1231

DOLBENMAEN WATER TREATMENT WORKS

Assessment of Potential for Analysis Report

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Dolbenmaen Water Treatment Works Dolbenmaen

Assessment of Potential for Analysis

Project No. G2293

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1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was commissioned by *Black & Veatch Limited* on behalf of *Dŵr Cymru Welsh Water (DCWW)* to undertake a programme of archaeological work prior to, and during the proposed development of Dolbenmaen Water Treatment Works (WTW), Dolbenmaen (centred on SH 4963 4290) (Figure 1).

The work was undertaken between May and August 2013 and consisted of a watching brief during the Stage 1 enabling works, monitoring all topsoil removal within the development area; as well as a controlled strip of Zone B and the main WTW prior to development. A project design was prepared which sets out the legislation framework and planning background in detail for the archaeological work (Appendix I).

The current report was carried out in accordance with the *Management of Archaeological Projects 2* (MAP 2, English Heritage 1990) and the Institute for Archaeology (IfA) *Standard and Guidance for Archaeological Excavation* (2008). Five stages are specified:

- Phase 1: Project planning
- Phase 2: Fieldwork
- Phase 3: Assessment of potential for analysis
- Phase 4: Analysis and report preparation
- Phase 5: Dissemination

This report has been produced as **Phase 3: Assessment of potential for analysis**. Recommendations for the work required for further analysis and report preparation (Phase 4), as well as dissemination (Phase 5), are included in Section 9 and the forthcoming updated project design which will accompany the Assessment of Potential for Analysis report for the Dolbenmaen to Cwmystradllyn Pipeline, and combines the work from the two sites.

2 SITE LOCATION

The site is located to the west of the village of Dolbenmaen and consists of a series of fields of improved pasture lying to the southeast of the steep cliffs of Craig y Llan and the rising ground of Bryniau Ystumcegid to the south. It is bounded to the north and west by roads, to the south by the Affo Dwyfor, and by fields of improved pasture to the east. The geology of the area consists of glacial till over Ordovician extrusive rocks (British Geological Survey Mapping).

3 ARCHAEOLOGICAL BACKGROUND

The archaeological background has been discussed in full in the previous archaeological assessment (Smith 2012), and the reader is referred to that document. However, a brief summary is presented here.

3.1 PREHISTORIC AND ROMAN SITES

The evidence for prehistoric occupation within the vicinity of the proposed site is slight. The nearest confirmed prehistoric sites are the hut groups PRN 145 and PRN 170, 450m to the northeast and southeast respectively. The Scheduled Ancient Monument of Craig-y-Tyddyn Camp (CN 046) lies approximately 715m to the southeast of the site.

The line of the proposed Roman Road from Segontium - Pen Llystyn - Tomen y Mur may lie under the present A487 although there is no direct evidence of occupation from the Roman period within the vicinity of the proposed site. The nearest confirmed Roman site is Pen Llystyn fort (PRN 144) approximately 2.3km to the northwest.

3.2 MEDIEVAL

The Scheduled Ancient Monument (CN 063) castle earthwork which marks the site of the medieval *llys* of Dolbenmaen, is approximately 830m to the west of the proposed site (PRN 161). The geological outcrop and associated earth mound known as Pen Bryn yr Orsedd which is situated directly to the north, and within the same field as the development site, may have served as an assembly mound for the retinue of a peripatetic early medieval court. Pen Bryn yr Orsedd translates as 'The Seat on top of the Hill', and assembly mounds which have similar characteristics are known from England, Scotland, Ireland and the Isle of Man (Pantos and Semple (eds.) 2004). The name Pen Bryn yr Orsedd in reference to the rock outcrop is not recorded on the 1st Edition OS map but does appear on the 2nd Edition.

The place name 'Dol Pen Maen' is mentioned in the medieval story of 'Math and Mathonwy' as a point where hostages were exchanged between two high – status families (Evans and Evans 2001, 57). Dolbenmaen / Dol Pen Maen translates as 'The Meadow with the Rock at the Head', and the rock in this instance may be Pen Bryn yr Orsedd.

3.3 POST-MEDIEVAL AND MODERN

An Exchequer survey dated 1589-90 shows that the boundary of the township of Dolbenmaen was almost exactly the same as the parish as given of the Tithe Map of 1838 (Gresham 1973). The development area is recorded by the 17th century as being part of a farm known as Tyddyn Rhwng y Ddwyryd.

In 1637 the lands were demised to John Griffith of Cefn Amlwch by his father in law Sir Richard Trevor, by which time, or shortly after, the lands were purchased from the Crown. John Griffith's heir and brother sold the township in 1719 to Williams Brynker, son of James Brynker of Brynkir. A rental of 1721 includes the farm of Plas

Dolbenmaen, which is the earliest found reference of the farm under this name. William ran into financial problems, and the lands with the exception of Dolwgan, were sold to William Owen of Clenennau and Brogyntyn in 1736, and so passed by marriage to the Ormesby (later Ormesby-Gore) family (Davidson and Evans 2011).

3.4 PREVIOUS WORK

A geophysical survey, using a magnetometer, was completed by *Stratascan* in February 2013 (*Stratascan 2013*). The survey covered an area of 8.4ha incorporating the main Water Treatment Works site within the central field and two ancillary zones. Approximately 20 linear and curvilinear anomalies, along with a number of positive and negative anomalies were identified across the site.

Following the results of the geophysical survey, GAT excavated fourteen trial trenches across the site specifically located to target a number of the anomalies. Five linear boundary ditches (**0502**, **0504**, **1102**, **1104**, and **1402**) relating to earlier field systems in the area were uncovered, along with a probable ring ditch (**0103**), a possible pit (**0203**), and two possible platforms (**0603** and **1002**). These features suggest there was at least small scale settlement in the area, however the extent and date of this settlement was not revealed during the evaluation (McNicol 2013).

4 AIMS AND OBJECTIVES

The original aim of the programme of work was to identify any archaeological remains revealed prior to the construction works. Appropriate mitigation measures were developed for all archaeological remains revealed.

The purpose of post-excavation work is to ensure appropriate analyses are undertaken, that site records are studied, compiled and that a coherent report on the results is produced with appropriate illustrations. It also involves ensuring that site records, both paper and digital are in a format suitable for long term storage.

The original aims of the archaeological work were to:-

- verify the efficacy of the geophysical survey for identifying archaeological remains within the site;
- establish the extent to which archaeological remains survive at the site;
- establish the date and nature of archaeological remains at the site and assess their implications for understanding the historical development of the area;
- establish the depth of archaeological remains and the quality, value and level of preservation of any deposits;
- and assess the level of risk any surviving remains may pose to development

5 METHODOLOGY

5.1 FIELDWORK METHODOLOGY

All works were carried out in accordance with the Project Design for the works (Appendix I) and the GAT standard operating procedures as set out in the GAT fieldwork Manual (*in prep)*).

All groundbreaking was undertaken under constant archaeological supervision. All archaeological features encountered were hand excavated. Where appropriate features were half sectioned in order to record the stratigraphy and then excavated in full. All sections were drawn at a scale of 1:10.

A written record of all identified features was completed using standard GAT pro-forma sheets and a running photographic record was maintained using a Nikon digital SLR camera set to maximum resolution. All features were digitally surveyed using a Trimble TSC2 controlled GPS receiver (Trimble R6 Unit), with the results tied into the National Grid. Hand drawn plans were produced at a scale of 1:20 where appropriate and also tied into the National Grid.

Bulk soil samples (a minimum of 10 litres and maximum of 40 litres) were taken for flotation of charred plant remains. These bulk samples were taken from all probably prehistoric contexts containing charcoal and/or finds to allow the recovery of both charred plant remains and small artefacts not easily recovered by hand. Potential cremation burials were fully excavated by hand and a 100% sample or as near as possible was taken from each.

5.2 POST EXCAVATION METHODOLOGY

A site database has been created in Microsoft Access into which basic site information has been entered. A database of the site photographs has also been produced to enable active long-term curation of the photographs and easy searching. The site records have been checked and cross-referenced and photographs, plans, finds, and samples have been cross-referenced to contexts. An initial site narrative has been written and the extent to which this needs to be expanded will be considered below.

The field drawings have been combined with the survey data to produce a plan of the site as well as a number of detailed plans and sections. The requirement for more detailed illustrations and for interpretative drawings has been included in the archive report method statement below.

All paper field records have been scanned to provide a backup digital copy. The photographs have been organised and precisely cross-referenced to the digital photo record so that the Royal Commission of Ancient and Historical Monuments of Wales can curate them in their active digital storage facility.

The finds have been catalogued and grouped by material type. All finds, where appropriate, have been cleaned. All finds have been packaged in suitable containers and conditions for long-term storage. Objects requiring conservation have been

identified. The finds have been assessed by specialists to describe and catalogue the collections and identify pieces to be drawn and any requirement for further study. Insignificant items recommended for discard have also been identified.

The sampling strategy 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 were sampled. The aim of the sampling strategy was to recover carbonised macroscopic plant remains, small artefacts, and possible human remains.

6 QUANTIFICATION OF RESULTS

Field records

Context sheets	231
Drawings	85 drawings on 11 sheets
Digital photographs	455

Environmental Samples

Samples containing burnt bone: 14 x 10 litre tubs from 10 contexts
Total Samples: 102 x 10 litre tubs from 58 contexts

Finds

Stone	5
Cu Object	1
Burnt Bone	>19
Slag	>1
Pottery	2
Glass	1
Fe Objects	2
Total	**>31**

7 FIELDWORK RESULTS

7.1 INTRODUCTION

This section provides a summary of the results of the excavation. The results of the evaluation (McNicol 2013) and a further five features (**1677**, **1678**, **1681**, **66001**, and **66004**) which were uncovered in the area during the works associated with the Dolbenmaen to Cwmystradllyn pipeline (McNicol 2015) have been integrated into this assessment. The features uncovered during the archaeological works (Figures 2 and 3) have been divided by type and are discussed below. For a detailed description of all the features and deposits uncovered during the archaeological works see Appendix II.

7.2 GEOLOGY

With the exception of Zone A where only the topsoil was removed, the entire site was taken down to the natural geology which consisted of light reddish brown sandy clay with patches of gravel throughout (**1501**). The natural topography sloped generally

downhill north to south or west to east, from approximately 96m AOD in the northwest to 89.5m AOD in the southeast. Patches of subsoil were visible across the site, ranging from 0.1m to 0.3m thick, and consisting of greyish brown sandy silt (**1507**). This was sealed by a dark greyish brown sandy silt topsoil, 0.15m to 0.6m thick (**1500**). All features uncovered were cut into the natural geology and sealed by the topsoil or subsoil unless stated otherwise.

7.3 Circular Ditches

Two circular ditches (**1652** and **1656**) and a possible third circular ditch (**1642**) were uncovered towards the western end of the site, with ditch **1656** representing what had initially been assumed to be a roundhouse (**103**) during the evaluation stage (McNicol 2013). Ditch **1652** (Plate 1) was located on the western edge of the site, and approximately a third of it had been truncated by a modern pipeline associated with the original WTW (Figures 3 and 4). It measured approximately 9m internally and 10m externally in diameter, with an average depth of 0.25m and was filled with a high concentration of sub-rounded stones (**1653**) which sealed a thin layer of light brown sandy silt (**1657**) (Figure 7). The sides of the ditch were near vertical and it had a fairly flat base with the exception of six depressions which were uncovered at the base of the ring ditch (Figure 4). These depressions were located at random and most likely represent stone holes rather than features associated with the ditch. Three features, consisting of two small pits (**1646** and **1648**) and a third possible pit (**1654**) were uncovered in the middle of circular ditch **1652** (Figure 4) (See below).

Circular ditch **1656** was located approximately 95m to the southeast of circular ditch **1652** and measured 9.5m and 11.5m in diameter, internally and externally respectively (Figure 5) (Plate 3). It had an average width of 1.1m with a depth of 0.35m, and had steep sloping sides with a slightly concave base. A number of deposits were visible within the ring ditch (**1653**, **1657**, **1658**, **1659**, **1660**, and **1661**) (Figure 8), the main ones consisting of a possible burnt layer (**1661**), 0.02m thick, located at the base of the ditch on its eastern side; a deliberately dumped deposit of sub-rounded stones on its eastern and western sides (**1653** and **1658** respectively), measuring a maximum of 0.35m thick; and a 0.35m thick brownish grey sandy silt deposit (**1659**), representing the main silting up episode of the ditch.

The third possible circular ditch (**1642**) was located approximately 21.5m to the ESE of circular ditch **1656** and consisted of a highly truncated curvilinear ditch, on average 0.05m deep (Plate 5). Given its close proximity to two circular ditches and that this ditch equates to a near perfect quarter arc of a 12.5m diameter circle (Figure 6), it is likely that this represents a third circular ditch which has been truncated by the original WTW. A large circular posthole (**1644**) was visible truncating the western part of this ditch (see below).

7.4 Linear Features

A total of nine ditches (**502**, **504**, **1524**, **1528**, **1530**, **1556**, **1561**, **66001**, and **66004**) and five gullies (**1543**, **1568**, **1570**, **1572**, and **1580**) were uncovered on site, ranging in

size from 0.4m wide and 0.1m deep (**1572**), to 1.78m wide and 0.38m deep (**66001**) (Figures 2 and 3). Post-medieval pottery was recovered from two of the ditches (**1530** and **1556**) and one of the gullies (**1572**). Gully **1572** was also visible cutting through the subsoil towards the eastern end of the site. Six of the ditches (**502**, **504**, **1524**, **1556**, **66001**, and **66004**) were seen to be continuing into the WTW and it is likely that they form part of these original works. All of the ditches and gullies appear to be fairly contemporary with each other due to their similar orientations and sizes, and in a number of cases they respect the presence of other ditches or gullies, such as ditches **1528** and **1530** terminating just before ditch **1561**.

7.5 PITS

A large number of pits (41) were uncovered during the archaeological work on site Figures 2 and 3), the majority concentrated towards the western part of the site. The fills of four of these pits (**1503**, **1514**, **1547**, and **1677**) contained fragments of 20th century glass and pottery, while a further five (**1547**, **1608**, **1648**, **1666**, and **1668**) contained fragments of burnt bone (see below). No other finds were recovered from any of the other pits.

Pit **1547**, located close to field boundary wall **1506** and linear gully **1556** (Figure 2), measured approximately 2.8m by 1.6m, and had a maximum depth of 0.75m. It was filled with four distinct deposits (Figure 12); a 0.15m thick greyish brown sandy silt (**1548**) located at the base representing the initial silting up of the pit. At least two in-situ burning events were visible within a 0.15m thick layer of charcoal rich black sandy silt (**1549**) located at the northern end of the pit. Small fragments of burnt bone were also recovered from this deposit. This was sealed by a grey stony silt deposit (**1550**), 0.4m thick, which was in turn sealed by a 0.32m thick greyish brown stony silt deposit (**1551**), both of which contained fragments of 20th century pot or glass.

Two pits (**1545** and **1562**), measuring 1.1m by 0.65m and 0.8m by 0.64m respectively were uncovered at the southern end of the site adjacent to the river (Figure 2). Both pits were on average 0.2m deep and contained a single deposit comprising of a large concentration of fire cracked stone (**1546** and **1563** respectively).

To the east of the site, a sub-rectangular pit (**1560**) with steep, irregular sides and an uneven base was uncovered (Figure 2). It measured 2.65m by 1m and had a maximum depth of 0.35m. It was filled with three distinct fills (**1576**, **1577**, and **1578**), with the main fill (**1577**) consisting of a heated or burnt clay. There was no evidence of any in-situ burning and the reason for the heated clay is unknown.

A single sub-oval pit (**1539**), measuring 0.88m by 0.75m, and with a depth of 0.32m was located in an isolated area to the northeast of ring ditch **1652** (Figure 3). It was filled with a single deposit comprising of a greyish brown sandy silt (**1539**).

Three intercutting pits were uncovered to the north of the site during the expansion works (Figure 3). These consisted of a modern rectangular pit (**1677**) which partially truncated sub-circular pit **1678**, and a circular pit (**1681**) which had an uncertain

relationship with pit **1678**. Pit **1678** measured 1.1m by 1m, with a depth of 0.45m and was filled with two distinct fills. A 0.25m thick dark grey clayey silt deposit (**1679**) which sealed a black silt deposit (**1680**), 0.15m thick, which represented an in-situ burning event. Pit **1681** measured 0.85m in diameter, with a depth of 0.3m, and was filled with a single dark greyish black clayey silt deposit (**1682**).

Sub-rectangular pit **1624** was uncovered to the south of pits **1677**, **1678**, and **1681**. It was truncated by pit **1622** (Figure 3), a sub-circular pit measuring 1.8m by 1.3m, with a depth of 0.2m, which was filled with a single deposit of deliberately dumped stone (**1623**). Pit **1624** measured 2.2m by 0.7m, with a depth of 0.2m and was aligned roughly ENE-WSW. It was filled with a charcoal rich dark greyish black sandy silt (**1625**), and showed evidence of a single in-situ burning event.

Pit **1608**, located directly to the south of pits **1622** and **1624**, as well as to the SSE of posthole **1606** (see below) (Figure 3), consisted of a large sub-rectangular pit measuring 1.25m by 0.85m, and with a depth of 0.55m (Figure 10). The basal fill of the pit consisted of a light brownish grey sandy silt and gravel with the occasional fragment of burnt bone (**1612**). No evidence of any in-situ burning or other burnt material was visible within this deposit. The upper fill of this pit, a dark brownish grey charcoal rich sandy silt (**1611**), contained part of a probable copper thimble (SF# 5), and a polished stone tool (SF# 6). A possible pit (**1634**) was cut into this deposit, and was completely contained within this deposit. It was filled with a light brown sandy silt and gravel (**1610**) most likely representing a re-deposited natural deposit, which in turn was sealed by a thin deposit of brownish grey sandy silt (**1609**).

A small concentration of five small rectangular pits and one circular pit (**1594**), the function of which are unknown, were located in the western part of the site adjacent to pit **1608** (Figure 3). With the exception of pit **1596** which truncated pit **1632**, the relationships between these pits is unknown, and a pattern to their placement was not visible. The rectangular pits were all roughly aligned either east-west (**1596**, **1600**, and **1632**) or north-south (**1598** and **1604**), and measured between 0.7m by 0.35m (**1600**) and 1.2m by 0.7m (**1632**), with an average depth of 0.2m. Pit **1594** measured 0.6m by 0.5m and had a depth of 0.15m. The fills of all these pits was a similar single silted up deposit consisting of a brownish grey sandy silt. The only difference was within pit **1598**, where occasional charcoal flecks were visible within its fill (**1599**).

To the east of these pits was a group of four shallow intercutting pits, consisting of two roughly circular pits (**1614** and **1639**), a sub-rectangular pit (**1616**), aligned east-west; and a sub-oval pit (**1618**) (Figure 3). All of these pits had been heavily truncated and were a maximum of 0.18m deep. With the exception of pit **1639**, which was filled with a stony black sandy silt (**1619**) and was visible cutting through the subsoil and truncating pit **1618**, the relationships between these pits is unknown. The fills of pits **1614**, **1616**, and **1618** were all very similar and consisted of a compact, mottled grey and brown sandy silt (**1615**, **1617**, and **1620** respectively).

Three large stone filled pits (**1626**, **1630**, and **1637**) were uncovered to the west of the site, between circular ditches **1642** and **1656** (Figure 3). Pit **1626** was roughly circular in plan, measuring 2.5m by 2.2m and with a depth of 0.38m. A small possible posthole (**1628**) was located truncating this pit on its southern side (see below). Pits **1630** and **1637** were located adjacent to each other and were both sub-circular in plan, measuring 3.45m by 2.3m and 1.85m by 1.3m, and with depths of 0.48m and 0.1m respectively. All three of these pits were filled with deliberately dumped deposits of sub-rounded stones (**1627**, **1631**, and **1638** respectively).

Two circular pits (**1666** and **1668**), measuring 0.75m in diameter and with an average depth of 0.35m, were located directly to the west of possible circular ditch **1642** and adjacent to posthole **1644** and possible postholes **1662** and **1664** (see below) (Figure 6). Both of these pits were filled with a charcoal rich dark greyish black clayey silt deposit with frequent inclusions of burnt bone (**1667** and **1669** respectively).

Two intercutting pits (**1646** and **1648**), and a third possible pit (**1654**) were uncovered within the central area of circular ditch **1652** (Figure 4). Pit **1646** measured 0.5m in diameter with a depth of 0.12m and was filled with a single deposit comprising of a charcoal rich black sandy silt (**1647**). The relationship with intercutting pit **1648** was unclear due to its shallow nature. Pit **1648** contained three distinct fills (Figure 9); a 0.02m thick charcoal rich black sandy silt (**1649**) containing fragments of burnt bone was located at the base of the pit. This was sealed by a 0.16m thick layer of brown sandy silt (**1650**), which in turn was sealed by a mottled black and brown sandy silt (**1651**), 0.12m thick. Directly to the south of these two pits, a third possible pit (**1654**), measuring 1.4m by 1.15m, and with a maximum depth of 0.1m was uncovered. It had uneven sides as well as an uneven base and was filled with a single deposit comprising of a brownish grey sandy silt with occasional charcoal flecks throughout (**1655**). A small concentration of stones was uncovered within the subsoil above this feature.

The remainder of the pits were circular in plan with steep sides and a slightly concave base and were located either within the main concentration of features towards the western part of the site (**0203**, **1512**, **1526**, **1592**, and **1672**) (Figure 3), or spread out within the eastern half (**1552**, **1554**, **1558**, and **1566**) (Figure 2). These pits measured between 0.55m and 1.2m in diameter, with an average depth of 0.2m. They were all filled with a single silted up deposit, the exception being pit **1586** which filled with a deliberately dumped, loose deposit of stone, and was most likely of a post-medieval date. Their function and date are unknown.

7.6 POSTHOLES

Seventeen postholes or possible postholes were uncovered on the site, and with the exception of possible posthole **1574** (Figure 2) they were all located within the western part of the site (Figure 3). Located to the east of gully **1570**, possible posthole **1574** measured approximately 0.5m in diameter, with a depth of 0.19m, and was filled with a dark greyish brown sandy silt (**1575**). Given its isolation it is likely that this feature represents a stone hole rather than a posthole.

Posthole **1606**, located to the NNW of pit **1608**, measured 0.4m in diameter and had a depth of 0.3m. It was filled with a single greyish brown sandy silt deposit (**1607**). No other postholes were located within this area, and its relationship to the nearby pits or its function is unknown.

Postholes **1588** and **1590** were located to the north and west of pit **1637** respectively, and within the main concentration of features at the western side of the site (Figure 3). Both measured approximately 0.65m in diameter, with posthole **1588** having a depth of 0.16m, and posthole **1590** a depth of 0.24m. Neither of the fills of the postholes (a brownish grey sandy silt (**1589**) and a dark greyish brown sandy silt (**1591**) respectively) contained any evidence of packing stones for a post, and it is likely that these features are actually the truncated remains of pits rather than postholes.

A small circular posthole (**1628**), 0.22m in diameter and 0.24m deep, was uncovered truncating the southern edge of pit **1626** (see above). It was filled with a single brownish grey sandy silt deposit (**1629**). No other postholes of a similar size were uncovered within this area, and its function is unknown.

A large circular posthole (**1644**), 0.7m in diameter, was located truncating the western part of possible circular ditch **1642** (see above) (Figure 6). It had a depth of 0.55m and was filled with a brownish grey sandy silt with frequent sub-rounded stone inclusions (**1645**). These stones are most likely the remains of the packing material for a post.

Two possible postholes (**1662** and **1664**) were uncovered directly to the west of posthole **1644**, and adjacent to pit **1668** (Figure 6). They measured approximately 0.4m in diameter and had a depth of 0.2m and 0.28m respectively. A similar, dark greyish brown clayey silt with charcoal inclusions (**1663** and **1665**) filled both of these pits. These deposits were very similar to those found within adjacent pits **1666** and **1668**, but were lacking any burnt bone and contained less charcoal. However, given this similarity, it is possible that these features represent the truncated remains of pits rather than postholes.

Posthole **1674** was located to the west of pit **1672** and the east of posthole **1628** (Figure 3). It was sub-rectangular in shape, measuring 0.8m by 0.55m, and with a depth of 0.47m. Frequent sub-rounded stones were uncovered within its fill, a greyish black clayey silt (**1675**), and these are likely to represent packing material for a post.

Three circular postholes (**1508**, **1534**, and **1584**) were uncovered in a triangular pattern to the southeast of circular ditch **1656** (Figure 3). They measured on average, 0.55m in diameter and with a depth of 0.35m. A similar sized posthole (**1510**) was located approximately 5m to the southeast of these postholes, at the edge of the excavation area. All four of the postholes were filled with a similar deposit comprising of a greyish brown sandy silt with frequent sub-rounded stones (**1509**, **1535**, **1585**, and **1511** respectively). These stones are most likely the remains of the packing material for posts.

A pattern of four postholes (**1516**, **1518**, **1520**, and **1522**) in a square, measuring approximately 3m by 3m (Plate 4), was uncovered directly to the east of where possible circular ditch **1642** would have originally extended to (Figure 6). The postholes all measured approximately 0.7m in diameter, with a depth of between 0.35m and 0.5m, and were filled with a single greyish brown sandy silt with frequent sub-rounded stone inclusions (**1517**, **1519**, **1521**, and **1523** respectively), most likely representing packing material for posts.

7.7 Field Boundaries

Two field boundaries (**1502** and **1505**) were partially truncated to provide access routes, and a large part (50%, approximately 115m) of a third field boundary (**1506**) was removed during the works. Field boundary 1502 was constructed from large angular cobbles, cemented in place and is likely to be 20th century in date. Both field boundaries **1505** and **1506** consisted of a rough drystone wall with an earthen bank in places, and most likely date to the 19th century. Post-medieval glass and pottery sherds were recovered from field boundary **1506** but not retained.

7.8 Other Features

Two scarps (**1582** and **1676**) were revealed during the excavation, one of which (**1582**) had been interpreted as a possible platform (**1002**) during the evaluation. Scarp **1582** was located within the eastern half of the site and was roughly semi-circular in shape with a diameter of approximately 44m, and a maximum depth of 0.7m. Scarp **1676** measured approximately 26m in length and was located towards the northwest corner of the site. It had a maximum depth of 0.25m. Both scarps were fairly steeply sloping to begin with before becoming more gradual. Concentrations of stones were uncovered along small sections at the base of both of these scarps, and it is likely that these are natural slopes which have been enhanced by ploughing.

To the east of the site and adjacent to scarp **1582**, a shallow linear alignment of stones (**1602**) was uncovered measuring 3.1m by 0.62m and aligned east-west (Figure 2). A square stone 'pad' (**1583**) measuring 0.48m by 0.42m by 0.28m, and with a flat top, was located at the northern edge of this stone alignment (Plate 6). Directly to the south of the stone alignment a large in-situ burnt deposit (**1603**) 0.1m thick and covering an area of 3.6m by 1.8m which contained fragments of slag.

8 SUMMARY OF SPECIALIST REPORTS

The full assessment reports by the relevant specialists are given in the appendices, and these are summarised here.

8.1 COPPER THIMBLE

The copper thimble was cleaned and stabilised by Phil Parkes of Cardiff Conservation Services. It has been left in a stable condition for long term storage and no further conservation work is proposed.

The thimble was examined by Jörn Schuster of ARCHAEOLOGICALsmallFINDS, and its dimensions and weight were recorded (Appendix III). It was subsequently compared with other pertinent collections of thimbles. On the basis of this it was dated to around the late 14th or early 15th century, although a manufacturing location was not able to be discerned. Given its fragmentary condition, it is thought that it may have been thrown away, possible elsewhere, and discarded on site with other waste as part of a fertiliser.

8.2 PALAEOENVIRONMENTAL SAMPLES

The soil samples were processed by flotation and wet sieving by CFA Archaeology Ltd, and Helen Muckle, and were assessed by Mhairi Hastie of CFA Archaeology Ltd (Appendix IV). A total of 60 samples were submitted for assessment.

The plant macrofossil material was generally in a poor condition and much abraded. Cereal grains were found in the majority of samples, with several high concentrations noted within the fills of pits **1547**, **1624**, and **1678**. A mixture of cereal species were identified including barley (hulled), wheat (emmer/ spelt and bread/ club), oat, and rye, with the most abundant cereal grain being barley. The high concentrations of grain are most likely the result of accidents during the drying of grain or conflagrations in which stores of grain were burnt.

Seeds of arable weeds were found in 15 samples, including corn marigold and fat hen, which are characteristic of arable fields and disturbed ground/ waste places, typically dating from the Prehistoric periods onwards. Occasional seeds such as bugle, sedge, and spike-rush/ club-rush were also found which are more characteristic of damp or wet/ marshy areas. Charred hazelnut shell fragments were also present, with a fairly high concentration recovered from four features (**1603**, **1624**, **1664**, and **1668**). These high concentrations may suggest that hazelnuts were being harvested as a food source. Fragments of carbonised peat were noted in small quantities in some of the features, which may suggest peaty turfs were being collected for use either as a fuel of to dampen down hearths.

Charcoal was present in all the samples in varying quantities and consisted of a mixture of blocky fragments of oak and smaller round wood fragments of both oak and non-oak species. Full analysis of the charcoal is recommended so as to allow for the

identification of all wood species present on site, and to discern any specific spatial distribution present.

The presence of hazelnut shell, barley, wheat, oat, and rye within the samples indicate the exploitation of these cereals in this area. Cereal grains suggest a domestic use to the site and a setting within a landscape where arable agriculture was carried out. Woodlands were most likely fairly close to the site and were quite varied with no need to resort to poor quality shrubby species for fire wood, as might be expected if woods were distant or impoverished.

Given the recovery of a mixture of cereal grain and other plant remains from across the site, potentially of a prehistoric date, it is recommended that further post-excavation analysis is carried out on the plant assemblage. This would include full identification (where possible) and tabulation of the plant remains present in each sample; analysis of any specific spatial distribution; and discussion of the plant remains in comparison with other excavated sites.

8.3 BURNT BONE

Small quantities of burnt bone (maximum 8g, average <1g) was recovered from 19 contexts and these were analysed by Jennifer Thoms of CFA Archaeology (Appendix V) and Jacqueline McKinley of Wessex Archaeology (Appendix VI).

The bone fragments were all very fragmented, worn, and chalky in appearance, indicative of erosion/ degradation in the acidic sandy silt soils prevalent across the site, with a consequent loss of surface morphology. All the fragments were burnt, most were oxidised (white or pale grey in colour) indicating they had burnt at high temperatures in a high oxygen environment. The fact that no unburnt fragments were retrieved indicates that the soil conditions were unsuited for the preservation of bone, therefore the assemblage has been affected by preservation bias in that only burnt bone survived.

In many cases the surviving bone was of such a small size (<50mm) and poor condition that no statement on its possible original could be given. Broadly identifiable bone fragments were observed in six contexts. Fragments of sheep bone were identified in contexts **1609**, **1649**, and **1667** (radius and metapodia-sized bone), cattle-sized metapodia in context **1612**, and medium-sized mammal bone in contexts **1603** and **1669** (species identifications by Lorrain Higbee). The rest of the bone from these contexts is of a size commensurate with these identifications, and no human bone could be identified within the overall assemblage.

8.4 STONE

Five stone finds were assessed by George Smith (Appendix VII). Three of them (SF# 1, 2, and 3) were identified as being either natural cobbles or formed naturally. One (SF# 4) may be a fragment of a shaped working slab with peck marks, although if so it is undateable.

The fifth stone was identified as a utilised pebble polishing tool (SF# 6) of a very fine-grained stone, possibly chert. It is smoothed from use on both flattish faces and worn to a facet on one narrow edge. Evidence of light hammering is visible on both ends. The edge faceting suggests it was used for leather burnishing, and the presence of the copper thimble within the same feature would appear to support this.

8.5 SLAG

The slag was examined visually with a low-powered binocular microscope where required by Dr Tim Young of GeoArch (Appendix VIII). Small fragments of indeterminate iron slag were noted from deposits **1599** and **1609**. These were not identifiable, however, their textures are compatible with identification as smithing slags and may date from the Iron Age to the modern period.

Fuel ash slag was noted from contexts **1603**, **1667**, and **1680**, with the largest amount coming from contexts **1603** and **1680**. Fragments of slag with an adhering red sandy ceramic, possibly from a hearth wall or floor were noted within the collection from deposit **1603**. The fuel ash slag is very similar to slags from cereal kilns, as well as to poorly-known slags from other longburning hearths.

The submitted material also included particles of burnt and/ or cooked organic matter from contexts **1513**, **1599**, **1603**, **1609**, **1668**, **1669**, and **1680**. The original nature of the organic material was not determinable.

8.6 OTHER FINDS

A small number of finds were recovered during the processing of the samples. These included two small fragments of modern pottery, a fragment of modern glass, and two very small fragments of possible iron objects. Both the glass and pottery fragments are likely to be later intrusions into the fills of the features, most likely by ploughing or animal disturbance. The iron fragments may also be later intrusions, however they are too small to be able to be identified.

9 INTERPRETATION

9.1 CIRCULAR DITCHES

The complete circular ditch (**1656**) uncovered within the western half of the site most likely represents the remains of a round barrow. Its diameter/ size is well within the average size for these types of features. The lack of an entranceway or causeway across is also indicative of a round barrow rather than a hut circle. Round barrows are usually of a Bronze Age date, although earlier examples are known, and they consisted of a circular ditch enclosing a mounded earthwork. The earthwork would have had a number of burials and/ or cremations placed into and/ or underneath it. Extensive ploughing and occupation of an area would slowly degrade/ obliterate the earthwork over time, leaving only the ring ditch and possibly any burials/ cremations which had placed underneath. The lack of any burials/ cremations uncovered within ring ditch **1656** suggests either extensive truncation, either by ploughing or possibly by the works associated with the original WTW, or that simple no burials/ cremations were place underneath the original earthwork.

Although the western part of circular ditch **1652** had been truncated by a modern pipeline it is likely, given its similar diameter and close proximity to ring ditch **1656**, that it also represents the truncated remains of a round barrow. The two intercutting pits (**1646** and **1648**) enclosed by this ring ditch may be contemporary with the round barrow. Burnt bone was recovered from both of these features, however whether the bone was human or animal could not be determined, and the amount of bone recovered was far less than would be expected from a cremation. It is possible that these features still represent the truncated remains of a cremation or of a feature associated with a funerary practice such as a pyre. The third pit (**1654**) enclosed by ring ditch **1652** may represent a disturbed stone hole, as a small concentration of stone was uncovered within the subsoil directly above this feature. Given its uneven nature its likely it was created by the ploughing out of these stones.

Ditch **1642**, although mostly destroyed, can also be tentatively interpreted as a ring ditch for a round barrow. This is due to its close proximity to the other two ring ditches as well as the fact that the shape of this ditch comprises a near perfect quarter arc of a circle. Its location, closer to the existing WTW than any of the other ring ditches, may also suggest more heavy truncation had taken place here, hence the virtual destruction of this feature.

9.2 PITS

Pits **1545** and **1562** were both located adjacent to the river and were filled with burnt stones. It is likely that these were used for warmth and/ or cooking while fishing, although no evidence of any fish bones was visible within either fill.

The multiple in-situ burning events in the base of pit **1547**, suggests it was open for some time, and the fact that the burning was concentrated within only a small area suggests a specific placement of the fire. This specific placement along with the

presence of a small amount of burnt bone and a high concentration of cereal grain suggests that this represents a small cooking fire, used on multiple occasions. The presence of the post-medieval pottery within the overlying layers, would suggest a fairly recent date to this activity as well.

Pits **1626**, **1630**, and **1637** were all located within the same area and were all filled with a high concentration of deliberately dumped sub-rounded stones. Given this deliberate dumping, it is likely that these pits were created specifically for the disposal of these stones, possibly as part of a field clearance.

Pits **1666** and **1668** were both filled with charcoal rich deposits containing fragments of burnt bone and fairly high concentrations of cereal grain suggesting a domestic use for these features. They were located adjacent to possible postholes **1662** and **1664**, however, given their similar concentrations of cereal grain and charcoal rich deposits, it is likely that these features are also the remains of domestic pits rather than postholes. High concentrations of cereal grain were also uncovered from the fill of pit **1624**, towards the northern edge of the site, suggesting a similar domestic use for this feature. Fuel ash slag was also recovered from the fill of pit **1666**, as well as from the fill of pit **1679** to the north, which is consistent with domestic activity in the area.

Small concentrations of cereal grain, and burnt bone were also recovered from the main fill of pit **1608**. However, the amounts recovered were too small to be able to suggest a possible domestic use for this pit, and it is possible that it was used for storage given its large size. The copper thimble fragment (SF #5) and the polished stone tool (SF #6) were both recovered from the top fill of pit **1608**. Both could have been used together during leather working, and it is likely that they were deposited here at the same time, either by accident or thrown away, and the broken nature of the thimble would suggest the latter. A small concentration of possible smithing slag was recovered from deposit **1609** which was located sealing the possible pit (**1634**) which truncated pit **1608**. The presence of this slag here, and within another nearby small pit (**1598**), would suggest that these features are contemporary and that they may represent small scale metalwork related to the leather working activity shown by the copper thimble and stone tool.

9.3 POSTHOLES

Posthole **1606** contained a fairly high concentration of cereal grain, suggesting a domestic use, and given its close proximity to pit **1608** it may be associated with this feature. No other postholes were located within the area, and it may be that this feature represents the truncated remains of a pit instead.

The large size of postholes **1516**, **1518**, **1520**, and **1522**, along with the presence of possible packing stones within their fills, suggest that they held substantial posts which would have formed a raised structure. Similar four post features are regularly encountered on settlements of late Prehistoric and Roman date, and are generally interpreted as raised granaries. Only a small amount of cereal grain was recovered

from the fills of these feature, however this would be consistent with their use as a storage structure.

Postholes **1508**, **1534**, and **1584** were located forming three corners of a possible square structure similar to postholes **1516**, **1518**, **1520**, and **1522** to the east. Given their similar size to these postholes it is likely that they form part of a similar structure, with the fourth posthole possibly destroyed during the construction of the original WTW. Posthole **1510**, to the southeast of these postholes and of a similar size and shape to them, may have formed another similar feature. However, the construction of the original WTW would have destroyed any other features related to it.

9.4 OTHER FEATURES

Burnt layer **1603** contained a high concentration of fuel ash slag, and it is possible that this layer, along with the adjacent square stone pad (**1583**) and the small stone filled gully (**1602**) would have formed part of the cereal drying progress. The shape these features make is not typical of cereal kilns, which are most commonly of a figure of eight or keyhole shape, however, they could represent the truncated remains of one.

10 STATEMENT OF POTENTIAL

10.1 RING DITCHES

The remains of two, if not three, ring barrows were uncovered on site, as shown by the ring ditches **1652**, **1656**, and **1642**. These all had a similar diameter of between 10m and 12m. A survey of round barrows in West Conwy and North Gwynedd (Smith 2002) indicated that that the most common size for a mounded round barrow was between 10m and 19m, showing that these fit the profile of these features in this area. Ring ditches are generally of a Bronze Age date, although earlier examples dating from the Neolithic period are not uncommon. The pits enclosed by ring ditch **1652** may be contemporary with it, although dating is needed to determine this. The presence of these features on site of national importance in understanding the landscape during this period, and dating of these features is essential so as to allow the site to be placed within its proper setting.

10.2 FOUR-POST STRUCTURE/S

The group of substantial postholes with packing stones indicate that there may have been a four-post granary on the site, to the east of the third possible ring ditch (**1642**). A second group of postholes, to the south of ring ditch **1656**, indicate a possible second four-post granary on the site. These granaries are typically found on Iron Age sites, with similar examples found at Moel y Gerddi (Kelly 1988). The interpretation of these features of granaries and the presence of the ring ditches nearby is interesting as they both generally fall within two different time periods (Iron Age and Bronze Age respectively). If these postulated granary structures are from the Iron Age then it would indicate a re-use of the site and the probability that the round barrows had been destroyed prior to this re-use, since granaries would most likely not be placed adjacent to an intact burial mound.

10.3 PITS

The high concentration of cereal grain within pits **1624**, **1644**, **1662**, **1664**, **1666**, and **1668** suggest a domestic nature to these features. The presence of burnt animal bone within pits **1666** and **1668** would also be consistent with a domestic use. Given this likely domestic use, it is probable that they are contemporary with the possible granary structures. Domestic use in this area is interesting, since it would not normally be carried out adjacent to round barrows, as funerary and domestic practices would be kept separate. This would suggest that these round barrows had already gone out of use and been at least partially destroyed prior to the use of these pits.

10.4 OTHER FEATURES

The high concentration of fuel ash slag from the in-situ burning layer 1603, may suggest that this was where cereal grains were dried, possibly prior to storage in the four-post granaries. The adjacent stone pad (**1583**) and gully (**1602**) may form part of a cereal kiln that has been heavily truncated by ploughing. If these features are contemporary with the four-post structures and the pits containing cereal grain, then it

is likely that they do represent a cereal kiln. Dating of this feature is therefore important, and examination of cereal kilns within the wider landscape would allow for its typology to be matched.

10.5 ARTEFACTS

Pottery

All the pottery recovered from site dates to the post-medieval period. They therefore have a very low archaeological potential.

Glass

All the glass fragments recovered from site dates to the post-medieval period. They therefore have a very low archaeological potential.

Slag

Slag was recovered from the samples taken from eleven features, including a high concentration from burnt layer **1603**. This slag has been assessed and no further work on it is recommended.

Bone

The burnt bone has been assessed and identified as far as possible given its condition. No further work on it is recommended.

Iron Objects

Two very small fragments of possible iron objects were recovered during the processing of the samples. These are too small to be identified and therefore have a very low archaeological potential.

Copper Thimble

The copper thimble will be recorded by photography, but no other work is proposed for it.

Stone Objects

Three of the stone objects (SF #1, 2, and 3) were deemed to be natural and will be discarded. The remaining two will be recorded photographically, but no other work is proposed for them.

10.6 ENVIRONMENTAL DATA

Charcoal and other charred plant remains

The evidence suggests that the deposits from which the samples derive represent the domestic waste associated with fires. Identification of the wood species the charcoal derived from will be needed. This will allow for the significance of the charcoal to be considered in the interpretation of the features it came from.

Given the recovery of a mixture of cereal grain and other plant remains from across the site, potentially of Prehistoric date, it is recommended that further post-excavation analysis be carried out on the plant assemblage. Post-excavation analysis would include: full identification (where possible) and tabulation of the plant remains present in each sample, analysis of any specific spatial distribution (following dating of the site), and discussion of the plant remains in comparison with other excavated sites.

10.7 DATING

The only roughly datable finds recovered from the site were the copper thimble and the stone leather working tool, both most likely dating from the medieval period. Dating is therefore a high priority, particularly as the site may have been in use during both the Bronze Age and Iron Age, as suggested by the presence of the ring ditches and possible four-post granary structures.

Due to the scarcity of any datable finds from the site, the dating must therefore rely on radiocarbon dates produced from the charcoal, cereal grains, and hazelnut shell recovered from the samples. Identification of the wood species and individual cereal grains would need to be carried out prior to the submission for dating. Two separate dates will be obtained from each feature to be dated. This is so as to obtain a more accurate date for the feature and reduce any possible error.

It is proposed to obtain dates from the burnt layer at the base of ring ditch **1656**, pit **1648**, and posthole **1644** which possibly truncates the third ring ditch (**1642**). This would give us a date for the complete ring ditch (**1656**), a possible date for ring ditch **1652** if pit **1648** is contemporary with it as thought, and a *terminus ante quem* for the third partial ring ditch (**1642**).

Further dates should be obtained from two of the postholes (**1520** and **1584**) of the two possible granaries and four of the pits (**1588**, **1666**, **1668**, and **1678**) located within the western half of the site. If these dates show them as contemporary then this would allow us to interpret the area and features as being within a domestic setting.

The presence of fuel ash slag within burnt layer **1603**, similar to that seen in cereal kilns, suggests a possible similar function to this feature. Dating of this feature would allow us to determine if it is contemporary with the cereal grain rich features located to the west.

The dating of all these features will help us to interpret their function and allow us to place them in context within the wider landscape.

A total of 20 dates are proposed on ten features. This will produce a fairly substantial suite of dates that will have to be compared to each other to judge which are contemporary and how long certain activities lasted. This comparison can be done by eye but this is inaccurate and not very rigorous. It is much preferable to use statistical methods to compare date; chi squared tests to see whether two dates from a feature are statistically indistinguishable, i.e. contemporary, or not, and Bayesian analysis to obtain durations of use of groups of features. It is therefore recommended that a

specialist experienced in these techniques be employed to interpret the radiocarbon dates that are produced and ensure that the maximum information is obtained from them.

10.8 RECOMMENDATIONS

The site narrative will need expanding and the site needs to be discussed in its wider landscape context. The site narrative will also be combined with that from the Dolbenmaen to Cwmystradllyn Pipeline. The following tasks are recommended:

- Full appropriate drawings and photographs to accompany the narratives are necessary.
- No further study of the stone objects or copper thimble is recommended, although both will be recorded photographically.
- The post-medieval glass and pottery, along with the natural stones will be discarded.
- No further work on the slag or burnt bone is recommended, however they will be retained with the site archive.
- Further analysis of the charcoal will be carried out by CFA Archaeology so as to fully identify and tabulate the charcoal remains, as well as to ascertain any specific spatial distribution.
- Further analysis of the cereal grain and plant remains will be carried out by CFA Archaeology so as to fully identify and tabulate the plant remains, as well as to ascertain any specific spatial distribution and discuss the remains in comparison with other sites.
- The charcoal and cereal grains will be assessed by CFA Archaeology to determine their suitability for dating and a selection sent to SUREC for dating. A total of 20 dates from ten features is proposed. The selection details will be included in the updated project design.

An updated project design will be completed for **Phase 4: Analysis and report preparation of MAP 2**, as outlined in Section 1. This updated project design will combine the work undertaken on this site as well as that undertaken on the Dolbenmaen to Cwmystradllyn Pipeline in 2014. The updated project design will be submitted along with the Dolbenmaen to Cwmystradllyn Pipeline: Assessment of Potential for Analysis Report.

11 ACKNOWLEDGEMENTS

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APPENDIX I: PROJECT DESIGN

DOLBENMAEN WATER TREATMENT WORKS

PROJECT DESIGN FOR ARCHAEOLOGICAL MITIGATION:

Prepared for

Black & Veatch Limited

May 2012

Ymddiriedolaeth Archaeolegol Gwynedd

Gwynedd Archaeological Trust

DOLBENMAEN WATER TREATMENT WORKS

PROJECT DESIGN FOR ARCHAEOLOGICAL MITIGATION

Prepared for Black & Veatch Limited, May 2012

1.0 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by *Black & Veatch Limited* to provide a project design for completing a programme of archaeological mitigation during the main ground works stage at the location of the proposed Dolbenmaen Water Treatment Works (WTW); centred on NGR **SH49634290**.

According to *Black and Veatch Ltd* amended drawing **174357-30-9114** (reproduced as Figure 1), the proposed WTW site is located across three irregular shaped enclosed fields and will comprise:

- the main WTW area within the central field (39,110m^2)
- Zone A (6,890m^2) - main site compound;
- Zone B (6,055m^2) - main soil storage area.

The groundworks will be completed in two main stages:

- Stage 1 – enabling works: this will include the establishment of the main site compound in Zone A and the soil storage area in Zone B, as well as the removal of topsoil across the entire site.

- Stage 2 – main works: the construction of the water treatment works and associated landscaping, which includes two earth bunds.

GAT has already completed a staged programme of archaeological works (cf. para. 2.0 for a detailed summary). This has included an archaeological assessment of the proposed works (GAT Report **1092**), a watching brief during the client ground investigation works (GAT Report **1098**), a geophysical survey of the proposed WTW zone (*Stratascan* report **J3297**) and an archaeological evaluation of the WTW zone targeting the geophysical survey results (GAT Report **1123**). *It is recommended that all of these reports are reviewed in tandem with this project design.*

Based on these results and the client programme and methodology, the GAT archaeological mitigation will include:

- A basic record of GAT Report **1092** features 3 and 4;
- An archaeological watching brief of Stage 1 enabling works, monitoring all topsoil removal within the development zone.
- An archaeological controlled strip of the main WTW area prior to Stage 2.
- An archaeological controlled strip of Zone B prior to Stage 2.

(cf. para. 3.0 for a detailed methodology)

Note: a haul road is required at the start of the enabling works to connect Zones A and B, crossing the main WTW site; this will require a controlled strip before the haul road is established and before the main controlled strip.

The site contractor working for *Black and Veatch Ltd* on Stage 1 will be *GT Williams Ltd*. who will be responsible for topsoil strip across the scheme, the haul road and the main site compound. GAT will also be contracting *GT Williams Ltd*. to undertake the controlled strip in tandem with the GAT team. The enabling works are currently scheduled from **29/05/13** to **18/07/13**. The GAT works will in tandem with this schedule.

A detailed brief has not been prepared for this stage by Gwynedd Archaeological Planning Service (GAPS). However GAPS has monitored all archaeological phases for this scheme. Based on those results and the known and suspected archaeological activity, GAPS has requested an archaeological watching brief in the location of Zone A and a controlled strip for the main WTW zone and Zone B. GAPS must approve this and any future project designs and output related to this scheme. The controlled strip areas must be approved by GAPS prior to the undertaking of the main works and all opportunities afforded to GAPS to visit and monitor the scheme.

Reference will also be made to the guidelines specified in *Standard and Guidance for Archaeological Watching Brief* (Institute for Archaeologists, 1994, rev. 2001 & 2008) and *Standard and Guidance for Archaeological Excavation* (Institute for Archaeologists, 1994, rev. 2001 & 2008)

2.0 BACKGROUND

GAT has completed an archaeological assessment report and ground investigation watching brief report in advance of the proposed works (Reports **1092** and **1098** respectively), along with a magnetometer geophysical survey of the area, completed by *Stratascan* for GAT (report forthcoming). The assessment identified characterised a study area within a rich archaeological landscape with thirty known sites of archaeological significance within a 500m radial zone. A large rock outcrop was identified in the Zone B field (cf. Figure 01), which appears from a combination of place name evidence and historic literature to have been used as an early medieval assembly mound. The remainder of the area was characterised by improved pasture separated by cloddiau (field boundaries) of post-medieval date. The archaeological and historical background is reproduced from report **1092** below. The ground investigation watching brief results and the magnetometer geophysical survey results are discussed below (paras. 2.4 and 2.5 respectively)

2.1 PREHISTORIC AND ROMAN SITES

The evidence for prehistoric occupation within the vicinity of the proposed development area is slight. The nearest confirmed prehistoric sites are the hut groups (PRN 145 SH 4994 4345) and (PRN 170 SH 5019 4276) 450m NE and 450m SE respectively. The Scheduled Ancient Monument of Craig-y-Tyddyn Camp (CN 046; SH 50594271) lies approximately 715m to the south east of the assessment area. It is possible; therefore that evidence of prehistoric activity may survive below ground in the vicinity of the proposed development, occupying as it does the lower ground between these two hut groups, the later agricultural improvement of this land may well have truncated or obscured the evidence for earlier occupation of the landscape. The line of the proposed Roman Road from Segontium - Pen Llystyn - Tomen y Mur may lie under the present A487 (T) although there is no direct evidence of occupation from the Roman period within the vicinity of the proposed development area. The nearest confirmed Roman site is Pen

Llystyn fort (PRN 144 SH 4809 4492), approximately 2.3 km to the NW. The sparseness of the evidence may reflect a lack of investigation rather than a lack of settlement activity relating to these periods.

2.2 MEDIEVAL

Scheduled Ancient Monument (CN 063; SH50654307) castle earthwork which marks the site of the medieval llys of Dolbenmaen is approximately 830m to the west of the proposed development area (PRN 161 SH 50654037). The western boundary of the land which made up the llys complex comes within 350m of the eastern boundary of the proposed development (GAT Report 790: 09). The geological outcrop and associated earth mound known as Pen Bryn yr Orsedd which is situated in Field 02 may have served as an assembly mound for the retinue of a peripatetic early medieval court. Pen Bryn yr Orsedd translates as 'The Seat on top of the Hill', and assembly mounds which have similar characteristics are known from England, Scotland, Ireland and the Isle of Man (GAT Report 790: 09). An assembly mound near Llangollen is currently subject to a programme of archaeological work as part of 'Project Eliseg'. In the case of 'Project Eliseg', the mound is topped by the remains of a stone cross, and academic work on the social context for the mound and the cross has recently been published (GAT Report 790: 09). The place name 'Dol Pen Maen' is mentioned in the medieval story of 'Math and Mathonwy' as a point where hostages were exchanged between two high – status families (GAT Report 790: 09). Dolbenmaen / Dol Pen Maen translates as 'The Meadow with the Rock at the Head', and the rock in this instance may be Pen Bryn yr Orsedd.

2.3 POST-MEDIEVAL AND MODERN

An Exchequer survey dated 1589-90 shows that the boundary of the township of Dolbenmaen was almost exactly the same as the parish as given of the Tithe Map of 1838 (GAT Report 790: 09). The assessment area is recorded by the 17th century as being part of a farm known as Tyddyn Rhwng y Ddwyryd. In 1637 the lands were demised to John Griffith of Cefn Amlwch by his father in law Sir Richard Trevor, by which time, or shortly after, the lands were purchased from the Crown. John Griffith's heir and brother sold the township in 1719 to Williams Brynker, son of James Brynker of Brynkir. A rental of 1721 includes the farm of Plas Dolbenmaen, which is the earliest found reference of the farm under this name. William ran into financial problems, and the lands with the exception of Dolwgan, were sold to William Owen of Clenennau and Brogyntyn in 1736, and so passed by marriage to the Ormesby (later Ormesby-Gore) family (GAT Report 790: 09).

Between the production of the Tithe Map in 1839 (GAT Report 790: Figure 03) and the 3rd Edition of the Ordnance Survey Map in 1915 (GAT Report 790: Figure 06), the field system within the assessment area saw several changes through the planting and grubbing up of field boundaries. The name Pen Bryn yr Orsedd in reference to the rock outcrop is not recorded on the 1st Edition O.S. map but does appear on the 2nd Edition.

2.4 ENVIRONMENTAL REMAINS AND SOIL MORPHOLOGY: GROUND INVESTIGATION STAGE

The topsoil within the assessment area is well drained, with some limited areas of waterlogging. GAT attended a Ground Investigation (GI) stage for Black and Veatch Ltd on the 10th and 11th of December 2012 and monitored the excavation of 12No trial pits (GAT Report

1098). All 12 trial pits revealed a clay silt topsoil, more humic in character in TPD02, TPD04, TPD08, TPD11 and TPD12 and varying in depth between 0.10m (TPD03 and TPD06) and 0.30m (TPD09). TPD02, cut into the southern side of Pen Bryn yr Orsedd revealed that this side of the mound had not been modified and was entirely natural, composed of a grey silt over a very clean orange brown sandy clay. TPD01, TPD05, TPD07 and TPD11 revealed river gravel below their respective sub-soils of sandy clay (TPD01); orange-brown till derived material (TPD05); grey-brown through red-orange clay (TPD07) and orange-brown clay-silt (TPD11). TPD03, TPD04, TPD05, TPD08, TPD09 and TPD10 came down immediately below the topsoil onto a till or till derived material Individual unabraded sherds of Post-Medieval pottery were recovered from the topsoil of TPD06 and TPD09.

2.5 Archaeological Evaluation – geophysical survey and trial trenching

The archaeological evaluation (trial trenching) of the main WTW and Zones A and B was completed by GAT in March 2013 (GAT Report **1123**) and revealed a range of features spread throughout the development site showing evidence of land use and settlement in the area. The 14No evaluation trenches targeted anomalies identified during the preceding geophysical survey (*Stratascan* report **J3297**), which identified features interpreted as former field boundaries throughout the site and anomalies possibly indicative of prehistoric farmstead activity in the central region where the main WTW is proposed. The trial trenching uncovered a number of features which showed that settlement of the site had taken place, most likely dating to the prehistoric period.

The two sets of parallel boundary ditches (**502** and **504**, and **1102** and **1104**) show that division of the land has occurred at some point, with the V-shaped nature of ditch **1104** tentatively suggesting that this may date to the prehistoric period.

Further use of the land was visible from the platforms revealed in Trenches 06 (**603**) and 10 (**1002**). These platforms, located within the same area to the east of the current water treatment works, suggest that the natural slope of the ground in this area was modified so as to provide flatter areas for the growing of crops. There is also the possibility that these platforms were used for settlement, although no evidence for this was uncovered during the evaluation. However settlements on south facing platforms are not uncommon, and evidence for this may survive outwith the evaluation area.

Directly to the north of the water treatment works settlement evidence was revealed in the form of a roundhouse ditch (**103**), a small pit (**203**), and a linear ditch (**1402**). The roundhouse is likely to be prehistoric in date, and carbon dating of charcoal recovered from the lower fill of the ditch (**107**) is recommended so that a definitive date can be assigned. It is possible that the ditch and pit are contemporary with the roundhouse, and form part of the same settlement, although no dating evidence was uncovered within any of the features. Given the roundhouse's ideal location close to a river it is likely that this is not an isolated feature, but rather it is part of a larger settlement, further evidence of which may still survive in this area in the form or further roundhouses, enclosures, and/ or associated features.

The anomalies that were recorded by the geophysical survey but not targeted by the evaluation may represent archaeological features given that evidence of activity throughout the site has been uncovered. However, given the amorphous nature of some of these anomalies (such as

those in the southeastern and southwestern corners of the site), it is also possible that they represent natural features such as bioturbation or animal burrows.

Given the evidence for settlement activity uncovered during the evaluation, it is likely that further archaeological features may survive in the areas that showed no anomalies on the geophysical survey and were therefore not targeted by the evaluation. The absence of any anomalies may be a result of any remains being un-magnetic; the truncation of any features by ploughing (such as Pit **203**); the destruction of features by the building of the compound for the construction of the water treatment plant in this area (The concentration of stones located within the topsoil of Trench 02, similar as they are to those within the uppermost fill of the roundhouse ditch, may represent such destruction); or by the masking of features by the magnetic disturbance of nearby metal objects, such as in the areas directly to the west and north of the roundhouse (**103**).

Due to the unknown size of the settlement uncovered during the evaluation, and with archaeological features uncovered towards both the eastern and western extents of the development, it was recommended in the report that a programme of controlled stripping of the entire development site was carried out to allow for the full extent and nature of the settlement on the site to be known, as well as providing evidence for any truncation or destruction.

It is currently understood that GAT Report **1092** Feature 5: Pen Bryn yr Orsedd Rock Outcrop and Earthen Mound, which is currently interpreted as a medieval meeting place, is not directly affected by either the Stage 1 or Stage 2 works and will not be mitigated at this time. There is still potential for associated activity to be identified within the surrounding areas including the controlled strip zones.

3.0 METHOD STATEMENT

3.1 BLACK & VEATCH/GT WILLIAMS ENABLING WORKS PROGRAMME

Based on current information *G T Williams Ltd* will complete the enabling works across Zones A, B and the main WTW between **29/05/13** to **18/07/13**. *Black and Veatch Ltd* drawing **174357-30-9114** (reproduced as Figure 1), identifies the location of the site compound (Zone A), the main WTW to the north of the existing WTW and the soil storage area (Zone B).

Zone A will be undertaken from 29/05/13, with the topsoil stripped to a mean depth of 140mm (Russell Brown *Black & Veatch pers comm.*) and then sealed with geotextile membrane; infrastructure, including below ground services, will be established between 12/06/13 and 17/07/13.

Preparation work for Zone B will be completed between 13/06/13 and 20/06/13 and will include topsoil removal and the breaching of Feature 4. The programme also lists the installation of geotextile membrane and stone. No underground services are listed here on the programme.

The main WTW area will include the removal of all topsoil and Feature 3 boundary wall breach. Geotextile membrane and then stone will be laid within the area, according to the current programme, between 03/07/13 and 10/07/13. Electrical services and lighting will be established on site between 11/07/13 and 16/07/13.

The haul road that is located on *Black and Veatch Ltd* amended drawing **174357-30-9114** is not listed on the programme but will form part of the main works area.

Please note: these timings are as currently as determined by the site contractor and are subject to change. The identification of archaeological activity in any of the zones can affect this programme.

3.2 ARCHAEOLOGICAL WATCHING BRIEF

(Reproduced from *Institute for Archaeologists 1994 rev. 2001 and 2008 Standard and Guidance for an archaeological watching brief)*

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

This definition and *Standard* do not cover chance observations, which should lead to an appropriate archaeological project being designed and implemented, nor do they apply to monitoring for preservation of remains *in situ.*

An archaeological watching brief is divided in to four categories according to the *Institute for Archaeologists Standard and Guidance for an archaeological watching brief:*

- comprehensive (present during all ground disturbance)
- intensive (present during sensitive ground disturbance)
- intermittent (viewing the trenches after machining)
- partial (as and when seems appropriate).

GAT recommends the following mitigation strategy, to be approved by GAPS.

- An **intensive watching brief** within Zone A during topsoil stripping scheduled from 30/07/13. Based on current client information, the mean topsoil strip depth will be 140mm (Russell Brown *Black & Veatch pers comm.*). GAT will monitor this depth across the zone to determine if this will be exceeded and whether further archaeological mitigation will be required were this to happen and/or any archaeological activity identified. Based on received service information, Zone A is dominated by two underground water mains that cross the site on a southwest-northeast orientation (also visible in *Stratascan* report **J3297** Figure 3).
  NOTE: bulldozer style machines fitted with blades cannot be monitored in a safe and effective way by the archaeological mitigation team and it is recommended that only tracked excavators fitted with toothless buckets are used for topsoil removal.

- An **intensive watching brief** within Zone B during topsoil stripping scheduled from 13/06/13. This area will be subsequently targeted by an archaeological controlled strip (cf. para. 3.3).
  NOTE: bulldozer style machines fitted with blades cannot be monitored in a safe and effective way by the archaeological mitigation team and it is recommended

that only tracked excavators fitted with toothless buckets are used for topsoil removal.

- An **intensive watching brief** within the main WTW zone identified on *Black and Veatch Ltd* drawing **174357-30-9114**, incorporating the main footprint of the WTW as well as the two landscaping bunds and haul road located on *Black and Veatch Ltd* drawing **174357-30-9114**. This area will be subsequently targeted by an archaeological controlled strip (cf. para. 3.3).
  NOTE: bulldozer style machines fitted with blades cannot be monitored in a safe and effective way by the archaeological mitigation team and it is recommended that only tracked excavators fitted with toothless buckets are used for topsoil removal.

- **The watching brief will be undertaken in a manner that allows for the immediate cessation of the main contractor groundworks for the recording of archaeological evidence. This will involve close liaison between the archaeologist and the site agent and the instigation of a further archaeological works mitigation programme (cf. para. 4.0)**

- A photographic record will be maintained throughout, using a digital SLR camera set to maximum resolution.

- Any subsurface remains will be recorded photographically, with detailed notations and a measured survey.
- Any further mitigation required will be subject to an additional Further Archaeological Works Design (FAWD) to be approved by GAPS.

The archive will then be held by GAT under an appropriate project number (**G2293**)

3.3 Archaeological Controlled Strip

GAT has recommended an archaeological **controlled strip** for the main WTW zone and Zone B.

This will be completed in the following sequence:

- Controlled strip of the haul road in the main WTW zone;
- Controlled strip of Zone B;
- Controlled strip of the main WTW zone

This sequence is required to allow the haul road linking Zone A to Zone B to be completed at the start of the works.

Please note in all instances that GAPS must approve all archaeological works within the controlled strip zones and sign-off the relevant areas prior to the start of any contractor works, including the haul road.

In general the controlled strip will involve the GAT mitigation team working with the *G T Williams Ltd* plant operator and banksman to strip the footprint of the designated areas to the glacial horizon and mitigate any archaeological activity identified within the footprint. Any areas of archaeological potential will be cleaned by hand. Where complex archaeological deposits

are identified during stripping, these will be identified at an early stage in order to formulate a defined area of work. This technique relies upon the recognition of features by plan; excavation of features will be kept to the minimum required to assess the nature and importance of the remains and to allow a suitable archaeological mitigation strategy. The mitigation strategy may require the production of a further works design (FAWD) generated by GAT and reviewed and approved by GAPS and the client (cf. para. 4.0).

3.3.1 Controlled strip of the haul road in the main WTW zone

Removal of the remaining topsoil and the subsoil horizons will be undertaken by a 360º tracked excavator with a toothless bucket of suitable size. The soil will be removed in thin spits down to either the top of significant archaeological deposits or to the initial glacial horizon. The stripping will be constantly monitored by an archaeologist to ensure that the right level is reached and to identify finds or layers that appear during stripping.

The precise length and width of the haul road is not currently understood, but the location is partly indicated on *Black and Veatch Ltd* drawing **174357-30-9114** as parallel to the northern boundary of the existing WTW. Two service pipes are known to run parallel to Feature 03 (Boundary Wall), from a service chamber to the existing WTW. The haul road will partly cross this location and will run in very close proximity to Feature 103, a curvilinear ditch of possible prehistoric date, identified both during the geophysical survey and subsequently in GAT trial trench 01 (GAT Report **1123**). *The feature was not fully exposed during the trial trench and it is possible that this feature or activity associated with it could be identified during the controlled strip.* ***Please note that the subsequent investigation of archaeological features could delay the completion of the haul road at this location and along the route as a whole.***

The archaeologist will not act as a banksman. GAT will work under *Black and Veatch Ltd* CDM throughout.

All identified archaeological contexts within the controlled strip locations will be excavated manually unless otherwise agreed with the curator in advance. All archaeological contexts subsequently located must be adequately sampled in order to define their function, date, and relationship to adjacent features.

- The site will be planned to scale and a digital survey completed using a Total Station or survey quality Global Positioning System (if required).
- A written record of the trench content and all identified features will be completed via pro-forma sheets
- All subsurface features will be recorded photographically using a digital SLR camera set to high resolution.
- Features and layers will be excavated only enough to establish their depth, character and if possible their date. The assumption is that excavation will be kept to a minimum. Any artefacts found during these investigations will be collected and where charcoal-rich deposits are found or other deposits likely to contain palaeoenvironmental information these will be sampled as appropriate.

3.3.2 Controlled strip of Zone B

The controlled strip will be completed after an initial topsoil strip.

The archaeological evaluation of Zone B (GAT Report **1123**), identified two parallel linear ditches (Contexts **1102** and **1104**), 1.8m apart and aligned north-south, within Trench 11 dcutting into the natural geology (**1101**) towards the middle of Trench 11 (Figure 9). Ditch **1102** measured 1.4m in width, with a depth of 0.2m. It had a concave base with a steep sloping side to the single silted up deposit of greyish brown gravelly clayey silt (**1103**). No finds were recovered from either of the ditches, and no other features were uncovered within the trench, but they were interpreted as earlier field systems of currently unknown date, although the V-shaped nature of ditch **1104** tentatively suggested that this may date to the prehistoric period. It is expected that further evidence for the ditches will be identified during the controlled strip.

Removal of any remaining topsoil and the subsoil horizons will be undertaken by a 360º tracked excavator with a toothless bucket of suitable size. The soil will be removed in thin spits down to either the top of significant archaeological deposits or to the initial glacial horizon. The stripping will be constantly monitored by an archaeologist to ensure that the right level is reached and to identify finds or layers that appear during stripping.

As indicated on *Black and Veatch Ltd* drawing **174357-30-9114**, an initial topsoil bund will be deposited along the northern boundary of Zone B, parallel to the A487 trunk road. This bound will be placed on top of an existing main (visible in *Stratascan* report **J3297** Figure 3). GAT is recommending that this bund area is not subject to a controlled strip due to the presence of the main beneath and associate ground disturbance. The remainder of the zone will be controlled stripped. As Zone B will be used for storing all topsoil and subsoil removed from Zone A and the WTW, it will not be possible to remove the controlled strip material from Zone B to an alternate location. GAT's current proposal is to strip the zone in portions, stripping a selected area and storing to the side, signing that area off under GAPS authorisation, backfilling and stripping the next portion until the entire area is completed. *Note: this will require approval by GAPS prior to instigation.*

The archaeologist will not act as a banksman. GAT will work under *Black and Veatch Ltd* CDM throughout.

All identified archaeological contexts within the controlled strip locations will be excavated manually unless otherwise agreed with the curator in advance. All archaeological contexts subsequently located must be adequately sampled in order to define their function, date, and relationship to adjacent features.

- The site will be planned to scale and a digital survey completed using a Total Station or survey quality Global Positioning System (if required).
- A written record of the trench content and all identified features will be completed via pro-forma sheets
- All subsurface features will be recorded photographically using a digital SLR camera set to high resolution.
- Features and layers will be excavated only enough to establish their depth, character and if possible their date. The assumption is that excavation will be kept to a minimum.

Any artefacts found during these investigations will be collected and where charcoal-rich deposits are found or other deposits likely to contain palaeoenvironmental information these will be sampled as appropriate.

3.3.3 Controlled strip of main WTW

The controlled strip will be completed after an initial topsoil strip and will incorporate the footprint of the proposed WTW as well as the landscaping bunds indicated on *Black and Veatch Ltd* drawing **174357-30-9114**. The haul road portion will be completed in advance (as discussed in para. 3.3.1)

The main WTW was the location for GAT Report **1123 Trenches 1** to **10** and **12** (cf. Figure 2). Five of the trenches, nos. 03-04, 08-09, and 12) revealed no evidence of any archaeological activity, while Trench 07 only revealed an animal burrow. Archaeological activity was identified in Trenches 01, 02, 05, 06 and 10.

TRENCH 01

Trench 01 measured 20m by 2m with a 2m by 2m extension on its western side. A curvilinear ditch (**103**) was revealed cutting into the natural geology (**102**), an orangey grey silty sand, along the western side of the trench. The ditch measured 1m in width with a maximum depth of 0.25m, and had steep sloping sides with a concave base. The basal fill of the ditch (**107**) consisted of a 0.04m thick layer of greyish brown clayey silt and charcoal which was sealed by a light whitish grey sandy clay, 0.03m thick. This in turn was sealed by a silted up layer of greyish brown clayey silt (**105**), 0.05m thick. The uppermost fill of the ditch consisted of a 0.15m thick concentration of sub-rounded stones within a greyish brown clayey silt (**104**) similar to (**105**). No finds were recovered from the fills of this ditch, and no other features were revealed within the trench. This was interpreted as a circular ditch for a roundhouse structure, indicating at least small scale settlement in this area.

TRENCH 02

A shallow circular pit (**203**), measuring approximately 0.9m in diameter and 0.1m in depth was uncovered within Trench 02 cutting into the natural geology (**202**). It had shallow sides with a fairly flat base and was filled with a single silted up deposit consisting of a greyish brown clayey silt (**204**). No finds were recovered from this feature.

TRENCH 05

Two parallel linear ditches (**502** and **504**), 1.5m apart and aligned ENE-WSW, were uncovered cutting into the natural geology (**501**) towards the middle of Trench 05. Ditch **502** measured 1m in width, with a depth of 0.3m and had steep sloping sides and a concave base (. It was filled with a single silted up deposit of greyish brown stony silt (**503**).

Ditch **504** measured 0.6m in width with a depth of 0.1m and had uneven sides and an uneven base. It was filled with a single silted up deposit (**505**) comprising of greyish brown stony silt. No finds were recovered from either of the ditches, and no other features were uncovered within the trench. As with the ditches in Zone B, but they were interpreted as earlier field systems of currently unknown date.

TRENCH 06

An approximately 2.1m wide linear feature (**603**), aligned NNW-SSE, was uncovered towards the middle of Trench 06. The WSW side of the feature had a steeply sloping, 0.2m deep side which gave way to the natural slope of the natural geology (**602**). The ENE side was very ephemeral, which may have been due to plough damage or that there was no other side and that the feature represents a platform, formed by cutting into the natural on one side and creating a levelled off area. No finds were recovered from this feature. No datable artefacts were recovered but it is thought possible that further evidence could be found during the controlled strip.

TRENCH 10

Trench 10 measured 20m by 2m, with a 5m by 5m extension on its northeastern side at its northwestern end. A large, stepped, linear feature (**1002**) was uncovered at the northwestern end of the trench, aligned northeast-southwest. It measured approximately 3.7m in width and consisted of two fairly steep cuts into the natural geology, forming two fairly flat platforms. The uppermost platform measured approximately 2.2m in width and had a depth of 0.32m, while the lower platform measured 1.5m in width with a depth of 0.2m. The upper platform was filled with a silted up deposit of greyish brown clayey silt (**1003**) similar to the subsoil (**1000**). A concentration of sub-rounded stones (**1004**) filled the lower platform, which may have been used as a border for the upper platform. No finds were recovered from the fills of either platform.

In all cases, further activity associated with these features is expected during the controlled strip.

Removal of any remaining topsoil and the subsoil horizons will be undertaken by a 360º tracked excavator with a toothless bucket of suitable size. The soil will be removed in thin spits down to either the top of significant archaeological deposits or to the initial glacial horizon. The stripping will be constantly monitored by an archaeologist to ensure that the right level is reached and to identify finds or layers that appear during stripping.

The archaeologist will not act as a banksman. GAT will work under *Black and Veatch Ltd* CDM throughout.

All identified archaeological contexts within the controlled strip locations will be excavated manually unless otherwise agreed with the curator in advance. All archaeological contexts subsequently located must be adequately sampled in order to define their function, date, and relationship to adjacent features.

- The site will be planned to scale and a digital survey completed using a Total Station or survey quality Global Positioning System (if required).
- A written record of the trench content and all identified features will be completed via pro-forma sheets
- All subsurface features will be recorded photographically using a digital SLR camera set to high resolution.

- Features and layers will be excavated only enough to establish their depth, character and if possible their date. The assumption is that excavation will be kept to a minimum. Any artefacts found during these investigations will be collected and where charcoal-rich deposits are found or other deposits likely to contain palaeoenvironmental information these will be sampled as appropriate.

3.4 PALEOENVIRONMENTAL ASSESSMENT/MITIGATION

If palaeoenvironmental activity of note is identified within any of the mitigation zones, then recourse to the specialist for advice is recommended both on recovering any samples and any further mitigation (including assessment and analysis) resulting from this.

4.0 Further Archaeological Works

- **The identification of significant archaeological features during the groundworks/archaeological watching brief may necessitate further archaeological works. This may require the submission of new cost estimates to the contractor. Any further mitigation required will be subject to an additional Further Archaeological Works Design (FAWD) to be approved by GAPS.**
- **This design does not include a methodology or cost for examination of, conservation of, or archiving of finds discovered during the watching brief, nor of any radiocarbon dates required, nor of examination of palaeoenvironmental samples. The need for these will be identified in the post-fieldwork programme (if required), and a new design will be issued for approval by the GAPS Archaeologist.**

5.0 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 http://www.legislation.gov.uk/ukpga/Vict/20-21/81/introduction 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.

6.0 Small Finds

The vast majority of finds recovered from archaeological excavations comprise pottery fragments, bone, environmental and charcoal samples, and non-valuable metal items such as nails. Often many of these finds become unstable (i.e. they begin to disintegrate) when removed from the ground. All finds are the property of the landowner, however, it is Trust policy to recommend that all finds are donated to an appropriate museum where they can be stored and made available for future study. Access to finds must be granted to the Trust for a reasonable period to allow for analysis and for study and publication as necessary. All finds would be treated according to advice provided within *First Aid for Finds* (Rescue 1999). Trust staff will undertake initial identification, but any additional advice would be sought from a wide range of consultants used by the Trust.

Unexpected Discoveries: Treasure Trove

Treasure Trove law has been amended by the Treasure Act 1996.
http://www.legislation.gov.uk/ukpga/1996/24/contents

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, on whose behalf the National Museums and Galleries of Wales acts as advisor on technical matters, and may be the recipient body for the objects.

The National Museums and Galleries of Wales 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.

7.0 POST-EXCAVATION PHASE

7.1 INTRODUCTION

The management of this phase will follow guidelines specified in Management of Archaeological Projects (English Heritage, 1991), and relevant guidelines from Management of Research Projects in the Historic Environment (English Heritage 2006). Five stages are specified:

- Phase 1: project planning
- Phase 2: fieldwork
- Phase 3: assessment of potential for analysis
- Phase 4: analysis and report preparation
- Phase 5: dissemination

The post-excavation stage for the project will include Phases 3 to 5.

Phase 3 involves an objective assessment of the results of the fieldwork phases (Phases 1 and 2) in order to ascertain the appropriate level of post-excavation analysis and reporting. This phase culminates in the production of a post-excavation assessment report. The second involves carrying out the work identified within the post-excavation assessment report, and culminates in a final report and project archive (Phases 4 and 5).

NOTE: any outstanding post-excavation material from the evaluation phase (GAT Report **1123**), will also be included as part of this stage.

7.2 POST-EXCAVATION ASSESSMENT

The level of post-excavation analysis and reporting for the purposes of the evaluation will be sufficient to establish the character, scale, date range, artefactual and palaeo-environmental potential and overall significance of the remains.

Style and format of the report will include as a minimum the following:

- A location plan of trenches and/or other fieldwork
- Plans and sections of features located at an appropriate scale
- A section drawing showing depth of deposits including the present ground level with Ordnance Datum, vertical and horizontal scale.
- A summary statement of the results.
- A table summarising per trench the features, classes and numbers of artefacts contained within, spot dating of significant finds and an interpretation.
- An interpretation of the archaeological findings both within the site and within their wider landscape setting.

Artefact analysis will be sufficient to establish date ranges of archaeological deposits, a general assessment of the types of pottery and other artefacts to assist in characterising the archaeology, and to establish the potential for all categories of artefacts should further archaeological work be necessary.

7.3 ANALYSIS AND REPORT PREPARATION

The work undertaken during this phase of the project will be carried out according to the recommendations contained within the post-excavation assessment report.

7.4 PRODUCTION OF SITE ARCHIVE

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. All plans, photographs and descriptions will be labelled and cross-referenced, and lodged in an appropriate place (to be decided in consultation with the regional Sites and Monuments Record) within six months of the completion of the project. All digital data will be written to CD-ROM and stored with the paper archive.

8.0 PROCESSING DATA, ILLUSTRATION, REPORT AND ARCHIVING

Following completion of the watching brief as outlined above, a report will be produced incorporating the following:

- Non-technical summary
- Introduction
- Specification and Project Design
- Methods and techniques
- Archaeological Background
- Description of the results of the mitigation
- Summary and conclusions
- Bibliography of sources consulted.

Illustrations, including plans and photographs, will be incorporated within the report.

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. All plans, photographs and descriptions will be labelled and cross-referenced, and lodged in an appropriate place (to be decided in consultation with the regional Historic Environment Record) within six months of the completion of the project. All digital data will be written to CD-ROM and stored with the paper archive.

- one or more copies (as required) will be sent to the client
- one or more copies (as required) will be sent to GAPS
- one or two copies (as required) sent to the Historic Environment Record Archaeologist for the area (HER, Gwynedd Archaeological Trust, Craig Beuno, Bangor, Gwynedd LL57 2RT);
- copies of all key digital files on optical media should be provided to GAPS and the Regional HER, including report, photographs, scans of maps etc.
- a copy of the report and/or digital files on optical media should be provided to the National Monument Record (Royal Commission on the Ancient and Historic Monuments of Wales, Aberystwyth, SY23 1NJ) dependent upon their requirements.

9.0 STAFF

The project will be supervised by a Senior Archaeologist at GAT Contracts Section. The work will be carried out by fully trained Project Archaeologists who are experienced in conducting watching briefs and working with contractors and earth moving machinery. (Full CV's are available upon request).

10.0 HEALTH & SAFETY

The Trust subscribes to the SCAUM (Standing Conference of Archaeological Unit Managers) Health and Safety Policy as defined in **Health and Safety in Field Archaeology** (1999).

11.0 INSURANCE

Liability Insurance - Aviva Policy 24765101CHC/00045

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

The current period expires 21/06/13

Professional Indemnity Insurance – RSA Insurance Plc P8531NAECE/1028

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

The current period expires 22/07/13

12.0 BIBLIOGRAPHY

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Smith, S. 2012. Gwynedd Archaeological Trust Report **1098** (DRAFT): *GARNDOLBENMAEN WATER TREATMENT WORKS - ARCHAEOLOGICAL WATCHING BRIEF: GROUND INVESTIGSTION WORKS (G2293)*

APPENDIX II: CONTEXT REGISTER

Context No	Type	Description
100	Topsoil	Dark greyish brown sandy silt, 0.15m deep
101	Subsoil	Brownish grey sandy silt, 0.3m deep
102	Natural	Reddish brown sandy clay
103	Ring Ditch	Ring Ditch, 1m wide, 0.25m deep
104	Fill	Stone fill of ditch [103]
105	Fill	Greyish brown clayey silt fill of [103]
106	Fill	Light whitish grey sandy clay fill of [103]
107	Fill	Greyish brown clayey silt fill of [103]
200	Topsoil	Dark greyish brown sandy silt, 0.2 - 0.45m deep
201	Subsoil	Brownish grey sandy silt, 0.2 - 0.25m deep
202	Natural	Reddish brown sandy clay
203	Pit	Circular pit, 0.9m in diameter, 0.1m deep
204	Fill	Greyish brown clayey silt fill of [203]
300	Topsoil	Dark greyish brown sandy silt, 0.35m deep
301	Subsoil	Greyish brown sandy silt, 0.2m deep
302	Natural	Dark yellowish brown sandy clay
400	Topsoil	Dark greyish brown sandy silt, 0.3m deep
401	Natural	Mottled, grey, brown, reddish brown and yellowish brown sandy clay
500	Topsoil	Dark greyish brown sandy silt, 0.3m deep
501	Natural	Mottled sandy gravel and light yellowish brown sandy clay
502	Ditch	Linear Ditch, 1m wide, 0.3m deep
503	Fill	Greyish brown stony silt fill of [502]
504	Ditch	Linear Ditch, 0.6m wide, 0.1m deep
505	Fill	Greyish brown stony silt fill of [504]
600	Topsoil	Dark greyish brown sandy silt, 0.4m deep
601	Subsoil	Greyish brown sandy silt, 0.25m deep
602	Natural	Sandy gravel at ENE end, yellowish brown sandy clay at WSW
603	Platform?	Possible Platform, 2.1m wide, 0.2m deep
604	Fill	Greyish brown clayey silt fill of [603]
700	Topsoil	Dark greyish brown sandy silt, 0.3m deep
701	Subsoil	Greyish brown sandy silt, 0.25m deep
702	Natural	Yellowish brown sandy clay
703	Animal Burrow	Animal Burrow
800	Topsoil	Dark greyish brown sandy silt, 0.2m deep
801	Natural	Sandy gravel
900	Topsoil	Dark greyish brown sandy silt, 0.2 - 0.4m deep
901	Natural	Mottled gravelly sandy clay
1000	Topsoil	Dark greyish brown sandy silt, 0.6m deep
1001	Natural	Sandy gravel at NNW end, rest yellowish brown sandy clay
1002	Platform?	Possible Platform, 3.7m wide, 0.32m deep
1003	Fill	Greyish brown clayey silt and gravel fill of [1002]
1004	Fill	Greyish brown clayey silt and gravel fill of [1002]
1100	Topsoil	Dark greyish brown sandy silt, 0.2m deep
1101	Natural	Sandy gravel
1102	Ditch	Linear Ditch, 1.4m wide, 0.2m deep

1103	Fill	Greyish brown stony silt fill of [1102]
1104	Ditch	Linear Ditch, 1.2m wide, 0.37m deep
1105	Fill	Greyish brown stony silt fill of [1104]
1106	Fill	Reddish brown gravelly silt fill of [1104]
1200	Topsoil	Dark greyish brown sandy silt, 0.3m deep
1201	Subsoil	Greyish brown sandy silt, 0.2m deep
1202	Natural	Bedrock
1300	Topsoil	Dark greyish brown sandy silt, 0.3m deep
1301	Natural	Bedrock
1400	Topsoil	Dark greyish brown sandy silt, 0.3m deep
1401	Natural	Reddish brown sandy clay and gravel
1402	Ditch	Linear Ditch, 1.5m wide, 0.1m deep
1403	Fill	Greyish brown clayey silt fill of [1402]
1500	Topsoil	Greyish brown sandy silt
1501	Natural	Reddish brown sandy loam with gravel patches throughout
1502	Field Boundary	Upstanding linear field boundary, 1.5m wide, 0.6m high
1503	Pit	Sub-rectangular pit, 1.8m x 0.58m x 0.08m
1504	Fill	Yellowish grey silty sand fill of [1503]
1505	Field Boundary	Upstanding linear field boundary, 2.5m wide, 1m high
1506	Field Boundary	Upstanding linear field boundary, 1.5m wide, 0.85m high
1507	Subsoil	Greyish brown sandy silt
1508	Posthole	Posthole, 0.5m diameter, 0.38m deep
1509	Fill	Light-mid greyish brown sandy silt, fill of [1508]
1510	Posthole	Posthole, 0.58m diameter, 0.33m deep
1511	Fill	Light-mid greyish brown sandy silt, fill of [1510]
1512	Pit	Shallow sub-oval pit, 0.85m x 0.8m x 0.08m
1513	Fill	Mid-dark greyish brown sandy silt, fill of [1512]
1514	Pit	Rectangular pit, 1.3m x 0.85m x 0.21m
1515	Fill	Mid-dark greyish brown clayey silt, fill of [1514]
1516	Posthole	Posthole, 0.65m diameter, 0.48m deep
1517	Fill	Greyish brown sandy silt, fill of [1516]
1518	Posthole	Posthole, 0.75m diameter, 0.37m deep
1519	Fill	Dark orangey brown sandy silt, fill of [1518]
1520	Posthole	Posthole, 0.73m diameter, 0.34m deep
1521	Fill	Dark brown clayey silt, fill of [1520]
1522	Posthole	Posthole, 0.68m diameter, 0.48m deep
1523	Fill	Greyish brown sandy silt, fill of [1522]
1524	Ditch	Linear ditch, 0.7m wide, 0.24m deep
1525	Fill	Mid-dark greyish brown clayey silt, fill of [1524]
1526	Pit	Circular shallow pit? 0.8m x 0.7m x 0.13m
1527	Fill	Mid-dark greyish brown clayey silt, fill of [1527]
1528	Ditch	Linear ditch - Same as [1102]
1529	Fill	Same as (1103), fill of [1528]
1530	Ditch	Linear ditch - Same as [1104]
1531	Fill	Same as (1105), fill of [1530]
1532	Fill	Same as (1106), fill of [1530]
1533	Void	Void
1534	Posthole	Sub oval posthole, 0.77m x 0.6m x 0.4m
1535	Void	Void
1536	Void	Void

1537	Fill	Brownish grey silty loam, fill of [1534]
1538	Fill	Brownish grey silty loam, fill of [1534]
1539	Posthole	Oval posthole, 0.88 x 0.75m x 0.32m
1540	Fill	Greyish brown sandy silt, fill of [1539]
1541	Void	Void
1542	Void	Void
1543	Ditch	Linear gully, 0.4m wide, 0.1m deep
1544	Fill	Greyish brown sandy silt, fill of [1543]
1545	Pit	Sub circular pit, 1.1m x 0.65m x 0.22m
1546	Fill	Black sandy silt, fill of [1545]
1547	Pit	Sub oval pit, 2.8m x 1.6m x 0.75m
1548	Fill	Greyish brown sandy silt, fill of [1547]
1549	Fill	Black sandy silt, fill of [1547]
1550	Fill	Grey stony silt, fill of [1547]
1551	Fill	Greyish brown stony silt, fill of [1547]
1552	Pit	Sub circular pit, 1.2m x 1m x 0.18m
1553	Fill	Mid-dark greyish brown silty sand, fill of [1552]
1554	Pit	Circular pit? 1m x 0.75m x 0.29m
1555	Fill	Greyish brown sandy silt, fill of [1554]
1556	Ditch	Linear ditch, 0.85m wide, 0.25m deep
1557	Fill	Brownish grey sandy silt, fill of [1556]
1558	Pit	Circular pit, 0.95m diameter, 0.23m deep
1559	Fill	Dark brownish grey sandy silt, fill of [1558]
1560	Pit	Sub oval pit, 2.65m x 1.1m x 0.35m
1561	Ditch	Linear ditch, 0.9m wide, 0.19m deep
1562	Pit	Oval pit, 0.8m x 0.64m x 0.18m
1563	Fill	Dark greyish black burnt sandy silt, fill of [1562]
1564	Fill	Light greyish yellow silty sand, fill of [1562]
1565	Natural	Natural
1566	Pit	Circular pit, 1.2m diameter, 0.25m deep
1567	Fill	Greyish brown sandy silt, fill of [1566]
1568	Ditch	Linear gully, 0.5m wide, 0.1m deep (average)
1569	Fill	Greyish brown sandy silt, fill of [1568]
1570	Ditch	Linear gully, 0.7m wide, 0.18m deep
1571	Fill	Greyish brown gravelly silt, fill of [1570]
1572	Ditch	Linear gully, 0.4m wide, 0.1m deep
1573	Fill	Greyish brown gravelly silt, fill of [1572]
1574	Posthole	Posthole? 0.5m diameter, 0.19m deep
1575	Fill	Dark greyish brown sandy silt, fill of [1574]
1576	Fill	Brownish grey silty loam, fill of [1560]
1577	Fill	Dark greyish red, heated silty clay, fill of [1560]
1578	Fill	Light orangey grey clayey loam, fill of [1560]
1579	Fill	Brownish grey sandy silt, fill of [1561]
1580	Ditch	Linear gully, 0.7m wide, 0.25m deep
1581	Fill	Greyish brown sandy silt, fill of [1580]
1582	Scarp	Semi-circular natural scarp, partially enhanced, 44m diameter, 3.5m width, 0.7m deep (average)
1583	Layer	Fairly square stone pad, 0.48m x 0.42m x 0.28m
1584	Posthole	Posthole, 0.46m diameter, 0.44m deep
1585	Fill	Brownish grey silty sand, fill of [1584]
1586	Pit/ Posthole	Sub rectangular pit or posthole, 1.1m x 0.6m x 0.4m
1587	Fill	Dark brown sandy silt, fill of [1586]

1588	Posthole	posthole, 0.65m diameter, 0.16m deep
1589	Fill	Brownish grey sandy silt, fill of [1588]
1590	Posthole	posthole, 0.65m diameter, 0.24m deep
1591	Fill	Dark greyish brown sandy silt, fill of [1590]
1592	Pit/ Posthole	Small circular pit/ posthole, 0.6m x 0.5m x 0.22m
1593	Fill	Dark greyish brown sandy silt, fill of [1592]
1594	Pit/ Posthole	Small circular pit/ posthole, 0.6m x 0.5m x 0.15m
1595	Fill	Brownish grey sandy silt, fill of [1594]
1596	Pit	Sub rectangular pit, 0.7m x 0.4m x 0.39m
1597	Fill	Brownish grey sandy silt, fill of [1596]
1598	Pit	Rectangular pit, 0.9m x 0.47m x 0.26m
1599	Fill	Greyish brown sandy silt, fill of [1598]
1600	Pit	Rectangular pit, 0.7m x 0.35m x 0.22m
1601	Fill	Greyish brown sandy silt, fill of [1600]
1602	Layer	Linear alignment of stones, 3.1m long x 0.62m wide. 0.17m high, in a shallow cut
1603	Layer	Mottled orangey grey and dark grey sandy silt and burnt clay, in-situ burnt layer
1604	Pit	Sub rectangular pit, 0.8m x 0.6m x 0.2m
1605	Fill	Greyish brown sandy silt, fill of [1604]
1606	Posthole	Posthole? 0.4m diameter, 0.3m deep
1607	Fill	Greyish brown sandy silt, fill of [1606]
1608	Cremation Pit	Sub rectangular cremation pit, 1.25m x 0.85m x 0.55m
1609	Fill	Dark brownish grey sandy silt, fill of [1608]
1610	Fill	Light brown sandy silt, fill of [1634]
1611	Fill	Dark brownish grey sandy silt, fill of [1608]
1612	Fill	Light brownish grey sandy silt and gravel, fill of [1608]
1613	Void	Void
1614	Pit	Sub circular pit, 1.3m x 1m x 0.18m
1615	Fill	Mottled greyish brown sandy silt, fill of [1614]
1616	Pit	Sub rectangular pit, 3.1m x 1.2m x 0.17m
1617	Fill	Mottled greyish brown sandy silt, fill of [1616]
1618	Pit	Sub oval pit, 2.5m x 2.2m x 0.18m
1619	Fill	Black/ burnt sandy silt and stone, fill of [1639]
1620	Fill	Mottled greyish brown sandy silt, fill of [1618]
1621	Fill	Light brown sandy silt, fill of [1618]
1622	Pit	Circular pit, 1.8m x 1.3m x 0.2m
1623	Fill	Dark greyish brown sandy silt and stone, fill of [1622]
1624	Pit	Rectangular pit, 2.2m x 0.7m x 0.2m
1625	Fill	Dark greyish black sandy silt, fill of [1624]
1626	Pit	Oval pit, 2.5m x 2.2m x 0.38m
1627	Fill	Brownish grey sandy silt, fill of [1626]
1628	Posthole	Posthole, 0.22m diameter, 0.24m deep
1629	Fill	Brownish grey sandy silt, fill of [1628]
1630	Pit	Sub circular pit, 3.45m x 2.3m x 0.48m
1631	Fill	Dark brownish grey sandy silt and stone, fill of [1630]
1632	Pit	Sub rectangular pit, 1.2m x 0.7m x 0.12m
1633	Fill	Brownish grey sandy silt, fill of [1632]
1634	Pit	Sub rectangular re-cut pit? 1.2m x 0.55m x 0.17m
1635	Void	Void
1636	Void	Void
1637	Pit	Sub circular pit, 1.85m x 1.3m x 0.1m

1638	Fill	Brownish grey sandy silt, fill of [1637]
1639	Pit	Sub circular pit, 1.4m x 1.2m x 0.1m
1640	Fill	Brownish grey sandy silt, fill of [1630]
1641	Topsoil	Topsoil
1642	Ring Ditch	Probable Ring Ditch, 12.6m in diameter (Approx.), 0.17m deep
1643	Fill	Brownish grey sandy silt and stone, fill of [1642]
1644	Posthole	Posthole, 0.7m diameter, 0.55m deep
1645	Fill	Brownish grey sandy silt and stone, fill of [1644]
1646	Pit	Circular pit? 0.5m diameter, 0.12m deep
1647	Fill	Black/ burnt sandy silt, fill of [1646]
1648	Cremation Pit	Sub circular cremation pit, 0.75m diameter, 0.28m deep
1649	Fill	Black/ burnt sandy silt and burnt bone, fill of [1648]
1650	Fill	Brown sandy silt, fill of [1648]
1651	Fill	Mottled black and brown sandy silt, fill of [1648]
1652	Ring Ditch	Ring Ditch, 8.5m internal 9.5m external diameter, 0.48m deep (max)
1653	Fill	Greyish brown sandy silt and stone, fill of [1652]
1654	Pit	Sub rectangular pit, 1.4m x 1.15m x 0.1m
1655	Fill	Brownish grey sandy silt, fill of [1654]
1656	Ring Ditch	Ring Ditch, 9.5m internal 11.5m external diameter, 0.35m deep (max)
1657	Fill	Light brown sandy silt, fill of [1652]
1658	Fill	Greyish brown sandy silt and stone, fill of [1656]
1659	Fill	Brownish grey and yellow sandy silt and stone, fill of [1656]
1660	Fill	Light brownish grey sandy silt, fill of [1656]
1661	Fill	Brownish grey sandy silt and charcoal, fill of [1656]
1662	Cremation Pit	Circular pit/ posthole, 0.4m diameter, 0.2m deep
1663	Fill	Dark greyish brown clayey silt, fill of [1662]
1664	Cremation Pit	Circular pit/ posthole, 0.45m diameter, 0.28m deep
1665	Fill	Dark greyish brown clayey silt, fill of [1664]
1666	Cremation Pit	Sub circular cremation pit, 0.75m x 0.7m x 0.3m
1667	Fill	Dark greyish black clayey silt, charcoal, and burnt bone, fill of [1666]
1668	Cremation Pit	Sub circular cremation pit, 0.8m x 0.7m x 0.35m
1669	Fill	Dark greyish black clayey silt, charcoal, and burnt bone, fill of [1668]
1670	Void	Void
1671	Void	Void
1672	Pit	Sub circular pit? 0.6m diameter, 0.15m deep
1673	Fill	Dark brownish grey clayey silt, fill of [1672]
1674	Posthole	Sub rectangular posthole, 0.8m x 0.55m x 0.47m
1675	Fill	Greyish black clayey silt and stone, fill of [1674]
1676	Scarp	Natural scarp, possibly partially enhanced, 26m long, 1m wide, 0.25m deep (average)
1677	Linear	Modern linear feature, >4.1m x 1.2m
1678	Pit	Sub-circular pit, 1.1m x 1m x 0.45m
1679	Fill	Dark grey clayey silt, upper fill of [1678], 0.25m thick
1680	Fill	Black, in-situ burning at base of pit [1678], 0.15m thick
1681	Pit	Circular pit, 0.8m diameter, 0.3m deep
1682	Fill	Dark greyish black clayey silt, fill of [1681]
66001	Ditch	Linear ditch, 1.78m wide, 0.38m deep
66002	Fill	Reddish brown clayey silt, upper fill of [66001], 0.25m thick
66003	Fill	Light yellowish brown clayey silt, basal fill of [66001], 0.13m thick
66004	Ditch	Linear ditch, 1.1m wide, 0.2m deep
66005	Fill	Greyish brown clayey silt, fill of [66004]

ARCHÆOLOGICAL smallFINDS

A MEDIEVAL SEWING-THIMBLE FROM DOLBENMAEN, GWYNEDD

for

Gwynedd Archaeological Trust

AsF Report: 0009.01

March 2014

www.smallfinds.org.uk

A MEDIEVAL SEWING-THIMBLE FROM DOLBENMAEN, GWYNEDD

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AsF Report: 0009.01
March 2014

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1. Introduction

ARCHÆOLOGICALsmallFINDS (AsF) was commissioned by Gwynedd Archaeological Trust to provide a report for publication of a medieval sewing-thimble found during excavation at Dolbenmaen, Gwynedd (Gwynedd Archaeological Trust Project Number G 2293).

The site comprises three ring ditches as well as several clusters of pits and post-holes, probably mainly of prehistoric (Bronze Age) date. The sewing-thimble ON 5 was recovered from a secondary, perhaps deliberately dumped, charcoal-rich fill (1611) in pit 1608 – a possible cremation related deposit of prehistoric date. Fill 1611 was cut by undated pit 1634, covering almost the entire length and width of the original pit.

Figure 1. Sewing- thimble ON 5. Scale in mm.

No evidence for medieval activity has been recorded on site, but "the geological outcrop and associated earth mound known as Pen Bryn yr Orsedd which is situated directly to the north, and within the same field as the development site, may have served as an assembly mound for the retinue of a peripatetic early medieval court". The castle earthworks marking the site of the medieval *llys* of Dolbenmaen lies *c.* 830m to the west of the site (D. McNicoll, pers. corr. 10.01.2014).

2. Method

The sewing-thimble was examined visually with the help of a hand lens (x8-magnification), and its dimensions and weight were recorded. It was subsequently compared with other pertinent collections of thimbles.

3. Discussion

The earliest evidence for the use of sewing-thimbles north of the Alps comes from written sources, indicating their use in the region of the middle Rhine valley during the 12th century (Langedijk and Boon 1999, 17). The earliest archaeological evidence comes from southern France, where bronze thimbles with relatively pointy tops have been recorded from 13th-century contexts at Rougiers and Avignon (ibid.). In Britain, the first use of thimbles can be dated no later than the middle of the 14th century (Holmes 1988 ,1); some of the earliest thimbles – in the form a soldered sheet ring with open top and drilled holes – were found at Billingsgate Lorry Park, London, in a context dated to ceramic phase 9 (*c.*1270–*c.* 1350; Egan 2010, 265), and at the Foundry, York, in a late 13th–early 14th-century layer (Ottaway and Rogers 2002, 2739–40 fig. 1347, 13302).

Since no context date is forthcoming for the Dolbenmaen thimble, its date can only be established by a detailed analysis of marks left by the manufacturing process on the thimble itself.

A good indicator for an early date of the thimble is the fact that it was cast. In Amsterdam, hammered or stamped thimbles start to appear from the second half of the 15th century, about a century later than cast thimbles. By the first half of the 16th century the latter have all but disappeared, and by that time holes also cease to be drilled (Langedijk and Boon 1999, 20). In Britain the picture seems to be slightly different in that stamped domed thimbles have been found in London in contexts dated to ceramic phases 10 and 11 (*c.*1330–*c.* 1380 and *c.*1350–*c.*1400, respectively), while indisputably cast domed thimbles were not recovered from context earlier than ceramic phase 12 (*c.*1400– *c.*1450; Egan 2010 ,266). The above mentioned thimble from York also supports this earlier use of open top thimbles compared to domed examples.

At Nuremberg, casting of thimbles is abandoned around 1530, although this method of manufacture was later reintroduced by Dutch thimble makers in the early 17th century and subsequently introduced to Britain (Holmes 1988, 2); however, these thimbles are easily distinguished from their earlier counterparts by their generally more careful manufacture and finish (ibid, 4 fig. 7b-c).

The tonsure-like patch of thimble ON 5 is equally indicative of an early date. Sewing-thimbles with bare crowns are not found after *c*. 1650 (Holmes 1988, 3).

While it is not uncommon to find cast thimbles with drilled holes featuring one or two lines above the opening (see e.g. Meols: Egan in Griffiths et al. 2007, 179 pl. 34, 2243; London: Egan 2010, 267 fig. 206, 830 and 831), it is very rare to find thimbles with a line separating the tonsure at the crown from the wall. Out of a total of 1140 objects recorded (and photographed) as thimbles of medieval date on the Portable Antiquities Scheme (PAS) database, only two are closely comparable to the Dolbenmaen thimble in sharing this line. One was found on the Isle of Wight (Figure 2; Basford 2010), the other comes from Clothall, Hertfordshire (Figure 3; Watters 2011). Compared to the Dolbenmaen thimble, both these thimbles have their indentations arranged in more carefully aligned vertical rows.

Figure 2. Figure 2. Sewing-thimble from the Isle of Wight. After Basford 2010. ©PAS.

Figure 3. Sewing-thimble from Clothall, Hertfordshire. After Watters 2011. ©PAS

It is interesting to note that on the oldest depiction of a thimble, from the Hausbuch der Mendelschen Zwölfbrüderstiftung dated to *c.* 1425 (Amb. 317.2° Folio 5 verso (Mendel I); Treue et al. 1965, 111, Taf. 13; cf. also Egan 2010, 264 fig. 205), the craftsman drilling the holes on both open and domed thimbles appears to have drilled them in no particular pattern. Unevenly scattered holes have been identified as a feature of earlier thimbles, although they are usually applied in regular patterns such as vertical lines or concentric circles, and by the 16th century the patterns commonly take the form of spirals (Holmes 1988, 2).

4. Conclusion

On the basis of the details of the production process discussed above it can be concluded that the Dolbenmaen thimble was most likely manufactured during the late 14th or early 15th century. Considering the scarcity of thimbles with an additional line between wall and crown, it has however not been possible to link it to a known centre of thimble manufacture like Nuremberg or Amsterdam. It is possible that it may have been made at an unknown location in southern Britain.

The thimble's deposition in the secondary fill of what may be a prehistoric cremation-related deposit is most likely due to a disturbance of the of that context during or after the late medieval period. Considering its fragmentary condition, it may have been thrown away elsewhere and discarded on site together with other organic settlement waste which might have been used as fertiliser.

5. Catalogue Description

Dolbenmaen Gwynedd (Gwyneed Archaeological Trust Project Number G 2293) Object Number 5, Context 1611

Sewing-thimble. Incomplete, slightly less than half remaining. Heavy duty, cast, domed thimble with drilled holes (indentations) of varying depths, arranged in irregular vertical lines. Holes do not extend below faint line *c*. 1.9mm above opening, nor above another faint line separating tonsure at the crown (top) from wall. Crown now appears flat (may have been caused by damage). Faint traces of filing visible at middle of wall and near opening. Dark green patina.

Material: Copper alloy (probably brass).

Measurement: H 20mm; Diam (at mouth) 21.4mm; Th of wall 1.04–1.45mm; Weight 4.0g.

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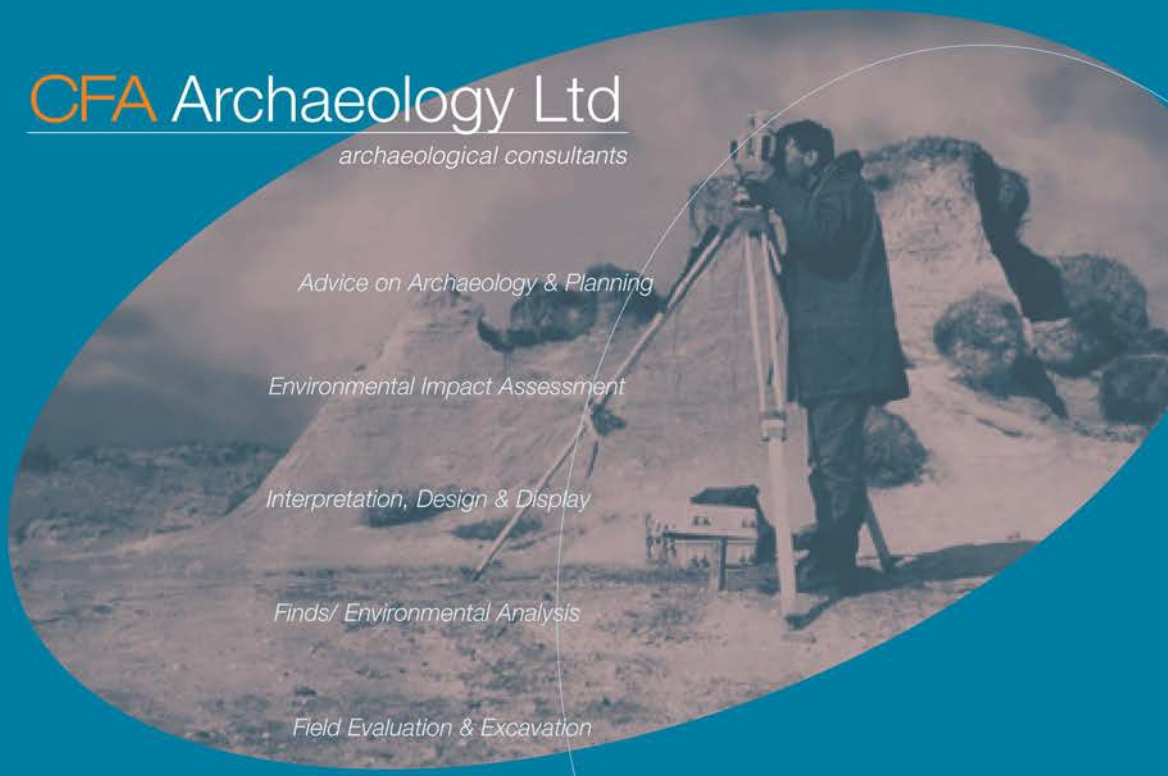
APPENDIX IV: SAMPLE ASSESSMENT



Garndolbenmaen Water Treatment Works (G2239)

Sample Assessment

Report No. 3252

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1. INTRODUCTION

Sixty bulk soil samples were retained for palaeoenvironmental analysis during an archaeological evaluation carried out in 2014 prior to the construction of the Dolbenmaen Water Treatment Works by Gwynedd Archaeological Trust. The majority of the samples were processed by Gwynedd Archaeology Trust through a system of flotation and wet-sieving. The material recovered from these samples and the remaining unprocessed samples were provided to CFA Archaeology Ltd in January 2015 for processing and assessment.

2. METHODOLOGY

The unprocessed soil samples (ranging from 10-20 litres in volume) were processed through a flotation tank. The floating material (flot) was collected in a 250μm sieve and the material remaining in the tank (retent) was sieved through a 1mm mesh; both the flots and retents were then air dried and added to the samples already processed by Gwynedd Archaeological Trust.

All of the flots were scanned using a binocular microscope (x10-x100 magnification) and any carbonised plant remains extracted and preliminarily identified. Where carbonised plant remains (cereal grains, nutshell and weed seeds) were recovered these were extracted and identified. Where flots contained large quantities of charcoal and/or other carbonised plant remain, the flot was sub-sampled using a riffle box, and a proportion of the plant remains sorted and identified. The proportion of flot assessed is noted in Appendix 1. Identifications were made with reference to the modern collection of CFA and standard seed atlases. Plant remains were stored in either plastic finds bags or plastic specimen tubes.

The retents were scanned for any archaeological significant material. The quantity and quality of any artefacts and small finds present in the retents were noted and the remains stored in plastic finds bags.

The quantity of plant remains and small finds (etc) were recorded using a four-point scale (see Table 1). The results are presented in Appendix 1 (Composition of Flots) and Appendix 2 (Composition of Retents).

Table 1. Four point scale

Scale	Abundance	Approx. quantity
+	Rare	1-10 items
++	Occasional	11-50 items
+++	Common	51-100 items
++++	Abundant	101+ items

3. RESULTS

3.1 General Observations

The bulk of the samples contained some carbonised plant remains including wood charcoal, cereal grain and chaff/rachis, hazelnut shell and weed seeds (or wild taxa). The concentration of carbonised plant remains varied considerably across the excavated area. Much of the plant material was in a poor condition and much abraded, suggesting that the material had undergone some movement prior to being buried.

Several high concentrations of cereal grain were noted, particularly from the fills of three pits [**1547**], [**1624**] and [**1678**]. Cereal chaff (culm nodes and rachis fragments) was present, albeit in small amounts, in the fills of four features. High concentrations of weed seeds (wild taxa) were noted in three samples, which also contained large quantities of charred grain. Other potential economic species, including hazelnut shell and fruit pips, were also recovered, although these were never present in large quantities.

A summary of the abundance of the carbonised plant remains recovered from each feature/deposit is provided in Table 2, organised by feature type.

Table 2. Summary Table of Carbonised Plant Remains

Key: + = rare (1-10 items), ++ = occasional (11-50 items), +++ = common (51-100 items) & ++++ = abundant (101+ items)

Feat No.	Flot vol (ml)	Cereal Grain	Rachis Frag.	Culm node	Wil Taxa/ Weed Seeds.	Nutshell	Rhizomes	Peat	Charcoal
BURNT LAYER									
1603	100	+++		+	+++	+++	+	+	++++
POSSIBLE CREMATION									
1608	80	++						++	++
1648	90	+				+			++++
1662	20	+++		+	+	+		++	+++
1664	30	++				+++			++
1666	100	+++			++	++		++	+++
1668	100	+++	+		+	+++		+	++++
POSTHOLE									
1508	10								+
1510	30				+				++++
1516	10	+					+		+
1518	10				+				+
1520	10	++			+				+
1522	10	+							+
1534	10							+	+
1534	10					+		+	+
1539	10	+							++
1560	10	+			++	+			++
1584	20					+		++	++
1588	20					++		+	++
1590	30								++
1606	10	+++							++
1628	10								+
1644	50	+++			+	+			+++
1674	50	+	+		+	+			++++
PIT									
1512	20	+				++		++	+++
1545	100								++++
1547	1000	++++	++		++++				++++
1562	250								++++

Feat No.	Flot vol (ml)	Cereal Grain	Rachis Frag.	Culm node	Wil Taxa/ Weed Seeds.	Nutshell	Rhizomes	Peat	Charcoal
1596	20							+	++
1598	20	+			+				++
1600	10								+
1604	10					+		+	+
1614	10								+
1616	10					+	+		+
1624	250	++++	+	+	++++	+++			++++
1626	20	+			++	+			++
1630	40	++				++	+	+	+++
1637	20	+				++		+	++
1646	20								++
1654	50					+			+++
1672	50	+				+		+	++++
1681	20	++					+		+
1592	250								++++
1594	10								+
1678	50	++++			+	++		++	++++
RING-DITCH									
103	50								++++
1642	20	+				+	+		+++
1652	10						+		+
1652	10	+				+			+
1656	100	+				+	+		++++

3.2 Carbonised Cereal Remains (Grain & Chaff)

A mixture of cereal species were noted within the features, including barley (*Hordeum* sp.), wheat (*Triticum* spp.), oat (*Avena* spp.) and rye (*Secale cereale*). The bulk of the grains were generally poorly preserved, but where well-preserved grain were found these allowed the identification of hulled barley (*Hordeum* var. *vulgare*), emmer/spelt wheat (*Triticum diccocum*/*spelta*) and bread/club wheat (*Triticum aestivo*/*compactum*). Overall, preliminary assessment suggests that the most abundant cereal grain was barley (*Hordeum* sp.). A small number of oat grain still had palea/lemma (outer hulls) attached, but these were fragmentary and were not sufficiently preserved to allow the distinction between the cultivated or wild species. Of note is the single assemblage of rye (*Secale cereale*) recovered from the fill of a pit [**1624**]; rye was not recovered from any other feature at the site. In this case the rye grains were recovered from a particularly rich-grain assemblage, which also included oat and a small number of bread/club wheat grains.

Occasional fragments of cereal chaff remains were identified along with the grain; the chaff included small culm nodes (straw fragments), internode fragments and occasional glume bases. The quantity of chaff remains was generally small, with only one or two fragments being found within the features. Given the limited quantity of chaff recovered from the samples it would suggest that the bulk of the grain from the site had already been cleaned (having gone through the threshing and winnowing process) prior to being charred. One feature, the fill of a pit [**1547**] did contain a slightly higher concentration of barley rachis internodes and glume bases in conjunction with several barley grains that were still enclosed in their hulls, potentially indicating that a proportion of the grain recovered from this pit may still have been on the ear when burnt.

Initial assessment of the distribution of the cereal grains, across the excavated area, suggests that there are particular concentrations of grain, for instance:

- Within a cluster of postholes/pits (features [**1662**, **1644**, **1662**, **1664**, **1666** and **1668**]) close to ring ditch [**1642**], these features have been preliminary interpreted as possible cremation burials: however, the large concentration of charred plant remains from these pit fills along with small amounts of bone would be more consistent with domestic debris.
- Within a pit [**1624**] and posthole [**1606**], located close together at the northern edge of the site;
- Within an isolated pit [**1547**] uncovered within the eastern half of the site; and,
- Within a layer (**1603**) and fill of pit [**1678**] both interpreted as having been burnt *in situ*. Interestingly a large quantity of burnt silicate was recovered from both of these and this would be consistent with the interpretation of these deposits as having been burnt *in situ*.

The high concentrations of grain are most likely to have been the result of conflagrations in which stores of grain were burnt or through accidents during the drying of grain. Drying/parching of the grains would have been carried out on a regular basis to aid removal of hulls and to improve milling qualities. Smaller quantities of grain (and other plant remains) observed in pits/postholes surrounding these concentrations may be material reworked and diluted from the larger plant assemblages.

3.3 Weed seeds (Wild taxa)

Weed seeds recovered from the site were relatively spare, although two high concentrations of seeds were recovered from the fills of pit [**1547**] and pit [**1624**] together with increased quantities of charred grain.

The bulk of the weed seeds present are typical seeds of disturbed ground/waste places and arable fields, and are typically found on British prehistoric and later archaeological sites along with cereal assemblages. Preliminary identifications of the weed seeds indicate that:

- the most abundant weed species present include: persicaria/pale persicaria (*Polygonum persicaria*/*lapathifolium* L.), hemp-nettle (*Galeopsis* sp.), knotgrass (*Polygonum aviculare* L.), corn marigold (*Chrysanthemum* sp.) and fat hen (*Chenopodium album* L.); both corn marigold and fat hen are common weeds of arable soils.

- additional arable weed seeds and those from more grassy places were also noted including corn cockle (*Agrostemma githago*), hawk's-beard (*Crepis* sp.), heath grass (*Danthonia decumbens* (L.) DC), ribwort (*Plantago lanceolata* L.), corn spurrey (*Spergula arvensis*), wild radish/charlock (*Raphanus rapanistrum*) and vetch/pea (*Vicia*/*Lathyrus* spp.).

- occasional seeds more commonly associated with damp or wet/marshy areas were also noted, such as bugle (*Ajuga reptans*), sedge (*Carex* spp.) and spike-rush/club-rush (*Eleocharis*/*Scripus* spp.).

Many of the wild taxa would have probably been growing on, or near, to the site and their seeds becoming accidentally burnt; others were probably contaminates of the cereal crops and accidentally harvested along with the cereals. The more wet-loving species could have been present in damp areas of the cultivated fields, or equally transported to the site via peaty turfs

for fuel or building. Fragments of carbonised peat and charred rhizome fragments (underground stems) were noted in some of the features, albeit in small quantities, and this may suggest that peaty turfs were being collected. Given the large quantity of wood charcoal recovered from the samples it suggests that fire-wood was readily available, therefore it is possible that the turfs were used for other purposes: for instance, Miller (2000) suggests that the presence of rhizomes along with cereal grain indicates the use of turfs to dampen down hearths prior to them being used for corn-drying purposes.

3.4 Hazelnut shell

Twenty-five features (burnt layer (1603), possible cremation pits [**1648**, **1662**, **1664**, **1666**, **1668**], six postholes [**1534**, **1560**, **1584**, **1588**, **1644**, **1674**], ten pits [**1512**, **1604**, **1616**, **1624**, **1626**, **1630**, **1637**, **1654**, **1672**, **1678**] and three ring ditch fills [**1642**, **1652**, **1686**] contained fragments of charred hazelnut shell. In most cases the quantity of nutshell recovered was small with only one or two abraded fragments recovered from each deposit. Large quantities of grain were, however, noted in three features: two possible cremations [**1664**, **1668**] and pit [**1624**] along with increased numbers of cereal grains and weed seeds. Hazelnuts have been collected throughout the British Isles from the prehistoric period onwards, and the high concentrations of nutshell recovered from a number of the features suggests that hazelnuts were probably being collected with the nutshell being remnants of discarded food rubbish.

3.5 Wood Charcoal

Charcoal was recovered from all of the features, in varying quantities; a mixture of blocky fragments of oak, more indicative of oak timbers and smaller round wood fragments of both oak and non-oak species (for instance, hazel, alder and willow) were found throughout.

3.6 Small finds / Other artefacts

The quantity and diversity of other finds recovered from the samples was low:

Pottery: Two small (less than 2cm in dia.) fragments of modern pottery were recovered from the fills of two pits [**1654**] and [**1664**].

Glass: A small (less than 1cm in dia.) fragment of modern glass was recovered from the fill of pit [**1656**].

Iron fragments: Two fragments of what may be iron, potentially the remnants of iron objects, were recovered from the fills of pits [**1596**] and [**1630**].

Metal slag: Low concentrations of metal slag were recovered from eleven samples. In most cases the amount of slag was small with only one or two fragments from each sample; although a large amount of slag was recovered from a burnt layer (**1603**).

4. RECOMMENDATIONS

- **Detailed Plant Analysis**:

  - Given the recovery of a mixture of cereal grain and other plant remains from across the site, potentially of prehistoric date, it is recommended that further post-excavation analysis be carried out on the plant assemblage. Post-excavation analysis would include: full identification (where possible) and tabulation of the plant remains present in each sample, analysis of any specific spatial distribution (following dating of the site), and discussion of the plant remains in comparison with other excavated sites.

- **AMS Dating:**

  - The majority of the charcoal fragments recovered were very small and would not be suitable for AMS dating: however, fragments of non-oak charcoal were noted in 17 features which may be sufficiently larger enough for dating purposes. The wood species present would need to be identified prior to submission for dating.

    <u>Features containing sufficiently large enough charcoal for AMS dating</u>
    Ring ditch – 103, 1652, 1656
    Pit – 1512, 1547, 1626, 1672
    Post hole – 1539, 1584, 1590, 1644
    Burnt layer – 1603
    Possible cremation – 1648, 1662, 1664, 1666, 1668

  - Sufficiently well-preserved cereal grains suitable for dating were recovered from 14 samples. Identification of the individual grains would need to be carried out prior to submission for dating.

    <u>Features containing cereal grains suitable for dating</u>
    Pit – 1547, 1624, 1630, 1672, 1678
    Post-hole – 1520, 1606, 1644, 1674
    Burnt layer – 1603
    Possible cremation – 1608, 1662, 1666, 1668

  - In addition, 13 features contained sufficiently large enough fragments of hazelnut shell that would also be suitable for dating.

    <u>Feature containing hazelnut shell suitable for dating</u>
    Pit – 1512, 1624, 1630, 1637, 1678
    Post hole – 1588, 1644
    Burnt layer – 1603
    Possible cremation – 1648, 1664, 1666, 1668

- **Small finds/Other artefacts**: The small finds/artefacts recovered from the samples should be added to any similar hand retrieved material from the site and sent to appropriate specialists for analysis.

5. REFERENCES

Miller, JJ, Ramsay, S and Alldritt, D 2000 ‘Charred and waterlogged plant macrofossils’, in Haselgrove, C and McCullagh, R (eds) *An Iron Age Coastal Community in East Lothian: The Excavation of Two Later Prehistoric Enclosure Complexes at Fisher Road, Port Seton: 1994–5*, Edinburgh (=STAR Monogr 6).

Appendix I: Composition of Flots

Key: PH = posthole, PIT = pit, BL = burnt layer, CRE = possible cremation, RD = ring-ditch
+ = rare (1-10 items), ++ = occasional (11-50 items), +++ = common (51-100 items) & ++++ = abundant (101+ items)
SF = small fragments (below 5mm in dia.), VSF = very small fragments (below 2mm in dia.)
BLOI = Below Level of Identification
* = sufficiently large enough fragments/well-preserved material suitable for AMS dating

Sample No.	Context No.	Feat. No.	Feat. type	% of sample sorted	Approx. flot vol. (ml)	Cereal Grain				Chaff		Wild Taxa/Weed Seeds			Hazelnut shell			Charcoal			Rhizomes	Peat	Silicate
						Qty	Preliminary Id.	Pres.	AMS	Rachis	Culm node	Qty.	Preliminary Id.	Pres.	Qty	Pres.	AMS	Qty	Preliminary Id.	AMS			
001	107	103	RD	100%	50													++++	Small non-oak round wood fragments	*			
002	1509	1508	PH	100%	10													+ (SF)	Mixture of small fragments of oak and non-oak round wood fragments				
003	1511	1510	PH	100%	30							+	*Galeopsis* sp. *Rumex* sp. Urtica sp.	Abraded				++++	Oak – blocky fragments				
004	1513	1512	PIT	100%	20	+	*Avena* sp.	Much abraded							++ (SF)	Slightly abraded	*	+++	Small non-oak round wood fragments	*			
005	1517	1516	PH	100%	10	+	Unidentifiable	Much abraded and fragmentary										+ (VSF)	BLOI		+		
006	1519	1518	PH	100%	10							+	*Chenopodium* sp. *Galeopsis* sp.	Much abraded				+ (VSF)	BLOI				
007	1521	1520	PH	100%	10	++	*Hordeum* sp. (cf. hulled) *Avena* sp.	Varied preservation	*			+	*Polygonum* sp.	Abraded				+ (VSF)	BLOI				
008	1523	1522	PH	100%	10	+	cf. *Avena* sp. cf. *Hordeum* sp.	Much abraded and fragmentary										+ (VSF)	BLOI				
009	1537	1534	PH	100%	10													+ (VSF)	BLOI			+	
010	1538	1534	PH	100%	10										+ (SF)	Slightly abraded		+ (VSF)	BLOI				
011	1540	1539	PH	100%	10	+	*Avena* sp.	Much abraded										++	Mixture of small fragments of oak and non-oak round wood fragments	*			
012	1546	1545	PIT	100%	100													++++	Oak – blocky fragments				
013	1549	1547	PIT	12.5%	1000	++++	*Hordeum* var. *vulgare* (hulled) *Avena* sp. cf. *Triticum* (bread/club wheat) Hundreds of grains	Varied preservation – generally well-preserved	*	++		++		Slightly abraded				++++	Mixture of small fragments of oak and non-oak round wood fragments	*			
014	1563	1562	PIT	25%	250													++++	Oak – blocky fragments				
016	1585	1584	PH	100%	20													++	Mixture of small fragments of oak and non-oak round wood fragments	*			
017	1603	-	BL	100%	100	+++	*Avena* sp.	Varied preservation – generally abraded	*		+	+++	*Carex* spp. *Chenopodium* spp. *Chrysanthemum* sp. *Eleocharis*/*Scirpus* sp. (crushed to check if charred) Gramineae indet. *Lapsana* sp. *Polygonum persicaria*/*lapathifolium* L. *Raphanus raphanistrum* L. *Spergula arvensis* L. Unidentified thorns x 2	Slightly abraded	++	Varied preservation, generally abraded	*	++++	Mixture of small fragments of oak and non-oak round wood fragments	*	+	+	+++
018	1591	1590	PH	100%	30													++	Mixture of small fragments of oak and non-oak round wood fragments	*			
019	1593	1592	PIT/ PH	25%	250													++++	Oak charcoal – blocky fragments				

020	1597	1596	PIT	100%	20													++ (VSF)	BLOI				
021	1599	1598	PIT	100%	20	+	cf. *Avena* sp.	Much abraded and fragmentary				+	*Ajuga reptans* L.	Slightly abraded				++ (VSF)	BLOI				
022	1589	1588	PH	100%	20										+	Slightly abraded	*	++ (VSF)	BLOI				
023	1595	1594	PIT/ PH	100%	10													+ (SF)	Mixture of small fragments of oak and non-oak round wood fragments				
024	1601	1600	PIT	100%	10													+ (VSF)	BLOI				
025	1605	1604	PIT	100%	10													+ (VSF)	BLOI				
026	1607	1606	PH	100%	10	+++	*Avena* sp. *Hordeum* sp.	Varied preservation – generally abraded and fragmentary	*									++ (VSF)	BLOI				
027	1609	1608	CRE	100%	30	++	*Avena* sp. cf. *Hordeum* sp.	Much abraded	*									+ (SF)	Mixture of small fragments of oak and non-oak round wood fragments				
028	1611	1608	CRE	100%	20	+	*Avena* sp.	Much abraded	*														
029	1612	1608	CRE	100%	10													+ (VSF)	BLOI			+	
030	1625	1624	PIT	12.5%	250	++++	*Avena* sp. *Secale cereale* *Triticum* sp. (cf. bread/club wheat) Hundreds of grains	Varied preservation	*	+	+	++++	*Chrysanthemum* sp. *Lapsana* sp. *Plantago* sp. *Polgonum persicaria*/*lapathioflium* L.	Varied preservation	+++	Slightly abraded	*	++++ (VSF)	BLOI				
031	1629	1628	PH	100%	10													+ (SF)	Mixture of small fragments of oak and non-oak round wood fragments				
032	1611	1608	CRE	100%	10	+	*Avena* sp.	Much abraded and fragmentary										+ (VSF)	BLOI				
033	1612	1608	CRE	100%	10	+	*Avena* sp.	Much abraded and fragmentary										+ (VSF)	BLOI				
034	1647	1646	PIT	100%	20													++ (VSF)	BLOI				
035	1649	1648	CRE	100%	50	+	cf. *Triticum* sp.	Much abraded							+	Slightly abraded	*	++++	Mixture of small fragments of oak and non-oak round wood fragments	*			
036	1651	1648	CRE	100%	20													+++	Oak charcoal				
037	1650	1648	CRE	100%	20										+	Slightly abraded	*	+++ (SF)	Mixture of small fragments of oak and non-oak round wood fragments				
038	1655	1654	PIT	100%	50													+++ (SF)	Mostly small fragments of oak charcoal				
039	1645	1644	PH	100%	50	+++	*Avena* sp. *Triticum* sp. (cf. bread/club wheat) cf. *Hordeum* sp.	Varied preservation – generally abraded	*			+	*Chrysanthemum* sp. *Galeopsis* sp. *Plantago* sp. *Polygonum* sp. *Spergula arvensis* L. cf. *Danthonia* sp.	Abraded	+	Abraded	*	+++	Mixture of small fragments of oak and non-oak round wood fragments	*			
040	1643	1642	RD	100%	20	+	*Avena* sp. *Hordeum* sp.	Much abraded and fragmentary							+ (SF)	Much abraded		+++ (VSF)	BLOI		+		
041	1653	1652	RD	100%	10													+	Mixture of small fragments of oak and non-oak round wood fragments	*	+		
042	1657	1652	RD	100%	10	+	Unidentifiable	Much abraded							+ (SF)	Much abraded		+ (VSF)	BLOI				
043	1658	1656	RD	100%	20													++	Non-oak round wood fragments	*	+		
044	1659	1656	RD	100%	20	+	cf. *Hordeum* sp.	Abraded										++ (VSF)	BLOI		+		
045	1615	1614	PIT	100%	10													+ (VSF)	BLOI				

046	1617	1616	PIT	100%	10												+ (SF)	Mixture of small fragments of oak and non-oak round wood fragments		+		
047	1560	-	PIT	100%	10	+	*Avena* sp.	Varied preservation – generally much abraded and fragmentary				++	*Danthonia decumbens* (L.) DC *Galeopsis* sp. *Plantago lanceolata* L. *Ranunculus* sp. cf. *Chrysanthemum* ap. cf. *Crepis* sp.	Slightly abraded	+ (SF)	Much abraded		++ (VSF)	BLOI				
048	1660	1656	RD	100%	10	+	Unidentifiable	Much abraded and fragmentary							+ (SF)	Much abraded		++	Mixture of small fragments of oak and non-oak round wood fragments	*			
049	1661	1656	RD	100%	50													++++	Small non-oak round wood fragments	*			
050	1627	1626	PIT	100%	20	+	*Triticum* sp. *Avena* sp.	Much abraded and fragmentary				++	*Chenopodium album* L. *Rubus* spp. *Rumex* sp. cf. *Danthonia* sp.	Slightly abraded				++	Mixture of small fragments of oak and non-oak round wood fragments	*			
051	1631	1630	PIT	100%	20	+	*Avena* sp.	Varied preservation – generally much abraded and fragmentary	*						+	Slightly abraded	*	+++ (SF)	Mixture of small fragments of oak and non-oak round wood fragments		+	+	
052	1638	1637	PIT	100%	20	+	*Avena* sp.	Much abraded and fragmentary							++	Slightly abraded	*	++ (VSF)	BLOI			+	
053	1663	1662	CRE	100%	20	+++	*Avena* sp. *Triticum* sp. (cf. spelt/emmer)	Varied preservation – generally slightly abraded	*		+	+	Chenopodiaceae indet.	Abraded				+++	Mixture of small fragments of oak and non-oak round wood fragments	*		++	
054	1665	1664	CRE	100%	30	++	*Avena* sp. cf. *Hordeum* sp.	Much abraded							++	Abraded	*	++	Mixture of small fragments of oak and non-oak round wood fragments	*			
055	1667	1666	CRE	50%	100	+++	*Avena* sp. *Triticum* sp. (bread/club wheat) *Hordeum* sp.	Abraded	*			++	*Agrostemma githago* L. *Polygonum persicaria*/*lapathifolium* L. *Vicia*/*Fabis* spp.	Abraded and fragmentary	++	Abraded	*	+++	Mixture of small fragments of oak and non-oak round wood fragments	*		+	
056	1669	1668	CRE	50%	100	+++	*Avena* sp.	Abraded	*	+		+	*Polygonum persicaria*/*lapathifolium* L.	Abraded	++	Abraded	*	++++	Mixture of small fragments of oak and non-oak round wood fragments	*			
058	1673	1672	PIT	100%	50	+	*Triticum*/*Hordeum* sp.	Much abraded	*									++++	Mixture of small fragments of oak and non-oak round wood fragments	*			
059	1675	1674	PH	100%	50	+	*Triticum* sp. (cf. bread/club wheat)	Varied preservation – generally much abraded and fragmentary	*	+		+	*Atriplex*/*Chenopodium* spp.	Much abraded	+ (VSF)	Much abraded		++++ (SF)	Mixture of small fragments of oak and non-oak round wood fragments				
060	1640	1630	PIT	100%	20	++	*Hordeum* sp. *Avena* sp.	Much abraded and fragmentary							+	Much abraded	*	++ (SF)	Mixture of small fragments of oak and non-oak round wood fragments				
061	1682	1681	PIT	100%	20	++	*Avena* sp. cf. *Hordeum* sp.	Much abraded and fragmentary										+ (VSF)	Occasional blocky oak fragments – mostly BLOI		+		
062	1680	1678	PIT/ BL	100%	50	++++	*Avena* sp. *Triticum* sp.	Abraded and fragmentary	*			+	*Galium aparine* L.	Abraded	++	Abraded	*	++++ (VSF)	BLOI			++	+++

Appendix II: Composition of plant remains

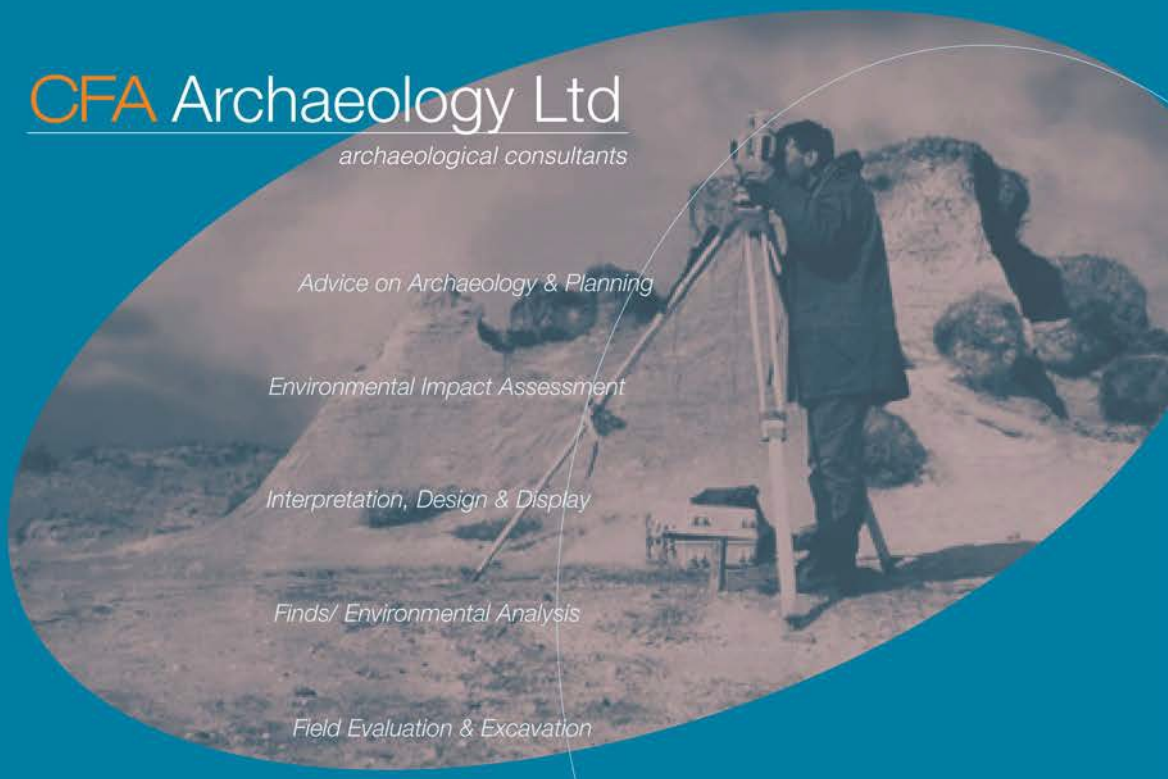
Key: PH = posthole, PIT = pit, BL = burnt layer, CRE = possible cremation, RD = ring-ditch
+ = rare (1-10 items), ++ = occasional (11-50 items), +++ = common (51-100 items) & ++++ = abundant (101+ items)
SF = small fragments (below 5mm in dia.), VSF = very small fragments (below 2mm in dia.)
BLOI = Below Level of Identification
* = sufficiently large enough fragments/well-preserved material suitable for AMS dating

Sample No.	Context No.	Feature No.	Feature type	Sample vol (litres)	Pot	Glass	Iron frags	Slag	Nutshell		Charcoal		Peat	Silicate	Other notes
									Qty	AMS	Qty	AMS			
1	107	103	RD	10							+ (VSF)				Charcoal fragment not kept
2	1509	1508	PH	10							+ (VSF)				
3	1511	1510	PH	10				+			+ (VSF)				
4	1513	1512	PIT	10				+	++				++		
5	1517	1516	PH	20				+			+				
6	1519	1518	PH	20							+ (VSF)				
7	1521	1520	PH	20							+				
8	1523	1522	PH	20							+				
9	1537	1534	PH	10							+		+		
10	1538	1534	PH	20							+		+		
11	1540	1539	PH	20							+				Stone conglomerates
12	1546	1545	PIT	10							+				
13	1549	1547	PIT	20							++				
14	1563	1562	PIT	10							+ (VSF)				
16	1585	1584	PH	20					+				++		
17	1603	-	BL	20				+++	++						
18	1591	1590	PH	20							+ (VSF)				
19	1593	1592	PIT/PH	20							+ (VSF)				
20	1597	1596	PIT	20			+						+		
21	1599	1598	PIT	20							+ (VSF)				

22	1589	1588	PH	10									+ (cf.)		
23	1595	1594	PIT/PH	10							+ (VSF)				
24	1601	1600	PIT	10				+			+ (SF)				
25	1605	1604	PIT	10					+		+		+		
26	1607	1606	PH	10							+ (VSF)				
27	1609	1608	CRE	20				+			+ (VSF)		+		
28	1611	1608	CRE	10				+			+ (VSF)		+		
29	1612	1608	CRE	10							+ (VSF)				
30	1625	1624	PIT	20					++	*	+ (VSF)				
31	1629	1628	PH	10							+ (VSF)				
32	1611	1608	CRE	10							+ (VSF)				
33	1612	1608	CRE	20							+ (VSF)				
34	1647	1646	PIT	10							+ (VSF)				
35	1649	1648	CRE	10					+	+	+ (VSF)				
36	1651	1648	CRE	20							+ (VSF)				
37	1650	1648	CRE	10							+ (VSF)				
38	1655	1654	PIT	20	+ (VSF)					+	++ (VSF)				
39	1645	1644	PH	30						+	++ (VSF)				
40	1643	1642	RD	30						+	+ (VSF)				
41	1653	1652	RD	30							+ (VSF)				
42	1657	1652	RD	30							+ (VSF)				
43	1658	1656	RD	30							++ (VSF)				
44	1659	1656	RD	30							+ (VSF)				Stone conglomerates
45	1615	1614	PIT	10							++ (VSF)				
46	1617	1616	PIT	10						+	+ (VSF)				
47	1560	-	PIT	10							+ (VSF)				

48	1660	1656	RD	30		+ (VSF)				+	+ (VSF)				
49	1661	1656	RD	10						+	++ (VSF)				
50	1627	1626	PIT	20						+	++ (VSF)				
51	1631	1630	PIT	20				+		+	+ (VSF)				
52	1638	1637	PIT	20							+ (VSF)				
53	1663	1662	CRE	10					+	+	++ (VSF)				
54	1665	1664	CRE	10	+ (VSF)					++	+ (VSF)				
55	1667	1666	CRE	20				++	++	*	++ (VSF)		++		
56	1669	1668	CRE	20					++	*	++		+		Peat fragment not kept
58	1673	1672	PIT	10					+		++		+		
59	1675	1674	PH	20					+		++				
60	1640	1630	PIT	10							+ (VSF)				
61	1682	1630	PIT	10							+			++	
62	1680	1678	PIT/BL	10					+	*	+			++++	

APPENDIX V: BONE ASSESSMENT



Garndolbenmaen Water Treatment Works (G2239)

Bone Assessment

Report No. 3262

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Commissioned by	Gwynedd Archaeological Trust
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Garndolbenmaen Water Treatment Works (G2239)

Bone Assessment

Report No: 3262

1. INTRODUCTION

Nineteen small bags of burnt bone were submitted for analysis. The material came from the sample processing carried out in the laboratory by CFA Archaeology Ltd.

The contexts were secure and there was no indication that any of the sampled contexts had suffered either contamination or residuality from nearby contexts. The samples from cremation pits had been excavated by hand and 100% sampled. The contexts containing the burnt bone consisted of five types: nine were from features recognised in the field as being "cremation pits"; six were from pits; one was from a smaller feature identified as "pit/posthole"; two from post-holes (1590 and 1644) and one from a burnt clay layer (1603). The samples analysed were from cremation pits 1608, 1646, 1648, 1664, 1666 and 1668. Two of these pits, 1646 and 1648, were located centrally within Ring Ditch 1652. The pit 1608 had also produced a small copper object, possibly part of a thimble, and a polished stone tool. The sampled post-holes 1590 and 1644 were among the 40 pits and postholes of varying depths and sizes described as being located on the eastern half of the site and likely to be associated with the nearby ring ditches and burial practices. The other pits within that collection on the eastern half of the site, which produced burnt bone were 1584, 1600, 1604, 1618, 1630 and 1637. Another sample was from the fil (1549) of pit 1547, also located in the eastern part of the site.

The bone fragments were all very fragmented and contained no articulating surfaces or other identifiable features that might have identified them as being human, or identified them to a particular animal species. All the fragments were burnt, most were oxidised (white or pale grey in colour) indicating they had burnt at high temperatures in a high oxygen environment. The fact that no unburnt fragments were retrieved indicates that the soil conditions were unsuited for the preservation of bone, therefore the assemblage has been affected by preservation bias in that only burnt bone survived.

The material is all in a stable condition, being both clean and dry, and could be stored indefinitely without any further attention, should this be necessary.

2. METHODOLOGY

The fragments of burnt bone had been picked out of flots and residues produced during sample processing and bagged according to fragment size. The material was then examined under a low power microscope by the osteological specialist. The results are presented in Table 1 bellow.

Occasional fragments could be identified as having derived from long bones, and were of a size that indicated they could have been from human bones, so the possibility that the samples came from cremation pits cannot be ruled out from the osteological evidence. However, the small amount of bone retrieved, despite 100% sampling having been undertaken, suggests that either the pits contained only parts of human cremations, or that they were not cremation pits, but instead contained other burnt material, such as ash from domestic fires, which may contain burnt animal bones. A cremation pit would be expected to yield around two kilos of burnt fragmented bones.

3. STATEMENT OF POTENTIAL

The results of this osteological analysis does not raise any new research questions, and is of no value to further local, regional and national research priorities. It is not recommended that any further analysis be carried out on this material.

Table 1: Results of bone analysis

Context	sample	Weight/g	bone present	Type of context
1549	13	2	indeterminate small fragments	Fill of pit 1547,
1584	16	1	indeterminate small fragments	Pit /posthole
1591	18	1	indeterminate small fragments	Fill of 1590 posthole
1601	24	1	indeterminate small fragments	Fill of 1600, rectangular pit
1603	17	1	indeterminate small fragments	Burnt clay layer
1605	25	1	indeterminate small fragments	Fill of 1604, sub-rectangular pit
1609	27	1	indeterminate small fragments	Fill of 1608, sub-rectangular cremation pit
1612	29	4	indeterminate small fragments	Fill of 1608, sub-rectangular cremation pit
1620	47	1	indeterminate small fragments	Fill of 1618, sub-oval pit
1631	51	1	indeterminate small fragments	Fill of 1630, sub-circular pit
1638	52	1	indeterminate small fragments	Fill of 1637, sub-circular pit
1645	39	1	indeterminate small fragments	Fill of 1644, post-hole
1647	34	1	indeterminate small fragments	Fill of 1646, circular cremation pit
1649	36	15	indeterminate small fragments	Fill of 1648, sub-circular cremation pit
1650	37	1	indeterminate small fragments	Fill of 1648, sub-circular cremation pit
1651	35	1	indeterminate small fragments	Fill of 1648, sub-circular cremation pit
1665	54	1	indeterminate small fragments	Fill of 1664, circular cremation pit
1667	55	11	indeterminate small fragments	Fill of 1666, sub-circular cremation pit
1669	56	4	indeterminate small fragments	Fill of 1668 sub-circular cremation pit

APPENDIX VI: BURNT BONE ASSESSMENT

Note on burnt bone.

Jacqueline I. McKinley

April 2015

Small quantities (maximum 8g, majority <1g) of well calcined bone from 19 contexts was subject to a rapid scan. The material derived from pits and post-holes all >0.10m depth, most being in excess of 0.25m. The bone is very worn and chalky in appearance, indicative of erosion/degradation in the acidic sandy silt soils prevalent across the site, with a consequent loss of surface morphology. All appears to comprise compact bone.

In many cases the surviving bone was of such a small size (<50mm) and poor condition no statement on its possible original can be given. Broadly identifiable bone fragments were observed in six contexts. Fragments of sheep bone were identified in contexts 1609, 1649 and 1667 (radius and metapodia-sized bone), cattle-sized metapodia in context 1612, and medium-sized mammal bone in contexts 1603 and 1669 (species identifications by Lorrain Higbee). The rest of the bone from these contexts is of a size commensurate with these identifications, and no human bone could be identified within the overall assemblage.

APPENDIX VII: STONE ASSESSMENT REPORT

G2293 DOLBENMAEN, GWYNEDD

STONE OBJECTS by George Smith

SF 1 (1511) Sub-angular broken boulder fragment of hard igneous rock, possibly diorite, with accidental natural concave facet. Such semi-conchoidal facets occur naturally as a result of ice action, but could also result from plough damage. DISCARD

SF 2 () Natural, sub-rounded cobble. DISCARD

SF3 (1538) Natural sub-rounded cobble. DISCARD

SF 4 (1585) Fire-shattered burnt cobble fragment, probably dolerite. Appears unnaturally flat-sided for a glacial cobble and has possible peck-marks. Rock not suitable for a quern but possibly a fragment of a shaped working slab. Undateable.

SF 6 (1611) Utilised pebble polishing tool. A small, flat oval natural pebble of a hard, very fine-grained stone, possibly chert. Smoothed from use on both flattish faces and worn to a facet on one narrow edge. There is a chip from one end possibly from use as a light hammer and the resulting broken edge has some fine cut 'nicks', so the tool was probably still used after the chip was removed. The opposite end also has a few some fine peck marks from light hammering. There is a concave facet in one face that has sharp edges so was probably created accidentally by burning after the tool ceased being used. Similarly polished stones have come from two places in Anglesey and those have been compared to similar stones interpreted as metal burnishers found in Early Bronze Age metalworkers graves in the Netherlands (Lynch 1991, 365). However, the edge faceting suggests a different use, possibly for leather burnishing.

Reference

Lynch, F.M 1991. *Prehistoric Anglesey (2nd Ed)*, Llangefni.

APPENDIX VII: SLAG ASSESSMENT REPORT

GeoArch

Report 2015/10

Assessment of possible archaeometallurgical residues from Dolbenmaen, G2293

Dr Tim Young
9th April 2015

Assessment of possible archaeometallurgical residues from Dolbenmaen, G2293

Dr T.P. Young

Abstract

The assemblage includes a very small proportion of fragments of indeterminate iron slag.

The more significant material is a fuel ash slag, very similar to slags from cereal kilns, as well as to poorly-known slags from other long-burning hearths. Detailed analysis of the fuel ash slags is not recommended at present, but may be informative if the likely originating feature (cereal kiln or other hearth) is identified.

The submitted material also included particles of indeterminate burnt organic matter, as well as a variety of natural geological materials.

Contents

Methods

All materials were examined visually with a low-powered binocular microscope where required. As an evaluation, the materials were not subjected to any high-magnification optical inspection, not to any form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional.

The examined materials are listed in Table 1.

This project was commissioned by Dave McNicol of the Gwynedd Archaeological Trust.

Results

Iron slag

Small fragments of dense grey slag were recovered from (1599) and (1609). Even the larger piece (from (1609)) weighed just 6g, so they were not identifiable in detail, although the textures would certainly be compatible with identification as smithing slags. Such materials might be from Iron Age to modern in date.

Fuel ash slag

Three contexts, (1603), (1667) and (1680) yielded assemblages of fuel ash slags. These materials comprised residues in the form of blebs and sheet fragments of up to 15mm thickness, formed of highly altered lithic clasts and grains in a dominantly glassy matrix. These slags are the result of partial melting of a substrate under the influence of alkali- and alkali earth-rich fuel ash.

The assemblage from (1667) weighed just 5g (18pieces), with larger collections from (1680) and (1603). That from (1680) comprised mainly rather spiky fragments and hollow blebs, showing inclusions of variously foliated and bloated grains, along with the dominant sand clasts. The collection from (1603) typically had a more glass-rich composition (indicating a higher degree of melting) and had more evidence for fluid flow. This collection also included fragments with an adhering red sandy ceramic, possibly from a hearth wall or floor.

Burnt organic matter

Fragments of burnt and/or coked organic matter occurred in contexts (1513), (1599), (1609), and (1669), as well as a minor component of the fuel ash slag-bearing assemblages ((1603), (1667) and (1680)). The original nature of the organic material was not determinable.

Natural materials

Fragments of a natural conglomerate, formed of small quartzose pebbles and granules, were abundant, occurring in contexts (1540), (1609), (1651), (1659), (1663) and (1667). Other fragments of rock occurred in (1511), (1517) and (1601), together with a piece of ferruginous crust in (1667) and an iron mottle in (1599).

Interpretation

The fragments of iron slag were not diagnostic of either process or age – except that they must be Iron Age or younger.

The fuel ash slags resemble those described from cereal kilns (Young 2005, 2010a, 2010b, 2015) in possessing a fine-grained or thin-sheet morphology and in the variety of detailed textures.

Examples associated with cereal kilns are mostly ex situ, in small fragments closely resembling the present material. A recent early medieval example from Llandeilo (Young 2015) was, however, in situ, and was a friable sheet, approximately 300mm by 400mm and up to 25mm thick, with a total original weight of 1755g. Chemical evidence was employed to suggest that the burning of grain contributed much to the formation of this slag mass. Emptying of the firebox of kiln by raking might typically dislodge any slag formed and fragment the slag into the small pieces more usually observed.

Somewhat similar fuel ash slags are common in Iron Age contexts, apparently generated in long-lived domestic hearths (Young 2011, 2012), with similar material having previously been labelled 'Iron Age grey slag' (Cowgill 2000, 2008; Cowgill et al. 2001; Swiss & McDonnell 2001). These materials usually differ from the present material in being fragments from much thicker (20-80mm thick) sheets.

In theory, at least, such fuel ash slags might be generated in a wide variety of mainly non-metallurgical contexts, but the firing of cereal kilns with straw and the accidental consumption of cereal grains, appears to produce a chemical environment that particularly favours the development of fuel ash slags.

Conclusion

The materials are not particularly diagnostic of processes or dates. The fuel ash slags are strongly suggestive of the nearby presence of cereal kilns, although other interpretations are possible.

No further analytical investigations are recommended for the present material at present, which should, however, be retained with the site archive. Should the field archaeology reveal the likely source of these residues, then their characterisation might have further value.

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Table 1: summary catalogue. FAS = fuel ash slag, BOM = burnt organic matter.

Context	Sample	No.	Item wt.	Notes
1511	3	1	<1	probable weathered rock
1513	4		7	2 tiny fragments of BOM, 1 large piece of probable natural concretion
1517	5	2	<1	probable weathered sulphide clast in conglomerate and small fragment of possible BOM
1540	11		8	fragments of natural conglomerate
1599	21	4	4	3g iron slag bleb, 1g iron mottle, 1 tiny iron slag bleb, 1 piece of coked BOM
1601	24	3	1	1 fragment of weathered stone, piece possible slag, 1 iron mottle
1603	17		26	coarser, darker fragments of more fluid FAS than that from 1680. Many rock inclusions, including slightly bloated red shale. Some pieces show well-formed grey glass. Fragments of sheet up to 15mm. Some pieces show red sandy adhering ceramic - very like furnace lining surface, but may be just hearth base.
1609	27		8	6g iron slag bleb, 6 small BOM pieces, 1 piece conglomerate and 1 pebble
1611	28	1	<1	conglomerate - but has smooth fissured texture so just possibly burnt
1651	35	2	<1	conglomerate
1659	44	2	4	two pieces of cemented gravel, probably naturally cemented material
1663	53	1	1	natural conglomerate
1667	55		7	5g (18 pieces) of conglomerate, 18 pieces of FAS, 2 pieces BOM, 1 piece ferruginous crust
1669	56	6	<1	BOM
1680	62		25	Assemblage of small fragments of FAS. Slag varies from thin spikey sheets to hollow blebs, white to dark grey and rarely maroon, Some larger fragments show inclusions of foliated and bloated grains, also sand and coarser grains. Sparse fragments of granular organic matter.

GeoArch

geoarchaeological, archaeometallurgical & geophysical investigations

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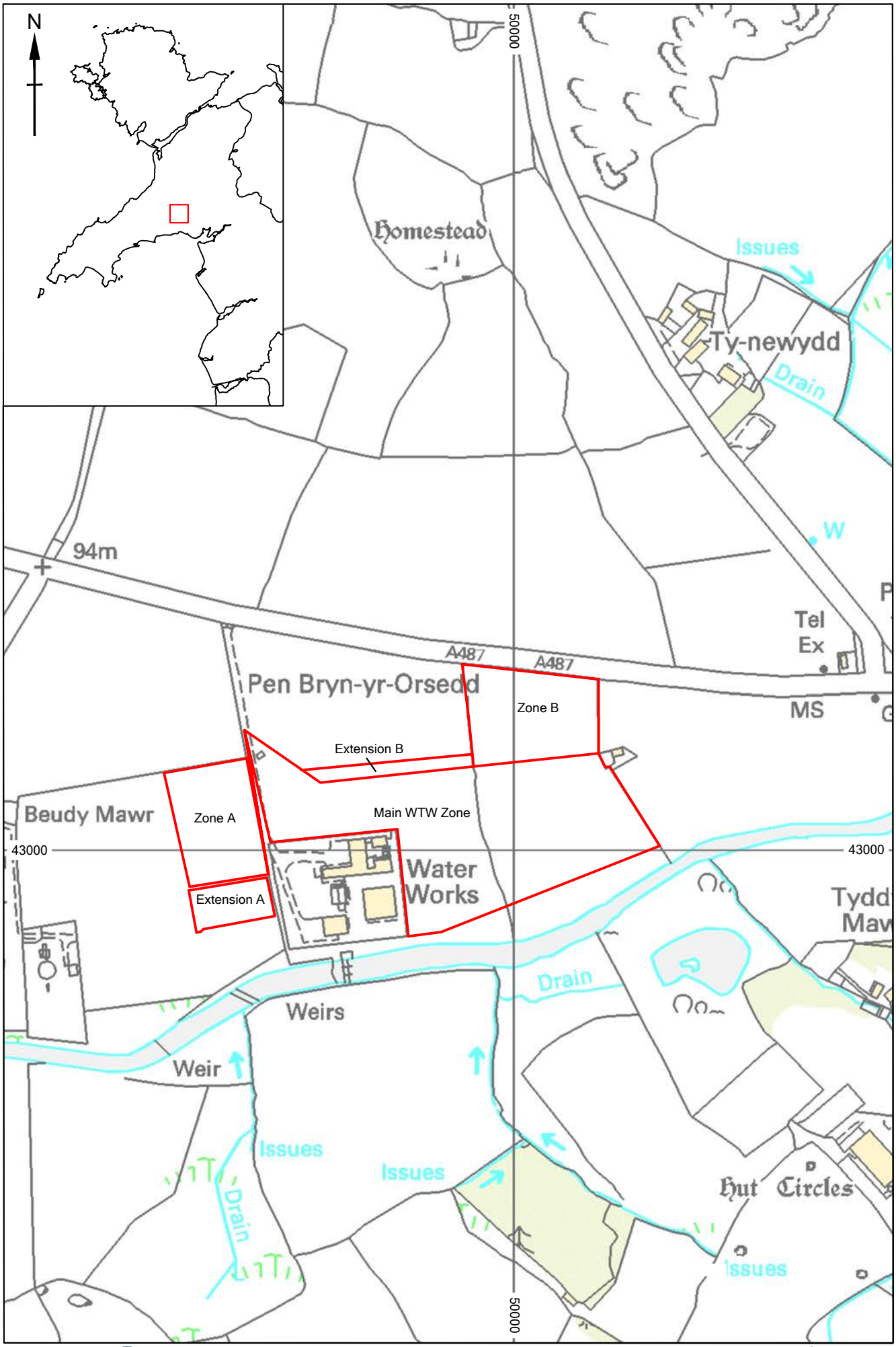

Fig. 1: Site Location

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

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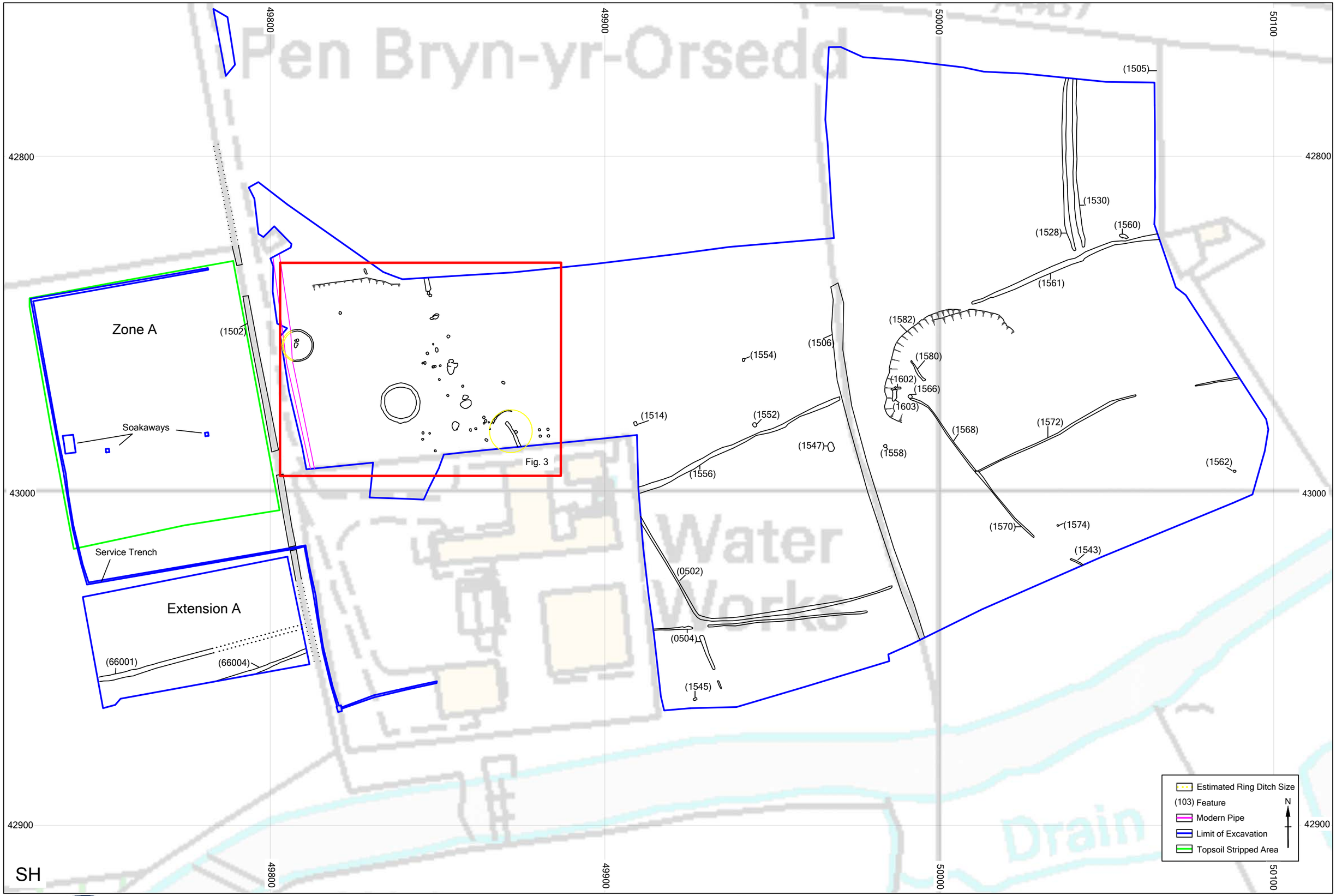

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Fig. 2: Site Plan

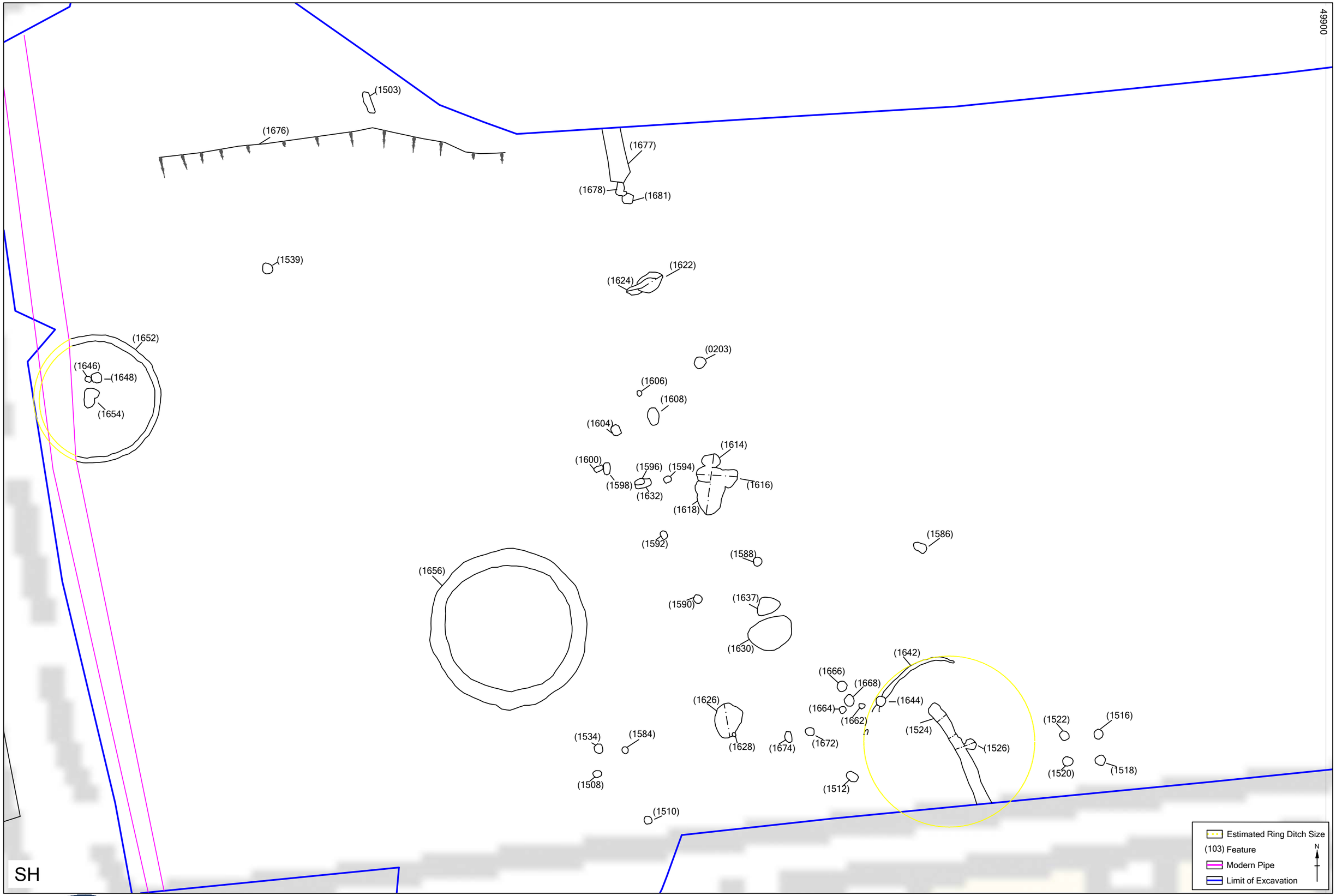

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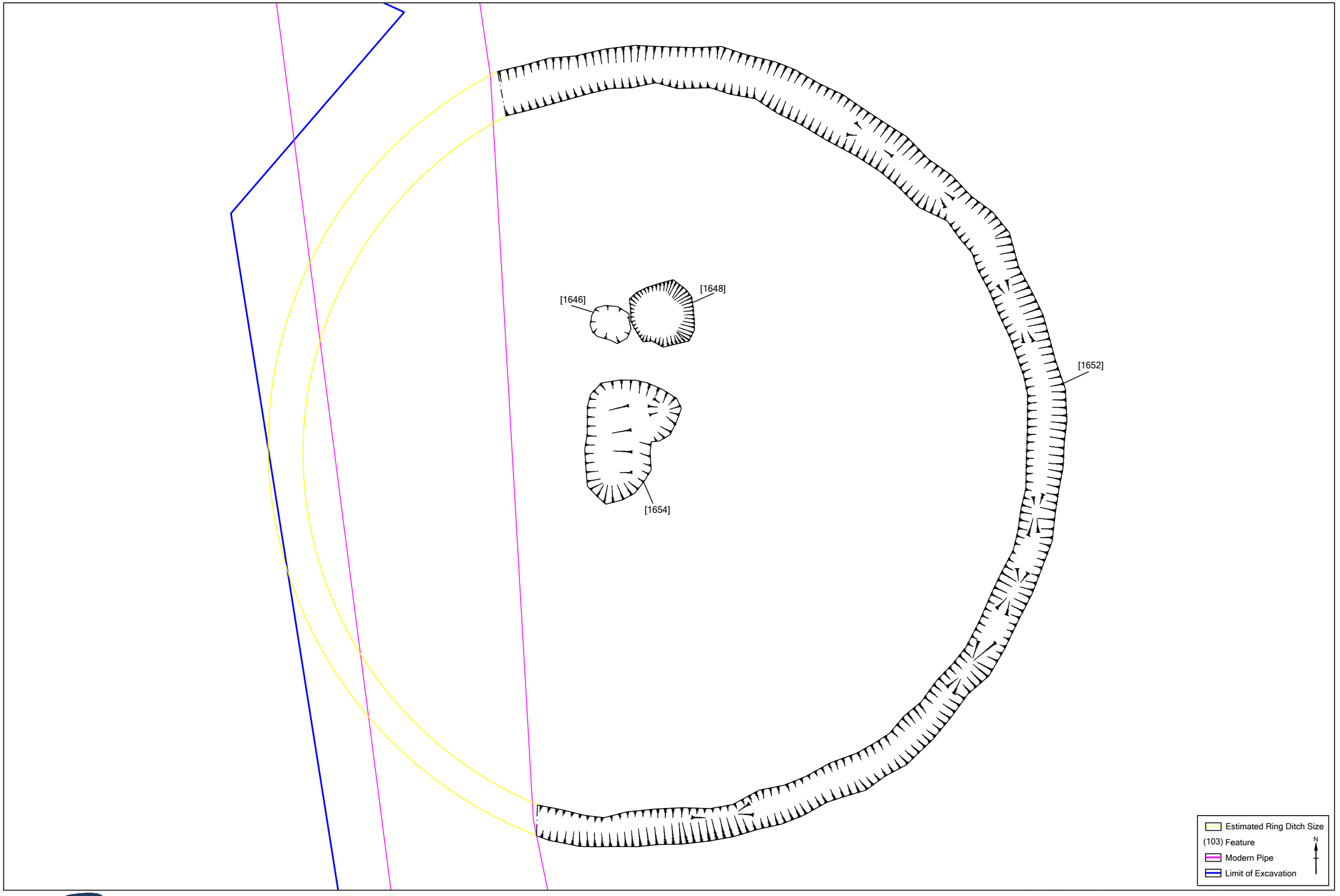
Fig. 3: Site Plan: Close-up of Western Area



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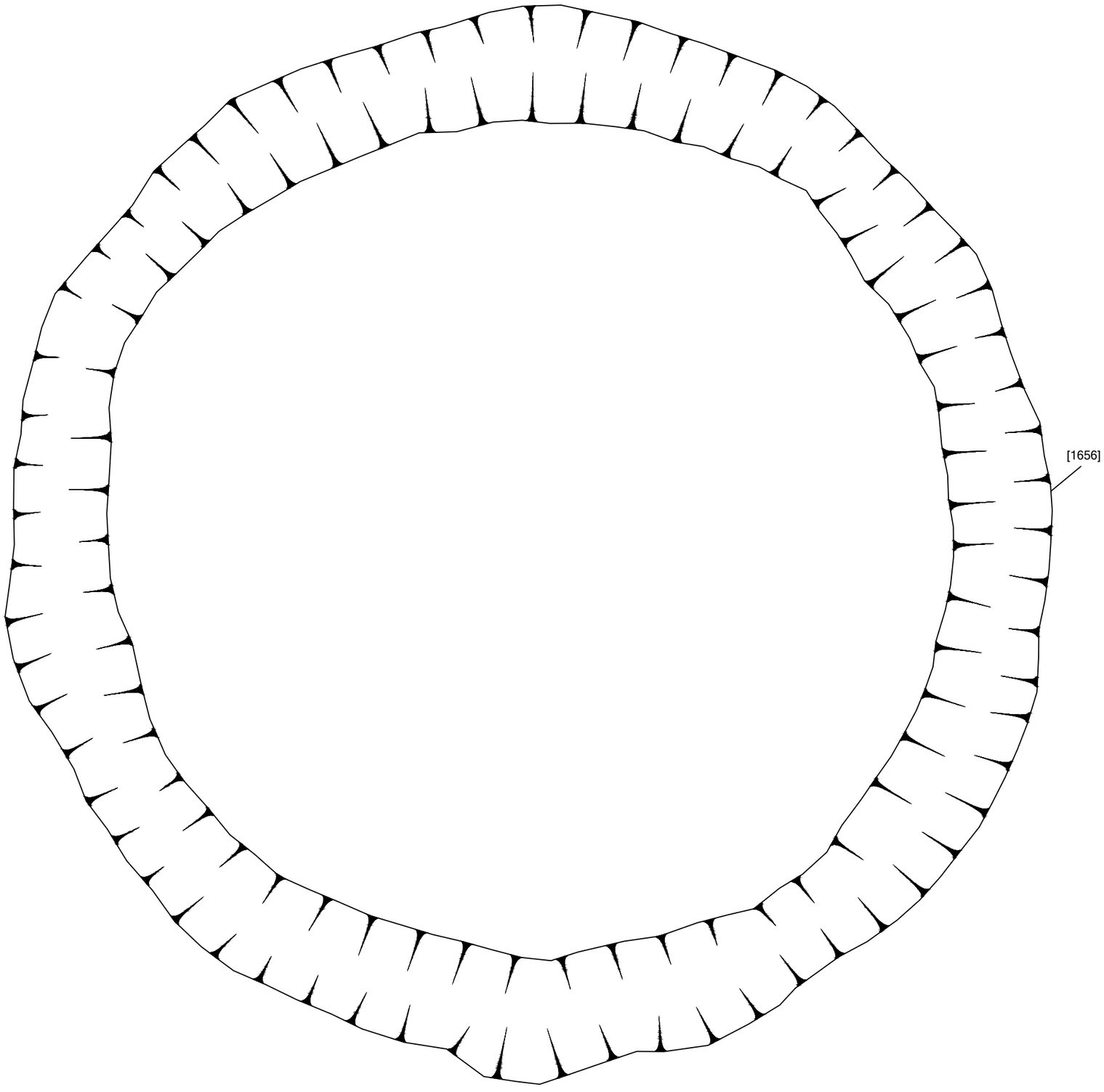
Gwynedd Archaeological Trust

Fig. 4: Plan of Ring Ditch [1652] with Internal Pits [1646], [1648], and [1654]



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Gwynedd Archaeological Trust

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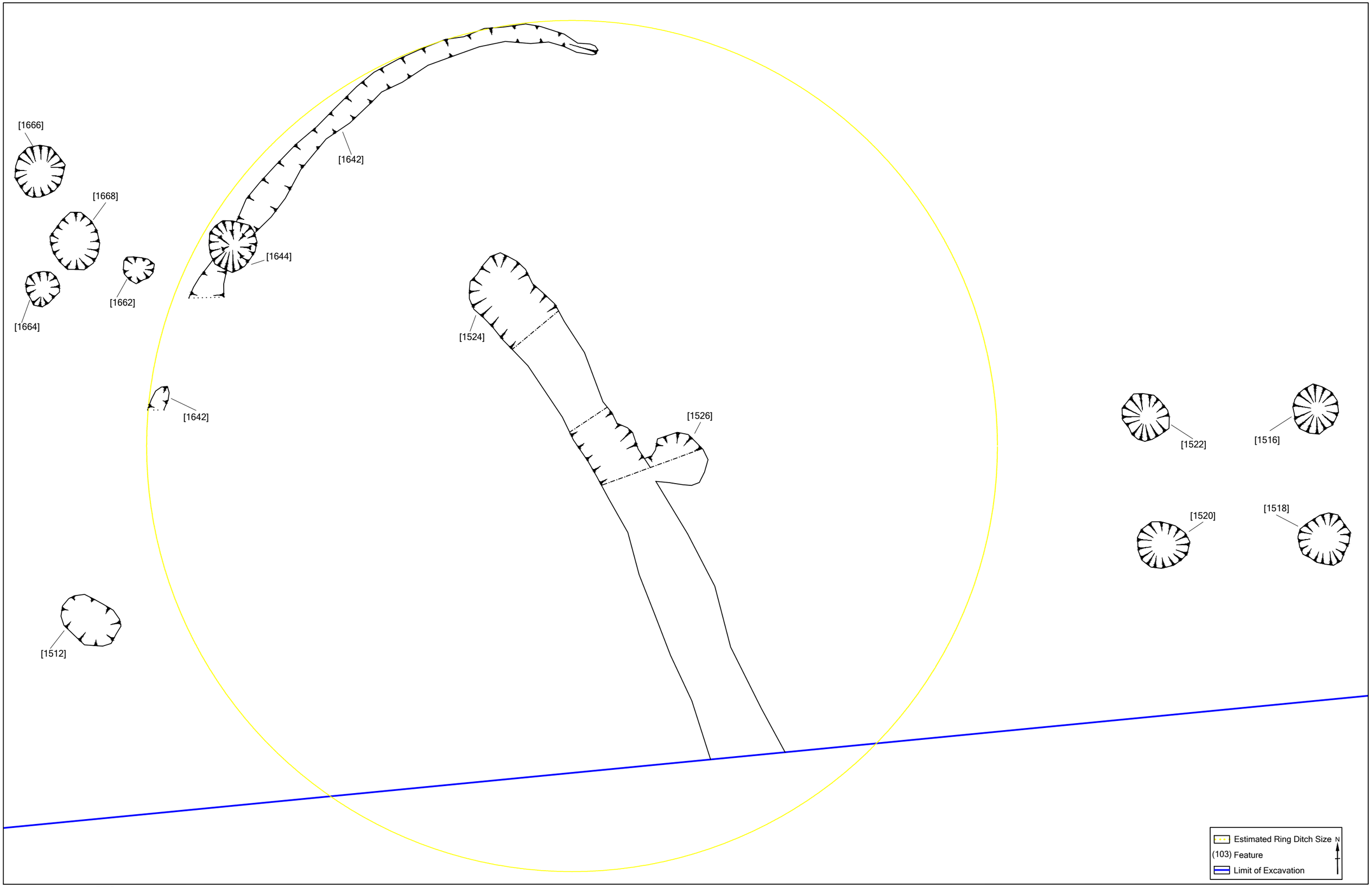
Fig. 5: Plan of Ring Ditch [1656]



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Gwynedd Archaeological Trust

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1:75 @ A3

Fig. 6: Plan Showing Possible Ring Ditch [1642]; Cremation Pits [1666] and [1668]; Pits [1512], [1526], [1622], [1624] and [1644]; Ditch [1524]; and Postholes [1516], [1518], [1520], and [1522].

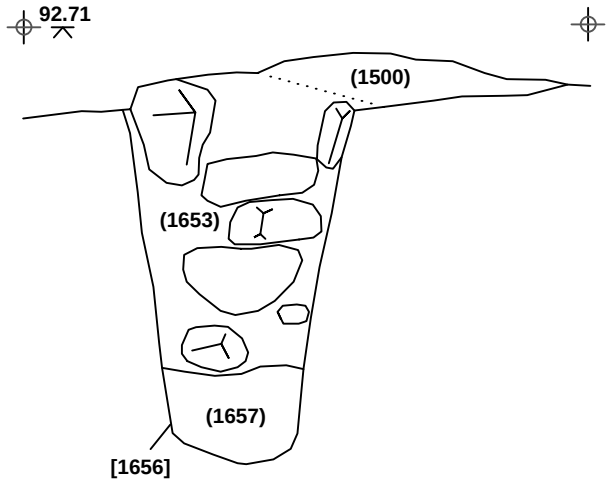
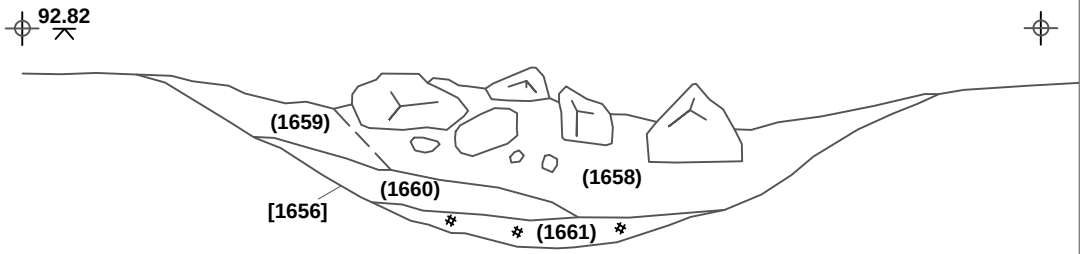
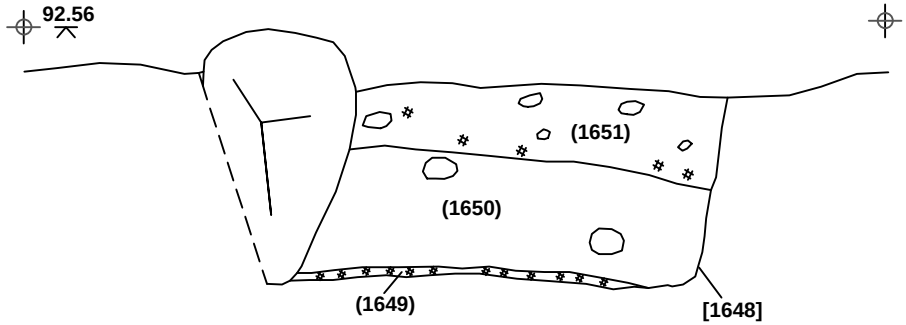


Fig. 7: SSW Facing Section of Ring Ditch [1652]



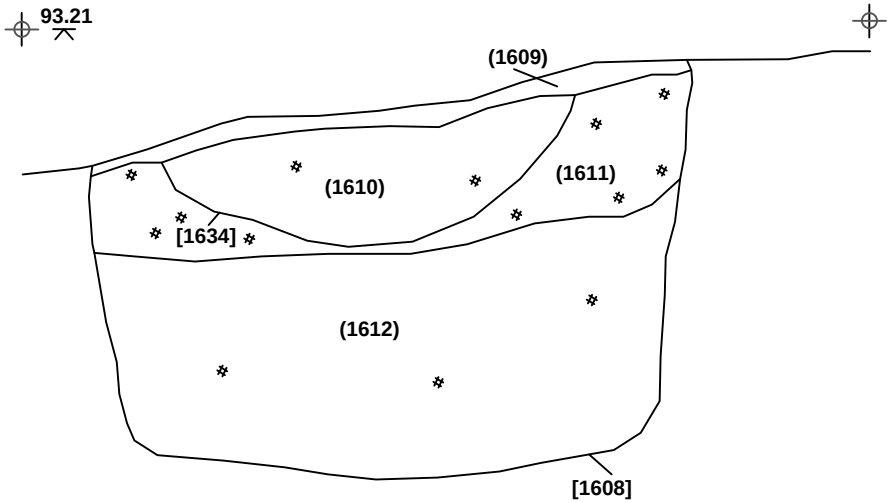
⁂ **Charcoal**

Fig. 8: SE Facing Section of Ring Ditch [1656]



⁂ **Charcoal**

Fig. 9: WSW Facing Section of Cremation Pit [1648]



⁂ **Charcoal**

Fig. 10: NNE Facing Section of Possible Cremation Pit [1608]

Plate 01: Post-Ex Circular Ditch [1652]. View from the North.

Plate 02: Post-Ex Pits [1646] and [1648] within Circular Ditch [1652]. View from the North

Plate 03: Pre-Ex Circular Ditch [1656]. View from the North.

Plate 04: Post-Ex Four Post Structure. Postholes [1516], [1518], [1520], and [1522]. View from the North.

Plate 05: Pre-Ex Circular Ditch [1642]. View from the East.

Plate 06: Stone Pad (1583) and Stone filled Gully [1602]. View from the West

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