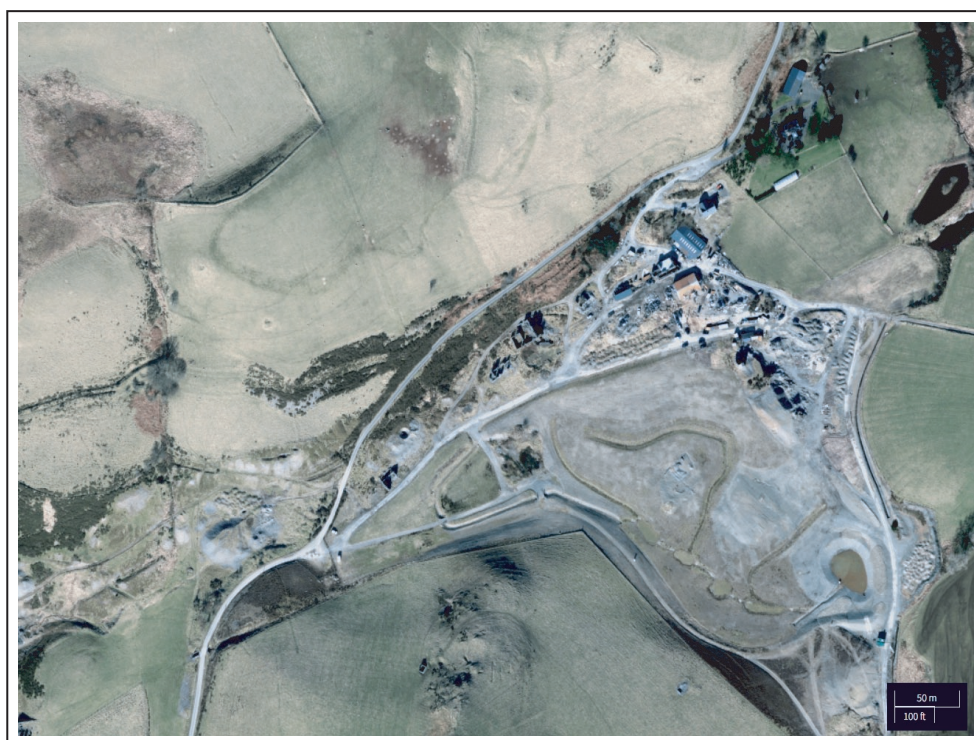




Frongoch Lead & Zinc Mine, Pontrhydygroes, Ceredigion.

Archaeological Watching Brief



By

Richard Scott Jones (*BA, MA, MCIfA*)

March 2022

HRS Wales
Report No: 251

ARCHAEOLOGICAL WATCHING BRIEF

Frongoch Lead & Zinc Mine, Pontrhydygroes, Ceredigion,

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On behalf of:

The Coal Authority

Date: March 2022

HRSW Report No: 251



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Non Technical Summary

The following report presents the results of an Archaeological Watching Brief during ground investigation works at the Frongoch Lead & Zinc Mine / Wemyss Lead & Zinc Mine– Williams Shaft, Pontrhydygroes, Ceredigion (centered on OS grid reference SN 72066 74424), in advance of and to inform water treatment works.

The specific objectives of this work were to undertake an archaeological watching brief during all investigative groundwork for the cutting of ten (10) machine dug trial trenches, six (6) infiltration test pits and six (6) hand excavated trial pits.

In summary, the archaeological watching brief during groundwork investigation works in the investigative area at the Frongoch Lead & Zinc Mine managed to establish the character of the below ground surface in the targeted areas. Of the ten (10) machine dug trial trenches, four of the trenches managed to locate the remains of the 19th Century mining leat as marked on the OS first edition map of 1887. Although the leat appeared to have been rock-cut, particularly in the area of the gorse bushes, the excavation did reveal that it appears that the leat may have been lined peat, which may have helped seal the leat slightly rather than the use of clay or else the use a timber built leat. No further dateable features or finds were recovered from any of the machine dug trenches, other than from Trial Trench No.16, where 20th Century waste material in the form of plastic and ironwork reached a depth of at least 2.8m directly at the base of the Hirnant Tips. No dateable finds and features were recovered from any of the hand dug trial pits which all revealed geology of sandy gravel and grit overlying a natural sedimentary shale.

1 Introduction

- 1.1 The following report presents the results of an Archaeological Watching Brief during ground investigation works at the Frongoch Lead & Zinc Mine / Wemyss Lead & Zinc Mine– Williams Shaft, Pontrhydygroes, Ceredigion (centered on OS grid reference SN 72066 74424), in advance of and to inform water treatment works.
- 1.2 The specific objectives of this work were to:
- Undertake an archaeological watching brief during all investigative groundwork for the cutting of ten (10) machine dug trial trenches, six (6) infiltration test pits and six (6) hand excavated trial pits..
- 1.3 The Technical Appendices for this report contains the following information:
- Appendix I: Figures;*
Appendix II: Photographs
Appendix III: Context Register
Appendix IV: Archive Cover Sheet

Site Location & Description (see Figures 1 - 4)

- 1.4 The Frongoch Lead & Zinc Mine is near the village of Pont-rhyd-y-groes, Ceredigion, and covers approximately 11 hectares. The mine produced lead and zinc ore from the late 1700s until the early 1900s, when it fell into disuse. From 1924 to 1930 the vast waste dumps were reworked to reclaim zinc and lead that had once been deemed uneconomical to recover. The mine is connected to nearby Wemyss Mine which worked the same mineral vein (The Frongoch Lode). The site is privately owned and has in recent years been used as a saw mill and is presently used for the storage of car parts.
- 1.5 The abandoned Wemyss Mine is located at the head of the Cwmnewydion valley, a tributary of the River Magwr, which joins the River Ystwyth at Abermagwr. The mine worked the Frongoch mineral lode alongside Frongoch and Graig Goch mines. Wemyss became an integral part of the larger Frongoch Mine and cannot be considered in isolation from its more illustrious neighbour. In the 1840s both mines came under the same ownership and the Wemyss drainage adit was extended to also serve the Frongoch workings, becoming the Frongoch Adit we know today.
- 1.6 The mines continued to be operated together with varying success throughout the latter half of the 19th century until they were acquired by the Belgian company ‘*Société Anonyme Minière*’ in 1898. The Belgians invested heavily in modernising and electrifying the mining operations, which included constructing a state-of-the-art hydro-electric power station at Pont Ceunant and a large ore dressing mill at Wemyss. However, the venture was short-lived and by 1904 the company were in liquidation and all of the mine’s machinery and effects were sold at auction.

- 1.7 Today, the Wemyss site is dominated by the ruins of the dressing mill and its large spoil tips which are bordered to the south by the Cwmnewydion Stream and to the west by the smaller Mill Race Stream. There are also the remains of the wheel pit for a 56-foot waterwheel, which was fed by a leat from Frongoch.
- 1.8 Both the Frongoch and Wemyss Mines are a major source of metals pollution, causing a chemical and ecological impact on downstream watercourses. The mines are the primary cause of the Frongoch Stream, Nant Cell, Nant Cwmnewydion and River Magwr failing to achieve the environmental quality standards for zinc, lead and cadmium required by the European Water Framework Directive (WFD). They are also a major source of zinc to the River Ystwyth, contributing to its failure of WFD standards. Fish population surveys carried out on the Nant Cwmnewydion showed the stream to be virtually fishless downstream of the Frongoch Adit to its confluence with the Magwr. The Nant Cell was also shown to be devoid of fish above its confluence with the River Ystwyth.

Background Information

- 1.9 Abandoned metal mines are the principal cause of failure to achieve Water Framework Directive (WFD) standards in Wales and drainage from underground workings, together with leaching and erosion of waste dumps are the major sources causing zinc, lead and cadmium failures.
- 1.10 In March 2011 Natural Resources Wales (NRW) diverted the Frongoch Stream to prevent it flowing into the mine and thus reduce the amount of contaminated water discharging from the Frongoch Adit into the Nant Cwmnewydion. This work was funded by the Welsh Government's Contaminated Land Capital Fund. The flow from the adit reduced by approximately 80% and metal loads by approximately 50% after the stream diversion, making future treatment of this discharge more feasible. This work also increased dilution of metals in the Frongoch Stream and Nant Cell, causing zinc concentrations to reduce by over 70%.
- 1.11 In January 2013 NRW started work on a project to further reduce pollution from the mine. The project was partly funded by the European Regional Development Fund, provided through the Welsh Government, and was delivered with technical support from the Coal Authority. The aim was to prevent rain and surface water from coming into contact with the contaminated mine waste, thus reducing the amount of metals being mobilised and entering the Frongoch Stream.
- 1.12 The first phase of the project, completed in 2013, involved the construction of a channel around the mine, directing surface water to a lined pond. This reduced the amount of water flowing through the mine waste and controlled the amount of water leaving the site, reducing the risk of flooding downstream.
- 1.13 In the second and final phase, the waste dumps were re-shaped and capped with clay and soils to prevent water ingress and to encourage re-vegetation. We also built channels to carry the clean surface water into a series of ponds, creating a wetland habitat. The works were designed to be sympathetic to the extensive archaeological remains present at the mine, to preserve its heritage

value for future generations. Dyfed Archaeological Trust carried out investigations at the site and recorded the features discovered during excavation of the mine waste.

- 1.14 The project was completed in June 2015 and we are currently monitoring its effectiveness. Early results have been encouraging with further reduction in metal concentrations, despite the wettest winter on record in Wales.
- 1.15 In order to design a suitable treatment system NRW are seeking a methodology to compile a longer term metal mines remediation programme across Wales as a whole. The programme will identify potential annual progression of sites towards remediation over the next fifteen years, incorporating checks at critical decision points to ensure only sites which are technically feasible and pass cost benefit assessments progress.

Development Proposals

- 1.16 To further inform the design making process a program of ground investigation works is to be undertaken at the Frongoch and Wemyss Mines This program of works for this phase entails the excavation by machine of ten (10) trial pits; the manual hand excavation of six (6) trial pits, and the excavation of six (6) infiltration test pits, to the north east and west of the Williams Shaft surrounding the Hirnant Tips.
- 1.17 These investigations are to confirm the nature of the material in these areas and to inform any remedial options.
- 1.18 Machine excavated Trial trenches are to be a maximum of 3 meters in depth and approximately 4m - 5m in length. These trial trenches will not undermine any adjacent slopes, tracks or other features. Trial trenches are to be reinstated to match existing levels and finish upon completion. The excavation of each of these trial pits will be supervised under archaeological watching brief conditions.
- 1.19 The hand excavated Trial Pits are to reach a depth of approximately 1.2m and approximately 0.50m in diameter. These manually excavated trial pits are to be reinstated to match existing levels and finish upon completion. The excavation of each of these trial pits will be supervised under archaeological watching brief conditions.
- 1.20 The proposed infiltration pits will measure approximately 250mm in diameter.

Historical & Archaeological Background *(see Figures 5 - 7)*

- 1.21 Frongoch Lead Mine is an extensive and important lead mine complex, first recorded in 1759 and last noted as a potential going concern in 1903. It was supplied with water for power and processing purposes from at least five reservoirs in the late nineteenth century: Pond Rhos-rhydd (SN 7045 7595), 2.3km to the north west of the mine, with Pond Glan-dwgan (SN 7070 7515) adjacent to its south; Llyn Frongoch (NPRN 32235; SN 7215 7535), 1km north of the mine, with the subsidiary

Blaen Pentre Pool (SN 7235 7487) adjacent to its south; and Ty'n-y-bwlch Pool (SN 7285 7470), some 800m to the north east of the mine.

- 1.22 In 1899 a Belgian firm, the *Societe Anonyme Metallurgique*, of Liege, took over Frongoch Mine and set about installing new electrically-driven plant. Power was supplied by a Pelton wheel and steam engine in a power house (NPRN 407230) adjacent to the road about 1.6km to the west. A five level dressing mill (NPRN 33870) was built on the (by then) closed Wemyss Mine (NPRN 33907) and this was served by a 700m-long tramway from Frongoch.
- 1.23 The Wemyss mine was a lead and zinc mine which operated in conjunction with Frongoch Mine (NPRN 302), working the Frongoch lode intermittently from 1861 to 1899, together with West Frongoch. In 1899 a dressing mill (NPRN 33870) was built on the site to process ore from Frongoch Mine. A fine wheelpit and remains of the dressing mill survive.

Geology

- 1.15 The geology of the area falls within the Undifferentiated Llandovery Rocks consisting of Mudstone, Siltstone and Sandstone.

2 Aims & Objectives

- 2.1 The aims of the watching brief, as defined by the ClfA (2014) were to:
- Allow a rapid investigation and recording of any archaeological features that are uncovered during the proposed groundwork.
 - Provide the opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief are not sufficient to support the treatment to a satisfactory or proper standard.

3 Methodology

Watching Brief

- 3.1 The archaeological watching brief was undertaken by HRS Wales staff using current best practice from 21st March – 24th March 2022.
- 3.2 All work was carried out by a suitably qualified archaeologist with relevant level membership of the Chartered Institute for Archaeologists (ClfA) and followed the ClfA Standard and Guidance for an archaeological watching brief (ClfA 2014).
- 3.3 All proposed groundwork was undertaken under close and constant archaeological supervision. All machine dug groundwork undertaken by the contractor was done using a mechanical digger with a toothless grading bucket. All hand dug trial pits were undertaken using a post-hole spade and shovel.

- 3.4 All archaeological deposits or features when encountered were investigated and recorded. All finds recovered during the watching brief were to be bagged and a grid coordinate was taken using a handheld GPS device in order to locate the find-spot with the OS national grid.
- 3.5 Any recording required was to be carried out using HRS Wales recording systems (pro-forma context sheets etc), using a continuous number sequence for all contexts.
- 3.6 Where considered necessary plans and sections were drawn to a scale of 1:50, 1:20 and 1:10 as required and related to Ordnance Survey datum and published boundaries where appropriate.
- 3.7 All features identified were tied in to both the OS National Grid and all local site and ground plans.
- 3.8 Photographs were appropriated in digital format, using a 24 mega-pixel DSLR camera in RAW format, to be exported later to TIFF format.

4 Results of Watching Brief (see Figure 4)

- 4.1 The archaeological watching brief was undertaken over a period four (4) days from 21st March to the 24th March 2022.
- 4.2 Groundwork entailed the excavation by machine of ten (10) trial pits; the manual hand excavation of six (6) trial pits, and the gathering of data from six (6) infiltration test pits, to the north east and west of the Williams Shaft surrounding the Hirnant Tips.
- 4.3 Given that the infiltration test pits entailed the insertion into the ground of an approximately 0.50m diameter collar into the ground without the removal of turf and then the observation of the speed of percolation of water through the ground at six targeted areas, then the archaeological data potential was of no consequence and as such the results of the infiltration test pits are not discussed in the following section, which concentrate only on the machine dug and hand dug trial pits/trenches.
- 4.4 All number enclosed in () refer to contexts encountered.

4.5 Trial Pits (Hand Dug) – No's. 1 – 4 and No's. 7 - 8

- 4.6 Each hand excavated trial pit was undertaken using a post-hole spade and shovel and each hole measured between 0.40m – 0.50m in diameter and were to reach a maximum depth of only 1.20m.

4.7 Trial Pit No.1

- 4.9 This small hand excavated trial pit was positioned at the far north-western end of the investigation area on the south facing slope of Cwm Newyddion, overlooking the mine to the south and southeast. This trial pit was positioned northwards upslope from the position of the known 19th Century mining leat. This pit measured approximately 0.40m in diameter and reached a depth of 1.05m. Once the turf and top soil (100) had been removed, a natural deposit of orange clay and grit (101) became exposed, which reached a depth of approximately 0.50m. Directly below this was a natural stony clay/shale to the base of the trench (102). No finds became exposed in this trench.

4.8 Trial Pit No.2

4.9 This small hand excavated trial pit was positioned at the far north-eastern end of the investigation area on the south facing slope of Cwm Newyddion, overlooking the mine to the south and southeast. This trial pit was positioned upslope from the position of the known 19th Century mining leat and east of Trial Pit No.1. This pit measured approximately 0.40m in diameter and reached a depth of 1.10m. Once the turf and top soil (100) had been removed, a stony clay/shale was exposed to the base of the trench (101). No finds became exposed in this trench.

4.10 Trial Pit No.3

4.11 This small hand excavated trial pit was positioned at the far north-western end of the investigation area on the south facing slope of Cwm Newyddion, overlooking the mine to the south and southeast. This trial pit was positioned northwards upslope from the position of the known 19th Century mining leat, but below Trial Pit No.1. This pit measured approximately 0.40m in diameter and reached a depth of 0.75m. Once the turf and top soil (100) had been removed, a natural deposit of stony clay/shale became exposed to the base of the trench (101). No finds became exposed in this trench.

4.12 Trial Pit No.4

4.13 This small hand excavated trial pit was positioned at the far north-eastern end of the investigation area on the south facing slope of Cwm Newyddion, overlooking the mine to the south and southeast. This trial pit was positioned northwards upslope from the position of the known 19th Century mining leat, but east of Trial Pit No.3. This pit measured approximately 0.40m in diameter and reached a depth of 0.80m. Once the turf and top soil (100) had been removed, a natural deposit of stony clay/shale became exposed to the base of the trench (101). No finds became exposed in this trench.

4.14 Trial Pit No.7

4.15 This small hand excavated trial pit was positioned at the far eastern end of the investigation area overlooking the highway road to the south and overlooking the mine to the south. This pit measured approximately 0.40m in diameter and reached a depth of 1.20m. Once the turf and top soil (100) had been removed, a natural deposit of orange clay and grit (101) became exposed, which reached a depth of approximately 0.50m. Directly below this was a natural stony clay/shale to the base of the trench (102). No finds became exposed in this trench.

4.16 Trial Pit No.8

4.17 This small hand excavated trial pit was positioned at the far eastern end of the investigation area overlooking the highway road to the south and overlooking the mine to the south. This pit was positioned southwest of Trial Pit No.7. This pit measured approximately 0.40m in diameter and reached a depth of 1.00m. Once the turf and top soil (100) had been removed, a natural deposit of orange stony clay/shale became exposed to the base of the trench (101). No finds became exposed in this trench.

4.18 *Trial Pits (Machine Dug) – No's. 5 - 6 and No's. 9 - 16*

4.19 Trial Pit No.9

4.20 This trial pit was positioned within an area of dense gorse bushes along the route of the known 19th Century mining leat as shown on the OS First edition map of 1887. The trench measured approximately 3m x 2m and was aligned N-S and reached a depth of between 1.30m – 1.40m. Once the turf/top soil had been removed (100) a sub deposit of soil/shale and grit became exposed (101) which varied in depth from between 0.20m at its southern end to approximately 1m at its northern end. Directly below this was a dark band of silt/shale (102) that appeared to have once been exposed to light given that it was oxidized, suggesting a previously exposed deposit. This band appeared curve downwards at its northern end suggestive of filling a previous ditch or leat. Directly below this dark band was a deposit of loose grey shale (103) that also was deeper at its northern end than its southern end, again suggestive of being a fill of an earlier cut ditch or leat. Directly below this loose shale was natural shale bedrock (104) that appeared to have been cut (105), again evidence for a cut ditch or leat. No datable finds were recovered from this trench.

4.20 Trial Pit No. 10

4.21 This trial pit was again positioned within the same area of dense gorse bushes along the route of the known 19th Century mining leat, as shown on the OS First edition map of 1887. The trench also measured approximately 3m x 2m and was aligned N-S and reached a depth of between 1.30m – 1.40m. Once the turf/top soil had been removed (100) a sub deposit of soil/shale and grit became exposed (101) which varied in depth from between 0.20m at its southern end to approximately 1m at its northern end. Directly below this was a dark band of silt/shale (102) that had evidence for the remains of peat turfs set within its matrix. This dark and organic band appeared to mark the fill of a previous ditch or leat. Directly below this dark band was a deposit of loose grey shale (103) that was also suggestive of being a fill of an earlier cut ditch or leat. Directly below this loose shale was a natural shale and pale orange grit (104) that appeared to have been cut (105), again evidence for a cut ditch or leat. No datable finds were recovered from this trench.

4.22 Trial Pit No. 11

4.23 This trial pit was again positioned within the same area of dense gorse bushes along the route of the known 19th Century mining leat, as shown on the OS First edition map of 1887. The trench also measured approximately 3m x 2m and was aligned N-S and reached a depth of between 1.30m – 1.40m. Once the turf/top soil had been removed (100) a sub deposit of orange soil/shale and grit became exposed (101). This deposit was approximately 0.30m in depth. Directly below this was a dark band of silt/shale (102) that had evidence for the remains of peat turfs set within its matrix. This dark and organic band appeared to mark the fill of a previous ditch or leat. Directly below this dark band was a deposit of loose grey shale (103) that was also suggestive of being a fill of an earlier cut ditch or leat. Directly below this loose shale was a natural shale and pale orange grit (104) that

appeared to have been cut (105), again evidence for a cut ditch or leat. No datable finds were recovered from this trench.

4.24 Trial Pit No. 12

4.25 This trial pit was again positioned on a flat platform area along the route of the known 19th Century mining leat, as shown on the OS First edition map of 1887. The trench measured approximately 4m x 1.75m and was aligned N-S and reached a depth of between 0.50m – 1.00m. Once the turf/top soil had been removed (100) a sub deposit of pale brown soil/shale and grit became exposed (101). This deposit was approximately 0.30m in depth. Directly below this was a dark band of apparent organic deposit or else an oxidized deposit suggestive of former exposure to light for some time (102). Evidence for the remains of some peat was also evident in this deposit. This dark and organic band very likely marks the route of a previous ditch or mining leat. No datable finds were recovered from this trench.

4.26 Trial Pit No. 13

4.27 This trial pit was again positioned in a grassed area to the south of Trial Pit No.9. The trench measured approximately 3m x 2m and was aligned N-S and reached a depth of between 1.40m – 1.80m. Once the turf/top soil had been removed (100) a sub deposit of orange sandy gravel/grit became exposed (101) which averaged approximately 0.20m in depth. Directly below this was pale yellow sandy shale which averaged approximately 0.80m in depth (103). Directly below this to the base of the trench was natural shale bedrock. No datable finds were recovered from this trench.

4.28 Trial Pit No. 14

4.29 This trial pit was again positioned in a grassed area to the southwest of Trial Pit No.13. The trench measured approximately 3m x 2m and was aligned N-S and reached a depth of between 1.25m. Once the turf/top soil had been removed (100) a sub deposit of orange sandy gravel/grit became exposed (101) which averaged approximately 0.50m in depth. Directly below this was natural shale bedrock (102). No datable finds were recovered from this trench.

4.30 Trial Pit No. 15

4.31 This trial pit was again positioned at the base of the Hirnant Tips at the far west end of the investigation area in an area of waste tipping also currently used for farming waste materials. The trench measured approximately 2m x 2m and reached a depth of between 2.20m. Once the turf/top soil had been removed (100) a sub deposit of orange sandy gravel/grit became exposed (101) which averaged approximately 0.20m in depth. Directly below this was natural grey shale (102) to the base of the trench. No datable finds were recovered from this trench.

4.32 Trial Pit No. 16

4.33 This trial pit was again positioned at the base of the Hirnant Tips at the west end of the investigation area in an area of waste tipping also currently used for farming waste materials, but also east of Trial

Pit No.15. The trench measured approximately 2.00m x 3.00m and reached a depth of between 2.40m and 3.00m. Once the turf/top soil had been removed (100) a dark deposit of 20th Century waste material (plastic, ironwork etc.) became exposed (101), which reached a depth of approximately 2,80m. Directly below this was a loose grey shale (102) to the base of the trench. This loose shale was very likely the base of the spoil tipping of the Hirnant Tips. No other datable finds or features were recovered from this trench.

5. Conclusion & Recommendations

- 5.1 The archaeological watching brief during groundwork investigation works in the investigative area at the Frongoch Lead & Zinc Mine managed to establish the character of the below ground surface in the targeted areas. Of the ten (10) machine dug trial trenches, four of the trenches managed to locate the remains of the 19th Century mining leat as marked on the OS first edition map of 1887. Although the leat appeared to have been rock-cut, particularly in the area of the gorse bushes, the excavation did reveal that it appears that the leat may have been lined peat, which may have helped seal the leat slightly rather than the use of clay or else the use a timber built leat. No further dateable features or finds were recovered from any of the machine dug trenches, other than from Trial Trench No.16, where 20th Century waste material in the form of plastic and ironwork reached a depth of at least 2.8m directly at the base of the Hirnant Tips. No dateable finds and features were recovered from any of the hand dug trial pits which all revealed a geology of sandy gravel and grit overlying a natural sedimentary shale.

6 Acknowledgements

Thanks to; All at Soil Engineering for their time and patience and understanding during the groundwork.

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- *Ordnance Survey 1st Edition map of 1887 (1:10560);*
- *Ordnance Survey 2nd Edition map of 1906 (1:10560);*
- *Ordnance 1953 (1:10560);*

APPENDIX I:

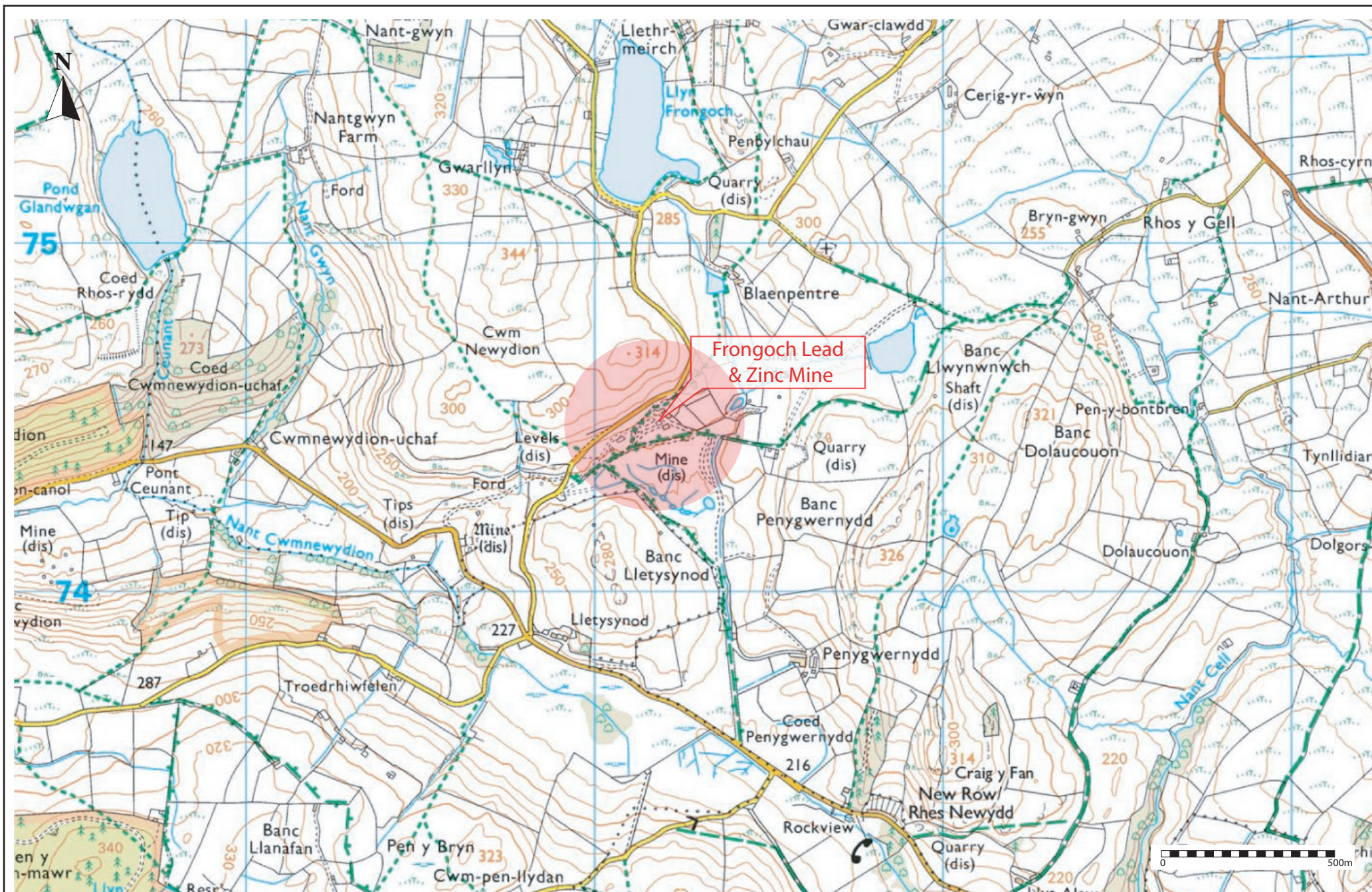
Figures



Project Title: Frongoch Lead & Zinc Mine, Ponrhydygroes.		
Date: 29th March 2022	Approx. Scale (@ A4):	
Drawn by:	Drawing No.	

Figure 1.
Location Map (OS 1:50,000 Landranger)





Project Title: Frongoch Lead & Zinc Mine, Porthdygroes.

Date: 29th March 2022

Drawn by:

Approx. Scale (@ A4):

Drawing No.

Figure 2.

Location Map (OS 1:25,000 Explorer)





Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date: 29th March 2022

Approx. Scale (@ A4):

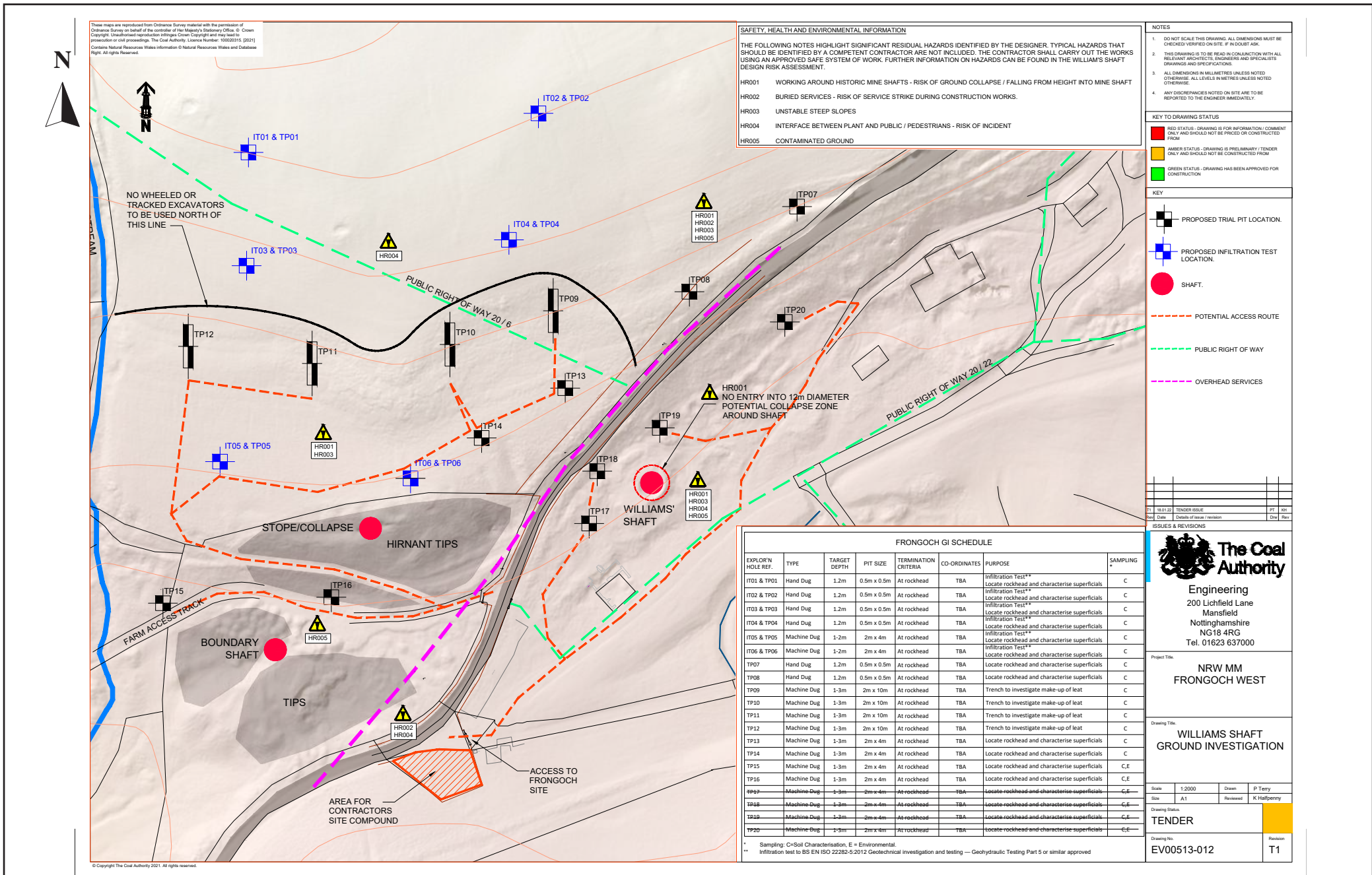
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Figure 3.

OS Aerial Photo (2016)





Project Title: Frongoch Lead & Zinc Mine, Ponrthydygroes.

Date: 29th March 2022

Approx. Scale (@ A4):

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Drawing No.

Figure 4.

Ground Investigation trenches/pits locations (Machine dug, hand dug and infiltration pits).





Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date: 29th March 2022

Approx. Scale (@ A4):

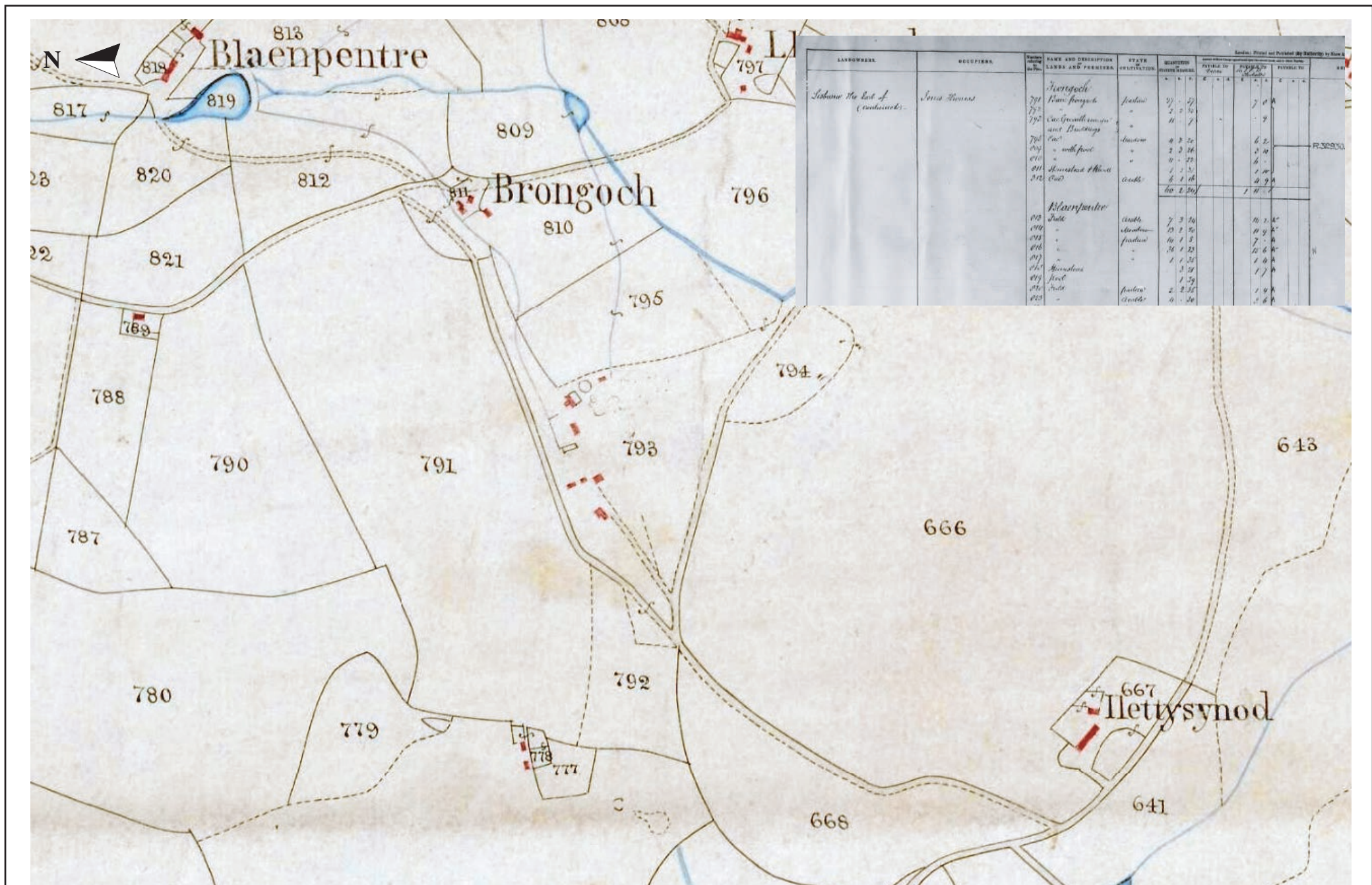
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Figure 5.

Proposed Ground Investigation trench locations overlying OS Aerial Photo (2016)





Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date: 29th March 2022

Drawn by:

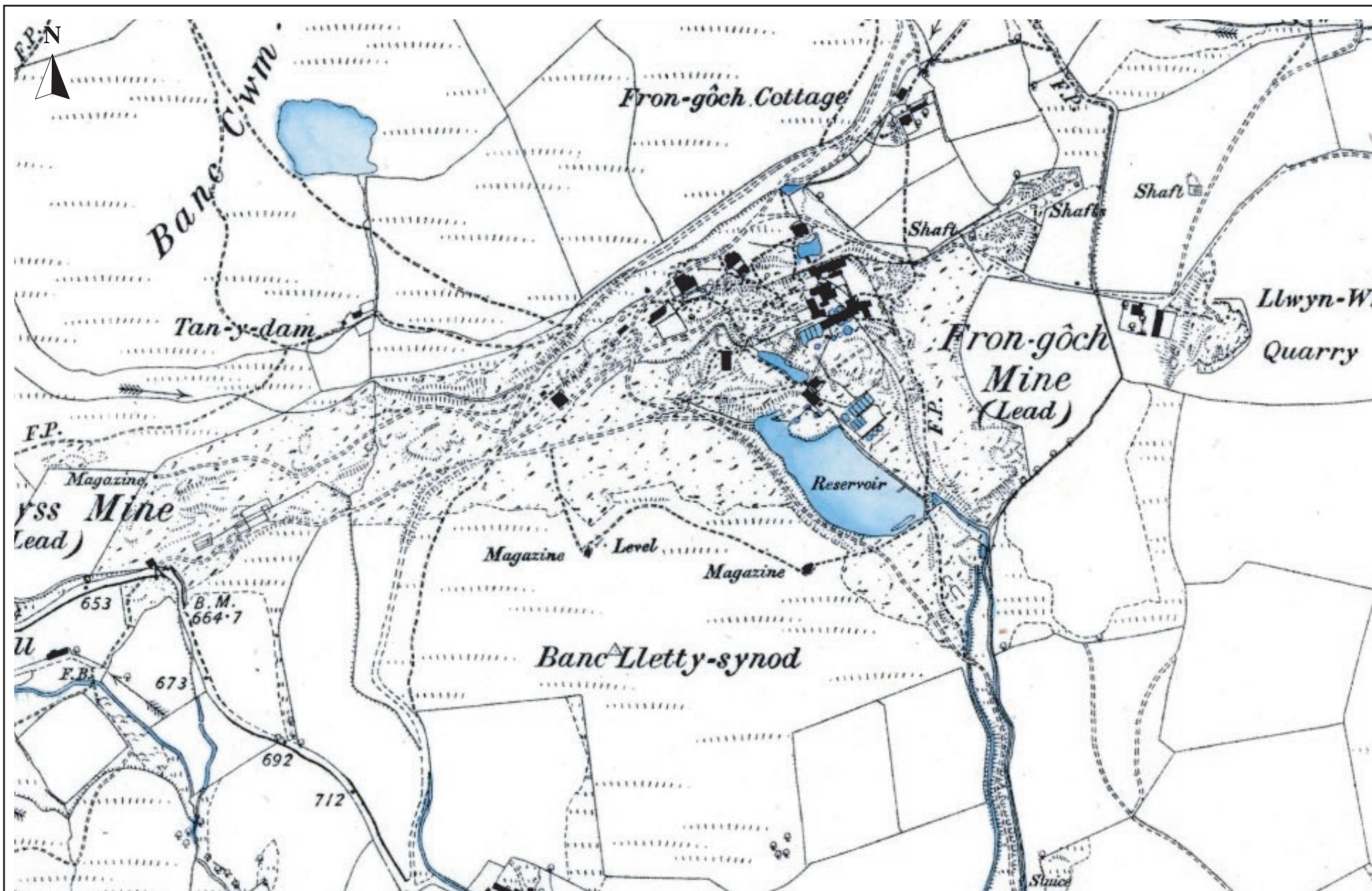
Approx. Scale (@ A4):

Drawing No.

Figure 6.

Tithe Map and apportionment details for Llanfiangel y Creiddyn parish (1848)





Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date: 29th March 2022

Drawn by:

Approx. Scale (@ A4):

Drawing No.

Figure 7.

Ordnance Survey First Edition Map (1887)





Project Title: Frongoch Lead & Zinc Mine, Ponrhydygroes.

Figure 8.

Date: 29th March 2022

Approx. Scale (@ A4):

Ordnance Survey Second Edition Map (1906)

Drawn by:

Drawing No.





Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date: 29th March 2022

Drawn by:

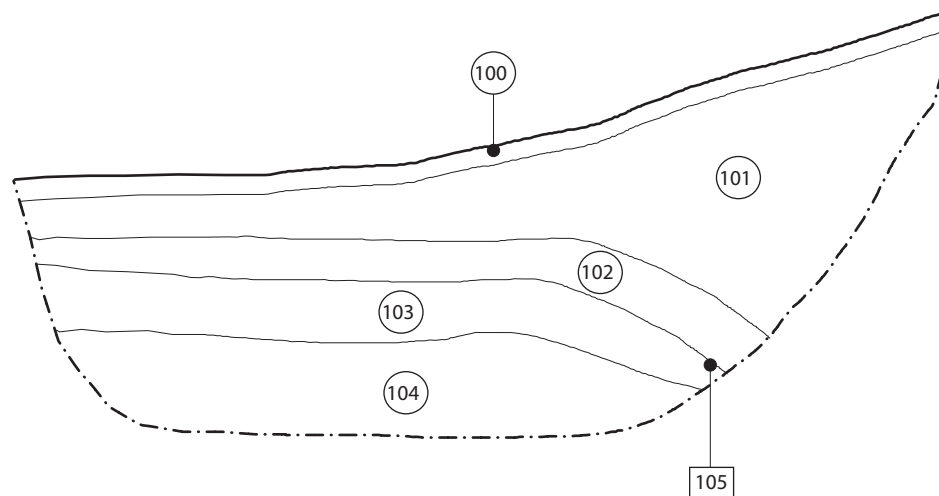
Approx. Scale (@ A4):

Drawing No.

Figure 9.

Ordnance Survey 1953 Edition Map

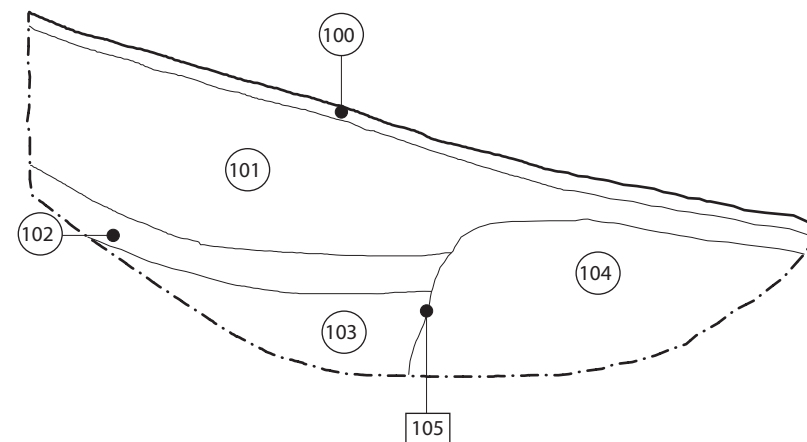




Trial Pit 09
- East Facing Section -

Contexts

- 100 - Turf / Top Soil
- 101 - Soil/shale/grit
- 102 - Dark band of oxidised silt/shale
- 103 - Loose grey shale
- 104 - Natural shale bedrock
- 105 - Cut for 19th Century mining leat



Trial Pit 10
- West Facing Section -

Contexts

- 100 - Turf / Top Soil
- 101 - Soil/shale/grit
- 102 - Dark band of oxidised silt/shale
- 103 - Loose grey shale
- 104 - Natural shale and pale orange grit
- 105 - Cut for 19th Century mining leat



Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date: 29th March 2022

Approx. Scale (@ A4):

Drawn by:

Drawing No.

Figure 10.

East and West Facing Sections of Ground Investigation Trial Pits (No's 9 and 10)



APPENDIX II:

Photo plates



Plate 01. Panoramic view of area of proposed Ground Investigation trenches immediately west of Frongoch Lead & Zinc Mine.

Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date taken: 23rd February 2022

Photographer: Richard Scott Jones

Plate No.

01



Plate 02. Trial Pit No. 1 (Hand dug).



Plate 03. Trial Pit No. 2 (Hand dug).



Plate 04. Trial Pit No. 3 (Hand dug).



Plate 05. Trial Pit No. 4 (Hand dug).



Plate 06. Trial Pit No. 5 (Machine dug).



Plate 07. Trial Pit No. 6 (Machine dug).


Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.		Photo Plate No's. 02- 07	
Date Taken: 22nd March 2022	Approx. Scale (@ A4):		
Appropriated by: RSJ	Drawing No.		



Plate 08. Trial Pit No. 7 (Hand dug).



Plate 09. Trial Pit No. 8 (Hand dug).



Plate 10. Trial Pit No. 9 (Machine dug). Looking northwards.



Plate 11 Trial Pit No. 9 (Machine dug). South facing section.



Plate 12. Trial Pit No. 9 (Machine dug). East facing section showing trench cut. Looking west.



Plate 13. Trial Pit No. 9 (Machine dug). South facing section.


Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.		Photo Plate No's. 08- 13	
Date Taken: 22nd March 2022	Approx. Scale (@ A4):		
Appropriated by: RSJ	Drawing No.		



Plate 14. Trial trench No. 10 (Machine dug). South facing section.

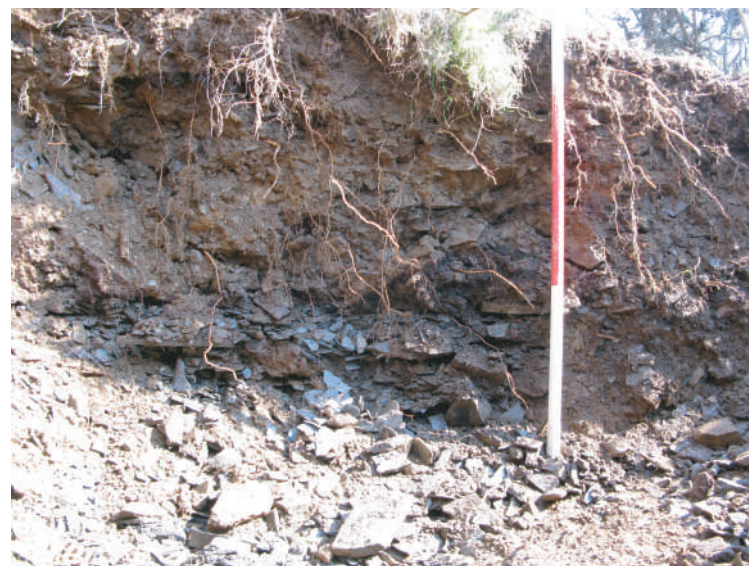


Plate 15. Trial trench No. 10 (Machine dug). West facing section.



Plate 16. Trial trench No. 11 (Machine dug). Working shot.



Plate 17. Trial trench No. 11 (Machine dug). West facing section showing cut and fill of 19th Century mining leat.

Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date taken: 23rd February 2022

Photographer: Richard Scott Jones

Plate No.

14 - 17



Plate 18. Area of Trial trench No. 12 (Machine dug). Looking east toward area of gorse.



Plate 19. Area of Trial trench No. 12 (Machine dug). Looking west along line of 19th Century mining leat.



Plate 20. Trial trench No. 12 (Machine dug). Working shot.



Plate 21. Trial trench No. 12 (Machine dug). East facing section showing position of 19th Century mining leat.

Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date taken: 23rd February 2022

Photographer: Richard Scott Jones

Plate No.

18 - 21



Plate 22. Area of Trial trench No. 13 (Machine dug). Looking west.



Plate 23. Area of Trial trench No. 13 (Machine dug). South facing section.



Plate 24. Trial trench No. 14 (Machine dug).



Plate 25. Trial trench No. 15 (Machine dug). Position of trench below tips. Looking west

Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date taken: 22nd February 2022

Photographer: Richard Scott Jones

Plate No.

22 - 25



Plate 26. rial trench No. 15 (Machine dug). West facing section.



Plate 27. Trial trench No. 15 (Machine dug). West facing section.



Plate 28. Area of Trial trench No. 16 (Machine dug). Looking west.



Plate 29. Trial trench No. 16 (Machine dug). Working shot.

Project Title:	Frongoch Lead & Zinc Mine, Pontrhydygroes.	Plate No. 26 - 29	
Date taken:	22nd February 2022		
Photographer:	Richard Scott Jones		



Plate 30. Trial trench No. 16 (Machine dug).

Project Title: Frongoch Lead & Zinc Mine, Pontrhydygroes.

Date taken: 22nd February 2022

Photographer: Richard Scott Jones

Plate No.

30

APPENDIX III:

Context Register

Appendix III

Context Register

Ground Investigation Pits/Trenches

TPO1 (Hand dug)

Depth – 1.05m
Dimensions – 0.40m

Contexts

- 100. Turf and top soil to depth of 0.05m
- 101. Natural Deposit – Orange clay/grit to depth of 0.50m
- 102. Natural Deposit – Stony clay/shale to base of trench

TPO2 (Hand dug)

Depth – 1.1m
Dimensions – 0.40m

Contexts

- 100. Turf and top soil to depth of 0.05m
- 101. Natural Deposit – Stony clay/shale to base of trench

TPO3 (Hand dug)

Depth 0.75m
Dimensions – 0.40m

Contexts

- 100. Turf and top soil to depth of 0.05m
- 101. Natural Deposit – Stony clay/shale to base of trench

TPO4 (Hand dug)

Depth – 0.80m
Dimensions – 0.40m

Contexts

- 100. Turf and top soil to depth of 0.05m
- 101. Natural Deposit – Stony clay/shale to base of trench

TPO5 (Machine dug)

Depth – 1.25m
Dimensions – 3m length

Contexts

- 100. Turf and top soil to depth of 0.20m
- 101. Deposit – Orange sandy gravel/grit to depth of 0.50m
- 102. Deposit – Shale to depth of 0.55m
- 103. Natural Deposit – Bedrock

TPO6 (Machine dug)

Depth – 1.20m
Dimensions – 3m x 0.75m

Contexts

- 100. Turf and top soil to depth of 0.20m
- 101. Deposit – Orange sandy gravel/grit to depth of 0.30m
- 102. Deposit – Shale to depth of 0.30m
- 103. Natural Deposit – Bedrock

TPO7 (Hand dug)

Depth – 1.20m
Dimensions - 0.50m

Contexts

- 100. Turf and top soil to depth of 0.05m
- 101. Natural Deposit – Orange clay/grit to depth of 0.50m
- 102. Natural Deposit – Stony clay/shale to base of trench

TPO8 (Hand dug)

Depth – 1.00m
Dimensions - 0.50m

Contexts

- 100. Turf and top soil to depth of 0.05m
- 101. Natural Deposit – Orange clay/grit and shale to depth of 1.00m

TPO9 (Machine dug)

Depth – 1.30m – 1.40m
Dimensions – 3m x 2m

Contexts

- 100 - Turf / Top Soil
- 101 - Soil/shale/grit
- 102 - Dark band of oxidised silt/shale
- 103 - Loose grey shale

- 104 - Natural shale bedrock
- 105 - Cut for 19th Century mining leat.

TP10 (Machine dug)

Depth – 1.30m – 1.40m
Dimensions – 3m x 2m

Contexts

- 100 - Turf / Top Soil
- 101 - Soil/shale/grit
- 102 - Dark band of oxidised silt/shale
- 103 - Loose grey shale
- 104 - Natural shale and pale orange grit
- 105 - Cut for 19th Century mining leat.

TP11 (Machine dug)

Depth – 1.30m – 1.40m
Dimensions – 2m x 1.75m

Contexts

- 100 - Turf / Top Soil
- 101 - Orange soil/shale/grit
- 102 - Dark band of oxidised silt/shale
- 103 - Loose grey shale
- 104 - Natural shale and pale orange grit
- 105 - Cut for 19th Century mining leat

TP12 (Machine dug)

Depth – 0.50m – 1.00m
Dimensions – 4m x 1.75m

Contexts

- 100 - Turf / Top Soil
- 101 – Pale brown soil/shale/grit
- 102 – Organic deposit approx. 0.10m - 0.20m in depth
- 103 – Grey clay/shale shale bedrock
- 104 - Line of 19th Century mining leat.

TP13 (Machine dug)

Depth – 1.40m – 1.80m
Dimensions – 3m x 2m

Contexts

- 100. Turf and top soil to depth of 0.20m
- 101. Deposit – Orange sandy gravel/grit to depth of 0.20m
- 102. Deposit – Pale yellow sandy shale to depth of 0.80m
- 103. Natural Deposit – Bedrock to base of trench

TP14 (Machine dug)

Depth – 1.25m
Dimensions – 3m length

Contexts

- 100. Turf and top soil to depth of 0.20m
- 101. Deposit – Orange sandy gravel/grit to depth of 0.50m
- 102. Deposit – Shale to depth of 0.55m
- 103. Natural Deposit – Bedrock

TP15 (Machine dug)

Depth – 2.20m
Dimensions – 2m x 2m

Contexts

- 100. Turf and top soil to 0.15m
- 101. Deposit – Orange sandy grit to depth of 0.20m
- 102. Deposit – Grey shale to base of trench.

TP16 (Machine dug)

Depth – 2.4m - 3.00m
Dimensions – 2m x 2m

Contexts

- 100. Turf and top soil
- 101. Deposit – 20th Century waste material (plastic, iron(Fe) etc.) to 2.8m
- 102. Deposit – Loose previously disturbed shale to base of trench.

APPENDIX IV:
Archive Cover Sheet

ARCHIVE COVER SHEET

Frongoch Lead & Zinc Mine, Pontrhydygroes, Ceredigion

ARCHIVE DESTINATION - RCAHMW

Site Name:	Frongoch Lead & Zinc Mine, Pontrhydygroes, Ceredigion
Site Code:	FLM/2022/WB
PRN:	-
NPRN:	302
SAM No.	
Other Ref No.	HRSW Rpt No. 251
NGR:	SN 72066 74424
Site Type:	Lead & Zinc Mine.
Project Type:	Archaeological Watching Brief
Project Manager:	Richard Scott Jones
Project Date(s):	21st March - 24th March 2022
Categories Present:	None
Location of Original Archive:	HRSW
Location of Duplicate Archive:	RCAHMW
Number of Find Boxes:	N/A
Location of Finds:	N/A
Museum Ref:	N/A
Copyright:	HRS Wales
Restrictions to Access:	None



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