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DCWW, Newry Llanfairfechan, Conwy, LL33 OER.
Water Main Renewal

September - November 2018
V 1.0

Archaeological Watching Brief
Project Code: A0181.1
Report no. 0192
Event PRN: 45421

REGISTERED ORGANISATION CIfA

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DCWW, Newry Llanfairfechan, Conwy, LL33 OER.

September & November 2018

Report no. 0192 v1.0

Archaeological Watching Brief

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Project Code: A0181.1
Date: 05/04/2019
Client: Dwr Cymru/Welsh Water
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1.0 NON TECHNICAL SUMMARY

Aeon Archaeology was commissioned by Dwr Cymru/Welsh Water to carry out an archaeological watching brief as part of a proposed water main renewal (WMR) between the existing pumping station at Valley Road, Llanfairfechan to Newry Cottage, Llanfairfechan, Gwynedd.

The archaeological watching brief uncovered the remains of five archaeological features comprising two ditches [1006 and 1004], a small pit [1008], a curvilinear gulley [1011], and a large pit [1013]. All of these features were located within an 18.0m length of pipe trench situated at the base of Field G on the north-western slope of Dinas. Radiocarbon dating of the fills of these features showed that all of the features, aside from ditch [1006], were of Roman period origin spanning a time period range between 74-546 AD. Ditch [1006] was dated to the early-medieval period between 776 - 971 AD.

The archaeological watching brief also enabled the recovery of thirty four items of stone, mainly flakes but also including scrapers and other, larger pieces of manufacturing debris associated with the nearby prehistoric stone source and axe working site on the western slopes of Dinas.

2.0 INTRODUCTION

Aeon Archaeology was commissioned by Dwr Cymru/Welsh Water, hereafter the client, to carry out an archaeological watching brief as part of a proposed water main renewal (WMR) between the existing pumping station at Valley Road, Llanfairfechan and Newry Cottage, Llanfairfechan, Gwynedd (**NGR SH 69736 73657 to SH 69849 74714**).

The scheme was located within twelve enclosed fields as shown in figures 01 and 02. The WMR scheme included the replacement of the existing water main with a new 90mm diameter high performance polyethelyne (HPPE) pipe, which entailed using open cutting from the Valley Road pumping station, Llanfairfechan for approximately 500m north of that position and crossing the *Afon Llanfairfechan*. After this the existing pipe was replaced using pipe bursting for the remaining 1.0km northwards to Newry Cottage.

As per the recommendations of the Gwynedd Archaeological Planning Service (GAPS) Development Control Archaeologist the following consultee comments were made as part of the application:

An archaeological watching brief should be carried out on this scheme. This area has a high prehistoric potential – the scheme passes below a hillfort (scheduled monument CN049) and within 100m of a Bronze Age barrow, with various recorded sites of settlement, agriculture and chance artefact finds throughout this area. The watching brief would require an archaeologist to attend during all excavation works for the scheme, including open cut trenching and any pits associated with sliplining/pipebursting. The field pattern here is interesting and appears to include some early boundaries, so the watching brief would also need to include a basic record (photographs and description) of any boundaries affected by the scheme.

The work adhered to the guidelines specified in Standard and Guidance for Archaeological Watching Brief (Chartered Institute for Archaeologists, 2014).

A Written Scheme of Investigation (WSI) was produced by Aeon Archaeology in August 2018 (appendix I) and submitted to the Development Control Archaeologist at GAPS. The WSI was subsequently approved in writing and the watching brief undertaken between September and October 2018. This document reports on the results of the archaeological watching brief.

The event Primary Reference Number (PRN) assigned by the Gwynedd Historic Environment Record (HER) for this archaeological watching brief is **45421**.

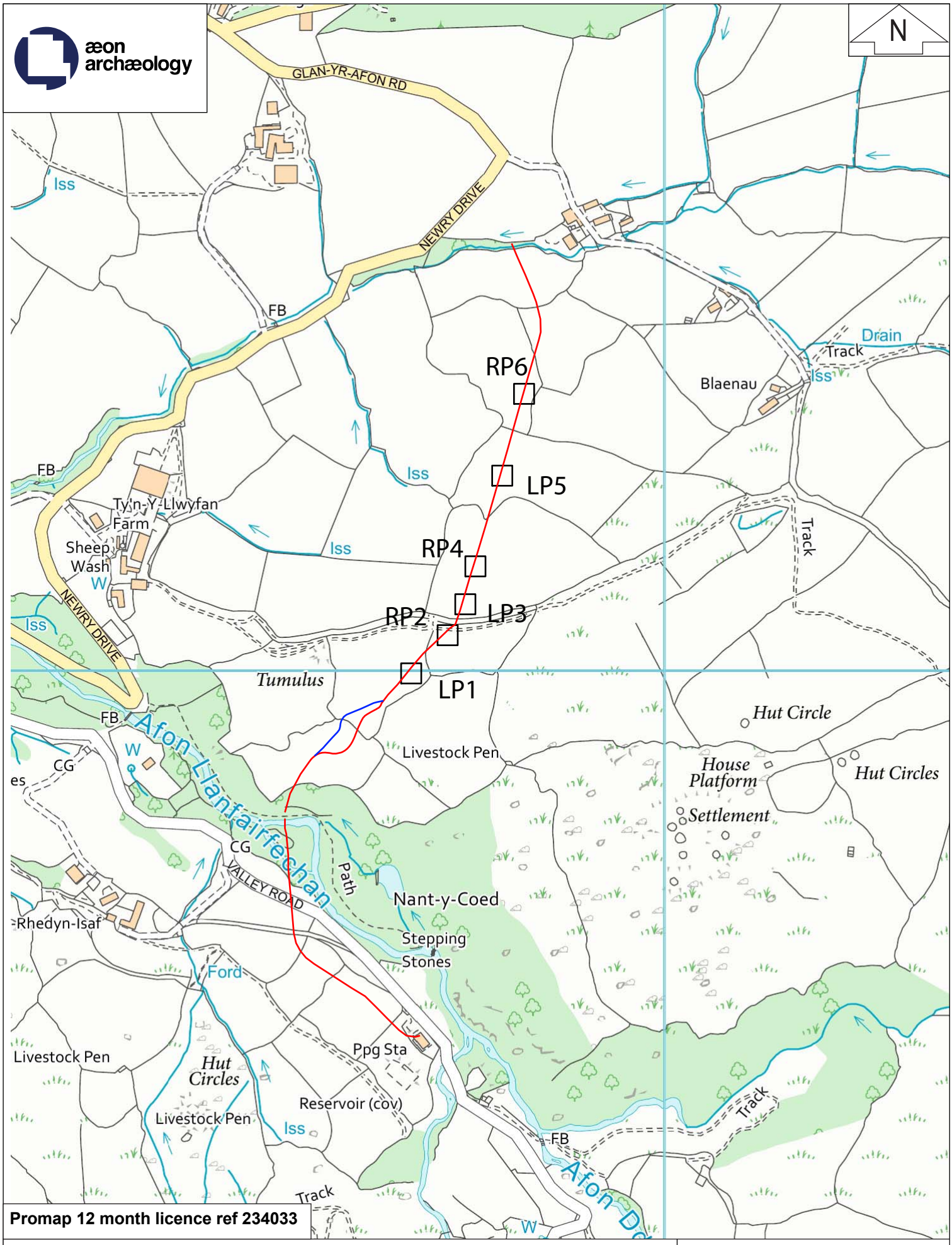

Figure 01. Location of water replacement scheme at Newry Llanfairfechan (final route outlined in red; route 2 outlined in blue; launch and reception pits located inside black boxes). Scale 1:5,000 at A4.

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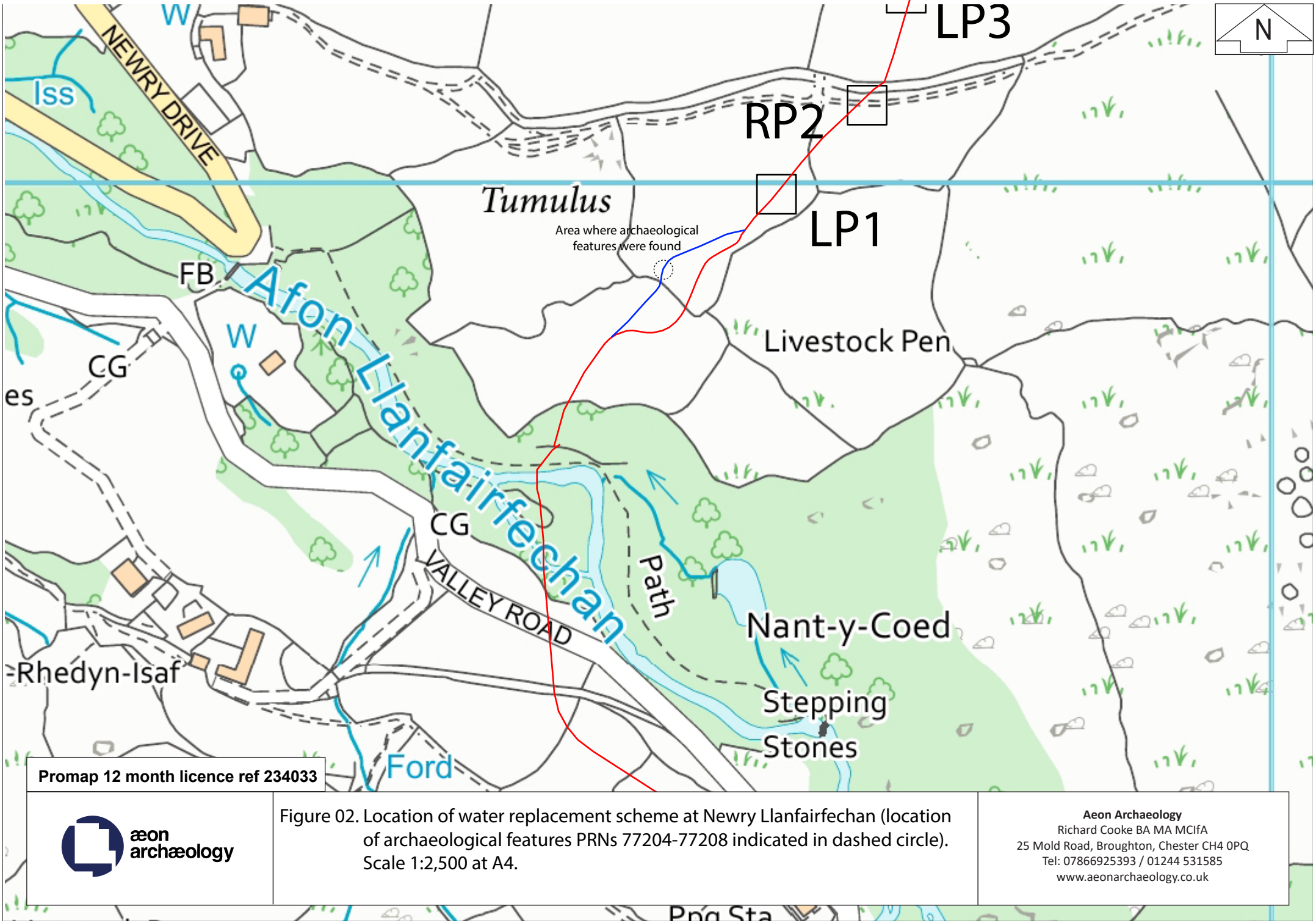

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3.0 POLICY CONTEXT

At an international level there are two principal agreements concerning the protection of the cultural heritage and archaeological resource – the UNESCO *Convention Concerning the Protection of World Cultural and Natural Heritage*[1] and the *European Convention on the Protection of the Archaeological Heritage*[2], commonly known as the Valetta Convention. The latter was agreed by the Member States of the Council of Europe in 1992, and also became law in 1992. It has been ratified by the UK, and responsibility for its implementation rests with Department for Culture Media and Sport.

The management and protection of the historic environment in Wales is set out within the following legislation:

- The Planning (Listed Buildings and Conservation Areas) Act 1990 (As amended)
- The Historic Environment (Wales) Act 2016
- The Town and County Planning Act 1990
- The Ancient Monuments and Archaeological Areas Act 1979
- The Town and Country Planning (General Permitted Development Order) 1995 (As amended)

The Historic Environment (Wales) Act is the most recent legislation for the management of the Historic Environment and amends two pieces of UK legislation — the Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) Act 1990. The new Act has three main aims:

- to give more effective protection to listed buildings and scheduled monuments;
- to improve the sustainable management of the historic environment; and
- to introduce greater transparency and accountability into decisions taken on the historic environment.

With respect to the cultural heritage of the built environment the *Planning (Conservation Areas and Listed Buildings) Act*[3] *1990* applies. The Act sets out the legislative framework within which works and development affecting listed buildings and conservation areas must be considered. This states that:-

> *"In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses" (s66(1))*

Other known sites of cultural heritage/archaeological significance can be entered onto county-based Historic Environment Records under the *Town and Country Planning 1995.*

Planning Policy Wales sets out the land use planning policies of the Welsh Government. Chapter 6 covers the historic environment and emphasises that the positive management of change in the

[1] UNESCO, 1972, *Convention Concerning the Protection of the World Cultural and Natural Heritage*
[2] Council of Europe, 1992, *European Convention on the Protection of the Archaeological Heritage*
[3] Great Britain. *Planning (Conservation Areas and Listed Buildings) Act.* Elizabeth II.(1990), London: The Stationery Office

historic environment is based on a full understanding of the nature and significance of historic assets and the recognition of the benefits that they can deliver in a vibrant culture and economy.

Various principles and polices related to cultural heritage and archaeology are set out in the Planning Policy Wales which guide local planning authorities with respect to the wider historic environment.

The following paragraphs from Planning Policy Wales are particularly relevant and are quoted in full:

Paragraph 6.1.5 concerns planning applications:

The planning system must take into account the Welsh Government's objectives to protect, conserve, promote and enhance the historic environment as a resource for the general well-being of present and future generations. The historic environment is a finite, non-renewable and shared resource and a vital and integral part of the historical and cultural identity of Wales. It contributes to economic vitality and culture, civic pride, local distinctiveness and the quality of Welsh life. The historic environment can only be maintained as a resource for future generations if the individual historic assets are protected and conserved. Cadw's published Conservation Principles highlights the need to base decisions on an understanding of the impact a proposal may have on the significance of an historic asset.

Planning Policy Wales is supplemented by a series of Technical Advice Notes (TAN). Technical Advice Note 24: The Historic Environment contains detailed guidance on how the planning system considers the historic environment during development plan, preparation and decision making on planning and listed building consent applications. TAN 24 replaces the following Welsh Office Circulars:

- 60/96 Planning and the Historic Environment: Archaeology
- 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas
- 1/98 Planning and the Historic Environment: Directions by the Secretary of State for Wales

4.0 PROJECT AIMS

The aim of the watching brief works was to characterise the known, or potential, archaeological remains uncovered during open cut trenching and launch and reception pits associated with the water main renewal (WMR) between the existing pumping station at Valley Road, Llanfairfechan and Newry Cottage, Llanfairfechan, Gwynedd.

The broad aims of the archaeological watching brief were:

- To allow, within the resources available, the opportunity to gain information about and record the presence/absence, nature and date of archaeological remains on the Site affected by excavations and groundworks, the presence and nature of which could not be established with sufficient confidence in advance of works which may disturb them.

- To provide the facility to signal to the relevant authorities, before irreversible impact to remains that an archaeological and/or historic find has been made for which the resources allocated to the watching brief itself are inadequate to support their treatment to an adequate and satisfactory standard.

The detailed objectives of the archaeological watching brief were:

- To observe and recover any artefacts of archaeological significance.

- To record the location, dimensions and nature of any deposits, features, structures or artefacts of archaeological significance

- To recover samples of any deposits considered to have potential for analysis for palaeoenvironmental data should the opportunity arise.

The management of this project has followed the procedures laid out in the standard professional guidance *Management of Research Projects in the Historic Environment Project Manager's Guide* (English Heritage 2006; rev 2015), and in the Chartered Institute for Archaeologists *Archaeological Watching Brief* (Chartered Institute for Archaeologists, 2014).

5.0 METHODOLOGY – ARCHAEOLOGICAL WATCHING BRIEF

5.1 Watching Brief

The CIfA maintains a standard for archaeological watching brief which states that:

An archaeological watching brief will record the archaeological resource during development within a specified area using appropriate methods and practices. These will satisfy the stated aims of the project, and comply with the Code of conduct and other relevant by-laws of CIfA.

An archaeological watching brief is defined by the CIfA as a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons (CIfA 2014a). The watching brief will take place within a specified area within the Site where there is a possibility that archaeological deposits may be disturbed or destroyed.

The CIfA further identifies the purpose of a watching brief as allowing, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established in advance of development or other potentially disruptive works.

It is also important to note that a watching brief provides an opportunity, if needed, for a signal to be made to all interested parties, before the destruction of the archaeological materials, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.

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

All excavations were undertaken using a mechanical excavator fitted with a toothless ditching bucket. A photographic record was maintained throughout, using a digital SLR camera (Canon 6000D) set to maximum resolution and any subsurface remains were to be recorded photographically, with detailed notations and measured drawings being undertaken if required.

In the event of archaeological discovery features were to be excavated by hand and fully recorded using Aeon Archaeology pro-formas, digital photographs, and plan and section drawings taken at a suitable scale (usually 1:20 for plan drawings and 1:10 for section drawings).

The archive produced is held at Aeon Archaeology under the project code **A0181.1**.

5.2 Data Collection from Site Records

A database of the site photographs was produced to enable active long-term curation of the photographs and easy searching. The site records were checked and cross-referenced and photographs were cross-referenced to contexts. These records were used to write the site narrative and the field drawings and survey data were used to produce an outline plan of the site.

All paper field records were scanned to provide a backup digital copy. The photographs were organised and precisely cross-referenced to the digital photographic record so that the Gwynedd Archaeological Trust (GAT) HER can curate them in their active digital storage facility.

5.3 Artefact Methodology

All artefacts were to be collected and processed including those found within spoil tips. They would be bagged and labelled as well any preliminary identification taking place on site. After processing, all artefacts would be cleaned and examined in-house at Aeon Archaeology. If required artefacts would be sent to a relevant specialist for conservation and analysis.

The recovery policy for archaeological finds was kept under review throughout the archaeological watching brief. Any changes in recovery priorities would be made under guidance from an appropriate specialist and agreed with the Client and the Gwynedd Archaeological Planning Service (GAPS) Development Control Archaeologist. There was a presumption against the disposal of archaeological finds regardless of their apparent age or condition.

5.4 Environmental Samples Methodology

The sampling strategy and requirement for bulk soil samples was related to the perceived character, interpretational importance and chronological significance of the strata under investigation. This ensured that only significant features would be sampled. The aim of the sampling strategy was to recover carbonised macroscopic plant remains, small artefacts particularly knapping debris and evidence for metalworking.

Advice and guidance regarding environmental samples and their suitability for radiocarbon dating, as well as the analysis of macrofossils (charcoal and wood), pollen, animal bones and molluscs would be obtained from Oxford Archaeology if required.

5.5 Report and dissemination

A full archive including plans, photographs, written material and any other material resulting from the project was prepared. All plans, photographs and descriptions were labelled, and cross-referenced, and will be lodged within a suitable repository to be agreed with the archaeological curator within six months of the completion of the project.

A draft copy of the report has been sent to the client and upon written approval from them paper and digital copies of the report will be sent to the regional HER, the GAPS Development Control Archaeologist, and will be logged with the RCAHMW. Copies of all notes, plans, and photographs arising from the watching brief will be stored at Aeon Archaeology under the project code **A0181.1** with the originals being lodged in a suitable repository to be agreed with the archaeological curator.

6.0 ARCHAEOLOGICAL BACKGROUND

It had been known since 1919 that stone axes were produced near a rock outcrop known as Y Graig Lwyd when the first axes were recognised by S. Hazzeldine Warren and he subsequently undertook excavations and found several tons of axes and roughouts (Warren 1919, 1922). Glen (1935, 189) records that by the end of his excavations Warren had collected 3 tons of good specimens of unfinished and broken axes as well as immense amounts of waste. He points out, in relation to axe working debris, "Hundreds of tons remain and hundreds more have gone down the quarry" (Glen 1935, 189).

Warren realised that axe roughouts could be found over a much wider area than the proximity of his excavations but this source is always referred to as "Graig Lwyd" and the extent of other stone sources in the area has not been widely considered. In the 1990s the Gwynedd Archaeological Trust (GAT) carried out detailed surveys of the surviving working area at Graig Lwyd and undertook some small scale excavations. The survey was also extended to the col between Graig Lwyd and Penmaenmawr Mountain, and on the western flank of the mountains. The results of the surveys and excavations were presented in two grey literature reports (Flook and Williams 1992 and Davidson and Williams 1998). The Graig Lwyd survey and excavations were published in Williams and Davidson 1998 and the surveys further west were published in Williams and Davidson 2002. Other work has occasionally revealed axe flakes and John Llywelyn Williams has published some finds from the wider area.

The Royal Commission (RCAHMW 1956, xliii) and Houlder (1976, 58) recognised that the stone axe workings extended to Garreg Fawr and Dinas, but little professional archaeological work has been done to investigate the wider landscape and to study the stone sources beyond Graig Lwyd. However, since the 1990s Mr David T. Jones of Llanfairfechan has been collecting axe roughouts and exploring axe-working sites around Llanfairfechan. His knowledge of these sites is unequalled and his collection now extends to at least 28 pieces, almost all of known provenance.

(Taken from background in GAT report 1416 – for full appreciation of setting and significance of Graig Llwyd and Dinas please read *Group VII Axe working sites and stone sources, Llanfairfechan , Conwy* J. Kenney (2017).

7.0 QUANTIFICATION OF RESULTS

7.1 The Documentary Archive

The following documentary records were created during the archaeological watching brief:

Watching brief day sheets	22
Context Sheets	15
Digital photographs	230

7.2 Environmental Samples

Five bulk environmental samples were taken during the archaeological watching brief. These were wet sieved and sorted by CR Archaeology (see section 8.0), after which samples of charcoal from all five samples were submitted to Beta Analytic for radiocarbon C14 dating (see section 9.0).

7.3 Artefacts

Twenty five items of stone, mainly flakes but also including scrapers and other, larger pieces of manufacturing debris were collected during the archaeological watching brief. This collection was combined with seven stone flakes recovered by Jane Kenny at GAT during an informal watching brief of a trench excavated to repair a burst on the existing water main on the 17th May 2018. An additional four further stone flakes were recovered during the flotation of bulk samples making a total of thirty four items. These were submitted to Dr Lynne Bevan BA MPhil PhD MCIfA for analysis and her report is reproduced below in section 10.0.

8.0 FLOTATION OF ENVIRONMENTAL BULK SAMPLES

By C.R. Archaeology

Introduction

Five bulk samples were received from Aeon Archaeology (Project Code AO181.1). The purpose of the sample was to identify any organic material (charcoal) which could be used for dating, and for the recovery of artefactual material. The results are listed in table form below.

Methodology

The sample was broken down in a floatation tank and then run through four sieves 1cm, 0.5cm, 0.2cm and flot (fine mesh). The residue was dried, and hand sorted. The 0.5cm, 0.2cm and residues were tested with a magnet.

Results

Sample 01 Context (1007)

Weight before Processing 6950g

Sieve Size	Weight	Description
1cm	1350g	Rounded and angular medium and small stones
0.5cm	561.5g	Rounded and angular small gravels
0.2cm	815.7g	Rounded and angular small gravels
Flot	0.4g	Charcoal, sand grains
Total Weight after processing	2727.6g	

Two fragments of possible Graig Lwyd stone was identified and bagged separately

Sample 02 Context (1005)

Weight before Processing 2240g

Sieve Size	Weight	Description
1cm	340.6g	Rounded and angular medium and small stones
0.5cm	143.4g	Rounded and angular small gravels
0.2cm	174.4g	Rounded and angular
Flot	0.5g	Charcoal, sand grains
Total Weight after processing	658.9g	

Sample 03 Context (1009)

Weight before Processing 2290g

Sieve Size	Weight	Description
1cm	243.7g	Rounded and angular medium and small stones
0.5cm	125.6g	Rounded and angular small gravels
0.2cm	172.0g	Rounded and angular
Flot	47.1g	Charcoal, sand grains
Total Weight after processing	588.4g	

Sample 04 Context (1012)

Weight before Processing 1660g

Sieve Size	Weight	Description
1cm	277.8g	Rounded and angular medium and small stones
0.5cm	82.9g	Rounded and angular small gravels
0.2cm	103.0g	Rounded and angular
Flot	0.5g	Charcoal, sand grains
Total Weight after processing	464.2g	

A single small fragment of possible Graig Lwyd stone was identified and bagged separately

Sample 05 Context (1014)

Weight before Processing 4590g

Sieve Size	Weight	Description
1cm	634.1g	Rounded and angular medium and small stones
0.5cm	368.3g	Rounded and angular small gravels
0.2cm	438.2g	Rounded and angular
Flot	1.1g	Charcoal, sand grains
Total Weight after processing	1441.7g	

A single small fragment of possible Graig Lwyd stone was identified and bagged separately

Conclusion

Charcoal was identified in all the contexts with a large amount (47.1g) coming from context (1009). Graig Lwyd stone was recovered from contexts (1007), (1012) and (1014) with a large fragment coming from (1007). The smallest recommended sample weight for radio carbon dating for charcoal is 10mg but this is dependent on the quality of the sample.

9.0 RADIOCARBON DATING

By BETA Analytic

Methodology

Samples were received and cross-checked for accuracy between sample containers and documentation. They were logged into the system with bar coding for tracking of all chemical steps with regards to date, time and technician. This bar-coding is used In the event of an inquiry so we can track the movement of each sample through each chemical step. Pretreatment of the charcoal was as follows.

Each sample was first visually inspected for size and durability. They were then rinsed in de-ionized water and sieved to isolate the charcoal from adhering sediments and fibrous material. They were then gently crushed while wet to 1-2mm particles, sieved again and allowed to saturate in the de-ionized water while heating to 70C. 1 N HCl was then applied at 70C for 2 hours. After rinsing to neutral, 1-2% alkali was then applied (50/50 wt NaOH) at 70C until no color change was observed. After rinsing to neutral, a final hot acid wash (0.5 HCl) was applied at 70 C for 30 minutes to ensure the alkali was neutralized and once again rinsed to neutral. During this process any remaining roots and organic debris were eliminated. The samples were then dried at 100C for 12-24 hours, weighed, microscopically examined for cleanliness, uniformity and where applicable appropriately sub-sampled for the measurements.

Each sample was then separately placed into a closed chemistry line which had been purged of any CO2 to a level below 10e-15 atoms (background levels). The line was filled with 100% oxygen and ignited at 900+C to combust the sample carbon to CO2. The CO2 was dried and introduced into a reaction vessel containing an aliquot of cobalt metal catalyst. Hydrogen was introduced such that when the cocktail was heated to 500C, the CO2 cracked to carbon (graphite). The graphite was pressed into a target for measurement in an accelerator mass spectrometer (AMS). The AMS was calibrated to provide an accurate ratio of the 14C/13C ratio between the sample graphite and a modern reference (NIST-4990C, Oxalic acid). Quality assurance samples were reacted simultaneously in the chemistry lab and measured simultaneously in the AMS. The analytical result was obtained as a fraction of the value of modern reference, corrected for isotopic fractionation using 13C/12C (d13C) and radiocarbon age calculated according to the conventions cited in Radiocarbon, Volume 19, Number 3, 1977. The QA samples were checked for accuracy and observed to fall within expectations for the laboratory to accept and report the sample results. Acceptance defined as being with 2 sigma of the known value, based on our total laboratory error known to be within 2 sigma.
Characteristics of the equipment.

Chemistry: Custom vacuum lines for collection and transfer of CO2 to produce graphite.

AMS: Highly customized 250Kev NEC single stage particle accelerators – 4 on-site

IRMS: Thermo Delta-Plus isotope ratio mass spectrometers – 4 on site.

Accuracy of final results: Routinely within 1 sigma of known reference value. Total laboratory known to be within 2 sigma of known reference value.

Precision: AMS +/- 0.001 – 0.004 fraction modern; d13C +/- 0.3 o/oo, and where applicable; d15N +/- 0.5 o/oo, d18O +/- 0.3 o/oo, dD +/- 2 o/oo.

Sample Data	Measured Radiocarbon Age	Conventional Radiocarbon Age	Reliability
Beta – 519685 SAMPLE: A0181.1 Sample 01. Context **(1007)** Analysis: AMS Standard Delivery MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid	(1174 - 979 cal BP)	776 - 971 cal AD	95.4%
Beta – 519686 SAMPLE: A0181.1 Sample 02. Context **(1005)** Analysis: AMS Standard Delivery MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid	(1540 - 1404 cal BP)	410 - 546 cal AD	95.4%
Beta – 519687 SAMPLE: A0181.1 Sample 03. Context **(1009)** Analysis: AMS Standard Delivery MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid	(1864 - 1708 cal BP)	86 - 242 cal AD	95.4%
Beta – 519688 SAMPLE: A0181.1 Sample 04. Context **(1012)** Analysis: AMS Standard Delivery MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid	(1876 - 1724 cal BP)	74 - 226 cal AD	95.4%
Beta – 519688 SAMPLE: A0181.1 Sample 05. Context **(1014)** Analysis: AMS Standard Delivery MATERIAL/PRETREATMENT: (charred material): acid/alkali/acid	(1708 - 1564 cal BP)	242 - 386 cal AD	95.4%

10.0 AN ASSEMBLAGE OF GROUP VII STONE TOOLS AND FLAKES FROM DCWW NEWRY, LLANFAIRFECHAN

by Lynne Bevan

Introduction

Thirty four items of stone, mainly flakes but also including scrapers and other, larger pieces of manufacturing debris collected during a watching brief for the excavation of a water main at DCWW Newry, Llanfairfechan, were examined for purposes of analysis. The collection included one stone fragment weighing 25 grams (Not catalogued, 1014 Flot 05) which was not considered to be a flake as its irregular morphology was more typical of breakage from past freeze-thaw conditions. It is included in the overall quantification (Table 1) but not in the Catalogue. Therefore the total of worked flakes and other debitage from the site comprises 33 items, weighing a total of 6693 grams (Table 1). The total weight of the assemblage is distorted by a very large flake weighing 1890 grams (Cat. No. 5) and a large chunk (Cat. No. 8a) which weighed 988 grams (Table 1).

With the exception of three scrapers, the assemblage was composed entirely of flakes of various sizes and larger struck chunks, again of varying size and weight (Table 1). Small numbers of flakes and chunks were obviously from the same stones and the result of single episodes of stone working, but no refitting was possible.

The raw material, artefactual composition and technology of the assemblage are discussed in detail, followed by an overall discussion of the assemblage in relation to previous work in the area, with a view to evaluating the potential of the assemblage. Every item has been catalogued below and photographed (figures 04-10) for record purposes but only a selection, comprising the more interesting pieces, will be discussed in detail.

Raw Material

All of the stone items collected are very similar in colour, which varies from light to dark grey, and the stone has sparse white inclusions within the matrix, although almost all of the pieces have developed an ochre-buff coloured patina, either entirely or in places, from being exposed to the elements and/or from past soil conditions. The texture of the stone is similar in most cases, although some pieces appear coarser than others and, where exposed, the grey stone does appear to be generally smoother in texture than the buff-coloured patinated stone. However, these differences may relate to the original pre-extraction positions of the stone flakes and chunks within the parent rock, as well as to varying rock morphology. The overall appearance of the stone items as well as the location of its recovery indicated that much, if not all of it, is the resulting debitage from the manufacture of Group VII stone axes (Houlder 1988) or from other tools.

Macroscopically, the raw material certainly conforms to the type of rock used for Group VII axe production which was defined as augite granophyre (Clough 1988, 7), a stone which, like flint, breaks with a conchoidal fracture and is particularly suited to stone axe manufacture (Kenney 2017, 9).

Similarities in raw material suggest a common origin, the most logical one being the nearby Graig Lwyd Neolithic ‘axe factory’ at Penmaenmawr, which lies close to the area of excavation, although the use of terms such as ‘trade, factory and industry’ which ‘carry sociological implications which need to be demonstrated rather than assumed’ are now regarded as inappropriate for discussing the Neolithic (Edmonds 1995, 51). Moreover, the use of terms such as ‘factory’ implies that the factory

was the locus of production and that all stages of the axe-making process will have taken place there - from stone selection to the primary reduction of the blocks, followed by the shaping of smaller pieces into rough-outs and finally, the polishing of shaped pieces. It is, however, well known that tool-making processes can be complex and various stages might have taken place at a number of different locations in the landscape.

With regard to resource exploitation the use of 'stone sources' or 'source areas' are now considered more appropriate terms than 'factory' with its industrial connotations (Kenney 2017, 5) and previous work in the general area has demonstrated that stone sources utilised in the Penmaenmawr and Llanfairfechan area were mainly scree sources rather than opencast workings, and that quarrying was very small scale in contrast to the production of axes from scree (Kenney 2017, 29).

Due to the close proximity of the site to Graig Lwyd, a common local origin for the raw material used for this assemblage would be logical, although this cannot be demonstrated without petrological analysis. A potentially close chronological relationship between the flakes and other material from Newry is also assumed, although, again, without secure dating being available or the presence of closely datable tool types in the assemblage, this assertion remains unproven. However, for the purposes of this report, the assemblage is treated as remnants of a single industry at a specific time during the Neolithic period.

Technology

With the exception of three scrapers (Cat. Nos. 1-3, figures 4-6), the assemblage was composed entirely of flakes of various sizes and larger struck chunks, again of various sizes and weights. Many of the more complete flakes exhibited conchoidal fracture together with pronounced bulbs of percussion, the latter presumably the result of being struck with a hard stone hammer or 'maul'. Interestingly, previous survey in the area revealed flake scarring on a rock face at Site D/F at Graig Lwyd which included 'ripple marks', indicating that the stone was struck off from below by a large stone maul swung upwards (Kenney 2017, Plate 21, 24, 25). Similar scars on a substantial flaked chunk from the present assemblage, weighing 449 grams (Cat No. 4, figure 09), might suggest that the larger piece it originated from was obtained in a similar way. However, this remains unproven, as the potential ripple marks may have been caused by other factors rather than human agency.

The largest flake (Cat. No. 5, figure 10) examined here, which weighs 1890 grams and may be a primary flake, is similar in shape to that of several large flakes comprising the remains of a broken boulder photographed during a recent survey of axe-working sites and stone sources around Llanfairfechan (Kenney 2017). The smashed boulder on the northern shoulder of Garreg Fawr, which had broken into a sequence of very large smashed flakes, was interpreted as possibly having been broken for axe material (Kenney 2017, Plate 8, 16). Origin from a similar source is possible for the unusually large flake from this collection which is characterised by its long and narrow shape and pronounced bulb of percussion. It is certainly much larger than all the other material collected during the watching brief and unusual in having a weathered, pitted surface reminiscent of a rock surface.

A similarly-shaped but much smaller flake (Cat. No. 6, figure 08), weighing 499 grams, also attests to the removal of large flat and narrow flakes early in the block reduction process. Another similarly-shaped large flake (Cat. No. 7, figure 10) weighing 636 grams, was approximately the correct size for an axe preform, but, as can be seen in the photograph, was too narrow and uneven in shape with the central axis veering to one side rather than being straight. This would explain why no further shaping was conducted on this piece but it suggests that longer and more potentially useful fragments were

detached quite early in the reduction process and that they were also being discarded without further attention. The discard of large and apparently usable pieces of Graig Lwyd flakes without further working or usage is a phenomenon observed previously at Parc Bryn Cegin at Landygai which is typical of the wider spectrum of sites in northern Wales (Williams, Kenney and Edmonds 2011, 271), and has also been observed in the vicinity of the source itself (Williams and Davidson 1998).

Conversely, a large patinated chunk (Cat. No. 8a, figure 05), weighing 988 grams, has been reduced on all sides and resembles a core, though its use appears to have gone beyond the size of flakes required for axe production. A few of the other chunks, including the scarred chunk discussed above (Cat No. 4, figure 09), have also been reduced down to small sizes which suggests that smaller tools such as scrapers, were being made from Graig Lwyd stone and three scrapers were identified in the current assemblage.

The complete scraper on a flake (Cat. No. 1, figure 04), had a large bulb of percussion indicative of a hard hammer technique and it is very broad in shape, like many of the more complete waste flakes recorded on the site. It had been retouched from opposing directions at its working end, with the retouched areas being as patinated as the flake itself, demonstrating that the retouch is not post-depositional chipping but that it occurred during prehistory. The retouch on this scraper was more regular in shape and easier to identify than the retouch and possible utilisation on the other two scrapers (Cat. Nos. 2-3, figures 05 and 06), mainly due to the coarse appearance of the stone resulting from the buff-coloured opaque patination which affected almost all the assemblage, although it is notable that neither retouch nor utilisation was apparent on any of the other material in the assemblage.

Both of the scrapers on chunks (Cat. Nos. 2-3, figures 05 and 06) were ‘scraper-like’ in form rather than formal scrapers of known Neolithic types. Both were triangular in shape and made from rough chunks, one of which (Cat. No. 2, figure 05) was a substantial primary flake with a naturally raised lump on its dorsal which lends itself to being held by a smaller hand, and the other was made from a similarly-shaped chunk which had been reduced on all sides (Cat. No. 3, figure 06). In contrast to the flake scraper, the other two had only marginal retouch and traces of use-wear along their edges.

All three of the scrapers are rare exceptions to the rule that few artefacts - other than axes - were made from Graig Lwyd stone. Although there is very little evidence for the manufacture of other tools from this material, a number of scrapers have previously been recorded in excavations at the Graig Lwyd site, including three large ‘scraper like’ objects (Warren 1922, Fig. 14: 12.1-12.3). Kendall (1927, 140) found ‘a dozen or more distinct scrapers’ on the site he excavated at Graig Lwyd and Davies mentioned a further scraper (Davies 1961, 3). Further afield, two crude scrapers of Graig Lwyd stone were found under the tomb of Bryn yr Hen Bobl, Anglesey (Lynch 1991, Fig. 29, 108) and a scraper made from a Graig Lwyd axe was found on the Great Orme (Glen 1935, 202-203).

None of the scrapers in this assemblage were very similar in form to the illustrated examples from Graig Lwyd (Warren 1922, Fig. 14: 12.1-12.3), although the scraper on a large flake (Cat. No. 1, figure 04) was the closest in size and shape. The possible tools made from Graig Lwyd stone, including two crude scrapers, recorded at Bryn yr Hen Bobl (Hemp 1935; Williams, Kenney and Edmonds 2011, 271-272, Fig. 9: 37.7 17, 37.7.18), were all made from a partly polished parent mass (ibid 272). While the first of the scrapers (Cat. No. 1, figure 04) is similarly-shaped to those from Bryn yr Hen Bobl, there is no evidence for polished surfaces on any of the three scrapers published here and no evidence of polishing was found on any of the other material in the assemblage.

While no axe rough-outs were identified in the assemblage and neither were any polished surfaces apparent on any of the flakes or chunks, three instances of discrete knapping episodes involving small numbers of flakes and chunks originating from the same stones were identified. Of perhaps most interest were seven items described as Group VII axe flakes (Cat. No. 9, figure 07), weighing a total of 448 grams, found by Jane Kenney and David T. Jones close to the axe-working site PRN 67640 on the distribution map (figure 03). While one of the flakes (9a) exhibited an irregular shape at the point of breakage and may have originated from near the surface of the rock, the other six were all struck flakes of a very similar stone. Based upon similarity in colour and texture, two separate knapping episodes appear to be represented in this small collection of seven items, although the differences between the types of stone are very subtle and may relate to some flakes being struck from closer to the outer surfaces of the stone than others. The knapping episodes comprised two flakes with a grey-buff colouration (9b, 9c) and a group of four flakes of a grey, coarser textured stone (9d, 9e, 9f, 9g). Unfortunately no refitting was possible and none of the flakes exhibited any secondary working.

Another knapping episode was identified in a small group of four items (Cat. No. 10, figure 06) located as bag 10 in the main area of excavation (figure 03). The items comprised a large flake (10a) and three chunks (10b, 10c, 10d), weighing a total of 355 grams, with the latter three chunks originating from the same knapping episode. The large flake was made from a coarser stone than the other three pieces and was completely patinated to an opaque buff colour and the chunks were all of an unpatinated mid-grey stone with white crystalline inclusions. The largest piece of the three had been systematically reduced on all sides. No refitting was possible.

Other debitage included two unrelated chunks, one of which was a small coarse, shattered chunk (Cat. No. 11, figure 04) weighing 62 grams, with an irregular-shaped surface due to the morphology of the stone and the other one (Cat. No. 12, figure 04) was heavier at 106 grams and had a pitted surface.

The remaining material comprised various unrelated flakes (Cat. Nos. 13-22, figures 04 and 09), only one of which was blade-like (Cat. No. 13, figure 09), and several of which were broken (Cat. Nos. 17-22, figures 04 and 09).

Although difficult to properly evaluate given the small size of the assemblage, the relative absence of primary flakes and micro-debitage in this small assemblage is interesting. With the exception of the large primary flake mentioned above, it appears logical that at least some primary reduction was being carried out elsewhere, perhaps nearer to the stone source to facilitate removal of the blocks to a site where finer working could then be carried out. A lack of micro-debitage is more problematic. On the one hand it may relate to the final shaping of axes and other tools having been conducted elsewhere but on the other hand there is ethnographic evidence for the removal of tool-making debitage for off-site disposal rather than leaving it where it falls (Gallagher 1977, 410-411; Binford 1986, 553).

Number	Grid Co-ordinates	Number of Items	Weight(s) grams	Identifications
1007 Flot 01/Cat. No. 18	N.A.	2	44, 1	2 broken flakes
1012 Flot 04/Cat. No. 17	N.A.	1	1	1 broken flake
1014 Flot 05	N.A.	1	25	*Not a flake
1/Cat. No. 11	69721/73976	1	62	Small chunk
2/Cat. No. 14	69743/73990	1	20	Flake
3 Context 1007/Cat. No. 12	69676/73953	1	106	Chunk, pitted, possibly original surface of stone
4/Cat. No. 16	69741/73991	1	159	Large flake
5/Cat. No. 20	69747/73990	1	16	Broken flake
6 Launch Pit 1 Topsoil/Cat. No. 1	69761/74006	1	95	Large retouched scraper
7 Launch Pit 3 Topsoil/Cat. No. 8	69797/74103	2	988, 49	Large chunk, small flake
8/Cat. No. 2	69659/73923	1	291	Scraper on a primary flake
9/Cat. No. 3	69734/73991	1	348	Rudimentary scraper on a chunk, triangular
10/Cat. No. 10	69611/73889	4	163*, (156, 21, 15)	*Largest (coarser stone) from different knapping episode to other three
11 Group VII Axe Flakes/Cat. No. 9	697561/73861	7	40*, (57, 28), (272, 33, 10, 7)	*Coarse flake dissimilar to other flakes from two knapping episodes
12/Cat. No. 6	69706/73972	1	499	Large flake
13/Cat. No. 19	69730/73987	1	155	Large broken flake
14/Cat. No. 4	69720/73976	1	449	Large chunk, possible ripples
15/Cat. No. 15	69732/73988	1	22	Flake
16/Cat. No. 21	69743/73990	1	38	Broken flake
17/Cat. No. 22	69664/73928	1	17	Broken flake
18/Cat. No. 13	69646/73914	1	4	Blade-like flake
19 1007/Cat. No. 7	69676/73953	1	636	Large flake, close to preform size
20 1002/Cat. No. 5	69723/73982	1	1890	Large flake
Totals: all/worked		34/33	6718/6693	

Table 1: Summary of the Assemblage Including Weights and Identifications

Catalogue

1. Scraper on a large flake, retouched from two opposing directions at its working end, partly patinated on one side to an opaque brownish-grey colour, but has largely retained its original mid-grey colouration. It has a pronounced bulb of percussion on each side from its original detachment from the rock and subsequent flaking to the dorsal. Size: 86 mm x 70 mm x 16 mm. Weight: 95 grams. 6 Launch Pit 1 Topsoil 69761/74006. Figure 04.

2. Scraper on a primary flake, naturally triangular in shape due to a hard, raised lump on the outer surface, which is ideally suited to a small hand. It has a pronounced bulb of percussion and is a good size and shape for a scraper but the possible retouch and/or utilisation is obscured by opaque, buff-coloured patination. Size: 122 mm x 73 mm x 45 mm. Weight: 291 grams. 8 69659/73923. Figure 05.

3. Rudimentary scraper on a chunk, roughly triangular in shape, completely patinated and now opaque and buff-coloured. There is a small area of regular-shaped retouch on one side and some retouch and/or use-wear at the front. Size: 122 mm x 73 mm x 45 mm. Weight: 348 grams. 9 69734/73991. Figure 06.

4. Substantial flaked chunk, struck on all sides, with possible ripple marks visible on one face, although these deep striations may be natural faults in the stone. Several flake removals, more recent damage rather than prehistoric working, reveal the original mid-grey colour of the stone through a layer of buff-coloured opaque patination. Size: 90 mm x 60 mm x 55 mm. Weight: 449 grams. 14 69720/73976. Figure 09.

5. Large flake, possibly a primary flake, the surface of which is almost completely patinated and is now opaque and buff-coloured. The outer surface is uneven and pitted in places and shows signs of weathering. Size: 290 mm x 200 mm x c. 30 mm. Weight: 1890 grams. 20 1002 69684/73965. Figure 10.

6. Large narrow flake, completely patinated and now opaque and buff-coloured. Size: 222 mm x 115 mm x 12 mm. Weight: 499 grams. 12 69706/73972. Figure 08.

7. Long flake, completely patinated and now opaque and buff-coloured, approximately the correct size for an axe preform, but uneven in shape and with the central axis veering to one side rather than being straight. Size: 214 mm x 110 mm x 35 mm. Weight: 636 grams. 19 Context 1007, 69676/73952. Figure 10.

8. Large chunk, reduced on all sides (a.) and a small flake (b.), unlikely to be from the same knapping episode as the flake is coarser in texture than the chunk. Both are completely patinated – the flake is grey-buff in colour and the chunk is opaque light grey with two flake scars revealing the mid-grey stone beneath. The chunk has been reduced on all sides and resembles a core, though it is not large enough for axe production. Sizes: a. 110 mm x 140 mm x 70 mm, b. 52 mm x 55 mm x 20 mm. Weights: a. 988 grams, b. 49 grams. 7 Launch Pit 3 Topsoil 69797/74103. Figure 05.

9. Seven flakes, comprising one irregular-shaped flake (a. 40 grams) of a very coarse-textured rock and six flakes from two separate knapping episodes, comprising two flakes with a grey-buff colouration (b. 57 grams, c. 28 grams) and a group of four flakes of a coarser-textured grey stone (d. 272, e. 33, f. 10, g. 7). Sizes: a. 55 mm x 82 mm x 16 mm, b. 55 mm x 66 mm x 22 mm, c. 75 mm x

36 mm x 10 mm, d. 120 mm x 105 mm x 17 mm, e. 90 mm x 44 mm x 7 mm, f. 30 mm x 46 mm x 4 mm, g. 42 mm x 29 mm x 8 mm. Total weight: 448 grams. 11 69797/74103. Figure 07.

10. Large flake (a. 163 grams) and three chunks (b. 156 grams, c. 21 grams, d. 15 grams), the latter from the same knapping episode. The large flake was made from a coarser stone than the other three pieces and was completely patinated to an opaque buff colour and the chunks were all of an unpatinated mid-grey stone with white crystalline inclusions. The largest piece of the three chunks had been systematically reduced on all sides. No refitting was possible. Sizes: a. 124 mm x 70 mm x 30 mm, b. 87 mm x 40 mm x 34 mm, c. 40 mm x 34 mm x 27 mm, d. 44 mm x 33 mm x 15 mm. Total weight: 355 grams. 10 69611/73889. Figure 06.

11. Small chunk with an irregular-shaped surface due to the morphology of the stone which shows signs of having been shattered in the past. Very coarse in texture and completely patinated to a brownish-grey colouration. Size: 50 mm x 60 mm x 27 mm. Weight: 62. 1 69721/73976. Figure 04.

12. Rough chunk, partly patinated to a buff-grey colour but the natural mid-grey stone is revealed at the point of breakage. The surface is pitted. Size: 90 mm x 45 mm x 30 mm. Weight: 106 grams. 3 Context 1007 69676/73953. Figure 04.

13. Blade-like flake, with opaque buff-coloured patination. Size: 60 mm x 7 mm x 5 mm. Weight: 4 grams. 18 69646/73914. Figure 09.

14. Flake, with an uneven outer surface, possibly primary, completely patinated to a buff colour on its outer surface and the natural mid-grey stone is revealed on its inner surface. Size: 33 mm x 53 mm x 17 mm. Weight: 20 grams. 2 69743/73990. Figure 04.

15. Flake, completely patinated to a buff colour. Size: 28 mm x 56 mm x 10 mm. Weight: 22 grams. 15 69732/73988. Figure 09.

16. Large flake, completely patinated to an opaque brownish-grey colour. Size: 112 mm x 60 mm x 32 mm. Weight: 159 grams. 4 69741/73991. Figure 04.

17. Small broken flake, mid-grey stone. Size: 21 mm x 14 mm x 4 mm. Weight: 1 gram. 1012 Flot 04.

18. Two broken flakes, both patinated, the smaller to a lighter buff colour than the larger which is coarser- textured. Sizes: a. 67 mm x 47 mm x 15 mm, b. 11 mm x 19 mm x 4 mm. Weights: 44 grams and 1 gram. 1007 Flot 01.

19. Large broken flake, the surface of which is patinated an opaque buff-grey colour, but the natural mid-grey colour of the stone shows through at three large flake scars. Size: 85 mm x 25 mm x 18 mm. Weight: 155 grams. 13 69730/73987. Figure 09.

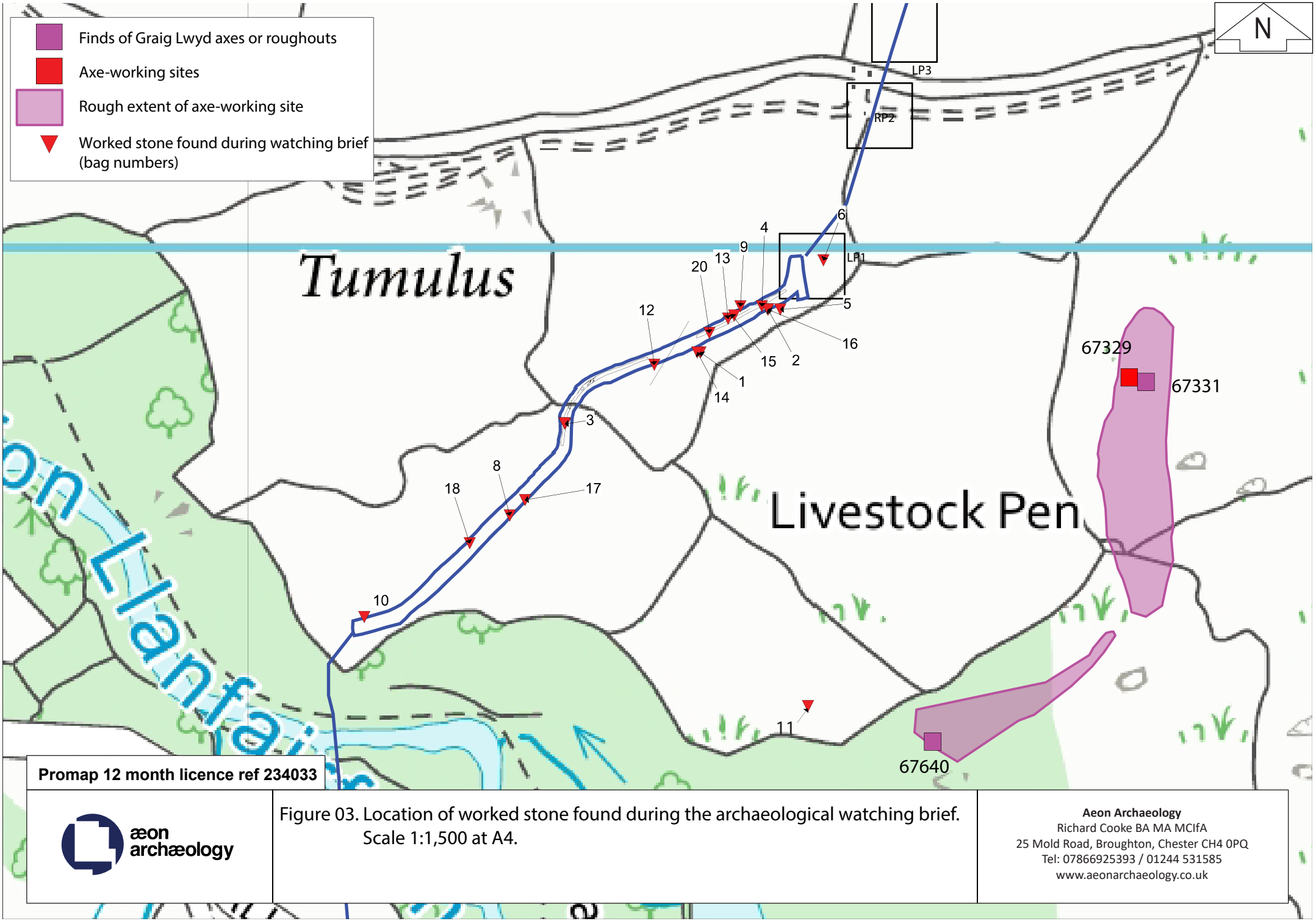
20. Small broken flake, completely patinated to an opaque brownish-grey colour. Size: 30 mm x 50 mm x 13 mm. Weight: 16 grams. 5 69747/73990. Figure 04.

21. Small broken flake, partly patinated to an opaque buff colour. Size: 68 mm x 50 mm x 15 mm. Weight: 38 grams. 16 69743/73990. Figure 09.

22. Small broken flake with pronounced conchoidal fracture on each side, the surface of which is patinated to an opaque buff colour. Size: 55 mm x 35 mm x 5 mm. Weight: 17 grams. 17 69664/73928. Figure 09.

Acknowledgements

The author wishes to thank Dr Rob Ixer for his comments on various artefacts in the collection.



Promap 12 month licence ref 234033

Figure 03. Location of worked stone found during the archaeological watching brief.
Scale 1:1,500 at A4.

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1/Cat. No. 11

2/Cat. No. 14

5/Cat. No. 20

3 Context 1007/
Cat. No. 12

4/Cat. No. 16

6 Launch Pit 1 Topsoil/
Cat. No. 1

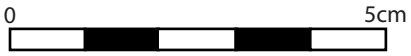

Figure 04. Worked stone small find bag numbers 1-6 / catalogue numbers 1, 11, 12, 14, 16 and 20. Scale 1:1 at A4.

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7 Launch Pit 3
Topsoil/Cat. No. 8a

7 Launch Pit 3
Topsoil/Cat. No. 8b

8/Cat. No. 2

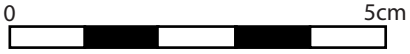

Figure 05. Worked stone small find bag numbers 7-8 / catalogue numbers 2 and 8.
Scale 1:1 at A4.

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Figure 06. Worked stone small find bag numbers 9-10 / catalogue numbers 3 and 10. Scale 1:1 at A4.

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Figure 07. Worked stone small find bag number 11 / catalogue number 9.
Scale 1:1 at A4.

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Figure 08. Worked stone small find bag number 12 / catalogue number 6.
Scale 1:1 at A4.

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Figure 09. Worked stone small find bag numbers 13-18 / catalogue numbers 4, 13, 15, 19, 21 and 22. Scale 1:1 at A4.

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19 1007/Cat. No. 7

20 1002/Cat. No. 5

0 10cm

Figure 10. Worked stone small find bag numbers 19-20 / catalogue numbers 5 and 7. Scale 1:2 at A4.

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11.0 RESULTS OF THE ARCHAEOLOGICAL WATCHING BRIEF

11.1 Overview

The archaeological watching brief was maintained by Richard Cooke BA, MA, MCIfA and Josh Dean BA ACIfA, archaeological contractors at Aeon Archaeology. The site was attended from the 3rd -5th, 10th, 12-13th, 17th-18th and 25th of October and 8th-10th, 26th and 30th November 2018 and the weather conditions varied between bright sunshine, overcast with persistent rain to heavy rain.

The watching brief was maintained during the excavation of a 6m wide easement followed by a 500m long open cut trench on the southern slopes above the Afon Llanfairfechan, starting near the Valley Road pumping station (SH 69736 73657**)** and extending northwest across Fields A, B and C before turning north (and downslope) across Field D, across the Valley Road and northwest across Field E before turning north once more to cross the Afon Llanfairfechan. Once across the river the open cut trench was then continued up the wooded northern bank into Field F, which constituted the southern slope of Mynydd Dinas. Within this area the trench divided into two separate routes, the western route (route 1) and the eastern route (route 2). These two routes then converged once more in Field G, before a series of launch and reception pits (1-6) were excavated across Fields H, I, J and K to facilitate pipe bursting along the existing main. Finally there was a small section of open cut trench (50m in length) that was excavated within Fields K and L (SH 69849 74714).

11.2 Fields A. B. and C (Closest to Valley Road pumping-station) (SH 69736 73657 – SH 69613 73746) (plates 1-11)

The Fields A, B, and C formed a long curving plateau on the southern hillside above the Afon Llanfairfechain. The initial works involved stripping the topsoil horizon across a 6m wide easement. This consisted of a 0.25m deep soft, dark grey-brown clay-silt with frequent sub-rounded pebble inclusions and fragments of post-medieval black ware pottery of 19th century date. This initial easement exposed the horizon between the topsoil and the subsoil and was began approximately 15m west of the Valley Road pumping station and extended for 160m in a north-westerly direction across fields A, B, and C. There were no archaeological features exposed during the topsoil strip.

Upon conclusion of the easement topsoil strip an open-cut trench was excavated through fields A, B and C for the water main replacement pipe. This trench was excavated to a width of 0.40m by 0.26m in depth and was located within the centre of the stripped easement. It cut through a 0.12m deep quite soft, mid orange-brown silt-clay subsoil with very frequent small sub-angular/rounded pebbles and cobbles into a >0.14m deep firm, yellow-brown natural clay substrata with very occasional large sub-rounded glacial boulders. There were no archaeological features exposed during the excavation of the pipe trench and no artefacts found.

Plate 01: Pre excavation shot looking northwest away from pumping station - from the southeast - scale 1m

Plate 02: Topsoil Strip shot looking northwest away from pumping station - from the southwest - scale 1m

Plate 03: Topsoil Strip shot looking southeast towards pumping station - from the northeast - scale 1m

Plate 04: Topsoil Strip in Field B looking southeast - from the north - scale 1m

Plate 05: Topsoil strip within Field B - from the west - scale 1m

Plate 06: Topsoil strip within Field C - from the west - scale 1m

Plate 07: Topsoil strip within Field C - from the east - scale 1m

Plate 08: Pipe trench in Field A - from the southeast - scale 1m

Plate 09: Pipe trench in Field A - from the southeast - scale 1m

Plate 10: Pipe trench in Field B - from the southeast - scale 1m

Plate 11: Pipe trench in Field C - from the west- scale 1m

11.3 Fields D and E and the Afon Llanfairfechan river crossing (SH 69613 73746 – SH 69604 73867) (plates 12-26)

The boundary between Fields C and D consisted of a barbed wire fence which had been situated at the break of slope of the plateau with field D falling away sharply to Valley Road. After the initial break of slope within Field D there was a grassed over post-medieval trackway that was retained on its northern side by a dry-stone revetment wall. The trackway comprised of 0.05m deep deposit of soft black-brown clay-silt topsoil, which lay above a 0.15m deep loose, mid orange-yellow sharp sand. Beneath this layer was a 0.10m deep deposit of crushed stone (shingle) and beneath this was a >0.22m deep deposit of soft, mid grey-brown, clay-silt subsoil with very frequent small angular/sub-rounded pebbles and cobbles. Upon breaching the revetment wall it was found to be constructed from small sub-angular boulders of dry-stone construction and measuring 0.3m in width. The wall had been constructed directly onto the natural glacial clay substrata although no foundation cut was discernible nor was any stratigraphic evidence for any earlier wall phasing.

The topsoil horizon was stripped across a 6m wide easement through fields D and E. In field D this consisted of a 0.25m deep soft, dark grey-brown clay-silt with frequent sub-rounded pebble inclusions. Within this the WMR pipe trench was excavated measuring 0.40m by 0.26m in depth and was located within the centre of the stripped easement. It cut through a 0.12m deep quite soft, mid orange-brown silt-clay subsoil with very frequent small sub-angular/rounded pebbles and cobbles into a >0.14m deep firm, yellow-brown natural clay substrata with very occasional large sub-rounded glacial boulders. There were no archaeological features exposed during the excavation of the pipe trench and no artefacts found.

The boundary between Field D and Valley Road was marked by a dry-stone wall which was breached by the open-cut water main renewal trench. The wall was constructed from small to large sub-angular and sub-rounded cobbles of dry-stone construction and measuring 0.5m in width. The wall had been constructed directly onto the natural glacial clay substrata which appeared to have been benched by a foundation cut permitting the construction of the wall from the level of Valley Road and backfilled on its western side, thus acting as a retaining wall for the field. There was no stratigraphic evidence of any earlier wall phasing.

Valley road was then closed before works continued across to the other side; the wall on this side of the road was not breached and was instead undermined to facilitate the pipe trench. The land fell away sharply to the north of Valley Road with Field E forming a narrow plateau south of the riverbed. The 6m wide easement strip within Field E cut through a 0.20m deep soft, dark grey-black silt topsoil with abundant pebble inclusions and evidence of heavy bioturbation. The open-cut pipe trench was then excavated through a >0.30m deep soft yellow-grey silt/gravel natural substrata with abundant pebble inclusions, suggesting that the field had formed part of the immediate floodplain of the Afon Llanfairfechan.

Plate 12: Pipe trench in Field C/D boundary looking downslope to Valley Road - from the south- scale 1m

Plate 13: Section of trackway within Field D - from the southwest - scale 0.5m

Plate 14: Section of trackway showing retaining wall for track (Field D) - from the west - scale 0.5m

Plate 15: Pipe trench within Field D looking downslope - from the south - scale 0.5m

Plate 16: Pre breach of field wall south of Valley Road (Field D) - from the north - scale 0.05m

Plate 17: Section of field wall marking boundary between Valley Road and field D - from the west - 0.5m scale

Plate 18: Topsoil Strip in Field E looking west- from the east - scale 1m

Plate 19: Topsoil Strip in Field E looking east- from the west - scale 1m

Plate 20: Pipe trench within Field E looking west - from the east - scale 0.5m

Plate 21: Pipe trench within Field E looking south - from the north - scale 0.5m

Plate 22: Section of pipe trench within Field E - from the north - scale 0.5m

Plate 23: Pipe trench within river basin - from the north - scale 1m

Plate 24: Section of pipe trench within river basin - from the west - scale 1m

Plate 25: Pipe crossing Afon Llanfairfechan - from the northwest - scale n/a

Plate 26: Pipe trench in northern bank of Afon Llanfairfechan - from the south - scale n/a

11.4 Fields F and G (Route 1) (SH 69604 73867 – SH 69717 73978) (plates 27-47)

The northern bank of the river was heavily wooded and covered in a layer of vegetation, however there was a natural break in the foliage at the point at which the open-cut trench left the river basin. The northern bank was almost vertical at this point and the trench was excavated into an almost sheer slope. The trench cut through a 0.50m deep deposit of degraded, orange-brown sand-clay-silt topsoil. Lying beneath this was a >0.62m deep deposit of mid grey-brown clay-silt natural substrata.

The trench then continued north and northeast into Field F where two separate routes were then excavated across the field, upslope into Field G. Both routes were stripped of topsoil across a 6m wide easement consisting of a 0.25m deep, mid red-brown silt clay topsoil (1001) onto a 0.17m deep, mid grey-brown silt-clay subsoil (1002). The WMR trench was then excavated through a >0.15m deep deposit of firm, bright yellow-brown clay natural (1003).

Route 1 ran from SH 69626 73893 to SH 69717 73978 with route 2 lying approximately 10.0m to the southeast. Fields F and G were divided by a dry-stone wall running roughly southeast-northwest. Route 1 utilised an existing opening in the field wall while route 2 required the wall to be breached, as described below. To the immediate north of the field wall and within Field G five archaeological features were uncovered within the WMR pipe trench.

The southernmost feature was a shallow linear ditch [1006] (PRN 77204) (SH 69676.70 / 73953.12) (figures 13 and 14) measuring >0.78m in length by 0.84m in width by a maximum of 0.18m in depth, orientated east-west and continuing into the eastern and western limits of excavation. The ditch had been cut into the natural glacial clay substrata (1003). The sides of the ditch were quite gradual, whilst the base varied between being flat and slightly concaved. This ditch lay approximately 7.4m north of the existing field boundary between Fields F and G but had a slightly different orientation and therefore was considered not to be related. The ditch [1006] had a single fill (1007) of a moderately soft, mid red-brown silt-clay with occasional small pebble inclusions. The fill produced two pieces of worked stone during excavation, a chunk (3/Cat. No. 12) and a large flake (19/Cat. No. 7). Two further pieces of worked stone were found during the flotation of the associated bulk sample (sample 01) consisting of two broken flakes (1007 Flot 01/Cat. No. 18). An environmental bulk sample was taken upon excavation and wet sieved producing 0.4g of charcoal and sand grains flot. A sample of the charcoal was sent for radiocarbon dating and produced a date of 776 - 971 cal AD (1174 - 979 cal BP).

Approximately 4.3m to the north of ditch [1006] a second linear ditch [1004] (PRN 77205) (SH 69678.51 / 73958.36) (figures 15 and 16) was uncovered within the WMR pipe trench. This ditch measured >0.82m in length by 1.50m in width by a maximum of 0.42m in depth, orientated northwest-southeast and continuing into the eastern and western limits of excavation. The ditch had been cut into the natural glacial clay substrata (1003). The sides of the ditch were marginally steeper near the top but became more gradual near the base of the cut which varied between being slightly concave and flat in places. The ditch appeared to mark the bottom of a break of slope and had two distinct fills. The primary fill (1005) consisted of a 0.24m deep moderately-soft, mid grey-brown (with purple mottling) silt-clay with occasional sub-rounded small to medium sized cobbles. The secondary fill (1015) consisted of 0.14m deep soft, light yellow-brown silt-clay with infrequent sub-rounded small sized cobbles. Neither of the ditch fills produced any artefacts and so an environmental bulk sample (sample 02) was taken from the primary fill (1005) and wet sieved producing 0.5g of

charcoal and sand grains flot. A sample of the charcoal was sent for radiocarbon dating and produced a date of 410 - 546 cal AD (1540 - 1404 cal BP).

Further to the northeast and lying approximately 5.6m away from ditch [1004] an ovoid / sub-rounded pit [1008] (PRN 77206) (SH 69682.63 / 73964.23) (figures 17 and 18) was uncovered within the WMR pipe trench. The pit measured 1.32m in length by 0.62m in width by a maximum of 0.33m in depth orientated northeast southwest, and was cut directly into the natural glacial substrata (1003). The sides varied - to the northeast and southwest the sides were gradual, whereas to the northwest and southeast the sides were fairly steep suggesting that it had been cut from those sides. The base of the cut was overall slightly concaved although there was mild undulation due to the stony natural. The pit had two distinct fills; the primary fill (1009) consisted of a 0.17m deep fairly soft, dark brown-grey clay-silt with occasional sub-angular small sized cobbles and quite frequent charcoal fleck inclusions. The secondary fill (1010) consisted of a 0.16m deep soft, yellow-brown silt-clay with occasional charcoal fleck inclusions. Neither of the pit fills produced any artefacts and so an environmental bulk sample (sample 03) was taken from the primary fill (1009) and wet sieved producing 47.1g of charcoal and sand grains flot. A sample of the charcoal was sent for radiocarbon dating and produced a date of 86 - 242 cal AD (1864 - 1708 cal BP).

Approximately 1.2m to the northeast of pit [1004] a curvilinear gulley [1011] (PRN 77207) (SH 69684.20 / 73965.28 to SH 69685.47 / 73967.04) (figures 19 and 20) was uncovered within the WMR pipe trench. The gulley measured >2.7m in length by 0.22m in width by a maximum of 0.22m in depth, orientated southwest-northeast before turning and running north into the north-western limit of excavation. The gulley had been cut into the natural glacial clay substrata (1003) and had very steep sides and a flat base. It had a single fill (1012) which consisted of a very soft, mid yellow-brown clay-silt with occasional charcoal fragments and occasional sub-angular small cobble inclusions. Within this fill (1012) pressed against the north-western side of the gulley was a single large flat sub-angular cobble, possibly indicative of a packing stone suggesting that the gulley may have originally retained a structural element. The single fill did not produce any artefacts and so an environmental bulk sample (sample 04) was taken from fill (1012) and wet sieved producing 0.5g of charcoal and sand grains flot as well as one broken stone flake (Flot 04/Cat. No. 17). A sample of the charcoal was sent for radiocarbon dating and produced a date of 74 - 226 cal AD (1876 - 1724 cal BP).

The gulley had been heavily truncated by a later large pit [1013] suggesting the gulley [1011] could have been of greater dimension and may have originally contained more of a structural element than apparent upon excavation. Pit [1013] (PRN 77208) (SH 69685.44 / 73966.42) (figures 19 and 20) measured 2.60m in length by >0.88m in width by a maximum of 0.74m in depth, orientated northeast-southwest and cut into the natural glacial substrata (1003). The sides were very steep, almost vertical and the base of the cut was flat and slightly concave sloping from northeast to southwest. The pit had a single fill (1014) which consisted of a soft, mid grey-brown silt-clay with frequent large sub-rounded cobble and small sub-rounded boulder inclusions. The single fill did not produce any artefacts and so an environmental bulk sample (sample 05) was taken from fill (1014) and wet sieved producing 1.1g of charcoal and sand grains flot, as well as one broken stone piece of stone that was later confirmed to have not been worked (1014 Flot 05). A sample of the charcoal was sent for radiocarbon dating and produced a date of 242 - 386 cal AD (1708 - 1564 cal BP)

There were no other features or artefacts found within route 1 however eighteen pieces of worked stone were found unstratified within the spoil tips after stripping and excavation had been completed, as shown in section 10.0.

Plate 27: Section of northern bank (south of Field F) - from the east - scale 1m

Plate 28: Pre excavation shot of Field F - from the southwest - scale n/a

Plate 29: Topsoil strip within Field F (from the base of the slope) - Route 1 - from the southwest - scale 1m

Plate 30: Topsoil strip within Field F (downlsope) - Route 1 - from the northeast - scale 1m

Plate 31: Pipe trench within Field F (from the base of slope) - Route 1 - from the southwest - scale 0.5m

Plate 32: Pipe trench within Field F (looking downslope) - Route 1 - from the northeast - scale 0.5m

Plate 33: Pipe trench within Field G (looking upslope) - Route 1 - from the south - scale 0.5m

Plate 34: Pipe trench within Field G (top of slope) - Route 1 - from the north - scale 0.5m

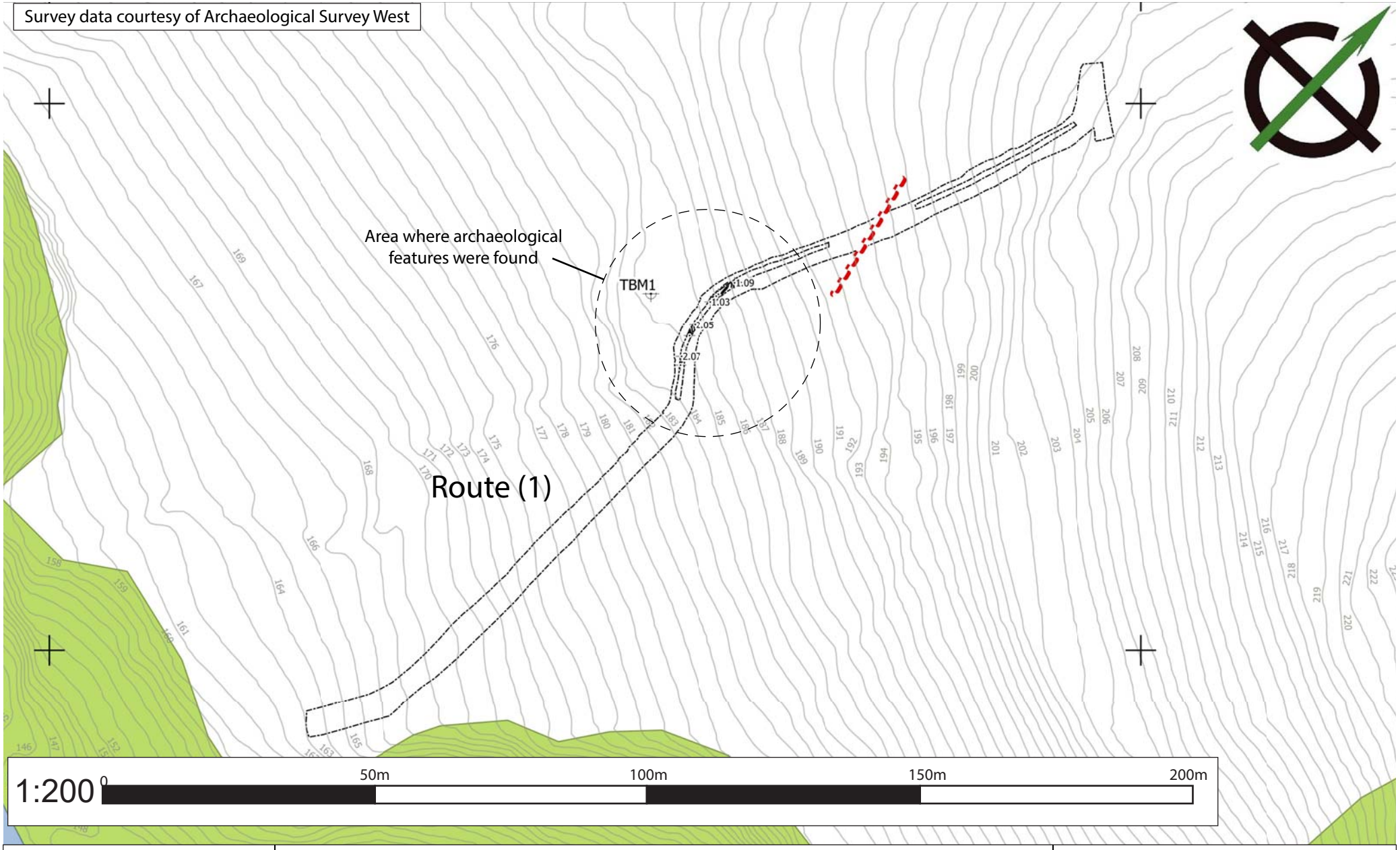

Figure 11. Plan showing extent of Route (1) with area of archaeological features outlined. Scale 1:200 at A4.

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Survey data courtesy of Archaeological Survey West

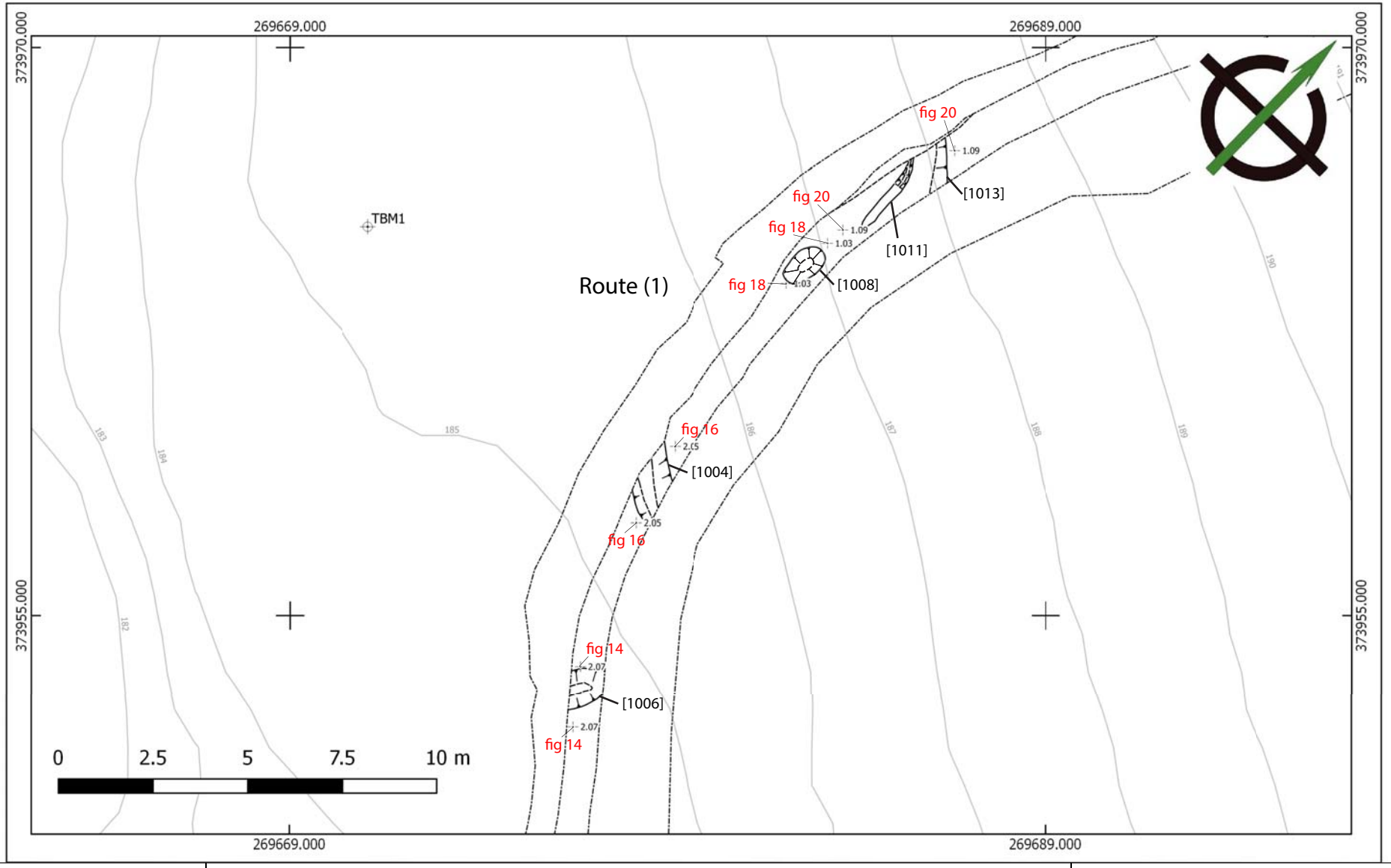

Figure 12. Plan showing location of archaeological features within Route (1)

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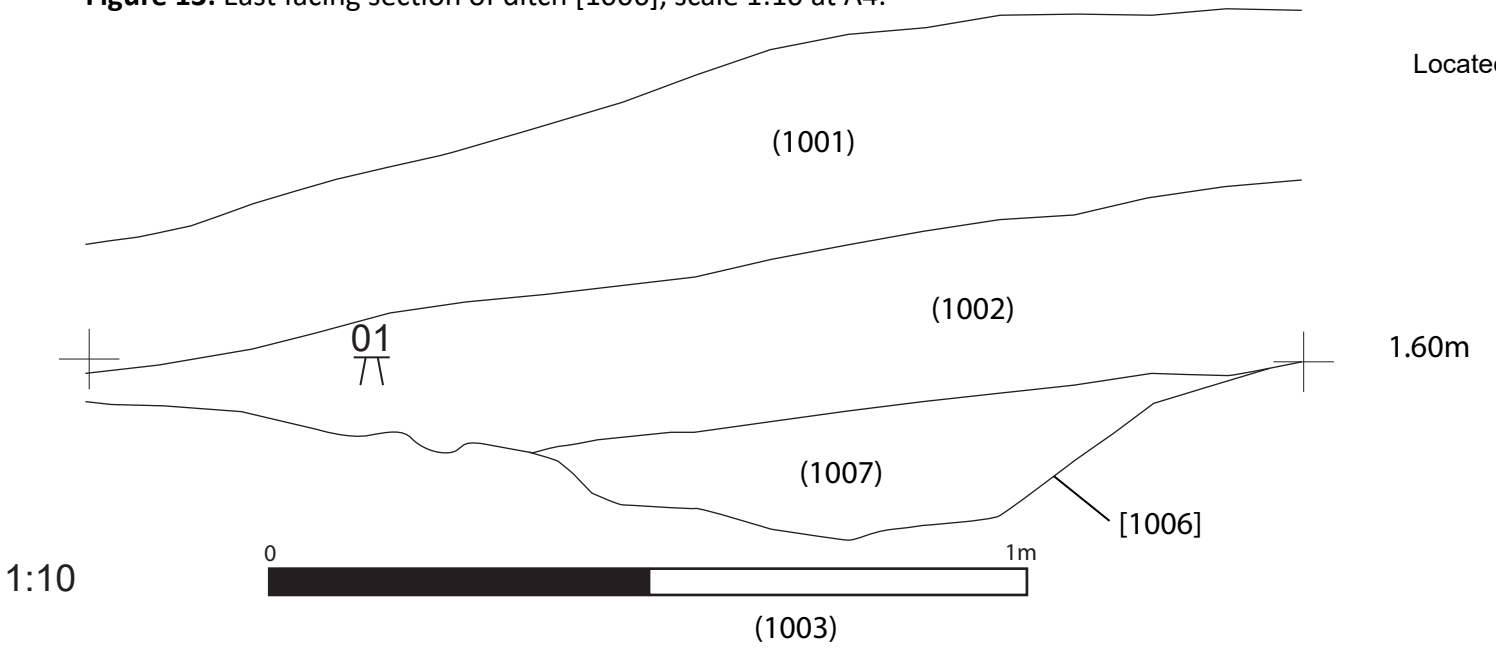
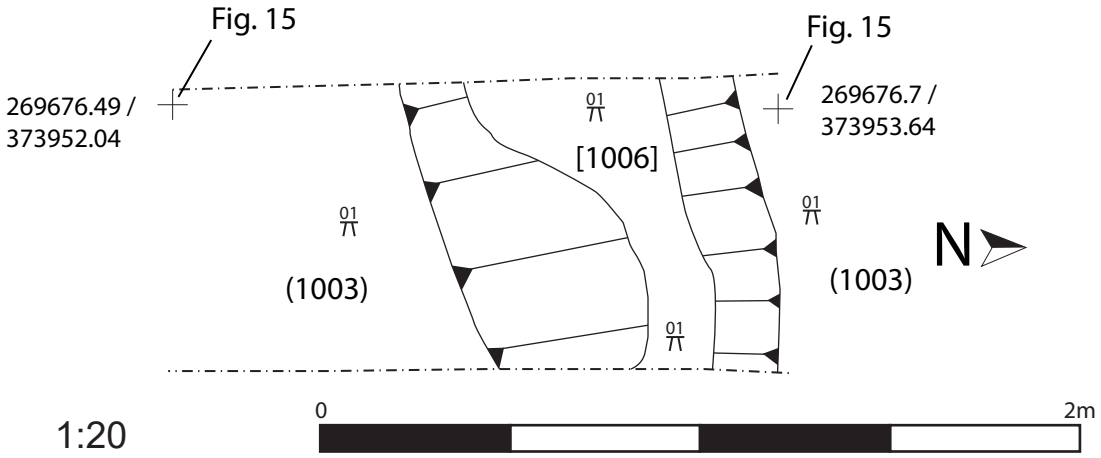
Figure 13: East facing section of ditch [1006], scale 1:10 at A4.



Levels (ODm)
TBM = 186.23
BS = 2.69
IH = 188.92
FS = 4.35
RL = 184.39

Figure 14: Plan of ditch [1006], scale 1:20 at A4.



Levels (ODm)
TBM = 186.23
BS = 2.69
IH = 188.92
1 = 184.35
2 = 184.15
3 = 184.41
4 = 184.28

Located on fig 12

Figures 13 & 14. East facing section of ditch [1006] and Plan of ditch [1006]
Scales are shown below figures.

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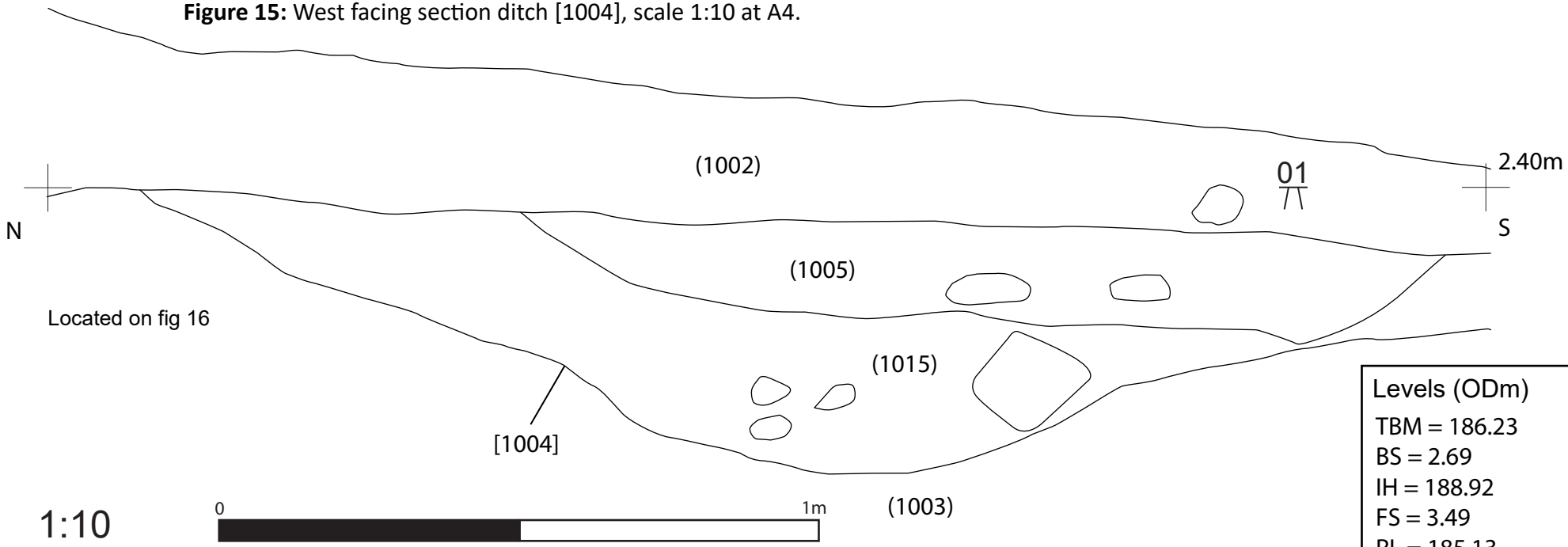
Plate 35: Post excavation shot of southern ditch [1006] - from the northwest - scale 0.5m

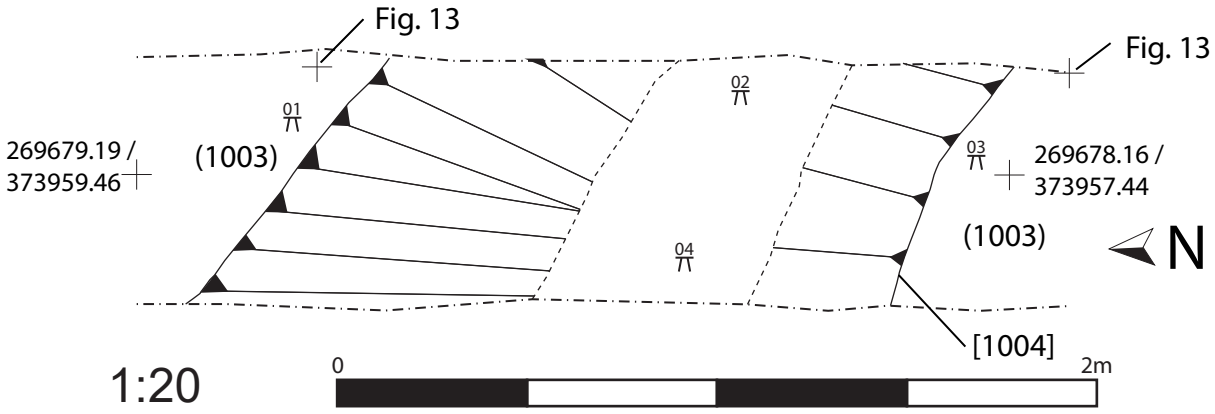
Plate 36: Section of southern ditch [1006] showing the single fill (1007) - from the north - scale 0.5m

Figure 15: West facing section ditch [1004], scale 1:10 at A4.



Levels (ODm)
TBM = 186.23
BS = 2.69
IH = 188.92
FS = 3.49
RL = 185.13

Figure 16: Plan of ditch [1004], scale 1:20 at A4.



Levels (ODm)
TBM = 186.23
BS = 2.69
IH = 188.92
1 = 185.07
2 = 184.62
3 = 184.76
4 = 184.92

Located on fig 12

Figures 15 & 16. West facing section of ditch [1004] and Plan of ditch [1004]
Scales are shown below figures.

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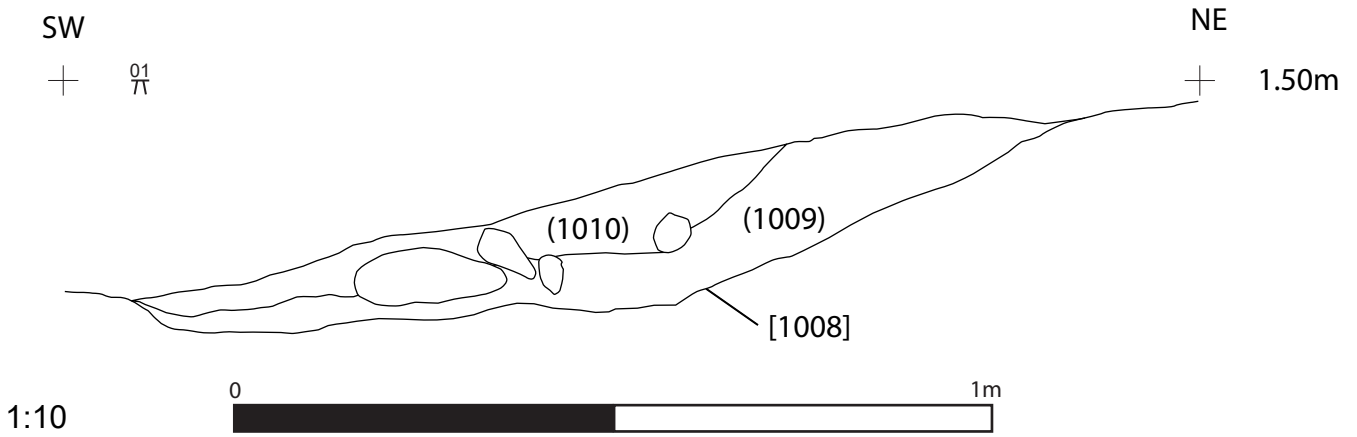
Plate 37: Post excavation shot of northern ditch [1004] - from the northwest - scale 0.5m

Plate 38: Section of northern ditch [1004] showing fills (1005) & (1015) - from the northwest - scale 0.5m

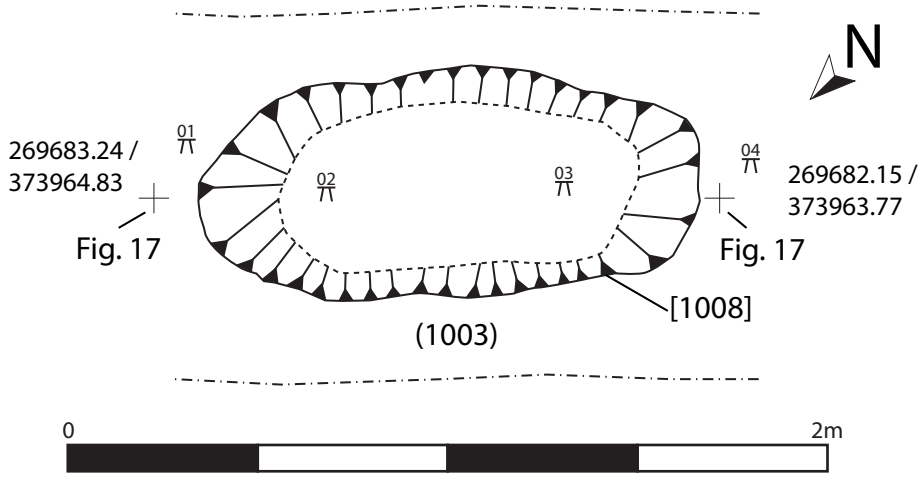
Figure 17: Southeast facing section of pit [1008], scale 1:10 at A4.



Located on fig 18

Levels (ODm)
TBM = 186.23
BS = 2.69
IH = 188.92
FS = 2.42
RL = 186.50

Figure 18: Plan of pit [1008], scale 1:20 at A4.



Levels (ODm)
TBM = 186.23
BS = 2.69
IH = 188.92
1 = 186.51
2 = 186.22
3 = 186.16
4 = 186.22

Located on fig 12

Figures 17 & 18. Southeast facing section of pit [1008] and Plan of pit [1008]
Scales are shown below figures.

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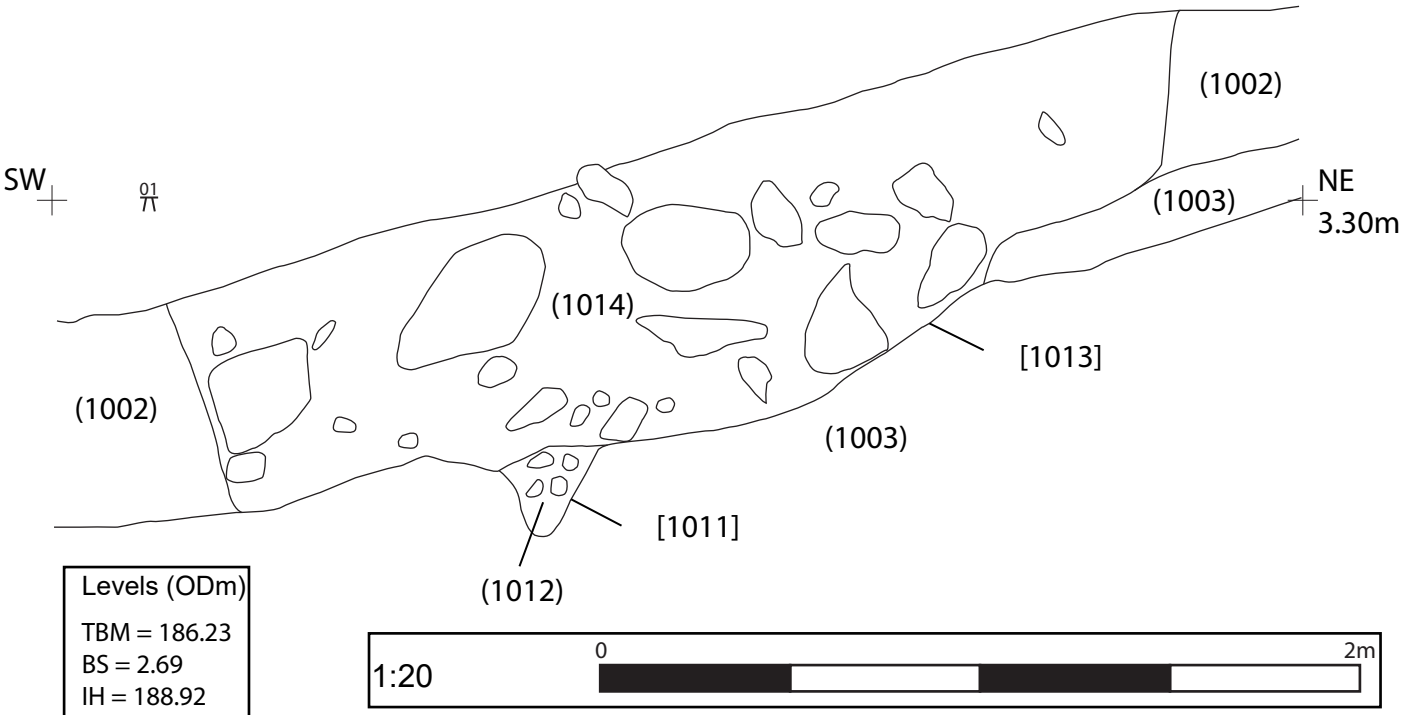
Plate 39: Pre excavation shot of pit [1008] - from the south - scale 1m

Plate 40: Half section of pit [1008] - from the southeast - scale 0.5m

Plate 41: Focus on section of pit [1008] showing fills (1009) & (1010) - from the southeast - scale 0.5m

Plate 41b: Post-excavation photograph of pit [1008] - from the southwest - scale 0.5m

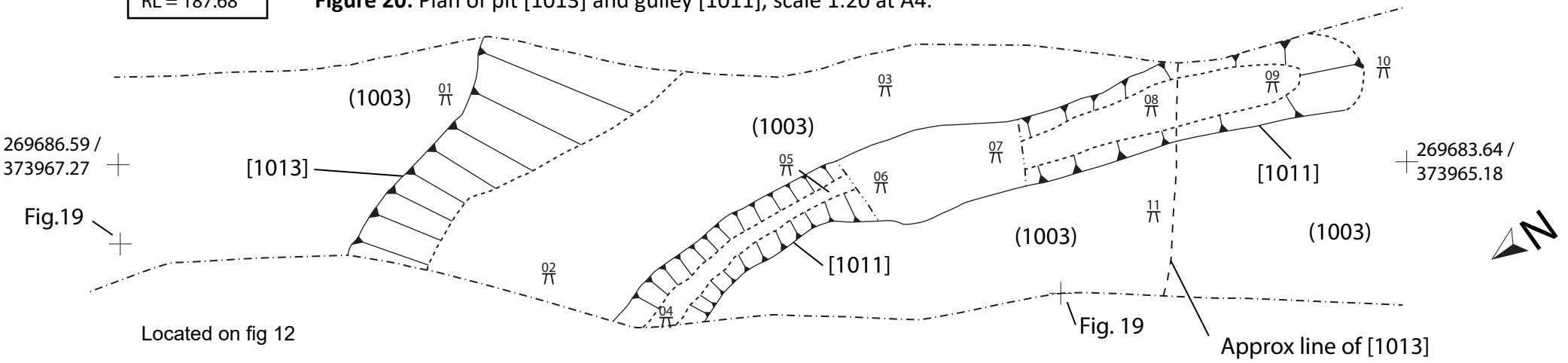
Figure 19: Southeast facing section of pit [1013] and gulley [1011], scale 1:20 at A4.



Located on fig 20

Levels (ODm)
TBM = 186.23
BS = 2.69
IH = 188.92
1 = 187.42
2 = 187.85
3 = 187.84
4 = 186. 80
5 = 186. 78
6 = 186.93
7 = 186. 85
8 = 186.71
9 = 186.62
10 = 186.60
11 = 186.65

Figure 20: Plan of pit [1013] and gulley [1011], scale 1:20 at A4.



Located on fig 12

Figures 19 & 20. Southeast facing section of pit [1013] and gulley [1011] and Plan of pit [1013] and gulley [1011].

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Plate 42: Pre excavation shot of pit [1013] - from the south - scale 1m

Plate 43: Post excavation shot of pit [1013] - from the north - 0.5m

Plate 44: Section of pit [1013] showing linear gulley [1011] (lower left of frame) - from the east - scale 0.5m

Plate 45: Post ex shot of linear gulley [1011] - from the south - 0.5m

Plate 46: Section of linear gulley [1011] - from the southwest - 0.5m

Plate 47: Focus on packing stone within [1011] projecting into section below [1013] - from the southeast - 0.5m scale

11.5 Fields F and G (Route 2) (SH 69604 73867 – SH 69717 73978) (plates 48-58)

The eastern open-cut WMR trench (route 2) cut through a 0.17m deep, mid grey-brown silt-clay subsoil (1002), which lay above a >0.15m deep deposit of firm, bright yellow-brown natural clay substrata (1003). This route breached a partially collapsed dry-stone field wall boundary between Fields F and G. The wall was constructed from sub-rounded large cobbles and small boulders of dry-stone construction, and tapered from 0.7m in width at the top of the wall to 1.0m in width at the base. The wall appeared to extend approximately 0.6m below ground level however an inspection of the revealed trench section showed that much of the ground at this point was of tumbled stone that had fallen from the wall. As such the wall had been constructed directly onto the natural glacial clay substrata within a fairly shallow foundation cut which was not clearly visible in section. There was no stratigraphic evidence of any earlier wall phasing.

The open cut trench ran closer to the eastern extent of Field F before entering Field G through the breached wall. The area directly northwest of the wall formed a small plateau within the field however no archaeological remains were found during this phase of excavation. Route 2 then merged with route 1 in the eastern corner of Field G at SH 69717 73978. No archaeological features or artefacts were found.

Plate 48: Topsoil strip within Field F (from the base of the slope) - Route 2 - from the southwest - scale 1m

Plate 49: Topsoil strip within Field F (looking downslope) - Route 2 - from the north - scale 1m

Plate 50: Wall separating Fields F & G - from the southwest - scale 1m

Plate 51: Section of breached wall (between Fields F & G) - from the west - scale 0.5m

Plate 52: Topsoil strip within Field G (looking upslope) - Route 2 - from the south - scale 1m

Plate 53: Topsoil strip within Field G (looking downslope) - Route 2 - from the northeast - scale 1m

Plate 54: Pipe trench base of Field F (base of field) - Route 2 - from the southwest - scale 0.5m

Plate 55: Pipe trench base of Field F (top of field) - Route 2 - from the north - scale 0.5m

Plate 56: Pipe trench base of Field G (base of field) - Route 2 - from the north - scale 0.5m

Plate 57: Pipe trench base of Field G (top of field) - Route 2 - from the south - scale 0.5m

Plate 58: Generic section of pipe trench - from the southeast - scale 0.5m

11.6 Exploratory pit in Field H. and Launch and Reception Pits (Fields G, H, I, and J) (plates 59-76)

Following the 500m of open-cut trenching on the lower slopes for the water main renewal the topography levelled out near the top of Field G with only a very slight change in slope running across the remaining fields in a northerly direction. The decision was taken to utilise pipe bursting for these sections to follow the route of the existing water main. Initially this involved the excavation of an exploratory trench in Field H over the proposed crossing for the existing gas main and in order to locate the existing water main pipe. This trench was located at NGR SH 69800 74129 and extended to the northwest for a distance of 7m at which point the existing main was found. The trench cut through a 0.71m deep, dark grey-brown silt clay topsoil onto a 0.13m deep, mid yellow-brown silt-clay subsoil, which lay above a >0.08m deposit of firm, white-grey natural clay substrata. No archaeological features or artefacts were found.

Launch Pit 1

Launch pit 1 measured 4m long by 1.60m wide by 0.70m deep and was located at NGR SH 69761 74006 within Field G. The trench cut through a 0.20m deep deposit of soft, mid red-brown silt-clay topsoil onto a light yellow-brown clay with frequent small and medium sub-rounded cobble inclusions. A large retouched scraper (6 Launch Pit 1/Cat. No. 1) was recovered from the topsoil but no archaeological features were found.

Reception Pit 2

Reception pit 2 measured 4m long by 1.75m wide by 1.25m deep and was located at NGR SH 69771 74047 on the boundary between Fields G and H. The trench cut through a 0.50m deep deposit of soft, mid grey-brown silt-clay topsoil onto a 0.30m deep deposit of light orange-brown sand-clay subsoil, which lay above >0.95m light yellow-grey clay with frequent small sub-rounded cobble inclusions. No archaeological features or artefacts were recovered.

Launch Pit 3

Launch pit 3 was located near to the exploratory pit in Field H that was excavated over the gas main. It measured 5m long by 1m wide by 1.25m deep and was located at NGR SH 69797 74103. The trench cut through a 0.75m deep soft, mid grey-brown silt-clay which was almost certainly backfill for the original water main trench. This lay above a >0.50m deep deposit of light yellow-brown sand-clay subsoil, which lay above a >0.95m deep light yellow-grey clay with frequent small sub-rounded cobble inclusions. No archaeological features were found but a large stone chunk and a small flake (7/Cat. No. 8) were recovered from the backfill material.

Reception Pit 4

Reception pit 4 measured 4m long by 1.25m wide by 0.75m deep and was located at NGR SH 69809 74142 in the northern area of Field H. The trench cut through a 0.60m deep deposit of soft, mid grey-brown silt-clay which was once again was probably backfill for the original water main trench. This lay above a >0.30m deep light yellow-grey clay natural with frequent small sub-rounded cobble inclusions. No archaeological features or artefacts were recovered.

Launch Pit 5

Launch pit 5 measured 4m long by 1.50m wide by 0.75m deep and was located at NGR SH 69844 74238 within Field I. The trench cut through a 0.30m deep deposit of soft, mid grey-brown silt-clay topsoil. This lay above a >0.30m deep deposit of light yellow-brown clay subsoil, which lay above a >0.15m deep light orange-brown clay natural with frequent small sub-rounded cobble inclusions. No archaeological features or artefacts were recovered.

Reception Pit 6

Reception pit 6 measured 4m long by 1.50m wide by 1.10m deep and was located at NGR SH 69869 74333 within Field J. The trench cut through a 0.60m deep deposit of soft, mid red-brown silt-clay topsoil. This lay above a >0.20m deep deposit of light grey, silt-clay natural and a >0.30m deep deposit of orange grey silt-clay natural with frequent small-medium sub-angular cobble inclusions. No archaeological features or artefacts were recovered.

Plate 59: Test pit within Field H to locate water main - from the southwest - scale 1m

Plate 60: Topsoil strip in Field H to 1st launch pit - from the northeast - scale 1m

Plate 61: Topsoil strip within Field H to 1st launch pit - from the south - scale 1m

Plate 62: Pipe trench within Field H - from the southwest - scale 0.5m

Plate 63: Section of pipe trench within Field H - from the west - scale 1m

Plate 64: Launch pit 1 - from the west - scale 1m

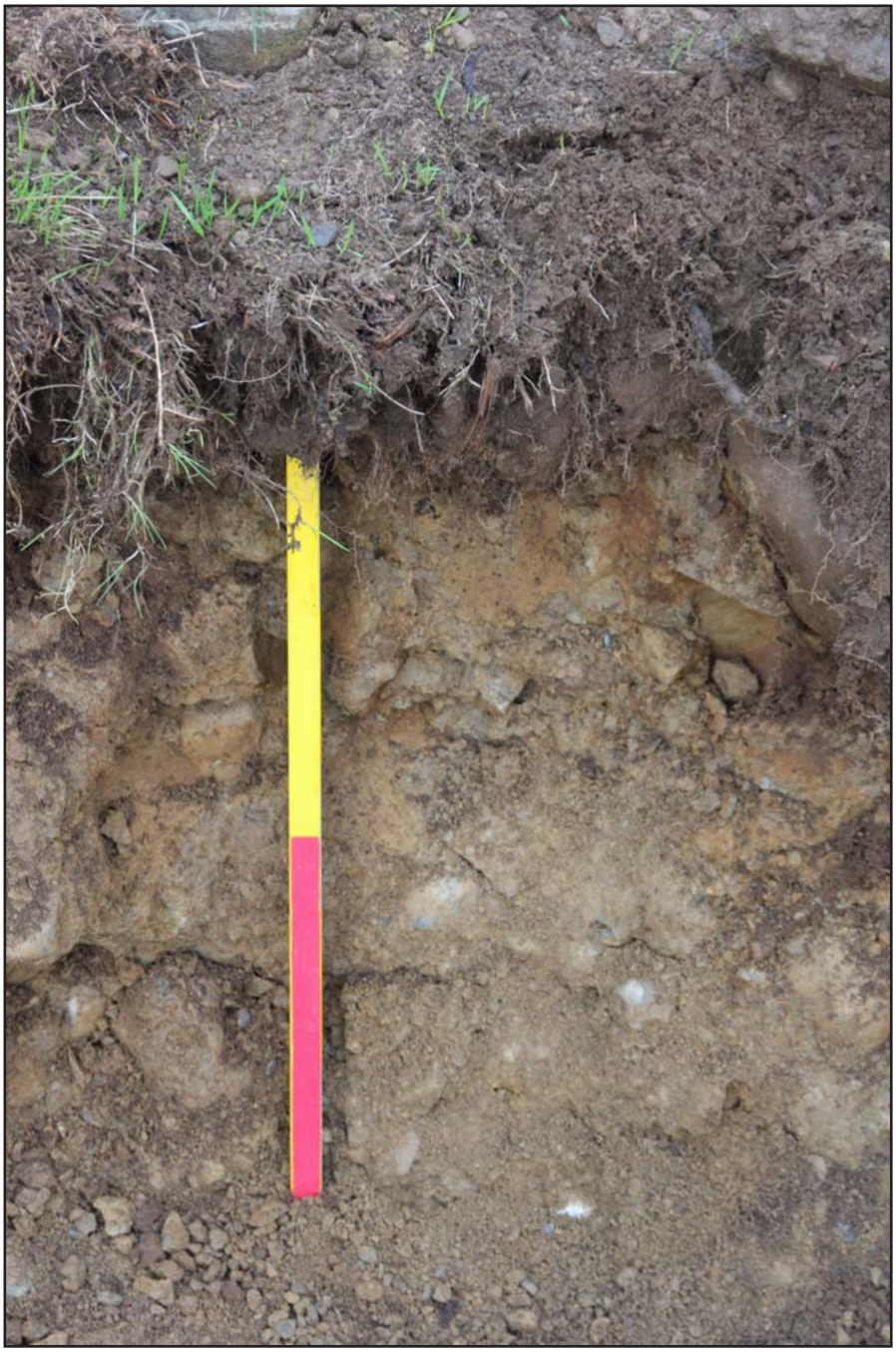

Plate 65: Section of launch pit 1 - from the north - scale 0.5m

Plate 66: Reception pit 2 - from the west - scale 1m

Plate 67: Section of reception pit 2 - from the north - scale 1m

Plate 68: Launch pit 3 - from the west - scale 1m

Plate 69: Section of launch pit 3 - from the north - scale 1m

Plate 70: Reception pit 4 - from the northeast - scale 1m

Plate 71: Section of reception pit 4 - from the southeast - scale 1m

Plate 72: Launch pit 5 - from the east - 1m

Plate 73: Section of launch pit 5 - from the north - scale 1m

Plate 74: Reception pit 6 - from the south - 1m

Plate 75: Section of reception pit 6 - from the southwest - 1m

11.6 Open-cut trench in Field K and L (Near Waen Farm) (SH 69859 74408 to SH 69856 / 74432) (plates 77-83)

Following the observation of the launch and reception pits the methodology returned once more to the excavation of an open-cut trench either side of *Nant y Iâr*; over the final 20m within Field K. and initial 4m within Field L. The trench in Field K cut through a 0.55m deep deposit of soft, mid red-brown silt-clay topsoil which lay above a >0.30m deep deposit of light grey silt-clay natural and orange grey silt-clay natural. No archaeological features or artefacts were recovered in this area.

The excavation was then observed crossing *Nant y Iâr* and running for 4m north into Field L. To the immediate north of the stream a field wall was breached, this ran east to west and measured 1.60m wide by 0.60m in height and was constructed from large sub-rounded cobbles and boulders – this wall had no apparent form and following the breach the stones were shown to have been laid on the ground surface without foundation.

The trench in Field L measured 4m long by 0.70m wide by 1.30m deep. The trench cut through a 0.30m deep deposit of soft, mid grey-brown silt-clay topsoil. This lay above a >1m deep deposit of orange (with grey/blue mottling) clay natural with frequent sub-rounded small to medium sized cobble inclusions.

Plate 76: Pipe trench within Field K - from the southeast - 1m scale

Plate 77: Pipe trench within Field K - from the north - 1m scale

Plate 78: Section of pipe trench within Field K - from the southeast - 1m scale

Plate 79: Wall south of Nânt y Iâr within Field L - from the southwest - scale 0.5m

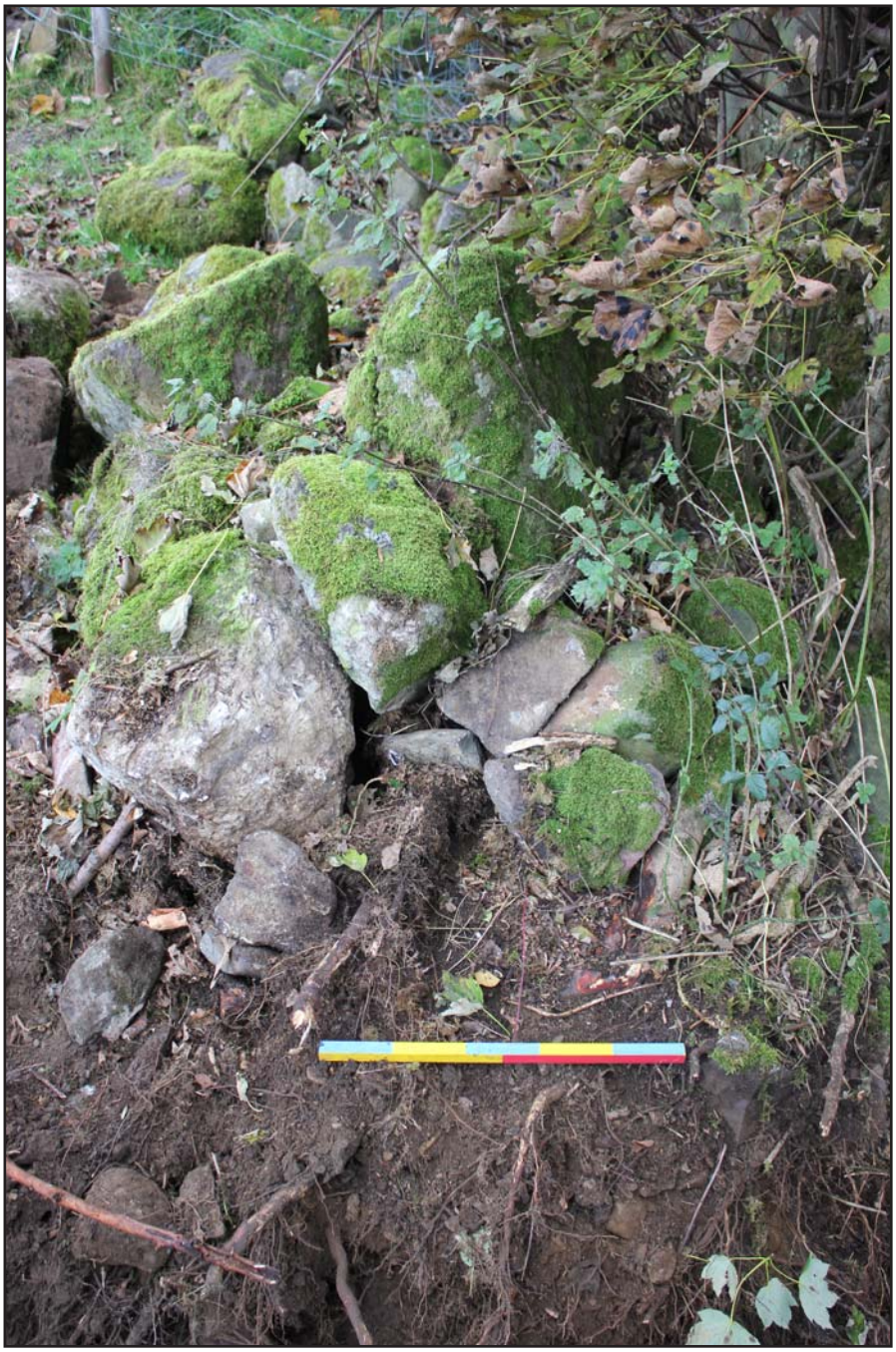

Plate 80: Section of breached wall south of Nânt y Iâr within Field L - from the south - scale 0.5m

Plate 81: Pipe trench within Field L north of Nânt y Iâr - from the south - scale 0.5m

Plate 82: Section of pipe trench within Field L - from the north - scale 0.5m

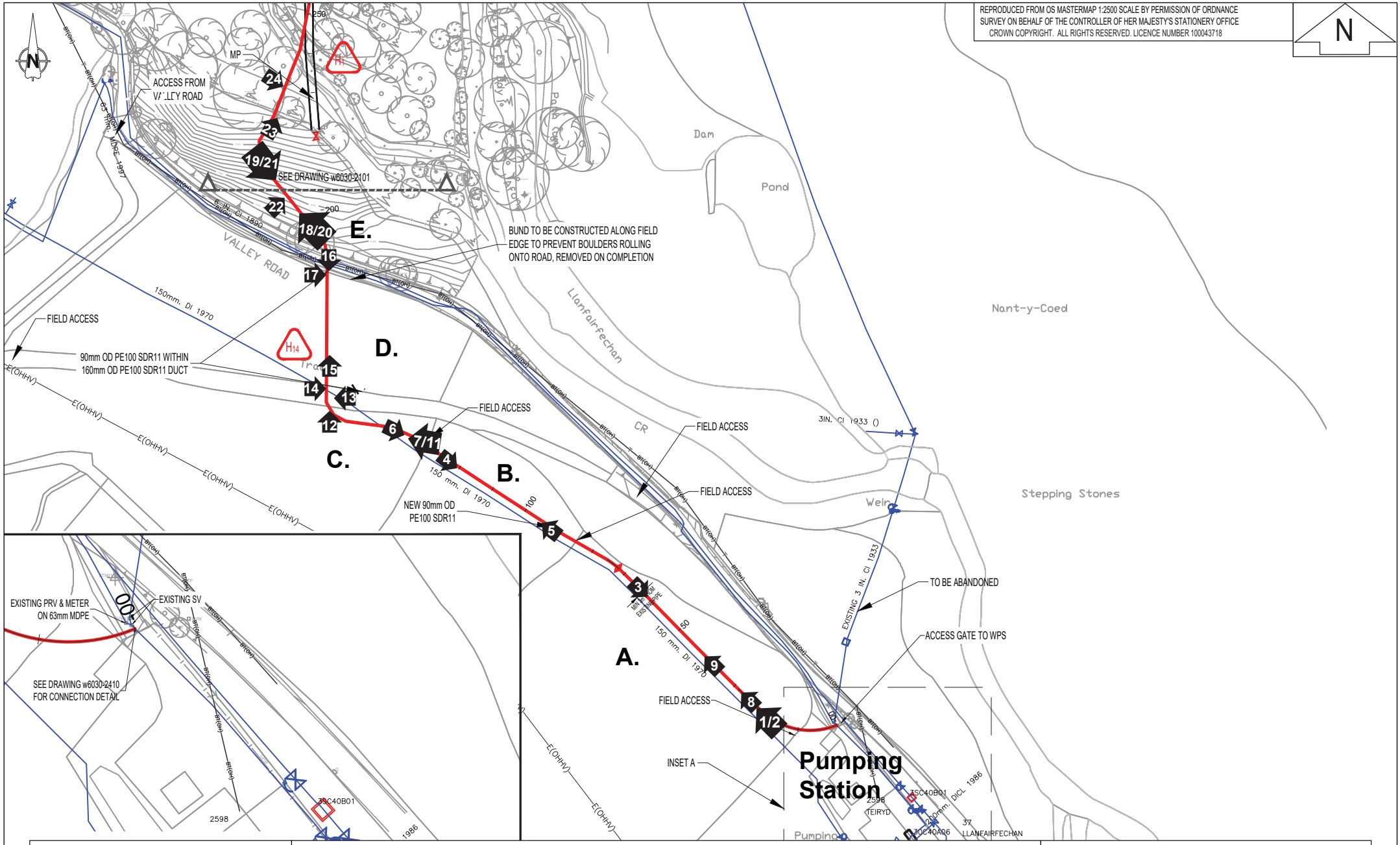

Figure 21. Location of photographic plates on southern slope of the Afon Llanfairfechan, starting near pumping station and river crossing (Fields A-E). Scale 1:500 at A4.

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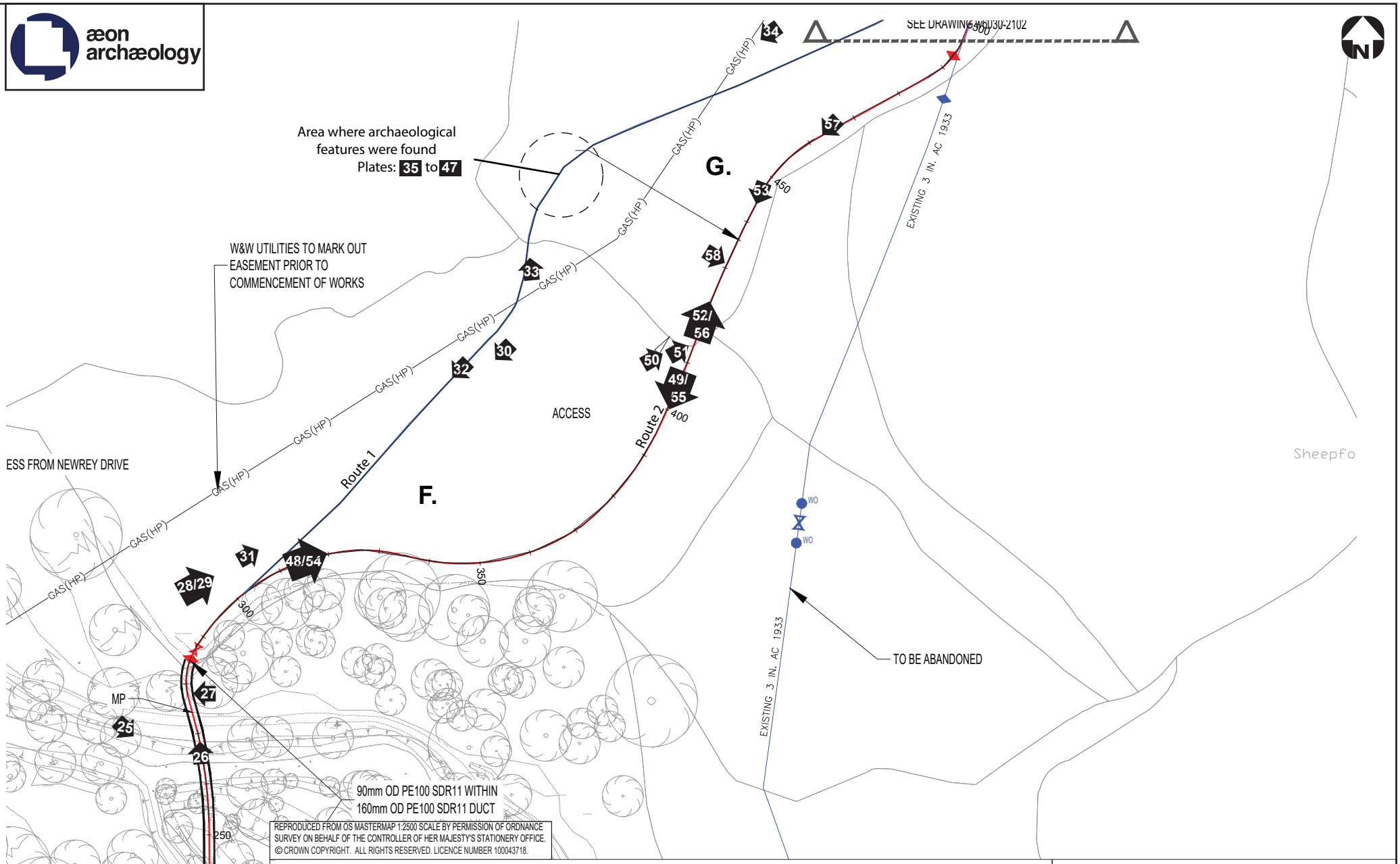

Figure 22. Location of photographic plates on northern slope above the Afon Llanfairfechan showing general area (Fields F-G) of recorded archaeological features. Also two routes for water main excavations. Scale 1:500 @ A4.

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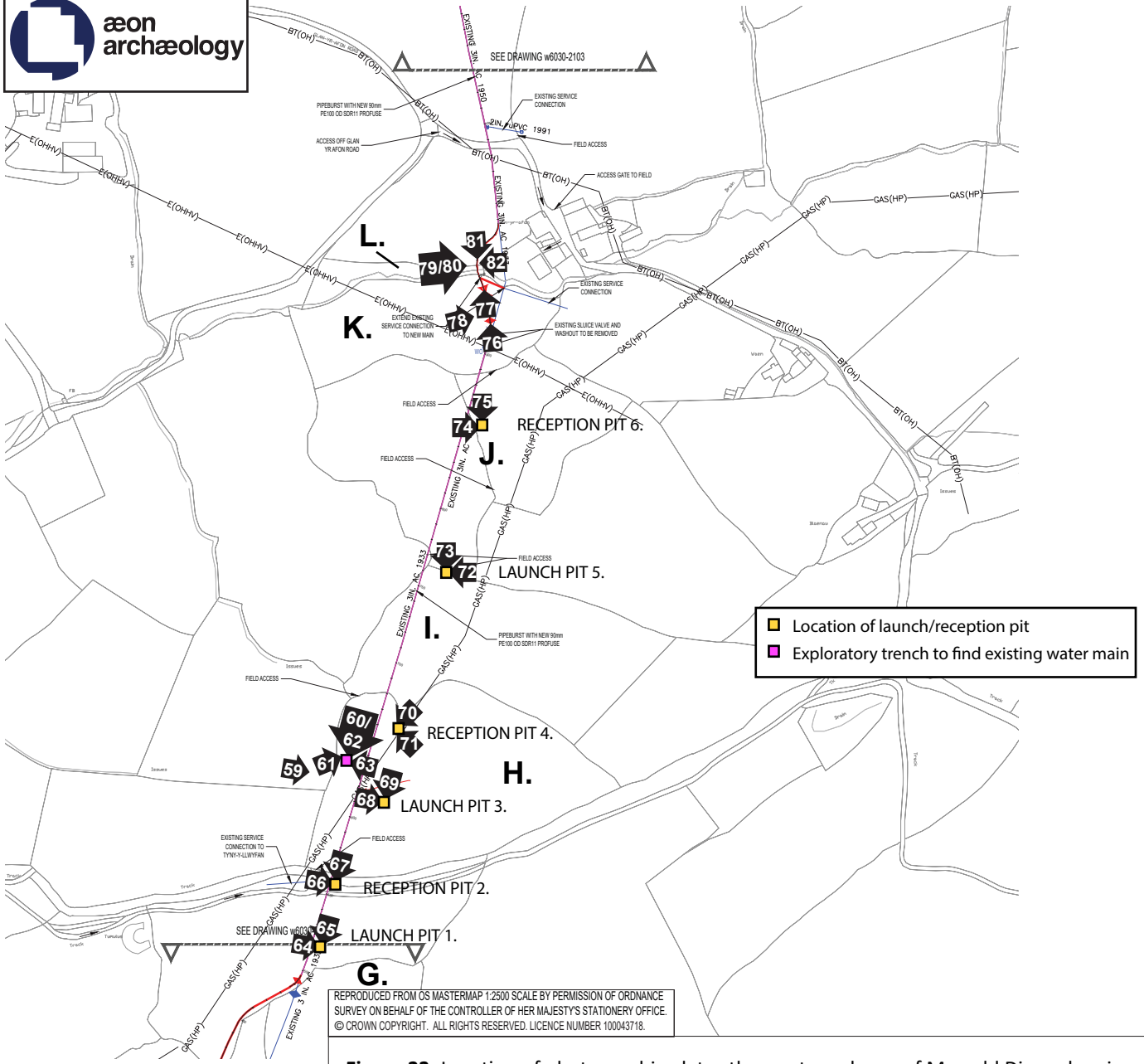

Figure 23. Location of photographic plates the western slopes of Mynydd Dinas showing the Fields G-L, with the locations of the launch and reception pits (1-6) .Scale 1:2000 @ A4.

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12.0 CONCLUSION

The archaeological watching brief maintained during the water main replacement scheme by DCWW at Newry Llanfairfechan uncovered the remains of five archaeological features comprising two ditches [1006 and 1004], a small pit [1008], a curvilinear gulley [1011], and a large pit [1013]. All of these features were located within an 18.0m length of pipe trench situated at the base of Field G on the north-western slope of Dinas, between SH 69676 / 73953 and SH 69685 / 73966. Topographically this area formed the lower part of a steep slope which briefly levelled out to the immediate south to form a narrow plateau, before falling away steeply again south-westward towards the Afon Llanfairfechan. There was therefore nothing apparent about the immediate localised environment that would have been especially conducive to an area of activity or occupation, aside from a proximity to the relatively flat plateau downslope. Moreover, the soil conditions were not of any distinct difference at this particular location to suggest that archaeological remains would have an increased chance of preservation compared to the rest of the scheme.

The southernmost ditch [1006] produced a stone chunk, a flake, and two broken flakes from within its fill, while curvilinear gulley [1011] produced a single broken stone flake from its fill. These artefacts form part of the Neolithic axe-making activity associated with the nearby prehistoric stone sources however the radiocarbon dates obtained from these features shows that they were residual finds of incidental deposition during the backfilling process of these features.

The five archaeological features span a time period of approximately 900 years. The earliest features are that of a curvilinear gulley [1011] and a small pit [1008] that went out of use between 74 - 226 cal AD and 86 - 242 cal AD according to their respective radiocarbon dates, and placing them within the Roman period. It is therefore possible that these features are contemporary in date and potentially associated.

The identity of the curvilinear gulley is unclear, partly because its full extent was not revealed and also because it had been truncated by a later pit [1013]. There was however a suggestion of stone packing within the gulley fill which may allude to use as a drainage gulley. The revealed dimensions of the gulley is reminiscent of prehistoric and Roman period round-house drip gullies, as seen at Parc Bryn Cegin, Llandygai and elsewhere within Northwest Wales, and it is possible that the feature represents that of a tail-end of such a gulley. This theory is however unproven.

The ovoid/sub-circular pit [1008] produced a high quantity of charcoal from its bulk sample suggesting that localised burning had occurred within its limits. This would suggest that it was a hearth or cooking pit, perhaps associated with an area of occupation.

The identity of the large pit [1013] is similarly unproven. The pit does however stratigraphically cut curvilinear gulley [1011] and its fill was radiocarbon dated to 242 - 386 cal AD. This would suggest a continuation of Roman period activity at the site and the inclusion of frequent large sub-rounded cobble and small sub-rounded boulders within the pit fill may be indicative of a phase of field clearance or even structure demolition that may feasibly have occurred immediately after the curvilinear gulley had gone out of use.

To the south of the above features a linear ditch [1004] was uncovered running northwest-southeast across the WMR trench. This ditch did not produce any artefacts but its fill was radiocarbon dated to 410 - 546 cal AD. The ditch appeared to follow the bottom of a break of slope with a narrow flat plateau lying to the south and as such may be a Roman period boundary or enclosure ditch to the focused area of activity to the north. Although the radiocarbon date would suggest a slightly later date

than the features mentioned above, the date is derived from the charcoal within the ditch infill and as such gives a date for when the ditch went out of use. As such the ditch may still be contemporary with the pit [1008], curvilinear gulley [1011] or pit [1013] but was infilled at a later date.

Evidence of Iron Age occupation is fairly well attested in the localised environment with prehistoric round-houses located on the northern, north-eastern, eastern and south-eastern slopes of Dinas (PRNs 498, 8035) along with areas of cultivation. Moreover, the prehistoric hillfort Scheduled Ancient Monument of Dinas Camp (CN049) lies 280.0m to the east of the WMR pipe route. However no areas of Roman period activity have been identified previously within the localised area. The time period assigned to these areas of occupation are based more upon typology rather than actual dating and as such it is possible that some of the occupation areas identified may be of multi-period or Roman period origin and therefore contemporary with the features found during the watching brief. Regardless of this, the watching brief has enabled the identification for the first time of Roman period activity on the north-western slopes of Dinas.

The closest area of suspected Roman activity is that of the possible Roman fortlet at Waun Llanfair (PRN 3990) located 930m to the northeast. It is difficult however to see how these two areas of activity could be related given the distance involved and the lack of any known Roman era transit route between them.

The final feature to be found was that of a second linear ditch [1006] located at the southern part of the field and orientated east-west. The fill of this ditch was radiocarbon dated to 776 - 971 cal AD showing that it had gone out of use and been backfilled in the early-medieval period. This would suggest a different phase of activity to the features mentioned above and may represent an early land division.

Early-medieval sites are rare in this part of Northwest Wales, although they must have existed, and it is generally considered that they were often built upon thus obscuring earlier foundation remains. In this case it is not clear whether the ditch was associated with any form of settlement or whether it merely represented part of an early-medieval field system.

Thirty four items of stone, mainly flakes but also including scrapers and other, larger pieces of manufacturing debris were collected during the watching brief. Far more is known of the treatment of stone axes when they reach their destinations than of the organisation of stone working in Neolithic Britain and how it may have been connected to cyclical patterns of landscape usage and resource exploitation. The Report and Gazetteer on Group VII Axe-working sites and stone sources in Llanfairfechan, Conway (Kenney 2017) brought together previous work on axe-making sites and demonstrates the massive scale of axe-working in the area, as well as establishing research objectives for the future to safeguard this endangered resource.

The three scrapers identified at Newry Llanfairfechan, along with the three knapping episodes and the working of very small chunks of stone, indicate that Graid Lwyd stone was being used for the production of tools other than axes. In spatial terms, the small size of the assemblage and scattered nature of its distribution makes it difficult to construct any meaningful conclusions about stone working and human activity in the vicinity of the site. However, the find spots of two of the scrapers are fairly closely associated, with two at one end of the area of excavation and the third scraper located near to the centre (figure 03). Scrapers are a class of tool often associated with domestic activity and occupation foci (Schofield 1987, 280), and they have been used in the reconstruction of gendered space since they are viewed as being associated with hearth-based activities carried out by

women (Herne 1991, 731; Hayden 1992; Gron 1995; Bevan 1995a, Bevan 1995b, 1996, 1997 and 2010).

Conversely, axes or knives have been regarded as 'male' tools among groups of recent tool-makers and users in Papua New Guinea (Pétrequin and Pétrequin 2011) or among the Alyawara of Australia (Binford 1986), for example. Scrapers, however, with their associations with hide-working may have been made and used by specific groups or families, as observed among late 20th century Ethiopian hide workers (Gallagher 1977). Therefore, the scrapers may have been associated with either gender or with a hide-working site or a cyclical encampment rather than occupation foci of any duration. In either case, while the nature of the site remains enigmatic, as well as the gendered identity of the tool makers and users, it is clear that tool making was one of the activities carried out there and that scrapers made from Graig Lwyd stone were being made and/or used on or in the vicinity of the site. The current assemblage represents only a small sample of the stone-working which took place at the site, which may have been used on an intensive or episodic basis by various members of a community over time.

Despite difficulties in understanding the organisation of tool-making on the site and in the wider landscape and the treatment of waste material, it is clear that stone working was taking place in the area of the site. A lack of axes or axe rough-outs in this assemblage does not mean that axe working was not carried out on site, only that there is no conclusive evidence for it in the current assemblage. While the site cannot currently be described as an 'axe-working site', including, for example, the site at Maes y Bryn near Dinas where scrapers and other tools were found together with stone axes (Kenney 2017, 46), there is evidence for the production of smaller tools in the current assemblage, including scrapers, although they may have been brought to the site for other purposes.

In conclusion, although small in size and limited in its composition, this collection enhances our knowledge of the exploitation and usage of Group VII stone in the area of Llanfairfechan, and helps to provide a context for the examination of future finds from the site and surrounding area. It also increases the evidence for scraper manufacture from Graig Lwyd stone, a stone which was accorded 'specific forms of attention' both as a raw material and when transformed into axes (Williams, Kenney and Edmonds 2011, 268). The complex processes leading to the manufacture of tools from reused polished axe flakes or issues relating to the destruction of flint axes and other tools (ibid, 273-274) are beyond the scope of the current study. That is not to say that similar processes did not occur in the area since artefacts 'could be accorded special treatment when their source was close at hand and even still in sight', as demonstrated by the Parc Bryn Cegin stone axe blades in contrast to the distance equals value arguments put forward in the past (Williams, Kenney and Edmonds 2011, 274). Stone axe studies have also moved on from the discussion of prestige goods economies and attention is now being focused on issues of identity, transformation and rites of passage (ibid, 274). The recovery of Graig Lwyd scrapers from diverse locations, including stone-working sites such as the one discussed here as well as from a funerary context in Anglesey (Lynch 1991, Fig. 29, 108) and further afield on the Great Orme (Glen 1935, 202-203), implies that the stone retained its special character and value when transformed into this artefact type, whatever its context of use and the circumstances of its eventual deposition, destruction or discard. Whether that 'special character' transcended the materiality of the raw material and the apparent utilitarian nature of the tools produced from it remains open to debate.

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APPENDIX I – DETAILS OF ARCHAEOLOGICAL CONTEXTS

Context	Description
1001	Topsoil
1002	Subsoil
1003	Natural
1004	Cut of northern ditch
1005	Primary fill of [1004]
1006	Cut of southern ditch
1007	Fill of [1006]
1008	Cut of small pit
1009	Primary fill of [1008]
1010	Secondary fill of [1008]
1011	Cut of linear gulley
1012	Fill of [1011]
1013	Cut of large Post-Medieval pit
1014	Fill of [1013]
1015	Secondary fill of [1004]

APPENDIX II: WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL WATCHING BRIEF

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DCWW Newry Llanfairfechan, Gwynedd LL33 0ER, Water Main Renewal.

Written Scheme of Investigation for Archaeological Watching Brief.

August 2018 v2.0

Project Code: A0181.1

1.0 INTRODUCTION

Aeon Archaeology has been commissioned by Dwr Cymru / Welsh Water (DCWW), hereafter the Client, to provide a written scheme of investigation (WSI) for carrying out an archaeological watching brief as part of a proposed water main renewal (WMR) scheme between the existing pumping station at Newry Llanfairfechan and Newry Cottage, Llanfairfechan, Gwynedd (**NGR SH 69736 73657 to SH 69849 74714**).

The scheme is located within several enclosed fields, as detailed in DCWW Drawing Nos. W6030-2100 to W6030-2103 (reproduced in figures 01-04). The WMR scheme will include the replacement of the existing water main with a new 90mm diameter high performance polyethelyne (HPPE), using open cutting from Newry Llanfairfechan for approximately 500m north. After this the existing pipe will be replaced using pipe bursting for the remaining 1.0km northwards to Newry Cottage

A mitigation brief was not prepared for this scheme by the Gwynedd Archaeological Planning Service (GAPS) Development Control Archaeologist but the following consultee comments were made as part of the application:

An archaeological watching brief should be carried out on this scheme. This area has a high prehistoric potential – the scheme passes below a hillfort (scheduled monument CN049) and within 100m of a Bronze Age barrow, with various recorded sites of settlement, agriculture and chance artefact finds throughout this area. The watching brief would require an archaeologist to attend during all excavation works for the scheme, including open cut trenching and any pits associated with sliplining/pipebursting. The field pattern here is interesting and appears to include some early boundaries, so the watching brief would also need to include a basic record (photographs and description) of any boundaries affected by the scheme.

The work will adhere to the guidelines specified in Standard and Guidance for Archaeological Watching Brief (Chartered Institute for Archaeologists, 2014).

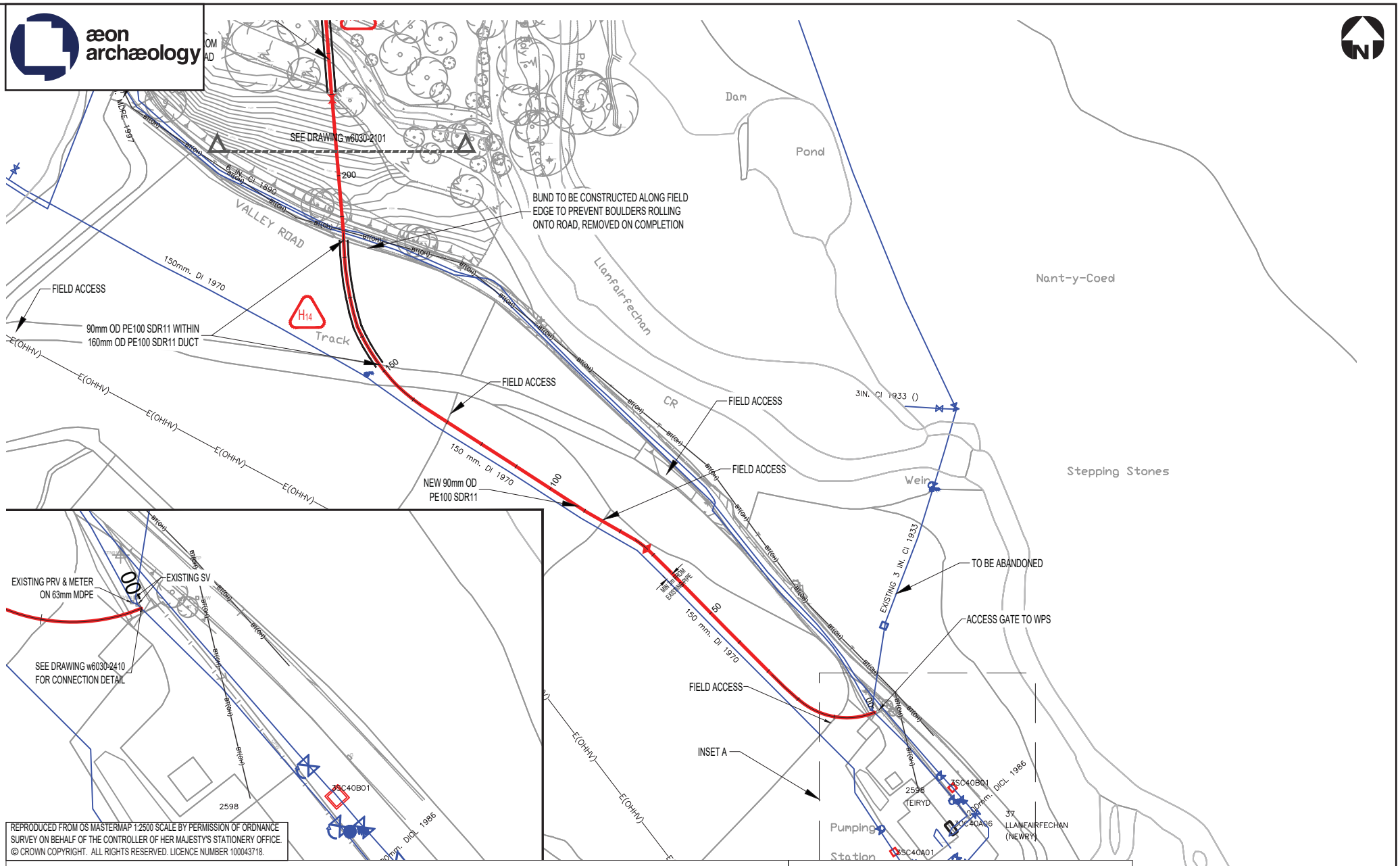

Figure 01: Location of water replacement scheme at Newry Llanfairfechan (works to be monitored by archaeological watching brief outlined in red).
Scale 1:500 at A4.

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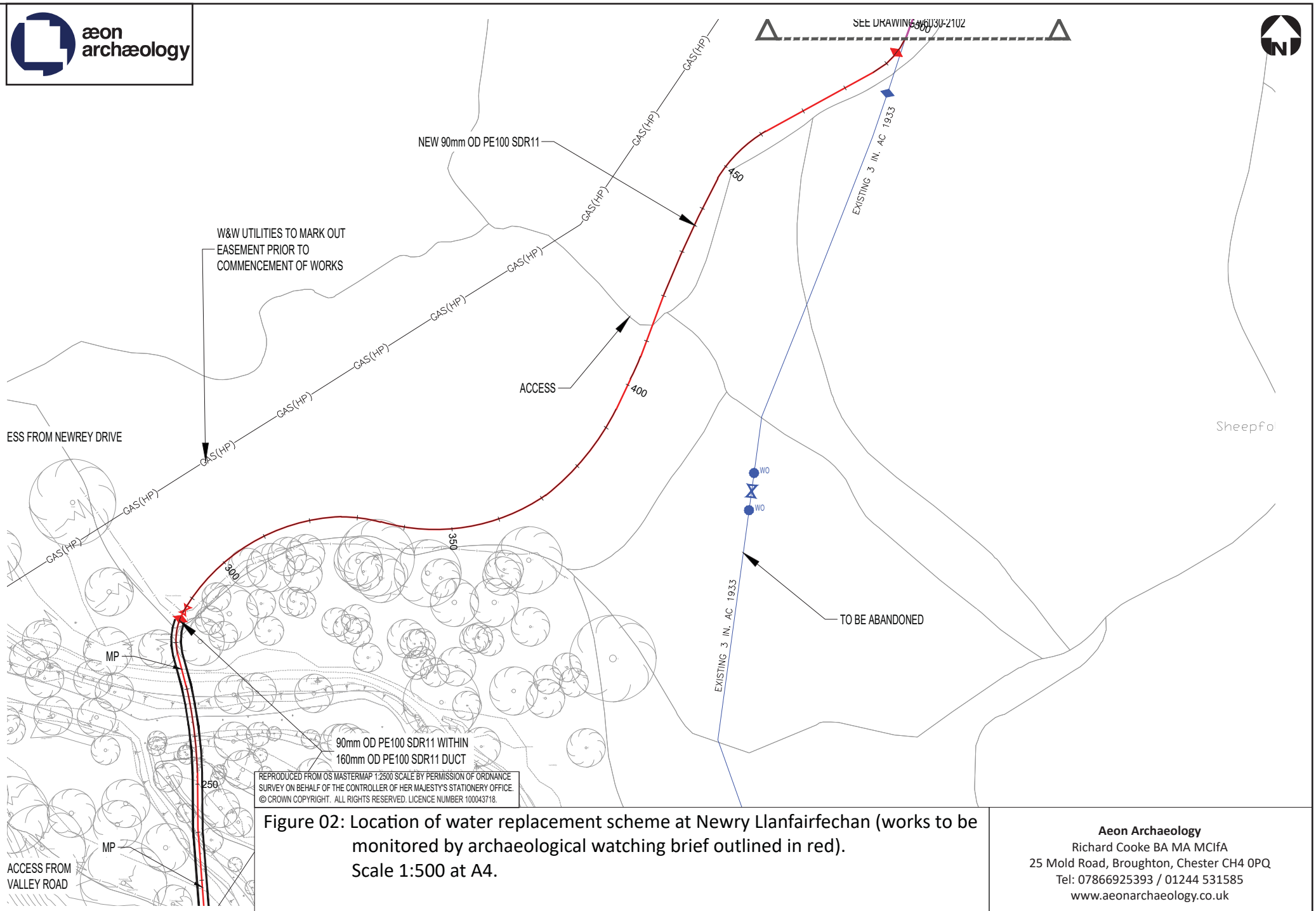

Figure 02: Location of water replacement scheme at Newry Llanfairfechan (works to be monitored by archaeological watching brief outlined in red).
Scale 1:500 at A4.

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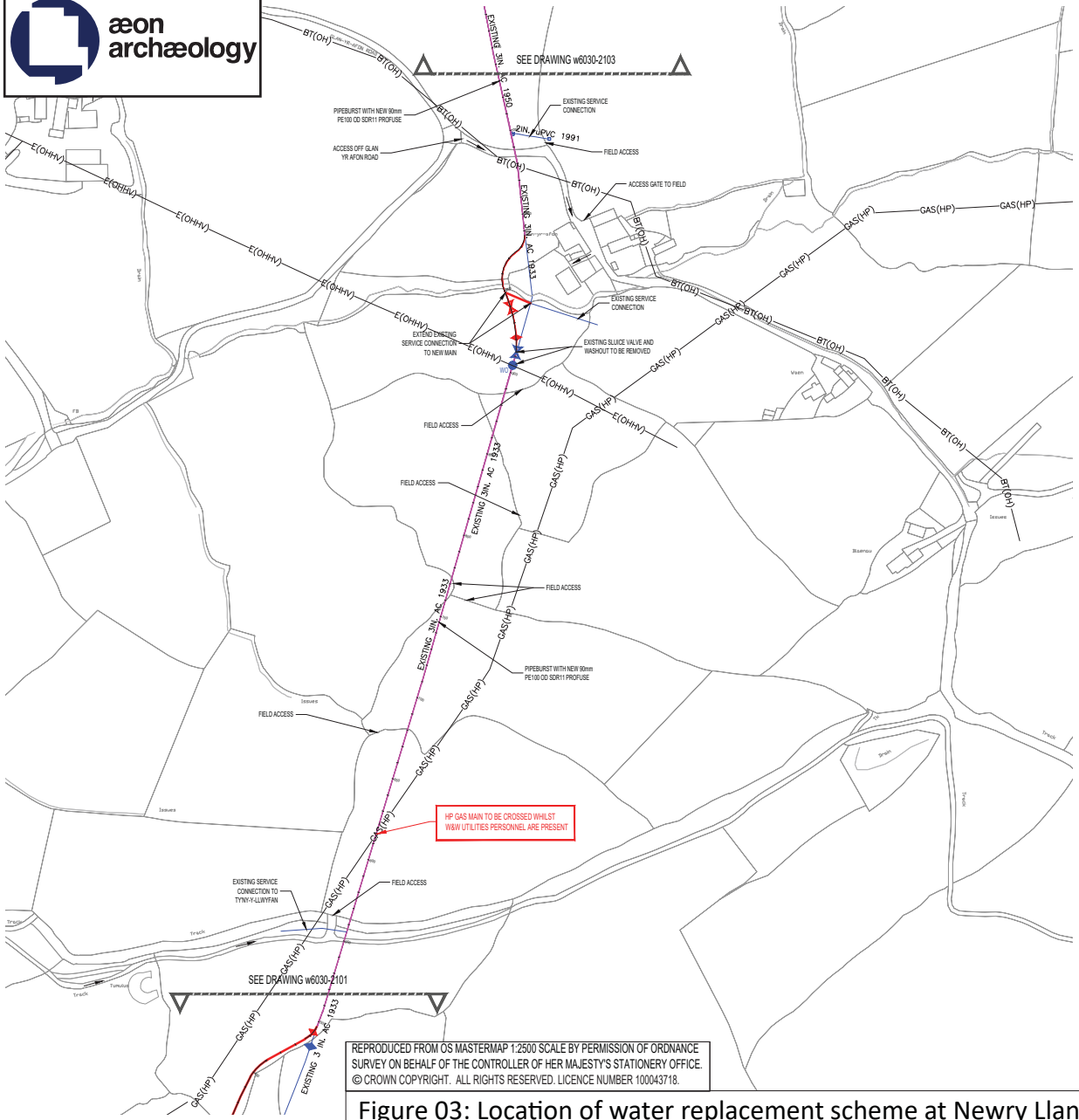

Figure 03: Location of water replacement scheme at Newry Llanfairfechan (works to be monitored by archaeological watching brief outlined in red; area of pipe bursting outlined in pink). Scale 1:2,000 at A4.

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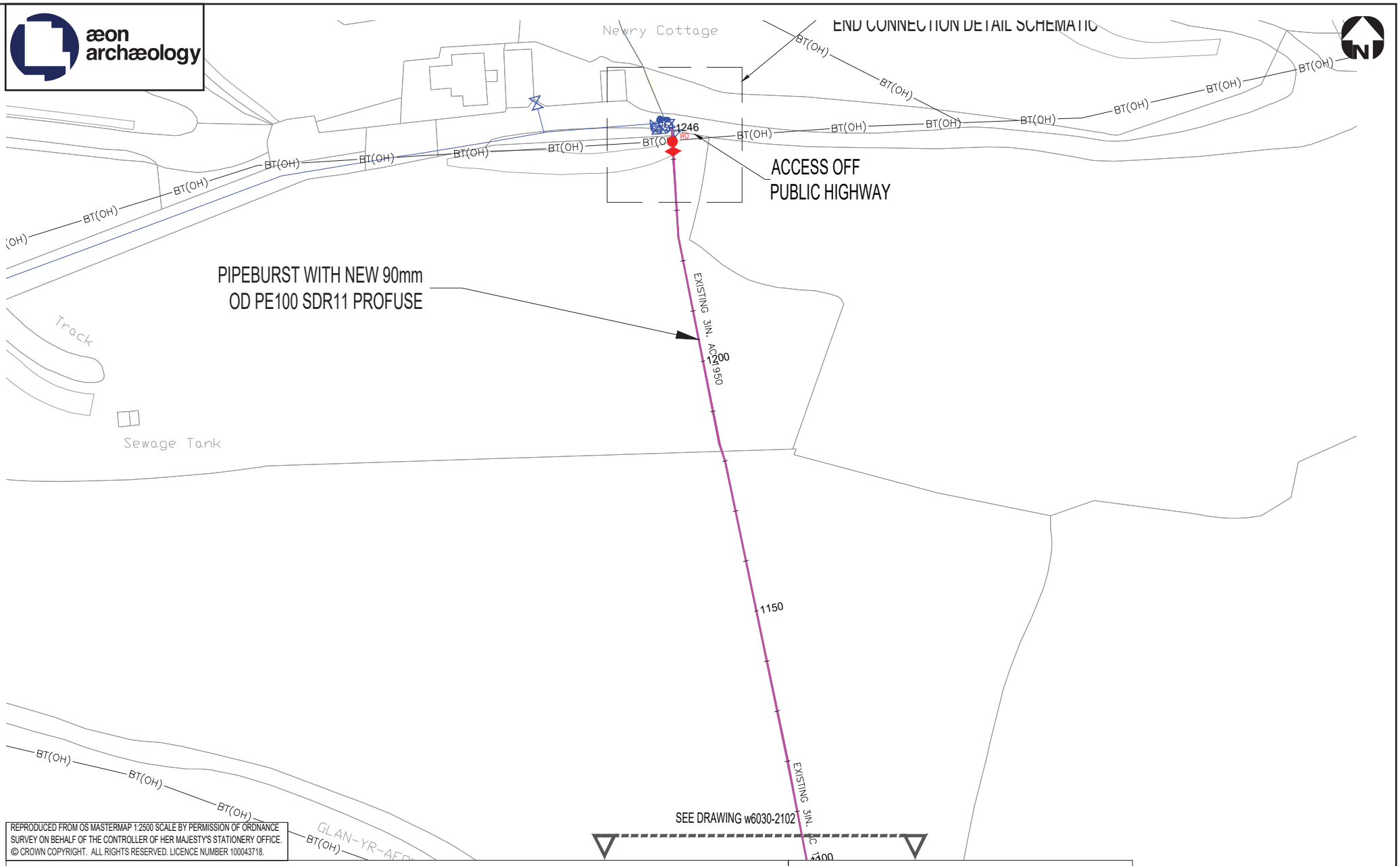

Figure 04: Location of water replacement scheme at Newry Llanfairfechan (works to be monitored by archaeological watching brief outlined in red; area of pipe bursting outlined in pink). Scale 1:500 at A4.

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2.0 POLICY CONTEXT

At an international level there are two principal agreements concerning the protection of the cultural heritage and archaeological resource – the UNESCO *Convention Concerning the Protection of World Cultural and Natural Heritage*[1] and the *European Convention on the Protection of the Archaeological Heritage*[2], commonly known as the Valetta Convention. The latter was agreed by the Member States of the Council of Europe in 1992, and also became law in 1992. It has been ratified by the UK, and responsibility for its implementation rests with Department for Culture Media and Sport.

The management and protection of the historic environment in Wales is set out within the following legislation:

- The Planning (Listed Buildings and Conservation Areas) Act 1990 (As amended)
- The Historic Environment (Wales) Act 2016
- The Town and County Planning Act 1990
- The Ancient Monuments and Archaeological Areas Act 1979
- The Town and Country Planning (General Permitted Development Order) 1995 (As amended)

The Historic Environment (Wales) Act is the most recent legislation for the management of the Historic Environment and amends two pieces of UK legislation — the Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) Act 1990. The new Act has three main aims:

- to give more effective protection to listed buildings and scheduled monuments;
- to improve the sustainable management of the historic environment; and
- to introduce greater transparency and accountability into decisions taken on the historic environment.

With respect to the cultural heritage of the built environment the *Planning (Conservation Areas and Listed Buildings) Act*[3] *1990* applies. The Act sets out the legislative framework within which works and development affecting listed buildings and conservation areas must be considered. This states that:-

> *"In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses" (s66(1))*

Other known sites of cultural heritage/archaeological significance can be entered onto county-based Historic Environment Records under the *Town and Country Planning 1995.*

Planning Policy Wales sets out the land use planning policies of the Welsh Government. Chapter 6 covers the historic environment and emphasises that the positive management of change in the historic environment is based on a full understanding of the nature and significance of historic assets and the recognition of the benefits that they can deliver in a vibrant culture and economy.

Various principles and polices related to cultural heritage and archaeology are set out in the Planning Policy Wales which guide local planning authorities with respect to the wider historic environment.

[1] UNESCO, 1972, *Convention Concerning the Protection of the World Cultural and Natural Heritage*

[2] Council of Europe, 1992, *European Convention on the Protection of the Archaeological Heritage*

[3] Great Britain. *Planning (Conservation Areas and Listed Buildings) Act.* Elizabeth II.(1990), London: The Stationery Office

The following paragraphs from Planning Policy Wales are particularly relevant and are quoted in full:

Paragraph 6.5.5 concerns planning applications:

The conservation of archaeological remains is a material consideration in determining a planning application, whether those remains are a scheduled monument or not. Where nationally important archaeological remains, whether scheduled or not, and their settings are likely to be affected by proposed development, there should be a presumption in favour of their physical protection in situ. It will only be in exceptional circumstances that planning permission will be granted if development would result in an adverse impact on a scheduled monument (or an archaeological site shown to be of national importance) or has a significantly damaging effect upon its setting. In cases involving less significant archaeological remains, local planning authorities will need to weigh the relative importance of the archaeological remains and their settings against other factors, including the need for the proposed development.

Planning Policy Wales is supplemented by a series of Technical Advice Notes (TAN). Technical Advice Note 24: The Historic Environment contains detailed guidance on how the planning system considers the historic environment during development plan, preparation and decision making on planning and listed building consent applications. TAN 24 replaces the following Welsh Office Circulars:

- 60/96 Planning and the Historic Environment: Archaeology
- 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas
- 1/98 Planning and the Historic Environment: Directions by the Secretary of State for Wales

3.0 SITE LOCATION

The water main renewal scheme is located between the existing pumping station at Newry Llanfairfechan and Newry Cottage, Llanfairfechan, Gwynedd (**NGR SH 69736 73657 to SH 69849 74714**). The scheme is located through several enclosed fields as shown in figures 01-04.

4.0 WATCHING BRIEF - ARCHAEOLOGICAL AIMS

The archaeological watching brief shall be maintained:

1. During the excavation of topsoil across a 5.0m wide easement – if the interface between the natural glacial substrata and top/subsoil is encountered then it will be necessary to strip cleanly on to the natural glacial substrata.

2. During the excavation of the pipe trench (except if the easement has been stripped cleanly on to the natural glacial substrata).

3. During the excavation of pipe-bursting launch and reception pits.

4. During the breaching of all field boundaries along the proposed route.

The CIfA maintains a standard for archaeological watching brief which states that:

An archaeological watching brief will record the archaeological resource during development within a specified area using appropriate methods and practices. These will satisfy the stated aims of the project, and comply with the Code of conduct and other relevant by-laws of CIfA.

An archaeological watching brief is defined by the CIfA as a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons (CIfA 2014). The watching brief will take place within a specified area within the Site where there is a possibility that archaeological deposits may be disturbed or destroyed.

The CIfA further identifies the purpose of a watching brief as allowing, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established in advance of development or other potentially disruptive works.

It is also important to note that a watching brief provides an opportunity, if needed, for a signal to be made to all interested parties, before the destruction of the archaeological materials, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.

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

The aims of the watching brief are:

- To allow, within the resources available, the opportunity to gain information about and record the presence/absence, nature and date of archaeological remains on the Site affected by excavations and groundworks, the presence and nature of which could not be established with sufficient confidence in advance of works which may disturb them.

- To provide the facility to signal to the relevant authorities, before irreversible impact to remains that an archaeological and/or historic find has been made for which the resources allocated to the watching brief itself are inadequate to support their treatment to an adequate and satisfactory standard.

The specific objectives of the watching brief are:

- To observe and recover any artefacts of archaeological significance.

- To record the location, dimensions and nature of any deposits, features, structures or artefacts of archaeological significance.

- To recover samples of any deposits considered to have potential for analysis for palaeoenvironmental data should the opportunity arise.

5.0 METHODOLOGY

5.1 Archaeological Watching Brief

The methodology for the watching brief has been prepared with reference to the CIfA's document Standards and Guidance for Archaeological Watching Brief (2014) and will be kept under constant review during the project, in order to see how far it is meeting the terms of the aims and objectives, and in order to adopt any new questions which may arise.

Curatorial monitoring of the archaeological work on behalf of the Council will be carried out by the GAPS Development Control Archaeologist. To facilitate the curatorial monitoring, the officer shall be provided with a minimum of two weeks' notice of the start of the archaeological work.

A suitably qualified and experienced archaeologist(s) from Aeon Archaeology will be commissioned for the maintenance of the watching brief. On arrival on site, the archaeologist(s) will report to the site manager and conform to the arrangements for notification of entering and leaving site. The archaeologist(s) will keep a record of the date, time and duration of all attendances at site, the names and numbers of archaeologists deployed and any actions taken. The archaeologist will be provided with a Health & Safety Induction by the construction contractor and wear a safety helmet, safety footwear and high visibility jacket/vest at all times.

If deposits and or artefacts are exposed during excavations for the development which require recording and recovery, it may be necessary to delay works whilst the proper investigation and recording takes place. Watching brief recording can often be undertaken without delay to groundworks, depending upon the specific circumstances and flexibility of all the staff on site.

Within the constraints of the terms of the watching brief work, the archaeologist will not cause unreasonable disruption to the maintenance of the work schedules of other contractors on site. In the event of archaeological discoveries the treatment of which (either arising from the volume/quantity of material and/or the complexity/importance of the material) is beyond the resources deployed the Client will be notified and a site meeting/telephone consultation arranged with the GAPS Archaeologist. The aim of the meeting will be to confirm that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard and identify measures which would be sufficient to support treatment to a satisfactory and proper standard prior to destruction of the material in question.

Any archaeological deposits, features and structures identified which can be investigated and recorded under the terms of the watching brief will be excavated manually in a controlled and stratigraphic

manner sufficient to address the aims and objectives of the project – subject to the limitations on site access.

It may not be necessary to excavate the complete stratigraphic sequence to geologically lain deposits but the inter-relationships between archaeological deposits, features and structures will be investigated sufficient to address the aims and objectives of the project and the complete stratigraphic sequence to geologically lain deposits will be investigated where practicable.

The method of recording will follow the normal principles of stratigraphic excavation and the stratigraphy will be recorded in written descriptions even where no archaeological deposits have been identified. The archaeologist will record archaeological deposits using proformae recording forms and locate them on a large-scale site plan related to the Ordnance Survey National Grid and Datum references.

The groundworks excavations shall be undertaken using a mechanical excavator fitted with a toothless ditching bucket.

The drawn record will comprise plans at scale 1:20 and sections at scale 1:10; propriety electronic hardware and software to prepare site drawings may be used as appropriate.

The photographic record will be maintained throughout using a digital SLR camera (Canon 600D) set to maximum resolution (72 dpi) and all archaeological features will be recorded photographically with photographs taken in RAW format and later converted to TIFF format for long-term storage and JPEG format for presentation and inclusion in the archive. The standards for the digital archive will adhere to those set out in '*Guidelines for Digital Archaeological Archives'* (RCAHMW, 2015).

The archive produced will be held at Aeon Archaeology under the project code **A0181.1**.

5.2 Watching brief report

5.2.1 Post-excavation Assessment

A report on the results of the watching brief, in accordance with the recommendations in *Management of Research Projects in the Historic Environment Project Manager's Guide* (English Heritage 2006; 2015), and in the Chartered Institute for Archaeologists *Standard and Guidance for an archaeological watching brief* (2014) will be required to be produced upon conclusion of the archaeological fieldwork. The report will be completed within a maximum of two months of completion of work on site and may include examination and quantification leading to the identification of function, form, date, method of manufacture, material/fabric type, source, parallels, attributes and condition of artefacts; of the exploitation of wild or domesticated resources; the reconstruction of environments; and the nature of human populations.

Full analysis of the results of the project, including: dating and interpretation of excavated features; pottery and other finds analysis; analysis of industrial residues by an appropriate specialist or specialists; analysis of samples for environmental data (including pollen, plant macrofossils and beetles) by an appropriate specialist or specialists; radiocarbon dating; discussion of the results in their local, regional and national context, including relating the excavated features and palaeoenvironmental data to evidence from nearby sites, and discussion of the results in their local, regional and national context may be required.

The scope of post-excavation assessment will subject to a specification for approval by the GAPS Archaeologist, upon the conclusion of the fieldwork project and preliminary report.

5.2.2 Post-excavation Report

Following completion of the stages outlined above, a report will be produced that will include:

- A non-technical summary.
- A table of contents.
- An introduction with acknowledgements, including a list of all those involved in the project and the location and description of the site.
- A statement of the project aims.
- An account of the project methodology undertaken, with an assessment of the same to include a statement on preservation bias and the means of data collection and sampling strategies.
- A factual summary of the history, development and use of the site.
- A statement setting out the nature, quantity and condition of the material archive (artefacts and ecofacts) including commentary on any bias observed due to collection and sampling strategies and commentary on long-term storage requirements.
- A statement setting out the nature and quantity of the documentary archive (notes, photographs, drawings, digital data).
- A general site plan indicating the position and size of the areas subject to watching brief and the locations of archaeological deposits identified and recorded during the works.
- Plans and sections at appropriate scales, augmented with appropriate photographs. All plans and sections will be related to the Ordnance Survey datum levels and to the National Grid.
- Other maps, plans, drawings, stratigraphic matrices and photographs as appropriate.
- Summary assessment reports on the artefact, bio-archaeological, dating and other assessments/analyses.
- A discussion of the location, extent, date, nature, condition, quality and significance of any archaeological deposits and finds identified during the project.
- A discussion of any research implications arising from the archaeological work.
- Notes on consultations with conservators and the nominated archive repository related to the immediate and long-term conservation and storage requirements for the data held in the site archive and recommendations of retention/discard of artefacts and ecofacts.
- A bibliography of sources consulted.
- Appendices to the report will include artefact catalogues, reports on assessments/analyses and an index to the project archive and a statement on its location/proposed repository.
- In addition the post-excavation report will summarise and draw together the findings of all of the phases of work.

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 the GAPS Archaeologist and to the client for comment and approval prior to production of the final report.

6.0 FURTHER ARCHAEOLOGICAL WORKS DESIGNS (FAWDs)

The discovery of substantial archaeological remains and/or features during the archaeological works may result in the requirement for an extended programme of archaeological mitigation. This may require the submission of revised quotes to the client as well as a new specification which will be required to be approved by the GAPS archaeologist prior to implementation.

7.0 ENVIRONMENTAL SAMPLES

Relevant archaeological deposits will be sampled by taking bulk samples (a minimum of 10.0 litres and maximum of 30.0 litres) for flotation of charred plant remains. Bulk samples will be taken from waterlogged deposits for macroscopic plant remains. Other bulk samples, for example from middens, may be taken for small animal bones and small artefacts.

Bulk environmental samples will also be taken from any fills, deposits or structures which yield archaeological artefacts, charcoal flecks/ fragments, bone, or any other historic remains.

Advice and guidance regarding environmental samples and their suitability for radiocarbon dating, as well as the analysis of macrofossils (charcoal and wood), pollen, animal bones and molluscs will be obtained from Oxford Archaeology.

For guidance purposes the following volume criteria represent the minimum feature sampling requirements:

- 50% of each discrete feature (e.g. pits and postholes)
- 25% of the exposed areas of each liner feature and all terminals/intersections
- 50% of structural features (e.g. beamslots, ring-ditches)
- 50%-100% of domestic/industrial working features (e.g. hearths and ovens)

8.0 HUMAN REMAINS

Any finds of human remains will be left *in-situ*, covered and protected, and both the coroner and the GAPS Archaeologist informed. If removal is necessary it will take place under appropriate regulations and with due regard for health and safety issues. In order to excavate human remains, a licence is required under Section *25* of the Burials Act 1857 for the removal of any body or remains of any body from any place of burial. This will be applied for should human remains need to be investigated or moved.

9.0 ARTEFACTS

All artefacts and ecofacts will be retrieved for identification and recording and will be treated in accordance with CIfA 2008 Guidelines for the collection, documentation, conservation and research of archaeological materials (Chartered Institute for Archaeologists, 2014).

All artefacts are the property of the landowner but it is recommended that finds are deposited with the rest of the project archive within an appropriate museum. Furthermore, the client agrees to granting access to all artefacts recovered by Aeon Archaeology for analysis, study and publication as necessary. All finds would be treated according to advice provided within *First Aid for Finds* (Rescue 1999). Aeon Archaeology staff will undertake initial identification, but any additional advice would be sought from a wide range of consultants.

The recovery policy for archaeological finds will be kept under review throughout the archaeological works. Any changes in recovery priorities will be under guidance from an appropriate specialist and agreed with the GAPS Archaeologist. There will be a presumption against the disposal of archaeological finds regardless of their apparent age or condition.

All finds will be collected and processed including those found within spoil tips. Their location and height will be plotted; finds numbers attributed, bagged and labelled as well any preliminary identification taking place on site. Where specialist advice is required provision will be made to do so at the earliest possible convenience.

After processing, artefacts which are suitable will be cleaned and conserved in-house. Artefacts requiring specialist cleaning and conservation will be sent to the relevant specialist. All artefacts will then be sent to a specialist for analysis, the results of which will then be assessed to ascertain the potential of the finds assemblage to meet the research aims of the project. The value of the finds will also be assessed in terms of the wider educational and academic contributions.

Depending upon the material of the remains the following experts will be consulted regarding the conservation of waterlogged material:

- Organic material: Mr Phil Parkes, Cardiff Conservation Services (tel: +44(0)29 2087 5628)
- Non-organic material: Mr Phil Parkes, Cardiff Conservation Services (tel: +44(0)29 2087 5628)

Depending upon the material of the remains the following experts will be consulted regarding the conservation and analysis of artefacts:

- Bone: Nora Bermingham
- Glass: Hilary Cool, Barbican Research Associates.
- Metal artefacts: Phil Parkes, Cardiff Conservation Services, Cardiff.
- Slag, burnt clay, hammerscale: Dr. Tim Young, Geoarch, Cardiff.
- Stone artefacts: George Smith, Gwynedd Archaeological Trust, Bangor.
- Wood artefacts: Jane Foley, Foley Conservation, Builth Wells.
- Leather: Quita Mould, Barbican Research Associates.
- Environmental Material: Dr Mike Allen, Allen Environmental Archaeology.
- Numismatics: Peter Guest, Barbican Research Associates.
- Ceramics: Leigh Dodd

If well preserved materials are found it may be necessary to employ additional staff. Furthermore, it may be necessary to suspend work within a specific region of the site, or across the whole site, while conservation and excavation/recording takes place.

10.0 UNEXPECTED DISCOVERIES: TREASURE TROVE

Treasure Trove law has been amended by the Treasure Act 1996. The following are Treasure under the Act:

- *Objects other than coins* any object other than a coin provided that it contains at least 10% gold or silver and is at least 300 years old when found.

- *Coins* all coins from the same find provided they are at least 300 years old when found (if the coins contain less than 10% gold or silver there must be at least 10. Any object or coin is part of the same find as another object or coin, if it is found in the same place as, or had previously been left together with, the other object. Finds may have become scattered since they were originally deposited in the ground. Single coin finds of gold or silver are not classed as treasure under the 1996 Treasure Act.

- *Associated objects* any object whatever it is made of, that is found in the same place as, or that had previously been together with, another object that is treasure.

- *Objects that would have been treasure trove* any object that would previously have been treasure trove, but does not fall within the specific categories given above. These objects have

to be made substantially of gold or silver, they have to be buried with the intention of recovery and their owner or his heirs cannot be traced.

The following types of finds are not treasure:

- Objects whose owners can be traced.
- Unworked natural objects, including human and animal remains, even if they are found in association with treasure.
- Objects from the foreshore which are not wreck.

All finds of treasure must be reported to the coroner for the district within fourteen days of discovery or identification of the items. Items declared Treasure Trove become the property of the Crown.

The British Museum will decide whether they or any other museum may wish to acquire the object. If no museum wishes to acquire the object, then the Secretary of State will be able to disclaim it. When this happens, the coroner will notify the occupier and landowner that he intends to return the object to the finder after 28 days unless he receives no objection. If the coroner receives an objection, the find will be retained until the dispute has been settled.

11.0 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 with the National Monument Record, RCAHMW within six months of the completion of the project.

A draft copy of the report will be produced within six months of the completion of the fieldwork and sent to the Client and the GAPS Archaeologist for comment prior to finalisation of the report and dissemination. Bound copies of the report and an archive CD will be sent to the regional HER, the GAPS archaeologist and to National Monument Record, of the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) for long term archiving. Furthermore, a summary of the project will be sent to *Archaeology in Wales* for publication. Copies of all digital files (inc. photos, report as PDF and Word, spreadsheets, databases, survey data etc) to be presented to each of above on optical disc (ie DVD).

12.0 PERSONNEL

The work will be managed by Richard Cooke BA MA MCIfA, Archaeological Contractor and Consultant at Aeon Archaeology.

13.0 MONITORING AND LIAISON

Regular liaison and site monitoring meetings will take place during all stages of work. The GAPS Archaeologist will be informed of the start date and of discreet subsequent stages.

14.0 HEALTH AND SAFETY

Aeon Archaeology has a Health and Safety Policy Statement which can be supplied upon request. Furthermore, site-specific Risk Assessments and Method Statements are compiled and distributed to every member of staff involved with the project prior to the commencement of works.

15.0 INSURANCE

Liability Insurance – Insignia Underwriting Policy 347002

Employers' Liability: Limit of Indemnity £10m in any one occurrence
Public Liability: Limit of Indemnity £2m in any one occurrence
Legal Defence Costs (Health and Safety at Work Act): £250,000

The current period expires 07/09/18

Professional Indemnity Insurance – Insignia Underwriting Policy 347002

Limit of Indemnity £500,000 any one claim

The current period expires 07/09/18


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