

# Llyn Alaw Water Treatment Works, Llantrisant, Anglesey

## Archaeological Assessment



Ymddiriedolaeth Archaeolegol Gwynedd  
Gwynedd Archaeological Trust



# Llyn Alaw WTW, Llantrisant, Anglesey

## Archaeological Assessment

Project No. G2297

Report No. 1107

Prepared for: Black and Veatch

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Front Cover: Llyn Alaw WTW from the north-west

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# Contents

<b>Summary</b>	<b>3</b>	<b>Conclusions</b>	<b>13</b>
<b>Introduction</b>	<b>4</b>	<b>Archive</b>	<b>14</b>
1.1 Acknowledgements	4	<b>References &amp; Other Sources Consulted</b>	<b>15</b>
<b>Design Brief &amp; Specification</b>	<b>5</b>	<b>Appendix I</b>	<b>17</b>
<b>Methods &amp; Techniques</b>	<b>6</b>	<b>Appendix II</b>	<b>18</b>
3.1 Desk Top Study	6	<b>Appendix III</b>	<b>21</b>
3.2 Field Search	6		
3.3 Report	6		
<b>Archaeological Results</b>	<b>7</b>		
4.1 Geology & Topographic Description	7		
4.2 Archaeological & Historical Background	7		
4.2.1 Prehistoric & Roman Sites	7		
4.2.2 Medieval	8		
4.2.3 Post - Medieval & Modern	8		
4.3 Statutory & Non-statutory Designations	9		
4.4 The Archaeological Survey (Figure 02)	9		
4.5 Aerial Photographs	10		
<b>Summary of Archaeological Potential</b>	<b>11</b>		
5.1 Location Summary	11		
5.2 Environmental Remains & Soil Morphology	11		
5.3 Artefactual Potential	11		
<b>Summary of Recommendations</b>	<b>12</b>		
6.1 Summary of Specific Recommendations	12		
6.2 General Recommendations	12		



# Figures

Figure 01: Site Location. Base map taken from Ordnance Survey 1:10 000 series sheets SH38 & SH48. Scale 1:20 000 at A4

Figure 02: Map showing sites noted on the Gwynedd HER (red dots) and listed buildings (purple crosses). The WTW area is outlined in blue. Base map taken from Ordnance Survey 1:10 000 series sheets SH38 & SH48. Scale 1: 25 000 at A4

Figure 03: Plan of Bodnolwyn and Caer Gwili from a survey of the Bodorgan Estate 1724 - 1727 (Bangor Archives, Bodorgan MSS B1579). Approximate location of the WTW outlined in red. Not to scale

Figure 04: Tithe Map of the Parish of Llantrisant of 1845. The approximate area of the WTW site is shaded in red (Field 29) Not to scale

Figure 05: Ordnance Survey 1st Edition 25" Map of 1889. Anglesey series sheet VI.12 Area of WTW shaded in red. Scale 1:7000 at A4

Figure 06: Ordnance Survey 12nd Edition 25" Map of 1900. Anglesey series sheet VI.12 Area of WTW shaded in red. Scale 1:7000 at A4

Figure 07: RAF aerial photograph 106G.UK/155 frame 4294 taken 13th August 1945, with approximate WTW area outlined in red. The image shows the drained Cors y Bol, which took place in 1815

Figure 08: Reproduction of Black & Veatch Ltd Drawing No. 176642-00-2000 detailing existing Water Treatment Works and the proposed works

# Plates

Plate 01: Llyn Alaw WTW from the east

Plate 02: View of development area, with the WTW in the background. View from the north-east

Plate 03: Llyn Alaw WTW from the north north-east, showing the development area

Plate 04: View of tanks east of development area, with the WTW in the background. View from the east

Plate 05: View of Llyn Alaw WTW across the water from the western bank of Llyn Alaw

Plate 06: View of Llyn Alaw WTW from the north-west across Llyn Alaw





## SUMMARY

*Gwynedd Archaeological Trust (GAT) has been asked by Black & Veatch Limited to carry out an archaeological assessment in advance of proposed works at the location of the existing Llyn Alaw Water Treatment Works (WTW), Llantrisant, Anglesey. The site is located approximately 1km along a track running east off an unnumbered minor road between the villages of Llanbabo and Llantrisant, Ynys Môn. The proposals include the construction of additional infrastructure within a 8000m<sup>2</sup> area to the immediate east of the existing WTW, utilising land that is currently scrub, with bramble and rough grass.*

*The assessment of the proposed WTW site and the environs at Llyn Alaw identified that the area is situated within an area of considerable archaeological potential for prehistoric and medieval settlement and ritual activity that includes four Scheduled Ancient Monuments (SAM) within 2km of the site. These include sites from early Neolithic date, such as the Bod Deiniol Burial Chamber to medieval sites.*

*The proposed site itself, before either the WTW or the Llyn Alaw reservoir were built in the mid-1960s, consisted of four small grassland paddocks, reclaimed in 1815, to the south of a marshy area of rough pasture known as Cors y Bol, and forming part of the land of Bodnolwyn Wen farm. The land was the property of the Meyricks of Bodorgan, and the estate was at the forefront of agricultural improvement in the 18<sup>th</sup> and 19<sup>th</sup> centuries in the area. No new archaeological sites were identified within the confines of the proposed WTW site as part of the current assessment.*

*The assessment identified that the area of proposed expansion to the Llyn Alaw WTW consisted of rough ground made up of deposited material from the excavation of the Llyn Alaw reservoir and the construction of the existing WTW, and subsequently. There were also noted to be a significant number of services cut into this ground. Whilst there is some potential for the survival of former ground surfaces below the made-up ground, the potential for the recovery of archaeological information in this area is considered to be low, and therefore a partial watching brief has been recommended.*

# 1. INTRODUCTION

Gwynedd Archaeological Trust (GAT) was commissioned by *Black & Veatch Limited* to complete an archaeological assessment in advance of proposed works at the location of the existing Llyn Alaw Water Treatment Works (WTW).

The Alaw WTW is located approximately 1km along a track running east off an unnumbered minor road between the villages of Llanbabo and Llantrisant, Ynys Môn (NGR **SH37958545**). The proposed development is shown on the *Black and Veatch/Dŵr Cymru* client drawing no: 176642-00-2000; reproduced as Fig. 8. The main structures of the existing works are located in the west of the proposed development area, which lies between the existing works and the open tanks/lagoons. The proposed development zone currently comprises 8000m<sup>2</sup> of bramble and coarse grass (Fig. 1). The approximate maximum height of the ridge of the proposed new buildings, at 63.38m OD, is 1.08m less than the height of the current lime silo, which stands at a height of 64.46m (Black and Veatch, *pers. comm*). The works compound is considered likely to be placed on areas of existing hard standing, and access along existing tracks.

## 1.1 Acknowledgements

The staffs at Anglesey Archives, Llangefni and Bangor University Archives are thanked for their help with providing archive material. Ashley Batten and Jenny Emmett of Gwynedd Archaeological Planning Service are thanked for their help and guidance. Chris Waring of *Black and Veatch* is thanked for his assistance during the site visit, and Richard Davies, also of *Black and Veatch*, is thanked for providing technical information relating to the building works.

## 2. DESIGN BRIEF AND SPECIFICATION

Gwynedd Archaeological Planning Services (GAPS) has not prepared a detailed archaeological brief for this scheme but *Black and Veatch* has requested an archaeological assessment, including a desk based study and walkover survey of the proposed WTW development site. GAT has produced a Project Design for the work, which has been submitted to GAPS. It is reproduced as Appendix 3.

Gwynedd Archaeological Planning Services will monitor the works and will be responsible for advising the Local Authority on the suitability of the work recommended and subsequently undertaken.

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 2001{revised 2012}, 2). This report follows the criteria laid down in this guidance document.

The aims of the assessment as given in the specification 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, and recommendations are made concerning further archaeological evaluation or mitigation.

### **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, which form part of the Historic Environment Record (HER), located at Gwynedd Archaeological Trust (GAT), Bangor. The archives held by Anglesey Archives, Llangefni and Bangor University were also consulted. Information about listed buildings was consulted by means of the CARN (Core Archaeological Index), which is the online index of the Royal Commission on Ancient and Historic Monuments, Wales. Relevant aerial photographs from the collection at RCAHM, Wales were examined.

The desk-based archaeological assessment studied a 2km wide radius of the site the field walkover survey subsequently targeted a 500m zone from the centre of the WTW site.

Sites, buildings and find spots listed in the regional HER were identified (Fig. 2), with PRN referring to the unique Primary Record Number given to each individual site.

#### **3.2 Field Search**

The field search was undertaken on 8th January 2013, when the area of the proposed WTW development, including a further 50m buffer zone, was examined. Notes were taken, sketches and measurements were taken of sites of potential archaeological interest and a photographic record was made. Weather was poor for a site visit with heavy rain, and ground conditions remained heavily waterlogged from recent wet conditions. The walk over survey was successfully completed despite the difficult conditions.

#### **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 in Appendix 2.

## **4. ARCHAEOLOGICAL RESULTS**

### **4.1 Geology and Topographic description**

The WTW is situated on the southern bank of Llyn Alaw, on low lying ground close to the valley floor at a height of about 30m OD, in an area of former marshland that was drained in the early 19<sup>th</sup> century (Bodorgan MSS 1275), forming small paddocks. It now consists of undulating made ground, created by the building of the Llyn Alaw Reservoir, and engineering associated with the subsequent WTW building.

The surrounding land slopes gently from the east from a height of about 43m, and with improved undulating grassland to the south. The regular hedgerows in the area appear to have been created as a result of agricultural improvements of 19<sup>th</sup> century date, as an earlier field system is shown on the tithe map of the parish of Llantrisant of 1845 (Gwynedd Archives; reproduced as Fig. 4).

The soils are mainly Cambrian Stagnogley brown earths and boulder clay, overlying partly Precambrian Gneiss rock of the Mona Complex and also Ordovician Shales (BGS 1981; Smith and George 1961, 88).

### **4.2 Archaeological and historical background**

#### *4.2.1. Prehistoric and Roman sites*

The area around Llyn Alaw is very rich in prehistoric archaeology. A burial Chamber of early Neolithic date is noted at Bod Deiniol (PRN 2074; SH 37028583), which lies about 800m WNW of the study area. Close by and to the west of this is the Glan Alaw Standing Stone (PRN 2066; SH 36838573) which is of probable early Bronze Age date. About 750m south of the study area is a mound (PRN 947; SH 37518470), which is of unknown date, but may be a Bronze Age barrow. It lies about 300m north of the Cors y Bol round barrow (PRN 2083; SH 37498436; SAM AN 091), which is a Scheduled Ancient Monument. It has been suggested that this is a henge monument of neolithic date (Davidson 1994)

About 2.6km west lies Bedd Branwen (PRN 2088; SH 36118497; SAM AN 098), which is also a Bronze Age Barrow. The site has been excavated on a number of occasions, firstly in 1813, but using modern archaeological methods by Lynch in the 1967, when it was found to have an elaborate ring kerb, 30m in diameter with a central cist covered by a low mound. Accompanying pottery vessels were also uncovered (Lynch 1991, 159-161).

The location of the WTW, on a low lying area would make the area suitable for Burnt Mounds. These are generally regarded as being bronze-age in date, and it is believed that they were used for cooking food through throwing fire heated hot stones into a pit of water, causing the water to boil, although a ritual function is a possibility. The pit and fire cracked stones sometimes survive archaeologically from this activity. No such sites have been identified in the vicinity of the WTW, but sites of this type are often found in areas close to watercourses, and the low lying ground close to the Afon Alaw would have been a very suitable location for them.

Later prehistoric archaeology is represented in the area by Y Werthyr Hillfort (PRN 2077; SH 36338431; SAM AN 158), a defended enclosure, which lies 1.8km south west of the WTW and probably dates from the last centuries BC. This site has been significantly damaged by agricultural activity, and was excavated in the 1960s, but it appears to be univallate at a height of about 65m OD, with the ramparts encircling the top of a low round

hill and with an entrance to the east (*ibid.*, 268). There appears to be an entrance on the north-east side (RCAHMW 1937, 114). It is shown as a circular feature on the Bodorgan estate map of 1724-7 (Bodorgan MSS 1579; Fig. 3).

No sites of demonstrably Roman date have been identified within 2km of the study area, although it is possible that late prehistoric sites, such as Y Werthyr, continued in use into Romano-British times.

#### 4.2.2 Medieval

Evidence for activity in the area in the medieval period is represented in the area by a possible early church site at Capel Deiniol (PRN 2070; SH 37208570) and at Rhodogeidio (PRN 4721; SH 39338461). These are recorded in documentary sources (GAT HER). The site at Rhodogeidio is situated within a possible enclosure, or *Llan*, about 200m across suggesting a possible early church site. Evidence of the medieval church is also noted at Llantrisant (PRN 7036; SH 34958406), where a partly medieval church building survives (Parry 2012). The second most valuable benefice in Anglesey in 1535 was Llantrisant with five associated chapels, worth £26 13s 4d (Carr 1982, 219).

During the medieval period land was divided into areas known as townships. They can sometimes be equated with the early medieval ecclesiastical parishes, although within this study area this is not an exact relationship. Medieval townships are recorded at Chwaen, Bodynolwyn and Llantrisant in Llantrisant Parish, and at Llanol, Gwaenydog and Ucheldre in Llanbabo Parish (Davidson 1994, 4; Jones-Pierce 1951).

Little evidence of potential medieval settlement has been found in this area, but this may be due to the fact that most of the area consists of improved fields of 18<sup>th</sup> and 19<sup>th</sup> century date, and archaeological evidence may survive below ground rather than as earthwork features. Both consolidated settlements and scattered farms would be expected, and it is possible that the boundaries shown on the early estate map (Bangor Archives, Bodorgan MSS B1579; Fig. 3), reflect the early Bodynolwyn township boundary.

#### 4.2.3 Post-Medieval and Modern

Bodnolwyn Wen, Bodnolwyn Groes, Caer Gwili and Bodnolwen Hir were the property of the Meyrick family of Bodorgan, through their intermarriage with the Prichard family of Dinam, Llangaffo, and had been so since at least the latter part of the 17<sup>th</sup> century (GAT 1994, 5). The estate map of 1724-7 shows that the farms were already in existence by this date, and it can be suggested that they consolidated into that pattern in the 16<sup>th</sup> century (Bodorgan MSS B1579, Bangor University Archives; Fig. 3). In 1786 John Jones is given a four life tenancy of Bodnolwyn Wen farm for £30 per annum (Bangor Archives, Bodorgan MSS 1154). In 1793 John Jones of Bodnolwyn Winn (*sic*) paid 9 shillings in land tax for his land (Anglesey Archives W/QT/62/16). The lands are shown on a Bodorgan estate map of 1724-1727, although little detail besides the boundary farmhouses themselves are shown (Fig. 3). In 1815 four small paddocks were created out of land drained from Cors Y Bol, the land on which the WTW now stands (Bangor Archives, Bodorgan MSS 1275).

In 1845 the property was noted on the tithe apportionment (Gwynedd Archives) and the estate is likely to have carried out agricultural improvements in the 19<sup>th</sup> century resulting in the creation of regular fields. The hedgerows and *cloddau* appear to be late 18<sup>th</sup> century of 19<sup>th</sup> century in date, and they are not shown on the 1724-1727 estate map (Fig. 3), although this cannot be taken to mean that there were none present. The tithe schedule is given below, with the field numbers corresponding to those shown on the Tithe Map (Fig. 4).

**Table 1 Tithe Apportionment for the parish of Llantrisant**

Landowner	Occupier	Plan Nos.	Name and Description of Land and Premises	State of Cultivation	Quantities in Statute Measure		
					A	R	P
Meyrick, Owen Fuller Esq.	Margaret Parry	30	Chwaen Goch	-	340	1	37
	William Humphrey	27	Bodnolwyn Groes	-	237	-	30
	Mary Williams	26	Bodnolwyn Hir	-	125	-	35
	Richard Jones	28	Caer Gwili	-	112	3	26
	Evan Jones	29	Bodnolwyn wen	-	180	2	-
	John Owen	46	Tan y rallt	-	104	1	35
	Robert Roberts	25	Rhyd y Coed	-	8	2	21
	William Parry	47	Tan Lawer	-	8	2	16

The site itself, before either the WTW or the reservoir were built, consisted of four small grassland paddocks to the south of a marshy area of rough pasture and forming part of the land of Bodnolwyn Wen farm (Ordnance Survey 25 inch 1<sup>st</sup> edition map of 1889, Ynys Môn Sheet VI.12, Fig. 5; Fig. 7). The land was taken for the construction of the Llyn Alaw reservoir and the WTW in the 1960s, and has been heavily disturbed and crossed by services (*Invent* Drwg. No. C1606/0-61).

### 4.3 Statutory and non-statutory designations

Sites on the Gwynedd HER within 2km of the study area are listed in Appendix 1. Four of the sites are Scheduled Ancient Monuments (SAMs), and the numbers of prehistoric sites in the vicinity of the WTW indicate that the area was an important one for both settlement and ritual activity. These are listed in Appendix 1 There is one Grade II Listed Building, Rhodogeido Church, within 2km of the WTW site, which is of medieval origin, and other medieval sites are believed to exist in the area.

Llyn Alaw is a site of Special Scientific Interest (SSSI), with considerable ornithological interest. The designation covers the area of open water and the WTW lies just outside the boundaries of this to the south.

The site is not located within a landscape of outstanding or special historic interest, as defined in Cadw's 1998 *Register of Landscapes of Outstanding Historic Interest in Wales*.

### 4.4 The Archaeological Survey (Fig. 2)

The feature listed below (located on Fig. 2) was identified during the survey, with recommendations for further assessment and mitigatory measures, where appropriate. The

assume impact only within the development zone defined by Black and Veatch. Any change to the boundary of the proposed development area will require the recommendations below to be changed also.

**Feature 1      WTW Site (Plates 1-6)**

*SH 53134115*

*Period: Post-medieval*

Category: C   Impact: Considerable

The development site consists of an area of scrubland to the east of the current WTW building, and west of the open water tanks. The area is one of uneven ground adjacent to the current WTW to the east, covered with deposits of soil, and with low scrub undergrowth. The land is crossed by a large number of services, and manhole covers are visible in the ground, and open water tanks have been constructed to the east (Plate 4).

It appears to have been landscaped with material dredge from Cors y Bol in 1965 when the reservoir was being constructed and from material subsequently added in connection with the WTW (Plates 1-3). The ground is shown as paddocks on the 1889 1<sup>st</sup> edition 25 inch OS map (Fig. 6), but none of this landscape is visible today.

The current WTW is visible from the surrounding area, particularly from the west. The approximate height of the ridge of the proposed new buildings, at 63.38m OD, is 1.08m less than the height of the current lime silo, which stands at a height of 64.46m. The visible building height is 9.387 on the south elevation (GL 54.0mAOD) and 10.705 on the north elevation (GL 52.682mAOD), which is slightly less than the current structures to the west.

***Recommendations for further assessment:*** None

***Recommendations for mitigatory measures:*** Partial Watching Brief

## **4.5 Aerial Photographs**

The following aerial photographs were examined, dating from 1945 and 1973. No additional archaeological sites were identified, although the 1945 image clearly shows the landscape prior to the construction of Llyn Alaw and the WTW (Fig. 7), with improved and drained pastureland shown where the WTW now stands, divided into paddocks. The site of Y Werthyr (PRN 2077, SAM AN158), and other known archaeological sites is particularly clear. The 1973 image shows the current reservoir and WTW.

- RAF 106G UK 655 frame 4294, taken 13<sup>th</sup> August 1945
- Ordnance Survey 73/020 frame 207, taken 21<sup>st</sup> March 1973



## **5. SUMMARY OF ARCHAEOLOGICAL POTENTIAL**

### **5.1 Location Summary**

The WTW is situated on the southern bank of Llyn Alaw, on low lying ground close to the valley floor at a height of about 30 OD, in an area of former marshland that was drained in the early 19<sup>th</sup> century (Bodorgan MSS 1275), forming small paddocks. It is located approximately 1km along a track running east off an unnumbered minor road between the villages of Llanbabo and Llantrisant, Ynys Môn (NGR SH37958545). It now consists of undulating made ground, created by the building of the Llyn Alaw Reservoir, and engineering associated with the subsequent WTW building.

### **5.2 Environmental Remains and Soil Morphology**

As the land on which construction is due to take place would appear to be made ground, it is thought that the potential for the survival of environmental remains is low. The observed soil appears to consist of mixed sands, silts and gravels. Geotechnical test pitting to the west of the WTW site has indicated that about 0.7m of top and subsoil are present over glacial till (Dŵr Cymru 2011). *If any additional geotechnical test pitting is completed at the location of the proposed WTW, it is recommended that this information is made available to GAT to support future mitigation.*

### **5.3 Artefactual Potential**

The potential for the survival of medieval or earlier artefacts is unknown, but is thought to be low, and any observed are fairly likely to be residual in soil that has been moved from other places.

## 6. SUMMARY OF RECOMMENDATIONS

### 6.1 Summary of Specific Recommendations

Number	Name	Importance	Impact	Recommendation for further evaluation	Mitigation recommendations
1	Llyn Alaw WTW site	C	Considerable	None	Partial watching Brief

### 6.2 General Recommendations

In addition to the specific recommendations given above the following scheme wide general recommendations are made.

- The potential for the identification of below ground archaeological remains at the WTW site is low and a **partial watching brief** would be adequate to examine the soil morphology within the WTW site (Appendix 2).
- Although no historic field boundaries are thought likely to be breached, and none exist within the development area, it is recommended that any boundary walls, hedges and *cloddau* are given a basic record (Appendix 2) and to be rebuilt in a sympathetic manner if they are breached as part of any plant or compound access arrangements.
- The surrounding landscape is one of significant archaeological importance. However the approximate maximum height of the ridge of the proposed new buildings, at 63.38m OD, which is 1.08m less than the height of the current lime silo, which stands at a height of 64.46m. There is likely therefore to be only limited wider archaeological landscape implications for the setting of the new work at the WTW.

## 7. CONCLUSIONS

The archaeological assessment at the Llyn Alaw WTW site identified that it was situated within a landscape of high archaeological potential for prehistoric and medieval settlement and ritual activity, and includes four SAMs within 2km of the site. The landscape contains sites from the neolithic to medieval periods, of which the Bronze Age burial mound of Bedd Branwen and the late prehistoric hillfort of Y Werthyr have been excavated archaeologically.

However the site itself, before either the WTW or the Llyn Alaw reservoir were built in the mid-1960s, consisted of four small grassland paddocks, reclaimed from marshland in 1815, to the south of a marshy area of rough pasture known as Cors y Bol, and forming part of the land of Bodnolwyn Wen farm. The land was the property of the Meyricks of Bodorgan, and the estate was at the forefront of agricultural improvement in the 18<sup>th</sup> and 19<sup>th</sup> centuries in the area.

The assessment identified that the area of expansion to the Llyn Alaw WTW consisted of rough ground made up of deposited material from the excavation of the Llyn Alaw reservoir and the construction of the WTW and development subsequently. It is possible however that some areas of earlier ground surfaces survive below these deposits. There were also noted to be a very significant number of services cut into this ground. The potential for the recovery of archaeological information in this area is considered to be low, and therefore a **partial watching brief** has been recommended.

## 8. ARCHIVE

The archive consists of historic maps, plans and aerial photographs, along with notes and digital images taken on the field visit. The archive is currently held by GAT under project code **G2297**.

One copy of the bound report will be sent to the GAPS archaeologist, and a further copy sent to the HER Archaeologist at the curatorial division of Gwynedd Archaeological Trust, Bangor, for deposition in the Regional HER. A copy of the report will be provided to the National Monument Record, Royal Commission on the Ancient and Historic Monuments of Wales, Aberystwyth.

## 9. REFERENCES AND OTHER SOURCES CONSULTED

BGS 1981 *Soil Map of England and Wales*

British Geological Society 1982 *British Geological Survey-Sheet 135 Solid Edition*

Cadw 1998 *Register of Landscapes of Outstanding Historic Interest in Wales*

Carr, A. D. 1982 *Medieval Anglesey*

Davies, R. 1999 *The Tithe Maps of Wales* (National Library of Wales)

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Fenton, R. 1917 *Tours in Wales 1804-1813* (Cambrian Archaeological Association)

GAT 1994 *Proposed Windfarm, Carmel, Anglesey. Archaeological Assessment*. Unpublished GAT Rep. No. 99

IFA 1994 *Standard and Guidance for Archaeological Desk-based Assessment* (rev. 2001 and 2008).

*Invent* Drwg. No. C1606/0-61

Lynch, F. 1991 *Prehistoric Anglesey* (2<sup>nd</sup> Ed.)

Parry, L.W. 2012 *Church of St. Afran, St. Ieuan and St. Sannan, Llantrisant, Anglesey-Archaeological Watching Brief*. Unpublished GAT Rep. No. 1069

Smith, B. and George, T.N. 1961 *British Regional Geology- North Wales*

### **Anglesey Archives, Llangeifni**

Tithe Map for the Parish of Llantrisant 1845

W/QT/62/16 Land Tax Assessment for Llantrisant 1793

### **Bangor University Archives**

Bodorgan MSS B1579 *Estate Survey of the Bodorgan Estate 1724-1727*

Bodorgan MSS 1151-1158 *Leases on Properties in Llantrisant 1780-1897*

Bodorgan MSS 1275 *An Estimate for Draining Cors y Bol* 29<sup>th</sup> May 1815

### **GAT Historic Environment Record**

#### **Ordnance Survey maps:**

1889 Anglesey First Edition County Series Sheet VI.12

1900 Anglesey Second Edition County Series Sheet VI.12

1915 Anglesey Third Edition County Series Sheet VI.12

**RCAHM Wales Aberystwyth**

Aerial Photographs

RAF106G/UK/655 Date: 13/08/1945 Frames: 4294

Ordnance Survey 73/020 frame 207, taken 21<sup>st</sup> March 1973



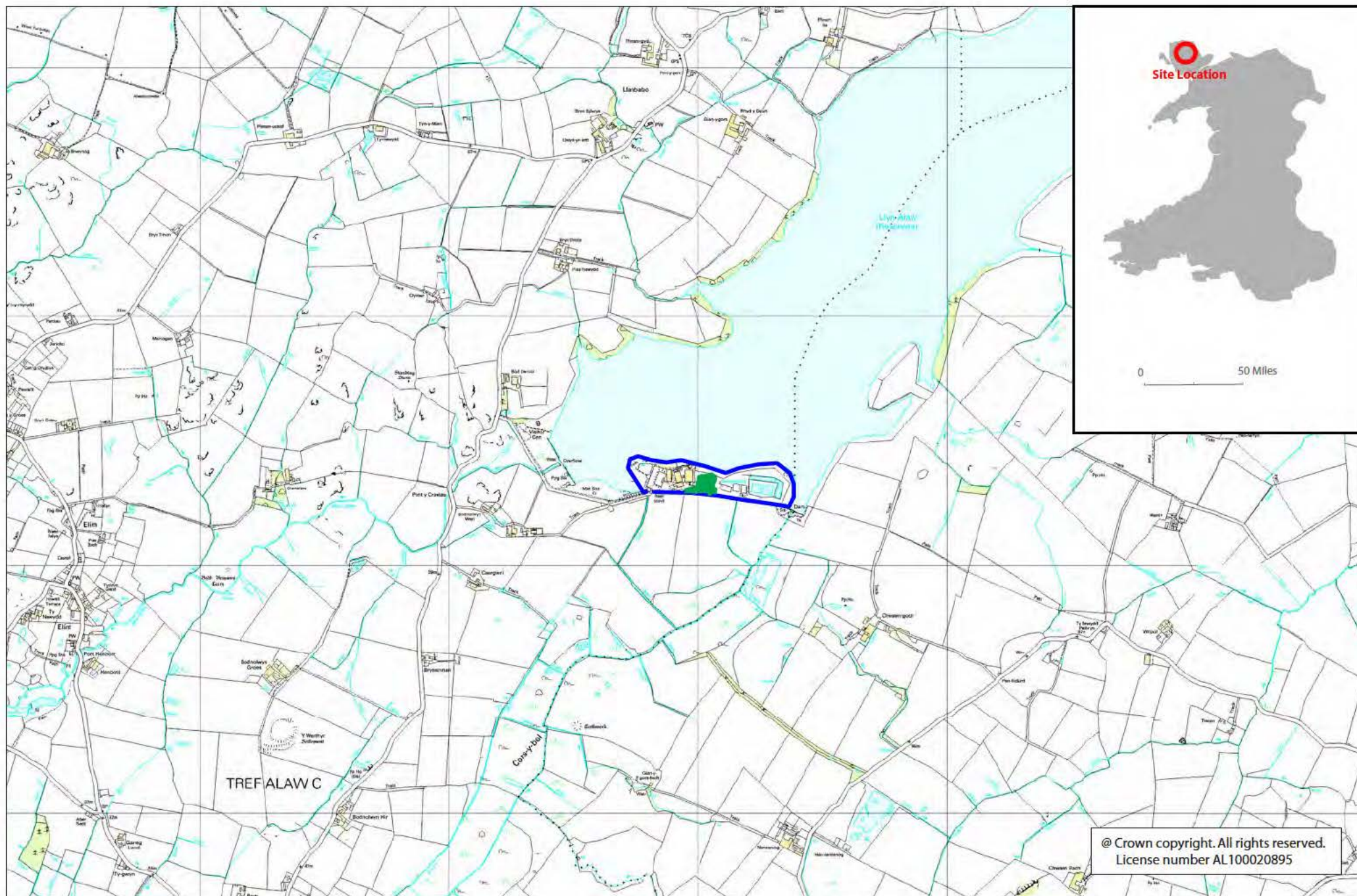


Fig. 1 Site Location. Base map taken from Ordnance Survey 1:10 000 series sheets SH38 and SH48. Scale 1:20 000 at A4. The current Water Treatment Works Zone is outlined blue and the proposed works are shaded green (towards the centre of the blue zone). For a detailed illustration of the proposed works, cf. Fig. 8



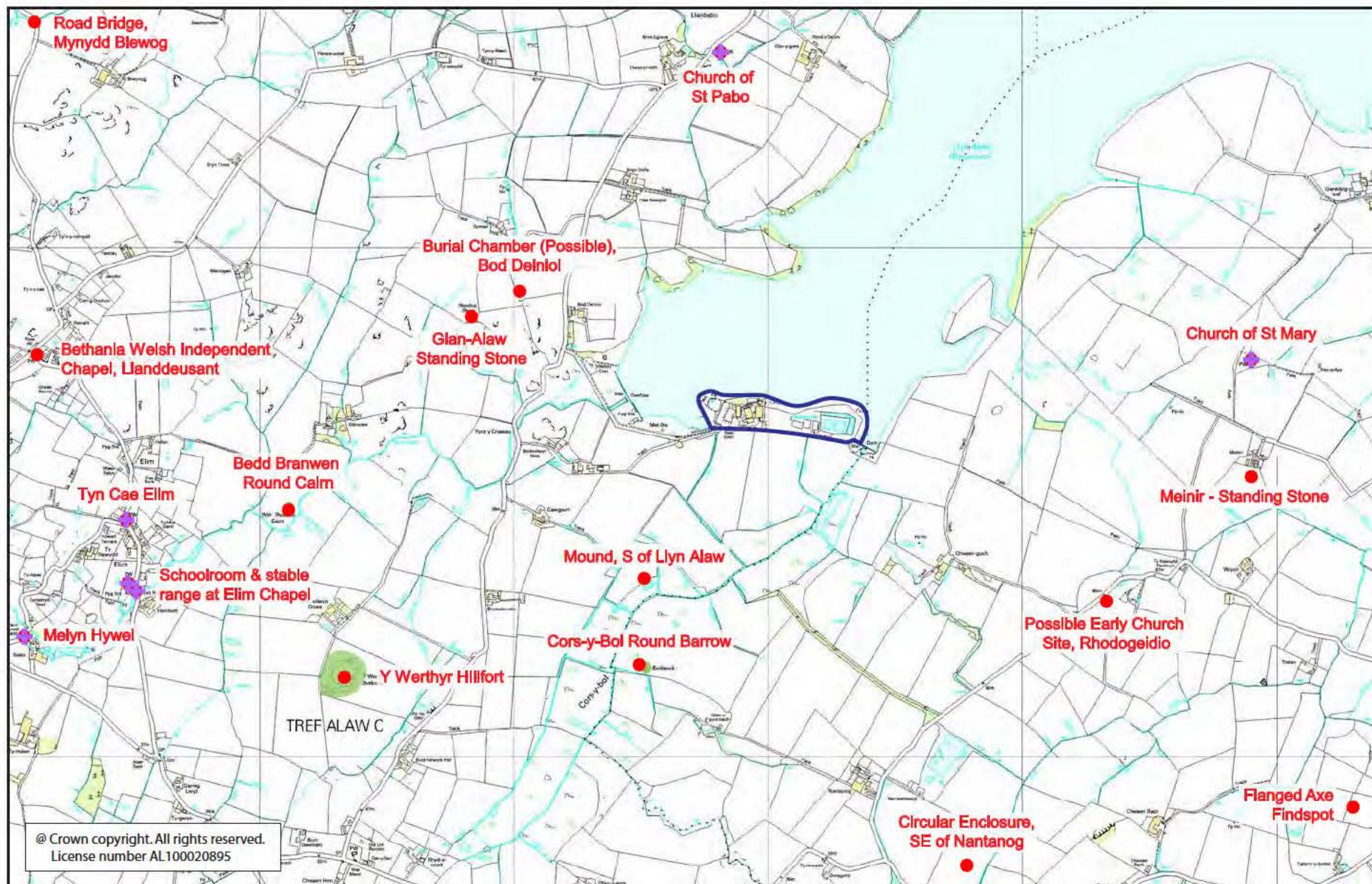


Figure 02: Map showing sites noted on the Gwynedd HER (red dots) and listed buildings (purple crosses). The WTW area is outlined in blue. Base map taken from Ordnance Survey 1:10 000 series sheets SH38 and SH48. Scale 1:25 000 at A4







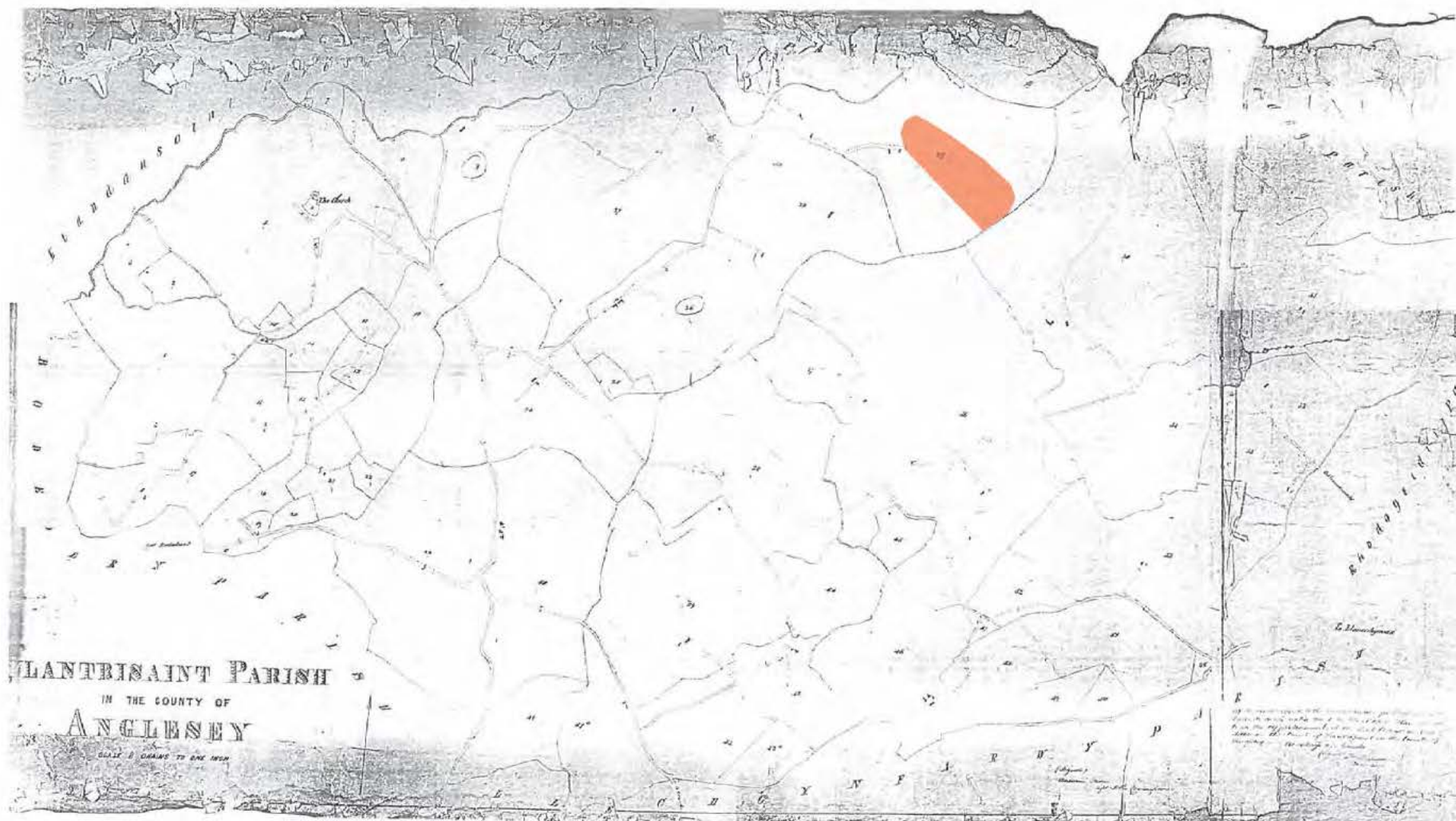


Fig. 4 Tithe Map of the Parish of Llantrisant of 1845.

The approximate area of the the existing Water Treatment Works is shaded in red; tithe map Field 29 (note the proposed works are located within the existing Water Treatment Works zone; cf. Fig.1 and Fig 8 for information on the proposed works).

Not to scale

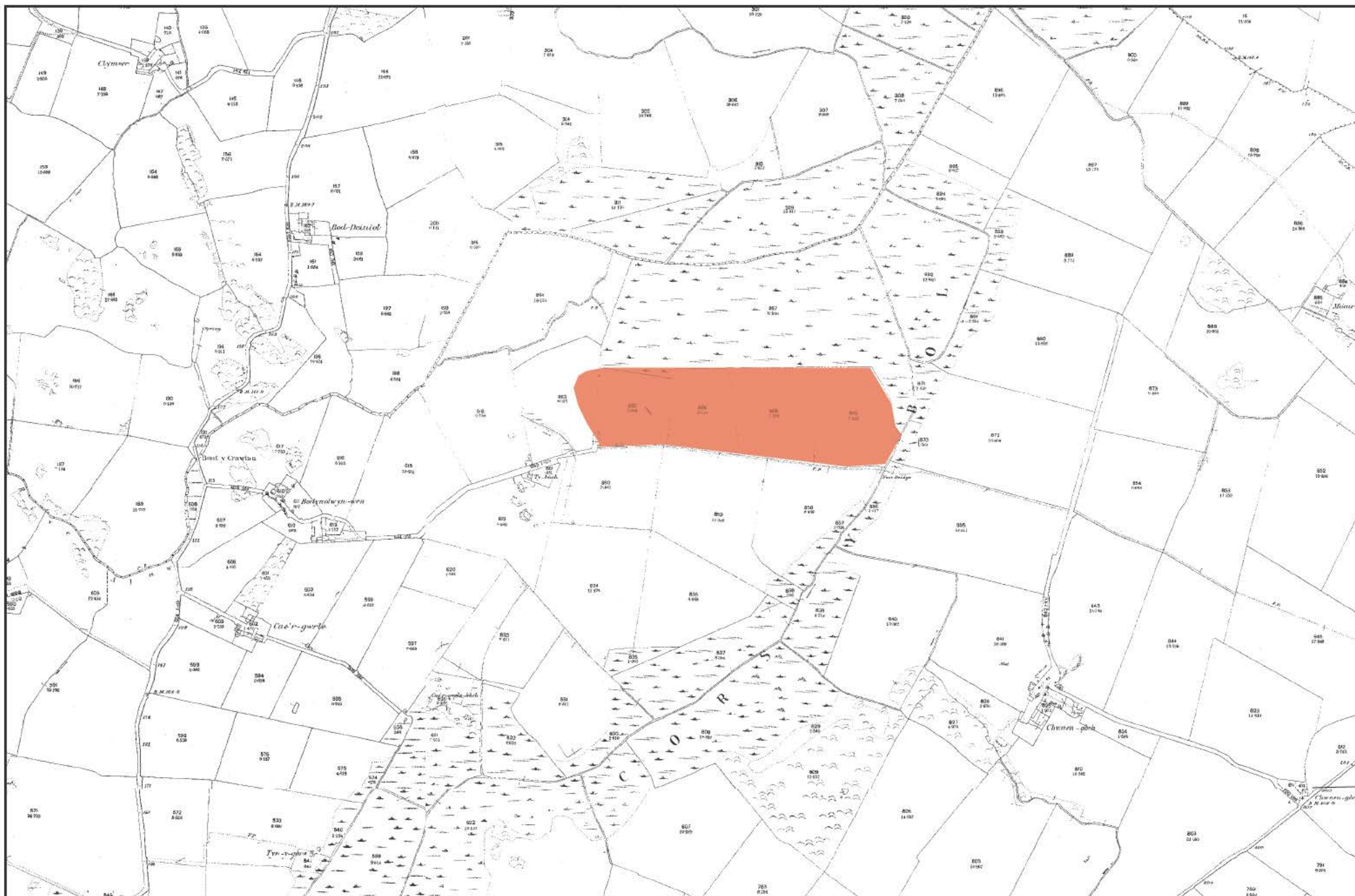


Fig. 5 Ordnance Survey 1st Edition 25 inch Map of 1889. Anglesey Series Sheet VI.12. Area of existing Water Treatment Works is shaded in red (note the proposed works are located within the existing Water Treatment Works zone; cf. Fig.1 and Fig 8 for information on the proposed works). Scale 1:7000 at A4







Fig. 7 RAF Aerial Photograph 106G/UK/155 frame 4294 taken 13th August 1945. The image shows the drained Cors y Bol, which took place in 1815. The existing Water Treatment Works is outlined in red (note the proposed works are located within the existing Water Treatment Works zone; cf. Fig.1 and Fig 8 for information on the proposed works).



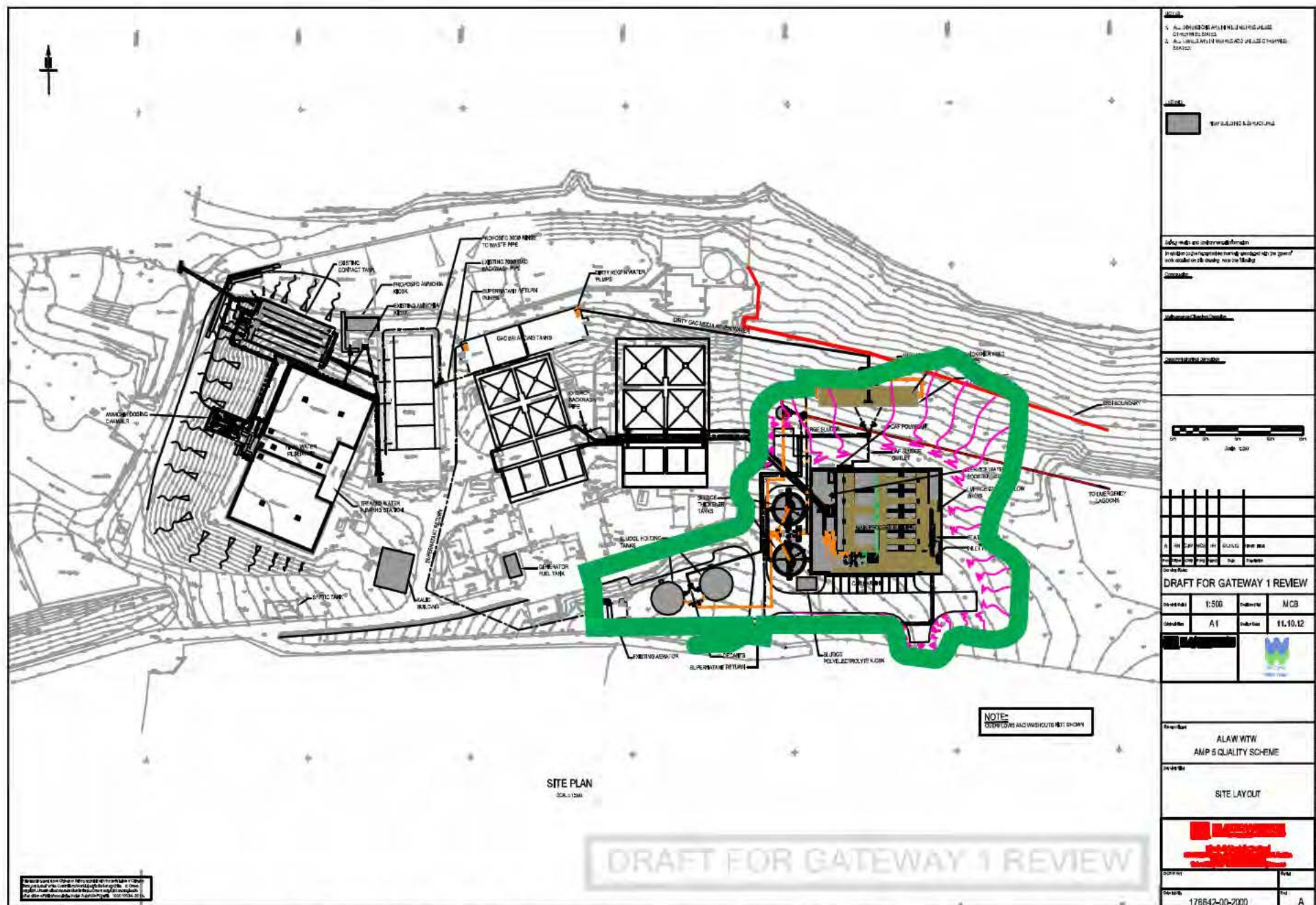


Fig. 8 Reproduction of Black & Veatch Ltd Drawing No. 176642-00-2000 detailing existing Water Treatment Works (centre and left portion of the illustration) and the proposed works (right portion of image outlined in green). The existing lagoons are not visible in this illustration but are to the right of the proposed works.





Plate 1: Llyn Alaw WTW from the east



Plate 2: View of development area, with the WTW in the background. View from the north-east





Plate 3: Llyn Alaw WTW from the north north-east, showing the development area



Plate 4: View of tanks east of development area, with the WTW in the background. View from the east



Plate 5: View of Llyn Alaw WTW across the water from the western bank of Llyn Alaw



Plate 6: View of Llyn Alaw WTW from the north west across Llyn Alaw





## APPENDIX 1

### Sites on the Gwynedd HER database, Listed Buildings and Scheduled Ancient Monuments (SAM), within 2km of the study area

PRN	Name	Grid Reference	Status (Scheduled Ancient Monument or Listed Building)	Date
2070	Capel Deiniol	SH37208570		Medieval-noted from documentary sources
2066	Standing Stone	SH36838573	SAM AN090	Probably Bronze Age
2074	Bod Deiniol Burial Chamber	SH37028583		Neolithic
947	Mound	SH37518470		Uncertain
2083	Cors y Bol Round Barrow	SH37498436	SAM AN091	Bronze Age
5870	Flint Scatter	SH37708440		Prehistoric
2088	Bedd Branwen	SH36118497	SAM AN098	Bronze Age
2077	Y Werthyr Hillfort	SH36338431	SAM AN158	Late Prehistoric
4721	Rhodogeido Church Site	SH39338461		Medieval-noted from documentary sources
2069	Meinir Standing Stone (site of)	SH39908510		Probably Bronze Age
2064	Rhodogeido Church	SH39908556	LB II No. 5402	Medieval- Post-Medieval

## APPENDIX 2

### Definitions of terms used within the report

#### 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.

#### Definition of Impact

The impact of the proposed development on each feature 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.

## **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. Topographic survey may also be employed where sites are thought to survive as earthworks.

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.

## **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.

APPENDIX 3

LLYN ALAW WATER  
TREATMENT WORKS

PROJECT DESIGN FOR  
ARCHAEOLOGICAL ASSESSMENT

***Prepared for***

BLACK & VEATCH LIMITED

***December 2012***

Ymddiriedolaeth Archaeolegol Gwynedd  
Gwynedd Archaeological Trust



# LLYN ALAW WATER TREATMENT WORKS

## PROJECT DESIGN FOR ARCHAEOLOGICAL ASSESSMENT (G2297)

Prepared for BLACK & VEATCH LIMITED, December 2012

### CONTENTS

1. INTRODUCTION .....	23
2. ARCHAEOLOGICAL AIMS.....	24
3. ARCHAEOLOGICAL BACKGROUND .....	25
4. PROGRAMME OF WORK .....	26
4.1 Introduction.....	26
4.2 Desk-based assessment .....	26
4.3 Field survey.....	27
4.3.1 Walkover.....	27
4.4 Field Evaluation .....	27
4.5 Data processing and report compilation .....	28
4.6 Definition of category of importance .....	28
5. DISSEMINATION AND ARCHIVING .....	30
6. PERSONNEL .....	31
7. HEALTH AND SAFETY .....	32
8. INSURANCE .....	33
9. OTHER .....	34
10. REFERENCES .....	35

## 1. INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by *BLACK & VEATCH LIMITED* to provide a cost and project design for carrying out an archaeological assessment in advance of proposed works at the location of the existing LLYN ALAW WATER TREATMENT WORKS (WTW).

The Llyn Alaw WTW is located approximately 1km along a track running east off an unnumbered minor road between the villages of Llanbabo and Llantrisant, Ynys Môn (NGR **SH37958545**). The main structures of the existing works are located in the west of the proposed area. The proposed development zone currently comprises 8000m<sup>2</sup> of bramble and coarse grass to the east of the main WTW buildings, and entirely within the current WTW complex between the current WTW and the open tanks.

This design will conform to the guidelines specified in *Standard and Guidance for historic environment desk-based assessment* (Institute for Archaeologists, 1994, rev. 2001, 2009 and 2011 [http://www.archaeologists.net/sites/default/files/node-files/DBA2010working%20draft\\_0.pdf](http://www.archaeologists.net/sites/default/files/node-files/DBA2010working%20draft_0.pdf)) and the

The content of this design must be approved by Gwynedd Archaeological Planning Service (GAPS) in line with Institute for Archaeologists guidelines.

## 2. ARCHAEOLOGICAL AIMS

A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets and, in England, the nature, extent and quality of the known or potential archaeological, historic, architectural and artistic interest. Significance is to be judged in a local, regional, national or international context as appropriate” (IFA 2011, 4)

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 design is for the first **three** phases only, and recommendations will be made for any field evaluation or appropriate mitigation required.

### 3. ARCHAEOLOGICAL BACKGROUND

Llyn Alaw Water Treatment Works (WTW) is located on the southern shore of the Llyn Alaw Reservoir, in the former parish of Llantrisant, Ynys Môn.

The surrounding land slopes gently from the east from a height of about 43m, and with improved grassland to the south. The regular hedgerows in the area appear to have been created as a result of agricultural improvements of 19<sup>th</sup> century date, as an earlier field system is shown on the tithe map of the parish of Llantrisant of 1845 (Gwynedd Archives).

The site itself, before either the WTW or the reservoir were built, consisted of four small grassland paddocks to the south of a marshy area of rough pasture and forming part of the land of Bodnolwyn Wen and Bod Deiniol farms (Ordnance Survey 25 inch 1<sup>st</sup> edition map of 1889, Ynys Môn Sheet VI.12). The land was taken for the construction of the Llyn Alaw reservoir and the WTW in the 1960s.

A number of archaeological sites are noted on the Gwynedd Historic Environment Record (HER) within 2km of the WTW site, dating from prehistoric to post-medieval times. These are noted in the table below:

PRN	Name	Grid Reference	Status (Scheduled Ancient Monument or Listed Building)	Date
2070	Capel Deiniol	SH37208570		Medieval-noted from documentary sources
2066	Standing Stone	SH36838573	SAM AN090	Probably Bronze Age
2074	Bod Deiniol Burial Chamber	SH37028583		Neolithic
947	Mound	SH37518470		Uncertain
2083	Cors y Bol Round Barrow	SH37498436	SAM AN091	Bronze Age
5870	Flint Scatter	SH37708440		Prehistoric
2088	Bedd Branwen	SH36118497	SAM AN098	Bronze Age
2077	Y Werthyr Hillfort	SH36338431	SAM AN158	Late Prehistoric
4721	Rhodogeido Church Site	SH39338461		Medieval-noted from documentary sources
2069	Meinir Standing Stone (site of)	SH39908510		Probably Bronze Age
2064	Rhodogeido Church	SH39908556	LB II No. 5402	Medieval- Post-Medieval

Four of the sites are Scheduled Ancient Monuments (SAMs), and the numbers of prehistoric sites in the vicinity of the WTW indicate that the area was an important one for both settlement and ritual activity. There is one Grade II Listed Building, Rhodogeido Church, within 2km of the WTW site, which is of medieval origin, and other medieval sites are believed to exist in the area.

Bodnolwyn Wen was the property of the Meyrick family of Bodorgan in 1845 (Gwynedd Archives, Llantrisant Tithe Apportionment) and the estate is likely to have carried out agricultural improvements later in the 19<sup>th</sup> century.

## 4. PROGRAMME OF WORK

### 4.1 Introduction

The project will take into account:

- The history of the site
- The potential impact of the proposals on archaeological remains
- The potential impact of the proposals on the setting of sites of archaeological importance
- The requirements for further assessment in the form of non-intrusive and intrusive field evaluation/further archaeological mitigation.

The desk-based assessment will incorporate a 2km HER Search and the field search a 500m radial zone surrounding the centre point of the proposed WTW.

The project will be undertaken in four stages:

- Desk-based assessment
- Field visit
- Report compilation
- Project archive

### 4.2 Desk-based assessment

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

The regional Historic Environment Register (HER) at Gwynedd Archaeological Trust (GAT) Craig Beuno, Bangor, Gwynedd LL57 2RT) will be examined for information concerning the study area. This will include an examination of the core HER, and secondary information held within the record which includes unpublished reports, the 1:2500 County Series Ordnance Survey maps, and the National Archaeological Record index cards. The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth, SY23 1NJ) will be checked for sites additional to the HER, and if required additional supporting information will be examined at the NMR.

Information about Listed Buildings and Scheduled Ancient Monuments from Cadw will be examined in the regional HER, with supporting information from Cadw if required. The Register of Outstanding and Special Historic Landscapes and the Register of Parks and Gardens will be checked, and also the location of World Heritage Sites.

Secondary sources will be examined, including the Inventories of the Royal Commission on Ancient and Historical Monuments for Wales, and works held within the regional libraries. Indices to relevant journals, including county history and archaeology society journals and national society journals such as *Archaeologia Cambrensis* will be checked. Also at this stage 19<sup>th</sup> century topographical dictionaries, antiquarian tours and trade directories will be examined where relevant.

Evidence from aerial photographs will be collated. Vertical and oblique collections held by the NMR, CCW and Welsh Assembly Government will be considered for examination. All photographs examined will be listed in the assessment report.

Archive maps, where relevant, will be consulted in the regional archive (Anglesey Archives Industrial Estate Road, Bryn Cefni Industrial Estate, Llangefni, Ynys Môn, LL77 7JA). This will include the relevant tithe map and information from Land Tax Assessments. If relevant antiquarian prints and photographs from the national and regional archives will be examined.

Results from previous archaeological work will be reviewed. These results, combined with the results from the desk-based assessment and field survey will be used to assess environmental potential, faunal potential and artefactual potential of the study area.

### **4.3 Field survey**

#### **4.3.1 Walkover**

This part of the assessment will involve a walkover of the study area and assessing the sites identified during the desk-based study. Any additional sites noted will also be assessed. The location of potentially well-preserved environmental deposits will be noted.

The aims of this stage of the work are to:

- verify the results of the desk based assessment
- identify any further archaeological sites which may exist as above ground features
- assess the potential for the preservation of below-ground archaeology
- assess the impact upon the historic landscape
- photograph and record the present condition of all sites noted.

**Access onto land is to be arranged by the Clients.**

### **4.4 Field Evaluation**

Following desk-based assessments field evaluation work may also be required in order to further assess the presence or absence of remains, their extent, nature, quality and character before determining the appropriate mitigation strategy, whether it be preservation *in situ*, archaeological excavation or a combination of the two. This will be discussed in the assessment along with alternative archaeological mitigation.

The evaluation may include:

- geophysical survey.
- a programme of trenching and/or test pits to investigate the proposed area in more detail.

Recommendations for any field evaluation considered necessary will be contained within the assessment report. Specific attention will be paid during the assessment as to the suitability of the geology for geophysical survey.

Any further archaeological works will need to be discussed and agreed with GAPS.

## 4.5 Data processing and report compilation

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

Non-technical summary

1. Introduction
2. Aims and purpose
3. Project Design
4. Methods and techniques, including details and location of project archive
5. Archaeological Background
6. Results of assessment in the form of a gazetteer
7. Assessment of impacts
8. Proposals for field evaluation and/or mitigation
9. Summary and conclusions
10. List of sources consulted.

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

A draft copy of the report will be sent to Gwynedd Archaeological Planning Service (GAPS) and to the client prior to production of the final report.

## 4.6 Definition of category of importance

To assess the importance of sites and to allow the appropriate mitigatory action to be proposed for each, a framework of categories will be used with each site allocated to a particular category according to its relative importance:

### Category A - Sites of National Importance.

This category includes Scheduled Ancient Monuments and Listed Buildings (Grade I and II\*) as well as those sites which would meet the requirements for scheduling (ancient monuments) or listing (grade I and II\* and certain grade II) 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 Importance

These sites are those which would not fulfil the criteria for scheduling, but may include Listed Buildings at grade II. They are sites 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. Sites that are Listed have legal protection, and it is recommended that all listed buildings are preserved *in situ*.

### Category C - Sites of District or Local Importance

These sites are not of sufficient importance to justify a recommendation for preservation if threatened, but nevertheless merit adequate recording in advance of damage or destruction.

### Category D - Minor and Damaged Sites

These are sites which are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category. For these sites the most appropriate mitigation is often rapid recording either in advance or during destruction.

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. This category can also apply to areas as well as to individual sites.



## ***5. DISSEMINATION AND ARCHIVING***

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. All plans, photographs and descriptions will be labelled, and cross-referenced, and lodged in an appropriate place within six months of the completion of the project. The location is to be agreed with the Curatorial Archaeologist.

Copies of the report will be sent to the regional HER; archaeological curator (GAPS) and the client.

The results of the assessment will be published in a suitable journal (e.g. Archaeology in Wales) if relevant.

## 6. *PERSONNEL*

The work will be managed by a Senior Archaeologist within GAT Contracts Section. The work will be undertaken by one of the Trust's Archaeologists experienced in the relevant skills/periods required. Full details of personnel involved, with *curricula vitae*, can be supplied upon request.

## *7. HEALTH AND SAFETY*

The Trust subscribes to the SCAUM (Standing Conference of Archaeological Unit Managers) Health and Safety Policy as defined in **Health and Safety in Field Archaeology** (2006). Risks will be assessed prior to and during the work. All staff will be issued with required personal safety equipment, including high visibility jacket, steel toe-capped boots and hard hat.

## 8. *INSURANCE*

*Liability Insurance - Aviva Policy 24765101CHC/00045*

- Employers' Liability: Limit of Indemnity £10m in any one occurrence
- Public Liability: Limit of Indemnity £5m in any one occurrence
- Hire-in Plant Insurance: £50,000.00 any one item;  
£250,000.00 any one claim

The current period expires 21/06/13

*Professional Indemnity Insurance – RSA Insurance Plc 201102552/1208*

- Limit of Indemnity £5,000,000 any one claim

The current period expires 22/07/13

## 9. *OTHER*

Any queries concerning the above should be directed to Principal Archaeologist Mr John Roberts at the Gwynedd Archaeological Trust Offices, Garth Road, Bangor. Telephone (01248) 352535 ext. **229**.

## 10. REFERENCES

Black and Veatch 2011 *Alaw WTW Geotechnical Desktop Study AMP 5 JET*. Unpublished Dwr Cymru Report

Gwynedd Archives, Tithe Map of Llantrisant Parish of 1845

*Standard and Guidance for historic environment desk-based assessment* (**Institute for Archaeologists**, 1994, rev. 2001, 2009 and 2011)

[http://www.archaeologists.net/sites/default/files/node-files/DBA2010working%20draft\\_0.pdf](http://www.archaeologists.net/sites/default/files/node-files/DBA2010working%20draft_0.pdf)

Ordnance Survey 25 inch 1<sup>st</sup> edition map of 1889. Ynys Môn Sheet VI.12





Gwynedd Archaeological Trust  
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