls were built in the 17<sup>th</sup> century. They would have defined the plot of the house to the north, while at the same time excluding game from the immediate landscape. Two crude arched niches or seats within the wall at the northern corner appear to be contemporary features and were presumably garden features relating to the formal gardens. The walls are listed as Grade II and located to the north of Parc between the barn and Gattws Parc.

***Bridge at Parc (19846):*** Road bridge possibly built to serve the drive to Parc. The latter appears to have been superseded by the top drive in the 17<sup>th</sup> century. It is presumed that the bridge has to predate the terracing and may therefore be of early 17<sup>th</sup> century origin. The bridge was partly rebuilt during the 19<sup>th</sup> century. The bridge is listed as Grade II and it is located approximately 150m from Gattws Parc.

***Walls to Enclosure adjoining L-shaped Agricultural Range at Parc (19847):*** Walled enclosure, belonging to the 17<sup>th</sup> century and in its position in relation to the main house and gardens perhaps originating as a walled produce garden. The walls are listed as Grade II and are located to south of and adjoining the main L-shaped agricultural range at Parc.

***Ceunant-y-Parc (20505):*** House originally built as an office for the Parc slate quarry. Parc quarry was developed as underground workings in the 1860s after the construction of Croesor Tramway. The quarry main output was specialist slabs and ridging slates. The office was used to show the varied products of the quarry. The building is said to have been adapted by Clough Williams Ellis as part of the Plas

Brondanw estate. The building is listed as Grade II and it is located 1km northeast of Plas Brondanw and 0.2km southwest of Parc.

**Parc (4773):** Parc 4, now the main house, is detached from the main group and is dated externally 1671. However, this date probably relates to a late 17<sup>th</sup> century remodelling of a second quarter 17<sup>th</sup> century lodgings range. In its original arrangement this building appears to have been split up into a series of lodgings or apartments, probably designed to serve as guest or overspill household accommodation; two ground-floor and both first and second-floor entrances are still visible, though blocked or altered. Each lodging was therefore originally independently accessible, the upper floors being reached via external stepped access, long since removed. The only clear parallel for this extraordinary plan-form is a lodgings block at Plas Newydd (near Penrhyndeudraeth), a similar unit-planned complex built for a cadet branch of the Anwyls in the later 17<sup>th</sup> century; here the external stairs survived intact until very recently. The 1671 phase saw the conversion of the range into a single house, with a rear stair and service projection and the addition of a curious vernacular pediment to the centre of the front elevation; it was apparently carried out for Lewis and Katherine Anwyl (married in 1668), whose initials appear on the datestone. The building is listed as a Grade II\* building and it is located on an elevated site above the Afon Maesgwm, approximately 2km southwest of Croesor; accessed via a long drive running southwest from the Garreg to Croesor road.

**L-shaped Agricultural Range at Parc (4816):** The main section of the agricultural range is an exceptionally-fine primary barn which is probably also part of William Lewis Anwyl's remodelling and may, like its parallel at Plas Newydd, have originated as a stable range with accommodation over; evidence of partitioning and even ceiling over of one central section of the first floor, make this a possibility. To this was added a further barn range in the later 17<sup>th</sup> or early 18<sup>th</sup> century, forming a flush, continuously-roofed range of ten bays in all; the fine gable parapet of the primary barn's right-hand gable was reused to serve the newer section. At the same time a series of what appear to have been two light mullioned windows on both floors of the primary range were carefully reduced to form neat vertical ventilation slits. A contemporary or near-contemporary addition was a three-bay carhouse, built at right-angles with the primary barn to the northeast. The range is listed as a Grade II\* building and it is located immediately to the west of Parc, facing a farmyard to the north.

**Middle Parc including Fountain Basin adjoining to W (4817):** The northern section of Middle Parc is a much-altered link-block between the second and third houses, the latter being represented by the main section to the southwest. Both blocks have elegant cylindrical chimneys which, if original would be unparalleled in north Walian vernacular. It is however possible that these are additions of the second-quarter or mid-19<sup>th</sup> century, and are 'Tudorbethan' cosmetic alterations. Both blocks were altered by Clough Williams-Ellis, owner of the Brondanw Estate, who converted the buildings for modern use after the last war. The adjoining fountain basin is likely to have served both as spring, conduit and washing basin and probably relates to one of the earliest phases at Parc. In its location to the side of the main domestic group

and away from the formal garden areas, it can be presumed always to have had a service function. Middle Parc and its fountain are listed as Grade II\* and located on an elevated site above the Afon Maesgwm, approximately 2km southwest of Croesor; sited some 50m northwest of Parc.

***Gattws Parc including Boulder Wall adjoining to NW (4818):*** This gatehouse was once the porter's private accommodation and appears to have always been storeyed with one room to each floor. A blocked first-floor hillslope probably related to a late 18<sup>th</sup> century loading bay. The gatehouse is a Grade II\* listed building and it is located on an elevated site above the Afon Maesgwm, approximately 2km southwest of Croesor, approximately 200m northeast of Parc.

## **Croesor**

***Cae Glas (18937):*** Late 16<sup>th</sup> century storey and chimney house. The house is significant as belonging to a class of early storeyed examples which can be seen as prototypical of the developed Snowdonia storied end chimney type; the persistence of cusped windbracing in the upper hall/solar space and the cross-passage plan are the survivals of the late medieval open hall tradition. Similarly, the corbelling-out of the first-floor chimney is an early diagnostic feature amongst this class of buildings. Lower service and stable/byre additions of the late early 18<sup>th</sup> century were added to the rear and to the NE respectively. Cae Glas is a Grade II building located 5km west of Croesor on an elevated site on the north side of the Maesgwm valley.

***Barn 25m SE of Cae Glas (19838):*** Boulder built barn dating to the late 17<sup>th</sup> century. The building incorporates two pairs of full trucks which may relate to Cae Glas. The barn is located immediately southwest of Cae Glas and is Grade II listed.

***Barn 100m NE of Cae Glas (19839):*** Three-bay boulder-built barn of late 17<sup>th</sup> century or early 18<sup>th</sup> century date and associated with the nearby Cae Glas. The barn is located 100m northeast of Cae Glas.

## **Plas Brondanw**

An examination of the listed buildings found within the adjacent area of the proposed development echo the importance that the architect Clough Williams-Ellis has had in the development of the built environments, landscape settings and the protection of rural Wales. The architect inherited Plas Brondanw in 1908 and he spent much of his life restoring the house and the gardens. A listed building belonging to Plas Brondanw has been documented through the search:

***Hafodty (5245):*** Longhouse type dating to the early 17<sup>th</sup> century, partly remodelled during the 19<sup>th</sup> century. The middle section is said to have been converted to a music room in 1930 as part of Clough William Ellis' work at Plas Brondanw estate. The structure is listed as Grade II.

## **Pont Garreg-Hylldrem**

***Pont Garreg-Hylldrem (19805):*** 19<sup>th</sup> century vernacular road bridge spanning the Afon Maesgwm approximately 2km northeast of Garreg. The bridge is listed as Grade II.

***Limekiln (19806):*** Located some 500m east of the Pont Garreg-Hylldrem on the north side of the Afon Maesgwm; accessed across a field northeast of the road, built into a revetted bank. Grade II listed.

***Beudy Newydd (4815):*** T-shaped, single-storey agricultural complex of unusual plan, including an accommodation wing. Built in 1666 for Katherine Anwyl, widow and heiress of neighbouring Parc and daughter of the famous Royalist general and Vice Admiral of North Wales Sir John Owen of Clennenau. Restored from a ruin by Clough Williams-Ellis, architect in 1951 for Mr and Mrs Uhlman. Beudy Newydd is a Grade II listed building and it is located on an elevated plateau between the Afon Croesor and the Afon Maesgwm, approximately 0.5km southwest of Parc; accessed via a long track running northeast from the road.

- 4.3.2 The Listed Buildings obtained through the search mostly belong to the two most significant estates found in the area: Parc and Plas Brondanw. While architecturally, Parc's listed buildings are significant for dating to the 16<sup>th</sup> and 17<sup>th</sup> centuries, designated structures within Plas Brondanw have, to a great extent, been remodelled by the architect Clough William Ellis. Other buildings listed within the area echo agricultural activity in the area in sub-medieval and post-medieval times.
- 4.3.3 The temporary access track is proposed to cut across Parc, running particularly close to L-shaped Agricultural Range at Parc (4816) and Barn at Parc (19842) during the development of the scheme. During this period, a direct visual impact upon the Listed Buildings is expected. Direct impact could also be expected in the form of damage by vibration of machinery accessing the site, dust created by the movement of machinery and impact from machinery driving too close to the structure. These potential impacts can be mitigated (see section 13).
- 4.3.4 The penstock route passes c. 50 west from Beudy Newydd (4815). No long term visual impact is expected due to the buried nature of the pipes however, there will be short term visual impact during the excavation of the trench with similar physical impacts such as those described above (7.3.2).

## 4.4 Registered Parks and Gardens (Figure 3)

- 4.4.1 The hydroelectric scheme is located within the boundaries of Parc, Llantrothen (PGQ (Gd) 35 (GWY), registered as a Grade II\* Park and Garden.

- 4.4.2 Parc (GD35) is located in the foothills to the northeast of the Traeth Mawr plain and contains a number of designated buildings (see section 7.3). The dwellings are an excellent example of the 'unit system' characteristic of the area whereby, instead of extending houses when more accommodation is required, a whole new house is built adjacent to previous structures (see Hemp and Gresham 1942). The earliest structure at Parc dates to the 16<sup>th</sup> century, two other structures are thought to have been built in the early 17<sup>th</sup> century and a further house has a date-stone of 1671, though it may not date the original construction of the house. All the structures at Parc have been built following the same style of slate stone and slate roofs. They all have tall chimney stacks and are two storey buildings, though one has an attic dormer. These structures were built by the Anwyl family who were related to the Clennau family (Haslam et al 2009)
- 4.4.3 The surname Anwyl was first adopted by Lewis Anwyl but it was probably his father Robert ap Morris who was responsible for the construction of the first building at Parc. Lewis, or perhaps his son, were responsible for the construction of the remaining structures. Robert ap Morris married Katherine who was responsible for the construction of Beudy Newydd (4815) in 1666 as the building bears her initials. The estate was sold a number of times during the 18<sup>th</sup> and 19<sup>th</sup> centuries and was finally bought by Clough William-Ellis.
- 4.4.4 The two streams that delimit the park are located in fairly steep valleys and the ground between them raises as an elongated plateau in which the buildings stand. The main drive enters the park from the northeast and bypasses the gatehouse and the house leading to the farmyard. The old drive used to cross Afon Maesgwm by means of a small stone bridge. Beyond this point the route it took is uncertain.
- 4.4.5 There is no reason to suppose that the landscape of Parc was ever substantially different than its current conditions, with areas for pasture and woodland. In the area of the quarry, trees of mixed age were planted and Clough William-Ellis planted oaks in and large beeches in the same location.

The industrial imprint in and around Parc is still visible. The incline/tramway serving Croesor quarry to the northeast divides the farming area at Parc. In the southwest of Parc a small quarry is still visible. This quarry belonged to the estate and it is associated to a number of buildings, tips and tramways. Along the northwest edge of Parc there is a route of a disused tramway and incline.

- 4.4.6 The gardens are located on the northwestern slope of the Afon Maesgwm valley. The main gardens were laid out during the 17<sup>th</sup> century though it is possible that the vegetable garden dates to the 16<sup>th</sup> century, being contemporary with the construction of the first house. From historical evidence, it is possible to suggest that William Lewis of Anwyl was responsible for the construction of the terraces. The houses are surrounded by courtyards that today contain few trees. However, it is unlikely that these were originally used as formal gardens. Only the vegetable garden is used as a



formal garden today. Local folklore suggests that the vegetable garden was the original setting for a 6<sup>th</sup> century church although there is no evidence for this.

#### 4.5 Non-designated sites (Figure 11)

4.5.1 A 1.2km radius search centred on the centre of the scheme (SH62492 43796) has resulted in 76 entries. These are summarised below:

<b>Prn</b>	<b>Site Name</b>	<b>Period</b>	<b>Type</b>
950	Gatehouse, Parc, Llanfrothen	Post-Medieval	Gate
994	Powder House, Coed Cae Fali	Modern	Powder Magazine
1492	Hut Group, Garth Y Foel	Unknown	Hut Circle Settlement
1493	Hut Circle, Garth Y Foel	Unknown	Hut Circle
1494	Deserted Rural Settlement, Pont Maesgwm	Unknown	Deserted Rural Settlement
1495	Long Hut, Pont Maesgwm	Unknown	Long Hut
1509	Olion Rhufeiniog Trackway, Croesor	Roman	Trackway
3783	Hut Circle And Enclosure, Cwm Dylif	Prehistoric	Hut Circle
4466	Parc Gardens, Llanfrothen	Post-Medieval	Garden
4737	Parc House, Parc, Llanfrothen	Post-Medieval	House
4740	Bronze Spearhead, Findspot, Nr Creua	Bronze Age	Findspot
4741	Holy Well, Ffynnon Helen	Unknown	Holy Well
4742	Platform Houses, Site Of, Llanfrothen	Medieval	House Platform
5153	Hut Group, Remains Of, Moelwyn Bach	Prehistoric	Hut Circle Settlement
5168	Hut Group, Remains Of, Cae Glas	Prehistoric	Hut Circle Settlement
5874	Wall And Trackway, N Pont Maesgwm	Unknown	Enclosure
5881	Platform House, Parc	Medieval	House Platform
5882	Possible Round Barrow, Parc	Unknown	Mound
5883	Cow House, Beudy Newydd, Parc	Post-Medieval	Barn
5884	Barn, Parc, Llanfrothen	Post-Medieval	Barn
6103	Group Of Round Huts, Bryn Derw	Prehistoric	Hut Circle Settlement

<b>Prn</b>	<b>Site Name</b>	<b>Period</b>	<b>Type</b>
6399	Gelli Mill, Afon Croesor	Post-Medieval	Mill
7488	?Mill, Pont Maesgwm	Unknown	Water Mill
12301	Beudy Newydd, Parc	Post-Medieval	Building
12382	Hafodty; Hafotty	Post-Medieval	Building
12428	Cottages, Ne Of Parc	Post-Medieval	House
15614	Drs, Pont Maesgwm	Medieval	Deserted Rural Settlement
15615	Drs, Pont Maesgwm	Medieval	Deserted Rural Settlement
15617	Drs, Pont Maesgwm	Medieval	Deserted Rural Settlement
17541	Part Of Roman Road, Segontium - Tomen Y Mur	Roman	Road
18211	Croesor Landscape	Multi-Period	Landscape
18222	Parc Landscape	Multi-Period	Landscape
18226	Intermediate Slopes Of The Moelwyn Range Landscape	Multi-Period	Landscape
18230	Brandanw Slopes Landscape	Multi-Period	Landscape
20257	Slate Quarry, Brondanw Uchaf	Post-Medieval	Slate Quarry
20258	Slate Quarry, Brongarnedd	Post-Medieval	Slate Quarry
20259	Parc Slate Quarry, Llanfrothen	Post-Medieval	Slate Quarry
20262	Hafoty Slate Quarry, Llanfrothen	Post-Medieval	Slate Quarry
20263	Slate Quarry, Garreg Uchaf	Post-Medieval	Slate Quarry
20264	Parc Slab Slate Quarry, Llanfrothen	Post-Medieval	Slate Quarry
20267	Slate Quarry, Bryn Y Gelynen	Post-Medieval	Slate Quarry
20268	Slate Quarry, Llidiart Yr Arian	Post-Medieval	Slate Quarry
20763	Lead And Copper Trial Level, Traian	Post-Medieval	Level
21893	Rhaiadr Mine	Post-Medieval	Copper Mine
27009	Trackway, Former Incline, Llanfrothen	Post-Medieval;Modern	Inclined Plane;Trackway
34658	Outdoor Swimming Pool, Croesor	Post-Medieval	Swimming Pool
55765	Slate Slab Bridge, Llanfrothen	Modern	Bridge
55766	Structure, Llanfrothen	Unknown	Structure
55767	Structure, Llanfrothen	Unknown	Structure
55768	Drumhouse, Llanfrothen	Post-Medieval	Winding Drum
55769	Field Bank, Llanfrothen	Unknown	Bank (Earthwork)
55770	Trackway, Llanfrothen	Post-Medieval	Trackway

<b>Prn</b>	<b>Site Name</b>	<b>Period</b>	<b>Type</b>
55771	Trial Level And Tip, Llanfrothen	Post-Medieval	Level
55772	Slate Tip, Llanfrothen	Post-Medieval	Spoil Heap
55773	Trackway, Former Incline, Llanfrothen	Modern;Post-Medieval	Trackway; Inclined Plane
55774	Field Boundary, Llanfrothen	Post-Medieval	Field Boundary
55775	Structure, Llanfrothen	Unknown	Structure
55776	Trackway, Llanfrothen	Unknown	Trackway
55777	Structure, Llanfrothen	Unknown	Structure
55778	Bank, Llanfrothen	Unknown	Bank (Earthwork)
55779	Sub-Circular Feature, Llanfrothen	Unknown	Structure
55780	Bank And Ditch, Llanfrothen	Unknown	Ditch
55789	Shell Midden, Garreg Hyldrem Rockshelter, Llanfrothen	Mesolithic	Shell Midden
55930	Courtyard Wall, Parc	Post-Medieval	Wall
55931	Wall, Parc	Post-Medieval	Wall
55932	Ditch, Parc	Post-Medieval	Drainage Ditch
55933	Pool, Parc	Modern	Pool
55934	Trackway, Parc	Post-Medieval	Trackway
55935	House, Site Of, Parc	Post-Medieval	House
55936	Structure, Parc	Modern	Structure
57298	Enclosure, Ne Of Bryn Fedw	Post-Medieval	Enclosure
57299	Sheep Fold, Ne Of Bryn Fedw	Post-Medieval	Sheep Fold
57360	Enclosure Complex, S Of Creua	Post-Medieval	Enclosure Complex
57361	Building, Ne Of Cae Glas	Post-Medieval	Building
57362	Sheep Fold, N Of Fynnon Helen (Well)	Post-Medieval	Sheep Fold
57363	Two Buildings, Nw Of Hafodty	Post-Medieval	Building
57364	Gareg Fawr, House, Outbuildings And Enclosure	Post-Medieval	Farmstead
57365	Building, S Of Gareg-Fawr	Post-Medieval	Building
57366	Structure, W Of Gareg-Fawr	Post-Medieval	Structure
57367	Enclosure, Sw Of Gareg Fawr	Post-Medieval	Enclosure
57368	Sheep Fold, N Of Bryn Derw	Post-Medieval	Sheep Fold
57369	Enclosures, Bryn Derw	Post-Medieval	Enclosure
57370	Sheep Fold, Nw Of Cefn Cyffin	Post-Medieval	Sheep Fold
57371	Sheep Folds, Se Of Penrallt	Post-Medieval	Sheep Fold
57510	Embankment, Se Of Garregelldrem	Post-Medieval	Flood Defences

Prn	Site Name	Period	Type
59318	Croesor Railway	Post-medieval	Railway
60912	Incline, Croesor Tramway	Post-medieval	Incline

4.5.2 **Prehistoric Period:** This period is mostly represented in the study area by late prehistoric and Romano-British activity, materialised in the form of hut circles and defensive structures. Moreover, the HER documents the existence of a shell midden of Mesolithic date, a possible round barrow and a Bronze Age findspot.

**Shell Midden, Garreg Hyldrem Rockshelter, Llanfrothen (55789):** In 2007 a rockshelter was discovered at the base of a cliff above Pont Garreg Hyldrem and partially excavated to assess potential for the preservation of archaeological remains. The excavation revealed deposits dating from the Early Mesolithic including midden deposits comprising molluscs, animal bone and heated flint. Excavation beyond the drip line of the shelter recovered a Bronze Age barbed and tanged arrowhead, which may have been associated with a burial that was subsequently destroyed by the acidic soil (Robinson 2013).

**Bronze Spearhead, Findspot, Nr Creua (4740):** A bronze socketed spearhead was found in 1910 in loose scree near the ruined cottage of Creua, below the rocks of Carreghyldrem, Llanfrothen.

**Possible Round Barrow, Parc (5882):** Very distinct mound on the top of a spur. May be natural but could also be a prehistoric round barrow or a Victorian garden feature. Some of the surrounding field names apparently suggest that it could be prehistoric, however a table and seat looking out over the view have been built into it, so it could be an artificial Victorian mound (Smith 2001).

4.5.3 **Roman Period:** After the conquest of the area in 77 AD, the Romans constructed a series of strategically located forts around Snowdon/Eryri, all linked by a road system. After the initial phase, the native communities would have prospered under the Roman administration. From the 2<sup>nd</sup> century, there is evidence for the development of hut settlements. Within the study area the remains of a Roman road and a track are evidenced.

**Olion Rhufeiniog Trackway, Croesor (1509):** Olion Rhufeinig means Roman traces or Roman track and the terrace depicted on the OS map probably represents an old route descending to the crossing of the Afon Dylif. The 18th century coach road which runs through this point from Tan y Bwlch is known as San Elen and is traditionally the Roman road from Segontium to Tomen y Mur (Bowen and Gresham 1967).

**Part of Roman Road, Segontium - Tomen y Mur (17541):** Portion of very ancient road at St Helen probably a pack horse route.

4.5.4 **Medieval times:** the evidence for this period is mainly represented in the HER through Parc (see section 7.3, 7.4). Further information is supplied through the HER indicating the existence of Platform Houses, Site of, Llanfrothen (4742).

4.5.5 **Post-medieval times:** evidence relating to the history of Parc is evident during post-medieval times. However, the HER highlights the imprint that the slate industry had in the area during this period. This is represented through the incline (60912), part of the Croesor Railway (59318) as well as evidence of a number of quarries (Slate Quarry, Brondanw Uchaf (20257), Slate Quarry, Brongarnedd (20258), Parc Slate Quarry, Llanfrothen (20259), Hafoty Slate Quarry, Llanfrothen (20262), Slate Quarry, Garreg Uchaf (20263), Parc Slab Slate Quarry, Llanfrothen (20264), Slate Quarry, Bryn Y Gelynen (20267) and Slate Quarry, Llidiart Yr Arian (20268). Other remains associated with this period are the Lead and Copper Trial Level, Traian (20763), Rhaiadr Mine (21893). It is also represented by railways, tramways and other structures directly associated to the industry:

**Croesor Railway (59318):** A 0.6 metre (2') gauge railway completed in August 1864 which connected the slate quarries in Cwm Croesor to the sea at Porthmadog. Noteworthy features include the two inclines at Parc, the upper one of which includes a drum house remodelled by Clough Williams Ellis as a banqueting hall for the Aberconway family, and the embankment from this point to Croesor village (Davidson and Gwyn 2014). This railway is associated with the scheduled ancient monument of Rhosydd Incline, Drumhouse & Tramway (ME142) whose high point is located some 2.5km to the north-east of the proposed development area. This upper part of the incline/railway network was considered worthy of scheduling because:

This dramatic incline is probably the highest single pitch incline in the slate industry. It was served by a drumhouse which retains its drum mechanism and which is sited some 15m up the steep hillside. The tramway leading to the top of the incline from the workshops of Rhosydd quarry is also an impressive engineering achievement, cut into the hillside and revetted by substantial stone walls, as it curves around the 450m contour. (Cadw 1994)

**Incline, Croesor Tramway (60912):** A constant pitch counterbalance incline running from SE to NE (summit), which lay at the extreme north end of the Croesor Tramway, and linked that tramway to Croesor and Rhosydd quarries. It is double track, some wooden sleepers survive, one cast iron chair was, noted in situ, which was intended to carry T-section wrought-iron rails.

**Trackway, Former Incline, Llanfrothen (27009):** This is a stone revetted incline built c. 1878 to connect the Parc quarry with the Croesor tramway. The incline

presently forms part of an access road to the farms of Parc and Beudy-newydd. (Dutton, Flook & Roberts, 1994).

***Trackway, Llanfrothen (55770):*** A well-built trackway which originally lead from Brondanw isaf, Llanfrothen to Parc, shown on the 1st edition Ordinance Survey and the Tithe map of 1840. The track is partly revetted on its lower and upper sides and at one place lies within a cutting.

***Trial Level and Tip, Llanfrothen (55771):*** A small narrow trial adit cut into the slope just above the track, just after the junction with the original track to the Gatehouse of Parc. Opposite and immediately down slope of the track is the associated waste tip (Dutton, Flook & Roberts, 1994).

***Slate Tip, Llanfrothen (55772):*** A long slate tip stretching from a point mid-way along the incline northwest to an engine house and other structures, including a stone slab covered leat at SH63144425C. The tip, part of the Parc Slab quarry, has already been breached by a water pipeline.

***Trackway, Former Incline, Llanfrothen (55773):*** A linear stone revetted track, probably the bed of an incline associated with a number of levels, part of the Parc Slab quarry. This quarry ceased production before the First World War (Dutton, Flook & Roberts, 1994).

***Outdoor Swimming Pool, Croesor (34658):*** An outdoor swimming pool fed by the nearby stream. Possibly built for the community by Clough Williams-Ellis.

- 4.5.6 Post-medieval agricultural activity has also had a major impact on the landscapes of the area researched. The area contains the remains of numerous enclosures (e.g. 57298, 57360, 57367, 57369), sheepfolds (e.g. 57299, 57362, 57368, 57370, 57371), and agricultural buildings (e.g. 57361, 57363, 57364, 57365, 57366). Other post-medieval remains associated to farming activities are:

***Field Bank, Llanfrothen (55768-9):*** A low linear feature, comprising an eroded field bank running down slope towards the river, on a north-south axis. The feature is cut by the later quarry and farm tracks (Dutton, Flook & Roberts, 1994).

***Field Boundary, Llanfrothen (55774):*** A length of walling comprising large orthostats running north, uphill from the metalled lane, forming part of a field boundary shown on the Tithe map of 1840. The walling may be a remnant of an earlier field pattern (Dutton, Flook & Roberts, 1994).

- 4.5.7 **Modern period:** A total of structures are documented in the search results belonging to the modern period. These are: A building used by Cooks explosives factory that may relate to the mining history of the area (994), a slate slab bridge that crosses Afon

Maesgwm dating to the 20<sup>th</sup> century (55765) and a pool structure found within the bounds of Parc (55933).

4.5.8 The hydroelectric scheme will not directly affect any sites recorded on the HER. The Turbine House will have a negligible visual impact upon Gelli Mill (6309) located south of the proposed outfall location and directly in front of Gelli Cornwydydd (406470).

#### 4.6 Sites Recorded on the NMRW

4.6.1 A total of twenty sites recorded on the NMRW are found within the 1.2km radius applied study area centred on SH62492 43796. These are summarised below:

<b>NPRN</b>	<b>SITE NAME</b>	<b>SITE TYPE</b>
406471	Garreg-Fawr	Farmhouse
406470	Gelli Cornwydydd	Farmhouse
406487	Cae Glas	Cottage
28469	Hadofy	Dwelling
300246	Hut circle of Garth y Foel	Settlement
404889	Bwthyn Cae Glas	Cottage
404989	Park, y Park, Croesor	Building Complex
404888	Cae Glass	Farmhouse
404890	Beudy Cae Glas	Cow shed
28289	Coed Ty	House
40980	Pandy'r Parc	Fulling Mill
28170	Beudy Newydd	House
28622	Parc	Dwelling
28623	Parc, cottages	Gatehouse
308293	Park Bridge	Bridge
96462	Pandy'r Parc	Woollen Mill
41715	Pard SW barn	Barn
40008	Gelli Mill	Corn Mill
265122	Parc, Garden, Croesor	Country House Garden
420105	Parc Slate quarry, Croesor	Slate quarry

4.6.2 The results obtained in the NMRW again highlight the impact that Parc has had in the area. Moreover, they stress the impact that post-medieval farming activities have had over the landscape researched.

4.6.3 Of particular importance are Gelli Cornwydydd (406470) and Gelli Mill (40008) due to their location with regards to the proposed location for the House Turbine. The former is situated on the western bank of Afon Croesor, c 60m south of the proposed location for the turbine house, and the latter is located c.60m south of the site but on the eastern bank of the river.

## 4.7 Previous Archaeological Studies

- 4.7.1 A 1.2km radius study area was applied to the centre of the scheme (SH62492 43796) and has provided 25 previous archaeological events. Generally, the events recorded refer to periods of survey and recording of the archaeology of Snowdonia though a number of events refer to desk-based assessments produced in advance of some developments around the area researched. These are summarised below:
- 4.7.2 In 1973, the Ordnance Survey surveyed and recorded two level platforms of medieval origin (4742) located in SH62594404 (43145).
- 4.7.3 In 1993, the National Trust carried out a survey of Coed Cae Fali estate (41596).
- 4.7.4 In 1994, Gwynedd Archaeological Trust carried out a survey to identify and record slate quarries and quarrying landscapes in Gwynedd (40138). This work was promoted by the project Gwynedd Quarrying Landscapes: Slate Quarries (see Davidson et al 1994). During the same year, Gwynedd Archaeological Trust produced a desk-based assessment in advance of the proposed construction of a hydroelectric scheme at Afon Maesgwm (40244) (see Dutton et al 1994). Furthermore, Gwynedd Archaeological Trust produced a desk based assessment and field survey carried out by Gwynedd Archaeological Trust of slate quarries in Gwynedd as part of a Cadw funded project to assess the archaeological remains of slate quarrying in Gwynedd (44419).
- 4.7.5 In 1996, Gwynedd Archaeological Trust carried out a survey of the deserted rural settlements of the area (40835). This was followed by a desk-based assessment as a part of a threat related assessment of these settlements (see Jones 1996). During the same year, Cadw carried out a number of site visit to the following PRNs: 4742, 5881, 5882, 5883, 5884, (43389-91).
- 4.7.6 In 1998, Gwynedd Archaeological Trust carried out a survey of the metal mines of Gwynedd (40413). During the same year, GAT carried out a visual assessment of the hut circle settlement in the area of Gwynedd (40782) (see Smith et al 1998).
- 4.7.7 In 2001, Gwynedd Archaeological Trust carried out a survey of the prehistoric and ritual monuments of Meirionnydd (see Smith 2001).
- 4.7.8 In 2003, Gwynedd Archaeological Trust developed the Historic Landscape Characterisation of the Vale of Ffestiniog (40558) (GAT report 422).
- 4.7.9 In 2004 - 2005, Gwynedd Archaeological Trust carried out a survey of the Roman Roads in northwest Wales (40544 - 40538) (see Hopewell 2005).
- 4.7.10 In 2008, Gwynedd Archaeological Trust produced a desk-based assessment for a Tir Golaf management plan at six land holdings to the east and northeast of Porthmadog (44403) (see Flook 2008)..



- 4.7.11 In 2010, Bangor University defined the project 'Early Celtic Societies in North Wales'. The project assessed evidence for settlement from the Late Bronze Age to the early medieval period (late 2nd millennium BC- early 2nd millennium AD) in northwest Wales and examined the long-term processes of social change and settlement practices (44557) (Waddington 2013).
- 4.7.12 In 2011, Gwynedd Archaeological Trust produced a desk-based assessment on land at Pont Briwet, Penrhyndeudraeth (44066).
- 4.7.13 During 2001-12, Bangor University excavated the multi-period rockshelter at Garreg Hylldrem (44404). This revealed a sequence starting in the Early Mesolithic and ending in the late Bronze Age (Robinson 2013).

## 5 NEW SITES (Figure 13)

- 5.1 During this assessment a new site has been noted. This is the drum house associated with the undesignated Croesor Incline (PRN60912). This drum house does not appear on the GAT HER. The drum house as noted in paragraph 4.1.9 was the upper drumhouse was for the incline and was converted into a banqueting house for Lady Aberconway by Clough Williams-Ellis. For the purposes of this assessment hit has been given site code BEC01.

## 6 MAP REGRESSION

### 6.1 Tithe map, Llanfrothen Parish 1841

The area proposed for development is located within a large field (field 1a) labelled as Park and Gilli and composed of 1600 acres. This field covers the totality of the area proposed for the hydroelectric scheme, including land on the western bank of Afon Croesor. The landowner was Hugh Reveley Esq and John Edmunds appears as the tenant. His tenancy already existed at the time when the Mostyn family owned Parc as he is mentioned on the Mostyn Catalogue of sale of Parc estate (1832) as holding a farm house, double barn and stabling, cattle houses for 120 heads, a factory, a fulling mill and eight labourer houses (see Snowdonia Dendochronology Project, Parc, House 4).

A single rectangular structure is depicted on the south-west edge of Parc which appears to be reached by two distinct paths. The structure is located in the area nowadays defined as a deer park. However, the accuracy obtained through an overlay of the tithe map against a modern OS map cannot be totally guaranteed. No signs of a structure were evidenced during the site visit.

## 6.2 County Series, Merionethshire, First Edition 1889, 1:2500

### ***Area W proposed for access track***

In plotting the proposed access track on the first edition of the County Series map, it is possible to observe that the track begins in the area east of Tan-y-Bryn and runs on a NE-SW direction alongside the main drive to Parc. Once reaching the SW edge of the estate, the access appears to cut across one of the central areas between the southwestern most buildings. At this point, the access track turns northwest crossing the Croesor Tramway directing itself towards the river. The surrounding area is mostly composed of large fields.

### ***Area E of proposed access track***

A significant element evidenced in this area is the Parc Slate quarry. An aqueduct runs alongside the River Maesgwm on a NE/SW axis. Beudy Newydd (4815) is depicted west of the river and east of Croesor Tramway. Interestingly, a smithy is depicted on the first edition of the County Series map west of the aqueduct.

### ***Area proposed for Site Boundary***

The proposed Site Boundary crosses a number of large fields. In its mid-point, the boundary crosses Croesor tramway. The proposed turbine house is located in a small field east of the River Croesor.

## 7.3 County Series, Merionethshire, Third Edition 1900, 1:2500

No major differences are observed between the first and the third edition of the County Series map for the area. This edition evidences an air shaft east of a Sheepfold. The field structure remains virtually identical.

## 7.4 Map Merionethshire 1977, 1:2500

No major developments are evidenced in comparing maps running from 1900 to 1977. It is significant to note that Parc quarry is at this point disused and the airshaft is no longer depicted on this OS map edition.

## **7 AERIAL PHOTOGRAPHS**

7.1 A total of 25 aerial photographs showing the area of the proposed hydro scheme were viewed. They show a largely unchanged landscape since at least the 1940's. A number of the photographs show the buildings at Parc and surviving structures shown on the first edition OS map. A large elongated teardrop shaped mound is noted on most of the photographs. This lies outside of the development area to the south and is likely to be the result of modern activity.

**3 May 1946. Sortie 106G UK 1467. RAF. B&W. 3191-93. Scale – Various**

The proposed hydro scheme site is visible in this group of photographs. The stream has trees running along the length of the river. The neighbouring fields can also be seen. A large elongated eardrop shaped mound visible to the south of the proposed route.

**4 May 1946. Sortie 106G UK 1469. RAF. B&W. 3185-87 and 4285-87. Scale – 1:10,000**

Only the very southern area, near to the Turbine House location can be seen on this photograph. Trees line the stream and fields lay adjacent to the tree line on both sides. The large mound observed in the previous image is still visible.

**11 June 1969. Sortie 58 RAF 9682. RAF. B&W. 145-6. Scale - 1:60,000**

This is a small scale image and oblique photograph and therefore it does not allow for suitable inspection of the area.

**4 June 1971. Sortie OS 71 286. OS. B&W. 085-6. Scale – 1:27,000**

The proposed hydro scheme site is visible with trackways and buildings visible on the south-east side of the stream. The large mound is still visible.

**17 April 1973. Sortie OS 73 082. OS. B&W. 402-4. Scale 1:7500**

This series of photographs clearly show the buildings at Parc, located to the south-west of the stream. Stone walls are also visible that are field boundaries. A building is noted as being in close proximity to the excavated route involved in the project and this is in the correct location to be Beudy Newydd (New Cowshed). To the north of this building there is a ruinous building that only preserves its walls but no roof. This structure is visible on the 1<sup>st</sup> edition OS map and it is likely to be a sheep barn or smaller cowshed, possibly associated with Beudy Newydd. The incline from the first edition OS map is clearly visible. To the north of the stream the remains of a stone walled structure can be seen that is also visible on the 1<sup>st</sup> edition OS map. On the map this is shown as an unroofed structure and is likely to be a sheep shelter. The large mound to the south of Beudy Newydd is visible.

**3 October 1986. Sortie JA Story. JA Story and Partners. Colour. 5286 204-6. Scale 1:10,000**

This photograph does not show further detail than that observed on the previous image. The rock outcrop to the north-west of the proposed area is clear.

***7 May 1987. Sortie 1 PRU RAF 1180. RAF. B&W. 12-14. Scale – Various***

The area is visible in these photographs however no detail can be seen due to the small scale.

***1 May 1990. Sortie ADAS 40/90. ADAS. B&W. 98-100. Scale – 1:20,000***

The area is visible in these photographs however no detail can be seen due to the small scale.

## **8 LIDAR RESULTS (Figure 14)**

8.1 An examination of LiDAR imagery of the area was undertaken in order to assess the potential that the area has to uncover previously unknown buried remains.

8.2 A 2m resolution DTM was used to explore the area. The landscape as noted from the historic maps and aerial photographs were seen in the LiDAR data. The rocky outcrops to the west and the field boundaries located on the fields of the eastern bank of Afon Croesor were clearly visible.

8.3 This research did not reveal any further archaeological remains than those already recorded in the area. Due to the scale of the LiDAR data it is unlikely that subtle features would be visible.

## **9 SITE VISIT**

9.1 A walkover survey over the area proposed for the development of the hydroelectric scheme took place on the 9th of January 2016. Weather conditions were dry though much of the area was still waterlogged due to previous episodes of flooding. Visibility outside of the waterlogged areas was good.

9.2 The area covered comprises the land located on the eastern bank of Afon Croesor, starting immediately before the proposed location for the turbine house, running all the way to the intake location and spanning east towards the disused incline (see Figure 2). While the fields to the north were predominantly characterised by open grassland, to the south, the fields were mainly defined by overgrown vegetation and in some areas by tree cover. The recent overflowing of the Afon Croesor, Afon Maesgwm and secondary streams made some of the areas inaccessible.

### 9.3 Turbine House Location (Plate 1 to 8)

During the site visit, an intensive walkover was made in the area proposed for the construction of a turbine house measuring 6.25m x 7m x 3.6 to the apex of the roof.

The area (SH 61890 43545) is located on the eastern bank of Afon Croesor and adjacent to a stretch where the river bends to the west and prior an area characterised by waterfalls. The ground is relatively uneven raising towards the east. The western boundary of the site is characterised by the existence of a dry stone wall that runs along much of the river in this location and through a series of enclosures running from the wall on an east/west direction. The area contains a great deal of overgrown vegetation and is currently covered by fallen leaves. It can be generally defined as rough grassland surrounded by a broad leaved wood. The location of the turbine house is currently concealed by tree cover.

Central to the study was to determine whether the turbine house would have a visual impact upon any designated asset. A detailed inspection of the area allowed determining that neither Scheduled Ancient Monuments nor Listed Buildings would be visually affected by the construction of the turbine house due to its location in relation to the surrounding topography. Any designated asset located to the west of the site – on the western bank of the river and beyond will not be visible due to the topography. The region of the western bank of the river raises almost vertically, blocking the view at a distance greater than 50m. To the north/north-east, the visibility is also obstructed by the topography as the site is located on the lowest point of an area which raises up to the north and east. The area of visibility is therefore restricted to the horizon viewed from the site to the point in which the slope reaches its highest point less than 50m from the centre of the site. The same can be said to occur when looking south/south-east and south-west. Further evidence with regards to the visual impact has been achieved through the development of a ZTV taking into consideration all Scheduled Ancient Monuments located within a 5km radius of the proposed site (see Figure 5).

It is expected however that the construction of the turbine house will have a slight visual impact upon Gelli-Cornwydydd (NPRN 406470). This sub-medieval dwelling can be seen from the area in which the turbine house is to be located as it is only c.60 metres to the south and on the western bank of Afon Croesor.

No archaeological features appear to be present on the surface chosen for the construction of the turbine house though some consideration should be given to the impact that this development will have upon both the dry stone wall that delimits the river edge and those walls that run east/west and north/south in the adjacent area. These walls and most related enclosures and structures are already depicted on the first edition of the OS map of the area and therefore pre-date the 1880s.

#### **9.4 Gelli Mill (6399) (Plate 9 to 12)**

While most structures encountered during the site visit were already recorded on different OS map editions, a structure south of the site and immediately east from Gelli on the eastern bank of Afon Croesor had not previously been documented in cartographic sources.

The structure abuts the dry stone wall delimiting the eastern bank of the river. It is approximately 7m in length by 10m in width and stands to a height of c 1.6 in the most-well preserved parts of the wall. The walls themselves measure c. 0.5m in thickness and mostly built as dry stone walls although in areas, it is possible to see the remains of mortar. Only the eastern, western and part of the south-eastern wall are still currently visible. A significant amount of demolition/tumbled material is still observable on the surface delimited by the existing walls.

It is most likely that this is a structure associated with Gelli Mill (6399).

#### **9.5 Penstock Route (Plate 13 to 16)**

A pipe is expected to run from the intake area to the turbine house following the route suggested in Figure 2. It is expected that the pipe will be buried for the majority of its length and therefore it does not present significant issues in terms of visual impact. However, the installation of the pipe necessitates the excavation of a trench and therefore it has the potential to encounter buried remains. In order to assess the potential that the area has to reveal previously unknown sites, this area was subject to the walkover survey.

The areas affected by activities of trenching are mostly defined as open fields with improved pastures. No previously unrecorded archaeological remains were found during the site visit. However, it was noted that activities of trenching will have a direct impact upon the remains of dry stone walling defining field divisions that in most cases pre-date the 20th century. Likewise, the works will directly affect the remains of the Croesor incline; a vestige of the significance that slate quarrying gained in the area during the 19th century. The penstock route is proposed to pass 50m west from Beudy Newydd (4815) and it will be therefore unaffected. However, the Grade II building was visited during the survey to investigate whether the remains of the adjacent structure observed in aerial photograph are still observable on the ground. No standing remains were evidenced during the site visit. The penstock route will also pass no closer than 100m away from new site BEC01 (Drum House).

#### **9.6 Intake structure (Plate 17)**

The intake structure is proposed to be built in the river and located on SH 62545 44192. A visit to this location allowed determining that the intake will not have a visual impact upon Scheduled Ancient Monument of Garth-y-Foel (ME170) located c 140 m northwest. It is thought that the intake will not have a visual impact upon the monument due to the

topography of the area and on account of the tree cover located around the location proposed for the intake.

## 10 **IMPACT ASSESSMENT**

### 10.1 Assessment of Archaeological Potential and Importance

10.1.1 Research has identified that the proposed area is particularly rich in later medieval and particularly post-medieval archaeology. This is due to the significance of and the development of Parc and to the agricultural and industrial importance that the area had during post-medieval times. A 1.2km study area applied to the centre of the scheme has shown the existence of prehistoric activity in the surrounding area, dating from the Mesolithic to the Iron Age. Therefore, the potential for prehistoric remains in the area should not be ruled out even though no evidence has been identified during the site visit and the exploration of aerial and LiDAR imagery. As map regression shows a largely unaltered field system and land use any buried archaeological remains are likely to be undisturbed.

### 10.2 Previous Impacts

10.2.1 The area has, at least for the last 200 years been mostly characterised as open grassland combined with wooded areas. While the tithe apportionments do not specify land use, it is thought that the area would have mainly been used for pasture. Evidence for this is still patent through the number of sheepfolds, cowsheds, enclosures and other remains that can be seen in the area.

10.2.2 It should however be noted that some limited ground disturbance occurred in post-medieval times as result of the rise of the slate industry through the construction of inclines, tramways and the opening of quarries.

### 10.3 Potential impacts of the proposed development

10.3.1 The penstock runs across open fields generally covered by grass and/or bracken. It passes through stone walls that separate the fields and a stone track. Generally the ground across the penstock route is rocky and fairly steep in sections, flattening out at the intake. There are sections which will require deeper trench digging where the ground surface undulates to ensure the penstock maintains a fall. The path will generally follow the natural contours of the valley. A buried 11kV line will run parallel to the penstock from a pole mounted transformer at the turbine house to the nearest available pole on the existing HV line.

- 10.3.2 Trench excavation to bury the pipe line has the potential to expose, damage or destroy previously unknown archaeological remains. Moreover, the penstock route is expected to cut across a number of historic field walls and it is therefore expected that damage to the walls will occur during the installation of the pipes unless suitable mitigation measures are employed.
- 10.3.3 The only known feature that it will cross is the incline (PRN60912) that runs NNE to SSW with a sharp bend in it. On account of this bend the route will cut the incline twice. Suitable mitigation will be required in this area.
- 10.3.4 The penstock route will pass approximately 100m to the west of the drum house (BEC01). All staff engaged with the development will be informed about the site and the requirement to avoid it by means of a tool box talk and the site fenced off.

#### 10.4 Historic Landscapes

- 10.4.1 The hydroelectric scheme falls within the historic landscape of Vale of Ffestiniog. The Scheduled Park and Garden of Parc (GD35) lies within the boundaries of this Historic Landscape. The penstock route is expected to pass through the southwest boundary of Parc, while the temporary track will cut through the central area of the estate. Both the turbine house and the intake location lie within an area categorised as essential setting belonging to Parc (GD35).
- 10.4.2 The visual impact of the hydroelectric scheme upon the historic landscape will be negligible given the buried nature of the penstock route and on the locations selected for the intake and the turbine house.
- 10.4.3 The temporary access track is proposed to cut across Parc (GD35), running particularly close to L-shaped Agricultural Range at Parc (4816) and Barn at Parc (19842) during the development of the scheme. It will also pass approximately 100m away from the drum house site (BEC01). During this period, there will be direct temporary visual impact upon the Listed Buildings and new site, as well as the potential for direct physical impact. The direct physical impact can be mitigated by suitable mitigation measures such as tool box talks and fencing.

#### 10.5 Scheduled Ancient Monuments

- 10.5.1 The intake location is located c. 140m northwest from the Scheduled Ancient Monument of Unenclosed Hut Circle Settlement East of Garth-y-Foel (ME170). Despite the proximity of the monument to the intake location, no visual or physical impact is expected due to the surrounding topography and to the location of the intake within Afon Croesor course.



10.5.2 A ZTV model has noted that the house turbine will have no visual impact on Ancient Scheduled Monuments found within 5km of the proposed location. Furthermore, a site visit has corroborated this, noting that visibility is reduced to less than 50m due to the surrounding topography and vegetation.

## 10.6 Listed Buildings

10.6.1 No Listed Buildings will be visually affected by the hydroelectric scheme once the installation of the penstock route is completed due to its buried character. However, during the time of construction the temporary access track is proposed to cut across Parc (GD35), running particularly close to L-shaped Agricultural Range at Parc (4816) and Barn at Parc (19842). During this period, there a direct visual impact upon the Listed Buildings will be expected. There is the possibility of direct physical impact during the construction of the temporary access track due to the potential movement of heavy machinery in close proximity to the affected buildings at Parc.

## 11 **CONCLUSIONS**

11.1 The turbine house will not have a visual impact upon Listed Monuments and Ancient Scheduled Monuments due to its location and to the surrounding topography. However, intervisibility between the non-designated sites of Gelli-Cornwydydd (406470) and Gelli Mill (6399) and the turbine house is expected.

11.2 The outtake location will have no visual impact upon the Unenclosed Hut Circle Settlement East of Garth-y-Foel (ME170). Despite the proximity of the monument to the intake location, no visual or physical impact is expected due to the surrounding topography and to the location of the intake within Afon Croesor course.

11.3 A direct visual impact is expected at Parc, the drum house and incline during the period of construction of the scheme as the temporary access track is proposed to cut across Parc (GD35), running particularly close to L-shaped Agricultural Range at Parc (4816) and Barn at Parc (19842). During this period, a direct visual impact upon the Listed Buildings will be expected. A direct physical impact might be expected during the construction of the temporary access track. This might be in the form of vibration through the movement of heavy plant in close proximity to the nearby Listed Buildings or from accidental collision with the building itself.

11.4 Trench excavation to bury the penstock pipe has the potential to expose, damage or destroy previously unknown archaeological remains. Moreover, the penstock route is expected to cut across a number of historic field walls and it is therefore expected that damage to the walls will occur during the installation of the pipes. It will also pass through the incline in two locations. Mitigation is required to negate the impact on this site.

## 12 MITIGATION

- 11.1 Without suitable forms of archaeological mitigation, it is possible that the scheme could have a negative effect upon any surviving buried remains. The potential to encounter remains belonging to the medieval and post-medieval period is moderate. The potential to encounter prehistoric remains should not be ruled out.
- 11.2 Due to the moderate potential of encountering archaeological remains, it is recommended that an archaeological watching brief be conducted during relevant ground work within the proposed development area. An assessment written in 1997 for a hydro scheme to the north of the current site suggested that an archaeological watching brief was not necessary (GAT 1997). This current assessment does recommend a watching brief to safeguard the potential archaeological resource.
- 11.3 In the two locations where the penstock route passes through the incline an archaeological excavation should be undertaken to provide the sections through the incline. This will allow an opportunity to investigate and further understand the nature of the incline. The research agenda for archaeology in Wales (A Research Framework for the Archaeology of Wales Version 02, Final Paper February 2011) states specifically that among its priorities are:
- The significance of technical change in, and the scale, landscape impact and survival (including below-ground archaeology) of, the major industries of coal, iron, copper, tin, lead and slate; their context and significance in terms of similar sites elsewhere in the world; their relationship with the markets they served
  - The significance, form and archaeological survival of transport corridors – turnpikes, government-sponsored roads, canals, railways – in terms of their engineering, the industries they served and the settlements they sustained; their context and significance in terms of similar sites elsewhere in the world

By excavating two sections through the incline important information about the features design, construction and survival will be gained that will address the research agenda points above. This will add to the important existing work undertaken on the slate industries of North Wales (Davidson et al 1994, 1995; Davidson and Gwyn 2014). This assessment could find no evidence of useful excavations of this sort in the immediate or wider area which places an emphasis on this opportunity. The resulting information will provide a platform for local, regional, national and international comparison as well as temporal comparisons within the region.

- 11.3 Where possible when the penstock pipe approaches a stone wall forming an historic field boundary a photographic record of the stone walls in the affected areas should be undertaken to ensure that the wall is reconstructed to its existing profile and to provide preservation by record.

- 11.4 Mitigation for the construction of the temporary access track should include the use of small machinery so that ground vibration in close proximity to the Listed Buildings and the drum house is reduced or eliminated. The Listed Building should also be fenced off using Heras fencing or similar and all site personnel informed of the designated status of the buildings to avoid accidental damage to the building. The effect and required mitigation at the drum house site is likely to be negligible but should be considered.
- 11.5 The above mitigation measures will reduce the impact on the archaeological resource of the area during the ground work associated with the scheme.

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- Waddington, K. 2013. *The Settlements of Northwest Wales: From the Late Bronze Age to the Early Medieval Period*, HER Library Record No. 2377

### Unpublished Reports

- Davidson, A., Gwyn, D. Rh., Jones, G. P. & Riley, H. 1994. Gwynedd Quarrying Landscapes: Slate Quarries, GAT Report No. 129
- Davidson, A., Dutton, D., Flook, H. & Gwyn, D. Rh., 1995, Gwynedd Slate Quarries: An Archaeological Survey 1994-5. GAT Report No. 154

Davidson, A. & D. Gwyn, 2014, Gwynedd Slate Industry Transport Routes. GAT Report 1207

Dutton, L. A., Flook, H. & Roberts, R. 1994. Proposed Hydro-Electric Scheme, Afon Maesgwm. Gwynedd Archaeological Trust.

Flook, R. 2008. Tir Gofal Management Plan: Bodlondeb, Rhyd.

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Hopewell, D. 2005. Roman Roads in North West Wales Parts I and II, GAT Report No. 572

Jones, S. & Thompson, D. 1996. Medieval and Later Deserted Rural Settlement Sites Pilot Study Report, GAT Report No. 200.

Smith, G. 2001. Survey of Prehistoric Funerary and Ritual Monuments in Wales: Meirionnydd, 2000-2001. Gwynedd Archaeological Trust.

### ***Maps***

British Geological Survey	2015	Geology of Britain Viewer - (accessed 1/1/16)
	1841	Tithe map, Llanfrothen Parish 1841
Ordnance Survey	1853	County Series, Merionethshire, 1st Edition 1:2500
Ordnance Survey	1900	County Series, Merionethshire, 3rd Edition, 1:2500
Ordnance Survey	1977	OS map 1:2500

### ***Aerial Photographs***

3 May 1946. Sortie 106G UK 1467. RAF. B&W. 3191-93. Scale – Various

4 May 1946. Sortie 106G UK 1469. RAF. B&W. 3185-87 and 4285-87. Scale – 1:10,000

11 June 1969. Sortie 58 RAF 9682. RAF. B&W. 145-6. Scale - 1:60,000

4 June 1971. Sortie OS 71 286. OS. B&W. 085-6. Scale – 1:27,000

7 April 1973. Sortie OS 73 082. OS. B&W. 402-4. Scale 1:7500

3 October 1986. Sortie JA Story. JA Story and Partners. Colour. 5286 204-6. Scale 1:10,000

7 May 1987. Sortie 1 PRU RAF 1180. RAF. B&W. 12-14. Scale – Various

1 May 1990. Sortie ADAS 40/90. ADAS. B&W. 98-100. Scale – 1:20,000

### ***Databases***

Regional Historic Environment Record (HER), held and maintained by Gwynedd Archaeological Trust

Natural Resources Wales – LiDAR downloads

### ***Online resources***

British Geological Survey – [bgs.ac.uk](http://bgs.ac.uk) (accessed 1/1/16)

Archwilio – [archwilio.org.uk](http://archwilio.org.uk) (accessed 2/1/16)

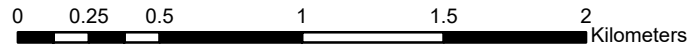
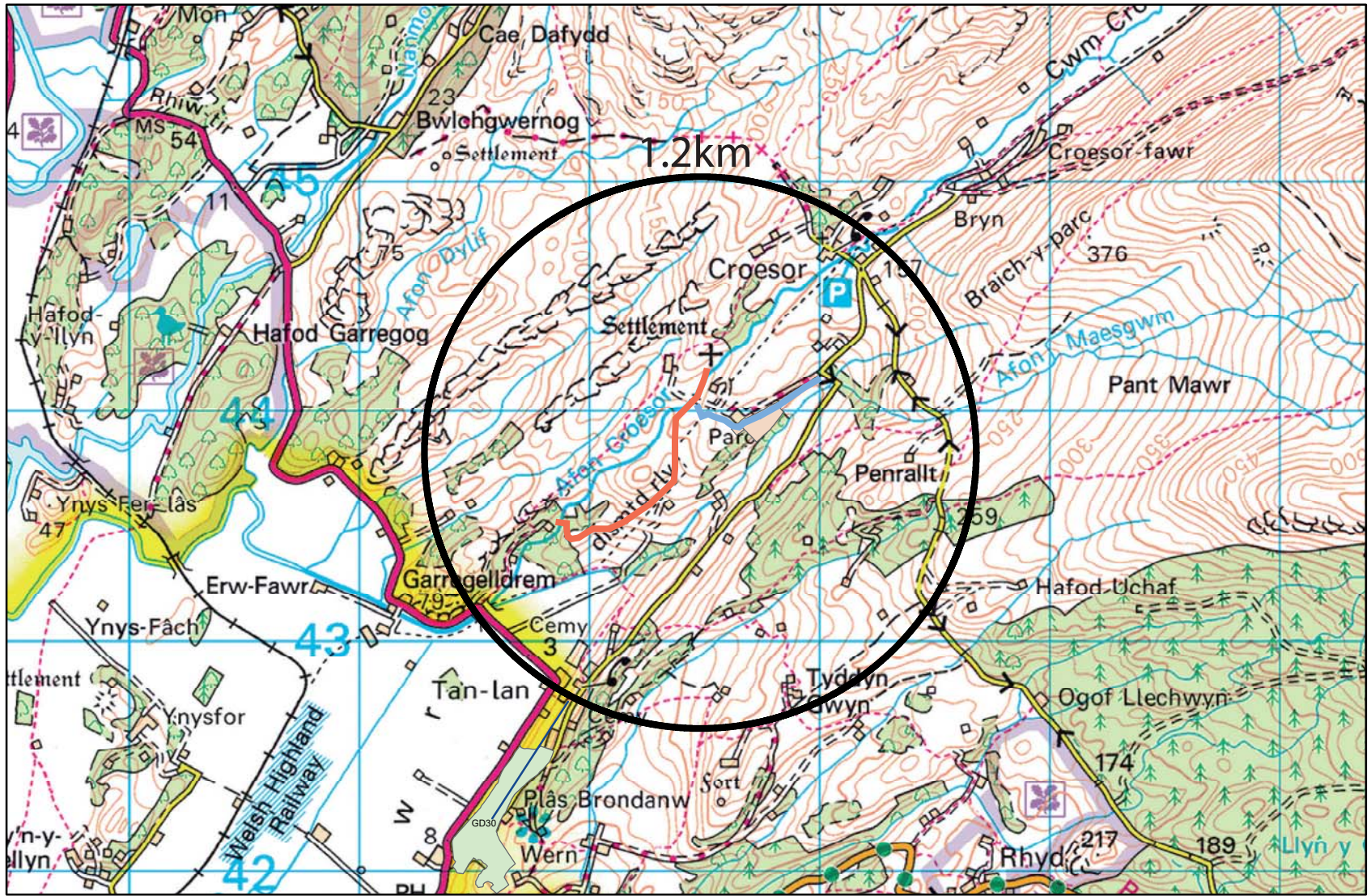


Fig. 1: Location of hydro electric scheme within study area.

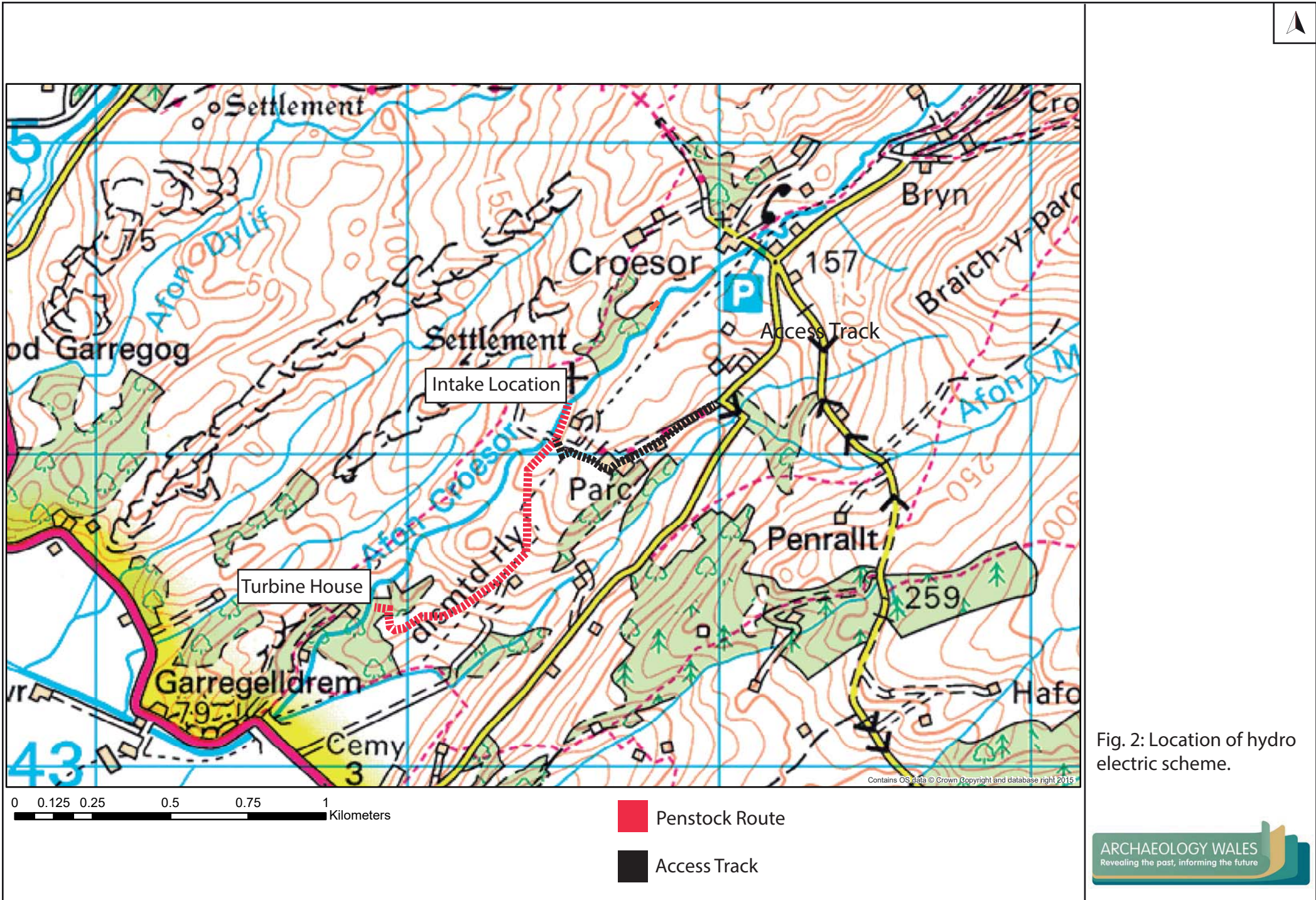
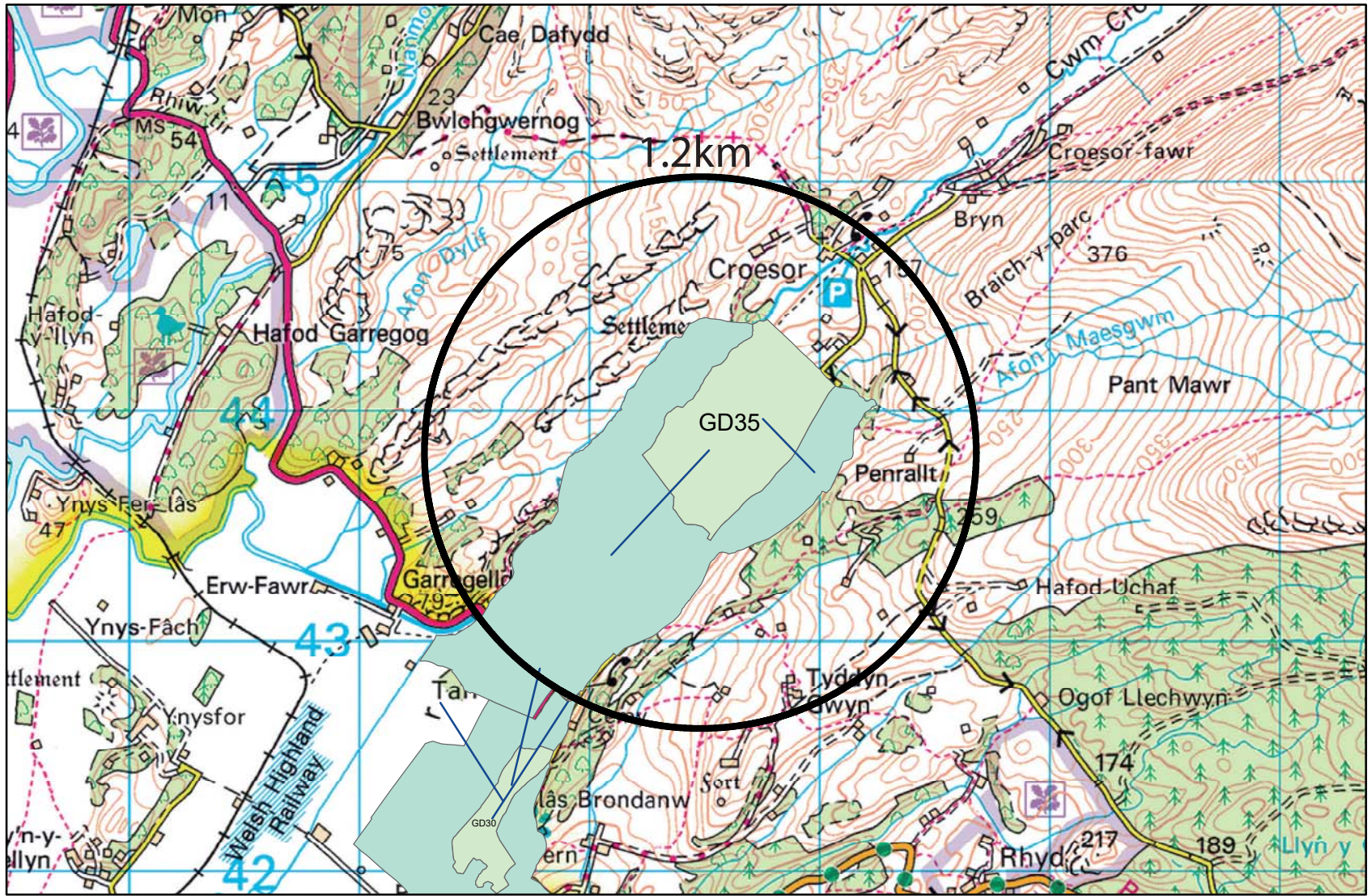


Fig. 2: Location of hydro electric scheme.



- Essential Setting
- Park boundary
- Significant view

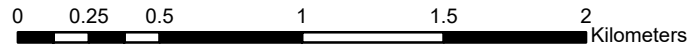


Fig. 3: Location of registered parks and gardens within a 1.2km radius study area (black outline).



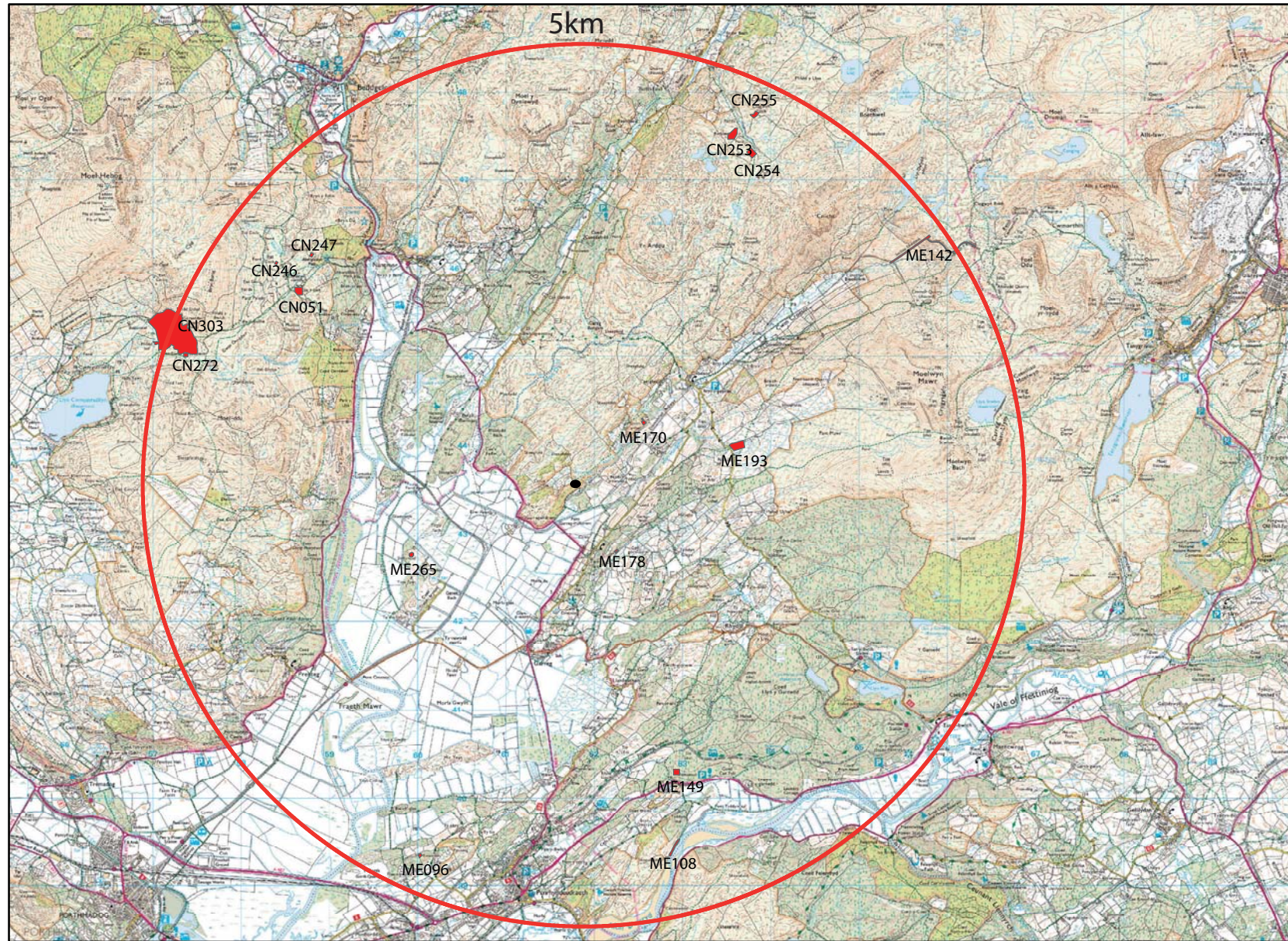


Fig. 4: SAMs within 5km radius from the turbine house.

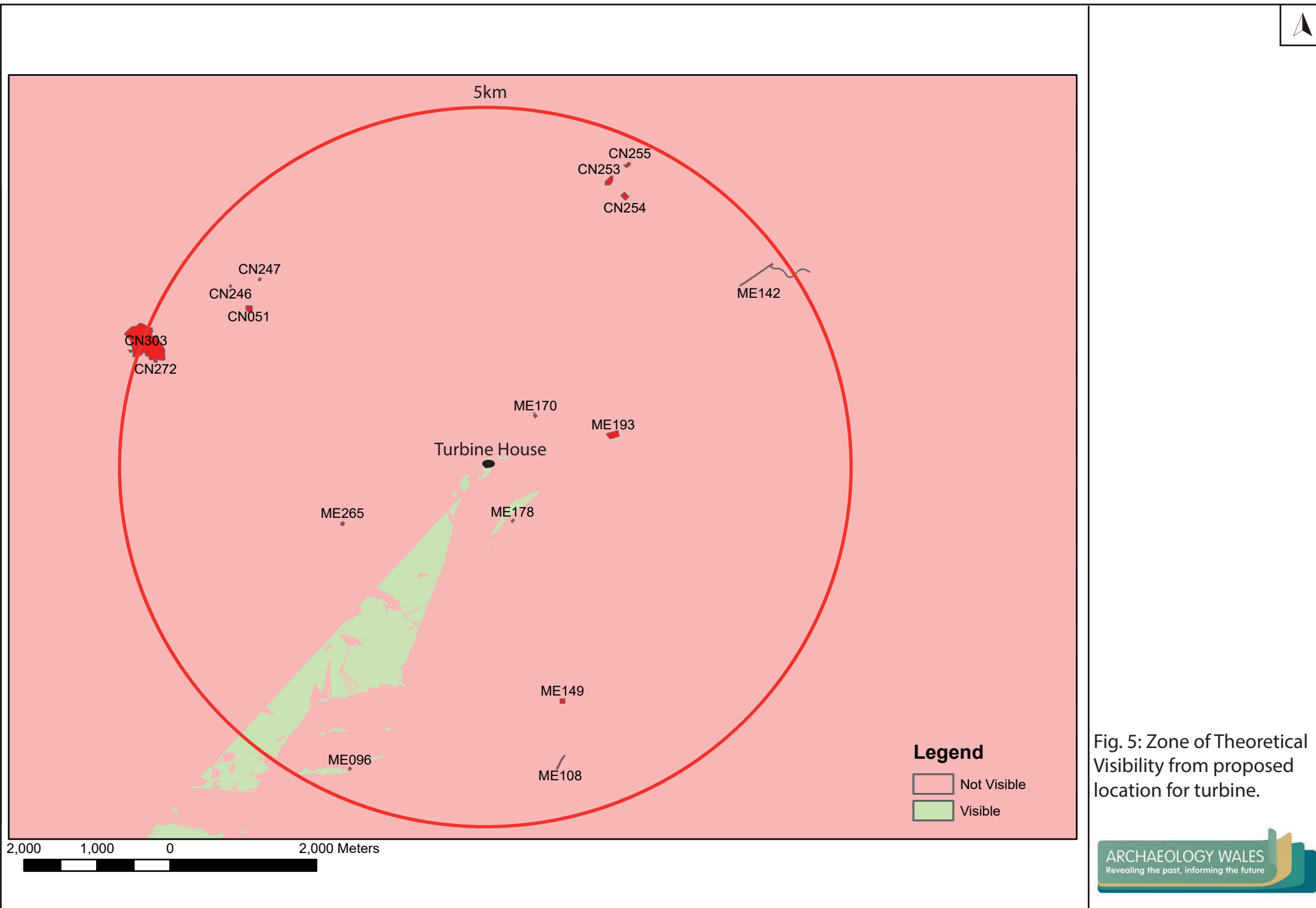


Fig. 5: Zone of Theoretical Visibility from proposed location for turbine.

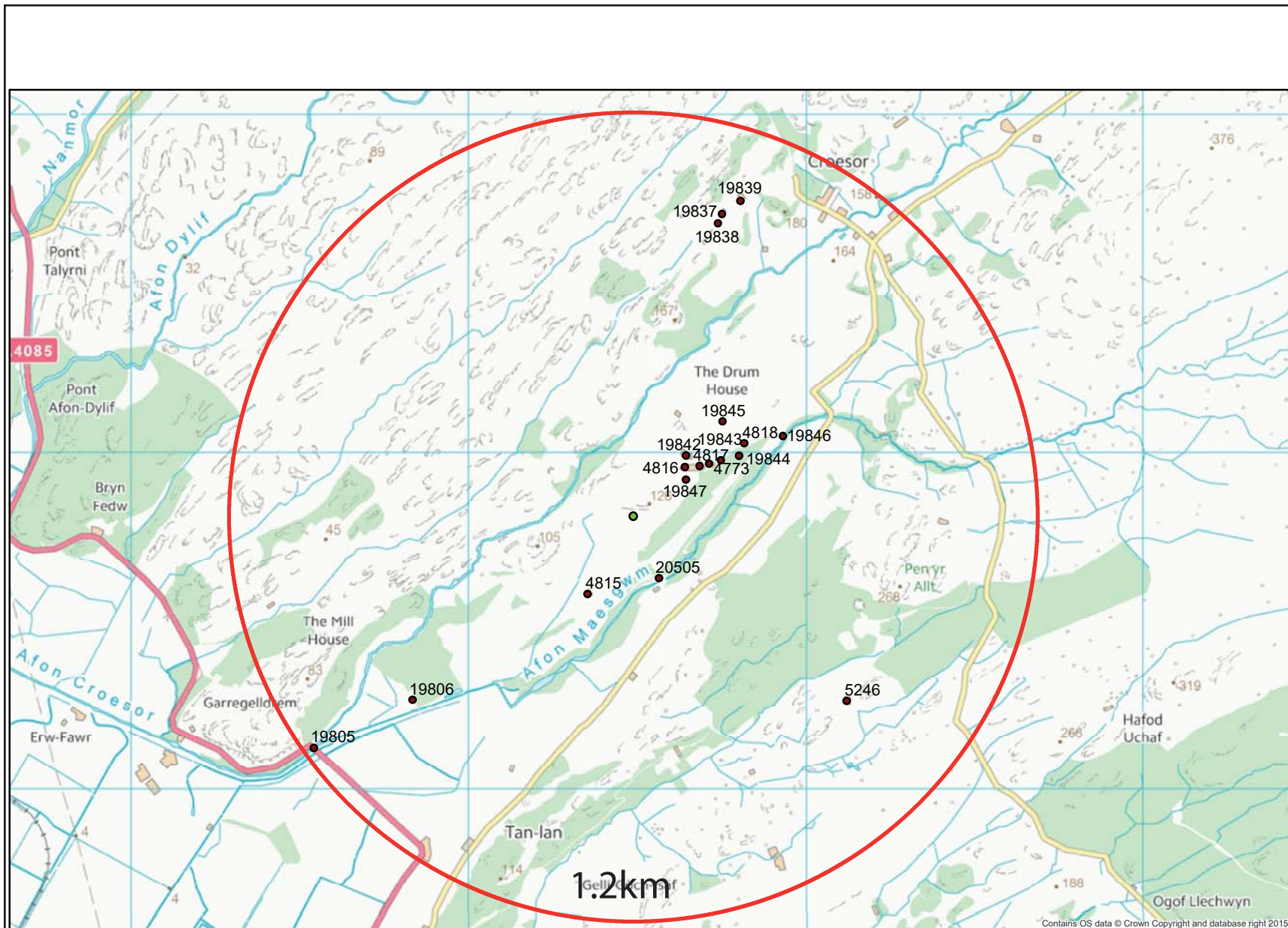


Fig. 6: Location of Listed Buildings within study area.

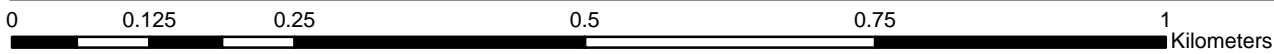
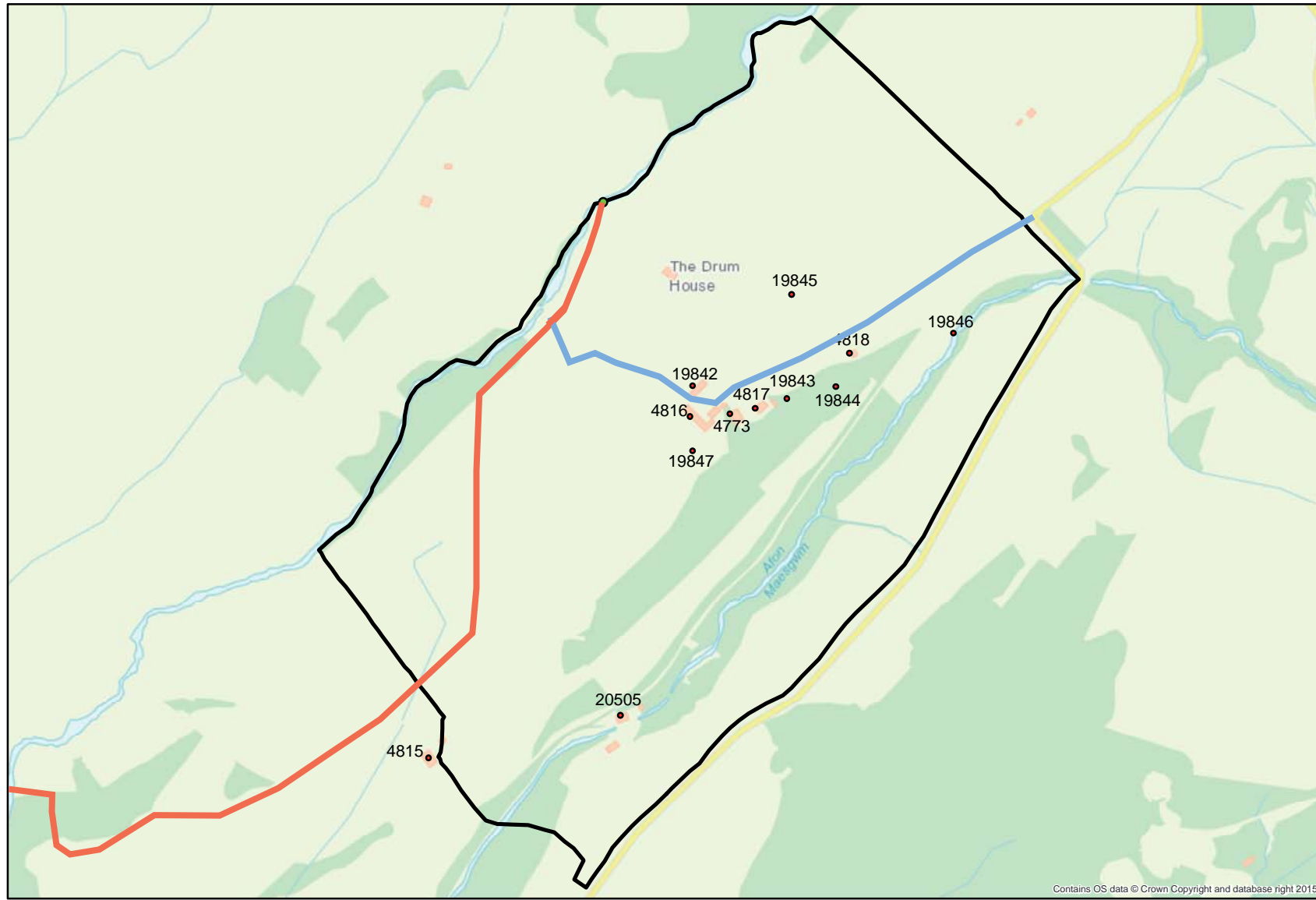
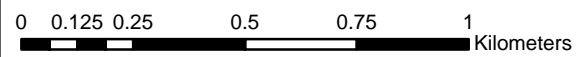
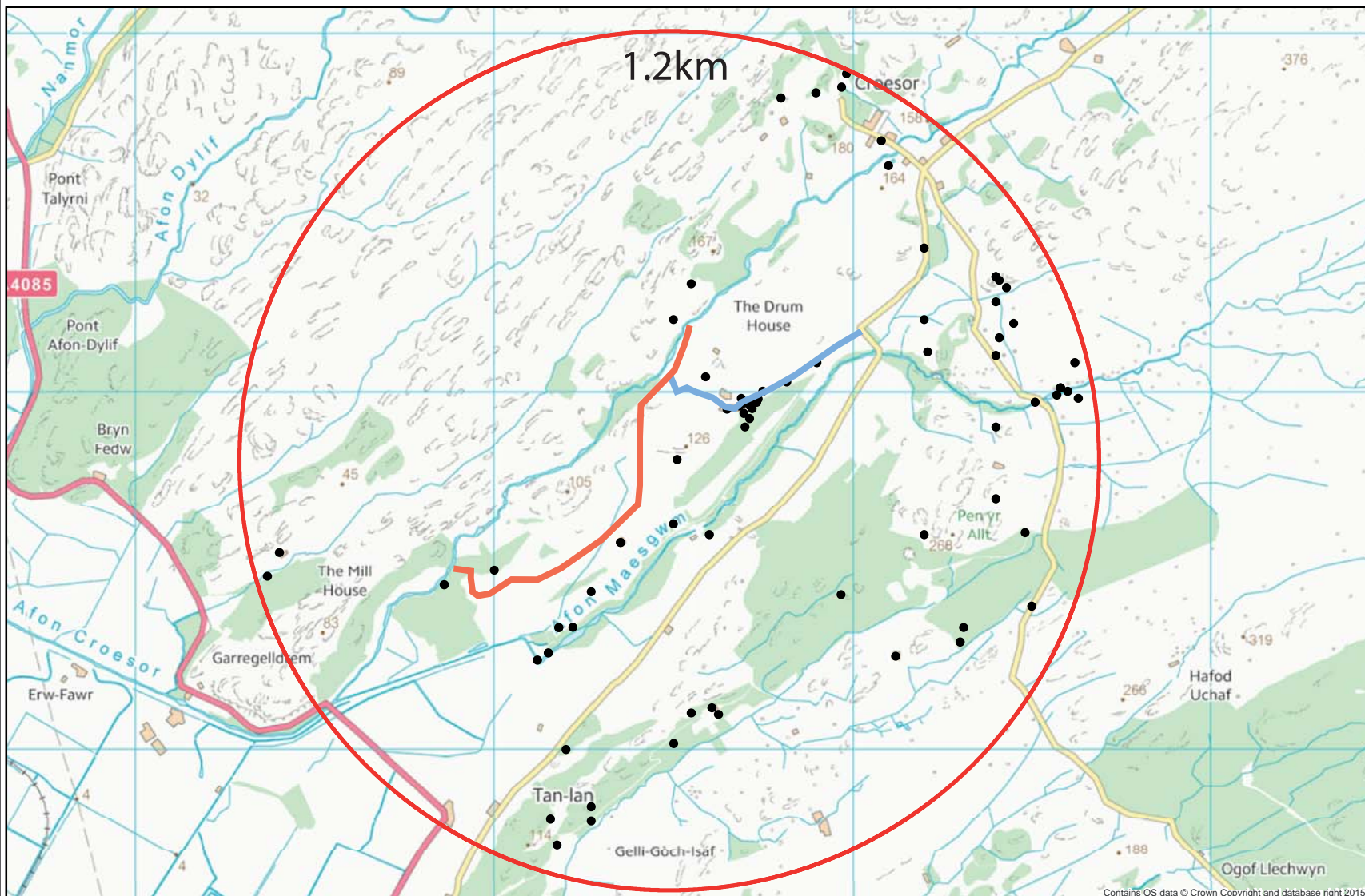


Fig. 7: Listed Buildings within Parc (black outline).





-  Penstock Route
-  Access Track

Fig. 8: PRN sites (black dot) held on the regional HER within the study area.

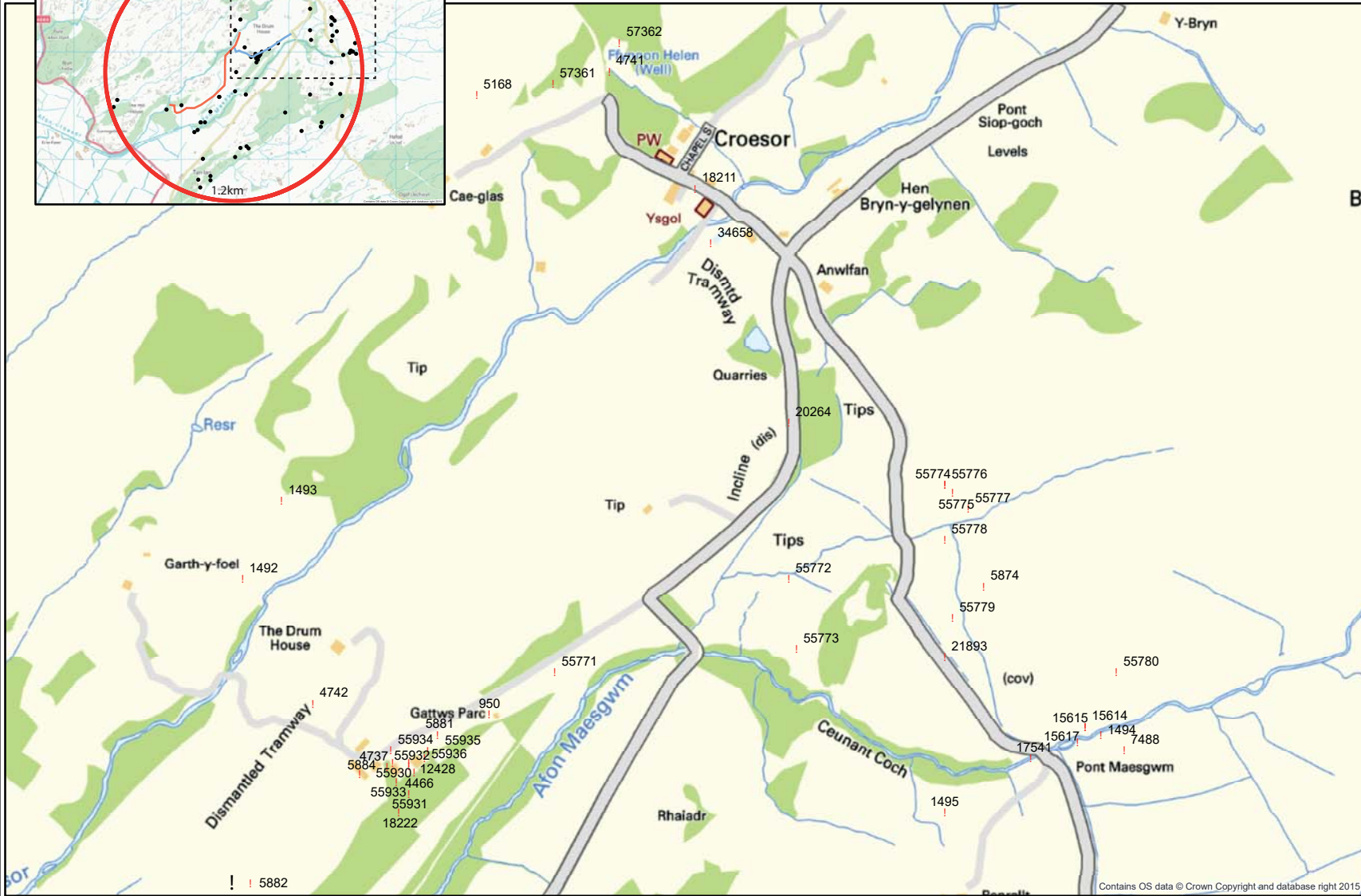
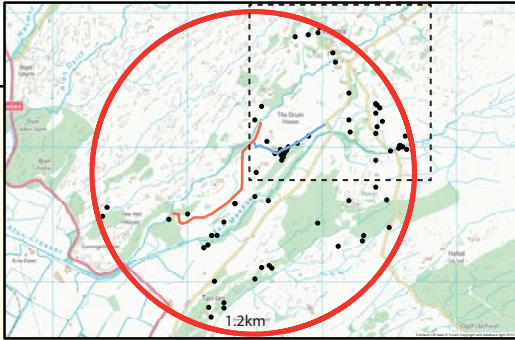
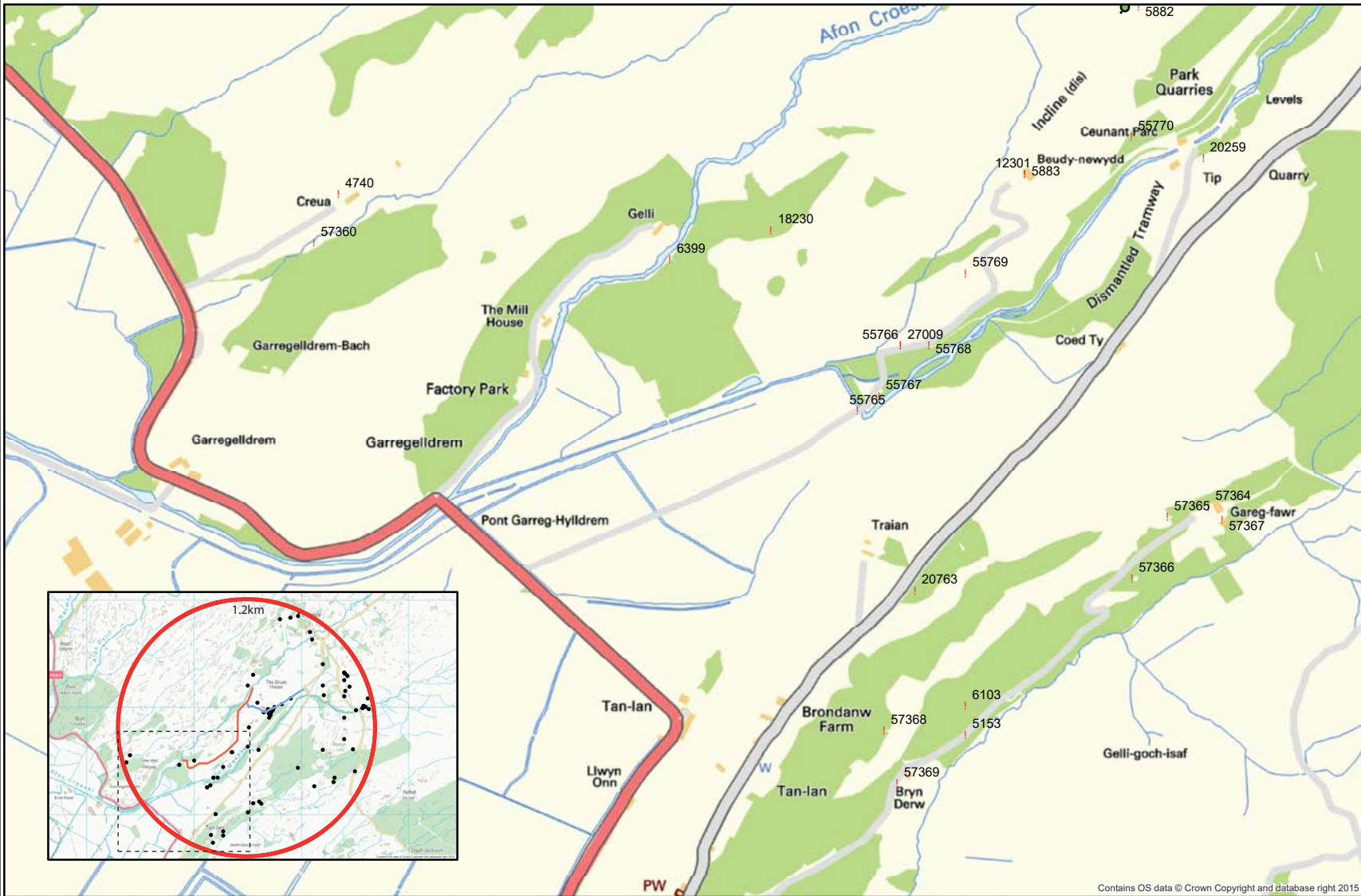


Fig. 9: HER located NE from centre of site.





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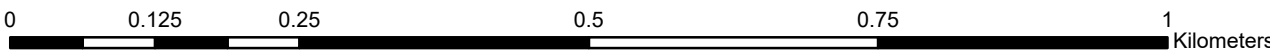
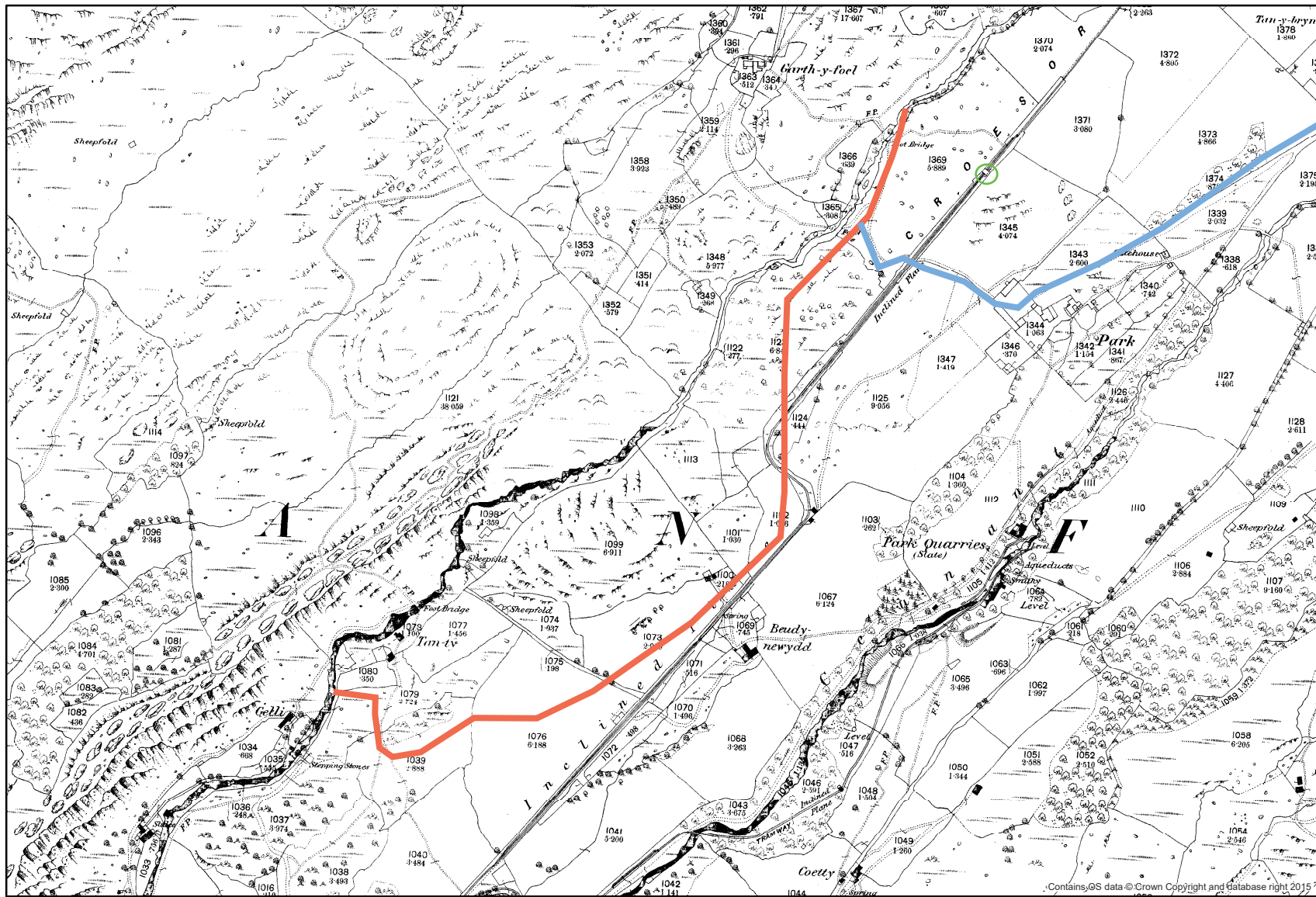


Fig. 11: HER located SW from centre of site.





Fig. 12: Tithe map, Llanfrothen Parish 1841.





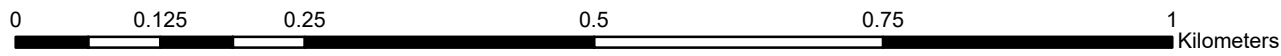
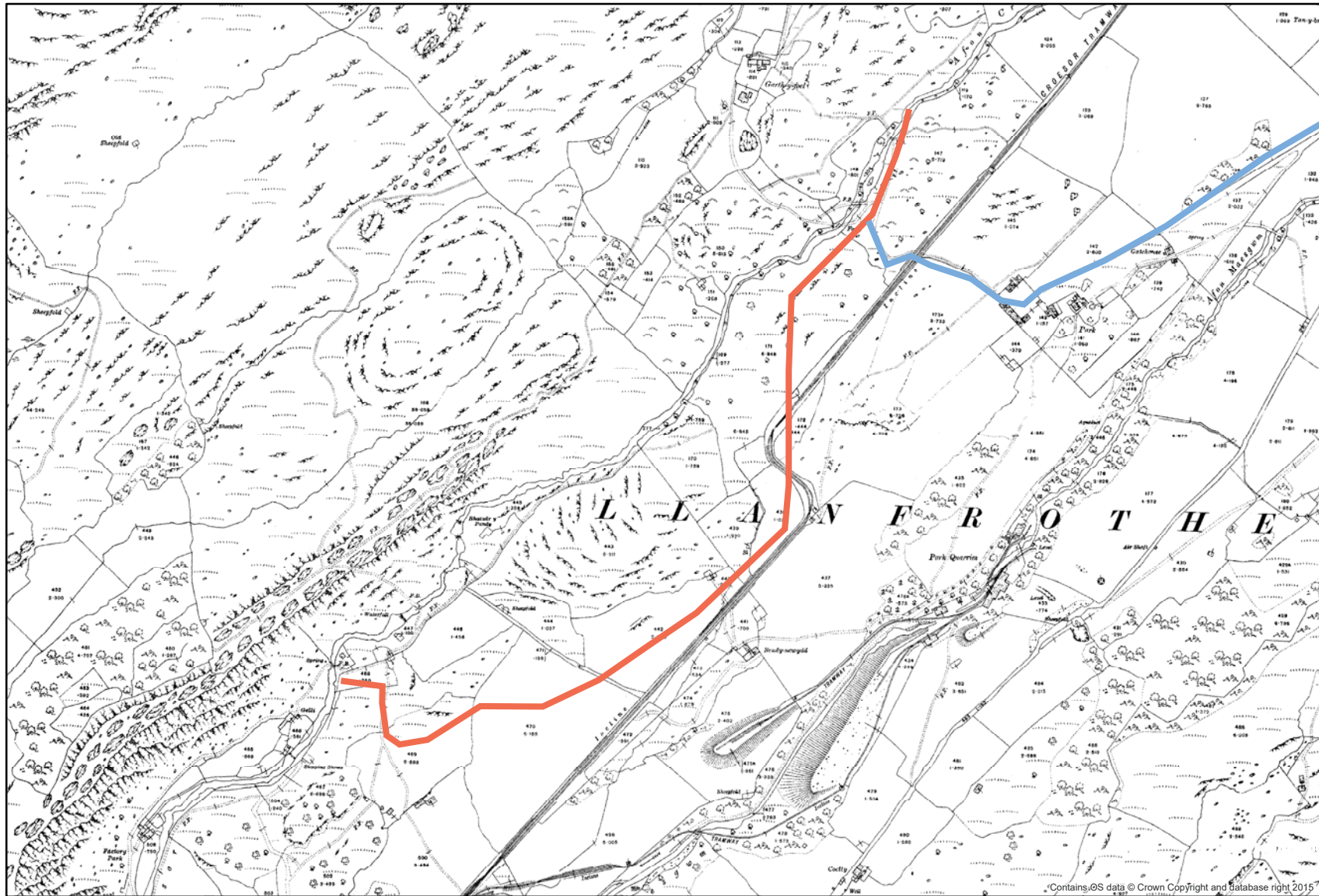
-  Penstock Route
-  Access Track

Fig. 13: County Series, First Edition 1889, Merionethshire showing approximate location of penstock route and access track. Also shows New Site BEC01 (Drum house) outlined in green



Penstock Route

Access Track

Fig. 14: County Series, Third Edition 1900, Merionethshire showing approximate location of site.

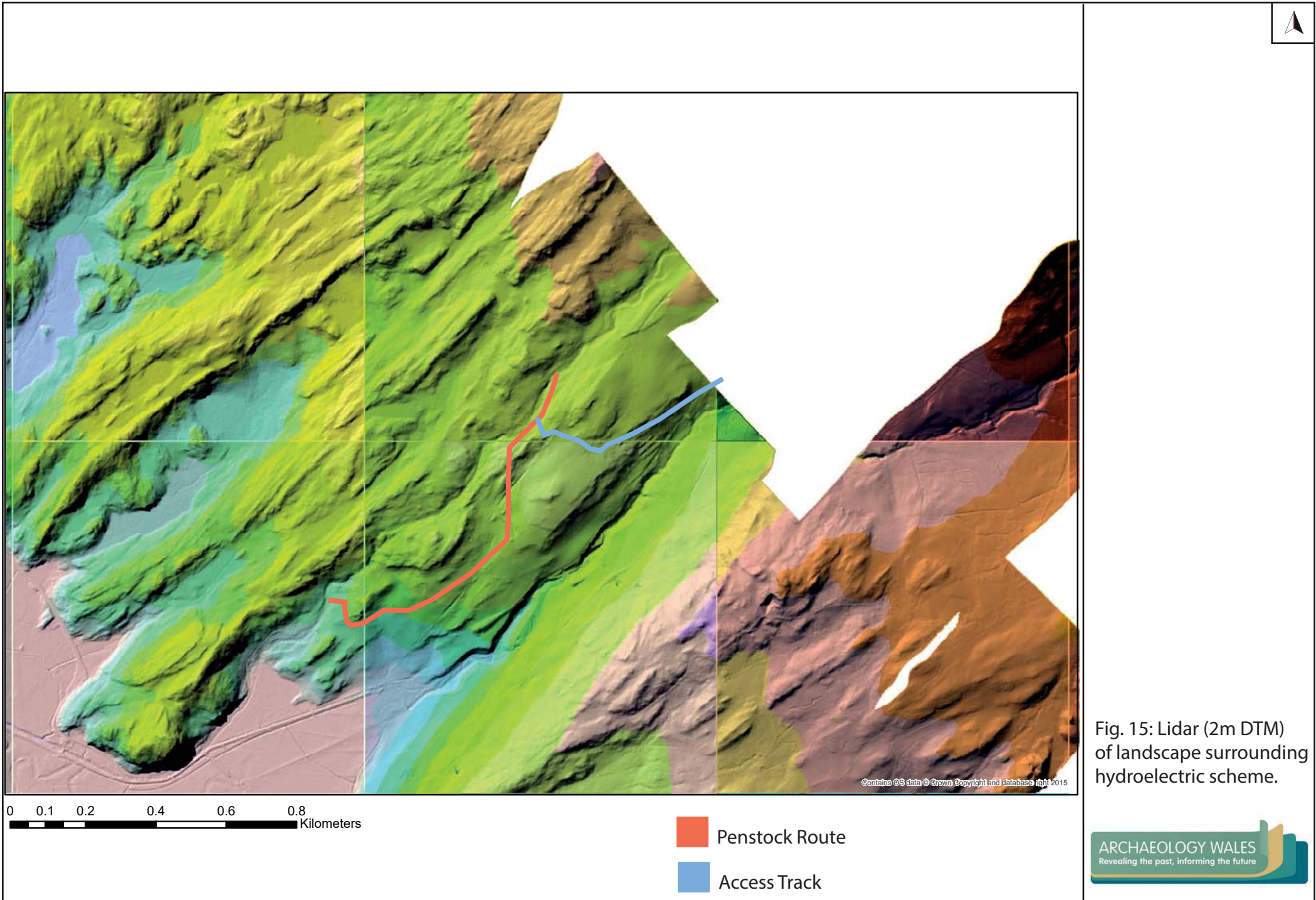


Fig. 15: Lidar (2m DTM) of landscape surrounding hydroelectric scheme.



Plate 1 (above): View S/SW from proposed location for turbine house.

Plate 2 (below): View E from proposed location for turbine house.



Plate 3 (above): View N from proposed location for turbine house.

Plate 4 (below): View to Afon Croesor.



Plate 5 (above): View towards SAMs CN246-7 and CN051.

Plate 6 (below): View towards SAMs CN253-55.



Plate 7 (above): View towards SAM M193

Plate 8 (below): View towards SAM ME265





Plate 9 (above): Structure associated to Gelli Mill (6399) looking W.

Plate 10 (below): Structure associated to Gelli Mill (6399) looking S.



Plate 11 (above): Structure associated to Gelli Mill (6399) looking E.

Plate 12 (below): Remains of bonding material.



Plate 13 (above): View SW towards area of penstock route.

Plate 14 (below): Croesor incline looking SW.



Plate 15 (above): View to Beudy Newydd looking E.

Plate 16 (below): View to Beudy Newydd looking SW



Plate 17: View to intake area from western bank looking E.

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**Specification**

**For an Archaeological Desk Based Assessment:**

**Brondanw Estate, Gwynedd**

Prepared for:  
Renewables First

Project No: 2400

January 2016

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## SUMMARY

*This Specification details the proposal for an archaeological desk based assessment and site visit associated with a hydro scheme between SH 62545 44192 and SH 61890 43545 located on the Afon Croesor just to the southwest of the settlement of Croesor, Gwynedd.*

*This document has been prepared by Archaeology Wales Ltd for Renewables First Ltd prior to the proposed submission of a planning application.*

### 1. Introduction

The proposed development comprises plans for a hydro scheme between NGR SH 62545 44192 and SH 61890 43545 located on the Afon Croesor just to the southwest of the settlement of Croesor, Gwynedd (hence forth – the site). Information relating to the development has been supplied by Renewables First Ltd. This desk based assessment is to be undertaken prior to the proposed submission of a planning application. The local planning authority is Gwynedd Council (henceforth – GC).

This Specification has been prepared by Rowena Hart (MCIfA), Project Manager at Archaeology Wales Ltd (henceforth - AW) at the request of Renewable First Ltd. It provides information on the methodology that will be employed by AW during an archaeological desk based assessment of the site.

All work will conform to the Standard and Guidance for Archaeological Desk Based Assessment (CIfA 2014).

### 2. Development details & site description

The proposed development includes the installation of hydro scheme between NGR SH 62545 44192 and SH 61890 43545 located on the Afon Croesor just to the southwest of the settlement of Croesor, Gwynedd. The description below is taken from Croesor HEP: Planning Application Supporting Statement (Renewables First 2015):

An intake structure would be constructed taking water through a buried penstock pipe 1.3to the turbine house / outfall location. The penstock runs across open fields generally covered by grass pasture and/or bracken, stone walls separating the fields and a stone track. Generally the ground across the penstock route is rocky and fairly steep in sections, flattening out at the intake. There are sections which will require deeper trench digging where the ground surface undulates to ensure the penstock maintains a fall. The path will generally follow the natural contours of the valley. A buried 11kV line will run parallel to the penstock from a pole mounted transformer at the turbine house to the nearest available pole on the existing HV line.

### **3. Site specific objectives**

The primary objective will be to assess the impact of the development proposals on the historic environment by means of a detailed desk top study and a site visit. This will help inform future decision making, design solutions and potential mitigation strategies associated with the development. The aim will be to make full and effective use of existing information in establishing the archaeological significance of the site, to elucidate the presence or absence of archaeological resource, its character, distribution, extent, condition and relative significance.

The work will include a comprehensive assessment of regional context within which the archaeological evidence rests and will aim to highlight any relevant research issues within national and regional research frameworks.

The work will result in a report that will provide information of sufficient detail to allow informed planning decisions to be made with regards to the likely impact of the proposed scheme on archaeological remains together with mitigation recommendations.

The report will consider all impacted areas to include:

- Intake structure
- Penstock pipeline
- Turbine House/Outfall location
- Access routes
- Compound location

### **4 The proposed archaeological work**

The aim of the work will be to establish and make available information about the archaeological resource existing on the site. The work will include the following elements:

- A detailed desk based assessment (Stage 1)
- A site visit (Stage 2)
- The production of an illustrated report

### **5 Method statement for a detailed desk based assessment (Stage 1)**

The assessment will consider the following:

a) The nature, extent and degree of survival of archaeological sites, structures, deposits and landscapes within the study area through assessment of various readily available primary sources:

1. Collation and assessment of all relevant information held in the regional HER at Gwynedd Archaeological Trust, within a 1.2km radius of the centre of the site.
2. Collation and assessment of the impact on all Designated sites (Scheduled Ancient Monuments, Listed Buildings, Historic Parks & Gardens, Conservation Areas) within a 1.2km radius of the centre of the site.



3. Assessment of all available excavation reports and archives (including unpublished and unprocessed material) affecting the site and its setting.
4. Assessment of all relevant extant aerial photographic (AP) evidence. This will include those held by the Central Registry of Aerial Photographs in Wales as well as internet sourced satellite imagery.
5. Assessment of archive records held at the County Archives, and as appropriate, National Monument Record files held by RCAHMW.
6. Records held by the developer or site owner e.g. bore hole logs, geological/geomorphological information, aerial photographs, maps, plans, LIDAR data
7. Assessment of environmental and artefactual potential of the archaeological deposits through existing data or by inference
8. Map regression analysis using all relevant cartographic sources e.g. All editions of the Ordnance Survey County Series, Tithe and early estate maps (as available).
9. LIDAR data as available through Welsh Government "Lle Portal" and Natural Resources Wales/Cyfoedd
10. Place name evidence
11. Historic documents (e.g. Charters, registers, Brondanw estate papers).
12. Assessment of the visual impact of the proposed development on the setting of known sites of archaeological importance.
13. Advice will also be sought from Richard Haslam regarding the historical potential of the area. His advice will be especially useful in detailing the architectural history of the structures within the study area and especially those at Parc.

b) The significance of any remains in their context locally, regionally and nationally and in light of the findings of the desk based study.

## **6 The Site Visit (Stage 2)**

The site visit will be a visual walked search of the entire development area. The ground surface will be visually inspected for all earthworks, structures and finds. The location of any environmental archaeological deposits, or areas which may have a potential for such deposits, will also be taken into account along with the more traditional 'visible' archaeology.

All located sites or finds encountered during the visit will be accurately fixed by means of GPS. Each individual find or site location will have an accurate NGR reference attached. Where a close cluster of related features is identified a single NGR for the centre of the cluster will be used, and each constituent feature separately described in the text.

The character, function, condition, vulnerability, potential dating and relationship to other features of each identified site or find will be described fully. The importance of the site or find will be assessed in terms of local, regional or national significance.

A sketch survey of each identified site layout will be made with accompanying metric measurements

Written, drawn and photographic records of an appropriate level of detail will be maintained throughout the course of the project. Digital photographs, including metric scales, will be taken using cameras with resolutions of 14 mega pixels or above. Photographs will be taken in RAW format and archived as RAW, JPEG and TIFF.

## **7 The production of an illustrated report and the deposition of the site archive (Stage 3)**

A report will be produced which synthesises the results of stages 1 and 2 and thereby assesses the total archaeological resource and potential within the development area.

The results will be presented in such a way that data and supporting text are readily cross-referenced. The regional HER Officer will be contacted to ensure that any sites or monuments not previously recorded in the HER are given a Primary Record Number (PRN) and that data structure is compatible with the HER. The historical development of the site will be presented in phased maps and plans comprising clearly, the outline of the site.

Within the report an attempt will be made to indicate areas of greater or lesser archaeological significance and the sites will be ranked in level of overall archaeological importance.

All relevant aerial photographs and historic maps will be included and be fully referenced. Any site photographs included in the report will be appropriately captioned and clearly located on a suitably scaled site plan.

The report will make recommendations regarding further stages of archaeological work (Field Evaluation, Watching Brief etc), considered to be necessary as part of the planning application determination processes and within construction phase in the event of planning permission being granted.

The report will specifically include the following:

1. a copy of the design brief (if available)
2. a location plan
3. all identified sites plotted on an appropriately scaled plan of the proposal site
4. a gazetteer of all located sites and finds with full dimensional and descriptive detail including grid reference and period
5. assessment of impact on any scheduled ancient monuments by the development
6. a proposed mitigation strategy for the safeguard of the archaeological resource before and during the proposed works

A draft copy of the report will be sent to Snowdonia National Park Authority for their comment and approval. Following approval copies of the report will be sent to: Renewables First Ltd and to Snowdonia National Park Authority and to Gwynedd Archaeological Trust for inclusion in the regional HER. Digital copies will be provided in pdf format.

### The site archive

An archive of records relating to the preparation of the report will be prepared to the

specifications set out in *Management of Archaeological Projects* (English Heritage, 1991) Appendix 6 and UKIC's *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation 2007*.

After an appropriate period has elapsed, copies of the report and archive index will be deposited with the regional Historic Environment Record (HER) and with Snowdonia National Park Authority. A copy of the report and archive index along with the full digital archive will also be deposited with the National Monuments Record, RCAHMW, Aberystwyth.

Other significant digital data generated by the survey (ie AP plots, EDM surveys, CAD drawings, GIS maps, etc) will be presented as part of the report on a CD/DVD. The format of this presented data will be agreed with the curator in advance of its preparation.

## **8 Resources and timetable**

### Standards

The desk based assessment will be undertaken by AW staff using current best practice.

All work will be undertaken to the standards and guidelines of the CIfA.

### Staff

The project will be undertaken by suitably qualified AW staff. Overall management of the project will be by Rowena Hart (CMIfA).

### Timetable of archaeological works

The work will be undertaken at the convenience of the client. No start date has yet been agreed.

### Insurance

AW is an affiliated member of the CBA, and holds Insurance through the CBA insurance service.

### Health and safety

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 AW.