
Mynydd Llandegai Raw Water Main Replacement Works



Assessment Report

GAT Project No. 2058
Report No. 776
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MYNYDD LLANDEGAI RAW WATER MAIN REPLACEMENT WORKS

AN ARCHAEOLOGICAL ASSESSMENT

GAT Project no. G2058

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**Prepared for Egniol Consulting
on behalf of Dŵr Cymru/Welsh Water**

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Cover: View of Carnedd y Filiast and Elidir Fawr from Mynydd Llandygai Water Works

**Gwynedd Archaeological Trust
Ymddiriedolaeth Archaeolegol Gwynedd**

G2058 PROPOSED RAW WATER MAIN REPLACEMENT WORKS, MYNYDD LLANDEGAI

ARCHAEOLOGICAL ASSESSMENT

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MYNYDD LLANDEGAI, RAW WATER MAIN REPLACEMENT WORKS (G2058)

ARCHAEOLOGICAL ASSESSMENT

SUMMARY

An archaeological assessment was carried out on the route of a raw water pipe line from Marchlyn Bach to the waterworks near Mynydd Llandegai in advance of the pipe's replacement. The pipe route runs along existing roads for its entire length and no significant features were identified near the route. No Scheduled Ancient Monuments or listed buildings lie close to the line of the pipe. This report recommends avoidance of damage to roadside walls and suggests a watching brief on work along one section of road that may have traces of an eighteenth century route preserved beneath it.

1. INTRODUCTION

Gwynedd Archaeological Trust (GAT) was asked by Egniol Ltd on behalf of their clients Dŵr Cymru Welsh Water to carry out an archaeological assessment in advance of a proposed replacement of the Mynydd Llandegai to Marchlyn Bach raw water main. The pipeline starts a short distance north of Marchlyn Bach (SH 6064 6275) at a height of approximately 460m, and ends at SH 5964 6550 at a height of 310m. The length is approximately 4.5 km (Figure 1). The pipeline runs along the existing roads and the works and works vehicles are to be restricted to the roads. The route is shown on drawing W745-1-d01 issued by Dŵr Cymru (see appendix II).

2. DESIGN BRIEF AND SPECIFICATION

A detailed brief has not been submitted for this scheme, but a design has been prepared following an appropriate generic brief. This design conforms to the guidelines specified in *Standard and Guidance for Archaeological Desk-based Assessment* (Institute of Field Archaeologists, 1994, rev. 2001 and 2008). This desk-based assessment follows that design and the assessment report will be monitored by Gwynedd Archaeological Planning Service.

A desk-based assessment is defined as 'a programme of assessment of the known or potential archaeological resource within a specified area or site on land, inter-tidal zone or underwater. It consists of a collation of existing written, graphic, photographic and electronic information in order to identify the likely character, extent, quality and worth of the known or potential archaeological resource in a local, regional, national or international context as appropriate' (*Standard and Guidance for Archaeological Desk-based Assessment*, IFA 2008, 2).

The aims of the assessment are:

- to identify and record the cultural heritage within the defined study area;
- to evaluate the importance of what has been identified;
- to recommend ways in which impact upon the cultural heritage can be avoided or minimised.

To comply fully with the aims expressed above it can be necessary to undertake a programme of Field Evaluation following the Desktop study and Field Visit. This is because some sites cannot be assessed by desktop or field visit alone, and additional fieldwork is therefore required. This typically takes the form of geophysical survey or trial excavation, although measured survey is also a possible option. A full programme of assessment and evaluation may therefore consist of:

- Desktop study
- Field walkover
- Initial report

- Field evaluation
- Draft report
- Final report

This phase of the project concerns the first three phases only, and recommendations will be made for any field evaluation required.

3. METHODS AND TECHNIQUES

3.1 Desk top study

The desktop study comprised the consultation of maps, documents, computer records, written records and reference works that form part of the Historic Environment Record (HER), located at Gwynedd Archaeological Trust (GAT), Bangor. The HER includes Cadw's information on listed buildings, and also holds copies of documents from the Penrhyn Collection in the Bangor University Archives. The original 1768 Penrhyn Estate map of the appropriate part of Llandygai parish was inspected in the Bangor University Archives. The archives held by the Gwynedd Record Office, Caernarfon were consulted, particularly for information from the relevant tithe maps. The Record Office holds a copy of the enclosure award for Llandeiniolen parish but does not have the associated map, which seems not to have survived. Relevant aerial photographs from the collection at the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), Aberystwyth were examined.

Published and unpublished papers on the area and on relevant aspects of archaeology in North Wales in general were consulted to gain a broader understanding of the study area. Three projects previously undertaken by Gwynedd Archaeological Trust cover areas close to the pipeline route (GAT 1993, Flook 1993 and Roberts 2006), and the reports on these were consulted. The latter in particular provided information on a quarry immediately adjacent to the pipeline route.

Appendix I contains a list of sites, buildings and find spots listed in the GAT HER and Cadw's register of listed buildings within about 500m of the route of the pipe. These sites are located on figure 2. Other sites outside the study area are marked on figure 2 for completeness but are not listed in appendix I. The numbers marked on figure 2 are PRNs (Primary Record Numbers) identifying the sites on the HER and listed building record numbers.

3.2 Field Search

The field search was undertaken along the route of the pipeline on 17th December 2008. As the pipe works are to be restricted to the roadways and permission had not been obtained for access to adjacent land the field search was restricted to the roads. Sites adjacent to the route were recorded from the road. The full route was walked on foot. The weather was dull but visibility was quite good. A conifer plantation completely obscured part of the land adjacent to the road, but in most places the vegetation was fairly short and features close to the road were visible. The field search was informed by the desk top study, with a particular aim to check on the ground features identified in the aerial photographs. Notes were taken, sketches and measurements were taken of sites of potential archaeological interest and a photographic record was made.

3.3 Report

The available information was synthesised to give a summary of the archaeological and historic background and of the assessment and recommendations, as set out below. The separate features, their evaluation and recommendations are listed separately, and a summary of the overall assessment of the area is given at the end.

The criteria used for assessing the value of features was based upon those used by the Secretary of State for Wales when considering sites for protection as scheduled ancient monuments, as set out in the Welsh Office circular 60/96. The definitions of categories used for impact, field evaluation and mitigation are set out below.

3.3.1 Categories of importance

The following categories were used to define the importance of the archaeological resource.

Category A - Sites of National Importance.

Scheduled Ancient Monuments, Listed Buildings of grade II* and above, as well as those that would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both.

Sites that are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected *in situ*.

Category B - Sites of regional or county importance.

Grade II listed buildings and sites which would not fulfil the criteria for scheduling or listing, but which are nevertheless of particular importance within the region.

Preservation *in situ* is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

Category C - Sites of district or local importance.

Sites which are not of sufficient importance to justify a recommendation for preservation if threatened.

Category C sites nevertheless merit adequate recording in advance of damage or destruction.

Category D - Minor and damaged sites.

Sites that are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category.

For Category D sites, rapid recording, either in advance of or during destruction, should be sufficient.

Category E - Sites needing further investigation.

Sites, the importance of which is as yet undetermined and which will require further work before they can be allocated to categories A - D are temporarily placed in this category, with specific recommendations for further evaluation. By the end of the assessment there should usually be no sites remaining in this category. In this case several areas of unknown potential have been allocated to this category. These require environmental sampling which should be carried out during the pipeline works.

3.3.2 Definition of Impact

The impact of the works on each site was estimated. The impact is defined as *none, slight, unlikely, likely, significant, considerable or unknown* as follows:

None:

There is no construction impact on this particular site.

Slight:

This has generally been used where the impact is marginal and would not by the nature of the site cause irreversible damage to the remainder of the feature, *e.g.* part of a trackway or field bank.

Unlikely:

This category indicates sites that fall within the band of interest but are unlikely to be directly affected. This includes sites such as standing and occupied buildings at the margins of the band of interest.

Likely:

Sites towards the edges of the study area, which may not be directly affected, but are likely to be damaged in some way by the construction activity.

Significant:

The partial removal of a site affecting its overall integrity. Sites falling into this category may be linear features such as roads or tramways where the removal of part of the feature could make overall interpretation problematic.

Considerable:

The total removal of a feature or its partial removal which would effectively destroy the remainder of the site.

Unknown:

This is used when the location of the site is unknown, but thought to be in the vicinity of the proposed works.

3.3.3 Definition of field evaluation techniques

Field evaluation is necessary to fully understand and assess most class E sites and to allow the evaluation of areas of land where there are no visible features but for which there is potential for sites to exist. Two principal techniques can be used for carrying out the evaluation: geophysical survey and trial trenching.

Geophysical survey most often involves the use of a magnetometer, which allows detection of some underground features, depending on their composition and the nature of the subsoil. Other forms of geophysical survey, including resistivity survey and ground penetrating radar might also be of use.

Trial trenching allows a representative sample of the development area to be investigated at depth. Trenches of appropriate size can also be excavated to evaluate category E sites. Trenching is typically carried out with trenches of between 20 to 30m length and 2m width. The topsoil is removed by machine and the resulting surface is cleaned by hand, recording features. Depending on the stratigraphy encountered the machine may be used to remove stratigraphy to deeper levels.

3.3.4 Definition of Mitigatory Recommendations

Below are the measures that may be recommended to mitigate the impact of the development on the archaeology.

None:

No impact so no requirement for mitigatory measures.

Detailed recording:

This requires a full photographic record and measured survey prior to commencement of works.

Archaeological excavation may also be required depending on the particular feature and the extent and effect of the impact.

Basic recording:

Requiring a photographic record and full description prior to commencement of works.

Strip, Map and Sample:

The technique of Strip, Map and Sample involves the examination of machine-stripped surfaces to identify archaeological remains. The stripping is undertaken under the supervision of an archaeologist. Stripping and removal of the overburden is undertaken in such a manner as to ensure damage does not take place to surfaces that have already been stripped, nor to archaeological surfaces that have not yet been revealed.

Stripping is undertaken in as careful a manner as possible, to allow for good identification of archaeological features. A small team of archaeologists will be responsible for subsequently further cleaning defined areas where necessary. Complex sites which cannot be avoided will need to be fully excavated.

Watching brief:

This is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

Avoidance:

Features, which may be affected directly by the scheme, or during the construction, should be avoided. Occasionally a minor change to the proposed plan is recommended, but more usually it refers to the need for care to be taken during construction to avoid accidental damage to a feature. This is often best achieved by clearly marking features prior to the start of work.

Reinstatement:

The feature should be re-instated with archaeological advice and supervision.

4. ARCHAEOLOGICAL RESULTS

4.1 Topographic description

The pipe line runs from the small lake of Marchlyn Bach at about 460m OD (figure 1). The lake is a natural corrie lake but it was dammed to form a reservoir. To the south-east lies the larger lake of Marchlyn Mawr. This is also a natural corrie lake dammed to provide water storage for the Dinorwic Power Station built within the adjacent mountain of Elidir Fawr. The route runs down onto the south-western edge of a boggy plateau, called Gwaen Gynfi, varying in altitude between 320 and 300m OD. The pipe follows the road along the plateau's north-western side at the foot of the hills of Parc Drysgol and Moel y Ci, which block views of the coastal plain, making this area seem hidden and isolated. To the north-east the plateau slopes down into the lower Ogwen valley and to the south-west towards Llyn Padarn. To the south-east the mountains of Elidir Fawr (924m OD) and Carnedd y Filiast (821m OD) dominate.

The hills of Moel y Ci and Parc Drysgol are composed of lavas and related rocks of the Pre and Early Cambrian period. This forms part of the Padarn Ridge running from Bethesda to Penygroes. The Cambrian rocks immediately to the south-east are of much greater economic importance as these are slates (Smith and George 1961), exploited in the Ogwen valley by the Penrhyn Quarry and in Nant Peris by the Dinorwic Quarry. The hard geology has been much eroded and shaped by glaciation. This formed the major valleys and the small corries in which the Marchlyn lakes developed. On the more level ground gleyed soils have developed over the boulder clay, with podsolised soils on the better drained slopes (Ball 1963). The vegetation is restricted to heather and rough grass on the hills and a rich marshland community built on peat within the boggy plateau.

4.2 Archaeological and historical background

This area of hill and bog is something of a 'no man's land' between the villages of Bethesda and Deiniolen. It was common land in the eighteenth and nineteenth centuries and may never have been extensively used, although there are later prehistoric settlements on the drier hill slopes. The more recent history has been one of encroachment of small holdings on the commonland. From the Bethesda side these encroachments were planned and organised by the Penrhyn Estate resulting in the regimented layout of Mynydd Llandegai. Llandeiniolen spread more organically with small fields gradually creeping up the hill sides until most of the potential agricultural land had been enclosed.

4.2.1. Earlier Prehistoric

A slight Mesolithic presence in the area is indicated by a sparse scatter of microliths found near Llandygai under both the Industrial Estate (Lynch and Musson 2001) and Parc Bryn Cegin (Kenney forthcoming). At Llyn Cororion a temporary forest clearance event involving fire showed that Mesolithic people in the area were already having an impact on the forests (Watkins 1990). Both Llandygai excavations produced a wealth of evidence of Neolithic activity, including early Neolithic rectangular buildings, later Neolithic pit clusters and two henge monuments and related features.

Just over 1.5km from the pipeline route lies a possible Neolithic chambered tomb at Sling. This is a large slab propped on small stones and Lynch (1969, 148) is certain that it is a collapsed chambered tomb, although supporting stones are lacking and it could be a slab abandoned in the process of being quarried.

A Bronze Age funerary cairn (PRN 31, scheduled monument CN374) stands near the summit of Moel y Ci. The Inventory lists a small number of Bronze Age burnt mounds in Llandeiniolen parish but none have yet

been found within the study area. These common sites are found in wet areas and often in the uplands so their absence is likely to be due to a lack of detailed field work rather than a genuine absence of sites.

4.2.2 Late Prehistoric / Romano-British

Hut circle settlements and defended enclosures are distributed along the slopes of the hills overlooking the Arfon coastal plain, although the scarcity of such sites on the lowlands is almost certainly due to the loss of sites on agricultural land. A roundhouse settlement has recently been excavated on Parc Bryn Cegin near Llandygai village (Kenney forthcoming). Most of these settlements consist of groups of only two or three roundhouses although the largest, at Parc Gelli, Tregarth (PRN 260, RCAHMW 1956, 108-9) had twelve roundhouses. Where well preserved these settlements were surrounded by small fields e.g. in Llanllechid (RCAHMW 1956, 140-1), Moel Faban (PRN 287, RCAHMW 1956, 145-6) and Cwm Ffrydlas (PRN 284, RCAHMW 1956, 144-5). Roman finds have been discovered on some of these sites but many probably originated in the Iron Age and some may have continued after the end of the Roman period (Smith 1999).

Probably roughly contemporary with at least some of the roundhouse settlements are defended enclosures. The closest to the study area being Pendinas, Tregarth (PRN 223, RCAHMW 1956, 107) and Dinas Dinorwig (PRN 5, RCAHMW 1960, 175). The former had a single wall and commanded the approaches to the Ogwen valley and the lowlands below it. Dinas Dinorwig also started as a single-walled fort but massive bivallate banks were added, and it may have been a more important site commanding a larger area than Pendinas. The construction of the rampart at Pendinas was dated to 202 BC- 129 AD (HAR-1671) (White 1992), but excavations at other defended enclosures show use into the Roman period.

An upland survey carried out by Gwynedd Archaeological Trust (GAT 1993) studied the lower slopes of Carnedd y Filiast. This shows how intensive field work can increase the number of known sites, and identified four settlements (PRN 1707, 5670, 12430, and 12500), two isolated hut circles (PRN 12195 and 12638) and an extensive cairn field (PRN 5671), all probably of a later prehistoric date. Some of the cairns may have been funerary but the evidence generally suggests at least seasonal occupation, pastoral farming and possibly a small amount of arable. The drier areas around this plateau may have been fairly extensively occupied and farmed in prehistory.

4.2.3. Roman period

Some of the roundhouse settlements in the general area probably continued in use throughout the Roman period, although those on the slopes of Carnedd y Filiast may not have done. Roman finds are often recovered from excavated sites and the roundhouse settlement at Parc Bryn Cegin produced both pottery and radiocarbon dates suggesting use into the third century AD (Kenney forthcoming). The main Roman road from Segontium (Caernarfon) to Canovium (Caerhun, Conway valley) (PRN 17567) ran along the coastal lowlands, about 3.5km north-west of the study area. This was marked by a milestone near Ty Coch, Pentir (PRN 18) and a 2nd century AD coin was recovered near a possible crossing point of the Afon Ogwen (PRN 6890). Waddelove (1999) suggests that a Roman road ran through the Ogwen valley. There are no traces of this road, but it might be supported by a slate sourced to Bethesda and used to roof a Roman legionary barracks in Chester (Hopewell 2005, 19). Also a third century AD Roman coin was found near the farm of Ty'n-y-maes in the Ogwen valley (PRN 2339, RCAHMW 1964, 134). The possibility of a Roman fort in Penrhyn Park has been suggested because of its intermediary position between Caerhun and Caernarfon (Lynch 1994, 9), but again there is no firm evidence.

4.2.4. Early Medieval

An early medieval cemetery dating to about the 5th to 7th centuries AD was excavated overlying the cursus found on the Llandygai Industrial Estate (Lynch and Musson 2001). This cemetery included a square barrow enclosing one grave and recent aerial photography has revealed the presence of a square barrow cemetery (PRN 404666), presumably of a similar date, just over 200m to the north-east (Driver 2006).

Settlement of this period is very rarely found but must have existed in the area. Excavations on Parc Bryn Cegin revealed early medieval metalworking dating between cal AD 480-650 and cal AD 600-760 (Kenney forthcoming). It is possible that some of the hut circle settlements closer to the study area continued in use into this period, but so far there is no firm evidence.

4.2.5. Medieval

The study area is split between two parishes, Llandygai (or Llandegai¹) and Llandeiniolen. The boundary between the two was not just a parish boundary but a commote and cantref boundary as well. Llandygai lies in the commote of Uchaf in the cantref of Arllechwedd, while Llandeiniolen is in the commote of Is Gwyrfaï in Arfon (Carr 1977). The parish of Llandygai was preceded by the township (*tref*) of Cororion (Creuwriion) (Carr 1977). The settlement was probably focused on the area of Tregarth (Penrhyn Collection B1794) but the township seems to have extended into the mountains in the medieval period as it is described in the *Mabinogion* as the ‘highest township of Arllechwedd [the cantref of Arllechwedd]’ (Jones and Jones 1949, 58). Llandeiniolen is named after Saint Deiniol who is said in the sixth century AD to have founded the monastery in Bangor which developed into the cathedral in the twelfth century (Longley 1994).

Just beyond the study area there are the remains of some huts on Moel y Ci that may be of a medieval date (PRN 18327) and on the lower slopes of Moel Rhiwen are platform houses and other remains of settlement (PRN 2431, 2432, 7510, 7511). Similar long huts or rectangular hut platforms have been dated to the medieval period since Gresham’s work (Gresham 1954). Just under 3km south-east of the study area lies Llys Dinorwig, which might be the remains of a fourteenth century fortified dwelling, but it remains are so fragmentary that they are difficult to interpret and date (RCAHMW 1960, 172). There is also a moated site (PRN 6) near Ty Mawr, a possible motte (PRN 7) known as Castell, and the village of Pentir originated as a medieval township (PRN 6814).

Closer to the study area (see figure 2) the remains of a rectangular building (PRN 12327) may represent a hafod of possible medieval date, with a contemporary trackway running next to it (GAT 1993). A sheepfold (PRN 12384) has been built over the remains of an earlier wall that may be of medieval date. Huts in use in the medieval period at this altitude were presumably hafodau (Gresham 1954), the summer dwellings used as part of the hafod and hendre system of annual transhumance. At least some of the family would inhabit a hafod in the hills to milk their livestock while they were on the mountain pastures in the summer. They would return to the family home (hendre) at lower altitudes for the winter. In Caernarvonshire documents record many hafodau in the sixteenth century but they are mentioned as early as the thirteenth century (Davies 1979, 26-29, 18).

4.2.6 Post-Medieval

In the nineteenth century both parishes of Llandygai and Llandeiniolen were dominated by slate quarrying. Local slates had been used for roofing local houses since the medieval period but it was the export of slates, starting in the mid eighteenth century, that powered the quarries’ expansion (Dodd 1990, 204). The earliest record of slate quarry in the Ogwen Valley dates to 1413 and small scale quarry is documented through to the end of the eighteenth century (Lindsay 1974, 27). In 1765, when Richard Pennant succeeded to the Penrhyn Estate, the quarry was let out to a small number of quarrymen (Dodd 1990, 16, 205). In 1782 Pennant bought out the leasees and started working the quarry himself, leading to its expansion and development (Dodd 1990, 205). In Llandeiniolen small, informal quarries were allowed on the hills until Thomas Assheton Smith of the Vaynol Estate took control of the mineral rights, first to lease the rights out in 1798 and then in 1809 to work the quarries himself (Dodd 1990, 206).

Richard Pennant created a model village for his quarry workers close to Penrhyn Castle, but this was too far from the quarry for many and they preferred the freedom of building on land not owned by the great landlord. Many people leased small plots of land from small landowners near the Bethesda Chapel on which to build their cottages and created an irregular settlement that was named after the chapel (Dodd 1990, 220). Similarly in the parish of Llandeiniolen the village of Deiniolen was built on freehold land surrounded by land owned by the Vaynol Estate (Gwyn 2006).

The study area lies on what was common land of both Llandygai and Llandeiniolen parishes, between the villages of Bethesda and Deiniolen. Settlement spread out from these two villages, often by encroachment on

¹ The parish name was traditionally spelt as ‘Llandegai’, but it is more correctly spelt with a ‘y’. It is most probable that the saint or personage remembered was actually called Cai not Tegai as is often suggested. The ‘te’ element being a common honorific seen in many Welsh ‘llan’ place names (David Longley, pers com). Most modern Ordnance Survey maps use the ‘y’ spelling, though they are not entirely consistent, as do the road signs. Melville Richards (1969), who was attempting to standardise and correct the spelling of Welsh place names uses ‘Llandygái’.

the common land. In the eighteenth century squatters occupied small plots of land and slowly spread cultivation up the hill sides. There was a belief that a cottage built in a day and a night (*caban un nos*) laid a claim to a plot of land. There was actually no foundation for this in either Welsh or English law but before enclosure of the commons few landlords were motivated to enforce the law (Dodd 1990, 59). The 1768 Penrhyn Estate map of the lower part of Llandygai parish (Penrhyn Collection MS 2205) shows these encroachments as small fields clustered around cottages forming islands of cultivation on the edge of the common. With the development of the quarries the great landowners had a reason to enforce their control of the commons. In Llandygai the Penrhyn Estate owned most of the parish and Richard Pennant did not require an enclosure act to enable the reorganisation of his lands. He did, however, lease the Crown wastelands around the quarries to allow for future expansion (Dodd 1990, 205). The difference between the small irregular fields of the 1768 estate map and the large regular fields of the 1841 tithe map clearly shows that he had a big impact on the landscape.

The 1843 tithe map for Llandeiniolen lists numerous small landowners, many owner occupiers, as well as Thomas Assheton Smith who held much of the parish as part of the Vaynol Estate. Assheton Smith required an enclosure act for the enclosure of the commonlands in this parish and the award of 1814 firmly established the Vaynol Estate's rights over quarrying activity and gave Assheton Smith the chance to further consolidate his lands by buying plots. The threat of eviction and the loss of use of the small quarries implied by the coming enclosure caused squatters on the common to riot in 1809 (Dodd 1990, 77).

Some land was required by the quarry workers to supplement their wages and help support their families. Many, therefore, lived on a *tyddyn*, a small holding capable of supplying eggs, bacon and dairy products (Gwyn 2006, 108). The Penrhyn Estate, well aware of this need, created the rigid pattern of allotments and cottages that formed Mynydd Llandegai. An area of common was enclosed into a regular series of narrow plots by the estate stewards. Plots were leased to the quarrymen for 30 years and reverted back to the Estate after the lease expired along with any buildings on them. The terms of the lease specified that the quarrymen were to build their own cottages on the plot to an approved design. These houses were built in the 1870s to the traditional 'croglloff' design (Lowe 1977, 62).

Hyde Hall (1952, 172) was not complimentary about Llandeiniolen parish, which he considered "a wet, naked, bleak and ugly tract". The study area is quite bleak today and the tithe maps (figures 3 and 4) suggest it was even more so in the early nineteenth century before the spread of settlement onto the higher land. It would still have been important for the grazing of livestock, both sheep and cattle, and to supply fuel in the form of peat. The Llandeiniolen enclosure award of 1814 preserved the right of turbary (peat cutting) and on the tithe map is a rectangular enclosure marked as the 'public turbary' in 1843 (figure 4). The tithe schedule shows that this was still in the communal ownership of all the landowners of the parish. The pipe route runs through the site of the turbary, one of the few features along the route shown on the tithe maps. No traces of peat cuttings will survive under the road and most of the rest of the area is now under a conifer plantation. However, small sub-circular features seen on the 1947 aerial photographs (CPE/UK/1939) at about SH 5934 6385 may be the remains of peat stacks. The turbary for Llandygai parish is marked in the 1768 estate map but is not so well defined.

The aerial photographs reveal patches of very narrow ridges. These are exclusively restricted to the smallest enclosures and are probably spade dug ridges for the planting of potatoes. Potatoes began to be widely cultivated in North Wales in the last quarter of the eighteenth century and became increasingly important especially in times of shortage and famine (Dodd 1990, 49). They were well suited to cultivation on the small plots of the quarrymen's *tyddynau*. The land enclosed to create Mynydd Llandegai had apparently been used as a potato patch since the Napoleonic Wars (Gwyn 2006, 216).

Bringing the history of the area up-to-date the Dinorwig Hydro-Electric Power Station was constructed between 1975 and 1983 to create reserve electric power by raising water from Llyn Peris to Marchlyn Mawr, using cheap electricity by night and generating more power at peak times by releasing the water to drive turbines deep within the mountain of Elidir Fawr (Roberts 2006). As part of these works Marchlyn Mawr was dammed between 1975 and 1979 to allow it to hold a much greater volume of water. Previously the lake had contributed to the drinking water supply (Orwig 1977), and prior to that it was used to supply water to the Penrhyn Quarry. The leat that carried the water from the lake is still visible on the ground from where it emerges from under the recent landscaping (PRN 12446). It runs along the hill slope, descending gradually and map evidence suggests that it turned sharply north-west at its north-eastern end and fed into Llyn Owen y Ddol, from where it was fed into the quarry to power machinery (GAT 1993). Afon Marchlyn Mawr was also diverted by a sluice to run directly into Llyn Owen y Ddol. Water was also collected and stored in an artificial lake, called Llyn y Mynydd, formed behind a long dam running across the middle of the bog in Gwaen Gynfi. It is shown on the OS map of 1914 and aerial photographs of 1947 (CPE/UK/1996) show that the dam was still

intact but the dam has now been breached and only a small pond builds up behind it in wet weather. By 1811 this water system was being used to power mills for sawing slates and grinding ochre (Hyde Hall 1952, 106).

About 680m from the eastern end of the pipe route is a rock cannon (PRN 12626). There is also a group of three rock cannon just east of Mynydd Llandegai (PRN 12639). These features are characteristic of the quarry areas and shed a light on the social history of the quarry villages. They are boulders or rock outcrops in which a series of holes have been drilled, generally linked together by shallow grooves, and were created in the later eighteenth and nineteenth centuries. The holes took gunpowder charges and they were fired to create the sound of cannons as a salutation for important local and national events. They were fired in celebration of weddings, coronations, the end of wars and important commercial events (Jones 2002). The location of the rock cannon PRN 12626 within the amphitheatre created by Elidir Fawr and Carnedd y Filiast would have made it particularly effective by reflecting its sound out over Deiniolen.

4.3 Statutory and non-statutory designations

The south-eastern end of the pipeline route finishes just west of the boundary of the Snowdonia National Park, so the works will have no direct impact on the park. As the pipe runs under existing roads the work will also have no visual impact, except during the construction period. The study area runs through two Landscapes of Outstanding Historic Interest as defined by Cadw. These are Dinorwig (HLW (Gw) 6) and Ogwen Valley (HLW (Gw) 10). The prehistoric and medieval sites in both are mentioned but they are classed as outstanding largely for their remains of the slate industry (Cadw 1998, 91, 108). There are no Scheduled Ancient Monument within the study area, although the cairn on Moel y Ci (scheduled monument CN374) lies within 700m of the route. The 16 listed buildings in appendix I are well beyond any impact from the pipe works.

4.4 Field boundaries and buildings adjacent to the route

Several cottages lie adjacent to the route. These are all within Llandeiniolen parish and form part of the expansion of the village up on to the commonland. None of these are shown on the tithe map (figure 4) and so all post-date 1840. The closest building to the route that does appear on the tithe map is Bryn-brith (listed building number 22646), which lies 530m from the route. None of these buildings will be impacted by the works and they are not listed separately in the archaeological survey below.

The field boundaries in this area are almost all drystone walls. The symbols used on the tithe maps show that even the boundary between the two parishes was not defined by a wall in the early 1840s, but was well marked by cairns and stones, one of which had 'Llandeiniolen and Llandegai' cut into it (see figures 2 and 4). All the walls within the study area therefore seem to have been built in the later nineteenth century. Along much of the road on the north-west side of Gwaen Gynfi the boundaries are rather dilapidated post and wire fences, reinforced in one short section by a very sparse hedge. From Pen-y-bwlch to the water works there are stretches of slate fencing. These are very typical of the Penrhyn Estate and are composed of slates set on end in the ground and secured at the top by wire. These fences were in use by 1798 on the estate and were originally held together by briars or flexible branches (Lindsay 1974, 53). If any of these boundaries are to be impacted on by the works they should be recorded before this occurs, but the present proposals do not imply any impact on field boundaries.

4.5 The Archaeological Survey (Figure 2)

Eight features are identified directly on or close to the route of the raw water pipe. These are shown on figure 2 and described below with recommendations for further assessment and mitigatory measures, where appropriate. Those features that did not previously have PRN numbers have been allocated them and they will be added to the HER. PRN numbers of these new features are not shown on figure 2 for clarity but are listed below.

Feature 01	Sheepfold	PRN 29292	Plate 1
-------------------	------------------	------------------	----------------

SH 60755 62690

Period: Post medieval

<i>Category: D</i>	<i>Impact: None</i>
--------------------	---------------------

A multicellular sheepfold with several small cells around a central enclosure. It is not indicated on the 1843 tithe map but is shown in detail on the 1889 OS map, and is represented on all subsequent maps with only

occasional small changes. The 1948 aerial photographs (CPE/UK/2525) show it very clearly. The walls still stand to nearly full height, although there has been some collapse in places.

Recommendations for further assessment: None

Recommendations for mitigatory measures: None

Feature 02 Marchlyn Quarry PRN 20,093 Plate 2

SH 6020 6280

Period: Modern

Category: D Impact: None

A small quarry developed by the Dinorwig Quarry Company late in its history in an attempt to quarry slate at a lower cost from a 'green field' site. Begun in the 1930s it appears on the 1948 aerial photographs (CPE/UK/2525) and was extended in the 1950s, but it was not a success and was closed in 1969 (Richards 1991, 40). Roberts (2006) has studied the maps showing the site of this quarry and shows that there were no workings at all in 1919, it is of a very limited extent in 1954 and is shown at its full extent but disused in 1978. The quarry itself lies to the east with slate waste tips to the west. The only remaining structure is a derelict brick building. It has been proposed to use the slate waste in a project to raise the crest of the Marchlyn Mawr dam, but the work has not yet been carried out (Roberts 2006).

Recommendations for further assessment: None

Recommendations for mitigatory measures: None

Feature 03 Road PRN 29293 Plates 3 and 4

SH 606406275 to SH 5970 6307

Period: Modern

Category: D Impact: Unlikely

This section of road was built in 1975 to provide access to Marchlyn Mawr reservoir (Roberts 2006). It is generally built on a bed of slate waste, in some places built up to 2m in height. The road surface is tarmaced. No significant archaeological features were seen close to this road and it is unlikely that any archaeology would be found beneath it. The impact on the road itself will be significant but this feature is of very little archaeological importance. The chance of impact on important buried archaeology is unlikely.

Recommendations for further assessment: None

Recommendations for mitigatory measures: None

Feature 04 Hollows and disturbed ground PRN 29294 Plate 5

SH 59795 63120

Period: Post medieval

Category: D Impact: None

An area of undulations, hollows and ponds is seen on the ground. These do not appear on maps before 1978 when they are shown as a series of small ponds joined by a stream or drain. They only appear after work starts on Marchlyn Quarry and are presumably associated with it.

Recommendations for further assessment: None

Recommendations for mitigatory measures: None

Feature 05 Road PRN 29295 Plates 6 and 7

SH 5970 6307 to SH 5893 6398 to SH 5928 6536

Period: Post medieval

Category: D Impact: Unlikely

The road running along the northern limit of the Deiniolen settlement and the western edge of Gwaen Gynfi. This is shown on the 1889 map but there was no settlement anywhere near it on the 1843 tithe map and no indication of a route. It is currently a well made, wide road with two lanes and broad verges, until it turns north-east along the edge of Gwaen Gynfi, where it is single track. It is unlikely that any archaeology survives beneath it but some traces of the late nineteenth century road might be detected. The impact on the road itself will be significant but this feature is of very little archaeological importance. The chance of impact on important buried archaeology is unlikely.

Recommendations for further assessment: None

Recommendations for mitigatory measures: None

Feature 06 Turbary PRN 29296

SH 5921 6391 (approx. centre)

Period: Post medieval

Category: D Impact: None

A rectangular area is marked on the Llandeiniolen tithe map and labelled as the turbary (figure 4). Small sub-circular features were seen on the 1947 aerial photographs (CPE/UK/1939) and may be the remains of peat stacks. This would need confirming by ground inspection but the area is now under conifer plantation and it is very likely that all traces of these features, and any others relating to the turbary, have been destroyed.

Recommendations for further assessment: *None*

Recommendations for mitigatory measures: *None*

Feature 07 Road PRN 29297

SH 5928 6536 to SH 5960 6556

Period: Post medieval

Category: D Impact: Slight

The road runs along the north-west side of Gwaen Gynfi from the junction with a track, now a footpath. This track and this section of road are shown as a track on the 1841 tithe map (figure 3) and are marked as leading to Pentir. This may be the road marked by J Evans on his map of 1797 (UWB ms MC 7/119), but it is not indicated on the 1768 Estate map. On the earlier map there is a track running approximately north-west to south-east across Gwaen Gynfi, but this seems to have crossed the present road to the east of the water works.

The present road is tarmaced and well made but is single track. It is generally terraced into the slope rather than being built up. It is unlikely that any archaeological features will survive beneath it but traces of the earlier road might be found. It is recommended that a watching brief be carried out during works on this section at least until it is confirmed whether remains of the earlier road survive or not.

Recommendations for further assessment: *None*

Recommendations for mitigatory measures: *Watching brief*

Feature 08 Slate fencing PRN 29298 Plate 8

SH 59285 65077 to SH 59695 65602

Period: Post medieval

Category: D Impact: None

Parts of the field boundary along this stretch of road, mainly on the eastern side, are composed of slate fencing typical of the Penrhyn Estate. Damage to this should be avoided, but if it needs to be disturbed it should be reinstated in the same style.

Recommendations for further assessment: *None*

Recommendations for mitigatory measures: *Reinstatement*

5. SUMMARY OF ARCHAEOLOGICAL POTENTIAL

5.1 Summary of features identified

The general area contains much of interest relating to the history of the slate quarries and the people that worked in them. The survey work done on the lower slopes of Carnedd y Filiast demonstrates that many more prehistoric and medieval features are likely to be present in the area than currently recorded. However, all the features listed above close to the pipe route are post-medieval in date, mainly late nineteenth century or more recent. Although of some interest within the wider landscape none are of more than minor significance. The restriction of the work to the existing roads means that even if there are unidentified sites of some significance in the area they will not be impacted by the work.

5.2 Aerial Photographs

Aerial photographic coverage of this area seems to be fairly limited. Vertical photographs from 1947 and 1948 are held by the National Monuments Record, but there are few oblique photographs due to the scarcity of scheduled sites. However, the vertical photographs taken in January 1947 are a particularly nice set as there was a thin layer of snow on the ground, which emphasises some features. The photographs give some indication of recent developments, such as the growth of Marchlyn Quarry and the disuse of Llyn y Mynydd.

The state of some of the cottages could be seen and the existence of potato ridges in some plots identified. Features within the area of bog, possibly peat stacks but perhaps burnt mounds, would have been worth closer inspection if they had survived, but as the area is now under conifers this is unlikely.

5.3 Environmental Remains and Soil Morphology

The peats of the uplands have a high potential for preserving a good pollen record, especially those in small bogs near farmsteads. The peat of Gwaen Gynfi, where it lies close to the prehistoric settlements on the slopes of Carnedd y Filiast, would be an ideal target for pollen studies. However, the present works will not damage any peat bogs or effect the drainage regime of the area, so it will have no impact on this preserved record.

5.4 Artefactual Potential

The possibility of finding significant archaeological artefacts during the works is very low. Most buried archaeology that might have been present on the route is likely to have been severely disturbed by the construction of the roads. There is a small chance that late eighteenth century material remains preserved in any traces of the earlier road recorded as feature 07.

6. SUMMARY OF RECOMMENDATIONS

The pipe works are to be restricted to the existing roads and are unlikely to cause any disturbance to features beyond the carriageways. Care should be taken to avoid damage to the field walls. It is possible that next to the water works a section of slate fencing will have to be disturbed. This must have been rebuilt after the construction of the water works so it is only necessary that any fencing disturbed is reinstated in the same style. The only area with any archaeological potential is the section of road near the waterworks (feature 07). It is recommended that an archaeological watching brief be conducted during work on this section at least until it is confirmed whether remains of the earlier road survive or not.

7. CONCLUSIONS

The works will have a very minimal impact on the archaeological resource and can proceed without any mitigation, except possibly for a watching brief on one short section.

8. ARCHIVE

The archive, which is held by Gwynedd Archaeological Trust, consists of copies of historic maps, plans with annotations made in the field and transcribed from aerial photographs, along with notes and 67 digital images taken on the field visit. A copy of the report will be deposited in the Gwynedd HER, and a copy will be provided to the National Monument Record, Royal Commission on the Ancient and Historic Monuments of Wales, Aberystwyth.

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Ordnance Survey 25 inch Second Edition County Series maps Caernarvonshire sheets XII.9 and 13; XVII.1 and 21 (1900)

Ordnance Survey 25 inch Third Edition County Series maps Caernarvonshire sheets XII.9 and 13; XVII.1 and 21 (1914)

Bangor University Archives

Penrhyn Collection MS2205: Map of the Lower part of Llandegai parish in Caernarvonshire (1768)

ms MC 7/119: Map of the six counties of North Wales, J Evans (1797)

Penrhyn Ms B1794, dated c. 1824, Map of the vill of Crewryon

Gwynedd Record Office, Caernarfon

Tithe map for the parish of Llandegai in the County of Caernarvonshire 1841.

Tithe Apportionment Schedule for the parish of Llandegai in the County of Caernarvonshire 1840.

Tithe map for the parish of Llanddeniolen situate in the County of Caernarvonshire 1843.

Tithe Apportionment Schedule for the parish of Llanddeniolen 1843.

Enclosure award for the parish of Llanddeniolen, 1814.

Vaynol Papers 2587-2594, rent book for cottages and encroachments

RCAHMW, Aberystwyth

Aerial Photographs

Verticals

CPE/UK/1939, frames 4122-4129, date 20/01/1947

CPE/UK/1996, frames 1325-1326, date 13/04/1947

CPE/UK/2525, frames 4100, 4129-4130, date 24/03/1948

APPENDIX I: Previously known sites along and around the route of the raw water pipeline

Table 1: Sites within about 500m of the pipe route

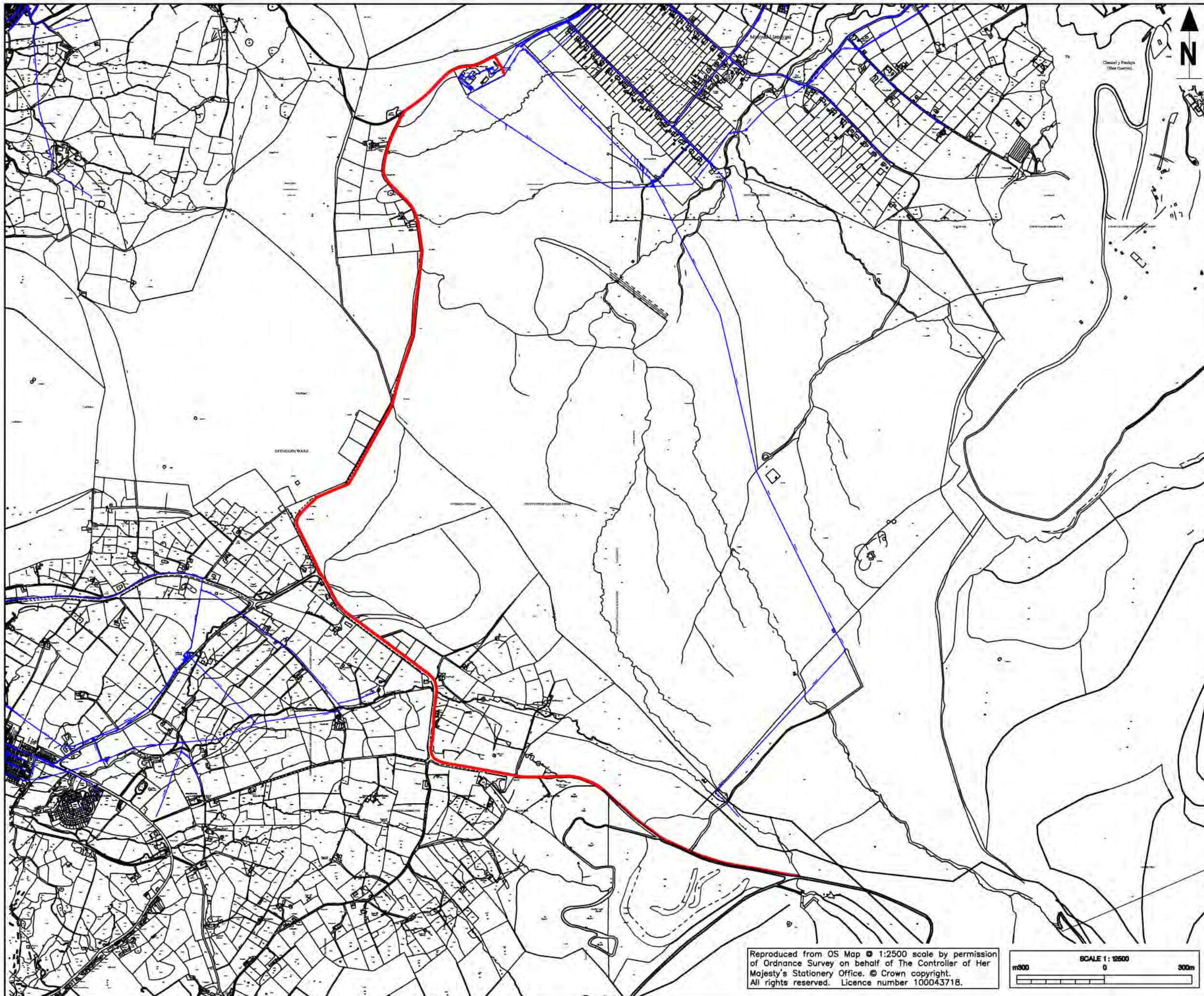
PRN	NPRN	Site name	NGR	Site type	Period	Form	Description
32	56735	Boundary stones, S. Side of Moel-y-Ci	SH59126589C	Stone upright	Post-medieval	Cartographic	Stone block
2433	55640	Cairn, Parc Drysgol	SH58476416	Cairn	Prehistoric	Stone built feature	Cairn
6586	63723	Field system, Moel Rhiwen	SH58696390	Field system	Unknown	AP site	Ridge and furrow
12409	0	Sheepfold, Gwaen Gynfi	SH60636345	Sheepfold	Post-Medieval	Stone built feature	Enclosure
12429	0	Trackway, Afon Marchlyn Mawr	SH60636342C	Trackway	Unknown	Earthwork	Trackway
12430	0	Enclosures, Gwaen Gynfi	SH60606343	Enclosure	Prehistoric	Stone built feature	Enclosure, wall
12445	0	Shelter, Gwaen Gynfi	SH60786340	Shelter	Post-Medieval	Stone built feature	Enclosure, hut - rectangular
12446	0	Leat, Marchlyn Mawr dam	SH60836294C	Leat	Post-Medieval	Earthwork	
12464	0	Enclosures, Gwaen Gynfi	SH60536335	Enclosure	Unknown	Stone built feature	Enclosure
12477	0	Stone pile, Gwaen Gynfi	SH60516325	Stone pile	Unknown	Stone built feature	Stone pile
12494	0	Enclosure, Gwaen Gynfi	SH60406320	Enclosure	Unknown	Stone built feature	Enclosure
12500	0	Enclosures and structures, Gwaen Gynfi	SH60386311C	Enclosure	Prehistoric	Stone built feature	Enclosure, wall
12511	0	Rectangular building, Gwaen Gynfi	SH60386310	Rectangular building	Unknown	Building - ruined	Building, hut - rectangular
12513	0	Enclosures, Gwaen Gynfi	SH60386311C	Enclosure	Prehistoric	Stone built feature	Enclosure defined by wandering walls
12524	0	Structure, Gwaen Gynfi	SH60366313	Feature	Unknown	Stone built feature	Hut - circular, enclosure
12609	0	Enclosure, Gwaen Gynfi	SH60576344	Enclosure	Unknown	Stone built feature	Enclosure, sheepfold
12611	0	Structure, Gwaen Gynfi	SH60586326	Building	Unknown	Building - ruined	Building, enclosure
12626	0	Carreg cannan, Gwaen Gynfi	SH61086326	Rock cannon	Post-Medieval	Other structure	Stone block
15864	0	Moel y Ci/Gwaen Gynfi unenclosed uplands - landscape	SH59706460	Landscape	Multi-period		
19885		Meolyci sheepfold V	SH59956601	Sheepfold	Post-medieval	Stone built feature	
19887		Meolyci sheepfold VII	SH59916576	Sheepfold	Post-medieval	Stone built feature	
20093	0	Slate quarry,	SH60206280	Slate	Post-		

		Marchlyn		quarry	Medieval		
22568		Marchlyn Bach feature	SH60386302	Deserted rural settlement?	Unknown		

Table 3: Listed buildings within about 500m of the pipe route

Listed building number	Grade	Name	Description	NGR
22646	II	Bryn-brith	Cottage likely to have been built as part of a smallholding created after 1814.	SH 59323 62610
23403	II	Mynydd Llandegai 24	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 60189 65320
23405	II	Mynydd Llandegai 3	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 59888 65620
23406	II	Mynydd Llandegai 4	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 59894 65614
23407	II	Mynydd Llandegai 23	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 60346 65587
23408	II	Mynydd Llandegai 24	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 60354 65583
23409	II	Mynydd Llandegai 7	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 60125 65779
23410	II	Mynydd Llandegai 8	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 60134 65771
23413	II	Fairview	Small holding/quarryman's cottage.	SH 60019 65949
23440	II	Privies to Nos.23 & 24	Privies contemporary with cottages.	SH 60351 65578
23441	II	Boundary Walls/Slate Fencing to Nos.23 & 24	Plots contemporary with the cottages.	SH 60344 65604
23442	II	Privy to No.7	Privy contemporary with the cottage.	SH 60113 65780
23443	II	Boundary Walls/Slate Fencing to Nos.24 & 25	Plots contemporary with the cottages.	SH 60199 65329
23445	II	Outbuildings to No.24	Outbuildings contemporary with the cottage.	SH 60195 65304
23446	II	Boundary Walls/Slate Fencing to Nos.3 & 4	Plots contemporary with the cottages.	SH 59886 65639
82290	II	Mynydd Llandegai 25	Cottage forming part of the quarryworkers' settlement at Mynydd Llandegai	SH 60223 65290

APPENDIX II: drawing W745-1-d01 issued by Dŵr Cymru



LEGEND:

Proposed Pipeline

01	First Issue	SMW	MM	30/10/08
Issue	Description	Drawn	Checked	Date

Drawing Status

CONSULTATION



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Job Title

**RAW WATER MAIN RENEWAL
MARCHLYN BACH**

Drawing Title

LOCATION PLAN



Eden Court, Ruthin LL15 1NJ
01824 702220 fax 705244
www.waterco.co.uk

Job No.

NP0910087

Scale

1:12500 @ A3

Drawn

SMW

Approved

Date

October 2008

Drawing No.

w745-1-d01

Issue

01

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SCALE 1:12500
0 300m

ILLUSTRATIONS AND PLATES

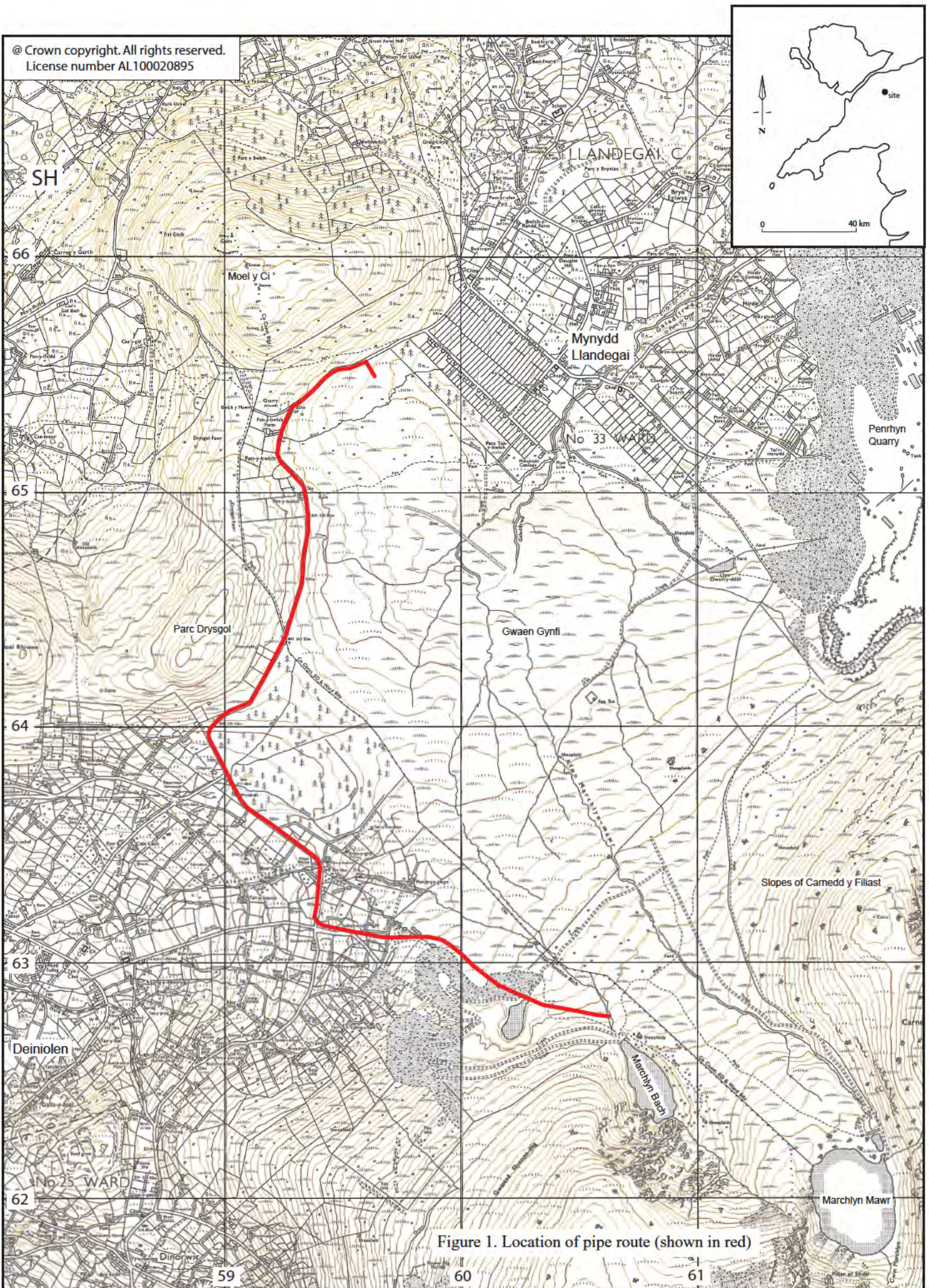
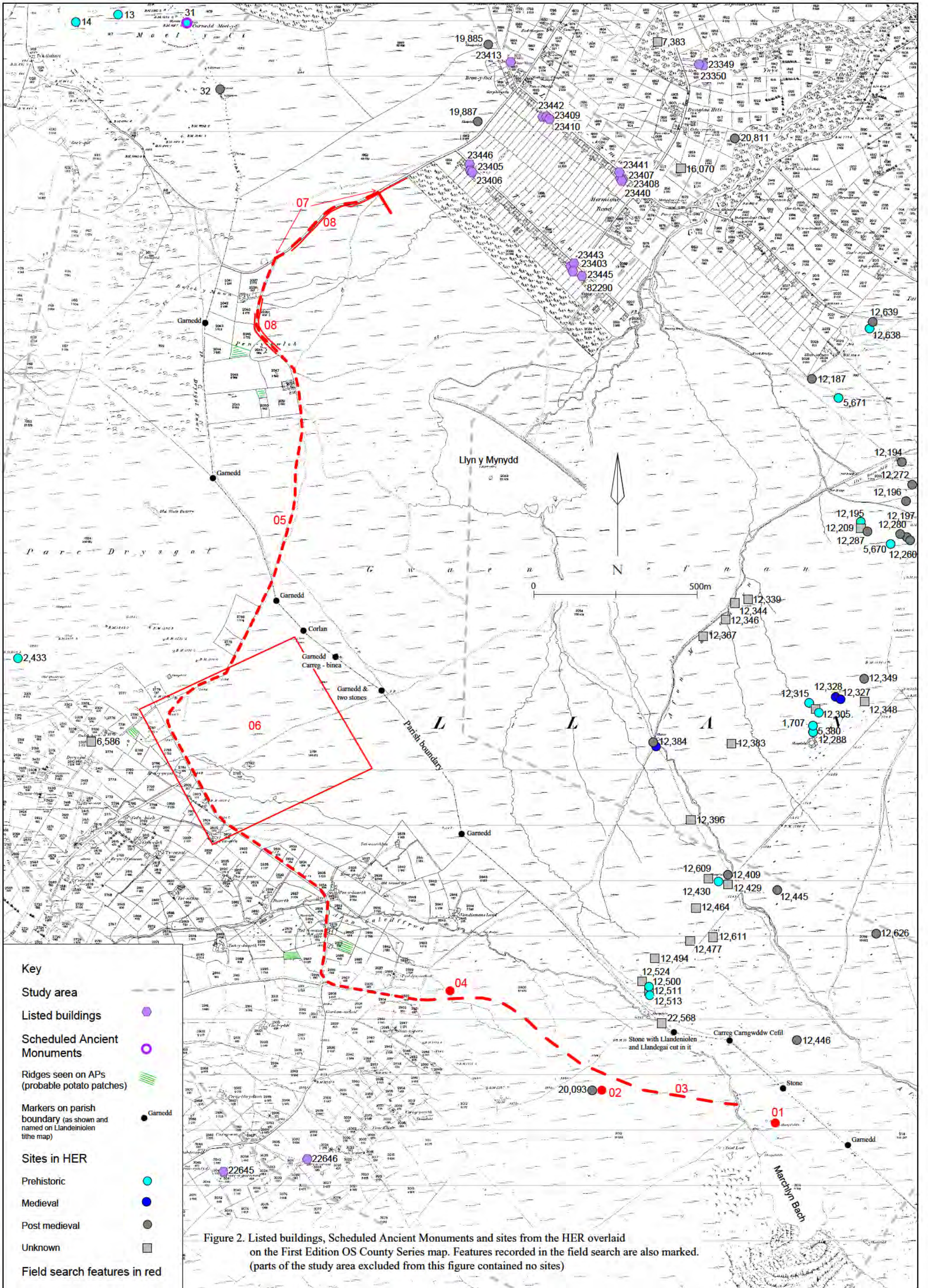


Figure 1. Location of pipe route (shown in red)



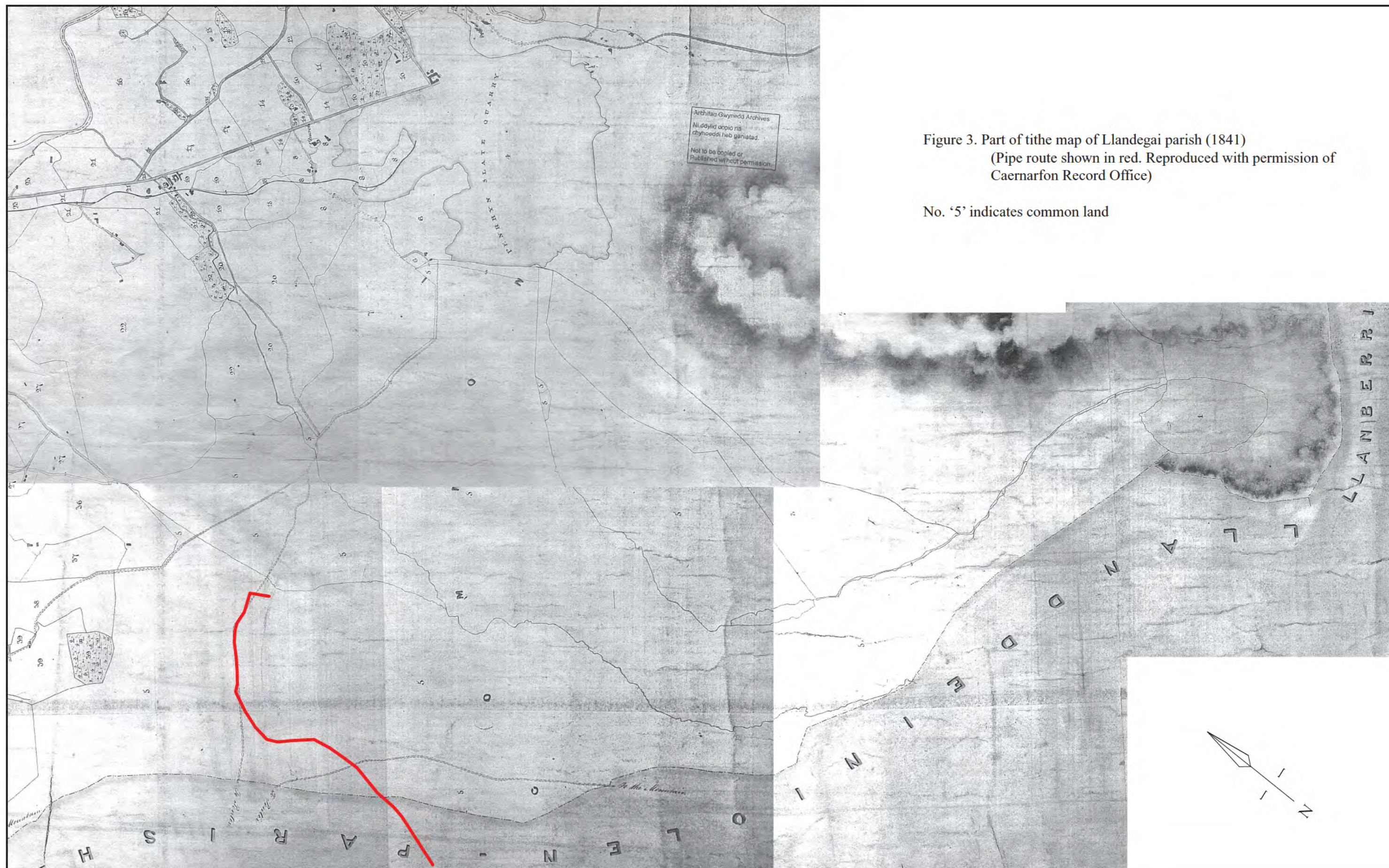


Figure 3. Part of tithe map of Llandegai parish (1841)
(Pipe route shown in red. Reproduced with permission of
Caernarfon Record Office)

No. '5' indicates common land



Plate 1: Feature 1, sheepfold
from north-west



Plate 2: Feature 2, Marchlyn Quarry
from north



Plate 3: Feature 3, road near Marchlyn Quarry
built up on slate waste, from south-east



Plate 4: Feature 3, road near Marchlyn Quarry,
looking down road from south-east



Plate 5: Feature 4, hollows and disturbed ground from south-east

Plate 6: Feature 5, road along north-east edge of Deiniolen, from north-west



Plate 7: Feature 5, road along edge of Gwaen Gyfni, from north

Plate 8: Feature 8, slate fencing, from south-west





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