A487 Caernarfon and Bontnewydd Bypass, Gwynedd

Post-Excavation Assessment and Updated Project Design

May 2024

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Summary

Oxford Archaeology was commissioned by Balfour Beatty/Jones Bros Civil Engineering UK Joint Venture, on behalf of the Welsh Government, to undertake an extensive programme of archaeological fieldwork as part of the construction of the A487 Caernarfon and Bontnewydd Bypass, Caernarfon, Gwynedd, north Wales (NGR: SH 47250 57750 to SH 50550 65750). The route of the bypass was suspected to contain archaeological remains, and hence, in advance of its construction, a scheme of archaeological mitigation works was undertaken, following on from an earlier phase of archaeological evaluation, completed in 2016, which had identified prehistoric and early medieval remains. These mitigation works were undertaken in 2019, and comprised additional archaeological evaluation, a watching brief, and a controlled archaeological strip and open-area excavation, along the entire route of the *c* 9.8km-long bypass, together with borehole sampling across a former wetland area at its northern end, close to a Scheduled Ancient Monument, at Caerlan Tibot (SAM: CN400).

The combined programme of fieldwork resulted in the identification of 31 archaeological sites, spread across five landscape units, which together represent a rich archaeological dataset, containing stratigraphical, artefactual, and palaeoenvironmental information, with good chronological depth. Significant prehistoric archaeology was encountered at 12 of these sites, which included important evidence for Mesolithic activity, comprising buried land surfaces, associated with worked lithics and palaeoenvironmental materials, and also evidence for a series of temporary encampments, close to Bethel Road, at the northern end of the bypass, again associated with a buried land surface and worked lithics/palaeoenvironmental remains, as well as pits and potential structures. Evidence for Neolithic activity was also identified in several places in the form of pits, some associated with rich assemblages of artefacts and ecofacts, which were deliberately deposited; post alignments; a possible earlier Neolithic structure; and a possible (though presently undated) monument, defined by a circle of pits/posts. In addition, the mitigation works also recorded a rich body of archaeological, artefactual, palaeoenvironmental, and oestological evidence relating to Chalcolithic/Bronze Age activity. This comprised: 23 burnt mounds (six of which have been scientifically dated to between the Chalcolithic and Late Bronze Age), some of which were associated with freestanding structures and wooden troughs, and cairn building; pits and pit groups; a small Bronze Age structure; and an Early/Middle Bronze Age cremation cemetery, at the northern end of the scheme, within an area that also possessed evidence for burnt-mound activity and the construction of a (monumental?) Bronze Age bank. The remaining evidence for prehistoric archaeology dates to the Iron Age, being concentrated at the northern end of the bypass, in the vicinity of Caerlan Tibot. This included enclosures, and a substantial ditch constructed around a large burnt mound. Other evidence for Iron Age activity was less secure, consisting of radiocarbon dated samples, which may represent residual/intrusive items in later/earlier features.

Significant Roman archaeology was also identified. This included a small open settlement in the southern section of the bypass, associated with an interesting sequence of buildings, and the substantial remains of a Roman road, in its central section, which linked the Roman forts at Caernarfon and Caerhun, Conwy. Moreover, this road was probably in use across the Roman period, forming a major route of communication (probably *Iter XI* in the Antonine

Itinerary). Other evidence for Romano-British activity was, however, less conspicuous and included a pit, dug into the top of a burnt mound, at the northern end of the bypass.

Excellent evidence for early medieval activity was recovered, which, given its general regional/national rarity, is highly significant. This comprised two adjacent settlement units, in the southern part of the bypass, associated with boundaries, timber buildings, and ovens, dating between the seventh and ninth centuries AD. Other evidence for early medieval activity included pit groups, in the southern and northern parts of the bypass, associated with palaeoenvironmental remains. Several later medieval pits/pit groups were also identified, as well as an early boundary, which might potentially also date to the later medieval period, mirroring the course of a later township/parish/municipal boundary.

Several features were also recorded that reflected post-medieval and recent activity. A proportion of these probably date to the eighteenth and nineteenth centuries and relate to the agricultural landscape depicted on historical mapping.

In addition to the archaeological data, the borehole cores close to Caerlan Tibot, comprising pollen and lithological data, provide good insights into the evolving prehistoric coastal landscape in the Caernarfon area, between the terminal Upper Palaeolithic period and Late Bronze Age, with additional, nearby pollen cores potentially extending this sequence into the later Iron Age. Together, these form an important regional pollen sequence covering the entirety of the prehistoric period, following the end of the last Ice Age. Furthermore, a pollen site was identified at the southern end of the bypass (at Goat roundabout), which provides additional evidence for the character of the late Mesolithic and early Neolithic landscape.

All of the data from the archaeological mitigation works have been examined in a post-excavation assessment, in line with standard procedures and guidelines, and indicate that, if subjected to a carefully tailored programme of analysis, there is excellent potential for comprehending the form and exploitation of the cultural and natural landscape in the Caernarfon area, throughout both the prehistoric and historic periods. In particular, analysis could explore: the character of the local environment during the prehistoric and early historic periods; the evidence relating to hunter-gatherer (Mesolithic) groups and early (Neolithic) farming communities; the chronology, use, and location of Chalcolithic/Bronze Age burnt mounds; Iron Age activity and enclosure; the character and development of Romano-British and early medieval settlement; the development of later medieval and post-medieval boundaries, enclosures, field systems, and activity areas; and the identification of 'persistent places' in the landscape that were seemingly used and held significance over many millennia. This document provides a summary of the results of the assessment and presents an updated project design and timetable for undertaking a programme of analysis and publication that will, ultimately, meet the full potential of the data and enable the results to be presented to the public in an accessible format.

Crynodeb

Comisiynwyd Oxford Archaeology gan Gyd-fenter Balfour Beatty/Jones Bros Civil Engineering UK, ar ran Llywodraeth Cymru, i ymgymryd â rhaglen helaeth o waith maes archaeolegol fel rhan o adeiladu ffordd osgoi Caernarfon a Bontnewydd ar yr A487, Caernarfon, Gwynedd, Gogledd Cymru. (NGR: SH 47250 57750 i SH 50550 65750). Roedd amheuaeth bod llwybr y ffordd osgoi yn cynnwys olion archaeolegol, ac felly, cyn ei hadeiladu, ymgymerwyd â chynllun o waith lliniaru archaeolegol, yn dilyn cam cynharach o werthusiad archaeolegol, a gwblhawyd yn 2016, a oedd wedi nodi gweddillion cynhanesyddol a chanoloesol cynnar. Ymgymerwyd â'r gwaith lliniaru hwn yn 2019, ac roedd yn cynnwys gwerthusiad archaeolegol ychwanegol, brîff gwylio, a llain archaeolegol reoledig a chloddiad ardal agored, ar hyd llwybr cyfan y ffordd osgoi tua 9.8km o hyd, ynghyd â samplu twll turio ar draws hen ardal wlyptir yn ei ben gogleddol, yn agos at Heneb Gofrestredig, yng Nghaerlan Tibot (SAM: CN400).

Arweiniodd y rhaglen gyfunol o waith maes at nodi 31 o safleoedd archaeolegol, wedi'u gwasgaru ar draws pum uned dirwedd, sydd gyda'i gilydd yn cynrychioli set ddata archaeolegol gyfoethog, yn cynnwys gwybodaeth stratigraffig, arteffactaidd a phalaeoamgylcheddol, gyda dyfnder cronolegol da. Daethpwyd ar draws archaeoleg gynhanesyddol sylweddol mewn 12 o'r safleoedd hyn, a oedd yn cynnwys tystiolaeth bwysig o weithgarwch Mesolithig, yn cynnwys arwynebau tir claddedig, yn gysylltiedig â defnyddiau lithig a phalaeoamgylcheddol wedi'u gweithio, a hefyd tystiolaeth o gyfres o wersylloedd dros dro, yn agos at Ffordd Bethel, ym mhen gogleddol y ffordd osgoi, eto'n gysylltiedig ag arwyneb tir claddedig ac olion lithig/palaeoamgylcheddol wedi'u gweithio, yn ogystal â phyllau a strwythurau posibl. Nodwyd tystiolaeth o weithgarwch Neolithig hefyd mewn sawl man ar ffurf pyllau, rhai yn gysylltiedig â chasgliadau cyfoethog o arteffactau ac ecoffactau, a adneuwyd yn fwriadol; aliniadau post; strwythur Neolithig cynharach posibl; a heneb bosibl (er nad oes dyddiad arni ar hyn o bryd), wedi'i diffinio gan gylch o dyllau/pyst. Yn ogystal, cofnododd y gwaith lliniaru hefyd gorff cyfoethog o dystiolaeth archaeolegol, arteffactaidd, palaeoamgylcheddol ac estolegol yn ymwneud â gweithgarwch yr Oesoedd Calcolithig/Efydd. Roedd hyn yn cynnwys: 23 o dwmpathau llosg (chwech ohonynt wedi'u dyddio'n wyddonol iddynt rhwng yr Oes Calcolithig a'r Oes Efydd Ddiweddar), rhai ohonynt yn gysylltiedig â strwythurau annibynnol a chafnau pren, ac adeiladu carneddi; pyllau a grwpiau pyllau; strwythur bach o'r Oes Efydd; a mynwent amlosgi o'r Oes Efydd Gynnar/Canol, ym mhen gogleddol y cynllun, o fewn ardal a oedd hefyd yn meddu ar dystiolaeth o weithgarwch twmpathau llosg ac adeiladu (cofeb?) Clawdd o'r Oes Efydd. Mae'r dystiolaeth sy'n weddill o archaeoleg gynhanesyddol yn dyddio o'r Oes Haearn, wedi'i chrynhoi ym mhen gogleddol y ffordd osgoi, yng nghyffiniau Caerlan Tibot. Roedd hyn yn cynnwys clostiroedd, a ffos sylweddol a adeiladwyd o amgylch twmpath llosg mawr. Roedd tystiolaeth arall o weithgarwch yr Oes Haearn yn llai sicr, yn cynnwys samplau â dyddiad radio carbon, a allai gynrychioli eitemau gweddilliol/ymwthiol mewn nodweddion diweddarach/cynharach.

Nodwyd archaeoleg Rufeinig sylweddol hefyd. Roedd hyn yn cynnwys anheddiad bach agored yn rhan ddeheuol y ffordd osgoi, yn gysylltiedig â dilyniant diddorol o adeiladau, ac olion sylweddol ffordd Rufeinig, yn ei rhan ganolog, a gysylltai'r caerau Rhufeinig yng Nghaernarfon a Chaerhun, Conwy. At hynny, mae'n debyg bod y ffordd hon yn cael ei

defnyddio ar draws y cyfnod Rhufeinig, gan ffurfio prif lwybr cyfathrebu (*Iter XI* yn Nheithlyfr Antonine mae'n debyg). Roedd tystiolaeth arall o weithgarwch Brythonaidd-Rufeinig, fodd bynnag, yn llai amlwg ac yn cynnwys pydew, a gloddiwyd i mewn i ben twmpath llosg, ym mhen gogleddol y ffordd osgoi.

Daethpwyd o hyd i dystiolaeth ragorol o weithgarwch canoloesol cynnar, sydd, o ystyried ei brinder rhanbarthol/cenedlaethol yn gyffredinol, yn arwyddocaol iawn. Roedd hyn yn cynnwys dwy uned anheddu gyfagos, yn rhan ddeheuol y ffordd osgoi, yn gysylltiedig â therfynau, adeiladau pren, a ffyrnau, yn dyddio rhwng y seithfed a'r nawfed ganrif OC. Roedd tystiolaeth arall o weithgarwch canoloesol cynnar yn cynnwys grwpiau pydew, yn rhannau deheuol a gogleddol y ffordd osgoi, yn gysylltiedig ag olion palaeoamgylcheddol. Nodwyd sawl pwll/grŵp pydew canoloesol diweddarach hefyd, yn ogystal â ffin gynnar, a allai fod yn dyddio o ddiwedd y cyfnod canoloesol hefyd, gan adlewyrchu cwrs ffin trefgordd/plwyf/trefol ddiweddarach.

Cofnodwyd sawl nodwedd hefyd a oedd yn adlewyrchu gweithgarwch ôl-ganoloesol a diweddar. Mae'n debyg bod cyfran o'r rhain yn dyddio o'r ddeunawfed ganrif a'r bedwaredd ganrif ar bymtheg ac yn ymwneud â'r dirwedd amaethyddol a ddarlunnir ar fapiau hanesyddol.

Yn ogystal â'r data archaeolegol, mae'r creiddiau tyllau turio yn agos at Gaerlan Tibot, sy'n cynnwys data paill a litholegol, yn rhoi mewnwelediad da i'r dirwedd arfordirol gynhanesyddol esblygol yn ardal Caernarfon, rhwng y cyfnod Paleolithig Uchaf terfynol a'r Oes Efydd Ddiweddar, gyda chreiddiau paill ychwanegol gerllaw o bosibl yn ymestyn y dilyniant hwn i ddiwedd yr Oes Haearn. Gyda'i gilydd, mae'r rhain yn ffurfio dilyniant paill rhanbarthol pwysig sy'n cwmpasu'r cyfnod cynhanesyddol cyfan, yn dilyn diwedd yr Oes Iâ ddiwethaf. At hynny, nodwyd safle paill ym mhen deheuol y ffordd osgoi (ar gylchfan Goat), sy'n darparu tystiolaeth ychwanegol o gymeriad y dirwedd Fesolithig hwyr a'r cyfnod Neolithig cynnar.

Mae'r holl ddata o'r gwaith lliniaru archaeolegol wedi'i archwilio mewn asesiad ôl-gloddio, yn unol â gweithdrefnau a chanllawiau safonol, ac yn dangos, os yw'n destun rhaglen ddadansoddi sydd wedi'i theilwra'n ofalus, fod potensial gwych ar gyfer deall y ffurf a'r manteisio ar dirwedd ddiwylliannol a naturiol ardal Caernarfon, drwy gydol y cyfnodau cynhanesyddol a hanesyddol. Yn benodol, gallai dadansoddiad archwilio: cymeriad yr amgylchedd lleol yn ystod y cyfnodau cynhanesyddol a hanesyddol cynnar; y dystiolaeth yn ymwneud â grwpiau helwyr-gasglwyr (Mesolithig) a chymunedau ffermio cynnar (Neolithig); cronoleg, defnydd a lleoliad twmpathau llosg Calcolithig/Oes Efydd; Gweithgarwch a lloc o'r Oes Haearn; cymeriad a datblygiad aneddiadau Brythonaidd-Rufeinig a chanoloesol cynnar; datblygiad ffiniau canoloesol diweddarach ac ôl-ganoloesol, clostiroedd, systemau caeau, ac ardaloedd gweithgaredd; ac adnabod 'lleoedd parhaus' yn y dirwedd a oedd i bob golwg yn cael eu defnyddio ac a oedd yn arwyddocaol dros sawl mileniwm. Mae'r ddogfen hon yn rhoi crynodeb o ganlyniadau'r asesiad ac yn cyflwyno cynllun prosiect wedi'i ddiweddaru ac amserlen ar gyfer cynnal rhaglen ddadansoddi a chyhoeddi a fydd, yn y pen draw, yn bodloni potensial llawn y data ac yn galluogi'r canlyniadau i gael eu cyflwyno i'r cyhoedd mewn fformat hygyrch.

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1 INTRODUCTION

1.1 Background

1.1.1 Balfour Beatty/Jones Bros Civil Engineering UK Joint Venture commissioned Oxford Archaeology (OA) to undertake a programme of archaeological fieldwork along the route of the A487 Caernarfon and Bontnewydd Bypass, Caernarfon, Gwynedd, north Wales (NGR: SH 47250 57750 to SH 50550 65750; Fig 1). The fieldwork principally comprised archaeological mitigation works (*Section 1.2.3*), implemented between February and September 2019, in accordance with a Written Scheme of Investigation (WSI; Balfour Beatty/Jones Bros JV 2018) agreed with the former Gwynedd Archaeological Planning Service (GAPS, now part of Heneb: The Trust for Welsh Archaeology (Gwynedd Archaeology)). The WSI also identified a requirement for a phase of post-excavation assessment, following the completion of the fieldwork, which has been duly completed by OA with the results of this, and an updated project design relating to an additional stage of analysis and publication, being set out in this report.

1.2 Archaeological Investigation

1.2.1 ***Previous archaeological investigations:*** prior to the archaeological mitigation works, several earlier schemes of preparatory archaeological investigation were completed between 2009 and 2016 (*cf* Balfour Beatty/Jones Bros JV 2016). These comprised an archaeological desk-based assessment, focused on the bypass route and its immediate environs (an area extending 500m either side of the bypass), which considered various published and unpublished reports and documents, cartographic sources, aerial photographs, and site records contained within the Historic Environment Record (HER) for Gwynedd and the National Monuments Record (NMR) for Wales (*ibid*). Other preparatory studies included: walk-over surveys; surveys of historic field boundaries; and geophysical survey across all the then accessible areas along the bypass route (*ibid*; Stratascan 2015). Whilst all produced useful results, the geophysical survey was particularly successful in determining the presence of buried archaeological remains, which were identifiable as geophysical anomalies. Many of these seemed, however, to reflect comparatively recent agricultural activity, though two areas were flagged as potentially containing significant archaeological remains. These comprised a broad area lying between, and encompassing, Caerlan Tibot and Bethel Road, which seemed to contain early enclosures, and north-east of Cibyn, where a linear anomaly corresponded to the line of a possible Roman road, also visible as a slight earthwork (Fig 2).

1.2.2 In addition, the preparatory work included some intrusive investigation. This comprised an archaeological watching brief during the excavation of geotechnical test pits (Balfour Beatty/Jones Bros JV 2016) and archaeological evaluation (GAT 2016). It was originally envisaged that evaluation would involve the excavation of 96 trial trenches; however, due to problems with land access, for operational reasons, it was only possible to excavate 30 of these, which were broadly spread along the route of the bypass (*ibid*). These targeted areas of archaeological potential, flagged up by the desk-based assessment and geophysical survey, and aimed to establish the presence and significance of any below-ground archaeology. Whilst 16 produced no archaeology, and ten contained remains of low significance (associated with late nineteenth- and early twentieth-century agricultural activity), four of the trenches, at the northern and southern ends of the route, did seemingly contain more significant remains. At the northern end, at Bethel Road, these comprised evidence for a prehistoric burnt mound, whilst at Plas Menai two parallel ditches were recorded, potentially associated with a large enclosure (Fig 2). Two samples of charred materials from the burnt mound were also subjected to radiocarbon assay. Whilst these confirmed its prehistoric origin, they were inconsistent, providing a possible date for use extending between the seventeenth and fifth centuries cal BC (Balfour Beatty/Jones Bros JV 2018, 22). At the southern end of the scheme, at Morogoro (Plot 107), a curvilinear ditch/gully was recorded, initially suspected to be later prehistoric in date, along with several pits and postholes, some containing burnt materials and very small amounts of metalworking residues and fuel-ash slag (Young 2016). These were also thought to date to the later prehistoric period and were viewed as potentially relating to early industrial activity; however, charred material was subsequently subjected to radiocarbon assay and was discovered to date to the seventh to eighth centuries AD, imply that some of the features related instead to early medieval activity (Balfour Beatty/Jones Bros JV 2018, 20).

1.2.3 ***Mitigation works:*** the archaeological mitigation works occurred at the start of the construction of the bypass in 2019 and worked to the archaeological WSI (*Section 1.1.1*), which set out the fieldwork strategy that was to be adopted. As standard OA practice, all fieldwork was also undertaken in accordance with the Chartered Institute for Archaeologists' guidance for evaluations, excavations, and watching briefs (CIfA 2020a; 2020b; 2020c).

1.2.4 ***Archaeological evaluation:*** the mitigation works initially aimed to evaluate those areas that were inaccessible during the earlier scheme of trial trenching in 2016 (*Section 1.2.2*). It was therefore proposed that 79 additional trial trenches (each measuring *c* 30 x 2m) should be excavated, which, as with the earlier phase of trenching, would target features detected by the non-intrusive surveys (*Section 1.2.1*). Once this scheme of trenching began, several areas earmarked for evaluation still remained inaccessible, however, which meant it was only possible to excavate 62 of the proposed trenches. A decision was therefore made to abandon the 17 remaining trenches, as it was considered that any archaeological remains in these areas would be adequately recorded as part of the next stage of mitigation.

1.2.5 ***Archaeological controlled strip and open-area excavation:*** the next mitigation stage included a general archaeological watching brief, which observed the initial stripping of the topsoil. In those areas of the bypass where the construction level extended beneath the topsoil, this watching brief was then followed by a controlled archaeological strip designed to identify, map, and record any archaeological remains (referred to as a 'strip, map and record' exercise). When archaeological remains were encountered, these were subjected to an appropriate level of excavation and recording, which in those instances where extensive archaeological remains were revealed included targeted open-area excavation.

1.2.6 Open-area excavation was also completed across those areas that had been identified during the trial trenching, completed in 2016 and 2019, as containing significant archaeological remains. These included: the area at the southern end of the bypass (at Morogoro), seemingly associated with early medieval activity (*Section 1.2.2*); and the two areas in the northern section of the route (at Bethel Road/Caerlan Tibot and Plas Menai) containing a burnt mound, geophysical anomalies suggestive of early activity, and a potentially early enclosure (*Section 1.2.2*). In addition, open-area excavation also focused on the line of the potential Roman road at Cibyn (*Section 1.2.1*).

1.2.7 ***Other works:*** the programme of mitigation also included an archaeological watching brief during the removal of extant field boundaries, deemed to have archaeological significance, and also during groundworks associated with the establishment of drains and services, and during the excavation for the piers of bridges spanning those watercourses that flowed across the bypass. In addition, at one of these bridging sites, test pits were also excavated across significant palaeoenvironmental/ archaeological deposits (*Section 2.3.39*).

1.2.8 A borehole survey was also undertaken at Caerlan Tibot, at the northern end of the bypass, to investigate a small wetland area. This had been identified during trial trenching at the start of the mitigation works (*Section 1.2.3*) and the survey was designed to determine the presence of any organic deposits, which could contain important palaeoenvironmental evidence (*Section 1.2.19*).

1.2.9 ***Excavation methodology:*** during the evaluation (*Section 1.2.4*), trial trenches were located using a differential Global Positioning System (dGPS), accurate to ± 0.01m, and altitude information was established above Ordnance Datum (aOD). Initially, the topsoil and subsoil were incrementally removed, using a mechanical excavator fitted with a toothless ditching bucket, down to the uppermost archaeological horizon or natural geology, depending on which was encountered first. This was followed by manual cleaning and investigation of all archaeological deposits using hoes, or by shovel scraping and/or trowelling, depending on the subsoil conditions.

1.2.10 A similar methodological approach was also adopted during the controlled archaeological strip. Hence, following stripping of the topsoil, monitored as part of a general archaeological watching brief (*Section 1.2.5*), stripping continued down to the uppermost archaeological horizon, natural geology, or in this instance construction level for the bypass, again dependent on which level was reached first (*ie* highest in the stratigraphic sequence). The controlled stripping was undertaken in incremental spits and also employed mechanical excavators, fitted with wide (minimum 1.8m) toothless ditching buckets, in order to produce an even and clean stripped surface, with each mechanical excavator operated under the supervision of a suitably experienced archaeologist.

1.2.11 Following topsoil/subsoil stripping, if there was an absence of archaeological remains in any area, this was signed off by GAPS, with no further archaeological investigation being undertaken. In contrast, those areas containing archaeology (including the areas identified by the evaluation trenching as containing significant remains) were subjected to detailed excavation in order to achieve 'preservation by record'. During excavation, and following the methodological requirements set out in the WSI

(*Section 1.1.1*), archaeological deposits were manually excavated down to naturally occurring deposits, and smaller archaeological features, such as pits and postholes, and burials, were excavated *in toto*. Initially, these discrete features were subjected to 50% examination (*ie* half-sectioned), providing a full vertical section for examination and recording, after which the remainder of the feature was fully excavated in order to retrieve any datable material and palaeoenvironmental samples.

1.2.12 Linear features, such as boundary ditches and gullies, were subject to a 10% sample, with slots a minimum of 1m wide, although if these features were deemed to be post-medieval in date only one intervention was excavated. All investigation slots through linear features were also positioned across their profiles, unless that precluded examination of termini or relationships with other features. All intersections between features were also excavated to determine the relationship(s) between component features, as were all ditch terminals.

1.2.13 Extensive homogeneous spreads of material, such as colluvium, were sampled by hand to a maximum of 50% by volume. When necessary, and after consultation with GAPS, the remainder of these deposits were then excavated mechanically. Burnt deposits, associated with burnt mounds, were also abundant along the route of the bypass, and these were manually excavated to ascertain their stratigraphic complexity. After recording had been completed, and appropriate palaeoenvironmental samples had been collected, the burnt mounds were fully removed to expose and record any features sealed beneath.

1.2.14 The watching brief during the removal of the extant field boundaries (*Section 1.2.7*) was undertaken by experienced archaeologists, who recorded their construction and make-up. The watching brief also aimed to record any phasing associated with boundary construction and maintenance (*eg* additions, rebuilds, modifications), and the areas beneath were also checked, and any underlying archaeological features/deposits were recorded. Similarly, the watching brief undertaken during the excavation of services and other deep excavations was also undertaken by an experienced archaeologist and it aimed to identify and record any below-ground remains and that might be affected by these works.

1.2.15 ***Recording the archaeological remains:*** all excavated archaeological features and deposits examined during the mitigation works were recorded stratigraphically, using a system adapted from the former Centre for Archaeology of English Heritage, with sufficient pictorial record (plans, sections, and digital photographs) to identify and illustrate individual features. Written descriptions of the excavated features were also recorded on *pro-forma* context sheets, and indices. In addition, the features/deposits were surveyed and levelled, using a GPS, and all discrete features and sections through linear features were recorded on hand-drawn plans at appropriate scales (*ie* 1:20 and 1:10). An indexed photographic record, utilising high-resolution digital imaging, was also produced. Some areas and features were also recorded through photogrammetric and drone surveys (using unmanned aerial vehicles (UAVs)).

1.2.16 During the archaeological fieldwork, much of the information from the recording process was also input directly into the OA Digital Recording System (OADRS), which, along with the survey data, was used to construct a Geographic Information System (GIS) project, accessible via WebMap, OA's bespoke web-based GIS viewer (OA 2021a). This allowed for a dynamic approach to archaeological recording and had the advantage of acting as an effective management tool for recording, providing a 'real-time' view of the features and deposits that were progressively identified, excavated, and sampled along the bypass.

1.2.17 ***Finds and sampling:*** all of the hand-collected finds (artefacts, animal and human bones) were retained, and recorded by context, following standard procedures (OA 2021b; CIfA 2020d), with a selection of the more significant being located in three-dimensions, with their positions then being recorded into the OADRS and WebMap (*Section 1.2.16*). All hand-collected finds were subsequently processed at the OA Lancaster Office.

1.2.18 Environmental sampling of all excavated features was also completed in accordance with the WSI (*Section 1.1.1*), standard guidelines (*cf* Campbell *et al* 2011), and OA's environmental guidelines (OA 2017a). This sampling was iterative and involved removing bulk soil samples (up to 40 litres in size) from deposits that were deemed to hold environmental potential, or from deposits that might be significant for dating purposes (*ie* basal fills of pits or ditches). In addition to bulk samples, monoliths were taken through a selection of features, which contained slowly accumulated deposits, to recover palaeoenvironmental data. Human remains (cremated materials) were also present and these were collected in their entirety. Some of these remains were also contained within ceramic vessels, which were subsequently block lifted on site, with their contents being removed, processed, and examined at the OA Lancaster Office.

1.2.19 ***Borehole survey:*** the borehole survey at Caerlan Tibot (*Section 1.2.8*) was designed to establish the geoarchaeological sequence in this wetland area, and recover monoliths, which might provide significant data on the palaeoenvironmental history of this area. This involved the extraction of cores using a gouge and Russian auger (*Sections 4.4.2* and *4.4.4*), which were positioned along two borehole transects, with some outlying sample points. The position of each of the boreholes was established using a dGPS.

1.2.20 Following extraction, the cores were given a unique cross-referable number, and the relative depth of each 1m section was recorded for extrapolation from the aOD height at the top of the sequence. The core samples were also examined and recorded on site on a summary *pro-forma* sheet by an OA environmental archaeologist following standard guidelines for geoarchaeology (Canti 2015) and using standard quaternary (Late Devensian and Holocene) terminology (*ibid*).

1.2.21 ***Post-excavation:*** following the completion of the fieldwork, OA undertook consolidation work, to ensure the integrity of the project archive (*cf* OA 2022). The project archive, which forms the principal record of the archaeological remains examined during the mitigation works, was therefore fully checked and collated. This included inputting all the stratigraphic information and relationships recorded during the fieldwork into OA's bespoke web-based project database (Caernarfon Finds Database), which captures and stores all of the recorded stratigraphic data. During consolidation, the stratigraphic data were also checked for consistency, with stratigraphic relationships and matrices being checked and validated, which also included checking/allocating stratigraphic group numbers. All records, including drawings and context records, were also digitally scanned, and uploaded into the database, which allows the original paper records to be searched and viewed by context. Many of the pertinent digital images acquired during the fieldwork were also uploaded into the database, being linked to the relevant features and deposits. In addition, the survey data, which had been integrated into the GIS and WebMap during the fieldwork (*Section 1.2.16*), were checked and validated to ensure that it corresponded with the data contained in the project database. Finally, all photogrammetric and drone surveys completed during the fieldwork were processed and geo-referenced (*Section 1.2.15*).

1.2.22 Other elements of the consolidation process included stabilising the artefacts recovered during the fieldwork, which were accordingly cleaned, weighed, appropriately packaged, conserved where necessary, with their details then being entered into the project database (*Section 1.2.21*). During the mitigation works, several waterlogged timbers were also recovered, and these were transported to York Archaeological Trust (YAT) for emergency conservation, stabilisation, and assessment.

1.2.23 The consolidation works also entailed the processing of the bulk soil samples at the OA Lancaster Office, using hand-flotation techniques, to recover charred and waterlogged plant remains and charcoal, other small palaeoenvironmental residues, and small artefactual materials. In total, 844 bulk samples were processed and, following this, those samples with potential for scientific (radiocarbon) dating were established.

1.2.24 The resulting archaeological data were then assessed. Initially, this entailed assessment of the palaeoenvironmental samples (*Section 1.2.23*), which was completed alongside archive consolidation (*Section 1.2.21*). Once completed, a scoping document was produced which established the remits and scope for a detailed programme of post-excavation assessment (OA 2022). Following a review of this document, by both GAPS and the archaeological consultants, the scope was agreed, and the final stages of the post-excavation assessment began in April 2022. This report details the results and recommendations of the post-excavation assessment, which has been conducted in accordance with the principles identified in several guidance documents. These primarily comprise Historic England's *Management of Research Projects in the Historic Environment*, specifically *The MoRPHE Project Manager's Guide* (2015a) and *PPN3 Archaeological Excavation* (2015b), and the advice for post-excavation assessment produced by the Association of Local Government Archaeological Officers (ALGAO) in England (ALGAO 2015). In addition, the assessment follows OA's own internal procedures relating to post-excavation assessment (OA 2017b).

1.3 Location, Topography, and Geology

1.3.1 The bypass extends for some 9.8km, from the Goat Roundabout, south of Llanwnda, up to the Plas Menai Roundabout north of Caernarfon (Fig 2). It therefore lies to the east of Caernarfon, the area's largest settlement, and also close to several of the area's smaller settlements, which are all located to its west. Along its southern extent these include Bontnewydd and Llanwnda, with Caeathro at its mid-point, and Bethel located near the northern part of the bypass route. Historically, all of these settlements, and the bypass route, were originally in central Caernarfonshire that became the district of Arfon in 1974, which was subsequently merged with the neighbouring districts of Aberconwy, Meirionnydd, and Dwyfor in 1996 to form the county of Gwynedd (Waddington 2013, 2).

1.3.2 Topographically, the bypass crosses a low-lying, though slightly undulating, coastal landscape, fluctuating between 30m and 50m aOD, which is agricultural in character. This landscape is sandwiched between the Menai Strait, which separates mainland Wales from Ynys Môn (Anglesey), and the imposing Eryri (Snowdonia) mountains, which dominate south-easterly vistas from the line of the bypass, with a distinct juxtaposition between the mountains and the Irish Sea. Slightly further afield, to the south-west, is the Llŷn peninsula, whilst moving north-eastwards along the coast from Caernarfon, the next major settlement is Bangor, followed by Llandudno and the adjacent Great Orme headland, all of which form archaeologically significant areas for settlement and industry, throughout the prehistoric and historic periods.

1.3.3 The bypass also traverses several watercourses and their associated valleys/terraces/floodplains, most flowing down from the Eryri uplands to the Menai Strait. When moving from the Goat Roundabout in a northly direction, the first of these is a small tributary of the Afon Carrog, which flows down from the Eryri foothills, near Rhostryfan. This passes some 190m north-east of the roundabout and then joins the main channel of the Afon Carrog, which eventually flows into Foryd Bay, south-west of Caernarfon. Slightly further northwards, the bypass then crosses the Afon Rhyd. This flows through Llanwnda and its source also lies in the Eryri foothills, close to Rhosgadfan; it eventually joins with the Afon Carrog, close to the latter's mouth. Continuing northwards, the route then crosses a larger river, the Afon Gwyrfai, which flows from Rhyd Ddu, at the base of Snowdon, through Bontnewydd, and again into Foryd Bay. In the vicinity of the bypass, historical mapping (*eg* OS 1889a; 1889b; 1890a) indicates that this river also formed a boundary separating the parishes/townships of Llanwnda, to its south, and Llanfaglan and Waenfawr, to its north.

1.3.4 Just beyond Afon Gwyrfai, the route turns to the north-east and crosses, then follows, a small tributary of this river, which, for much of its course, also forms another historic boundary (*ibid*), separating the parishes/townships of Llanfaglan and Waenfawr. By the later nineteenth century, it also formed the boundary of the Municipal Borough and Parliamentary Constituency for the Caernarfon District. Just beyond this is another river, the Afon Seiont. This forms the largest of the rivers crossed by the bypass, and it flows from its source (Llyn Padarn lake in Eryri, initially as the Afon Rhythallt), next to Llanberis, and down into the Menai Strait, with its final stretch bounding the southern side of Caernarfon. Near the bypass this river also forms the boundary separating the parishes/townships of Waenfawr, to its south, and Llanbeblig, to its north (*cf* OS 1889c).

1.3.5 Past the Afon Seiont the bypass continues in a north-easterly direction and then turns north-west enroute to the Plas Menai Roundabout. In its final north-westerly stretch, it also crosses two watercourses, both elements of the Afon Cadnant. One of these, south of Bethel Road, forms the main river channel, which flows through Caernarfon, entering the sea close to the mouth of the Afon Seiont, whilst the other is a smaller (distributary) channel which branches off the main channel, at Bethel Road, immediately to the east of the bypass, and then flows northwards entering the sea close to Plas Menai. Near the bypass, both of these channels also formed significant boundaries, dividing townships/parishes, and by the late nineteenth century had become the Parliamentary Boundary for the Caernarfon District (*cf* OS 1889d).

1.3.6 The character and topography of the landscape crossed by the bypass is partly a product of the underlying solid geology, which is mostly composed of different classes of sedimentary rock. At the southern end, around Llanwnda, these comprise conglomerates of sandstone, containing thin volcanic tuffs (part of the Fachwen Formation), which were laid down between 635 and 508 million years ago (mya) (during the Ediacaran and Cambrian periods; Howells *et al* 1985). Between Bontnewydd and Bethel Road, covering much of the bypass route, the bedrock changes to younger siltstone (part of the Nant Ffrancan Formation), which was laid down between 447 and 449 mya (in the Ordovician period; Howells and Smith 1997). A narrow band of sandstone (part of the Allt Lwyd Formation) also crosses Bethel Road, which was laid down at a similar time (Pratt *et al* 1995). Between Bethel Road, and just south of the Plas Menai roundabout, the solid geology changes, once more, to an older igneous-type rock, defined by a *c* 1km-wide band of granite (part of the Twt Hill Granite Pluton) formed between 1000 and 541 mya (during the Tonian and Edicaran periods; Greenly 1944). After this point, and up to the southern side of the Menai Strait, some 500m distant from Plas Menai, the bedrock then reverts back to sedimentary rock, specifically a conglomerate of mudstone, siltstone, and sandstone (part of the Warwickshire Group) that was laid down between 318 and 272 mya (during the Carboniferous and Permian periods; Davies *et al* 2004).

1.3.7 Overlying these bedrocks are superficial geological deposits, which reflect the geomorphological process occurring during the last Ice Age (between 116,000 and 11,000 years ago in the Devensian period), and also over the last 11,000 years (during the Holocene), following the melting of the last major ice sheets covering the region (Howells and Smith 1997). Glacial till forms the dominant superficial deposit along the bypass, laid down during the last Ice Age, along with some isolated pockets of glaciofluvial sand and gravel, dumped by glacial meltwater during the same period (BGS 1980). These latter deposits are largely confined on the bypass to the southern side of the Afon Seiont (*Section 1.3.4*), where they form two river terraces. Close to Bontnewydd, the route also clips the eastern side of a linear deposit of glacial sands and gravels, which forms another river terrace, following the course of the tributary of the Afon Gwyrfai (*Section 1.3.3*).

1.3.8 More recent deposits of peat and alluvium have also been identified, which may have started to form at the very end of the last glacial period, and throughout the Holocene (*ibid*). These include localised areas of peat and alluvium to the west of Llanwnda, which relate to the present and former course of the Afon Rhyd and its tributaries (*Section 1.3.3*). Large swathes of alluvium also follow the courses of the

Afon Gwyrfai and Afon Seiont, with the latter lying to the north of the former river terraces (*Section 1.3.7*). Further north, localised peat deposits have also been mapped crossing the bypass, following the course of the Afon Cadnant and its distributary that diverge at Bethel Road (*Section 1.3.4*).

1.4 Archaeological Background

1.4.1 ***Earlier prehistoric/hunter-gatherer (Palaeolithic and Mesolithic) activity:*** the early stages of human history in north Wales are associated with pre-agricultural hunter-gatherer groups. Initially, these included Neanderthal and then anatomically modern humans operating across the Palaeolithic period (which in Wales spans *c* 225,000 to 11,500 years ago). This was followed by the Mesolithic period, when hunter-gatherers also roamed and exploited the early landscape during the first half of the Holocene (*c* 9500-4000 cal BC; *cf* Aldhouse-Green 2000).

1.4.2 It was clear, however, that no archaeological remains relating to the Palaeolithic occupation had been recorded in the vicinity of the bypass. This is not particularly surprising though as, in north Wales, this evidence only really survives in caves, some distance from the bypass in the limestone outcrops flanking the Vale of Clwyd and at Great Orme (*cf op cit*, fig 1.4; Davies 1989; Dinnis and Ebbs 2013).

1.4.3 At the start of the mitigation works, evidence for Mesolithic occupation was similarly absent. There was, however, evidence for Mesolithic activity relatively close by, which seemed to imply that the bypass area could have been exploited by hunter-gatherers in the early stages of the Holocene. Specifically, several Mesolithic sites have been recorded on nearby Ynys Môn, which for much of this period would have been joined to the mainland, with land extending further westwards for some distance beyond the present coastline (Bell 2007, 9).

1.4.4 These Mesolithic sites include Aberffraw/Trwyn, on Ynys Môn's western coastline, associated with Deepcar-type lithics, which are typically associated with Early Mesolithic (*c* 9500-8200 cal BC) occupation, though this site has also produced later radiocarbon dates (spanning the late eighth to mid-seventh millennia cal BC) suggesting later phases of hunter-gatherer occupation (White 1978; Conneller 2022, 87). There are five other areas on Ynys Môn that have produced Early Mesolithic lithics, lying on both the western and eastern sides of the island (Smith and Walker 2014, fig 1). Other Mesolithic lithic sites on Ynys Môn date to the Late and Final Mesolithic periods (7000-5000 cal BC and 5000-4000 cal BC respectively; Conneller 2022, 25, 296, fig 5.1), with that closest to the bypass at Newborough Warren on the south-western tip of the island, whilst other sites hug its western coastline, with one also present within its interior (Smith and Walker 2014, fig 1). A possible Mesolithic 'monument' also exists on Ynys Môn, at Bryn Celli Ddu, defined by a line of pine posts dating to the early sixth millennium cal BC (*cf* Conneller 2022, 296), whilst a possible later Mesolithic structure has been recorded at Parc Cybi, on Holy Island (Kenney *et al* 2021). Apart from the Mesolithic sites on Ynys Môn, later Mesolithic lithics and an intentionally scratched pebble, together with evidence of burning, have been recorded on the adjacent mainland area at Llandygai, next to Bangor (Lynch and Musson 2001; Kenney 2008). These were only discovered during archaeological excavation and suggested that comparable evidence might also exist in other mainland areas close to Ynys Môn, such as along the route of the bypass.

1.4.5 ***The first prehistoric (Neolithic) farming communities:*** in north Wales, the Neolithic period seemingly starts in the first centuries of the fourth millennium cal BC and continues up until *c* 2500 cal BC (*cf* Griffiths 2011; Lynch 2000a; 2000b). During the earlier Neolithic period, its initial inception witnessed the introduction of farming, focusing on domesticated plants and/or animals, whilst other (usually geographically restricted) artefacts, technologies, and practices were also adopted. These included specific types of pottery and stone tools; the burial of the dead in tombs; the construction of large enclosures; and the emergence of substantial timber houses or halls, as well as small groups of pits, which seemingly relate to areas of occupation (*cf* Bradley 2019). This was followed by a period (*c* 3500-3000 cal BC) when the creation of substantial houses ceased, being replaced by smaller circular or square structures, whilst tombs were also used in slightly different ways. At this time, domestic occupation was still often defined by groups of pits, though new styles of decorated pottery (*ie* Peterborough Ware/Impressed Ware and its regional variants; *op cit*, 81) were also introduced. Then, in the later Neolithic period, new types of monuments appeared (principally henges and stone circles), along with different forms of artefacts, such as stone tools and pottery (*ie* Grooved Ware). These later Neolithic monuments and artefacts were also often geographically restricted, resulting in the appearance of distinctive, Neolithic regional and sub-regional styles and traditions (*ibid*; Cummings 2017).

1.4.6 Evidence for earlier Neolithic remains and activity along the bypass and in the wider Caernarfon area was, however, largely absent prior to the mitigation works. Indeed, the evidence merely included isolated finds of Neolithic polished-stone axe blades, from Caernarfon, and to the south of its airport (Smith 2005a, fig 2), along with an isolated pit in the southern part of the town (Kenney and Parry 2012). Such polished-axe blades seem to represent a typical component of Neolithic culture in north Wales, and many of these were produced at the 'axe-factories' at Graig Lwyd (from Group VII stone), located between Bangor and Llandudno, and Mynydd Rhiw (from Group XXI stone), at the tip of the Llŷn Peninsula (Williams and Davidson 1998; Burrow 2011).

1.4.7 This scarcity of evidence from Caernarfon and the bypass is curious, particularly given the rich body of evidence for earlier Neolithic activity in adjacent areas, specifically on Ynys Môn and at Bangor. Moreover, the evidence from these areas is diverse and includes different types of megalithic tombs, including portal dolmens and passage graves, as well as a collection of unclassified stone-built types, some of which are associated with pottery and lithics (*cf* Lynch 1991; 1997; 2000a, fig 2.1). Both areas also contain evidence for large houses/halls, which were rectangular in shape and constructed in timber; on Ynys Môn these include a single example at Parc Cybi (Kenney *et al* 2021) and four examples at Llanfaethlu (Rees and Jones 2017), whilst two examples are known from Llandygai, near Bangor (Lynch and Musson 2001; Kenney 2008). Furthermore, Ynys Môn also contains a potentially earlier Neolithic enclosure at Bryn Celli Wen, just across the Menai Strait from Caernarfon (*cf* Davis and Sharples 2017). This may have been a causewayed enclosure, a distinctive type of earlier Neolithic monument, which seems to have first appeared in (south) Wales and the Marches in the second quarter of the fourth millennium cal BC (Bayliss *et al* 2011, 548). Other earlier Neolithic remains recorded on Ynys Môn include groups of pits, some associated with pottery, suggestive of temporary occupation, recorded on the line of the upgraded A55 (at Cefn Du and Tŷ Mawr; Cuttler 2012; Kenney and Longley 2012), and pits, postholes, and hearths at Parc Cybi (Kenney *et al* 2021).

1.4.8 At the start of the project, evidence for later Neolithic activity was also absent from the bypass area, though, again, remains from this period are known on nearby Ynys Môn and Bangor. On Ynys Môn, this includes pit groups, with Grooved Ware pottery (*cf* Cuttler 2012; Kenney *et al* 2021, 12-13), probably associated with domestic occupation, and large monuments probably used for congregation and ritual activities, including two henge monuments (at Castell Bryn Gwyn and possibly at Bryn Celli Ddu). It also seems that two large passage tombs on Ynys Môn date to the later Neolithic period, which again may have been used for congregation (Lynch 2000a, 73-7). Later Neolithic ceremonial monuments have also been excavated at Llandygai, Bangor, and these again include two henge monuments, together with a hengiform monument, a small timber cursus monument (though this could potentially be earlier Neolithic in date) and a 'cremation circle' (Lynch and Musson 2001). Areas of later Neolithic occupation were discovered in the vicinity of the monuments, defined by pits, containing Grooved Ware pottery and worked stone, similar to those recorded in Ynys Môn (Kenney 2008).

1.4.9 ***Bronze Age activity:*** this period extends between *c* 2500 and *c* 800 cal BC and is characterised by significant and ongoing changes in technology, particularly involving the introduction of copper/bronze metalwork, and new types of pottery and stone tools, and also changes in settlement and land allotment, burial and ritual practice, and social organisation (*cf* Bradley 2019). Importantly, north-west Wales holds particularly significance for Bronze Age studies, as it forms an important source area for copper ore, used to produce metalwork, the acquisition of which led to the development of extensive exchange networks along Britain's western seaboard. Although initially the ore used to produce the earliest metalwork was from Ireland, this was followed by the exploitation of many regional copper sources in Britain, one of which seems to have included Parys Mountain, on Ynys Môn (Jenkins 1995). The exploitation of these sources seems to have been short-lived and there was a quick switch to obtaining copper ore from the Continent. This pattern dramatically changed, however, in 1600-1400 cal BC, as copper-mining at Great Orme, just up the coast from Caernarfon, dramatically increased to such an extent that it became the major source for most of the metalwork in Britain during this period (*cf* Williams and Le Carlier de Veslud 2019; Bradley 2022, 120). Following this period of intense mining activity, the recycling of existing bronze metalwork became a dominant feature in the later Bronze Age, and the importance of Great Orme dwindled (Bradley 2022, 120).

1.4.10 One noteworthy feature of the earlier part of this period (the Chalcolithic and Early Bronze Age, *c* 2500-1500 cal BC) relates to the treatment and disposal of the dead, which creates a readily identifiable component of the archaeological record. The evidence comprises various types of funerary sites, including upstanding circular burial mounds (stone cairns or earthen round mounds) and flat cemeteries (either unenclosed or enclosed by a ring-ditch). Such sites can contain either human burials or cremated remains, as well as associated artefacts, mainly ceramic vessels that either accompanied the dead, or contained their cremated remains (*ibid*). Such burial sites are common in north-west Wales (*cf* Lynch 2000b, fig 3.1) and several, dating to the Early Bronze Age, have been recorded during developer-funded excavations in the wider environs of the bypass, on nearby Ynys Môn. These include a probable round mound covering eight stone cists, and adjacent burial monuments defined by a ring-ditch and a D-shaped enclosure, at Parc Cybi (Kenney *et al* 2021), and a cremation cemetery, defined by cremation pits, some containing cinerary urns, at Cefn Rhostrehwfa on the route of the A55 (Roberts *et al* 2012).

1.4.11 Bronze Age burial sites also present much closer to the bypass, with one potential example directly adjacent to its northern end, between the Plas Menai roundabout and Bethel Road (Balfour Beatty/Jones Bros JV 2016, 111). This was probably at Crug House (Fig 2), based on discoveries made in 1855 and 1868, during farming operations, which recovered burnt bones, cinerary urns, and a smaller vessel (a pygmy cup), as well as bronze implements, including two pins, and a double-looped palstave axe from this location (*ibid*). Although the form of this burial site is unknown, significantly, the place-name ‘Crug’ translates as ‘mound’, suggesting that these finds may originally have been associated with a Bronze Age round mound/barrow. A second round mound is also known in the wider environs of the bypass, at Bryn Seiont, south of Caernarfon, from which a pygmy cup and cinerary vessel were recovered (*ibid*). In addition, a bronze palstave is known from Glan Gwna, in the wider environs of the bypass, which could tentatively derive from another burial (*ibid*), whilst a round mound and cinerary urn, a possible ring-ditch, and Bronze tool have been recorded on the outskirts of Caernarfon (Swallow 2019).

1.4.12 In the Caernarfon area, settlements dating to the Bronze Age directly are elusive, though Early Bronze Age open (unenclosed) settlements may have existed based on the wider evidence from Wales and western/northern Britain. These would contain one or more small roundhouses, supported by post-rings, with timber, stone, or turf/clay outer walls (*cf* Pope 2015; Ghey *et al* 2007; 2008). This roundhouse tradition, within open settlements, continued into the Middle and Late Bronze Age (1500-1100 cal BC and 1100-800 cal BC respectively), when the landscape began to be more systematically divided through the construction of field systems and enclosures (Bradley 2019, 218-26). In north-west Wales, the final centuries of the second millennium cal BC also witnessed the appearance of enclosed/defensive settlements (including hillforts and ‘concentric circular settlements’; *cf* Ghey *et al* 2008), although open settlements were still in use (Waddington 2013, 12). Indeed, one good example (a concentric circular settlement) has been identified not far from Caernarfon, at Arfyn, Bodedern, Ynys Môn, which consisted of a roundhouse central to a circular ditched enclosure (Hedges 2016). It also seems that many of these settlements were long-lived, as opposed to the more transient settlement that charaterised the earlier part of the Bronze Age (Waddington 2013, 13). Given this, there was a slight chance that similar roundhouse settlements might be found along the route of the bypass, although, as in other areas, these would be largely invisible at ground level. Therefore, their discovery would only be through excavation, as has been the case on Ynys Môn, where occasionally Bronze Age timber-built structures have been identified associated with pottery during extensive open-area excavations completed in advance of development (*cf* Kenney *et al* 2021, 16).

1.4.13 Burnt mounds form another component of Bronze Age activity (though they were also used in earlier and later periods) and these are often readily detectable as slight earthworks (Topping 2011). These sites are usually located near to a water source and were seemingly used to heat water, probably for a variety of purposes. This involved heating stones, until red hot, and then placing them in water-filled troughs; once the process was complete, the fire-cracked stones were dumped adjacent to the trough, along with other burnt materials, to form the burnt mound (*ibid*). Significantly, prior to the mitigation works, one example was identified in 2016 close to Bethel Road, during trial trenching (*Section 1.2.2*). Whilst the discovery of this single burnt mound is important, the evidence from the wider area also indicates that these often cluster together, and hence there was a strong possibility that other examples might be present. For instance, excavation at Llandygai, near Bangor, recorded 16 burnt mounds, many of which formed tight groups, with one group containing four burnt mounds and another containing three (Kenney 2008). Moreover, linear development schemes, in western Britain, often expose the remains of multiple burnt mounds along their routes (*cf* Maynard 1993; Kenney *et al* 2014; Bailie 2021; Brown *et al* forthcoming), with, for instance, two nearby schemes in Ynys Môn (the A55 and work along a water pipeline) together recording over 50 burnt mounds (Davidson 1998; Maynard 2012), and, given this, it seemed possible that multiple burnt mounds would be present along the bypass.

1.4.14 ***Later prehistoric (Iron Age) settlement:*** in north Wales the Iron Age extends between *c* 800 cal BC until the arrival of the Roman military in mid-first century AD (*Section 1.4.17*), with this area, perhaps, falling within the territory of the Ordovices, or one of its sub-groups, in its later stages (Arnold and Davies 2002, 3-12). Throughout the Irish Sea area, the Iron Age is characterised by the emergence and proliferation of distinctive forms of settlement associated with an increase in woodland clearance and agricultural production (*cf* Bradley 2019, 276-7). It is notable that this evidence seems to dominate, and other aspects of Iron Age activity, such as formal burial, are rare, especially in western Britain (*cf* Harding 2016). In north-west Wales, these settlements have been classified into various types (*cf* Waddington 2013; Ghey *et al* 2008), but they broadly comprise those enclosed by palisades, banks, ditches or walls (with curvilinear- or rectilinear-shaped enclosures) and unenclosed settlements. In both cases, the roundhouse tradition established in the Bronze Age continued (*Section 1.4.12*). Many of these sites also occupied defensive situations (including hillforts and coastal promontory forts, which are scattered across north-west Wales; *cf* Smith 2018) and their boundaries (and indeed some of the roundhouses) were often of monumental proportions (*cf ibid*).

1.4.15 Several of these Iron Age settlements have been excavated in the wider environs of the bypass, in the area between Carernarfon and Bangor, and on the south-eastern side of Ynys Môn (*cf* Ghey *et al* 2008, fig 1). On the mainland, they consist of roundhouses and four-post structures at Llandygai, Bangor, rather unusually, within the confines of a pre-existing henge monument (*Section 1.4.8*; Lynch and Musson

2001). An early Iron Age unenclosed house was also present in an area immediately to the south (at Parc Bryn Cegin), along with two enclosed (clay-walled) roundhouse settlements dating to later Iron Age (Kenney 2008). Another excavated mainland site is at Bush Farm, some 2km north-east of the bypass, on the line of the A487, which again comprised an unenclosed clay-walled roundhouse (Longley *et al* 1998). Similarly, in south-eastern Ynys Môn, a multi-period rectilinear enclosed settlement has been excavated at Bryn Eryr (Longley 1998), whilst an unenclosed settlement was recorded at Cefn Du, on the line of the A55 (Cuttler 2012). Further along this route, a similar unenclosed settlement was excavated at Melin y Plas (Smith 2012). The area occupied by present-day Caernarfon also seems to have used for Iron Age settlement. Specifically, a possible defended Iron Age settlement/fort is known at Twthill, north-west of Caernarfon Castle, which has also produced an Iron Age cremation burial (Swallow 2019), with a possible later prehistoric palisaded enclosure and pits recorded during excavations within Caernarfon's Roman fort (Casey *et al* 1993, 27; *Section 1.4.18*). Mention must also be made of Dinas Dinlle, an impressive Iron Age coastal fort, *c* 3.7km south-west of the southern end of the bypass, which forms a highly visible landmark containing several roundhouses, two rectilinear enclosures, and an earlier Bronze Age barrow, indicating it was occupied over an extended period (Waddington 2013, 177).

1.4.16 In addition, several potential Iron Age settlements seem to be present much closer to the bypass, though only one, the Scheduled Monument at Bryn-Glas (Fig 2), has been subjected to limited archaeological excavation (SAM: CN188; Balfour Beatty/Jones Bros JV 2016, 113). The scheduling description (compiled in 1995) indicates that this forms a rectilinear enclosure, initially interpreted as a Roman signal station, although geophysical survey has revealed circular anomalies suggesting that it could be a later prehistoric enclosed settlement, perhaps comparable in form to that at Bryn Eryr, on Ynys Môn (*Section 1.4.15*). The other potential, though unexcavated, Iron Age settlements comprise an unenclosed settlement, with at least two stone-built roundhouses, and an associated field system, at Pont-Rug (*op cit*, 111). This Scheduled Monument (SAM: CN229) lies just to the east of the northern section of the bypass, adjacent to the Afon Cadnant (*Section 1.3.4*). Just to its north is the Scheduled Monument (SAM: CN400) at Caerlan Tibot, which again seems to be an enclosed Iron Age settlement (Smith 2005b, 13), though there is also a possibility that it was also occupied during the medieval period (J Emmett *pers comm*), based on its similarities to a medieval earthwork site located at Hen Gastell, close to the southern end of the bypass (*Section 1.4.28*). Significantly, cropmarks between Pont-Rug and Caerlan Tibot could form additional elements of Iron Age settlement, defined by roundhouses, field systems, and curvilinear ditched enclosures (Balfour Beatty/Jones Bros JV 2016, 112). Another potential settlement at the southern end of the bypass is a possible defended promontory settlement/fort at Dinas Dinoethwy (Fig 2), which is depicted on historical mapping (OS 1890a; Smith 2005b, 14). Several potential Iron Age earthworks also exist further south, some 770m west of the bypass, which are Scheduled Monuments, defined by compact groups of roundhouses contained within enclosure, one (SAM CN278) north of Rhedynog Felen Bach and the other (SAM CN212) east of Dinas y Prif; Smith 1998). Both were also directly adjacent to Dinas y Prif, a well-defined rectilinear ditched enclosures, which has similarities with the rectilinear enclosure at Bryn-Glas (*Section 1.4.16*) and Bryn Eryr, on Ynys Môn (*Section 1.4.15*). Therefore, the origins of this site might also reside in the Iron Age, though there have been various suggestions that it dates to later periods (*cf* Smith 2005b, 11).

1.4.17 ***Roman period:*** the first incursions by the Roman military into Wales was in AD 47, though it was not until AD 60 that the army first reached north-west Wales, where it attacked Ynys Môn, then a convenient stronghold for the native population (Arnold and Davies 2000, 5). This was followed by a quick retreat from north Wales, again in AD 60, to counter the Boudiccan revolt in southern England (*op cit*, 11). It was not until the reign of the Flavian emperors, ten years later, that military campaigning in Wales resumed, which resulted in the conquest of north-west Wales in late AD 70s, under the Roman governor Agricola, who defeated the Ordovices and seized Ynys Môn (*op cit*, 15).

1.4.18 The most graphic expression of the Roman conquest was the construction of an auxiliary fort at Caernarfon (*Segontium*) in *c* AD 78 (Fig 2). This was the largest Flavian fort in north Wales, designed to accommodate a 1000-strong infantry cohort (Casey *et al* 1993, 10). A construction camp associated with its construction probably lay to the south-east (Kenney and Parry 2012). Occupation at *Segontium* continued into the early second century, the fort's barracks being rebuilt on numerous occasions (Casey *et al* 1993, 11). During the mid-second century, although many auxiliary forts in Wales were abandoned, Caernarfon continued to be garrisoned, although on a reduced scale, and internal stone buildings were constructed, together with a stone curtain wall (*op cit*, 47-65). The most spectacular building contained a courtyard and bath-house, perhaps the residence of a *procurator metallorum* (an imperial freedman, in charge of soldiers and mining activities in the area; *op cit*, 13). Occupation then continued throughout the remainder of the second century and also throughout the third and fourth centuries, mostly with very small garrisons; however, the garrison was increased in AD 330 in response to the threat of Irish raiders, when it also seems to have housed a Roman unit, forming an element of the *limitanei* (frontier garrison; Arnold and Davies 2000, 28-31, 143). This threat also resulted in the construction of a small fort on Ynys Môn, at Holyhead, and a watch tower/signal station on Holyhead Mountain (Hopewell 2010; Crew 2010), which, together with Caernarfon, formed an integrated coastal defensive system (Arnold and Davies 2000, 33). The fort at Caernarfon was then occupied throughout most of the fourth century, eventually forming the last Roman garrison post in Wales, which was finally abandoned in *c* AD 393 (*op cit*, 33). It is also possible that in AD 383 the garrison was greatly reduced by Magnus Maximus (Emperor of the Western Roman Empire, AD 383-388) who passed his authority to Welsh leaders, and who may even have sanctioned Irish settlement in Wales (*op cit*, 146).

1.4.19 Following the establishment of the Roman fort, an extramural settlement (*vicus*) grew up outside its gates in the late first century, providing goods and services to the garrison, and also housing the dependents of the troops (*cf* Davies 1990; Sommer 2006). This settlement was extensive, surrounding the north-eastern, north-western, and south-western sides of the fort. It probably also partly functioned as a market centre visited for the local population, though it was also occupied by outsiders to the region, evidenced through the discovery of a gold amulet that perhaps belonged to a merchant from the eastern Mediterranean (Arnold and Davies 2000, 62). This settlement had been abandoned by the late second century, possibly a result of a reduction in the numbers of stationed troops (*Section 1.4.18*), changes in supply, or perhaps due to civilians being allowed to live within the fort in the later Roman period (*op cit,* 26, 58). Roman cremation cemeteries were also placed outside the south-eastern and northern sides of the fort, whilst close to its eastern side was a Mithraic temple (Pollock 2006; Boon 1960).

1.4.20 Beyond the fort and *vicus*, the pattern of rural settlement established in the later prehistoric period seems to have largely continued (*Section 1.4.14*), perhaps because of the absence of Roman urban centres, or villas, in this region, these being confined to south Wales (Arnold and Davies 2000, 45-57, 62-4, 80-7). Indeed, many settlements established in the Iron Age continued to be occupied, with no clear evidence for a break in occupation. These include excavated settlements on Ynys Môn, such as Bryn Eryr, Cefn Du, and Melin y Plas (*Section 1.4.15*; Longley 1998; Cuttler 2012; Smith 2012), and also on the mainland at Bush Farm and Llandygai (Parc Bryn Cegin) (*Section 1.4.16*; Longley *et al* 1998; Kenney 2008). Based on the recovery of Roman pottery and coins, the forts at Dinas Dinlle (*Section 1.4.15*) and Dinas Dinoethwy (*Section 1.4.16*) were perhaps also occupied during the late Roman period (Waddington 2013, 108, 177), and the same may also be the case with the rectilinear enclosure at Dinas y Prif (*Section 1.4.16*), based on the presence of (rectangular?) stone buildings (Smith 2005b, 12). Similarly, on the basis of the artefacts recovered, the potential Iron Age settlement area at Caerlan Tibot (*Section 1.4.16*), adjacent to the bypass, was perhaps also occupied during the Roman period (*op cit*, 13). It seems then that some settlements adopted elements of Roman material culture (*eg* Roman pottery and metalwork), coinage, and building styles (*ie* rectangular buildings), and it may well be that their inhabitants were supplying agricultural surpluses and raw materials to the Roman forts/*vici* in return for Romanised products, and were adopting Roman architectural styles (Waddington 2013, 22). In addition, new forms of settlement appeared, specifically, those enclosed by rectangular or polygonal stone walls, which, again, produce rich assemblages of Roman finds (*ibid*). One unique settlement was also established close to the bypass, at Tai Cochion, on the Ynys Môn shore of the Menai Strait, directly opposite Caernarfon. This seems to have been an unenclosed market settlement, situated on a Roman road, with several high-status buildings set in large rectangular plots, which was situated at a crossing point between Ynys Môn and the mainland (Hopewell 2016).

1.4.21 One other distinctive feature of the Roman military occupation was the establishment of a network of roads to link the forts and other military installations. Prior to the archaeological mitigation works, it was suspected that three major Roman roads running from Caernarfon (*Section 1.4.18*) crossed the bypass (Fig 2), designated RR67c, RR68, and RRX95 (*cf* Margary 1967, 350-2; Hopewell 2007, 14). Of these, RRX95 was suggested to extend southwards from Caernarfon to an auxiliary fort at Pen Llystyn; however, it seems that in the vicinity of the bypass this road followed the modern A4871, passing through Bontnewydd, and hence had been potentially destroyed, this being unavailable for further investigation (Hopewell

2007, 14). Road RR68 was thought to extend between Carernarfon and the auxiliary fort at Tomen y Mur (Margary 1967, 351-2), though, again, close to the bypass, this may have followed the modern A4085 (Hopewell 2007, 12).

1.4.22 The third road, the RR67c, is thought to have connected Caernarfon with the auxiliary fort at Caerhun (*Canovium*), next to the River Conwy, and then ultimately with the legionary fortress at Chester (Margary 1967, 350-1). Moreover, this road was highly significant, forming a major route of communication throughout the Roman period, appearing as *Iter XI* in the Antonine Itinerary, with six milestones known on its route from other parts of Gwynedd (Hopewell 2007, 6). Close to Caernarfon, tracing its precise course is, however, complicated, as four potential routes have been suggested. Three of these were determined on the basis of topography and the alignments of modern features, and so can probably be disregarded as *bona fide* features; however, prior to the mitigation works, the fourth route seemed a more secure possibility, as it was partially identified on aerial photographs, in hedgerow alignments, and as a slight earthwork (*ibid*), and also as an anomaly detected by geophysical survey (*Section 1.2.1*; Stratascan 2015). This route traversed the bypass at Cibyn and this location was flagged as an important area for investigation during the mitigation works (Fig 2).

1.4.23 ***Early medieval period:*** the start of the early medieval period notionally begins in the early fifth century, continuing until the Norman conquest in the late eleventh century (*Section 1.4.27*). Initially, it witnessed continued threats from Irish raiders, a feature characteristic of the late Roman period (*Section 1.4.18*), though occurring with greater intensity, and also further incursions from Ireland in the eighth and ninth centuries by Viking raiders from Dublin (Griffiths 2010; Charles-Edwards 2014). These all seem to have resulted in settlement in the area (particularly on Ynys Môn) and probably competition/friction between the new settlers and indigenous groups (Waddington 2013, 24). This period in north-west Wales was, however, certainly formative (*cf* Carver 2019), in that it witnessed the widespread adoption of Christianity, and all of it associated trappings relating to worship and burial (*ie* churches/chapels, monastic sites, inscribed stone crosses, and cemeteries; Waddington 2013, 23), as well as the formation of small Christian kingdoms. These were potentially structured along the lines of the ‘multiple estate model’, with estates being divided into *maerdrefi* (townships), with those at the top of the social hierarchy (a territorial lord) owning land, which was farmed by subordinate kinship groups in return for military protection (Jones 1976; Davies 1982, 32; Edwards 1997). The documentary evidence also indicates that these smaller territories had coalesced (though they were probably still broadly independent) into the kingdom of Gwynedd by the mid-sixth century (Davies 1982, 90). In western Britain, the period also seems to be partly defined by the use of defended settlements (including, in north-west Wales, hilltop sites and sites that had seen earlier occupation; Waddington 2013, 24; Seaman 2016), which were often associated with metalworking and had access to imported Mediterranean goods, including pottery and glass (Carver 2019, 189).

1.4.24 Although some details relating to the history and structure of early medieval Wales can be broadly surmised, some 20 years ago it was succinctly noted that this period ‘remains poorly understood because of the relative lack of data, and uncertainty as to whether that paucity reflects the true state of affairs or rather archaeologist's inability to locate and identify the evidence' (Arnold and Davies 2000, 142). Fortunately, since this statement was made, more early medieval sites have come to light, though its gist remained pertinent some ten years later (Waddington 2013, 23), and still largely holds true today (cf Hopewell and Edwards 2017, 232). It is also probable that settlement patterns, at least, were highly complex and discerning these on the basis of the rather limited archaeological dataset will undoubtedly be difficult (Edwards 1997).

1.4.25 Unsurprisingly then, at the start of the mitigation works, the evidence for early medieval activity along the bypass and its environs was minimal. It included the single radiocarbon date from Morogoro, at the southern end of the scheme, obtained on charred material recovered from an evaluation trench (*Section 1.2.2*). This seemed to suggest some form of early medieval activity (potentially associated with metalworking), or even settlement, in this area, though the nature of this was not entirely clear. It has also been suggested that the nearby rectilinear enclosure at Dinas y Prif (*Section 1.4.16*) is early medieval in date, on the basis on folklore identifying it as the residence of an early Irish (Viking) settler (a Goidel), though this is purely anecdotal (*cf* Smith 2005b, 11). Just beyond the bypass, in Bontnewydd, there was also evidence for a cross-incised stone that once stood beside the Afon Beuno (a small tributary of the Afon Gwyrfai; *Section 1.3.3*). This cross was reportedly at Glan Beuno House, though it has now been moved, and is suggested to be a relic of St Beuno's short-lived church at Gwaredog and would, as such, date to *c* 630 (Hemp and Raleigh Radford 1961).

1.4.26 On the western side of the bypass, it is possible that the Roman fort at Caernarfon acted as a focus for post-Roman settlement. This could have involved reusing existing Roman buildings, as no evidence for early medieval structures has been encountered, and this may also explain the presence of two early medieval coins recovered from a Roman guard chamber (Casey *et al* 1993, 16-17). In addition, confirmation of an early medieval settlement at Caernarfon is provided by an inhumation cemetery and five mortuary enclosures (resembling Iron Age square barrows), possibly dating to the sixth-seventh centuries, at Ysgol yr Hendre, immediately to the south-east of the fort (Kenney and Parry 2012). This early medieval cemetery also complements several other similar burial grounds that have been excavated across the wider area, such as those at Tŷ Mawr and Parc Cybi, on Ynys Môn (Kenny and Longley 2012; Kenney *et al* 2021), and Llandygai, Bangor (Lynch and Musson 2001). More direct evidence for early medieval settlement has also been recorded on Ynys Môn, including a rectangular stone building, probably dating to the seventh or eighth century, and an associated field system, at Rhuddgaer, in the south-western part of the island, opposite Caernarfon (Hopewell and Edwards 2017). In addition, other early medieval rectangular buildings are known from the northern and eastern parts of the island, at Carrog, Llanbadrig (Smith 2014) and Llanbedrgoch (Redknap 2000; 2004). Corn-dryers also seem to be another feature associated with early medieval activity in north-west Wales, and several dating to this period are known from Ynys Môn, such as those at Parc Cybi, the location of which were seemingly influenced by earlier Roman boundaries (Kenney *et al* 2021).

1.4.27 ***Later medieval period:*** in Wales, the later medieval period begins with the Norman incursions into the region, followed by conquest and colonisation, and nominally ends with the Act of Union in 1536 (Davies 2000). Close to the bypass, many of these later medieval events are manifest at Caernarfon, which, in Wales as a whole, forms an extremely significant later medieval site. In summary, it seems that at the end of the early medieval period Caernarfon (meaning 'fort in the district of Arfon') was the site of a township. This also formed the centre and demesne lands of the Welsh princes of Gwynedd, with their court (*Ilys*) and manor house perhaps being on the site of the later castle (Swallow 2019; *below*). It is possible that a motte-and-bailey castle was then constructed there in *c* AD 1090 by Hugh de Avranches, the Earl of Chester, during the first brief Norman incursion into the region (*ibid*). After Edward I's conquest of Wales (1282-3), Caernarfon New Castle was established, in 1284, along with an adjacent walled borough (bastide) that was also granted a charter in 1284 and formed the administrative capital of north Wales. By the mid-fourteenth century, the castle served as a depot for the armament for other castles in North Wales. Nevertheless, it continued to be maintained and garrisoned and withstood sieges in the early fifteenth century during a rebellion led by Owain Glyndŵr (Taylor 1997). This highly impressive piece of medieval architecture and the town walls are still largely extant, and their historical and architectural significance has been internationally recognised, resulting in the site being inscribed with World Heritage Site (WHS) status (UNESCO 1986).

1.4.28 The route of the bypass crosses the later medieval agricultural hinterlands that surrounded the castle, and it is probable that many of the contemporary settlements in this area also functioned as such in this period, though, due to later rebuilding, this is not proven (Balfour Beatty/Jones Bros JV 2016, 114). The desk-based assessment did, however, flag up some potential later medieval sites along or adjacent to the route of the bypass (*ibid*). One of these is a small, embanked enclosure, at Hen Gastell, which is situated on a promontory above the Afon Carrog, just south of the southern end of the bypass (Fig 2). This earthwork has been subjected to survey and excavation, which has indicated that it dates to the eleventh-twelfth centuries and represents a high-status defended site, containing a timber tower or hall, that was partly involved in metalworking (Kenney 2014). Based on the documentary evidence, the wider area also appears to have contained small-scale medieval industry associated with textile fulling and iron production (Balfour Beatty/Jones Bros JV 2016, 114). The geophysical survey completed along the route of the bypass also detected numerous anomalies that seemingly relate to medieval ridge-and-furrow cultivation (Stratascan 2015), whilst close to the Plas Menai roundabout, at the northern end of the bypass, an anecdotal account suggested the presence of a medieval holy well, though the presence of this feature is far from certain (Balfour Beatty/Jones Bros JV 2016, 114).

1.4.29 ***Post-medieval and modern landscape:*** in the vicinity of the bypass, the form and division of the present landscape is largely a product of post-medieval and modern activity, particularly that spanning the eighteenth-twentieth centuries. It was, for instance, during this period that most of the farmhouses and rural buildings were constructed, which are now recognised as heritage assets, with several of the more architecturally significant being designated as listed buildings (Balfour Beatty/Jones

Bros JV 2016, 115-16). It was also during this period that the settlements at Caernarfon underwent considerable expansion, as did some of the smaller settlements in the area, such as Bont-newydd. Parliamentary enclosure was implemented during the late eighteenth-early nineteenth centuries, creating a landscape of bounded fields, many of which are still extant (*ibid*). Enclosure was also accompanied by land improvement that included the draining of wetlands and the reduction of woodlands to bring more land into agricultural production (*ibid*).

1.4.30 In addition, throughout the eighteenth and nineteenth centuries, industry brought about other changes to the landscape, with several of these industrial concerns being situated close to the bypass. These include small-scale quarrying, evidenced at the far northern end of the bypass, close to Plas Menai, by a small quarry, depicted on historical mapping, which by 1889 was no longer in use (OS 1889e). Brick manufacture formed another small-scale nineteenth-century industry in this area, as just to the north-west, on the coast, the Parkia Brickworks was operating at this time (which prior to this may have been a fulling mill; Williams 2019), whilst two other brickworks are shown on nineteenth-century OS mapping (OS 1890b) in the central section of the bypass, these being the Peblig Brickworks and Seiont Works. These works were established in the nineteenth century and were eventually purchased by John Summers & Sons Ltd in 1931, before being nationalised, for a short time, in 1967 (RCAHMW 2021a).

1.4.31 Nineteenth-century mapping (OS 1890b) also indicates that the Afon Seiont was a highly significant focus for other industries, which required water for power and/or for use in specific processes. Close to the bypass, these included two woollen factories, the Snowdon Woollen Factory to the east of the bypass and the Peblig Woollen Factory to the west (directly adjacent to the Peblig Brickworks; *Section 1.4.30*), both of which were associated with a weir and mill race. It is also possible that the Snowdon Woollen Factory dated to before the nineteenth century, being originally established as a water-powered corn mill (Evans and Burnett 2012). Another mill was also immediately west of the bypass, which is named on nineteenth-century mapping as the Bod-Rhual Flour Mill, which, again, was powered by a weir upstream, on the Afon Seiont, from which water was diverted to the mill along a 425m-long mill race (*ibid*). Another industrial works to the just west of the bypass, on this river, was the Seiont Tannery, which also received water from a leat, whilst further to the west, just beyond the Seiont Brickworks (*Section 1.4.30*), was Seiont Mill, which operated as a corn mill, and Glanmorfa Slate Works, both of which were powered by water flowing along mill races (*ibid*; RCAHMW 2021b). The slate works also functioned as a processing works with raw materials being transported to the site along a nearby railway (*Section 1.4.32*) and then along a short viaduct which crossed over the Afon Seiont (RCAHMW 2021b). In between these works and the Peblig Brickworks to the north-east (*Section 1.4.30*) was also the Caernarfon Union Workhouse, built in 1845 (RCAHMW 2021c), and the Borough Hospital, for infectious diseases, which is depicted on the OS map of 1890 (OS 1890b).

1.4.32 Another defining feature of the nineteenth century is improvements in communications through the growth of the railways, with three lines being constructed around Caernarfon. The first was the Bangor and Carnarvon railway along the coast just to the north of the bypass, which opened in 1852 (Baughan 1991, 92-100), whilst the other two lines from Caernarfon are traversed by the bypass. These were the Carnarvon and Llanberis Railway, which followed the course of the Afon Seiont, opening in 1864 (*ibid*). It is crossed by the central section of the bypass, and was primarily designed for the transportation of slate from Eryri. It also crossed the Afon Seiont several times, which required the construction of a series of bridges, and was linked to the Bangor and Carnarvon line in 1865, via the Carnarvon Town Line (*ibid*). The other line was the Carnarvonshire Railway, which opened in 1867, and formed a link between Caernarfon and Afon Wen (*ibid*). This ran southwards from Caernarfon (where it is traversed by the southern section of the bypass) through a series of railway cuttings and across several bridges that were built across the Afon Seiont and Afon Gwyrfai. By 1889, all three lines were owned by the London and North Western Railway (L&NWR) company (*ibid*).

1.5 Original Aims and Objectives

1.5.1 The primary aim of the site mitigation works was to identify and record the archaeological resource along the bypass, which might be impacted on by its construction. Following this, and in the line with the WSI (*Section 1.1.1*), the aim was then to consolidate the archive, to ensure its long-term survival and suitability for deposition in an appropriate repository, and to assess its significance and determine its potential to contribute to wider research agendas, through post-excavation analysis. A further aim was to disseminate the archaeological results from the project, particularly those gained from additional analysis to the public, and to place these in their local, regional, and national contexts.

1.6 Project Scope

1.6.1 This post-excavation assessment focuses on the archaeological and palaeoenvironmental remains that were excavated during the mitigation works. It therefore assesses the results gained from the controlled archaeological strip and open-area excavations (*Sections 1.2.5* and *1.2.6*). The results of the evaluation completed by OA at the start of the mitigation works (*Section 1.2.4*) also form part of this assessment, with the results from the first stage of trial trenching (completed prior to the mitigation works) considered when these provide additional details relevant to the assessment (*Section 1.2.2*). During the mitigation works, the removal of extant field boundaries (*Section 1.2.7*) was also observed; however, none were found to have any complexity or produced datable materials, and therefore are not considered further, with the records relating to this element of the project being lodged in the archive. In addition, the cores extracted during the borehole sampling programme (*Section 1.2.8*) have also been considered as part of the assessment.

2 FACTUAL DATA: STRATIGRAPHY

2.1 General Introduction

2.1.1 The archive of primary stratigraphic data from the mitigation works was collated (Table 1), as part of the consolidation phase (*Section 1.2.21*), which checked the integrity of the data. This archive contains 23,041 individual items, comprising written indices, context records, and other records (watching brief records/trench records/site notes/day sheets), along with plans and section drawings, and digital survey files and photographs. All stratigraphic data are also available as a digital resource, accessible through the project database and WebMap (*Section 1.2.21*).

Record type	Number
Indices	749
Context records	4293
Other written records	29
Plans and sections	2568
Digital survey data files	1,153
Photographs	14,249
Total	***23,041***

Table 1: Summary of the stratigraphic archive relating to all investigated areas along the bypass

2.1.2 Archaeological features were encountered along most of the bypass, apart from chainage 9000-9100 at its far northern end, where earlier activity had been destroyed by previous development work. In addition to the archaeological remains, several natural features were identified, the more significant of which seem to have been the focus for human activity. Radiocarbon dates were obtained as part of the assessment to provide chronological details for a selection of the stratigraphic remains (*Section 4.7*). Those quoted in this section have been calibrated at the 95% confidence level and are followed by the uncalibrated (BP) date, and laboratory code.

2.1.3 ***Landscape units:*** as the stratigraphic data extend along a linear scheme, they have been split between five units of landscape that are principally defined and bounded by the rivers that cross the route of the bypass (*Sections 1.3.3* and *1.3.4*). These divisions can also be directly related to the engineering chainage that was used during construction (Fig 3).

2.1.4 Moving from south to north, Landscape 1 forms the first and smallest landscape unit, sandwiched between a tributary of the Afon Carrog and the Afon Rhyd (*Section 1.3.3*), between chainages 200 and 500 (NGR: SH 47111 57890 to SH 471157 58271). Landscape 2 starts on the northern side of this tributary of the Afon Carrog, at chainage 500, and covers a block of landscape (NGR: SH 47171 58289 to SH 47299 59753) up to the southern bank of the Afon Gwyrfai, at chainage 2000 (*Section 1.3.3*). The northern portion of this landscape unit (from chainage 1300) forms a low-lying area that represents the floodplain for the Afon Gwyrfai.

2.1.5 Landscape 3 is the largest of the landscape units, extending from the Afon Gwyrfai, at chainage 2000 (NGR: SH 47296 59772), with its northern edge being defined by the Afon Seiont (*Section 1.3.4*), just beyond chainage 5300 (NGR: SH 49588 62133). Across much of this area, the bypass follows the course of a tributary of the Afon Gwyrfai (*Section 1.3.4*), the source of which lies to the north of Meifod. The southern part of this landscape unit, in the vicinity of Bontnewydd, also contains a river terrace associated with, and to the north of, the Afon Gwyrfai, which is marked by a fairly steep slope running down to this watercourse.

2.1.6 Landscape 4 is defined as between the Afon Seiont and the Afon Cadnant at chainage 8100 (*Section 1.3.4*; NGR: SH 49609 62136 to 51006 64269). The northern landscape, Landscape 5, covers the remaining part of the bypass, running from chainage 8200, just north of the Afon Cadnant, up to Plas Menai at chainage 9800 (NGR: SH 50992 64501 to 50520 65747). This landscape unit is crossed by the distributary of the Afon Cadnant (*Section 1.3.4*) and contains the Caerlan Tibot Scheduled Ancient Monument (*Section 1.4.16*).

2.1.7 As part of the assessment, the stratigraphic data from the open-area excavations and watching brief areas within each of these landscape units have been examined, with an emphasis being placed on understanding the character of the activity that this information reflects, and its sequence, which in many instances can be determined by the relative positions of stratigraphic units (such as intercutting ditches, pits, and postholes). In addition, the artefactual materials from individual stratigraphic units, along with the radiocarbon dates, have been essential in determining the date of many of the excavated deposits and features.

2.1.8 Based on this assessment, it has been possible to group the archaeological remains from the separate landscape units into 31 sites and situate these into a chronological and sequential framework, with eight broad phases of activity being identified along the bypass, spanning the Mesolithic period through to the post-medieval period (Table 2). At this stage, and based on the large number of radiocarbon dates obtained as part of this assessment, this phasing is considered fairly robust, although a more nuanced interpretation of the date and sequence of the excavated remains will be possible following the implementation of a further programme of scientific dating and stratigraphic analysis.

Phase	Landscape 1	Landscape 2	Landscape 3	Landscape 4	Landscape 5
Phase 1: Mesolithic		***Site 10:*** buried land surface	***Site 15:*** lithics and other stone tools associated with buried land surface		***Site 27:*** buried land surface/natural hollows, Pit Group 13, and Structures 6 and 7
Phase 2: Neolithic		***Site 4:*** Post Alignment 1 and Pit Group 3	***Site 11:*** Pit Groups 5 and 6 ***Site 17:*** Pit Group 8		***Site 27:*** pit (?) and Structure 8 (?) ***Site 30:*** pit (part of Pit Group 25)
Phase 3: Bronze Age		***Site 7:*** Structures 1 and 2, cairns, and Burnt Mound 1	***Site 12:*** Structure 4 ***Site 15:*** Burnt Mounds 11, 12, and 17, and pit ***Site 16:*** Burnt Mound 16 ***Site 19:*** pit		***Site 27:*** Cremation cemetery (Pit Group 14), Pit Group 15, Burnt Mound 18, and Structures 9 and 10 ***Site 30:*** pit (part of Pit Group 25)
Phase 4: Iron Age					***Site 29:*** ditch surrounding Burnt Mound 23 and Enclosure 15
Phase 5: Roman		***Site 3:*** Buildings 1 and 2		***Site 25:*** Roman road	***Site 27:*** pit
Phase 6: Early medieval	***Site 1:*** Pit Groups 1 and 2	***Site 5:*** Settlements 1 and 2, Buildings 3-5, and ancillary features			***Site 27***: pits (?); including some from Pit Group 16) ***Site 30:*** pit
Phase 7: Later medieval			***Site 15:*** pits		***Site 27:*** Pit Groups 17 and 18 (?) ***Site 29:*** pits
Phase 8: Post-medieval	***Site 2:*** Ditch Group 1 (boundary ditches)	***Site 3:*** boundary ditches ***Site 5:*** boundary ditches ***Site 6:*** lynchet, boundary ditches, and pits ***Site 8 (north):*** Enclosure 1, Fence 1, Pit Group 4, and Buildings 6 and 7	***Site 11:*** boundary ditches ***Site 12:*** Ditch Group 3 ((boundary ditches) and Enclosures 3-11 ***Site 13:*** Ditch Group 4 (boundary ditches) and Fence 2 ***Site 14:*** Pit Group 7 ***Site 15:*** Ditch Group 5 (boundary ditches) and Structure 5 ***Site 17:*** field boundaries ***Site 18:*** Ditch Group 6 (boundary ditches) ***Site 20:*** pits and ditch	***Site 21:*** boundary ditches ***Site 22:*** pits and ditch ***Site 23:*** Municipal Boundary, Trackways 2-4, Enclosure 12, and Ditch Groups 7 and 8 (field systems) ***Site 24:*** Ditch Group 9 (field system) and Enclosure 13 ***Site 26:*** pit	***Site 27:*** boundary ditches and pits (some in Pit Group 16) ***Site 28:*** hedgerow ***Site 31:*** Ditch Group 11 (field boundaries)
Presently undated	***Site 2:*** tree-throw (containing burnt material suggestive of prehistoric activity)	***Site 3:*** pits and postholes ***Site 5:*** pits ***Site 8 (north):*** Trackway 1, Enclosure 2, and pits ***Site 8 (south):*** pits (prehistoric?), ditch, and Structure 3	***Site 12:*** pits and postholes (post-medieval?) ***Site 13:*** Burnt Mounds 3-6 (Bronze Age?) and pits (prehistoric and post-medieval?) ***Site 14:*** Pit Group 7 (post-medieval?)	***Site 23:*** early (township/parish?) boundary ***Site 26:*** Fences 3 and 4 and pits (post-medieval?)	***Site 27:*** Burnt Mounds 19-22 (Bronze Age?), bank (Bronze Age?), Trackway 5, Pit Groups 19-21, Fences 4 and 5, and Structure 11-13 ***Site 28:*** Enclosure 14 and pits ***Site 29:*** Burnt Mound 23

Phase	Landscape 1	Landscape 2	Landscape 3	Landscape 4	Landscape 5
		Site 9: Burnt Mound 2 (Bronze Age?) ***Site 10:*** Ditch Group 2 (post-medieval? Drainage ditches)	***Site 15:*** Burnt Mounds 7, 8, 10, and 13-15, Post Alignment 2, and pits (Bronze Age and later medieval?) ***Site 16:*** Burnt Mound 9 and pits (Bronze Age?) ***Site 17:*** Tree-throws, Pit Groups 9 and 10, and Post Alignment 3 (Neolithic/Bronze Age?), and cow burial (post-medieval?) ***Site 19:*** Pit Groups 11 and 12		(Chalcolithic/Bronze Age?), Enclosures 16 (Iron Age/medieval?) and 17 (Iron Age?), and Pit Groups 22-24 ***Site 30:*** Pit Group 26 and pits and Ditch Group 10 ***Site 31:*** Pit Group 27 and pits (post-medieval?), and Fences 6 and 7 (post-medieval?)

Table 2: Summary and concordance of the archaeological remains from the landscape units, and the character of the associated archaeology

2.1.9 As with rural sites in general, later ploughing and/or truncation has meant that the depth of archaeological stratigraphy was not particularly extensive and hence some stratigraphically isolated features were also recorded. Many of these features also lacked diagnostic artefactual evidence or material suitable for radiocarbon dating and so many are presently undated/unphased, though in some cases it has been possible, based on the location, the date of the surrounding archaeology, and the character of the deposits, to make a 'best-guess estimate' for their age. Many areas of the bypass also contained evidence relating to natural features, such as tree throws, rootholes, and palaeochannels. The date of many of these is also unknown, and only those which have some significant bearing on the archaeological remains are discussed. Similarly, the bypass route also produced a proportion of features relating to the present-day use of the landscape, which again are omitted from this report. These principally comprised field drains and pits, details of these being contained within the project database (*Section 1.2.21*).

2.2 Landscape 1 (chainages 200-500)

2.2.1 Landscape 1 lies at the far southern end of the bypass, between two watercourses (Afon Carrog and Afon Rhyd), which flowed across the route in an east/west direction (*Section 2.1.4*; Fig 3). Prior to the mitigation works, one archaeological trial trench (Trench 96) had been excavated in this landscape unit (*Section 1.2.2*), though this produced negative results (GAT 2016). At the start of construction this area was therefore monitored as part of the general archaeological watching brief (*Section 1.2.7*). The controlled strip completed as part of this work indicated that in this area the topsoil and subsoil (with a combined thickness of *c* 0.45m) sealed superficial deposits of glacial till, into which a scattering of archaeological features had been cut; these have been grouped together as Sites 1 and 2 (Fig 4).

2.2.2 ***Site 1. Early medieval (Phase 6) pits:*** this site was immediately to the north of a tributary of the Afon Carrog, between chainages 200 and 300 (centred on NGR: SH 47184 57946), and was defined by a scattering of 21 shallow pits/postholes. These formed two separate groups (Pit Groups 1 and 2; Fig 5), which seemingly relate to early medieval activity, across a 70 x 30m area next to the bank of the tributary.

2.2.3 Pit Group 1 included two circular pits (***17526*** and ***17523***) at its southern limits and a large oval-shaped pit (***17565***) to the north. This latter pit had been backfilled and recut on several occasions and returned two radiocarbon dates of cal AD 600-665 (1397±24 BP; SUERC-105175) and cal AD 655-775 (1313±24 BP; SUERC-105176), along with a fragment of (intrusive) post-medieval pottery. At the centre of the group were several intercutting pits, one of which (***17568***) contained undiagnostic handmade pottery, whilst another (***17550***; Plate 1), backfilled with charcoal and redeposited natural material, produced radiocarbon dates of: cal AD 570-650 (1460±24 BP; SUERC-105177); cal AD 435-605 (1530±24 BP; SUERC-105178); cal AD 545-640 (1490±24 BP; SUERC-105179); and cal AD 575-650 (1452±24 BP; SUERC-105180). Pit Group 2 lay *c* 33m to the south and contained six sub-circular pits similar in character to those in Pit Group 1, which may, therefore, be contemporary. One other feature was also encountered in Site 1 to the east of the pit groups. This, however, was a modern drainage ditch for a hedgerow.

*Plate 1: The alternate layers of redeposited natural and charcoal-rich material in pit **17550**, Site 1, looking south-west (scale 1m)*

2.2.4 ***Site 2. Post-medieval (Phase 8) drainage ditches and enclosures and (prehistoric?) tree-throw:*** this site lay directly to the south of Afon Rhyd and north of the Glanryd Road to Llanwnda, between chainages 400 and 500 (centred on NGR: SH 47140 58189), and contained ten post-medieval ditches (Ditch Group 1; Fig 6), mostly aligned north-west/south-east, with widths ranging between 0.4m and 1.4m. The widest of the ditches defined a rectangular enclosure that contained a large pit (***17741***), which produced post-medieval pottery. A tree-throw (***17745***) was also present, which contained burnt stone, charcoal, charred cereals and hazelnut fragments, suggestive of prehistoric activity.

2.3 Landscape 2 (chainages 500-2000)

2.3.1 Landscape 2 falls between the Afon Rhyd and Afon Gwyrfai (*Section 2.1.4*; Fig 3), and it represents an area that, prior to the mitigation works, was initially evaluated through the excavation of nine trial trenches (Trenches 37, 38, and 89-95; GAT 2016). Most of these produced negative results, although one (Trench 92) revealed archaeological features at Morogoro, producing charred material dating to the early medieval period (*Section 1.2.2*). From the outset, this area was earmarked for open-area excavation. Other parts of this landscape unit were also the subjected of an additional phase of evaluation trenching at the start of the mitigation works (*Section 1.2.4*), which entailed the excavation of 20 trial trenches (Trenches 73, 74, 76-9, 80-4, 86-8, 98, 102-6), some of which revealed archaeological remains, which were then investigated further through open-area excavation.

2.3.2 The controlled strip and open-area excavations indicated that the combined average depth of the topsoil and subsoil was 0.45m in the southern half of the landscape unit (as in Landscape 1; *Section 2.2.1*), thinning to 0.35m in its northern half (between chainage 1300 and 2000). This latter area was also situated at a lower height as it formed a relatively expansive floodplain that ran up to the southern bank of the Afon Gwyrfai. Perhaps unsurprisingly, this part of Landscape 2 was subject to periodic flooding which, although not hampering the mitigation works, was reflected in the type of archaeology encountered. This landscape unit contained a fairly large collection of archaeological remains that were also chronologically diverse. Many of these remains also clustered in certain parts of the bypass and have therefore been grouped together as Sites 3-10 (Fig 7).

2.3.3 ***Site 3. Romano-British (Phase 5) buildings and post-medieval ditch (Phase 8):*** this site lay immediately north of the Afon Rhyd, between chainages 600 and 750 (centred on NGR: SH 47149 58448). It contained two Romano-British buildings (Buildings 1 and 2; Fig 8), along with some piecemeal evidence for contemporary activity in the immediate environs, as well as a post-medieval drainage ditch. It is worth stressing, however, that the stratigraphic interpretations formulated for this assessment are provisional, and the evidence would benefit from more in-depth analysis, which could be used to confirm or enhance the provisional understanding of the archaeological remains (*Section 6.3.5*).

2.3.4 ***The Romano-British (Phase 5) buildings:*** the remains of these buildings comprised pits, gullies, and postholes, as well as consolidation layers, floors, occupation deposits, wall footings, and stone-lined drains (Plate 2). Some of these features also produced artefacts and abundant evidence of cereals.

Plate 2: The Romano-British buildings, Site 3, looking south (scale 1m)

2.3.5 Not all of these features were contemporary, relating to two provisional phases (I and II) of construction/modification. The initial phase (Phase I) witnessed the construction of a building platform, acting as a base for a stone-walled building (Building 1). This was defined by three wall lines (***17152***, ***17121***, and ***17123***) and a depression (***17207***), probably relating to a robbed-out corner stone. In addition, a discrete dump of stone (***17235***) may represent collapsed building materials derived from the building's western wall. Extending along the central axis of the building was a stone-lined drain (***17253***), seemingly running from its destroyed eastern wall line, and joining with a circular sump (***17166***). Other interior features included a pit (***17154***), a hearth (***17168***), a posthole (***17204***), and a portion of cobbled flooring (***17113/17097***), associated with Roman pottery (*Section 3.5.2*) and occupation layers. The platform also produced some Roman (*ie* ***17122***; *Section 3.5.2*) and intrusive medieval and post-medieval pottery (*Section 3.5.4*), whilst depression ***17207***, posthole ***17024***, occupation layer ***17061*** (adjacent to hearth ***17168***), and drain ***17253*** also contained charred cereals that were radiocarbon dated. Respectively, these returned dates of cal AD 120-235 (1870±24 BP; SUERC-105170); cal AD 125-240 (1854±24 BP; SUERC-105169); (1866±24 BP; SUERC-105158); and cal AD 215-340 (1789±24 BP: SUERC-105168). The combined structural and dating evidence, therefore, indicate that Building 1 had a rectangular plan, measuring *c* 7.5m north/south and *c* 6m east/west, and it was probably constructed and in use between the mid-second and mid-third centuries.

2.3.6 A charcoal-rich deposit (***17096***), suggestive of *in-situ* burning, overlay Building 1's interior features, indicating that it had suffered extensive fire damage (marking the end of Phase I), which seems to have resulted in its destruction. A charred cereal from this deposit was dated to cal AD 120-250 (1842±24 BP; SUERC-105166), suggesting this conflagration occurred not long after the building had been erected. After this event, curiously, a roundhouse (Building 2) was then constructed partially over the footprint of the earlier building. This had a diameter of *c* 7m and was defined by an arcing stone-lined drainage gully (***17087/17163***) that was probably parallel with its wall line, which was perhaps constructed of materials (*eg* clay/turf) that have left no archaeological trace. Tentatively, a posthole (***17125***) could have formed an element of an entrance/porch on the western side of the structure. An occupation deposit (***17062***) inside the building, which overlay charcoal-rich deposit ***17096*** (*above*), and a substantial stone-lined drain. This drain had two channels (***17084*** and ***17081***), linked to a larger channel (***17153***) extending beyond its western side for *c* 13.5m, terminating at a large drainage sump (***17193***). This building also produced charred cereals, and two returned dates of cal AD 130-320 (1825±24 BP; SUERC-105157, from drainage gully ***17087***) and cal AD 125-315 (1828±24 BP; SUERC-105159, from occupation deposit ***17062***).

2.3.7 Surrounding Buildings 1 and 2 was a scatter of pits and postholes, which might relate to ancillary activities and structures. The pits were more substantial and some seem to have been deliberately backfilled, whilst three of the postholes (***17020***, ***17022***, and ***17024***) formed a short (*c* 3.7m-long) alignment, possibly a small east/west-aligned fence, windbreak, or drying rack/frame, which seems to have burnt down. Posthole ***17031*** also produced a small lithic flake, though this might represent a residual item.

Postholes ***17029*** and ***17031*** may also have formed a similar, though smaller (*c* 1.9m-long) structure, and there was also a single isolated posthole (***17059***).

2.3.8 ***Post-medieval (Phase 8) and presently undated activity***: Site 3 also contained some evidence for post-medieval activity (Fig 9). This comprised three *c* 1m-wide boundary ditches (***17056***, ***17025/17027***, and ***17181***), which had an identical alignment to those identified in Landscape 1 on the southern side of the Afon Rhyd (Site 2); hence, these seem to form additional elements of the same broad scheme of land division (Ditch Group 1: *Section 2.2.4*). A tree-throw (***17217***) was also present, which produced a pottery sherd suggesting the tree was felled in the eighteenth century, whilst a pit (***17037***) next to ditch ***17025*** contained late post-medieval/modern glass, a fragment of an iron key, and animal bones, including sheep/goat, some of which may have been articulated. A small pit (***17012***; 0.4m diameter and 0.1m deep) at the far northern edge of the site contained burnt material; however, the date of this feature is presently unknown.

2.3.9 ***Site 4. Neolithic (Phase 2) pits and postholes:*** this site, was immediately south of the Dinas Road to Llanwnda, at chainage 800 (centre on NGR: SH 47180 58567; Fig 7), and contained a cluster of pits (Pit Group 3) and postholes spread across an area measuring *c* 28 m square (Fig 10), which were seemingly contemporary. In total, six postholes were present, potentially part of a north-east/south-west alignment of timber uprights (Post Alignment 1) extending for 23m. This alignment also included two postholes (***17161*** and ***17159***) adjacent to each other, one of which (***17161***) contained a fragment of charcoal, radiocarbon dated to 3335-3020 cal BC (4457±24 BP; SUERC-105167).

2.3.10 The pits were positioned on either side of the alignment, and they included six tightly clustered pits (***17003***, ***17006***, ***17009***, ***17014***, ***17017***, and ***17003***) to its north-west, set in a T-shaped arrangement. One (***17014***; Plate 3), the least disturbed, had been backfilled on three separate occasions, and this, and several others, also contained artefacts. Specifically, pits ***17006***, ***17009***, ***17014***, and ***17048*** produced Neolithic pottery (*Section 3.4*), and two, ***17006*** and ***17014***, produced worked flint and stone (*Sections 3.2* and *3.3*). In addition, some of the pits contained burnt hazelnut shell fragments, which have radiocarbon dated: two fragments from pit ***17009*** were dated to 3610-3370 cal BC (4700±24 BP; SUERC-105160) and 3515-3360 cal BC (4641±24 BP; SUERC-105161); and one from pit ***17014*** was dated to 3610-3370 cal BC (4700±24 BP; SUERC-105156). This latter pit also contained an (intrusive) charred wheat grain dated to cal AD 1665-1910 (156±24 BP; SUERC-105155).

Plate 3: Pit **17014***, Site 4, looking east (scale 0.2m)*

2.3.11 Four pits (***17115***, ***17118***, ***17148***, and ***17169***) were positioned to the south-east of Post Alignment 1 (*Section 2.3.9*), all filled with burnt material, possibly hearth waste, whilst a larger pit (***17111***) lay directly at the south-western end of the alignment, which had been deliberately filled with stone cobbles. Based on their similarities to the pits to the north, these are presently assumed to date to the Neolithic period, although one (***17115***) contained a charred cereal that provided an Iron Age date of 735-400 cal BC (2416±24 BP; SUERC-105165). This could be an intrusive ecofact within a Neolithic pit, though this hypothesis could be tested though additional radiocarbon dating.

2.3.12 ***Site 5. Early medieval (Phase 6) settlement and post-medieval (Phase 8) boundaries****:* this site, at Morogoro, lay immediately north of the Dinas Road, at chainage 850, and extended some 200m north, to chainage 1100 (centred on NGR: SH 47179 58628; Fig 7). Prior to the mitigation works, a phase of archaeological trial trenching had indicated that this site contained remains dating to the early medieval period (*Section 1.2.2*). Accordingly, once the construction of the bypass began, open-area excavation was undertaken, which revealed an early medieval settlement (Fig 11). The stratigraphic remains associated with the settlement were comparatively complex, and, as such, the interpretations set out below, generated during the assessment, are provisional. Within this settlement area, and immediately to its north, several other features were recorded which relate to the post-medieval division of Landscape 2.

2.3.13 ***Early medieval (Phase 6) settlement:*** the principal components of the settlement comprised two clearly defined and bounded settlement areas. These have been classified as Settlements 1 and 2.

2.3.14 *Settlement 1:* this settlement (Fig 12) lay just north of the present-day Dinas Road (Plate 4), and was partially enclosed by three, silt-filled, drainage gullies (***16022***, ***16023***, and ***16034***), which defined a roughly rectangular area (*c* 23 x 36m). The most extensive of these (***16022***) bounded the southern side (and was also the gully that was identified in one of the earlier trial trenches; GAT 2016; *Section 1.2.2*), and contained charred cereals radiocarbon dated to cal AD 705-885 (1219±24 BP; SUERC-105138) and cal AD 705-890 (1208±24 BP; SUERC-105139). Gully ***16034*** also bounded the settlement's southern side, with a possible entrance situated between this and gully ***16022***. Within this area, two closely set sub-rectangular pits (***16044*** and ***16047***) might mark the position of a gate. The third drainage gully (***16023***) bounded the north-eastern corner of the settlement area and produced a charred cereal dating to cal AD 655-775 (1304±24BP; SUERC-105140). It is also likely that this gully continued further southwards, as gully segment ***16036***. In addition, the southern side of Settlement 1 was enclosed by a probable hedgerow (***16088***), defined by a broad arcing 'channel' peppered with rootholes. This was adjacent to, and parallel with, drainage gully ***16022*** and also respected the position of the proposed entrance into the settlement area.

Plate 4: Settlement 1, Site 5, during the initial stages of excavation, looking east (scale 1m)

2.3.15 Several features were also encountered within the interior of Settlement 1. These comprised a group (***16025***) of seven postholes, which defined the footprint of a rectangular timber building (Building 3), measuring *c* 7.1 x 4.1m (postholes ***16108/10/13*** western end; ***16118/20*** eastern end; ***16115*** north side; ***16106*** south side). All contained charred plant remains, with a hazelnut shell from one of the postholes (***16120***) providing a radiocarbon date of cal AD 660-775 (1303±24 BP; SUERC-105151). The footprint of the building was also sealed by a destruction/demolition deposit composed of charcoal-rich silty clay (***16024***), which suggests that the building was destroyed by fire. This deposit contained fragments of fired clay, daub, and animal bone, probably originally derived from the building. It also produced charred cereals, two of which have been radiocarbon dated to cal AD 650-775 (1321±24 BP; SUERC-105141) and cal AD 675-880 (1245±24 BP; SUERC-105145).

2.3.16 Two corn-drying kilns were also present on either side of Building 3. The northernmost (***16027***) possessed a rectangular chamber and an associated flue extending from its north-western side (Plate 5). This was lined with stone cobbles and contained charred cereals; one cereal dated to cal AD 665-775 (1291±24 BP; SUERC-105149). Immediately adjacent to its chamber/flue was a shallow, heat-affected, rake-out pit (***16026***), used to hold spent fuel removed from the kiln. This contained two successive deposits, with charred cereal grains, with the earliest deposit being dated to cal AD 665-800 (1277±24 BP; SUERC-105148) and the later to cal AD 670-875 (1253±24 BP; SUERC-105147). These deposits were also sealed by a rubble layer (***16065***) that may represent collapsed/demolished elements of the kiln's superstructure. This rubble layer also contained some charred cereals with one being dated to cal AD 655-775 (SUERC-105146). One other feature, a posthole (***16067***), also lay in the general vicinity of the kiln; however, the purpose of this feature is not particularly clear.

Plate 5: Kiln **16027***, Site 5, following excavation, with rake-out pit* **16026** *to the rear, looking south-east (scale 1m)*

2.3.17 The other corn-dryer (***16075***) lay to the south-east of Building 3. This was defined by a rectangular chamber (but with no apparent linking flue) sealed by a rubble layer, which might have derived from the demolished/collapsed superstructure (Plate 6). The chamber also contained a charcoal-rich deposit, and charred cereals were dated to cal AD 705-890 (1208±24 BP; SUERC-105150).

Plate 6: The rubble layer contained in the chamber of kiln **16075***, Site 5, looking north-east (scale 1m)*

2.3.18 *Settlement 2:* this lay some 67m north-east of Settlement 1 and was also bounded by several silt-filled drainage gullies, which enclosed a sub-rectangular area (c 22 x 26m), though the south-eastern end of the settlement extended beyond the limits of the bypass (Fig 13). Gully ***22532*** bounded the north-western end of the settlement area; three segmented drainage gullies (***22530***, ***22531***, and ***22533***), one of which (***22531***) had been recut (as ***22537***), bounded its north-eastern side; and three longer drainage gullies (***17903***, ***17963***, and ***22529***) defined its south-western side. Presumably, the gaps between the drainage gullies might denote the positions of entrances into the settlement. Some of these gullies also contained large quantities of fired clay, as well as charred plant remains and charcoal, with three samples from gullies ***22532***, ***22529***, and ***17963*** returning dates of cal AD 670-875 (1251±24 BP; SUERC-105181); cal AD 890-995 (1106±24 BP; SUERC-105186); and cal AD 675-880 (1245±24 BP; SUERC-105187). It seems therefore that the drainage gullies were receiving material between the late seventh and late ninth centuries cal AD, whilst slightly later material from gully ***22529***, dating to the late ninth to late tenth century cal AD, might represent intrusive material from a later phase of activity (*Section 2.3.23*).

2.3.19 Numerous features were present within the interior of Settlement 2, again associated with charred materials, two broad groups being identified, which have been provisionally interpreted as the remains of two rectilinear timber buildings (Buildings 4 and 5). Building 4 formed the larger (possibly *c* 9.5 x 15m) and was defined by a scatter of shallow postholes (postholes ***17964*** and ***17991/3/5/7/9*** at the north-eastern end; ***17915*** and ***22517/21*** at the east corner; and ***17915/18/72*** on the south-eastern side). Intriguingly, although the radiocarbon dates from the enclosing drainage gullies (*Section 2.3.18*) suggest the building was standing in the early medieval period, a charred cereal grain from posthole ***17999*** returned an Iron Age date of 360-105 cal BC (2168±24 BP; SUERC-105188). It is therefore possible that this was residual, although this posthole also contained other charred plant remains often associated with Iron Age cultivation (*Section 4.5.13*). Further stratigraphic analysis and dating may clarify if this formed an element of Building 4, or indeed if the surrounding postholes and pits at the northern end of this proposed building actually define an earlier structure (perhaps a roundhouse).

2.3.20 Six pits and two postholes were also present inside the building. These comprised a row of two pits (***17966*** and ***22507***) and a posthole (***17968***) at its presumed northern end, and a cluster of four pits (***17897***/***90***/***92*** (an intercutting group) and ***22502***) and a posthole (***17938***) at its southern end. Adjacent to these latter features, and against the footprint, was a drainage gully (***22522***), which possibly served the building. A cobbled surface (***22510***) was also evident at the north-eastern corner of the building, which continued outside in a south-easterly direction (as ***22511***), and perhaps marked an entrance.

2.3.21 The other potential building (Building 5) was also defined by a scatter of postholes and, although it was more fragmentary, it is possible that it had a square plan (*c* 8 x 8m), sharing the same alignment as Building 4. The postholes (***17954/56/58/73/75/77*** and ***22512***) defining its south-western side were very closely spaced, whilst posthole ***22518*** could have formed the only surviving element of its south-eastern side, with posthole ***17911*** forming the north-western corner. It also possible that this putative building was associated with two drainage gullies (***22525*** and ***22538***).

2.3.22 *Extramural features:* beyond the settlement areas, a pit (***17929***; Fig 11), radiocarbon dated to cal AD 895-1025 (1072±24 BP; SUERC-105185), indicated further early medieval activity. This date is, however, suggestive of activity after the abandonment of the settlement areas, perhaps associated with the agricultural activity that led to the introduction of the seemingly intrusive charred seed into one of the drainage gullies (***22529***) associated with Settlement 2 (*Section 2.3.18*).

2.3.23 ***Post-medieval (Phase 8) and presently undated activity***: two insubstantial boundary ditches were present, which probably relate to the division of the post-medieval landscape (Fig 11). One (***16007***) was located to the east of Settlement 1, whilst the other (***17140***) was to its west. A pit (***16017***) and two adjacent postholes (***16013*** and ***16015***) also lay immediately east of Settlement 1 and, again, these might have been post-medieval in date, though none were associated with datable artefacts. Another undated pit (***16009***) also lay slightly further to the east, whilst two small shallow pits (***16091*** and ***16093***) had been dug into hedgerow ***16088*** (*Section 2.3.14*) both producing post-medieval pottery. Close to Settlement 2 were also an undated posthole (***17906***) and pit (***17909***).

2.3.24 ***Site 6. Post-medieval (Phase 8) lynchet, boundaries, and pits:*** this site lay immediately north of Site 5, at chainage 1000 (centred on NGR: SH 47188 58779; Fig 7), and had been subjected to trial trenching in 2016 (*Section 1.2.2*) and as part of the mitigation works in 2019 (*Section 1.2.4*). Following the controlled stripping of this area (*Section 1.2.5*) it was apparent, however, that the remains at Site 6 seem largely to relate to post-medieval agricultural activity (Fig 14). The most substantial feature was a lynchet (***17255***), defined by a 9m-wide terrace that was sealed by a ploughsoil. A ditched field boundary (***17099***), extending from its top edge, and a comparable kinked boundary (***17851***) lay to the north, below the lynchet. Three shallow pits (***16099***, ***17799***, and ***8705***) were also recorded, which probably also relate to post-medieval agricultural activity, one of which (***8705***) was sealed by colluvium derived from the lynchet higher up the slope.

2.3.25 ***Site 7. Bronze Age (Phase 3) burnt-mound activity (Burnt Mound 1):*** this site was positioned above the Gwyrfai floodplain (at chainage 1300, centred on NGR: SH 47163 59037; Fig 7). Trial trenching in 2019 (*Section 1.2.4*), which identified the remains of a burnt mound (Burnt Mound 1), and therefore these were earmarked for detailed archaeological excavation. This indicated that the stratigraphy was comparatively complex and, during the assessment, four phases (Phases I-IV) of activity have been identified; however, the stratigraphy might also contain information relating to additional (more subtle) activity, which could be teased out through analysis.

2.3.26 The earliest activity (Phase I) involved the creation of a pit (***19108***; Fig 15), which contained charcoal and fire-cracked stone, suggestive of processes (*ie* the heating and dousing of stone) normally associated with burnt mounds; however, no actual mound of fire-cracked stone was associated with this feature. Charcoal from this pit was dated to 1945-1765 cal BC (3530±24 BP; SUERC-105200), indicating that it was probably in use in the Early Bronze Age.

2.3.27 The locale was then revisited (in Phase II) which resulted in the erection of Structures 1 and 2, surviving as a scatter of postholes, which seem to have defined two windbreaks or benders. Structure 1 formed the smaller, defined by eight postholes, with a span of *c* 8m, one (***19016***) containing prehistoric pottery. This structure surrounded four pits (***19052***, ***19087***, ***19099***, and ***19112***), that were tightly clustered, with the largest (***19087***) positioned on the northern edge of the cluster, perhaps forming a trough. Structure 2 lay *c* 6.5m to the east and was defined by seven postholes, which defined a *c* 12m area. This structure also seems to have surrounded/enclosed two pits (***19097*** and ***19105***), the larger of which (***19105***) also lay being adjacent to three postholes, indicating the position of additional timber uprights. It seems possible that ***19105*** functioned as a trough, particularly as it had a stone-lined flat base and was filled with a charcoal-rich deposit containing large quantities of fire-cracked stone.

2.3.28 Intriguingly, following the abandonment of these structures, two cairns (***19021*** and ***19022***), composed of large river cobbles, and incorporating burnt-mound materials, were created over their footprints (in Phase III). Cairn ***19022*** contained prehistoric pottery and a radiocarbon date of 1495-1305 cal BC (3137±24 BP; SUERC-105199) was obtained from a lower layer, suggesting it dates to the first centuries of the Middle Bronze Age. Following their creation, a natural soil horizon (***19113***; not illustrated) formed over the two cairns.

2.3.29 Slightly later in the Bronze Age, this locale was again revisited (in Phase IV), and burnt-mound activities resumed. This was evidenced by a substantial trough (***19064***), which had been cut through the earlier soil horizon (***19113***; *Section 2.3.28*). The trough was also surrounded by a large burnt mound (***19006***; Plate 7), covering an area of *c* 22 x 15m, composed of charcoal-rich silty clay and fire-cracked stone, along with sherds of prehistoric pottery. After the final use of the trough, when the site was finally abandoned, the trough was backfilled with material from the surrounding burnt mound, probably in the later stages of the Middle Bronze Age, based on a radiocarbon date of 1205-1005 cal BC (2900±24 BP; SUERC-105198) obtained on a fragment of charcoal from its base. Following this backfilling, a soil horizon (***19004***; not illustrated) formed over the burnt mound.

Plate 7: Burnt mound **19006** *(Burnt Mound 1), Site 7, partially excavated, looking north-west*

2.3.30 ***Site 8. Post-medieval (Phase 8) and presently undated activity:*** this site, between chainages 1400 and 1700, was defined by a comparatively dense swathe of archaeology on the Afon Gwyrfai's floodplain, adjacent to one of the meanders of this river (centred on NGR: SH 47209 59277; Fig 7). It was also overlooked by the promontory fort at Dinas Dinoethwy (*Section 1.4.16*), which lies some 370m to the east. The site was subjected to trial excavation at the start of the mitigation works (*Section 1.2.4*), though the full extent and density of the archaeology was not apparent until the area was examined during the controlled archaeological strip (*Section 1.2.5*).

2.3.31 A palaeochannel (***17852***) was identified within the southern part of this site containing some sherds of Roman pottery (*Section 3.5.2*), with remnants of another similar palaeochannel (***8003***) identified at the northern edge of the site (Fig 16). Both channels represent much earlier meanders of the Afon Gwyrfai. The site was also peppered with rootholes and tree-throws relating to former vegetation adjacent to the river, much of which may have been progressively cleared across the later prehistoric and historic periods. Although many of the archaeological remains recorded are presently undated, a large proportion were certainly post-medieval in date, though, significantly, none are depicted on late nineteenth-century OS mapping (OS 1890a), suggesting they date to the eighteenth or early/mid-nineteenth century. These remains have some degree of stratigraphic complexity, and the provisional interpretations generated during the assessment could be confirmed, enhanced, or modified following more in-depth stratigraphic analysis (*Section 6.3.5*).

2.3.32 ***Post-medieval (Phase 8) activity:*** the post-medieval features clustered in the northern half of the site (Fig 17) and included two ditches (***23785*** and ***23793***) that seemed to define an enclosure (1), which could be accessed from the east, into its interior, through a *c* 16m-wide entrance. These ditches were severely truncated, but did produce some pottery of eighteenth and nineteenth century date. The enclosure also contained four postholes forming a *c* 25m-long fence (Fence 1) and a group of 17 pits (Pit Group 4). This contained four large circular pits, three of which were intercutting, surrounded by two large oval pits, and 11 smaller pits. Most had been backfilled and one (***23503***) contained post-medieval pottery.

2.3.33 Building 6 lay to the east and had a rectangular footprint, measuring *c* 11.2 x 9.3 m. Its south-western, south-eastern, and north-western wall lines were defined by postholes (***23579*** and ***23638/42/61***; ***23640***; and ***23566/81*** and ***23630***), whilst its north-eastern wall was marked by three pits (***23632/34/36***), which produced late eighteenth/nineteenth-century pottery. Several postholes (***23569/78/83/85/89/91***) were found in its interior, whilst two posts (***23605/07***), to its north, and one to its south-east (***23644***), might relate to ancillary elements. It is also possible that another rectilinear building (Building 7) was present to the south-east; however, its remains were fragmentary, merely comprising four shallow post-pits, with one (***23622***) yielding an eighteenth-century clay tobacco pipe stem (*Section 3.8.1*).

2.3.34 ***Presently undated activity:*** the northern half of Site 8 also contained a series of features, which, although presently undated, possibly relate to post-medieval enclosure (Fig 17). The more prominent was a *c* 2.5m-wide trackway (Trackway 1), defined by two parallel ditches (***23760*** and ***23789***), both recut (as ***23787*** and ***23788*** respectively), demonstrating their maintenance and longevity. Extendting from the southern side of the trackway was Enclosure 2, which was clearly earlier than Enclosure 1 (*Section 2.3.32*). This was defined by rows of pits/postholes forming two fencelines that defined a *c* 50m-wide enclosure parallel to Trackway 1. To the east of Enclosure 2 were three pits (***23665***, ***23648***, and ***23594***), and to its south were two postholes (***23603*** and ***23782***). One presently undated pit (***23721***) also lay to the north of Trackway 1 (Fig 16), which contained burnt cereals (*Section 4.5.17*).

2.3.35 The archaeology in the southern half of Site 8 was less dense (Fig 18). Although this is presently undated, there is a suggestion that it might reflect prehistoric activity on either side of palaeochannel ***17852*** (*Section 2.3.31*), which formed an early landscape feature. The archaeology included 11 shallow pits (***8304***, ***17750/52/55/67/72/87/89*** and ***17803/19/21/34***) of varying sizes, one of which (***17789***) produced a prehistoric flint blade. Once infilled, this pit had been recut, as pit ***8304***, which also produced two flint flakes; however, a sherd of post-medieval pottery was also retrieved from the surface, and it could well be that pit ***8304*** dates to this later period.

2.3.36 Spatially, six of the pits seemed to follow the course of the palaeochannel, whilst the remaining five (***17750***/***52***/***67***/***72***, and ***17834***) lay to the south and were arranged in an arcing configuration; however, it is unclear whether this pattern holds any significance. Other features in this area included a ditch (***17757***/***8305***), running towards the palaeochannel, and Structure 3, defined by four postholes, which was at least 4m long.

2.3.37 ***Site 9. Presently undated burnt-mound activity (Burnt Mound 2):*** this site was located on the floodplain of the Afon Gwyrfai between chainages 1700 and 1800 (centred on NGR: 47232 59511; Fig 7). The area was evaluated in 2019 (*Section 1.2.4*), which identified burnt stone suspected to derive from a burnt mound. This was confirmed by excavation, which uncovered Burnt Mound 2, and, although this is presently undated, there is a strong possibility that it relates to Bronze Age activity on the floodplain.

2.3.38 Burnt Mound 2 was defined by seven pits/postholes, covered by a thin layer of burnt stones and charcoal (***7802***), covering an area of 17.3 x 7.2m (Fig 19). The largest pit (***26604***; Plate 8) lay at the eastern end of the burnt mound, had a flat-base and had been lined with clay, and was clearly a trough, which had been backfilled with fire-cracked stone. A posthole (***26609***) was positioned on its northern edge, indicating that it was associated with a timber upright. Three similar-sized circular pits (***26586***, ***26590***, and ***26602***) were located at the opposite end of the burnt mound. Two (***26590***, and ***26598***) had vertical sides and flat-bases and may have been additional troughs, backfilled with fire-cracked stone, whilst the other (***26586***) was much shallower and was possibly a hearth. West of these were two smaller features (***26589*** and ***26593***), filled with fire-cracked stone, perhaps represent postholes.

Plate 8: Trough **26604***, Site 9, following half-sectioning, looking west (scale 2m)*

2.3.39 ***Site 10. Mesolithic (Phase 1) activity and presently undated enclosure:*** this northernmost site in Landscape 2 was found between chainages 1850 and 2000 (centred on NGR: SH 47280 59678; Fig 7) and was the fourth site (in addition to Sites 7-9) on the Afon Gwyrfai's floodplain. It extended back some 180m from the present-day course of the Gwyrfai and was on the construction site for a bridge across this river.

2.3.40 The southern part of the site was initially subjected to trial trenching in 2019 (*Section 1.2.4*), which revealed several ditches, and this was followed by further investigation during the controlled archaeological strip (*Section 1.2.5*). This indicated that extensive deposits were present that seemingly contained evidence for the early landscape and its habitation. These seemed, therefore, to be highly significant, though, given that the construction of the bridge (*Section 2.3.39*) would only cause limited disturbance, it was agreed that the deposits could be left *in situ*. Some limited excavation did, however, take place in the three areas which would house the piers for the bridge. This small-scale investigation involved the excavation of 12 test pits (Test Pits 1-12; Fig 20), excavated to varying depths (between 0.23m and 0.9m). The stratigraphy was surprisingly complex, particularly given the size of the small interventions, and hence the interpretations presented as part of the assessment are provisional, but could be confirmed or enhanced through analysis (*Section 6.3.5*).

2.3.41 ***Mesolithic (Phase 1) and later prehistoric/Romano-British riverside activity:*** an *in-situ* former land surface/buried soil (***26518***) was identified within the southern part of the site. Four test pits were excavated through this, producing an assemblage of struck flint that on technological grounds, and on the basis of a radiocarbon date of 5310-5070 cal BC (6247±24 BP; SUERC-105394) from Test Pit 7, probably relates to Late Mesolithic riparian activity.

2.3.42 A substantial palaeochannel (***26545***) was present some *c* 47m north of this former land surface, the course of which could be traced across the floodplain as a drainage channel, within a hollow, depicted on nineteenth-century and modern mapping. Limited excavation indicated that it contained alluvial sands and silt (***26539***), producing small quantities of worked flint, charred plant material, and burnt stone. The worked flint suggests that it may have been receiving cultural materials during the time Late Mesolithic activity was occurring on land-surface ***26518*** (*Section 2.3.41*). Moreover, it is possible that during the earlier Holocene, this formed the main active channel of the Afon Gwyrfai, which eventually shifted further northwards (probably close to its present course). Following this shift, the palaeochannel would have gradually infilled and stabilised, and although this process seems to have started in the Late Mesolithic period, on the basis of the worked flint from ***26539*** (*above*), the recovery of prehistoric pottery from the same deposit suggests that it spanned several centuries, extending into the period when prehistoric agricultural groups operated in the area.

2.3.43 Once completely infilled, the palaeochannel was sealed by alluvial deposits, the most extensive of which was ***26519*** (Table 3). These seemed to represent overbank alluvium that was progressively deposited, stabilised, and periodically reworked, during flooding, when the active river channel (to the north) burst its banks. These deposits contained a mixture of redeposited cultural materials, including lithics and prehistoric and Roman pottery, along with charcoal and charred plant remains. Radiocarbon dating also indicates that this material is of disparate prehistoric and Roman-period date.

Deposit	Location	Radiocarbon date
26519	Test Pit 3	
	Test Pit 4	
	Test Pit 5	380-195 cal BC (2217±24 BP; SUERC-105393)
	Test Pit 6	
	Test Pit 8	
	Test Pit 9	
26523	Test Pit 4	1105-915 cal BC (2840±21 BP; SUERC-105404)
26541	Test Pit 8	5010-4845 cal BC (6044±22 BP; SUERC-105395)
26548	Test Pit 11	
26549	Test Pit 9	
26551	Test Pit 12	
26563	Northern edge of palaeochannel ***26545***	cal AD 25-205 (1929±24 BP; SUERC-105403)
26564	Test Pit 11	
26579	Test Pit 12	
26580	Test Pit 12	
26581	Test Pit 12	cal AD 75-220 (1897±24 BP: SUERC-105396)
		cal AD 125-315 (1829±24 BP; SUERC-105397)
		cal AD 75-210 (1905±21 BP; SUERC-105398)
26615	Test Pit 3	
	Test Pit 4	1110-915 cal BC (2840±24 BP; SUERC-105402)

Table 3: The alluvial deposits forming elements of the overbank alluvium, Site 10

2.3.44 ***Presently undated ditches*:** in the southern part of Site 10, partially disturbing the Mesolithic land surface (*Section 2.3.41*), were five silt-filled ditches (Ditch Group 2), one of which (***7303***) had also been recut (as ***7505***). Two, ***26611*** and ***26613***, produced lithics, most likely residual items from the underlying land surface, and hence these ditches remain presently undated; however, it is possible that they formed post-medieval drainage ditches used to drain agricultural land close to the river.

2.4 Landscape 3 (chainages 2000-5300)

2.4.1 Landscape 3 represents the largest landscape unit crossed by the bypass (Fig 3). It extends between the northern bank of the Afon Gwyrfai and the southern bank of the Afon Seiont, with the bypass following the tributary of the Gwyrfai, which formed a significant boundary from at least the post-medieval period, separating the parishes/townships of Llanfaglan and Waenfawr (*Section 1.3.4*). This landscape is also traversed by the former route of the A487, which possibly follows the course of a Roman road (RRX95), whilst at its far northern end another Roman road (RR86) might follow the route of the A4085 (*Section 1.4.21*).

2.4.2 Prior to the mitigation works, the character of the archaeology in this landscape was largely unknown, as it was only possible to excavate four trial trenches during the 2016 archaeological evaluation (GAT 2016; *Section 1.2.2*). An additional phase of evaluation was therefore completed at the start of the mitigation works, which entailed the excavation of 27 trial trenches (41-2, 45-8, 53, 56-8, 60, 62-72, 99, 100, 101, 107, and 108), several of which identified archaeological remains, in the form of ditches, pits, and burnt-mound deposits, which were earmarked for excavation.

2.4.3 Further investigation of this landscape was also completed during the controlled strip and open-area excavations. These indicated that the topsoil had an average thickness of 0.3m across this landscape unit, and in some areas lay above a shallow (0.05m-thick) subsoil, with the natural geology mostly comprising glacial till. The archaeology, although scattered across the landscape, was largely concentrated at the southern end, in the vicinity of a river terrace close to Bontnewydd, and in its central area, next to the Gwyrfai's tributary. Together, these remains have been grouped as Sites 11-20.

2.4.4 ***Site 11. Neolithic (Phase 2) pits and post-medieval (Phase 8) enclosure:*** this site was located close to the northern bank of the Afon Gwyrfai, below the river terrace, between chainages 2100 and 2300 (centred on NGR: SH 47233 59802; Fig 21). Four trial trenches were excavated at the start of the mitigation works, though it was not until the area was monitored as part of the controlled strip that most of the archaeology was identified and recorded. These remains were not, however, particularly dense, or stratigraphically complex, comprising isolated pits, associated features, and ditches.

2.4.5 ***Neolithic (Phase 2) pits:*** 15 pits were scattered across the site. These were possibly contemporary features and have been split into Pit Groups 5 and 6 (Fig 22). Pit Group 5 was the northern and contained 11 pits, two of which, ***24006*** and ***24008***, lay close together, forming its western limits, whilst the remaining nine were arranged in a north-east/south-west alignment, extending for some 77m. Some had silted up, whilst six (***24013***, ***24040***, ***24041***, ***24045***, ***24048***, and ***24067***) had been deliberately backfilled, and contained burnt materials. Moreover, one (***24013***) contained pottery, a Neolithic flint arrowhead and debitage, and charred hazelnuts, one being radiocarbon dated to the late Neolithic period (3025-2900 cal BC; 4344±25 BP; SUERC-105377). Pit ***24041*** also contained Neolithic pottery, whilst pit ***24040*** produced a large pottery assemblage that could be either Neolithic or Iron Age in date (*Section 3.4.14*), along with a worked flint and other cultural materials. This backfilled pit had been partially destroyed by a post-medieval posthole, which contained a fragment of clay tobacco pipe. Post-medieval pottery was also recovered from ***24067***, though this is presumed to be intrusive.

2.4.6 Pit Group 6 lay to the south and comprised four similar-sized pits. Three formed a cluster, one of which (***24010***) had been backfilled. The other pit (***24029***) lay to the south-west and had been cut into the top of a silt-filled irregular ditch (***24398***), which, although presently undated, probably represents another prehistoric feature.

2.4.7 ***Post-medieval (Phase 8) boundaries:*** two shallow ditches were present, aligned north-east/south-west. The westernmost (***24019***) was a late nineteenth-century boundary, depicted on historical OS mapping (OS 1890a), which following silting, had been recut (as ***24021***). The other ditch (***24089***) lay to the east, and it probably also formed a post-medieval field boundary.

2.4.8 ***Site 12. Bronze Age (Phase 3) structure, post-medieval (Phase 8) enclosure, and presently undated pits:*** this site was on the terrace overlooking the Afon Gwyrfai between chainages 2300 and 2700 (centred on NGR: 47483 60182; Fig 21), and contained a comparatively dense swathe of buried remains. These comprised ditches, pits, and postholes, some of which were initially detected during evaluation trenching at the start of the mitigation works (*Section 1.2.4*). Although, as part of the assessment, many of these features have been dated, stratigraphic analysis might tease out further details relating to the post-medieval archaeology at this site (*Section 6.3.5*).

2.4.9 ***Bronze Age (Phase 3) structure:*** Structure 4 was close to the centre of Site 12 (Fig 23). It was a small apparently rectangular post-built feature (c 2.5 x 3.1m) defined by six shallow postholes. Two larger postholes, ***24181*** and ***24203***, contained charred materials, including cereals and hazelnuts, and produced radiocarbon dates of 1920-1745 cal BC (3512±24 BP; SUERC-105382) and 1880-1680 cal BC (3448±27 BP; SUERC-105600) respectively, indicating that the structure dates to the Early Bronze Age.

2.4.10 ***Post-medieval (Phase 8) enclosure and presently undated pits:*** most of the remains (Ditch Group 3) formed the boundaries of post-medieval fields/enclosures that are depicted on late nineteenth-century mapping (Fig 24). This suggests that they directly related to land division associated with three separate farmsteads: Cae-Ilidiart-gwyn; Cae-Gwyneed; and Merddyn.

2.4.11 Sinuous boundary ***24387***, probably the remains of a hedgerow, formed the north-western boundary for five enclosures (Enclosures 3-7; Figs 23 and 24) three of which (Enclosures 3-5) may have formed part of Cae-Ilidiart-gwyn, with the remaining two (Enclosures 6 and 7) forming elements of Cae-Gwyneed. The boundaries associated with Enclosures 3 and 4 also seemed to have some longevity as they had been recut and redefined on several occasions, and it also seems that Enclosure 4 was sub-divided at some stage. Additional post-medieval boundaries lay to the north-east, including another sinuous boundary (***24381***), which might again define a hedgerow. This was associated with Enclosures 8-11 (Fig 23), which were probably associated with Merddyn (*Section 2.4.10*), as they could be accessed via a track leading from this farmstead (Fig 24).

2.4.12 Other evidence for post-medieval agricultural activity comprised six pits (***24111***, ***24151***, ***24153***, ***24240***, and ***24242***; Fig 23), which produced fragments of post-medieval pottery. Two (***24240*** and ***24242***) lay at the northern end of Site 12, two (***24151*** and ***24153***) were adjacent in Enclosure 6, whilst the remaining two (***24111*** and ***24113***) were next to Enclosure 4. Two postholes, one (***24043***) containing post-medieval pottery and the other (***24049***) charred cereals, were also post-medieval, with the latter producing a radiocarbon date of cal AD 1655-1920 (189±24 BP; SUERC-105378). These also lay next to a modern fenceline.

2.4.13 Several other pits and postholes were scattered across the site, most of which are probably post-medieval in date. They comprised: two pits in Enclosure 4; two pairs of postholes and a pit in Enclosure 6; a posthole in Enclosure 7; two postholes and a pit in Enclosure 8; a pit and a cluster of three postholes in Enclosure 10; and a pit positioned between Enclosure 10 and post-medieval pit ***24242***. Of these one of the postholes (***24176***) in Enclosure 6 contained prehistoric pottery (*Section 3.4.12*), though this could well be residual, whilst another (***6504***) in Enclosure 8 produced post-medieval pottery.

2.4.14 ***Site 13. Burnt mounds (presently undated), post-medieval (Phase 8) enclosure, and presently undated pits:*** this site lay immediately north-west of Bontnewydd, between chainages 2800 and 3000 (centred on NGR: 47873 60392; Fig 21), adjacent to the Pant Road, which is also depicted on nineteenth-century mapping (OS 1889f). The tributary of the Afon Gwyrfai also crossed the site, which formed a township/parish boundary from at least the post-medieval period (*Section 1.3.4*). The site was subjected to trial trenching at the start of the mitigation works and this suggested the presence of burnt mounds, which was confirmed during open-area excavation (Burnt Mounds 3-6). All are presently undated, though there is a strong possibility that they are of Bronze Age date (*Section 1.4.13*). Other recorded remains included ditches, potholes, and pits. Again, many of these are presently undated, though they most probably relate to post-medieval agricultural activity.

2.4.15 ***Burnt mounds:*** Burnt mounds 4-6 clustered at the northern end of the site, directly adjacent to the Afon Gwyrfai's tributary (Fig 25). All were defined by sub-circular spreads of fire-cracked stone and charcoal-rich silty clay (with diameters of *c* 6m, 8m, and 9m respectively), and that associated with Burnt Mound 6 also sealed three pits. The largest of these, ***24372***, was rectangular, possibly a trough, though it was a comparatively shallow feature and it also contained a sherd of (intrusive) post-medieval pottery. The other two pits, ***24368*** and ***24374***, were smaller and both contained charcoal-rich material, and ***24368*** also cut a buried soil (***24370***) that partially survived beneath the burnt mound.

2.4.16 Burnt Mound 3 lay to the south and, again, was defined by a spread of burnt-mound material (c 13m in diameter). Sealed beneath this material were two large sub-rectangular troughs (***24342*** and ***24367***), filled with burnt-mound material (Plate 9).

Plate 9: Trough **24367** *(Burnt Mound 3), Site 13, following half-sectioning, looking south (scale 1m)*

2.4.17 ***Post-medieval (Phase 8) enclosure and presently undated pits:*** other features recorded included fragmentary ditches (Ditch Group 4), which probably relate to post-medieval fields/enclosures either side of the Bontnewydd to Pant road, particularly as one (***24355***) produced silver and copper-alloy coins dating to 1920 and 1902, and fragments of a leather coin purse (*Section 3.9.2*). Fence 2, an alignment of five posts parallel with the road, was also recorded, and one of its postholes (***24283***) contained a sherd of post-medieval pottery (*Section 3.5.5*), whilst a Mesolithic tool was recovered from close to its northern end (*Section 3.2.15*). A pit (***24350***) next to the fence produced post-medieval pottery.

2.4.18 Other features scattered across the site comprised pits, of varying sizes, that are presently undated. One (***24281***) contained charcoal and fire-cracked stone, suggesting it might be contemporary with the burnt mounds (S*ection 2.4.14*), and two others, ***21503*** and ***24314***, contained possible prehistoric pottery. There was also a group of three intercutting pits (***24304/06/08***) and it is possible that the earliest of these (***24308***) represents the remains of a hearth or bonfire.

2.4.19 ***Site 14. Post-medieval (Phase 8) and presently undated pits:*** this site was excavated at chainage 3200 (centred on NGR: SH 48108 60563; Fig 21), to the south of the tributary of the Afon Gwyrfai, and was identified during the controlled archaeological strip. It contained Pit Group 7, a scatter of pits/postholes of varying sizes (Fig 26). Most are presently undated, though there is a suggestion that they relate to post-medieval activity as three (***21257***, ***21517***, and ***21521***) contained artefacts dating to this period.

2.4.20 ***Site 15. Mesolithic (Phase 1) and Neolithic (Phase 2) activity, Bronze Age (Phase 3) burnt mounds and associated features, and later medieval (Phase 7), post-medieval (Phase 8), and presently undated activity:*** this site lay between chainages 3500 and 3800 (centred on NGR: 48337 60857; Fig 27), and spanned the A4871, the possible route of a Roman road (RRX95; *Section 1.4.21*). The tributary of the Afon Gwyrfai also crossed the site. The area was subjected to some limited trial trenching, at the start of the mitigation works, though this revealed few archaeological remains; however, during the controlled archaeological strip it became apparent that it contained a dense concentration of buried remains. These comprised Mesolithic lithics and numerous burnt mounds, on either side of the Gwyrfai's tributary, which seems to have formed the focus for early activity. Several other features were recorded relating to later activity. Many of these, including a proportion of the burnt mounds, are presently undated and, hence, the interpretations presented are provisional, and could be confirmed/enhanced through additional dating and stratigraphic analysis (*Section 6.3.5*).

2.4.21 ***Mesolithic (Phase 1) activity***: on the northern side of the Gwyrfai's tributary, a relatively large assemblage of worked flint was recovered from a buried soil/land surface (***25508***), whilst another identical buried soil (***26004***; Fig 28) to the south-west contained two coarse-stone tools (*Sections 3.2* and *3.3*) and charcoal dating to 6080-5990 cal BC (7171±27 BP; SUERC-105601). Both buried soils were sealed beneath later burnt mounds (Burnt Mounds 11 and 15). Similarly, to the south of the tributary buried soil ***26032*** (beneath Burnt Mound 7) produced one flaked lithic. This might therefore represent another Mesolithic land surface; however, it also produced sherds of prehistoric pottery, although these could relate to the later phase of burnt-mound activity.

2.4.22 ***Neolithic (Phase 2)***: close to one of the burnt mounds (Burnt Mound 17), a Neolithic polished-stone axehead (*Section 3.3.4*) was recovered, though it was unstratified. Presumably, this relates to an early phase of activity, which, apart from this object, has left no other archaeological trace.

2.4.23 ***Bronze Age (Phase 3) and presently undated burnt mounds:*** nine burnt mounds were clustered along the banks of the Gwyrfai's tributary, which presumably provided the water required for related activity. Seven (Burnt Mounds 8, 10-15) lay on the northern side of the tributary, with just two (Burnt Mounds 7 and 17) to the south of this watercourse (Fig 28). All were defined by sub-circular spreads of fire-cracked stone, contained in a matrix of dark charcoal-rich silty clay (Plate 10). Some of the spreads had 'classic' kidney-shaped morphologies, though those forming Burnt Mounds 7, 8, and 10 were not associated with any other features (Table 4).

Plate 10: The burnt spread defining Burnt Mound 17, Site 15, following half-sectioning, looking west (scale 2m)

Burnt Mound	Spread/layer	Approximate dimensions	Underlying pits	Radiocarbon dates
7	***25524***	4.4 x 2m and 0.1m thick	Buried soil ***26032*** and pottery	
8	***26008***	9.1 x 6.8 and 0.3m thick	No	
10	***26069***	11.1 x 6.8 m and 0.35m thick	No	
11	***26003*** (composed of two sequential burnt mound deposits)	9.6 x 7.4m and 0.3m thick	***26013*** (trough?) and ***26011*** (trough?)	Trough ***26013***: 2345-2140 cal BC (3807±24 BP; SUERC-105383)
12	***26049***	7.7 x 4.5m and 0.15m thick	***26054*** (hearth?) and ***26055*** (trough?)	Trough ***26055***: 2345-2145 cal BC (3812±24 BP; SUERC-105385)
13	***26052***	5.3 x 4m and 0.1m thick	***26064*** (hearth?), ***26066*** (tree-throw?), and ***26057*** (hearth?)	
14	***26059***	10.5 x 7m and 0.1m thick (forms a kidney-shaped mound)	***26061*** (hearth?), ***26067*** (trough?), ***26074*** (trough?), ***26070*** (trough?), and ***26072*** (pit?)	Trough ***26067***: cal AD 1525-1800 (240±24 BP; SUERC-105386)
15	***25525*** (composed of three sequential burnt mound deposits)	15.7 x 12.5m and 0.7m thick	***25512*** (trough?), ***25514*** (trough?), ***25518*** (trough?), and ***25516*** (pit?)	
17	***25526***	10.5 x 8.5m and 0.3m thick (forms a kidney-shaped mound)	***26118*** (trough), ***26119*** (trough?), ***26106*** (pit?), ***26112*** (earth?), and ***26115*** (pit?)	Trough ***26118***: 1380-1125 cal BC (3007±21 BP; SUERC-105387) Pit ***26106***: 1225-1045 cal BC (2941±24 BP; SUERC-105388)

Table 4: The burnt spreads and pits defining the burnt mounds, Site 15, and associated radiocarbon dates

2.4.24 In contrast, the burnt spreads associated with Burnt Mounds 11-15, and 17 sealed underlying pits filled with burnt-mound materials. Some probably functioned as troughs, other shallower examples may have been hearths, some seem just to have been pits, and one (beneath Burnt Mound 13) may have been a tree-throw. Burnt Mounds 14, 15, and 17 also contained sequences of intercutting troughs/pits, demonstrating that these burnt mounds were used and revisited on several occasions. One of the troughs (***26118***; Plate 11), associated with Burnt Mound 17, also stands out as it was associated with a series of stakeholes, cut into its base and following its northern edge, which indicate that it had a wattle lining (Plate12).

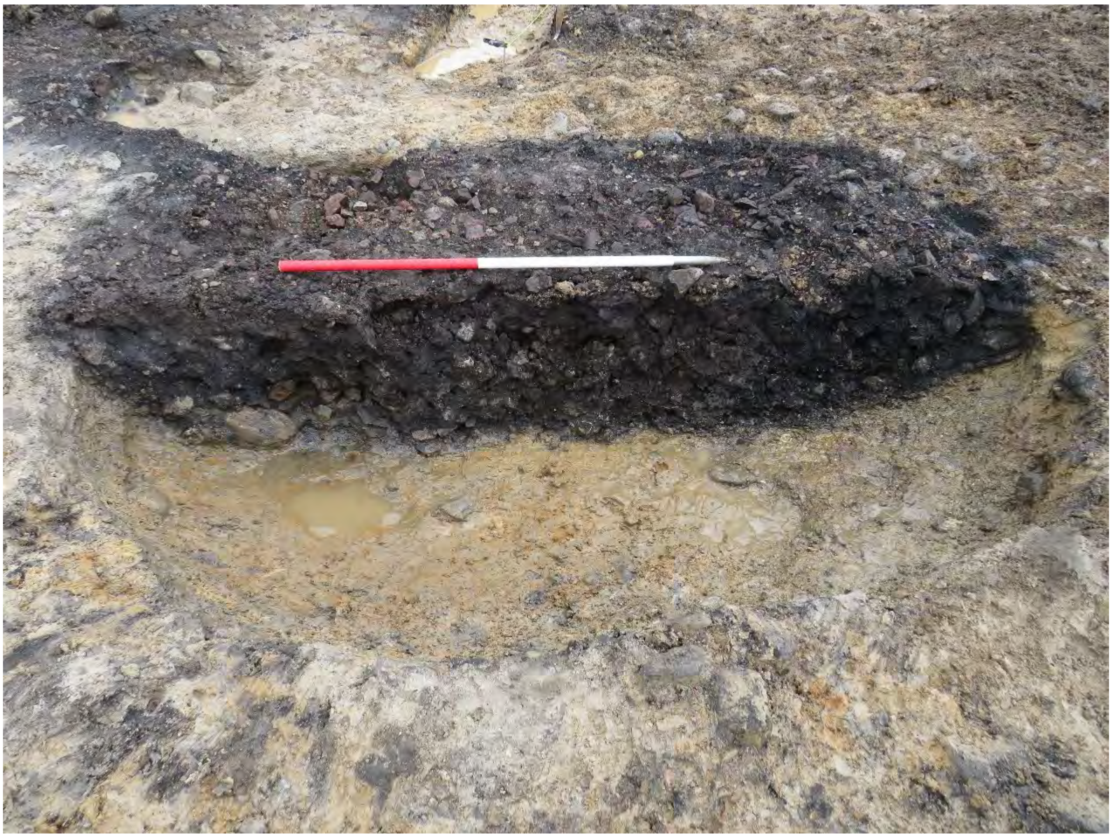

Plate 11: Trough **26118***, Site 15, following half sectioning, looking east (scale 1m)*

Plate 12: The stakeholes in trough **26118***, Site 15, after excavation, forming elements of its wattle lining*

2.4.25 Samples from Burnt Mounds 11, 12, and 17 were also radiocarbon dated (Table 4), indicating that burnt-mound activity extended over a long period. Dates falling in the latter centuries of the third millennium cal BC were produced by Burnt Mounds 11 and 12, whilst Burnt Mound 17 was dated to the latter centuries of the second millennium cal BC. A cereal from Burnt Mound 14 was dated to the post-medieval period and hence was an intrusive ecofact.

2.4.26 ***Additional Bronze Age (Phase 3) and presently undated pits:*** directly surrounding the burnt mounds were other features, which, although presently undated, might be contemporary (Fig 28). They included Post Alignment 2, which included two pits (***26037*** and ***26100***) and two postholes (***26152*** and ***26153***) containing charcoal-rich deposits, comparable to those defining the burnt mounds. A larger pit (***26086***) and a short arching ditch (***26080***) lay at the southern end of the alignment, and several pits were also positioned to its east. Three pits (***10803***, ***26027***, and ***26033***) were also located to the west and north of Burnt Mound 17, one of which (***26027***) has been dated to 1110-920 cal BC (2846±24 BP; SUERC-105392). This indicates use of the site in the Late Bronze Age and it therefore seems highly possible that some of the surrounding and undated burnt mounds also date to this period.

2.4.27 ***Later medieval (Phase 7), post-medieval (Phase 8), and presently undated activity and enclosure:*** two closely spaced pits (***21553*** and ***21556***) in the north-east corner of Site 15 had both been backfilled and a radiocarbon date of cal AD 1165-1265 (843±24 BP; SUERC-105376) from ***21553*** suggests that they relate to later medieval activity. Other similar backfilled pits (***21534*** and ***21536***) lay to the east and, although presently undated, might be contemporary. Set between these was Ditch Group 5, formed of three ditches containing silt and post-medieval pottery. The cartographic evidence (OS 1889f) indicates that they were elements of the post-medieval landscape, defining the north-eastern end of a field that pre-dates the construction of the road that later became the A487 (Fig 29). This also seems to suggest that this road did not follow an earlier route, *ie* Roman road RRX95 (*Section 1.4.21*). Contained within this early field was Structure 5 (*c* 7.1 x 2m), defined by three postholes set parallel with the field boundaries, and a small pit (***21551***) containing post-medieval pottery. To the north-east was a larger pit (***21576***), which also contained post-medieval artefacts.

2.4.28 ***Site 16. Bronze Age (Phase 3) burnt mounds, and post-medieval and presently undated activity:*** this site was positioned adjacent to the northern bank of the Afon Gwyrfai's tributary, between chainages 3900 and 4100 (centred on NGR: SH 48760 60975; Fig 27). Three trial trenches were excavated in 2019, though only one contained evidence for buried remains. Once stripping was complete several more archaeological features were, however, recorded, relating to burnt-mound activity.

2.4.29 The remains of two burnt mounds, 9 and 16 (Fig 30), were present, which were outliers of the large group of burnt mounds at Site 15, some 200m to the south-west (*Section 2.4.23*). Both comprised spreads of fire-cracked stone and charcoal-rich silty clay (*c* 1.1m in diameter, Burnt Mound 9, and *c* 3.5 x 2m, Burnt Mound 16) and that forming Burnt Mound 16 sealed two intercutting troughs, ***26023*** and ***26021***, filled with burnt material; material from ***26023*** was dated to the mid-third millennium cal BC (2575-2465 cal BC; 4003±24 BP; SUERC-105384). To the north were two presently undated pits (***4704***, and ***4707***), one (***4707***) containing burnt-mound material, and another pit (***26088***) containing post-medieval pottery.

2.4.30 ***Site 17. Neolithic (Phase 2) and presently undated pits and post-medieval enclosure:*** this site, between chainages 4200 and 4400 (centred on NGR: SH 49069 61165; Fig 27), was identified as part of the controlled archaeological strip, and contained pits and ditches (Fig 31). The pits were in three groups (Pit Groups 8-10), with Pit Group 8 seemingly relating to Neolithic activity. This comprised two pits, ***19503*** and ***19509***, the latter producing lithics and charred hazelnuts, with one being dated to 3315-2920 cal BC (4416±24 BP; SUERC-105201). Pit Group 9 lay to the south and consisted of ten pits, some intercutting, clustered around two tree-throws, and most (*ie* ***19514***, ***19517***, ***19516***, and ***19523***) contained charcoal, burnt clay, and prehistoric pottery, suggesting they might have been hearths contemporary with the activity to the north. The eastern tree-throw also contained comparable sherds of prehistoric pottery. Pit Group 10 lay further to the west and comprised four pits, three of which (***19550***, ***19558***, and ***19560***) were filled with fire-cracked stone and charcoal, reminiscent of burnt-mound material. One (***19550***) also seemed comparable to many of the troughs associated with the Bronze Age burnt mounds at Site 15 (*Section 2.4.23*).

2.4.31 The other remains at Site 17 included Post Alignment 3, positioned between Pit Groups 8 and 9, which was composed of three equidistantly spaced pits/postholes, one of which (***19512***) contained burnt materials. Other remains comprised three ditches, probably of post-medieval origin, as one (***19546***) directly related to a boundary plotted on late nineteenth-century mapping (OS 1889g), whilst the other two (***19578*** and ***19579***) were parallel with another field boundary plotted on this mapping. Directly adjacent to ditch ***19546*** was a pit (***19575***) containing a comparatively recent cow burial (*Section 4.3.6*).

2.4.32 ***Site 18. Post-medieval enclosure:*** this site lay on the southern side of the tributary of the Afon Gwyrfai, between chainages 4600 and 4700 (centred on NGR: SH 49311 61348; Fig 27). During the controlled strip three ditches were recorded (Ditch Group 6), which could be directly related to field boundaries depicted on late nineteenth-century mapping (OS 1889g; Fig 32). One of these boundaries, extending north-east/south-west, had also been recut.

2.4.33 ***Site 19. Bronze Age and presently undated pits:*** this site was located between chainages 4900 and 5000, at the far northern end of Landscape 3 (centred on NGR: SH 49434 61551; Fig 27). The archaeology included five circular pits (each *c* 1-1.4m in diameter) and two postholes (Fig 33). One of the pits (***19568***) contained burnt material and might represent a hearth, being dated to the Early Bronze Age (1875-1630 cal BC; 3434±24 BP; SUERC-105344). The postholes (***20760*** and ***20755***) and other pits were located to the north and all are presently undated, though one (***20741***) had been deliberately backfilled, and contained prehistoric pottery. They also seemed to form two clusters (Pit Groups 11 and 12) each containing two pits, though the northernmost was also associated with one of the postholes.

2.4.34 ***Site 20. Post-medieval activity:*** this site was between chainages 5100 and 5300 (centred on NGR: SH 49471 61789; Fig 27), immediately south of the A4085, which is suspected to follow the route of a Roman road (RR68; *Section 1.4.21*). It was subjected to trial trenching at the start of the mitigation works, though this did not detect any archaeological remains. The area was then examined during the controlled strip which revealed two shallow pits (***20763*** and ***20765***; Fig 34). Both probably date to the post-medieval period, as one (***20763***) produced animal bone and post-medieval pottery. To the north was ditch ***20784***, probably the base of a hedgerow, which was parallel with boundaries depicted on historical mapping (OS 1889g).

2.5 Landscape 4 (chainages 5300-8100)

2.5.1 Landscape 4 extends between the Afon Seiont and the Afon Cadnant (*Section 2.1.6*), the Cibyn Industrial Estate being directly to the west of the bypass. It also contained a major historic boundary, separating the parishes/townships of Llanbeblig and Llanrûg, which in the late nineteenth century formed the Municipal Borough and Parliamentary Boundary for the Caernarfon District (OS 1889c). This landscape is also crossed by the Llanberis Road (A4086), as well as a major Roman road (RR67c), the course of which was identified prior to the mitigation works (*Section 1.4.21*).

2.5.2 This landscape had been initially subjected to some limited trial trenching in 2016 (GAT 2016; *Section 1.2.2*), with nine additional trial trenches (27, 28, 32-6, 109, and 110) being excavated at the start of the mitigation works in 2019, several of which identified buried ditches and pits. The area was further investigated during the controlled archaeological strip and through open-area excavation. These investigations indicated that the topsoil and subsoil were *c* 0.45m thick, the natural geology was dominated by glacial till, and that the archaeological remains concentrated in the central section of the landscape, thinning out towards the two watercourses bounding the area. These remains have been grouped into six sites (Sites 21-6; Fig 35).

2.5.3 ***Site 21. Post-medieval enclosure:*** this site lay west of a meander of the Afon Seiont, between chainages 5700 and 5800 (centred on NGR: SH 49808 62324; Fig 35). The recorded remains consisted of two parallel ditches (***20730*** and ***20733***), containing silt and post-medieval pottery (Fig 36). Both relate to a field boundary depicted on late nineteenth-century mapping (OS 1889c).

2.5.4 ***Site 22. Presently undated (post-medieval?) activity:*** this site was located immediately east of the Cibyn Industrial Estate, between chainages 5850 and 6100 (centred on NGR: SH 49908 62453; Fig 35), and west of the Afon Seiont, and was subjected to trial trenching, and monitoring during the controlled strip. This revealed a small number of features, which, although presently undated, probably relate to post-medieval agricultural activity (Fig 37). They included a backfilled ditch (***20672***), containing post-medieval pottery and a scatter of small pits, none of which seem to have formed meaningful groups. There were also two larger adjacent pits (***20689*** and ***20691***), which could be related to post-medieval field clearance, as both had been backfilled with stones.

2.5.5 ***Site 23. Post-medieval and presently undated township/parish boundaries and enclosure:*** this site covered a fairly large area between chainages 6150 and 6700 (centred on NGR: SH 50106 62802; Fig 35). Its southern half was south of the Llanberis Road, and immediately adjacent to the Cibyn Industrial Estate and Afon

Seiont, whilst its northern portion lay immediately north of the road. The cartographic evidence indicates the parish/township boundary for Llanbeblig and Llanrûg followed a north-east/south-west direction through the southern part of the site (*Section 2.5.1*). A single trial trench was excavated at the start of the mitigation works, which identified a ditch on the suspected line of this boundary. The site was then investigated during the controlled strip and via open-area excavation, which revealed additional boundaries, many of which were intercutting features (Fig 38). Several different phases defining and enclosing the landscape were represented and, although many of boundaries are presently undated, a large proportion probably date to the post-medieval period. These have been provisionally grouped into two phases (I and II), though stratigraphic analysis and dating would potentially enhance this broad phasing, and allow for a more nuanced interpretation of the sequence of events (*Section 6.3.5*).

2.5.6 ***Presently undated ditch:*** stratigraphically, the earliest (Phase I) feature was a sinuous silt-filled ditch (Plate 13). This was identified to south of the Llanberis Road (as ***20662*** and ***20663***) and probably also to its north (as ***21065***; Fig 38). This extensive boundary lay in the vicinity of the parish/township boundary, plotted on historical mapping, and it is possibly an earlier manifestation of this. Some dating evidence was obtained, though this was recovered from the upper fills of this boundary and probably represents intrusive materials that derived from later activity (*Section 2.5.7*). It includes late post-medieval glass and clay tobacco pipe, and a charred cereal, dated to cal AD 1685-1925 (100±24 BP; SUERC-105375).

Plate 13: Ditch **20622***, Site 23, following partial excavation, looking south-west (scale 1m)*

2.5.7 ***Post-medieval boundaries, enclosures, and trackways:*** the next phase of activity (Phase II) involved the creation of an extensive ditched boundary (***20659***), to the south of the Llanberis Road, which seems to represent the Municipal Borough and Parliamentary Boundary for the Caernarfon District, plotted on historical mapping (OS 1889c; Fig 39). It had a stone drain at its base and its far southern end had also been recut (as ***20786***; Fig 38). Adjacent to it was Trackway 2, defined by two parallel ditches (*c* 2.4m apart), which continued southwards from Llanberis Road. This seems to pre-date fields depicted on late nineteenth-century OS mapping (*ibid*), the ditches of which were also recorded (Ditch Group 7). Other post-medieval features included isolated pits, the largest of which (***20592***) might have been a quarry pit.

2.5.8 Two trackways (Trackways 3 and 4) were identified to the north of the Llanberis Road, and were comparable in form to Trackway 2 (*Section 2.5.7*). Neither can be discerned on late nineteenth-century mapping (Fig 39), though they did produce post-medieval pottery, and one also cut through an earlier boundary, which contained post-medieval pottery. These trackways were intercutting features (Trackway 3 the earlier, Trackway 4 the later), and Trackway 4 was also contemporary with a ditched enclosure (12). Ditch Group 8 was identified to the north of the Llanberis Road and was possibly also contemporary with Trackway 4. It comprised one ditch extending from the southern side of the trackway, and two others, to the north, mirroring the slightly curving form of this route. One of these latter ditches (***21045***) had been recut (as ***21043***) and produced post-medieval pottery. Four pits were also recorded in this area, which may have been contemporary with the trackways and field boundaries.

2.5.9 ***Site 24. Post-medieval enclosure and field boundaries:*** this site covered a large portion of Landscape 4, extending between chainages 6750 to 7300 (centred on NGR: SH 50473 63224; Fig 35). Nineteenth-century mapping (OS 1889c) indicates that it was sandwiched between two farms, Cefn-tre-Seiont and Tyddyn-bisle, which are still extant, with the site covering the intervening fields (Fig 40). The potential Iron Age settlement at Bryn-Glas lay just to the west (*Section 1.4.16*). At the start of the mitigation works, four evaluation trenches were excavated across this area, identifying several ditches. Later investigation indicated that these created Ditch Group 9, comprising seven silt-filled, and artefactually sterile ditches, relating directly, or parallel with, the field boundaries depicted on late nineteenth-century mapping. Enclosure 13 (*c* 23m wide) was also recorded at the southern end of the site. Its northern-eastern and southern-western sides were defined by closely set and intercutting boundaries. Its southern-western side had been partly destroyed by recent field drains, whilst the ditches formed its northern-eastern side produced a few fragments of post-medieval pottery and a (residual) sherd of medieval pottery. On this side was a *c* 3m-wide entrance gap, and a posthole (***21020***), possibly for a gatepost. Two pits were also recorded, one in the interior, and the other just to the east of the entrance, both producing post-medieval pottery.

2.5.10 ***Site 25. Roman road:*** this site, between chainages 7300 and 7400 (centred on NGR: SH 50750 63572; Fig 35), was specifically targeted by open-area excavation to record any remains relating to the major Roman road (RR67c) which was suspected to traverse the route of the bypass. This partially survived as an earthwork (*Section*

1.4.22), situated in a low-lying area, depicted as marshland on historical mapping (*eg* OS 1889d). Excavation revealed a *c* 123m-long stretch of a well-preserved road (***15003***; Plate 14). Although presently undated, and not associated with any diagnostic artefacts, this was almost certainly of Roman date being part of the route linking the Roman forts at Caernarfon and Caerhun (Margary 1967, 350-1).

Plate 14: Roman road **15003***, Site 25, looking south-west (scale 2m)*

2.5.11 Ten interventions were excavated along the road (Fig 41), and these demonstrated that its construction was similar along its entire exposed length. It was up to 6.3m wide and generally comprised a layer of poorly sorted limestone rubble, which, in some areas, overlaid silty-clay bedding layers. In some areas, as part of the initial construction of the road, the original ground surface had also been levelled/sculpted, which had entailed digging away any topographic irregularities; this was evidenced by a construction cut recorded in five of the interventions, which contained the metalling for the road. In some areas depressions along its surface were also recorded, which probably related to traffic along it (*ie* wheel ruts and potholes), indicating that it probably formed an important route of communication for many centuries. It is also possible that the fabric of the road contained evidence for different phases of construction and repair, although this will need to be clarified through more detailed analysis of its surface (*Section 6.3.5*).

2.5.12 ***Site 26. Post-medieval and presently undated pits:*** the northernmost of the sites in Landscape 4 was immediately south of the Afon Cadnant, between chainages 8000 and 8100 (centred on NGR: SH 51002 64226; Fig 35). In 2019, two trial trenches were excavated in this area, and some limited archaeology was revealed during the controlled strip, comprising a scatter of pits and postholes (Fig 42). One of these was a post-medieval pit, ***2703***, which produced mid-eighteenth-century pottery and clay tobacco pipe. The other features are presently undated, though they could also date to the post-medieval period and included several postholes, which defined Fences 3 and 4, and two pairs of closely spaced pits, the southern of which (***15511*** and ***15504***) was inter cutting.

2.6 Landscape 5 (chainages 8200-9800)

2.6.1 Landscape 5 was defined as from the northern bank of the Afon Cadnant up to the Plas Menai roundabout, close to the present coastline (*Section 2.1.6*). Flowing through this landscape, in northerly direction, is a channel of the Afon Cadnant, which branches off the main river channel (and hence forming a distributary channel) at the southern limits of this landscape (*Section 1.3.5*). Although this was a comparatively small channel, both this and the main channel of the Afon Cadnant, acted as a township/parish/parliamentary boundary, which is depicted on historical mapping (OS 1889d). The route of the bypass and distributary channel are also both crossed by the Bethel Road (B4366), and the probable Iron Age settlement at Caerlan Tibot (*Section 1.4.16*) is to the north of this, and west of the bypass. Within Landscape 5, another seemingly important focus for prehistoric activity also lay to the east of the bypass, and the Cadnant's distributary channel, at Crug House (*Section 1.4.11*).

2.6.2 Prior to the mitigation works, this landscape had been subjected to extensive evaluation, entailing the excavation of 14 trial trenches (GAT 2016), which identified a burnt mound, north of Bethel Road, and enclosures at Plas Menai, close to Crug House (*Section 1.2.2*). Accordingly, both sites were earmarked for open-area excavation at the start of the mitigation works. Eight additional trial trenches (5-12) were excavated as start of the mitigation works, adjacent to Caerlan Tibot and Crug House, and across land to the north. These areas were then further recorded as part of the controlled archaeological strip.

2.6.3 These excavations indicated that the topsoil and subsoil across Landscape 5 extended for a maximum depth of *c* 0.9m, and all archaeological features/deposits were cut into, or sealed, glacial till. The remains have been grouped as Sites 27-31 (Fig 43). Aside from the archaeology, an extensive area of peat was identified north of Bethel Road and adjacent to the Cadnant's distributary channel. This marked the site of a former lake/wetland area, in which organic materials had gradually accumulated. This was subjected to a borehole survey, and the extracted cores were then assessed for pollen (*Section 4.4*).

2.6.4 ***Site 27. Mesolithic-Bronze Age (Phases 1-3), Roman (Phase 5), medieval (Phases 6 and 7), post-medieval (Phase 8), and presently undated activity:*** this site was sandwiched between the northern bank of the Afon Cadnant and Bethel Road, between chainages 8200 and 8350 (centred on NGR: SH 50980 64419; Fig 43). The distributary channel of the Afon Cadnant also flowed through the site and to its north was the former lake/wetland (*Section 2.6.3*), whilst to the east was the possible Iron Age settlement at Pont-Rug (*Section 1.4.16*).

2.6.5 The area was subjected to trial trenching in 2016 (*Section 1.2.2*), though this did not encounter any significant archaeology; however, it was further examined during the controlled archaeological strip, which indicated that it contained buried remains, suggestive of prehistoric activity, and hence the site was the focus for detailed open-area excavation. This entailed the examination of areas on either side of the distributary channel, with the larger falling on its western side, with smaller areas being examined along its eastern bank (Fig 44).

2.6.6 These excavations proved highly significant as they revealed a very dense scatter of archaeological features and deposits, which were stratigraphically complex. Indeed, this site contained the densest concentration of remains encountered along the bypass, and also appears to be a highly significant location, which was repeatedly revisited over many millennia, forming a 'persistent place' within Landscape 5. The site was peppered with natural features, both rootholes and tree-throws (not illustrated), as well as the evidence for a palaeochannel (***27187***), containing alluvium and some lithics, clearly a former course of the distributary channel, which, when active, probably the original focus for much of prehistoric activity.

2.6.7 Assessment of the stratigraphic remains, allied with the available dating evidence, suggest activity dating to the Mesolithic, Neolithic, Bronze Age (with three provisional sub-phases I-III), Roman, medieval, and post-medieval periods. These remains were also scattered amongst a collection of presently undated features/deposits. It is important to stress that the interpretation of this complex stratigraphic dataset presented below, is necessarily provisional, and will be enhanced, and modified through stratigraphic analysis and additional dating (*Section 6.3.5*).

2.6.8 ***Mesolithic (Phase 1) activity:*** the earliest remains at the site appear to relate to Mesolithic activity next to the west bank of the Cadnant's distributary channel. Some features associated with this activity were sealed beneath later archaeology, including a buried soil (***27195***), which survived within two hollows (Fig 45). This contained a large assemblage of Mesolithic lithics and charred hazelnuts, one of which (from hollow ***27110***) was dated to 5200-4905 cal BC (6076±20 BP; SUERC-105366). This soil also contained charred cereals (*Section 4.5.21*), which might suggest (if these are not intrusive) that it formed over an extended period during which potentially the switch from hunter-gathering to early agriculture was accomplished.

2.6.9 Pit Group 13, composed of six pits, and close to hollow ***27110*** (*Section 2.6.8*), related to additional Mesolithic activity in this area. These pits had been backfilled, and some were intercutting. Some also contained lithics, whilst five produced charred plant remains, including hazelnuts, four of which have been radiocarbon dated (Table 5). These dates fall at the end of sixth/beginning of the fifth millennia cal BC, which is comparable to the date from the adjacent hollow (*Section 2.6.8*).

Pit	Lithics	Charred plant remains	Radiocarbon date
24980	No	No	
24983/27046/27048 (intercutting)	No	Yes	
27050	Yes	Yes	5210-4945 cal BC (6115±20 BP; SUERC-105368)
27052	Yes	Yes	5045-4850 cal BC (6065±24 BP; SUERC-105367)
27095	Yes	Yes	5200-4855 cal BC (6076±24 BP; SUERC-105372)
27104	Yes	Yes	5000-4845 cal BC (6035±23 BP; SUERC-105374)

Table 5: The Mesolithic pits (Pit Group 13), Site 27

2.6.10 Two possible Mesolithic structures (Structures 6 and 7) were also recorded (Figs 44 and 45). Structure 6 was defined by an irregular, though slightly arcing, gully (***24572***), containing charred hazelnuts, one of which returned a date of 5475-5315 cal BC (6408±25 BP; SUERC-105353), suggesting it was probably earlier than Pit Group 13 to the east (*Section 2.6.9*). Next to the gully were two pits (***24556*** and ***24558***) and a small posthole (***24552***). Although these are presently undated, they seem to represent additional components of the structure, particularly as they contained a similar dark silt to that in the dated gully. The position of the posthole may suggest that the structure was circular, 3.8m in diameter. The existence of Structure 7 is more tenuous, but may have comprised a pit (***24793***; Fig 45), possibly a hearth, containing charcoal that was radiocarbon-dated to 7055-6820 cal BC (8008±24 BP; SUERC-105362). Surrounding this were two pits (***24857*** and ***24768***) and two pairs of postholes (***20380/82*** and ***24849/51***) which, although presently undated, seem to have been related.

2.6.11 Two intercutting pits in the north of the site (***24740*** and ***24742***) could also relate to Mesolithic activity (Fig 44), as the earlier (***24742***) returned a radiocarbon date of 4995-4840 cal BC (6024±24 BP; SUERC-105356), although this is later than the other Mesolithic dates from the site (*Sections 2.6.8-2.6.10*). There was one other Mesolithic radiocarbon assay on a (residual) charred hazelnut in one of the later burnt mounds (*Section 2.6.18*), which was dated to 6420-6245 cal BC (7472±25 BP; SUERC-105373).

2.6.12 ***Neolithic pits and structure (?):*** several features provide evidence for both early and late Neolithic activity. One was a large pit (***24524***), in the west of the site, containing charcoal dating to 3960-3795 cal BC (5078±24 BP; SUERC-105348); however, post-medieval pottery was also collected from its top, though this presumably was intrusive. The pit was associated with a tight cluster of other pits (***24527/39/62/64/78/87/89*** and ***24615***) and postholes (***24520/43/54***), which defined Structure 8, which had a rectangular plan (9.6 x 6m; Fig 45). All of these features remain undated, though most contained charcoal and charred plant remains. The other Neolithic feature (***24599***; Fig 44) was a probable hearth, containing a charcoal-rich deposit, prehistoric pottery, and charred hazelnuts, one of which was dated to 2625-2470 cal BC (4038±22 BP; SUERC-105354). In addition, pit ***20415*** might also relate to Neolithic activity, as it contained prehistoric pottery, probably from the same vessel; this shares characteristics with Early Neolithic (as well as later prehistoric) pottery (*Section 3.4.10*).

2.6.13 ***Bronze Age (Phase 3) cremation cemetery:*** based on the radiocarbon evidence from the assessment, it seems that initial Bronze Age activity involved the establishment of a cremation cemetery. Cremation burial ***27154*** (Fig 45) was the most prominent feature, in that it contained an inverted, and near-complete Bronze Age ceramic vessel (***20479***; *Section 3.4.8*; Plate 15). Immediately to its south was Pit Group 14, composed of 15 pits producing burnt materials, 12 of which (***27150***/***52***/***55***/***57-60***/***62-3***/***66***/***70***/***75***) also contained varying amounts of cremated human bone (*Section 4.2*). Radiocarbon dating of charred plant remains, and cremated bone, from eight of these pits indicated the cemetery dates to the Early/Middle Bronze Age (Table 6).

Plate 15: The inverted Bronze Age vessel associated with burial **27154***, Site 27*

Pit	Radiocarbon date
27150	1610-1450 cal BC (3258±24 BP; SUERC-105423)
27154	1615-1455 cal BC (3266±24; SUERC-105427)
27157	1535-1435 cal BC (3225±24 BP; SUERC-105363)
27158	1600-1435 cal BC (3243±24 BP; SUERC-105426)
27160	1535-1435 cal BC (3228±24 BP; SUERC-105425)
27162	1530-1430 cal BC (3220±24 BP; SUERC-105424)
27165	1500-1395 cal BC (3159±24 BP; SUERC-105357)
27166	1540-1440 cal BC (3244±21 BP; SUERC-105358)

Table 6: Radiocarbon dates from the Pit Group 14, Site 27

2.6.14 Pit Group 15, comprising 68 pits, was interspersed with 14 (*Section 2.6.13*), though cremated bone was not present in any. This may suggest that were dug for other purposes, perhaps being postholes relating to funerary structures. Two, ***24685*** and ***24804***, provided radiocarbon dates of 1505-1420 cal BC (3191±24 BP; SUERC-

105365) and 1530-1430 cal BC (3222±24 BP; SUERC-105364) respectively. One (***24824***) also contained charred cereals, whilst a monolith was extracted from another (***24654***), which was assessed for pollen (*Section 4.4*).

2.6.15 ***Bronze Age (Phase 3), and presently undated burnt mounds and bank:*** the site contained five burnt mounds (Burnt Mounds 18-22), clustered on either side of the Cadnant's distributary channel (Fig 44). These were defined by spreads of fire-cracked stone, associated with charcoal-rich deposits of silty clay/sand, and most sealed pits of varying sizes, filled with burnt materials, the only exceptions was 21 on the east bank of the stream (Table 7). Burnt Mounds 19 and 20 contained large numbers of these, many of which were intercutting, indicating repeated use of these sites. Burnt Mound 19 was also associated with a substantial ditch (***24756***), angled towards the distributary, and perhaps designed to bring water to this area, as well as trample (***24811***) associated with the activity. At Burnt Mound 20, the pits clustered in two discrete areas, one (comprising ***24874***, ***24942***, ***27057/59/72*** and ***27103***) being sealed beneath burnt-mound material, whilst the other (***24631***, ***24765***, and ***24878***) was instead surrounded by a crescent-shaped halo of burnt-mound material. Two large pits (***20407*** and ***20387***) were also recorded to the west of Burnt Mounds 18-20, which contained fire-cracked stone and burnt materials (Fig 44). It is therefore possible that these also related to contemporary burnt-mound activity, though one (***20407***) contained a fragment of post-medieval pottery.

Burnt Mound	Spread/layer and dimensions	Underlying/associated pits	Structures	Timber trough
18	***27186***; *c* 19.5 x 13.2m (composed of seven burnt-mound deposits)	***27105***; ***27028***; and ***27061***	Structure 9 (eight postholes); Structure 10 (two postholes)	***27054*** (13 planks lining pit ***27024***)
19	***27193***; *c* 14.3 x 6.6m (associated with trample ***24811***)	***24845*** (truncated ***24938***); ***24756***; ***24785***; ***24843***; ***24882*** (truncated by ***24931***); ***24884***; ***24886*** (truncated by ***24969***); ***24931***; ***24938*** (truncated by ***24882***); ***24961*** (truncated by ***24903***); ***24696***; ***24903*** (truncated by ***24785*** and ***24790***); and ***24790***	Posthole ***24880***	
20	***27191***; *c* 14.3 x 6.1m (composed of ten burnt-mound deposits; associated with trample ***24811B***)	***24631***; ***24765***; ***24874*** (truncates one of the burnt-mound deposits); ***24878***; ***24942***; ***27057*** (truncated by ***27059***); ***27059***; ***27072*** (truncated by ***27078*** and ***27059***); and ***27103***	Postholes ***27098*** and ***24828***	***27109*** (eight planks lining pit ***27078***)
21	***27974***; *c* 25 x 4.9m			
22	***27194***; *c* 10m in diameter (composed of two burnt-mound deposits)			27142 (plank at base of pit ***27139***)

Table 7: The burnt spreads and pits/toughs defining the burnt mounds, Site 27

2.6.16 In addition to the pits, Burnt Mounds 18-20 were associated with postholes. Three (***24828***, Burnt Mound 19, and ***24880*** and ***27098***, Burnt Mound 20) secured isolated timber uprights, each adjacent to a pit, whilst those associated with Burnt Mound 18 formed Structures 9 and 10, which could have been windbreaks. Burnt Mounds 18, 20, and 22 were also associated with troughs, lined with timber planks. Prior to the insertion timber plank 27142 at Burnt Mound 22 (Plate 16), the trough had been lined with blue/green stones. The burnt mounds also produced some artefacts, including lithics (Burnt Mounds 18, 19, and 21), ceramic building material (Burnt Mound 18 and 21), and prehistoric pottery (Burnt Mound 22).

Plate 16: Timber 27142, Site 27, looking south (scale 2m)

2.6.17 Although most of the burnt mounds are presently undated, their stratigraphic positioning, and a dendrochronological date from one (*below*), indicate that they probably date to the latter stages of the Bronze Age. They were clearly not all contemporary, as assessment suggests that those on the western side of the distributary channel, along with a manmade bank (*Section 2.6.18*), created a stratigraphic sequence (Phases I-III), Burnt Mounds 18 and 19 being the earliest (Phase I; though not necessarily contemporary); the eastern side of Burnt Mound 18 had also been partially destroyed by the palaeochannel, indicating that this was probably active during this, and a later period (*Section 2.6.6*). Burnt Mound 18 was also associated with a timber-lined trough (***27054***; Table 7; Plate 17), dendrochronological dating indicating that the timbers came from the same tree, which was felled sometime after 1019 BC (*Section 4.6.6*).

Plate 17: Trough **27054***, Site 27, looking north-east*

2.6.18 The extensive and intentionally constructed bank (***27192***; Fig 44) sealed Burnt Mounds 18 and 19 (Phase II). This curious feature followed the course of the palaeochannel from the timber-lined trough associated with Burnt Mound 18 (*Section 2.6.17*), up to Burnt Mound 19, and then beyond, ending with a rounded terminal. The precise purpose of the bank is unclear, though it might have been a 'flood defence', or even a way of emphasising/monumentalising the river channel, and the burnt-mound activity that preceded its construction. At a later stage, this bank was covered by a layer of colluvium. Burnt Mound 20 was then established (in Phase III) sealing both the bank and the northern end of Burnt Mound 18, within which the dated trough (*Section 2.6.17*) provides a *terminus post quem* for the creation of Burnt Mound 20. The other two burnt mounds (21 and 22) were positioned on the eastern side of the distributary (Fig 44), some 80m apart, and could not be related to the sequence of events recorded on the opposite side of the channel.

2.6.19 ***Roman (Phase 5) activity:*** there was some limited evidence for Romano-British activity at the site. Specifically, pit ***24958*** had been cut into the top of Burnt Mound 18 (Fig 45), which contained two sherds of second- to third-century samian ware (*Section 3.5.3*).

2.6.20 ***Early medieval (Phase 6), post-medieval (Phase 8), and presently undated pits:*** Pit Group 16, next to Burnt Mound 20 (Fig 44), comprised three intercutting pits, surrounded by four similar-sized pits, one of which (***20336***) was associated with posthole ***20334*** (Fig 45). The group included pit ***20349***, which contained charred material dated to cal AD 580-660 (1438±27BP; SUERC-105599). It is therefore possible that this and the other pits date to the early medieval period, although two (***20338*** and ***20339***) produced post-medieval pottery.

2.6.21 ***Later medieval (Phase 7) and presently undated pits:*** Pit Group 17 lay to the north of the cremation cemetery (*Section 2.6.13*) and comprised six large pits, which may relate to the same broad phase of activity (Fig 45). One was stratigraphically later than a cremation burial (***27162***), and two others (***20446*** and ***24638***) contained charred materials dated to cal AD 1025-1160 (956±24 BP; SUERC-105352) and cal AD 1300-1405 (598±24 BP; SUERC-105355) respectively, suggesting that the pits relate to later medieval activity.

2.6.22 Much further to the south was another comparable group, Pit Group 18 (Fig 44), consisting of three large pits at the northern end of the group and five small pits to the south. Most are presently undated, apart from one (***20331***), which contained material dated to cal AD 1175-1275 (813±24 BP; SUERC-105347), suggesting a later medieval date for the group, although another (***20456***) produced post-medieval pottery.

2.6.23 ***Post-medieval (Phase 8) boundaries:*** a north-east/south-west aligned boundary ditch (***27185***) was present east of the Cadnant's distributary, whilst on the opposite side of the watercourse was a similar ditched boundary (Fig 44). These seem to be comparatively recent in date as they contained post-medieval pottery and ran parallel with the modern road.

2.6.24 ***Presently undated trackway/ford:*** Trackway 5 was recorded in the north-eastern corner of the site, to the east of the distributary channel (Fig 44). It was aligned north-east/south-west and probably crossed this watercourse, as further elements of it were evident on the western side of the channel. Large boulders defined its edges and there was a metalled surface in between composed of compact stones in a silty-clay matrix (Plate 18). Underlying bedding material and possible construction cuts were identified in a small number of interventions across it. Although the trackway is presently undated, it was clearly later than Burnt Mound 22, as material from it had become incorporated into its composition, though it could conceivably represent an early routeway, or at least, its position could have been conditioned by an early (prehistoric?) fording point over the distributary channel. One possibility, however, based on its style of construction, was that this formed a Romano-British trackway/ford.

Plate 18: Trackway 5, Site 27, looking south-west (scale 2m)

2.6.25 ***Presently undated structures and pits:*** a further scatter of postholes, some associated with pits, on the western side of the channel may relate to structures. They included Fence 4, defined by five postholes, in the north of the site, and, to the north of this, Fence 5 defined by three postholes, one of which (***24568***; Fig 44) contained charred plant remains. In between these fences was Structure 11, defined by a gully (***27180***) and posthole, and Pit Group 19, which shared some similarities with the possible medieval pits recorded to the immediate east (Pit Group 17; *Section 2.6.21*); however, one pit (***24506***) contained a sherd of possible prehistoric pottery. A small structure defined by four postholes and a pit (Structure 12) was identified to the south, also just to the north of the possible Mesolithic structure (Structure 6; *Section 2.6.10*). There were also several pits and postholes in the vicinity of the putative Neolithic structure (Structure 8; *Section 2.6.12*). These can be divided into two groups: Pit Group 20, to the south, consisting of a line of five pits with two postholes to the south-west; and Pit Group 21, west of Structure 8, consisting of a posthole sandwiched between two areas of intercutting pits. Structure 13 was identified further south, adjacent to Burnt Mound 18, defined by ten postholes in a rectangular area, interspersed with six large pits; one of the postholes (***24909***) contained charred plant remains.

2.6.26 ***Site 28. Post-medieval (Phase 8) boundary and presently undated enclosure and pits:*** this site was immediately north of Bethel Road and south of the former lake/wetland (*Section 2.6.3*), between chainages 8400 and 8500 (centred on NGR: SH 50941 64520; Fig 43), all the archaeology present being recorded as part of the controlled archaeological strip. The density of buried remains was low, comprising only a few pits and boundary features, although some were associated with a degree of stratigraphic complexity.

2.6.27 One of the boundaries had clearly been a post-medieval hedgerow (***27179***; Fig 46), perpendicular to the Bethel Road, which was potentially in existence in the late eighteenth or early nineteenth century, as it is not depicted on late nineteenth-century mapping (OS 1889d). The other features are presently undated and included two large pits (***24722*** and ***20291***) in the western part of the site sealed by alluvium (***27218***; not illustrated), after which Enclosure 14 was created, its ditch (***27178***) being cut through the alluvium and pit ***20291***. This was rectilinear, measuring some 18m wide, with a possible eastern entrance and a single posthole (***20282***) in its interior. Following silting, the enclosure ditch was cut by pit ***20324***.

2.6.28 Two pits (***20264*** and ***20260***) and two postholes (***20269*** and ***20271***) formed a loose cluster to the east of the enclosure, and to the south and east of these were two isolated pits (***20279*** and ***27119***). Significantly, pits ***20260***, ***20264***, and ***27119*** contained dumps of fire-cracked stone and charcoal-rich silty clays, reminiscent of those associated with the burnt mounds to the south of Bethel Road, at Site 27 (*Section 2.6.15*).

2.6.29 ***Site 29. Burnt mound (Bronze Age?), Iron Age (Phase 4) ditch and enclosures, later medieval (Phase 7) pits, and presently undated enclosures and pits:*** this site was immediately north of the former lake/wetland area (*Section 2.6.3*), between chainages 8550 and 8850 (centred on NGR: SH 50905 64783; Fig 43). It was to the west of the distributary of the Afon Cadnant and the probable Iron Age settlement at Caerlan Tibot was to its west (*Section 1.4.16*). This area had been flagged as being archaeologically significant (because of the discovery of a burnt mound during trial trenching (GAT 2016; *Section 1.2.2*)) and it was excavated in details, which indicated that it possessed some stratigraphic complexity. At the start of the mitigation works, four additional trial trenches were excavated to the north of the burnt mound, on the eastern side of Caerlan Tibot. Although these only contained a few archaeological features, the area was subsequently monitored during the controlled strip, resulting in the discovery of numerous remains that were also excavated.

2.6.30 ***Bronze Age (? Phase 3) burnt mound:*** the complete extent of Burnt Mound 23 was revealed (Fig 47). Two samples acquired during its initial trial trenching were radiocarbon dated; however, these were inconsistent and hence merely provide a broad Bronze Age/early Iron Age date for its creation (*Section 1.2.2*), though based on evidence from other parts of the bypass it could conceivably be Bronze Age in date. It was defined by a spread (***18122***) of fire-cracked stone/charcoal-rich silty clay (18m in diameter), beneath which was a large trough (***18227***) containing a timber (18225; Plate 19). On initial discovery, this timber was suspected to be reused from a log boat, though this does not now seem to be the case (*Section 3.11.16*). Adjacent to this were two other troughs (***18201*** and ***18203***), one of which, ***18201***, was lined with timbers. The three troughs had all been backfilled and capped with a layer of large stones (***18152***). Other associated features comprised a posthole (***18198***) and three shallow pits (***18190***, ***18194***, and ***18196***), possibly hearths. A layer of colluvium (***18149***; not illustrated) had also accumulated around the eastern side of the burnt mound, presumably once activities had ceased.

Plate 19: Overhead view of trough **18227***, Site 29, containing timber 18225 (scales 1m and 2m)*

2.6.31 ***Iron Age (Phase 4) ditch and enclosure:*** a large arcing ditch (***18242/18243***) was parallel with the circumference of Burnt Mound 23 (*Section 2.6.30*), set some 13m distant from its western side. A break in this ditch created an entrance, and samples from successive deposits in its southern ditch terminal provided radiocarbon dates of 390-205 cal BC (2243±24 BP; SUERC-105195), 340-50 cal BC (2118±24 BP; SUERC-105196), and 355-55 cal BC (2155±24 BP; SUERC-105197), indicating that it was progressively silting in the later Iron Age. In addition, there was a shorter, arcing ditch (***18247***) directly adjacent to the south-western side of the burnt mound, which may have been contemporary with the larger ditch. At the northern end of the site, there was some additional evidence for Iron Age activity, in the form of Enclosure 15, defined by ditch ***18250***. This silt-filled ditch produced a radiocarbon date of 50 cal BC-cal AD 80 (2000±24 BP; SUERC-105189).

2.6.32 ***Later medieval (Phase 7) pits:*** two pits in the northern half of the site have been radiocarbon dated to the later medieval period. Specifically, charred materials from one (***18029***), possibly a hearth or bonfire, were dated to cal AD 1225-1285 (763±24 BP; SUERC-105191), whilst material from the other (***18015***) were dated to cal AD 1455-1635 (367±24 BP; SUERC-105190).

2.6.33 ***Presently undated pits and enclosures:*** two enclosures were recorded, which are presently undated. Enclosure 16, in the northern part of the site, had a curvilinear plan and an entrance. To the north of this entrance, it was defined by a single ditch (***18244***), whilst to the south it was bounded by two closely spaced parallel ditches (***18245*** and ***18246***). Following silting, both ditches were cut by pits ***18039*** and ***18049***, one of which (***18049***) had a scorched base suggesting it was a hearth.

2.6.34 Enclosure 17 was adjacent to and respected the position of the Iron Age ditch surrounding Burnt Mound 23 (*Section 2.6.31*), suggesting it might also be Iron Age in date; however, it produced a few fragments of post-medieval pottery and glass, though these are probably intrusive. Its northern side was defined by ditch ***18240***, which created a funnelled entrance, and its southern sides by segmented ditches ***18241***, ***18171***, and ***18208***, the relationship of this with the Iron Age ditch being unclear, as the junction between these two features had been destroyed by a land drain. These segmented ditches also defined an entrance into a small sub-rectangular internal enclosure, at the south-eastern corner of the main enclosure. This contained a large pit (***18176***), though this was clearly earlier than the enclosure, and two smaller pits (***18137***, and ***18160***), filled with fire-cracked stone and charcoal (identical to burnt-mound material), one of which (***18160***) was cut by a later posthole (***18158***).

2.6.35 In addition, numerous presently undated pits formed three pit groups. Pit Group 22, directly north of Burnt Mound 23 (*Section 2.6.30*), comprised eight pits, one of which (***18094***) contained fire-cracked stone. Pit Group 23 was located south-west of Enclosure 16 (*Section 2.6.33*) and consisted of six pits, one of which, ***20218***, also contained fire-cracked stone and charcoal. To the west was also an isolated pit (***20241***), again containing fire-cracked stone and charcoal. Pit Group 24, to the north and close to Enclosure 15 (*Section 2.6.31*), comprised 11 pits/postholes of various sizes, arranged in rectilinear pattern, one, ***20196***, containing burnt clay and ceramic building material. To the east were three postholes (***18207***, ***18008***, and ***18006***), which arced around the exterior of Enclosure 15. One, ***18008***, produced fragments of post-medieval pottery, though it is unclear whether these date the feature or were intrusive.

2.6.36 ***Site 30. Neolithic, Bronze Age, and early medieval (Phases 2, 3, and 6) pits, and presently undated pits, ditches, and enclosures:*** this site was identified on either side of the distributary of the Afon Cadnant between chainages 8950 and 9100 (centred on NGR: SH 50705 65117; Fig 43). It also lay immediately south-west of Crug House, a possible Bronze Age burial site (*Section 1.4.11*). Although an earlier trial trench to the north of the distributary had produced negative results, a scatter of ditches and pits was identified either side of the stream during the controlled archaeological strip, which were subsequently excavated; radiocarbon dating indicates that some relate to Neolithic and early medieval activity.

2.6.37 ***Neolithic (Phase 2) and Bronze Age (Phase 3) pits:*** Pit Group 25 lay immediately south of the Cadnant's distributary and consisted of three pits (Fig 48), containing charred hazelnut-shell fragments and other charred materials, with two relating to different episodes of prehistoric activity. Specifically, the central pit, ***20140***, has been radiocarbon-dated to the late Neolithic period (3310-2920 cal BC; 4416±22 BP; SUERC-105346), and the western pit, ***20138*** was dated to the Chalcolithic period (2295-2140 cal BC; 3791±22 BP; SUERC-105345). This latter pit also produced struck flint and prehistoric pottery. The third pit (***20150***) is presently undated.

2.6.38 ***Early medieval (Phase 6) pit:*** pit ***20094*** was north of distributary. It contained abundant charred cereal remains, and produced a radiocarbon date of cal AD 548–640 (1488±24 BP; SUERC-106025).

2.6.39 ***Presently undated pits, ditches, and enclosures:*** south on the Cadnant's distributary and Pit Group 25 (*Section 2.6.37*), a collection of pits and a ditch remains presently undated. Pit Group 26 created a circle, suggestive of a prehistoric monument (a timber or pit circle), with a diameter of *c* 30m. Six pits (***20133/42/44/53/66/77***) formed a northern arc two of which ***20142/44*** (first to last) were intercutting; two pits (***20134/49***) seemed to create a southern arc; and two pits (***20156/79***) lay in the presumed interior. None contained charred materials suitable for radiocarbon dating, making the precise dating of this possible monument difficult. One isolated pit (***20172***) was also recorded to the east this, and sandwiched between the Pit Groups was an undated, silt-filled ditch (***20198***). This seemed to respect their positions and hence could be an early landscape feature.

2.6.40 On the other side of the distributary was Ditch Group 10, composed of five ditches, which, if contemporary, might relate to an early enclosure. This area also contained an early medieval pit (*Section 2.6.38*), as well as four other pits (***20086***, ***20088***, ***20090***, and ***20112***), which, although presently undated, were possibly elements of early activity in this area. These all seem to have been hearths/fire pits, associated with *in-situ* burning, and charcoal and charred plant remains. One, ***20088***, also contained lithics and possible prehistoric pottery.

2.6.41 ***Site 31. Post-medieval (Phase 8) enclosures and presently undated pits:*** this northernmost site in Landscape 5 lay south of Plas Menai roundabout, between chainages 9200 and 9300, and west of Crug House (centred on NGR SH 50679 65299; Fig 43). During trial trenching, several ditches were identified that seemed to be associated with an enclosure (GAT 2016*; Section 1.2.2*). These and other ditches were also identified by the controlled strip, and it is now evident that, together, they formed a group of post-medieval field boundaries (Ditch Group 11; Fig 49). Although they are not depicted on late nineteenth-century mapping (OS 1899e), they do mirror the alignments of the fields that were depicted. The excavated boundaries were arranged in a T-shape, separating three fields. They also contained a small amount of post-medieval pottery, along with some residual fragments of prehistoric pottery from ditch ***20052*** (*Section 3.4.6*). The westernmost boundary had also been partially recut, and shorter parallel ditches were associated with this, and the other boundaries, suggesting trackways adjacent to the field boundaries. Several presently undated pits/postholes were probably also post-medieval in date, though one (***20043***) did contain a sherd of medieval pottery (*Section 3.5.4*). These defined Fences 6 and 7, parallel with the field boundaries, undated Pit Group 27 (comprising five pits), and a few other isolated pits adjacent to the field boundaries.

3 Factual Data: Artefacts

3.1 General Introduction

3.1.1 Given the extent of the bypass, a comparatively small assemblage of artefacts was recovered during the fieldwork, totalling in excess of 3086 separate items (Table 16). The bulk of these comprise prehistoric flaked lithics, and pottery, with the latter being dominated by prehistoric sherds, with a smaller amount of Roman and post-Roman material. Other finds comrpise: coarse- and ground-stone tools; ochre; fired clay; ceramic building material; clay tobacco pipe; metalwork; and worked wood. The following section provides an assessment of each class of artefact recovered.

Material	Number of items
Flaked prehistoric lithics	644
Coarse-stone tools	17
Polished stone axe	1
Ochre	2
Prehistoric pottery	285
Roman and post-Roman pottery	400
Fired clay	934+
Ceramic building material (CBM)	614+
Clay tobacco pipe	29
Glass	92
Metalwork	41
Worked wood	27
Total	***3086+***

Table 8: The types and quantities of artefacts assessed

3.2 Flaked Lithics *by Antony Dickson*

3.2.1 In total, 701 lithics were submitted for assessment. Of this, 57 items were burnt natural flint, and hence the assemblage comprises 644 worked/flaked lithics. The primary aims were to consider the raw materials used in the production of the flaked lithics, and examine their technological traits and, where possible, chronology.

3.2.2 ***Methodology***: the artefacts were macroscopically scanned and assigned to a category within a simple lithic classification system. Cores have been characterised by reference to the number and type of platforms and the reduction strategy exhibited by their flaking fronts. Evidence for the maintenance and upkeep of these during reduction has also been recorded, when present. Debitage is considered by an assessment of its technological character, whilst indeterminate debitage has been subdivided into chunks, representing thicker, angular pieces, and fragments, which probably represent blade and flake shatter. Diagnostic tools and utilised pieces have been characterised by type and classification. Beyond this, no detailed metrical or technological recording was undertaken.

3.2.3 ***Assessment, raw materials:*** flint is the main raw material present (Table 17), the bulk of which is pebble flint, probably procured from local till deposits and beach contexts (Smith 2005a). It varies in colour, through various shades of brown and grey, generally has a fine-grained texture, and contains variable inclusions, ranging from those without any to pieces with small white and brown speckling, and larger blemishes. The material also varies in opacity/translucency and lustre. Where cortex is present, it ranges in thickness, but invariably comprises a worn and abraded, chittered pebble surface. In addition to the pebble flint, there is also a very small quantity of other flint, probably comprising no more than four pieces, which probably came from beyond the region. This typically comprises a dark brown, fine-grained flint with a shiny lustre, dark speckled inclusions and a thick, pale brown, chalky cortex. It is notable that a finely made transverse arrowhead was made from this material (*Section 3.2.17*).

Raw material	Number of items	Percentage of overall assemblage
Flint	614	95.34
Chert	2	0.31
Quartz	3	0.46
Volcanic stone (?)	23	3.58
Indeterminate	2	0.31
Total	***644***	***100***

Table 9: Raw materials used in the production of the flaked lithics

3.2.4 The other raw materials identified comprise small amounts of chert (reddish-grey in colour) and quartz, and slightly larger numbers of lithics worked from volcaniclastic rocks, or material altered by volcanic activity, which was probably procured from the local area. This latter material varies greatly in colour, texture, and inclusion type, and comprise: a greenish-grey, fine-grained stone, with rare small, white inclusions; and a greenish-brown, medium-grained rock.

3.2.5 ***Technological traits and chronology:*** overall, the assemblage (Table 10) comprises lithic relating to both primary and secondary technology (636 items), with a few unidentifiable pieces (eight). They were recovered from 19 sites along the bypass, with the bulk being from Sites 10 (*Section 2.3.39*) and 27 (*Section 2.6.4*).

Site	Number of items	Percentage of overall assemblage
3	3	0.47
4	16	2.48
5	3	0.47
7	6	0.91
8	4	0.62
9	18	2.80
10	178	27.64
11	5	0.78
12	4	0.62
13	5	0.78
14	1	0.16
15	42	6.52
16	2	0.31
17	56	8.70
22	1	0.16
23	1	0.16
27	252	39.13
29	5	0.78
30	4	0.62
Unstratified (U/S) items from outside site areas	38	5.89
Total	***644***	***100***

Table 10: The sites producing flaked lithics

3.2.6 *Condition:* the bulk of the assemblage is fresh with most pieces exhibiting some small irregular scarring on their lateral edges and dorsal ridges. A small amount has more substantial edge damage, which includes several flakes from both stratified and unstratified contexts; however, several blades appear to have more extensive damage, particularly those from pit ***17789***, Site 8 (*Section 2.3.35*); overbank alluvium ***26615*** and ditch ***26613***, Site 10 (*Section 2.3.43* and *2.3.44*); a buried soil (***26032***), Site 15 (*Section 2.4.21*); and pit ***27104***, Site 27 (*Section 2.6.9*).

3.2.7 In addition to the edge-damaged pieces, five items of struck flint have thermal scars on their principal faces, whilst 136 pieces are also burnt. These generally occurred as one or two items within their parent deposits. The exceptions were the 12 from pit ***19509***, Site 17 (*Section 2.4.30*), and nine from pit ***27104*** (*Section 2.6.9*) and seven from buried soil ***27195*** (*Section 2.6.8*), both at Site 27. In addition, Burnt Mounds 18 and 20, Site 27 (*Section 2.6.15*), produced 57 pieces of burnt natural flint and stone. Several lithics also have a black residue adhering to their faces; however, this is probably post-depositional in origin, rather than reflecting their use or hafting.

3.2.8 *Primary technology:* in total, 13 complete cores and four core fragments were recorded (Table 11). One of these fragments is undiagnostic to a specific reduction strategy, while the others are from bipolar cores and a core on a flake. Most of the complete cores are single-platform types and those from Site 10 (*Section 2.3.39*) are probably late Mesolithic in date, with two being associated with indeterminate blade and flake manufacture. Site 10 also produced two opposed-platform cores, whilst another example was recovered from Burnt Mound 21, Site 27 (*Section 2.6.15*).

Site	Pebble	Core	Flake	Blade	Blade chip	Small flakes	Indeterminate chunk	Indeterminate fragments	*Total*
3			1			1	1		***3***
4			8	2	1			4	***15***
5								3	***3***
7			3					1	***4***
8			3	1					***4***
9		1	11	1				5	***18***
10		9	62	16	11	20	5	52	***175***
11			2	1					***3***
12			3	1					***4***
13			2				1		***3***
14								1	***1***
15		2	13	1		4	2	18	***40***
16								1	***1***
17			16	2	3	11		24	***56***
22			1						***1***
23			1						***1***
27		5	46	7	10	10	11	161	***250***
29			5						***5***
30			2	1					***3***
U/S	1		28	5			1	2	***37***
Total	***1***	***17***	***207***	***38***	***25***	***46***	***21***	***272***	***627***

Table 11: Primary lithic technology by type and site

3.2.9 The remainder of the cores comprise a core on a flake, made on a hard hammer struck flake, from an alluvial deposit, Site 10 (*Section 2.3.43*); a thin, bipolar flake core (30.5 x 20.3 x 6.4mm) from palaeochannel ***27187***, Site 27 (*Section 2.6.6*), which exhibits extensive edge damage from the flaking process; and a core with platforms at right-angles from pit ***27095***, Site 27 (*Section 2.6.9*). The latter core is derived from the reduction of a small flint pebble (25.8 x 29.72 x 25.11mm) and is associated with a small assemblage of debitage. The principal face exhibits several narrow flake removals that relate to the initial preparation of the core. A single deep and irregular flake scar, aligned perpendicularly across the main direction of reduction, probably represents an attempt to set up a platform across the top of the core. This removal hit a flaw within the body of the pebble and the core was subsequently discarded. The only other item associated with core maintenance is an unstratified trimming flake.

3.2.10 The assemblage of primary technology is dominated by debitage, particularly flakes (33% of the total assemblage; Table 11). They vary in size (43 x 28 x 9.9mm to 8.6 x 12.1 x 1.8mm) and most of the complete flakes relate to the secondary and tertiary stages of reduction, with only a few complete primary flakes present. This is supported by the quantity of broken flakes, of which the majority also retains either some cortex or potentially none.

3.2.11 The platforms on the complete flakes are often cortical but also vary in thickness from those that are very thin, sometimes exhibiting preparation, to thicker examples that often have associated cones, fissures, and pronounced bulbs of percussion. This suggests that soft/indirect percussion and a hard-hammer technology was used, indicative of Neolithic/Early Bronze Age stone working (Butler 2005). In contrast, those from buried soil ***27195*** (*Section 2.6.8*) and pit ***27095*** (*Section 2.6.9*), Site 27, are much smaller, mainly exhibit thin platforms, often showing evidence of being prepared, and are relatively narrow in form, which suggests that these are late Mesolithic in date (*ibid*).

3.2.12 Several flakes show evidence of probable bipolar reduction. For example, a flake from Burnt Mound 15 (*Section 2.4.23*), Site 15, has a collapsed platform, a bulbar scar, and is also crushed at the distal end. A few siret fractures (flakes and blades split longitudinally; Inizan *et al* 1992) are also present in the assemblage and they probably reflect the poor quality of some of the pebble flint, an unskilled approach to knapping, and the use of hard hammers.

3.2.13 Blades are relatively fewer in number and, although the majority are broken (Table 11), most relate to the later stages of reduction. There are also several true blades, and a relatively long (35.8 x 9.6 x 3.3mm), parallel sided example from buried soil ***26032***, Site 15 (*Section 2.4.21*), with a prepared thin platform, and blade scars on the dorsal face, is probably late Mesolithic in date (Butler 2005). Two broken blades from Site 10 (from overbank alluvium ***26615*** (*Section 2.3.43*) and buried soil ***26518*** (*Section 2.3.41*)) are also probably late Mesolithic in date and have proximal lips on their platforms, indicating they were knapped using a soft hammer. Although most features/deposits containing blades only produced single examples, a relatively large collection of broken blades was recovered from buried soil ***27195***, Site 27 (*Section 2.6.8*). Several of these had bladelet dimensions (<8mm in width) suggestive of late Mesolithic stone working. The assemblage also includes several probable Neolithic blades (*eg* from pit ***17014***, Site 4; *Section 2.3.10*), which are large and possess a flake-like morphology.

3.2.14 The remainder of the debitage comprises small flakes and blade chips (*ie* with dimensions less than 10mm), and indeterminate fragments and chunks (Table 11). The indeterminate material represents a mixture of unidentifiable blade and flake fragments, and shatter generated during stone working. Although most deposits/features containing chips and indeterminate material produced only small amounts, there were larger collections from buried soil ***27195*** (*Section 2.6.8*), and pits ***27095*** and ***27104***, at Site 27 (*Section 2.6.9*). Moreover, the buried soil contained a large number of indeterminate fragments, which probably represents micro-debitage derived from *in-situ* stone working.

3.2.15 *Secondary technology:* this comprises several different microlithic tool types, retouched blades and flakes, and a utilised flake (Table 12). These include an early Mesolithic obliquely backed point from Site 13 (recovered next to Fence 2; *Section 2.4.17*), which comprises the distal end of a blade (37.1 x 11 x 2.4mm), abruptly retouched from the right lateral edge on an oblique angle across its width. The dorsal face has several narrow scars indicating it was produced as part of a blade-based reduction strategy. The distal tip is missing, and the piece has several areas of edge damage from post-depositional processes.

Site	Microlith	Retouched Blade	Retouched Flake	Utilised flake	*Total*
4		1			***1***
7			1	1	***2***
10	2	1			***3***
11		1	1		***2***
13	1	1			***2***
15	1	2			***3***
27	2				***2***
30			1		***1***
U/S			1		***1***
Total	***6***	***6***	***4***	***1***	***17***

Table 12: Secondary lithic technology by type and site

3.2.16 A Mesolithic or Early Neolithic burin was unstratified. This was produced on a blade and has possible burin facets and/or resharpening scars at the distal end that form a point. Several late Mesolithic microlith fragments were also recorded, from Sites 10 (*Section 2.3.39*), 15 (*Section 2.4.20*), and 27 (*Section 2.6.4*), along with a retouched blade fragment that is a probable microburin (derived from the production of microliths; *cf* Conneller 2022, 26).

3.2.17 Some of the recorded secondary technology seems to be later in date. This includes a large (44.4 x 43.5 x 7mm), finely made later Neolithic transverse arrowhead from pit ***24013***, Site 11 (*Section 2.4.5*), made from a non-local flint. The was produced on a secondary flake and has abrupt/semi-abrupt retouch on the dorsal face forming a V-shaped tang. The ventral face has inverse, semi-invasive retouch on one edge, also situated on the tang, whilst the cutting edge is splayed and has edge damage, possibly from use. A blade (38.8 x 15 x 4.3mm) from the same pit was possibly made from the same flint used to produce the arrowhead. This has micro-denticulation along the left lateral edge, was produced using a soft hammer or indirect percussion, and has a deep, hinged termination. Micro-denticulated blades have a long currency of use, spanning the Mesolithic and Neolithic periods (Butler 2005; Milner *et al* 2018); however, they are common during the later Neolithic period and are often associated with edge-use gloss derived from the processing of organic material, such as grasses (Hurcombe 2014, 158-9). The fact that the pit contained these two artefacts, both formal tools of a similar chronology, alongside two further flake fragments, all of which were potentially made from a non-local flint, could imply that they were elements of a deliberate deposit.

3.2.18 Another later tool is a small side-and-end scraper from pit ***20138***, Site 30 (*Section 2.6.37*). It was produced from non-local flint similar that used to produce the transverse arrowhead (*Section 3.2.17*). It appears to have been manufactured on a broken tertiary flake and has semi-abrupt retouch along the proximal break and the right lateral edge, which extends slightly onto the distal end. The scraper is sub-circular in plan and has a secondary phase of working relating to bipolar reduction. A second scraper was unstratified at Site 27 (*Section 2.6.4*). This is an end scraper, probably Bronze Age in date, manufactured on a thick, naturally fractured flake. It has limited abrupt retouch on one edge and irregular scarring at the base of the retouched area, denoting use-wear.

3.2.19 A large blade (89 x 29.3 x 10.8mm) from pit ***17014***, Site 4 (*Section 2.3.10*), probably represents a Neolithic knife-form tool, as this has a patch of semi-abrupt retouch on the right lateral edge. The blade has a broad platform with a pronounced bulb of percussion, platform preparation, and a ventral lip. The latter suggests that it is a product of indirect/soft hammer percussion. Given the size of the blade, it is also likely that it was produced on non-local flint. A second knife form, a probable plano-convex knife, was recovered from pit ***26013***, Burnt Mound 11, Site 15 (*Section 2.4.23*). This has semi-invasive, semi-abrupt retouch along the left lateral edge and less invasive, but more abrupt, retouch on the other edge.

3.2.20 Beyond the formal tools are several miscellaneous retouched blades and flakes, such as a utilised pebble-flint flake from Site 7 (*Section 2.3.25*). These, however, are relatively few, forming only 3% of the total assemblage. Nevertheless, their technological character indicates that they were associated with Mesolithic, Neolithic, and probable Bronze Age stone-working traditions.

3.3 Coarse-stone Tools, Polished-stone Axe, and Ochre *by Antony Dickson*

3.3.1 A small collection of coarse-stone tools was assessed, along with a single fragment from a polished-stone axe, and a small amount of ochre. All were assessed in order to determine their form, raw materials, and stratigraphic provenance.

3.3.2 ***Coarse-stone tools:*** few coarse-stone tools were retrieved, probably produced from volcaniclastic rocks procured from the local area. One, a utilised teardrop-shaped pebble, was unstratified. It measures 67.3 x 15.5 x 8.7mm, and exhibits slight patches of polish on one side suggesting it was a rubber. The date of the piece is difficult to ascertain, though it could potentially be a prehistoric tool.

3.3.3 Other items include 13 flakes from pit ***17014***, Site 4, radiocarbon dates to the Neolithic period (*Section 2.3.10*), derived from the same bluish-grey, relatively fine-grained rock, with the complete flakes ranging in size from 21.4 x 26.7 x 7.3mm to 30.4 x 73.8 x 6.5mm. These exhibit attributes associated with hard-hammer percussion: cones, sometimes double, on their platforms; platforms that are wing-shaped in plan; large bulbs of percussion; and hinge terminations. Moreover, two of the broken pieces refit to form a large, but still incomplete, flake. These appear to represent the reduction of a cobble (with a brownish-grey weathering rind) to prepare a roughout for an implement. Two other flakes were also recovered from this pit, though these relate to the reduction of a different raw material types. One is a tertiary flake (29.7 x 27 x 4.2mm) of a light brownish-grey medium-grained rock with rare pale small inclusions, whilst the other is a larger secondary flake (78.8 x 50.9 x 21.1mm) of similar coloured material, although it is coarser-grained with frequent small pale inclusions. The latter also has a cobble weathering rind. Both flakes also exhibit attributes associated with hard-hammer percussion.

3.3.4 The remainder of the assemblage comprises a broken worked flake of unidentifiable coarse stone and a fragment of a probable ground stone, both from buried soil ***26004***, Site 15 (*Section 2.4.21*). The latter is a fragment of coarse-grained stone that may have been shaped by grinding around its surviving edges.

3.3.5 ***Polished-stone axe:*** a small, polished axe blade was unstratified from next to Burnt Mound 15, Site 15 (*Section 2.4.24*). It is 118.5mm long, 51.5mm wide at the blade and tapers to 27.6mm wide at the butt end, with a maximum thickness of 16.2mm. It is sub-elliptical in cross-section and there are shallow concave depressions on either face along the edges of the implement, on opposite sides. It was probably roughed out into shape through flaking and finished by grinding and polishing; however, this process was not applied extensively and there appears to have been a focus on the blade. The edge of the blade, including the butt end, were polished into a facet that varies in width and profile, and in places has been damaged. Given the size of the blade and its somewhat irregular morphology, it is possible that it comprises a flake struck from a larger implement that had been reworked into an axe shape.

3.3.6 This axe is probably Neolithic date and was manufactured on a greenish-grey fine-grained rock that is pale grey on one of the principal faces. Macroscopic inspection of this stone suggests that it could be an augite granophyre derived from the Penmaenmawr region, either from the axe production sites at Craig Lwyd (petrological Group VII; Houlder 1988), or one of the production sites known from the surrounding area (GAT 2017), or those at Mynydd Rhiw on the Llŷn Peninsula (petrological Group XXI; Burrow 2011).

3.3.7 ***Ochre:*** in addition to the worked stone, two fragments of ochre were recovered. One came from a small pit at Site 22 (*Section 2.5.4*) and the other was from buried soil ***27195***, Site 27 (*Section 2.6.8*).

3.4 Prehistoric Pottery *by Adam Tinsley*

3.4.1 The assemblage of prehistoric pottery comprises 285 ceramic fragments and a further collection of small crumbs, with a collective weight of *c* 3.25kg (3248g). These came from 14 sites along the bypass: specifically: Sites 1 (*Section 2.2.2*); 4 (*Section 2.3.8*); 7 and 8 (*Sections 2.3.25* and *2.3.30*); 10-13 (*Sections 2.3.39*, *2.4.4*, *2.4.8*, and *2.4.14*); 15 (*Section 2.4.20*); 17 (*Section 2.4.30*); 19 (*Section 2.4.33*); 27 (*Section 2.6.4*); and 30 and 31 (*Sections 2.6.36* and *2.6.41*). The assemblage dates from at least the Middle Neolithic potentially through to the Iron Age, with diagnostic traits suggesting at least two, if not possibly three or four, different typological groups.

3.4.2 ***Methodology:*** the assessment was undertaken in accordance with guidance provided by the Prehistoric Ceramic Research Group (PCRG) *et al* (2016) and other standard guidelines (Historic England 2015a; CIfA 2020d). The assemblage was scanned by context using a x10 magnifying glass to provide sufficient detail to identify basic diagnostic characteristics that would allow initial typological designation and the establishment of provisional fabric types. The form of individual sherds and wider vessel profiles, the type of decorative media, motif and surface treatment employed, where present, as well as other features, such as the presence of potential organic residues, were also noted. Individual fragments were sorted and counted by size, with any item measuring over 10mm in size classified as an individual fragment or sherd, while items smaller than 10mm were classed as crumbs. Material classed as crumbs was collectively weighed and recorded by context, but not examined further, as they generally lack any diagnostic features or value. Similarly, any material not identified as deriving from ceramic vessels (such as burnt clay deriving from heat-affected surfaces *etc*) was collectively weighed and listed by context for the same reasons. These data were entered into the project database, but no further cataloguing of the material was undertaken as part of the assessment.

3.4.3 ***Assessment:*** the assemblage comprises mainly plain, relatively undiagnostic and variably abraded body sherds of various sizes, although a small selection of rim, shoulder, and potential base fragments are also represented. Except for the near-complete vessel, the remaining material is highly fragmentary and only allows a partial profile of parental vessels to be developed.

3.4.4 The bulk of the material, while generally lacking many diagnostic traits, demonstrates a range of fabric types, which are relatively synonymous with prehistoric ceramic production (*cf* Cleal 1995; Gibson 2002). In total, nine fabric groups have been identified, which contain variable quantities of crushed igneous stone used as a temper, and less frequently flint or, to a lesser extent, quartz. Fabrics that demonstrate no discernible inclusions or a range of small voids, possibly indicative of the leaching out of inclusions and minerals, are also relatively common, and potentially include material that may be later prehistoric in date.

3.4.5 Several of the pottery sherds are also noteworthy, as these have carbonated organic residue adhering to their interior surfaces. These include a sherd from posthole ***24176***, Site 12 (*Section 2.4.13*), and a group of sherds from Site 27, comprising a sherd from cremation burial ***27154*** (*Section 2.6.13*), three sherds from pit ***24599***, and 13 sherds from pit ***20415*** (probably all from the same vessel; *Section 2.6.12*).

3.4.6 ***Neolithic (Impressed Ware) pottery:*** among the material possessing diagnostic traits, the most readily identifiable elements are from Middle Neolithic 'Impressed' or Peterborough Ware vessels (Smith 1956; Gibson 1995; Tinsley 2013), with approximately 58 sherds deriving from pit ***17014*** (with possibly two vessels present) and one sherd from pit ***17009***, both at Site 4 (*Section 2.3.10*), with five sherds from pit ***24041*** (potentially from two vessels), Site 11 (*Section 2.4.5*). The vessels are distinguished by profuse use of impressed decoration, with whipped cord maggot decoration arranged in multiple horizontal rows around upper sections of the vessel, forming a herringbone motif, which on occasion is visible both internally and externally. In the case of material from pit ***24041***, the decoration includes impressions probably made with the broken shaft of a bird or other animal bone. The material from pits ***17014*** and ***24041*** also includes sherds from vessels with a characteristic cavetto neck, rim forms presenting a vertical profile, with a flat rim tip and an expanded thick external lip. Such vessels have clear affinities with local Impressed Ware (Gibson 1995, figs 3.2 and 3.5, 26-8), and more generally among examples of the Mortlake sub-group of the style represented across England and Wales (Smith 1956; Tinsley 2013). The assemblage in pit ***24041*** also includes a plain, simple, vertical rim with a pointed edge, derived from a small cup or bowl. Such bowls or cups, both decorated and plain, are also known from Impressed Ware assemblages from the British Isles (Tinsley 2013).

3.4.7 Several other sherds are possibly also from Impressed Ware vessels, although their designation is less certain. These include three sherds from ditch ***20052***, Site 31 (*Section 2.6.41*); 14 sherds from pit ***17014***, Site 4 (*Section 2.3.10*); and three sherds from pit ***19523***, Site 17 (*Section 2.4.30*). Of these, a single sherd from pit ***17014*** was decorated with whipped cord, while a sherd from ditch ***20052*** was seemingly decorated with incised lines, and one from pit ***19523*** may possess bird bone impressions.

3.4.8 ***Bronze Age pottery:*** a near-complete vessel (***20479***) was recovered from Site 27, which had been used as a used as a cremation urn (*Section 2.6.13*). It was executed in a stone-tempered, seemingly coarse fabric, with many temper elements protruding across the external surface (Plate 20); however, its interior surface appears to have been smoothed over and there are indications, particularly around the rim and upper sections of the vessel, that the external surface of the vessel had been similarly treated. The rough appearance of its exterior may, therefore, have resulted from weathering while inverted. The vessel also has faint traces of incised decoration on the preserved elements of the external rim surface. This forms a motif comprising diagonally incised lines arranged in a single row below the external rim edge, and framed below by one or more incised lines extending horizontally around the circumference of the vessel.

Plate 20: Cremation urn **20479** *after conservation*

3.4.9 In size and form the vessel is conical, with a flat base and a flat-topped vertical rim extending directly from the body of the vessel, with no shoulder, neck, or equivalent demarcating cordon. It is approximately 210mm high and 200mm in diameter at the external rim edge. While the radiocarbon dates from the burial indicate that this vessel is Early/Middle Bronze Age in origin (*Section 2.6.13*), its simplistic form does not fit well with any of the well-known and more elaborate Early Bronze Age ceramic forms, such as Beakers (Clarke 1970; Lanting and Van de Waals 1972; Boast 1995; Case 1995), Collared Urns (Longworth 1984), and Food Vessels (Cowie 1978), or later Bronze Age forms, such as Bucket Urns and similar tub-shaped vessels of the Deverel Rimbury tradition (Barrett 1980). While further work is required to situate the vessel typologically, initial assessment suggests that the closest parallels, both in form and decorative treatment, may reside with domestic wares in the Standrop Rigg style, which are known from northern and western Britain (*cf* Burgess 1995). Examples include a similarly decorated conical vessel from Houseledge (*op cit*, fig 13.3, 149) and a near-identical vessel from Standrop Rigg (*op cit*, fig 13.4, 151), although the distinction between domestic wares and the use, in this instance, as a cremation urn, if such a distinction can be sustained, would need to be reconciled, as would the obvious geographical separation of such comparative material.

3.4.10 ***Undesignated pottery:*** 55 sherds from pit ***20415***, Site 27 (*Section 2.6.12*), are probably from a single vessel, based upon similarities in fabric and colour, and are also indicative of a separate typological group, although its potential designation is uncertain. Most of the material comprises moderately worn, plain body sherds in a generic fabric characterised by common small voids and are, therefore, relatively undiagnostic. That said, several sherds deriving from the shoulder of the vessel, albeit missing the key diagnostic profile of the rim, indicate they are from a small- to medium-sized carinated bowl. Such shouldered bowls may be indicative of an earlier Neolithic origin among vessels of the carinated bowl tradition (Sheridan 2007); however, the fabric and surface finish lack certain characteristics, for example a burnish, that more comfortably fit with this ceramic tradition. Moreover, the presence of a single potential base sherd, while quite worn and potentially equivocal, may indicate the presence of a slightly pedestalled ring base. If correctly identified, such basal forms would rather indicate an origin among shoulder bowls of the Late Bronze Age-Early Iron Age Post-Deverel-Rimbury traditions (*cf* Cunnington 1923; Challis and Harding 1975; Barrett 1980; Elsdon 1975; 1989; Gibson 2002; Cunliffe 2005; Brudenell 2012).

3.4.11 A selection of plain undiagnostic sherds was also recovered from various features along the bypass. These include four body sherds from pit ***17006***, Site 4 (*Section 2.3.10*), which, given the presence of Impressed Wares from other pits at this site (*Section 3.4.6*), could be Neolithic in date. Pit ***17568***, Site 1 (*Section 2.2.2*), also produced a body sherd, which could conceivably be prehistoric in date, though this site also contained pits dating to the early medieval period. Burnt Mound 1, Site 7 (*Section 2.3.25*), also produced body sherds, which presumably date to the Bronze Age.

3.4.12 Three body sherds were recovered from pit ***19523***, Site 17 (*Section 2.4.30*), which, based on radiocarbon dates, could be Neolithic in date, and a nearby tree-throw contained comparable pottery (11 sherds in total). From Site 13, one sherd was recovered from pit ***21503*** and three were from pit ***24314*** (*Section 2.4.18*), and these could be related to nearby burnt-mound activity, whilst the prehistoric sherds from ditch ***23788***, Site 8 (*Section 2.3.34*), and posthole ***24176***, Site 12 (*Section 2.4.13*), are probably residual. A sherd from a pit (***20741***), at Site 19, might tentatively date to the

Bronze Age, based on a radiocarbon date from an adjacent feature (*Section 2.4.33*). Similarly, three sherds from Site 15 are possibly a product of Bronze Age activity associated with Burnt Mound 7 (*Section 2.4.23*).

3.4.13 At Site 27, pit ***24599*** (*Section 2.6.12*), radiocarbon dated to the very end of the Neolithic period, produced four body sherds, whilst two other pits at this site, ***24506*** (*Section 2.6.25*) and ***24969***, contained body sherds, with the latter being associated with Burnt Mound 19 (*Section 2.6.15*). Sherds were also recovered from the deposit defining Burnt Mound 22 (*Section 2.6.15*). Two pits, ***20088*** (*Section 2.6.40*) and ***20138*** (*Section 2.6.37*), at Site 30, contained body sherds (three in the former and 15 in the latter), which, because of the other finds recovered, almost certainly relate to prehistoric activity (*Section 2.6.39*). Pit ***20138*** has also been radiocarbon dated to the Chalcolithic/Bronze Age. Plain body sherds were recovered from alluvium within a palaeochannel, and sealing deposits of overbank alluvium, at Site 10 (*Sections 2.3.42* and *2.3.43*).

3.4.14 In addition to these, a larger collection of 57 sherds was recovered from pit ***24040***, Site 11 (*Section 2.4.5*). These comprise a small amount of plain body sherds executed in a fabric with crushed-stone temper, potentially indicative of earlier prehistoric forms elsewhere on the site. However, most of the sherds from this pit, while heavily abraded and worn, appear to have been executed in a relatively generic, well-fired, fabric, with no visible temper inclusions, and include a series of distinctively decorated body sherds. They are decorated with a well-defined impressed, or possibly rouletted, groove forming a circular motif. Such decorative techniques and motifs are more redolent of late Iron Age ceramic forms (Elsdon 1957; 1989; Cunliffe 2005). Two conjoining, but heavily abraded, rim sherds from the same context may or may not derive from the same vessel, as may several potential basal fragments. The fragments appear to indicate a vessel profile with a vertical, outwardly flaring rim, with a flat top and externally projecting edge, while the base appears to be a globular form. The profile is too fragmented and equivocal to be certain, but again it would not be out of keeping with a late Iron Age designation. A further sherd from this pit is executed in a similar fabric and also demonstrates a well-defined, grooved decoration forming a circular motif, and this may well be late prehistoric in origin.

3.5 Roman and Post-Roman Pottery *by Christine Howard-Davis and Edward Biddulph (Samian Ware)*

3.5.1 The Roman and post-Roman pottery comprises 400 fragments, weighing *c* 6.9kg, with a relatively high overall average sherd weight of 17.4g; however, the several collected from sieved soil samples weigh <1g and, as a consequence, the average weight is distorted. Indeed, if the smallest sherds are removed from this calculation, the average sherd weight increases to 18.6g. Overall, sherd sizes are small, with only a small number of post-medieval rim and base sherds providing most of the weight. The overall small sherd size suggests that there has been a considerable amount of movement in the soil.

3.5.2 ***Assessment, Romano-British pottery:*** 16 Romano-British sherds were recovered during the mitigation works (Table 13). Together these weigh 173g, giving a very low average sherd weight of 9.1g, and all are badly abraded. The stratified examples were recovered from Romano-British buildings at Site 3 (*Section 2.3.4*), a palaeochannel at Site 8 (*Section 2.3.31*), and overbank alluvium at Site 10 (*Section 2.3.43*). A typical range of fabrics is present, with Black-burnished ware 1 (BB1), possibly Black-burnished ware 2 (BB2), a non-specific sandy greyware and a relatively fine orange oxidised ware, probably Severn Valley (SV) ware.

Site	Context	Form and Fabric	Number of items	Weight (g)	Date range (centuries)	Description
3	Cobble floor ***17113***, Building 1	Jar: BB1	1	6	2–3	Body sherd from jar
			3	3		Chips only
		Bowl: BB2? SV ware	2	40	2–4	Flange-rimmed Orangeware bowl rim; thin BB2? body
	Bedding layer ***17122***	Greyware	5	5		Chips only
8	Paleochannel ***17852***		1	8		Orange oxidised body
10	Overbank alluvium ***26580***	Greyware	1	30		Body sherd
	U/S	Mortaria	3	53		Two conjoining rim sherds and one body sherd from mortaria
Total			***16***	***145***		

Table 13: Romano-British pottery recovered during the mitigation works

3.5.3 ***Continental Roman pottery (Samian ware):*** two sherds (28g) of Central Gaulish samian ware (Tomber and Dore 1998, fabric LEZ SA 2) were from pit ***24958***, Site 27 (*Section 2.6.19*). The refitting fragments are from the body of a Dragendorff 37 bowl. The sherds are very worn; very little slip survives on the exterior surface and the slip is patchy on the interior. The decoration is poorly preserved, but two figures can be seen: the central and rear parts of a lion (or perhaps, less likely, a dog) running from right to left; and, above that, another lion or other animal, though smaller, running from left to right. The arrangement appears to form part of a 'freestyle' scheme and recalls the decoration on a bowl by Attianus ii (Stanfield and Simpson 1958, pl 86, no 12), although other potters, such as Cinnamus ii or Paternus v, are possible (*cf* Webster 1996). The vessel cannot be closely dated, but an early/mid-Antonine date (*c* AD 140–70/80) is likely (*cf ibid*; Hartley *et al* 2008a; 2008b). A bowl with similar 'freestyle' decoration was recovered from the 1975-9 excavations at *Segontium* (King and Millett 1993, fig 16.3, no 89).

3.6 Medieval and Later Pottery *by Christine Howard-Davis*

3.6.1 ***Medieval pottery:*** there are only ten pottery fragments (174g) of potential medieval date (Table 14). The relatively low average sherd weight (17.4g) for this group of fabrics suggests that all are from disturbed contexts and have been redeposited. Fabrics have not been differentiated, but most are very sandy or coarse/gritty oxidised fabrics, except for two sherds of fine, fully reduced, green-glazed fabric from Site 31, though these were unstratified.

Site	Context	Form and Fabric	Number of items	Weight (g)	Description
3	Bedding layer ***17122***	Very gritty oxidised orange	2	31	Body sherd, possible light slip
7	Trough ***19064***, Burnt Mound 1	Very sandy incompletely reduced	3	16	Body sherds
24	Ditch ***21016***, Enclosure 13	Bowl: very gritty oxidised orange	1	61	Bowl with glazed interior. Clubbed rim with slightly thumbed cordon below
31	Pit ***20043***		2	4	Poorly preserved, possibly burnt, possibly later
	U/S	Fine green-glazed, fully reduced	2	62	Body sherds
Total			***10***	***174***	

Table 14: Medieval pottery recovered during the mitigation works

3.6.2 ***Post-medieval and later pottery:*** in total, of 345 sherds of post-medieval and later pottery were recovered, weighing *c* 6.54kg. The average sherd weight is *c* 18.7g. It should be noted, however, that some sherds are very large (*Section 3.5.6*).

3.6.3 A range of pottery types is represented in the assemblage, the majority of which can be dated to the nineteenth century, or later, although there are occasional earlier fragments dating to the later seventeenth to eighteenth century. They include refined white earthenwares, china/porcelain, creamwares and pearlwares, late stonewares, slipwares, and yellow wares, many produced on an industrial scale in the nineteenth century. In addition, the assemblage contains dark-glazed redwares (and a few fragments of the related self-glazed redwares) that were either produced at Buckley in Flintshire (Jones 2019), which supplied much of north Wales, or slightly further afield, from potteries in the South Lancashire coalfields (*eg* Rainford (Philpott 2015) or Prescot (Davey 1982; 1987)), which supplied north Wales and Liverpool (Howard-Davis 2014). Both fine and coarse fabrics are represented in this latter material, with some sherds in the coarser fabric being very large, with several weighing around 100g each, and some individual sherds being up to 593g in weight. Sherds in the finer version of this fabric seldom exceed 15g in weight.

3.6.4 The pottery was recovered from 23 sites (Table 15), although a small proportion also came from modern field drains, probably redeposited material. There are also a small number of fragments suspected to be intrusive, incorporated into earlier features, particularly those that have been dated to the prehistoric or early medieval periods, or have a spatial association with dated remains from these periods. The largest assemblages derive from Sites 15 (*Section 2.4.20*) and 23 (*Section 2.5.5*), with small assemblages (11-32 sherds) present at Sites 2 (*Section 2.2.4*), 8 (*Section 2.3.30*), 12 (*Section 2.4.8*), 13 (*Section 2.4.14*), 21 (*Section 2.5.3*), 24 (*Section 2.5.9*), and 27 (*Section 2.6.4*). Of these, the assemblages from Sites 8 and 23 were associated with fairly extensive areas of post-medieval archaeology, including buildings, enclosures, trackways, and pits.

Site	Number of items	Weight (g)	Types represented
1	2	4	Refined white earthenware
2	12	197	Late slipware and dark-glazed redware
3	3	115	Dark-glazed redware
5	2	22	Refined white earthenware and dark-glazed redware
8	11	682	Creamware, slipware, refined white earthenware, and dark-glazed redware
11	2	12	Refined white earthenware and slipware
12	32	188	Refined white earthenware, dark-glazed redware, creamware, slipware, china/porcelain, and stoneware
13	12	99	China/porcelain, refined white earthenware, dark-glazed redware, and self-glazed redware
14	3	4	Refined white earthenware
15	123	1384	Refined white earthenware, slipware, stoneware, and dark-glazed redware
16	3	6	Stoneware, dark-glazed redware and self-glazed redware
17	1	1	Dark-glazed redware
18	2	7	Refined white earthenware
20	1	4	Slipware
21	13	99	Refined white earthenware, dark-glazed redware, and self-glazed redware
22	4	307	Slipware, dark-glazed redware, and yellow ware
23	75	1564	Refined white earthenware, creamware, pearlware, dark-glazed redware, stoneware, and yellow ware
24	13	637	Refined white earthenware and dark-glazed redware
27	21	676	Refined white earthenware, creamware, china/porcelain, dark-glazed redware
29	2	67	Possible post-medieval pottery
30	1	4	Dark-glazed redware
31	5	344	Refined white earthenware and dark-glazed redware
Outside of site areas (U/S)	2	12	Refined white earthenware
Total	***345***	***6435***	

Table 15: Post-medieval pottery recovered during the mitigation works

3.7 Fired Clay *by Karen Barker*

3.7.1 In total *c* 3.12kg of fired clay was recovered from the bypass. Although some was collected by hand, during the excavations, most was retrieved during the processing of bulk environmental soil samples.

3.7.2 ***Assessment:*** the fired clay was recovered from 11 of the excavated sites (Table 16). Most of the fragments are brown in colour, range in size from 5mm to 10mm, and weigh between 0.5g and 2g. A very small amount may derive from burnt daub or clay wasters, some of which may have been associated with heat-affected surfaces relating to burnt mounds (*ie* Burnt Mounds 1 (Site 7; *Section 2.3.25*), 18 and 20 (Site 27; *Section 2.6.15*), destruction layers (*ie* layers ***17096*** (Building 1, Site 3; *Section 2.3.6*) and ***16024*** (Building 3, Site 5; *Section 2.3.15*)), and kilns (*ie* ***16075*** (Settlement 1, Site 5: *Section 2.3.17*) and rake-out pit ***16026*** (Settlement 1, Site 5; *Section 2.3.16*)). By both weight and quantity, the largest amount of fired clay was from Site 5, from Settlements 1 and 2.

Site	Number of items	Weight (g)	Description
2	*c* 100+	260	Brown fired clay
3	*c* 210+	310	Brown fired clay, including possible daub or waster (light grey throughout)
4	40	24	Brown and dark brown fired clay, including possible daub or waster (light orange surface and dark red interior)
5	*c* 240+	1870	Brown and light brown fired clay, some encased with medium stones. Includes possible daub (orange surface and medium grey interior and core)
7	5	16	Light grey-orange and dark reddish-grey fired clay
8	277	532	Brown and brown-grey fired clay
10	3	6	Light brown-black fired clay
13	5	4	Possible waster (black throughout)
15	6	14	Brown-grey fired clay
27	48	91	Dark brown
Total	***934+***	***3127***	

Table 16: The fired clay recovered during the mitigation works

3.8 Ceramic Building Material and Tile *by Karen Barker*

3.8.1 In total, *c* 6.9kg of ceramic building material (CBM) was retrieved from 14 sites on the bypass, with some unstratified from other areas (Table 17). Most of the weight is from large fragments of handmade brick. All but 11 of the finds were retrieved during the environmental processing of bulk samples, these latter examples being small, weighing on average just over 1g.

Site	Number of items	Weight (g)	Description
1	4	5	Red
3	230+	263	Weathered orange pieces and some orange brick
4	2	3	Orange
5	104+	110	Red pieces and one piece of grey mortar
7	90	278	Weathered orange pieces, orange brick and tile
11	13	21	Weather pink piece
12	1	1	Red
13	10	1453	Weathered orange pieces and fragments of red brick
17	8	3028	Orange piece and fragments of red brick, and a machine-made brick
23	2	706	Handmade brick
27	89	269	Weathered orange and red pieces, including one burnt fragment, handmade brick fragments, and slate tile
29	28	168	Brick fragments, grey mortar, and roof tile
30	22	46	Weathered orange and red pieces and fragment of pink brick
31	1	215	Handmade brick
Outside of site areas (U/S)	10	391	Brick fragments
Total	***614+***	***6957***	

Table 17: The ceramic building material recovered during the mitigation works

3.8.2 ***Assessment, small fragments of CBM:*** the small fragments from the environmental processing have been broadly classified as ceramic building material, though these cannot be identified to type/date. These came from 14 sites, with some being associated with Romano-British buildings (Site 3; *Section 2.3.3*), and an early medieval settlement (Settlement 1, Site 5; *Section 2.3.12*) and pits (Site 1; *Section 2.2.2*), and others being derived from known or suspected prehistoric features, such as burnt mounds (Sites 7 and 29; *Sections 2.3.25* and *2.6.29*) and pits (Sites 4 and 11; *Sections 2.3.10* and *2.4.4*). Whilst at least some of the items from prehistoric and early historic features are intrusive (fragments of brick and tile), another possibility is that they are not ceramic building *per se*, but highly vitrified pieces of clay that directly relate to contemporary activity. The remaining examples are from post-medieval features and probably date to that period.

3.8.3 ***Brick***: there are two handmade bricks: one, a corner fragment with no complete edge, unstratified from Site 31 (*Section 2.6.41*); while the other, from Trackway 2, Site 23 (*Section 2.5.7*), measures 114 x 62 x 58mm. In 1784, the government implemented a brick tax, after which bricks became much larger (Harrison 2022), and the size of this latter example suggests that it pre-dates that tax. Another brick from ditch ***19546***, Site 17 (*Section 2.4.31*), has a shallow frog on both sides and is clearly machine manufactured, thus dating to the late nineteenth century or later (Kitching 2016). Brick fragments were also present at Sites 13, 17, 27, and 30.

3.8.4 ***Tile***: a corner fragment from a 7mm-thick post-medieval tile, made from a stone with high mica content, was recovered from a tree-throw, Site 17 (*Section 2.4.30*), whilst another post-medieval tile, a small fragment of now off-white glazed slate, broken on all four edges and with a thickness of 6mm, was also recovered from a palaeochannel (***27187***), at Site 27 (*Section 2.6.6*). Two weathered fragments of post-medieval tile have a lipped edge suggesting they are from roofs, one unstratified, the other recovered from Burnt Mound 23, Site 29 (*Section 2.6.30*).

3.9 Clay Tobacco Pipe *by Christine Howard-Davis*

3.9.1 ***Quantification and assessment:*** in total, 29 fragments (78g) of clay tobacco pipe were recovered (Table 18). Most are featureless stem fragments, with the bulk (19 fragments, 46g) deriving from pit ***21576***, Site 15 (*Section 2.4.27*). There are few chronologically diagnostic pieces, though a single plain, eighteenth-century stem was present in pit ***23622***, Site 8 (*Section 2.3.33*), and a bowl from a pit at Site 22 (*Section 2.5.4*) may date to a similar period.

Site	Number of items	Weight (g)	Description
5	1	1	Stem
8	1	4	Stem, large bore
12	1	1	Chip from bowl
13	3	7	Stems
14	1	2	Stem
15	19	46	Stems, one with spur
17	1	6	Stem
22	1	9	Bowl with spur
23	1	2	Stem
Total	***29***	***78***	

Table 18: The clay tobacco pipes recovered during the mitigation works

3.10 Metalwork *by Karen Barker*

3.10.1 The metalwork assemblage comprises 41 objects. The majority are iron, with smaller numbers made of copper-alloy, lead, and silver. All were x-rayed as part of the assessment.

3.10.2 ***Silver and copper-alloy coins:*** four coins were recovered, three from ditch ***24355***, Site 13 (*Section 2.4.17*). They include one silver coin, a 1920 George V sixpence, and two worn copper-alloy half-pence, one with a legible date of 1902. These were found in association with the remains of a leather coin purse, and a fragment of paper with 'Nestle' written on it. A small and incomplete grooved fragment of iron, which may be part of the surround of the purse (*Section 3.9.5*), was recovered from the same ditch. The other coin is a George V sixpence dated to 1931, though this was unstratified.

3.10.3 ***Copper-alloy objects:*** there are four other copper-alloy items within the assemblage. These comprise three modern items, a fitting from the subsoil at Site 27 (*Section 2.6.4*), and a fragment of wire from Site 15 (*Section 2.4.20*), and a tiny fragment from a consolidation/bedding layer, Site 3 (*Section 2.3.5*), which is probably intrusive.

3.10.4 The fourth copper-alloy object is more significant being a fragment from a Roman brooch, although unstratified, recovered during the stripping of subsoil at Site 29 (*Section 2.6.29*). It is a small fragment from a bow brooch, of which only part of the body and head survives (10mm long, 1.2g; Plate 21). To one side is the remains of an iron axle pin (5mm), which suggests that it dates to the second century AD (Mackreth 2011).

Plate 21: The Roman copper-alloy brooch fragment (OR1111)

3.10.5 ***Iron objects:*** in total, 31 iron objects were recovered, all of which were bulk x-rayed to assist identification. These include various post-medieval/modern objects, many with little interpretative value, from five sites, and unstratified from other parts of the bypass, during the stripping of the topsoil/subsoil (Table 19).

Site	Number of items	Description
3	3	Modern wire and post-medieval key
13	1	Post-medieval purse edge
15	3	Rod, sheet, and fragment
25	3	Modern bolt and pipe fitting, and post-medieval horseshoe
27	3	Fragments and modern knife
Outside of site areas (U/S)	3	Fragments, hook, and strip
Total	***16***	

Table 19: The iron objects recovered during the mitigation works

3.10.6 In addition to these objects, a small collection of iron nails was recovered (Table 20). These are consistent with carpentry detail, rather than structural timbers, most having a simple and long-lived form and are difficult to date. That said, all the nails from Site 3, bar one, were from within, or in the immediate vicinity of, Romano-British buildings (*Section 2.3.3*) and were probably contemporary with these structures. The other nails were either in post-medieval features, or may have been intrusive, with one, from Site 27, incorporated within a possible Bronze Age pit (Pit Group 15; *Section 2.6.14*); other modern nails, from Site 10, were incorporated into an earlier deposit of overbank alluvium (*Section 2.3.43*).

Site	Number
3	8
10	1
14	2
15	2
27	1
29	1
Total	***15***

Table 20: The iron nails recovered during the mitigation works

3.10.7 ***Lead objects:*** two lead objects were recovered. One is a musket ball from the topsoil at Site 7 (*Section 2.3.25*). It is a cast, unused hemispherical ball (16mm diameter; weighing 20.6g) with a sprue on the flat face, and is post-medieval in date.

3.10.8 The other object is an incomplete, possibly child's, bangle (Plate 22) from topsoil, overlying Burnt Mound 5, Site 13 (*Section 2.4.15*). It is broken at both ends and is now oval, with raised decoration to the exterior edges. Lead jewellery is very uncommon and it may be a trial piece. As such, it could date from the Late Bronze Age through to the later Roman period.

Plate 22: The lead bangle (OR1112)

3.11 Glass *by Karen Barker*

3.11.1 In total, there 92 fragments of glass were recovered. These have a combined weight of 439g, but 32 weigh 1g or less.

3.11.2 ***Assessment:*** all are consistent with a late post-medieval or modern date. The majority comprise small chips, with identifiable features surviving on only two items. These include the base of a green bottle from ditch ***18241***, Site 29 (*Section 2.6.34*). This also has a pontil scar, which shows the bottle was handmade using a blowpipe. Although there is no maker's mark, its form indicates that it dates to the mid-nineteenth century (Jones 1986). The other identifiable item was also from a ditch (***18171***; *Section 2.6.34*) at Site 29. This is a fragment from a pressed vessel, which must date from the nineteenth century onwards (Britannica 2022).

3.12 Worked Wood *by Steven J Allen*

3.12.1 In total, 27 individual pieces of worked wood were lifted during the excavations, suitably packaged, and submitted for conservation and assessment. These were derived from the troughs beneath Burnt Mounds 18, 20, and 22, Site 27 (*Section 2.6.15*), and Burnt Mound 23, Site 29 (*Section 2.6.30*).

3.12.2 ***Methodology:*** each piece of wood was removed from its packaging, washed under cold running water, to remove any soil adhering to the wood surface, then recorded, and sampled for wood species identification. Following Historic England

(2010) guidelines, standard York Archaeological Trust (YAT) wood record sheets were used during recording. Species identification was done via a transmitted light microscope at x40, x100, and x200 magnification, as appropriate. All species identifications follow Schweingruber (1982). Full details of the assessed timbers are presented in *Appendix A1*.

3.12.3 ***Assessment, condition:*** the wood had been preserved in waterlogged anaerobic conditions and most is in fair condition. The oak (*Quercus* sp) planking is in generally solid condition, albeit with eroded surfaces, while the other species had suffered erosion and a degree of structural collapse indicative of recent changes to, and a drying out of, the local water table prior to excavation. Two 'timbers' had almost completely disintegrated before excavation and their original form is speculative.

3.12.4 ***Wood species:*** the timber assemblage comprises four wood species: oak; willow (*Salix* sp); alder (*Alnus* sp); and ash (*Fraxinus excelsior* L). Each of these four species are native to the British Isles, and there would have been no necessity for any of the material to have been imported over any great distance. Alder and willow are species that tolerate damp and wet soil conditions (Stace 2010). Ash tends to grow in drier conditions, and oak is tolerant of most soil conditions (*ibid*). This suggests that the wood from this assemblage had been sourced from more than one woodland environment.

3.12.5 ***Timbers from Burnt Mound 18:*** 13 timbers (24500-12) formed the remains of the lining of a sub-rectangular trough (***27054***; *Section 2.6.17*). Timbers 24504-12 were boards at the base of this structure, laid horizontally on face, and edge to edge, across the width of the trough. The lining was not continuous, however, and there were gaps between the edges of adjacent pieces that may have been deliberate or (less likely) due to the *in-situ* decay of the timbers. Timber 24505 was cut from willow, with 24508 and 24509 from alder. All six of the remaining boards are radial conversions, cut from oak, mostly from the main trunk, but one (24510) appears to have come from a substantial piece of branch wood. The two remaining boards (24504 and 24505) survive only as disarticulated fragments, badly damaged before or during burial, and may be tangential or radial conversions. The loss of surfaces to erosion during burial precludes any discussion of toolmarks or carpentry. The boards were certainly cut to length and the edges trimmed, but the tools used for the purpose cannot be determined owing to the surface condition of the timbers.

3.12.6 Timber 24500 was the surviving piece of the north side revetment, timbers 24501 and 24502 the corresponding south edge, and timber 24503 the only surviving part of the east end. These boards have mixed conversions, with one radial and three tangential examples. Although when viewed on site, boards 24501 and 24502 appeared to be parts of the same timber, separated by damage midway long their length, the differing conversions indicates that they were separate pieces of wood, and not a single continuous board.

3.12.7 ***Timbers from Burnt Mound 20:*** eight timbers (24513-21) were recovered from the base of a sub-rectangular trough (***27078***; *Section 2.6.16*). These created a base at the south-east end of the feature; no timbers survived at the north-east end or forming the sides of the trough. The timbers were laid horizontally on face, across the long axis of the trough, parallel to each other, and may originally have been butted edge to edge; however, this is not entirely certain due to poor preservation.

3.12.8 Most of the timbers are tangentially faced, the exceptions being 24514, which is halved roundwood, and timber 24516, which is radially faced. Timber 24514 is also unusual in having one end cut to a sub-rectangular cross-section at the tip. It is possible that this is a timber that was originally prepared for use as a stake but was repurposed.

3.12.9 One notable feature is the diversity of wood species represented in the timbers from this burnt mound: three are alder (24513, 24515, and 24519); two willow (24514 and 24517); two ash (24516 and 24521); and one oak (24518).

3.12.10 ***Timber from Burnt Mound 22:*** one timber (27142) was present at the base of a trough (***27139***; *Section 2.6.16*). This represents a substantial plank, 3.72m long, 0.63m wide, and 0.10m thick, and has been tangentially faced from a substantial tree with straight, rather than spiralling, grain. There are almost no knots present, indicating that it came from a dense woodland where the tree was unable to put out significant branches at low level. Erosion and decay during use/burial has removed any toolmarks that were once present.

3.12.11 There is little, if any, taper along its length, and there is no indication of hollowing on the upper face. The lower face towards each end was slightly reduced in thickness. The upper face is, allowing for decay, continuous from end to end with no hint of a scar where an end or a side might have been broken away and lost, while the lower face incorporates the natural curvature of the outer face of the parent log, along both edges.

3.12.12 ***Timbers from Burnt Mound 23:*** three timbers (18229-31) from trough ***18201*** (*Section 2.6.30*) were assessed. This trough also contained two other timbers (18232 and 18256) though these disintegrated, prior to excavation, and hence could not be assessed. All formed elements of an incomplete timber lining with the surviving timber boards being present at the base of the north (timber 18229) and south edges (timbers 18230 and 18231), and forming the south edge (timber 18232) and mid-line (timber 18256) of the trough. No toolmarks were recorded on these timbers, and any once present seem to have been lost to surface erosion, prior to excavation. The assessed timbers are all oka, tangential conversions, produced by splitting a parent log into parallel slabs.

3.12.13 Although these boards have all suffered severely from erosion and decay, the waterlogged conditions within these two troughs indicate that more of the base boards should have survived than was actually the case. It is therefore possible that the more usable (and easier to remove) timbers were removed from the troughs at the end of their useful life, leaving in place those not thought worth salvaging.

3.12.14 One other timber (18225) was also recovered from Burnt Mound 23 and assessed, which was from trough ***18227*** (*Section 2.6.30*). This is a large (3.59m long, 0.67m wide, and up to 0.12m thick) slab or plank of tangentially faced oak. It was taken from a mature tree with an estimated minimum diameter of 1m. The grain runs at a slight angle to the longitudinal axis of the timber, indicating that the parent trunk had spiralling grain. No significant knots were observed during the recording, suggesting that the tree came from dense woodland where it was unable to put out significant side branches at a level below the canopy. The widest surviving part of the slab corresponds to the butt end of the growing tree.

3.12.15 No definite toolmarks survive on the surfaces of the timber, either on the upper face as found or on the lower face, where they might have been protected from wear. However, some evidence of woodworking is present on the upper face towards the broader end. Although no toolmarks survive, the area shows clear signs of having been hollowed, the actual rising end of the object having broken away and become lost.

3.12.16 Given its morphology, during fieldwork it was initially suspected that this timber formed the remains of a log boat; however, the assessment indicates that there is no evidence of any shaping to form a bow or stern, nor any sign of a transverse groove cut to house the transom stern. Similar hollowed logs have been recorded elsewhere that demonstrate a variety of uses, from small portable troughs through to vertically set well linings and hollowed out log coffins (*cf* Elgee and Elgee 1949, 91; Sayce 1945, 108; Ward 1974, 21, 23; Jobey 1984, 236). Given this, it seems that the example from Burnt Mound 23 was specifically designed as a trough lining.

4 FACTUAL DATA: OSTEOLOGICAL AND ENVIRONMENTAL EVIDENCE

4.1 General Introduction

4.1.1 The osteological and environmental evidence forms an important dataset. It comprises cremated human remains, some animal bone, along with charred plant remains and charcoal recovered during the sampling/processing of bulk soil samples. In addition to plant macrofossils, pollen was also retrieved from several monoliths extracted from natural and archaeological deposits. The following section therefore provides an assessment of each of these classes of palaeoenvironmental evidence. A final section discusses those organic remains that were subjected to radiocarbon dating.

4.2 Cremated Human Remains *by Helen Webb and Iulia Rusu*

4.2.1 In all, 13 burnt human bone deposits, all associated with the Bronze Age cremation cemetery at Site 27 (*Section 2.6.13*; Fig 45), were submitted for osteological assessment. One burial (***27154***) was a cremation, contained within a ceramic vessel, whilst the other 12 were from unurned burials, associated with Pit Group 14. During fieldwork, the unurned burials were excavated in spits, whilst the urned cremation deposit (burial ***27154***) was excavated at OA's Lancaster Office, which entailed micro-excavating the contents in ten 20mm-deep spits, divided into 40 separate quadrants (Plate 23; *Appendix A2*).

Plate 23: Micro-excavation of the cremation from burial **27154***, following the removal of the three quadrants from the uppermost spit*

4.2.2 ***Methodology:*** all deposits containing cremated human bone were assessed in accordance with published guidelines (Mays *et al* 2002; Brickley and McKinley 2004). All deposits (from the urned and unurned burials) were therefore processed by wet sieving and separated into fractions (>10mm, 10-4mm, 4-2mm, and 2-0.5mm). For most deposits, only the larger fractions (>10mm and 10–4mm) were sorted. Bone deposits were then rapidly scanned to assess their potential for further analysis. This included observations relating to the overall weights of the deposits (only fully sorted fractions were weighed), the levels of bone fragmentation, the presence of identifiable fragments, and the potential for biological (*ie* age, sex, and non-metric traits) and palaeopathological information to be retrieved.

4.2.3 ***Assessment****:* a summary of the osteological assessment of each cremation deposit is presented in *Appendix A2*. Further details are contained in the site archive.

4.2.4 ***Urned cremation* 27154*:*** this burial yielded by far the greatest bone weight (722.9g) of all the assessed deposits. Many bone fragments were identified to skeletal element, with all skeletal regions apparently represented. Preliminary observations indicate that there may be two individuals, possibly an adult and an older juvenile, represented.

4.2.5 ***Unurned cremations:*** the total weights of the 12 unurned deposits (sorted fractions only) ranges from 0.2g (burials ***27170*** and ***27175***) to 96.8g (burial ***27160***), though more than half (burials ***27152***, ***27159, 27163, 27166, 27166***, ***27170***, and ***27175***) have notably low bone weights (<3g). As a result, macroscopic identification of the bone as either human or animal was problematic. For burials ***27152***, ***27157***, **27159**, and ***27163***, although no fragments could be identified to a specific element, the appearance/texture of the bone fragments is in keeping with human bone. For burials ***27166***, ***27170***, and ***27175***, the quantity of bone is so small (each 0.5g or less) that macroscopic identification of the bone as human or animal was not possible; however, this is presumed to represent human bone, particularly as very low bone weight is a key feature of certain cremation-related activities (*eg* redeposited pyre debris, cenotaph (token) burials; *cf* McKinley 2004, 10).

4.2.6 Within burials ***27152***, ***27170***, and ***27175***, no unsorted 2-0.5mm fractions were present for assessment, and in burial ***27170*** there was also no 4-2mm fraction (the remains comprise just two 10-4mm-sized fragments). Therefore, it may be that no cremated bone was present in the smaller fractions from these deposits. All four fraction sizes were present for each of the larger unurned deposits (from burials ***27150***, ***27155***, ***27158***, ***27160***, and ***27162***), with sorted bone weights ranging from 18.9g (burial ***27150***) to 96.8g (burial ***27160***). For eight of the cremation deposits (from burials ***27150***, ***27155***, ***27157***, ***27158-60***, ***27162***, and ***27163***), the 4-2mm fractions were unsorted, though the quantities of burnt bone within these fractions is notably small. For the cremation deposits from burials ***27158***, ***27160***, and ***27162***, the >10mm and 10–4mm fractions were sorted but mixed.

4.3 Animal Bone *by Ian Smith*

4.3.1 A small assemblage of animal bone was retrieved from the bypass. This comprised 400 fragments of bone and teeth.

4.3.2 ***Methodology:*** the assessment of the animal bone was undertaken following guidelines in Baker and Worley (2019). Brief approximate fragment totals and comments relating to the presence of identifiable bones were recorded at context level, but detailed recording of individual bones was undertaken at this stage. Notes were made regarding 'countable' bones based on anatomical elements and diagnostic zones illustrated by Serjeantson (1996).

4.3.3 The condition of groups of bone by context was classed as good, moderate, or poor. Poor corresponds approximately to the large mammal weathering stages 4 and 5 of Behrensmeyer (1978). Approximate fragment totals of the smallest indeterminate bones (those bearing no diagnostic zones) and fragmented teeth were also noted.

4.3.4 ***Assessment:*** the better-preserved bones include the remains of cattle, sheep/goat, and horse derived from three features. These were a large quantity of cattle bones from pit ***19575***, Site 17 (*Section 2.4.31*), which, based on the condition of the bone, probably dates to the post-medieval period; cattle and horse remains from post-medieval pit ***20763***, Site 20 (*Section 2.4.34*); and a small number of sheep/goat bones from pit ***17037***, Site 3 (*Section 2.3.8*), which again dates to the post-medieval period. All bones bearing diagnostic zones (Serjeantson 1996), and judged to be countable, were also from these three pits.

4.3.5 The remaining bones in the assemblage are in poor condition and comprise burnt, calcined, small fragments with little surviving surface morphology. Therefore, within this material there are few identifiable bones and no countable zones (*ibid*). Indeed, this assemblage is dominated by tiny <10mm fragments, with a small number of fragments, or largely complete, sheep/goat, horse and cattle teeth.

4.3.6 ***Numbers of mandibular rows:*** there are no mandibular rows of any species present. Although there are some loose teeth, these are largely fragmented or with eroded occlusal surfaces.

4.3.7 ***Associated bone groups (ABGs):*** the cattle bones from pit ***19575*** (*Section 4.3.4*) clearly represent an ABG. This group includes forelimb and hindlimb bones that bear epiphyseal fusion (age-related) information and there is a small number of measurable bones that are relevant to the stature of the animal. The fragmented cattle metacarpal from this group shows evidence of having been affected by some form of pathology, which may or may not relate to its death and burial. The bones from pits ***20763*** and ***17037*** also appear to contain associated remains.

4.4 Pollen and Non-pollen Palynomorphs *by Mairead Rutherford*

4.4.1 ***Sampling and borehole survey:*** an integral element of the archaeological mitigation works was the identification and sampling of organic deposits that might contain palaeoenvironmental evidence, in the form of preserved pollen, which could be used to assess the character of the former environment that existed along the bypass. To this end, one potentially significant area was identified at the northern end of the scheme, in Landscape 5 (*Section 2.1.6*), sandwiched between Sites 28 and 29 (Fig 43). This formed a low-lying boggy area that contained organic deposits that had seemingly accumulated within a former lake/wetland area, close to the presumed Iron Age settlement at Caerlan Tibot (*Section 1.4.16*).

4.4.2 Given the potential significance of this former lake/wetland area for palaeoenvironmental reconstruction, a borehole survey was initially undertaken (*Section 1.2.8*). During this survey, two main transects were set out across the area, extending north-west/south-east and south-west/north-east (Fig 50), and along these coring was undertaken at approximately 10m intervals, using a 30mm-bore handheld Eijkelkamp gouge auger, in order to determine the nature, extent and thickness of the organic deposits. Some additional augering was also undertaken on either side of the transects to provide supplementary information, as several of the initial borehole locations were on higher ground and/or contained clay deposits that were too stiff to penetrate using handheld equipment. This resulted in the extraction of 38 cores. During the survey, each core location was recorded and the lithologies described on *pro-forma* sheets, following standard geoarchaeology and environmental guidelines (Campbell *et al* 2011; Canti 2015).

4.4.3 This borehole survey indicated that gravel deposits were sealed by stiff blue/grey/black clays across much of the wetland area. In places, these blue/grey clays were overlain by, or graded into, softer green/grey silty deposits. The blue and green/grey clay and silt deposits were then overlain by organic deposits of peat and silty clay, with wood fragments noticed in the peat, for example in BH-4 and BH-5.

4.4.4 Following the completion of the survey, two boreholes were selected, where peat had been encountered, which were deemed suitable for the extraction of pollen cores, using a Russian-type auger. Two Russian auger cores were therefore collected from BH-4 (BH-4.1 and BH-4.2), where approximately 2m of organic sediments were present, and one was collected at BH-5 (BH-5.1), as this penetrated a deeper sequence of silts and clays, beneath less-thick organic peaty deposits. One of these cores (BH-4.2) was considered as part of the pollen assessment.

4.4.5 In addition, another pollen site was identified at the far southern end of the scheme (at Chainage 100; NGR: SH 47193 57849), close to the Goat Roundabout (Fig 2), and just south of the tributary of the Afon Carrog, which formed the southern boundary for Landscape 1 (*Section 2.1.4*). At this site, a sequence of minerogenic deposits were present (***17545***, ***17557***, and ***17513***), which were sealed by layers of organic-rich alluvium (***17514-18***), and then by a layer of colluvium ***17519*** (Fig 51). These deposits were sampled through the extraction of three monoliths (17505, 17506, and 17527), and the pollen from these has also been assessed.

4.4.6 In addition to the pollen sites, monolith samples were taken from suspected organic-rich deposits encountered during the archaeological excavations, and these have been assessed. These include monoliths from pit ***17550***, Site 1 (*Section 2.2.3*); a floor (***17097***; *Section 2.3.5*), in Building 1, and a pit (***17012***; *Section 2.3.8*), both at Site 3; a destruction/demolition deposit (***16024***), covering Building 3, Site 5 (*Section 2.3.15*); a buried soil (***19113***) at Burnt Mound 1, Site 7 (*Section 2.3.28*); alluvium from a palaeochannel (***26545***), Site 10 (*Section 2.3.42*); a deposit (***26003***) defining Burnt Mound 11, Site 15 (*Section 2.4.23*); a buried soil (***27195***; *Section 2.6.8*), and deposits from pits ***24654*** (Pit Group 15; *Section 2.6.14*) and ***20446*** (*Section 2.6.21*), Site 27; a layer of alluvium (***27218***), Site 28 (*Section 2.6.27*); and deposits in ditch ***18242***, Site 29 (*Section 2.6.31*).

4.4.7 ***Methodology:*** core BH-4.2 from the Caerlan Tibot lake/wetland area (*Section 4.4.4*) was cleaned and then 24 sub-samples were extracted at *c* 0.08m intervals, whilst 64 sub-samples were taken from the monoliths from Goat Roundabout and the archaeological features/deposits sampled during fieldwork. The BH-4.2 sub-samples were processed at the Department of Environment and Geography, University of York, whilst the other sub-samples were processed at the RPS Laboratory, Northwich. The processing at both laboratories followed standard palynological methodology. Hence, the samples were prepared using a standard-chemical procedure (Method B of Berglund and Ralska-Jasiewiczowa 1986), using using potassium hydroxide (at York) and hydrofluoric acid (at Northwich), sieving, HF, and Erdtman's acetolysis, to remove carbonates, humic acids, particles >170µm, silicates, and cellulose, respectively. The samples were then stained with safranin, dehydrated in tertiary butyl alcohol, and the residues mounted in 2000cs silicone oil. Heavy-liquid separation (using sodium polytungstate, at a density of 1.95SG; *cf* Campbell *et al* 2016; Leipe *et al* 2019) was also used to remove the minerogenic fraction from two of the sub-samples (23 and 24) from core BH-4.2.

4.4.8 Slides were examined at a magnification of x400 by ten equally spaced traverses across at least two slides to reduce the possible effects of differential dispersal on the slides (Brooks and Thomas 1967), or until at least 100 pollen grains were counted. Pollen identification was made following the keys of Moore *et al* (1991), Faegri and Iversen (1989), and a modern reference collection. Identification of non-pollen palynomorphs (NPP) follows van Geel (1978), and van Geel and Aptroot (2006). Plant nomenclature follows Stace (2010). The level of preservation of the pollen was noted, and an assessment was made of the potential for analysis. The raw pollen counts are detailed in *Appendix A3*.

4.4.9 ***Assessment***, ***Caerlan Tibot lake/wetland area:*** pollen is present in all 24 sub-samples, and preservation is generally good to mixed. As part of the assessment, pairs of radiocarbon dates (on the humin and humic organic fractions) were obtained from three positions on the core (Table 21). The pollen in each of the sub-samples is described below (in ascending order, in terms of depths below ground level, which is then followed by a brief interpretation of the results.

Depth (m) below ground level	Laboratory code	Organic fraction	Radiocarbon age (BP)	Calibrated date range (95% confidence)
1.79-1.78	SUERC-105418	humin	11669±26	11650-11510 cal BC
	SUERC-105422	humic	11550±25	11540-11380 cal BC
0.25-0.24	SUERC-105416	humin	3403±24	1865-1620 cal BC
	SUERC-105417	humic	3331±20	1680-1530 cal BC
0.12-0.11	SUERC-105414	humin	2885±24	1195-980 cal BC
	SUERC-105415	humic	2857±20	1115-930 cal BC

Table 21: Radiocarbon dates from core BH-4.2, Caerlan Tibot lake/wetland area pollen site

4.4.10 *Sub-samples 1.92-1.84m:* these sub-samples are from a very soft clayey silt, which is light grey/olive green in colour. Abundant green algae, *Botryococcus* (HdV-766) and *Pediastrum* (HdV-760), characterise these deposits. Pollen of aquatic plants was recorded at 1.84m and includes alternate water-milfoil (*Myriophyllum alterniflorum*) and spiked water-milfoil (*Myriophyllum spicatum*), as well as bulrush (*Typha latifolia*) and lesser bulrush (*Typha angustifolia*). The minerogenic nature of the deposit, as well as the relative abundance of pollen of aquatic plants and, in particular, of green algae, probably account for the less abundant, although quite diverse, terrestrial pollen. Of note in the deeper sub-sample, at 1.92m, is the occurrence of tree pollen, including pine (*Pinus*), alder (*Alnus*), birch (*Betula*), and willow (*Salix*), as well as a range of herbs including sedges (Cyperaceae), mugworts (*Artemisia*), pinks family (Caryophyllaceae), goosefoot family (Chenopodiaceae), buttercups (Ranunculaceae), and thrift (*Armeria maritima*). A similar assemblage was recorded at 1.84m, which also includes meadow-rues (*Thalictrum*), grasses (Poaceae), docks/sorrels (*Rumex*), and dandelion-type (*Taraxacum*-type).

4.4.11 *Interpretation:* the data suggest dominantly biogenic lacustrine development, with abundant green algae contributing to the palynological record, and the derivation of pollen limited to plants of disturbed ground and open habitats, such as herbs including sedges, grass, mugworts, meadow-rues, and docks/sorrels, and shrubs such as birch and willow, with pine trees and rare alder. *Pediastrum* (HdV-760) and *Botryococcus* (HdV-766) are indicative of shallow freshwater lakes or ponds (van Geel 1978). Elements of a colder climate may be inferred from the occurrence of thrift, but thermophilous plants were also recorded (Mighall and Chambers 1995). This assemblage seems to contain elements suggestive of a Late Glacial age, and this is confirmed by radiocarbon dates from a slightly higher depth (1.79-1.78m BGL), which provide a terminal Upper Palaeolithic date range (Table 21), though it should be stressed that it has not been possible from the assessment data to identify peak occurrence of taxa normally associated with this period. Previous work on Late Glacial pollen communities from around Eryri indicate that these comprised tall fen communities, including meadowsweet, valerian, and cinquefoils, and a large lake known as 'Llyn Ffrancon' formed in Nant Ffrancon at that time and persisted for *c* 5000 years (Rhind and Jones 2003). During the Late Glacial, the aquatic vegetation that colonised some of Eryri's early lakes included alternate water-milfoil and bulrush (*ibid*).

4.4.12 *Sub-sample 1.76m:* this sub-sample is distinguished by the recovery of abundant pollen from sedges. Grasses are also present, along with mugworts, bedstraws (Rubiaceae), and bogbean (*Menyanthes*). Rare green algae and pollen of aquatic plants were also recorded.

4.4.13 *Interpretation:* the data suggest the development of a sedge fen, and the natural habitat of bogbean is also shallow water, bogs, and fens (Stace 2010). An aquatic margin habitat seems to have therefore existed.

4.4.14 *Sub-samples 1.67-1.36m:* these sub-samples are characterised by pollen from aquatic plants, though recovery was low. Green algae were also rarely preserved. The pollen present derives from a range of herbs, including the pinks and goosefoot families, buttercups, dandelion-type, meadowsweets, docks/sorrels, marsh marigold, grasses, sedges, and ribwort plantain (*Plantago lanceolata*). Tree and shrub pollen are also present, including rare occurrences of alder, oak, birch, hazel-type, and pine. Pollen from aquatic plants of bulrush and lesser bulrush was also recorded. Of the green algal taxa, *Pediastrum* (HdV-760) was recorded, as well as *Spirogyra* (HdV-132).

4.4.15 *Interpretation:* the low amounts of pollen may be due to increased mineral matter in the sediments; however, the pollen data do suggest occurrence of herbs of disturbed ground around a shallow, perhaps stagnant, waterbody or wet muddy area, with small quantities of tree and shrub pollen derived from further away.

4.4.16 *Sub-samples 1.28-0.98m:* low amounts of pollen were recorded from 1.20-0.98m, which were from aquatic plants comparable to those recorded at 1.67-1.36m (*Section 4.4.14*). They also include alternate and spiked water-milfoils at 1.28m, which then increased in abundance, and at 0.98m was the most common pollen type in the assemblage.

4.4.17 *Interpretation:* water-milfoils inhabit lakes, ponds, slow-moving streams, and ditches (Stace 2010). The abundance of pollen from aquatic plants may suggest lacustrine palaeoenvironments.

4.4.18 *Sub-samples 0.88-0.80m:* rich pollen assemblages are present in these sub-samples, with herbs of grasses, meadow-sweets, and sedges dominating. Other herbs include mints (*Mentha*-type), valerian (*Valeriana*-type), bedstraws, pinks and goosefoot families, meadow-rues, willow-herbs, mugworts, and docks/sorrels. Tree pollen is present in low numbers and includes pine, birch, hazel-type, alder, oak, and willow. Abundant pollen of aquatic plants was recorded, in particular, bulrush and lesser bulrush, as well as water-milfoils. Small amounts of microcharcoal were recorded and the fungal spore *Gelasinospora* (HdV-1) is present at 0.88m.

4.4.19 *Interpretation:* the pollen data suggest development of herb-rich communities around a lake or pond. In particular, an abundance of meadowsweet suggests damp, wet areas (Stace 2010), with relatively high values of sedges and grasses at 0.80m suggesting possible fen-carr development. The abundant recovery of pollen from aquatic plants further confirms the likely presence of lacustrine habitats. *Gelasinospora* (HdV-1) is associated with charred vegetation (van Geel and Aptroot 2006).

4.4.20 *Sub-samples 0.72-0.64m:* tree pollen dominates the assemblages, with hazel-type, pine, and birch being the most commonly recorded taxa at 0.72m BGL, as well as an abundance of fern spores. Possibly higher values of pine, along with rare occurrences of alder, oak, elm, and lime pollen, were present at 0.64m. A transition from trees and shrubs with commonly occurring herbs (including mostly grasses, sedges, and meadowsweet) at 0.72m, to an assemblage almost entirely composed of tree and shrub pollen and practically devoid of herbs, was noted at 0.64m.

4.4.21 *Interpretation:* the sub-sample at 0.72m is strikingly different from the deeper sub-sample at 0.80m, associated with aquatic palaeoenvironments (*Section 4.4.18*), suggesting that a major shift in environment occurred. Indeed, by 0.72m, the pollen indicates that trees and shrubs formed the dominant habitat, with a reduced diversity of herbs, though the pollen of sedges, grasses, and meadowsweet was still recorded. The data suggest the development of hazel-type/pine/birch woodlands. Abundant to commonly occurring fern spores suggest woodland or woodland-edge environments, as ferns are epiphytic on trees, or may grow in more open areas adjacent to woodland (Stace 2010). During the period between 0.80m and 0.72m, a possible lacustrine palaeoenvironment may have become infilled and the area vegetated with woodland. At 0.64m, pine pollen appears to have dominated the arboreal assemblage. The rational limit for pine in north Wales has been dated at Llyn Cororion to 9540–9270 cal BC (8425±70 BP; SRR3472; Watkins *et al* 2007).

4.4.22 *Sub-samples 0.56-0.24m:* arboreal pollen continues to dominate the assemblages, with alder the most commonly occurring tree type. A range of other trees and shrubs are also well represented, especially hazel-type, with occurrences of elm, pine, oak, lime, birch, ivy, and honeysuckle. Fern spores include common polypody and monolete ferns. Very little microcharcoal is present and practically no fungal spores. Diatoms occur throughout.

4.4.23 *Interpretation:* the pollen assemblage at 0.56m probably represents a post-alder rise; the rapid expansion of alder in north Wales has been dated at Llyn Cororion to 8640-8390 cal BC (7745±65 BP; SRR3471; *ibid*). The data suggest a mixed woodland canopy dominated by alder, which would have grown very well on the damp soils of the former wetland/lake area. Radiocarbon dates from 0.25-0.24m suggest that the pollen assemblages in these sub-samples date to the Early Bronze Age (Table 21).

4.4.24 *Sub-samples 0.16-0.08m:* alder continues to dominate the tree pollen assemblage in these sub-samples, with less hazel-type and occurrences only of oak, birch, and willow, and commonly occurring fern spores. However, this assemblage is distinguished from the underlying woodland assemblage at 0.24m (*Section 4.4.22*), as it includes a range of herbs, particularly sedges, grasses, docks/sorrels, meadowsweet, and, at 0.08m, pollen of the goosefoot family, thistles, and a single cereal-type/large grass pollen grain. Very little microcharcoal is present. Diatoms are commonly recorded.

4.4.25 *Interpretation:* a dominantly wooded palaeoenvironment has been interpreted, the main tree type being alder; however, it is possible that small openings within the woodland may have been present, in particular, at 0.08m. The occurrence of a large grass grain, which may be representative of a cereal-type, is potentially important. It is possible that herbs, in particular docks/sorrels, goosefoot, and the possible cereal-grain may represent anthropogenic disturbance to the landscape. Radiocarbon dates from 0.12-0.11m suggest these sub-samples date to the Late Bronze Age (Table 21).

4.4.26 *Summary:* the pollen assessment, together with the lithology of the cored deposits, suggest a probable lacustrine environment was present when blue clay and green/grey banded silts at the base of core BH-4.2 were deposited. These would appear to date to the Late Glacial period, based on the assessed pollen assemblages. This is confirmed by radiocarbon dating, which indicates a terminal Palaeolithic date at 1.79-1.78m (Table 21). A very sharp transition to brown organic peat deposition is apparent in BH-4.2 (Plate 24), and pollen from the overlying organic deposit (at 1.79m) suggests development of sedge fen at the site. It is possible that the sharp transition between the silts and peat deposits may relate to a hiatus in sedimentation. This may correspond to an apparent lack of typical Late Glacial palynoflora, including juniper (*Juniperus*) and docks/sorrels (*Rumex* sp), perhaps supported by the records for birch. Comparison with published data from lake deposits in mid-Wales appears to show a similar pollen sequence (Mighall and Chambers 1995; Watkins *et al* 2007). Full analysis, however, would be necessary to draw further comparisons, or conclusions.

Plate 24: The transition from minerogenic biogenic deposition to more organic deposition in core BH-4.2 (2.0-1.5m)

4.4.27 The lake site did not appear to have become fully infilled until much later in the sedimentary record. A very clear, distinct change in pollen was observed in core BH-4.2 at 0.72m, which suggests changes in the assemblage leading to the development of alder carr. Radiocarbon dates for the upper part of the core (at 0.12-0.11m) are indicative of sediments from the Late Bronze Age (Table 21), suggesting the probability that the entire sequence contains sediments that range in age from the Late Glacial period to the Bronze Age.

4.4.28 ***Goat Roundabout:*** sub-samples were extracted from three overlapping monoliths taken from the naturally layered deposits exposed. The monolith sequence began with a minerogenic deposit (***17513***; Fig 51) that produced no pollen, overlain by organic-rich alluvial deposits, followed by alluvium and peat (***17515-17***), all of which yielded good pollen assemblages. One pair of radiocarbon dates (on the humin and humic organic fractions) was also obtained from a position in one of the monoliths (17505; deposit ***17517***), whilst another pair was obtained from a second monolith (17527; deposit ***17515***; Table 22). In addition, a seed in an upper, sealing layer of colluvium (***17519***) was dated, but returned a post-medieval/modern date.

Monolith	Deposit	Laboratory code	Organic fraction/ material	Radiocarbon age (BP)	Calibrated date range (95% confidence)
17527	***17515***	SUERC-105407	humin	7501±23	6435-6255 cal BC
		SUERC-105408	humic	7398±21	6380-6110 cal BC
17505	***17517***	SUERC-105405	humin	5071±22	3955-3795 cal BC
		SUERC-105406	humic	5001±22	3940-3655 cal BC
	17519	SUERC-105171	Seed	134±24	cal AD 1675–1945

Table 22: Radiocarbon dates from the Goat Roundabout pollen site

4.4.29 *Deposits 17515 and 17517:* sub-samples from the deepest organic-rich alluvium (***17515***) produced an assemblage dominated by herb pollen, in particular, grasses, sedges, dandelion-type, and pinks family, with fewer counts of pollen of mugworts, stitchworts, willow-herbs (*Epilobium*-type), meadow-rues, and daisy-types. Tree and shrub pollen are represented mostly by hazel-type, with lower counts of alder, pine, elm, and lime. Fern spores are well represented, in particular common polypody and monolete ferns, but with occurrences also of bracken and clubmoss (*Huperzia selago*). Above (within deposits ***17515*** and ***17516***) abundant tree/shrub pollen was recovered, in particular hazel-type, followed in abundance by alder, with fewer counts of birch, oak, pine, and elm. The assessment suggests a possible shift to alder-dominated woodlands witnessed in peat ***17517***. Apart from the deepest sub-sample, herb pollen is relatively poorly represented, with sporadic occurrences only of grasses, sedges, devil's bit scabious, mugworts, daisy-family, thistles, bedstraws, and ribwort plantain. Fern spores were consistently recorded, but with abundance apparently declining towards the top of the layered deposit. Low levels of microcharcoal are present throughout.

4.4.30 *Interpretation:* the deepest productive sub-sample suggests herb pollen accounts for over 50% of the assemblage, which is indicative of areas of open grassy communities supporting a rich variety of herbs, largely typical of areas of rough/waste ground, field edges, or hedges (for example dandelion- and daisy-types, stitchworts, and willowherbs). Hazel-type scrub may have been growing in, or near, the area, and there is evidence of some woodland, including alder, elm, pine, and lime. Fern spores were probably associated with the woodland or were perhaps growing in cleared areas, by the woodland edge. Microcharcoal may derive from local and/or regional fires. The presence of alder pollen suggests a Mesolithic or later age; the early rapid expansion of alder in north Wales has been dated at Llyn Cororion to 8640-8390 cal BC (7745 ± 65 BP; SRR3471; Watkins *et al* 2007). This is confirmed by the radiocarbon assays from deposits ***17515*** and ***17517***, which have returned Late Mesolithic and Early Neolithic dates respectively (Table 22).

4.4.31 ***Other monolith samples:*** insufficient pollen was identified in most of the sub-samples taken from the monoliths extracted from natural deposits and archaeological features during the mitigation works (*Section 4.4.6*). Although many of the sub-samples contained clays that appeared to be organic and, in some cases, were associated with charcoal fragments, these contained very low levels of pollen (*Appendix A3*), or pollen assemblages that are deemed unsuitable for assessment. For instance, although sub-samples from Burnt Mound 1 (*Section 2.3.25*) contained potentially workable pollen assemblages, those of grasses and dandelion-type dominate the assemblages. This suggests that these assemblages have probably been compromised through preservation of the more robust pollen grains. Similarly, a sub-sample from destruction/demolition deposit ***16024*** (*Section 2.3.15*) contains an assemblage dominated by herbs of grasses and dandelion-type, with rare occurrences of ribwort plantain, pinks, and daisy-families, and rare tree pollen, including birch and alder. Once again, therefore, the assemblage probably only contains pollen grains with a better survival rate and is therefore not representative of the vegetation as a whole. Although most of the monolith samples were, therefore, unproductive, in contrast, those extracted from ditch ***18242***, Site 29 (*Section 2.6.31*), did contain rich pollen assemblages.

4.4.32 *Ditch 18242, Site 29:* pollen sub-samples were collected from samples at 0.04m intervals through ditch fills ***18100***, ***18180***, and ***18181***. In addition, one segment of the ditch also contained a layered deposit composed of peaty clay (***18233***) and monolith (18100) was extracted from this, which was sub-sampled as part of the pollen assessment. A pair of radiocarbon dates (on the humin and humic organic fractions) were also obtained from one position within this monolith (Table 23), which accord with the dated plant macrofossils in this ditch (*Section 2.6.31*).

Laboratory code	Depth (m)	Organic fraction	Radiocarbon age (BP)	Calibrated date range (95% confidence)
SUERC-105412	0.41–0.42	humin	2183±20	360-165 cal BC
SUERC-105413	0.41–0.42	humic	2146±20	350-55 cal BC

Table 23: Radiocarbon dates from deposit **18233***, ditch* **18242***, Site 29*

4.4.33 Deposits ***18180*** and ***18181*** yielded good assemblages, but a sparser assemblage was recovered from ***18100***. Grasses, sedges, and dandelion-type were commonly recorded, with ribwort plantain also present, and only occurrences of thistles, buttercup-type, and devil's-bit scabious. Tree pollen, including hazel-type, alder, and rare oak, is also present. Rare cereal-type pollen was recorded. However, as the dimensions of cereal-type grains overlap with those for wild grasses, the identification cannot be certain (Andersen 1979). Microcharcoal is present in small quantities throughout.

4.4.34 Layered deposit ***18233*** yielded rich assemblages. The deeper sub-samples appear to be dominated by tree pollen, in particular hazel-type and alder, but also with sporadic occurrences of oak, birch, lime, and elder, and rare occurrences of heather (*Calluna*) and ivy (*Hedera*). Pollen of grasses and sedges appears to increase towards the top of the deposit and a range of herbs is present, including ribwort plantain, buttercup-, daisy- and dandelion-types, thistles, and devil's-bit scabious. Small quantities of cereal-type pollen are present in most of the sub-samples, but these could represent wild or cultivated grasses. Fern spores, including common polypody, monolete ferns and bracken, are also common. In addition, *Sphagnum* moss spores are present. Microcharcoal is recorded in small quantities towards the top of the deposit. Non-pollen palynomorphs include occurrences of HdV-128, rare *Glomus* (HdV-207), and *Botryococcus* (HdV-766).

4.4.35 *Interpretation:* the pollen data in ***18181*** suggest open areas, with possibly greater evidence of some woodland (mainly hazel-type and alder) environments. Pollen from ***18233*** may suggest declining frequencies of trees and increases in herbs, especially grasses. The overall herb assemblage may be indicative of wet meadows, possibly suitable for grazing animals. Records of cereal-type pollen may suggest possible small-scale cultivation, or it may represent wild grasses that grew in damp areas (such as sweetgrasses; Stace 2010). The non-pollen palynomorphs suggest the presence of shallow, freshwater environments, and possible disturbed or eroded ground (van Geel 1978). Radiocarbon AMS assays for the humin/humic fractions of the peat in the lower part of the layered deposit, at 0.41–0.42m, returned later Iron Age dates (Table 23).

4.5 Plant Remains and Charcoal *by Denise Druce*

4.5.1 In total, 986 environmental bulk samples were collected during the mitigation works from all of the identified sites and from a wide range of feature and deposit types, with details of all bulk sample locations contained within the project database and GIS (*Section 1.2.21*). Of these, 844 samples were selected and processed for the assessment of palaeoenvironmental material, including charred plant remains, waterlogged plant remains, and charcoal.

4.5.2 ***Methodology:*** in accordance with accepted professional guidelines (Campbell *et al* 2011), bulk, 40-litre samples were taken during fieldwork, or the entirety of deposits if these were less by volume than this. At least 30 litres of material (or the entirety of the sample if smaller than this, bar 1 litre retained for other specialist remains) were then processed from features considered more likely to be in direct receipt of settlement debris (*eg* pits, postholes, spreads, hearths), significant or unusual features (*eg* cremation burials, burnt mounds), and ditches and gullies, either directly associated with structures (*ie* enclosure ditches/house gullies) and/or noted in the field as containing significant quantities of refuse. Otherwise, 10 litres were processed from natural features (palaeochannels/tree-throw holes) likely to contain waterlogged plant remains, invertebrates or molluscs, and field boundary ditches that, being situated away from the focus of activity, were generally considered less likely to contain settlement waste/debris.

4.5.3 Samples were processed using either a modified Siraf-type flotation tank or by hand flotation in a sink, during which flots were collected on a 250µm mesh, air-dried and examined under a binocular microscope. Residues were passed through a 500µm and 2mm mesh, and were also air-dried. The fine residue (500µm to 2mm size) was subsequently checked under a binocular microscope for the presence of small plant remains and finds, such as metalworking waste. The coarse residue (larger than 2mm) was checked by eye and any plant material was extracted and assessed along with the flots. All residues from samples associated with cremation features were retained for checking by an OA osteologist.

4.5.4 Any surviving palaeoenvironmental remains, such as cereal grains, cereal chaff, weed seeds and molluscs, were quantified, so too was other material, such as coal, heat-affected vesicular material (HAVM), bone, mortar and ceramic building material (CBM). Modern roots and seeds were also noted to ascertain the likelihood of any contamination. Plant remains were quantified on a scale of 1–4 where 1 is rare (one to five items); 2 is frequent (6–50 items); 3 is common (51–100 items); and 4 is abundant (greater than 100 items). Plant nomenclature follows Stace (2010).

4.5.5 Charcoal fragments larger than 2mm in size within the bulk samples were quantified and provisionally identified where possible as a means of assessing the potential of each to provide information on fuel use. The presence of any short-lived wood species, such as alder (*Alnus glutinosa*), hazel (*Corylus avellana*) or birch (*Betula* sp), was noted, as was the presence of other charred material, such as Poaceae (grass family) stems or tuber fragments, as these would provide suitable material for radiocarbon dating in the absence of any macrofossils. Due to the anatomical similarity of some tree/shrub species, charcoal fragments identified as blackthorn-type (*Prunus* sp) may include sloe/blackthorn, wild plum, wild cherry and bird cherry. Similarly, fragments identified as hawthorn-type (Maloideae) may include hawthorn, whitebeam, apple and pear. These designated sub-groups follow Hather (2000).

4.5.6 The assessment results were entered into a spreadsheet and include the potential of each of the samples for palaeoenvironmental analysis and for providing suitable material for radiocarbon dating. The data were then uploaded into the project database. For the plant and other palaeoenvironmental indicators, the potential was for either full analysis or rapid analysis (RA), based on the quantity and diversity of surviving material, and the significance of the feature from which it came.

4.5.7 ***Assessment:*** the majority of the surviving palaeoenvironmental material comprises charred plant remains and charcoal. Only a very limited number of features contained non-transformed (*ie* uncharred) organic material, and much of this is likely to represent modern seeds.

4.5.8 The results of the environmental assessment are described from each of the landscape units identified during as part of the assessment. Within these units, sites and features that contained significant assemblages of archaeobotanical interest are discussed; however, necessarily at this stage, the results and any interpretations remain provisional until final feature dating/phasing has been established through stratigraphic analysis and additional scientific dating.

4.5.9 ***Landscape 1:*** significant assemblages of charred plant remains (CPR) and charcoal were recovered from Pit Group 1, Site 1, which has been dated to the early medieval period (*Section 2.2.3*). Many of these pits contained abundant charred cereal remains, which, along with common charred weed seeds and charcoal, may represent the waste from cereal-processing activities involved with drying or roasting. At this stage, there is no evidence to suggest that the material represents malted grain. The cereals comprise mixed assemblages of wheat (both glumed and free threshing), barley and oats; the latter is particularly abundant and includes both wild (*Avena fatua*) and cultivated (*Avena sativa*) varieties. The presence of several wheat grains with characteristics consistent of a free-threshing wheat, such as bread wheat (*Triticum aestivum*), is noteworthy, given that both free-threshing wheat and oats are more commonly found in Roman and medieval cereal assemblages (Greig 1991; Allen *et al* 2017).

4.5.10 The charcoal assemblages in some of the pits appear to be dominated by oak and/or alder or hazel and includes roundwood. Several of the pits contained more mixed assemblages of charcoal, including mixed roundwood. The additional taxa recovered from these pits include hawthorn-type (Maloideae), willow/poplar (*Salix/Populus* sp) and holly (*Ilex aquifolium*), which may indicate differing sourcing of fuel and/or structural wood.

4.5.11 ***Landscape 2:*** several sites in this landscape unit produced significant assemblages of plant remains and charcoal. Probable Neolithic assemblages were present in Pit Group 3, Site 4, with two pits, ***17014*** and ***17009*** (*Section 2.3.10*), producing common to abundant charred hazelnuts, and pit ***17014*** containing rare, charred wheat grains and tuber fragments. These features were dominated by oak and alder/hazel charcoal. Another Neolithic pit ***24013*** (Pit Group 5; *Section 2.4.5*), Site 11, also contained an assemblage of charred hazelnut fragments.

4.5.12 Charcoal from ***19006***, Burnt Mound 1 (Site 7: *Section 2.3.29*), was overwhelmingly dominated by oak, with a sub-component of alder/hazel; however, the layers beneath this deposit (in cairns ***19021*** and ***19022***; *Section 2.3.28*) produced mixed charcoal assemblages, including oak, alder/hazel, ash, and hawthorn-type. It is possible this material represents the remains of open scrubby woodland that was initially cleared. The dominance of oak in the burnt-mound deposits may suggest the conscious selection of this wood for burnt-mound activities. If this was the case, then oak may have been recognised as providing good-quality fuel (Edlin 1949). Charcoal recovered from the postholes and troughs at Burnt Mound 1 (*Sections 2.3.27* and *2.3.29*) were either in low concentrations or comprised poorly preserved oak and alder/hazel.

4.5.13 A significant assemblage of plant remains was also recovered from Romano-British Buildings 1 and 2, Site 3 (*Section 2.3.3*), which included abundant cereal remains, dominated by a glumed wheat (both spelt and possible emmer), with an occasional sub-component of barley and/or oats. Much of the charcoal is dominated by oak, combined with ash (*Fraxinus excelsior*), maple (*Acer* sp), and possible birch (*Betula* sp). It is not clear at this stage whether these species types reflect local availability or conscious selection for fuel and/or structural wood.

4.5.14 Early medieval Settlements 1 and 2, Site 5 (*Section 2.3.13*), also produced abundant charred cereal grains, and, although several cereal types were noted, the assemblages appear to be dominated by oats. Settlement 1 produced most of the cereal remains, which suggests that it was engaged in the processing/drying of cereal grains. Although several of the features also contained common charred weed seeds, a lack of cereal chaff suggests the material may represent a fully processed crop, perhaps being dried prior to storage or milling. The presence of possible spelt wheat in posthole ***17999***, Settlement 2 (*Section 2.3.19*), a crop more commonly associated with Iron Age and Roman crop assemblages (Greig 1991), may indicate its continued cultivation or reintroduction during the early medieval period, a pattern common at other early medieval sites in southern Britain (R Nicholson *pers comm*). Perhaps, significantly though, this posthole did contain another cereal grain which has been radiocarbon dated to the Iron Age.

4.5.15 Another dated Iron Age cereal, a wheat (*Triticum* sp) grain, was also recovered from pit ***17115*** (Pit Group 3), Site 4 (*Section 2.3.11*). This pit also produced other grains of wheat (both glumed and possibly free-threshing), barley (*Hordeum vulgare*), oats (*Avena* sp), and charred weed seeds. However, given this feature's proximity to several Neolithic pits (*Section 4.5.11*), it is possible that this material was intrusive in an earlier feature. The presence of a possible emmer wheat (*Triticum dicoccum*) spikelet fork would be consistent with an early Neolithic date (Greig 1991); however, the presence of oat grains further indicates a much later date for the material.

4.5.16 Test pits excavated across a deposit of overbank alluvium at Site 10 (*Section 2.3.43*) produced frequent charred cereal grains, seeds/fruits (including charred hazelnut-shell fragments) and tubers, samples of which have been radiocarbon dated to the

Bronze Age, Iron Age, and Roman period. Given the nature of this deposit, it is possible that the remains were reworked material. However, the identification of a few possible bur-reed (*Sparganium* sp) seed heads, which is an aquatic plant, is consistent with a wet flood-plain environment (Stace 2010). Charcoal retrieved from these test pits is variable and includes a range of taxa, including oak, ash, alder/hazel, hawthorn-type, blackthorn-type, and holly, with rare occurrences of pine and possible gorse-type (Leguminosae). It is not clear if these reflect the remains of burnt wood from clearance or settlement waste (either *in situ* or washed in). Either way, it would appear the charcoal came from sources of open/woodland edge with scrub.

4.5.17 A few samples were also assessed from several post-medieval and undated ditches and pits at Site 8 (*Section 2.3.30*). The features mostly produced very little charred material; however, pit ***23721*** (*Section 2.3.34*) contained abundant cereal remains dominated by oats, barley and wheat, along with common charcoal dominated by oak, alder/hazel, hawthorn-type and field maple.

4.5.18 ***Landscape 3:*** an Early Bronze Age, Structure 4, at Site 12 (*Section 2.4.9*), was associated with frequent cereal grains, including barley and wheat, as well as charred hazelnuts. An Early Bronze Age pit (***19568***), at Site 19 (*Section 2.4.33*) also produced an assemblage of charred hazelnuts, as did Neolithic pits ***24013*** (Site 11; *Section 2.4.5*) and ***19509*** (Site 17; *Section 2.4.30*), and it seems that the presence of hazelnuts is a common feature of the prehistoric pits along the bypass. One medieval pit (***21553***), Site 15 (*Section 2.4.27*), and a post-medieval posthole (***24049***), Site 12 (*Section 2.4.12*) produced frequent cereal grains, those from the posthole being very well-preserved, including possible bread-type wheat and oats. Other features of archaeobotanical interest include presently undated pits from Site 17. One of these, ***19512*** (*Section 2.4.31*), contained charcoal, dominated by pine, whilst the other, ***19560*** (*Section 2.4.30*), primarily alder/hazel roundwood charcoal.

4.5.19 This landscape also contained a high density of burnt mounds (Burnt Mounds 3-17), distributed across Sites 13 (*Section 2.4.14*), 15 (*Section 2.4.20*), and 16 (*Section 2.4.28*). However, very few produced charred plant remains other than charcoal, and this was overwhelmingly dominated by oak, or a mixture of oak and alder or hazel. Only a few burnt mound pits contained mixed charcoal assemblages, which, in addition to oak and alder/hazel, include blackthorn-type, willow/poplar, field maple, ash and holly. Several of the burnt-mound pits also contained abundant fragments of large roundwood of primarily alder/hazel wood, which may represent the remains of structural features.

4.5.20 ***Landscape 4:*** the sites in this landscape only produced low levels of charred materials. It therefore seems that activity there did not generate quantities of charred plant remains and charcoal, or alternatively that the preservation of such material was poor.

4.5.21 ***Landscape 5:*** a large assemblage of charred plant remains and charcoal was recovered from Site 27 (*Section 2.6.4*). Some of this material was from prehistoric features, including those suspected to relate to Mesolithic activity. This latter material includes acorn cup fragments from pit ***24793***, Structure 7 (*Section 2.6.10*), and abundant charred hazelnuts from Pit Group 13 (*Section 2.6.9*) and a gully (***24572***) associated with Structure 6 (*Section 2.6.10*). This latter feature also contained rare cereal grains, though presumably these were intrusive, whilst similarly, a Mesolithic buried soil (***27195***) associated with Pit Group 13 contained rare wheat grains. Again, these may be intrusive or suggest that the soil formed over a prolonged period (*Section 2.6.8*). This soil also produced charcoal dominated by oak, with rare pine.

4.5.22 Pit ***24599***, which has been dated to the end of the Neolithic period (*Section 2.6.12*), contained frequent charred hazelnuts, whilst samples from the probable Bronze Age burnt mounds (Burnt Mounds 18-22; *Section 2.6.15*) produced reasonable quantities of charcoal dominated by oak and/or alder or hazel. Several of the associated pits and troughs also contained charcoal dominated by oak and alder/hazel.

4.5.23 Many of the pits in Pit Group 15 (*Section 2.6.14*), forming elements of the Early/Middle Bronze Age cremation cemetery at Site 27, contained frequent charred grass (Poaceae) stem fragments and tubers, including possible lesser celendine (*Ficaria verna*), and weed seeds, which may represent burnt vegetation surrounding the pyre sites. One pit, ***24824***, also produced rare grains of naked barley (*Hordeum vulgare* var *nudum*), which would be consistent with a Bronze Age date (Greig 1991). Two of the cremation burials (***27154*** and ***27162***; in Pit Group 14; *Section 2.6.13*) produced common charred hazelnut-shell fragments, and it is possible that these were from hazel branches used in the pyre. Other than a few exceptions where charcoal assemblages appear to be more diverse, most samples retrieved from Pit Group 15 are dominated by oak, which is consistent with previous charcoal studies carried out on Bronze Age funerary sites in Wales (Caseldine 2017).

4.5.24 Other notable features from Site 27 included medieval pits ***20349*** (*Section 2.6.20*) and ***20446*** (*Section 2.6.21*), which both contained oat grains with frequent to common weed seeds. Other presently undated pits from this site also contained frequent cereal remains, including wheat (both glumed and free threshing), barley, and oats, whilst a presently undated posthole (***24909***) from Structure 13 (*Section 2.6.25*) contained rare cereal grains, whilst another similarly undated posthole (***24658***; *Section 2.6.25*), forming an element of Fence 5, produced frequent cereal grains, including glumed wheat and barley. Two presently undated pits, ***24569*** (part of Pit Group 19; *Section 2.6.25*) and ***24578***, are notable for their mixed charcoal assemblages of oak, alder/hazel, and pine. It is also possible that this latter pit dates to the Neolithic period, as it seems to have formed an element of Structure 8 (*Section 2.6.12*). Presently undated gully ***27180***, Structure 11 (*Section 2.6.25*), also produced an assemblage dominated by pine, and it is possible that these three pine-bearing features were related, dating to the same period.

4.5.25 Burnt Mound 23, at Site 29 (*Section 2.6.30*), and its associated features, produced some charcoal. This reflected a mixture of species, and hence the difference in fuel use between this burnt mound and the others on the bypass, which were associated with a more limited range of species, is notable.

4.5.26 Site 30 (*Section 2.6.36*) also produced plant remains and charcoal. Specifically, two pits, ***20138*** (*Section 2.6.37*) and ***20094*** (*Section 2.6.38*), contained cereal remains comprising oat, wheat, and barley, samples of which produced Chalcolithic and early medieval radiocarbon dates respectively. Some pits also contained abundant charcoal assemblages dominated by oak, mixed oak and alder, or mixed taxa like those recorded elsewhere on the bypass. Moreover, one pit (***20086***; *Section 2.6.40*) was dominated by oak charcoal and showed evidence of scorching, which may indicate *in situ* burning and a possible use as a hearth/fire pit.

4.6 Dendrochronology *by Ian Tyres*

4.6.1 During fieldwork, 27 waterlogged timbers were recovered from the troughs associated with Burnt Mounds 18, 20, and 22, Site 27 (*Section 2.6.15*), and Burnt Mound 23, Site 29 (*Section 2.6.30*). These timbers were transported to YAT for conservation (*Section 3.11.1*) and assessed for denrochronological potential (*ie* whether the timbers were oak (*Quercus* sp) containing 50 or more annual rings, and if they were free of aberrant anatomical features, such as those caused by physical damage to the tree whilst it was still alive). The preliminary assessment resulted in 12 timber samples being selected, from all four of the burnt mounds, which were subjected to dendrochronological dating. These comprised eight samples from Burnt Mound 18, two from Burnt Mound 23, and single samples from Burnt Mounds 20 and 22.

4.6.2 ***Methodology:*** standard dendrochronological dating methods were followed (English Heritage 1998). Hence, a surface equivalent to the original horizontal plane of the parent tree was prepared on each sample, with a sequence of increasingly fine bladed tools: surform or plane; box cutter blades; medical scalpel blades; and razor blades. This was undertaken whilst the samples were frozen, as they are not solid enough to take a sharp edge in ordinary circumstances. This allowed the sequences of ring widths to be revealed, and once each sample had thawed it could be assessed again for suitability. The complete sequence of the annual growth rings in the suitable samples were then measured to an accuracy of 0.01mm using a micro-computer based travelling stage. The sequences of ring widths were plotted onto semi-log graph paper to enable visual comparisons to be made between the sequences and reference data. In addition, cross-correlation algorithms (*cf* Baillie and Pilcher 1973) were employed to search for positions, where the ring sequences were highly correlated. Highly correlated positions were checked using the graphs and where these were satisfactory, these locations were used to identify the calendar dates of the measured series.

4.6.3 The *t*-values (a measure of the strength of the correlations) were derived from the original CROS algorithm (*ibid*). A *t*-value of 3.5 or over is usually indicative of a good match, with the proviso that high *t*-values at the same relative, or absolute, position need to have been obtained from a range of independent sequences, and that these positions were supported by satisfactory visual matching.

4.6.4 The sequences obtained from the suitable slices were compared with each other and any found to crossmatch were combined to form a composite sequence. These, and any remaining unmatched sample sequences, were tested against a range of reference chronologies, using the same matching criteria: high *t*-values; replicated values against a range of chronologies at the same position; and satisfactory visual matching. When such positions are found, these can provide calendar dates for the ring-sequence. Specifically, if the sample ended in the heartwood, a *terminus post quem* for the death of the tree was provided by the date of the last ring, plus the addition of the minimum expected number of missing sapwood rings. Conversely, if some of the outer sapwood or the heartwood/sapwood boundary survived, a date range for the death of the tree could be calculated by using the maximum and minimum number of sapwood rings likely to have been present. For dated samples where the bark edge survived intact, a precise date for the felling or death of the tree could be identified from the date of the last surviving ring. A 10-55-year range for missing sapwood rings was used for dating the samples.

4.6.5 ***Results:*** the tree-ring sequences present in ten of the 12 oak samples were measured successfully (Table 24). Intercomparison of the ten sequences identified a closely related group of six samples from timbers 24500, 24501, 24503, 24507, 24511, and 24512 (Table 25), all forming elements of trough ***27054***, associated with Burnt Mound 18 (*Section 2.6.17*). The tree-ring results indicated that these were all from the same tree. These series were combined into a composite sequence (CPPB_T6), which is 242 years long. Comparison with all current British and Irish prehistoric and historic tree-ring reference sequences identified this composite, matched to a range of material from western England and south-east Ireland (Table 26), from the later part of the second millennium BC. It was not, however, possible to date the four remaining oak tree-ring sequences from Burnt Mounds 18, 20, 22, and 23.

Burnt Mond	Timber	Cross-section (mm)	Rings	Sap	AGR	Result	Interpretation
18	24500	155 x 110	105	-	1.46	1270-1166BC	after 1156BC
	24501	155 x 40	91	-	0.73	1130-1040BC	after 1030BC
	24503	135 x 40	106	-	0.91	1146-1041BC	after 1031BC
	24506	95 x 10	~25	-	~0.3	not analysed	-
	24507	215 x 35	193	-	1.07	1221-1029BC	after 1019BC
	24510	110 x 45	45	-	2.37	not dated	-
	24511	135 x 40	131	-	1.01	1160-1030BC	after 1020BC
	24512	90 x 30	58	-	1.50	1235-1178BC	after 1168BC
20	24518	195 x 25	~70	-	~0.6	not analysed	
22	27142	640 x 100	61	-	1.80	not dated	-
23	18225	670 x 120	63	-	2.36	not dated	-
	18229	120 x 45	59	-	0.80	not dated	-

Table 24: The dendrochronological samples from oak timbers (AGR: growth rate mm/year, dimensions to nearest 5mm)

	24501	24503	24507	24511	24512
24500	\	\	8.48	\	7.73
24501		10.05	7.45	8.39	\
24503			7.71	9.87	\
24507				11.26	9.02
24511					\

Table 25: Correlation t-values between six tree-ring sequences forming composite CPPB_T6

	CPPB_T6 1270-1029BC
Ireland Master Chronology (Brown *pers comm*)	5.83
Somerset, Harters Hill (Groves and Locatelli 2004)	5.55
County Longford, Derrynaskea (Brown *pers comm*)	5.49
Lancashire, Leyland Farington Moss (Brown *pers comm*)	5.38
County Tipperary, Littleton Bog (Brown *pers comm*)	5.20
County Longford, Derryoghil (Brown *pers comm*)	4.66
County Cork, Garryduff Bog (Brown *pers comm*)	4.53
County Offaly, Clonfinlough (Brown *pers comm*)	4.51

Table 26: Illustrative correlation t-values between composite sequence CPPB_T6 (t-values in Table 25 combined) and contemporary datasets from western England and Ireland

4.6.6 There is no sapwood survival on any of the dated or undated samples. The eroded nature of the material may also mean significant amounts of heartwood, as well as sapwood, have been lost from these timbers. The latest dated oak heartwood tree-ring is from 1029 BC (timber 24507), from the single tree that was used to provide the boards for trough ***27054*** in Burnt Mound 18. Adding the minimum sapwood allowance indicates this tree was felled sometime after 1019 BC.

4.7 Radiocarbon Dating

4.7.1 At the start of the assessment, the dates of many of the excavated features and deposits were largely unknown, which was largely down to a lack of associated artefactual materials, or the broad date ranges potentially associated with some of this artefactual material. Therefore, an integral element of the post-excavation assessment was the implementation of an extensive programme of radiocarbon dating in order to provide a secure chronological framework for a selection of the undated features/deposits.

4.7.2 ***Methodology:*** in total, 110 radiocarbon dates were acquired from both archaeological features and natural deposits. The bulk of these, following the recommendations of Patrick Ashmore (1999), were derived from single-entity short-lived items, which included 93 plant macrofossils (*ie* charred seeds, tubers, and fruits, and charcoal derived from roundwood/sapwood) and five fragments of cremated human bone. In addition, 12 dates were obtained from sediment samples (comprising paired dates on the humin and humic fractions), with four from two monoliths through natural deposits at the Goat Roundabout pollen site (*Section 4.4.28*); two from a monolith from an Iron Age ditch, Site 29 (*Section 4.4.32*); and the remaining six from core BH-4.2, extracted from the former lake/wetland area at Caerlon Tibot (*Section 4.4.9*). All samples were submitted to the Scottish Universities Environmental Research Centre (SUERC) where they were assayed using the accelerator mass spectrometry (AMS), following the methods described in Dunbar *et al* (2016). The resulting dates were then calibrated using IntCal20 and OxCal v4.4 (Reimer *et al* 2020; *cf* Bronk Ramsey 2001; 2009), at the 95% probability level, and rounded outwards to five years where the error measurement is less than ±25 BP and to ten years when it is greater than this (Mook 1986).

4.7.3 ***Assessment:*** a complete list of the radiocarbon results is presented in *Appendix A.5*. Taken together, these results have a broad chronological spread, reflecting human activity spanning some 9000 years, and landscape development from the end of the last Ice Age onwards, across much of the Holocene (Table 27). As such, these radiocarbon dates represent a highly significant chronological dataset.

Landscape	Site	Period										Total
		Terminal Upper Palaeolithic	Mesolithic	Neolithic	Chalcolithic	Bronze Age	Iron Age	Roman	Early medieval	Later medieval	Post-medieval	
	Goat Roundabout pollen site (south of Landscape 1)		2	2							1	***5***
1	Site 1								6			***6***
2	Site 3							7				***7***
	Site 4			4			1				1	***6***
	Site 5						1		15			***16***
	Site 7					3						***3***
	Site 10		2			2	1	4				***9***
3	Site 11			1								***1***
	Site 12					2					1	***3***
	Site 15		1		2	4				1		***8***
	Site 16				1							***1***
	Site 17			1								***1***
	Site 19					1						***1***
4	Site 23										1	***1***
5	Site 27		9	2		10			1	3		***25***
	Site 29						6			2		***8***
	Site 30			1	1				1			***3***
	Caerlan Tibot lake/wetland pollen site	2				4						***6***
Total		***2***	***14***	***11***	***4***	***26***	***9***	***11***	***23***	***6***	***4***	***110***

Table 27: Quantifications of the calibrated radiocarbon dates by broad period

4.7.4 In addition to the 110 samples dated as part of the assessment, one major focus of the palaeoenvironmental-sampling programme (*Section 4.5.1*) was to obtain organic materials which might be suitable for radiocarbon dating. This programme proved successful and a large collection of samples has been identified which could be subjected to radiocarbon dating as part of any future analysis, in order both to confirm the existing dates and site chronologies, and also confirm many of the features and structures which are presently undated (*Section 5.4.4*). Radiocarbon-dating potential was based primarily on samples containing single-entity material (*ie* seeds or fruits) and/or short-lived wood. Samples containing only charcoal from long-lived taxa (*eg* oak (*Quercus* sp), pine (*Pinus* sp), or hawthorn-type), were flagged as

OWE (subject to the old wood effect), as they may, inherently, possess errors of several hundred years.

5 STATEMENT OF POTENTIAL

5.1 Stratigraphy

5.1.1 The stratigraphic data are of prime importance, as they provide the foundation for understanding the successive phases of human activity within each of the landscapes and sites identified along the bypass. Moreover, when combined, this evidence possesses considerable time depth and hence, following additional stratigraphic analysis and dating, will provide valuable data for comprehending settlement, activity, and land-use, throughout both the prehistoric and historic periods.

5.1.2 ***Natural features:*** the investigated sites contained a range of natural features, comprising palaeochannels, tree-throws, root holes, areas of bioturbation, and buried land surfaces. Although many of these have little potential to provide evidence of human activity, several of the palaeochannels seem to have influenced the location of settlement/activity, at certain times, and hence form significant topographic features. The most notable of these is the large palaeochannel at Site 10 (*Section 2.3.42*), reflecting an earlier course of the Afon Gwyrfai, which may have been active in the earlier part of the Holocene and acted as a focus for Mesolithic activity in Landscape 2 (*Section 2.3.41*). The same might also be the case for two other palaeochannels, at Site 8, Landscape 2, again representing former meanders associated with the Afon Gwyrfai, which could (along with the present-day course of this river) have influenced the positioning of post-medieval remains and presently undated pits (*Section 2.3.30*). Similarly, a palaeochannel at Site 27, Landscape 5 (an earlier incarnation of the present-day distributary of the Afon Cadnant; *Section 2.6.6*), was also a significant early landscape feature, which probably originally flowed into the former lake/wetland at Caerlan Tibot (*Section 2.6.3*). Indeed, this lake/wetland seems to represent a highly significant topographic feature, probably acting as the initial focus for early prehistoric activity, as well as that dating to the later phases of prehistory and the early historic periods, as evidenced by the archaeological remains at Site 27, to its south, Site 29, to its north (*Sections 2.6.4* and *2.6.29*), and the surrounding (Bronze Age and Iron Age) settlement/activity at Caerlan Tibot and Crug House (*Section 1.4.16* and *1.4.11*).

5.1.3 Many of the present-day watercourses also seem to have been highly significant landscape features in antiquity. Specifically, the tributary of Afon Carrog and the main channel of the Afon Rhyd may have influenced the position and activities at Sites 1 (early medieval pits; *Section 2.2.2*) and 2 (post-medieval enclosures; *Section 2.2.4*) respectively, in Landscape 1. The tributary of the Afon Gwyrfai, flowing through Landscape 2, also seems to have formed a major focus for burnt-mound activity recorded at Sites 13, 15, and 16 (*Sections 2.4.14, 2.4.23,* and *2.4.28*), as well as the Neolithic and presently undated pits at Site 17 (*Section 2.4.30*). Furthermore, this tributary and its confluence with the present-day course of the Afon Gwyrfai might also have influenced the location of Neolithic activity at Site 11 (*Section 2.4.4*). Many of these watercourses also retained their significance in the historic period, being used as the boundaries for townships/parishes (*Sections 1.3.3-1.3.5*).

5.1.4 Other natural features holding archaeological significance include buried land surfaces/soils identified at Sites 10, 13, 15, and 27 (*Sections 2.3.41, 2.4.15, 2.4.21*, and 2.6.8). These directly relate to early landscape development, with the most extensive surviving at Site 10, immediately south of a palaeochannel (*Section 5.1.2*), which was associated with an *in-situ* lithic scatter. The other land surfaces were less extensive and more localised, though again these form vestiges of the early landscape, and some also contained flaked lithics (at Sites 15 and 27), which had been fortuitously preserved beneath prehistoric burnt mounds.

5.1.5 In addition, it also seems that several excavated tree-throws were foci for prehistoric activity. Specifically, a tree-throw at Site 2 contained burnt materials suggestive of prehistoric activity (*Section 2.2.4*), as did one at Site 17, which also produced prehistoric pottery, and was surrounded by a scatter of probable prehistoric pits (Pit Group 9; *Section 2.4.30*).

5.1.6 ***Mesolithic activity:*** Sites 10, 15, and 27 produced evidence that has good potential for understanding the form and use of the later Mesolithic landscape, and settlement, in the Caernarfon area (*Sections 2.3.41*, 2.4.21, and 2.6.8). Given the absence of evidence relating to this period in the immediate vicinity of Caernarfon (*Section 1.4.3*), they are highly significant, and have the potential to provide much-needed evidence relating to hunter-gatherer life in north Wales; they also add to the growing corpus of evidence relating to the later Mesolithic in nearby Ynys Môn (*Section 1.4.4*), as well as the Llŷn peninsula, to the south-west, and the wider Irish Sea area (*cf* Maxwell Heath 2023; Conneller 2022). At Sites 10 and 15, this evidence comprised early land surfaces (*Section 5.1.4*), containing late Mesolithic flaked lithics and worked stone, and charred plant remains/charcoal. Both areas lay next to watercourses and could reflect small, possibly repeated, visitations, which, based on the radiocarbon evidence, date to the end of the seventh/beginning of the sixth millennia cal BC at Site 15, and the late sixth/early fifth millennia cal BC at Site 10.

5.1.7 More significant evidence for Mesolithic activity was, however, recovered from Site 27 (*Section 2.6.8*), which was the focus for sustained Mesolithic activity. This site is also highly significant as it contains potential Mesolithic structures (Structures 6 and 7), defined by gullies, pits/postholes and a hearth; a buried land surface, associated with hollows, pits (Pit Group 13), and lithics and ecofacts; and intercutting pits. All these features/deposits/artefacts/ecofacts presumably relate to different phases of temporary encampment, this site being repeatedly visited over many generations. This longevity of occupation increases the potential and significance of these remains. Specifically, the radiocarbon evidence suggests that Structure 7 dates to the late eighth- to early seventh millennia cal BC and, as such, represents the earliest evidence associated with human activity at this site, and, significantly, the bypass as a whole. Later activity spans much of the remainder of the Mesolithic period, between the later seventh- and early fifth millennia cal BC. Chronologically, these therefore cover the Late and Final Mesolithic periods (Conneller 2022, 25).

5.1.8 ***Neolithic activity:*** the bypass contained a scattering of buried remains that have been dated to the Neolithic period and hold good potential for providing insights into the earliest agricultural groups in the Caernarfon area. Notably, in the immediate vicinity of the bypass such evidence was conspicuously absent, which increases the significance and potential of these remains, and will also allow comparison with that from adjacent areas, which contain more abundant evidence for Neolithic activity, particularly on Ynys Môn and around Bangor (*Sections 1.4.7* and *1.4.8*), as well as the slightly more distant Llŷn peninsula (Maxwell Heath 2023). Based on the radiocarbon evidence the remains on the bypass can be broadly divided into those reflecting earlier Neolithic activity (early-mid fourth millennium cal BC; *ie* Early and Middle Neolithic) and also late Neolithic activity (late fourth-mid third millennia cal BC). Most comprised concentrations of pits, with four groups being identified: earlier Neolithic Pit Group 3, Site 4 (*Section 2.3.9*); and late Neolithic Pit Groups 5 and 6, Site 11 (*Sections 2.4.5* and *2.4.6*); and Pit Group 8, Site 17 (*Section 2.4.30*). In addition, a possible isolated earlier Neolithic pit was present at Site 27 (*Section 2.6.12*), whilst an isolated late Neolithic pit was recorded at Site 30 (part of Pit Group 25; *Section 2.6.37*).

5.1.9 Some of these pits had also been intentionally backfilled and were associated with the possible deliberate deposition of pottery, lithics, and plant remains (*ie* pits in Pit Groups 3 and 5, and the isolated pit at Site 27), and some were also associated with possible pit/post alignments, specifically Post Alignment 1/Pit Group 3 and Post Alignment 3/Pit Group 8. They seem to therefore relate to significant locales which may have been 'formalised' through pit digging and the deposition of selected materials, and presumably a proportion might also relate to areas of nearby settlement, lying beyond the bypass corridor. Given this, these features have the potential to provide good comparative evidence for this style/type of Neolithic activity, which seems to be a defining feature of earlier Neolithic life in north-west Wales (as seen on Ynys Môn, Parc Bryn Cegin, Bangor, and Clynnog, Gwynedd; Cuttler 2012; Kenney 2008; Roberts 2009), and across other parts of Britain (*cf* Cummings 2017, 84-6).

5.1.10 One of the isolated pits at Site 30 was also located close to a possible (though undated) monument, defined by a large ring of pits/timber uprights (*Section 2.6.39*), in a riverside location, which could be contemporary and may explain the presence of the nearby pit. The presence of this possible monument, therefore, has the potential to feed into a broader understanding of late Neolithic monument types and their locations (*cf op cit*, 193-7; Gibson 1998; 2004).

5.1.11 Importantly, Site 27 also contained evidence for a possible earlier Neolithic structure (Structure 8; *Section 2.6.12*), defined by pits and postholes, which, given its presumed early fourth millennium cal BC date, is highly significant, perhaps corresponding to the period when agriculture was first adopted in the region. It may therefore provide valuable details relating to the adoption of 'Neolithic' practices, as well as the adoption of early architectural styles/traditions across a wider area of north Wales and the Irish Sea zone (*cf* Cummings 2017, 76-82; Smyth 2014).

5.1.12 ***Chalcolithic/Bronze Age activity:*** one of the major archaeological successes of the bypass project was the recovery of a large quantity of stratigraphic data spanning the Chalcolithic (mid-late third millennium cal BC) and Bronze Age (late third-late first millennia cal BC). Importantly, this evidence is varied and, accordingly, holds excellent potential for understanding the form/character of occupation/activities relevant to these periods in both the Caernarfon area and wider region.

5.1.13 Along the bypass, the principal Chalcolithic/Bronze Age remains are burnt mounds, with six examples presently radiocarbon/dendrochronologically dated to these periods. In chronological order, the dated examples comprise Burnt Mounds 16 (Site 16; *Section 2.4.29*), 11, and 12 (both Site 15; *Section 2.4.25*), dating to the Chalcolithic period; Burnt Mound 1 (Site 7), dating to the Early-Middle Bronze Age (*Section 4.7.7*); Burnt Mound 17 (Site 15) dating to Middle-Late Bronze Age (*Section 2.4.25*); and Burnt Mound 18 (Site 27) dating to the Late Bronze Age (*Section 2.6.17*). In addition to these, there are a further 17 presently undated monuments, from Sites 9, 13, 15, 16, 27, and 29, which are also assumed to belong to these periods (*Sections 2.3.37, 2.4.14, 2.4.20, 2.4.28, 2.6.15,* and *2.6.30*), although one (Burnt Mound 23) might be much later in date (*Section 2.6.30*). All of the dated burnt mounds, and most of the presently undated examples, were associated with pits and troughs, the more significant of which contained timber linings (Burnt Mounds 18, 20 and 22, Site 27 (*Section 2.6.15*), and Burnt Mound 23, Site 29 (*Section 2.6.30*)). Together, therefore, these have the potential for comparison with similar timber-lined troughs from other parts of north Wales (such as those excavated on the Llŷn peninsula; *cf* Maxwell Heath 2023, 97-102), and for providing a much broader understanding into how these functionally elusive sites were used in Britain and Ireland (*cf* Hawkes 2018; Johnston 2021, 145-9).

5.1.14 Significantly, free-standing timber structures were also associated with Burnt Mounds 1 (Structures 1 and 2; *Section 2.3.27*) and 18 (Structures 9 and 10; *Section 2.6.16*), which are comparatively rare features, with, for instance, only one example discovered during excavation along the A55, Ynys Môn (Structure F3), though this set some distance from the actual burnt mound (Maynard 2012). Therefore, the structures at Burnt Mound 1 hold further stratigraphic potential for discerning the use/activities at these specific sites, and for eliciting wider discussion regarding their use and form. Moreover, Burnt Mound 1 was also associated with several phases of use, which included the construction of cairns over the abandoned structures (*Section 2.3.28*), which, again, is highly unusual. This could reflect acts designed to mark (through a form of 'monument' building), or perhaps even 'seal' the activities associated with these structures, and accordingly these cairns hold considerable stratigraphic potential for understanding the use, and perceived significance, of burnt mound sites by Bronze Age communities more generally. Furthermore, Burnt Mounds 18-20 hold additional potential for understanding the progression of Bronze Age activity at Site 27, as they created a stratigraphic sequence, which significantly, also included the construction of a long bank, parallel with the distributary of the Afon Cadnant (*Section 2.6.18*), perhaps as part of water management, or even, again, as way as an act of marking/'monumentalising' the channel. If the latter proves to be the case, again, it holds potential for insights into how these sites were perceived by prehistoric groups operating across the region, and also novel forms of Bronze Age monuments, which were perhaps designed to emphasise important natural features.

5.1.15 Given these factors, the burnt mounds from the bypass hold considerable potential, which could be further refined through additional radiocarbon dating of the presently undated examples. Indeed, following such dating, the dataset could be a highly significant one, with great potential for comparable analysis with other excavated burnt mounds in north Wales. These could include those on nearby Ynys

Môn (*Section 1.4.13*), which together with the examples from the bypass form a significant (and near continuous) transect across the Bronze Age landscape; single Welsh examples (*eg* Graeanog, Gwynedd: Kelly 1992); the large collection at Parc Bryn Cegin, Llandygai, Bangor (Kenney 2008); and other multiple examples recorded along extensive linear development schemes in this region (*eg* Pwllheli to Blaenau Ffestiniog pipeline, crossing the Llŷn peninsula; Kenney *et al* 2014), as well as in other parts of Wales (such as those recorded along the Milford Haven to Brecon gas pipeline; Hart *et al* 2014).

5.1.16 Other Bronze Age remains on the bypass included pits, positioned beyond the burnt mounds, which also hold stratigraphic potential for comprehending Bronze Age activity in the area. These include those at Sites 15, 19 and 30, dating to the Chalcolithic period (Site 30; *Section 2.6.36*), Early Bronze Age (Site 19; *Section 2.4.33*), and Late Bronze Age (Site 15; *Section 2.4.26*). That at Site 30 was also adjacent to a Late Neolithic pit and presently undated timber monument (*Section 5.1.10*) and therefore has potential to provide further chronological information on the use of this location, whilst that at Site 15 was adjacent to the numerous burnt mounds recorded at this site. Furthermore, this latter pit also lay close to other presently undated pits and Post Alignment 2, all of which could be related to the nearby burnt mounds, providing complementary details relating to this activity. The pit at Site 19 formed part of Pit Group 11, with other presently undated pits (Pit Group 12) lying immediately to the north.

5.1.17 In addition to the dated Chalcolithic/Bronze Age pits, a collection of presently undated examples was recorded at several other sites that might also (following additional radiocarbon assays) be confirmed to date to a similar time. This is particularly the case for those at Site 13 (*Section 2.4.18*), Site 16 (*Section 2.4.29*), and Site 29 (Pit Groups 22 and 23; *Section 2.6.35*), which were in the vicinity of burnt mounds and contained burnt materials (*ie* fire-cracked stones and charcoal) superficially similar to burnt mound deposits, and in some cases prehistoric pottery. Other pits containing 'burnt mound' materials, more distant from the excavated burnt mounds, were also present at Site 17 (Pit Group 9; *Sections 2.4.30*) and Site 28 (*Section 2.6.28*); however, those at Site 17 could also relate to Neolithic activity, based on the presence of a Neolithic pit group immediately to the north (Pit Group 8; *Section 5.1.8*).

5.1.18 Another Bronze Age feature on the bypass was Structure 4, at Site 12 (*Section 2.4.9*). This was a small post-defined structure, and, although it was an isolated feature, it is an additional strand of evidence relating to the use and occupation of the Bronze Age landscape in the Caernarfon area.

5.1.19 In addition to the burnt mounds, pits, and structure, the remains of an Early/Middle Bronze Age cremation cemetery were present at Site 27, which was a highly significant discovery. This cemetery consisted of a single cremation covered by an inverted urn, with several surrounding unurned cremation deposits, placed in pits (Pit Group 14), in addition to a dense scatter of other pits (Pit Group 15), which seem to have been contemporary features (*Sections 2.6.13* and *2.6.14*). These remains hold considerable potential for providing details on Bronze Age funerary practices, such as the mortuary rites performed, as well as the spatial configuration of the cemetery, which may also, following stratigraphic analysis, have been associated with funerary structures, represented by some of the features in Pit Group 15. When this is considered in relation to the other suspected Bronze Age burial sites close to the bypass (*Section 1.4.11*), the evidence holds additional potential for considering the range of Bronze Age burial sites in the area. Furthermore, the evidence from Site 27 holds potential for comparative analysis with other excavated Early/Middle Bronze Age burial sites from north-west Wales, which include several on Ynys Môn (*Section 1.4.10*), and also Bronze Age cremation cemeteries from a wider area in Britain and Ireland that were seemingly unmarked by a monument (*ie* a mound or ring ditch; *cf* Johnston 2021, 92-8). It is also noteworthy that the cemetery was positioned directly within an area associated with burnt-mound activity (*Section 2.6.15*). Some of these mounds were certainly later in date and it is possible that the presence of the cemetery (or a memory of it) influenced their creation. Other mounds at the site are presently undated and could (following radiocarbon dating) conceivably be earlier features, which may, in turn, also have influenced the positioning of the cemetery. This apparent juxtaposition, between sites for the living and sites for the dead, seems, therefore, highly significant, and holds potential for a more nuanced understanding of the siting of Bronze Age burial grounds, their influence on later features, and the fluctuating and changing function of significant Bronze Age locales in north Wales and across a much wider area of western Britain and Ireland (*ibid*).

5.1.20 ***Iron Age activity:*** most of the recorded Iron Age archaeology was concentrated at the northern end of the bypass at Site 29, Landscape 5 (*Section 2.6.31*), and seems to have some connection with the possible Iron Age settlement at Caerlan Tibot (*Section 1.4.16*), which is immediately east of this site. The remains therefore have good stratigraphic potential to determine the form and character of Iron Age activities in this area, which seems to have been a major focus for Iron Age settlement. At Site 29, Enclosure 15 dates to the last decades of the Iron Age and may therefore have been contemporary with the nearby settlement, forming another settlement unit or stock enclosure. Moreover, two other enclosures, Enclosures 16 and 17, were also present at this site (*Sections 2.6.33* and *2.6.34*). Both are presently undated but, based on their morphology, these might conceivably be Iron Age settlement elements; if this is clarified through radiocarbon dating, these remains, therefore, also possess stratigraphic potential for comprehending the form and character of Iron Age activity in the vicinity of Caerlan Tibot.

5.1.21 The other securely dated Iron Age feature from Site 29 was a substantial ditch set partly around the circumference of Burnt Mound 23 (*Section 2.6.31*). This ditch dates to the later centuries of the first millennium cal BC and it clearly had a direct relationship with the burnt mound, though, presently, the precise relationship is unclear, as the date of Burnt Mound 23 has yet to be fully established; however, it might conceivably have been a contemporary feature, associated with a large Iron Age burnt mound, which would be a very rare and significant discovery, given that most of the excavated burnt mounds from the bypass and wider area seem to date to the Chalcolithic/Bronze Age (*Section 5.1.13*). Another alternative, therefore, is that it was constructed around an 'ancient' landscape feature to emphasise its significance to Iron Age communities operating in the area. This, again, would represent a very rare occurrence, and the stratigraphic evidence, therefore, has the potential to inform how these Iron Age communities perceived and interacted with much earlier landscape features. Moreover, the reuse and reinvention of earlier monuments has been observed in other parts of Britain and hence the stratigraphic evidence has potential for comparative analysis with these other sites (*cf* Hingley 1996).

5.1.22 In addition to this evidence, several features in the southern part of the bypass produced Iron Age radiocarbon dates, specifically Sites 4 (Pit Group 3; *Section 2.3.11*) and 5 (Building 4, Settlement 2; *Section 2.3.19*), both in Landscape 2. Whilst it is possible that the date from the former is derived from intrusive material in a suspected Neolithic pit, and that from the latter represents residual material in an early medieval posthole, this could be clarified through additional dating. If the material is intrusive or residual it has some taphonomic implications and provides evidence of a background Iron Age presence in the wider landscape. It is of course possible that the material does indeed date the parent features and, if so, these will allow for revised interpretations of Pit Group 3 and Building 4. In terms of the latter, it may even suggest that an Iron Age structure/building was present in an area that was subsequently used for early medieval settlement, and hence this and surrounding features hold stratigraphic potential for determining the form of this earlier occupation.

5.1.23 ***Romano-British activity:*** the evidence for activity dating to the Roman period was identified at three locations on the bypass. One of these, in Landscape 2, included structural remains excavated at Site 3 (*Section 2.3.3*), which relate to two Romano-British buildings (Buildings 1 and 2), seemingly associated with a small open settlement, dating to the second to fourth centuries AD. As such, they hold excellent stratigraphic potential for determining the form and layout of these mid-late Roman buildings, one of which seems have been rectilinear in plan, whilst the other was a roundhouse. In addition, the buildings were surrounded by a scatter of presently undated pits and small timber structures, which may (following additional dating) represent contemporary features, providing further evidence relating to this settlement. Together, therefore, the structural and other remains hold excellent stratigraphic potential for determining the character of Romano-British rural settlement in the Caernarfon area, which seems to be represented by several other nearby sites in Landscapes 1 and 2, (*Section 1.4.20*). This evidence may also provide information on the nature of settlement in the hinterland of the Roman fort/settlement at Caernarfon (*Sections 1.4.18* and *1.4.19*) and the concomitant interactions between military and rural settlement, which may also provide additional insights into such relationships across a wider swathe of the militarised zone in western and northern Britain (*cf* Brindle 2016, 384). Furthermore, the structural remains from Site 3 hold excellent stratigraphic potential for comparative analysis with those other buildings, and associated Romano-British settlement types, dating to this period known from north-west Wales, and will therefore form a valuable addition to this corpus (*cf* Waddington 2013; Brindle 2016).

5.1.24 It is also worthing noting that, although in architectural terms the buildings from Site 3 may prove not to be particularly unusual, they were clearly within a stratigraphic sequence, whereby the earlier was the rectilinear building, which seems to have been destroyed by fire, and then replaced by a roundhouse. The stratigraphic evidence has the potential to examine this sequence further, which is unusual and potentially highly significant. Specifically, it could seemingly reflect the presence of a Roman-style building that was destroyed (either deliberately or accidentally), and then replaced by an 'Iron Age'-style building. Indeed, this might relate to subtle, or even overt, acts of resistance to 'exotic'-style architecture (and the ideas/concepts they embodied), with a conscious return to pre-existing Iron Age vernacular architecture; if so, this could contribute to a broader understanding of indigenous responses to Roman rule (*cf* Hingley 1997).

5.1.25 Site 25, Landscape 4 (*Section 2.5.10*), was the second site containing Roman archaeology. This comprised the well-preserved remains of a road, which although presently undated, was clearly a section of Roman road RR67c, running between the forts at Caernarfon and Caerhun (Margary 1967, 350-1; *Section 1.4.22*). Therefore, the stratigraphic data hold excellent potential for understanding both its construction, use, and potentially repair/modification, and will also add significantly to a current understanding of the Roman settlement pattern and road network in the area.

5.1.26 Site 27, Landscape 5, was the third site with evidence for Romano-British activity in the form of a pit, containing Roman pottery, cut into the surface of a burnt mound (*Section 2.6.19*). This stratigraphic evidence is admittedly limited, though it does indicate that this area was visited in the Roman period, and it also provides some background evidence for rural activity within the wider landscape at this time, which could well have been associated with areas of nearby settlement.

5.1.27 ***Early medieval activity:*** the southern half of the bypass produced some significant areas of early medieval archaeology. The most spectacular was the stratigraphic remains at Site 5, Landscape 2, which related to two adjacent early medieval settlement units (Settlements 1 and 2) probably in existence (though not necessarily at the same time) during the seventh to ninth centuries AD. Given the absence of excavated early medieval settlements in the Caernarfon area, and their general rarity across north-west Wales, these remains are highly significant, at both a regional and national level (*Section 1.4.26*; Edwards *et al* 2005). Moreover, the remains are varied, and exhibit some complexity, being associated with enclosing boundaries/drains, building remains, and ovens, and, as such, the stratigraphic evidence holds excellent potential for providing a detailed understanding of settlement morphology, layout, and evolution, vernacular architecture, and domestic activity during this elusive period. The stratigraphic remains will also provide some much-needed details on patterns of early historic settlement in the Caernarfon area, as well as being suitable for comparative analysis with the small number of early medieval buildings and ovens known from Ynys Môn (*Section 1.4.26*), as well as other potential early medieval settlements further afield, though also in Gwynedd, such as the suspected settlements at Graeanog and Graeanog East (Kelly 1982; Fasham *et al* 1998; Waddington 2013, 228-30; Hopewell and Edwards 2017, 233-4).

5.1.28 Site 1, Landscape 1 (*Section 2.2.2*), was another area in the southern half of the bypass, which contained early medieval remains. These comprised a group of pits (Pit Group 1), which seem to be broadly contemporary with the settlement remains at Site 5, to the north (*Section 5.1.27*). Although, in comparison to Site 5, the stratigraphic remains were limited, they do have potential for providing additional and complementary evidence for early medieval activity in the Caernarfon area, which possibly also relates to nearby settlement activity. Again, as with Site 5, given the general rarity of evidence for early medieval settlement in the region, the significance of these remains, and the stratigraphic potential they hold, is greatly enhanced.

5.1.29 In addition to these remains, Landscape 5, in the northern part of the bypass, also contained remains dating to the early medieval period, and these also hold some potential for discerning activity and possible areas of nearby settlement dating to this period. Specifically, the evidence includes a pit at Site 27, and part of Pit Group 16 (*Section 2.6.20*), and an isolated pit at Site 30 (*Section 2.6.38*), both dating to the post-Roman period. These features hold potential for examining the evolution and chronology of activity in this area, as they potentially reflect a continuation of settlement within this area/landscape, which formed a significant location in both the prehistoric and Roman periods, based on the evidence from Sites 27 and 29 (*Sections 2.6.4* and *2.6.29*).

5.1.30 ***Medieval and post-medieval activity:*** most of the later medieval remains on the bypass comprise pits, with several being recorded at Sites 15 and 29 (*Sections 2.4.27* and *2.6.32*), as well as Site 27, where they seemed to be grouped (Pit Groups 17 and 18; *Sections 2.6.21* and *2.6.22*). These most probably relate to agricultural activity in Landscapes 3 and 5, and therefore hold some potential for discerning areas of land that were cultivated during the twelfth to sixteenth centuries. One other feature, which may potentially be medieval in date (although this could only be confirmed through additional dating) was present at Site 23, Landscape 4. This formed an extensive ditched boundary that may have been an early township/parish boundary, the course of which was followed at a later date by the Municipal Borough and Parliamentary Boundary for the Caernarfon District (*Section 2.5.6*). If this is the case, this boundary holds some potential for understanding the nature of medieval land holdings, and also the use/retention of significant early boundaries in the post-medieval period.

5.1.31 The post-medieval remains are much more numerous and varied, being recorded at 21 of the excavated sites, and also being scattered across all of the five landscapes along the bypass (*Section 2.1.8*; Table 2). These mostly comprise ditches, hedgerows, and fence lines, forming field boundaries, enclosures, and trackways, with some, although by no means all, being depicted on late nineteenth-century mapping. All, by virtue of their lack of antiquity, hold a lesser significance than the earlier remains excavated, but they still possess some stratigraphic potential for elucidating the pattern of enclosure and the organisation of land holdings in the eighteenth and nineteenth centuries. In addition, they hold some potential for understanding the processes and sequence of enclosure, associated with the transformation of an open agricultural landscape to one enclosed with a multitude of fields, which now define the present-day character of the area. Several post-medieval pits were recorded, most of which probably relate to agricultural activity and refuse disposal. These again have limited archaeological significance, though they do include a fairly complex group of intercutting pits at Site 8 (Pit Group 4; *Section 2.3.32*). The significance of the post-medieval remains at this site is also slightly elevated, as it produced the remains of two post-medieval timber buildings (Buildings 6 and 7; *Section 2.3.33*), providing additional evidence for post-medieval agricultural activity/settlement adjacent to the Afon Gwyrfai, in Landscape 2.

5.1.32 ***Presently undated activity:*** the bypass also produced a large selection of remains that are presently undated, these being found at 20 of the excavated sites (*Section 2.1.8*; Table 2). A good proportion probably relate to post-medieval activity, forming ditched field and trackway boundaries, and pits, and hence hold limited archaeological significance (*Section 5.1.31*). Of much greater importance are the undated burnt mounds, which, if additional radiocarbon dating is undertaken, have the potential to provide further and highly significant information relating to prehistoric activity in the Caernarfon area (*Sections 5.1.15* and *5.4.4*). Similarly, some of the presently undated pits forming elements of suspected early groups, were adjacent to early structures and burnt mounds, or contained valuable palaeoenvironmental and artefactual assemblages, and hence additional dating of these would enhance their stratigraphic interpretation (*Section 5.4.4*). The same is also true of several presently undated postholes and other structural features, forming elements of undated (though possible early) structures, or those provisionally dated as part of the assessment (*Section 5.4.4*). Taken together, and following the identification of suitable material for additional dating, these pits and structural elements might, therefore, hold the potential to establish the date and character of prehistoric and early historic activity at specific sites (*Section 5.4.4*).

5.2 Artefacts

5.2.1 ***Prehistoric lithics and worked stone:*** the combined assemblage of lithics (*Section 3.2*) and other items of worked stone (*Section 3.3*) hold great significance for comprehending Mesolithic, Neolithic, and Bronze Age occupation and activity on the bypass (*cf* Smith 2005a). Furthermore, elements of the assemblage were well stratified and, as such, interpretation of specific site sub-assemblages has great potential for contributing to an understanding of lithic utilisation, deposition, distribution, and chronology.

5.2.2 Site 27, Landscape 5 (*Section 2.6.4*), produced the largest assemblage, which was partially recovered as stratified items in pits and buried soils. Much of this material is suspected to relate to Mesolithic activity and hence it has the potential to provide details relating to this early occupation; regionally, it also forms an important assemblage that has potential for comparison with other known Mesolithic assemblages from the bypass (*Sections 5.2.3* and *5.2.4*) and the wider area (*Section 1.4.4*). Other stratified lithics were from burnt-mound deposits and these, together with the unstratified material from this site (which possibly also relates to the use of these features), may provide valuable insights into the character of this activity, particularly when considered with the smaller lithic assemblage from Sites 29 and 30 (*Sections 2.6.29* and *2.6.36*), just to the north, which also included the use of burnt mounds (at Site 29). Indeed, the assessment identified at least two Bronze Age tools (one from Site 27 and the other from Site 30; *Section 3.2.18*) and the analysis of the flake debitage recovered from Landscape 5 could confirm if this was of a similar chrono-technological character.

5.2.3 Other significant assemblages were from Site 10, Landscape 2 (*Section 2.3.39*), and Site 11, Landscape 3 (*Section 2.4.4*), on either side of the Afon Gwyrfai, and as such providing interesting parallels. At Site 10, to the south, the lithics (from an early land surface and palaeochannel deposits) hold potential for providing details on Mesolithic riparian activity, as well as being material that has potential for comparison with the other Mesolithic assemblages from the bypass (*Sections 5.2.2* and *5.2.4*). At Site 11, to the north, the lithics were from Neolithic Pit Group 5, and hence have potential to provide details on lithic composition and depositional activity, and could also be compared with other Neolithic pit-group assemblages from the bypass (*Section 5.2.5*) and the wider region (*Section 1.4.8*). Within this latter assemblage, a transverse arrowhead and micro-denticulate (from pit ***24013***; *Sections 2.4.5*) also hold particular significance, as these were produced from imported flint (*Section 3.2.17*).

5.2.4 Several additional sites produced assemblages of worked stone that have potential for comprehending Mesolithic and Neolithic activity. One, from Site 15 (*Section 2.4.20*), Landscape 3, includes a microlith fragment and a large quantity of debitage, which have potential for understanding hunter-gatherer activity; this assemblage could also be compared with the Mesolithic assemblages from Sites 10 (*Section 5.2.3*) and 27 (*Section 5.2.2*). In addition, this site produced a Neolithic axe blade, which is a highly significant item. Although this was unstratified, it still has great potential to provide information on the production and distribution of similar axes in north Wales. Moreover, its lithology could be confirmed through thin-section analysis, which might allow it to be assigned to a specific implement petrology group, and, in turn, add to the corpus of axe blades from Wales derived from known source areas (Houlder 1988). The size and morphology of the axe blade suggests that it possibly represents the reworking of a flake from a larger implement, which could also be significant, as it may suggest that it formed a symbolic artefact.

5.2.5 Site 4, Landscape 2 (*Section 2.3.8*), also produced a significant assemblage associated with Neolithic Pit Group 3, and holds potential for elucidating the nature of depositional activity; this assemblage could also be compared with the material from other Neolithic pit groups from the bypass and wider region (*Section 5.2.3*). One of the pits (***17014***; *Section 2.3.10*) also produced a large assemblage of stone flakes, and these hold additional significance, as they seemingly relate to intentional deposition of material derived from the preparation of an implement roughout (*Section 3.3.3*). This material therefore has potential for additional regional comparison with similar stone flakes, recovered from Neolithic pits, such as those from Llandygai, near Bangor (Williams and Kenney 2009).

5.2.6 Other sites produced smaller assemblages of lithics and worked stone, some of which was probably residual in later deposits/features. However, that from Site 13 (*Section 2.4.17*) includes an early Mesolithic obliquely backed point (*Section 3.2.15*), which potentially relates to the earliest activity yet recorded on the bypass, whilst that from Site 7 (*Section 2.3.25*) contains a utilised pebble-flint flake (*Section 3.2.20*) that could have been associated with burnt-mound activity. These observations indicate that elements of these smaller collections have significance and warrant further recording and interpretation.

5.2.7 ***Prehistoric pottery:*** this material represents a regionally significant assemblage with potential for detailed analysis, that could contribute to an understanding of the form, distribution, mode of production, use, and discard of prehistoric ceramic traditions, with further value in terms of potential museum display. Specifically, the assemblage contains at least three identifiable prehistoric typological groups, with relatively good diagnostic traits. These comprise Neolithic Impressed Wares, from Sites 4, 11, 17, and 31 (*Sections 3.4.6*); the near-complete Early/Middle Bronze Age plain vessel, used as an inverted cremation urn, at Site 27 (*Section 3.4.8*); and an undesignated vessel (*Section 3.4.10*), which shows similarities with both Early Neolithic and later prehistoric wares, also from Site 27. In addition, the assemblage, contains a collection of plain body sherds, which, although largely devoid of key diagnostic traits, form complementary material, adding to the overall significance of the assemblage, and assisting in the stratigraphic interpretation of pertinent features/deposits.

5.2.8 Several of the sherds from the identified typological groups also have the potential for partial illustrative reconstruction of parental forms and, in the case of the near-complete vessel, a full profile. Such reconstructions will allow for more in-depth comparison with other excavated prehistoric pottery assemblages from north Wales and the wider Irish Sea area.

5.2.9 The nine identified fabric groups within the assemblage (*Section 3.4.4*), also hold potential for further scrutiny. Specifically, aspects of their provenance and manufacturing technology could be explored through a thin-section petrographic analysis.

5.2.10 The assemblage holds some potential for further refining the chronological parameters of the constituent typological groups, which are not entirely understood. Specifically, charred residues were present on several sherds (*Section 3.4.5*), and a selection of these vessels be directly dated following radiocarbon assay of the residues. Whilst all of these residues have the potential to provide direct and valuable chronological data, of particular significance would be the dating of the residues on an undesignated vessel from Site 27 (pit ***20415***), to establish if this was Neolithic or later prehistoric in date (*Section 3.4.10*).

5.2.11 In addition to typological, petrographic, and chronological studies, the assemblage holds potential for understanding vessel use. Specifically, their original contents and use could be explored through organic residue analysis of selected sherds. Indeed, there are 19 sherds that could form part of this study, from pits (some within pit groups), burnt mounds, and a cremation burial, which may provide additional evidence for the activities occurring at these sites (Table 28).

Site	Number of sherds	Provenance	Date
1	1	Pit ***17568***; Pit Group 1	Prehistoric or early medieval? (Confirm through radiocarbon dating)
4	1	Pit ***17009***; Pit Group 3	Middle Neolithic
4	2	Pit ***17014***; Pit Group 3	Middle Neolithic
7	1	Posthole ***19016***; Structure 1; Burnt Mound 1	Bronze Age
7	1	Layer ***19022***; Burnt Mound 1	Bronze Age
7	1	Layer ***19021***; Burnt Mound 1	Bronze Age
11	1	Pit ***24013***; Pit Group 5	Late Neolithic
11	1	Pit ***24040***; Pit Group 5	Neolithic? (Confirm through radiocarbon dating)
11	3	Pit ***24041***; Pit Group 5	Middle Neolithic
13	1	Pit ***24314***	Prehistoric? (Confirm through radiocarbon dating)
17	1	Pit ***19523***; Pit Group 9	Prehistoric? (confirm through radiocarbon dating)
27	1	Cremation burial ***27154***	Early/Middle Bronze Age
27	1	Pit ***20415***	Neolithic or late prehistoric? (Confirm through radiocarbon dating)
27	1	Pit ***24599***	Late Neolithic
27	1	Pit ***24969***; Burnt Mound 19	Presently undated (Bronze Age? Confirm through radiocarbon dating)
30	1	Pit ***20138***; Pit Group 25	Chalcolithic/Bronze Age
Total	***19***		

Table 28: Prehistoric pottery sherds with potential for organic residue analysis

5.2.12 ***Roman and post-Roman pottery:*** the Roman and post-Roman pottery assemblages have limited potential for analysis. These assemblages do, however, contribute to the dating of activity, and provide some limited details on the types of pottery that was used in the rural hinterland surrounding the Roman fort at Caernarfon. Significantly, in the case of Site 3, the pottery was also associated with contemporary rural settlement (*Section 3.5.2*).

5.2.13 Whilst the potential of the medieval pottery is extremely limited, as this mostly seems to represent redeposited material (*Section 3.6.1*), the post-medieval pottery (*Section 3.6.2*) has slightly higher potential in that much of this was stratified, and this provides valuable dating evidence for some of the boundaries, pits, and structures that were excavated along the bypass. Overall, many of these stratified assemblages are small and reflect rural and agricultural activity along the bypass, though it would be informative to consider the stratigraphic provenance of this material in more detail than was possible as part of the assessment, particularly at those sites that have also produced evidence for post-medieval buildings and structures (*eg* Site 8; *Section 2.3.30*). In addition, one of the larger assemblages, from Site 23 (*Section 2.5.5*), was derived from an area of fairly complex post-medieval archaeology, and additional consideration of this assemblage may provide some details on the chronology and types of activities occurring in, or close to, this area. Some limited analysis of the fabrics of the dark-glazed redwares, some of which was probably produced in north Wales (*Section 3.6.3*), may also contribute to studies of trade in such wares at a regional level (*cf* Longworth 2004; Jones 2019).

5.2.14 ***Fired clay and ceramic building material:*** most of the fired-clay assemblage comprises small amorphous fragments, though it does also include fragments of possible daub/waster derived from burnt mounds, and Romano-British and early medieval buildings (*Section 3.7.2*). Therefore, more detailed examination of these pieces may offer further insights into their use, and, in turn, the character of activity at these sites. Similarly, aside from the handmade bricks and tile, the material provisionally classified as ceramic building material is dominated by small fragments, a proportion of which derive from prehistoric burnt mounds and pits, and Romano-British and early medieval buildings (*Section 3.8.2*). Again, more detailed examination of these pieces may clarify if these relate to contemporary activity at these sites.

5.2.15 ***Worked wood:*** the worked wood, comprising planks and boards, from the Burnt Mounds 18, 20, 22, and 23 (*Section 3.12.1*) forms an important and comparatively rare assemblage. Recording of these items (aside from drawing and photographing the items) has been largely completed as part of the assessment, and hence they hold little potential for additional examination; however, this important assemblage does hold potential for a comparative study with other timber-lined pits and troughs known from other burnt-mound sites in north Wales and beyond.

5.2.16 ***Other finds:*** most of the other finds from the scheme have limited potential for analyses. These comprise clay tobacco pipes; glass; silver and copper-alloy coins; copper-alloy and iron objects and nails; and the lead musket ball. Apart from the iron nails, these objects do, however, contribute to the dating of activity at certain sites. The metalwork assemblage also includes a Roman brooch (*Section 3.10.4*) and an incomplete lead bangle (*Section 3.10.8*), potentially dating to the late Bronze Age to late Roman period. Hence, comparative analysis of similar objects may aid in interpreting these items.

5.3 Osteological and Environmental Data

5.3.1 ***Cremated human remains:*** the 13 cremation deposits from Site 27 are an important group and have potential to provide additional details relating to Bronze Age cremation practices in north Wales. Specifically, they have potential to provide information on aspects of pyre technology, through analysis of bone colour (which is dependent on the temperatures achieved on the pyre), and to determine if they represent formal burials, or perhaps redeposited pyre debris or token deposits, through analysis of the total bone weights present and the non-bone components (charcoal and other materials extracted during wet sieving). With more detailed examination of the context records and photographs relating to the burials (Pit Group 14; *Section 2.6.13*), as well as the other surrounding pits (Pit Group 15; *Section 2.6.14*), it may also be possible to identify evidence of *in-situ* burning (either relating to the actual cremation processes or the deposition of cremated remains when still hot), which has further potential for determining mortuary rites. At least one fragment of bone, from burial ***27158***, also exhibits a blue-green spot stain, perhaps indicative of contact with a metal (probably copper-alloy) object. Therefore, this could enable the presence of burial or pyre goods, or an object worn by the deceased, to be established (Webb 2015, 129).

5.3.2 When interpreting cremation deposits, the total weight of the recovered bone is a key consideration. At Site 27, the levels of truncation appear to be minimal for most of the burials (*Appendix A2*), and thus the bone weights recorded are likely to be a good reflection of the material that was originally deposited. Therefore, as it was noted that several 4-2mm/2-0.5mm fractions were not present during the assessment, these absences could be further investigated to ensure that the total weights have been accurately calculated and interpreted. The high bone weight from burial ***27154*** (*Section 4.2.4*), which was contained within an inverted ceramic vessel (*Section 2.6.13*), is in keeping with a formal cremation burial (McKinley 2013). The cremation deposits within this vessel were micro-excavated in spits, and hence the material from these spits has the potential for additional scrutiny to determine if there was any structure to the way that the cremated remains were situated/placed within the urn (*eg* whether the skull, upper and lower body elements were placed in order, as observed in other urned cremation burials; *cf* McCarthy 2010; Webb and Dean 2023). Such an analysis would also be informed through detailed examination of the annotated records made during the micro-excavation, as it is likely that some fragments identifiable to skeletal element will have fragmented during wet sieving. Furthermore, measurements taken of the largest fragments during the micro-excavation are more indicative of the maximum fragment sizes originally deposited, than the measurements taken after environmental processing.

5.3.3 Whilst the potential for these cremation deposits to provide information on burial practice is relatively good, their potential for biological information is more limited. Of the unurned deposits, only three (from burials ***27155***, ***27158***, and ***27160***) have the potential for sex and/or age estimation. For the remaining unurned deposits, sex and/or age estimation is precluded by their low bone weights. There is, however, considerable potential for sex and/or age information from urned-burial ***27154***, considering its overall high weight and the presence of multiple, identifiable fragments (*Section 4.2.4*).

5.3.4 ***Animal bone:*** although there is good potential for analysis amongst the cattle ABG in pit ***19575*** (*ie* the identification of butchery, pathology, and age-related data), and to a lesser extent the animal bones from pits ***20763*** and ***17037*** (*Section 4.3.4*), given the confirmed or suspected post-medieval date of these remains, the material is of limited significance and warrants little further study. The other bones in the assemblage are in poor condition and this precludes the identification of data relating to the proportions and distributions of species, biometrics, butchery, and non-metric traits. However, the condition of the overall assemblage does hold some potential for exploring the taphonomic factors that were in operation along the bypass. Specifically, by comparing the better-preserved animal bones from the post-medieval pits with the other bone-bearing features, it may be possible to reveal how chronology, burial environment, and geology have influenced the recovery and survival of animal bone across the various sites and landscapes.

5.3.5 ***Pollen and geoarchaeology:*** core BH-4.2 from the Caerlan Tibot lake/wetland (*Section 4.4.9*), the incremental samples and monolith from ditch ***18242***, Site 29 (*Section 4.4.32*), and the monoliths from the Goat Roundabout (*Section 4.4.28*), all contain sub-samples with sufficient quantities of pollen suitable for more detailed analysis. Specifically, the pollen in core BH-4.2 has great potential for discerning the depositional environment at the lake/wetland, as well as the fluctuating character of vegetation in Landscape 5. Indeed, radiocarbon dating indicates that the depositional sequence spans the terminal Palaeolithic period through to the Late Bronze Age and, as such, the pollen forms a regionally important palaeoenvironmental dataset that complements other similar datasets derived from nearby areas, such as Eryri (*inter alia*; Mighall and Chambers 1995; Rhind and Jones 2003). In addition, the pollen data from core BH-4.2 hold added significance, as the former lake/wetland area at Caerlan Tibot may have been an attractive environment for Mesolithic hunter-gatherers, as well as forming a resource-rich environment for later agricultural groups, which (based on the results from the upper section of the core) may have been actively modifying the woodland environment in this area. Analysis of the pollen from this wetland could also be enhanced by a complementary geoarchaeological study, based on the data from the borehole survey (*Section 4.4.2*). In addition, diatoms were noted within the core, at 0.56-0.24m below ground level (*Section 4.4.22*) and 0.16-0.08m below ground level (*Section 4.4.24*), and these have potential as a further source of proxy palaeoenvironmental data, which could feed into, and enhance, any palaeoenvironmental reconstruction of this area. Specifically, diatoms (which are single-celled algae with shell made from silica) can provide data on the character of watery environments and the nature of the habitat.

5.3.6 The sub-samples from ditch ***18242*** were from Site 29, which lay just to the north of the Caerlan Tibot lake/wetland area (*Section 2.6.29*) and core BH-4.2. Whilst these samples hold good potential for comprehending the Iron Age landscape that existed, and human impact on this, their importance is enhanced because they may partially overlap and extend the pollen sequence recorded in core BH-4.2 (*Section 5.3.5*). A composite sequence from the Palaeolithic to at least the later Iron Age is therefore possible, which is highly significant. Moreover, this composite sequence would cover the periods of human activity recorded not only at Site 29 but also Site 27, to the south (*Section 2.6.4*), which together contain significant prehistoric archaeology spanning the Mesolithic period to the Iron Age. The pollen sequence would therefore act as a valuable adjunct to the archaeological data, allowing insights into the environment, landscape, and activity that occurred during these successive periods of occupation.

5.3.7 The monoliths from the natural deposits at the Goat Roundabout pollen site also hold potential for study, which could be used to investigate the change from significant open areas with hazel-type scrub to a dominantly wooded environment, just south of Landscape 1. Furthermore, this sequence encompasses sediments of late Mesolithic to Early Neolithic date and therefore holds palaeoenvironmental potential to provide insights into the early landscape and changes that may have occurred during the Mesolithic/Neolithic transition.

5.3.8 In contrast, the remaining samples and monoliths recovered during the mitigation works have little potential. This is largely a result of the insufficient amounts of pollen, or the survival of only the more robust pollen types, which are not reflective of the surrounding environment that existed at their time of deposition.

5.3.9 ***Plant remains and charcoal:*** the assessment indicates that many of the bulk samples collected during the excavations contain well-preserved charred plant and charcoal assemblages, which is highly significant given the importance that such data hold for contributing to environmental reconstruction in Wales (*cf* Treasure 2016; Caseldine 2017; Treasure *et al* 2019). Indeed, the samples from the bypass hold excellent potential for providing information on the local landscape and its ancient woodlands, environmental change, and the regimes of land-use and agriculture that were practised across many millennia. Moreover, these data feed into the archaeological understanding of some of the excavated features and deposits, providing information on the activities that occurred at certain sites, favoured architectural materials, as well as patterns of deposition/disposal and resource use, and how these were spatially and temporally located along the bypass. In addition, the data hold excellent potential for complementing other palaeoenvironmental data from the bypass, particularly the pollen evidence (*Section 5.3.5*), and together these sources allow for a more holistic view of the evolution of the former landscape and the impact of humans. Although these factors clearly indicate that the charred plant remains and charcoal form a regionally important dataset (*cf ibid*), the potential of these samples is enhanced, given that no significant assemblages of plant and/or insect remains preserved under anoxic (waterlogged) conditions were identified from any of the excavated features and deposits.

5.3.10 ***Plant remains:*** based on the quantity and nature of the assessed assemblages, together with their stratigraphic provenances, 83 samples containing charred plant remains hold potential for archaeobotanical analysis. These samples were derived from four of the landscape units, with a notable absence of samples from Landscape 4. Within these areas, these samples were split across 14 separate sites, in varying quantities (Table 29).

Landscape	Site	Number of samples
1	1	12
2	3	7
	4	5
	5	14
	8	1
	10	3
3	11	1
	12	3
	15	4
	17	1
	19	1
5	27	27
	29	2
	30	2
Total		***83***

Table 29: The number of samples containing charred plant remains with potential for analysis, by landscape and site

5.3.11 Full details of each of these samples are presented in *Appendix A4*, though in summary, from Landscape 1, a fairly large number of the samples were recovered from Site 1, all from early medieval Pit Group 1 (*Section 2.2.3*). In Landscape 2, Sites 3 and 4 produced smaller numbers of samples, with those from the former being obtained from features and deposits associated with Romano-British buildings (Buildings 1 and 2: *Section 2.3.3*), and those from the latter site deriving from Neolithic Pit Group 3 (*Section 2.3.9*). Site 5, also in Landscape 2, produced a moderate number of samples worthy of analysis, all seemingly relating to early medieval settlement, with Settlement 1 producing the bulk of these, with just two being derived from Settlement 2 (*Section 2.3.13*). Of the other sites in Landscape 2, Site 8 only produced one sample from a presently undated pit (***23721***; *Section 2.3.34*), and only a small number of samples came from Site 10. These comprise three samples from a Mesolithic buried land surface (***26518***; *Section 2.3.41*). This site did, however, produced 12 additional samples containing charred plant remains, though their potential is curtailed because they were derived from deposits of overbank alluvium (*Section 2.3.43*). Indeed, these probably represent mixed assemblages deposited over lengthy time periods, which may contain fluvially reworked materials.

5.3.12 In Landscape 3, five sites produced samples that hold potential for analysis, though the numbers from each of these sites were small. Single samples came from Sites 11, 17, and 19, deriving from Neolithic pits (in Pit Groups 5 and 8; *Sections 2.4.5* and *Section 2.4.30*), and a Bronze Age hearth (***19568***; *Section 2.4.33*), with slightly larger numbers from Sites 12 and 15. These latter samples derive from a post-medieval pit (***24049***; *Section 2.4.12*) and a Bronze Age structure (Structure 4; *Section 2.4.9*) at Site 12, and a medieval pit (***21553***; *Section 2.4.27*), together with a Bronze Age pit (***26027***; *Section 2.4.26*), and two pits/troughs (***26067*** and ***26119***) associated with two separate burnt mounds (Burnt Mounds 14 and 17; *Section 2.4.23*), at Site 15.

5.3.13 Landscape 5 produced a large number of samples with potential for analysis. The bulk of these were from Site 27 (*Section 2.6.4*), deriving from a range of dated and presently undated features and deposits (*Appendix A.4*). These comprised seven samples from a Mesolithic buried soil, pits, and structures (Structures 6 and 7); two from two Neolithic pits, one associated with Structure 8; samples from nine Bronze Age cremations (in Pit Group 14) and two associated Bronze Age pits (in Pit Group 15); samples from an early medieval pit and two later medieval pits; and four samples from a posthole and presently undated pits, associated with Pit Groups 15 and 19, Fence 5, and Structure 13, which would require radiocarbon dating to make any analysis viable. Sites 29 and 30, in Landscape 5, also produced two samples each, which hold potential for analysis. Those from Site 29 (*Section 2.6.29*) derive from an Iron Age ditch and later medieval pit, whilst those from Site 30 (*Section 2.6.36*) are from a Bronze Age and early medieval pits.

5.3.14 ***Charcoal:*** the assessment identified 230 samples which contain charcoal with potential for analysis. However, when considered in terms of their stratigraphic provenance and the presence of other palaeoenvironmental materials, this number is reduced to 84. These are scattered along the bypass, being concentrated in Landscapes 1-3 and 5 (Table 30). They comprise 52 that derive from samples that also contain charred plant remains with potential for analysis (*Section 5.3.11*). Therefore, these charcoal assemblages form a valuable complementary dataset and, as such, hold enhanced potential for analysis. In addition, there are 32 samples from features and deposits associated with 11 of the burnt mounds (Burnt Mounds 1, 3, 7, 8, 15-20, and 23), at Sites 7, 13, 15, 16, 27, and 29, and the cremation burials at Site 27, that produced charcoal-only assemblages. The potential of these samples can be enhanced, particularly once some have been subjected to radiocarbon dating (*Section 5.4.3*), as they hold excellent potential for insights into the fuel types and associated woodland exploitation/management seemingly associated with Bronze Age activity.

Landscape	Site	Number of samples
1	1	11
2	3	2
	4	5
	5	13
	7	4
	8	1
	10	3
3	11	1
	13	1
	15	4
	16	1
	17	1
	19	1
5	27	28
	29	6
	30	2
Total		***84***

Table 30: The number of samples containing charcoal with potential for analysis, by landscape and site

5.4 Scientific Dating

5.4.1 ***Dendrochronology:*** there is no potential for dendrochronological dating of the timbers recovered from the bypass. Two, 18225 and 27142, from Burnt Mound 23 and 22 respectively (*Sections 3.11.12* and *3.11.10*), have, however, been sampled and prepared for radiocarbon assay, and these have potential for radiocarbon dating (*Section 5.4.5*).

5.4.2 ***Radiocarbon dating:*** this technique has proved to be highly successful, with dating of 110 samples providing essential chronological details for the activity recorded at many of the sites. Moreover, radiocarbon dating indicates that the bypass contains a rich chronological dataset with considerable time depth. Indeed, it is worth reiterating, that without the evidence from radiocarbon dating the chronological importance of both the archaeological and palaeoenvironmental evidence along the bypass would not have been fully realised at this stage, and would only have come to light during any later stages of analysis.

5.4.3 ***Plant macrofossils and charcoal:*** the 93 samples of short-lived plant macrofossils and charcoal that have been subjected to radiocarbon dating during the assessment are by no means exhaustive, as a further 495 comparable samples have been identified as holding potential for radiocarbon dating. Many of these are highly significant, as their dating would allow for a proportion of the presently undated features and deposits to be slotted into the rudimentary chronological framework that has been established during the assessment. Furthermore, these would also provide additional chronometric data and confirmation for the date of the features and sites that have already produced dating evidence. Indeed, additional radiocarbon dating would allow for: the dating of the presently undated burnt mounds, pit groups, and structures; provide confirmatory dating evidence for several of the sites containing significant prehistoric and early historic remains; and provide dating evidence for those undated samples that contain palaeoenvironmental materials worthy of analyses, and undiagnostic prehistoric artefacts.

5.4.4 With this mind, each of the samples with dating potential has been carefully considered, in terms of its stratigraphic provenance, and how it might most valuably assist in answering chronological questions raised during the assessment. This process has resulted in the identification of 112 additional samples which hold the greatest potential for radiocarbon dating, with details of these and the rationale for dating set out in *Appendix A.5*.

5.4.5 ***Other materials:*** in addition to the plant macrofossil/samples, several other types of material identified during the assessment hold potential for radiocarbon dating, specifically: timbers from burnt mounds (two samples); charred residue on pottery (one sample); and natural sediments (paired humin and humic fraction dates from one sediment sample). Details of these samples and the rationale for dating can also be found in *Appendix A.5*.

5.4.6 ***Statistical testing and chronological modelling:*** some of the samples dated as part of the assessment, along with any of the additional dates derived during analysis, also hold potential for statistical testing. This could be used to determine if the dated samples from the same feature, or samples from groups of features, are of the same age, allowing stratigraphic hypotheses to be tested. Statistical testing could also be employed on the duplicate dates derived from the humin and humic fractions in the dated sediments, again to establish their consistency.

5.4.7 In addition, once all radiocarbon assay has been completed and finalised, chronological modelling could also be employed, which would adopt a Bayesian approach (*cf* Bayliss and Marshall 2022; Griffiths 2022). Such modelling has the potential to refine the chronology of activity at particular sites, which possess adequate stratigraphy. Indeed, such 'site-specific prior information models' (Griffiths and Staff 2022, 163) might provide additional chronological details for those sites on the bypass that exhibited the most complex stratigraphy, such as the Bronze Age remains associated with Burnt Mound 1, Site 7 (*Section 2.3.25*); the Romano-British remains at Site 3 (*Section 2.3.3*); the early medieval remains, Site 5 (*Section 2.3.11*); and the complex series of prehistoric and early historic remains at Site 27 (*Section 2.6.4*).

5.4.8 Chronological modelling could also be used to assist in the interpretation of the pollen data derived from the former lake/wetland area at Caerlon Tibot (*Section 4.4.9*). This could be achieved through the construction of a deposit model, which might allow for the estimation of the age of any identified key pollen events, which have not be directly dated by radiocarbon dating (*op cit*, 186-7).

5.5 Overall Potential

5.5.1 A range of complementary data, principally stratigraphical, artefactual, and palaeoenvironmental information, has been successfully recovered by the archaeological mitigation works. Taken together, these have excellent potential for determining the evolution of the cultural and natural landscape in the Caernarfon area, over a protracted period of time, which will also feed into wider understandings of landscape development and use across a much broader area of north-west Wales. Indeed, chronologically, the evidence recovered from the bypass extends from the terminal stages of the Upper Palaeolithic right through to the post-medieval period, and includes direct evidence for human activity dating from the Mesolithic period onwards and, as such, forms a regionally important dataset.

5.5.2 Although the evidence seemingly encompasses most periods of human occupation in the Caernarfon area, those remains with the greatest potential for analysis relate to the prehistoric and early historic periods, with elements of these scattered across the five landscape units. The earliest of these remains were buried Mesolithic land surfaces, some with associated lithic scatters (at Sites 10, 15, and 27), as well as possible structures (at Site 27), which are highly significant features, due to their general rarity, and hold potential for comparison with other similarly dated Mesolithic structures from northern and western Britain. Neolithic pit groups and post alignments were also found (at Sites 4, 11, 17, and 30), which will provide good comparative evidence with other similar Neolithic pit groups from the wider region, whilst a potential Early Neolithic structure was also recorded (at Site 27). This structure therefore holds great potential for examining the architecture adopted by the earliest agricultural groups in this area, and the wider region, and any ramifications this has for the initial adoption of agriculture. There is also a suggestion that a late Neolithic monument, in the form of a timber/pit circle, might be present on the bypass (at Site 30), which is again significant, and holds potential for comparison with other similar monuments from north Wales and the wider Irish Sea zone.

5.5.3 The stratigraphic data also include a mass of evidence for Bronze Age activity, which hold great potential for insights into this period, both in the immediate Caernarfon area and across a wider swathe of north-west Wales. Importantly, the chronological and spatial patterning of this evidence along the bypass also holds potential for understanding how the landscape was used (and perhaps perceived) throughout this period. This evidence principally comprised 23 burnt mounds (some securely dated and others presently undated), in Landscapes 2, 3, and 5, as well as structures (most of which were associated with the use of burnt mounds); cairns (which perhaps marked burnt mound activities); pits; a possible 'monumental' bank; and a cremation cemetery. A proportion of the burnt mounds and pits was recorded at Site 7 (which also contained structures and cairns) and Site 9, Landscape 2, whilst others were concentrated in Landscape 3, at adjacent Sites 15 and 16, with the former also containing (presently undated) pits and post alignments, possibly relating to burnt-mound activity. This landscape also produced evidence for a small Bronze Age structure (at Site 12). In Landscape 5, a large burnt mound was present at Site 29, and, to the south, burnt mounds, along with the cremation cemetery, 'monumental' bank (following the course of the distributary of the Afon Cadnant), and various pits and pit groups, were concentrated at Site 27. Significantly, this site seems to have formed a 'persistent place' that had been previously occupied and used over many millennia. The evidence from this site therefore holds additional potential for examining such processes, and the creation of foci in a Bronze Age landscape that may have possessed some form of *genius loci*. In this respect, it may be significant that the former lake/wetland area at Caerlan Tibot lay just north of the site, and this along with the distributary of the Afon Cadnant, were perhaps important topographical features that drew people to this area.

5.5.4 Iron Age and Roman-period remains were less well represented, though they include important evidence relating to Iron Age activity at the northern end of the bypass, in Landscape 5 (at Site 29). This activity largely comprised the creation of enclosures, and also perhaps activity designed to emphasise the location of an earlier (although presently undated) burnt mound; it was also seemingly associated with the occupation of the Scheduled Monument at Caerlan Tibot. It therefore holds great potential for discerning the form and character of Iron Age settlement and landscape use in this area, and holds further potential as a comparative dataset pertinent to wider studies of Iron Age settlement in the region. Nearby Site 27 also produced a pit containing Roman pottery, which provides some additional (albeit limited) evidence for the retained use of Landscape 5 in the Roman period.

5.5.5 At the southern end of the scheme, in Landscape 2, a small Romano-British settlement was present (at Site 3), which contained an interesting and highly unusual sequence of buildings. These remains hold good potential for understanding Romano-British rural settlement in the hinterland of the Roman fort at Caernarfon, that importantly was occupied across most of the Roman interlude, and perhaps also the interaction between 'urban' and rural areas. The buildings and the sequence of construction also hold potential for comparison with other Romano-British buildings from the wider region, as well as those dating to the immediate pre-Roman Iron Age, and form a valuable addition to the regional corpus. In addition, a well-preserved section of a Roman road existed in the central part of the bypass, in Landscape 4, which probably formed a highly significant route for the entirety of the Roman period, and also potentially into post-Roman times. Therefore, this holds potential for enhancing current understandings of the construction and use of Roman roads, and also the wider Roman road network in the region and its subsequent use.

5.5.6 Importantly, evidence relating to early medieval activity was also recorded, which, given the general rarity of such remains, is regionally significant. This is particularly the case at Site 5, Landscape 2, which produced evidence for two adjacent settlement units, associated with boundaries, internal buildings, drains, and corn-drying kilns. These remains hold great potential for discerning settlement morphology, domestic activity, and architecture associated with this elusive period, and, as such, also hold good potential for comparative analysis with the small corpus of early medieval settlements known from the wider area. Other early medieval remains included a pit group (at Site 1), which again, based on the rarity of such features, is regionally significant, and this holds potential for informing on other forms of early medieval activity and possible areas of nearby settlement.

5.5.7 Of lesser significance are those remains relating to later medieval and post-medieval activity. These do, however, provide important details relating to the division/enclosure and agricultural use of the landscape during these periods, with the post-medieval remains exhibiting some stratigraphic complexity at several of the sites (Sites 8, 12, 23, and 24).

5.5.8 Overall, analysis of the stratigraphic data, therefore, has the potential to provide greater definition of the activity present on the bypass. It will also lead to a more nuanced understanding of those prehistoric and early historic sites containing more complex stratigraphic remains (Sites 3, 5, 7, and 27). Moreover, this will be greatly enhanced by an additional programme of radiocarbon dating and subsequent Bayesian modelling. Radiocarbon dating also holds great potential for determining the date of several presently undated features and structures, which may also relate to prehistoric activity, as well as providing confirmatory evidence for the dating evidence acquired during the assessment.

5.5.9 Furthermore, radiocarbon dating has the potential to provide valuable chronometric data relevant to the study of the artefacts from the bypass, principally worked stone and prehistoric pottery. Moreover, the study of the worked stone and pottery also has the potential to provide additional evidence for the nature and character of prehistoric occupation and activity, and depositional practices, and the study of these artefacts will also be enhanced through petrological and residue analyses. These artefacts form a significant collection of material culture that can be compared, and feed into, wider understandings of the distribution and use of specific artefact types across the region and beyond. The remaining artefacts, whilst of lesser potential, provide some useful evidence for the dating of remains, and also provide additional evidence relevant to the activities occurring at several sites.

5.5.10 Similarly, the palaeoenvironmental remains hold excellent potential for reconstructing the character of the local environment and human interaction with this, as well as insights into the ancient economy and, in some instances, depositional practices. Again, the potential would be greatly enhanced through analysis and radiocarbon dating. It is noteworthy that potential early cereals were present in a (Mesolithic) buried soil (at Site 27), which might, following dating, provide evidence relating to the adoption of agriculture in the region. Moreover, those remains with good potential are varied, comprising charred plant remains, charcoal, pollen, and diatoms, and as such represent a highly complementary and regionally significant dataset.

6 UPDATED PROJECT DESIGN

6.1 Revised Research Aims

6.1.1 As part of the assessment, the initial broad aims and objectives of the project (*Section 1.5*) have been reviewed and developed as a series of Updated Research Aims (URAs) and objectives, the former being expressed as a series of Research Questions (RQs). Overall, these are designed to inform and guide the strategies implemented during post-excavation analysis, and address those elements of the project dataset with the highest potential to advance regional research agendas.

6.1.2 ***Updated Research Aims:*** the following URAs, which the results from the bypass could contribute to, are drawn from the the *Research Framework for the Archaeology of Wales* (RFAW). This framework outlines a research agenda and strategy for the archaeology of north-west Wales, and Wales as a whole, divided by broad period, though it also contains a dedicated section on the palaeoenvironment of Wales. This framework was initially compiled in 2003, followed by updates and reviews between 2004 and 2017. The framework is also currently undergoing further review, with that relating to the Palaeolithic and Mesolithic, the Later Bronze and Iron Ages, and early medieval period, being completed in 2022. Each of the following aims is arranged by the periods used in the RFAW, and incorporates the pertinent key priorities for each period/topic, as set out in its various iterations.

6.1.3 ***Palaeolithic and Mesolithic period:*** the RFAW (2003a; 2003b; 2016a; 2022a; Walker 2011) contains the following key priorities relating to the Palaeolithic and Mesolithic periods, which the archaeology and palaeoenvironmental evidence on the bypass could contribute to:

- *URA1. Settlement patterns and histories*: establishing the distribution and relationships between settlement sites; correlating lithic and palaeoenvironmental evidence; and investigating buried land surfaces;
- *URA2. Social organisation, action, and belief systems*: establishing the social significance and patterning of sites; elucidating social systems and territories; and discerning patterns of raw material exploitation;
- *URA3. Mobility and seasonality*: investigating the use of river valleys and coastal locations, and their use as routeways;
- *URA4. Natural landscapes and resources*: using palaeoenvironmental sequences to determine local natural landscapes and available resources; and determining the environmental conditions associated with wetland sites;
- *URA5. Chronology:* establishing a chronological framework for archaeological remains/lithic technologies and environmental change; and establishing continuities between Mesolithic and Neolithic sites.

6.1.4 ***Neolithic and earlier Bronze Age:*** for the purposes of the RFAW, the Neolithic and earlier Bronze Age were grouped, covering the period 4000-1500 BC. It should be noted, however, that some of the remains from the bypass (*ie* cemetery remains from Site 27; *Section 2.6.12*) span the transition between the 'earlier' and 'later' Bronze Age, as set out in the RFAW, and therefore hold relevance to both of these periods (*Section 6.1.5*). With this in mind, the following key priorities relating to this period were identified by the RFAW (2003b; 2003c; 2011a; 2016b; Lynch 2003; Burrow 2010; Caseldine 2017; Pannett 2017), which the archaeology and palaeoenvironmental evidence on the bypass could contribute to:

- *URA6. The nature of the Mesolithic/Neolithic transition*: investigating whether farming replaced or supplemented the economy of later Mesolithic communities; and examining the environmental context for the transition;
- *URA7. The introduction, character, and development of agricultural practices:* establishing when cereal cultivation was first introduced; investigating the relative significance of arable farming and animal husbandry during the earlier Neolithic; determining if there was a change (intensification) of farming practice during the later Neolithic and earlier Bronze Age, and whether there was greater agricultural diversification; investigating evidence for sedentism, tenure and land ownership; and considering palaeoenvironmental data and applying scientific techniques (*eg* lipid analysis) to study agricultural practices and diet;
- *URA8. Settlement:* recovering evidence for Neolithic house sites, and other evidence relating to domestic occupation (*eg* pits, trenches, stakeholes, hearths, artefact scatters); determining if earlier Neolithic settlement was mobile or permanent; considering whether there was a change to more permanent settlement during the later Neolithic/earlier Bronze Age; considering how evidence for settlement fits into wider patterns of land-use; and focusing on monument types (such as burnt mounds) to inform understandings of settlement patterns and landscape use;
- *URA9. Understanding monuments:* investigating the chronology of Neolithic and Bronze Age monument types and their broader social and topographical context; and using palaeoenvironmental data (*eg* charcoal *in lieu* of pollen data) to determine the environmental conditions surrounding monuments;
- *URA10. Burnt mounds:* determining the reasons for their construction and whether they were used for different purposes;
- *URA11. Access to resources and trade:* determining what stone was being employed for implements, and where it was procured from;
- *URA12. The distribution and context of material culture deposition:* investigating the nature and use of material culture through its depositional context; identifying deliberate deposition strategies; and advancing knowledge of types and use of Neolithic pottery;
- *URA13. Landscape:* considering how the landscape was used and conceptualised/understood; and determining the nature of farming activity and any changes that may have occurred;
- *URA14. Inter- and Intra-regional relationships and patterns:* considering regional links in Wales, and the links between Wales and neighbouring areas throughout this period;
- *URA15. Human remains*: analysing human remains to establish the lifestyle of Early Bronze Age populations;
- *URA16. Chronology:* establishing the date at which Neolithic culture was introduced; establishing the date of monuments and artefact types; establishing

changes over the course of the period; and applying scientific techniques and approaches to chronological studies (*eg* radiocarbon dating, Bayesian modelling);

6.1.5 ***Later Bronze Age and Iron Age:*** these two periods (covering 1500 BC - AD 43) were grouped together for the purposes of the RFAW (with some remains from the bypass dating to the transition between the 'earlier' and 'later' Bronze Age; *Section 6.1.5*). Within the RFAW the following key priorities were identified (RFAW 2003d; 2014; 2016c; 2022b; Longley 2003; Gale 2010; Caseldine 2017), which the archaeology and palaeoenvironmental evidence from the bypass could contribute to:

- *URA17. Settlement and land-use:* considering the pattern of land-use and agriculture;
- *URA18. Environment:* investigating the environmental contexts exploited; investigating food production, diet, and use of organic materials; understanding the natural environment and any constraints it imposed on agriculture; using palaeoenvironmental data to detect increased agricultural productivity in the early Iron Age; and considering palaeoenvironmental evidence from lowland wetland areas;
- *URA19. Burial and ritual:* considering the evidence for ritual and burial practices; investigating Middle Bronze Age cremation cemeteries;
- *URA20. Material culture (and mobility, contact, and exchange):* considering the manufacture of artefacts and how they may have changed over time; and the movement of material culture;
- *URA21. Chronology:* using radiocarbon dating (particularly of carbonised plant remains) to explore the chronology of this period, and linking this with any artefacts recovered (*eg* ceramics);
- *URA22. Reuse of existing sites:* considering how earlier monuments were reused/redefined;

6.1.6 ***Roman period:*** the RFAW (2003b; 2003e; 2016d; Davies 2003; 2011; 2017; Caseldine 2011) contains the following key priorities relating to the Roman period (AD 43-410), which the archaeology and palaeoenvironmental evidence on the bypass could contribute to:

- *URA23. Communications:* investigating and confirming the presence of roads and the wider network of communications; considering how the communication system affected the existing settlement pattern;
- *URA24. Rural settlement:* considering the form of rural settlement; considering sites with 'Romanised' buildings and establishing their function; using environmental data to investigate rural settlement and agricultural practices; applying radiocarbon dating; and considering if the pattern of rural settlement was influence by earlier settlement patterns, and if it continued or changed during the early medieval period;
- *URA25. Interaction between Roman occupiers and the indigenous population:* investigating the nature of interaction between the colonisers and the colonised; and the use of palaeoenvironmental data to discern relationships (*ie* agricultural supply) between the Roman military and native populations;
- *URA26. Technology and industry:* considering what commodities (*eg* ceramics) were made outside of, and reaching, Wales.

6.1.7 ***Early medieval period:*** the RFAW (RFAW 2003b; Bapty 2004; Edwards *et al* 2005; 2011; 2017; Caseldine 2017; Comeau and Seaman 2022) contains the following key priorities relating to the early medieval period (AD 400-1070), which the archaeology and palaeoenvironmental evidence on the bypass could contribute to:

- *URA27. Settlement and society:* investigating the form, and hierarchy, of secular settlement types; determining the form of buildings; and considering how settlement location was influenced by earlier settlement patterns, and if it was influenced by later (Irish) incomers;
- *URA28. Economy and landscape:* using palaeoenvironmental data (*eg* charred cereal assemblages), archaeological remains (*eg* corn dryers and pits), and radiocarbon dating to understand the economy, land-use, and the character of the landscape; and establishing if there was continuity in the crops grown from the Roman through to the early medieval periods;
- *URA29. Chronology:* improving chronological understanding using radiocarbon dating and Bayesian modelling.

6.1.8 ***Medieval period:*** the RFAW (2003f; Davidson and Silvester 2013; Davidson *et al* 2017) contains the following key priorities relating to the early medieval period (AD 1100-1539), which the archaeology and palaeoenvironmental evidence on the bypass could contribute to:

- *URA30. Land-use:* investigating landscape division and areas of land allotment; considering the range of cultivated crops and the development of agriculture.

6.1.9 ***Post-medieval and modern periods:*** the RFAW spilt the post-medieval and modern periods into two, and the research agendas for each contain the following key priorities (Briggs 2007; RFAW 2003g; 2011b; 2011c; Bezant and Bailey 2017), which the archaeology and palaeoenvironmental evidence on the bypass could contribute to:

- *URA31. Land-use and enclosure:* recording field boundaries, features associated with agricultural activity, and using palaeoenvironmental data, to discern (social and tenurial) changes in the rural landscape.

6.1.1 ***Research questions:*** based on the assessment of the archaeological, osteological, and palaeoenvironmental datasets from the bypass, and with the URAs in mind, a series of research questions (**1-23**) have been formulated, which may be addressed by a programme of analysis. These have been grouped under four broad research themes (Themes 1-4).

6.1.2 ***Theme 1 (chronology and processes of change):*** refining the chronological development of activity along the bypass.

1 Is it possible to refine the dating of the prehistoric and early historic structural remains and pit groups?

2 Is it possible to date the start of the Neolithic period on the bypass and the introduction of agriculture?

3 Can additional chronological evidence be gained for the establishment/use of burnt mounds on the bypass?

4 Is it possible to date the artefacts and ecofacts from the bypass independently?

5 To what extent does the dating evidence correlate with, or deviate from, regional chronologies for prehistoric and early historic activity and settlement?

6.1.3 ***Theme 2 (understanding landscapes):*** situating the sites within the wider cultural and natural landscape.

6 Can the palaeoenvironmental and stratigraphic data be used to determine the character of the local environment and human interaction/land-use/clearance during the prehistoric and early historic periods?

7 In what ways were settlement and other activities influenced by, or utilised, natural features and topography?

8 Can contemporary areas of prehistoric and early historic occupation and land-use be identified along the bypass?

9 Was the location of settlement/structures, burial sites, monuments, and other activities influenced by earlier phases of activity?

10 How do the excavated settlements, burnt mounds, boundaries, field systems, and enclosures relate to those boundaries and settlements (contemporary or otherwise) in the wider landscape, depicted on historical and modern mapping, and in other documentary sources, and detected by remotely sensed sources (*eg* LiDAR, aerial photographs, geophysics)?

6.1.4 ***Theme 3 (activity, function, and development):*** understanding the form and function of prehistoric burnt mounds, the prehistoric cemetery, prehistoric and early historic settlements and pit digging, and other activities, and their local and regional context.

11 Do the stratigraphic, artefactual, and palaeoenvionmental remains provide clues on the form and function of the burnt mounds?

12 Do the stratigraphical, artefactual, and palaeoenvionmental remains provide insights into the types/use of prehistoric monuments on, or adjacent to, the bypass?

13 Can the form and function of the excavated buildings, structures, and pit groups be established?

14 Can the archaeological and palaeoenvironmental remains be used to elucidate the layout and use of the Bronze Age cremation cemetery, and the presence of any funerary structures?

15 How does the Bronze Age cemetery articulate, spatially and chronologically, with the burnt mounds, and other prehistoric remains, at Site 27?

16 Do the stratigraphical and artefactual remains shed light on early routes of communication, the movement of people, or trade and exchange?

17 What insights do the stratigraphical, artefactual, and palaeoenvironmental remains provide on the rural economy and land-use?

18 How does the evidence of burnt mounds, settlement, burial, and other activities compare with that from comparable sites in the region, and what can this tell us about the place of these communities within wider socio-economic networks?

6.1.5 ***Theme 4 (people and communities):*** advancing understanding of the beliefs/perceptions, and lifestyles of the communities that occupied the scheme area in the prehistoric and early historic periods.

19 What information do the palaeoenvironmental, artefactual, and stratigraphical remains provide on diet, the role of different foods, and food processing/preparation practices over time?

20 What insights do the artefactual, palaeoenvironmental, and osteological remains provide on depositional practices and taphonomic processes?

21 Do the Bronze Age cremation burials (and associated ceramics and charred plant remins/charcoal) at Site 27 provide any additional data on those individuals interred, as well as burial practices, pyre technology, and the treatment of the dead in the north-west Wales and the wider region?

22 Do the archaeological remains provide any evidence relevant to incomers into the area (*eg* Roman military, Irish settlers) and the relationships between these groups and the indigenous population?

23 Can the social status of the early historic communities who inhabited the bypass be determined from the artefactual, palaeoenvironmental, and stratigraphical remains?

6.2 Interfaces

6.2.1 As part of the project, it will be important to develop consultational interfaces with a range of specialists, the archaeological consultants working on the project, as well as the Senior Planning Archaeologist at Heneb: The Trust for Welsh Archaeology (Gwynedd Archaeology). It will also be necessary to maintain close liaison with the Storiel Art Gallery and Museum, Bangor, which will be the recipient of the finds and paper archive (*Section 6.7.1*), and the Archaeological Data Service/Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), which will be the recipients of the digital archive (*Section 6.7.3*), as well as GAPS, which will receive copies of all reports and the publication.

6.3 Method Statement

6.3.1 ***Management:*** OA operates a project management system, whereby the team is headed by a Project Manager, who assumes ultimate responsibility for the implementation and execution of the *Updated Project Design* and for the achievement of performance targets, be they academic, budgetary, or timetable related. The Project Manager may delegate specific aspects of the project to other key staff, who both supervise others and have a direct input into the compilation of the report. The Project Manager will define and control the scope and form of the post-excavation programme, with the Regional Manager and Project Executive providing academic and logistical leadership to ensure the research aims are appropriately addressed, and participating in any necessary high-level liaison.

6.3.2 General management time will be required to deal with the organisation of non-specific tasks, administration, and correspondence. Time will also be required by the Regional Manager and Project Executive to provide academic advice and assure quality at all stages, and for the post-excavation programme- and specialist managers to programme work. Basic project review, including the tracking of task completion and logging of resource expenditure, will be undertaken internally on a weekly basis.

6.3.3 It will be necessary to brief each member of the project team concerning the aims and objectives of the project, expected outcomes, and their specific roles, responsibilities, products, and timetable. Where possible, the briefing will be undertaken collectively. Communication between all concerned in the post-excavation programme is of paramount importance, and it is essential that all team members working on different aspects of the project liaise closely in order that comparable data are obtained. To this end, regular meetings and reviews are envisaged between all project staff and between particular groups of specialists.

6.3.4 ***Stratigraphic analysis:*** the broad stratigraphic narratives for each excavated site have been compiled as part of the assessment process, and are considered to be fairly robust, contributing to the majority of the research aims and questions. Hence, these narratives will act as the frameworks for all respective programmes of artefactual and palaeoenvironmental analyses. They will also form the basis for the production of phased site plans and will be synthesised to create the text, detailing the sequences of archaeological remains for publication.

6.3.5 The respective assessment narratives will need additional scrutiny and testing, however, entailing detailed analysis of the context data relating to specific groups of features, and possibly the allocation of new stratigraphic entities, followed by confirmation/revision/enhancement of the provisional schemes of phasing generated as part of the assessment. This is particularly the case for those sites which show a greater degree of stratigraphic complexity, as their interpretation could be enhanced through additional stratigraphic interrogation, combined with improved ceramic dating, along with dating evidence derived through radiocarbon dating. Specifically, these stratigraphically complex remains/sites comprise the Romano-British buildings at Site 3 (*Section 2.3.3*); the early medieval settlements at Site 5 (*Section 2.3.12*); Bronze Age remains associated with Burnt Mound 1, Site 7 (*Section 2.3.25*); the post-medieval and undated remains at Sites 8 (*Section 2.3.30*), 12 (*Section 2.4.8*), and 23 (*Section 2.5.5*); the sequence of alluvial deposits at Site 10 (*Section 2.3.39*); the buried land surfaces and burnt mounds at Site 15 (*Section 2.4.20*); the highly complex prehistoric remains at Site 27 (*Section 2.6.4*); and the prehistoric and undated remains at Site 29 (*Section 2.6.29*). The Roman road, at Site 25 (*Section 2.5.10*), whilst not particularly stratigraphically complex, would also benefit from analysis to determine if any construction phases are evident in the make-up of the road surface.

6.3.6 Additional dating evidence would also enable some of the presently undated features and deposits (*ie* structures, pits, and burnt mounds), at both the stratigraphically complex and simple sites, to be assigned to specific site sub-phases. This in turn would result in a reinterpretation of the sequences generated during the assessment.

6.3.7 ***Conservation:*** all of artefacts are well packed (in acid-free cardboard boxes or airtight plastic boxes, as appropriate), and the near-complete ceramic cremation urn, from Site 27 (*Section 3.4.8*), has been the subject of specialist conservation work and reconstruction. All of the substantial pieces of wood from the burnt mounds (*Section 3.11*) have also been subjected to conservation by the York Archaeology. These comprise two large planks from Burnt Mounds 22 (wood 27142) and 23 (wood 18225), together with the better-preserved smaller boards from Burnt Mounds 18 (wood 24500-24503, 24506-24507, and 24509-12), 20 (24513-24519), and 23 (items 18229-18231).

6.3.8 ***Lithics and worked stone (RQs 8, 9, 11-13, 16, 17, 19, and 20):*** the relevant sub-assemblages of worked stone identified in *Section 5.2.1* should be analysed fully. This would record the metrical, typological, and technological attributes of each sub-assemblage, by context, which would allow their composition, date, function, stratigraphic association, and provenance to be examined at a much greater level than has been possible as part of the assessment.

6.3.9 In addition, the basic catalogue of the other lithics, and the coarse- and ground-stone tools, produced as part of the assessment, should be updated following the stratigraphic analysis and dating, and once the stratigraphic narratives for each site have been finalised. This may allow these to be more confidently assigned to specific activities and chronological periods.

6.3.10 The axe blade should also be subjected to thin-section analysis to determine its source area. This would be supplemented through detailed analysis of the implement, along with research into axe-blade typology, chronology, and distribution, which would assist in elucidating the axe's form and function.

6.3.11 Once completed, the results of all lithic/worked stone studies would be integrated into the lithic database, in line with the final stratigraphic narratives produced for each site, and a specialist report would be produced, with the results from this being synthesised for inclusion in any forthcoming publication. The report/publication would contain text detailing the results of the analysis, as well as relevant tables and charts, generated through querying the project database. The report/publication would also include scaled line drawings at an appropriate scale (*cf* Martingell and Saville 1988) and photographic images of selected lithics, angled correctly to show technological detail (*cf* Fisher 2009). Specifically, it is recommended that 18 of the flaked lithics (four cores, four pieces of debitage, and ten tools), along with the axe blade, and four of the coarse-stone tools should be illustrated. Finally, the report would consider the lithics and items of worked stone, including the axe balde, in relation to local and regional assemblages.

6.3.12 ***Prehistoric pottery (RQs 8, 9, 11-13, 16, 17, and 19-21):*** the prehistoric pottery should be fully recorded following PCRG standards (PCRG *et al* 2016). This would include quantification and qualification of the ceramic assemblage by context, including a record by weight, sherd count and estimated number of vessels. As part of this recording, it is also recommended that a maximum of 30 pottery drawings are produced, showing significant sherds, and where appropriate individual vessel reconstructions (*Section 5.2.8*). A catalogue of these illustrated sherds would also be compiled.

6.3.13 It is also recommended that three additional and complementary analyses should be undertaken. One would require the direct dating of one sherd/vessel, which haa been identified as having charred residues adhering to their internal surfaces (*Section 5.2.10*; *Appendix A.5*).

6.3.14 It is also recommended that a petrographic study should be undertaken considering the nine fabric groups identified as part of the assessment (*Section 5.2.9*). Such a study would entail sampling selected sherds from the fabric groups and preparing thin sections, which could then be analysed petrographically, using a polarising light microscope. This would allow their constituent raw materials and manufacturing technology to be elucidated. The possible provenance of the ceramic samples might also be established by comparing their petrographic fabric with the local geology, or through reference to other petrographic studies of prehistoric pottery.

6.3.15 A third complementary study would entail organic residue analysis of 19 sherds identified as suitable candidates during the assessment (*Section 5.2.11*). Such a study would determine the presence of lipids (fats, waxes, and resins) that may have become impregnated into the fabric of pottery. If present, these would act as biomarkers, which might allow the identification of terrestrial animal fats, marine animal fats, plant waxes, beeswax, or birch-bark tar, providing evidence for the use of the vessels and the diet and commodities that were available to prehistoric groups in the area (*cf* Copley *et al* 2003; 2004).

6.3.16 Once all of the analyses have been completed, the pottery database would need to be updated in the line with the final stratigraphic narratives produced for each respective site that produced prehistoric pottery. Following this, a report would be produced, with the results being integrated into the final publication. The report would describe and discuss the pottery in detail, and the methods and results utilised during the complementary analyses, from which a synthesised publication text could be produced, focusing on the types of pottery present, its chronological development in relation to regional and national ceramic series, its manufacture and use, and depositional practices, in relation to the local, regional, and wider datasets.

6.3.17 ***Roman and post-Roman pottery (RQs 13, 15, 17, 22, and 23):*** the pottery database relating to the Roman and post-Roman pottery should be updated, in line with the revised stratigraphic narratives for each site, after which the types/quantities from respective features can be scrutinised in greater depth. The analysis would also comprise some limited examination of the fabrics associated with the post-medieval dark-glazed material. A small selection of the Roman and post-Roman pottery would also require illustration (including a maximum of 15 items) through a combination of line drawing and photography, and a catalogue of these illustrated sherds would be compiled. Ultimately, a report will be produced, with the details being extrapolated for publication.

6.3.18 ***Fired clay and ceramic building material (RQs 11, 13, and 20):*** the possible pieces of daub/waster identified within the fired-clay assemblage, and the small items classified as ceramic building material, would be fully recorded and examined in more detail, and a detailed catalogue compiled by stratigraphic provenance. This may allow further insights into the character of activity at the prehistoric and early historic sites on the bypass. The results should then be presented in a specialist report and be extrapolated for publication.

6.3.19 ***Worked wood (RQs 6, 11, and 18):*** several of the timbers should be illustrated through a combination of photography and line drawings. Specifically, these should be eight timbers from (24500, 24502, 24506, 24507, 24509, and 24510-24512) from Burnt Mound 18; four (24513, 24514, 24518, and 24519) from Burnt Mound 20; two (18225 and 18229) from Burnt Mound 23; and one timber (27142) from Burnt Mound 22. Some additional research will also be required, as part of a comparative study, with those recorded at other excavated burnt mound sites in north-west Wales, and further afield. The illustrations and comparative study would then be integrated with data compiled during the assessment, and presented in a specialist report, from which text suitable for publication could be extracted.

6.3.20 ***Other finds (RQs 16, 17, and 23):*** most of the other finds from the sites require no further work, these being clay tobacco pipes; glass; silver and copper-alloy coins; copper-alloy and iron objects and nails; and the lead musket ball. In all instances, however, archival catalogues should be completed for each item and short specialist reports should then be prepared on each artefact category, and, as appropriate, could be extrapolated for publication. However, the incomplete lead bangle (*Section 3.10.8*) should be fully recorded to aid comparative analysis. This item, together with a Roman copper-alloy brooch fragment (*Section 3.10.4*), should also be illustrated for the proposed publication.

6.3.21 ***Cremated human remains (RQs 20 and 21):*** detailed analysis of the 12 unurned and single urned cremated bone deposits should be undertaken. This will include investigating the absence of some of the 4-2mm and 2-0.5mm sieve fractions; fully sorting all of the unsorted 4-2mm fractions; resieving and separating the mixed, >10mm and 10-4mm fractions; and estimating the bone content within the unsorted 2-0.5mm residues. Furthermore, the field and environmental processing records should be reviewed in order to confirm the suspected extent of truncation, deposit, and feature descriptions (*ie* soil colour, evidence of *in situ* burning, pit size/shape), and quantifications of charcoal/other pyre debris in order to explore further the nature of the deposits. The results from this analysis would be detailed within a specialist report. These results could then be extrapolated for publication and discussed in the context of Bronze Age burial practices across north-west Wales and further afield.

6.3.22 ***Animal bone (RQ 20):*** in order to examine the taphonomic factors operating along the bypass, which have influenced the survival of animal bone (*Section 5.3.4*), the assemblage will be fully recorded by context. The animal bone database will then be updated, and the results incorporated with those derived from the assessment, within a data report, which can be extrapolated for publication.

6.3.23 ***Pollen and geoarchaeology (RQs 2, 6, 7, and 17):*** analysis of core BH-4.2 should be undertaken because of its clear potential for providing data for palaeoenvironmental reconstruction (*Section 5.3.5*). This would comprise sub-sampling at *c* 0.04m intervals over 2m, resulting in a maximum of 46-50 samples, though fewer may be collected from intervals with lower pollen levels. In total, 24 samples were assessed, and therefore analysis will require the processing of a further 24 samples. Further dating of 'pollen events' would also be necessary. Although six radiocarbon dates have already been obtained from sub-samples collected at depths 0.12–0.11m, 0.25-0.24m, and 1.79-1.78m (*Section 4.4.9*), a pair of dates (on the humin and humic fractions) from 0.80-0.72m would also be required *(Appendix A.5*), as this part of the depositional sequence seems to reflect the point when the possible lacustrine palaeoenvironment was infilled and the area vegetated with woodland.

6.3.24 In relation to the other pollen sites, given their potential (*Section 5.3.7*), the monoliths from the Goat Roundabout should also be analyed. In total, seven of the eight sub-samples assessed contain sufficient pollen for such an analysis, and therefore three further sub-samples should be extracted to provide complementary data (from sample ***17505*** at depths of 0.12m, 0.20m and 0.28m). The layered deposit (***18233***) from Site 29 (*Section 5.3.6*) should also be analysed. This sequence has already been sub-sampled and assessed at 0.04m intervals, so no new processing will be required.

6.3.25 The specific methods employed in processing and sample preparation, and examination and recording, would follow those used in the assessment (*Sections 4.4.7 and 4.4.8*). As part of the analysis, pollen diagrams will also be prepared.

6.3.26 The analysis of pollen core BH-4.2, from the lake/wetland at Caerlan Tibot, should be complemented by two additional studies. One would comprise a lithological study of the borehole data from the transects across the former lake/wetland area (*Section 5.3.5*), which would entail detailed analysis of the borehole logs and the creation of an illustrated lithological cross-section of lake/wetland, using the computer programme Rockworks, which would then assist in interpretation and presentation of the depositional sequence.

6.3.27 The second complementary study would comprise an analysis of the diatoms identified in specific parts of core BH-4.2 (*Section 5.3.8*), which could provide additional palaeoenvironmental data relevant to the development of this wetland environment. Such a study would focus on ten samples extracted from sub-sample areas of 0.56-0.24m (eight samples) and 0.16-0.08m (two samples). Processing of the diatom samples, counting, and species identification would follow standard methodologies and taxonomic publications (*cf* Battarbee *et al* 2001; Krammer and Lange-Bertalot 1986; 1988; 1991a; 1991b).

6.3.28 Once the pollen analysis and two complementary studies (lithology and diatomns) were completed, the methodologies, results, and a discussion of the findings would be compiled within a specialist report, which could be synthesised for publication. This report will also include and discuss the results of those samples that have been assessed, but which have not been subjected to detailed analysis.

6.3.29 ***Plant remains and charcoal (RQs 6, 11-14, and 17-21):*** the 83 samples identified as containing suitable charred plant remains, from 14 sites, should be analysed (*Section 5.3.10*); however, these should not all be subjected to the same level of analysis, being split between full analysis, focusing on 29 samples identified as having the greatest variety and quantity of charred plant remains; and rapid analysis, considering 54 samples with less-rich assemblages, or samples which would form a complementary dataset for those features/deposits containing samples selected for full analysis. The samples earmarked for these two different levels of analysis are detailed in *Appendix A.4* and summarised in Table 31.

Landscape	Site	Full analysis	Rapid analysis	Total
1	1	5	7	***12***
2	3	3	4	***7***
	4	2	3	***5***
	5	10	4	***14***
	8	1		***1***
	10		3	***3***
3	11		1	***1***
	12		3	***3***
	15	1	3	***4***
	17		1	***1***
	19		1	***1***
5	27	4	23	***27***
	29	1	1	***2***
	30	2		***2***
Total		***29***	***54***	***83***

Table 31: The samples containing charred plant remains selected for full and rapid analysis, by landscape and site

6.3.30 Similarly, the 84 samples containing suitable charcoal should be analysed (*Section 5.3.14*). As with the plant remains (*Section 6.3.29*), this analysis should also adopt a two-tier approach, with full analysis focusing on the samples with the highest potential, and rapid analysis on those with more moderate potential, and those which derive from features/deposits containing samples selected for full analysis. Details of all these samples, and the modes of analysis, are contained in *Appendix A.4*, and summarised in Table 32.

Landscape	Site	Full analysis	Rapid analysis	Total
1	1	4	7	***11***
2	3	2		***2***
	4	3	2	***5***
	5	9	4	***13***
	7	3	1	***4***
	8		1	***1***
	10	2	1	***3***
3	11	1		***1***
	13	1		***1***
	15	4		***4***
	16	1		***1***
	17	1		***1***
	19	1		***1***
5	27	14	14	***28***
	29	3	3	***6***
	30	2		***2***
Total		***51***	***33***	***84***

Table 32: The samples containing charcoal selected for full and rapid analysis, by landscape and site

6.3.31 The methods employed during the analysis will follow the standard OA techniques, which adhere to accepted professional guidelines (Campbell *et al* 2011). Following analysis, the results would be presented in a specialist report and would also be integrated into the publication as appropriate. For the sake of completeness, this specialist report would also consider the results of the charred plant and charcoal data generated from the assessment, and reference would also be made to any comparative assemblages of charred plant remains and charcoal from other areas of north-west Wales, and, if pertinent, beyond this area.

6.3.32 ***Scientific dating (RQs 1-5):*** the 117 samples (112 plant macrofossils/charcoal; two timbers; one charred residue; and two sediment sample dates) identified as having potential for radiocarbon dating (*Sections 5.4.4 and 5.4.5; Appendix A.5*) should be submitted for radiocarbon assay, to refine or confirm the chronology of the excavated remains and specific categories of artefacts, and also assist in the analysis of the palaeoenvironmental data. In addition to these, it is also recommended that ten additional dates are factored into the dating programme, to address and resolve any chronological questions raised during analysis. This would therefore result in 127 samples being submitted for radiocarbon dating.

6.3.33 The samples would first need to be prepared, with those relating to charred plant remains and charcoal being selected and extracted from processed flot; samples being cut and extracted from the selected timbers; residue being extracted from the selected pottery sherd; and sediment samples being obtained from the pollen core. Once selected, the samples would be submitted to the radiocarbon laboratory where they would be dated by the AMS technique and calibrated using IntCal20 and OxCal v4.4 (Reimer *et al* 2020; *cf* Bronk Ramsey 2001; 2009).

6.3.34 Following dating, relevant uncalibrated dates will then be subjected to statistical testing to determine their consistency and, in turn to assist in the formulation of chronological hypotheses. This testing would utilise the non-Bayesian chi-square test of Ward and Wilson (1978), which can be used to determine whether duplicate dates are actually of the same age, and would be performed using the Combine function in OxCal v4.4. The uncalibrated radiocarbon dates, as well as the date derived from dendrochronology (*Section 4.6.6*), would also be subjected to chronological (Bayesian) modelling, which, again, will be undertaken using OxCal v4.4 (Bronk Ramsey 2009). This would be used to construct site-specific prior information models (*Section 5.4.7*) and a deposit model for the pollen core from the Caerlan Tibot former lake/wetland (*Section 5.4.8*). Following best practice (Bayliss and Marshall 2022), the calibrated and modelled results will be tabulated and depicted on a series of graphical outputs, with the results being interpreted and presented in a specialist report. The results would also be integrated into the stratigraphic narratives for each of the respective sites and extrapolated for publication.

6.3.35 ***Background research (RQs 5, 16, and 18--22):*** a targeted programme of background research is required to contextualise the remains of archaeological interest recovered by the project, particularly those dating to the prehistoric and early historic periods. A main element of this research will comprise consultation of the National Monuments Record of Wales (NMRW) and Historic Environment Record

(HER) for Gwynedd, together with any other appropriate and accessible sources, including local and university libraries, to locate and review pertinent research. This will include published and unpublished archaeological and palaeoenvironmental reports relating to comparable and contemporary sites, and also regional syntheses for the relevant periods. Such research will, therefore, be useful for furthering an understanding of all of the archaeology recorded by the project.

6.3.36 ***LiDAR data, aerial photographs, geophysics, and historical mapping (RQ 10):*** material held in national and local collections will be examined, explicitly focusing on the landscape surrounding the bypass and the excavated sites. This will include analysis of remotely sensed data and also any early historical mapping (*eg* early county maps, estate maps, enclosure maps/awards, tithe maps/awards, and First Edition OS mapping), which may enable further insights into the extent of the prehistoric and historic boundaries, enclosures, and settlements recorded by the project.

6.3.37 ***Integrated analysis:*** the integrated analysis will pull together each of the different threads of documentary research, finds and environmental analysis, radiocarbon dating, and stratigraphical and archival interrogation, to form a coherent whole that will allow the best possible understanding of landscape development along the bypass. Integrated analysis will contribute to virtually all of the updated research questions and will comprise three distinct elements.

6.3.38 The first element will entail assimilation of specialist information into stratigraphic records, to refine feature and structure groups, to identify and test key spatial and chronological relationships, and assign any refined chronological phases. Formation processes will also be examined, which may use data from the palaeoenvironmental and artefactual analyses. Overall, this will use all available data to establish the best possible scheme of phasing and enable the formulation of the final stratigraphical narratives and phased plans for each of the investigated sites. In addition, the project database and the GIS/WebMap (*Section 1.2.21*) will also require some revision, in line with the final stratigraphic interpretations.

6.3.39 The second element will analyse the integrated data derived from stratigraphic, artefactual, and palaeoenvironmental analyses**.** This will allow the sites to be placed more securely in their landscape and topographical settings, and also enable aspects of function, economy, trade, industry, status, and ritual to be explored. It will also enable a consideration of how each of the sites fitted into, and engaged with, wider social, political, economic and belief systems relevant to specific chronological periods.

6.3.40 The third element comprises comparative analysis of the data recovered from the project with that from other sites in the region, and further afield, as determined by the programme of background research (*Section 6.3.35*). This will, in turn, allow the excavated sites to be situated within their local and regional framework, and also within the prevailing cultural, economic, and social milieux that existed for relevant chronological periods. Moreover, as the archaeological remains recorded along the bypass cover an extended chronological period, comparative analysis might also provide a useful framework for explaining specific changes in the archaeological data.

6.4 Publication and Dissemination

6.4.1 One of the primary aims of the project is to make the results of the archaeological mitigation works available to the wider public (*Section 1.5.1*). It is recommended that the best way to achieve this is through 'layered' publication. Layered publications form an active element of OA's group-wide publication strategy (OA 2021c), and, in this instance, would entail the production of a monograph for publication, together with a digitally accessible archive report, containing specialist data.

6.4.2 ***Archive (specialist data) report:*** an archive report will be produced, containing the detailed data generated by the artefactual and palaeoenvironmental analyses, together with a preliminary section introducing the background to the project and summarising the stratigraphic remains. Apart from specialist text, as appropriate, this archive report will also include a series of illustrations, comprising photographs and drawings of artefacts (worked stone, pottery, and other artefacts), location maps/plans, as well as graphs, charts, and tables.

6.4.3 The production of this archive report is an essential element, as it provides a 'direct route' to the specialist data used to formulate the interpretations and summaries presented in the published monograph (*Section 6.4.5*). In terms of presentation, the report will follow a standard OA report format (Table 33).

1	**Introductory section:** setting out general background to the project, location of scheme and individual sites. This section would also direct the reader to the published monograph, which will contain more detailed interpretations and discussions of the results
2	**Stratigraphy:** summary of the stratigraphic remains
3	**Artefacts:** edited specialist artefact reports, generated by the analysis, including summaries of those artefact categories not subjected to detailed analysis. Supported by drawings and photographic images of selected artefacts, and, where appropriate, graphs/charts and tabular data
4	**Environmental and Osteological Evidence:** edited specialist palaeoenvironmental and osteological reports, generated by the analysis, including summaries of those elements not subjected to analysis. Supported by pertinent pollen diagrams, graphs/charts, tabular data, and, where appropriate, photographic images
5	**Radiocarbon dating:** details of the radiocarbon dates generated by the assessment and analysis, including the results of Bayesian modelling. Supported by tabular data, and figures plotting calibrated dates and posterior-density estimates
6	**Bibliography**
7	**Appendices:** containing supporting specialist data, primarily in tabular form

Table 33: Proposed contents of the archive (specialist data) report

6.4.4 Once compiled, all elements of the archive report will be edited for internal consistency and, following this, it will be quality assured. During the QA process, any corrections and copy-editing will be addressed. After internal sign-off, the archive report will be submitted to the Client, the archaeological consultants, and GAPS, for approval, and following this, it will be uploaded and made accessible through OA's Knowledge Hub, which is a dedicated platform allowing academics, researchers, and the general public access to OA's work and research. In addition, a copy of the report will form an element of, and be accessible through, the digital archive

(*Section 6.7.3*), with a hard copy also being lodged with the finds and paper archive (*Section 6.7.1*).

6.4.5 ***Publication (monograph):*** a publication should be produced, based on the results of the stratigraphical, artefactual, environmental, osteological, and integrated analyses. This publication should take the form of a well-illustrated monograph, synthesising the specialist information in an informed yet accessible manner, forming part of OA's well-received *Lancaster Imprints* series. Although the precise structure of the monograph and its size (number of words and illustrations) will necessarily be determined by the results of the proposed analysis (particularly following additional radiocarbon dating; *Section 6.3.32*), based on the assessment, its provisional content is presented in Table 34.

Chapter	Principal sections	Content	Words	Figs/ tables	Plates
PRELIMINARIES	CONTENTS		6,000		
	LIST OF ILLUSTRATIONS				
	ABBREVIATIONS				
	CONTRIBUTORS				
	SUMMARY				
	ACKNOWLEDGEMENTS				
	FOREWORD				
1. THE A487 CAERNARFON AND BONTNEWYDD BYPASS	THE ROUTE OF THE BYPASS	General illustrated overview of the project background, and the bypass location, route, and setting	11,000	12	10
	THE NATURAL LANDSCAPE	Illustrated overview of the landscape (topographical and geological) traversed by the bypass, with reference to the five identified landscape units			
	ARCHAEOLOGICAL INVESTIGATION	Illustrated discussion and details of the various stages involved in the archaeological investigations, specifically: desk-based assessment; non-intrusive (geophysical) survey; excavation; post-excavation assessment; and analysis. This section will also include details of the research aims of the project (linking these with the RFAW) and details of the methodologies employed during the post-excavation analyses			
	WIDER INVESTIGATION	An overview of other archaeological and palaeoenvironmental investigations undertaken across the wider region, pertinent to the results from the bypass			
	THE STRUCTURE OF THE VOLUME	Brief description of the contents of the monograph chapters and appendices			
	THE PROJECT ARCHIVE	Brief description of the various components of the project archive and details of where this has been deposited			

Chapter	Principal sections	Content	Words	Figs/ tables	Plates
2. LANDSCAPES 1 AND 2: THE AFRON CARROG TO THE AFON GWYRFAI	**INTRODUCTION**	Introductory section outlining the location of the landscape units, the known archaeological resource prior to the mitigation works, and scale/scope of the mitigation works across this area	15,000	15	15
	THE MESOLITHIC LANDSCAPE AND ACTIVITY ON THE BANKS OF THE GWYRFAI	Illustrated overview of the pollen evidence from the Goat Roundabout pollen site. Illustrated details of the Mesolithic stratigraphy and palaeochannel, lithics, palaeoenvironmental remains, and radiocarbon-dating evidence from Site 10, next to the Afon Gwyrfai			
	THE NEOLITHIC LANDSCAPE AND PIT DIGGING	Illustrated overview of the pollen evidence from the Goat Roundabout pollen site. Illustrated details of the Neolithic pits/post alignments at Site 4. Includes overviews of the Neolithic finds (pottery and lithics), palaeoenvironmental remains, and radiocarbon-dating evidence			
	BRONZE AGE BURNT MOUNDS	Illustrated details of Burnt Mounds 1 and 2 (Sites 7 and 9). Includes overviews of the finds (pottery and lithics), palaeoenvironmental remains, and radiocarbon-dating evidence			
	ROMANO-BRITISH SETTLEMENT AT MOROGORO	Illustrated details of the Romano-British settlement/buildings at Site 3, and the associated finds, and palaeoenvironmental and radiocarbon-dating evidence			
	AN EARLY MEDIEVAL SETTLEMENT AT MOROGORO	Illustrated details of the early medieval settlement at Site 5, and pits at Site 1 and the associated finds, and palaeoenvironmental and radiocarbon-dating evidence			
	POST-MEDIEVAL ACTIVITY	Illustrated details of the post-medieval boundaries and enclosures (at Sites 3,5, 6, and 8)			
3. LANDSCAPES 3 AND 4: THE AFON GWYRFAI TO THE AFON CADNANT	**INTRODUCTION**	Introductory section outlining the location of the landscape units, the known archaeological resource prior to the mitigation works, and scale/scope of the mitigation works across this area	15,000	15	15
	MESOLITHIC ACTIVITY	Illustrated details of the Mesolithic stratigraphy, lithics, palaeoenvironmental remains, and radiocarbon-dating evidence from Site 15			
	NEOLITHIC PIT DIGGING	Illustrated details of the Neolithic pits/post alignments at Sites 11 and 17. Includes overviews of the Neolithic finds (pottery and lithics), palaeoenvironmental remains, and radiocarbon-dating evidence. This section would also include details of the stone axe from Site 15			

Chapter	Principal sections	Content	Words	Figs/ tables	Plates
	Bronze Age Burnt Mounds	Illustrated details of Burnt Mounds 3-17 (Sites 13, 15, and 16), Structure 4 (Site 12), and pit (Site 19). Includes overviews of the finds (pottery and lithics), palaeoenvironmental remains, and radiocarbon-dating evidence			
	The Roman Road	Illustrated details of the Roman road at Site 25			
	Medieval and Post-Medieval Activity	Illustrated details of the medieval pits (Site 15) and post-medieval boundaries and enclosures (Sites 11-15 and 17-20), and associated artefacts			
4. LANDSCAPE 5. CAERLAN TIBOT AND THE AFON CADNANT	**Introduction**	Introductory section outlining the location of the landscape, the known archaeological resource prior to the mitigation works, and scale/scope of the mitigation works across this area	25,000	25	20
	The Early Landscape	Illustrated overview of the pollen, geoarchaeological, and radiocarbon-dating evidence from the Caerlan Tibot lake/wetland relevant to the development of the immediate post-Glacial landscape			
	A Mesolithic Encampment at Bethel Road	Illustrated details of the Mesolithic structures, pits, artefacts, and palaeoenvironmental and radiocarbon-dating evidence from Site 27, and pollen evidence from the Caerlan Tibot lake/wetland			
	Neolithic Domestic Occupation at Bethel Road	Illustrated details of the Neolithic structure at Site 27, and associated palaeoenvironmental and radiocarbon-dating evidence. Overview of the relevant pollen evidence from the Caerlan Tibot lake/wetland			
	A Late Neolithic/Chalcolithic Monument?	Illustrated details of the pits and possible timber/pit circle at Site 30, and associated palaeoenvironmental and radiocarbon-dating evidence			
	Bronze Age Burial and Burnt Mounds	Illustrated details of the cremation cemetery at Site 27, and associated artefactual, osteological, palaeoenvironmental, and radiocarbon-dating evidence. Illustrated details of Burnt Mounds 18-22 and the 'monumental' bank at Site 27, Burnt Mound 2 at Site 29, and associated artefactual, palaeoenvironmental, and radiocarbon-dating evidence. Overview of the relevant pollen evidence from the Caerlan Tibot lake/wetland			
	Iron Age and Romano-British Activity	Illustrated details of the Iron Age ditch surrounding Burnt Mound 23 and enclosures at Site 29, and the Romano-British pit at Site 27, and associated palaeoenvironmental, and radiocarbon-dating evidence. Details of the Roman brooch from Site 29 Overview of the pollen evidence from the Iron Age ditch at Site 29			

Chapter	Principal sections	Content	Words	Figs/ tables	Plates
	MEDIEVAL AND POST-MEDIEVAL ACTIVITY	Illustrated details of the medieval pits at Sites 27, 29, and 30, and associated palaeoenvironmental, and radiocarbon-dating evidence. Illustrated details of the post-medieval boundaries and enclosures across the landscape			
5. DISCUSSION	HUNTER-GATHERERS ON THE BYPASS	Synthesis and interpretation of the remains from prehistoric and early historic periods, with a discussion of how these relate to the archaeology from the region and the wider Irish Sea area	20,000	20	15
	CAERNARFON'S EARLIEST FARMERS				
	BRONZE AGE LANDSCAPES FOR THE LIVING AND DEAD				
	LATER PREHISTORIC COMMUNITIES AT CAERLAN TIBOT				
	IN THE HINTERLAND OF *SEGONTIUM*				
	EARLY MEDIEVAL SETTLEMENT				
	ENCLOSURE AND DIVISION	Synthesis of the evidence for later medieval and post-medieval agricultural activity and enclosure, which will also consider this in relation to historic mapping			
	PERSISTENT PLACES	Short discussion on the identification and significance of 'persistent places' (*eg* Site 27) that saw activity over many millennia			
	CONCLUSION	Concluding statement summarising the results and successes of the project			
BIBLIOGRAPHY			10,000		
INDEX					

Notes: The presently undated features on the bypass will be integrated into appropriate sections in the monograph following additional dating and stratigraphic analysis. The chapter structures, and word and illustration counts, may be subjected to revision following full analysis of the archaeological dataset.

Table 34: Draft publication synopsis

6.4.6 ***Preparation of publication draft:*** a draft of the monograph will be assembled. It is envisaged that the preliminaries, main text, and bibliography will be *c* 102,000 words (*c* 230 pages), supported by illustrations, comprising drawings (prepared in Adobe Illustrator) and photographs, tables to summarise data and, where appropriate, interpretative phase and reconstruction drawings. The complete, illustrated, text will be edited and then undergo quality assurance (QA) by the project executive, to check and ensure that it is complete, appropriate for the purpose intended, and academically legitimate. Any corrections arising from the QA will be addressed by the project manager/principal authors before the draft document is copy edited and signed-off by the project executive. Following sign-off, all components of the draft will be submitted to the Client, the archaeological consultants, and GAPS for review; all appropriate comments will be then incorporated and the finalised text will undergo QA, resulting in a revised draft.

6.4.7 ***Publication production:*** the approved text and illustrations will be typeset using standard desk-top publishing (DTP) packages. The typeset monograph will then be proofed and subjected to a final QA by the project executive. Any further issues arising from the final QA will be addressed and the document will then undergo final proofing, page cross-referencing, and indexing.

6.4.8 ***Print and digital publication:*** it is envisaged that the typeset publication will be available in dual formats: as a printed copy, available to libraries and those interested individuals who favour a traditional publication format; and replicated as a digital publication, which will be freely available to all through OA's Knowledge Hub (along with the supporting archive (specialist data) report; *Section 6.4.4*), forming an element of the digital archive (*Section 6.7.3*). This approach will, therefore, allow for maximum accessibility to the information gained through the archaeological analysis, and access to a digital version will probably increase demand for the printed copy.

6.4.9 For the physical monograph, a high-quality PDF of the typeset volume will be submitted to the printers, which, following checking of the printer's proofs will then be printed for publication. It is recommended that 200 copies of the monograph should be printed, a small proportion of these being sent to the contributors to the publication, the Client, and GAPS, whilst the remaining copies will be available for purchase. For the digital version, an interactive PDF of the typeset monograph will be produced suitable for uploading to OA's Knowledge Hub and the other digital repositories. This version will also undergo some adjustments and reformatting to make it suitable for web interactivity and downloading.

6.5 Management of Digital Data

6.5.1 The digital data captured during the fieldwork and generated during the assessment are managed and stored within the environment of OA's digital systems. These are administered via OA's Digital Data Management Plan (DDMP; OA forthcoming), which operates in accordance with standard guidelines (Historic England 2015c; Historic England and Dig Ventures 2019; ADS/Digital Antiquity 2023). These digital datasets are not, however, complete and will be updated and augmented during the analysis and publication phase of the project.

6.5.2 With completion of the analysis and publication, all curated and resultant data will constitute the final digital archive, which will be reviewed, checked, and updated prior to digital deposition (*Section 6.6.3*). This process will check that the data have been correctly curated and that version control is in line with OA's DDMP. In relation to version control, it is recommended that only the final version of born-digital elements will be selected for digital deposition, specifically: final reports (PDF files); database outputs/spreadsheets (CSV files); images (JPEG and TIFF files); video (MP4 files); GIS data (SHP files, and SHX and DBF and other associated files), and scientific data (*eg* OxCAL files). Any digital elements not selected for deposition (*such as* duplicate and superseded data or confidential business data and documentation) will be retained by OA for a minimum of three years following the completion of the project, at which point it will be reviewed and deleted as necessary, in line with the OA DDMP. Information will be held and discarded in accordance with good business practice and GDPR guidelines.

6.6 Archive Preparation and Deposition

6.6.1 ***Finds and paper (material) archive:*** the finds and paper archive generated by the project will be deposited at the Storiel, Gwynedd Museum and Art Gallery, Bangor, which has been approached and has agreed to receive these materials. Prior to deposition these will be properly ordered and indexed to professional standards, in accordance with the CIfA (2020e) and other standard guidelines (Brown 2011; Historic England 2015a; Walker 1990).

6.6.2 It is estimated that 20 boxes of material will be submitted for deposition. These will comprise standard-size, acid-free cardboard archive boxes, which will mainly contain artefacts, but there will also be some palaeoenvironmental and osteological materials, and original fieldwork records. In addition, the preserved timbers that are currently at YA would also be submitted to the museum. Whilst the landowners will be offered finds recovered from their properties, it is expected that most, if not all, of the artefacts, as well as the paper records, will be deposited, along with a hardcopy of the monograph if required. In relation to the osteological materials (human remains), these are currently held under a Ministry of Justice licence (number: 19-0168), which stipulates that they should be deposited at the Storiel no later than 4 July 2024. Given that analysis and archive deposition will continue beyond this date (*Section 7.2.1*), an extension to this licence will be submitted at the start of the analysis phase of works.

6.6.3 ***Digital archive:*** the digital archive generated by the project (*Section 6.5.2*) will be deposited with either the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) or the Archaeology Data Service (ADS), depending on the preferences of the Client. Both depositories have adopted similar requirements for digital deposition and accept similar digital file formats, though each has slightly different metadata requirements and templates (ADS 2022; RCAHMW 2013).

6.6.4 The digital archive currently comprises *c* 186GB of data (*c* 28,520 files), though this will undoubtedly grow following analysis and final auditing of the datasets. Prior to digital deposition, collection-level metadata will be compiled, to allow for the issuing of a DOI (Digital Object Identifier) for the project dataset, providing it with a permanent web address (URL). Metadata will also be compiled for specific elements of the digital archive (*eg* digital images, database outputs *etc*), in line with the digital metadata templates supplied by the RCAHMW/ADS, which allow for files, and the data they contain, to be captioned and spatially located. This metadata also provides details of the date the at which data was created, the software (and version) used to create it, as well as details of the organization that holds the copyright for it. The digital files/metadata will also be organised in logical categories (the file structure; *eg* by site/element), which is replicated on the digital repositories website, allowing for easy access to the dataset, and also allying this with how the archaeological data have been presented in the publication. All data and metadata will also be reviewed and checked by the Project Manager prior to final deposition.

6.6.5 In addition, OA will ensure that the final project database (*Section 1.2.21*), updated during the analysis, will be publicly accessible. This will enable researchers access to the primary project data, which have been used to formulate interpretative arguments within the publication, and allow them to search, query, and download specific elements of the project dataset. In order to achieve this, a mirrored (and locked) version of the database will be available through a dedicated web address set up by OA.

6.7 Retention and Disposal of Finds and Environmental Evidence

6.7.1 The material archive presently contains a range of materials that are of academic value (*Section 5*), and which could potentially be used for more detailed, or newly devised, analyses in the future. Thus, provisionally, and notwithstanding the results of analysis, it is considered that the following materials would be retained for submission as part of the finds and paper archive:

- Prehistoric lithics and worked stone artefacts;
- Prehistoric, Roman, medieval, and stratified post-medieval pottery;
- Stratified fired clay and small fragments of CBM (if deemed to be early in date);
- Stratified clay tobacco pipes;
- Metalwork (coins, copper-alloy Roman brooch; lead bangle and musket ball; post-medieval purse edge; and iron nails from Site 3);
- Cremated human bone;
- Preserved worked wood from the burnt mounds;
- Palaeoenvironmental flots with potential for analysis and/or radiocarbon dating.

6.7.2 There are various materials that have no real potential for analysis (*Section 5*). In accordance with the requirements of the designated repository (*Section 6.6.1*), it is likely that the following material will not be retained for deposition with the project archive, and will be discarded following cataloguing (and photographing), and the completion of the publication:

- Post-medieval/modern finds (tiles and bricks; glass; modern iron objects and nails);
- Post-medieval animal bone;
- Palaeoenvironmental flots with no potential for analysis or radiocarbon dating.

6.8 Ownership

6.8.1 OA will retain copyright of all reports and the documentary and digital archive produced in this project.

7 Text Resources and Programming

7.1 Project Team Structure

7.1.1 The project team is set out in Table 35.

Team member	Organisation	Role
Fraser Brown (FB), BA (Hons)	OA	*Regional Manager:* project monitoring and quality assurance; radiocarbon modelling
Rachel Newman (RMN), BA (Hons), FSA	OA	*OA North Senior Executive Officer: Research and Publications:* quality assurance and academic leadership
Richard A Gregory (RAG), BA (Hons), PhD	OA	*Post-excavation Project Manager:* project organisation and budget management; liaison; preparation of management documents; editing of specialist reports; and authoring and editing of publication text
Charlotte Howsam (CH), BA (Hons), PhD	OA	*Post-excavation Project Officer:* stratigraphic analysis; GIS manipulation and updating of database; examination of LiDAR and historical mapping; and background research; analysis of integrated data; and comparative analysis
Antony Dickson (AD), BA (Hons)	OA	*Project Officer:* stratigraphic analysis; GIS manipulation and updating of database; lithic reporting; background research; analysis of integrated data; and comparative analysis
Mik Markham, PhD (MM)	External Specialist	Petrological and geochemical analysis
Adam Tinsley (AT), BA, PhD	OA	*Prehistoric pottery specialist:* analysis of the prehistoric pottery and reporting
Patrick Quinn (PQ), BSc, PhD	Institute of Archaeology, UCL	*Ceramic petrology specialist:* petrographic analysis of prehistoric pottery and reporting
Oliver Craig (OC), BSc, PhD	BioArch, University of York	*Organic residue specialist*: organic/reside analysis of prehistoric pottery and reporting
Adam Parsons (AP), BA (Hons)	OA	*Project Officer, Illustrator:* compilation of site drawings and artefact illustration for publication; DTP
Marie Rowland (MER), BA (Hons), MA	OA	*Project Officer, Illustrator:* compilation of site drawings and artefact illustration for publication; DTP; indexing
Christine Howard-Davis (CHD), BA (Hons)	Independent External Specialist	Cataloguing of Roman and post-Roman pottery; updating of the database; analysis of post-medieval pottery fabrics; analysis of selected artefacts; reporting
Karen Barker (KB), BSc (Hons)	OA	*Finds, Archives and Environmental Officer:* analysis and reporting of fired clay and ceramic building material; artefact and conservation advice; administration of the finds; oversight of archiving; contacting landowners; discard policy
Steve J Allen (SJA), BA, MA	York Archaeology	*Specialist wood technologist:* comparative wood study
Helen Webb (LM), BSc (Hons), MSc	OA	*Project Officer, Human Remains:* osteological advice, academic leadership and analysis; osteological archive reports, compilation of osteological data and reporting
Ian Smith (IS), BA (Hons), MSc	OA	*Project Officer, Animal bone:* advice, academic leadership and analysis (animal bone); compilation of animal bone data and reporting

Team member	Organisation	Role
Roderick Bale (RB) BSc, PhD	Environmental Archaeology Laboratory, Lampeter Campus, University of Wales Trinity Saint David	Pollen sample processing
Maria Rabbani (MRi), BSc, MSc, PhD	OA	*Project Officer, Palaeoenvironmental:* palaeoenvironmental analysis (pollen and lithology); preparation of pollen samples; compilation of pollen/geoarchaeological data and reporting
Nigel Cameron, BSc, PhD	Independent External Specialist	*Diatom specialist:* diatom analysis and reporting
Denise Druce (DD), BA (Hons), PhD	OA	*Project Officer, Palaeoenvironmental:* palaeoenvironmental advice, academic leadership and analysis of charred plant remains and charcoal; compilation of plant remains and charcoal data and reporting
Ian Tyers (IT), BA (Hons), PhD	Independent External Specialist	*Dendrochronology specialist:* extraction of timber samples for radiocarbon dating and interpretation of the results
SUERC	External Specialist	Radiocarbon assay
TBC	OA	*Geomatics Project Officer:* GIS manipulation and updating of Webmap
Lucian Pricop (LP)	OA	*Senior Web Developer*: update and maintenance of Project Database
TBC	OA	*IT Project Officer*: review and update of digital archive
TBC	OA	*Supervisor:* preparation of the finds and paper archive, and digital archive and metadata

Table 35: The project team

7.2 Task List and Programme

7.2.1 The programme of post-excavation work will take **39 months**. It will commence after consultation and agreement with the client but is expected to begin in **February 2024** and end with submission of the publication to the printers and the deposition of the archive in **April 2027**. This timetable also assumes a two-month period for the external review of the draft publication, prior to its final production.

7.2.2 A task list is presented below (Table 36). A programme is appended at the end of the report.

Task no	Description	Performed by	Days/Quantities per unit
1. Management and administration			
1.1	Project management, liaison and review, including briefings, meetings and ongoing quality assurance	RAG	50
		Specialists	2
1.2	Post-excavation monitoring/QA	FB/RMN	2
1.3	Finds administration	KB	5
1.4	Palaeoenvironmental administration	DD	5
2. Stratigraphic analysis			
2.1	Stratigraphic analysis	CH/AD	35
3. Artefacts			
3.1	***Lithics and worked stone:*** analysis, additional description, and cataloguing, and updating of lithic database	AD	12
3.2	***Stone axe:*** petrological and geochemical analysis	MM	1 item
3.3	***Lithics and worked stone:*** illustration of 23 items	AP	15
3.4	***Lithics and worked stone:*** research into local/regional comparanda, and production of integrated lithic/worked stone specialist report and publication text	AD	5
3.5	***Prehistoric pottery:*** analysis, additional description, cataloguing, and updating of pottery database. Production of catalogue of illustrated sherds	AT	10
3.6	***Prehistoric pottery:*** petrographic analysis	PQ	9 samples
3.7	***Prehistoric pottery:*** organic residue analysis	OC	19 samples
3.8	***Prehistoric pottery:*** research into local/regional comparanda, and production of integrated pottery specialist report and publication text	AT	10
3.9	***Prehistoric pottery:*** illustration of max 30 sherds/vessels	AP/MR	12
3.10	***Roman and post-Roman pottery:*** additional description, cataloguing, and updating the pottery database following additional stratigraphic analysis. Limited analysis of post-medieval fabrics. Production of catalogue of illustrated sherds, pottery specialist report, and publication text	CHD	10
3.11	***Roman and post-Roman pottery:*** illustration of max 15 sherds/vessels	AP/MR	4
3.12	***Fired clay and ceramic building material:*** detailed cataloguing, analysis, specialist report, and publication text	KB	5
3.13	***Worked wood:*** illustration/photography of 15 conserved timbers, comparative study, specialist report, and publication text	SJA	8
3.14	***Other finds:*** preparation of archival catalogues and recording, comparative analysis of the lead bangle, specialist report, and publication text	KB	5
3.15	***Other finds:*** illustration of lead bangle and copper-alloy brooch fragment	AP/MR	2
4. Osteological and palaeoenvironmental data			
4.1	***Cremated human remains:*** additional recording, analysis, comparative research, specialist report, and publication text	HW	15
4.2	***Animal bone:*** recording bone by context group, taphonomic analysis, updating database, specialist report, and publication text	IS	5
4.3	***Pollen and geoarchaeology:*** processing of recommended pollen sub-samples	RB	27 sub-samples
4.4	***Pollen and geoarchaeology:*** sub-sampling, analysis, and preparation of pollen diagrams	MRi	51

Task no	Description	Performed by	Days/Quantities per unit
4.5	***Pollen and geoarchaeology:*** lithological analysis and production of lithological cross-section	MRi	2
4.6	***Pollen and geoarchaeology:*** diatom analysis	NC	10 samples
4.7	***Pollen and geoarchaeology:*** integrated specialist report and publication text	MRi	15
4.8	***Charred plant remains:*** detailed analysis (29 samples) and rapid analysis (54 samples) of charred plant remains, comparative analysis, specialist report, and publication text	DD	53
4.9	***Charcoal:*** detailed analysis (51 samples) and rapid analysis (33 samples) of charcoal, comparative analysis, specialist report, and publication text	DD	55
5.	**Radiocarbon dating**		
5.1	Select, extract, prepare, and submit charred plant remains and charcoal samples to the radiocarbon laboratory	DD	10
5.2	Extract, prepare, and submit wood samples to the radiocarbon laboratory, and interpretation of the results	IT	1
5.3	Extract, prepare, and submit reside sample to the radiocarbon laboratory	OC	0.5
5.4	Select, extract, prepare, and submit sediment samples to the radiocarbon laboratory	MR	0.5
5.5	AMS Radiocarbon dating	SUERC	127 samples
5.6	Statistical testing and radiocarbon modelling	RAG/FB	5
5.7	Interpretation of radiocarbon results, specialist report, and publication text	RAG/FB	5
5.8	Integration the radiocarbon results into project database, stratigraphic text, and updating of phasing	CH/AD	10
6.	**Research and integrated analysis**		
6.1	Background research	CH/AD	6
6.2	Examination of LiDAR, geophysical survey, aerial photographs, and historical mapping	CH	6
6.3	Assimilation of specialist information with stratigraphic records and revision/updating of stratigraphic database and GIS/WebMap	CH/AD	10
		Geomatician	10
		LP	2
6.4	Analysis of integrated data	CH/AD	6
6.5	Comparative analysis	CH/AD	6
7.	**Archive (specialist data) report**		
7.1	Edit and compile specialist reports	RAG	20
7.2	Prepare illustrations	AP/MR	10
7.3	QA text, plates and illustrations	RMN	3
7.4	Copy editing	KB	5
8.	**Publication (monograph): preparation of draft publication**		
8.1	Prepare text and plates for publication	RAG	65
8.2	Prepare illustrations for publication	AP/MR	30
8.3	Edit and QA publication text, plates and illustrations	RMN	10
8.4	Copy editing	KB	10
8.5	Submit publication text, plates and illustrations to the Client, archaeological consultants, and GAPS for review	AP/MR	0.25
8.6	Incorporate review comments	RAG	5
8.7	QA revised draft	RMN	5
9.	**Publication (monograph): production**		
9.1	Typeset draft monograph and design covers and preliminaries	AP/MER	20

Task no	Description	Performed by	Days/Quantities per unit
9.2	QA and proof typeset monograph	RMN	10
9.3	Corrections to typeset monograph	AP/MR	5
		RAG	2
9.4	Final proof	RMN	2
9.5	Final proof corrections	AP/MR	2
9.6	Produce index and page referencing	MR	5
9.7	Sign-off QA	RMN	1
9.8	Produce high-quality PDF and submit to printers	AP/MR	1
9.9	Check printer's first and final proofs	RMN	1
		AP/MR	1
9.10	Print and bind 200 copies	Printers	Printer's Costs
9.11	Produce and format lower-resolution PDF for digital publication and upload to Knowledge Hub	AP/MR	2
10. Management of Digital Data			
10.1	Review, check and update digital archive	Supervisor	10
		IT Technician	5
		RAG	2
11. Archive Preparation and Deposition (material archive)			
11.1	Preparation of primary fieldwork records, and artefactual, palaeoenvironmental, and osteological archive, including appropriate storage and packaging for recipient museum and discard those finds unsuitable for retention	Supervisor	10
		KB	3
11.2	Contact landowners	KB	1
11.3	Transport and submit finds and paper archive to museum (*c* 20 boxes and preserved timbers)	KB	2
		Supervisor	2
			Museum Box Charge
12. Archive Preparation and Deposition (digital archive)			
12.1	Prepare collection level metadata and metadata for individual elements of the digital archive	Supervisor	20
		RAG	5
12.2	Submit/upload digital archive to the digital repository	Supervisor	1
			Digital Repository Data Storage Charge
12.3	Creation of mirrored version of the project database and dedicated web address and upload digital elements of the archive/monograph to OA's Knowledge Hub	LP	5

Table 36: Task list

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Appendix A. Supporting Data

A.1 Worked Wood

Item	Entity/feature	Description
18225	Burnt Mound 23; trough ***18227***	Base plank of composite trough. Large slab of tangentially faced timber. Possible sapwood, but no bark present. Parent timber had spiraling grain. Possible traces of hollowing towards broader end on upper surface as found. Tapers towards one end due to erosion. All surfaces highly eroded with several eroded fissures along its length, some of which pass through the thickness of the timber. Part of narrower end detached but refitting. 3594mm length; 670mm width; 120mm thick. *Quercus* sp
18229	Burnt Mound 23; trough ***18201***	Timber fragment. Tangentially faced conversion, no bark or sapwood present. No working marks. All surfaces highly eroded. Tapers towards one end due to erosion. 823mm length; 117mm width; 47mm thick. *Quercus* sp
18230	Burnt Mound 23; trough ***18201***	Timber fragment from outer face of roundwood log. Tangentially faced slab from around stump of side branch. No bark or sapwood present. No working marks. All surfaces eroded. 402mm length; 133mm width; 20mm thick. *Quercus* sp
18231	Burnt Mound 23; trough ***18201***	Board fragment. Tangentially faced fragment, no bark or sapwood present. No working marks. Highly eroded surfaces. 367mm length; 52mm width; 16mm thick. *Quercus* sp
24500	Burnt Mound 18; trough ***27054***	Section of timber. Tangentially faced, near-halved conversion. No bark or sapwood present. No working marks. All surfaces and especially the upper edge eroded. Tapers towards one end due to erosion. 1334mm length; 162mm width; 94mm thickness. *Quercus* sp
24501	Burnt Mound 18; trough ***27054***	Board fragment. Tangentially faced conversion, no bark or sapwood present. No working marks. All surfaces and especially the upper edge heavily eroded. Some old surface damage on one face towards west end. 424mm length; 154mm width; 41mm thick. *Quercus* sp
24502	Burnt Mound 18; trough ***27054***	Board fragment. Radially faced conversion, no bark present, possible sapwood. No working marks. All surfaces and especially the upper edge highly eroded. 928mm length; 132mm width; 63mm thick. *Quercus* sp
24503	Burnt Mound 18; trough ***27054***	Board fragment. Tangentially faced conversion, no bark or sapwood present. No working marks. All surfaces highly eroded. Both ends broken away and missing. 253mm length; 67mm width; 18mm thick. *Quercus* sp
24504	Burnt Mound 18; trough ***27054***	Fragments, comprising 34 non-refitting items. All highly eroded. Largest piece 152mm length; 49mm width; 12mm thick. *Quercus* sp
24505	Burnt Mound 18; trough ***27054***	Wood fragments, comprising 14 non-refitting items. All highly eroded. Largest piece 99mm length; 19mm width; 5mm thick. *Salix* sp
24506	Burnt Mound 18; trough ***27054***	Board fragment. Tangentially faced conversion, no bark, possible sapwood present. No working marks. Eroded surfaces with both ends and most of one edge lost. 1044mm length; 214mm width; 37mm thick. *Quercus* sp
24507	Burnt Mound 18; trough ***27054***	Board fragment. Radially faced conversion, no bark or sapwood present. No working marks. One end appears to have been cut square to axis. Eroded surfaces with one end and most of one edge lost. 1069mm length; 191mm width; 24mm thick. *Quercus* sp
24508	Burnt Mound 18; trough ***27054***	Board fragment. Radially faced conversion, no bark or sapwood present. Eroded surfaces, both ends broken away and missing. Two non-refitting fragments. 147mm length; 39mm width; 16mm thick. *Alnus* sp

Item	Entity/feature	Description
24509	Burnt Mound 18; trough ***27054***	Board fragment. Radially faced conversion, no bark present, possible sapwood. Eroded surfaces. Both ends and both edges damaged by erosion. Degraded wood structure. In six refitting and three non-refitting sections. 1182mm length; 93mm width; 21mm thick. *Alnus* sp
24510	Burnt Mound 18; trough ***27054***	Board fragment. Radially faced conversion, no bark, possible sapwood present. Cut from irregular branch(?) wood. No working marks present. Eroded surfaces. Both ends lost to erosion. 893mm length; 110mm width; 58mm thick. *Quercus* sp
24511	Burnt Mound 18; trough ***27054***	Plank fragment. Radially faced conversion. No bark present, possible sapwood present. No working marks. Eroded surfaces. Both ends lost to erosion. 1064mm length; 140mm width; 51mm thick. *Quercus* sp
24512	Burnt Mound 18; trough ***27054***	Board fragment. Radially faced conversion, no bark present, possible sapwood present. No working marks. Eroded surfaces. Both ends lost to erosion. 902mm length; 89mm width; 41mm thick. *Quercus* sp
24513	Burnt Mound 20; trough ***27078***	Board fragment. Tangentially faced conversion, no bark or sapwood present. No working marks. Highly eroded surfaces. Both ends lost to erosion, degraded wood structure. In four partially refitting sections. 729mm length; 115mm width; 31mm thick. *Alnus* sp
24514	Burnt Mound 20; trough ***27078***	?Stave. Halved conversion, no bark present. Eroded tip with two opposing facets cut to create sub-rectangular cross-section. All surfaces eroded. Upper end attenuated through erosion. Degraded wood structure. In nine refitting and partially refitting sections. 1012mm length; 64mm width; 30mm thick. *Salix* sp
24515	Burnt Mound 20; trough ***27078***	?Board or stave. Tangentially faced, near quartered conversion, no bark present, possible sapwood present. No working marks. Eroded surfaces. One end lost to attenuation, other end broken away and missing. Degraded wood structure. In 11 refitting and three non-refitting sections. 1226mm length; 83mm width; 37mm thick. *Alnus* sp
24516	Burnt Mound 20; trough ***27078***	Timber fragment. Radially faced conversion, no bark or sapwood present. No working marks. Eroded surfaces with severe longitudinal fissuring due to drying damage whilst buried. Both ends broken away and missing. Degraded wood structure. 817mm length; 51mm width; 18mm thick. *Fraxinus excelsior* L
24517	Burnt Mound 20; trough ***27078***	Timber fragment. Tangentially faced conversion, no bark or sapwood present. No working marks. Eroded surfaces, both ends lost to erosion. Wood structure badly degraded. In nine partially refitting sections. 612mm length; 98mm width; 38mm thick. *Salix* sp
24518	Burnt Mound 20; trough ***27078***	Board fragment. Tangentially faced conversion, no bark present, sapwood present. No working marks. Eroded surfaces. Both ends and both edges lost to erosion. 817mm length; 102mm width; 24mm thick. *Quercus* sp
24519	Burnt Mound 20; trough ***27078***	Board fragment. Tangentially faced from outer slab of roundwood log. No bark present, sapwood present. No working marks. Eroded surfaces with multiple longitudinal fissures derived from partial drying whilst buried. Both ends lost to erosion. Narrower end detached but refitting. In four refitting sections. 1039mm length; 102mm width; 37mm thick. *Alnus* sp
24521	Burnt Mound 20; trough ***27078***	Timber fragment. Tangentially faced conversion, no bark or sapwood present. No working marks. All surfaces highly abraded with multiple longitudinal fissures from partial drying out whilst buried. Wood structure badly degraded. In two refitting sections. 336mm length; 45mm width; 34mm thick. *Fraxinus excelsior* L
27142	Burnt Mound 22; trough ***27139***	Base plank of composite trough. Large slab of tangentially faced timber. Possible sapwood, but no bark present. Tapers towards one end due to burial damage and presence of large stones in trough towards narrower end. All surfaces highly eroded with several eroded fissures along its length, occasionally passing through the thickness of the timber. 3728mm length; 638mm width; 104mm thick. *Quercus* sp

Table 37: Assessed structural timbers

A.2 Cremated Human Remains

Burial	Cremation deposit	Sample	Context summary	Truncation
27150	***20454/20455***	20111 and 20112	Unurned cremation deposit. Excavated in two spits: Upper spit (1): ***20455*** Lower spit (2): ***20454***	No truncation noted
27152	***20422/20423/20424***	20086	Unurned cremation deposit. Excavated in three spits: Upper spit (1): ***20422*** Middle spit (2): ***20423*** Lower spit (3): ***20424***	No truncation noted
27154	***27147***	Q1–Q40	Urned cremation deposit (from vessel 20479). Excavated in ten spits, each spit in quadrants (Q1–Q40)	Limited truncation/disturbance
27155	***27027***	20293, 20294, and 20295	Unurned cremation deposit. Excavated in three spits: Upper spit (1): sample no 20293 Middle spit (2): sample no 20294 Lower spit (3): sample no 20295	No truncation noted
27157	***24806/24807/24808***	20215, 20216, and 20217	Unurned cremation deposit. Excavated in three spits: Upper spit (1): ***24806*** Middle spit (2): ***24807*** Lower spit (3): ***24808***	No truncation noted
27158	***24734/24735/24736***	20190-20192	Unurned cremation deposit. Excavated in three spits: Upper spit (1): ***24736*** Middle spit (2): ***24735*** Lower spit (3): ***24734***	No truncation noted
27159	***24706/24707***	20177	Unurned cremation deposit. Excavated in two spits: Upper spit (1): ***24707*** Lower spit (2): ***24706***	No truncation noted
27160	***24697/24718/24723***	20172, 20183, and 20186	Unurned cremation deposit. Excavated in three spits: Upper spit (1): ***24697*** Middle spit (2): ***24718*** Lower spit (3): ***24723***	Some root action at north-western edge of feature
27162	***24641/24662***	20151 and 20155	Unurned cremation deposit. Excavated in two spits: Upper spit (1): ***24641*** Lower spit (2): ***24662***	Eastern edge of feature damaged by machine
27163	***24620/24621***	20144 and 20145	Unurned cremation deposit. Excavated in two spits: Upper spit (1): ***24620*** Lower spit (2): ***24621***	No truncation noted
27166	***24774***	20207	Unurned cremation deposit. Excavated as a single deposit	No truncation noted

Burial	Cremation deposit	Sample	Context summary	Truncation
27170	***24841***	20234	Unurned cremation deposit. Excavated as a single deposit. Possible evidence of *in-situ* burning in/around(?) pit	No truncation noted
27175	***24813***	20222	Unurned cremation deposit. Excavated as a single deposit	No truncation noted

Table 38: The burials and associated deposits/samples containing cremated human bone

Burial	Fractions present	Total weight (sorted fractions only)	Unsorted fractions	Provisional bone IDs	Potential for further bone ID?	Potential for age estimation?	Potential for sex estimation?	Notes/other osteological observations
27150	>10mm 10–4mm 4–2mm 2–0.5mm	18.9g	4–2mm 2–0.5mm	Long bone shafts, joint surface fragments	Y	N	N	Adult/adolescent remains?
27152	10–4mm 4–2mm	1.2g	-	Unidentified long bone	N	N	N	Bone from 20422 only. No bone from 20423/20424 No 2–0.5mm fraction ?Animal/human – too little bone to identify
27154	>10mm 10–4mm 4–2mm 2–0.5mm	722.9g	2–0.5mm	Long bone shafts (multiple identified), hand/foot bones, skull (various bones), articular facets, ribs, patellae, vertebrae, mandible/maxilla, innominate	Y	Y	Y	Possibly MNI 2 (adult + juvenile) Pathology: ?enthesophyte on a patella fragment
27155	>10mm 10–4mm 4–2mm 2–0.5mm	51.1g	4–2mm 2–0.5mm	Long bone (multiple identified), joint surface fragments, skull (inc. petrous, ?tooth fragments), mandible	Y	Y	Y	Adult/adolescent remains?
27157	10–4mm 4–2mm 2–0.5mm	2.9g	4–2mm 2–0.5mm	Unidentified long bone	N	N	N	?Animal/human – too little bone to identify

Burial	Fractions present	Total weight (sorted fractions only)	Unsorted fractions	Provisional bone IDs	Potential for further bone ID?	Potential for age estimation?	Potential for sex estimation?	Notes/other osteological observations
27158	>10/10–4mm (mixed) 4–2mm 2–0.5mm	68.7g	4–2mm 2–0.5mm	Skull, long bones (multiple identified), joint surface fragments	Y	Y	Y	Possibly MNI 2 (adult + older juvenile) Turquoise spot staining on one bone fragment (in context ***24736***)
27159	10–4mm 4–2mm 2–0.5mm	1.2g	4–2mm 2–0.5mm	Unidentified long bone	N	N	N	No bone from 24706 (bone from 24707 only) Animal/human – too little bone to identify
27160	>10/10–4mm (mixed) 4–2mm 2–0.5mm	96.8g	4–2mm 2–0.5mm	Long bone shafts (multiple identified), skull (?petrous)	Y	Y	Y	Adult/adolescent remains?
27162	>10/10–4mm (mixed) 4–2mm 2–0.5mm	43.2g	4–2mm 2–0.5mm	Long bone shafts, skull	Y	N	N	Adult/adolescent remains?
27163	10–4mm 4–2mm 2–0.5mm	1.3g	4–2mm 2–0.5mm	Unidentified long bone	N	N	N	Animal/human – too little bone to identify
27166	4–2mm 2–0.5mm	0.5g	2–0.5mm	None	N	N	N	?Animal/human – too little bone to identify
27170	10–4mm	0.2g	-	None	N	N	N	No 4–2mm, 2–0.5mm fraction ?Animal/human – too little bone to identify
27175	4–2mm	0.2g	-	None	N	N	N	No 2–0.5mm fraction ?Animal/human – too little bone to identify

Table 39: The osteological assessment of the cremated human remains

A.3 Pollen

Depth (m) BGL		0.07-0.08	0.15-0.16	0.23-0.24	0.31-0.32	0.39-0.40	0.47-0.48	0.55-0.56	0.63-0.64	0.71-0.72	0.79-0.80	0.87-0.88	0.95-0.96
Preservation		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Mixed
Potential		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	Possible
Trees/Shrubs													
Alnus	Alder	50	39	33	53	51	52	48	2			2	
Betula	Birch		1				1			13	2	4	
Quercus	Oak	4	6		2	3	5	3	1		1		
Corylus avellana-type	Hazel-type	11	18	26	31	31	22	24	26	27	1	4	
Empetrum	Crowberry											2	
Pinus	Pine					2		16	37	25		1	
Ulmus	Elm	?1		1				3	1				
Hedera	Ivy	1	2	1				1		1			
Calluna	Heather		1						1				
Lonicera-type	Honeysuckles	1			1			1		1	1		
Salix	Willow	1	1								6		
Sambucus	Elder										1		
Rosaceae	Rose family									1	2		
Tilia	Lime			1			1	1	1				
Crops													
Cerealia	Cereal-type	1											
Herbs													
Amaranthaceae/ Chenopodiaceae	Goosefoot family	1									1		
Artemisia	Mugworts										2	1	
Asteraceae	Daisy family										2	3	
Caltha-type	Marsh marigold										1		
Caryophyllaceae	Pinks family										1	1	
Cirsium-type	Thistles	1								1			
Cyperaceae	Sedges	6	1							9	15	3	2
Epilobium-type	Willowherbs											1	
Fabaceae	Pea family	1											

Depth (m) BGL		**0.07-0.08**	**0.15-0.16**	**0.23-0.24**	**0.31-0.32**	**0.39-0.40**	**0.47-0.48**	**0.55-0.56**	**0.63-0.64**	**0.71-0.72**	**0.79-0.80**	**0.87-0.88**	**0.95-0.96**
Preservation		**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Mixed**
Potential		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**Possible**
Filipendula	Meadowsweets	1	1						1	5	21	38	3
Lysimachia-type	Loosestrifes												
Mentha-type	Mints										1		
Plantago media/major	Hoary / greater plantain			1									
Poaceae	Grasses		2				1	1		9	14	26	9
Ranunculaceae	Buttercups										1	3	1
Rubiaceae	Bedstraws										2	2	
Rumex spp	Docks/Sorrels	1	1					1				1	2
Sedum-type	Stonecrops												
Succisa	Devil's Bit Scabious							1					
Taraxacum-type	Dandelion-type											1	1
Thalictrum-type	Meadow-rues										1		1
Valeriana-type	Valerians										1		
	Indeterminate herbs		1							8	8	5	
Fern spores													
Osmunda regalis	Royal fern											1	
Polypodium vulgare	Polypodies	1	12	17	17	15	6	11	5	3	1	2	
Pteridium aquilinum	Bracken	3	1					1	1				
Pteropsida	Monolete ferns	24	19	21	22	12	12	20	23	abt	4	3	
	Total land pollen	109	108	101	126	114	102	132	110	103	90	104	19
	Number of traverses	2	3	2	2	1	1	1	1	2	10	5	10
Lycopodium	Exotic	1	2	2	2	2	2	1	3	6	7	1	4
Aquatics													
Myriophyllum alterniflorum	Alternate water-milfoil										24	36	41

Depth (m) BGL		0.07-0.08	0.15-0.16	0.23-0.24	0.31-0.32	0.39-0.40	0.47-0.48	0.55-0.56	0.63-0.64	0.71-0.72	0.79-0.80	0.87-0.88	0.95-0.96
Preservation		**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Mixed**
Potential		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**Possible**
Myriophyllum spicatum	Spiked water-milfoil												3
Typha angustifolia	Lesser Bulrush					1				1	3	33	3
Typha latifolia	Bulrush									1	63	33	3
Green algae													
Botryococcus HdV-766											1		2
Pediastrum HdV-760												2	2
	TLP + Aquatic pollen +Green algae										181	208	73
Mosses													
Sphagnum	Moss spores									4	1		
Microscopic charcoal		2	2				1	3	6	34	5	8	2
NPP													
HdV-25											1		
HdV-128		2	1								21		1
Gelasinospora HdV-1												1	
Pediastrum HdV-760												2	2
Sordaria HdV-55A/B													1
Broken grains			1		1	2	1	1	3	2	3	5	
Concealed grains		5	4	7	4		6	2	5	12	4	12	3
Crumpled grains		3	3	4		1	1	1	3	2	6	7	2
Diatoms present		+	+	+		+	+	+	+	+		+	
Wood platelets					+								

Table 40: Pollen and non-pollen palynomorph counts from core BH-4.2 (0.07–0.96m BGL), Caerlan Tibot lake/wetland area

Depth (m) BGL		**1.03-1.04**	**1.11-1.12**	**1.19-1.20**	**1.27-1.28**	**1.35-1.36**	**1.43-1.44**	**1.51-1.52**	**1.59-1.60**	**1.66-1.67**	**1.75-1.76**	**1.83-1.84**	**1.91-1.92**
Preservation		**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**
Potential		**Possible**	**Possible**	**Possible**	**Possible**	**Possible**	**NO**	**Possible**	**NO**	**YES**	**Possible**	**YES**	**Possible**
Trees/Shrubs													
Abies?	Fir?												3
Alnus	Alder	10	3	2		1	1	1	1				1
Betula	Birch	5	2	1		1	3	1	1	1			2
Quercus	Oak	1	6	5	5	5	2	6	2	3	1		
Corylus avellana-type	Hazel-type	12	4	4	3	1	5	4	2	2		1	
Empetrum	Crowberry	1	1						1				
Fagus	Beech												
Pinus	Pine		1		1	1	1	2				3	5
Rosaceae	Rose family									1			
Ulmus	Elm		1	1									
Salix	Willow	1		2	5	2		2				2	2
Herbs													
Amaranthaceae/ Chenopodiaceae	Goosefoot family	1											1
Anagallis-type	Pimpernels								1				
Apiaceae	Carrot family							2					
Armeria maritima	Thrift											1	3
Artemisia	Mugworts		2	1	1				1		1	4	2
Asteraceae	Daisy family	2	1	1		1							
Caltha-type	Marsh marigold					7	5	1					
Caryophyllaceae	Pinks family		3	2	5	1	1	1	2	2		5	2
Cirsium-type	Thistles		1										
Cyperaceae	Sedges	1	5	2	3	2	1	2			48	11	3
Epilobium-type	Willowherbs							2					
Fabaceae	Pea family	1		2	1			2		1			
Filipendula	Meadowsweets	13	2	2	5	2	2	2	2				
Lysimachia-type	Loosestrifes												
Lotus-type	Bird's-foot-trefoils		1	3	4			2					

Depth (m) BGL		**1.03-1.04**	**1.11-1.12**	**1.19-1.20**	**1.27-1.28**	**1.35-1.36**	**1.43-1.44**	**1.51-1.52**	**1.59-1.60**	**1.66-1.67**	**1.75-1.76**	**1.83-1.84**	**1.91-1.92**
Preservation		**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**
Potential		**Possible**	**Possible**	**Possible**	**Possible**	**Possible**	**NO**	**Possible**	**NO**	**YES**	**Possible**	**YES**	**Possible**
Limonium vulgare-type	Sea lavenders												1
Plantago lanceolata	Ribwort plantain					1							
Poaceae	Grasses	7	5	1	11	3	1	5	3	2	4	2	
Potentilla-type	Cinquefoils		1										
Rosaceae	Rose family												
Ranunculaceae	Buttercups		4	2	24	8	5	6	3	6		4	1
Rubiaceae	Bedstraws										1		
Rumex spp	Docks/Sorrels			1		2	1	1				1	
Stellaria	Stitchworts											1	
Taraxacum-type	Dandelion-type	1						2	1	1		1	
Thalictrum	Meadow-rues	1		1								1	
	Indeterminate herbs	1		4	10	2	3	4	6	3		2	1
Fern spores													
Osmunda regalis	Royal fern												
Polypodium vulgare	Polypodies	2	2				1	1			1		1
Pteridium aquilinum	Bracken		1										
Pteropsida	Monolete ferns	4	2	2	4	1	3	2	1	3			1
	Total land pollen	64	48	39	83	41	35	51	27	25	56	39	29
	Number of traverses	4	10	10	10	10	10	10	10	10	10	10	10
Lycopodium	Exotic	4	3	4	5	4	5	6	4	4	1	28	18
Mosses													
Sphagnum	Moss spores		1										
Aquatics													
Menyanthes	Bogbean										1		

Depth (m) BGL		**1.03-1.04**	**1.11-1.12**	**1.19-1.20**	**1.27-1.28**	**1.35-1.36**	**1.43-1.44**	**1.51-1.52**	**1.59-1.60**	**1.66-1.67**	**1.75-1.76**	**1.83-1.84**	**1.91-1.92**
Preservation		**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**
Potential		**Possible**	**Possible**	**Possible**	**Possible**	**Possible**	**NO**	**Possible**	**NO**	**YES**	**Possible**	**YES**	**Possible**
Myriophyllum alterniflorum	Alternate water-milfoil	18	74	3	1			2				1	
Myriophyllum spicatum	Spiked water-milfoil	4	4	9	1							1	
Nymphaea alba	White water-lilies		1										
Typha angustifolia	Lesser Bulrush	13	1		2	1		8	1	1		5	
Typha latifolia	Bulrush	7	4		4	8	7	3	6	3	1	9	
Green algae													
Botryococcus HdV-766												65	5
Pediastrum HdV-760		1	5	2	3	1	3	5	4	2	1	15	16
	TLP + Aquatic pollen + Green algae	109	137	53	94	51	45	69	38	231	59	135	50
Microscopic charcoal		8	2	2	1	4	5	10	2	5	0	12	31
NPP													
HdV-128		1	1		1		1						
Glomus HdV-207					3			1	2			3	
Sordaria HdV-55A/B		1					1	1		1		2	
Spirogyra HdV-132						2	2			1			
Broken grains		1	3	2	2		3	1	1	1	1		
Concealed grains		6	5	4	5	16	13	17	7	12	4	6	15
Crumpled grains		3	6	4	4	2	3				2	1	
Diatoms present		+	++	+	++	+++	+	+	+	+			

Table 41: Pollen and non-pollen palynomorph counts from core BH-4.2 (1.03-1.92m BGL), Caerlan Tibot lake/wetland area

Monolith		**17505**				**17506**				**17527**			
Deposit		***17517***	***17516***	***17516***	***17515***	***17517***	***17517***	***17516***	***17516***	***17515***	***17515***	***17515***	***17513***
Preservation		**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Mixed**	**Good**	**Mixed**	**Good**	**Mixed**
Potential		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**
Depth (m)		**0.03–0.04**	**0.07–0.08**	**0.15–0.16**	**0.23–0.24**	**0.11–0.12**	**0.15–0.16**	**0.19–0.20**	**0.27–0.28**	**0.03–0.04**	**0.07–0.08**	**0.11–0.12**	**0.15–0.16**
Trees/Shrubs													
Alnus	Alder	66	27	30	45	65	35	30	3	31	25	10	
Betula	Birch	3	1	5		3			1	1	6		
Quercus	Oak	16	12	5	11	16	14	3	1	3	3		
Corylus avellana-type	Hazel-type	13	54	75	67	17	53	55	87	72	65	25	1
Juniperus	Juniper								1				
Pinus	Pine		1	1	1		3		11	2	1	4	
Ulmus	Elm	3	4	4	10	2	3	8	1	1	2	3	
Hedera	Ivy	1		2	1	1	2	1		2			
Calluna	Heather												
Lonicera-type	Honeysuckles	1		1	1								
Tilia	Lime		1				1					1	
Herbs													
Amaranthaceae/ Chenopodiaceae	Goosefoot family						1						
Artemisia	Mugworts			1				1				2	
Asteraceae	Daisy family		1		1							3	2
Caryophyllaceae	Pinks family						1					9	4
Cirsium-type	Thistles	1			1								
Cyperaceae	Sedges	1	2								2	9	
Epilobium-type	Willowherbs											2	2
Filipendula	Meadowsweets			1									
Hippocrepis-type	Horse-shoe vetch				1								
Plantago lanceolata	Ribwort plantain	1											

Monolith		**17505**				**17506**				**17527**			
Deposit		***17517***	***17516***	***17516***	***17515***	***17517***	***17517***	***17516***	***17516***	***17515***	***17515***	***17515***	***17513***
Preservation		**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Mixed**	**Good**	**Mixed**	**Good**	**Mixed**
Potential		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**
Depth (m)		**0.03–0.04**	**0.07–0.08**	**0.15–0.16**	**0.23–0.24**	**0.11–0.12**	**0.15–0.16**	**0.19–0.20**	**0.27–0.28**	**0.03–0.04**	**0.07–0.08**	**0.11–0.12**	**0.15–0.16**
Poaceae	Grasses	1	1					1	1		1	25	
Ranunculaceae	Buttercups	1											
Rubiaceae	Bedstraws			1									
Rumex spp.	Docks/Sorrels	1											
Stellaria-type	Stitchworts								1			1	
Succisa pratensis	Devil's Bit Scabious					1	1	1		1			
Taraxacum-type	Dandelion-type						1					6	
Thalictrum	Meadow-rues											1	1
	Indeterminate herbs					1	1						
	Total land pollen	109	104	125	139	106	116	100	107	114	105	101	18
	Number of traverses	1	2	1	1	1	3	1	2	1	2	10	10
Fern spores													
Huperzia selago	Clubmoss											4	3
Ophioglossum	Adder's-tongues												
Polypodium vulgare	Polypodies	3	3	10	13	13	44	25	2	20	12	14	3
Pteridium aquilinum	Bracken						1					1	
Pteropsida	Monolete ferns	15	3	6	11	75	36	3	53	14	35	34	2
Mosses													
Sphagnum	Moss spores			1									
Microscopic charcoal		-	-	-	+	+	+	+	-	+	-	+	+
Broken grains			4			1	5			1	3	2	1
Concealed grains		2	2	2			3	2	8	2	5	8	2

Monolith		17505				17506				17527			
Deposit		*17517*	*17516*	*17516*	*17515*	*17517*	*17517*	*17516*	*17516*	*17515*	*17515*	*17515*	*17513*
Preservation		Good	Good	Good	Good	Good	Good	Good	Mixed	Good	Mixed	Good	Mixed
Potential		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO
Depth (m)		0.03–0.04	0.07–0.08	0.15–0.16	0.23–0.24	0.11–0.12	0.15–0.16	0.19–0.20	0.27–0.28	0.03–0.04	0.07–0.08	0.11–0.12	0.15–0.16
Crumpled grains		5	8	2			6	5	1	3	4	16	1

Table 42: Pollen and non-pollen palynomorph counts from the Goat Roundabout pollen site

Site			**1**		**3**		**5**
Monolith			**17539**	**17539**	**17053**	**17064**	**16040**
Feature			**Pit *17550***	**Pit *17550***	**Floor *17097***	**Pit *17012***	**Destruction deposit *16024***
Context			***17552***	***17553***	***17097***	***17013***	***16051***
Preservation			**-**	**-**	**-**	**-**	**Mixed**
Potential			**NO**	**NO**	**NO**	**NO**	**Possible**
Depth (m)			**0.15–0.16**	**0.19–0.20**	**0.02–0.03**	**0.19–0.20**	**0.07–0.08**
Trees/Shrubs							
Alnus	Alder						1
Betula	Birch						3
Herbs							
Artemisia	Mugworts						
Asteraceae	Daisy family						6
Caryophyllaceae	Pinks family						1
Plantago lanceolata	Ribwort plantain						1
Poaceae	Grasses						34
Stellaria-type	Stitchworts				1		
Taraxacum-type	Dandelion-type		2				56
	Total land pollen		2	0	1	0	102
	Number of traverses		10	10	10	10	7
Fern spores							
Ophioglossum	Adder's-tongues						5
Microscopic charcoal					+	-	+
Broken grains							5
Concealed grains							1
Crumpled grains							6

Table 43: Pollen and non-pollen palynomorph counts from Sites 1, 3, and 5

Monolith		**19021**	**19022**	**19023**	**19024**	**19025**	**19026**	**19027**	**19028**	**19029**	**19030**
Preservation		**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**-**	**-**	**-**	**Mixed**	**-**
Potential		**Possible**	**NO**	**NO**	**NO**	**Possible**	**NO**	**NO**	**NO**	**NO**	**NO**
Series no./ Depth (m)		**19021**	**19022**	**19023**	**19024**	**19025**	**19026**	**19027**	**19028**	**19029**	**19030**
Trees/Shrubs											
Acer	Field-maple	1									
Alnus	Alder	2	1		1	2				2	
Betula	Birch	8								2	
Quercus	Oak	4	3	4	1	2				1	1
Corylus avellana-type	Hazel-type	16								1	1
Pinus	Pine				1	1					
Ulmus	Elm	1				1					
Hedera	Ivy				1						
Calluna	Heather					1				1	
Tilia	Lime				1						
Herbs											
Amaranthaceae/ Chenopodiaceae	Goosefoot family	1									
Artemisia	Mugworts										
Asteraceae	Daisy family		2	2	1	1					
Caltha-type	Marsh marigold										
Caryophyllaceae	Pinks family	1			1						
Centaurea nigra	Common knapweed		2								
Cirsium-type	Thistles										
Cyperaceae	Sedges	6		8	1						
Plantago lanceolata	Ribwort plantain	2				3					
Poaceae	Grasses	7	4	10	2	19				1	3
Ranunculaceae	Buttercups		1								

Monolith		**19021**	**19022**	**19023**	**19024**	**19025**	**19026**	**19027**	**19028**	**19029**	**19030**
Preservation		**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**-**	**-**	**-**	**Mixed**	**-**
Potential		**Possible**	**NO**	**NO**	**NO**	**Possible**	**NO**	**NO**	**NO**	**NO**	**NO**
Series no./ Depth (m)		**19021**	**19022**	**19023**	**19024**	**19025**	**19026**	**19027**	**19028**	**19029**	**19030**
Succisa pratensis	Devil's Bit Scabious	2			2	1					
Taraxacum-type	Dandelion-type	12	15	25	11	21	1			5	1
	Total land pollen	63	28	49	23	57	1	0	0	13	6
	Number of traverses	10	10	10	10	10	10	10	10	10	10
Fern spores											
Polypodium vulgare	Polypodies	4	4	3	10	5				4	1
Pteridium aquilinum	Bracken	3		1		1					
Pteropsida	Monolete ferns	6	1	5	3	11					
Mosses											
Sphagnum	Moss spores	1		1							
Microscopic charcoal		++	+	+	+	++	+	+	+	++	+
NPP											
HdV-121		1									
HdV-128					1						
Gelasinospora HdV-1					1						
Glomus HdV-207											1
Podospora HdV-368				1							
Sordaria HdV-55A/B		2	1	1		1					
Broken grains		1									
Concealed grains		8	5	2	4	2				4	
Crumpled grains		1	3	2	1	6					2

Table 44: Pollen and non-pollen palynomorph counts from buried soil ***19113****, Burnt Mound 1, Site 7*

Monolith		**26537**	**26537**	**26543**	**26543**	**26546**	**26546**	**26546**	**26550**	**26550**	**26553**	**26571**	**26575**
Context		***26552***	***26555***	***26576***	***26576***	***26501***	***26501***	***26565***	***26557***	***26563***	***26570***	***26551***	***26560***
Preservation		**Mixed**	**Mixed**	**Mixed**	**-**	**Mixed**	**-**	**-**	**-**	**-**	**-**	**Mixed**	**-**
Potential		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Depth (m)		**0.15–0.16**	**0.47–0.48**	**0.23–0.24**	**0.31–0.32**	**0.07–0.08**	**0.27–0.28**	**0.31–0.32**	**0.07–0.08**	**0.19–0.20**	**0.15–0.16**	**0.0–0.05**	**0.63–0.67**
Trees/Shrubs													
Alnus	Alder		1	1			1	1					
Quercus	Oak												
Corylus avellana-type	Hazel-type	2				2	1						
Pinus	Pine			1									
Calluna	Heather					?1							
Herbs													
Caryophyllaceae	Pinks family		1	1				1	1				
Centaurea nigra	Common knapweed			3			1						
Cyperaceae	Sedges	2	1	1									
Poaceae	Grasses	1	7	5		3						5	
Ranunculaceae	Buttercups					1							
Taraxacum-type	Dandelion-type		8	9		5						3	
	Total land pollen	9	18	22	0	12	3	2	1	0	0	8	0
	Number of traverses	10	10	10	10	10	10	10	10	10	10	10	10
Fern spores													
Polypodium vulgare	Polypodies	4	5	4				3	2			2	
Pteridium aquilinum	Bracken			1									
Pteropsida	Monolete ferns	19	7	10					1				
Mosses													
Sphagnum	Moss spores	4	6	3									

Monolith		26537	26537	26543	26543	26546	26546	26546	26550	26550	26553	26571	26575
Context		*26552*	*26555*	*26576*	*26576*	*26501*	*26501*	*26565*	*26557*	*26563*	*26570*	*26551*	*26560*
Preservation		Mixed	Mixed	Mixed	-	Mixed	-	-	-	-	-	Mixed	-
Potential		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Depth (m)		0.15–0.16	0.47–0.48	0.23–0.24	0.31–0.32	0.07–0.08	0.27–0.28	0.31–0.32	0.07–0.08	0.19–0.20	0.15–0.16	0.0–0.05	0.63–0.67
Microscopic charcoal		+	+	+				+				+	
NPP													
Botryococcus HdV-766				2									
Broken grains			3	1		2		1	2				
Concealed grains			6			3		1					
Crumpled grains						2							

Table 45: Pollen and non-pollen palynomorph counts from palaeochannel **26545**, *Site 10*

Monolith		26576	26577	26578	26588	26589	26591	26591
Context		*26567*	*26568*	*26569*	*26557*	*26563*	*26523*	*26584*
Preservation		-	-	-	-	-	-	-
Potential		NO	NO	NO	NO	NO	NO	NO
Depth (m)		0.67–0.70	0.70–0.73	0.73–0.78	0.40–0.45	0.45–0.48	0.23–0.24	0.35–0.36
Herbs								
Asteraceae	Daisy family			1				
Caryophyllaceae	Pinks family			1	1			
Poaceae	Grasses		3			1		
Taraxacum-type	Dandelion-type			1	2	1		
	Total land pollen	0	3	3	3	2	0	0
	Number of traverses	10	10	10	10	10	10	10
Fern spores								
Polypodium vulgare	Polypodies		1	1		1		4
Pteropsida	Monolete ferns					6		

Monolith		**26576**	**26577**	**26578**	**26588**	**26589**	**26591**	**26591**
Mosses								
Sphagnum	Moss spores		1		2			
Microscopic charcoal		-	-	-	-	-	-	-
Broken grains			2	2				
Concealed grains						5		
Crumpled grains							1	

Table 46: Pollen and non-pollen palynomorph counts from palaeochannel ***26545****, Site 10*

Site		**15**		**27**					**28**
Monolith		**26004**	**26004**	**20237**	**20237**	**20331**	**21255**	**21255**	**20056**
Feature/Type		**Burnt Mound 11**	**Burnt Mound 11**	**Pit 24654**	**Pit *24654***	**Buried soil *27195***	**Pit *20446***	**Pit *20446***	**Alluvium *27218***
Context		***26004***	***26004***	***24655***	***24655***	***27065***	***20445***	***20445***	***20332***
Preservation		**Mixed**	**Mixed**	**-**	**-**	**-**	**-**	**-**	**Mixed**
Potential		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Depth (m)		**0.15–0.16**	**0.23–0.24**	**0.03–0.04**	**0.07–0.08**	**0.15–0.16**	**0.27–0.28**	**0.31-0.32**	**0.19–0.20**
Trees/Shrubs									
Acer	Field-maple								
Alnus	Alder	1	1			1			1
Betula	Birch		1						
Quercus	Oak								1
Corylus avellana-type	Hazel-type	5	1						8
Herbs									
Caryophyllaceae	Pinks family								3
Cyperaceae	Sedges								1
Poaceae	Grasses	3	4						10
Stellaria-type	Stitchworts	1							
Succisa pratensis	Devil's Bit Scabious								1
Taraxacum-type	Dandelion-type	4	4						20

Site		**15**		**27**					**28**
Monolith		**26004**	**26004**	**20237**	**20237**	**20331**	**21255**	**21255**	**20056**
Feature/Type		**Burnt Mound 11**	**Burnt Mound 11**	**Pit 24654**	**Pit *24654***	**Buried soil *27195***	**Pit *20446***	**Pit *20446***	**Alluvium *27218***
Context		***26004***	***26004***	***24655***	***24655***	***27065***	***20445***	***20445***	***20332***
Preservation		**Mixed**	**Mixed**	**-**	**-**	**-**	**-**	**-**	**Mixed**
Potential		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Depth (m)		**0.15–0.16**	**0.23–0.24**	**0.03–0.04**	**0.07–0.08**	**0.15–0.16**	**0.27–0.28**	**0.31-0.32**	**0.19–0.20**
	Total land pollen	14	11		0	1	0	0	45
	Number of traverses	10	10		10	10	10	10	10
Fern spores									
Polypodium vulgare	Polypodies	11	17						4
Pteridium aquilinum	Bracken								1
Pteropsida	Monolete ferns	2	3						
Sphagnum	Moss spores	1							
Microscopic charcoal		+		+	+	+			+
Broken grains		1							
Concealed grains		3							

Table 47: Pollen and non-pollen palynomorph counts from Sites 15, 27, and 28

Sample/monolith		**18055**	**18062**	**18066**	**18100**						
Context		***18100***	***18180***	***18181***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***
Preservation		**Mixed**	**Mixed**	**Mixed**	**Good**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**
Potential		**Possible**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Depth (m)		**0.10–0.11**	**0.44–0.45**	**0.65–0.66**	**0.19–0.20**	**0.23–0.24**	**0.27–0.28**	**0.31–0.32**	**0.35–0.36**	**0.39–0.40**	**0.43–0.44**
Trees/Shrubs											
Alnus	Alder	1	1	10	16	16	25	38	44	40	54
Acer	Sycamore				?1						
Betula	Birch							1	1	2	
Quercus	Oak	1	1	3	1	2	1		3	2	6
Corylus avellana-type	Hazel-type	2	5	9	7	8	12	17	11	10	20

Sample/monolith		**18055**	**18062**	**18066**	**18100**						
Context		***18100***	***18180***	***18181***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***
Preservation		**Mixed**	**Mixed**	**Mixed**	**Good**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**
Potential		**Possible**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Depth (m)		**0.10–0.11**	**0.44–0.45**	**0.65–0.66**	**0.19–0.20**	**0.23–0.24**	**0.27–0.28**	**0.31–0.32**	**0.35–0.36**	**0.39–0.40**	**0.43–0.44**
Ulmus	Elm				1		1				1
Hedera	Ivy									1	1
Calluna	Heather	1	1			1			1		
Salix	Willow										1
Tilia	Lime								1		
Crops											
Cerealia	Cereal-type	1		1			2	4	3	2	1
Herbs											
Amaranthaceae/ Chenopodiaceae	Goosefoot family					1			1		
Artemisia	Mugworts							1			
Asteraceae	Daisy family		1		4	5	3	2	3		
Brassicaceae	Cabbage family					1					
Caltha-type	Marsh marigold					1					
Caryophyllaceae	Pinks family			1							
Centaurea nigra	Common knapweed	4			2						
Cirsium-type	Thistles		1		1	3	2				
Cyperaceae	Sedges		2	5	3	20	14	14	17	26	11
Fabaceae	Pea family						1	1			1
Filipendula	Meadowsweets								1		
Plantago lanceolata	Ribwort plantain	1	4	2	4	4	2	4	2	5	
Plantago media/major	Hoary / Great plantain								1		
Poaceae	Grasses	17	77	66	49	39	25	17	13	18	10
Ranunculaceae	Buttercups		1	1	1		1	1	1	1	
Stellaria-type	Stitchworts			1	1						

Sample/monolith		**18055**	**18062**	**18066**	**18100**						
Context		***18100***	***18180***	***18181***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***
Preservation		**Mixed**	**Mixed**	**Mixed**	**Good**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**
Potential		**Possible**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Depth (m)		**0.10–0.11**	**0.44–0.45**	**0.65–0.66**	**0.19–0.20**	**0.23–0.24**	**0.27–0.28**	**0.31–0.32**	**0.35–0.36**	**0.39–0.40**	**0.43–0.44**
Succisa pratensis	Devil's Bit Scabious		1			1				1	
Taraxacum-type	Dandelion-type	19	8	31	12	6	1	3	1	1	
	Indeterminate herbs				3		3			1	1
	Total land pollen	47	103	130	106	108	103	103	104	110	107
	Number of traverses	10	4	3	2	3	2	3	2	6	4
Fern spores											
Polypodium vulgare	Polypodies	1	1	1	12	13	5	4	2	6	3
Pteridium aquilinum	Bracken						2	5	4	4	3
Pteropsida	Monolete ferns				11	24	14	15	18	4	6
Aquatics											
Nymphaea	Water-lilies	?1									
Typha angustifolia	Lesser bulrush							1			
Mosses											
Sphagnum	Moss spores					3	1		3	1	
Microscopic charcoal		+	+	+	+	+					
NPP											
HdV-128						1	4	2	2		1
Glomus HdV-1							1				
Botryococcus HdV-766						1					
Closterium HdV-60											1

Sample/monolith		**18055**	**18062**	**18066**	**18100**						
Context		***18100***	***18180***	***18181***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***	***18233***
Preservation		**Mixed**	**Mixed**	**Mixed**	**Good**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**	**Mixed**
Potential		**Possible**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Depth (m)		**0.10–0.11**	**0.44–0.45**	**0.65–0.66**	**0.19–0.20**	**0.23–0.24**	**0.27–0.28**	**0.31–0.32**	**0.35–0.36**	**0.39–0.40**	**0.43–0.44**
Broken grains		1	15	5	1		5	1	2	5	2
Concealed grains		2	1	3	3	11	8	7	8	6	6
Crumpled grains		2	6	4	7	3	2	1	4	3	5

Table 48: Pollen and non-pollen palynomorph counts from ditch **18242**, *Site 29*

A.4 Plant Remains and Charcoal

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
16005	2	5	***16033***	Settlement 1	Gully ***16022***	Early medieval	SUERC-105138	150	3		*Avena* sp, *Hordeum* sp, maybe few *Triticum* sp, including possible free-threshing		1	*Galium* sp	ra
16007	2	5	***16029***	Settlement 1	Gully ***16022***	Early medieval	SUERC-105139	200	3		*Avena* sp, *Triticum* sp (including free-threshing), *Hordeum* sp (hulled)		1	*Galium* sp	ra
16010	2	5	***16050***	Settlement 1	Gully ***16023***	Early medieval	SUERC-105140	550	4		*Avena* sp, *Triticum sp* (including free-threshing), *Hordeum* sp, various condition				yes
16026	2	5	***16057***	Settlement 1	Gully ***16022***	Early medieval		280	3		*Avena* sp and *Hordeum* sp (some possibly malted)				yes
16027	2	5	***16051***	Settlement 1. Building 3	Destruction/ demolition deposit ***16024***	Early medieval	SUERC-105141	250	4		*Avena* sp and *Triticum* sp (including free-threshing)				yes
16028	2	5	***16051***	Settlement 1. Building 3	Destruction/ demolition deposit ***16024***	Early medieval	SUERC-105145	250	3		*Avena* sp, *Triticum* sp, *cf Hordeum* sp				ra
16033	2	5	***16065***	Settlement 1	Kiln ***16027***: rubble/demolition deposit ***16065***	Early medieval	SUERC-105146	650	4		*Avena* sp, *Triticum sp* (including free-threshing), *Hordeum* sp	1	2	*Polygonum* sp incl *P.* l/p, Asteraceae, *Carex* trig.	yes
16034	2	5	***16068***	Settlement 1	Kiln ***16027***: rake-out pit ***16026***	Early medieval	SUERC-105147	1200	4		more than 1000 grains: *Triticum* sp, *Hordeum* sp, *Avena* sp	1	3	small Poaceae, *Polygonum* l/p, Asteraceae, fragment of pod	yes

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
16035	2	5	***16069***	Settlement 1	Kiln ***16027***; rake-out pit ***16026***	Early medieval	SUERC-105148	50	3		*Hordeum* sp, *Triticum* sp, *Avena* sp				ra
16036	2	5	***16071***	Settlement 1	Kiln ***16027***: flue	Early medieval	SUERC-105149	170	4		*Hordeum* sp, *Triticum* sp, *Avena* sp		1	*Polygonum aviculare*, Asteraceae	yes
16037	2	5	***16074***	Settlement 1	Kiln ***16075***: chamber	Early medieval	SUERC-105150	2500	4		*Triticum* sp, *Avena* sp, *cf Hordeum* sp		3	*Carex* sp, *Polygonum* l/p, small Poaceae	yes
16039	2	5	***16074***	Settlement 1	Kiln ***16075***: chamber	Early medieval		250	4		*Avena* sp, *Triticum* sp, *Hordeum* sp	1	3	small Poaceae, Asteraceae, *Polygonum* l/p	yes
17001	2	4	***17015***	Pit Group 3	Pit ***17014***	Neolithic	SUERC-105155	100	1		*Triticum aestivum*-type	2		Tuber fragment?	ra
17002	2	4	***17016***	Pit Group 3	Pit ***17014***	Neolithic	SUERC-105156	200	1		*Triticum* sp, and indeterminate cereals	4	1	small Fabaceae	yes
17021	2	3	***17086***	Building 2	Drain ***17087***	Roman	SUERC-105157	70	4	2	*Triticum* sp, *cf Hordeum* sp, Triticum sp glume bases, spiklet forks		1	*Carex* trig, *Polygonum* sp, small Poaceae	yes
17024	2	3	***17061***	Building 1	Occupation deposit ***17061***	Roman	SUERC-105158	900	3		*Triticum* sp (including glumed)		1	*Polygonum* sp	ra
17025	2	3	***17062***	Building 2	Occupation deposit ***17062***	Roman	SUERC-105159	600	4	1	*Triticum sp* (including glumed), *cf Triticum dicoccum* spikelet fork		2	*Rumex* sp, *Carex* sp, *Polygonum* l/p	yes
17031	2	4	***17011***	Pit Group 3	Pit ***17009***	Neolithic	SUERC-105161	330				3			ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
17034	2	4	***17116***	Pit Group 3	Pit ***17115***	Iron Age?	SUERC-105165	250	2	1	*Triticum* sp (glumed and possible free-threshing), *Hordeum* sp, *Avena* sp, *Hordeum* sp rachis, *cf Triticum dicoccum* spikelet fork, culm node		2	Small Poaceae (including possible *Danthonia decumbens*), small Fabaceae, *Polygonum* l/p, *Eleocharis* sp	yes
17041	2	3	***17096***	Building 1	Destruction deposit ***17096***	Roman	SUERC-105166	2400	4	3	More than 1000 grains in good condition, incl *Triticum* sp (including glumed), *Triticum spelta* glume bases, spikelet forks, culm nodes		2	*Polygonum* l/p, *Rumex* sp	yes
17048	2	4	***17162***	Pit Group 3	Posthole ***17161***	Neolithic	SUERC-105167	70				3			ra
17053	2	3	***17080***	Building 1	Drain ***17253***	Roman	SUERC-105168	40	2	1	*Triticum* sp, *Hordeum* sp and *Avena* sp *Triticum cf dicoccum* glume base				ra
17061	2	3	***17205***	Building 1	Posthole ***17204***	Roman	SUERC-105169	80	1	1	*Triticum* sp, indeterminate. *Triticum* sp spikelet fork		1	*Raphanus* pod fragment, *Rumex* sp, *cf* Caryophyllaceae	ra
17062	2	3	***17208***	Building 1	Stone-hole ***17027***	Rom	SUERC-105170	150	3	1	*Triticum* sp *Triticum spelta* spikelet fork, culm node		1	*Carex* sp, *Polygonum aviculare*	ra
17524	1	1	***17537***	Pit Group 1	Pit ***17536***	Presently undated		200	3	1	*Hordeum* sp, *Triticum* sp, *Avena* sp, culm nodes, lemma/palea		2	small Poaceae	yes

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
17525	1	1	***17540***	Pit Group 1	Pit ***17539***	Presently undated		1500	4		*Hordeum* sp, *Avena* sp		3	*Carex* sp, *Polygonum* sp, small Poaceae	yes
17526	1	1	***17543***	Pit Group 1	Pit ***17542***	Presently undated		500	3		*Avena* sp, *Hordeum* sp, rare *Triticum* sp				ra
17529	1	1	***17569***	Pit Group 1	Pit ***17568***	Presently undated		200	3		*Hordeum* sp, *Avena* sp, *Triticum* sp				ra
17531	1	1	***17564***	Pit Group 1	Pit ***17565***	Early medieval	SUERC-105175 & SUERC-105176	1800	4	3	*Avena* sp, *Triticum* sp (including *T aestivum*), *Hordeum* sp, *Avena* sp awns (very well preserved)	1	2	small Poaceae, *Polygoum* sp	yes
17532	1	1	***17570***	Pit Group 1	Pit ***17565***	Early medieval		550	4	2	*Triticum aestivum. Avena* sp, *cf Hordeum* sp, oat awns	1	3	*Carex* sp, *Plantago lanceolata, Persicalia* sp	ra
17534	1	1	***17562***	Pit Group 1	Pit ***17565***	Early medieval		80	4		*Avena* sp, *Triticum* sp, *cf Hordeum* sp		3	*Polygonum* sp, *Bromus* sp, small Poaceae	ra
17541	1	1	***17551***	Pit Group 1	Pit ***17550***	Early medieval		500	4	1	*Avena* sp, *Hordeum* sp, *Triticum aestivum*-type, *Avena* awns		2	small Poaceae, *Polygonum* sp, *Danthonia decumbens*	ra
17542	1	1	***17552***	Pit Group 1	Pit ***17550***	Early medieval		1700	4	1	*Triticum* sp, *Avena* sp, *Hordeum* sp, oat awns		2	small Poaceae, *Danthonia decumbens, Carex* sp, Polygonum sp, *Galium* sp	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
17544	1	1	***17554***	Pit Group 1	Pit ***17550***	Early medieval		140	4		*Avena* sp including *Avena sativa* and *fatua, Hordeum* sp		2	*Polygonum/ Carex* sp	ra
17545	1	1	***17555***	Pit Group 1	Pit ***17550***	Early medieval	SUERC-105177 & SUERC-105178	500	4	2	*Avena sp* incl *Avena sativa, Hordeum* sp, *Triticum* sp, oat awns (very well preserved)	4	3	*Raphanus* pod, Asteraceae, small Poaceae, *Carex/ Polygonum* sp	yes
17547	1	1	***17549***	Pit Group 1	Pit ***17548***	Presently undated		250	4		*Avena* sp, *Hordeum* sp, *Triticum aestivum*-type		2	*Raphanus* pod, small Poaceae	yes
17910	2	5	***17946***	Settlement 2	Gully ***22529***	Early medieval	SUERC-105186	500	1		*Secale cereale*, *cf Avena* sp, and *Hordeum* sp				yes
17930	2	5	***22500***	Settlement 2	Posthole ***17999***	Early medieval	SUERC-105188	370	3	2	*Triticum* sp, *Triticum spelta* glume bases, *cf Hordeum* sp (possibly *nudum*)	1	1	*Polygonum l/p, Carex* sp	yes
18023	5	29	***18030***		Pit ***18029***	Late medieval	SUERC-105191	700	4	4	*Avena* sp, *Triticum* sp, oat awns, *Avena sativa* floret bases. Excellent preservation	1	4	*Raphanus* pod, small Fabaceae, *Carex* sp, *Glebionis segetum,* small Poaceae, *Bromus* sp	yes
18068	5	29	***18180***		Ditch ***18242***	Iron Age	SUERC-105196	10	1		*cf Triticum* sp	1	2	*Persicaria l/f,* small Poaceae, catkin fragment? Rhizome fragment	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
19501	3	17	***19508***	Pit Group 8	Pit ***19509***	Neolithic	SUERC-105201	255				3			ra
19527	3	19	***19567***		Hearth ***19568***	Bronze Age	SUERC-105344	4000	1			3			ra
20012	5	30	***20095***		Pit ***20094***	Early medieval	SUERC-106025	250	4		*Avena* sp, *cf Hordeum* sp, *cf Triticum* sp	1	1	Poaceae	yes
20013	5	30	***20139***	Pit Group 25	Pit ***20138***	Bronze Age	SUERC-105345	250	2		*cf Triticum* sp, *Hordeum* sp	1			yes
20044	5	27	***20330***	Pit Group 18	Pit ***20331***	Late medieval	SUERC-105347	25	2		*Avena* sp, *Triticum* sp	1	1	*Glebionis segetum*	ra
20055	5	27	***20350***	Pit Group 16	Pit ***20349***	Early medieval	SUERC-105599	250	4		*Avena* sp, *Hordeum* sp	1	3	*Polygonum* sp, *Persicaria lapathifolia, Chenopodium*	yes
20079	5	27	***20433***	Pit Group 14	Cremation ***27151***	Bronze Age		600						Small culm fragments	ra
20080	5	27	***20392***	Pit Group 14	Cremation ***27154***	Bronze Age	SUERC-105427	1400				3		Tubers	yes
20104	5	27	***24514***	Pit Group 19	Pit ***24517***	Presently undated		80				1	1	*cf* Peppercorn??	ra
20109	5	27	***24526***	Structure 8	Pit ***24524***	Neolithic	SUERC-105348	100	1		*cf Triticum aestivum*	1			ra
20110	5	27	***20445***	Pit Group 17	Pit ***20446***	Late medieval	SUERC-105352	3500	3		*Avena* sp		2	*Polygonum lapathifolium, Glebionis segetum,* small Fabaceae	yes
20123	5	27	***24567***	Fence 5	Pit ***24568***	Presently undated		150	2	1	*Triticum* sp (glumed), *Hordeum* sp (hulled) glume base	1			ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
20126	5	27	***24573***	Structure 6	Gully ***24572***	Mesolithic	SUERC-105353	30	1		Indeterminate	4			ra
20139	5	27	***24600***		Pit ***24599***	Neolithic	SUERC-105354	700				3			ra
20151	5	27	***24641***	Pit Group 14	Cremation ***27162***	Bronze Age	SUERC-105424	500				3		Small culm fragments and bases. Tubers (possible *Calendine*), and buds	ra
20190	5	27	***24736***	Pit Group 14	Cremation ***27158***	Bronze Age	SUERC-105426	400					1	Small culm fragments and bases. *Plantago lanceolata* and unknown	ra
20191	5	27	***24735***	Pit Group 14	Cremation ***27158***	Bronze Age	SUERC-105426	200						Small culm fragments. Tuber (poss *Celandine*)	ra
20192	5	27	***24734***	Pit Group 14	Cremation ***27158***	Bronze Age	SUERC-105426	400						Small culm fragments	ra
20196	5	27	***24749***	Pit Group 14	Cremation ***27165***	Bronze Age	SUERC-105357	250						Small culm fragments and bases	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
20207	5	27	***24774***	Pit Group 14	Cremation ***27166***	Bronze Age	SUERC-105358	500				2	3	Small culm fragments and culm bases. *Plantago lanceolata, Carex* sp, *Danthonia decumbens*	yes
20214	5	27	***24803***	Structure 7	Hearth ***24793***	Mesolithic	SUERC-105362	220	1		Indeterminate	2		*cf Quercus* sp cup fragment	ra
20217	5	27	***24808***	Pit Group 14	Cremation ***27157***	Bronze Age	SUERC-105363	400				2	1	Unknown seed, tuber fragment	ra
20221	5	27	***24810***	Pit Group 15	Pit ***24804***	Bronze Age	SUERC-105364	1500						Small culm fragments and bases	ra
20224	5	27	***24825***	Pit Group 15	Pit ***24824***	Presently undated		200	1		*Hordeum* var *nudum*				ra
20236	5	27	***24686***	Pit Group 15	Pit ***24685***	Bronze Age	SUERC-105365	700				2		Small culm fragments	ra
20265	5	27	***24910***	Structure 13	Posthole ***24909***	Presently undated		300	1		*Avena* sp	3			ra
20315	5	27	***27065***		Buried soil ***27195***	Mesolithic	SUERC-105366	250	1		*cf Triticum* sp	2			ra
20318	5	27	***27053***	Pit Group 13	Pit ***27052***	Mesolithic	SUERC-105367	300				3			ra
20332	5	27	***27051***	Pit Group 13	Pit ***27050***	Mesolithic	SUERC-105368	400				4			ra
20337	5	27	***27096***	Pit Group 13	Pit ***27095***	Mesolithic	SUERC-105372	150				3			ra
20347	5	27	***27106***	Pit Group 13	Pit ***27104***	Mesolithic	SUERC-105374	70				4 (very			ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
												abundant)			
21512	3	15	***21554***		Pit ***21553***	Med	SUERC-105376	150	4		*Avena* sp, *Triticum* sp				yes
23524	2	8	***23720***		Pit ***23721***	Presently undated		500	4		*Avena* sp, *cf Hordeum* sp, *Triticum* sp		2	*Carex* sp, small Poaceae, *Polygonum* sp	yes
24003	3	11	***24014***	Pit Group 5	Pit ***24013***	Neolithic	SUERC-105377	1750				3			ra
24016	3	12	***24050***		Pit ***24049***	Post-medieval	SUERC-105378	60	2	1	*Hordeum* sp, *Triticum aestivum*-type, *Avena* sp, oat awns (well preserved)				Ra
24048	3	12	***24180***	Structure 4	Posthole ***24181***	Bronze Age	SUERC-105382	300	1		*cf Hordeum* sp	3			ra
24052	3	12	***24202***	Structure 4	Posthole ***24203***	Bronze Age	SUERC-105600	80	3		*Triticum* sp, *Hordeum* sp, (some grains very small - immature?)			Small culm fragments	ra
26014	3	15	***26029***		Pit ***26027***	Bronze Age	SUERC-105392	500	2		Incl *Triticum* sp		1	*Persicaria* l/p	ra
26028	3	15	***26068***	Burnt Mound 14	Pit ***26067***	Bronze Age	SUERC-105386	450	1		*cf Hordeum/Avena* sp				ra
26045	3	15	***26120***	Burnt Mound 17	Trough ***26119***	Bronze Age		3000	2		*cf Triticum* sp				ra
26506	2	10	***26530***		Buried land surface/soil ***26518***	Mesolithic	SUERC-105394	180	1		*Triticum* sp		1	*cf Plantago* sp, rhizome fragment, *cf Prunus* sp	ra
26512	2	10	***26540***		Buried land surface/soil ***26518***	Presently undated		50					1	*Lapsana* sp, Poaceae	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charred crop	Charred chaff	Charred crop/chaff comments	Charred hazelnut fragments	Charred weed seeds	Charred weed seeds/ fruits/other comments	Potential charred plant remains
26513	2	10	***26537***		Buried land surface/soil ***26518***	Presently undated		300	2		Indeterminate and *Triticum* sp		1	Poaceae, small Fabaceae, *Brassica* sp, tuber fragments	ra

Table 49: Palaeoenvironmental samples with potential for analysis of charred plant remains (highlighted samples have been dated as part of the assessment; yes=full analysis; ra=rapid analysis)

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
16005	2	5	***16033***	Settlement 1	Gully ***16022***	Early medieval	SUERC-105138	150	4	3	Mixed, including *Quercus* sp and Maloideae	ra
16007	2	5	***16029***	Settlement 1	Gully ***16022***	Early medieval	SUERC-105139	200	4	4	Mixed, including *Alnus/Corylus*	yes
16010	2	5	***16050***	Settlement 1	Gully ***16023***	Early medieval	SUERC-105140	550	4	4	Including *Alnus/Corylus* roundwood	yes
16027	2	5	***16051***	Settlement 1. Building 3	Destruction/ demolition deposit ***16024***	Early medieval	SUERC-105141	250	4	4	Mixed, including *Alnus/Corylus* and *cf* Maloideae	yes
16028	2	5	***16051***	Settlement 1. Building 3	Destruction/ demolition deposit ***16024***	Early medieval	SUERC-105145	250	4	4	Mixed, including *Alnus/Corylus*	yes
16029	2	5	***16051***	Settlement 1. Building 3	Destruction/ demolition deposit ***16024***	Early medieval		70	4	4	Including *Alnus/Corylus* roundwood	ra
16030	2	5	***16051***	Settlement 1. Building 3	Destruction/ demolition deposit ***16024***	Early medieval		250	4	4	Including *Alnus/Corylus* round wood	ra
16034	2	5	***16068***	Settlement 1	Kiln ***16027***: rake-out pit ***16026***	Early medieval	SUERC-105147	1200	4	4	Including *Alnus/Corylus* roundwood	yes
16036	2	5	***16071***	Settlement 1	Kiln ***16027***: flue	Early medieval	SUERC-105149	170	4	4	Including *Alnus/Corylus* roundwood	yes
16037	2	5	***16074***	Settlement 1	Kiln ***16075***: chamber	Early medieval	SUERC-105150	2500	4	4	Including *Alnus/Corylus* roundwood	yes

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
16039	2	5	***16074***	Settlement 1	Kiln ***16075***: chamber	Early medieval		250	4	4	Mixed, including *cf Betula* sp, *Fraxinus excelsior* and *Alnus/Corylus* roundwood	yes
17001	2	4	***17015***	Pit Group 3	Pit ***17014***	Neolithic	SUERC-105155	100	4	3	Including *Alnus/Corylus* and *Quercus* sp	ra
17002	2	4	***17016***	Pit Group 3	Pit ***17014***	Neolithic	SUERC-105156	200	4	4	Including *Alnus/Corylus* and *Quercus* sp	yes
17025	2	3	***17062***	Building 2	Occupation deposit ***17062***	Roman	SUERC-105159	600	4	4	Including *Quercus* sp and *Fraxinus excelsior*	yes
17031	2	4	***17011***	Pit Group 3	Pit ***17009***	Neolithic	SUERC-105161	330	4	4	Including *Alnus/Corylus* and *Quercus* sp	yes
17034	2	4	***17116***	Pit Group 3	Pit ***17115***	Iron Age?	SUERC-105165	250	4	4	Including *Alnus/Corylus* and *Prunus* sp roundwood	yes
17041	2	3	***17096***	Building 1	Destruction deposit ***17096***	Roman	SUERC-105166	2400	4	4	Including *Quercus* sp (Including sapwood), and *cf Acer campestre*	yes
17048	2	4	***17162***	Pit Group 3	Posthole ***17161***	Neolithic	SUERC-105167	70	4	4	Including *Quercus* sp and *Alnus/Corylus*	ra
17510	1	1	***17521***	Pit Group 1	Pit ***17523***	Presently undated		920	4	4	Mostly *Quercus* sp sapwood. Rare *Alnus/Corylus*, and other diffuse porous taxa?	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
17524	1	1	***17537***	Pit Group 1	Pit ***17536***	Presently undated		200	4	4	Round wood, including *Quercus* sp and diffuse porous, incl *Alnus/Corylus* and *cf Ilex* sp observed	ra
17525	1	1	***17540***	Pit Group 1	Pit ***17539***	Presently undated		1500	4	4	*Quercus* sp, *Alnus/Corylus* roundwood	yes
17526	1	1	***17543***	Pit Group 1	Pit ***17542***	Presently undated		500	4	4	*Quercus* sp and diffuse porous roundwood, including *cf Salix* sp, Maloideae, and others	yes
17529	1	1	***17569***	Pit Group 1	Pit ***17568***	Presently undated		200	4	4	*Quercus* sp and *Alnus/Corylus* roundwood fragments	ra
17531	1	1	***17564***	Pit Group 1	Pit ***17565***	Early medieval	SUERC-105175 & SUERC-105176	1800	4	4	Diffuse porous including *Alnus/Corylus,* Maloideae/*Prunus* sp, some roundwood	yes
17533	1	1	***17566***	Pit Group 1	Pit ***17565***	Early medieval		150	4	4	Diffuse porous incl *Alnus/Corylus, cf Salix* sp	ra
17537	1	1	***17541***	Pit Group 1	Pit ***17539***	Presently undated		320	4	4	*Quercus* sp, *Alnus/Corylus* and *cf Ilex* sp roundwood	ra
17541	1	1	***17551***	Pit Group 1	Pit ***17550***	Early medieval		500	4	4	*Quercus* sp, diffuse porous including *Alnus/Corylus*	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
17545	1	1	***17555***	Pit Group 1	Pit ***17550***	Early medieval	SUERC-105177 & SUERC-105178	500	4	4	*Quercus* sp, diffuse porous including *Alnus/Corylus*, possible *Betula* sp, roundwood	yes
17547	1	1	***17549***	Pit Group 1	Pit ***17548***	Presently undated		250	4	4	*Quercus* sp, *Alnus/Corylus,* roundwood	ra
17910	2	5	***17946***	Settlement 2	Gully ***22529***	Early medieval	SUERC-105186	500	4	3	Including *Quercus* sp and Betulaceae or *Alnus/Corylus*	ra
17930	2	5	***22500***	Settlement 2	Posthole ***17999***	Early medieval	SUERC-105188	370	4	4	Mixed, including *Alnus/Corylus*, *Fraxinus excelsior* roundwood, Maloideae and *cf Ilex aquifolium*	yes
18023	5	29	***18030***		Pit ***18029***	Late medieval	SUERC-105191	700	4	4	Mainly *Alnus/Corylus* roundwood (various sizes), few *Quercus* sp	yes
18043	5	29	***18119***	Burnt Mound 23	Burnt mound ***18122***	Presently undated		4000	4	4	Mostly *Alnus/Corylus*. Rare *Quercus* sp	yes
18044	5	29	***18119***	Burnt Mound 23	Burnt mound ***18122***	Presently undated		250	4	4	Mixed. Including *cf* Maloideae, *Alnus/Corylus* and *Quercus* sp	ra
18045	5	29	***18119***	Burnt Mound 23	Burnt mound ***18122***	Presently undated		150	4	4	Mixed. Mostly *Alnus/Corylus*, with *cf* Maloideae and rare *Quercus* sp	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
18046	5	29	***18119***	Burnt Mound 23	Burnt mound ***18122***	Presently undated		1400	4	4	*Quercus* sp including sapwood	yes
18074	5	29	***18206***	Burnt Mound 23	Trough ***18203***	Presently undated		1900	4	4	Mostly *Quercus* sp. Diffuse porous including Maloideae and *Prunus* sp	ra
19007	2	7	***19003***	Burnt Mound 1	Burnt mound ***19006***	Bronze Age		900	4	4	Including *Quercus* sp and *Alnus/Corylus*	yes
19032	2	7	***19032***	Burnt Mound 1	Cairn ***19022***	Bronze Age	SUERC-105199	900	4	4	*Quercus* sp (including sap wood), diffuse porous included *Alnus/Corylus* and *cf* Maloideae	yes
19038	2	7	***19029***	Burnt Mound 1	Buried soil ***19113***	Bronze Age		500	4	4	*Quercus* sp, *cf Fraxinus excelsior*, diffuse porous including *Alnus/Corylus*	yes
19045	2	7	***19103***	Burnt Mound 1	Trough ***19105***	Bronze Age		10000	4	3	*Alnus/Corylus*	ra
19501	3	17	***19508***	Pit Group 8	Pit ***19509***	Neolithic	SUERC-105201	255	2	4	Mostly *Quercus* sp, rare short-lived wood	yes
19527	3	19	***19567***		Hearth ***19568***	Bronze Age	SUERC-105344	4000	4	4	Mostly *Quercus* sp Rare *Alnus/Corylus* and *cf Salix/Betula*	yes

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
20012	5	30	***20095***		Pit ***20094***	Early medieval	SUERC-106025	250	4	4	*Quercus* sp, *diffuse porous* including *Alnus/Corylus,* roundwood	yes
20013	5	30	***20139***	Pit Group 25	Pit ***20138***	Bronze Age	SUERC-105345	250	4	4	*Quercus* sp, diffuse porous including *Alnus/Corylus* and *Prunus* sp	yes
20079	5	27	***20433***	Pit Group 14	Cremation ***27151***	Bronze Age		600	4	4	*Quercus* sp	ra
20080	5	27	***20392***	Pit Group 14	Cremation ***27154***	Bronze Age	SUERC-105427	1400	4	4	*Quercus* sp, rare roundwood	yes
20088	5	27	***20424***	Pit Group 14	Cremation ***27152***	Bronze Age		50	4	4	*Quercus sp,* rare *Alnus/Corylus*	ra
20104	5	27	***24514***	Pit Group 19	Pit ***24517***	Presently undated		80	4	4	*cf Alnus/Corylus*	ra
20110	5	27	***20445***	Pit Group 17	Pit ***20446***	Late medieval	SUERC-105352	3500	4	4	Mostly *Alnus/Corylus* including large roundwood fragments. *Salix/Populus* sp and *Ilex* sp	yes
20126	5	27	***24573***	Structure 6	Gully ***24572***	Mesolithic	SUERC-105353	30	2	3	Including *Quercus* sp and Pinaceae	ra
20139	5	27	***24600***		Pit ***24599***	Neolithic	SUERC-105354	700	4	4	*Quercus* sp, diffuse porous incl *Alnus/Corylus*	yes

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
20144	5	27	***24620***	Pit Group 14	Cremation ***27163***	Bronze Age		600	4	4	*Quercus* sp, rare roundwood	yes
20151	5	27	***24641***	Pit Group 14	Cremation ***27162***	Bronze Age	SUERC-105424	500	4	4	*Quercus* sp Rare roundwood	yes
20190	5	27	***24736***	Pit Group 14	Cremation ***27158***	Bronze Age	SUERC-105426	400	4	4	*Quercus* sp, very brittle and clinkered, with abundant radial splitting. Old, knarled green wood? Sapwood also observed. Rare *Calluna/Erica* roundwood	yes
20191	5	27	***24735***	Pit Group 14	Cremation ***27158***	Bronze Age	SUERC-105426	200	4	4	*Quercus* sp including twig fragments	ra
20192	5	27	***24734***	Pit Group 14	Cremation ***27158***	Bronze Age	SUERC-105426	400	4	4	*Quercus* sp (clinkered and brittle). Rare diffuse porous roundwood	ra
20196	5	27	***24749***	Pit Group 14	Cremation ***27165***	Bronze Age	SUERC-105357	250	4	4	Mostly *Quercus* sp Frequent *Alnus/Corylus*	yes
20202	5	27	***24764***	Burnt Mound 20	Pit ***24765***	Presently undated		300	4	4	Mixed *Alnus/Corylus*, *Fraxinus excelsior* including roundwood, *Acer* sp and *Quercus* sp	yes
20207	5	27	***24774***	Pit Group 14	Cremation ***27166***	Bronze Age	SUERC-105358	500	4	4	*Quercus* sp	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
20214	5	27	***24803***	Structure 7	Hearth ***24793***	Mesolithic	SUERC-105362	220	4	4	Mostly Pinaceae, frequent *Quercus* sp Rare *Alnus/Corylus* roundwood	yes
20217	5	27	***24808***	Pit Group 14	Cremation ***27157***	Bronze Age	SUERC-105363	400	4	4	*Quercus* sp (knarled and split), roundwood	yes
20221	5	27	***24810***	Pit Group 15	Pit ***24804***	Bronze Age	SUERC-105364	1500	4	4	*Mostly Quercus* sp (knarled and split), rare *Alnus/Corylus* roundwood	yes
20224	5	27	***24825***	Pit Group 15	Pit ***24824***	Presently undated		200	4	4	*Quercus* sp	ra
20236	5	27	***24686***	Pit Group 15	Pit ***24685***	Bronze Age	SUERC-105365	700	4	4	*Quercus* sp, frequent diffuse porous including *Alnus/Corylus*, frequent small roundwood	yes
20253	5	27	***24875***	Burnt Mound 20	Pit ***24874***	Presently undated		150	4	4	Diffuse porous including *Alnus/Corylus* and *cf* Maloideae, rare *Quercus* sp. Frequent roundwood	yes
20278	5	27	***24939***	Burnt Mound 19	Trough ***24938***	Presently undated		500	4	4	*Quercus* sp, diffuse porous including *Alnus/Corylus* and Maloideae	ra
20293	5	27	***27027***	Pit Group 14	Cremation ***27155***	Bronze Age		100	4	4	*Quercus* sp	ra

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
20296	2	27	***27029***	Burnt Mound 18	Pit ***27028***	Bronze Age		30	3	3	*Quercus* sp and *Alnus/Corylus*	ra
20307	2	27	***27040***	Burnt Mound 18: Structure 9	Pit ***27039***	Bronze Age		120	4	3	Including *Quercus sp* and *Alnus/Corylus*	ra
20315	5	27	***27065***		Buried soil ***27195***	Mesolithic	SUERC-105366	250	4	3	Mostly *Quercus* sp, rare Pinaceae	ra
20337	5	27	***27096***	Pit Group 13	Pit ***27095***	Mesolithic	SUERC-105372	150	4	4	Including *Quercus* sp and *Alnus/Corylus*	yes
20347	5	27	***27106***	Pit Group 13	Pit ***27104***	Mesolithic	SUERC-105374	70	4	3	Including *Quercus* sp	ra
23524	2	8	***23720***		Pit ***23721***	Presently undated		500	4	3	*Quercus* sp, diffuse porous incl *Alnus/Corylus, Prunus* sp and *cf Acer* sp	ra
24003	3	11	***24014***	Pit Group 5	Pit ***24013***	Neolithic	SUERC-105377	1750	4	4	*Quercus* sp, *Alnus/Corylus*, Maloideae	yes
24090	3	13	***24366***	Burnt Mound 3	Trough ***24367***	Presently undated		400	4	4	*Quercus* sp, diffuse porous including *cf Salix sp*, Maloideae, and *Alnus/Corylus*	yes
25502	3	15	***25506***	Burnt Mound 15	Burnt mound ***25525***	Presently undated		800	4	4	Including *Alnus/Corylus* and *Quercus* sp	yes
26005	3	15	***26008***	Burnt Mound 8	Burnt mound ***26008***	Presently undated		1000	3	4	Mostly *Quercus* sp, with rare *Alnus/Corylus*	yes

Sample	Landscape	Site	Context	Provenance	Feature/ deposit	Date	C14 Laboratory code	Flot size (ml)	Charcoal <2mm	Charcoal >2mm	Charcoal comments	Potential charcoal
26012	3	16	***26024***	Burnt Mound 16	Pit ***26023***		SUERC-105384		4	4	Mostly *Alnus/Corylus* large roundwood. Rare *Quercus* sp	yes
26016	3	15	***26031***	Burnt Mound 7	Burnt mound ***26031***	Presently undated		1000	4	4	Including *Quercus* sp and *Alnus/Corylus*	yes
26045	3	15	***26120***	Burnt Mound 17	Trough ***26119***	Bronze Age		3000	4	4	Including *Alnus/Corylus* and *Quercus* sp roundwood	yes
26506	2	10	***26530***		Buried land surface/soil ***26518***	Mesolithic	SUERC-105394	180	4	4	Mostly *Quercus* sp, rare *Alnus/Corylus* and *cf* Maloideae	yes
26512	2	10	***26540***		Buried land surface/soil ***26518***	Presently undated		50	2	3	Including *Quercus* sp and *Alnus/Corylus*	ra
26513	2	10	***26537***		Buried land surface/soil ***26518***	Presently undated		300	4	4	Mixed *Quercus* sp, *Alnus/Corylus*, *cf* Betulaceae, *cf* Maloideae	yes

Table 50: Palaeoenvironmental samples with potential for charcoal analysis (highlighted samples have been dated as part of the assessment; yes=full analysis; ra=rapid analysis)

A.5 Radiocarbon Dates

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	δ^{13}C (‰)	Calibrated date range (95% confidence)
South of Landscape 1: Goat Roundabout pollen site	SUERC-105171	Seed: *Rubus* sect 2 *Glandulosus*	Natural deposit ***17519***	134 ± 24	-28.4	cal AD 1675-1945
	SUERC-105405	Organic sediment (humin)	Natural deposit ***17517***. Monolith 17505: 0.05-0.06m BGL	5071±22	-26.6	3955-3795 cal BC
	SUERC-105406	Organic sediment (humic)	Natural deposit ***17517***. Monolith 17505: 0.05-0.06m BGL	5001 ± 22	-29.3	3940-3655 cal BC (3940-3875 cal BC (20.5%) 3810-3705 cal BC (72.5%) 3675-3655 cal BC (2.5%))
	SUERC-105407	Organic sediment (humin)	17515: 0.03-0.04m depth	7501±23	-29.9	6435-6255 cal BC (6435-6340 cal BC (69.5%) 6315-6255 cal BC (25.9%))
	SUERC-105408	Organic sediment (humic)	17515: 0.03-0.04m depth	7398±21	-29.9	6380-6110 cal BC (6380-6220 cal BC (94.9%) 6120-6110 cal BC (0.6%))
Landscape 1: Site 1	SUERC-105175	Charred fruit fragment: *Corylus avellana*	Pit Group 1: pit ***17565*** (fill ***17564***)	1397±24	-26.5	cal AD 600-665
	SUERC-105176	Charred seed: *Avena* sp	Pit Group 1: pit ***17565*** (fill ***17564***)	1313±24	-23.4	cal AD 655-775 (cal AD 655-710 (49.0%) cal AD 725-775 (46.4%))
	SUERC-105177	Charred fruit fragment: *Corylus avellana*	Pit Group 1: pit ***17550*** (fill ***17555***)	1460±24	-23.2	cal AD 570-650
	SUERC-105178	Charred seed: *Hordeum vulgare*	Pit Group 1: pit ***17550*** (fill ***17555***)	1530±24	-22.8	cal AD 435-605 (cal AD 435-465 (7.4%) cal AD 475-500 (8.9%) cal AD 505-520 (1.0%) cal AD 530-605 (78.2%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	δ^{13}C (‰)	Calibrated date range (95% confidence)
Landscape 1: Site 1	SUERC-105179	Charred fruit fragment: *Corylus avellana*	Pit Group 1: pit ***17550*** (fill ***17556***)	1490±24	-23.5	cal AD 545-640
	SUERC-105180	Charred seed: *Triticum* sp	Pit Group 1: pit ***17550*** (fill ***17556***)	1452±24	-21.3	cal AD 575-650
Landscape 2: Site 3	SUERC-105157	Charred seed: *Triticum* sp	Building 2: drain ***17087*** (fill ***17086***)	1825±24	-23	cal AD 130-320
	SUERC-105158	Charred seed: *Triticum* sp	Building 1: occupation deposit ***17061***	1866±24	-21.9	cal AD 120-235
Landscape 2: Site 3	SUERC-105159	Charred seed: *Triticum* sp (glumed)	Building 2: occupation deposit ***17062***	1828±24	-22.3	cal AD 125-315
	SUERC-105168	Charred seed: *Triticum* sp (glumed)	Building 1: drain ***17253*** (fill ***17080***)	1789±24	-21.9	cal AD 215-340
	SUERC-105169	Charred seed: *Triticum* sp	Building 1: posthole ***17204*** (fill ***17205***)	1854±24	-20.8	cal AD 125-240
	SUERC-105170	Charred seed: *Triticum* sp (glumed)	Building 1: stone-hole ***17027*** (fill ***17208***)	1870±24	-23.9	cal AD 120-235
	SUERC-105166	Charred seed: *Triticum* sp (glumed)	Building 1: destruction deposit ***17096***	1842±24	-22.2	cal AD 125-250
Landscape 2: Site 4	SUERC-105155	Charred seed: *Triticum* sp	Pit Group 3: pit ***17014*** (fill ***17015***)	156±24	-23.3	cal AD 1665-1910
	SUERC-105156	Charred fruit fragment: *Corylus avellana*	Pit Group 3: pit ***17014*** (fill ***17016***)	4700±24	-24.2	3610-3370 cal BC (3610-3585 cal BC (3.4%) 3530-3485 cal BC (25.5%) 3470-3370 cal BC (66.5%))
	SUERC-105160	Charred fruit fragment: *Corylus avellana*	Pit Group 3: pit ***17009*** (fill ***17010***)	4700±24	-26.5	3610-3370 cal BC (3610-3585 cal BC (3.4%) 3530-3485 cal BC (25.5%) 3470-3370 cal BC (66.5%))
	SUERC-105161	Charred fruit fragment: *Corylus avellana*	Pit Group 3: pit ***17009*** (fill ***17011***)	4641±24	-23	3515-3360 cal BC (3515-3425 cal BC (76.2%) 3410-3395 cal BC (3.5%) 3385-3360 cal BC (15.7%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	δ^{13}C (‰)	Calibrated date range (95% confidence)
Landscape 2: Site 4	SUERC-105165	Charred seed: *Triticum* sp	Pit Group 3: pit ***17115*** (fill ***17116***)	2416±24	-23.6	735-400 cal BC (735-695 cal BC (7.7%) 665-645 cal BC (3.8%) 550-400 cal BC (83.9%))
	SUERC-105167	Charred fruit fragment: *Corylus avellana*	Pit Group 3: posthole ***17161*** (fill ***17162***)	4457±24	-27.4	3335-3020 cal BC (3335-3210 cal BC (48.2%) 3190-3145 cal BC (11.6%) 3140-3020 cal BC (35.6%))
Landscape 2: Site 5	SUERC-105138	Charred seed: *Avena* sp	Settlement 1: Gully ***16022*** (fill ***16033***)	1219±24	-25.3	cal AD 705-885 (cal AD 705-740 (10.7%) cal AD 770-885 (84.7%))
	SUERC-105139	Charred seed: *Hordeum vulgare*	Settlement 1: Gully ***16022*** (fill ***16029***)	1208±24	-23.4	cal AD 705-890 (cal AD 705-725 (2.8%) cal AD 770-890 (92.7%))
Landscape 2: Site 5	SUERC-105140	Charred seed: *Hordeum vulgare*	Settlement 1: Gully ***16023*** (fill ***16050***)	1304±24	-25.4	cal AD 655-710 (45.6%) cal AD 720-775 (49.8%)
	SUERC-105141	Charred seed: *Triticum* sp	Settlement 1. Building 3: destruction/ demolition deposit ***16024*** (layer ***16051***)	1321±24	-21.5	cal AD 650-775 (cal AD 650-710 (53.8%) cal AD 735-775 (41.7%))
	SUERC-105145	Charred seed: *Hordeum vulgare*	Settlement 1. Building 3: destruction/ demolition deposit ***16024*** (layer ***16051***)	1245±24	-23.5	cal AD 675-880 (cal AD 675-750 (49.6%) cal AD 755-780 (5.9%) cal AD 785-840 (31.5%) cal AD 845-880 (8.4%))
	SUERC-105146	Charred seed: *Avena* sp	Settlement 1. Kiln ***16027***: rubble/ demolition deposit ***16065***	1318±24	-25	cal AD 655-775 (cal AD 655-710 (52.2%) cal AD 735-775 (43.3%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	δ^{13}C (‰)	Calibrated date range (95% confidence)
Landscape 2: Site 5	SUERC-105147	Charred seed: *Triticum* sp	Settlement 1. Kiln ***16027***: rake-out pit ***16026*** (fill ***16068***)	1253±24	-21.3	cal AD 670-875 (cal AD 670-780 (70.8%) cal AD 785-830 (21.1%) cal AD 850-875 (3.6%))
	SUERC-105148	Charred seed: *Hordeum vulgare*	Settlement 1. Kiln ***16027***; rake-out pit ***16026*** (fill ***16069***)	1277±24	-24.5	cal AD 665-800 (cal AD 665-780 (94.8%) 790-800 (0.6%))
	SUERC-105149	Charred seed: *Triticum* sp	Settlement 1. Kiln ***16027***: flue (fill ***16071***)	1291±24	-23.2	cal AD 665-775
	SUERC-105150	Charred seed: *Avena* sp	Settlement 1, Kiln ***16075***: chamber (fill ***16074***)	1208±24	-24.6	cal AD 705-890 (cal AD 705-725 (2.8%) cal AD 770-890 (92.7%))
	SUERC-105151	Charred fruit fragment: *Corylus avellana*	Settlement 1. Building 3: posthole ***16120*** (fill ***16119***)	1303±24	-27.4	cal AD 660-775 (cal AD 660-710 (45.3%) cal AD 720-775 (50.2%))
	SUERC-105181	Charred seed: *Hordeum vulgare*	Settlement 2: gully ***22532*** (fill ***17914***)	1251±24	-25	cal AD 670-875 (cal AD 670-780 (67.2%) cal AD 785-835 (23.6%) cal AD 850-875 (4.6%))
	SUERC-105185	Charred seed: *Prunus spinosa*	Pit ***17929*** (fill ***17930***)	1072±24	-26	cal AD 895-1025 (cal AD 895-925 (22.6%) cal AD 945-1025 (72.9%))
	SUERC-105186	Charred seed: *Secale cereale*	Settlement 2: gully ***22529*** (fill ***17946***)	1106±24	-25	cal AD 890-995

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	δ^{13}C (‰)	Calibrated date range (95% confidence)
Landscape 2: Site 5	SUERC-105187	Charred roundwood (three-years growth, with bark): *Alnus glutinosa/ Corylus avellana*	Settlement 2: gully ***17963*** (fill ***17951***)	1245±24	-27	cal AD 675-880 (cal AD 675-750 (49.6%) cal AD 755-780 (5.9%) cal AD 785-840 (31.5%) cal AD 845-880 (8.4%))
	SUERC-105188	Charred seed: *Triticum* sp	Settlement 2: posthole ***17999*** (fill ***22500***)	2168±24	-22.8	360-105 cal BC (360-275 cal BC (45.6%) 260-245 cal BC (1.1%) 235-145 cal BC (45.0%) 140-105 cal BC (3.8%))
Landscape 2. Site 7	SUERC-105198	Indeterminate charred roundwood (three-years growth, with bark)	Burnt Mound 1: trough ***19064*** (fill ***19049***)	2900±24	-28.1	1205-1005 cal BC (1205-1140 cal BC (14.0%) 1135-1005 cal BC (81.4%))
	SUERC-105199	Charred sap wood: *Quercus* sp	Burnt Mound 1: cairn ***19022*** (layer ***19014***)	3137±24	-26.3	1495-1305 cal BC (1495-1475 cal BC (5.2%) 1460-1375 cal BC (75.1%) 1345-1305 cal BC (15.2%))
	SUERC-105200	Indeterminate charred roundwood	Burnt Mound 1: pit ***19108*** (fill ***19107***)	3530±24	-27.7	1945-1765 cal BC (1945-1860 cal BC (41.0%) 1855-1765 cal BC (54.4%))
Landscape 2. Site 10	SUERC-105393	Indeterminate charred tuber fragment	Overbank alluvium ***26519*** (layer ***26524***)	2217±24	-27.9	380-195 cal BC (380-335 cal BC (17.9%) 330-195 cal BC (77.5%))
	SUERC-105394	Indeterminate charred roundwood (one-year growth, no bark)	Buried land surface/soil ***26518*** (layer ***26530***)	6247±24	-27.2	5310-5205 cal BC (5310-5205 cal BC (76.7%) 5170-5115 cal BC (13.6%) 5105-5070 cal BC (5.1%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Landscape 2. Site 10	SUERC-105395	Indeterminate charred roundwood (two-years growth, no bark)	Overbank alluvium ***26541***	6044±22	-27.6	5010-4845 cal BC
	SUERC-105396	Charred roundwood (one-year growth, no bark): *cf* Leguminosae	Overbank alluvium ***26581***	1897±24	-25.9	cal AD 75-220
	SUERC-105397	Charred fruit fragment: *Corylus avellana*	Overbank alluvium ***26581***	1829±24	-25.6	cal AD 125-315 (cal AD 125-255 (88.7%) cal AD 290-315 (6.7%))
	SUERC-105398	Charred seed: *Triticum* sp	Overbank alluvium ***26581***	1905±21	-19.4	cal AD 75-210
	SUERC-105402	Charred sapwood: *Quercus* sp	Overbank alluvium ***26615*** (layer ***26522***)	2840±24	-27.5	1110-915 cal BC (1110-1095 cal BC (1.6%) 1085-1065 cal BC (2.0%) 1060-915 cal BC (91.9%))
	SUERC-105403	Charred tuber: *Arrhenatherum elatius* var *bulbosum*	Overbank alluvium ***26563***	1929±24	-27.8	cal AD 25-205 (cal AD 25-175 (89.4%) cal AD 180-205 (6.0%))
	SUERC-105404	Charred seed: *Prunus spinosa*	Overbank alluvium ***26523***	2840±21	-26.2	1105-915 cal BC (1105-1095 cal BC (0.8%) 1080-1065 cal BC (1.1%) 1060-915 cal BC (93.6%))
Landscape 3. Site 11	SUERC-105377	Charred fruit fragment: *Corylus avellana*	Pit Group 5: pit ***24013*** (fill ***24014***)	4344±25	-24.9	3025-2900 cal BC
Landscape 3. Site 12	SUERC-105378	Charred seed: *Hordeum vulgare*	Pit ***24049*** (fill ***24050***)	189±24	-22.7	cal AD 1655-1920
	SUERC-105382	Charred fruit fragment: *Corylus avellana*	Structure 4: posthole ***24181*** (fill ***24180***)	3512±24	-23.5	1920-1745 cal BC (1920-1910 cal BC (1.2%) 1905-1745 cal BC (94.3%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Landscape 3. Site 12	SUERC-105600	Charred seed: *Hordeum vulgare*	Structure 4: posthole ***24203*** (fill ***24202***)	3448±27	-26	1880-1640 cal BC (1880-1680 cal BC (94.4%) 1660-1640 cal BC (1.0%))
Landscape 3. Site 15	SUERC-105376	Charred seed: *Triticum* sp	Pit ***21553*** (fill ***21554***)	843±24	-23.1	cal AD 1165-1265
	SUERC-105383	Charred sapwood (two-years growth, with bark): *Prunus spinosa*	Burnt Mound 11: pit ***26013*** (fill ***26014***)	3807±24	-27.2	2345-2140 cal BC (2345-2315 cal BC (4.1%) 2310-2190 cal BC (80.3%) 2180-2140 cal BC (11.1%))
	SUERC-105385	Charred roundwood: *Corylus avellana*	Burnt Mound 12: pit ***26055*** (fill ***26056***)	3812±24	-25	2345-2145 cal BC (2345-2195 cal BC (87.6%) 2175-2145 cal BC (7.9%))
Landscape 3. Site 15	SUERC-105386	Charred seed: *Hordeum vulgare*	Burnt Mound 14: pit ***26067*** (fill ***26068***)	240±24	-23.9	cal AD 1525-1800 (cal AD 1525-1545 (2.1%) cal AD 1630-1680 (60.2%) cal AD 1740-1755 (1.7%) cal AD 1760-1800 (31.4%))
	SUERC-105387	Indeterminate charred roundwood (one-year growth, no bark)	Burnt Mound 17: pit ***26118*** (fill ***26116***)	3007±21	-31.5	1380-1125 cal BC (1380-1345 cal BC (9.5%) 1305-1190 cal BC (80.4%) 1180-1160 cal BC (2.6%) 1145-1125 cal BC (2.9%))
	SUERC-105388	Charred fruit fragment: *Corylus avellana*	Burnt Mound 17: pit ***26106*** (fill ***26105***)	2941±24	-26	1225-1045 cal BC
	SUERC-105392	Charred seed: *Triticum* sp	Pit ***26027*** (fill ***26029***)	2846±24	-25.2	1110-920 cal BC (1110-1065 cal BC (7.6%) 1060-920 cal BC (87.9%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	δ[13]C (‰)	Calibrated date range (95% confidence)
Landscape 3. Site 15	SUERC-105601	Indeterminate charred roundwood (one-year growth, no bark)	Buried soil ***26004***	7171±27	-28.3	6080-5990 cal BC
Landscape 3. Site 16	SUERC-105384	Indeterminate charred roundwood	Burnt Mound 16: pit ***26023*** (fill ***26024***)	4003±24	-25.6	2575-2465 cal BC
Landscape 3. Site 17	SUERC-105201	Charred fruit fragment: *Corylus avellana*	Pit Group 8: pit ***19509*** (fill ***19508***)	4416±24	-22.7	3315-2920 cal BC (3315-3295 cal BC (1.0%) 3285-3240 cal BC (5.4%) 3105-2920 cal BC (89.0%))
Landscape 3. Site 19	SUERC-105344	Charred fruit fragment: *Corylus avellana*	Hearth ***19568*** (fill ***19567***)	3434±24	-25	1875-1630 cal BC (1875-1840 cal BC (14.0%) 1825-1795 cal BC (4.3%) 1780-1665 cal BC (72.0%) 1660-1630 cal BC (5.0%))
Landscape 4. Site 23	SUERC-105375	Charred seed: *Triticum* sp	Ditch ***20662*** (fill ***20654***)	100±24	-23.3	cal AD 1685-1925 (cal AD 1685-1730 (25.5%) cal AD 1805-1925 (70.0%))
Landscape 5. Site 27	SUERC-105347	Charred seed: *Triticum* sp	Pit Group 18: pit ***20331*** (fill ***20330***)	813±24	-21.6	cal AD 1175-1275 (cal AD 1175-1190 (2.5%) cal AD 1205-1275 (93.0%))
	SUERC-105348	Indeterminate charred roundwood (one-year growth, no bark)	Structure 8: pit ***24524*** (fill ***24526***)	5078±24	-27.6	3960-3795 cal BC (3960-3890 cal BC (33.9%) 3885-3795 cal BC (61.5%))
	SUERC-105352	Indeterminate charred bark fragment	Pit Group 17: pit ***20446*** (fill ***20445***)	956±24	-25.4	cal AD 1025-1160 (cal AD 1025-1055 (18.6%) cal AD 1060-1160 (76.8%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Landscape 5. Site 27	SUERC-105353	Charred fruit fragment: *Corylus avellana*	Structure 6: gully ***24572*** (fill ***24573***)	6408±25	-27.6	5475-5315 cal BC (5475-5425 cal BC (34.9%) 5415-5315 cal BC (60.6%))
	SUERC-105354	Charred fruit fragment: *Corylus avellana*	Pit ***24599*** (fill ***24600***)	4038±22	-24.9	2625-2470 cal BC
	SUERC-105355	Charred seed: *Triticum* sp	Pit Group 17: pit ***24638*** (fill ***24639***)	598±24	-21.7	cal AD 1300-1405 (cal AD 1300-1370 (73.6%) cal AD 1380-1405 (21.9%))
	SUERC-105356	Charred fruit fragment: *Corylus avellana*	Pit ***24740*** (fill ***24741***)	6024±24	-26.4	4995-4840 cal BC
	SUERC-105357	Charred fruit fragment: *Corylus avellana*	Pit Group 14: cremation ***27165*** (fill ***24749***)	3159±24	-25.9	1500-1395 cal BC
	SUERC-105358	Indeterminate charred rhizome/tuber fragment	Pit Group 14: cremation ***27166*** (fill ***24774***)	3244±21	-26.7	1540-1440 cal BC
	SUERC-105362	Charred roundwood (three-years growth, no bark): *Alnus glutinosa/ Corylus avellana*	Structure 7: hearth ***24793*** (fill ***24803***)	8008±24	-28.1	7055-6820 cal BC
	SUERC-105363	Charred roundwood (one-year growth, no bark): *cf* Leguminosae	Pit Group 14: cremation ***27157*** (fill ***24808***)	3225±24	-26	1535-1435 cal BC
	SUERC-105364	Charred roundwood (two-years growth, no bark): *Corylus avellana*	Pit Group 15: pit ***24804*** (fill ***24810***)	3222±24	-25	1530-1430 cal BC
	SUERC-105365	Charred fruit fragment: *Corylus avellana*	Pit Group 15: pit ***24685*** (fill ***24686***)	3191±24	-22.9	1505-1420 cal BC

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	δ^{13}C (‰)	Calibrated date range (95% confidence)
Landscape 5. Site 27	SUERC-105366	Charred fruit fragment: *Corylus avellana*	Buried soil ***27195*** (layer ***27065***)	6076±20	-23.2	5200-4905 cal BC 5200-5190 cal BC (1.3%) 5050-4930 cal BC (90.8%) 4925-4905 cal BC (3.3%)
	SUERC-105367	Charred fruit fragment: *Corylus avellana*	Pit Group 13: pit ***27052*** (fill ***27053***)	6065±24	-23.6	5045-4850 cal BC 5045-4895 cal BC (92.0%) 4870-4850 cal BC (3.4%)
	SUERC-105368	Charred fruit fragment: *Corylus avellana*	Pit Group 13: pit ***27050*** (fill ***27051***)	6115±20	-23.4	5210-4945 cal BC (5210-5170 cal BC (19.6%) 5115-5100 cal BC (1.5%) 5075-4945 cal BC (74.3%))
	SUERC-105372	Charred fruit fragment: *Corylus avellana*	Pit Group 13: pit ***27095*** (fill ***27096***)	6076±24	-24	5200-4855 cal BC (5200-5185 cal BC (2.1%) 5050-4900 cal BC (92.5%) 4865-4855 cal BC (0.9%))
	SUERC-105373	Charred fruit fragment: *Corylus avellana*	Pit ***27103*** (fill ***27102***)	7472±25	-26.1	6420-6245 cal BC (6420-6330 cal BC (49.2%) 6320-6245 cal BC (46.2%))
	SUERC-105374	Charred fruit fragment: *Corylus avellana*	Pit Group 13: pit ***27104*** (fill ***27106***)	6035±23	-25.3	5000-4845 cal BC
	SUERC-105423	Cremated human bone	Pit Group 14: cremation ***27150*** (fill ***20455***)	3258±24	-22.7	1610-1450 cal BC (1610-1570 cal BC (11.0%) 1565-1490 cal BC (71.2%) 1485-1450 cal BC (13.3%))
	SUERC-105424	Cremated human bone	Pit Group 14: cremation ***27162*** (fill ***24662***)	3220±24	-22.2	1530-1430 cal BC (1530-1525 cal BC (0.7%) 1520-1430 cal BC (94.8%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Landscape 5. Site 27	SUERC-105425	Cremated human bone	Pit Group 14: cremation ***27160*** (fill ***24718***)	3228±24	-23.6	1535-1435 cal BC
	SUERC-105426	Cremated human bone	Pit Group 14: cremation ***27158*** (fill ***24734***)	3243±24	-26.7	1600-1435 cal BC (1600-1590 cal BC (1.2%) 1545-1435 cal BC (94.2%))
	SUERC-105427	Cremated human bone	Pit Group 14: cremation ***27154*** (fill ***27147***)	3266±24	-25.2	1615-1455 cal BC (1615-1495 cal BC (89.6%) 1480-1455 cal BC (5.8%))
	SUERC-105599	Charred seed: *Avena* sp	Pit Group 16: pit ***20349*** (fill ***20350***)	1438±27	-25.1	cal AD 580-660
Landscape 5. Site 29	SUERC-105189	Charred seed: *Avena* sp	Enclosure 15; ditch ***18250*** (fill ***18018***)	2000±24	-25	50 cal BC-cal AD 80
	SUERC-105190	Charred roundwood (three-years growth, no bark): *cf* Leguminosae	Pit ***18015*** (fill ***18016***)	367±24	-24.2	cal AD 1455-1635 (cal AD 1455-1525 (52.6%) cal AD 1555-1635 (42.8%))
	SUERC-105191	Charred seed: *Avena* sp	Pit ***18029*** (fill ***18030***)	763±24	-26.1	cal AD 1225-1285
	SUERC-105195	Indeterminate charred roundwood (four-years growth, no bark)	Ditch ***18242*** (upper fill ***18100***)	2243±24	-27.1	390-205 cal BC (390-345 cal BC (27.0%) 315-205 cal BC (68.5%))
	SUERC-105196	Indeterminate charred rhizome/tuber fragment	Ditch ***18242*** (tertiary fill ***18180***)	2118±24	-29.3	340-50 cal BC (340-325 cal BC (1.9%) 200-50 cal BC (93.6%))
	SUERC-105197	Charred roundwood: *Alnus glutinosa*/ *Corylus avellana*	Ditch ***18242*** (secondary fill ***18181***)	2155±24	-27.2	355-55 cal BC (355-285 cal BC (33.2%) 230-95 cal BC (61.0%) 70-55 cal BC (1.3%))
	SUERC-105412	Organic sediment (humin)	Ditch ***18242*** (layered deposit 18233): 0.41-0.42m depth	2183±20	-29.6	360-165 cal BC (360-275 cal BC (56.4%) 260-245 cal BC (2.4%) 235-165 cal BC (36.7%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Landscape 5. Site 29	SUERC-105413	Organic sediment (humic)	Ditch ***18242*** (layered deposit ***18233***): 0.41-0.42m depth	2146±20	-29.5	350-55 cal BC (350-310 cal BC (22.1%) 210-95 cal BC (70.9%) 75-55 cal BC (2.4%))
Landscape 5. Site 30	SUERC-105345	Charred seed: *Hordeum vulgare*	Pit Group 25: pit ***20138*** (fill ***20139***)	3791±22	-22.1	2295-2140 cal BC
	SUERC-105346	Charred fruit fragment: *Corylus avellana*	Pit Group 25: pit ***20140*** (fill ***20141***)	4416±22	-24.4	3310-2920 cal BC (3310-3300 cal BC (0.4%) 3285-3275 cal BC (0.6%) 3270-3240 cal BC (3.6%) 3105-2920 cal BC (90.8%))
	SUERC-106025	Charred seed: *Hordeum vulgare*	Pit ***20094*** (fill ***20095***)	1488±24	-25	cal AD 545-640
Landscape 5. Caerlan Tibot lake/wetland pollen site	SUERC-105414	Organic sediment (humin)	BH-4.2: 0.11-0.12m BGL	2885±24	-29.6	1195-980 cal BC (1195-1170 cal BC (2.7%) 1160-1145 cal BC (2.1%) 1130-980 cal BC (90.6%))
	SUERC-105415	Organic sediment (humic)	BH-4.2: 0.11-0.12m BGL	2857±20	-29.5	1115-930 cal BC (1115-970 cal BC (86.1%) 960-930 cal BC (9.4%))
	SUERC-105416	Organic sediment (humin)	BH-4.2: 0.24-0.25m BGL	3403±24	-30	1865-1620 cal BC (1865-1855 cal BC (0.2%) 1765-1760 cal BC (0.3%) 1755-1620 cal BC (94.9%))
	SUERC-105417	Organic sediment (humic)	BH-4.2: 0.24-0.25m BGL	3331±20	-30.2	1680-1650 cal BC (1680-1650 cal BC (4.2%) 1645-1530 cal BC (91.2%))

Landscape/Site	Laboratory code	Material	Provenance	Radiocarbon age (BP)	$\delta^{13}C$ (‰)	Calibrated date range (95% confidence)
Landscape 5. Caerlan Tibot lake/wetland pollen site	SUERC-105418	Organic sediment (humin)	BH-4.2: 1.78–1.79m depth	11669±26	-28.9	11650-11510 cal BC (11650-11590 cal BC (51.9%) 11580-11510 cal BC (43.5%))
	SUERC-105422	Organic sediment (humic)	BH-4.2: 1.78–1.79m depth	11550±25	-28.6	11540-11380 cal BC

Table 51: Radiocarbon dates acquired during the assessment, by landscape and site

Site	Dating Rationale	Features/deposits for dating	Samples for dating	Number of proposed dates
1	To establish dates of (early medieval?) pits from Pit Group 1, which have potential for CPR and pottery residue analysis	Pits ***17523***, ***17536***, ***17539***, ***17542***, ***17548***, and ***17568***	17510, 17524, 17529, 17537, 17538, and 17547	6
	To establish if the pits from Pit Group 2 are early medieval in date	Pits ***17507*** and ***17509***	17503 and 17508	2
2	To establish the date of a tree-throw containing possible prehistoric material	Tree-throw ***17745***	17701	1
3	To establish if pits and structures surrounding the Romano-British buildings are contemporary features. These and the dates from the assessment could be subjected to Bayesian modelling to provide greater temporal resolution for the activity at the site	Posthole ***17022***, and pits ***17031***, ***17050***, and ***17104***	17005, 17007, 17012, and 17023	4
4	To confirm the Neolithic date of Post Alignment 1 and to establish the date of the pits (in Pit Group 3) to the south-east of this alignment. This would include a duplicate date from a suspected Neolithic pit (***17115***) which produced an Iron Age cereal	Posthole ***17109*** and pits ***17115*** and ***17169***	17034 (duplicate), 17042, and 17051	3
5	To confirm the (early medieval?) date of Building 3, Settlement 1, and Buildings 4 and 5, Settlement 2, and drainages gully (***22522***) spatially associated with these latter two buildings. Dating would also confirm the date of a drainage gully (***22529***), which produced a dated sample outside of the range of the early medieval dates acquired during the assessment, and establish, via a duplicate date, if a dated sample from Building 4 (posthole ***17999***) is residual or forms an element of an Iron Age structure. The combined dates from the assessment and analysis could be subjected to Bayesian modelling to provide greater temporal resolution for the activity at the site	Posthole ***16110***, Building 3; pits/postholes ***17966***, ***17972***, ***17999***, ***22517***, Building 4; pit/postholes ***17915*** and ***22518***, Building 5; and drainage gullies ***22522*** and ***22529***	16047, 17903, 17915, 17918, 17930 (duplicate), 17935, 17938, 17941, and 17944	9

Site	Dating Rationale	Features/deposits for dating	Samples for dating	Number of proposed dates
7	To establish the date of Structures 1 and 2 and refine the dating of the successive phases of activity at this burnt mound. The combined dates from the assessment and analysis could be subjected to Bayesian modelling to provide greater temporal resolution for the activity at the site	Pit ***19052***, Structure 1; posthole ***19085*** and trough ***19105***, Structure 2; cairn ***19021***; buried soil ***19113***; burnt mound ***19006***	19007, 19010, 19036, 19038, 19045, and 19048	6
8	To establish the date of a pit that has potential for CPR analysis	Pit ***23721***	23524	1
9	To establish the date of Burnt Mound 2	Pit ***26586*** and trough ***26598***	26592 and 26599	2
10	To confirm the date/duration of formation of a buried land surface containing Mesolithic materials and establish the date of an adjacent palaeochannel	Buried land surface/soil ***26518*** and alluvium in palaeochannel ***26545***	26513 and 26515	2
11	To establish the date of a pit, in Pit Group 5, containing a large assemblage of prehistoric pottery	Pit ***24040***	24013	1
13	To establish the date of Burnt Mounds 3 and 5, and a pit containing prehistoric pottery	Troughs ***24367***, Burnt Mound 3; trough ***24372***, Burnt Mound 6; and pit ***24314***	24077, 24088, and 24090	3
15	To establish dates of Burnt Mounds 7, 8, 13, and 15, a trough from Burnt Mound 17 containing charred plant remains, Post Alignment 2, and a buried soil beneath Burnt Mound 7	Buried soil ***26032***; burnt mound ***26031***, Burnt Mound 7; burnt mound ***26008***, Burnt Mound 8; pit ***26057***, Burnt Mound 13; pit ***25512*** and burnt mound ***25525***, Burnt Mound 15; trough ***26119***, Burnt Mound 17; pit ***26037***, Post Alignment 2	25503, 26005, 26016, 26017, 26018, 26022, and 26045	8
16	To establish the date of Burnt Mound 9	Burnt mound ***26010***	26006	1
17	To establish the dates of Pit Groups 9 and 10, and Post Alignment 3	Pits ***19517*** and ***19523***, Pit Group 9; pits ***19550*** and ***19560***, Pit Group 10; and pit ***19512***, Post Alignment 3	19504, 19506, 19509, 19522, and 19524	5
19	To establish the date of a pit (in Pit Group 11) containing prehistoric pottery	Pit ***20741***	20529	1
23	To establish the date of an early (township?) boundary	Ditch ***20662***	20500	1

Site	Dating Rationale	Features/deposits for dating	Samples for dating	Number of proposed dates
27	To establish the dates of Burnt Mounds 19 and 20, Structures 11 and 13, Fences 4 and 5, and Trackway 5. Dating would also establish the chronology of the presently undated cremation burials (Pit Group 14) and determine if the scatter of pits, to the north of the main concentration of cremation burials (part of Pit Group 15), form contemporary elements. This would, therefore, provide details relevant to the spatial pattern and chronological range of the Bronze Age cemetery. Dating would also be used to confirm the date of Structure 9, Burnt Mound 18, and Structures 6-8, and establish/confirm the dates for Pit Groups 16-21. The dating of these respective elements favours samples that hold potential for CPR/charcoal analysis. In addition, the potential early cereals in a (Mesolithic) buried soil would be dated to establish their date. The combined dates from the assessment and analysis could be subjected to Bayesian modelling to provide greater temporal resolution for the activity at the site	Pit ***27039***, Structure 9, Burnt Mound 18; pit ***24903*** and trough ***24938***, Burnt Mound 19; pits ***24765***, ***24874***, and ***27072***, and trough ***27078***, Burnt Mound 20; posthole ***24556***, Structure 6; pit ***24768*** and posthole ***24849***, Structure 7; posthole ***24520***, and pits ***24562*** and ***24578***, Structure 8; gully ***27180***, Structure 11; posthole ***24909*** and pit ***24907***, Structure 13; posthole ***20493,*** Fence 4; postholes ***24568*** and ***24575***, Fence 5; cremations ***27151***, ***27152***, ***27155***, ***27159***, ***27163***, and ***27170***, Pit Group 14; pits ***20449***, ***24674***, ***24681***, and ***24824***, Pit Group 15; pits ***20353*** and ***20367***, Pit Group 16; pits ***20466*** and ***24608***, Pit Group 17; pits ***20304*** and ***20329***, Pit Group 18; pits ***24506***, ***24517***, ***24569***, and ***24580***, Pit Group 19; pit ***20473***, Pit Group 20; and pit ***24648***, Pit Group 21; cereals from buried soil ***27195***	20042, 20043, 20050, 20060, 20079, 20084, 20088, 20091, 20093, 20097, 20098, 20100, 20106, 20120, 20122, 20123, 20124, 20127, 20131, 20133, 20140, 20144, 20159, 20166, 20171, 20176, 20202, 20205, 20234, 20245, 20253, 20261, 20264, 20265, 20278, 20293, 20307, 20322, 20329, 20334, 20539, 20104, and 20224	43
28	To establish the dates of possible prehistoric pits and provide a *terminus post quem* for Enclosure 14	Pits ***20260***, ***20264***, and ***20291***	20033, 20034, and 20036	3

Site	Dating Rationale	Features/deposits for dating	Samples for dating	Number of proposed dates
29	To establish the date of Enclosure 16, and Pit Groups 22 and 24, and Burnt Mound 23, as well as the chronological range of burnt-mound activity	Ditch ***18246***, Enclosure 16; pits ***18068***, ***18072***, and ***18094***, Pit Group 22; pit ***20199***, Pit Group 24; and pit ***18194,*** trough ***18203***, and burnt mound ***18122***, Burnt Mound 23	18014, 18016, 18021, 18025, 18044, 18070, 18074, and 20021	8
30	To establish the date of two hearths in the vicinity of dated prehistoric and early medieval features	Hearths ***20086*** and ***20088***	20008 and 20009	2
Total				***112***

Table 52: The palaeoenvironmental samples containing short-lived plant macrofossils and charcoal with the greatest potential for radiocarbon dating

Site	Dating Rationale	Features/deposits for dating	Samples for dating	Number of proposed dates
27	To establish the date of Burnt Mound 22	Trough ***27139***	Timber 27142	1
29	To establish the date of Burnt Mound 23 and the chronological range of burnt-mound activity	Trough ***18227***	Timber 18225	
Total				***2***

Table 53: The timber samples with the greatest potential for radiocarbon dating

Site	Dating Rationale	Samples for dating	Number of proposed dates
27	To establish the date of a ceramic vessel from pit ***20415***, which has affinities with both Early Neolithic and later prehistoric pottery traditions	Charred residue from sherd	1
Total			***1***

Table 54: The charred residue with the greatest potential for radiocarbon dating

Site	Dating Rationale	Samples for dating	Number of proposed dates
Caerlan Tibot former lake/wetland	To date a section of the core from BH-4.2 when the former lake was infilled	Humin and humic fractions from 0.80-0.72m BGL	2
Total			***2***

Table 55: The natural sediments with the greatest potential for radiocarbon dating

APPENDIX B RISK LOG

B.1.1 The potential risks for the post-excavation analysis work have been defined (Table 56).

Risk No	Task	Associated risk	Probability	Impact of risk	Counter measures	Residual Risk
1	Data processing	Loss of data	Moderate	Limits the understanding of the site and potential for analysis of all other forms of data	Back-up digital material regularly to OA Cloud and OA Servers	Low
2	Finds, Palaeo-environmental	Loss, damage to, and disorganisation of material	Moderate	Material will be rendered useless for analysis	Ensure an organised working environment, with all materials clearly labelled, and supporting documentation completed, including forms for the removal, receipt and return of material for specialist examination. Care during handling by appropriate staff	Low
3	Scientific Dating	Charred plant remains/ charcoal proves unsuitable for dating	Moderate	It will not be possible to date features without artefacts or stratigraphic/ spatial relationships	Submit alternative organic materials (*eg* animal bone), if available	Low
4	Scientific Dating	Material is of ambiguous date	High	The dated material will fall within a part of the calibration curve with a plateau and will therefore provide no clear date	See 3	Moderate
5	Report production (specifically material from literature search)	Reference material is not obtainable at all/within project timetable	Low	Curtails setting the sites in local/regional context	Gather comparative literature at early stage of project, focusing on key texts	Low
6	General	Periods of illness	High	Set-back to timetable	Leave sufficient time in schedule to allow for reasonable periods of sickness	Low
7	General	Competition with other projects	Moderate	Set-back to timetable	Timetable staff appropriately	Low

Table 56: Risk log

APPENDIX C HEALTH AND SAFETY

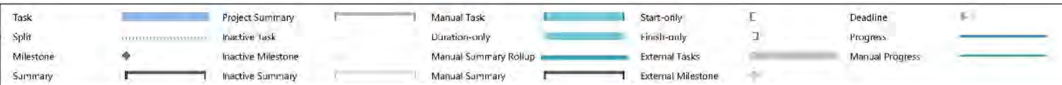
C.1.1 All OA post-excavation work will be carried out under relevant Health and Safety legislation, including the Health and Safety at Work Act (1974). A copy of the Health and Safety Policy can be supplied. The nature of the work means that the requirements of the following legislation are particularly relevant:

- Workplace (Health, Safety and Welfare) Regulations 1992 – offices and finds processing areas
- Manual Handling Operations Regulations (1992) – transport: bulk finds and samples
- Health and Safety (Display Screen Equipment) Regulations (1992) – use of computers for word-processing and database work
- COSSH (1988) – finds conservation and environmental processing/analysis

APPENDIX D GANTT CHART

ID	Task Name	Start
1	**Activity 1: Management and adminstratior**	**Thu 01/02/24**
2	Task 1.1. Management and admin	Thu 01/02/24
3	Task 2. Post-excavation monitoring/QA	Thu 01/02/24
4	Task 1.3. Finds administration	Thu 01/02/24
5	Task 1.4. Finds administration	Thu 01/02/24
6	**Activity 2: Stratigraphic Analysis**	**Fri 01/03/24**
7	Task 2.1. Stratigraphic analysis	Fri 01/03/24
8	**Activity 3: Artefacts**	**Mon 03/06/24**
9	Task 3.1. Lithics/worked stone analysis	Mon 03/06/24
10	Taskk 3.2. Stone axe petrology	Mon 03/06/24
11	Task 3.3. Lithics illustration	Mon 03/06/24
12	Task 3.4. Lithics reporting	Mon 03/06/24
13	Task 3.5. Prehistoric pottery analysis	Mon 03/06/24
14	Task 3.6. Prehistoric pottery petrology	Mon 03/06/24
15	Task 3.7. Prehistoric pottery residue analysis	Mon 03/06/24
16	Task 3.8. Prehistoric pottery reporting	Mon 03/06/24
17	Task 3.9. Prehistoric pottery illustration	Mon 03/06/24
18	Task 3.10. Roman and post-Roman pottery analysis and reporting	Mon 03/06/24
19	Task 3.11. Roman and post-Roman pottery illustration	Mon 03/06/24
20	Task 3.12. Fired clay and ceramic building material analysis and reporting	Mon 03/06/24
21	Task 3.13. Worked wood illustrationa and reporting	Mon 03/06/24
22	Task 3.14. Other finds analysis and reporting	Mon 03/06/24
23	Task 3.15. Other finds illustration	Mon 03/06/24
24	**Activity 4: Osteological and palaeoenvironmental data**	**Mon 03/06/24**
25	Task 4.1. Cremated human remains analysis and reporting	Mon 04/11/24
26	Task 4.2. Animal bone analysis and reporting	Mon 03/06/24
27	Tasks 4.3. Pollen processing	Mon 04/11/24
28	Task 4.4. Pollen analysis	Mon 04/11/24
29	Task 4.5. Lithological analysis	Mon 04/11/24
30	Task 4.6. Diatom analysis	Mon 04/11/24
31	Task 4.7. Pollen reporting	Mon 04/11/24
32	Task 4.8. Charred plant remains analysis and reporting	Mon 04/11/24
33	Task 4.9. Charcoal analysis and reporting	Mon 04/11/24

Project: Caernarfon Analysis Tim
Date: Fri 01/12/23



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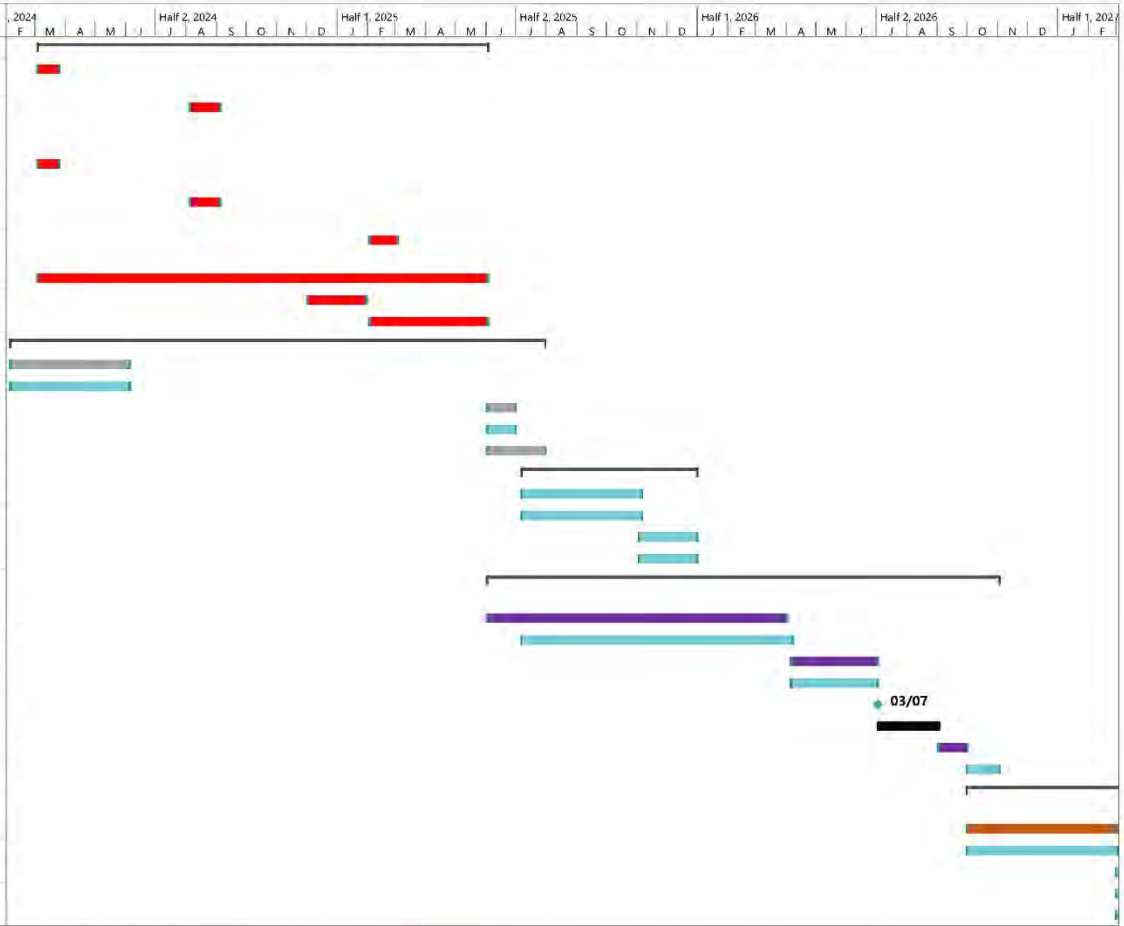
ID	Task Name	Start
34	**Activity 5: Radiocarbon dating**	**Mon 04/03/24**
35	Tasks 5.1. CPR/charcoal selection/submission (112 samples)	Mon 04/03/24
36	Tasks 5.1. CPR/charcoal selection/submission (10 additional samples)	Mon 05/08/24
37	Task 5.2. Wood extraction/submission (2 samples)	Mon 04/03/24
38	Task 5.3. Residue extraction/submission (1 sample)	Mon 05/08/24
39	Task 5.4. Sediment extraction/submission (2 humin/humic	Mon 03/02/25
40	Task 5.5. AMS dating	Mon 04/03/24
41	Task 5.6. Modelling	Mon 02/12/24
42	Task 5.8. Integration and updating	Mon 03/02/25
43	**Activity 6: Research and integrated analysi**	**Mon 05/02/24**
44	Task 6.1. Background research	Mon 05/02/24
45	Task 6.2. LiDAR and historic mapping	Mon 05/02/24
46	Task 6.3. Assimilation	Mon 02/06/25
47	Task 6.4. Analysis of integrated data	Mon 02/06/25
48	Task 6.5. Comparative analysis	Mon 02/06/25
49	**Activity 7: Archive report**	**Mon 07/07/25**
50	Task 7.1. Compilation and editing	Mon 07/07/25
51	Task 7.2. Prepare illustrations	Mon 07/07/25
52	Task 7.3. QA	Mon 03/11/25
53	Task 7.4. Copy edit	Mon 03/11/25
54	**Activity 8: Publication: preparation of draft publication**	**Mon 02/06/25**
55	Task 8.1. Prepare text and plates	Mon 02/06/25
56	Task 8.2. Prepare illustrations	Mon 07/07/25
57	Task 8.3. Edit and QA	Mon 06/04/26
58	Task 8.4. Copy editing	Mon 06/04/26
59	Task 8.5. Submit draft to client	Fri 03/07/26
60	**Client/Readers Review**	Fri 03/07/26
61	Task 8.6. Incorporate review comments	Wed 02/09/26
62	Task 8.7. QA revised draft	Thu 01/10/26
63	**Activity 9: Publication (monograph) production**	**Thu 01/10/26**
64	Tasks 9.1. Typeset and design	Thu 01/10/26
65	Task 9.2. QA and proofing	Thu 01/10/26
66	Task 9.3. Corrections	Mon 01/03/27
67	Task 9.4. Final proof	Mon 01/03/27
68	Task 9.5. Final proof corrections	Mon 01/03/27



Project: Caernarfon Analysis Tim
Date: Fri 01/12/23

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

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ID	Task Name	Start
69	Task 9.6. Produce index and page refs	Thu 01/04/27
70	Task 9.7. Sign-off QA	Thu 01/04/27
71	Task 9.8. Produce printer's PDF	Thu 01/04/27
72	Task 9.9. Check printer's proof	Thu 01/04/27
73	Task 9.10. Print 200 copies (following approval of the final printer's proof the duration for printing is dependant on the printer's timetable)	Thu 29/04/27
74	Task 9.11. Produce digital publication	Mon 05/04/27
75	**Activity 10: Management of digital data**	**Wed 01/07/26**
76	Task 10.1. Review, check and update digital archive	Wed 01/07/26
77	**Activity 11: Archive preparation and deposition (material archive)**	**Tue 01/09/26**
78	Task 11.1. Preparation	Tue 01/09/26
79	Task 11.2. Contact landowners	Tue 01/09/26
80	Task 11.3. Deposit archive	Thu 01/04/27
81	**Activity 12: Archive preparation and deposition (digital archive)**	**Mon 04/01/27**
82	Task 12.1. Preparation	Mon 04/01/27
83	Task 12.2. Submission	Thu 01/04/27
84	Task 12.3. Creation of mirrored project database	Mon 05/04/27

Project: Caernarfon Analysis Tim
Date: Fri 01/12/23

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List of Figures

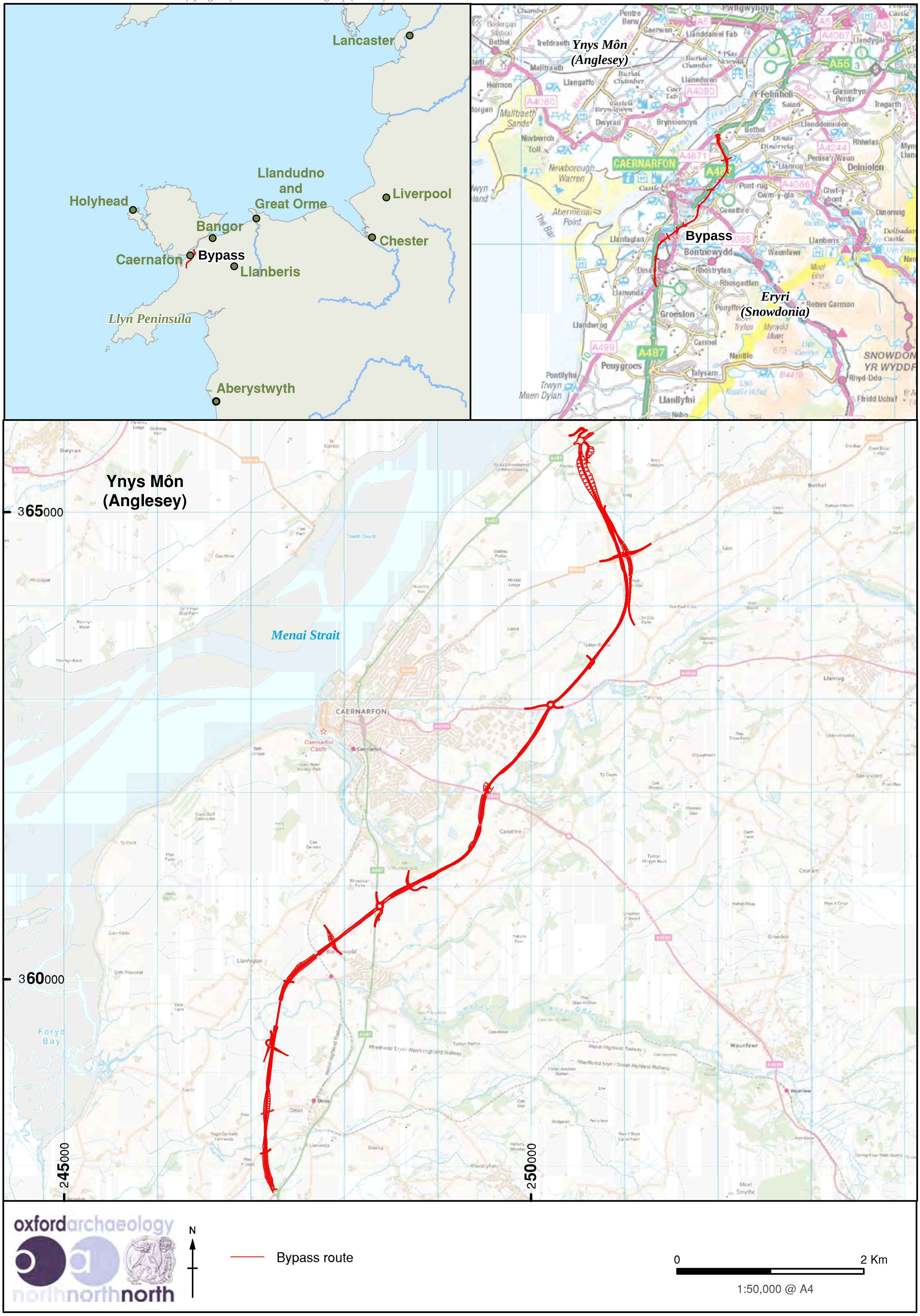

Figure 1: The route of the A487 Caernarfon and Bontnewydd Bypass

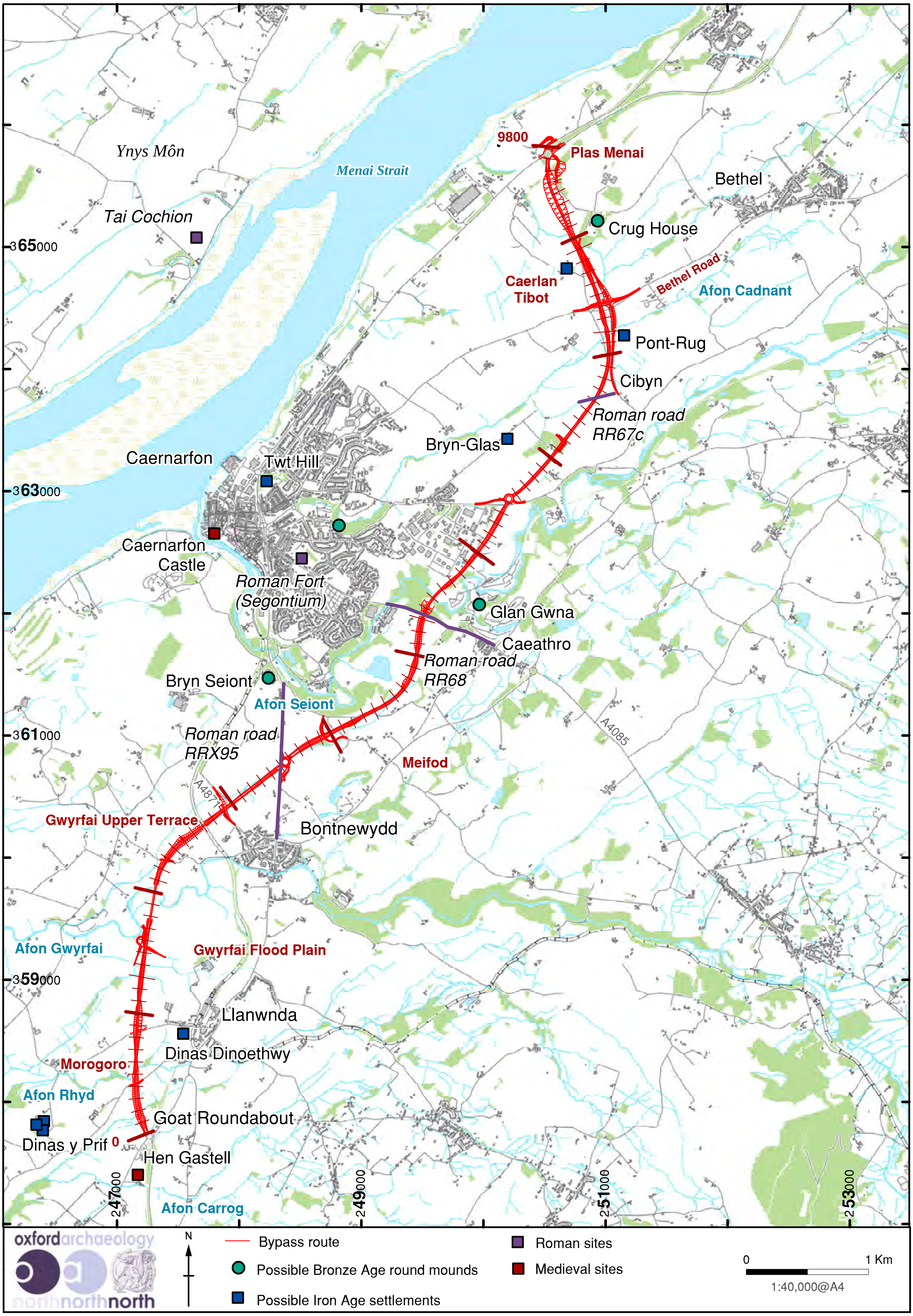

Figure 2: The major watercourses and significant archaeological sites identified by desk-based studies, survey, and archaeological trial trenching, prior to the mitigation works

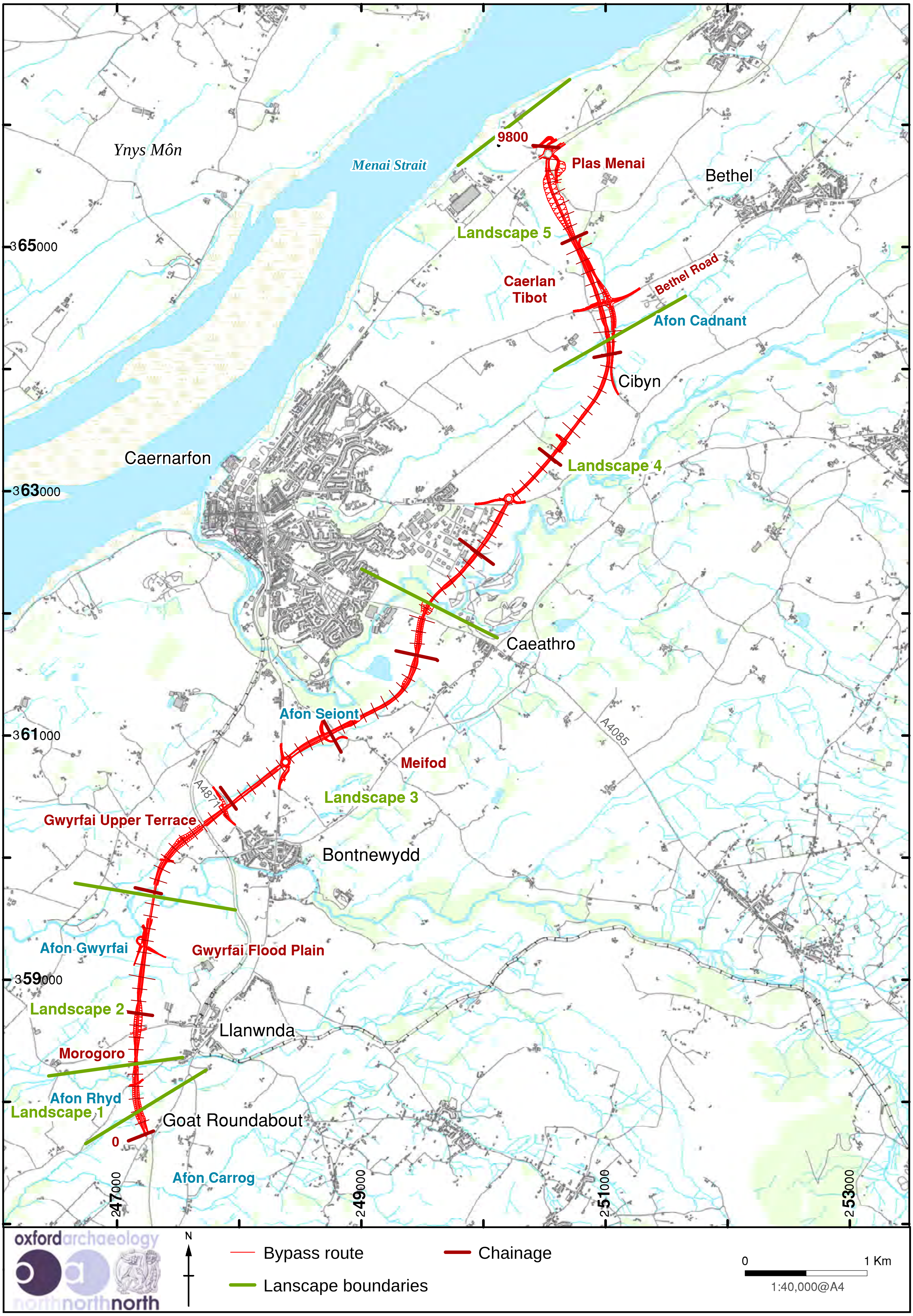

Figure 3: Landscape units and chainages along the course of the bypass

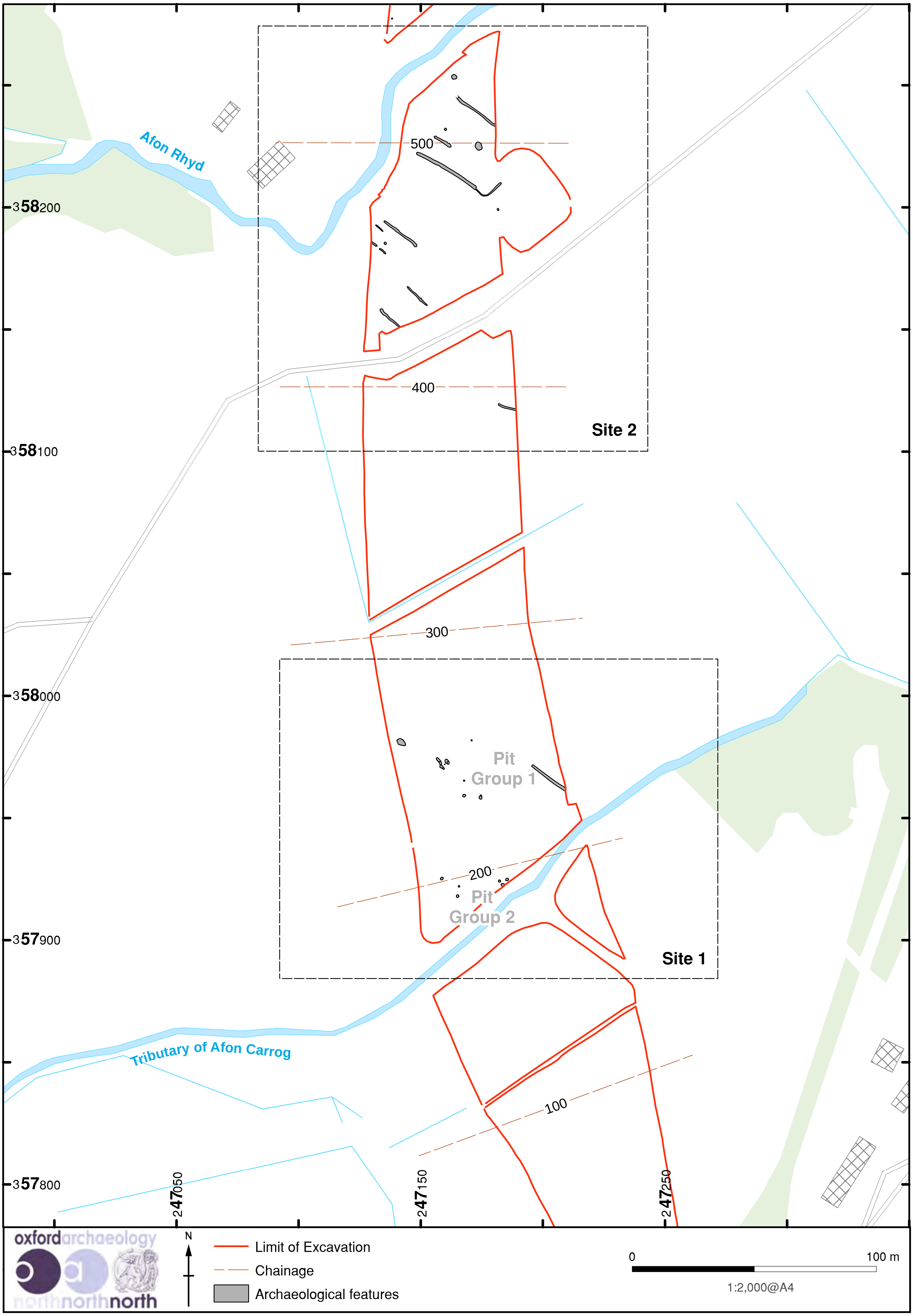

Figure 4: The locations of Sites 1 and 2 in Landscape 1

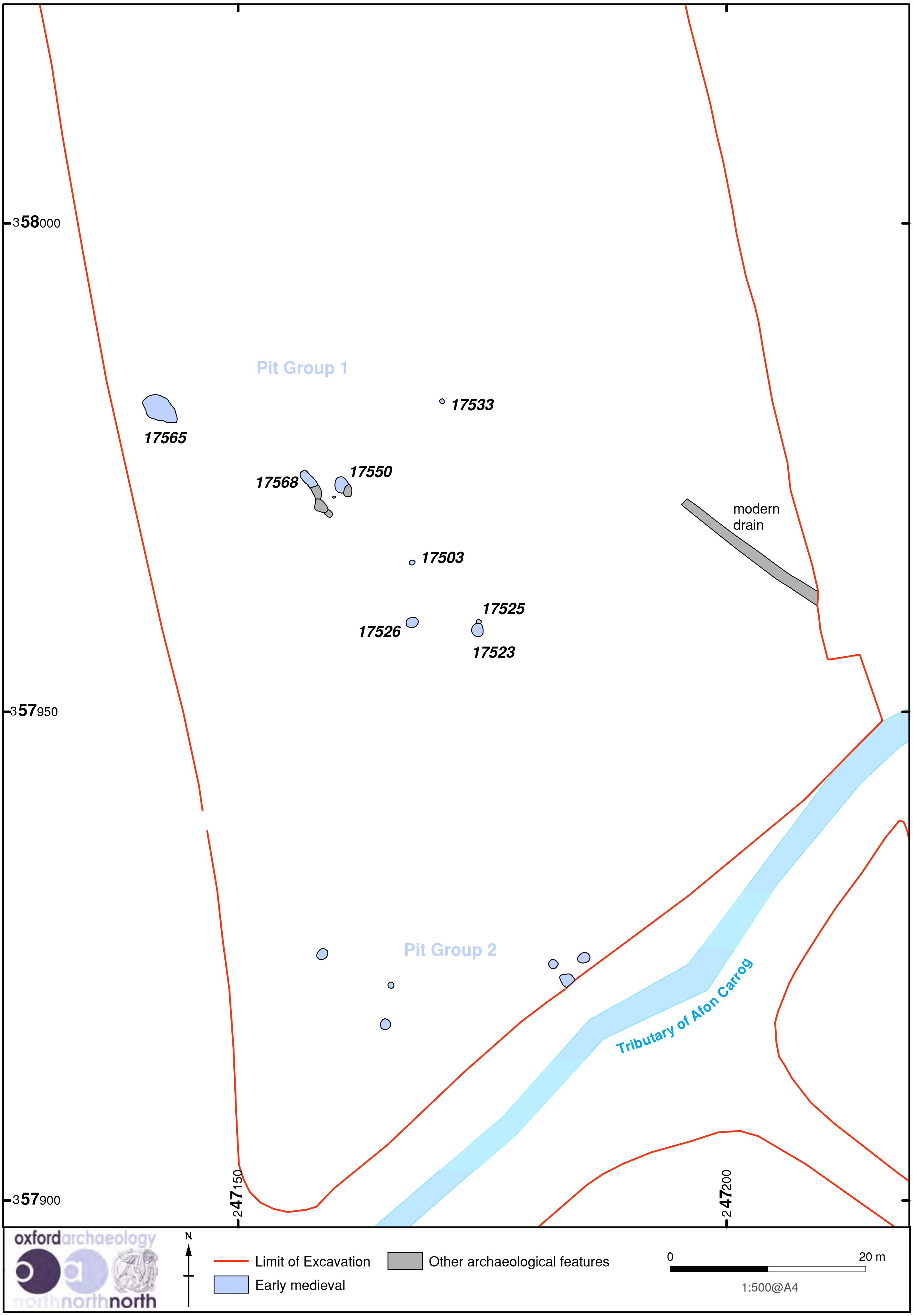

Figure 5: The early medieval pits (Pit Groups 1 and 2) at Site 1

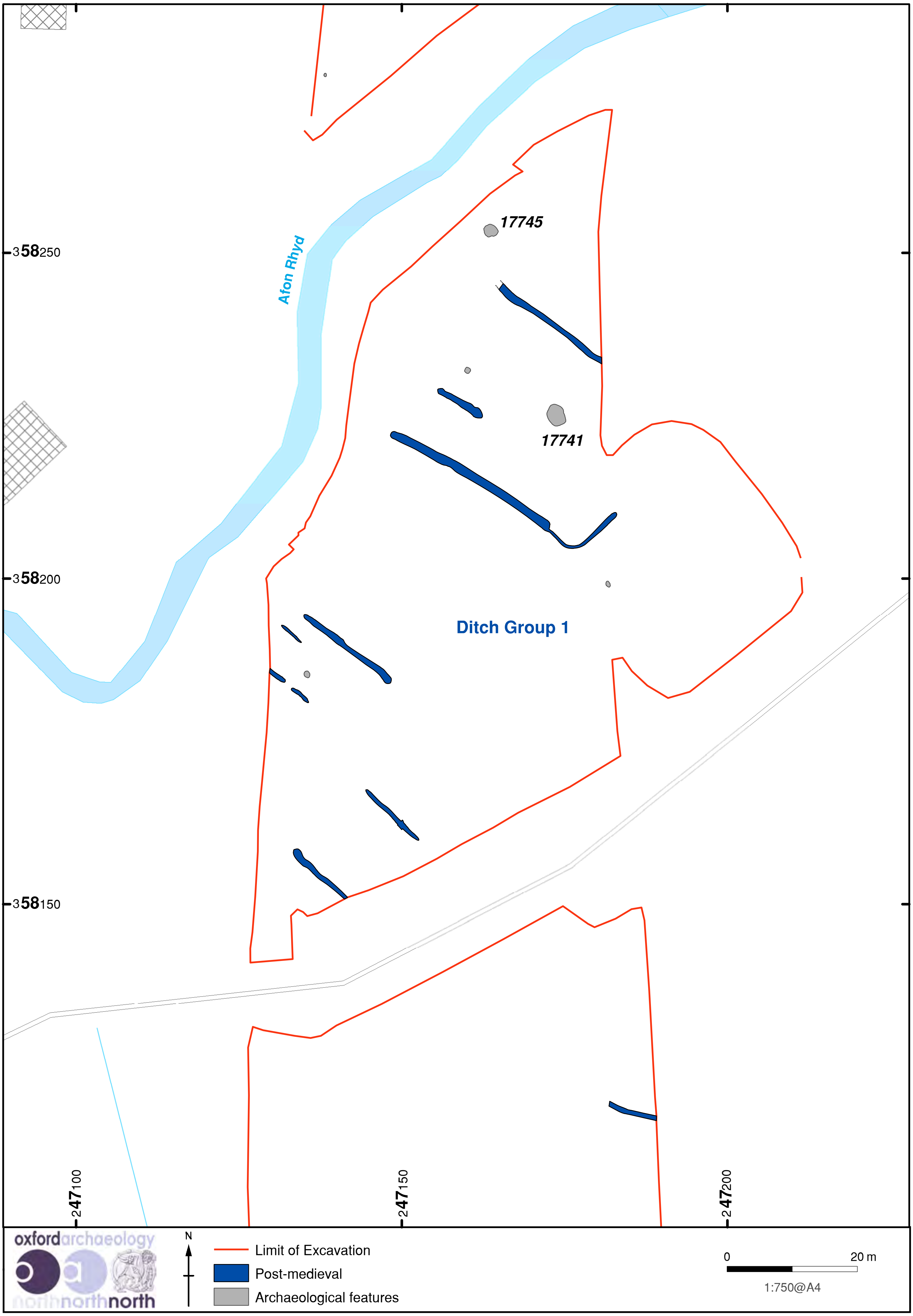

Figure 6: The post-medieval ditches (Ditch Group 1) at Site 2

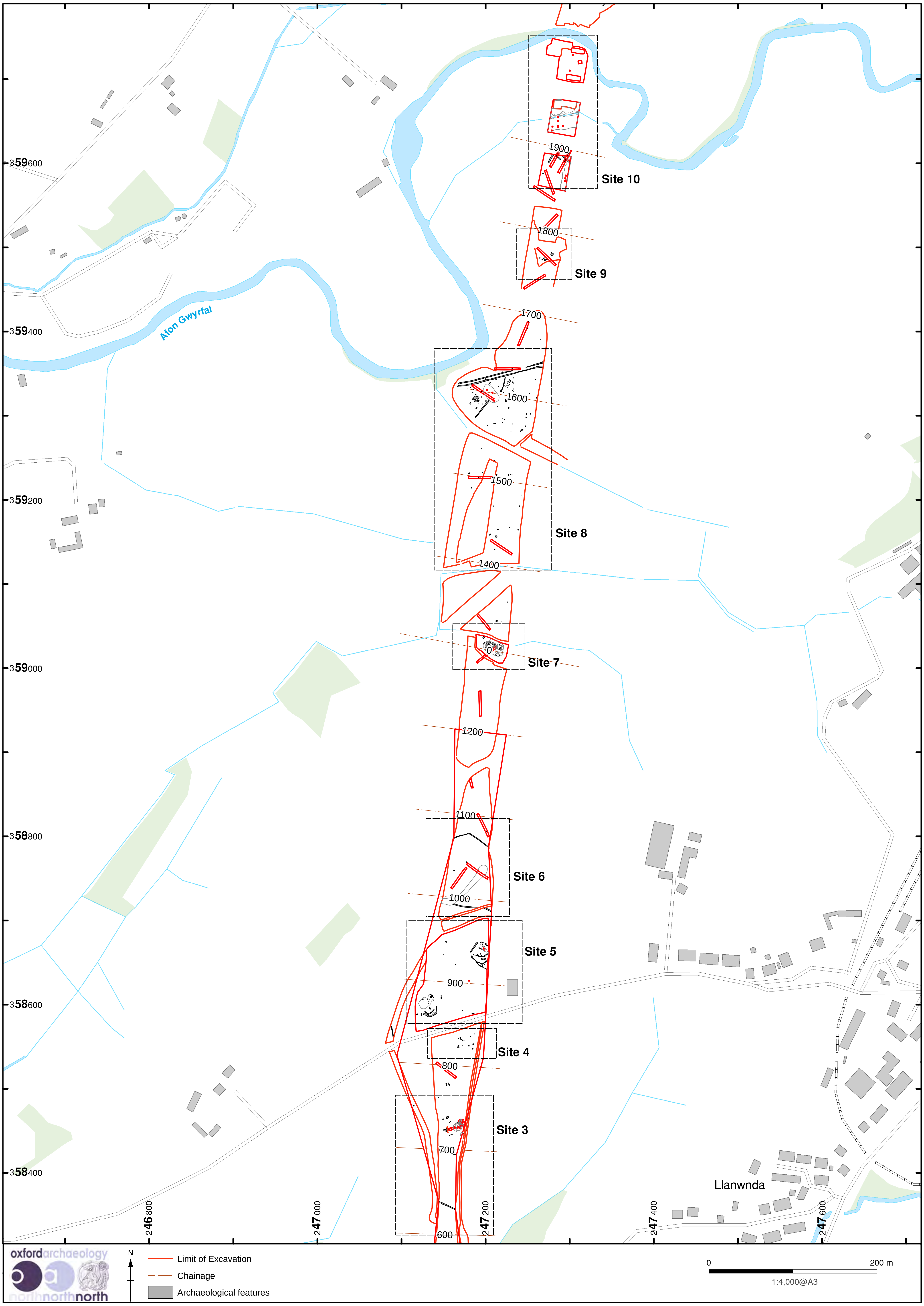

Figure 7: The locations of Sites 3-10 in Landscape 2

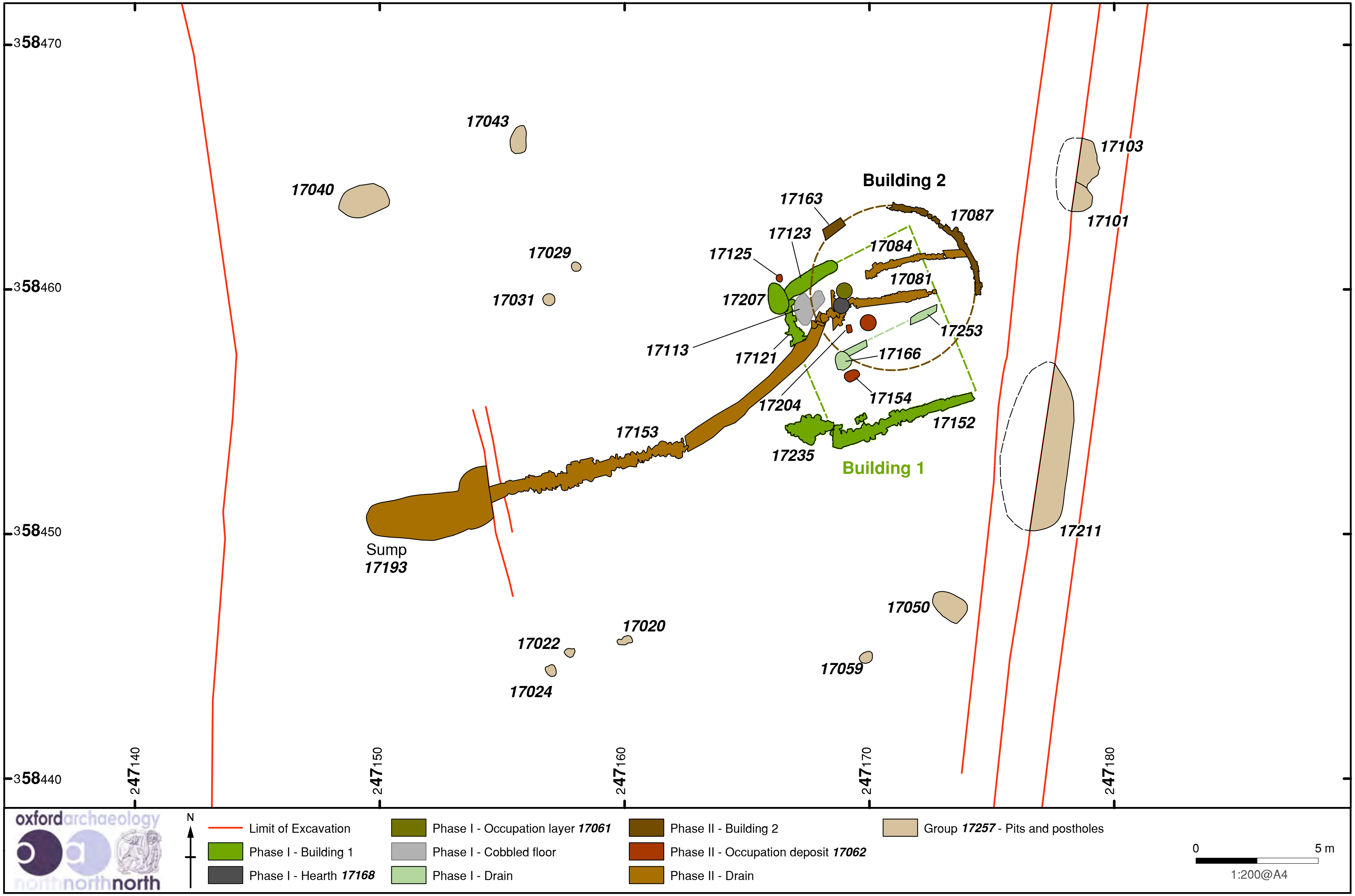

Figure 8: The sequence of Romano-British buildings (Buildings 1 and 2) at Site 3

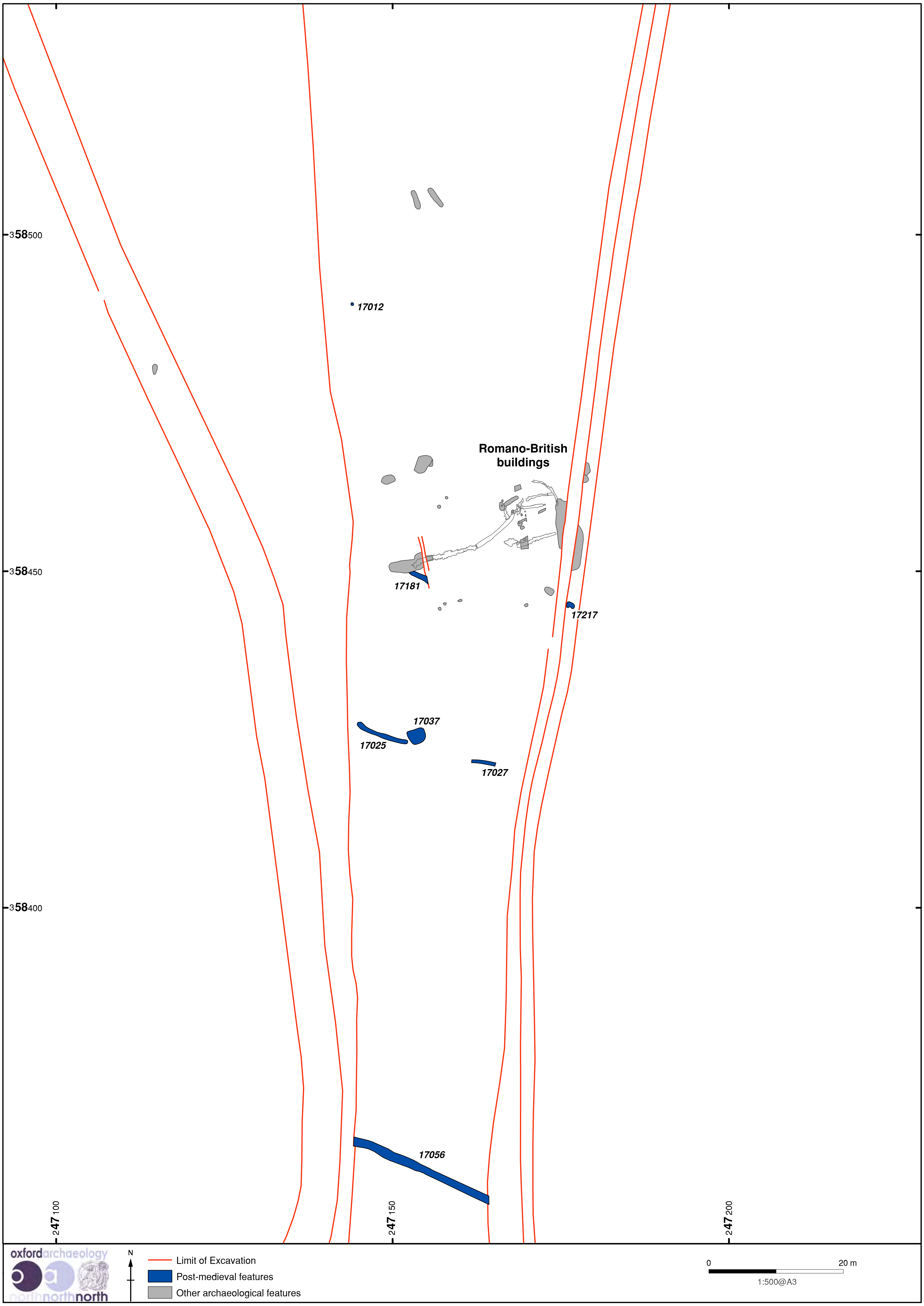

Figure 9: Post-medieval features at Site 3

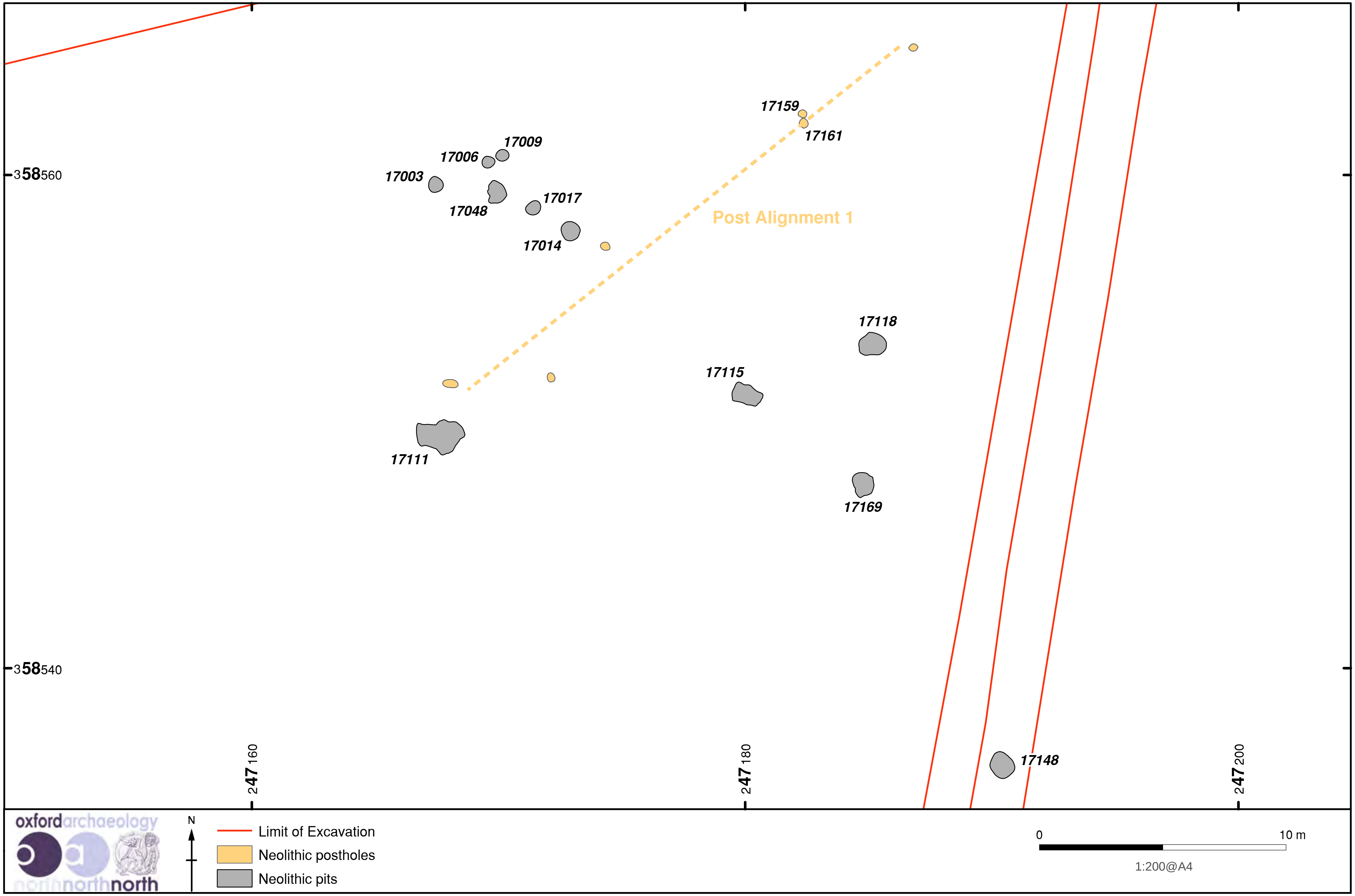

Figure 10: The Neolithic pits and postholes (Pit Group 3) at Site 4

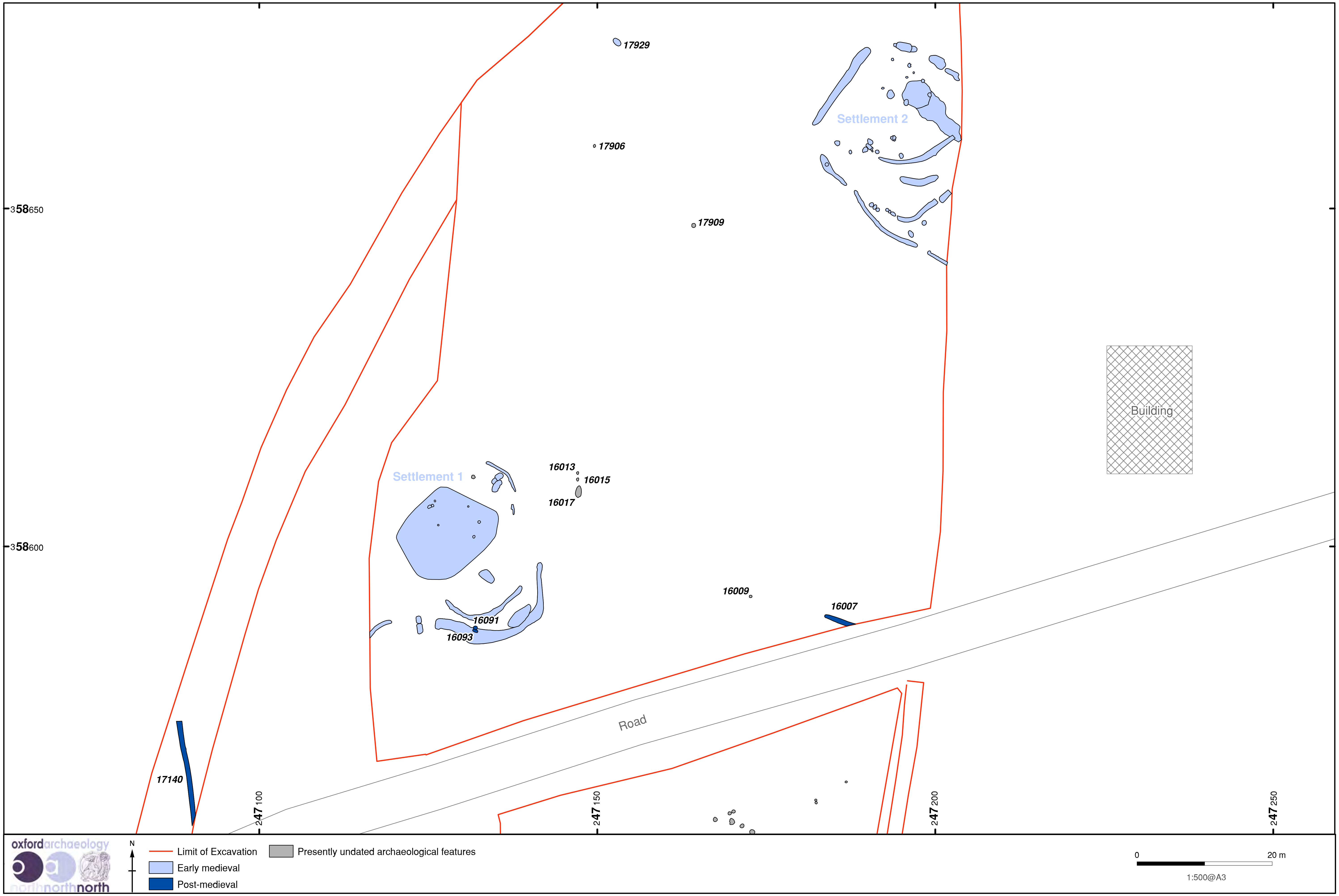

Figure 11: The early medieval settlement areas, early medieval pit ***17929***, and post-medieval and undated remains at Site 5

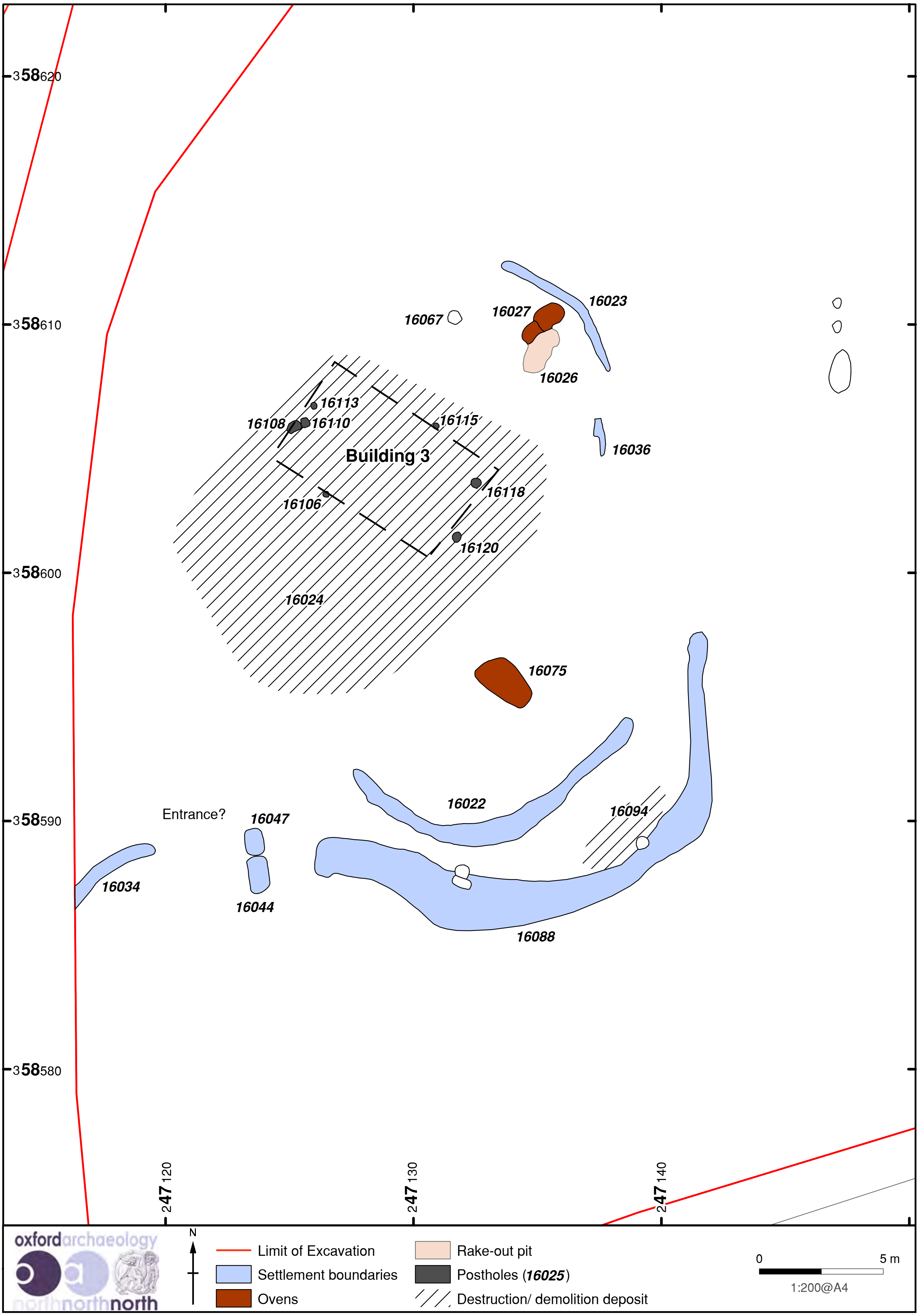

Figure 12: Settlement 1, forming a component of the early medieval settlement at Site 5

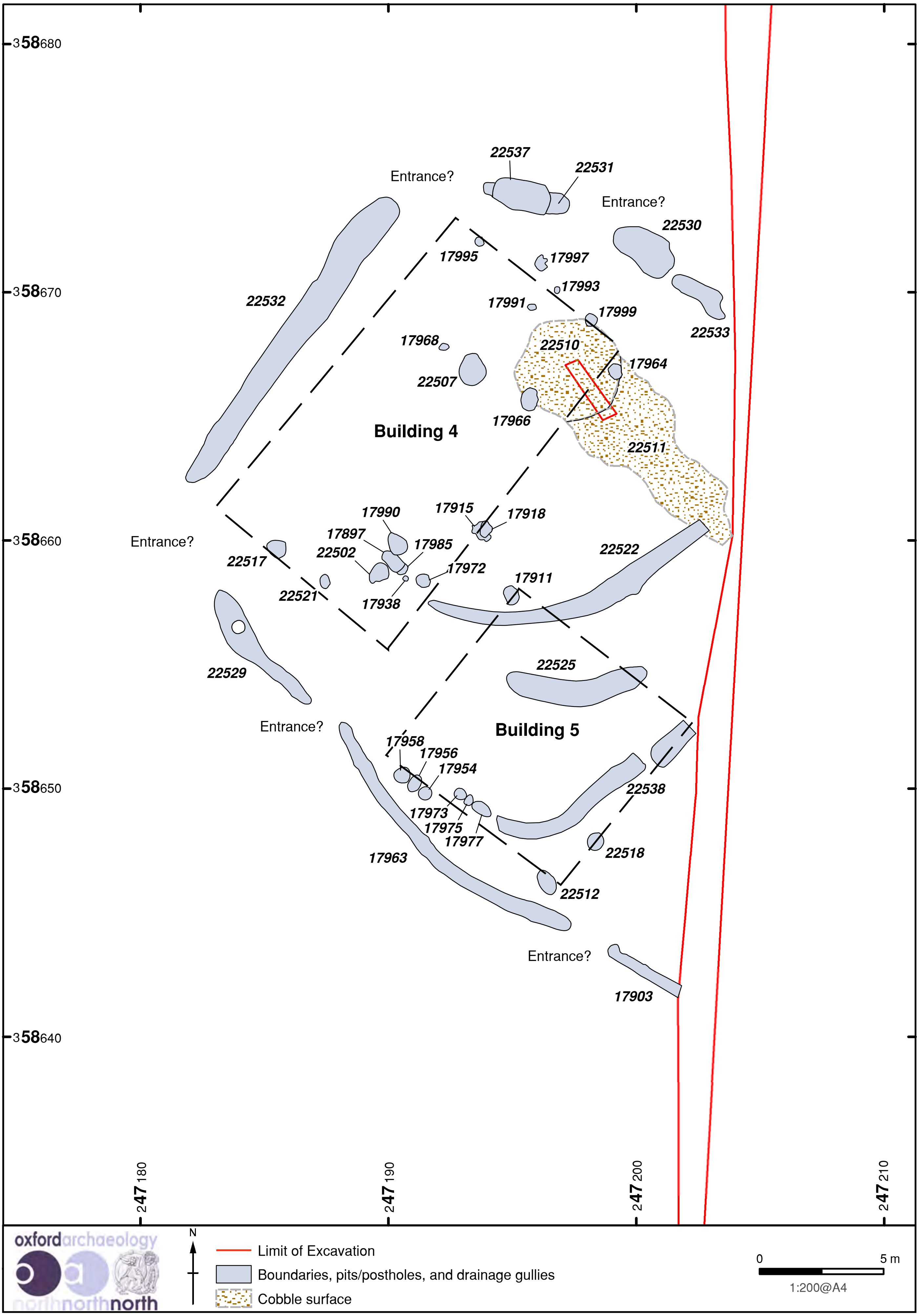

Figure 13: Settlement 2, forming a component of the early medieval settlement at Site 5

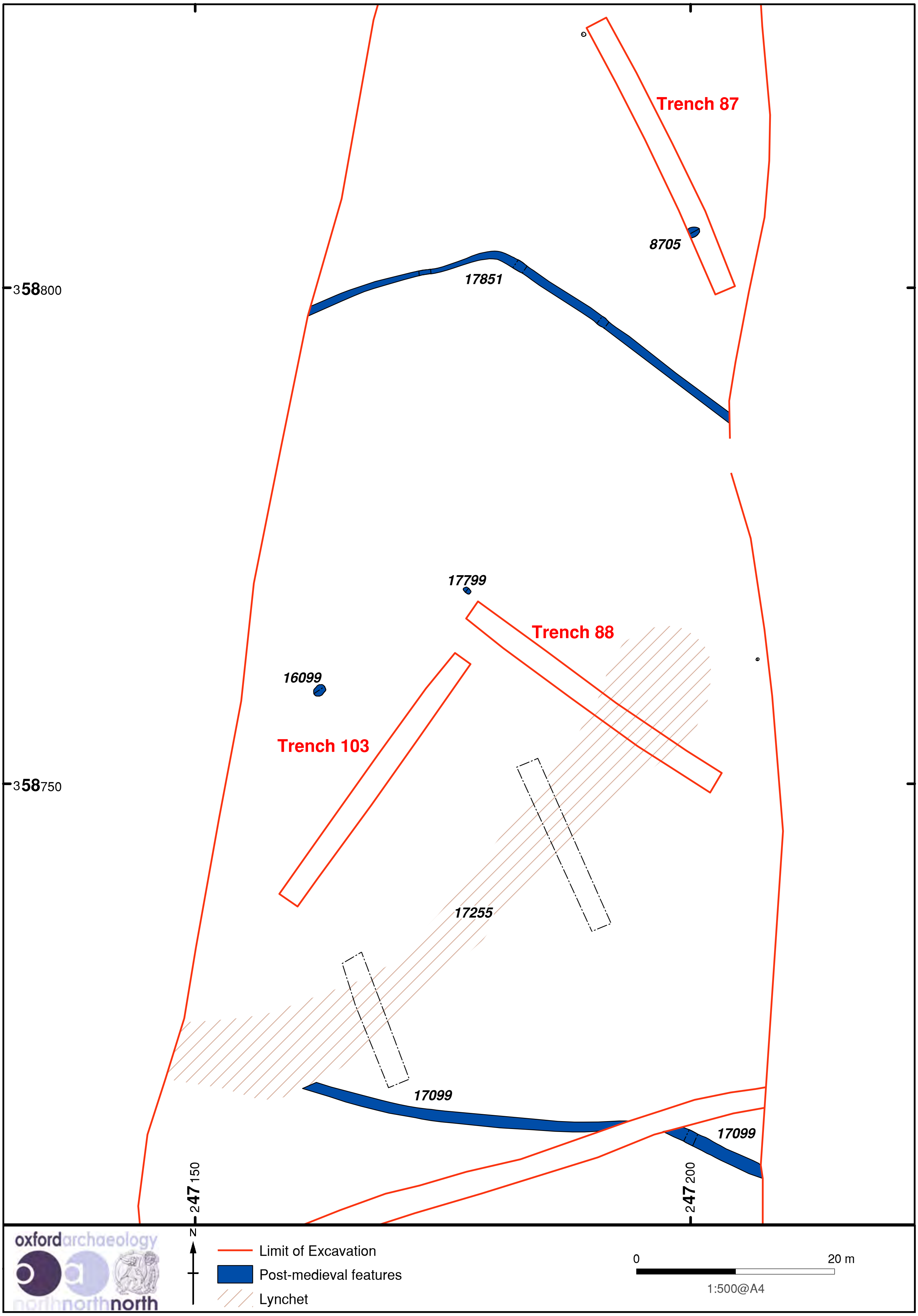

Figure 14: Post-medieval lynchet, boundaries, and pits at Site 6

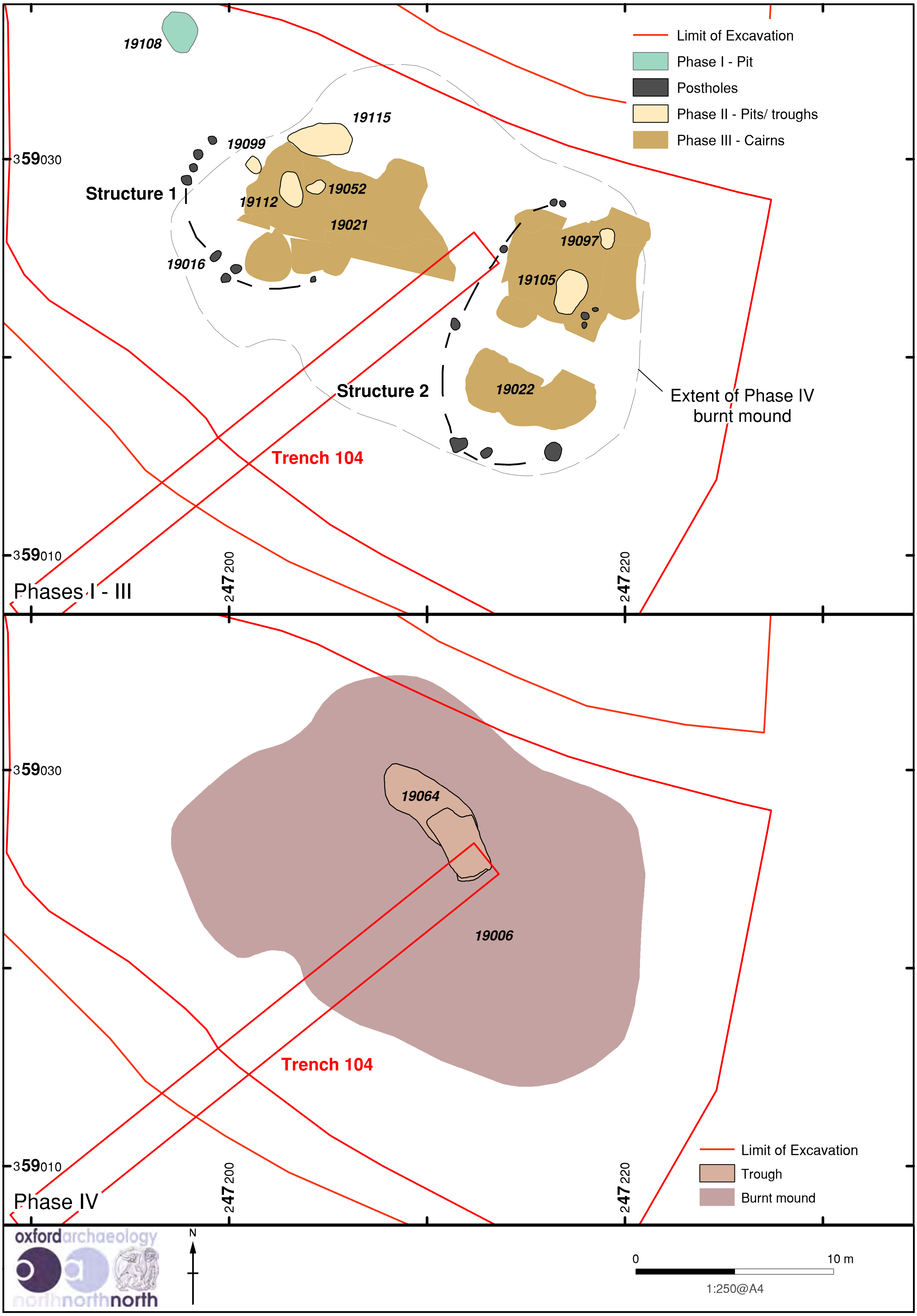

Figure 15: Burnt-mound activity (Burnt Mound 1) at Site 7

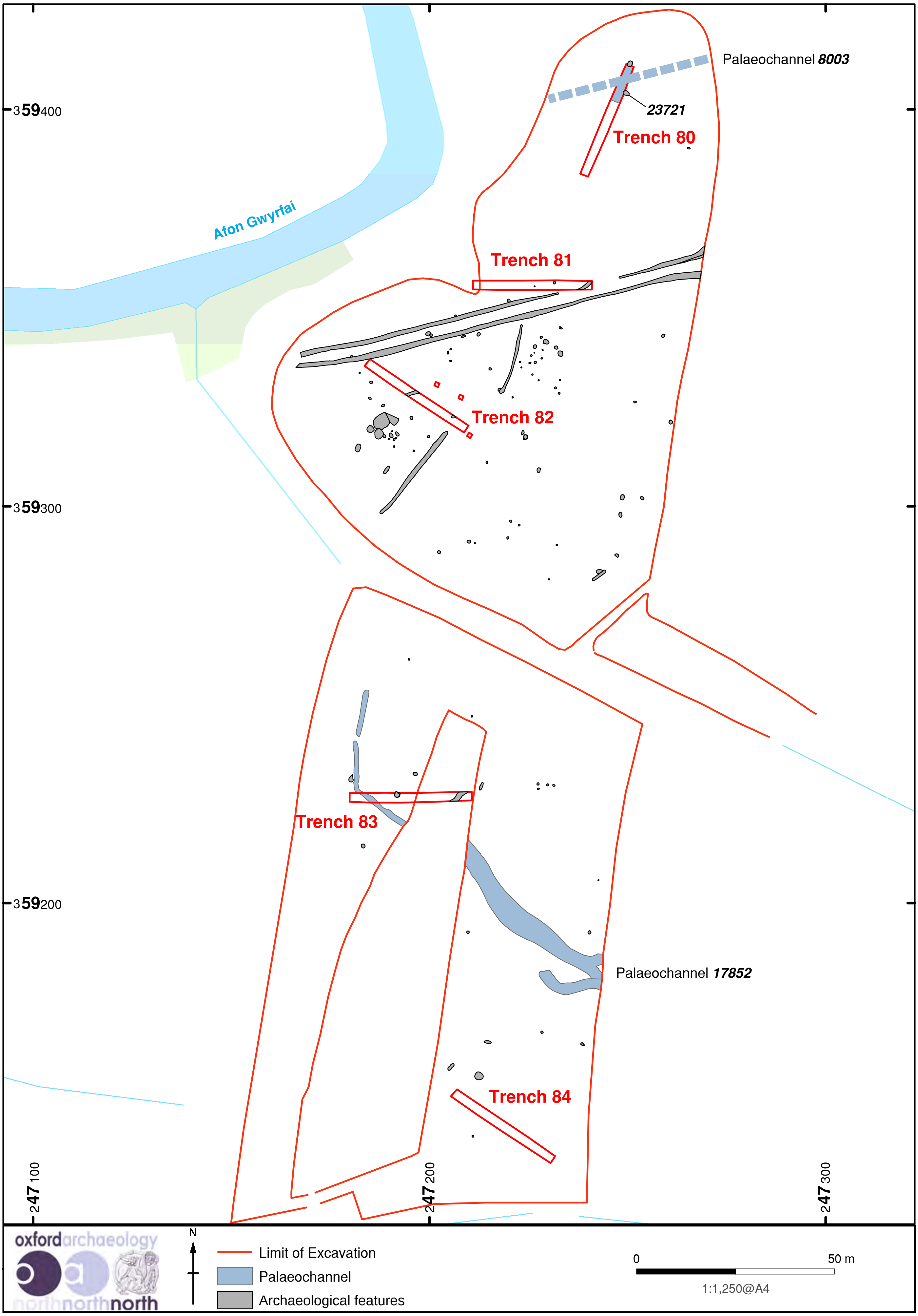

Figure 16: The extent of Site 8 and the location of the palaeochannels

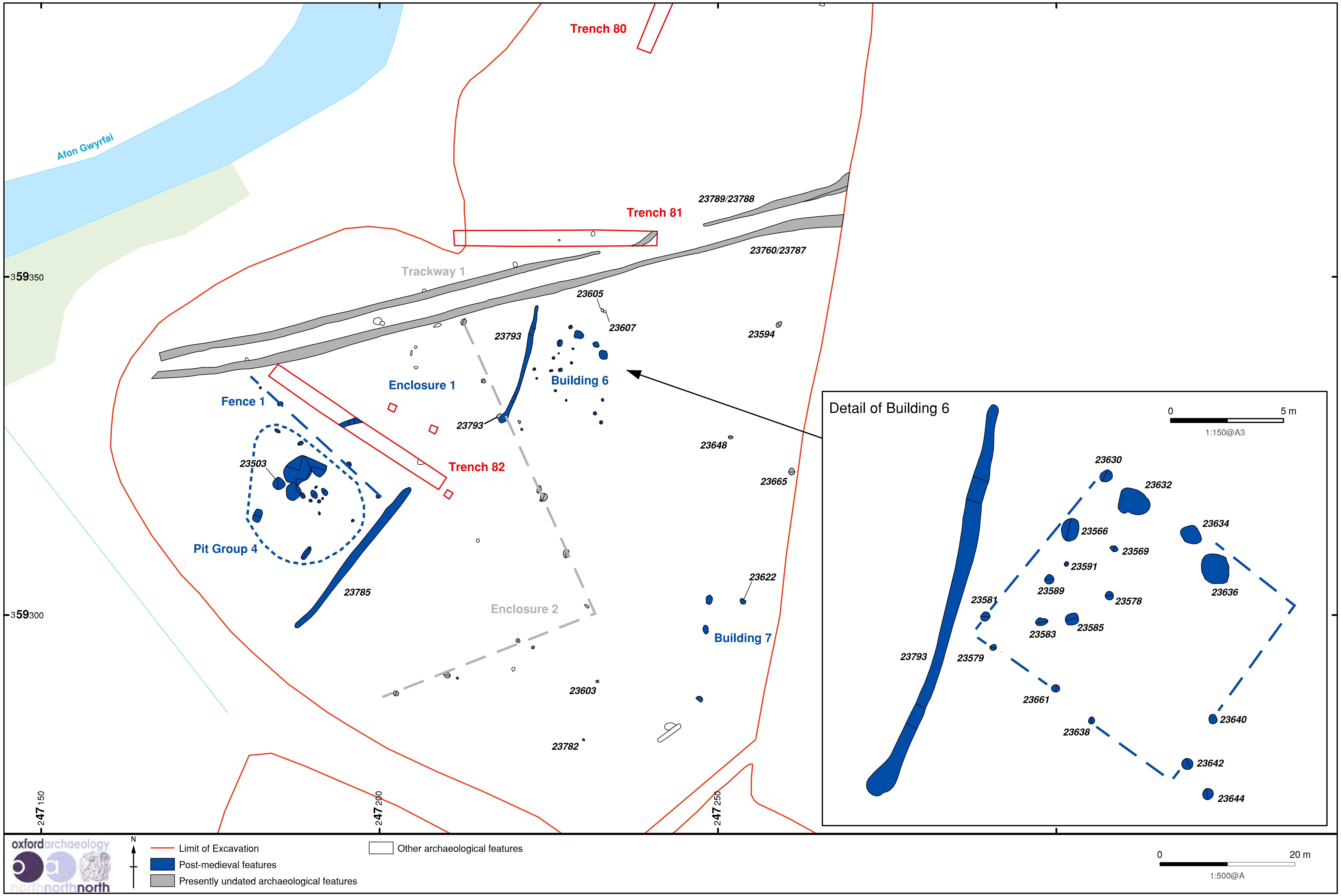

Figure 17: The post-medieval and presently undated features in the northern half of Site 8

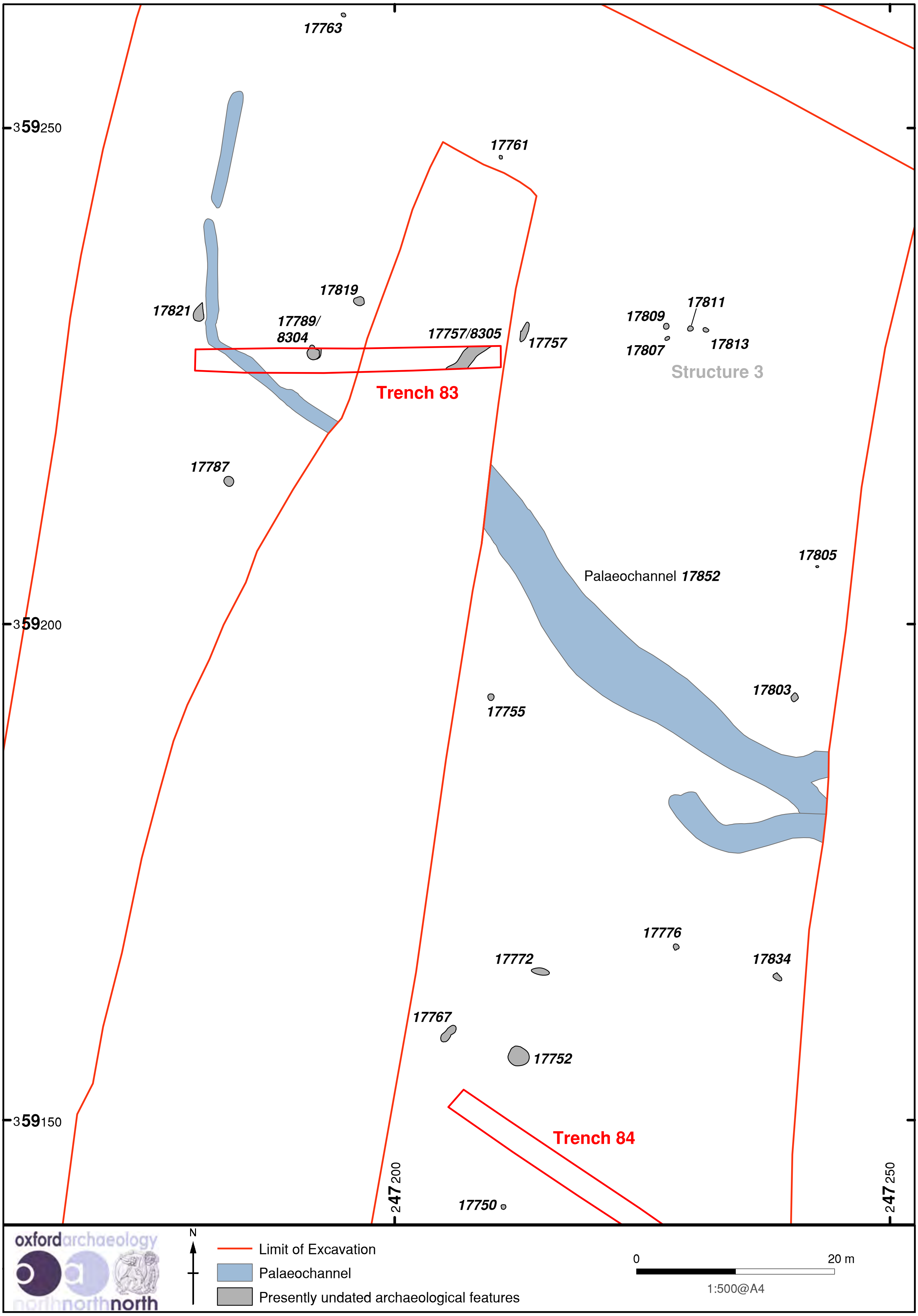

Figure 18: The presently undated features in the southern half of Site 8

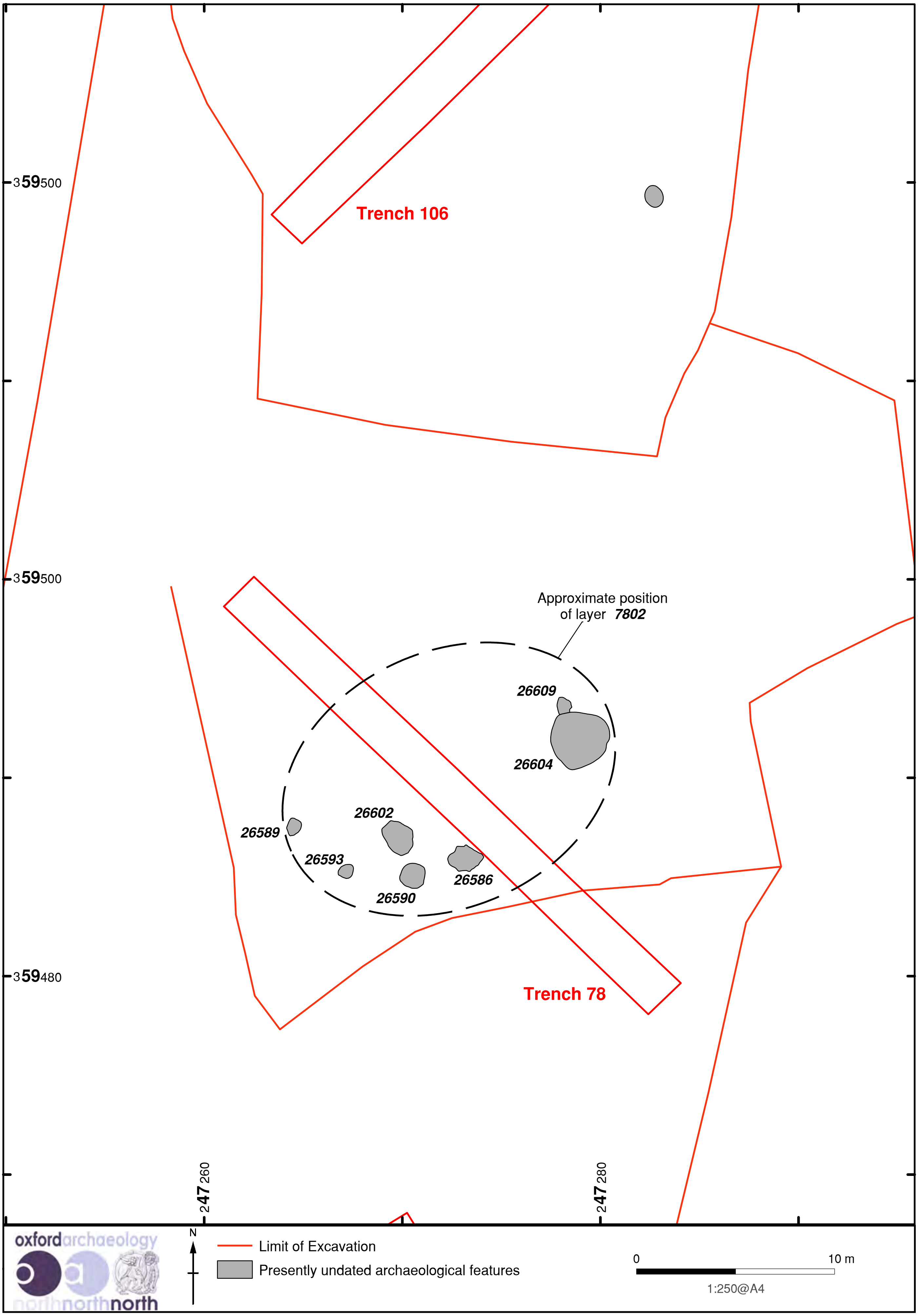

Figure 19: The presently undated features forming Burnt Mound 2 at Site 9

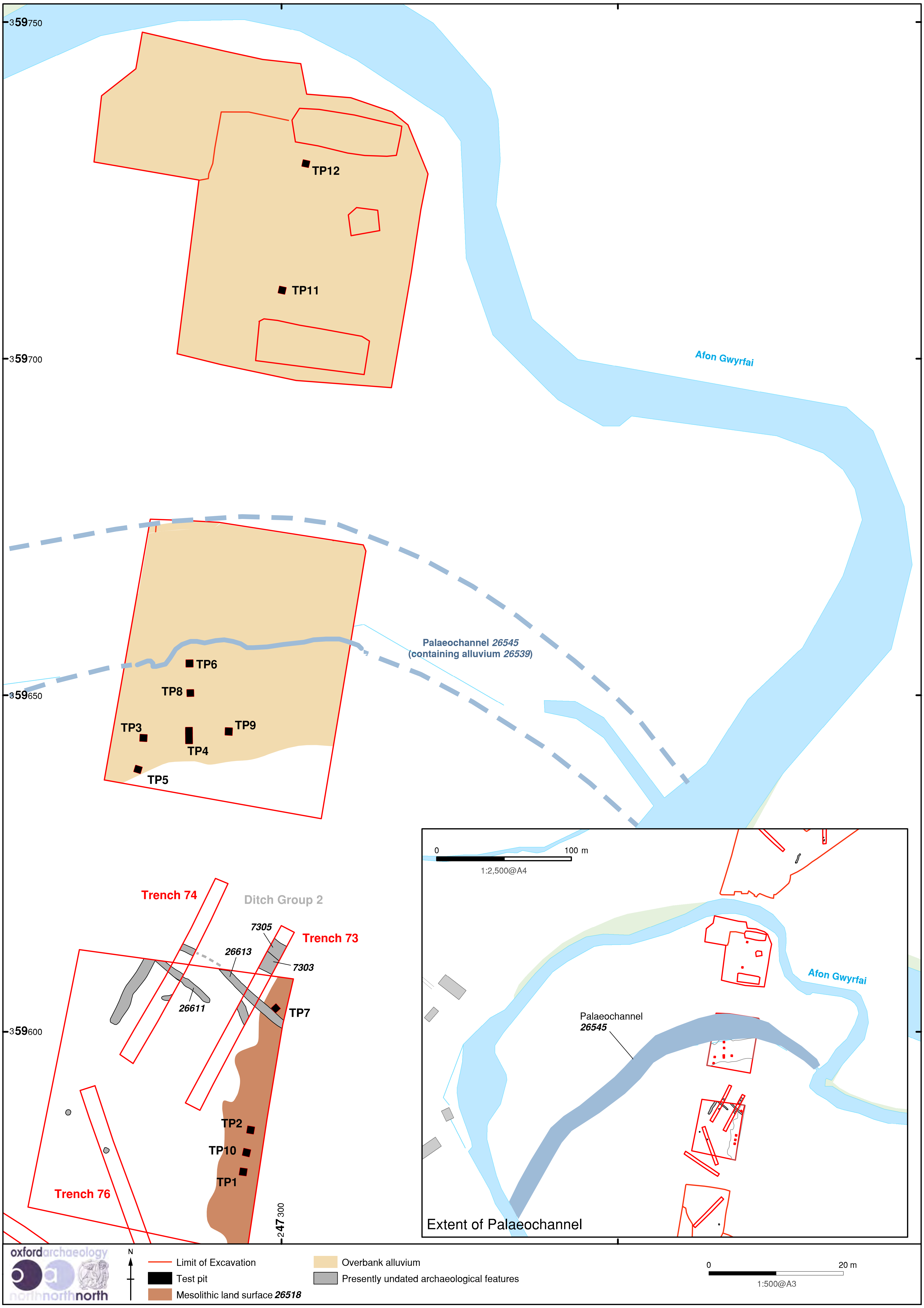

Figure 20: The late Mesolithic land surface, palaeochannel, and presently undated ditches at Site 10

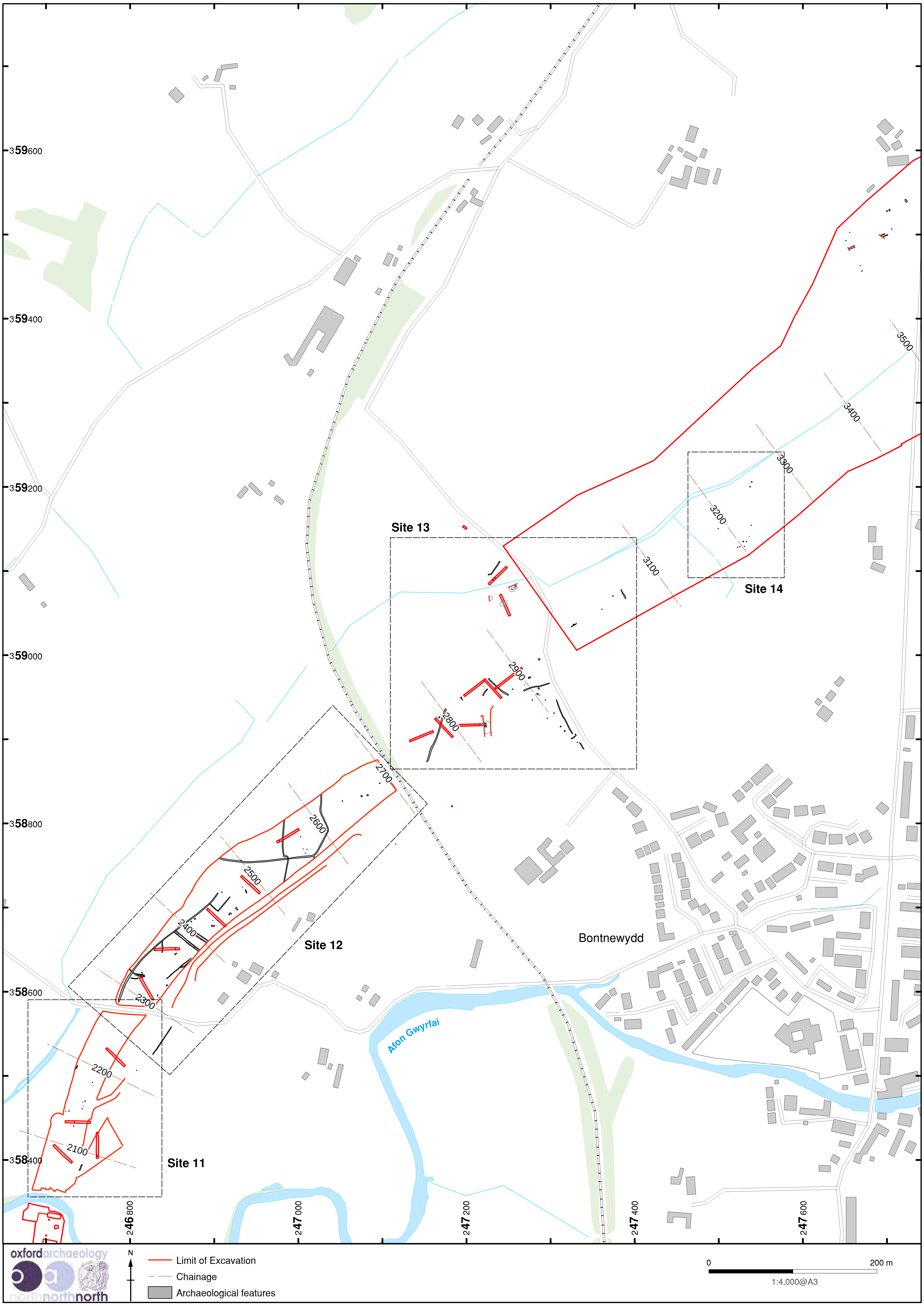

Figure 21: The locations of Sites 11 to 14 in Landscape 3

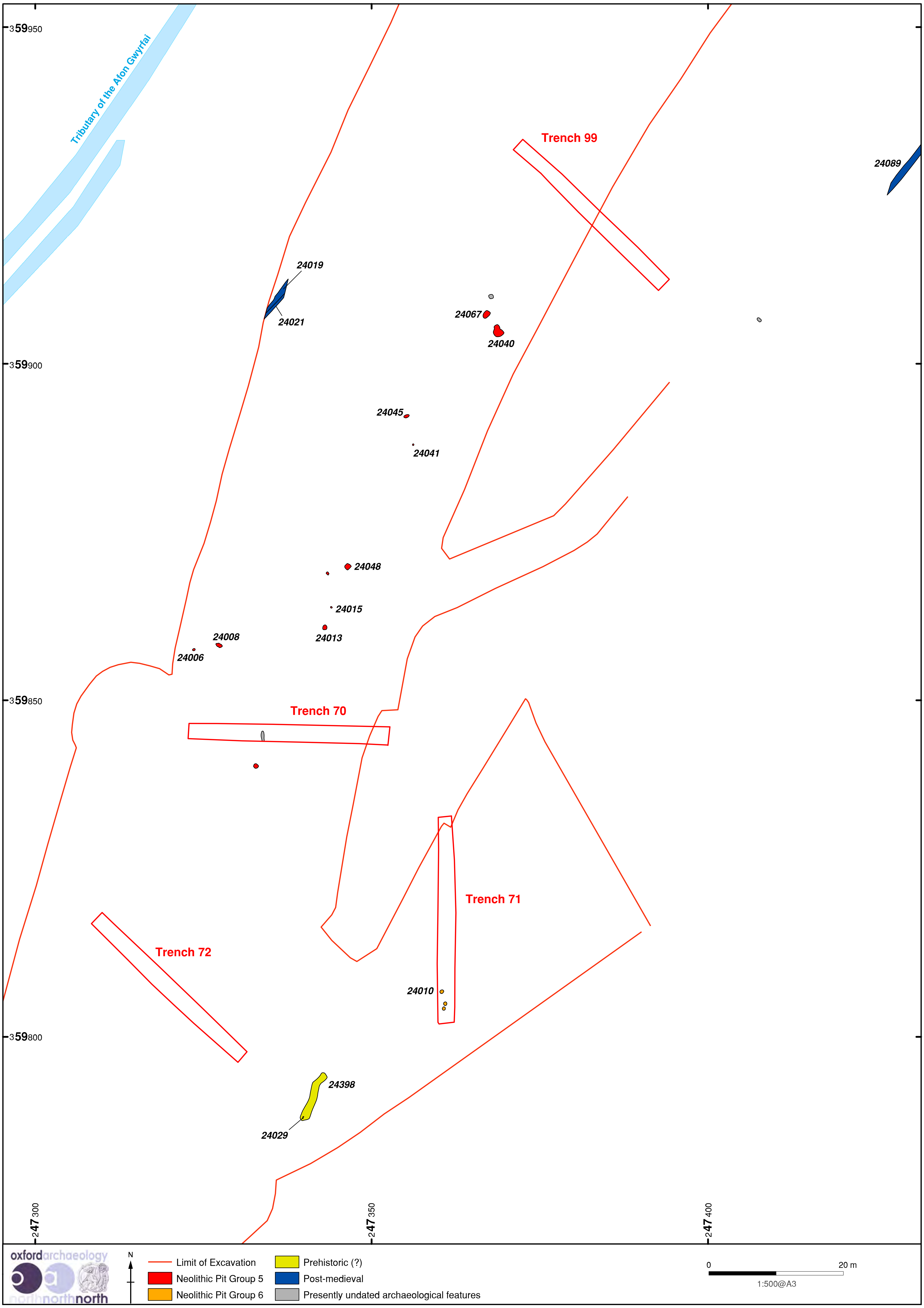

Figure 22: Neolithic pits and post-medieval boundaries at Site 11

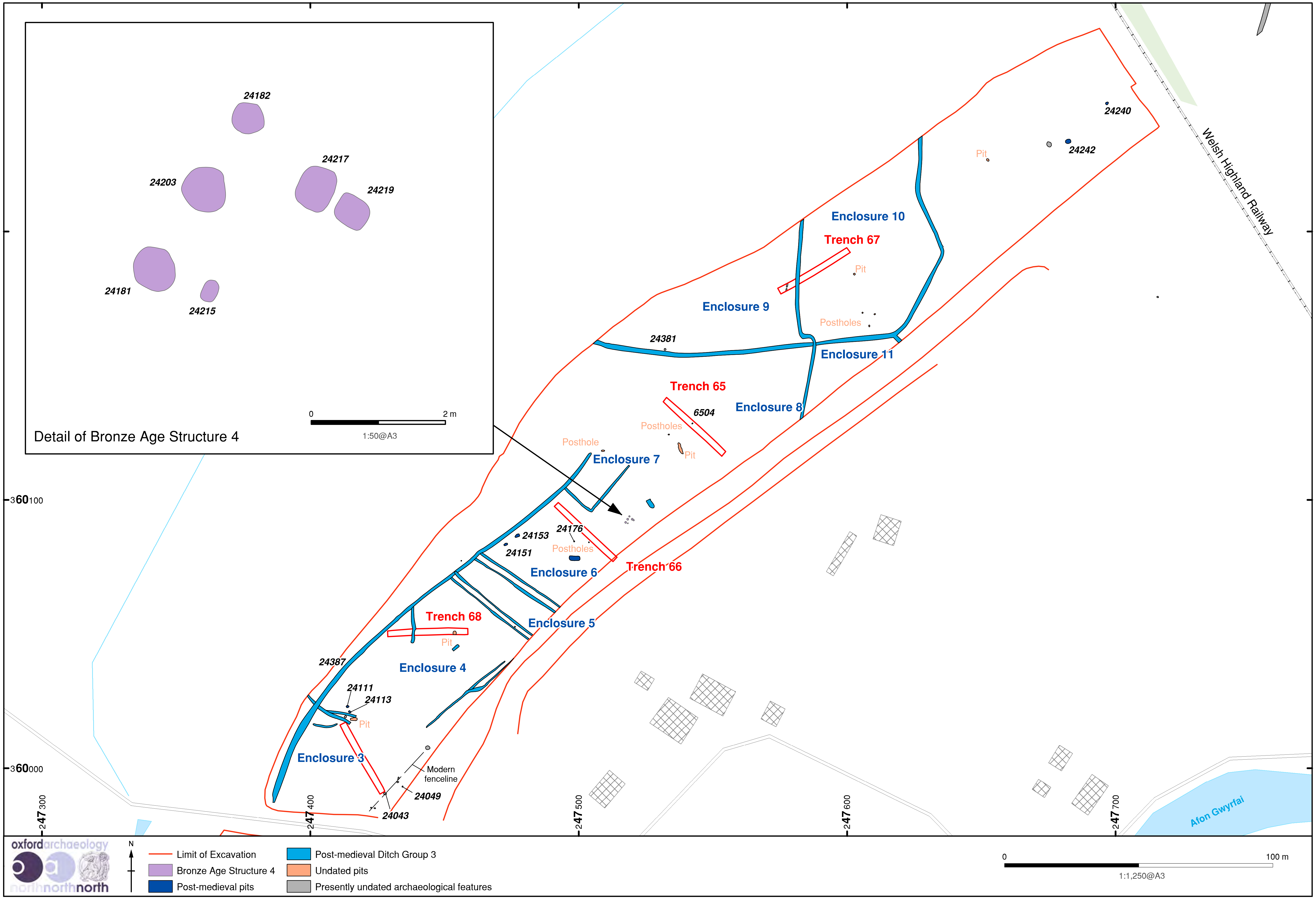

Figure 23: Bronze Age, post-medieval, and presently undated remains at Site 12

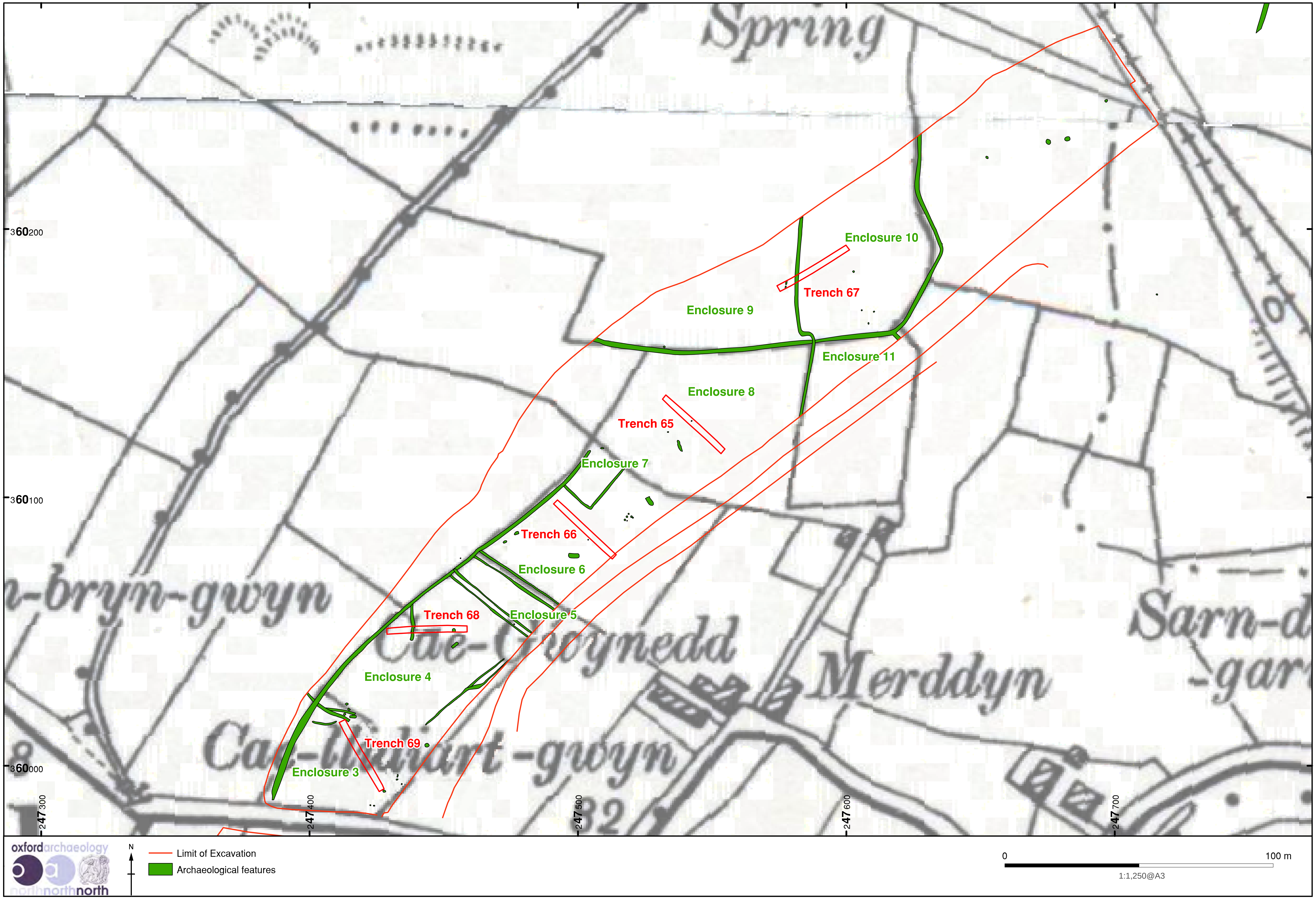

Figure 24: The remains from Site 12 superimposed on the Ordnance Survey map of 1890 (OS1890a)

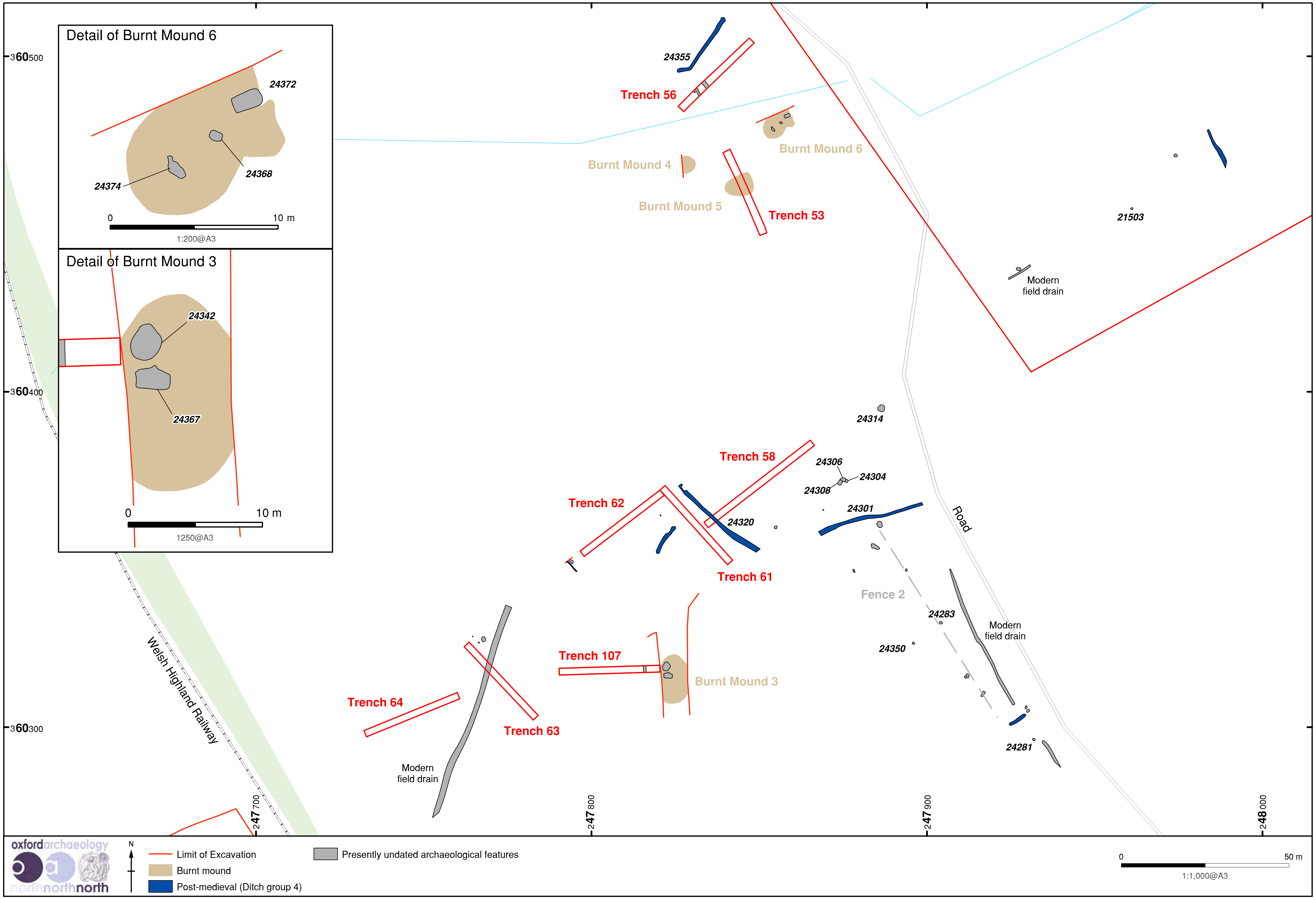

Figure 25: The burnt mounds, post-medieval enclosure, and presently undated pits at Site 13

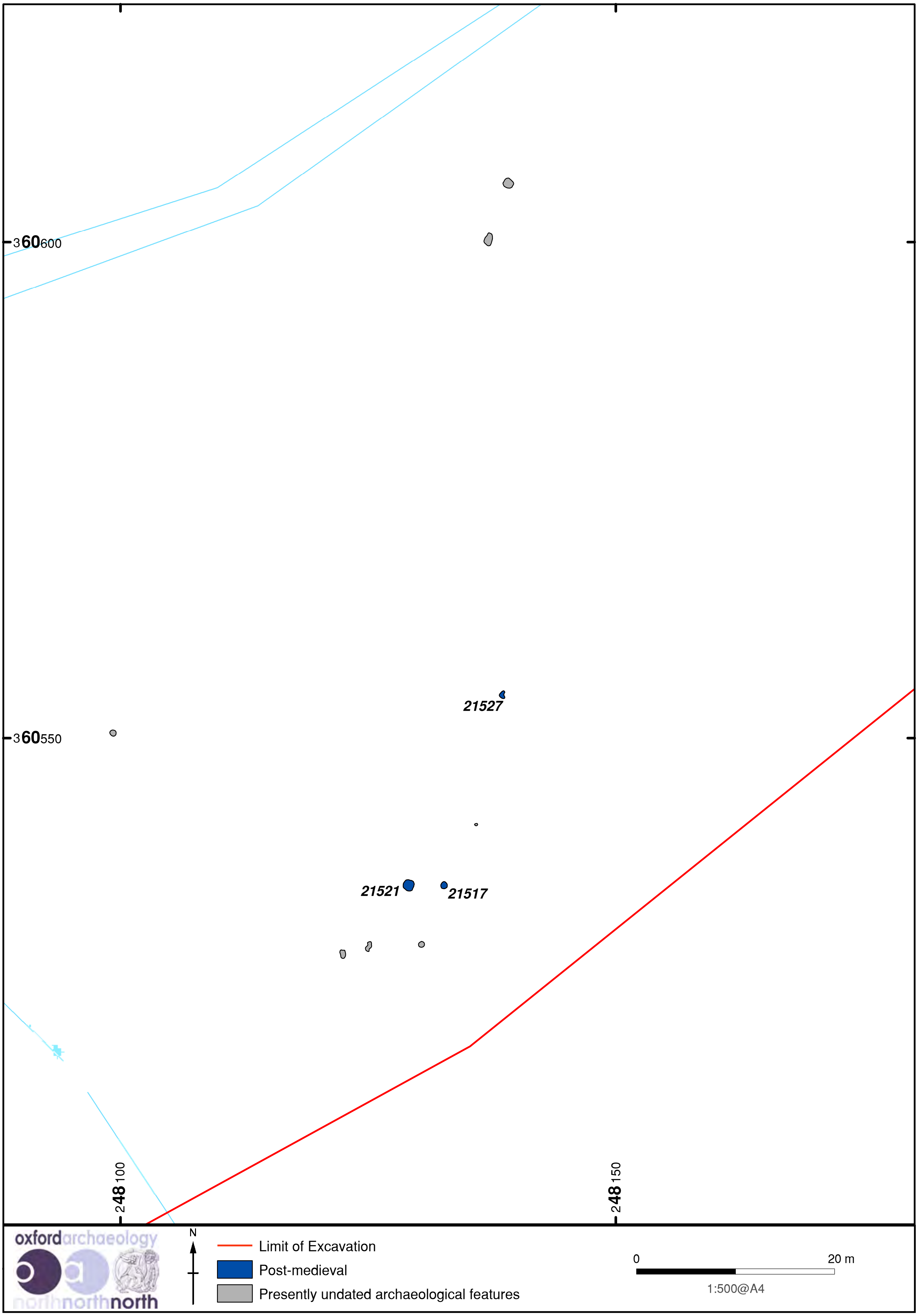

Figure 26: Pit Group 7 at Site 14

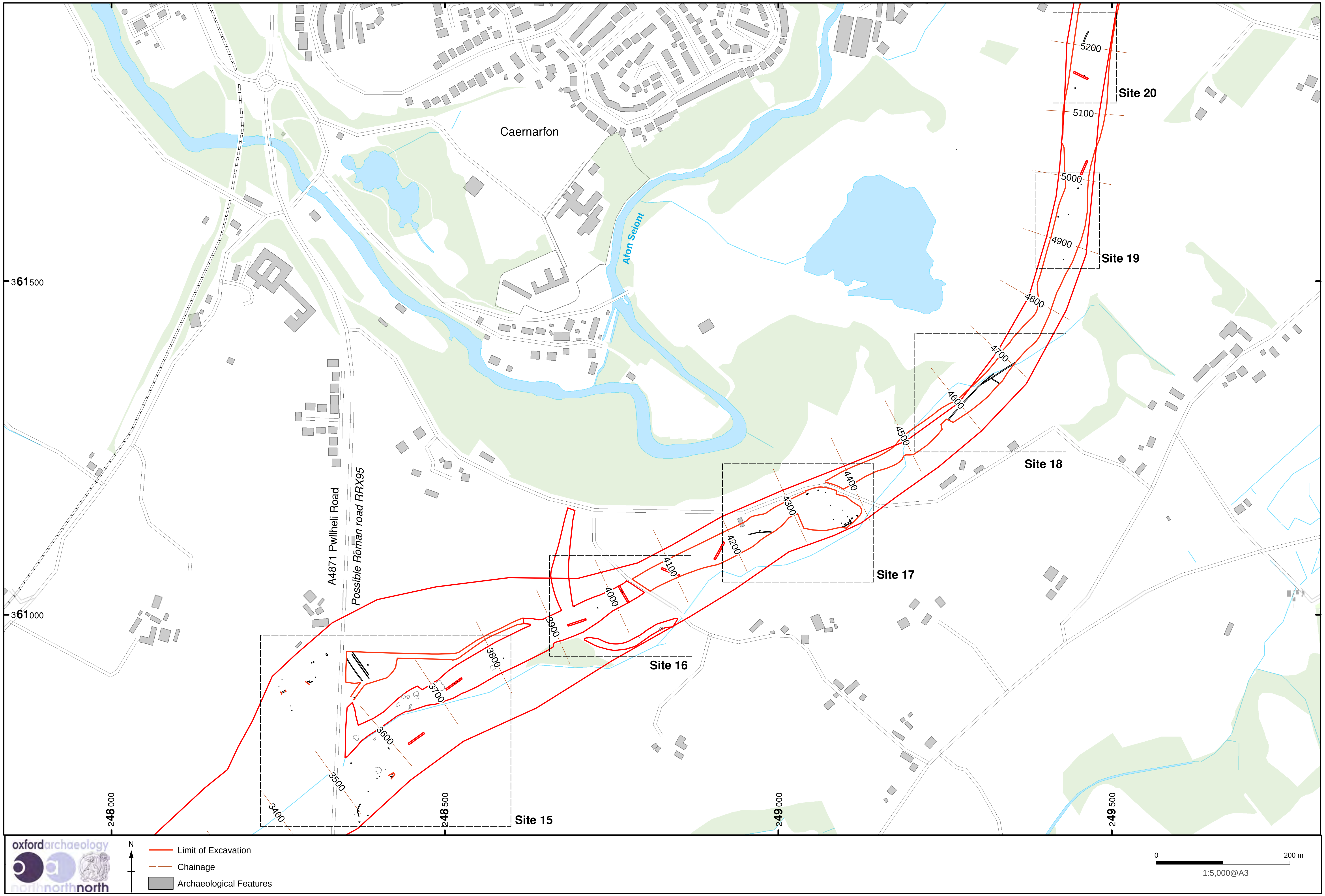

Figure 27: The locations of Sites 15 to 20 in Landscape 3

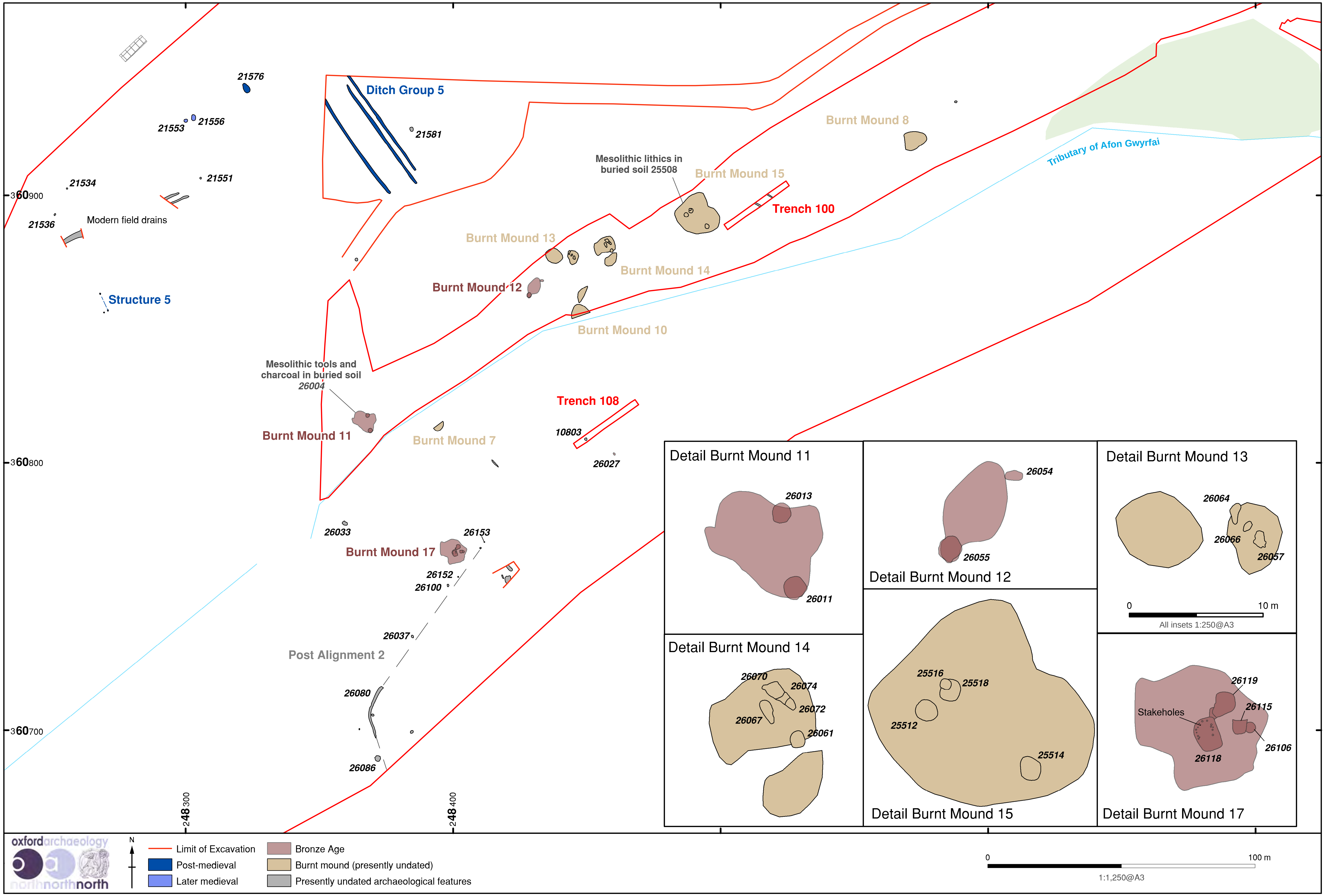

Figure 28: The Mesolithic buried soils, Bronze Age and presently undated burnt mounds, and post-medieval and presently undated pits and ditches at Site 15

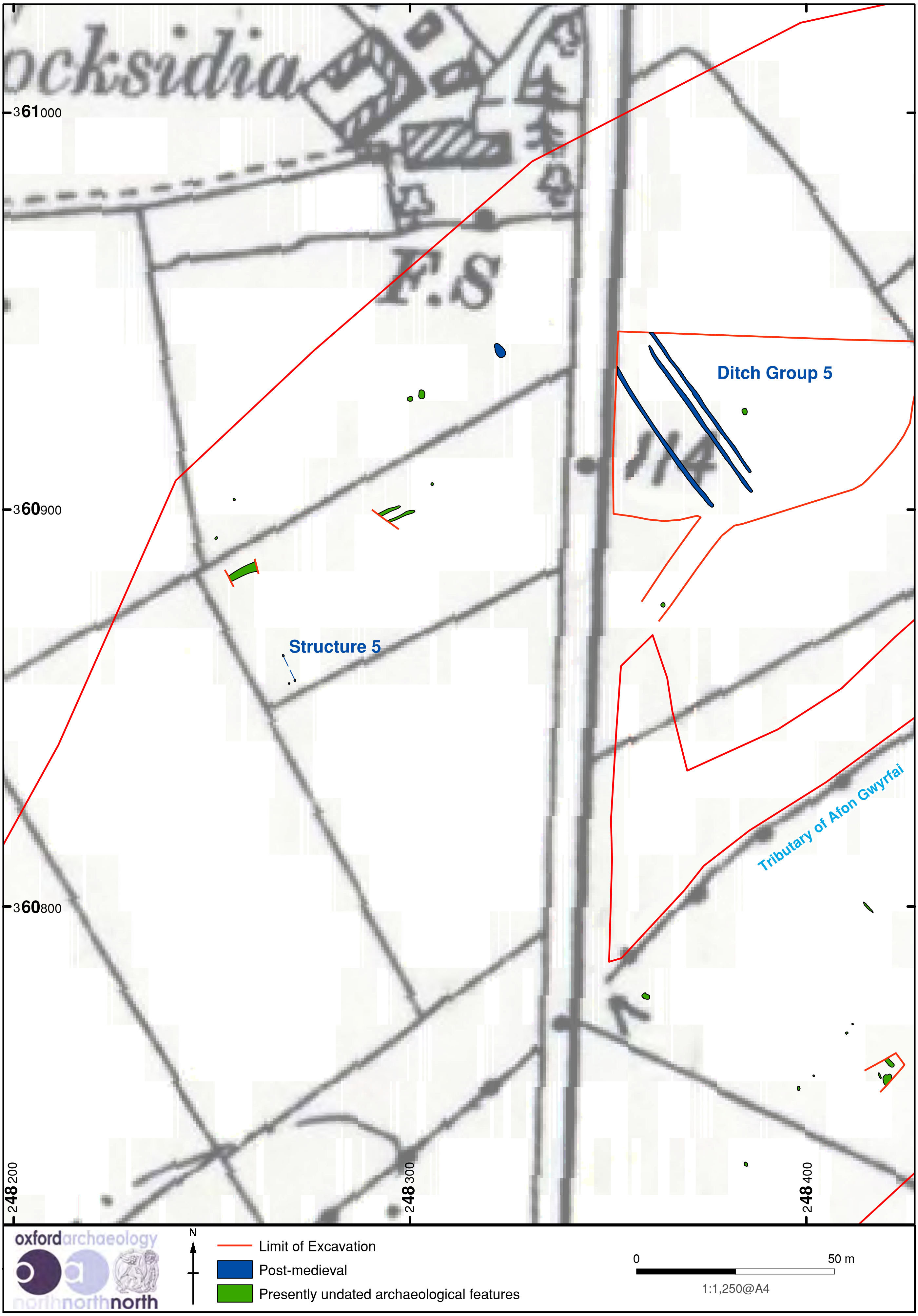

Figure 29: Ditch Group and Structure 5 superimposed on the Ordnance Survey map of 1889 (OS 1889f)

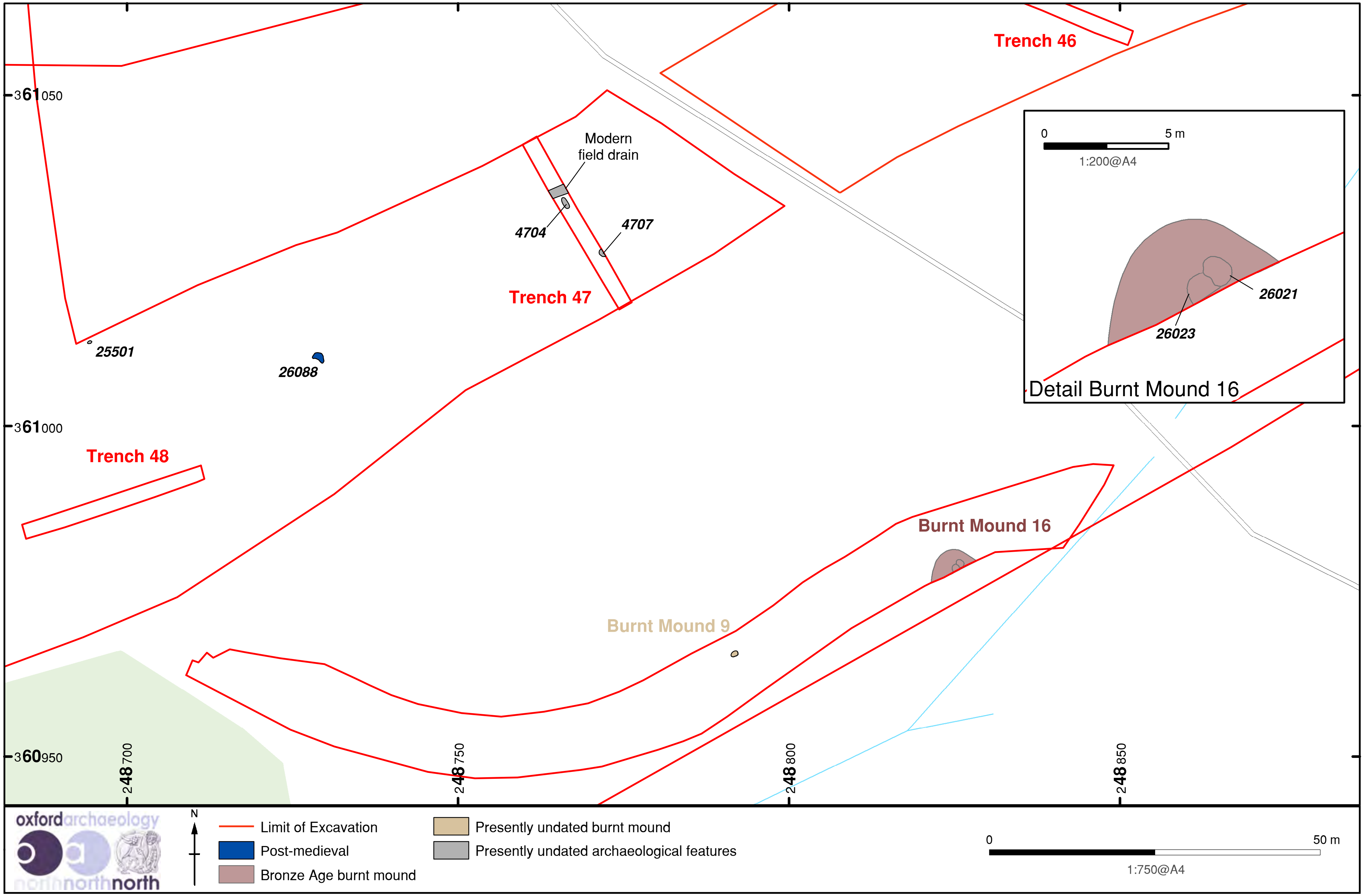

Figure 30: Burnt mounds, post-medieval features, and presently undated pits at Site 16

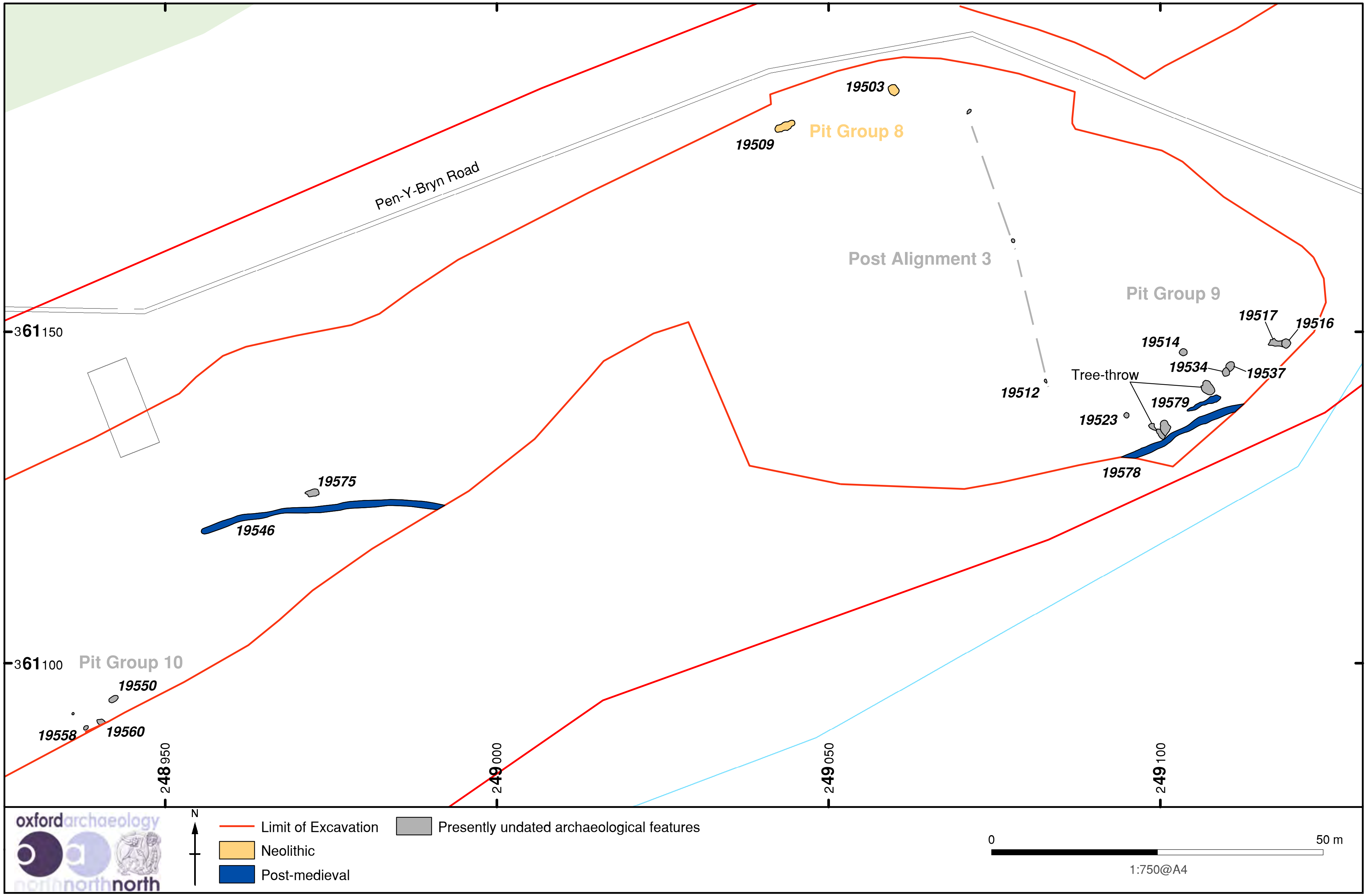

Figure 31: Pit groups and ditches at Site 17

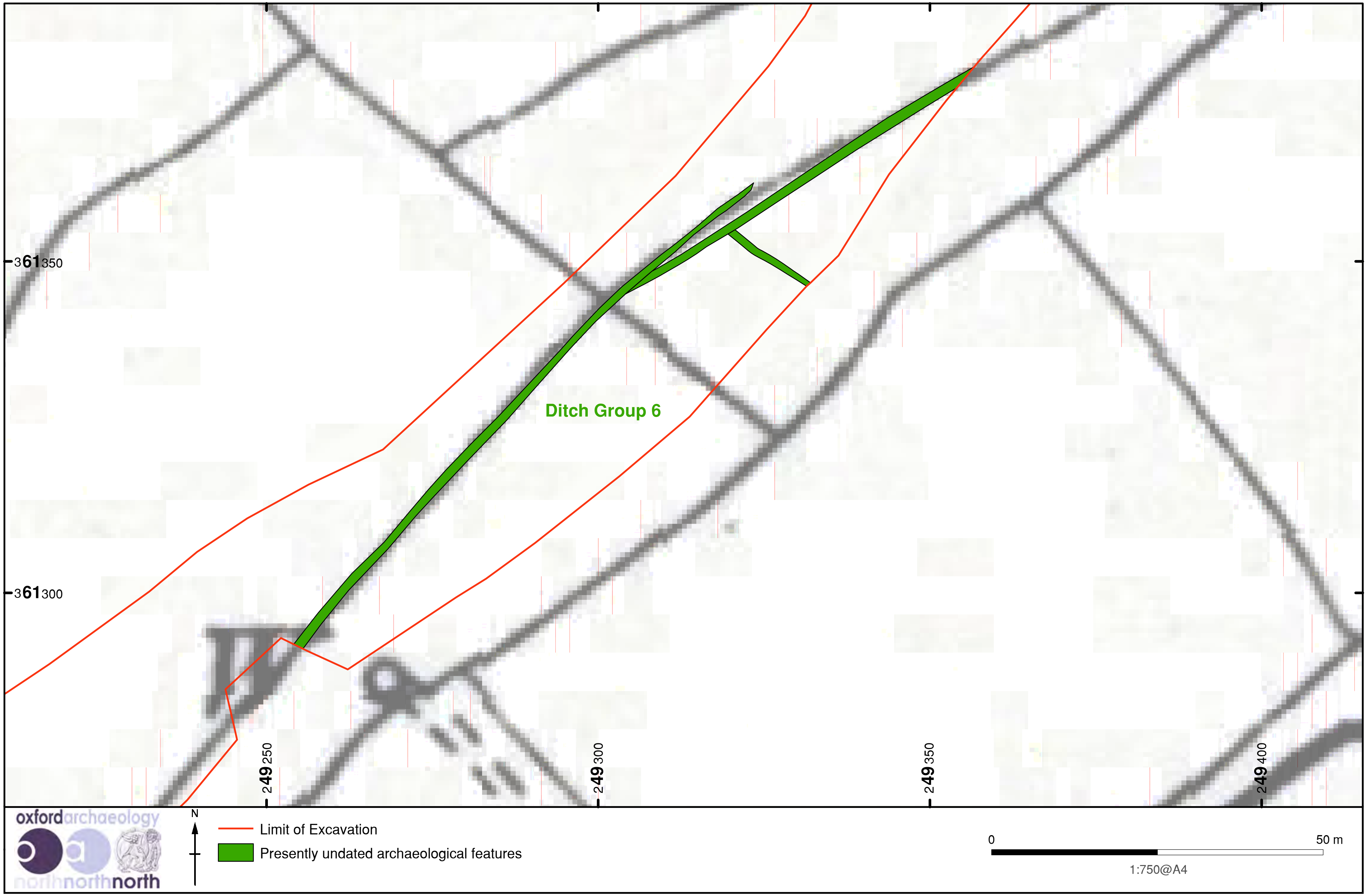

Figure 32: Ditch Group 6, Site 18, superimposed on the Ordnance Survey map of 1889 (OS 1889g)

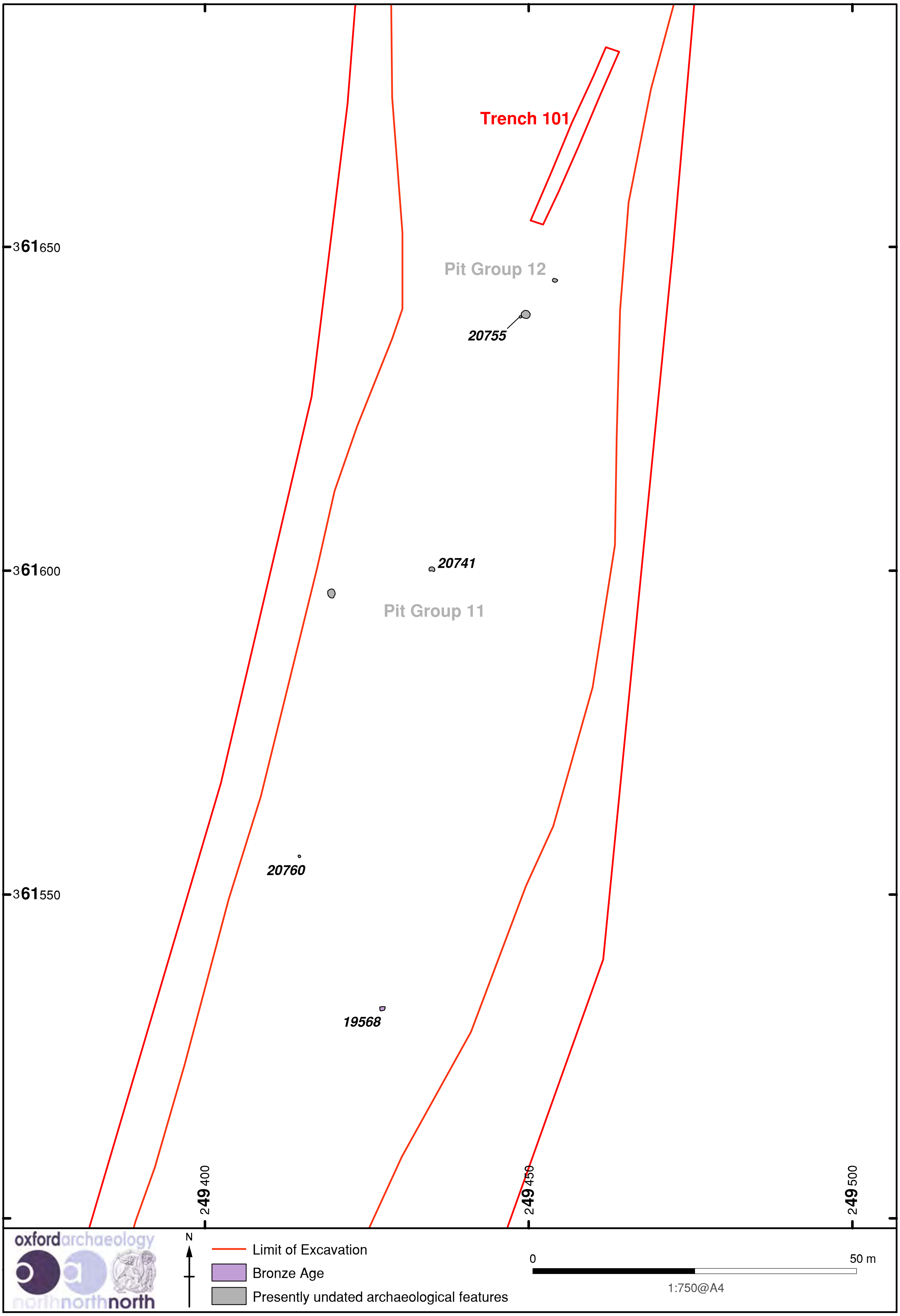

Figure 33: Pit groups and ditches at Site 19

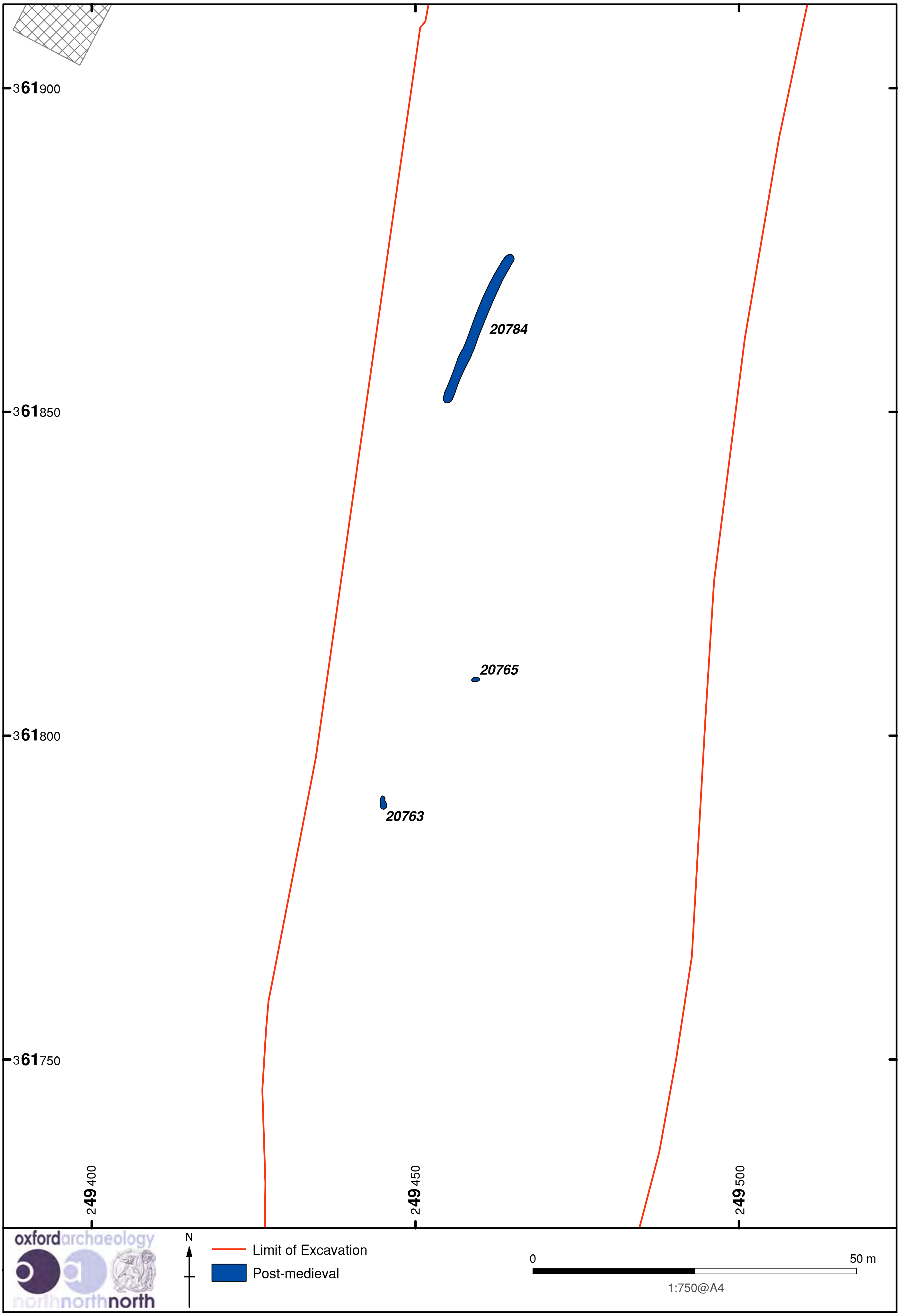

Figure 34: Post-medieval pits and ditch at Site 20

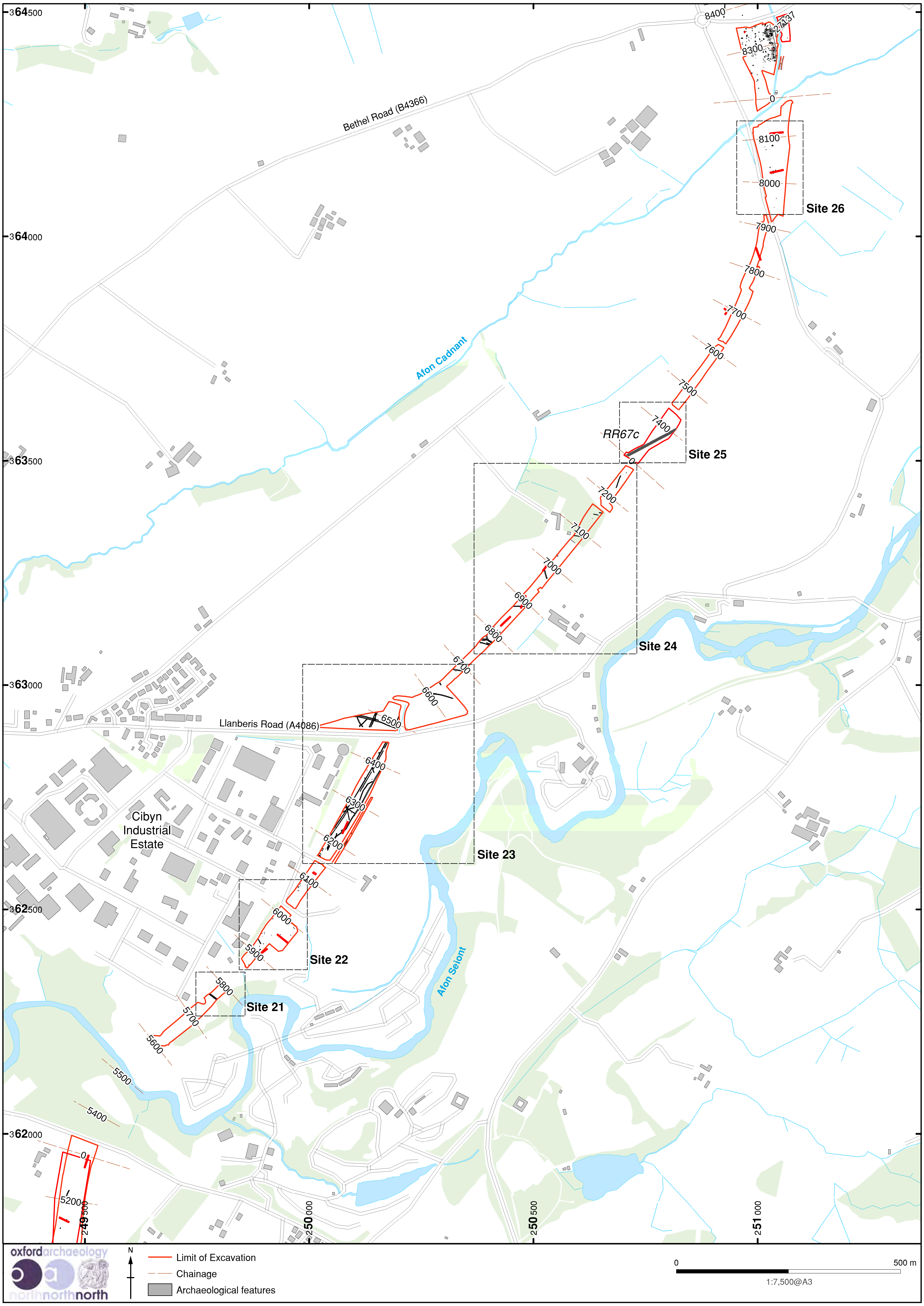

Figure 35: The locations of Sites 21-6 in Landscape 4

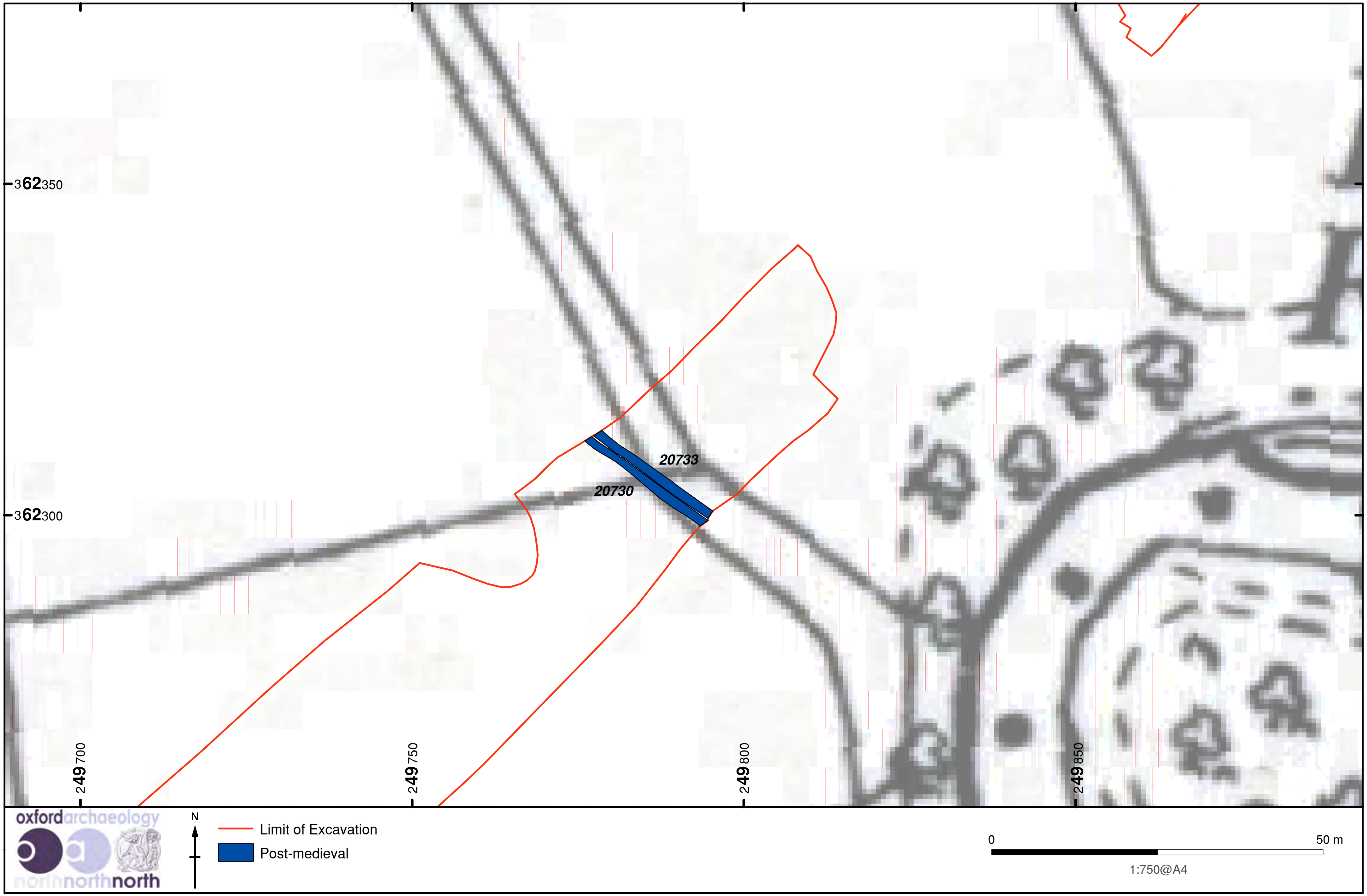

Figure 36: Post-medieval ditches, Site 21, superimposed on the Ordnance Survey map of 1889 (OS 1889c)

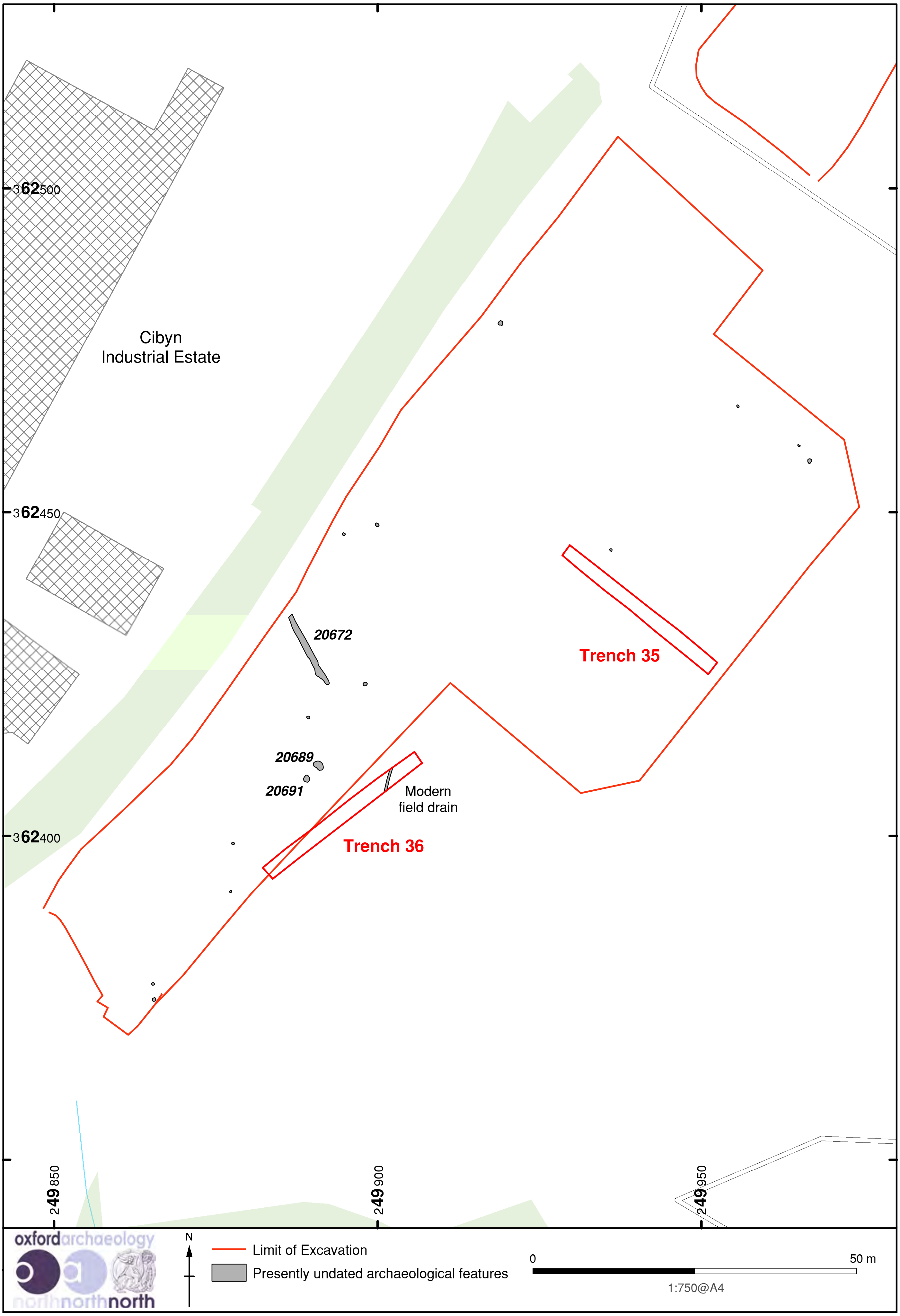

Figure 37: Presently undated features at Site 22

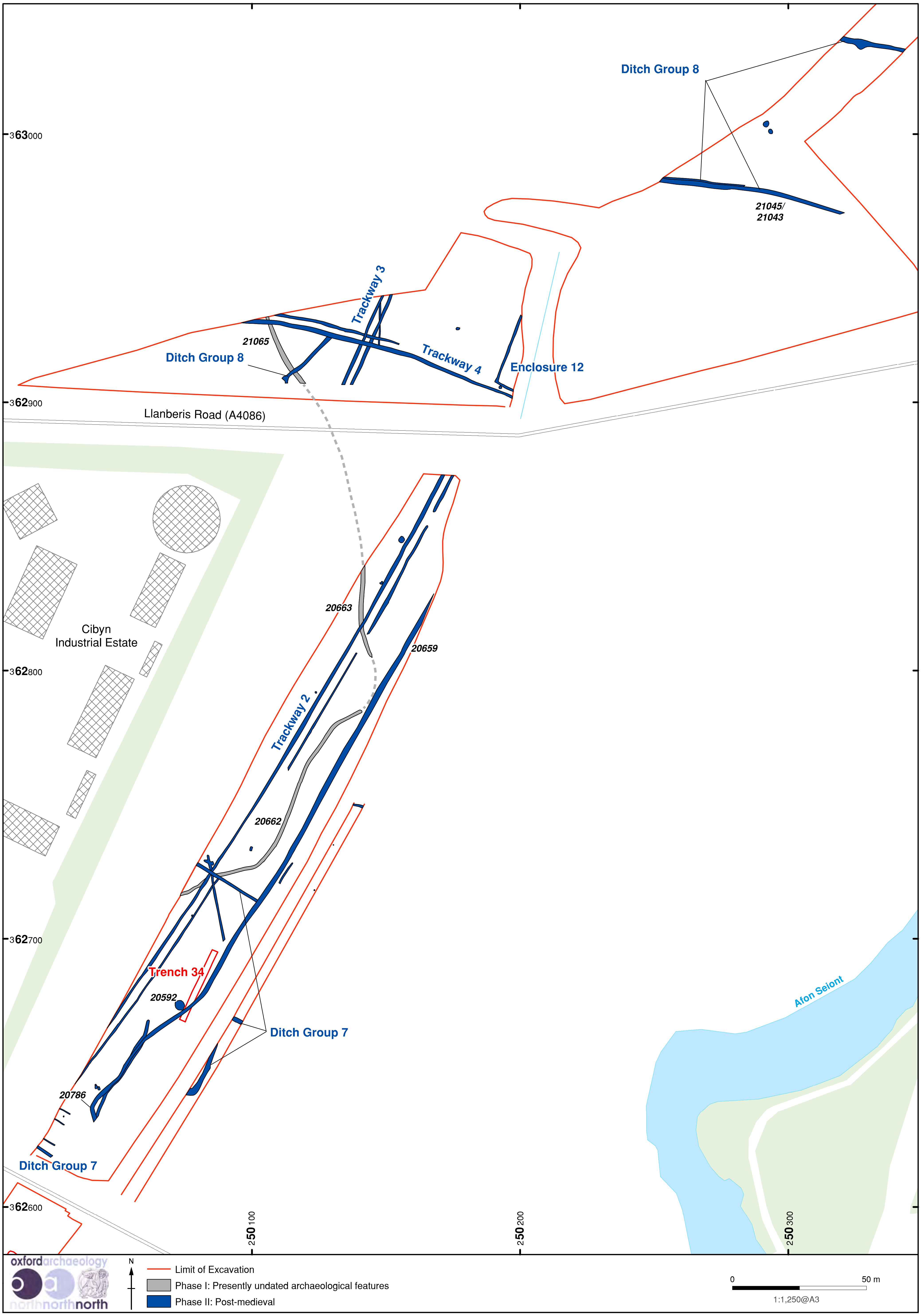

Figure 38: Post-medieval and presently undated features at Site 23

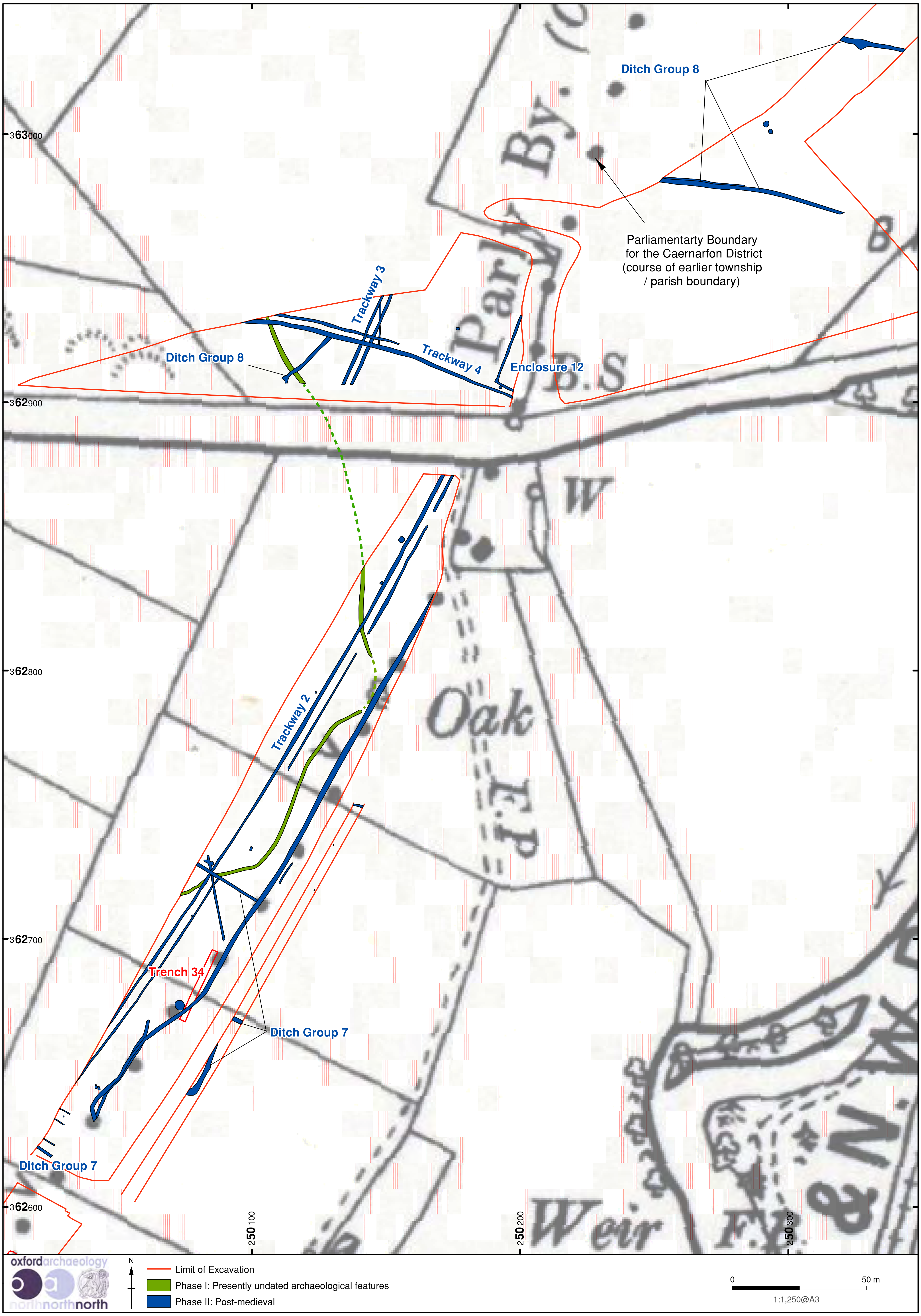

Figure 39: Post-medieval ditches, Site 23, superimposed on the Ordnance Survey map of 1889 (OS 1889c)

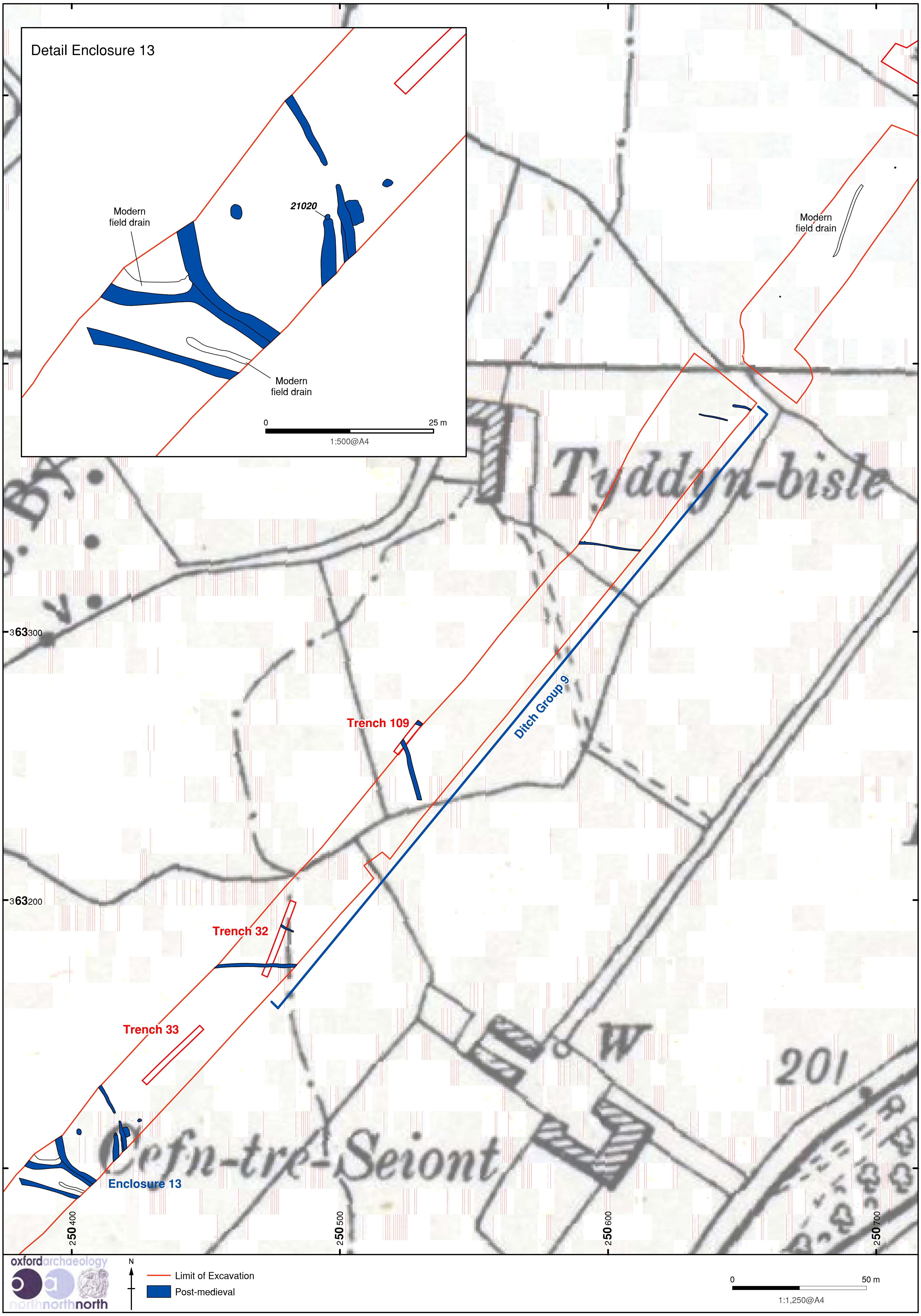

Figure 40: Post-medieval ditches, Site 24, superimposed on the Ordnance Survey map of 1889 (OS 1889c)

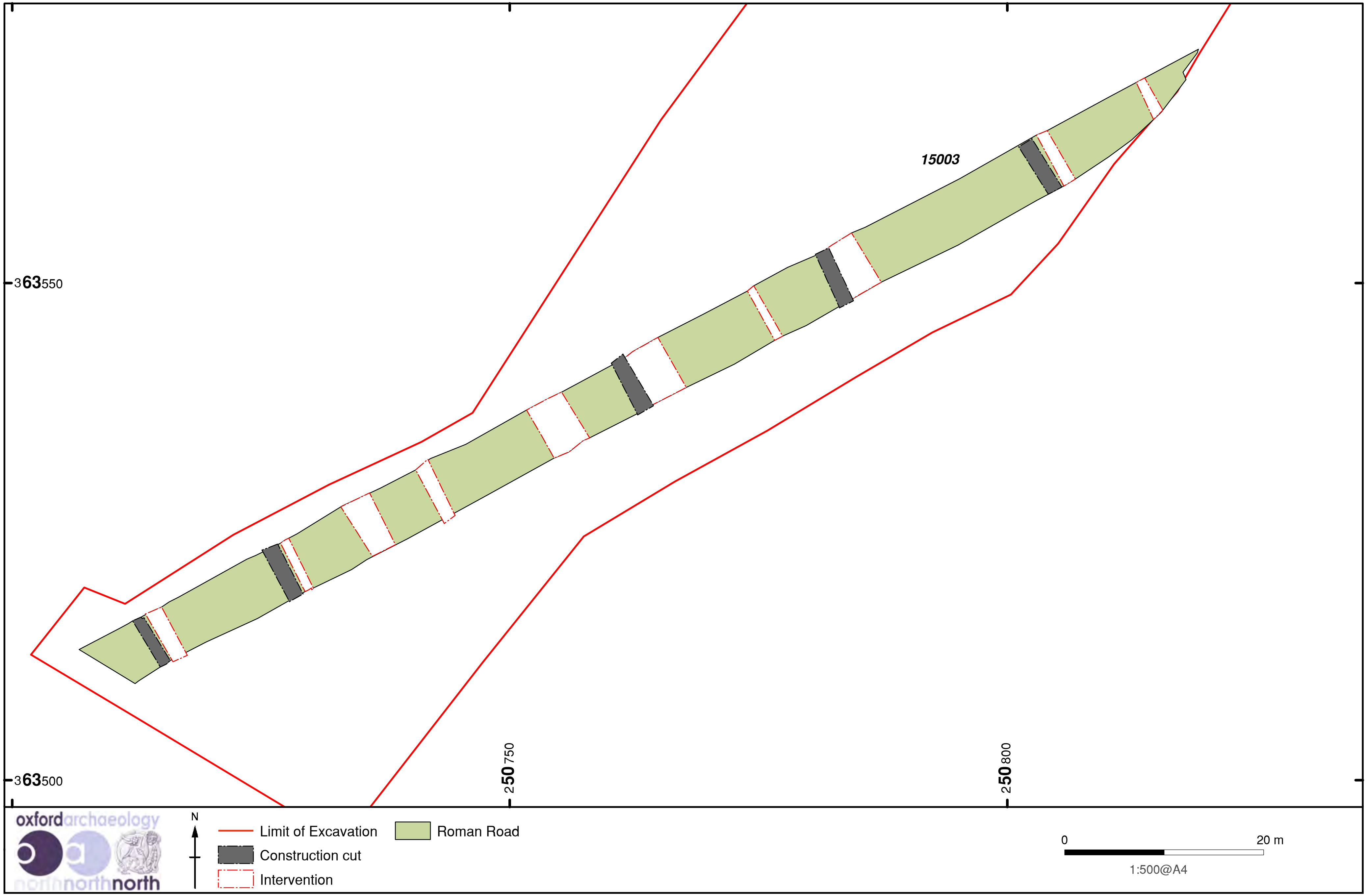

Figure 41: The Roman road, and the excavated interventions, at Site 25

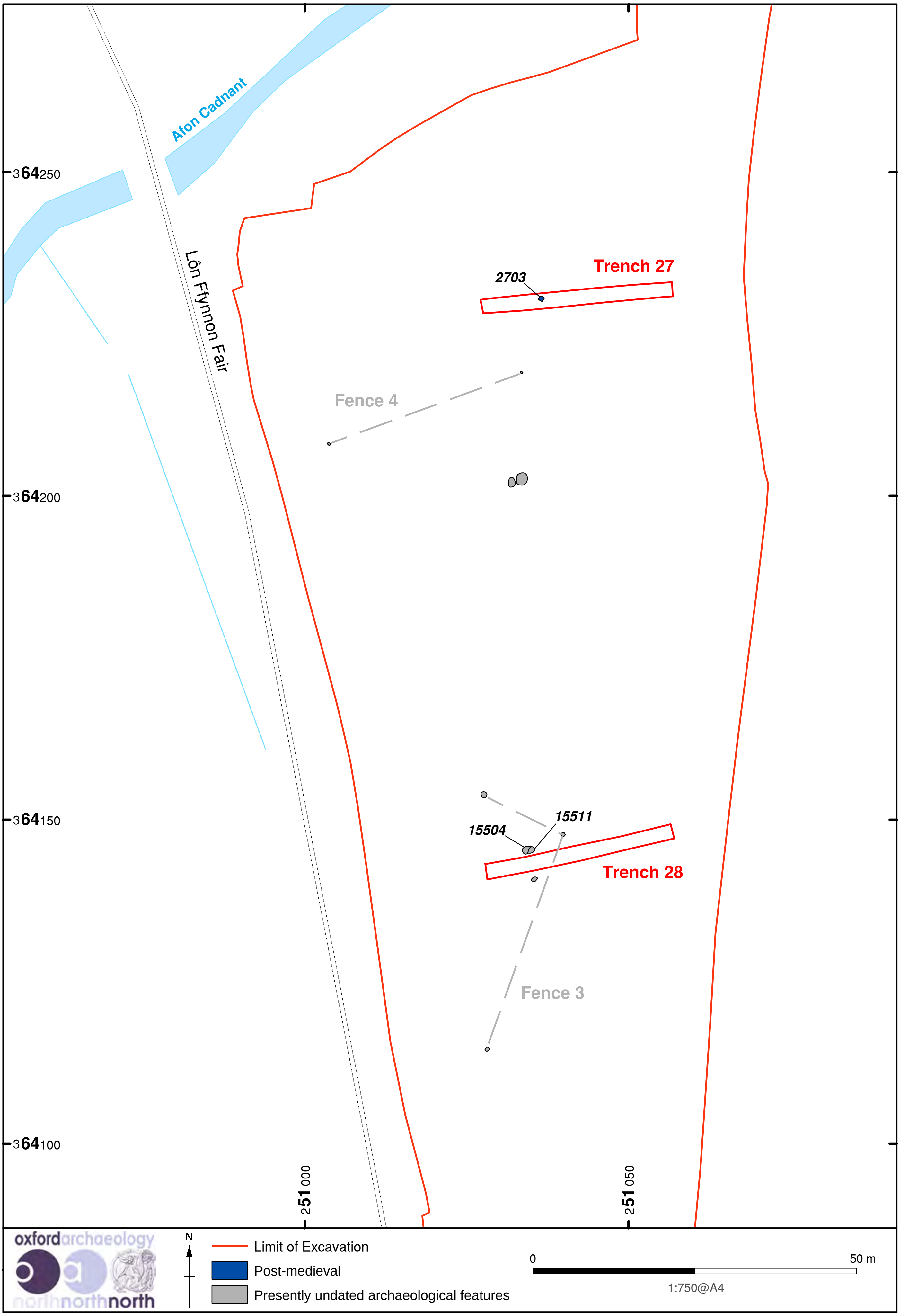

Figure 42: Post-medieval and presently undated pits at Site 26

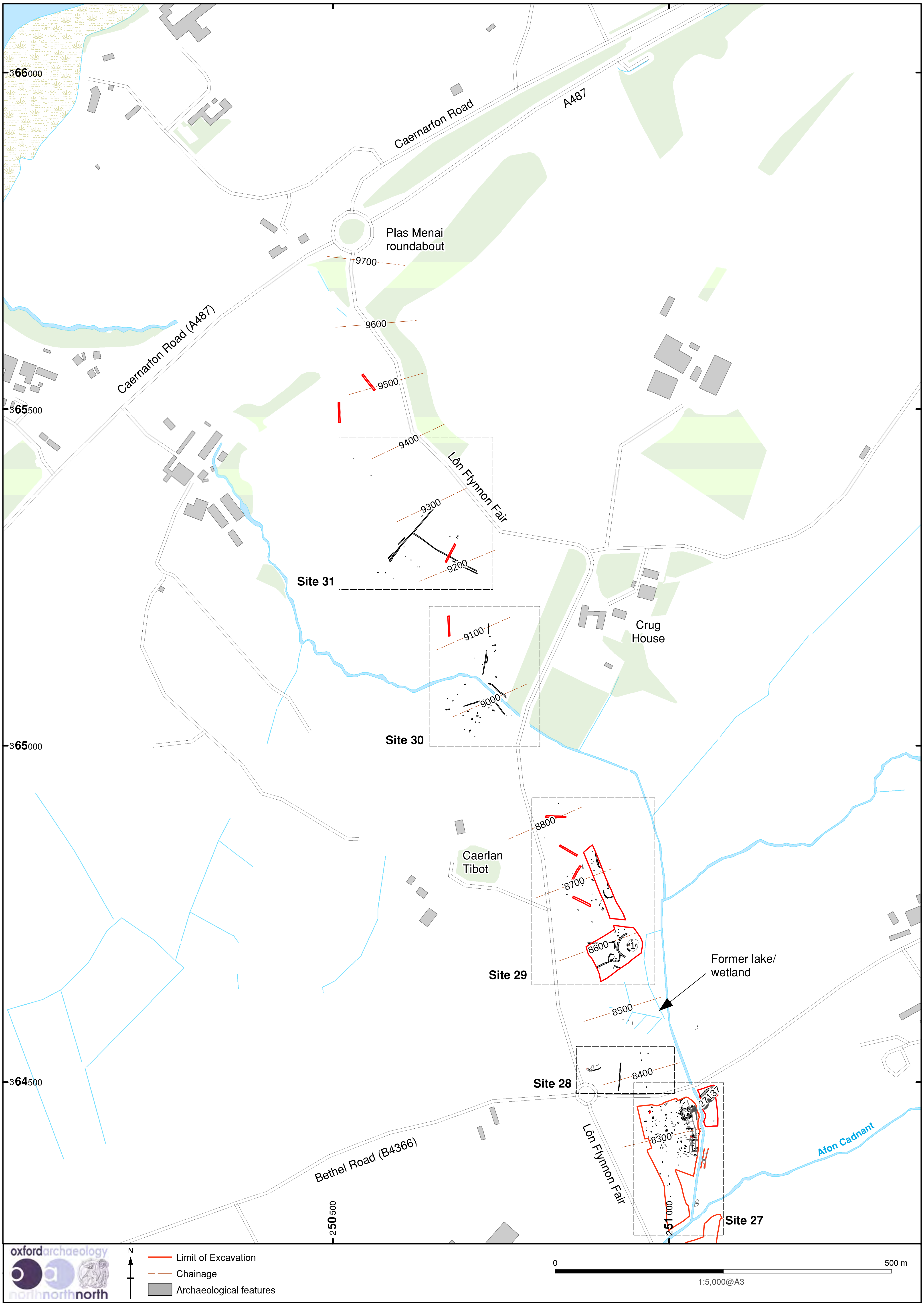

Figure 43: The locations of Sites 27-30 in Landscape 5

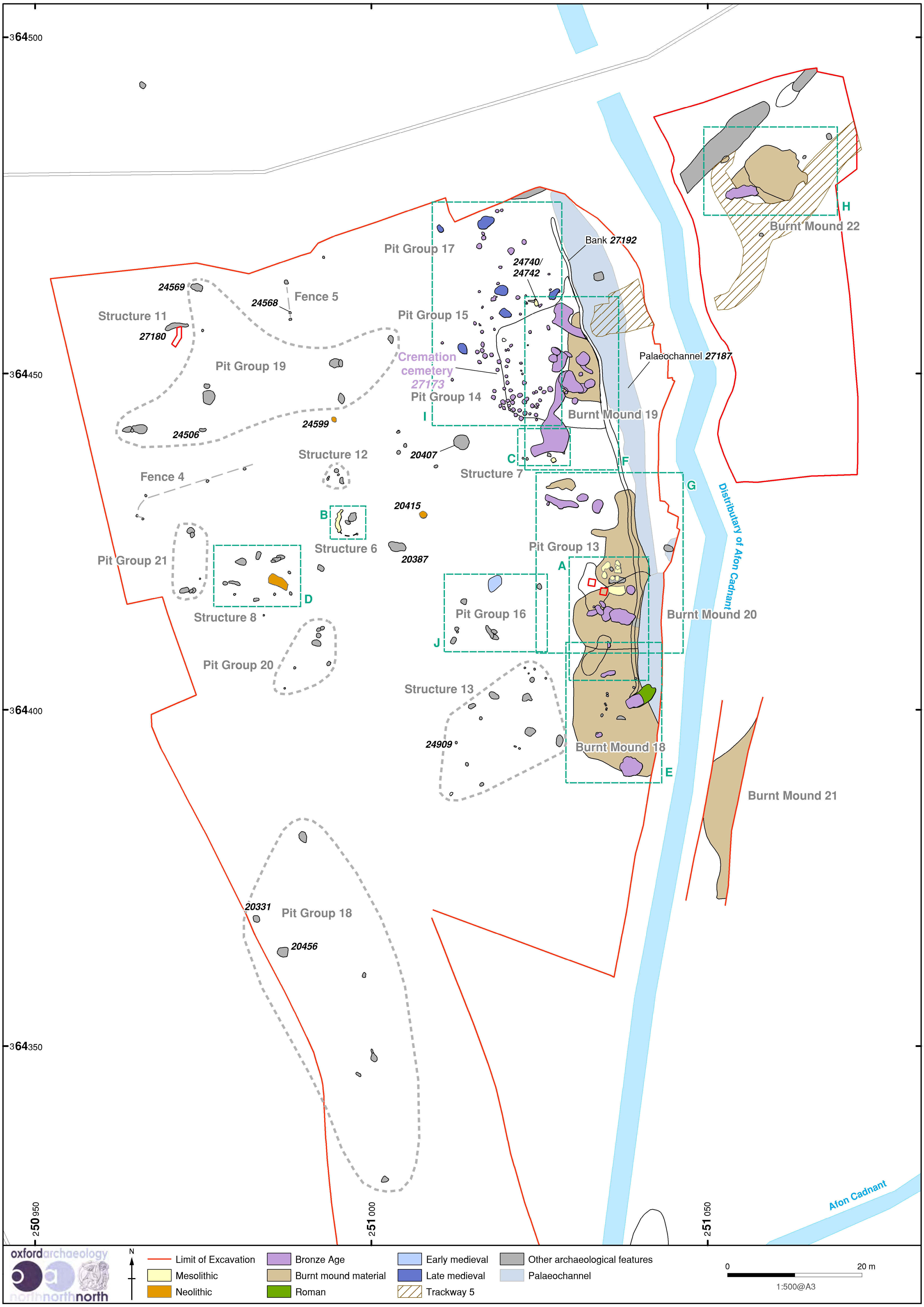

Figure 44: Site 27, showing areas of Mesolithic, Neolithic and Bronze Age activity, and the locations of detailed insets (Figure 45)

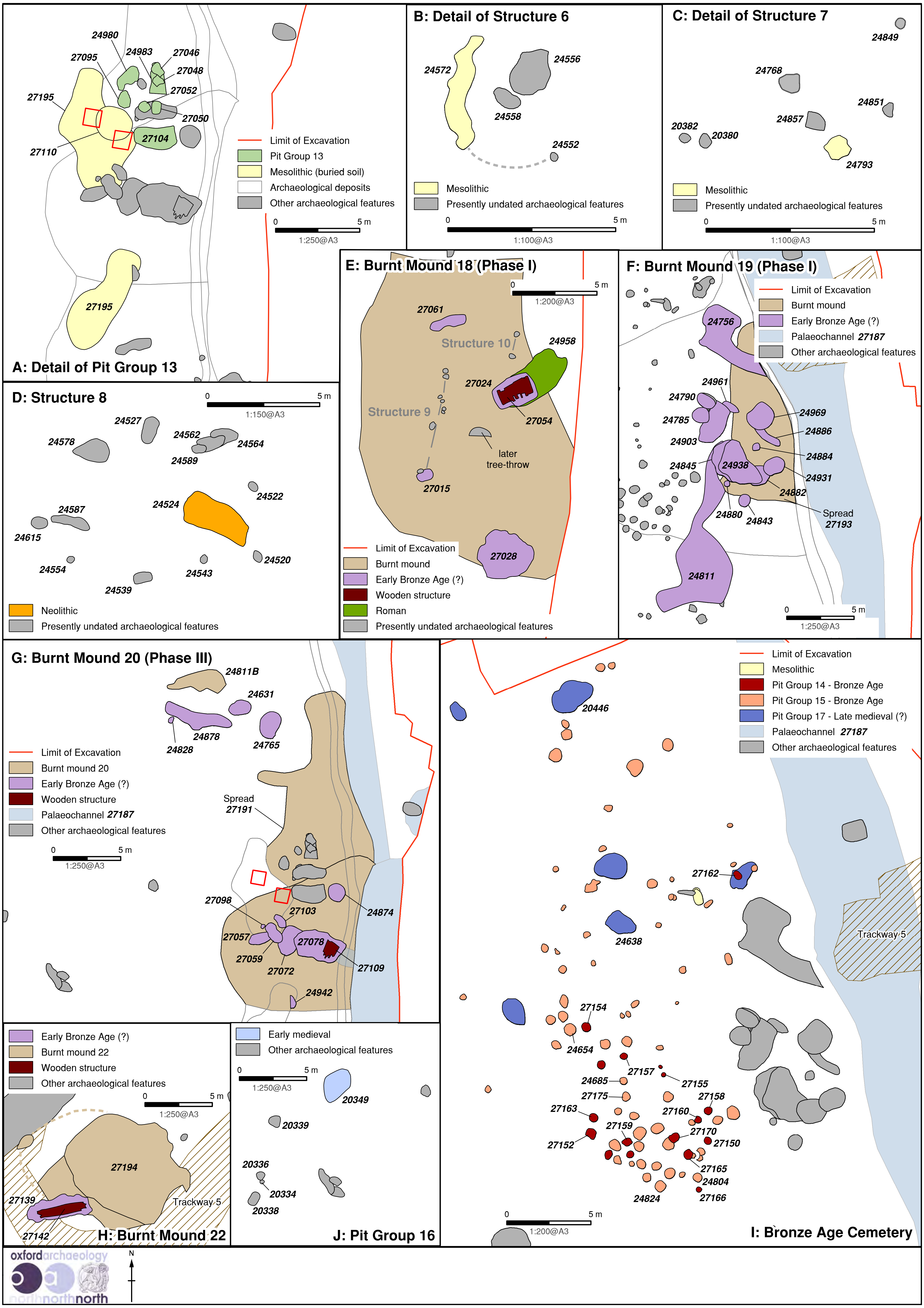

Figure 45: Detailed views of specific areas of Mesolithic, Neolithic, and Bronze Age activity at Site 27

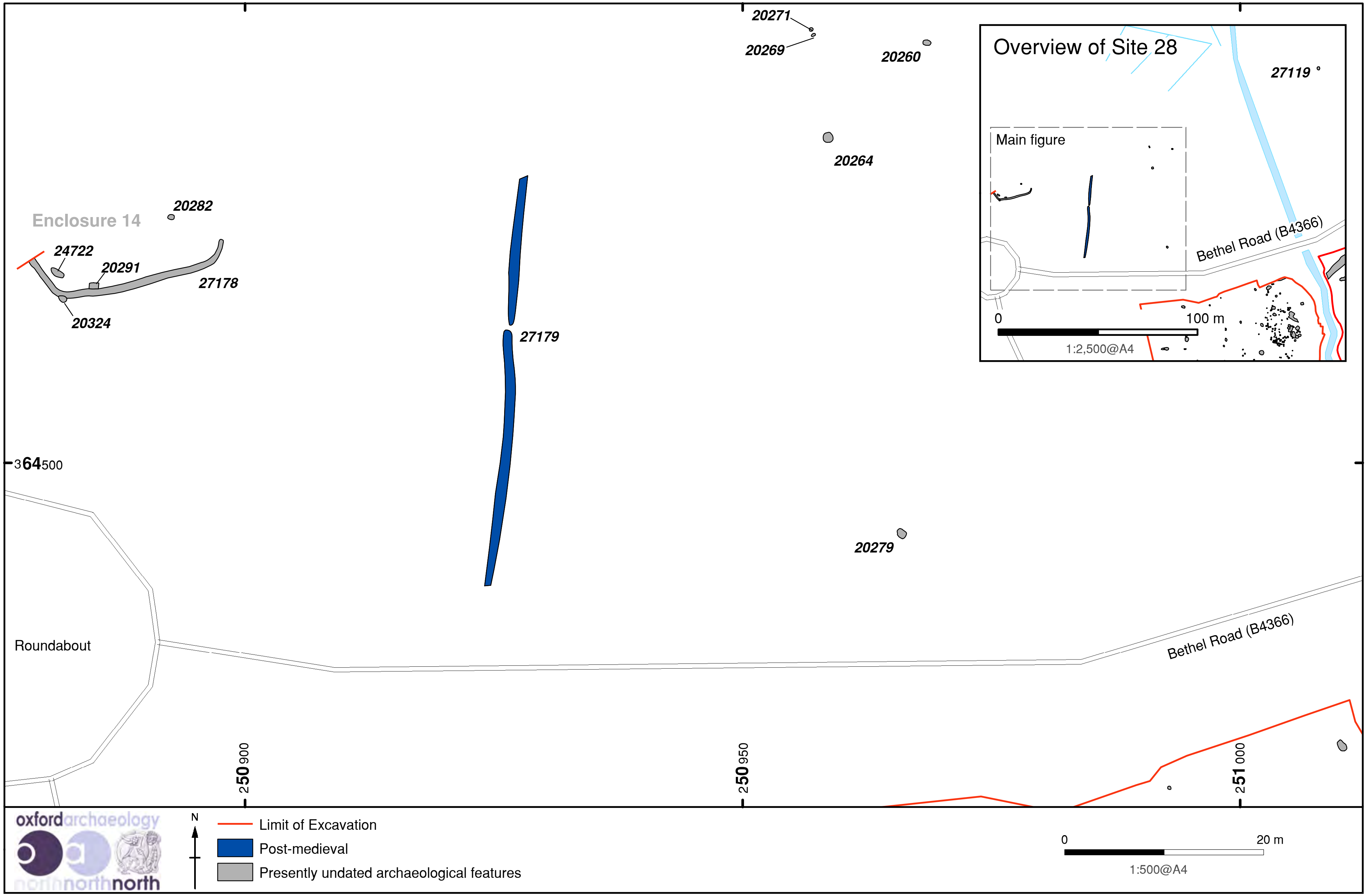

Figure 46: Post-medieval and presently undated enclosure and pits at Site 28

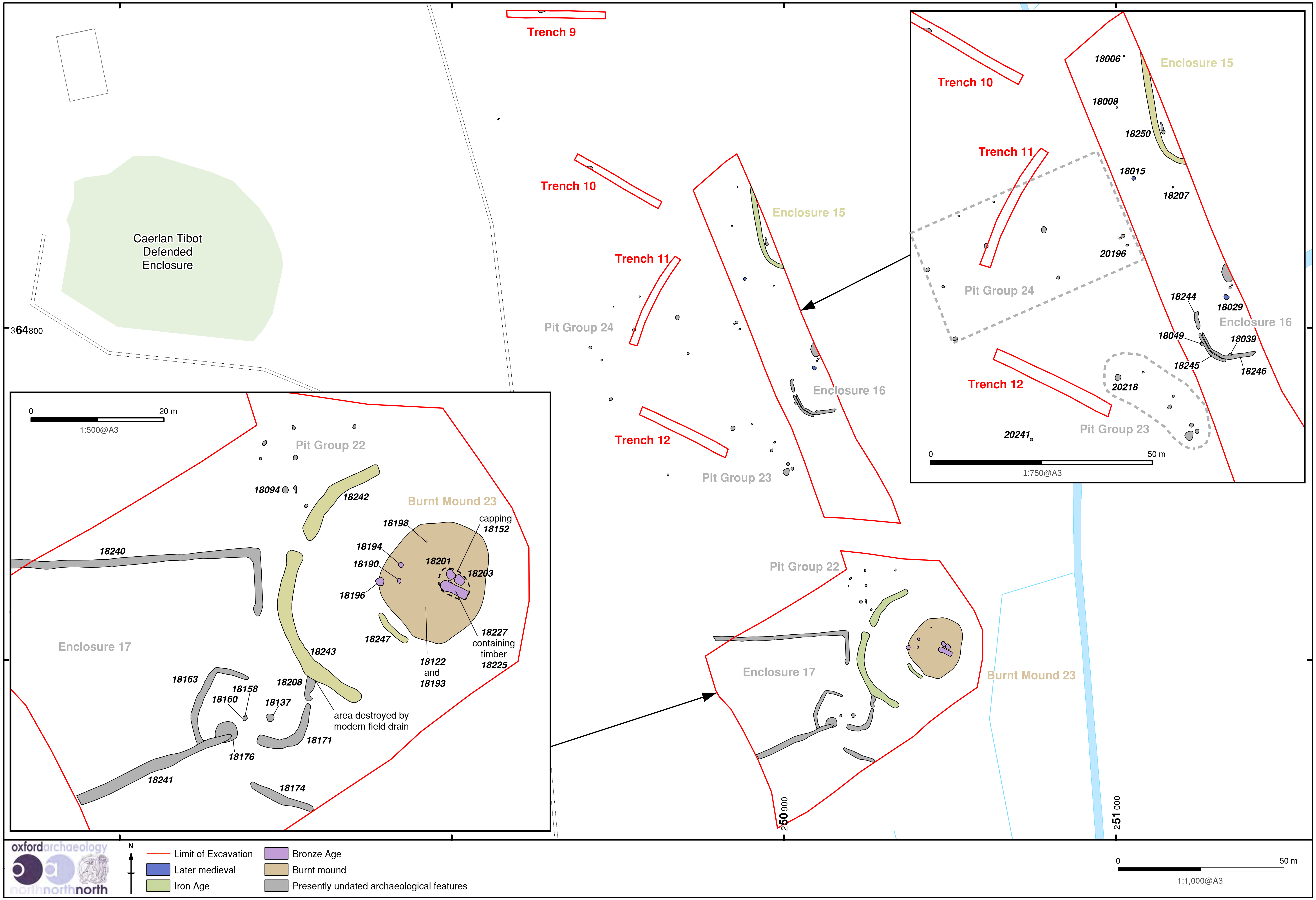

Figure 47: Bronze Age (?), Iron Age, later medieval, and presently undated features at Site 29

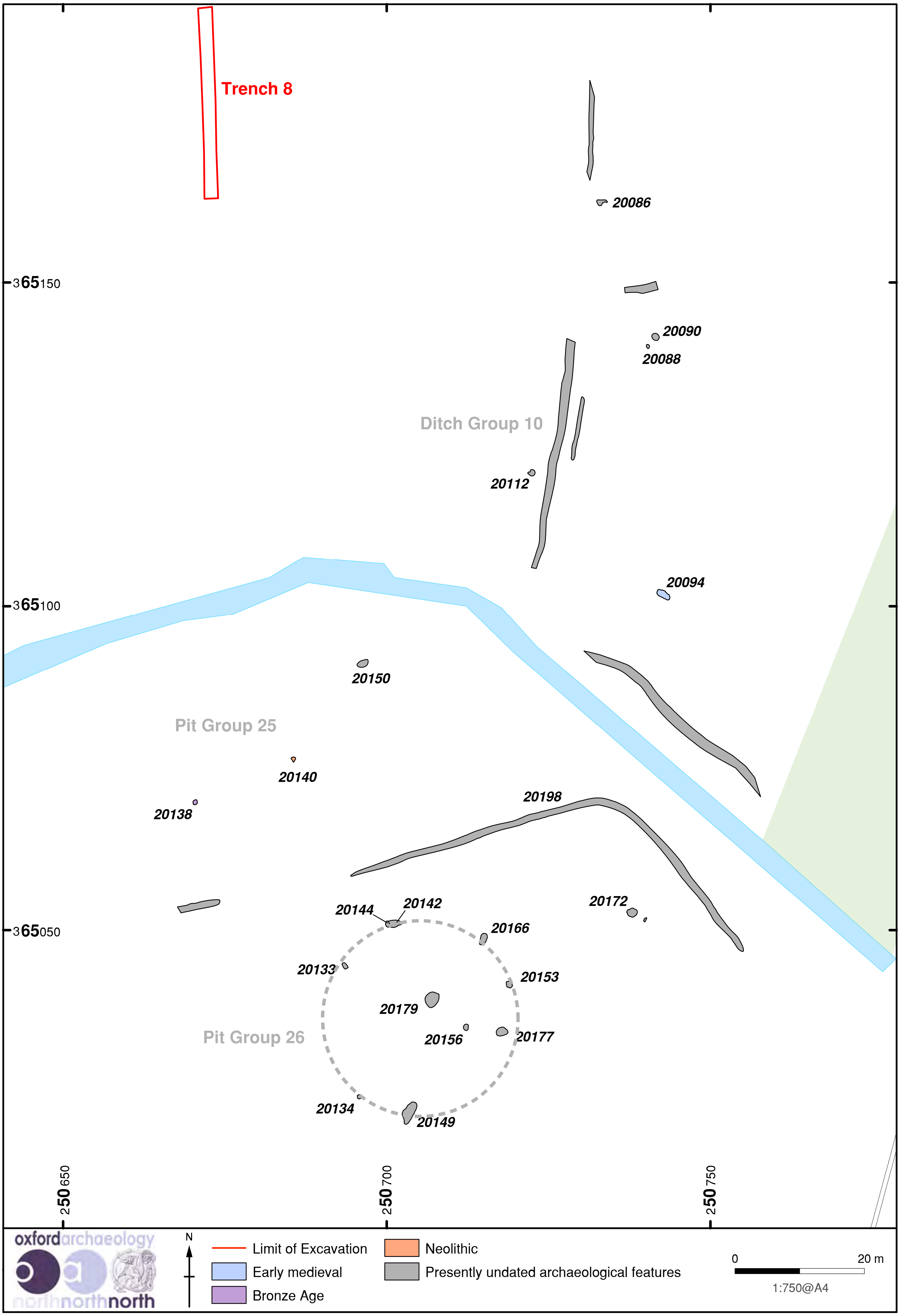

Figure 48: Neolithic, Bronze Age, early medieval, and presently undated pits and ditches at Site 30

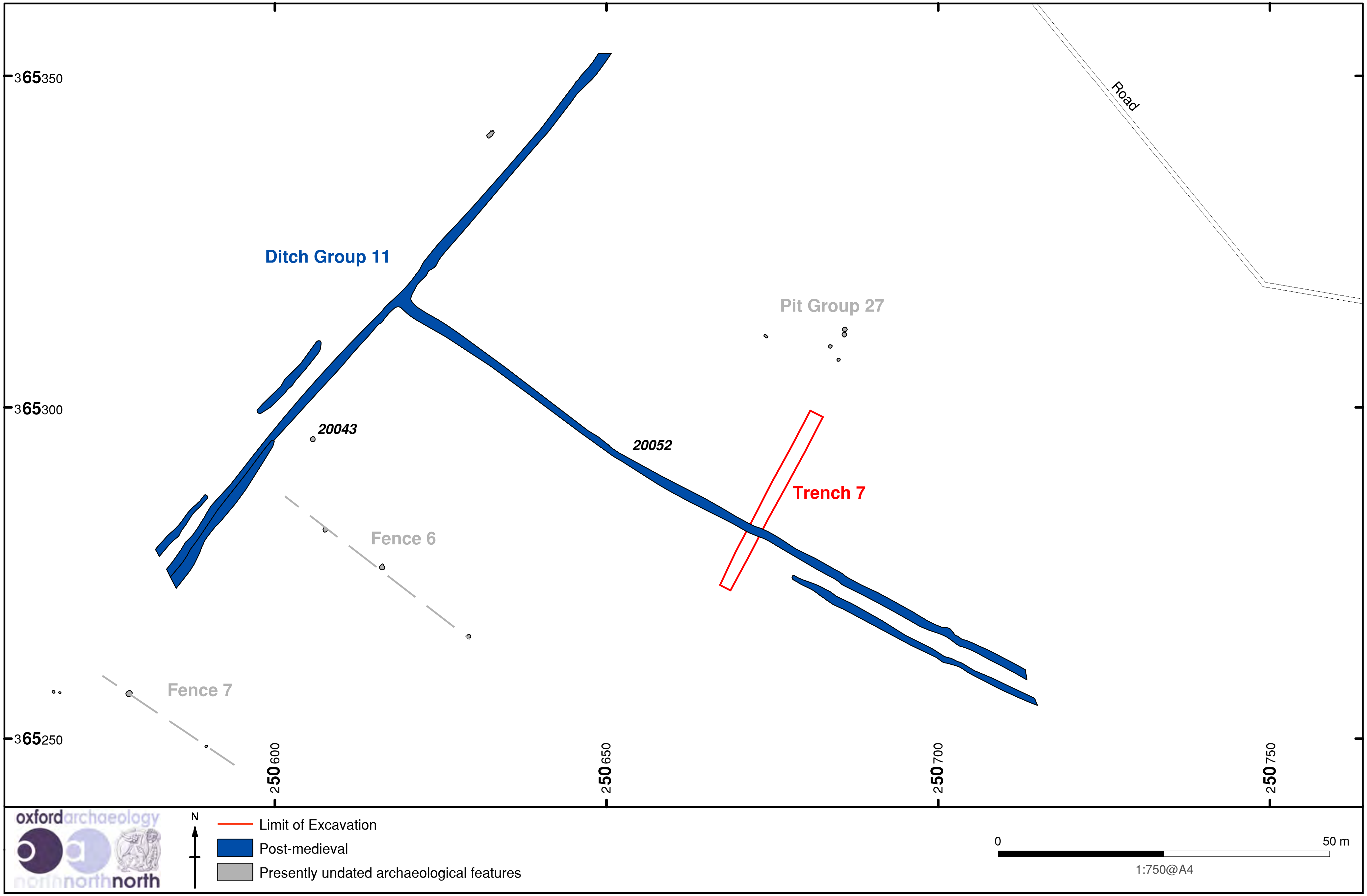

Figure 49: Post-medieval boundaries and pits at Site 31

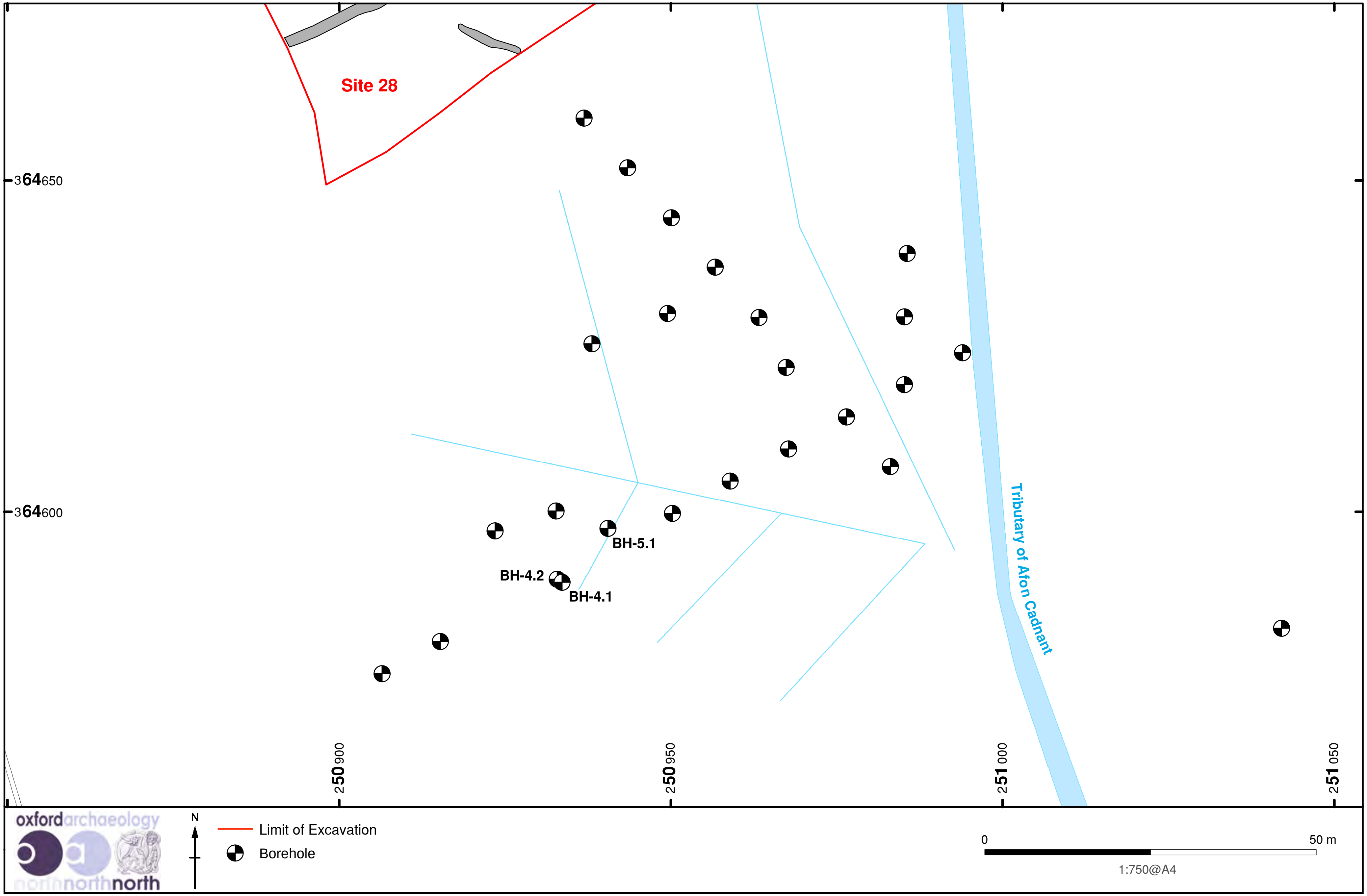

Figure 50: The borehole transects across the former lake/wetland area at Caerlan Tibot

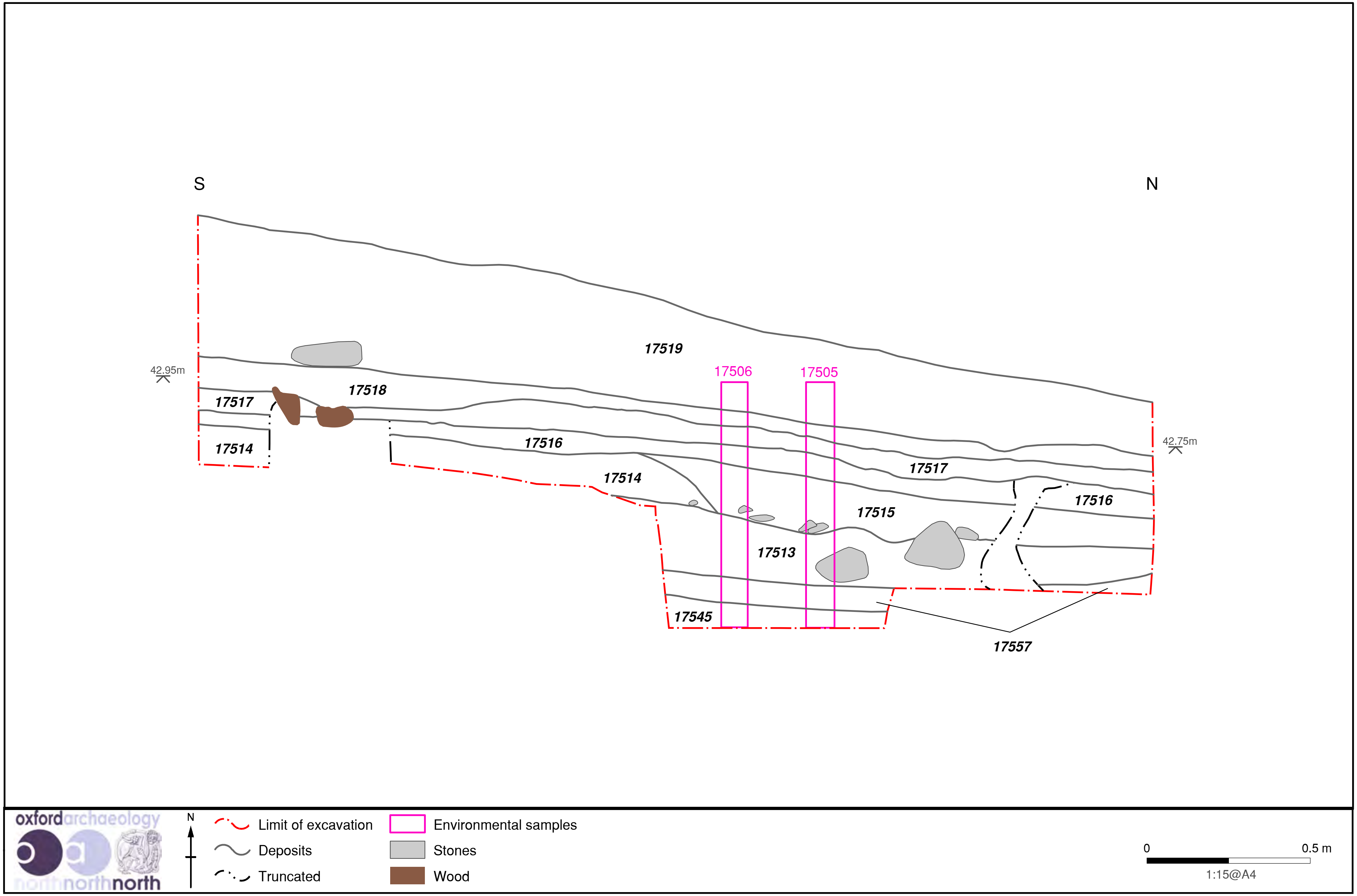

Figure 51: The sequence of deposits at Goat Roundabout

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