LAND OFF PENRHOS ROAD, BANGOR, GWYNEDD

Archaeological Assessment

Oxford Archaeology North

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REDROW HOMES

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SUMMARY

Redrow Homess commissioned Oxford Archaeology North (OA North) to undertake a desk-based assessment and geophysical survey to accompany a planning application for residential development of land off Penrhos Road, Bangor, Gwynedd (NGR centred SH 55488 69830). This work was undertaken as the first stage of a phased evaluation to establish the archaeological resource and its significance across the site. OA North was also provided the opportunity of undertaking a watching brief of geotechnical site investigations during the assessment.

In total, 43 heritage assets were identified within the study area as a result of the desk-based assessment and walkover survey. These include two prehistoric barrows (Sites **7** and **8**), a group of possible barrows (Site **41**), a group of circular features that might also be indicative of burial monuments (Site **42**), and a burnt mound (Site **40**). Most of the remaining sites were associated with the agricultural use of the fields around the Goetre-uchaf (Site **26**) and Goetre-isaf farmsteads during the medieval or post-medieval periods. This includes 18 field boundaries, some of which may have been established during the medieval period. Green Lanes (Sites **6** and **10**) and a trackway (Site **29**) were also associated with access to the farmsteads and fields. A pit containing burnt stone and charcoal was identified during the watching brief, and numerous anomalies of possible archaeological interest were identified across the whole of the proposed development site during the geophysical survey.

The scheduled Goetre-uchaf barrow (Site **8**) and the Grade II* listed Capel-y-Graig Lodge (Site **35**) are the two sites of *national importance*, with numerous sites of *regional/county importance* and *local/borough importance*. There will be 19 predicted significant impacts as a result of the proposed development. Four of these will be *major* impacts, which will affect a barrow (Site **7**), Goetre-uchaf barrow (Site **8**), a burnt mound (Site **40**), and a group of possible barrows (Site **41**). These sites are likely to be severely disturbed or destroyed, with the exception of the Goetre-uchaf barrow (Site **8**), which, as a standing monument, will be impacted in terms of a substantial change to its setting. A total of 15 sites, all of which are elements of the agricultural landscape, will be subject to *intermediate* impacts, and a further five agricultural sites will be subject to *intermediate/minor* impacts. Although seven other sites will be impacted upon, the low level of importance of those sites means that the impact significance is assessed as neutral. The impact significance upon a group of circular features (Site **43**) is unknown. There is also an extremely high likelihood of impacts upon previously unidentified sub-surface remains dating to the prehistoric periods, as well as the medieval or early-post-medieval periods, some of which appear to have been alluded to in the watching brief and geophysical survey.

In order to be able to fully characterise the archaeological resource within the proposed development area and, therefore, fully assess the likely impact of the proposed development on previously unidentified sub-surface remains, it is recommended that a programme of archaeological evaluation trenching should be undertaken. In addition, mitigation has been proposed in order to reduce the impact of the proposed development on recognised heritage assets. This includes changes in the design scheme in order to reduce the impact upon the setting of the Goetre-uchaf barrow (Site **8**). It is also recommended that archaeological excavation should be undertaken in order to facilitate the preservation by record of a barrow (Site **7**), if it is not retained *in situ*, a burnt mound (Site **40**), a group of possible barrows (Site **41**) and

two intercutting ditches (Site **39**). It is suggested that the remaining sites that are visible above ground, such as banks, ditches, and sunken lanes, should be subject to topographic and photographic survey and recorded in cross-section, and inspected for datable material during a watching brief. Standing structures, such as gates, should be subject to photographic survey.

ACKNOWLEDGEMENTS

OA North would like to thank Paul Fox of Redrow Homes for commissioning the project. OA North would also like to thank the staff at Caernarvon Record Office, Gwynedd Historic Environment Record (HER), and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW). Thanks are also due to Phase Site Investigations for undertaking the geophysical survey and to Alan Jones from Geosolve for details of the geotechnical site investigations.

The desk-based research was undertaken by Peter Schofield and reported upon by Alastair Vannan, who also wrote the impact assessment. Peter Schofield undertook and reported upon the walkover survey, and the watching brief was undertaken by Lewis Stitt. Elizabeth Huckerby assessed the environmental sample and wrote the report, and Denise Druce assessed the charcoal. Emily Mercer wrote the watching brief report and summarised the findings of the geophysical survey. Emily Mercer also managed the project and edited the report, which was illustrated by Mark Tidmarsh.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

1.1.1 Redrow Homes commissioned Oxford Archaeology North (OA North) to undertake a desk-based assessment and geophysical survey to accompany a planning application for residential development of land off Penrhos Road, Bangor, Gwynedd (NGR centred SH 55488 69830). Gwynedd Archaeological Planning Service (GAPS) issued a formal brief for the desk-based assessment and geophysical survey (*Appendix 1*) as the first stage of a phased evaluation to establish the archaeological resource and its significance across the site. Redrow Homes also invited OA North to undertake a watching brief of geotechnical site investigations. Following a verbal brief from GAPS for the watching brief, OA North subsequently submitted project designs for each phase of work (*Appendices 2 and 3*).

1.1.2 In addition to the design brief issued by GAPS, a screening opinion was also issued by the Senior Planning Archaeologist at GAPS on 3rd August 2012. The CADW Inspector of Ancient Monuments subsequently endorsed this screening opinion on 6th August 2012. The screening opinion was carefully considered during the impact assessment and the formulation of recommended further investigation and mitigation.

1.1.3 The site occupies nearly 14ha of agricultural land and has a high potential for the presence of buried archaeological remains. Two prehistoric barrows (Cn 376; PRN 22), one of which is scheduled, are present in the vicinity of the proposed development, and querns, a probable burnt mound, and two intercutting ditches have been discovered in the area. These features all indicated that there was a high potential for the presence of previously unrecognised heritage assets within the proposed development area.

1.1.4 The desk-based assessment comprised a search of both published and unpublished records held by Caernarvon Record Office, Gwynedd Historic Environment Record (HER), and the National Monuments Record of Wales (NMR). The archives and library held at OA North were also consulted. A walkover survey was conducted of the land subject to the development proposals, in order to relate the landscape and surroundings to the results of the desk-based assessment.

1.1.5 The watching brief commenced at the end of July 2012, whist the remaining elements of the assessment, i.e. the desk-based research, walkover survey and geophysical survey, were undertaken in August 2012. The following report briefly sets out the results and assesses the significance of, and impact upon, the heritage resource.

1.2 LOCATION, TOPOGRAPHY AND GEOLOGY

1.2.1 The proposed development site occupies part of the south-facing northern slope and plateau of the Nant y Garth stream valley at Penrhos Garnedd, to the south-west of Bangor, Gwynedd (NGR centred SH 55488 69830; Fig 1). As part of the site occupies a slope, the height across the area varies between

approximately 55m and 90m (aOD). The proposed development site consists of agricultural fields lying between the A55 around the southern perimeter, and residential development to the north-west, and Gwynedd Hospital, to the north-east.

1.2.2 The underlying bedrock consists of interbedded sandstone and conglomerate, to the east, and felsic tuff, to the west. This is overlain by glacial till (British Geological Survey 2012). Borehole logs produced in 1971, in association with investigations relating to the Bangor Bypass at the south-western side of the proposed development site, show that bedrock was encountered at 1.32m (*ibid*). Boreholes undertaken in 1973, at the southern side of the site, showed that bedrock was encountered at 0.65m and was overlain by 0.27m of brown silty-clay, which was overlain by 0.38m of gravel-rich topsoil (*ibid*).

2. METHODOLOGY

2.1 INTRODUCTION

2.1.1 This desk-based assessment was carried out in accordance with the relevant Institute for Archaeologists and English Heritage guidelines (IfA 2008, 2010, 2011a, 2011b; English Heritage 2006 and 2008) and generally-accepted best practice (including Gaffney *et al* 2002).

2.2 DESK-BASED ASSESSMENT

2.2.1 The principal sources of information consulted were historical and modern maps of the study area and information held by the HER, as well as published and unpublished secondary sources. A study area with a radius of 250m, extending from the centre of the proposed development area, was examined in detail in order to provide an understanding of the potential impact of the proposed works on any identified surrounding heritage assets. All heritage assets identified within the study area have been included in the Gazetteer of Sites (*Section 7*) and plotted onto the corresponding Figures 2-3. The results were analysed using the set of criteria used to assess the national importance of an ancient monument (DCMS 2010). Sources consulted include:

2.2.2 ***Gwynedd Historic Environment Record (HER):*** the HER, in Bangor, was consulted to establish the sites of archaeological interest already known within the study area. The HER is a database of all known sites of archaeological interest in Gwynedd, and is maintained by Gwynedd Archaeological Trust.

2.2.3 ***Caernarvon Record Office:*** the Caernarvon record office is managed by Gwynedd County Council and holds both published and manuscript maps, as well as unpublished primary sources and secondary published sources, relating to Caernarvonshire.

2.2.4 ***The Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW):*** the RCAHMW is based in Aberystwyth and is an investigative body that also maintains the national archive for the historic environment of Wales. The RCAHMW holds both published and manuscript maps, as well as unpublished primary sources and secondary published sources.

2.2.5 ***University College Bangor:*** the archives of University College Bangor include information relating to the Penrhyn estate, which the proposed development site formerly occupied. However, at the time of the data capture the archives were closed for refurbishment, and it was not possible to access any relevant documents.

2.2.6 ***Oxford Archaeology North:*** OA North has an extensive archive of secondary sources, as well as numerous unpublished client reports on work carried out both as OA North and under its former guise of Lancaster University Archaeological Unit (LUAU). These were consulted where relevant.

2.3 WALKOVER SURVEY

2.3.1 A walkover survey was conducted of the proposed development area on 9th August 2012. The main aim of this survey was to identify the location and extent of any previously unrecorded sites of archaeological interest, as well as to gain an understanding of the state of preservation and extent of any known sites, together with their setting, that might be affected by the proposed works. The results of the survey were compiled using photographic and written records.

2.4 WATCHING BRIEF

2.4.1 The watching brief was undertaken between the 30th July and 2nd August 2012, and comprised a programme of field observation that recorded accurately the location, extent, and character of surviving archaeological features and deposits within the excavations for geotechnical site investigations.

2.4.2 In total, 50 test pits (TP1-50) were excavated (Fig 4), during which close liaison was maintained with the geotechnical contractor at all times, and all works were monitored by an experienced archaeologist. The test pits were excavated by a mechanical excavator that was fitted with a wide toothed ditching bucket, which, by its nature inhibits the observation of more subtle archaeological features, such as pits and ditches. The programme of field observation comprised the systematic examination, characterisation and recording of any subsoil horizons exposed during the course of the excavation. Removed spoil was systematically searched for artefacts and other dating evidence. Recording was by means of OA North's standard system, with *pro forma* record sheets and supporting registers and indices. A fully indexed photographic record in digital format was maintained.

2.5 PALAEOENVIRONMENTAL ASSESSMENT

2.5.1 A single bulk environmental sample, less than two litres in volume, was taken from a burnt pit fill, ***603***, identified in TP6. The sample was hand floated and the flot was collected on a 250 micron mesh and air-dried. The flot were scanned with a Leitz/Wild stereo microscope, plant material was recorded on a scale of 1-4 where 1 is five items or less, and 4 is more than 100 items, and provisionally identified. The matrix components were also noted as present (+) or frequent (++) and the residues were examined.

2.5.2 Charcoal fragments greater than 2mm were scanned under a binocular microscope at X20 magnification to assess overall preservation and diversity. Subsequently, representative fragments were viewed at up to X40 to confirm the range of species/types present and the type of wood present, i.e. roundwood, heartwood, or sapwood.

2.5.3 The data were recorded on a *pro forma* sheet, as part of the site archive. The data are shown in Table 2 (*Section 5.3*) and are included in a brief assessment

report of the environmental remains summarising the main findings and outlining future recommendations. Plant nomenclature follows Stace (1997).

2.6 GEOPHYSICAL SURVEY

2.6.1 The survey area of 13.6ha was subject to a detailed magnetometer survey, for which a methodology and description of the technique and configuration has been provided in the geophysical survey report (*Appendix 5*). A dual sensor Bartington grad 601-2 gradiometer was used over a 30m-gridded survey area, collecting data at 0.25m intervals on transects 0.5m apart.

2.6.2 The survey area was divided across several fields, and numbered as per the walkover survey system (Fig 3). Areas were prevented from being surveyed or were restricted in size due to obstructions, such as dense vegetation, boggy ground or buildings, or due to the steep gradient. Fields 5, 6, 9, 10, 12, and 14 could not be surveyed. Consequently, the total area available for survey was reduced by 6.4ha to 7.2ha.

2.7 ARCHIVE

2.7.1 A full archive has been produced to a professional standard in accordance with current English Heritage guidelines (English Heritage 2006). Copies of the report will be sent to the HER in Bangor, and to the Development Control Officer at Gwynedd Archaeological Planning Service (GAPS).

3. BACKGROUND

3.1 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

3.1.1 ***Introduction:*** in addition to a detailed investigation of the closely defined study area, it is also necessary to present a general archaeological and historical background of the wider locale. This will allow the wider archaeological context of the site to be considered.

Period	**Date Range**
Palaeolithic	500,000 – 10,000 BC
Mesolithic	10,000 – 4000 BC
Neolithic	4000 – 2400 BC
Bronze Age	2400 – 700 BC
Iron Age	700 BC – AD 43
Romano-British	AD 43 – AD 410
Early Medieval	AD 410 – AD 1066
Late Medieval	AD 1066 – AD 1540
Post-medieval	AD 1540 – *c* 1750
Industrial Period	*c* AD1750 – 1914
Modern	Post-1914

Table 1: Summary of British archaeological periods and date ranges

3.2 PREHISTORIC PERIODS

3.2.1 ***Palaeolithic and Mesolithic Periods:*** the earliest evidence for human activity within Gwynedd consists of decorated deer teeth and a worked horse jawbone from Kendrick's Cave on the eastern face of the Great Orme (Lynch 1995, 4). The jawbone is likely to date to *c* 30,000 BC, during an interglacial phase of the Palaeolithic period (*ibid*). Evidence of Mesolithic activity in Gwynedd consists of scatters of flint tools found on coastal cliff tops on the Lleyn peninsula and in Anglesey, where a Mesolithic camp was excavated at Aberffraw (*op cit*, 5). Human activity at this time is likely of have consisted of small and mobile bands of hunters moving between inland and coastal areas to exploit varying and seasonal resources (*op cit*, 4). Evidence of Mesolithic activity has been identified further inland, such as flint scatters being found to the east of the study area, in the upland moorlands of Mynydd Hiraethog, or the Denbigh Moors (Barker and Leighton 2011, 21) and hearths having been excavated in the Brenig Valley (Allen 1993, 22). Flint scatters were also found to the north-east of the study area, at Landygai (Kenney 2008, 14). No known

sites of Palaeolithic or Mesolithic date have been identified within the study area.

3.2.2 ***Neolithic Period:*** the Neolithic period is often considered to mark the transition from subsistence strategies based on transient hunting, fishing, and gathering to the adoption of more settled agricultural communities and the subsequent development of funerary architecture. However, this transition need not preclude the continued exploitation of wild resources or mobility within the landscape that were typical of the preceding Mesolithic period. The most conspicuous sites of Neolithic date in Gwynedd and the wider locale are megalithic tombs, with numerous examples having been identified in Anglesey and the uplands in the vicinity of Penmaenmawr and Llandudno (Lynch 1995, 7-30; GAT 2002a, 16). Most of these sites occupy marginal upland areas lying between 200m and 350m (aOD) and an example lies approximately 4.5km to the south-east of the study area at Sling (GAT 2002a, 14; 16).

3.2.3 Although not as conspicuous as megalithic architecture, and more prone to damage and disturbance, areas of farming and associated settlements are likely to have lain in the vicinity of the megalithic tombs (*op cit*, 15). Flat cist burials, which are, once more, less conspicuous sites than upstanding tombs are also known from the wider area, with one example having been identified to the north-east of Bangor, at Pen y bryn (*op cit*, 16). A large Neolithic complex, including henges, a cursus, groups of pits, and settlement evidence, including rectangular buildings, lies approximately 3km to the north-east of the study area, at Landygai (*op cit*, 17-18; Kenney 2008). No sites of this date have been identified within the study area.

3.2.4 ***Bronze Age:*** similarly to evidence for Neolithic activity, funerary and ritual monuments are the most conspicuous and easily recognised sites of Bronze Age date within Gwynedd, with settlement sites being more difficult to identify. During the Bronze Age, there was an expansion of activity into upland areas, with numerous stone-walled roundhouses, field systems, burial mounds, cairns, and stone circles being evident in these areas (Lynch 1995, 31-2). However, numerous barrows and cairns have also been identified in lower-lying areas, below 100m (aOD) (GAT 2002a, 20). Indeed, 3km to the north-east of the study area, at Landygai, two distinct programmes of archaeological investigation have revealed the presence of extensive sub-surface Bronze Age remains occupying land between 25m and 65m (aOD) (Kenney 2008, 10-11; 60-70). These remains include burnt mounds, pits, earth ovens, a round barrow, and a putative burial cairn (*ibid*). A standing stone of possible Bronze Age date lies within 2km to the south-west of the study area, at Cadair Elwa (PRN 631).

3.2.5 Close to the study area, an undated flint scraper (HER PRN3737) was found near to Hafod Cottage. A circular cropmark (HER PRN59), which was noted from aerial photographs to the south-east of Tyddan Bach, has not been closely dated but might be of prehistoric origin. A large quantity of quern stones (Site **37**) was also found near Perfeddgoed by a local resident who built them into the wall of a cottage, which no longer appears to be extant. However, the date of origin of the quern stones is not known.

3.2.6 There is considerable evidence for Bronze Age activity within the proposed development site, with two possible Bronze Age barrows having been identified within the area (Sites **7** and **8**). Goetre-uchaf barrow (Site **8**) is a scheduled monument (CN 376), and an undated flint scraper (Site **36**) was found on the second mound (Site **7**). This mound (Site **7**) has been damaged by quarrying and, in 1970, the Ordnance Survey (OS) inspector suggested that bedrock rose to within a few inches of the surface of the mound and that it was, therefore, of natural origin. The conspicuous presence of burial mounds within the local area is suggested by the place-name Penrhos-Garnedd, which appears to describe 'the cairns at the head of the moor' (*eg* Davies 2012, 17; 45). The sub-surface remains of a burnt mound of possible Bronze Age date (Site **39**) were found during a watching brief within the northern part of the proposed development area (GAT 2010, 6). This lay adjacent to a stream channel and an area of saturated ground, which is often a characteristic of the siting of burnt mounds (Barfield and Hodder 1987; OA North 2009, 31-33).

3.2.7 ***Iron Age:*** there was a general degree of cultural continuity between the late Bronze Age and the early Iron Age, although additional influences, such as the use of iron, were introduced. Agriculture continued as the primary means of subsistence, and was practised on the fringes of the uplands, and in low-lying areas, such as Landygai (Lynch and Carr 1986, 13). However, the most conspicuous sites of this period comprise the numerous hillforts (*op cit*, 14), which retain a high degree of visibility in the landscape as a result of their enclosure earthworks, the remains of stone-walled roundhouses, and a good degree of survival due to their hill top locations. Although Iron Age funerary and ritual monuments are not known from Gwynedd, large quantities of metalwork, much of which was associated with warfare, appear to have been deposited as votive offerings at the lake of Llyn Cerrig Bach, on Anglesey (Lynch and Carr 1986, 14; Lynch 1995, 65).

3.2.8 Lowland Iron Age settlement sites have been identified in Gwynedd, including an extensive group of stone-walled roundhouses at Ty Mawr, on Holyhead (Lynch 1995, 84-5). There are similarities between the style of Iron Age settlements and those of the preceding Bronze Age and the later Romano-British period, with many sites being in continuous occupation throughout the latter periods (*op cit*, 63-4). Therefore, caution should be exercised when dating sites that have not been subject to excavation and close dating.

3.2.9 Sub-surface remains of Iron Age date were found at Landygai and consisted of an Early Iron Age roundhouse close to an area of possibly associated metalworking debris (Kenney 2008, 70). A late Iron Age structure associated with an industrial or cooking area was also identified, which was succeeded by a small enclosed, or partially enclosed, settlement comprising one or two roundhouses (*op cit*, 100-2). No remains of Iron Age date have been identified within the study area, although a Romano-British hut circle settlement (HER PRN792) lies to the south-east of the area, and several undated quern stones have been found (Sites **37** and PRN82).

3.3 HISTORIC PERIODS

3.3.1 ***Romano-British Period:*** following the Roman military invasion of North West Wales between *c* AD 60 and the completion of the conquest in AD 78, various auxiliary forts were established, with the most significant fort being *Segontium*, at Caernarvon (Lynch and Carr 1986, 14-16; Lynch 1995, 98-9). Although civilian settlements developed in the vicinity of military establishments, no Roman towns were established in North Wales. Settlement appears to have been largely rural and, between the second and fourth centuries AD, large farmsteads associated with intensified agriculture developed that might be indicative of a period of relative prosperity (Lynch and Carr 1986, 16; Lynch 1995, 98-9). The Iron Age tradition of roundhouses and a lack of formality of settlement layout continued to characterise prosperous rural settlements in North Wales, in contrast to the adoption of villas elsewhere in Britain (Lynch 1995, 99).

3.3.2 A large enclosed agricultural settlement with several roundhouses developed at Landygai, within an area that appears to have been in continuous use as a farmstead from the Late Iron Age (Kenney 2008, 100-2). A smaller settlement consisting of an enclosed roundhouse and an associated field system (HER PRN29494, HER PRN34) of apparent Romano-British date (HER PRN792) has also been identified to the south of the study area. An undated quern stone was also found in this area (HER PRN82). No sites of Romano-British date have been identified within the proposed development area.

3.3.3 ***Early Medieval Period:*** the early medieval period in North Wales was characterised by the development of new kingdoms following the decline of the Roman Empire during the fifth century (Lynch 1995, 111). Between the fifth and eleventh centuries, Gwynedd engaged in violent struggles with neighbouring kingdoms, including Powys and Deheurbarth, the powerful Saxon kingdoms of Mercia and Northumbria, and Viking raiders in the ninth and tenth centuries. During this time, established centres of power and defence, such as hillforts and Roman forts, are likely to have been utilised as bases (*ibid*). Romano-British farmsteads are also likely to have continued in use into the early medieval period, although a lack of material culture, such as pottery, from this period can make the recognition of such phases of occupation challenging. However, radiocarbon dating has demonstrated the continued use of settlements at Ty Mawr, on Holyhead, and Greanog, near Llanllyfni (*op cit*, 112).

3.3.4 Monasteries flourished during this period and fragments of stone crosses from Penmon and Bangor attest to the former presence of ecclesiastic monuments in the wider area (*op cit*, 114). An early monastery was established at Bangor, although no buildings of this period survive as standing remains (*ibid*). An early medieval smithing site was identified at Landygai and dated to between AD 480-650 and AD 600-760 (Kenney 2008, 107) and a cemetery of early medieval date was excavated at Landygai in 1966-7 (Lynch and Musson 2004). No sites of this period have been identified within the study area.

3.3.5 ***Medieval Period:*** Gwynedd represented one of the most powerful kingdoms in Wales into the earlier part of the medieval period, and was involved in

successive phases of English invasion during the eleventh and twelfth centuries (Lynch and Carr 1986, 19-20). In 1164-5 Owain Gwynedd was accepted as the leader of all of the Welsh rulers and Gwynedd became the dominant kingdom in Wales (*ibid*). This political stability fractured following Owain's death in 1170, but Llewelyn eventually became overlord over all of the Welsh kingdoms from Gwynedd in 1216 (*ibid*). However, by 1301, the whole of Wales was held as a principality granted to Edward, the son of Edward I (*op cit*, 24).

3.3.6 Between 1400 and 1405 an unsuccessful revolt occurred in North Wales against Henry IV and the submission of Gwilym ap Gruffydd ap Gwilym of Gwynedd in 1405 allowed him to acquire large tracts of land and to found the Penrhyn estate (*op cit*, 25), within which the proposed development area lies. Another major local landowner was the cathedral at Bangor, which was established by the early twelfth century and was one of the most important religious centres in Gwynedd (*op cit*, 26). The presence of a town was recorded in 1211 and a close relationship existed with the ruling dynasties of Gwynedd (*ibid*). The Vaynol (*Y Faenol*) estate, which lay to the south-west of the study area, was established on land formerly owned by the bishops of Bangor, and comprised a park surrounding a sixteenth-century hall with twelfth-century foundations (GAT 2002b). These large estates dominated the environs of the study area and lay within the larger medieval territorial unit of the *Cantref* of Arfon, which comprised nine *maenolau*, or lordships (GAT 2003, 3-4). The study area lay within the maenol of Bangor, part of the hundred of Isgorvai, and the maenol was the lordship of the Bishop of Bangor (Bassett and Davies 1977, 68). All of these territorial units lay within the overarching county of Caernarvonshire (*op cit*, 87). The Pentir place-name was first recorded in 1306-7 and means 'headland' (Owen and Morgan 2007), although this is likely to reflect the topographic context of the village of Pentir, rather than the parish.

3.3.7 In addition to medieval remains associated with ecclesiastic institutions, such as Bangor Cathedral, and halls at the centre of medieval estates, such as Vaynol Hall, remains of agricultural features have also been identified in the wider area. For example, corn drying kilns dating to between the early eleventh and early thirteenth centuries were found at Landygai, and these may have been associated with remnant medieval field systems (Kenney 2008, 109-11). Earthworks suggestive of medieval open field ridge and furrow agriculture have also been identified within the southern part of Vaynol Park and numerous smallholdings and tenements of likely medieval origin have been identified in and around the extents of the park (GAT 2003, 4). Strip fields indicative of medieval field systems have also been identified in Vaynol Park (PRN 12145). With no large settlements within the immediate vicinity of the study area, it is likely that habitation patterns consisted of dispersed farmsteads during the medieval period. No medieval sites have been identified within the study area.

3.3.8 ***Post-medieval and Industrial Periods:*** the study area lies within what was part of the parish of Pentir during the earlier post-medieval period but, by 1657, had been merged with Bangor (Lewis 1849, 308-18). The Penrhyn

estate was owned by the Pennant family from 1765 and was one of the wealthiest estates in Britain (CADW 2012). Maps produced during surveys of the neighbouring Vaynol estate in 1777 and 1832 (Vaynol MSS 4056; 4067) showed that the study area lay within land that fell outside of the Vaynol estate, but within the Penrhyn estate. This included an area marked as Goedtre Farm on the map of 1832 (Vaynol MSS 4067), which was indicated as being in the possession of GHD Pennant.

3.3.9 Numerous episodes of the enclosure of common land took place in Caernarvonshire between 1802 and 1850, including the enclosure of land in Penrhos in 1811 (Bassett and Davies 1977, 148). By the time of the production of the Bangor tithe maps of 1840-1 (NLW 1165, see *3.4.3*, below), the study area and surrounding land was characterised by dispersed farms set within enclosed agricultural field systems. However, the field systems within the proposed development area did not exhibit the uniform geometric character of many fields that were created as a result of nineteenth-century enclosure and appear to have developed more gradually, as a process of the sub-division of larger sub-ovoid or sub-rectangular enclosures. The fields surrounding Goetre-isaf and to the south of Goetre-uchaf, which occupied the slopes of the Nant y Garth stream valley, appeared particularly irregular and likely to have developed as the result of *ad hoc* processes of sub-division. The land occupying the plateau to the north of the farms, along the southern side of the main road through Penrhos, may have been subject to the more formal laying out of planned field systems, as it appeared more regular and ordered. The tithe apportionment showed Goetre-uchaf to have been owned by Reverend Hugh Davies Owen, and occupied by William Williams in 1840-1, and to have comprised a mixture of meadow, pasture, arable land, and woodland. Goetre-isaf was owned by Lord George Boston and occupied by Thomas Owen, and comprised a mixture of pasture, arable, and meadow. The farmstead names of Goetre-uchaf (Site **26**) and Goetre-isaf both incorporate the 'goetre' (coed-tre) element, meaning 'a home in a wood' (Davies 2012, 30). This might indicate that at least one of the farmsteads was established within a clearing in a largely wooded area and could, therefore, have originated early enough to pre-date the widespread use of the study area for agriculture. However, it is not currently known at what date the study area was cleared. The 'uchaf' and 'isaf' elements are topographic indicators for 'upper' and 'lower', respectively, which correspond with the location of Goetre-uchaf (Site **26**) at the top of the hill slope, and Goetre-isaf further down the slope.

3.3.10 Few changes occurred within the immediate environs of the study area during the first half of the twentieth century, although ribbon development gradually accumulated along Penrhos Road, to the north of the study area (OS 1914; 1970-2). By 1970-2, extensive housing developments had been constructed to the north of the study area, adjacent to Penrhos Road. Gwynedd Hospital was established by 1983 (OS 1983) and one of the most conspicuous changes to the area was the opening of the Bangor bypass portion of the A55 during the 1980s (OS 1987).

3.4 MAP REGRESSION ANALYSIS

3.4.1 ***Introduction:*** the following section comprises a summary of the relevant cartographic evidence available for the study area. This consists of tithe plans and OS mapping from the nineteenth and twentieth centuries. As the rate of change to the landscape of the study area was relatively slow throughout the late-nineteenth and twentieth centuries, only those editions that portray pertinent information are discussed. Documents relating to the Penrhyn estate, within which the proposed development area was situated, held by the archives of University College Bangor were, however, unavailable at the time of the data acquisition due to the refurbishment of the archive.

3.4.2 ***OS draft survey at 2": 1 mile, 1822:*** the earliest available OS map was that produced as a draft prior to the later detailed surveys at 6" and 25". The scale of the map means that there was a very low degree of detail, with no minor land divisions, such as field systems, being depicted and only a selection of building names being provided. Goetre-uchaf was, however, named on the map, and shaded rectangles representing buildings at Goetre-uchaf and Goetre-isaf. A trackway was also depicted running past the two farms and linking Penrhos Road and Cyttir Lane.

3.4.3 ***Bangor Tithe Map of 1840-1 (NLW 1165;Fig 5):*** this is the earliest available map to have depicted the study area in any detail. The tithe map depicted the study area as a rural landscape of enclosed fields and dispersed farmsteads. The fields in the southern part of the study area appeared to have been subject to intensive and gradual sub-division, whilst those in the northern part of the area were larger and appeared to have been laid out systematically and with formal planning. Ranges of farm buildings were depicted at Goetre-isaf and Goetre-uchaf, with a third set of buildings lying to the south of Goetre-uchaf.

3.4.4 ***OS first edition 25": 1 mile, 1889 (Fig 6):*** the earliest detailed OS map of the study area was not produced until 1889. This was an extremely detailed map and was considerably more accurate than the preceding tithe map of 1840-1. More buildings were depicted along Penrhos road than had been shown on the previous mapping, with increased terraced housing and a school. St Peter's church was also shown for the first time on this map. The field systems around Goetre-isaf and Goetre-uchaf continued to form the most conspicuous elements of the landscape of the proposed development area, in addition to the farmstead of Goetre-uchaf and the trackways associated with the farms. The fields to the north of the farmsteads appeared very similar in layout to those shown on the tithe map. The layout of some of the fields to the south, however, was depicted differently, and several earlier field boundaries were no longer shown.

3.4.5 ***Twentieth century OS maps:*** little discernible change to the area was evident on the OS maps produced in 1900 and 1914. The first changes in this area appeared on the mapping of 1938-53, which showed that a drainage channel had been established along the field boundary behind St Peter's church. The mapping of 1970-2 (Fig 6) did not depict any significant changes within the proposed development area, although the volume of residential development at Penrhos-Garnedd, to the north of the proposed development area, had

increased, with the construction of semi-detached housing estates and rows of terraced housing. The mapping from the later twentieth century documented some of the most conspicuous changes to the study area, with Gwynedd Hospital being shown on the mapping of 1983, and the Bangor bypass being depicted on the mapping of 1987. These developments, and the gradual increase of residential properties, resulted in the current character of the study area (Fig 2-3).

3.5 AERIAL PHOTOGRAPHIC ANALYSIS

3.5.1 Investigation for archaeological sites was limited to evidence derived from several sorties of high level RAF vertical photography from the mid-late-1940s that were held in the National Monument Records (NMR). A run of newer Ordnance Survey vertical photography was found to be missing the relevant photographs covering the site. No relevant aerial photography was held in the Gwynedd HER. All of the historic photographs consisted of black and white vertical images.

3.5.2 ***Aerial photographs, 1945 (NMR 106G/UK655/4027-8):*** showed a similar, although truncated, view of the proposed development area to a later series from 1947 (below). However, the clarity of the photographs was not as sharp as the images from 1947, which are more useful for the purposes of archaeological survey.

3.5.3 ***Aerial photographs, January 1947 (NMR CPE/UK/1939/3170; Plate 1):*** clearly showed the raised mounds of the two known barrows within the proposed development area (Sites **7** and **8**). Between four and five possible additional discrete mounds were visible within the same field, aligned in an approximate row, close to the northern boundary. Although several of these possible mounds lie within the area now occupied by the hospital, at least one of them lies within the proposed development area, to the north-west of Site **8**. Given the presence of prehistoric barrows within the vicinity (Sites **7** and **8**), and the detection of four sub-circular anomalies within this field by the geophysical survey (Phase SI 2012, 27; Field 8, 8G), the former presence of burial mounds must be considered as a possible explanation for such features. In addition to these mounds, a series of parallel lines was visible in the same field. These lines were similarly aligned to several parallel linear anomalies detected in this field by the geophysical survey (Phase SI 2012, 27; Field 8). The uniformity of these features suggests that they might be part of a land drainage system. The corduroy striations indicative of intensive ploughing were also visible across many of the fields.

3.5.4 A second set of aerial photographs taken in April 1947 (CPE/UK/1996/2312-5) also showed the probable drainage system to the north of Goetre-uchaf. However, the clarity of the images was not of sufficient quality to discern any further features of archaeological interest

3.5.5 ***Aerial photographs, 1948 (NMR 541/178/3183-4):*** were from a higher position than those from January 1947 (NMR CPE/UK/1939/3170) and were not as sharp in their definition. However, approximately six apparent circular

parch marks were visible within a field to the south-west of Goetre-uchaf (Plate 2). This area was directly adjacent to an area where the geophysical survey detected six sub-circular anomalies (Phase SI 2012, 25; Field 2, 2G) and it is possible that these features are of a shared type or origin to those anomalies. Given the presence of prehistoric barrows within the vicinity (Sites **7** and **8**), the presence of sub-surface remains of burial mounds must be considered as a possible explanation for such features.

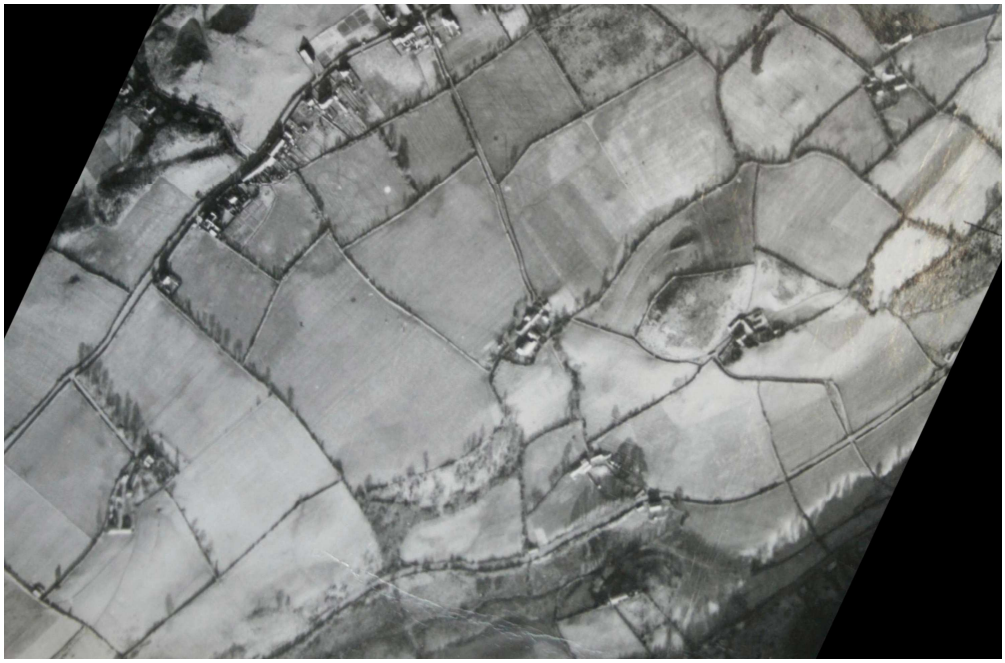

Plate 1: Extract from an RAF vertical aerial photograph taken in January 1947 (rotated so that the top of the image is orientated north)

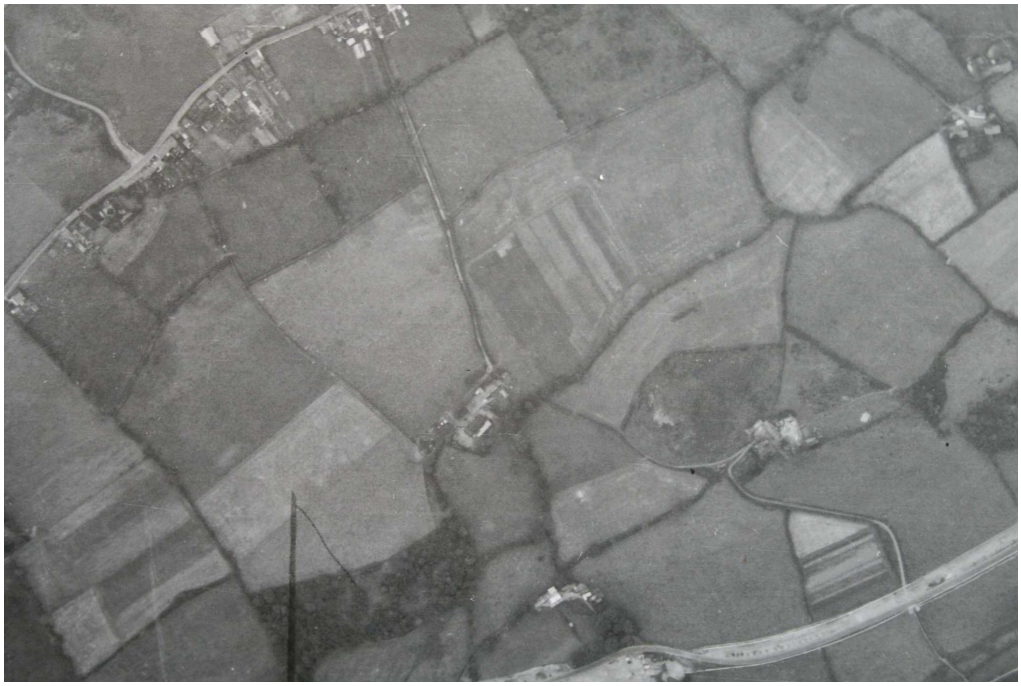

Plate 2: Extract from an RAF vertical aerial photograph taken in 1948

4. WALKOVER SURVEY

4.1 INTRODUCTION

4.1.1 The walkover survey was undertaken on 9th August 2012 and aimed to determine the survival of any above ground remains of heritage assets identified during the desk-based assessment, and also to identify any previously unrecorded sites within the proposed development area (Figs 2-3). The field numbering system (Fig 3) was the same as that employed for the geophysical survey. The majority of the proposed development area was accessible, and was examined systematically, except for several small stands of gorse and the thin strip of land accessing the site to the south of Goetre-isaf Farm. The weather was sunny and dry. Ground conditions were favourable for identifying archaeological features.

4.2 RESULTS

4.2.1 The survey area consisted of enclosed farmland associated with the farmsteads of Goetre-uchaf and Goetre-isaf (Figs 2-3), defined on all sides by twentieth century development associated variously with road construction to the south, housing development to the north-west and a hospital to the north-east. The general topography was undulating in nature with a sharp drop to the south-east down to the narrow vale containing the A55 (Plate 3). Salient topographic features included a wide south-east scarp running north-east/south-west through the western portion of the site (Field 2) that gave extensive views south towards the Snowdonia massif (Plate 4). To the east of the main scarp ran a smaller parallel ridge (Field 11) that ran down to a large rocky knoll positioned above Goetre-isaf farm (outside of the survey area). Between the two ridges, in Field 8, was a slight gully, running north-east of Goetre-uchaf farm which, although partially drained by a spring, had an area of boggy ground (Fig 3; Plate 5) situated south of the completely extant barrow (Site **8**), also in Field 8.

Plate 3: Steep slope on the southern end of the survey area into the vale containing the A55

*Plate 4: View south from the scarped ridgeline and barrow (Site **8**), in Field 8, towards the Snowdonia massif*

*Plate 5: Shallow gully and boggy area (on the left), in Field 8, below the scarped slope and with a barrow in the background (Site **7**)*

*Plate 6: Truncated barrow adjacent to Goetre-uchaf farm, looking south-west (Site **7**)*

*Plate 7: Proximity of barrow (Site **8**) to surrounding twentieth century development of the hospital*

4.2.2 ***Prehistoric period:*** the two putative barrows were identified in a closely-related group situated on the very upper edge of the main scarped slope in Field 8 to the north-east of Goetre-uchaf farm (Sites **7** and **8**; Plates 5-7). These sites may have lain on the southern end of a larger agglomeration of similar monuments (now destroyed) which gave the place-name of 'Penrhos-Garnedd' to the local environs (*Section 3.2.9*). One of the barrows (Site **7**; Plates 5 and 6) could be seen to be partially truncated by quarrying associated with Goetre-uchaf farm.

4.2.3 ***Medieval/Post-medieval period:*** the surviving surface archaeological resource is dominated by an agricultural landscape of enclosed and improved fields associated with the farmsteads of Goetre-isaf and Goetre-uchaf farms (Plate 8). Extant features include numerous field boundaries of various types, but mainly consisting of earth and stone-constructed banks, often with stone-facing (Sites **1**, **3**, **4**, **11**, **13**, **18**, **20**, **21**, **23**, **25** and **32**), and many of the field boundaries contain overgrown hawthorn hedges or standard trees (Plate 6). In one area, between Goetre-uchaf and Goetre-isaf farms, an earlier field boundary had been replaced by a wired slate fence (Site **19**) between Fields 10 and 11. Essentially, the pattern of field boundaries, except for some boundary loss (Sites **30** and **33**), and several later twentieth century enclosures (Sites **27** and **28**) remained very similar to the pattern depicted on the tithe mapping of 1840-1 (Fig 5) and identical to the OS First Edition mapping of 1889 (Fig 6). Improvement to the fields appears to have been piecemeal, and the field containing the rocky knoll above Goetre-isaf farm still remains rough grazing. The larger, relatively level, fields within the survey area have been subjected to intensive twentieth century ploughing, as this was mentioned in the RCAHMW Inventory field investigators' notes and was shown on the RAF aerial photography (*Section 3.5.3*). A series of drains was identified (Site **12**)

in Field 8 (containing the barrows), and further drains or possible narrow field boundaries on the eastern end of the survey area in Field 13 (Sites **14**-**16**). Other boundary features included a stone-constructed farm access bridge (Site **22**), several farm gates with slate gate stoups (Sites **5** and **17**), and gates associated with the public footpath (Sites **2** and **24**).

Plate 8: View southwards from the proposed development

*Plate 9: Small outbuilding on the east side of the farmyard at Goetre-uchaf (Site **9**)*

4.2.4 The farmstead of Goetre-uchaf was almost completely demolished after the late 1980s, leaving only a single small outbuilding on an infilled quarry on the east side of the farmyard (Site **9**; Plate 9). The identification of several hand-made bricks in the backfill of the quarry may point to at least one of the original farm buildings as being pre-nineteenth century in date. The original access route to the farm, between Fields 3 and 8, in the form of a large green lane (Site **6**), ran in a north-north-west/south-south-east orientation on the north side of the farmstead (Plate 10). This was superseded in the late twentieth century, after the construction of the housing estate, by a metalled farm track (Site **29**). A further short section of green lane ran to the north-east of the farm yard (Site **10**), between Fields 8 and 11.

*Plate 10: Green lane flanked by stone-faced boundary banks running north from Goetre-uchaf farm (Sites **3**, **4** and **6**)*

5. WATCHING BRIEF RESULTS

5.1 INTRODUCTION

5.1.1 The following section presents a synthesised summary of the results of the watching brief investigation. For the sake of brevity and clarity, more detailed context descriptions are tabulated in *Appendix 4*. The location of the test pits (TPs) has been plotted in Figure 4.

5.2 FIELDWORK RESULTS

5.2.1 The dimensions of the geotechnical test pits were approximately 2.5m x 2m. For the majority, the stratigraphy consisted of a mid-brown loamy topsoil overlying an orangey-brown sandy glacial till. The till included fractured rock inclusions in places. In TPs 4, 5, 7, 8, 12-14, 17 and 20 there was also a layer of buff sandy-clay and fine gravel till. Bedrock was encountered, on average, at approximately 0.8-1m.

5.2.2 Layers of redeposited material were encountered in TP2, ***201*** and ***202***, and TP15, ***1502***, both of which are thought to be associated with upcast from the construction of the A55. Similarly, redeposited material was observed in TP18, which was thought to be associated with the demolished farm. Evidence of the farm was also encountered in TP21 with a concrete surface, and demolition material in TP24, 26-8, although TP17, 19, 20, 22 and 23 around the site of the now demolished farm did not uncover any noticeable remains.

5.2.3 In TP6 a pit of apparent archaeological origin was observed in section between approximately 0.6-0.7m. The base of the pit was lined with a burnt deposit, ***603***, containing burnt stone, which was sampled to assess the potential for palaeoenvironmental evidence (see *Section 5.3*, below). The pit measured approximately 1.1m wide and at least 0.3m deep. No finds were retrieved from which to date the pit.

5.3 PALAEOENVIRONMENTAL RESULTS

5.3.1 The only charred plant remains recorded in the sample were charcoal fragments from alder/hazel (*Alnus*/*Corylus*) round wood, with some positively identified hazel. Unfortunately, it can be difficult to distinguish between the charcoal of alder and hazel. Charcoal less than 2mm was engrained with silt/clay.

5.3.2 Fungal sclerotia and occasional mollusc remains were recorded in the matrix together with abundant modern roots. No small finds were observed in the residue.

5.3.3 Abundant charcoal fragments were identified in the undated burnt pit fill (***603***), despite the very small volume of the bulk sample. The presence of

alder/hazel roundwood charcoal suggests the possible use of the wood as fuel on the site and the disposal of the charcoal in the pit.

FLOT SIZE (ML)	MATRIX	CHARRED PLANT REMAINS	CHARCOAL	POTENTIAL FOR ANALYSIS	POTENTIAL FOR DATING
50	Charcoal >2mm (4), <2mm (4), modern roots ++, fungal sclerotia +, molluscs +	None	Charocal mostly alder/hazel roundwood with some positively identified hazel	None	Yes

*Table 2: Environmental assessment of burnt pit fill (**603**), TP6*

5.3.4 ***Potential***: although no other charred plant remains were recorded during the assessment of the undated burnt pit fill (***603***), it has shown that there is the potential for the preservation of charred plant remains, including charcoal, on the site. There is a good potential for the scientific dating of the charcoal from fill ***603***, but there is no potential for the further analysis of the plant remains.

6. GEOPHYSICAL SURVEY RESULTS

6.1 INTRODUCTION

6.1.1 The following discussion is based on the results produced in the geophysical survey report (Phase SI 2012; *Appendix 5*). It is not intended to entirely replicate the full results but to present an archaeologically informed précis following the research findings and walkover survey (*Sections 3 and 4*). The features discussed below are numbered and prefixed by 'M' (magnetometry) for ease of reference, and plotted onto Figure 8. The historic field boundaries have also been abstracted and plotted on Figure 8 from the Tithe map of 1840-1 (Fig 5), the OS First Edition map of 1889 (Fig 6) and the OS map of 1970-72 (Fig 7), for interpretation purposes.

6.2 DISCUSSION OF THE RESULTS

6.2.1 The survey has detected numerous features pertaining to a largely agricultural origin, although many of these appear to be of archaeological significance. There are also features that, due to their characteristics, are attributable to modern features, which have been discussed in the survey report (*Appendix 5*) and so will not be included here. The strength of the anomalies representing the features, and the contrast displayed between positively magnetic and negatively magnetic features corresponds to the underlying igneous geology, which possesses a residual magnetism. There is a possibility that more subtle anomalies, normally associated with archaeological features, may be prevented from being easily observed in the data by the stronger contrasting magnetic anomalies. Indeed, there are areas of complexity where it is difficult to distinguish the individual anomalies, which is suggestive of some archaeological potential but not easily interpreted.

6.2.2 Several of the features can be attributed to those observed during the walkover (*Section 4*). Two parallel linear features, M1, are ditches associated with the metalled road leading to the now demolished farm of Goetre-uchaf (Site **29**). The areas of positive response in Field 3 and partly into Field 8, M2, correlate with an undulating topography in this field and it is likely that these relate to quarrying activity. There is also an extant ditch in Field 2, M3, relating to a relict field boundary from the twentieth century (OS 1970-2) and associated with a lynchet observed during the walkover (Site **30**). Two further field boundaries observed on the First Edition OS mapping (1889), are observed in the results, M4 in Field 3, and M5 in Field 8 (Site **33**). Both of these field boundaries can be seen to have been straightened or altered throughout the historic mapping (Figs 5-7), which is also noted in the geophysical survey data (Fig 8).

6.2.3 In Field 13, there are three parallel linear anomalies running north-west/south-east, M6. These were observed as extant during the walkover and are either relict field boundaries or drainage. Should these be field boundaries, they pre-date the mid-nineteenth century mapping (Figs 5-7).

6.2.4 Generally, however, across the whole site there are two distinct set of anomalies that are of archaeological potential; a complexity of linear features, and two areas of discrete circular features. Apart from some modern drainage and areas of plough marks, the majority of linear features appear to be associated with at least two phases of field systems, the most recent of which from appearance, are a set of rectilinear aligned ditches (M7). A second field system can be discerned as a more irregular alignment of ditched features (M8), intercut by many of the ditches associated with M7, abutting what seems to be a possible rectilinear enclosure (M9) around the now demolished Goetre-uchaf farmstead. It is not possible to date these field systems from the survey results, although those in Field 8 appear to be sinuous and reminiscent of medieval ploughing. From the evidence from the available historic mapping from the mid nineteenth century onwards, however, few can be attributed to mapped field boundaries (Fig 8).

6.2.5 The earlier field system, M8, in the eastern portion of Field 2, overlies two of the discrete circular anomalies clustered in this area, although, confusingly, they then overlie a rectilinear that was attributed to the later system. At least a dozen of these circular features can be observed (M10), with another further to the west (M11), and another cluster in Field 8 (M12). These features, with a diameter of approximately 5-7.5m on average, are interesting as they are difficult to interpret from commonly occurring geophysical anomalies, would seem to be earlier than M8, and of possible archaeological potential. The most obvious archaeological explanation of such circular anomalies would be round barrows or hut circles, the latter of which would be observed as discontinuous circle anomalies, as can be seen here, representing the entrance. However, the position of cluster M10 on a steep slope, and cluster M12 on the edge of a scarp is not the usual topography for the location of such features, unless similar features have been ploughed-out in the more level areas (*Section 3.5*).

6.2.6 The position of the extant barrow (Site **8**) is not discernible in the geophysical survey, but this is possibly as there are no distinguishing features to be detected by the magnetometer, i.e. infilled cut or heated/fired features for instance. There are, interestingly, some discrete positive features to the north-west of the barrow, however, that appear to be pits (M13), and may be associated.

6.2.7 Those fields that could not be surveyed, or the data has been adversely disturbed by strong modern features, such as Field 1, should not be discounted for their archaeological potential, and should be considered during any potential further investigation, i.e. trial trenching.

7. GAZETTEER OF SITES

Site number	**1**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55397 69986
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34965
Statutory Design.	**-**
Sources	Walkover survey
Description	Linear boundary bank located on the east side of the northern end of the green lane (Site **6**). The bank is up to 2.5m wide by 0.5m high and has trees and mostly outgrown plashed hedging on top of it
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**2**
Site name	Gate, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55417 69934
Site type	Gate Stoup
Period	Modern
HER No	None previously, now assigned PRN 34966
Statutory Design.	**-**
Sources	Walkover survey
Description	A modern metal kissing gate associated with the public footpath running through the centre of the proposed development along the alignment of the green lane (Site **6**).
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**3**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55454 69856
Site type	Boundary bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34967
Statutory Design.	**-**
Sources	Walkover survey
Description	Linear stone-faced boundary bank situated on the east side of the green lane (Site **6**). The bank is up to 2.5m wide by 0.3m high and has trees and mostly outgrown plashed hedging on top of it
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**4**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55444 69858
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34968
Statutory Design.	**-**
Sources	Walkover survey
Description	Linear stone-faced boundary bank situated on the west side of the green lane (Site **6**). The bank is up to 2.5m wide by 0.3m high and has trees and mostly outgrown plashed hedging on top of it

Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**5**
Site name	Gate Stoup, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55439 69870
Site type	Gate Stoup
Period	Post-medieval
HER No	None previously, now assigned PRN 34969
Statutory Design.	-
Sources	Walkover survey; OS First Edition, 1889
Description	An extant farm gateway first depicted on the First Edition OS mapping, and giving access into the field to the west of the green lane (Site **6**). It consists of a pair of slate gate stoups containing an iron gate.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**6**
Site name	Green Lane, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55446 69866
Site type	Trackway
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34970
Statutory Design.	-
Sources	Walkover survey
Description	A linear green lane orientated roughly north-west/south-east and giving access from Penrhos Road in the north to Goetre-Uchaf farm. It measures 3m wide and is flanked by several extant sections of boundary bank (Sites **1**, **3** and **4**). At the south-eastern end the lane enters the farmyard, is extant as a slight curving lynchet and ends at a farm gate (Site **24**).
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**7**
Site name	Barrow, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55503 69801
Site type	Barrow
Period	Prehistoric
HER No	PRN22
Statutory Design.	-
Sources	HER; Walkover survey
Description	This is one of two tumuli within the field (the second tumulus (Site **8**) lies *c* 135m to the north-east). The approximate dimensions are 12m wide and up to 0.4m high The site consists of a circular mound that survives as an extant earthwork except for roughly one-third of the southern portion that has been quarried away, revealing natural rock rising to near surface. The barrow, along with its neighbour, Site **8**, is sited on the edge of a prominent south-east-facing scarp. Neither barrow is shown on any historic mapping. A convex flint scraper was found on its surface in 1934.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**8**
Site name	Barrow, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55565 69902
Site type	Barrow

Period	Prehistoric
HER No	PRN23
NMR No	400483
Statutory Design	Cn376
Sources	HER; Walkover survey
Description	This second of the two tumuli present on site near Goetre-uchaf is situated *c* 135m north-east of the first tumulus (Site **7**). The extant mound is sub-circular in plan, measuring *c* 20m long by 18m wide and survives up to 0.8m high, probably dating to the Bronze Age (*c* 2400 BC - 700 BC), situated within enclosed pasture on the leading edge of a slight terrace. Neither barrow is depicted on any historic mapping.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**9**
Site name	Farm Building, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55508 69788
Site type	Building
Period	Modern
HER No	None previously, now assigned PRN 34972
Statutory Design	**-**
Sources	Walkover survey
Description	An extant small single-storied farm building positioned within an area of infilled quarrying on the north-east side of the farmyard at Goetre-uchaf farm. The building was not depicted on any of the historic OS mapping but the surrounding fenced boundary is shown on the early 1980s OS mapping. The building consists of a modern brick-built single-celled structure, with a slightly pitched corrugated iron roof. There is an open doorway on the south-east gable end and a metal louvered ventilation panel on the opposite gable end.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**10**
Site name	Green Lane, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55571 69829
Site type	Trackway
Period	Post-medieval
HER No	None previously, now assigned PRN 34973
Statutory Design	**-**
Sources	Walkover survey
Description	A small, slightly-sunken, section of a possible green lane extending into the field to the north-east of Goetre-uchaf farm, and on the north side of an extant field boundary (Site **11**). The west side of the lane consists of a lynchet cut into the south-east-facing scarp slope. The lane probably also drained a boggy area to the north and a spring marked on the historic OS mapping.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**11**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55586 69843
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34974
Statutory Design	**-**
Sources	Walkover survey
Description	Slightly sinuous boundary bank running roughly south-west/north-east from the

	east side of Goetre-uchaf farm. It measures approximately 2.5m wide by up to 0.5m high, and is topped with trees.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**12**
Site name	Field Drains, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55473 69942
Site type	Drain
Period	Modern
HER No	None previously, now assigned PRN 34975
Statutory Design	-
Sources	Walkover survey
Description	A series of at least three parallel field drains located in the north end of the field containing the barrows (Sites **7** and **8**). The drains are all orientated roughly north-west/south-east. One is depicted on the current OS mapping.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**13**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55722 69874
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34976
Statutory Design	-
Sources	Walkover survey
Description	Short section of linear boundary bank situated running north from Goetre-Isaf farm. It measures 1.5m wide by up to 0.5m high.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**14**
Site name	Boundary Bank, Goetre-uchaf , Penrhosgarnedd
NGR	SH 55836 69875
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34977
Statutory Design	-
Sources	Walkover survey, geophysical survey
Description	A linear field bank, one of three parallel features within a field to the north-east of Goetre-isaf farm, and also observed in the geophysical survey results. It is orientated roughly north-west/south-east, and measures 3m wide by up to 0.3m high.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**15**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55856 69903
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34978
Statutory Design	-
Sources	Walkover survey
Description	A linear field bank, one of three parallel features within a field to the north-east of

	Goetre-isaf farm, and also observed in the geophysical survey results. It is orientated roughly north-west/south-east, and measures 2m wide by up to 0.2m high.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**16**
Site name	Boundary Ditch, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55826 69853
Site type	Boundary Ditch
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34979
Statutory Design	-
Sources	Walkover survey
Description	A linear field ditch, one of three parallel features within a field to the north-east of Goetre-isaf farm, and also observed in the geophysical survey results. It is orientated roughly north-west/south-east, and measures 0.7m wide by up to 0.2m deep.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**17**
Site name	Gate Stoup
NGR	SH 55726 69858
Site type	Gate Stoup
Period	Post-medieval
HER No	None previously, now assigned PRN 34980
Statutory Design	-
Sources	Walkover survey
Description	An extant farm gateway giving access into a field to the north of Goetre-isaf farm. It consists of a single slate gate stoup.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**18**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55648 69827
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34981
Statutory Design	-
Sources	Walkover survey
Description	A curvilinear stone-faced boundary bank enclosing the north and west sides of the field, positioned immediately north-west of Goetre-isaf farm. It measures approximately 3m wide by up to 0.6m high and is topped with an overgrown hedge.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**19**
Site name	Slate Fence, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55583 69754
Site type	Boundary Fence
Period	Post-medieval
HER No	None previously, now assigned PRN 34982
Statutory Design	-

Sources	Walkover survey
Description	An L-shaped section of slate fence located on the field boundary running between Goetre-uchaf and Goetre-isaf farms. In places, it partially overlay an earlier stone-faced boundary bank (Site **20**).
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**20**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55537 69768
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34983
Statutory Design	-
Sources	Walkover survey
Description	A small linear section of stone-faced boundary bank located immediately to the east of the farmyard at Goetre-uchaf farm. It measures approximately 1.5m wide by up to 0.4m high and topped with a hedge. The boundary has been superseded by a slate fence (Site **19**).
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**21**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55540 69685
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34984
Statutory Design	-
Sources	Walkover survey
Description	A linear section of boundary bank running downhill adjacent to a stream on the south side of Goetre-uchaf farm. It measures approximately 2.5m wide by 0.5m high, and has trees growing along its length including several mature oaks.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**22**
Site name	Culvert, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55528 69706
Site type	Culvert
Period	Post-medieval
HER No	None previously, now assigned PRN 34985
Statutory Design	-
Sources	Walkover survey
Description	A mortared stone-constructed bridge/culvert giving access over a stream between fields on the south side of Goetre-uchaf farm. It measures 3m square by up to 1.3m high.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**23**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55512 69725
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34986

Statutory Design	-
Sources	Walkover survey
Description	A slightly curvilinear section of boundary bank running downhill adjacent to a stream on the south side of Goetre-uchaf farm. It measures approximately 2.5m wide by 0.5m high and has trees growing along its length.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**24**
Site name	Gateway, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55500 69746
Site type	Gate Stoup
Period	Post-medieval to Modern
HER No	None previously, now assigned PRN 34987
Statutory Design	-
Sources	Walkover survey
Description	A pedestrian gateway located on the south side of the farmyard at Goetre-uchaf farm. It is located on the modern public footpath and consists of a simple slate kissing gate with wooden gate.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**25**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55486 69729
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34988
Statutory Design	-
Sources	Walkover survey
Description	A curvilinear boundary bank that defines the southern extent of the farmyard at Goetre-uchaf farm. It is fragmentary, but measures approximately 2m wide by 0.4m high, and is topped by an overgrown hedge.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**26**
Site name	Farmstead, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55465 69761
Site type	Farmstead
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34989
Statutory Design	-
Sources	Walkover survey; OS 2inch map 1822, Tithe Map 1840-1, OS First Edition 1889
Description	The farmstead at Goetre-uchaf. It was depicted on the Tithe mapping of 1840-1 and possibly earlier on the 1822 OS 2 inch mapping. The farmstead historically consisted of an L-shaped range of farmhouse and outbuildings located on the north and west sides of the yard, and further buildings were constructed around this core in the twentieth century. The farmstead was demolished almost entirely post the OS mapping dated 1987-1990. A single outbuilding survives on the east side of the farmyard (Site **9**), which is constructed in an infilled quarry scoop. Debris here included several hand-made bricks that may have come from the farmhouse.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**27**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55425 69805
Site type	Boundary Bank
Period	Modern
HER No	None previously, now assigned PRN 34990
Statutory Design	**-**
Sources	Walkover survey
Description	An L-shaped boundary bank demarcating the north and west sides of a small field plot located on the north side of Goetre-uchaf farm. It consists of a slight bank measuring up to 1m wide by 0.4m high, topped with trees. It is twentieth century in origin.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**28**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55421 69742
Site type	Boundary Bank
Period	Modern
HER No	None previously, now assigned PRN 34991
Statutory Design	**-**
Sources	Walkover survey
Description	An L-shaped boundary bank demarcating the east and west sides of a small field plot located on the west side of Goetre-uchaf farm. It consists of a slight bank measuring up to 1m wide by 0.4m high, topped with trees. It is twentieth century in origin.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**29**
Site name	Farm Track, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55369 69815
Site type	Trackway
Period	Modern
HER No	None previously, now assigned PRN 34992
Statutory Design	**-**
Sources	Walkover survey; OS mapping 1980-2
Description	A linear farm access track running north-west from Goetre-Uchaf farm towards the 1970s housing estate. This track, which is metalled superseded the green lane (Site **6**) and was presumably constructed when the housing estate was built. It is not shown on any OS mapping earlier than 1980-2.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**30**
Site name	Boundary Lynchet, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55329 69783
Site type	Lynchet
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34993
Statutory Design	**-**
Sources	Walkover and geophysical surveys
Description	A linear lynchet located in a field to the west of Goetre-uchaf farm. It is orientated roughly north-west/south-east and corresponds with a field boundary depicted on all the historic OS mapping, although it appears to have moved/straightened slightly throughout (Fig 8). It measures approximately 1.3m wide by up to 0.3m

	high.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**31**
Site name	Boundary Lynchet Goetre-uchaf, Penrhosgarnedd
NGR	SH 55099 69704
Site type	Lynchet
Period	Unknown
HER No	None previously, now assigned PRN 34994
Statutory Design	-
Sources	Walkover survey
Description	A linear lynchet in a small triangular field sandwiched between the A55, a 1970s housing estate and Penrhos Road. It is orientated roughly west-north-west/east-south-east and survives up to 1m wide and 0.5m high. It does not conform to any relict field boundaries depicted on the historic OS mapping and may reflect more modern farm vehicular activity.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**32**
Site name	Boundary Bank, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55436 69710.
Site type	Boundary Bank
Period	Medieval to Post-medieval
HER No	None previously, now assigned PRN 34995
Statutory Design	-
Sources	Walkover survey; OS First Edition mapping 1889
Description	A sinuous boundary bank located to the west of Goetre-uchaf farm. It runs uphill in a general south-east/north-west direction and measures 2.5m wide by 0.4m high. The southern end is topped with trees, there is a kink east towards the farm in the centre of the boundary where an access track was depicted on the historic mapping, and the surviving north section has an overgrown hawthorn hedge on top. The boundary was shown on all of the historic OS maps from 1889 onwards.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**33**
Site name	Boundary Ditch, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55556 69933
Site type	Boundary Ditch
Period	Medieval to Post-Medieval
HER No	None previously, now assigned PRN 34996
Statutory Design	-
Sources	Walkover and geophysical surveys; OS mapping 1889; 1900; 1970-2
Description	A slight boundary ditch located adjacent to the east side of Goetre-uchaf Barrow (Site **8**). It consists of a north-west/south-east orientated ditch measuring up to 0.2m deep. The boundary was depicted on the First Edition OS mapping of 1889 slightly further to the north-east, and then was shown at a slightly different alignment from the map of 1900 onwards. That seen during the walkover survey probably relates to the boundary depicted on the tithe. All three alignments were also observed in the geophysical survey.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**34**
Site name	Capel-y-Graig, Penrhosgarnedd
NGR	SH 55310 70130
Site type	Chapel
Period	Post-medieval
HER No	None previously, now assigned PRN 34997
NMR No	6706
Statutory Design	-
Sources	NMR
Description	Capel-y-Graig Methodist Chapel was built in 1814 and rebuilt in 1872. The present chapel, dated 1872, was built in the Classical style of the gable-entry type, but has now been converted into residential flats.
Assessment	The feature lies outside of the boundary of the proposed housing development and it is unlikely that any groundworks will affect the site.

Site number	**35**
Site name	Capel-y-Graig, Lodge, Vaynol Hall
NGR	SH 54595 69506
Site type	Lodge
Period	Post-medieval
HER No	PRN16051
NMR No	405498
Statutory Design	4201 - Listed Building Grade II*
Sources	NMR, HER
Description	The Capel-y-Graig lodge was built in 1863-4 when work began on the perimeter wall. The setting has already been compromised by the dumping on the field to the south. The lodge is set behind the boundary wall on the east side of Vaynol Park, on the road formerly leading to the village of Capel-y-Graig. The lean-to veranda supported on limestone columns is distinctive and comparable with other estate cottages.
Assessment	The feature lies outside of the boundary of the proposed housing development and will not be affected by the proposed development.

Site number	**36**
Site name	Flint Scraper Findspot, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55500 69800
Site type	Findspot
Period	Prehistoric
HER No	PRN02
Statutory Design	-
Sources	HER
Description	Convex flint scraper found on one of two tumuli (Site **7**) near Goetre-uchaf. Now in the Museum of Wales.
Assessment	The feature lies within the boundary of the proposed housing development and any groundworks would directly impact upon the site.

Site number	**37**
Site name	Querns Findspot, near Perfeddgoed, Penrhosgarnedd
NGR	SH 55980 69740
Site type	Findspot
Period	Unknown
HER No	PRN025
Statutory Design	-
Sources	HER
Description	"Many years ago a large number of querns ..were dug up near Bangor. They were so numerous that the finder built a good part of a wall of a cottage with them, and they may not be seen there. The house stands near the branching off of the lane

	towards Perfeddgoed, about two miles from Bangor on the Caernarvon Road." (Arch Camb 1860). There is now no trace of a house in the area indicated near the junction of the lane, leading to Perfeddgoed, with the Caernarvon road. Querns found at Tyddyn-Brwynog.
Assessment	The feature lies outside of the boundary of the proposed housing development and it is unlikely that any groundworks will affect the site.

Site number	**38**
Site name	Stone with graffiti, Wern Farm, Bangor
NGR	SH 56056 69460
Site type	Inscribed Stone
Period	Post-medieval
HER No	PRN17164
Statutory Design	-
Sources	HER
Description	Stone in doorway has markings on it which appear to be post-medieval graffiti. Dates inscribed on stone are 1793 and 1797.
Assessment	The feature lies outside of the boundary of the proposed housing development and will not be affected by the proposed development.

Site number	**39**
Site name	Intercutting Ditches, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55528 69980
Site type	Ditches
Period	Unknown
HER No	None previously, now assigned PRN 34998
Statutory Design	-
Sources	GAT 2010
Description	The ditches were observed in during a watching brief associated with the cutting of a cable trench. The earlier of the ditches was just over 1m wide and 0.2m deep, and the later ditch measured 0.45m wide and 0.3m deep.
Assessment	The feature lies at the edge of the proposed housing development and groundworks could directly impact upon the site.

Site number	**40**
Site name	Burnt Mound, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55625 69916
Site type	Burnt Mound
Period	Prehistoric (?Bronze Age)
HER No	None previously, now assigned PRN 34999
Statutory Design	-
Sources	GAT 2010
Description	The burnt mound was observed in section only during a watching brief associated with the cutting of a cable trench. The feature was observed as a layer of charcoal and fire-cracked stone and was adjacent to a boggy area.
Assessment	The feature lies at the edge of the proposed housing development and groundworks could directly impact upon the site.

Site number	**41**
Site name	Possible Barrows, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55522 69976
Site type	?Barrows
Period	Prehistoric (?Bronze Age)
HER No	None previously, now assigned PRN 35000
Statutory Design	-
Sources	Aerial photography (NMR CPE/UK/1939/3170)

Description	Between four and five possible discrete mounds were visible within Field 8, aligned in an approximate row, close to the northern boundary and continuing into the field to the east. Although several of these possible mounds lie within the area now occupied by the hospital, at least one of them lies within the proposed development area, to the north-west of Site **8**. Given the presence of prehistoric barrows within the vicinity (Sites **7** and **8**), and the detection of four sub-circular anomalies within this field by the geophysical survey (Phase SI 2012, 27; Field 8, 8G), the former presence of burial mounds must be considered as a possible explanation for such features.
Assessment	The group of features falls partly within the proposed housing development and groundworks could directly impact upon the site.

Site number	**42**
Site name	Circular Features, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55352 69760
Site type	Parch marks
Period	Unknown (?Bronze Age)
HER No	None previously, now assigned PRN 35001
Statutory Design	**-**
Sources	Aerial photography (NMR 541/178/3183-4)
Description	Approximately six apparent circular parch marks were visible within a Field 2, to the south-west of Goetre-uchaf. This area was directly adjacent to an area where the geophysical survey detected six sub-circular anomalies (Phase SI 2012, 25; Field 2, 2G) and it is possible that these features are of a shared type or origin to those anomalies. Given the presence of prehistoric barrows within the vicinity (Sites **7** and **8**), the presence of sub-surface remains of burial mounds must be considered as a possible explanation for such features.
Assessment	The group of features lies within the proposed housing development and groundworks could directly impact upon the site.

Site number	**43**
Site name	Drainage System, Goetre-uchaf, Penrhosgarnedd
NGR	SH 55525 69908
Site type	Drainage
Period	Modern
HER No	None previously, now assigned PRN 35002
Statutory Design	**-**
Sources	Aerial photography (NMR CPE/UK/1939/3170)
Description	A series of parallel lines was visible in Field 8. These lines were similarly aligned to several parallel linear anomalies detected in this field by the geophysical survey (Phase SI 2012, 27; Field 8). The uniformity of these features suggests that they might be part of a land drainage system.
Assessment	The group of features falls partly within the proposed housing development and groundworks could directly impact upon the site.

8. ASSESSMENT OF THE SIGNIFICANCE OF THE REMAINS

8.1 INTRODUCTION

8.1.1 A total of 43 sites, or heritage assets, have been identified within the study area. Sites **1**-**33** were identified during the walkover survey, Sites **34**-**38** from the HER, Sites **39**-**43** were identified during the desk-based research. In total, 39 of the heritage assets are situated within the boundaries of the proposed development area and, therefore, lie within areas that likely to be impacted by development (Sites **1**-**33**, **36**, **39**-**43**). There is one scheduled monument within the proposed development area, which is Goetre-Uchaf Barrow (Site **8**; CN376). Capel-y-Graig, Lodge (Site **35**) is a Grade II* listed building, although it lies at a distance from the proposed development area, and separated by the A55 dual carriageway, and will not be affected in terms of visual impact.

Period	**No of Sites**	**Site**
Neolithic/Bronze Age	4	Barrow (Site **7**), Goetre-Uchaf Barrow (Site **8**), Flint Scraper (Site **36**), Burnt Mound (Site **40**), Possible Barrows (Site **41**)
Medieval/Post-medieval	18	Boundary Banks (Sites **1**, **3**-**4**, **11**, **13**-**15**, **18**, **20**-**1**, **23**, **25**, **32**), Green Lane (Site **6**), Boundary Ditches (Site **16**, **33**), Farmstead (Site **26**), Lynchet (Site **30**),
Post-medieval	8	Gate Stoups (Sites **5**, **17**), Green Lane (Site **10**), Slate Fence (Site **19**), Culvert (Site **22**), Capel-y-Graig (Site **34**), Capel-y-Graig Lodge (Site **35**), Graffiti Stone (Site **38**)
Post-medieval/Modern	1	Gateway (Site **24**)
Modern	6	Gate Stoup (Site **2**), Farm Building (Site **9**), Field Drains (Site **12**), Boundary Banks (Site **27**-**8**), Farm Track (Site **29**), Circular Features (Site **42**), Drainage System (Site **43**)
Undated	3	Lynchet (Site **31**), Querns (Site **37**), Intercutting Ditches (Site **39**)

Table 3: Number of sites by period

8.1.2 It is described in Planning Policy Wales (PPW) that it is important for the relative importance of archaeological sites to be understood by the planning authorities (WAG 2011, Section 6.5.1). Therefore, the following section will determine the nature and level of the significance of this archaeological resource, as detailed in *Sections 3* to *5*. This is an iterative process, beginning with the guideline criteria outlined in Table 2, below. In general terms, the recording of a heritage asset, e.g. HER, SM or listed building, and any subsequent grading thereafter, by its nature, determines its importance. However, this is further quantified by factors such as the existence of surviving remains or otherwise, its rarity, or whether it forms part of a group. There are a number of different methodologies used to assess the

archaeological significance of heritage assets, but that employed here (*Section 8.2*) is the 'Secretary of State's criteria for scheduling ancient monuments' (Annex 1; DCMS 2010).

Importance	**Examples of Heritage Asset**
National	Scheduled Monuments (SMs), Grade I, II* and II Listed Buildings
Regional/County	Conservation Areas, Registered Parks and Gardens (Designated Heritage Assets) Sites and Monuments Record/Historic Environment Record
Local/Borough	Assets with a local or borough value or interest for cultural appreciation Assets that are so badly damaged that too little remains to justify inclusion into a higher grade
Low Local	Assets with a low local value or interest for cultural appreciation Assets that are so badly damaged that too little remains to justify inclusion into a higher grade
Negligible	Assets or features with no significant value or interest

Table 4: Guideline criteria used to determine Importance of Heritage Assets

8.2 QUANTIFICATION OF IMPORTANCE

8.2.1 The gazetteer sites previously listed (*Section 7*, above) were each considered using the criteria for scheduling ancient monuments, with the results below. This information will contribute to the overall assessment of the importance of each heritage asset.

8.2.2 ***Period:*** four sites (Sites **7**, **8**, **36**, and **40**) are of likely prehistoric date and, as such, possess the potential to inform us about some of the earliest human activity within the study area. The two barrows (Sites **7** and **8**) and the burnt mound (Site **40**) are all of probable Bronze Age date and may have been associated with some of the earliest settled agricultural communities in the immediate vicinity of the study area, in addition to the activity of a funerary and ritual nature that is represented by the barrows. A further group of possible barrows (Site **41**), and a group of circular features that also possess the potential to represent barrows (Site **42**), might also be of prehistoric origin.

8.2.3 Several field boundaries (Sites **1**, **3-4**, **11**, **13-16**, **18**, **19**, **20-1**, **23**, **25**, **30**, **32**, **33**) and a green lane (Site **6**) have not been closely dated, but may be of medieval origin. If any of them were demonstrated to be of medieval date then this would add to our understanding of the chronological development of enclosed field systems within the study area, and of the dates of the establishment of the farmsteads of Goetre-uchaf (Site **26**) and Goetre-isaf.

8.2.4 Three sites (Sites **31**, **37**, and **39**) are undated. A group of quern stones (Site **37**) has the potential to date to the prehistoric or Romano-British periods and is, therefore, of significance. A pair of intercutting ditches (Site **39**) and a lynchet (Site **31**) could each represent widely differing date ranges and retain the potential to inform us of changes to the agricultural landscape over time.

8.2.5 ***Rarity:*** the proposed development area represents one of the last portions of the plateau above the northern side of the Nant y Garth stream valley to be

developed, with large residential and hospital developments having occupied much of the southern end of this plateau. Therefore, at a local, if not regional, level, this area retains rare examples of heritage assets from a variety of periods, which retain the potential to inform us about the character and development of human activity in the local landscape between the Bronze Age and the modern period. The barrows (Site **7** and **8**), and potential barrows (Sites **41**-**2**), and any associated sub-surface remains, may be some of the only remaining examples of a larger barrow cemetery that might have occupied this area and resulted in the place-name 'Penrhos-Garnedd' (*Section 3.2.9*), and may be of potential national significance.

8.2.6 ***Documentation:*** this report includes a preliminary search of documentation from the most accessible resources. There are few documents relating directly to the identified sites, however, as many of the gazetteer sites are likely to have formed elements of the post-medieval agricultural landscape, it is possible that there may be further associated documents.

8.2.7 ***Group Value:*** the barrows (Site **7** and **8**), and potential barrows (Sites **41**-**2**), may represent the remains of a barrow cemetery and may, therefore, provide information relating to what was formerly a much larger complex of monuments. The numerous field boundaries (Sites **1**, **3**-**4**, **11**, **13**-**16**, **18**, **19**, **20**-**1**, **23**, **25**, **30**-**32**, **33**) form component elements of a field system, although it is possible that they relate to several phases of development of fields. These might also include a pair of intercutting ditches (Site **39**). Understanding the boundaries as a group will be more informative than examining each site in isolation.

8.2.8 ***Survival/Condition:*** Goetre-uchaf barrow (Site **8**) remains in good condition, although the second barrow (Site **7**) has been partially destroyed by quarrying. Parts of the green lane (Site **6**) remain in extremely good condition. Many of the field boundaries (Sites **1**, **3**-**4**, **11**, **13**-**16**, **18**, **19**, **20**-**1**, **23**, **25**, **30**-**32**, **33**) are also in good condition, although some of them have become eroded to low banks, or shallow ditches. Associated sub-surface remains are likely to be associated with many of these sites.

8.2.9 ***Fragility/Vulnerability:*** the barrows (Sites **7** and **8**), and potential barrows (Sites **41**-**2**), burnt mound (Site **40**), field boundaries (Sites **1**, **3**-**4**, **11**, **13**-**16**, **18**, **19**, **20**-**1**, **23**, **25**, **30**-**32**, **33**), intercutting ditches (Site **39**), green lanes (Sites **6** and **10**), field drains (Sites **12** and **43**), farm track (Site **29**), and any sub-surface remains of Goetre-uchaf farmstead (Site **26**) are extremely fragile in the context of development works and will be vulnerable to any intrusive ground disturbance.

8.2.10 ***Diversity:*** none of the sites exhibit a diverse range of characteristics.

8.2.11 ***Potential:*** there is significant potential for previously unknown sub-surface remains associated with prehistoric activity, such as additional burial mounds. Although the projecting mounds may have become denuded, mound material, infilled encircling ditches, and burials may survive at, or below, the current ground level. There is also the potential for additional contemporary, or near contemporary, features, such as burnt mounds or features associated with settlement and agriculture. The potential for such remains has been highlighted

by the geophysical survey, which identified ten sub-surface circular features (Phase SI 2012, 25-7; Field 8, 8G; Field 2, 25).

8.2.12 There is also considerable potential for the presence of sub-surface remains associated with medieval and post-medieval field systems. The quantity of field boundaries within the proposed development area has decreased from the time of the production of the tithe map in 1840-1 and remains of these boundaries, or other boundaries that have not been recorded previously, might survive below ground.

8.3 STATEMENT OF IMPORTANCE

8.3.1 Using the guideline criteria outlined in Table 4, together with further quantification (*Section 8.2*), and informed professional judgement, each of the sites listed in the gazetteer has been assessed for importance as a heritage asset of archaeological interest (Table 5). The scheduled Goetre-uchaf barrow (Site **8**) and the Grade II* listed Capel-y-Graig Lodge (Site **35**) are the only sites of *national importance*. The damaged barrow (Site **7**), Capel-y-Graig (Site **34**), querns (Site **37**), and graffiti stone (Site **38**) are all contained within the HER as recognised sites and have all been classified as being of *regional/county importance*. The flint scraper findspot (Site **36**) would normally be considered as a site of significance, as indicators of prehistoric activity with the potential for further associated material, and would be of *regional/county importance*. However, the location of the findspot was Goetre-uchaf barrow (Site **8**), which is already classified as a site of *national importance*, and, consequently, would be associated by group value in this instance. The burnt mound (Site **40**) and possible barrows (Site **41**) are of sufficient potential significance to be considered of *regional/county importance*, until information obtained through investigation though trial trenching provides information that may upgrade or downgrade their significance.

8.3.2 The field boundaries (Sites **1**, **3-4**, **11**, **13-16**, **18**, **19**, **20-1**, **23**, **25**, **30**, **32**, **33**) and a green lane (Site **6**) have the potential to be of medieval origin and have been classified as being of *local/borough importance*, as has Goetre-uchaf farm (Site **26**), which, although demolished, retains the potential for sub-surface remains that could provide information relating to the date of foundation and development of the farmstead, which may even relate to an apparent rectilinear enclosure seen in the geophysical survey results. Many features of the agricultural landscape that are likely to be of post-medieval date have been considered to be of *low local importance* and sites of modern origin of *negligible importance*. The importance of the circular features (Site **42**) identified by aerial photography is currently *unknown*, as they are too indistinct for a confident assertion of their origin to be suggested. However, if they were to be demonstrated to represent the sub-surface remains of prehistoric barrows then their importance would be of at least *regional/county importance*.

Site No	Site name	Importance
1	Boundary Bank	Local/Borough
2	Gate Stoup	Negligible
3	Boundary Bank	Local/Borough
4	Boundary Bank	Local/Borough
5	Gate Stoup	Low Local
6	Green Lane	Local/Borough
7	Barrow	Regional/County
8	Goetre-uchaf Barrow	National
9	Farm Building	Negligible
10	Green Lane	Low Local
11	Boundary Bank	Local/Borough
12	Field Drains	Negligible
13	Boundary Bank	Local/Borough
14	Boundary Bank	Local/Borough
15	Boundary Bank	Local/Borough
16	Boundary Ditch	Local/Borough
17	Gate Stoup	Low Local
18	Boundary Bank	Local/Borough
19	Slate Fence	Local/Borough
20	Boundary Bank	Local/Borough
21	Boundary Bank	Local/Borough
22	Culvert	Local/Borough
23	Boundary Bank	Local/Borough
24	Gateway	Low Local
25	Boundary Bank	Local/Borough
26	Farmstead	Local/Borough
27	Boundary Bank	Negligible
28	Boundary Bank	Negligible
29	Track	Negligible
30	Lynchet	Local/Borough
31	Lynchet	Low Local
32	Boundary Bank	Local/Borough
33	Boundary Ditch	Local/Borough
34	Capel-y-Graig	Regional/County
35	Capel-y-Graig Lodge	National
36	Flint Scraper	Regional/County (National by association)

Site No	Site name	Importance
37	Querns	Regional/County
38	Graffiti Stone	Regional/County
39	Intercutting Ditches	Local/Borough
40	Burnt Mound	Regional/County
41	Possible Barrows	Regional/County
42	Circular Features	Unknown
43	Drainage System	Negligible

Table 5: Importance of each gazetteer site based on current information

9. IMPACT ASSESSMENT

9.1 IMPACT

9.1.1 Heritage assets are an '*irreplaceable resource*' (DCLG 2012) and it is a stated objective of the Welsh Assembly Government to '*preserve or enhance the historic environment*' and '*protect archaeological remains*' (WAG 2011). Therefore, it has been the intention of this study to identify the archaeological significance and potential of the study area, and assess the impact of the proposed development, thus allowing the objectives of PPW (WAG 2011) to be enacted upon. Assessment of impact has been achieved by the following method:

- assessing any potential impact and the significance of the effects arising from the proposals;
- reviewing the evidence for past impacts that may have affected the archaeological sites;
- outlining suitable mitigation measures, where possible at this stage, to avoid, reduce or remedy adverse archaeological impacts, or suggestions for further investigation where necessary.

9.1.2 The impact is assessed in terms of the importance, or sensitivity, of the site to the magnitude of change or potential scale of impact during the proposed scheme. The magnitude, or scale, of an impact is often difficult to define, but will be termed substantial, moderate, slight, or negligible, as shown in Table 6, below.

Scale of Impact	Description
Substantial	Significant change in environmental factors; Complete destruction of the site or feature; Change to the heritage asset resulting in a fundamental change in ability to understand and appreciate the resource and its cultural heritage or archaeological value/historical context and setting.
Moderate	Significant change in environmental factors; Change to the heritage asset resulting in an appreciable change in ability to understand and appreciate the resource and its cultural heritage or archaeological value/historical context and setting.
Slight	Change to the heritage asset resulting in a small change in our ability to understand and appreciate the resource and its cultural heritage or archaeological value/historical context and setting.
Negligible	Negligible change or no material changes to the heritage asset. No real change in our ability to understand and appreciate the resource and its cultural heritage or archaeological value/historical context and setting.

Table 6: Criteria used to determine Scale of Impact

9.1.3 The scale of impact, when weighted against the importance of the heritage asset, produces the impact significance. This may be calculated by using the matrix shown in Table 7, below.

Resource Value (Importance)	**Scale of Impact Upon Heritage Asset**			
	Substantial	**Moderate**	**Slight**	**Negligible**
National	Major	Major	Intermediate/ Minor	Neutral
Regional/County	Major	Major/ Intermediate	Minor	Neutral
Local/Borough	Intermediate	Intermediate	Minor	Neutral
Local (low)	Intermediate / Minor	Minor	Minor/ Neutral	Neutral
Negligible	Neutral	Neutral	Neutral	Neutral

Table 7: Impact Significance Matrix

9.1.4 ***Previous disturbance:*** the extent of any previous disturbance to buried archaeological horizons is an important factor in assessing the potential impact of the development scheme. The main type of previous disturbance that will have occurred at the site is intensive modern ploughing. Aerial photographs suggest that this occurred extensively across the proposed development site and will have caused disturbance to remains. However, sub-surface remains often survive below the level of topsoil and subsoil within areas that have been subject to intensive ploughing routines and, indeed, some earthworks can survive above the level of the topsoil, although they may be damaged or reduced in height by ploughing. There is also evidence of quarrying across the site, which, from the geophysical results (*Section 6*), appears to have affected discrete areas formed by extraction pits, rather than representing sub-surface damage across extended areas.

9.1.5 Goetre-uchaf farmstead (Site **26**) has been demolished and the demolition works have removed most remains of standing structures. However, foundation-level structural remains and associated features will survive as sub-surface remains.

9.2 SIGNIFICANCE OF IMPACT

9.2.1 Following on from the above considerations, the significance of effects of the proposed development has been determined, which includes ground disturbance associated with building construction, establishments of roads, and provision of services. It is assumed that areas indicated as proposed open grassland will not be subject to intrusive ground disturbance and any subsequent decisions to landscape, re-grade, or disturb these areas will require additional assessment. Accordingly, it is assumed that the features associated with the southern end of the watercourse (Sites **21**-**3**) will not be subject to disturbance. The results are summarised in Table 7, below, in the absence of mitigation.

Site No	Site name	Nature of Impact	Scale of Impact	Impact Significance
1	Boundary Bank	The erection of fencing to define the site perimeter, or hoarding to seal the site during development, could cause damage to the bank.	Moderate	Intermediate
2	Gate Stoup	The gate is likely to be removed to facilitate a cycle way	Substantial	Neutral
3	Boundary Bank	Destruction during groundworks associated with road establishment and residential landscaping	Substantial	Intermediate
4	Boundary Bank	Destruction during groundworks associated with road establishment and residential landscaping	Substantial	Intermediate
5	Gate Stoup	Destruction during groundworks associated with road establishment and residential landscaping	Substantial	Intermediate/ Minor
6	Green Lane	Destruction during groundworks associated with road establishment and residential landscaping	Substantial	Intermediate
7	Barrow	Destruction during groundworks associated with construction	Substantial	Major
8	Goetre-uchaf Barrow	Impact on the setting of the barrow by isolation within the centre of a surrounding road network and the construction of residential housing	Substantial	Major
9	Farm Building	Demolition and re-development of the site	Substantial	Neutral
10	Green Lane	Destruction during groundworks associated with road and pathway establishment	Substantial	Intermediate/ Minor
11	Boundary Bank	Destruction during groundworks associated with road and pathway establishment	Substantial	Intermediate
12	Field Drains	Destruction during groundworks associated with construction	Substantial	Neutral
13	Boundary Bank	The erection of fencing to define the perimeter of gardens could cause damage to the bank	Moderate	Intermediate
14	Boundary Bank	None	None	None
15	Boundary Bank	None	None	None
16	Boundary Ditch	None	None	None

Site No	Site name	Nature of Impact	Scale of Impact	Impact Significance
17	Gate Stoup	The erection of fencing to define the perimeter of gardens is likely to result in the removal of the gate stoup	Substantial	Intermediate/ Minor
18	Boundary Bank	The erection of fencing to define the perimeter of gardens could cause damage to the bank	Moderate	Intermediate
19	Slate Fence	Partial removal during groundworks associated with road and driveway establishment	Moderate	Intermediate
20	Boundary Bank	Destruction during groundworks associated with road and driveway establishment	Substantial	Intermediate
21	Boundary Bank	None	None	None
22	Culvert	None	None	None
23	Boundary Bank	None	None	None
24	Gateway	Removal to enable establishment of roads, driveways, and gardens	Substantial	Intermediate/ Minor
25	Boundary Bank	Removal to enable establishment of roads, driveways, and gardens	Substantial	Intermediate
26	Farmstead	Disturbance of sub-surface remains during construction work	Substantial	Intermediate
27	Boundary Bank	Destruction during construction work	Substantial	Neutral
28	Boundary Bank	Destruction during construction work	Substantial	Neutral
29	Track	Destruction during construction work	Substantial	Neutral
30	Lynchet	Destruction during construction work	Substantial	Intermediate
31	Lynchet	Destruction during landscaping associated with establishment of road and pathways	Substantial	Intermediate/ Minor
32	Boundary Bank	Destruction during construction work	Substantial	Intermediate
33	Boundary Ditch	Destruction during construction work	Substantial	Intermediate
34	Capel-y-Graig	None	None	None
35	Capel-y-Graig Lodge	None	None	None
36	Flint Scraper	None	None	None

Site No	Site name	Nature of Impact	Scale of Impact	Impact Significance
37	Querns	None	None	None
38	Graffiti Stone	None	None	None
39	Intercutting Ditches	Destruction during landscaping, tree planting, and construction work	Substantial	Intermediate
40	Burnt Mound	Destruction during landscaping, tree planting, and construction work	Substantial	Major
41	Possible Barrows	Destruction during landscaping, tree planting, and construction work	Substantial	Major
42	Circular Features	Destruction during construction work	Substantial	Unknown
43	Drainage System	Destruction during construction work	Substantial	Neutral

Table 8: Assessment of the impact significance on each site during development, based on current information

9.2.2 The assessment of impact significance (Table 8) indicates that there will be 19 significant impacts as a result of the proposed development. There will be four *major* impacts, which will affect a barrow (Site **7**), Goetre-uchaf barrow (Site **8**), a burnt mound (Site **40**), and a group of possible barrows (Site **41**). These sites are likely to be severely disturbed or destroyed, with the exception of the Goetre-uchaf barrow (Site **8**), which will be impacted in terms of a substantial change to the setting of the monument.

9.2.3 The English Heritage guidance on the setting of heritage assets (English Heritage 2012, 2) states that the '*significance of a heritage asset derives not only from its physical presence and historic fabric but also from its setting – the surroundings in which it is experienced.*' A pertinent case study describes how the setting of a Bronze Age burial mound on Yew Tree Heath, in the New Forest National Park, is likely to resemble the environment within which the monument was constructed (*op cit*, 14). This setting, therefore, '*adds to the significance of the monument and the public's ability to understand and appreciate it.*' The Goetre-uchaf barrow (Site **8**) currently lies within a rural landscape that is relatively open, with the exception of agricultural field boundaries.

9.2.4 Unfortunately, the setting of the Goetre-uchaf barrow (Site **8**) has already been compromised, with the construction of the hospital complex to the north and residential properties to the west, and the likely destruction of additional barrows that would have provided context for the site as forming part of a wider complex of monuments. However, the sense of the siting of the monument within the local topography remains. The placing of these monuments, within conspicuous focal points in the landscape, such as the along the skyline of ridges, was one of their defining characteristics and their relationship to the natural topography is a key aspect in understanding their

role and function. The current environs of the Goetre-uchaf barrow (Site **8**) allow a sense of the form of the Nant y Garth stream valley to be experienced, and enable an appreciation of the siting of the monument at the top of the valley slope and at the edge of the upper plateau. The proposal to surround the barrow with an encircling road network, and an outer, concentric, ring of residential properties will isolate the monument from the surrounding landscape. The experiential link with the local topography, which contributes significantly to the character of the monument, will be disrupted, and the exaggerated emphasis on the monument within concentric rings of designed landscape will create a false sense of the individuality and singularity of a monument that appears to have been one element of a larger complex of monuments.

9.2.5 A total of 15 sites will be subject to *intermediate* impacts, all of which are elements of the agricultural landscape, and comprise 13 boundaries and ditches (Sites **1**, **3-4**, **11**, **13**, **18-20**, **25**, **30**, **32-33**, **39**), a green lane (Site **6**), and Goetre-uchaf farm (Site **26**). Five further former agricultural sites, comprising three gates (Sites **5**, **17**, **24**), a green lane (Site **10**), and a lynchet (Site **31**), will be subject to *intermediate/minor* impacts. Although seven other sites will be impacted upon, the low level of importance of those sites means that the impact significance is assessed as neutral. The impact significance upon the circular features (Site **43**) is unknown, although the scale of impact is likely to be substantial. Until the importance of the features can be established it is not possible to ascertain how significant the impact will be. If the circular features represent prehistoric burial monuments then the impact significance will be major.

9.2.6 ***Previously Unidentified Sub-surface Remains:*** there is considerable evidence to suggest the presence of previously unidentified sub-surface remains within the proposed development area. In addition to the two known prehistoric barrows (Sites **7** and **8**), a group of possible barrows (Site **41**) and a series of circular features (Site **42**) were identified from aerial photographs (*Section 3.5*). Numerous circular anomalies were also detected by the geophysical survey (*Appendix 5*), which might be indicative of burial monuments, and the place-name of Penrhos-Garnedd (*see Section 3.2.7*) is also an indicator that numerous burial mounds might once have occupied this area. Intensive ploughing during the twentieth century may have truncated and reduced many such sites, so that they are no longer visible as raised mounds, but substantial remains of such sites could survive below the current ground level.

9.2.7 The burnt mound (Site **40**) was discovered during a watching brief and was not represented by a visible site above ground level. This site occurred in the vicinity of saturated ground and a stream channel, which is a typical environment for this type of site. It is possible that further such sites exist adjacent to these wet areas. In addition to prehistoric burial monuments and burnt mounds, it is also possible that the remains of associated contemporary sites might survive below ground level. Indeed, during the excavation of geotechnical test pit 6 (Fig 4; TP6) the watching brief identified a pit containing a burnt deposit that included charcoal and burnt stone (*Section 5*). It is possible that this site could be associated with the heating of stone in

association with activity at a burnt mound, or in association with domestic cooking using the 'pot-boiler' technique, where water is heated using hot stones. The circular anomalies identified by the geophysical survey (*Section 6*) could represent hut circles, which were a feature of numerous rural settlements during the Bronze Age, Iron Age, and Romano-British period and, therefore, the potential exists for the presence of remains of features associated with early settlement of the site.

9.2.8 The number of field boundaries gradually reduced between the time of the production of the Bangor tithe map of 1840-1 and the later OS maps. It is possible that remains of these derelict boundaries, and boundaries that may have become obsolete prior to the production of the tithe map, might survive as sub-surface remains. Indeed the geophysical survey appears to have identified elements of a field system that pre-dates the boundaries shown on these maps (*Section 6*). The geophysical survey results also appear to show part of a rectilinear enclosure that may have surrounded part of the Goetre-uchaf farmstead (Site **26**), but which was not shown on any of the historic mapping. This may suggest that the site occupied by Goetre-uchaf formed a focal point within an agricultural landscape pre-dating the historic field systems. It is unclear when the Goetre-uchaf (Site **26**) and Goetre-isaf farmsteads were first established and when agriculture was first practised within the proposed development area. It is, therefore, possible that sub-surface remains indicative of farming practices and structures pre-dating the farmsteads of Goetre-uchaf and Goetre-isaf that were shown on historic mapping might survive within the area. These are particularly likely in terms of medieval and early post-medieval features.

9.2.9 Intrusive ground works will be necessary across much of the proposed development area and there is, therefore, extremely high potential for the disturbance or destruction of previously unidentified sub-surface remains.

10. RECOMMENDATIONS

10.1 INTRODUCTION

10.1.1 A desk-based assessment is usually the first stage of an iterative process of investigating the archaeological resource within the proposed development area. Having identified the potential for archaeological remains, the significance of these remains, and the significance of the impact by the development, further investigation is often required to determine the exact nature, survival, extent, and date of the remains so that effective mitigation strategies can be proposed.

10.1.2 In determining proposals for mitigation, it is necessary to consider only those heritage assets identified in the desk-based assessment that are likely to be affected by the proposed development. Chapter 6 of Planning Policy Wales states '*Where nationally important archaeological remains, whether scheduled or not, and their settings are likely to be affected by proposed development, there should be a presumption in favour of their physical preservation in situ.*' (Section 6.5.1, PPW, WAG 2011). Therefore preservation *in situ* is the preferred course in relation to such sites unless exception circumstances exist.

10.1.3 Where it is decided by local planning authorities that physical preservation of sites of archaeological interest is not justified in the context of the proposed development, the developer is obliged to make appropriate provision for the preservation of the site by record (Section 6.5.3, PPW, WAG 2011). Non-designated heritage assets of archaeological interest will also be subject to the policies reserved for designated heritage assets if they are of equivalent significance to scheduled monuments (Section 6.5.1, PPW, WAG 2011).

10.2 FURTHER INVESTIGATION

10.2.1 ***Introduction:*** a series of circular features (Site **42**) and a group of possible barrows (Site **41**) were identified from aerial photographic survey (*Section 3.5*). Numerous anomalies were also detected by the geophysical survey (*Appendix 5*), which could relate to features of archaeological interest and a pit containing burnt stone and charcoal was identified during the watching brief (*Section 5*). The presence of two barrows (Sites **7** and **8**) and a burnt mound (Site **40**), and the place-name of Penrhos-Garnedd (*see Section 3.2.7*), are also indicators of the likely presence of previously unidentified sub-surface remains of archaeological interest within the proposed development area. Due to the extremely high potential for further sub-surface remains it is, therefore, recommended that further investigation should be undertaken in order to determine the nature and extent of any such previously unknown remains and enable the likely impact on any such remains to be assessed. The early identification of any such remains will enable a comprehensive assessment of impacts on heritage assets in association with the planning application, and will allow for any resultant necessary works to be considered within the development timetable.

10.2.2 The most effective strategy to identify and characterise the presence of sub-surface remains will be archaeological evaluation trenching. This will enable the anomalies identified during the geophysical and aerial photographic surveys to be examined and characterised, in addition to examining the potential for further remains that may not have been revealed by the surveys. Fields 2 and 8 represent the areas with the densest concentrations of identified anomalies, including several sub-circular geophysical anomalies that could represent burial monuments, and groups of possible barrows and circular features (Sites **41** and **42**) identified from aerial photographs. These areas should be subject to systematic evaluation trenching, with targeted trenches investigating the identified anomalies, in addition to relatively evenly-spaced trenches to ensure appropriate general coverage of the fields within the proposed development area.

10.2.3 Field 4 contains the remains of Goetre-uchaf farmstead (Site **26**) and evaluation trenches should target the sites of the former farm buildings, in order to evaluate the likelihood of phases of the farm that pre-date the buildings that were depicted on historic mapping, and any association with the apparent rectilinear enclosure seen in the geophysical survey around the farmstead. This will enable the extent of any necessary archaeological excavation of the farmstead to be established.

10.2.4 Due to the sensitivity of the remains identified within the proposed development area, the remaining fields should also be subject to systematic evaluation trenching.

10.3 PROPOSED MITIGATION

10.3.1 ***Introduction:*** although further investigations will enhance our understanding of the character and extent of sites of archaeological interest across the proposed development area, numerous predicted impacts have been identified and assessed, for which it is currently possible to propose mitigation. The nature of proposed mitigation is determined by the degree of impact significance, and the characteristics of the sites affected.

10.3.2 ***Goetre-uchaf barrow:*** Goetre-uchaf barrow (Site **8**) will be subject to a major impact as a result of substantial changes to setting (*Section 9.2.4*). Although this has already been impinged upon by the extant development surrounding it to the north, in consultation with the client, and with GAPS and the CADW Inspector of Ancient Monuments, the design scheme will look to reduce this impact by providing an open area around the monument in order to reduce the separation, and maintain the appreciation, of the monument from the open terrain of the landscape. The surrounding open ground in the design will aim to accommodate vistas that allow the relationship between the monument and the local topography to be discerned, such as its siting at the top of a steep slope of the stream valley to the south.

10.3.3 Even with such design changes, there will still be an adverse impact on the setting of the Goetre-uchaf barrow (Site **8**), which could be offset further by the provision of information panels to present the prehistoric heritage of the

area and provide graphic reconstructions of the topographic and monumental contexts of the site.

10.3.4 ***Preservation by Record:*** three of the major impacts comprise the destruction of sites of national or regional/county importance: a barrow (Site **7**), a burnt mound (Site **40**), and a group of possible barrows (Site **41**). The only effective mitigation for the destruction of such sites would be preservation by record, which would require archaeological excavation and recording. This is also the appropriate mitigation for the intercutting ditches (Site **39**). However, given the suggested prehistoric origins and significance of the barrow (Site **7**), the most appropriate form of mitigation would be to preserve the monument *in situ*. In addition to the destruction of these sites, palaeoenvironmental data that might relate to the landscapes contemporary with the sites will also be lost if the saturated land in Field 8 is subject to drainage and infilling. Environmental sampling from this area, prior to disturbance, could allow data relating to the development of the local landscape to be retrieved, which would elucidate our understanding of the sites that will be destroyed and contribute to offsetting these impacts.

10.3.5 The impacts upon many of the 15 sites that will be subject to *intermediate* impacts and the five sites subject to *intermediate/minor* impacts could be mitigated by preservation by record in the form of topographic surveys (earthwork surveys) and photographic surveys prior to the instigation of ground works. This would be appropriate for sites, such as banks, ditches, and sunken lanes, which are visible as above-ground land forms. Cross-sections of these features should be obtained as part of an archaeological watching brief, which would also enable the inspection of the sites for datable material. Standing structures, such as gates, should be subject to photographic survey.

10.3.6 ***Palaeoenvironmental Sampling:*** it is recommended that charcoal fragments retrieved during the watching brief (*Section 5*) should be selected and submitted for AMS dating. If further archaeological interventions take place on site it is highly recommended that a programme of environmental sampling should be included as part of this work following the high potential for the preservation of charred plant remains shown by the abundant charcoal in burnt pit fill (***603***), identified in TP6 (*Section 5*). The saturated land at the site, such as that within Field 8, provides an opportunity for the retrieval of preserved sequences of pollen and preserved plant remains that might advance our understanding of the development of the local landscape.

Site No	Site name	Importance	Impact Significance	Mitigation
1	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
2	Gate Stoup	Negligible	Neutral	None
3	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief

Site No	Site name	Importance	Impact Significance	Mitigation
4	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
5	Gate Stoup	Low Local	Intermediate/ Minor	Photographic survey
6	Green Lane	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
7	Barrow	Regional/County	Major	Preservation *in* situ or open area archaeological excavation
8	Goetre-uchaf arrow	National	Major	Changes to design scheme. Provision of information panels to explain the significance and former context of the monument
9	Farm Building	Negligible	Neutral	None
10	Green Lane	Low Local	Intermediate/ Minor	Topographic and Photographic survey. Watching brief
11	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
12	Field Drains	Negligible	Neutral	None
13	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
17	Gate Stoup	Low Local	Intermediate/ Minor	Photographic survey
18	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
19	Slate Fence	Local/Borough	Intermediate	Photographic survey
20	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
24	Gateway	Low Local	Intermediate/ Minor	Photographic survey
25	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
26	Farmstead	Local/Borough	Intermediate	Further investigation necessary
27	Boundary Bank	Negligible	Neutral	None
28	Boundary Bank	Negligible	Neutral	None
29	Track	Negligible	Neutral	None

Site No	Site name	Importance	Impact Significance	Mitigation
30	Lynchet	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
31	Lynchet	Low Local	Intermediate/ Minor	Topographic and Photographic survey. Watching brief
32	Boundary Bank	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
33	Boundary Ditch	Local/Borough	Intermediate	Topographic and Photographic survey. Watching brief
39	Intercutting Ditches	Local/Borough	Intermediate	Archaeological excavation
40	Burnt Mound	Regional/County	Major	Archaeological excavation
41	Possible Barrows	Regional/County	Major	Further investigation necessary
42	Circular Features	Unknown	Unknown	Further investigation necessary
43	Drainage System	Negligible	Neutral	None

Table 9: Summary of site-specific proposals for archaeological mitigation

11. CONCLUSIONS

11.1 DISCUSSION

11.1.1 Human activity within, and in the immediate vicinity of, the proposed development area is evident from at least as early as the Bronze Age, when burial mounds were created along the edge of the plateau above the Nant y Garth stream valley. The landuse of the area during the Iron Age and early historical periods is unclear but, from the medieval or post-medieval periods until the later twentieth century, the character of the local area was dominated by agriculture. The suburban extent of Bangor spread gradually south-westwards, as ribbon development along Penrhos Road, and a residential agglomeration with a hospital formed at Penrhos-Garnedd.

11.1.2 A total of 43 sites, or heritage assets, were identified within the study area as a result of the desk-based assessment and walkover survey, which relate to differing phases in the historical development of the local landscape. These include two prehistoric barrows (Sites **7** and **8**), a group of possible barrows (Site **41**), a group of circular features that might also be indicative of burial monuments (Site **42**), and a burnt mound (Site **40**). Most of the remaining sites were associated with the agricultural use of the fields around the Goetre-uchaf (Site **26**) and Goetre-isaf farmsteads during the medieval or post-medieval periods. This includes 18 field boundaries (Sites **1**, **3**-**4**, **11**, **13**-**16**, **18**-**21**, **23**, **25**, **30**-**32**, **33**) that have not been closely dated, but many of which may have been established during the medieval period. Green lanes (Sites **6** and **10**) and a trackway (Site **29**) that were associated with access to the farmsteads and fields were also identified within the area. The presence of two identified areas of land drainage (Sites **12** and **43**) attests to the saturated nature of areas to the north and north-east of Goetre-uchaf farm. A pit containing burnt stone and charcoal was identified during the watching brief of geotechnical test pits (*Section 5*) and numerous anomalies of possible archaeological interest were identified during the geophysical survey (*Section 6*).

11.1.3 There will be 19 predicted significant impacts as a result of the proposed development. Four of these will be ***major*** impacts, which will affect a barrow (Site **7**), Goetre-uchaf barrow (Site **8**), a burnt mound (Site **40**), and a group of possible barrows (Site **41**). These sites are likely to be severely disturbed or destroyed, with the exception of the Goetre-uchaf barrow (Site **8**), which will be impacted in terms of a substantial change to the setting of the monument. A total of 15 sites, all of which are elements of the agricultural landscape, will be subject to ***intermediate*** impacts and a further five agricultural sites will be subject to ***intermediate/minor*** impacts. Although seven other sites will be impacted upon, the low level of importance of those sites means that the impact significance is assessed as neutral. The impact significance upon a group of circular features (Site **43**) is unknown. There is an extremely high likelihood of impacts upon previously identified sub-surface remains dating to the prehistoric periods, as well as the medieval or early post-medieval periods.

11.1.4 In order to be able to fully characterise the archaeological resource within the proposed development area and, therefore, fully assess the likely impact of the

proposed development on previously unidentified sub-surface remains, a programme of archaeological evaluation trenching will be undertaken on behalf of the client, Redrow Homes in consultation with GAPS to inform the planning requirements. In addition, mitigation has been proposed in order to reduce the impact of the proposed development on recognised heritage assets. This includes changes in the design scheme in order to reduce the impact upon the setting of the Goetre-uchaf barrow (Site **8**). It is also recommended that archaeological excavation should be undertaken in order to facilitate the preservation by record of a barrow (Site **7**), if it is not retained *in situ*, a burnt mound (Site **40**), a group of possible barrows (Site **41**) and two intercutting ditches (Site **39**). It is suggested that the remaining sites that are visible above ground, such as banks, ditches, and sunken lanes, should be subject to topographic and photographic survey and recorded in cross-section and inspected for datable material during a watching brief. Standing structures, such as gates, should be subject to photographic survey.

12. BIBLIOGRAPHY

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13. ILLUSTRATIONS

13.1 FIGURES

Figure 1: Site location

Figure 2: Plan of gazetteer sites within the study area

Figure 3: Plan of gazetteer sites within the development boundary

Figure 4: Plan of test pits within the development boundary

Figure 5: Development boundary superimposed on the Tithe map of Bangor, 1840-1

Figure 6: Development boundary superimposed on the Ordnance Survey first edition 25": 1 mile map, 1889

Figure 7: Development boundary superimposed on the Ordnance Survey 1: 2500 map, 1970-2

Figure 8: Assessment of the geophysical survey results

13.2 PLATES

Plate 1: Extract from an RAF vertical aerial photograph taken in January 1947 (rotated so that the top of the image is orientated north)

Plate 2: Extract from an RAF vertical aerial photograph taken in 1948

Plate 3: Steep slope on the southern end of the survey area into the vale containing the A55

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Plate 7: Proximity of barrow (Site **8**) to surrounding twentieth century development of the hospital

Plate 8: View southwards from the proposed development

Plate 9: Small outbuilding on the east side of the farmyard at Goetre-uchaf (Site **9**).

Plate 10: Green lane flanked by stone-faced boundary banks running north from Goetre-uchaf farm (Sites **3**, **4** and **6**)

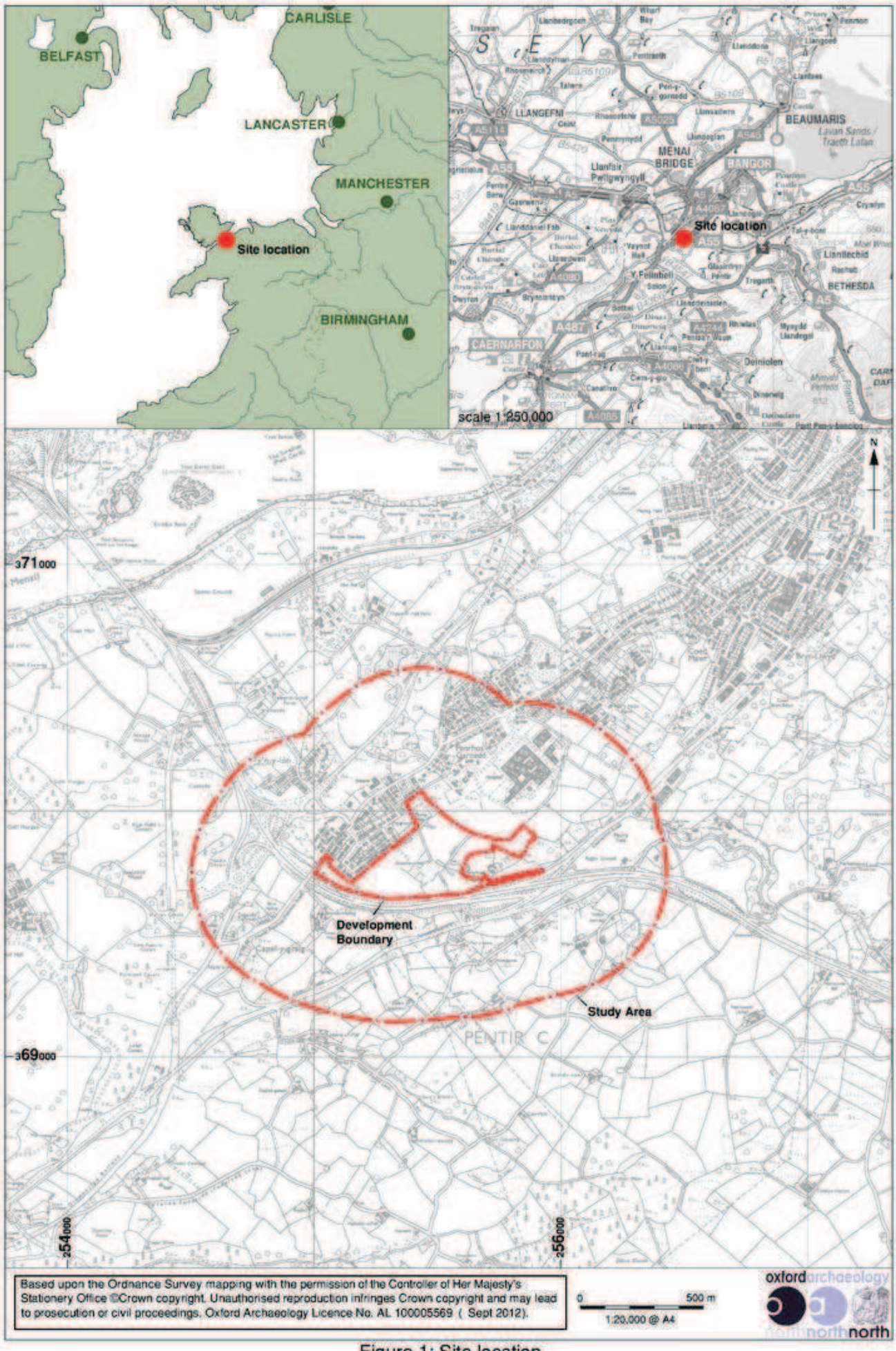

Figure 1: Site location

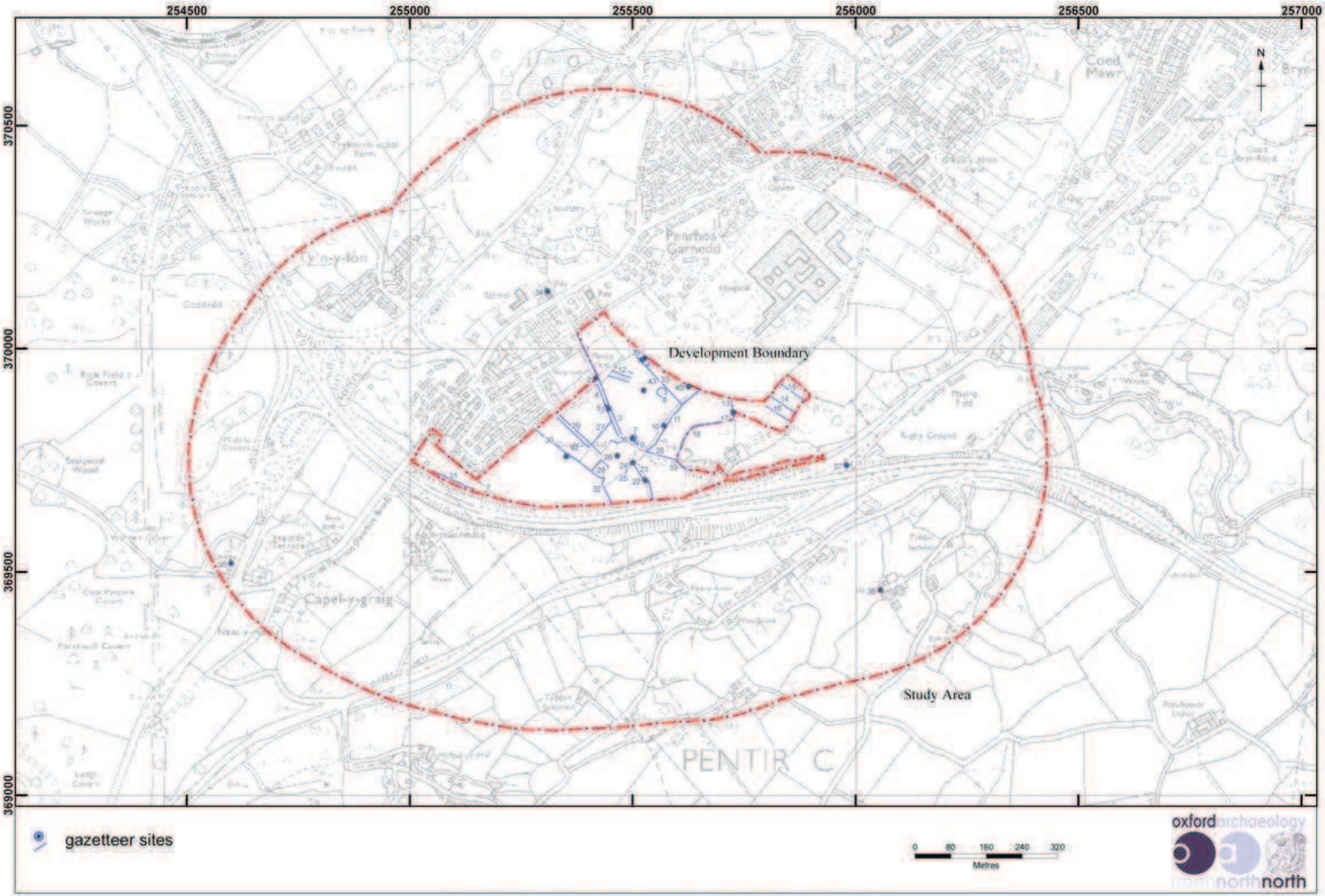

Figure 2: Plan of gazetteer sites within the study area

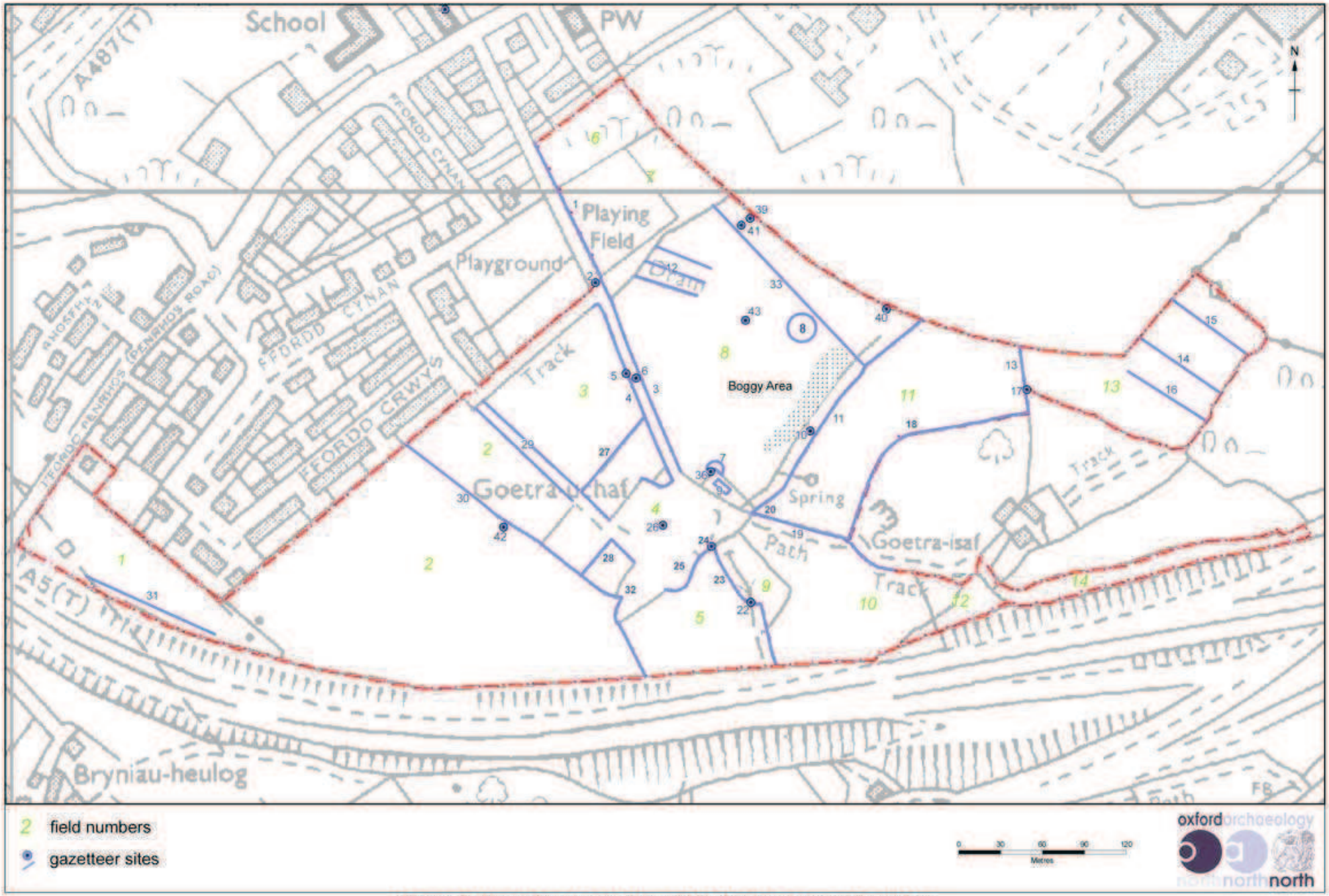

Figure 3: Plan of gazetteer sites within the development boundary

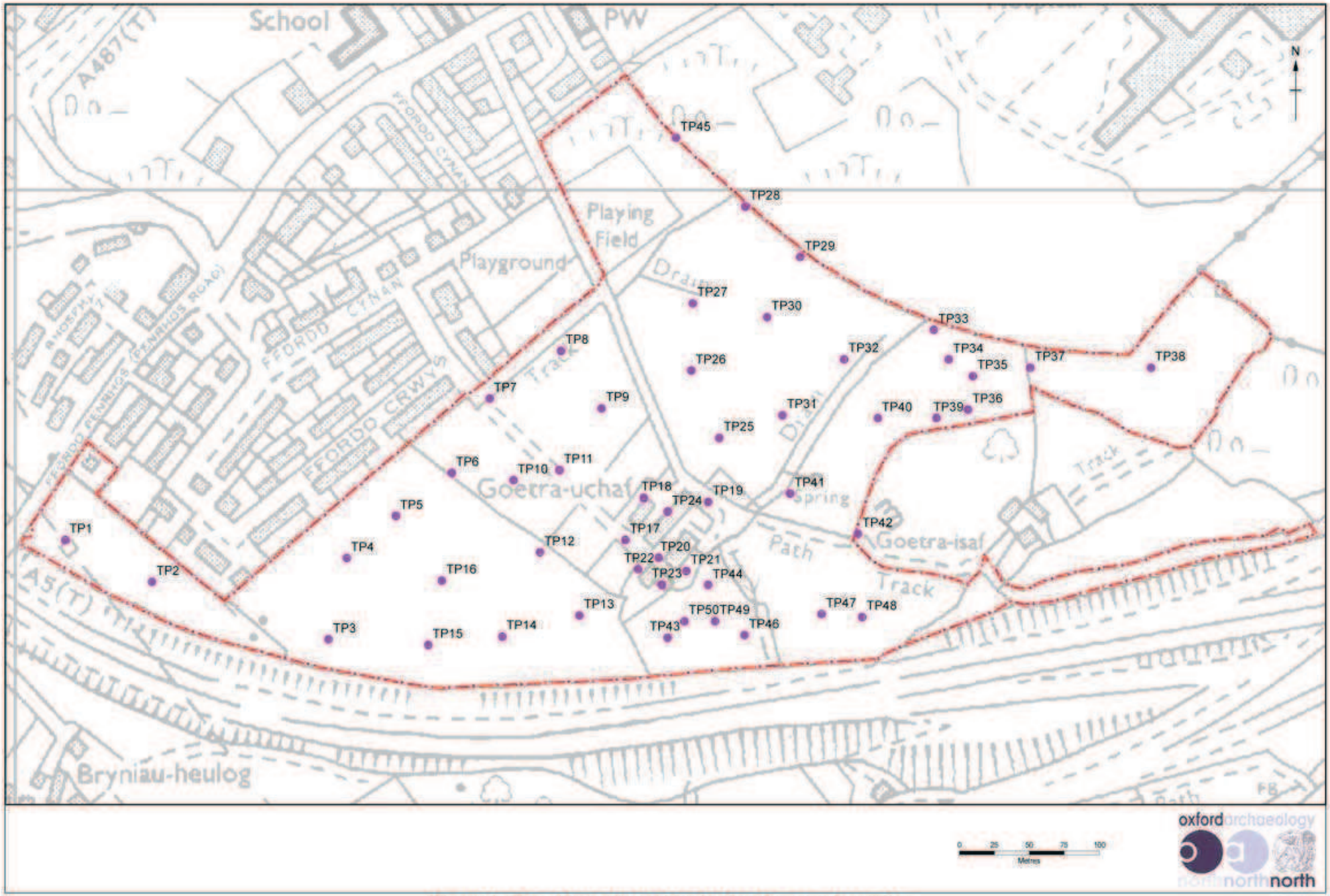

Figure 4: Plan of test pits within the development boundary

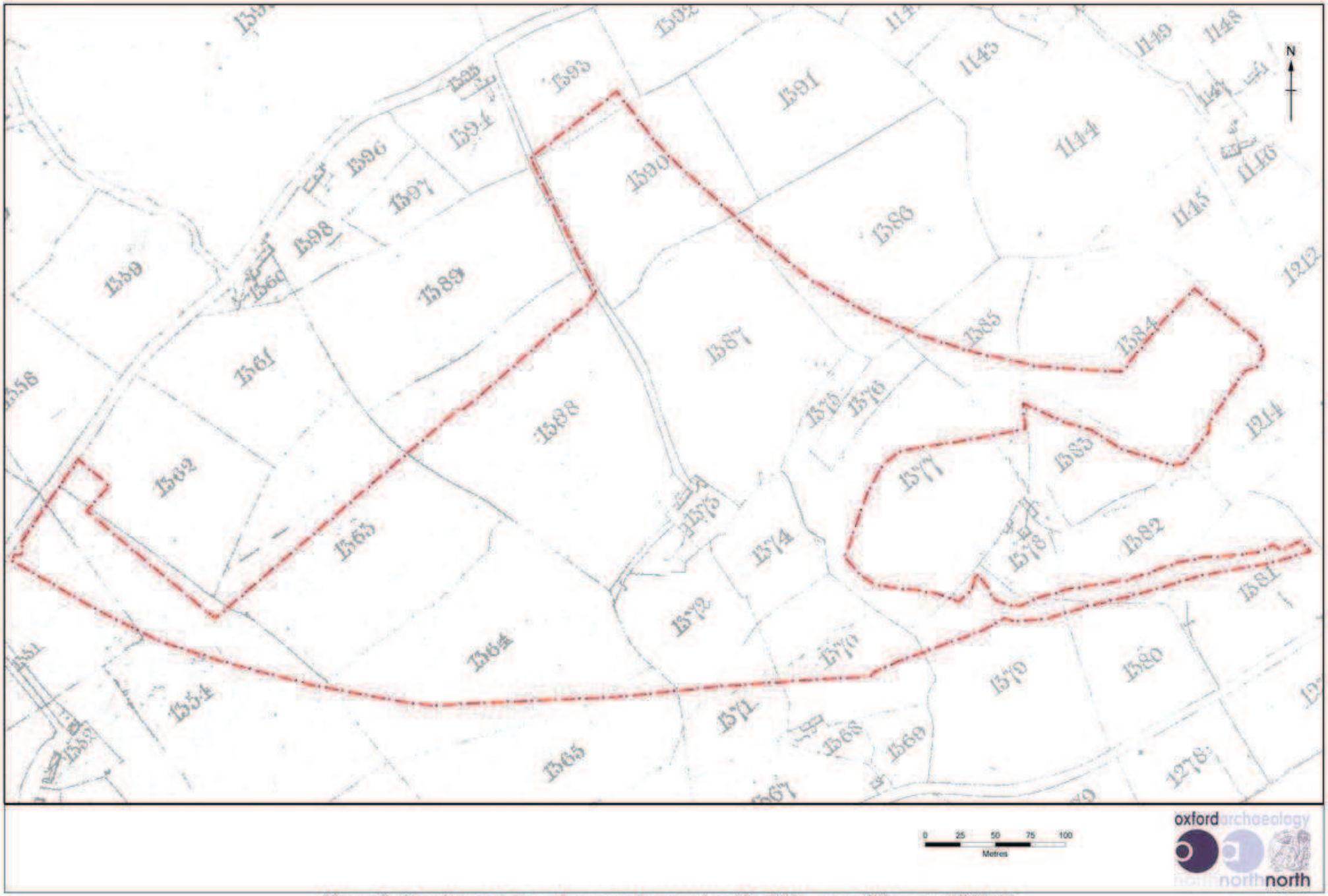

Figure 5: Development boundary superimposed on the Tithe map of Bangor, 1840-41

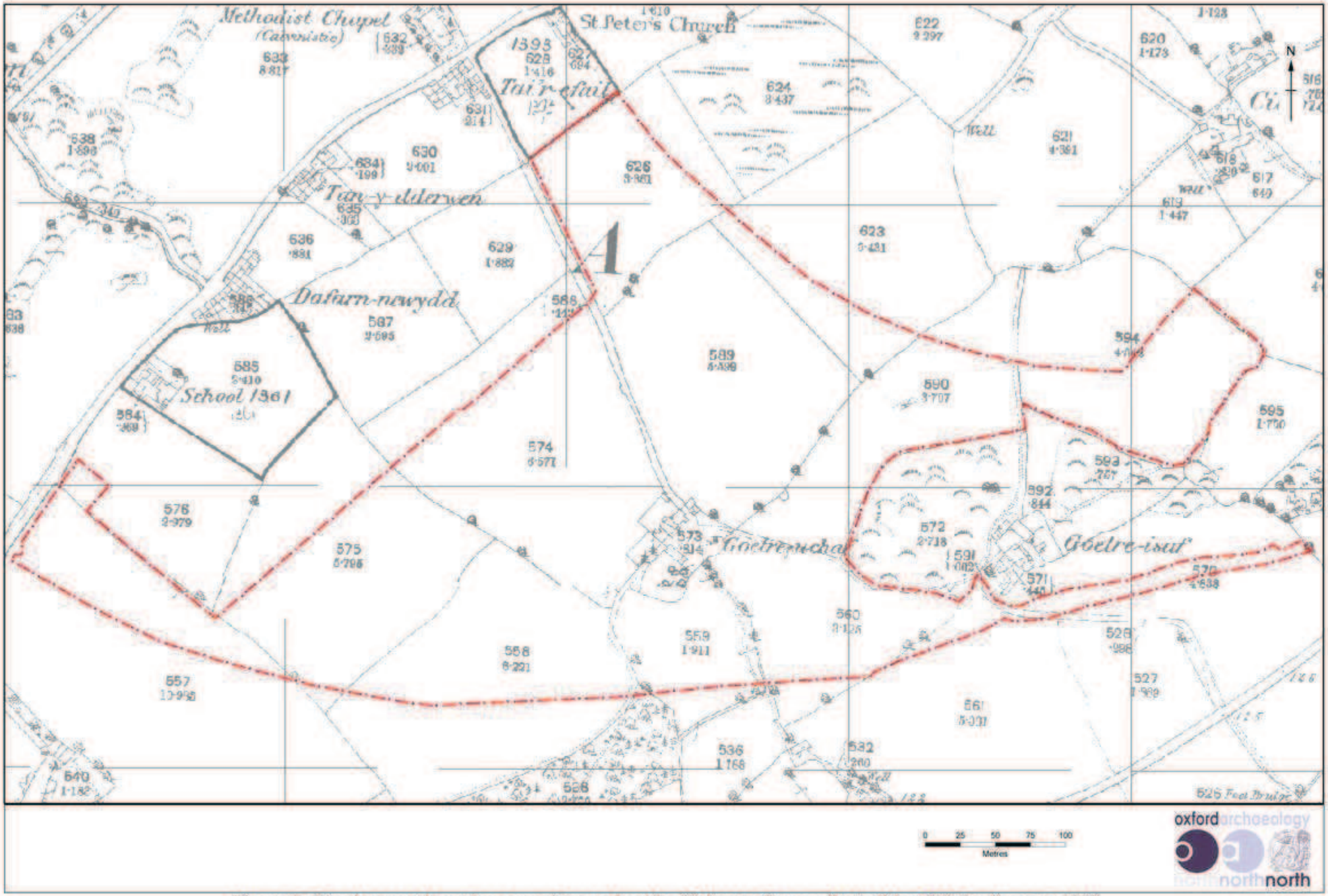

Figure 6: Development boundary superimposed on the Ordnance Survey first edition 25":1 mile map, 1889

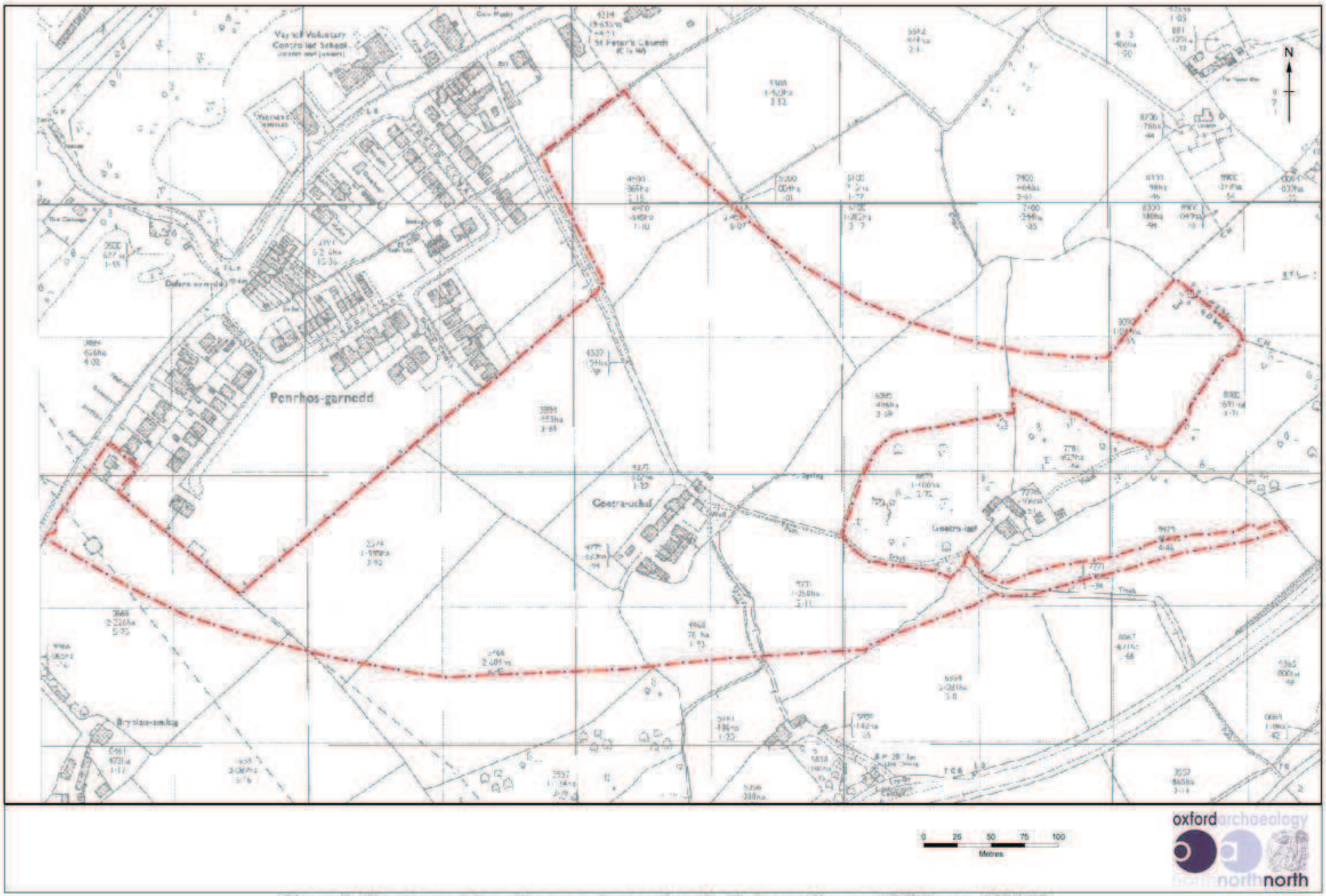

Figure 7: Development boundary superimposed on the Ordnance Survey 1:2500 map, 1970-72

Figure 8: Assessment of the geophysical survey results

APPENDIX 1: DESIGN BRIEF

DESIGN BRIEF FOR ARCHAEOLOGICAL ASSESSMENT AND EVALUATION

Site: Land off Penrhos Road, Bangor

Date: 17th July 2012

National Grid Reference: 255500, 370000

Planning reference: Pre-application

Applicant: Redrow Homes

This design brief is only valid for six months after the above date. After this period Gwynedd Archaeological Planning Service should be contacted.

It is recommended that the contractor appointed to carry out the archaeological work visits the site of the proposed development and consults the regional Historic Environment Record (HER) for north-west Wales before completing their specification. Gwynedd Archaeological Planning Service cannot guarantee the inclusion of all relevant information in the design brief.

Key elements specific to this design brief have been highlighted.

1.0 Site Location and Description

1.1 For the purposes of this brief the site comprises an irregularly shaped plot totalling approximately 13.86 hectares in the Penrhosgarnedd area of Bangor, Gwynedd. The city of Bangor is located on the north coast of Wales, on the southern side of the Menai Strait.

1.2 The site consists mainly of agricultural land at the edge of existing development, and includes the existing farmstead of Goetre Uchaf. The site is bordered to the north by Ysbyty Gwynedd, to the east by agricultural land, to the south by the A55, and to the west by residential development. Internal boundaries are defined by hedgerows. The existing ground conditions and nature of agricultural usage is unknown at the time of writing.

1.3 The application site is set at approximately 80-90m OD, with a generally southerly/ south-easterly aspect.

2.0 Archaeological Background

2.1 The proposed development site includes the Goetre Uchaf barrow (scheduled monument Cn376); a second possible barrow, affected by historic quarrying, is recorded approximately 140m to the south-west of this (PRN 22). Other archaeological records within the site comprise a flint scraper (PRN 2) found in association with PRN 22 and an antiquarian reference to the discovery of a collection of querns approximately at the south-eastern boundary of the site (PRN 25).

2.2 An archaeological watching brief was carried out on cabling work (within the site) in the vicinity of Goetre Uchaf in 2010 (Gwynedd Archaeological Trust report 906). Despite the relatively limited dimensions of the work, a probable burnt mound and two undated intercutting ditches were recorded. This indicates the survival of undisturbed archaeological deposits within the site.

2.3 The extent, nature and significance of the archaeological resource above and below ground requires clarification in order to inform the development design and subsequent planning decisions at the site.

3.0 The nature of the development and archaeological requirements

3.1 Planning consent is being sought for the residential development of the site, including access roads, amenity space, etc.

3.2 This is a *design brief* for the **first phase** of a staged programme of archaeological works, to be undertaken prior to planning consent, in accordance with guidelines set out in *Planning Policy Wales 2011* and Welsh Office Circular 60/96 (*Planning and the Historic Environment: Archaeology*). This phase will comprise an **archaeological desk-based assessment and geophysical survey**.

3.3 The objective of this programme of archaeological works is to make full and effective use of existing information to establish the archaeological significance of the site; to assess the impact of the development proposals on surviving monuments or remains; and to help inform future decision making, design solutions and potential mitigation strategies.

3.4 Following the desk-based assessment and geophysical survey, and informed by the findings of these elements, a programme of trial trenching will be required in order to verify the presence or absence of remains, their extent, nature, quality and character. Because it is impossible to state at this stage what the scope of this further evaluation might be, this will be covered by a separate brief.

3.5 Any additional stages of work further to that described by this brief will require prior approval of a new detailed specification by Gwynedd Archaeological Planning Service.

3.6 This *design brief* should be used by the archaeological contractor as the basis for the preparation of a detailed written archaeological *specification*. The specification must be submitted to the Gwynedd Archaeological Planning Service for approval before the work commences.

3.7 The *specification* should contain, as a minimum, the following elements:

- non-technical summary
- details of the proposed works as precisely as is reasonably possible, indicating clearly on a plan their location and extent
- a research design which sets out the site-specific objectives of the archaeological works
- field methodology
- post-fieldwork methodology
- the level and grade of all key project staff
- details of external specialists
- a timetable for the proposed works, including contingency if appropriate
- the intended method of publication
- archive deposition

- reference to relevant legislation
- health and safety considerations
- monitoring procedures

4.0 Archaeological Programme Detail

Desk-based assessment detail

4.1 The assessment must consider the following:

a) the nature, extent and degree of survival of archaeological sites, structures, deposits and landscapes within the study area through the development of an **archaeological deposit model**. This deposit model should reflect accurately the state of current knowledge and provide a research agenda for further work if necessary [See 4.2 below for further details]

b) the **significance** of any remains in their context both regionally and nationally

c) the **history** of the site [See section 4.3 below for further details]

d) the potential impact of any proposed development on the **setting** of known sites of archaeological importance.

4.2 Development of the **archaeological deposit model** will involve the following areas of research:

a) collation and assessment of all relevant information held in the HER

b) assessment of all available excavation reports and archives (including unpublished and unprocessed material) affecting the site and its setting

c) assessment of all extant aerial photographic (AP) evidence and, where relevant, a re-plotting of archaeological and topographic information by a suitably qualified specialist at an appropriate scale. The main source of archaeological aerial photographic records is held at the Royal Commission on Ancient and Historical Monuments in Wales (RCAHMW), Aberystwyth

d) assessment of archive records held at Gwynedd Archives, Caernarfon, and as appropriate, RCAHMW and University College Bangor

e) assessment of the environmental potential of the archaeological deposits through existing data or by inference

f) assessment of the faunal potential of the archaeological deposits through existing data or by inference

g) assessment of the artefactual potential of the archaeological deposits through existing data or by inference

h) assessment of available geotechnical information for the area including the results of test pits and boreholes

i) assessment of the present topography and land use of the area through maps and site inspection

4.3 Assessment of the **history of the site** will involve the following:

a) a review of relevant published sources

b) an analysis of relevant maps, plans and other relevant illustrative material. Cartographic evidence is held at the County Record Offices, including tithe maps, enclosure act plans, estate maps and all editions of the Ordnance Survey. Place and field-name evidence from these sources must be considered.

c) an analysis of the historical documents (e.g. county histories, local and national journals and antiquarian sources) held in museums, libraries or other archives, in particular local history and archives library.

d) a review of the aerial photographic evidence.

Archaeological field evaluation detail

4.4 The following non-destructive field evaluation techniques must be employed as part of this phase of work:

- Field visit / walk-over of all accessible areas.
- A high resolution geophysical survey of all feasible parts of the site. A narrow sampling interval of 0.25m, traverse spacing of 0.5m, should be employed for magnetometer survey in order to identify discrete features.

4.5 This work should be informed by desk-based research. The effectiveness of the selected technique should be established through a test area before undertaking survey of the whole area and alternative methods of evaluation considered if necessary.

5.0 Results

5.1 The results must be presented in a bound report and should be detailed and laid out in such a way that data and supporting text are readily cross-referenced. **The HER Officer should be contacted to ensure that any sites or monuments not previously recorded in the HER are given a Primary Record Number (PRN) and that data structure is compatible with the HER**.

5.2 The deposit model should be presented graphically in plan and, where appropriate, in profile and at a scale that is commensurate with subsequent use as a working document.

5.3 Within the report an attempt should be made to indicate areas of greater or lesser archaeological significance and the sites should be ranked in level of overall archaeological importance (locally, regionally and nationally).

5.4 All relevant aerial photographs, re-plots and historic maps must be included and be fully referenced. Any site photographs included in the report should be appropriately captioned and clearly located on a suitably scaled site plan. The final report should specifically include the following:

- a copy of the design brief and agreed specification
- a location plan

- all identified features and significant finds plotted on an appropriately scaled site plan
- a gazetteer of all located sites with full dimensional and descriptive detail **including grid reference** and, where possible, period
- a full bibliography of sources consulted
- an archive compact disc

5.5 Any relevant desk-based sources included for the purposes of interpretation and analysis must be fully referenced, and related to both the archaeological mitigation work and the development proposals.

5.6 The report should include an assessment of the potential for further archaeological investigation and give recommendations for an appropriate future strategy.

5.7 The methodology for any subsequent phase of the archaeological programme must consider the use of the following techniques:

a) alternative methods of ground survey

b) a programme of archaeological trial trenching, test pits and/or cores to investigate the archaeological deposit model in more detail

c) strip, map and sample

d) design modification to preserve remains *in situ*

e) archaeological building recording

f) archaeological excavation

g) archaeological survey / recording

h) archaeological watching brief on construction works

6.0 General requirements

6.1 The archaeological assessment and evaluation must be undertaken by an appropriately qualified individual or organisation, fully experienced in work of this character.

6.2 Details, including the name, qualifications and experience of the project director and all other key project personnel (including specialist staff) should be communicated to the Gwynedd Archaeological Planning Service and all written work attributed to an author(s).

6.3 Contractors and subcontractors are expected to conform to standard professional guidelines. The following are of particular relevance to this project:

- English Heritage, 1991. *Management of Archaeological Projects (MAP2)*
- English Heritage, 2006. *Management Of Research Projects in the Historic Environment (MORPHE)*
- Brown D. H., 2007. *Archaeological Archives A guide to best practice in creation, compilation, Transfer and curation.* Archaeological Archives Forum
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- The Institute for Archaeologists, 1994 (revised 2009) *Standard and Guidance for Archaeological Desk-Based Assessment*
- The Institute for Archaeologists 1994 (revised 2008) *Standard and Guidance for Archaeological Field Evaluation*
- The Institute for Archaeologists, 2001 (revised 2008). *Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials*
- The Institute for Archaeologists, 2008. St*andard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*

6.4 Many people in North Wales speak Welsh as their first language, and many of the archive and documentary references are in Welsh. Contractors should therefore give due consideration to their ability to understand and converse in Welsh.

6.5 The archaeological contractor must satisfy themselves that all constraints to groundworks have been identified, including the siting of live services, Tree Preservation Orders and public footpaths. Gwynedd Archaeological Planning Service bears no responsibility for the inclusion or exclusion of such information within this brief.

6.6 Any changes to the specifications that the archaeological contractor may wish to make after approval by this office should be communicated to Gwynedd Archaeological Planning Service and approved before implementation.

6.7 Care must be taken in dealing with human remains and the appropriate environmental health regulations followed. Gwynedd Archaeological Planning Service and the local Coroner must be informed immediately human remains are discovered.

6.8 Arrangements for the long-term storage and deposition of all artefacts must be agreed with the landowner and Gwynedd Archaeological Planning Service before the commencement of investigation.

6.9 The involvement of Gwynedd Archaeological Planning Service should be acknowledged in any report or publication generated by this project.

6.10 A full archive including plans, photographs, written material and any other material resulting from the project should be prepared in accordance with standard guidance. All plans, photographs and descriptions should be labelled, cross-referenced and lodged in an appropriate place (to be agreed with Gwynedd Archaeological Planning Service) within six months of the completion of the project.

6.11 Two copies of the bound report must be sent to the address below, one copy marked for the attention of the Development Control Archaeologist, the other for attention of the HER Officer, who will deposit the copy in the HER.

7.0 Curatorial monitoring

7.1 The project will be monitored by Gwynedd Archaeological Planning Service to ensure the fulfilment of the brief and specifications. The Development Control Archaeologist will normally review the progress of reports and archive preparation. The archaeological contractor must inform Gwynedd Archaeological Planning Service in writing of the proposed start dates for the project and any subsequent phases of work.

8.0 Further information

8.1 This document outlines best practice expected for a programme of archaeological mitigation but cannot fully anticipate the conditions that will be encountered as work progresses. If requirements of the brief cannot be met they should only be excluded or altered after gaining written approval of the Gwynedd Archaeological Planning Service.

8.2 Further details or clarification of any aspects of the brief may be obtained from the Development Control Archaeologist at the address below.

Jenny Emmett
Archaeolegydd Rheoli Datblygiad - Development Control Archaeologist

Gwasanaeth Cynllunio Archaeolegol Gwynedd - Gwynedd Archaeological Planning Service
Craig Beuno, Ffordd Y Garth, Bangor, Gwynedd LL57 2RT

Ffôn/Tel: 01248 370926
Ffacs/Fax: 01248 370925

jenny.emmett@heneb.co.uk

Glossary of terms

Archaeological Contractor
A professionally qualified individual or an organisation employing professionally qualified archaeological staff, able to offer appropriate and satisfactory treatment of the archaeological resource, who is retained by the developer to carry out archaeological work either prior to the submission of a planning application or as a requirement of the planning process.

Archaeological Curator
A person, or organisation, responsible for the conservation and management of archaeological evidence by virtue of official or statutory duties. In north-west Wales the archaeological advisors to the Local Planning Authorities are the Gwynedd Archaeological Planning Service, who work to the Welsh Archaeological Trusts' *Curators' Code of Practice*.

Archive
An ordered collection of all documents and artefacts from an archaeological project, which at the conclusion of the work should be deposited at a public repository, such as the local museum.

Brief
The Association of Local Government Archaeological Officers (1993) defines a *brief* as an outline framework of the planning and archaeological situation which has to be addressed, together with an indication of the scope of works that will be required.

Historic Environment Record (HER)
A documentary record of known sites in a given area. In north-west Wales the HER is curated by the curatorial division of the Gwynedd Archaeological Trust.

Specification
The Association of Local Government Archaeological Officers (1993) defines a *specification* as a schedule of works outlined in sufficient detail to be quantifiable, implemented and monitored.

Watching brief
A formal programme of observation during non-archaeological works in order to identity, investigate and record any archaeological remains which may be present.

APPENDIX 2: PROJECT DESIGN FOR DESK-BASED ASSESSMENT AND GEOPHYSICAL SURVEY

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Redrow Homes have requested that Oxford Archaeology North (OA North) undertake consultation with Gwynedd Archaeological Planning Service (GAPS) as to the requirements for an assessment to accompany a planning application for residential development of land off Penrhos Road, Bangor, Gwynedd (NGR centred SH 55488 69830). GAPS issued a formal brief requesting that a desk-based assessment and geophysical survey be undertaken as the first stage of a phased evaluation to establish the archaeological resource and its significance across the site that may be impacted by the development. In addition to this, the results of a geotechnical site investigation (SI), which is currently being undertaken under archaeological supervision, will also be incorporated into the assessment. This work was agreed with GAPS verbally and has been dealt with in a separate project design. The results of this first stage will inform a subsequent second stage of evaluation likely to comprise a programme of trial trenching.

1.1.2 The site is an area of agricultural land, equating to nearly 14ha, surrounding the existing farmstead of Goetre-uchaf, and has a high potential for buried archaeological remains to exist. The known archaeological resource consists of a scheduled barrow (Cn 376) of probable Bronze Age date, with a second possible barrow (PRN 22) positioned 140m to the south-west of this that would appear to have been affected by historic quarrying. Other archaeological assets include a flint scraper (PRN 2) found in association with the barrow (PRN 22), and an antiquarian reference to the discovery of a collection of querns on the south-eastern boundary of the site. Furthermore, a probably burnt mound and two undated intercutting ditches were recorded during a programme of watching brief for the purposes of the excavation of a cable trench in 2010. These features all indicate that there is a high potential for as yet unknown archaeological features to be discovered during the forthcoming work in association with the proposed development.

1.1.3 The following project design has been prepared in line with the formal brief issued by GAPS.

1.2 OXFORD ARCHAEOLOGY NORTH

1.2.1 OA North has considerable experience of fieldwork and post-excavation, having undertaken a great number of small and large-scale projects during the past 30 years. Such projects have taken place to fulfil the requirements of the clients to rigorous timetables. OA North has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. OA North is an Institute for Archaeologists (IfA) registered organisation, registration number 17, and all its members of staff operate subject to the IfA Code of Conduct (2010).

2 OBJECTIVES

2.1 PROPOSED PROGRAMME

2.1.1 The following programme has been designed to identify the known archaeological resource and assess the potential for further archaeological deposits that may be affected by the proposed development, to provide information on their nature, potential, survival, and significance. The work will be carried out in line with current IfA guidelines (2011a and b) and in line with the IfA *Code of Conduct* (2010). It will be conducted within the general parameters defined by Chapter 6 of the Planning Policy Wales (2011) and the Welsh Office Circular 60/96 (1996).

2.1.2 ***Desk-based assessment:*** to provide a desk-based assessment of available resources for the proposed development site and its immediate environs in order to identify the archaeological potential and any constraints (in accordance with the IfA standards (2011a)).

2.1.3 ***Archaeological Geophysical Survey:*** a magnetometer survey will be undertaken across the whole of the area available in accordance with industry standards (English Heritage 2008; Gaffney, Gater and Ovenden 2002; and current IfA standards 2011b).

2.1.4 ***Report:*** following completion of the assessment and survey work, a report will be produced for the client within six weeks, unless a report submission deadline is agreed with the client at the time of commission. An archive will be produced to English Heritage guidelines (1991), and used to inform the requirements for the subsequent programme of trial trenching.

2.1.5 ***Archive:*** a site archive will be produced to IfA guidelines (2010). The information will be finally disseminated through the deposition of the combined evaluation archive in a repository to be agreed with GAPS.

3 HEALTH AND SAFETY

3.1 RISK ASSESSMENT

3.1.1 OA North provides a Health and Safety Statement for all projects and maintains a Company Safety policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (1997). OA North will liase with the client and/or on-site contractors to ensure all health and safety regulations are met. A detailed risk assessment will be completed in advance of any on-site works, with continuous monitoring and updating during the fieldwork. This can be supplied to all interested parties on request.

3.2 STAFF ISSUES

3.2.1 All project staff will be CSCS qualified, proof of which can be provided in the form of CSCS cards, and will wear full basic PPE whilst on site. The use of standard high-visibility clothes with reflective Scotchlite will be limited to the visual inspection due to the magnetic properties of Scotchlite preventing its use during the geophysical survey. Therefore, alternative high visibility clothing will be used by the surveyors. This also applies to steel toe-capped boots and other clothing with metallic zippers and buttons.

4 METHOD STATEMENT

4.1 DESK-BASED ASSESSMENT

4.1.1 ***Introduction:*** a desk-based assessment is usually undertaken as the first stage of a programme of archaeological recording, prior to further field investigation. It is not intended to reduce the requirement for fieldwork, but it will provide an appraisal of the archaeological or historical potential of a site in terms of the extent, nature and significance, and inform the requirement for any further work, including the second stage of the evaluation.

4.1.2 The following research will be undertaken as appropriate, depending on the availability of source material, and in accordance with the requirements of the GAPS brief. The level of such work will be dictated by the time scale of the project. The results will be analysed using the set of criteria used to assess the national importance of an ancient monument (DCMS 2010). This aids in the presentation of the significance or otherwise of the site, and thereby the assessment of the impact during the planning process.

4.1.3 ***Documentary and Cartographic Material:*** a review of all known and available resources of information relating to the site of the proposed development, and the study area consisting of 0.25km radius centred on the site, will be undertaken. The aim of this is to give consideration not only to the application site, but also its setting in terms of historical and archaeological contexts. This will include consultation of the Gwynedd County Historic Environment Record (HER) in Bangor, as well as the archives at the County Records Office (CRO) in Caernarvon and the University College Bangor. The Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) in Aberystwyth will also be consulted regarding available archives as well as aerial photographs, and the local history and archives library will be consulted.

4.1.4 The sources include;

- relevant published sources; to include articles, and regional and local journals,
- relevant unpublished documentary sources; to include, where appropriate, reports compiled by heritage conservation professionals and student theses, as well as excavation reports and archives affecting the site and its setting,
- data held in local and national archaeological databases
- printed and manuscript maps
- place and field-name evidence
- evidence for township, ecclesiastical and other ancient boundaries
- aerial photographs and other photographic/illustrative evidence

4.1.5 ***Map regression analysis:*** a cartographic analysis will be undertaken to aid investigation of the post-medieval occupation and land-use of the area and its development through to its modern-day or most recent use. This allows identification of:

- areas of potential archaeological interest,
- areas where any recent developments on site, of which there is no longer any evidence, may have impeded or disturbed below-ground archaeological remains.

4.1.6 Particular emphasis will be on the early cartographic evidence and will include estate maps, tithe maps, and Ordnance Survey maps, through to present mapping where possible.

4.1.7 ***Walkover:*** during the research for the desk-based assessment, the site will be visited in order to relate the existing topography and land use to research findings. A walkover will enable any features of potential archaeological or historical interest to be noted. It will also provide an understanding for areas of impact by the proposed redevelopment.

4.1.8 ***Geotechnical SI results:*** the information collected from the monitoring of the excavation of geotechnical SI pits will be incorporated into the assessment and first stage of evaluation of the archaeological potential of the site.

4.2 ARCHAEOLOGICAL GEOPHYSICAL SURVEY

4.2.1 The geophysical survey will be undertaken using a fluxgate gradiometer or equivalent geomagnetic sensor and an appropriate data-logger on a regular grid ("the survey grid"). The survey grid will be accurately tied in to the Ordnance Survey National Grid and/or to local features by instrument survey. Magnetic readings will be taken every 0.25m along parallel traverses spaced a maximum of 0.5m apart within each grid square. Given the prehistoric potential for the site, this spacing of readings is the most suitable to detect the subtle features anticipated.

4.2.2 Data from the survey will be downloaded from the data-logger into a lap top or field computer at appropriate intervals (minimum daily), to ensure security of the data. Data will be processed to maximise the clarity of the archaeological data, including, as appropriate, the removal of striping or other survey artefacts, random 'spikes', drift in machine calibration and the minimisation of background 'noise' or other natural or modern features which tend to obscure archaeological anomalies.

4.3 REPORT

4.3.1 The results of the desk-based assessment, walkover, watching brief of the geotechnical SI works and the geophysical survey will be incorporated into an all encompassing assessment report.

4.3.2 Before issue of the report, the HER officer will be contacted for a Primary Record Number (PRN) of any heritage assets discovered that are not recorded on the HER.

4.3.3 Once fully cross-referenced and ensuring that the data structure is compatible with the HER, a bound copy of a written synthetic report to be submitted to the client, together with a digital copy (pdf) on CD. A bound copy will also be submitted to the HER for reference purposes and a copy forwarded to the Development Control Archaeologist (GAPS). The report will present, summarise, and interpret the results of the programme detailed above in order to

come to as full an understanding as possible of the archaeological potential, its extents and significance, of the proposed development area. The assessment report will include;

- a front cover to include the NGR,
- a concise, non-technical summary of the results,
- the circumstances of the project and the dates on which the fieldwork was undertaken,
- a summary of the historical background of the study area and a gazetteer of all the sites of historical and archaeological significance identified,
- an interpretation of the results and their significance, using the 'Secretary of State's criteria for scheduling ancient monuments' included as Annex 4 (DCMS 2010),
- description of the methodology, including the sources consulted,
- a statement, where appropriate, of the archaeological implications of the impact,
- a copy of this project design, and indications of any agreed departure from that design,
- the report will also include a complete bibliography of sources from which data has been derived, and a list of any further sources identified but not consulted,
- a site location plan related to the national grid,
- appropriate plans showing the location and position of features or sites located,
- plans and sections showing the positions of deposits and finds,
- illustrative photographs as appropriate.

4.3.4 ***Confidentiality:*** all internal reports to the client are designed as documents for the specific use of the client, for the particular purpose as defined in the project brief and project design, and should be treated as such. They are not suitable for publication as academic documents or otherwise without amendment or revision.

4.4 ARCHIVE

4.4.1 This archive will be collated in accordance with the relevant IfA guidelines and a synthesis will be submitted to the HER (the index to the archive and a copy of the report). OA North will deposit the original record archive of projects (paper, magnetic and plastic media), and a full copy of the record archive together with the with material archive (artefacts, ecofacts, and samples) in an appropriate repository to be agreed with GAPS.

5 OTHER MATTERS

5.1 ACCESS

5.1.1 It is assumed that access to the proposed development site for both the walkover survey and the geophysical survey will be arranged by the client. If there are any arrangements to be made by OA North, these details need to be forwarded prior to commencement of the project. For the purposes of the geophysical survey, the proposed development area must be free of all livestock for the duration and both pedestrian and vehicular access is required.

1.2 OS BASE MAP

5.2.1 It is assumed that the client will supply suitable digital base mapping (dwg or dxf) at the outset of the project for the purposes of geo-referencing the geophysical survey data and features identified during the research and walkover survey. Should this not be possible this mapping may need to be purchased from the OS, the cost of which will be passed onto the client.

5.3 PROJECT MONITORING

5.3.1 Whilst the work is undertaken for the client, monitoring of the work will be undertaken by the Development Control Archaeologist (GAPS).

5.4 WORK TIMETABLE

5.4.1 ***Desk-based assessment and walkover survey:*** it is anticipated that approximately two weeks will be required to undertake this element.

5.4.2 ***Archaeological geophysical survey:*** following the collation of the sources and research for the desk-based assessment, the duration of the geophysical survey is anticipated as being six days.

5.4.3 ***Report:*** the client report will be completed within approximately four weeks following completion of all assessment elements and the inclusion of the watching brief report, subject to any outstanding specialist reports required for any finds, environmental or other similar assessment resulting from the monitoring of the SI works.

5.4.4 ***Archive:*** the archive will be deposited within six months following completion of the site work.

5.3 STAFFING

5.3.1 The project will be under the direct management of **Emily Mercer** (OA North Senior Project Manager) to whom all correspondence should be addressed.

5.3.2 The desk-based assessment will be undertaken by **Alastair Vannan** (OA North Heritage Management Services (HMS) project officer) who is very experienced in such work and capable of carrying out projects of all sizes.

5.3.3 The geophysical survey will be subcontracted to a geophysical contractor experienced in archaeological surveys and their interpretation. This will either be Stratascan Ltd or Phase SI, both of whom have worked extensively for OA previously. The contract will be awarded depending on availability to mobilise within the shortest time period, given that the forthcoming months are busy periods for such surveys over agricultural land.

5.4 INSURANCE

5.4.1 OA North has a professional indemnity cover to a value of £2,000,000; proof of which can be supplied as required.

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APPENDIX 3: PROJECT DESIGN FOR WATCHING BRIEF

1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Redrow Homes have requested that Oxford Archaeology North (OA North) undertake consultation with Gwynedd Archaeological Planning Service (GAPS) as to the requirements for an assessment to accompany a planning application for residential development of land off Penrhos Road, Bangor, Gwynedd (NGR centred SH 55488 69830). As part of the general collation of pre-application information, a geotechnical site investigation (SI) will be undertaken across the site, and OA North have been invited to monitor the groundworks associated with the trial trenches and window samples to further inform the archaeological assessment.

1.1.2 The site is an area of agricultural land, equating to nearly 14ha, surrounding the existing farmstead of Goetre-uchaf, and has a high potential for buried archaeological remains to exist. The known archaeological resource consists of a scheduled barrow (Cn 376), with a second possible barrow (PRN 22) positioned 140m to the south-west of this that would appear to have been affected by historic quarrying. Other archaeological assets include a flint scraper (PRN 2) found in association with the barrow (PRN 22), and an antiquarian reference to the discovery of a collection of querns on the south-eastern boundary of the site. Furthermore, a probably burnt mound and two undated intercutting ditches were recorded during a programme of watching brief fort the purposes of the excavation of a cable trench in 2010. These features all indicate that there is a high potential for as yet unknown archaeological features to be discovered during the forthcoming work in association with the proposed development.

1.1.3 A formal brief has been prepared by GAPS for the purposes of a desk-based assessment and geophysical survey to inform a programme of evaluation trenching. However, this project design deals solely with the watching brief of the geotechnical SI works and has been prepared in line with a verbal brief from GAPS. The remainder of the work will be detailed in a separate project design.

1.2 OXFORD ARCHAEOLOGY NORTH

1.2.1 OA North has considerable experience of fieldwork and post-excavation, having undertaken a great number of small and large-scale projects during the past 30 years. Such projects have taken place to fulfil the requirements of the clients to rigorous timetables. OA North has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. OA North is an Institute for Archaeologists (IfA) registered organisation, registration number 17, and all its members of staff operate subject to the IfA Code of Conduct (2010).

2. OBJECTIVES

2.2 INTRODUCTION

2.2.1 The following programme has been designed to preserve by record any archaeological deposits or features that may be present that will be exposed and disturbed during the excavation of window samples and trial trenches associated with the SI works. The following will be undertaken in order to mitigate the impact of the proposals on any such archaeological remains. The fieldwork will be carried out in line with current IfA guidelines (2008a) and in line with the IfA *Code of Conduct* (2010). It will be conducted within the general parameters defined by Chapter 6 of the Planning Policy Wales (2011).

2.2.2 ***Watching Brief:*** a permanent presence archaeological watching brief is required during groundworks associated with the proposed SI works. This will aim to determine the quality, extent and importance of any archaeological remains, and record their presence.

2.2.3 ***Report:*** the results of the fieldwork will be incorporated into the proposed assessment report for the desk-based assessment and geophysical survey, and used to inform the requirements for the subsequent programme of trial trenching.

2.2.4 ***Archive:*** a site archive will be produced to IfA guidelines (2008b). The information will be finally disseminated through the deposition of the combined evaluation archive in a repository to be agreed with GAPS.

3. HEALTH AND SAFETY

3.1 RISK ASSESSMENT

3.1.1 OA North provides a Health and Safety Statement for all projects and maintains a Company Safety policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (1997). OA North will liase with the client and/or on-site contractors to ensure all health and safety regulations are met. A detailed risk assessment will be completed in advance of any on-site works, with continuous monitoring and updating during the fieldwork. This can be supplied to all interested parties on request.

3.1.2 All open archaeological sites, especially in the event of deep excavations, will be inspected by the Site Director or other appointed and competent person. These inspection records will be signed and dated, and form part of the on-site Health and Safety folder, which will always be available to all interested parties on request.

3.2 STAFF ISSUES

3.2.1 All project staff will be CSCS qualified, proof of which can be provided in the form of CSCS cards.

3.2.2 All project staff will wear full basic PPE whilst on site, to include safety helmets, safety boots and high-visibility jackets. Noise defenders and eye protectors will be made available to staff as necessary.

3.2.3 It is assumed that OA North staff will be able to use the on-site contractor's welfare facilities.

3.3 CONTAMINATION

3.3.1 Any known contamination issues or any specific health and safety requirements on site should be made known to OA North by the client or main contractor on site to ensure all procedures can be met, and that the risk is dealt with appropriately.

3.3.2 Should any presently unknown contamination be discovered during excavation, it may be necessary to halt the works and reassess the risk assessment. Should it be necessary to supply additional PPE or other contamination avoidance equipment this will be costed as a variation.

4. METHOD STATEMENT

4.1 WATCHING BRIEF

4.1.1 A programme of field observation will accurately record the location, extent, and character of surviving archaeological features and/or deposits within the excavations for the SI works. For such purposes the on-site contractor will need to use a toothless ditching bucket for excavating purposes.

4.1.2 A systematic examination will be carried out of any subsoil horizons exposed during the course of the groundworks, and all archaeological features and horizons, and any artefacts identified during observation will be accurately recorded.

4.1.3 The discovery of archaeological remains will require stoppage of the clearance/construction work to allow the OA North archaeologist sufficient time to adequately record the remains. This would aim to minimise disruption to the construction works.

4.1.4 Putative archaeological features and/or deposits identified by the machining process, together with the immediate vicinity of any such features, will be cleaned by hand, using either hoes, shovel scraping, and/or trowels depending on the subsoil conditions, and where appropriate sections will be studied and drawn. Any such features will be sample excavated (i.e. selected pits and postholes will normally only be half-sectioned, linear features will be subject to no more than a 10% sample, and extensive layers will, where possible, be sampled by partial rather than complete removal).

4.1.5 During this phase of work, recording will comprise a full description and preliminary classification of features or materials revealed, and their accurate location (either on plan and/or section, and as grid co-ordinates where appropriate). Features will be planned accurately at appropriate scales and annotated on to a large-scale plan provided by the client.

4.1.6 A monochrome photographic record will be undertaken simultaneously for archiving purposes, although a digital photographic record will be maintained for reporting purposes.

4.1.7 A plan will be produced of the areas of groundworks showing the location and extent of the ground disturbance and one or more dimensioned sections will be produced.

4.1.8 ***Contingency plan:*** in the event of significant archaeological features being encountered during the watching brief, discussions will take place with the Development Control Archaeologist (GAPS) or a representative, as to the extent of further works to be carried out. All further works would be subject to a variation to this project design.

4.2 GENERAL PROCEDURES

4.2.1 ***Environmental Sampling:*** samples (bulk samples of 40 litres volume, to be sub-sampled at a later stage) will be collected from stratified undisturbed deposits and will particularly target negative features (gullies, pits and ditches). Monolith samples will be collected from freshly exposed sections through all buried soils/old ground surfaces by trained staff. These will be returned to OA North's offices for processing.

4.2.2 Deposits of particular interest may incur additional sampling, on advice from the appropriate in-house specialist.

4.2.3 The location of all samples will be recorded on drawings and sections with heights OD etc.

4.2.4 Between 50%-100% of bulk samples shall be selected for processing, based on the advice from OA North's in-house environmental manager. An assessment of the environmental potential would include soil pollen analysis and the retrieval of charred plant macrofossils and land molluscs from former dry-land palaeosols and cut features. In addition, the samples would be assessed for plant macrofossils, insect, molluscs and pollen from waterlogged deposits.

4.2.5 It may be required to obtain dating evidence through radiocarbon dating, dendrochronological or other such techniques. This would only be undertaken in consultation with the client.

4.2.6 ***Human remains:*** should evidence of burials be identified, the Development Control Archaeologist (GAPS) and the local Coroner will be informed immediately. All work will cease until the proper authorities were satisfied before the burials are able to be removed. In normal circumstances, field recording will also include a continual process of analysis, evaluation, and interpretation of the data, in order to establish the necessity for any further more detailed recording that may prove essential. The grave cut and/or coffin and contents will be recorded in plan at 1:20. Significant details of any grave goods, should they be discovered, will be planned at 1:10. Photography will be used to provide a further detailed record of the skeleton. The removal of such remains will be carried out with due care and sensitivity.

4.2.7 ***Finds:*** all finds recovered during the evaluation investigation (metal detecting and trial trenching) will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with the United Kingdom Institute for Conservation (UKIC) *First Aid For Finds*, 1998 (new edition) guidelines.

4.2.8 Finds recovery and sampling programmes will be in accordance with best practice (current IfA guidelines) and subject to expert advice. Neither artefacts nor ecofacts will be collected systematically during the mechanical excavation of the topsoil unless significant deposits are encountered. In such an eventuality, material will be sampled in such a manner as to provide data to enhance present knowledge of the production and dating of such artefacts. Other finds recovered during the removal of overburden will be retained only if of significance to the dating and/or interpretation of the site. It is not anticipated that ecofacts (e.g. unmodified animal bone) will be collected during this procedure.

4.2.9 All finds will be treated in accordance with OA standard practice, which is cognisant of IfA and UKIC Guidelines. In general this will mean that (where appropriate or safe to do so) finds are washed, dried, marked, bagged and packed in stable conditions; no attempt at conservation will be made unless special circumstances require prompt action. In such case guidance will be sought from OA North's consultant conservator.

4.2.10 All waterlogged finds will be treated as appropriate. In the case of large deposits of waterlogged environmental material (e.g. unmodified wood), advice will be sought with the OA North consultant with regard to an appropriate sampling strategy.

4.2.11 Where possible, spot dates will be obtained on pottery and other finds recovered from the site. Artefacts will be examined and commented upon by OA North in-house specialists. Initial artefact dating shall be integrated into the site matrix.

4.2.12 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996. Where removal cannot take place on the same working day as discovery, suitable security will be employed to protect the finds from theft.

4.3 REPORT

4.3.1 The results of the watching brief will be incorporated into an all encompassing assessment report of the site, including the forthcoming results of the desk-based assessment and geophysical survey. This will include a bound copy of a written synthetic report to be submitted to the client, together with a digital copy (pdf) on CD. A bound copy will also be submitted to the HER for reference purposes and a copy forwarded to the Development Control Archaeologist (GAPS). The report will present, summarise, and interpret the results of the programme detailed above in order to come to as full an understanding as possible of the archaeology of the development area. The overarching assessment report will include;

- a front cover to include the NGR,
- a concise, non-technical summary of the results,
- the circumstances of the project and the dates on which the fieldwork was undertaken,
- a summary of the historical background of the study area,
- description of the methodology, including the sources consulted,
- a statement, where appropriate, of the archaeological implications of the impact,
- a copy of this project design, and indications of any agreed departure from that design,
- the report will also include a complete bibliography of sources from which data has been derived, and a list of any further sources identified but not consulted,
- a site location plan related to the national grid,
- appropriate plans showing the location and position of features or sites located,
- plans and sections showing the positions of deposits and finds,
- illustrative photographs as appropriate.

4.3.2 ***Confidentiality:*** all internal reports to the client are designed as documents for the specific use of the client, for the particular purpose as defined in the project brief and project design,

and should be treated as such. They are not suitable for publication as academic documents or otherwise without amendment or revision.

4.4 ARCHIVE

4.4.1 This archive will be collated in accordance with the relevant IfA guidelines (2008b) and a synthesis will be submitted to the HER (the index to the archive and a copy of the report). OA North will deposit the original record archive of projects (paper, magnetic and plastic media), and a full copy of the record archive together with the with material archive (artefacts, ecofacts, and samples) in an appropriate repository to be agreed with GAPS.

5. OTHER MATTERS

5.1 PROJECT MONITORING

5.1.1 Whilst the work is undertaken for the client, monitoring of the work will be undertaken by the Development Control Archaeologist (GAPS).

5.2 WORK TIMETABLE

5.2.1 ***Archaeological Watching Brief:*** the duration of the archaeological presence for the watching brief will be dictated by the client's schedule of works, but is anticipated as being four days.

5.2.2 ***Report:*** the client report will be completed within approximately six weeks following completion of all assessment elements, subject to any outstanding specialist reports.

5.2.3 ***Archive:*** the archive will be deposited within six months following completion of the site work.

5.3 STAFFING

5.3.1 The project will be under the direct management of **Emily Mercer** (OA North Senior Project Manager) to whom all correspondence should be addressed.

5.3.2 The fieldwork will be undertaken by an OA North supervisor or assistant supervisor experienced in this type of project, who will be responsible for liaison with the site contractors and the client, and other relevant interested parties with regards to on-site work and procedures. The attending archaeologist will be supported by specialist staff based both on site and in the office in Lancaster.

5.3.3 **Christine Howard-Davis** (OA North finds manager) has extensive knowledge of all categories of artefacts of all periods and is a recognised expert in the analysis of post-medieval artefacts. The assessment and subsequent analysis of all artefacts recovered during the course of the investigation will be undertaken by or under the auspices of Christine.

5.3.4 Environmental management will be undertaken by **Elizabeth Huckerby** (OA North environmental manager), who will also provide specialist input on pollen analysis/charred and waterlogged plant remains. Elizabeth has extensive knowledge of the palaeoecology of the North, and has contributed to all of the English Heritage funded volumes of the Wetlands of the North West. Elizabeth has also acted as palaeoenvironmental consultant for several archaeological investigations. Elizabeth will advise on site sampling procedures and co-ordinate the processing of samples and organise internal and external specialist input as required.

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APPENDIX 4: SUMMARY OF CONTEXTS

TEST PIT NO.	CONTEXT NO.	DESCRIPTION	THICKNESS (M)
1	***100***	Loose, mid-brown loam turf and topsoil	0.23
1	***101***	Loose brown/grey silty-loam subsoil	0.22
1	***102***	Orange/brown sand and fractured ignatius rock	0.35
1	***103***	Rock head, orange/brown ignatius rock	-
2	***200***	Loose, mid-brown loam turf and topsoil	0.2
2	***201***	Mid-brown/grey silty-soil (redeposited, possibly from A55 construction)	0.46
2	***202***	Compact mid-brown/grey silty-soil (possibly earlier subsoil)	0.1
2	***203***	Buff/orange glacial sand till	0.45
2	***204***	Ignatius rock head	-
3	***300***	Loose mid-brown loam turf and topsoil	0.25
3	***301***	Rich orange/brown silty-sand till geology	0.55
3	***302***	Mixed orange, buff, sandy-clay, geology (with frequent, fractured ignatius rock)	0.43+
4	***400***	Loose mid-brown loam turf and topsoil	0.26
4	***401***	Loose orange silty-sand till geology	0.3
4	***402***	Firm, buff sand clay and fine gravel geology	0.53
4	***403***	Light buff sand/clay natural	0.21+
5	***500***	Loose mid-brown loam turf and topsoil	0.25
5	***501***	Loose orange clayey-sand	0.18
5	***502***	Buff/orange sandy-clay with occasional glacial ignatius stones	0.48
5	***503***	Light brown/buff sandy-clay geology	0.38+
6	***600***	Mid-brown turf and topsoil	0.25
6	***601***	Firm, mid-brown silty subsoil	0.13
6	***602***	Loose, mid-brown silty-sand with frequent fractured	0.18

		ignatius rocks	
6	***603***	Burnt layer in base of pit, with burnt stone	0.08
6	***604***	Pit cut	-
6	***605***	Buff/orange sandy-clay geology	0.55
6	***606***	Light buff sandy and gravel clay geology	0.29+
7	***700***	Mid-brown turf and topsoil	0.2
7	***701***	Firm buff clayey-sand geology	0.26
7	***702***	Light/pale buff clayey-sand and gravel geology	0.16
7	***703***	Light brown/buff silty, clayey-sand and gravel geology	0.58+
8	***800***	Loose, mid-brown turf and topsoil	0.15
8	***801***	Light brown/grey silty-soil (subsoil)	0.14
8	***802***	Rich orange, silty-sand geology	0.2
8	***803***	Light buff clayey-sand geology (occasional gravel)	0.5
8	***804***	Mid-brown sand/clay geology	0.2+
9	***900***	Loose, mid-brown turf and topsoil	0.15
9	***901***	Loose brown/grey silty subsoil	0.15
9	***902***	Rich orange silty-sand geology	0.25
9	***903***	Buff clay/sand and fine gravel geology	0.44
9	***904***	Pale/cream weathered rock layer	0.15
9	***905***	Buff/orange clayey weathered rock	0.14
10	***1001***	Loose, mid-brown turf and topsoil	0.11
10	***1002***	Loose, brown/grey silty-subsoil	0.2
10	***1003***	Orange/buff clayey-sand and fine gravel geology	0.6
10	***1004***	White/purple ignatius rock head	0.2+
11	***1100***	Loose, brown turf and topsoil	0.1
11	***1101***	Brown/grey silty-subsoil	0.12
11	***1102***	Orange sandy natural	0.18+
12	***1200***	Loose brown turf and topsoil	0.12
12	***1201***	Loose brown/grey silty-subsoil	0.08

12	***1202***	Rich orange/brown silty-sand	0.4
12	***1203***	Light buff clayey-sand and fine gravel geology	0.38
12	***1204***	Rock head	-
13	***1300***	Loose brown turf and topsoil	0.25
13	***1301***	Mid-brown silty subsoil	0.1
13	***1302***	Rich orange sand geology with occasional fractured rock inclusions	0.48
13	***1303***	Buff/cream clay-sand and fine gravel geology	0.38
14	***1400***	Loose, mid-brown turf and topsoil	0.11
14	***1401***	Brown/grey silty-subsoil	0.2
14	***1402***	Rich orange sand	0.34
14	***1403***	Buff clayey-sand and fine gravel	0.24
14	***1404***	Pale/cream weathered rock geology	0.2+
15	***1500***	Loose, mid-brown turf and topsoil	0.1
15	***1501***	Mid-brown/grey silty-subsoil	0.2
15	***1502***	Rich brown silty-soil and buried subsoil	0.09
15	***1503***	Rich orange sand	0.26
15	***1504***	Cream/buff clayey-sand and fine gravel geology	0.62+
16	***1600***	Loose mid-brown turf and topsoil	0.11
16	***1601***	Loose, mid-brown/grey silty-subsoil	0.2
16	***1602***	Orange/buff sand and fractured rock geology	0.6
16	***1603***	Buff clayey-sand and fractured rock geology	0.38+
17	***1700***	Loose, mid-brown turf and topsoil	0.17
17	***1701***	Loose, dark brown/grey silty-subsoil	0.19
17	***1702***	Rich orange/buff silty-sand	0.25
17	***1703***	Buff clayey-sand and fine gravel (regular iron-panning)	0.58+
18	***1800***	Loose, mid-brown turf and topsoil	0.05
18	***1801***	Loose, re-deposited dark brown soil and fibrous material (most likely turf)	0.44
18	***1802***	Large cut (most likely associated with recently	-

		demolished farm)	
18	***1803***	Loose, mid-brown/grey silty-soil	0.06
18	***1804***	Orange/buff sand-geology	0.13
18	***1805***	Buff clayey-sand and fine gravel geology	0.44+
19	***1900***	Mid-brown silty topsoil	0.08
19	***1901***	Light brown/grey silty-subsoil	0.09
19	***1902***	Mixed brown and orange sand and fine gravel	0.43
19	***1903***	Compact pale weathered stone	0.05
19	***1904***	Buff sand and fine gravel geology with fractured rock	0.5+
20	***2000***	Mid-brown turf and topsoil	0.14
20	***2001***	Loose, brown/grey silty-soil (subsoil)	0.23
20	***2002***	Moist cream/buff clayey-sand geology	0.43
20	***2003***	Mid brown/buff sandy-clay geology	0.4+
21	***2100***	Loose, dark brown silty topsoil	0.05
21	***2101***	Very loose, mid-brown silty-subsoil with frequent fractured stone	0.41
21	***2102***	White/buff concrete floor surface	0.09
21	***2103***	Loose brown/grey silty-soil, with frequent stone (early buried topsoil)	0.13
21	***2104***	Loose, mixed orange/buff sand with frequent fractured stone	0.58+
22	***2200***	Mid-brown turf and topsoil	0.14
22	***2201***	Dark brown/grey silty-subsoil	0.08
22	***2202***	Rock head of sloping outcrop	0.28+
23	***2300***	Mid-orange topsoil/overburden	0.12
23	***2301***	Loose, light brown sandy-subsoil	0.12
23	***2302***	Pale/buff weathered rock	0.33
23	***2303***	Rock head geology	0.6+
24	***2400***	Mid-brown topsoil	0.2
24	***2401***	Loose brown/grey silty-subsoil	0.05

24	***2402***	Crushed slate deposit	0.18
24	***2403***	Crushed cinder surface	0.16
24	***2404***	Mixed buff sand and mortar deposit	0.1
24	***2405***	Compact brown/grey silty-sand and fine gravel deposit	0.15
24	***2406***	Buff/orange silty-sand and fine gravel	0.38+
25	***2500***	Mid-brown topsoil	0.18
25	***2501***	Rich brown/orange silty-sand	0.15
25	***2502***	Mid-brown sand and fractured rock	0.4
25	***2503***	Rock head	-
26	***2600***	Mid-brown topsoil	0.28
26	***2601***	Light orangey-brown sand with medium stones	0.42
26	***2602***	Light grey bedrock, loose large stones	0.36+
27	***2700***	Mid-brown topsoil	0.3
27	***2701***	Clay mix with large stones, light orangey-brown	0.22
27	***2702***	Bedrock	0.48+
28	***2800***	Topsoil	0.3
28	***2801***	Clay mix with large stone, light orangey-brown	0.48
28	***2802***	Bedrock	0.18+
29	***2900***	Topsoil and turf	0.3
29	***2901***	Light brown sand, small stone inclusions	0.28
29	***2902***	Bedrock, light orangey-brown, large stones, angular	0.35+
30	***3000***	Topsoil	0.28
30	***3001***	Orangey-brown sand, mixed with large stones	0.24
30	***3002***	Bedrock, light grey, large stone	0.28+
31	***3100***	Topsoil and turf, mid-brown colour	0.58
31	***3101***	Sandy clay, light orangey brown	0.48+
32	***3200***	Topsoil	0.54
32	***3201***	Grey clay band, small stones	0.08
32	***3202***	Bedrock, orangey-brown sandy-clay	0.44

33	***3300***	Topsoil	0.22
33	***3301***	Grey clay, small and medium stones	0.42
33	***3302***	Brown/orange clay-sand	0.4+
34	***3400***	Topsoil	0.4
34	***3401***	Brown, orange sand, small stone inclusions	0.3
34	***3402***	Bedrock, grey large stone	0.3+
35	***3500***	Topsoil	0.3
35	***3501***	Orangey-brown sand with medium stones	0.4
35	***3502***	Bedrock, large grey stones	0.34+
36	***3600***	Topsoil	0.4
36	***3601***	Bedrock	0.2+
37	***3700***	Topsoil and turf	0.38
37	***3701***	Dark orangey-brown sand with large stones	0.24
37	***3702***	Bedrock, dark browny-orange, large stony layer with sand	0.28+
38	***3800***	Topsoil and turf	0.4
38	***3801***	Mid-orangey-brown sand with large stones	0.16
38	***3802***	Mid-orangey-brown stony layer with sand	0.21+
39	***3900***	Topsoil	0.35
39	***3901***	Natural mid-browny-orange sandy-silt	0.82+
39	***3902***	Natural geology cut	-
39	***3903***	Natural geology, yellow clay	0.5
40	***4000***	Topsoil and turf	0.4
40	***4001***	Light, orangey-brown sand, with medium angular stones	0.49
40	***4002***	Bedrock, light grey	0.1+
41	***4100***	Topsoil and turf	0.41
41	***4101***	Light browny-orange clay	0.4
41	***4102***	Light grey bedrock	0.28+
42	***4200***	Topsoil and turf	0.4

42	***4201***	Orangey sand mixed with medium angular stones	0.7+
43	***4300***	Topsoil and turf	0.4
43	***4301***	Light orange sand mixed with large angular stones	0.24
43	***4302***	Bedrock, light grey	0.5+
44	***4400***	Topsoil and turf	0.41
44	***4401***	Light orange sand mix with medium angular stones	0.32
44	***4402***	Bedrock, light grey	0.4+
45	***4500***	Topsoil and turf	0.26
45	***4501***	Light orangey-brown clay mixed with large stone	0.6+
46	***4600***	Topsoil and turf	0.35
46	***4601***	Mid browny-orange sand, small-medium angular stones	0.6+
47	***4700***	Topsoil and turf	0.28
47	***4701***	Bedrock, light orangey-brown	0.3+
48	***4800***	Topsoil and turf	0.3
48	***4801***	Mid-browny-orange sand with small-medium stones	0.7+
49	***4900***	Topsoil and turf	0.41
49	***4901***	Mid-browny-orange sand, small-medium stones	0.6+
50	***5000***	Topsoil and turf	0.6
50	***5001***	Dark browny-orange sand, small angular stones	0.46+
SOAK AWAY			
SO7	**SO700**	Topsoil and turf	0.38
SO7	**SO701**	Light orange sand mix with medium angular stones	0.36
SO7	**SO702**	Bedrock, light grey	0.3+

APPENDIX 5: GEOPHYSICAL SURVEY

Land off Penrhos Road
Bangor

Archaeological Geophysical Survey

Project No. ARC/854/323

August 2012

Land off Penrhos Road
Bangor

Archaeological Geophysical Survey

Project No. ARC/854/323

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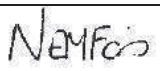
Signature		Signature	
Date	28/08/12	Date	28/08/12

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1. SUMMARY

Phase Site Investigations Ltd was commissioned to carry out a magnetic gradient survey at a site off Penrhos Road, Bangor. The aim of the survey was to help establish the presence / absence, extent, character, relationships and date (as far as circumstances and the inherent limitations of the technique permit) of archaeological features within the survey area.

A Bartington Grad 601-2 gradiometer was utilised with data collected at 0.5 m by 0.25 m intervals over a series of 30 m grids.

The magnetic survey has shown that there are extensive archaeological remains within the site. It has not been possible to fully define the extent of the archaeological activity as significant parts of the site could not be surveyed, there are numerous areas of very strong responses that could mask anomalies caused by archaeological features and the background magnetism at the site is highly variable.

In places the data quality is relatively low. The uneven ground associated with dense and 'tussocky' vegetation coupled with areas of steep slopes meant that it was very difficult to maintain an even pace when collecting data, resulting in some data being 'staggered'. It was not possible to fully correct for this during processing and so some data points may be offset slightly from their correct position, resulting in a saw-tooth effect in some anomalies. Detection of isolated responses is more difficult in these areas, although linear and curvi-linear anomalies can still be identified.

There are a large number of very strong magnetic anomalies throughout the site. Some of these are associated with modern features, such as pipes or cables. Others may indicate areas of former quarrying activity or natural geological variations. The strength of these responses are such that if archaeological features were present it is unlikely that the anomalies associated with them would be identified.

As well as identifying probable archaeological features the survey has detected anomalies that could be caused by possible archaeological features and a number of responses of unknown or uncertain origin.

Several archaeological ditches, identified by the survey, appear to intersect each other suggesting that there may be multiple phases of archaeological activity at the site.

Of particular interest are a number of sub-circular anomalies, many of which appear to surround an area of enhanced response. Given the extensive archaeological remains that the survey has identified and the presence of a barrow and other prehistoric finds within the site and archaeological origin for these features is considered likely as they are suggestive of an infilled circular ditch surrounding an area of burning or a pit. Although it should be recognised that the responses could potentially be modern in origin.

No anomalies that can be directly associated with the Goetre Uchaf scheduled barrow have been identified.

2. INTRODUCTION

2.1 Overview

Phase Site Investigations Ltd was commissioned by Ms Emily Mercer of Oxford Archaeology North, to carry out an archaeological geophysical survey at a site off Penrhos Road, Bangor (centred at NGR SH 557 698) utilising a magnetic gradiometer.

The aim of the survey was to help establish the presence / absence, extent, character, relationships and date (as far as circumstances and the inherent limitations of the technique permit) of archaeological features within the survey area.

The location of the site is shown in drawing ARC_854_323_01.

2.2 Site description

The site is situated in the Penrhosgarnedd area of Bangor, Gwynedd, approximately 2 km to the south of the town centre (centred at NGR SH 575 715).

The total site area is approximately 13.6 ha and encompasses numerous fields, some of which were sub-divided and others contained buildings. The site is bounded to the south and south-west by an embankment and area of dense vegetation adjacent to the A55, farmland to the south-east, Gwynedd Hospital to the north-east and housing to the north and north-west. All fields were in use as pasture / scrub at the time of the survey.

For the purpose of this survey each major field has been given a number as shown on drawing ARC_854_323_02. Each field is described below.

Field 1 was bounded by a wooden fence and hedge to the south, a stone wall and metallic fencing to the north-west, and gardens with a mixture of walls, metallic fencing and hedging to the north-east. The field was overgrown in many places, with gorse and thistles, which could not be surveyed. The area surveyed was covered by long grass and tussocks and was generally level. A large pylon was present in the western corner of the field, as well as overhead cables running NW-SE along the northern edge of the field. An area to the north-east of this field contained a house and was not surveyed.

Field 2 was bounded by metal fences to the north-west, a mixture of wooden fencing, stone walls and hedging to the south and a modern track to the north-east. The majority of the field was covered with tall grass and some areas were overgrown with waist high nettles, thistles and bushes, a few areas of which were too dense to survey. The field sloped downwards towards the south and east with a gradually increasing gradient. Telegraph poles carrying an overhead cable run roughly north to south across the field.

Field 3 was bounded by a modern track to the south-west and metallic fencing with hedging to the north, east and west. The field was generally level with long grass and tussocks and occasional patches of thistles.

Field 4 was bounded to the north-west, north-east and south-east by a mixture of metallic fencing and broken hedge line and to the south-west a mixture of stone walling, metallic fencing and overgrown hedge line. The eastern area of this field had been the site of modern farm buildings, still shown on Ordnance Survey maps, and as such were not covered by the

survey. The remains of the demolished buildings were still visible on the ground surface. The western corner of the field was being used as a storage area for metallic fencing and the southern corner was heavily overgrown with thistles and nettles. Only the northern portion of the field could therefore be surveyed as this was generally level and had a ground cover of short grass.

Field 5 had a very steep gradient sloping down towards the south. The slope was too steep to survey safely.

Field 6 was overgrown with dense vegetation and it was not possible to survey in this area.

Field 7 was bounded by metallic fencing to the north-east, north-west and south-east and metallic fencing, stone wall and a broken hedge line to the south-west. The ground surface was level with a covering of short grass.

Field 8 was bounded to the north by metallic fencing, to the south-west by metallic fencing, stone wall and broken hedge and to the south-east by a ditch and metallic fencing. Areas of the field to the north-west and south-east were boggy, some so much so that they could not be surveyed. In addition an overgrown area of thistles to the south-west, was also too dense to survey. The ground was generally level, though it began to slope downwards towards the southernmost corner. Ground cover was mainly short grass, but more dense vegetation was present closer to the overgrown and marshy areas of the field. Earthworks were present in the form of what looked to be short drainage ditches running north-west to south-east from the north-west field boundary, as well as a small earth mound. Two metallic feeding troughs were located in the southern end of the field, just outside the area surveyed.

The Goetre Uchaf scheduled barrow is believed to be present in an overgrown area of Field 8 (OA North forthcoming).

Field 9 was overgrown and it was not possible to survey in this area.

Field 10 had a very steep gradient sloping down towards the south. The slope was too steep to survey safely.

Field 11 was bounded by a stone wall and metallic fencing to the east, a ditch and metallic fence to the west and metallic fencing to the north and south. This field was effectively divided in two by a steep slope running roughly north-east to south-west through the field and sloping down to the west. To the east of this was a level area with a covering of short grass and overgrown bushes, and to the west a long, narrow area of grass edged with marsh and overgrown vegetation. Areas which were not overgrown or too steep were surveyed. A telegraph pole carrying overhead cables was present.

Field 12 was overgrown and it was not possible to survey in this area.

Field 13 was bounded by metallic fencing on all sides. An area of overgrown vegetation was present at the western side of the field where survey was not possible. The remainder had ground cover of short grass and was generally flat, though began to slope down towards the eastern boundary.

Field 14 was overgrown and it was not possible to survey in this area.

The geology in the western and southern parts of the site consists of the Padarn Tuff formation of igneous bedrock with the Minnffordd formation of interbedded sandstone and conglomerate present in central and eastern parts of the site. The solid geology is overlain in places with Devensian Till deposits.

2.3 Archaeological background

A brief for archaeological evaluation issued by Gwynedd Archaeological Planning Service (GAPS) indicates that "*the known archaeological resource within and in the vicinity of the site consists of a scheduled barrow (Cn 376) of probable Bronze Age date, with a second possible barrow (PRN 22) positioned 140 m to the south-west of this.*" This latter feature is located beyond the site boundary and would appear to have been affected by historic quarrying.

"Other archaeological assets include a flint scraper (PRN 2) found in association with the barrow (PRN 22), and an antiquarian reference to the discovery of a collection of querns on the south-eastern boundary of the site. Furthermore, a probably burnt mound and two undated intercutting ditches were recorded during a programme of watching brief for the purposes of the excavation of a cable trench in 2010. These features all indicate that there is a high potential for as yet unknown archaeological features to be discovered during the forthcoming work in association with the proposed development."

2.4 Scope of work

Due to the high potential for prehistoric archaeological remains within the survey area the brief specified that a magnetic survey should be undertaken on profiles spaced 0.5 m apart, with readings taken every 0.25 m.

Although the site is approximately 13.6 ha in area it was recognised before the commencement of the survey that a significant part of the site could not be surveyed due to the presence of buildings and dense vegetation. The actual area covered by the survey was 7.2 ha as there were also areas of marsh / boggy ground, steep gradients and surface obstructions.

The location of the areas covered by the magnetic gradient survey are shown on drawing ARC_854_323_02.

Even in some of the areas that could be covered by the survey the vegetation cover was such that it was very difficult to walk at a constant pace, particularly where the ground sloped.

The survey was carried out between 13 August and 17 August 2012.

3. SURVEY METHODOLOGY

3.1 Magnetic survey

A Bartington Grad601-02 magnetic gradiometer was used for the magnetic survey. The instrument was balanced and 'zeroed' on site in a magnetically uniform area at the start of each days survey. The instruments was regularly checked for instrument drift during the course of each day and rebalanced as required.

The data was collected over a series of 30 m by 30 m survey grids. All data was collected at 0.25 m intervals over profiles spaced 0.5 m apart and stored in the instrument for download at the end of the day.

Major grid points were established using a Sokkia GRX-1 RTK GPS Leica and were set-out relative to field boundaries, to an accuracy better than 0.03 m. Bamboo canes or tent pegs were used to mark the grid points. Intermediate grid points were established using tape measures and the position of each profile were be established by stringing either a pre-marked rope or a 100 m tape measure between grid points. Bamboo canes were then used to mark profiles and the operator walked between these at a constant pace.

The location of the survey grid(s) was recorded directly to Ordnance Survey national grid co-ordinates using the UKO OSTN2 projection to an accuracy better than 0.03 m. At the request of the client additional survey stations were not established.

The gradiometer data was downloaded and gridded in Archaeosurveyor 2.5.3 (DW Consulting). Where required, the data were minimally processed or improved to remove errors caused by instrument drift and/or collection errors (See Appendix 1.4).

The data was exported from Archaeosurveyor as raster images (PNG files) and is presented in greyscale format at 1:1500 in drawings ARC_854_323_03 and ARC_854_323_05 with accompanying interpretations in drawings ARC_854_323_04 and ARC_854_323_06. All greyscale plots were clipped at -3 nT to 4 nT. The data shown in the greyscale plots has been 'smoothed' using the Grad. Shade option for presentation purposes.

The data has been displayed relative to a digital topographic survey base plan provided by the client as drawing *' Bangor Amend A 2d.dwg'*. The base plan was in the National Grid co-ordinate system and as the survey grids were set-out directly to national grid co-ordinates the data could be simply superimposed onto the base plan in the correct position.

X-Y trace plots were examined for all of the data and overlain onto the greyscale plot to assist in the interpretation, primarily to help identify dipolar responses that will probably be associated with surface / near-surface iron objects. However, X-Y trace plots have not been presented here as they do not show any additional anomalies anomies that are not visible in the greyscale data. A digital drawing showing the X-Y trace plot overlain on the greyscale plot is provided in the digital archive.

All isolated responses have been assessed using a combination of greyscale and X-Y trace plots. If a response is not thought to have significant archaeological potential then it has not been shown on the final interpretation.

The data was examined over several different ranges during the interpretation to ensure that the maximum information possible was obtained from the data.

The anomalies have been categorised based on the type of response that they exhibit and an interpretation as to the cause(s) or possible cause(s) of each anomaly type is also provided.

A general discussion of the anomalies is provided for the entire site. Anomalies of interest have been labelled on the interpretation and are discussed in more detail on a field by field basis in Section 4 of this report.

The geophysical interpretation drawing must be used in conjunction with the relevant results section and appendices of this report.

4. RESULTS

4.1 General

In places the data quality is relatively low. The uneven ground associated with dense and 'tussocky' vegetation coupled with areas of steep slopes meant that it was very difficult to maintain an even pace when collecting data, resulting in some data being 'staggered'. It is often possible to process out staggering but this is much more difficult to do when a 0.5 m profile spacing is adopted as the survey profiles are collected on overlapping traverses. There are therefore areas where, even after processing, the data points may be offset slightly from their correct position, resulting in a saw-tooth effect in some anomalies. Detection of isolated responses is more difficult in these areas, although linear and curvi-linear anomalies can still be identified.

Another complicating factor in the detection of features is that there is a strongly variable background magnetism across the site. This is probably associated with natural variations in the soil and / or underlying geology. The variable background magnetism produces numerous isolated responses which has the effect of masking responses from small, isolated archaeological features.

There are also a number of very strong magnetic anomalies throughout the site. Some of these are associated with modern features, such as pipes or cables. Others may indicate areas of former quarrying activity or natural geological variations.

The categories of anomaly, and their possible causes, which have been identified by the survey are discussed in detail below. The survey is then summarised on a field by field basis.

4.2 Dipolar responses

Dipolar responses are those that have a sharp variation between strongly positive and negative components. In the majority of cases dipolar responses are usually caused by modern ferrous features / objects, although fired material (such as brick), some ferrous or industrial archaeological features and strongly magnetic gravel could also produce dipolar responses.

There are numerous **isolated dipolar responses** (iron spikes) across the survey area that are indicative of ferrous or fired material on or near to the surface. The isolated responses are often caused by small objects, such as spent shotgun cartridges, iron nails and horseshoes or pieces of modern brick or pot. Archaeological artefacts can also produce this type of response but unless there is strong supporting evidence to the contrary they are assumed not to be of archaeological significance. Only very strong isolated dipolar responses have been shown on the interpretation. Several of these are located in close proximity to probable and possible archaeological features. An archaeological origin cannot be ruled out for these responses but a modern origin is more probable.

There are several areas containing strong dipolar responses (**magnetic disturbance**). This type of anomaly is usually caused by concentrations of ferrous or fired material and are often found adjacent to field boundaries where such material tends to accumulate. If an area of magnetic disturbance is located away from existing field boundaries then it could indicate a former field boundary, several large isolated objects in close proximity, an area where modern material has been tipped or an infilled cut feature, such as a quarry pit. Areas of dipolar

response can occasionally be caused by features / material associated with archaeological industrial activity but they are usually caused by modern activity. Responses in areas of magnetic disturbance can sometimes be so strong that archaeological features located beneath them may not be detected.

Above ground metallic or strongly magnetic features, such as fences, gates, pylons and buildings can produce very strong dipolar responses. The strength of magnetic response from these features is such that any sub-surface features located in their vicinity may not be detected.

There are a number of linear anomalies that contain dipolar responses. These **dipolar linear** anomalies are caused by modern pipes or cables.

4.3 Very strong responses

There are a number of areas that contain very strong positive and / or negative responses. Many of these anomalies do not exhibit typical dipolar responses, suggesting that some of these are not caused by near-surface metallic features. Historic quarrying is known to have taken place within the site and it is possible that these anomalies are associated with infilled quarries or made ground.

Parts of the site may be underlain by igneous rocks and it is possible that some of the very strong responses may be associated with geological features. Others may be associated with modern pipes or cables or with ground disturbance associated with the installation of these features.

The strength of these responses is such that any archaeological features located in the vicinity of them may not be detected.

4.4 Negative linear anomalies

There are several negative linear anomalies present in the data. This type of anomaly occurs when a feature has lower magnetic readings than the surrounding material. It can often be associated with ploughing or drainage regimes or it can indicate a feature that cuts into magnetic soils or bedrock and which is infilled with less magnetic material.

Several of the negative linear anomalies are in association with positive linear responses which are of a possible archaeological origin. It is possible that where these occur together that they are caused by the same feature.

4.5 Linear anomalies (possible agricultural)

There are a number of broadly parallel, positive linear anomalies present in several of the fields that may be associated with relatively modern agricultural activity.

However there are several probable linear features on a similar alignment and it is possible that some of the linear anomalies that have been highlighted as possible agricultural may in fact be associated with archaeological features that produce relatively weak anomalies.

4.6 Linear trends

There are a number of linear and curvi-linear responses that are weak, irregular or discontinuous. These anomalies have been categorised as trends as it is not certain what their cause is or even if they are associated with definite features.

Given the presence of known archaeological and probable archaeological features within the site it is possible that some of the trends are associated with archaeology features. The responses of which are either relatively weak or are partially masked by the strongly variable background magnetism.

It is also possible that some of the trends are associated with agricultural features, natural variations or some may even be artificial data products and are not caused by real features.

4.7 Enhanced / positive responses (areas and isolated anomalies)

Isolated positive responses or areas of positive response can occur if the magnetism of a feature, area or material has been enhanced or if a feature is naturally more magnetic than the surrounding material. It is often difficult to determine which of these factors causes any given response and so the origin of this type of anomaly can be difficult to determine. They can have a variety of causes including geological variations, infilled archaeological features, areas of burning (including hearths), industrial archaeological features such as kilns or deeper buried ferrous material and modern fired material.

The strategy of carrying out the survey on a 0.5 m profile spacing was specified with the specific aim of helping to identify the presence of isolated archaeological features that may have an archaeological origin.

Unfortunately the pedological / geological conditions at this site have produced strong variations and numerous isolated positive responses. It is almost impossible therefore to determine if the positive responses that are present are archaeological or natural in origin. The number and spread of these responses precludes all of them being shown on the interpretation.

Only the strongest responses or those in close proximity to probable archaeological features have therefore been shown. It should be recognised that archaeological features may be present that have produced a positive response but that it has not been possible to differentiate this responses from the natural positive variations.

There are several **areas containing strong enhanced / positive.** These areas are where there is an accumulation of responses. These could be caused by natural variations but the strength or concentration of the responses is slightly greater than is normal across the rest of the site. These areas could therefore have a higher archaeological potential, although there is no obvious pattern to the distribution of the areas or the responses within them that would indicate a probable archaeological origin.

Some larger or stronger areas of **enhanced / positive response** have been shown on the interpretation as have those isolated responses located in close proximity to possible or probable archaeological features. These anomalies could also be associated with geological / pedological variations but their size or proximity to other anomalies increases their archaeological potential.

Several isolated enhanced / positive responses are considered to have a high archaeological potential and have been categorised as probable archaeological in origin.

The differentiation between possible and probable archaeological origins is generally based on the proximity of the responses to other potential archaeological features.

4.8 Positive linear / curvi-linear anomalies

Positive magnetic anomalies can occur if the magnetism of a feature, area or material has been enhanced or if a feature is naturally more magnetic than the surrounding material. If the resulting anomaly is linear or curvi-linear then this can indicate the presence of a man-made feature. Positive linear responses can be associated with agricultural activity but they can also be caused by ditches that are infilled with magnetically enhanced material and as such can indicate the presence of archaeological features.

A number of positive, linear / curvi-linear anomalies are present that are suggestive of archaeological enclosures / land division. A number of these anomalies intersect each other suggesting that there are at least two phases of activity. Some of the anomalies are relatively straight and regular whilst others are more irregular / curving. Again the different morphology of the anomalies suggests different phases of activity. The majority of these anomalies have been categorised as probable archaeological features.

There are several areas where the linear anomalies are less clear and there are also linear anomalies that correspond with the direction of ploughing but are also adjoining probable archaeological features. These anomalies have generally been categorised as possible archaeological features.

4.9 Specific anomalies

Specific anomalies are described in more detail below on a field by field basis.

Field 1

The data in this field is dominated by a linear dipolar response, caused by a modern pipe or cable, and very strong responses that are either associated with the modern feature or possibly made ground. The strength of the responses in this field is such that if archaeological features were present it is unlikely that the anomalies associated with them would be identified.

Field 2

The background magnetic values in this field were strongly variable. Responses associated with isolated features may not been identified.

There are several anomalies associated with modern features / activity and a number of areas of very strong responses. The strength of these responses are such that if archaeological features were present it is unlikely that the anomalies associated with them would be identified.

The magnetic data indicates the presence of significant archaeological features in this field. There are several anomalies that indicate the presence of archaeological ditches and also a number of possible and probable discrete features in association with the ditches. A number of the anomalies appear to intersect each other which suggests that there may be multiple phases of archaeological activity.

There are several weak, broadly parallel, discontinuous linear anomalies. These are probably caused by the remains of relatively modern agricultural features, such as an old ploughing regime. However, the fact that they are not present across the entire field and they have a similar alignment to probable archaeological features means that and archaeological origin for some of them cannot be totally discounted.

Anomaly 2A consists of a negative linear anomaly with adjacent positive linear anomalies. This group of parallel anomalies are very straight and this, coupled with the strong negative component, suggests that they may be caused by a modern feature. However there are several anomalies of a probable archaeological origin that have a similar alignment and as the geology in parts of the site is igneous it is possible that some archaeological features may have a strong negative component. An archaeological origin for these responses cannot therefore be ruled out.

Anomaly 2B consists of a several different types of responses that are in close proximity or on a similar alignment to anomalies of a probable archaeological origin. These include linear trends, isolated positive responses, and a negative anomaly with an associated positive response. Given their alignment and proximity to archaeological features it is possible that these anomalies are also associated with archaeological features but the responses are not clear or consistent enough to ascribe them an archaeological original with any certainty.

Anomaly 2C comprises a number of weak linear trends and isolated positive responses. There are two areas containing a concentration of strong positive responses and linear anomalies that may be caused by archaeological ditches in the vicinity of Anomaly 2C. It is possible that some of the responses in this area are caused by archaeological features. However, the strongly variable background precludes a definite interpretation of the anomalies as they could be caused by natural geological / pedological variations.

There are a number of sub-circular positive curvi-linear anomalies (**Anomaly 2D**) present in this field, predominantly in the south-east, many of which appear to have a discrete positive response within them. The sub-circular anomalies vary between approximately 6.5 m and 7.5 m in diameter and the majority of them are discontinuous or do not form complete circles. There are several weaker or more discontinuous anomalies (**Anomaly 2E**) which could be caused by the same type of feature.

The shape of Anomalies 2D and 2E strongly indicate an anthropogenic origin. The presence of known archaeological features and the significant archaeological activity indicated by the magnetic data suggest that these anomalies could also be caused by archaeological features. The responses could be caused by infilled sub-circular ditches with an area of burning or infilled pit(s) within them.

However, there is known to have been quarrying activity within the site and it is possible that the anomalies could have a more modern origin, such as small quarry pits, although the relatively small and generally circular of the anomalies does not immediately indicate that they would be caused by this type of feature. It is worth noting that very occasionally compacted ground caused by livestock walking in a circle after being staked down can produce a circular positive anomaly. The evidence suggests that an archaeological origin is the most likely cause of these anomalies but it should be recognised that a modern origin is also possible. It is likely that all of the anomalies categorised as 2D are caused by the same type of feature so if the origin of one of them can be confirmed then this can be ascribed to

the others with reasonable certainty. Anomalies 2E may also have the same origin, although the responses for these anomalies are weaker and are less certain.

Field 3

The background magnetic values in this field were strongly variable. Responses associated with isolated features may not have been identified.

There are several anomalies associated with modern features / activity and a number of areas of very strong responses. The strength of these responses is such that if archaeological features were present it is unlikely that the anomalies associated with them would be identified.

There are several weak, broadly parallel, discontinuous linear anomalies. These are probably caused by the remains of relatively modern agricultural features, such as an old ploughing regime. However, the fact that they are not present across the entire field and they have a similar alignment to probable archaeological features means that and archaeological origin for some of them cannot be totally discounted.

There are two linear anomalies that indicate the presence of archaeological ditches and there are several discrete areas of enhanced response and linear trends that could also be associated with archaeological features. The latter responses could however be caused by natural or agricultural features / variations.

Field 4

The data in the part of this field that could be surveyed is dominated by very strong responses. An anomaly suggestive of a probable archaeological ditch can still be seen through the disturbance but the strength of the responses in this field is such that if additional archaeological features were present it is possible that the anomalies associated with them would be identified.

Much of the field could not be surveyed or contained modern material associated with the former modern buildings which would have masked responses from underlying archaeological remains.

Field 5 and Field 6

These fields could not be surveyed.

Field 7

Very strong and dipolar responses were present in parts of this survey area, suggestive of modern features or activity. Two weak trends were also present, the cause of which is not known.

Field 8

The background magnetic values in this field were strongly variable. Responses associated with isolated features and possibly some linear features may not been identified.

There are several anomalies associated with modern features / activity and a number of areas of very strong responses. The strength of these responses are such that if archaeological

features were present it is unlikely that the anomalies associated with them would be identified.

The magnetic data indicates the presence of significant archaeological features in this field. There are several anomalies that indicate the presence of archaeological ditches and also a number of possible and probable discrete features in association with the ditches.

There are several weak, broadly parallel, discontinuous linear anomalies (**Anomaly 8A**). These are probably caused by the remains of relatively modern agricultural features, such as an old ploughing regime. However, the fact that they are not present across the entire field and they have a similar alignment to probable archaeological features means that an archaeological origin for some of them cannot be totally discounted.

Anomaly 8B consists of a combination of negative and positive linear anomalies. These responses are relatively straight and this, coupled with the strong negative component, of part of the anomaly suggests that they may be caused by a modern feature. However, given the extensive archaeological features that can be seen to be present in this area an archaeological origin for these responses is also possible.

Anomaly 8C comprises linear anomalies indicative of archaeological ditches which form a recti-linear enclosure. There are numerous responses within and adjacent to this enclosure that could also be caused by archaeological features, although the variable magnetic background makes a more definite interpretation of many of the anomalies difficult. There appear to be several adjacent and broadly parallel linear anomalies at the eastern side of this enclosure.

Anomaly 8D consists of two broadly parallel discontinuous linear anomalies. These responses are on a different alignment to the adjacent probable archaeological features and have a stronger negative component. They could be caused by archaeological ditches but it is also possible that they are associated with a modern linear feature.

There are a series of isolated responses that form a generally linear trend **(Anomaly 8E)**. These responses are adjacent and parallel to a dipolar response caused by a modern pipe or cable and are probably associated with this feature or by the construction of the trench that the buried service is located in. However, given the presence of significant archaeological remains in the immediate vicinity and archaeological origin cannot be completely ruled out.

Anomaly 8F consists of two linear trends. These anomalies are quite diffuse and broad and so cannot be categorised as linear anomalies but they are on a similar curving alignment to an anomaly of probable archaeological origin to the north-east and so may indicate a continuation of this feature.

There are a number of sub-circular positive curvi-linear anomalies (**Anomaly 8G**) present in the east of this field which appear to have a discrete positive response within them. The sub-circular anomalies vary between approximately 6.5 m and 7.5 m in diameter. These anomalies probable have the same cause as Anomaly 2D described above.

The Goetre Uchaf scheduled barrow is believed to be located in Field 8 (OA North forthcoming) but no anomalies that can be directly associated with the barrow have been identified.

Field 9 and Field 10

These fields could not be surveyed.

Field 11

Two survey areas were covered in this field. The background magnetic values in both survey areas were strongly variable. Responses associated with isolated features and possibly some linear features may not have been identified.

A very strong area of magnetic disturbance is present in this field. The strength of the responses indicate the presence of modern ferrous or fired material.

Several broad linear / curvi-linear anomalies and trends have been identified. It is possible that some of these are associated with archaeological features but the narrow width of surveyable area in the north of the field coupled with the variable magnetic background preclude a definite interpretation of the anomalies.

Field 12

This field could not be surveyed.

Field 13

The background magnetic values in this field were strongly variable. Responses associated with isolated features may not been identified.

Two linear anomalies suggestive of probable infilled archaeological ditches are present in this field.

Two possible trends are also present but the very strong response associated with a modern pipe or cable and the general variable background preclude a definite interpretation of these possible anomalies.

Field 14

This field could not be surveyed.

5. DISCUSSION AND CONCLUSIONS

The magnetic survey has shown that there are extensive archaeological remains within the site. It has not been possible to fully define the extent of the archaeological activity as significant parts of the site could not be surveyed, there are numerous areas of very strong responses that could mask anomalies caused by archaeological features and the background magnetism at the site is highly variable.

The Goetre Uchaf scheduled barrow is present in the site and a number of prehistoric finds have been located within and adjacent to the survey area. Due to the high potential for prehistoric archaeological remains within the survey area a profile spacing of 0.5 m was specified to attempt to better identify and define discrete prehistoric features. Unfortunately the site conditions meant that even with the closely spaced profile interval it has been very difficult to identify discrete features.

In places the data quality is relatively low. The uneven ground associated with dense and 'tussocky' vegetation coupled with areas of steep slopes meant that it was very difficult to maintain an even pace when collecting data, resulting in some data being 'staggered'. It was not possible to fully correct for this during processing and so some data points may be offset slightly from their correct position, resulting in a saw-tooth effect in some anomalies. Detection of isolated responses is more difficult in these areas, although linear and curvi-linear anomalies can still be identified.

There are a large number of very strong magnetic anomalies throughout the site. Some of these are associated with modern features, such as pipes or cables. Others may indicate areas of former quarrying activity or natural geological variations. The strength of these responses are such that if archaeological features were present it is unlikely that the anomalies associated with them would be identified.

As well as identifying probable archaeological features the survey has detected anomalies that could be caused by possible archaeological features and a number of responses of unknown or uncertain origin.

Several archaeological ditches, identified by the survey, appear to intersect each other suggesting that there may be multiple phases of archaeological activity at the site.

Of particular interest are a number of sub-circular anomalies, many of which appear to surround an area of enhanced response. Given the extensive archaeological remains that the survey has identified and the presence of a barrow and other prehistoric finds within the site and archaeological origin for these features is considered likely as they are suggestive of an infilled circular ditch surrounding an area of burning or a pit. Although it should be recognised that the responses could potentially be modern in origin.

No anomalies that can be directly associated with the Goetre Uchaf scheduled barrow have been identified.

It should be noted that a geophysical survey does not directly locate sub-surface features - it identifies variations or anomalies in the background response caused by features. The interpretation of geophysical anomalies is often subjective and it is rarely possible to identify the cause of all such anomalies. Not all features will produce a measurable anomaly and the effectiveness of a geophysical survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the

composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a geophysical survey will identify all sub-surface features. Confirmation on the identification of anomalies and the presence or absence of sub-surface features can only be achieved by intrusive investigation.

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APPENDIX 1

Magnetic survey: technical information

1.1 Theoretical background

1.1.1 Magnetic instruments measure the value of the Earth's magnetic field; the units of which are nanoTeslas (nT). The presence of surface and sub-surface features can cause variations or anomalies in this magnetic field. The strength of the anomaly is dependent on the magnetic properties of a feature and the material that surrounds it. The two magnetic properties that are of most interest are magnetic susceptibility and thermoremnant magnetism.

1.1.2 Magnetic susceptibility indicates the amount of ferrous (iron) minerals that are present. These can be redistributed or changed (enhanced) by human activity. If enhanced material subsequently fills in features such as pits or ditches then these can produce localised increases in magnetic responses (anomalies) which can be detected by a magnetic gradiometer even when the features are buried under additional soil cover.

1.1.3 In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. Less magnetic material such as masonry or plastic service pipes which intrude into the topsoil may give a negative magnetic response relative to the background level. The strength of magnetic responses that a feature will produce will depend on the background magnetic susceptibility, how rapidly the feature has been infilled, the level and type of human activity in the area and the size and depth of a feature. Not all infilled features can be detected and natural variations can also produce localised positive and negative anomalies.

1.1.4 Thermoremnant magnetism indicates the amount of magnetism inherent in an object as a result of heating. Material that has been heated to a high temperature (fired), such as brick, can acquire strong magnetic properties and so although they may not appear to have a high iron content they can produce strong magnetic anomalies

1.1.5 The magnetic survey method is highly sensitive to interference from surface and near-surface magnetic 'contaminants'. Surface features such as metallic fencing, reinforced concrete, buildings or walls all have very strong magnetic signatures that can dominate readings collected adjacent to them. Identification of anomalies caused by sub-surface features is therefore more difficult, or even impossible, in the vicinity of surface magnetic features. The presence of made ground also has a detrimental effect on the magnetic data quality as this usually contains magnetic material in the form of metallic scrap and brick. Identification of features beneath made ground is still possible if the target feature is reasonably large and has a strong magnetic response but smaller features or magnetically weak features are unlikely to be identified.

1.1.6 The interpretation of magnetic anomalies is often subjective and it is rarely possible to identify the cause of all magnetic anomalies. Not all features will produce a measurable magnetic response and the effectiveness of a magnetic survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the

composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a magnetic survey will identify all sub-surface features.

1.1.7 Most high resolution, near surface magnetic surveys utilise a magnetic gradiometer. A gradiometer is a hand-held instrument that consists of two magnetic sensors, one positioned directly above the other, which allows measurement of the magnetic gradient component of the magnetic field. A gradiometer configuration eliminates the need for applying corrections due to natural variations in the overall field strength that occur during the course of a day but it only measures relative variations in the local magnetic field and so comparison of absolute values between sites is not possible.

1.1.8 Features that are commonly located using magnetic surveys include archaeological ditches and pits, buried structures or foundations, mineshafts, unexploded ordnance, metallic pipes and cables, buried piles and pile caps. The technique can also be used for geological mapping; particularly the location of igneous intrusions.

1.2 Instrumentation

A Bartington Grad601-2 magnetic gradiometer was used for the magnetic survey. The Bartington Grad601-2 is a dual sensor instrument, incorporating two Grad-01-1000 gradiometers set at a distance of 1 m apart.

1.3 Survey methodology

1.3.1 The magnetic survey was carried out on a series of regular 30 m grids. Data was collected on zig-zag profiles (walking along a profile and then returning up the adjacent profile in the opposite direction) that were 1 m apart within a grid (the dual sensor array means that this equates to 0.5 m profile intervals. All data was collected at 0.25 m and stored in the instrument for download at the end of the survey.

1.3.2 Readings were taken on 100 nT range (0.1 nT sensitivity). The instrument was balanced and 'zeroed' at a base station that was established on site in a magnetically quiet and uniform location. The instrument was checked for electronic and mechanical drift at this base station at regular intervals during the course of the survey.

1.3.3 The survey grids were established using a Sokkia GRX-1 RTK GPS system. Grid points were set-out to an accuracy better than 0.03 m using bamboo canes.

1.3.4 The location of the survey grid(s) was tied-in using the GPS system and related direct to Ordnance Survey national grid. As a check the survey was also tied-in to existing survey stations.

1.4 Data processing, presentation and interpretation

1.4.1 The data was downloaded from the instrument at the end of the each days survey using bespoke software specific to the instrument. The gradiometer data was downloaded and gridded in Archaeosurveyor 2.5.13 (DW Consulting).

1.4.2 Where required the data was destriped and destaggered to remove errors caused by instrument drift and heading errors. This data has been classed as minimally processed data as no other processing steps were used.

1.4.3 The following processing schedule was applied to all data presented within the report.

- Zero median sensor
- A Destagger function of between 1 and -2 was applied to various parts of the data set
- The data presented in the greyscale plots has been 'smoothed' using the Grad. Shade option clipped at -3 nT to 4 nT.

1.4.4 The data has been displayed relative to a digital topographic survey base plan provided by the client as drawing *'Bangor Amend A 2d.dwg'*. The base plan was in the National Grid co-ordinate system and as the survey grids were set-out directly to national grid co-ordinates the data could be simply superimposed onto the base plan in the correct position.

1.4.5 The anomalies have been categorised based on the type of response that they have and an interpretation as to the cause(s) or possible cause(s) of each anomaly type is also provided.

1.4.6 Several different ranges of data were used in the interpretation to ensure that the maximum information possible is obtained from the data.

1.4.7 X-Y trace plots were examined for all of the data and overlain onto the greyscale plot to assist in the interpretation, primarily to help identify dipolar responses that will probably be associated with surface / near-surface iron objects. X-Y trace plots have not been used in the report as they do not show any additional anomies that are not visible in the greyscale data. A digital drawing showing the X-Y trace plot overlain on the greyscale plot has been provided in the digital archive.

1.4.8 All isolated responses have been assessed using a combination of greyscale and X-Y trace plots. If a response is not thought to have significant archaeological potential then it has not be shown on the final interpretation

1.4.9 The greyscale plots and the accompanying interpretations of the anomalies identified in the magnetic data are presented as 2D AutoCAD drawings. The interpretation is made based on the type, size, strength and morphology of the anomalies, coupled with the available information on the site conditions. Each type of anomaly is displayed in separate, easily identifiable layers annotated as appropriate.

1.5 Limitations of magnetic surveys

1.5.1 The magnetic survey method requires the operator to walk over the site at a constant walking pace whilst holding the instrument. The presence of an uneven ground surface, dense, high or mature vegetation or surface obstructions may mean that some areas cannot be surveyed.

1.5.2 The depth at which features can be detected will vary depending on their composition, size, the surrounding material and the type of magnetometer used for the survey. In good conditions large, magnetic targets, such as buried drums or tanks can be located at depths of more than 4 m. Smaller targets, such as buried foundations or archaeological features can be located at depths of between 1 m and 2 m.

1.5.3 A magnetic survey is highly sensitive to interference from surface and near-surface magnetic 'contaminants'. Surface features such as metallic fencing, reinforced concrete, buildings or walls all have very strong magnetic signatures that can dominate readings collected adjacent to them. Identification of anomalies caused by sub-surface features is therefore more difficult or even not possible in the vicinity of surface and near-surface magnetic features.

1.5.4 The presence of made ground also has a detrimental effect on the magnetic data quality as this usually contains magnetic material in the form of metallic scrap and brick. Identification of features beneath made ground is still possible if the target feature is reasonably large and

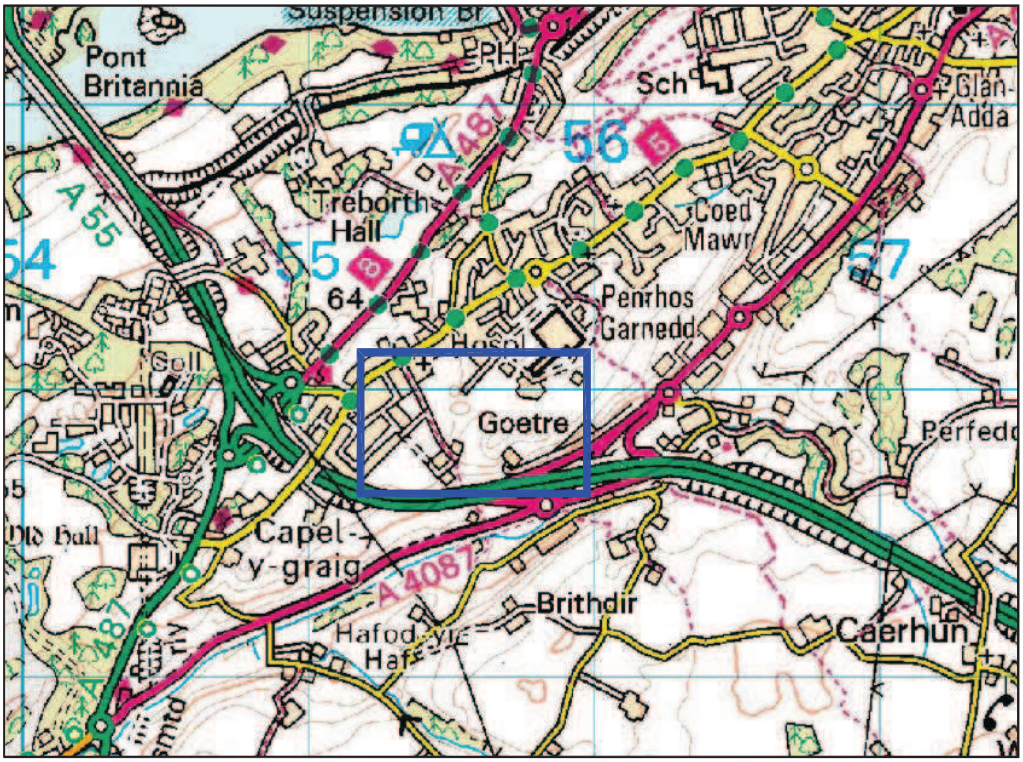
has a strong magnetic response but smaller features or magnetically weak features are unlikely to be identified.

1.5.5 It should be noted that anomalies that are interpreted as modern in origin may be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

1.5.6 A magnetic survey does not directly locate sub-surface features - it identifies variations or anomalies in the local magnetic field caused by features. It can be possible to interpret the cause of anomalies based on the size, shape and strength of response but it should be recognised that a magnetic survey produces a plan of magnetic variations and not a plan of all sub-surface features. Interpretation of the anomalies is often subjective and it is rarely possible to identify the cause of all magnetic anomalies. Geological or pedological (soil) variations or features can produce responses similar to those caused by man-made (anthropogenic) features.

1.5.7 Anomalies identified by a magnetic survey are located in plan. It is not usually possible to obtain reliable depth information on the features that cause the anomalies.

1.5.8 Not all features will produce a measurable magnetic response and the effectiveness of a magnetic survey is also dependant on the site-specific conditions. It is not possible to guarantee that a magnetic survey will identify all sub-surface features. A magnetic survey is often most-effective at identifying sub-surface features when used in conjunction with other complementary geophysical techniques.



SITE LOCATION

SCALE

0m 500m 1000m

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LANCASTER

Site: LAND OFF PENRHOS ROAD
BANGOR

Title: SITE LOCATION MAP

Job No: ARC/854/323

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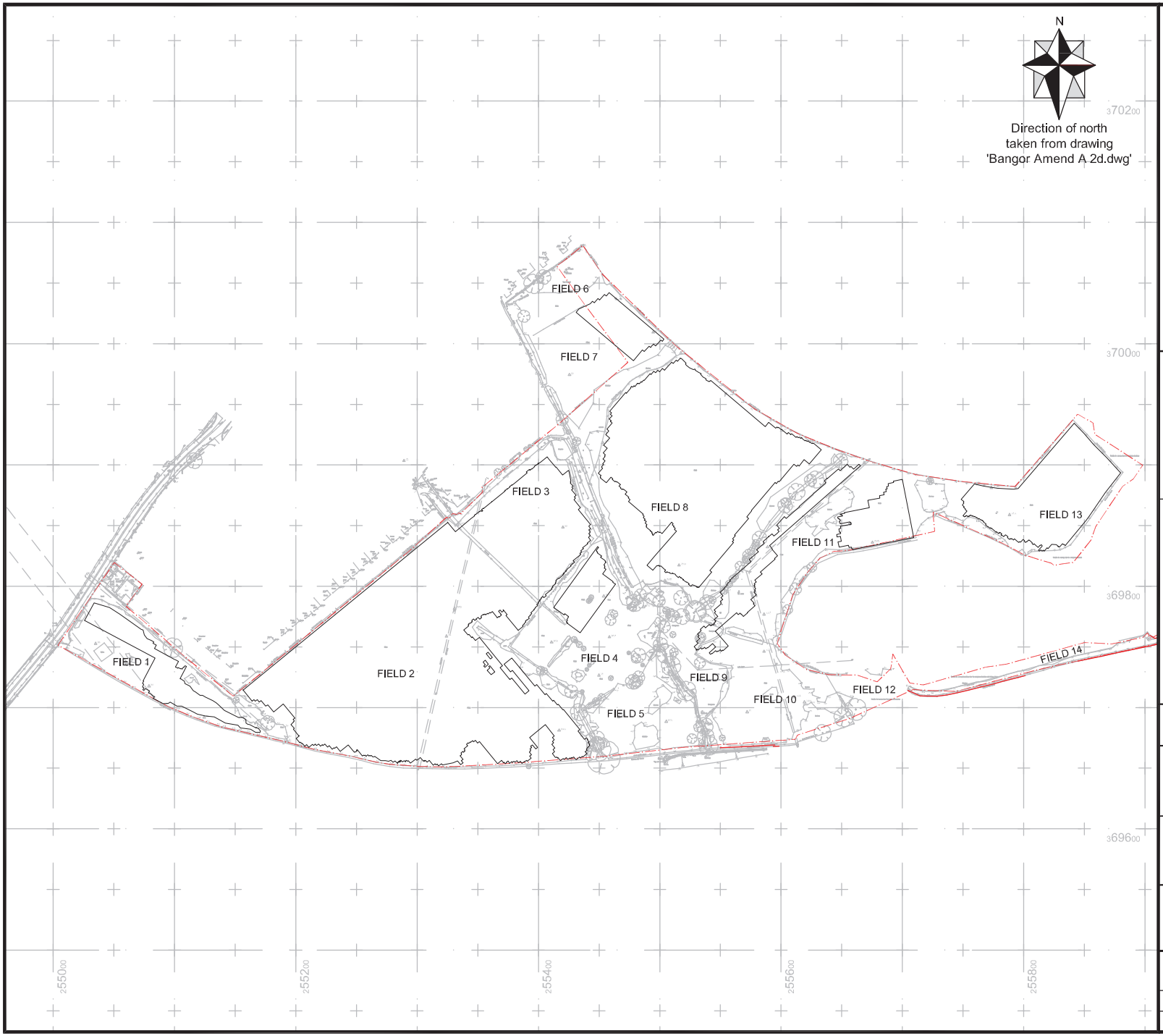
Chk.	MW	Date	17/08/2012



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KEY

EXTENTS OF MAGNETIC GRADIENT SURVEY

SITE BOUNDARY

EXISTING SURVEY STATION

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Site
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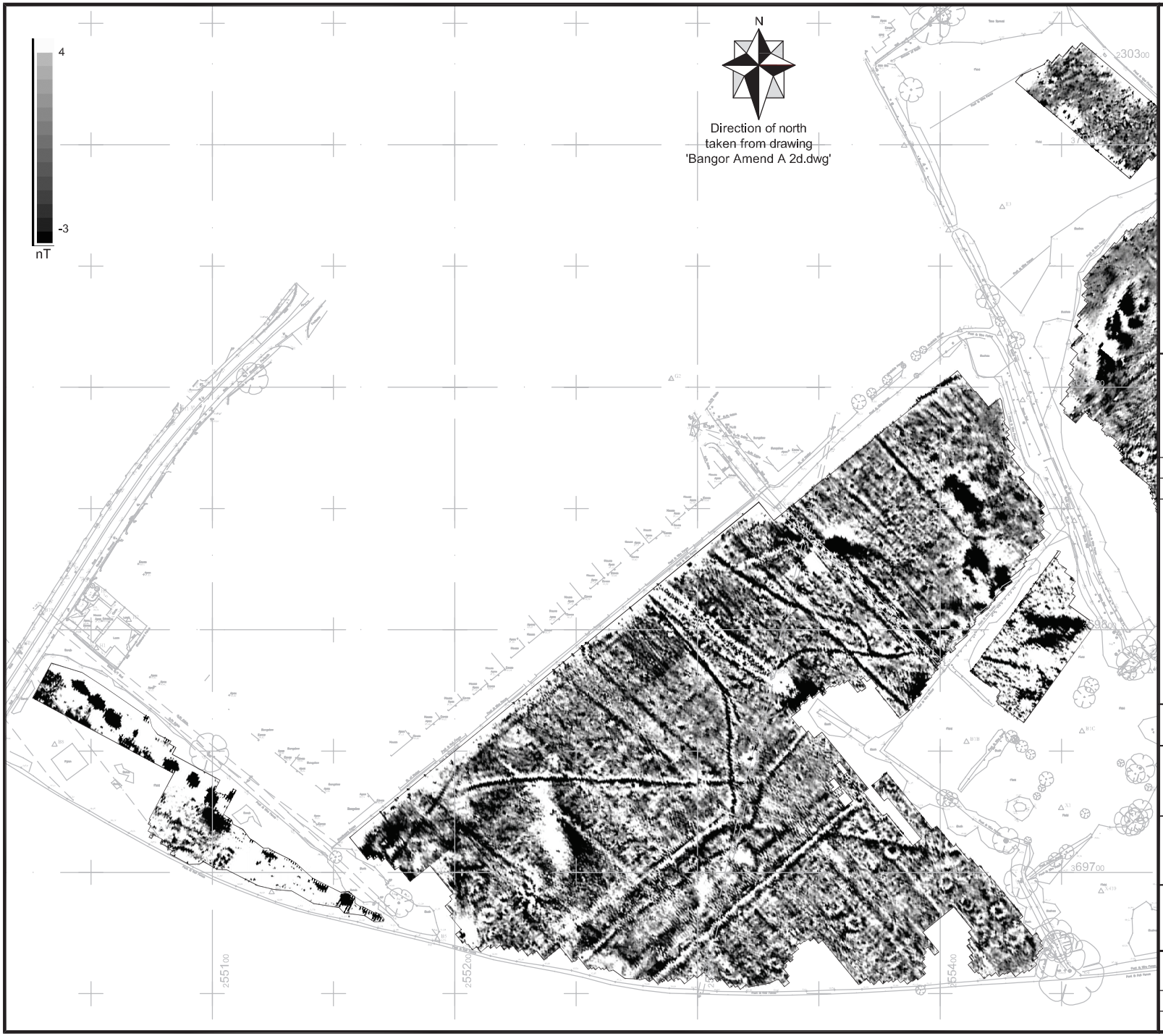
BANGOR

Title
LOCATION OF MAGNETIC GRADIENT SURVEY AREAS

Job No
ARC_854_323

Surveyed	KIT, JMD	Drawn	JMD
Chk.	MW	Date	17/08/2012



NOTES

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ALWAYS EXERCISE CAUTION WHEN EXCAVATING

Rev	Date	Drawn	Chk.	Description
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PHASE SITE INVESTIGATIONS

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Scale [A3 Sheet]	Drawing	Status
1:1500	ARC_854_323_03	FINAL

Client
OXFORD ARCHAEOLOGY NORTH
LANCASTER

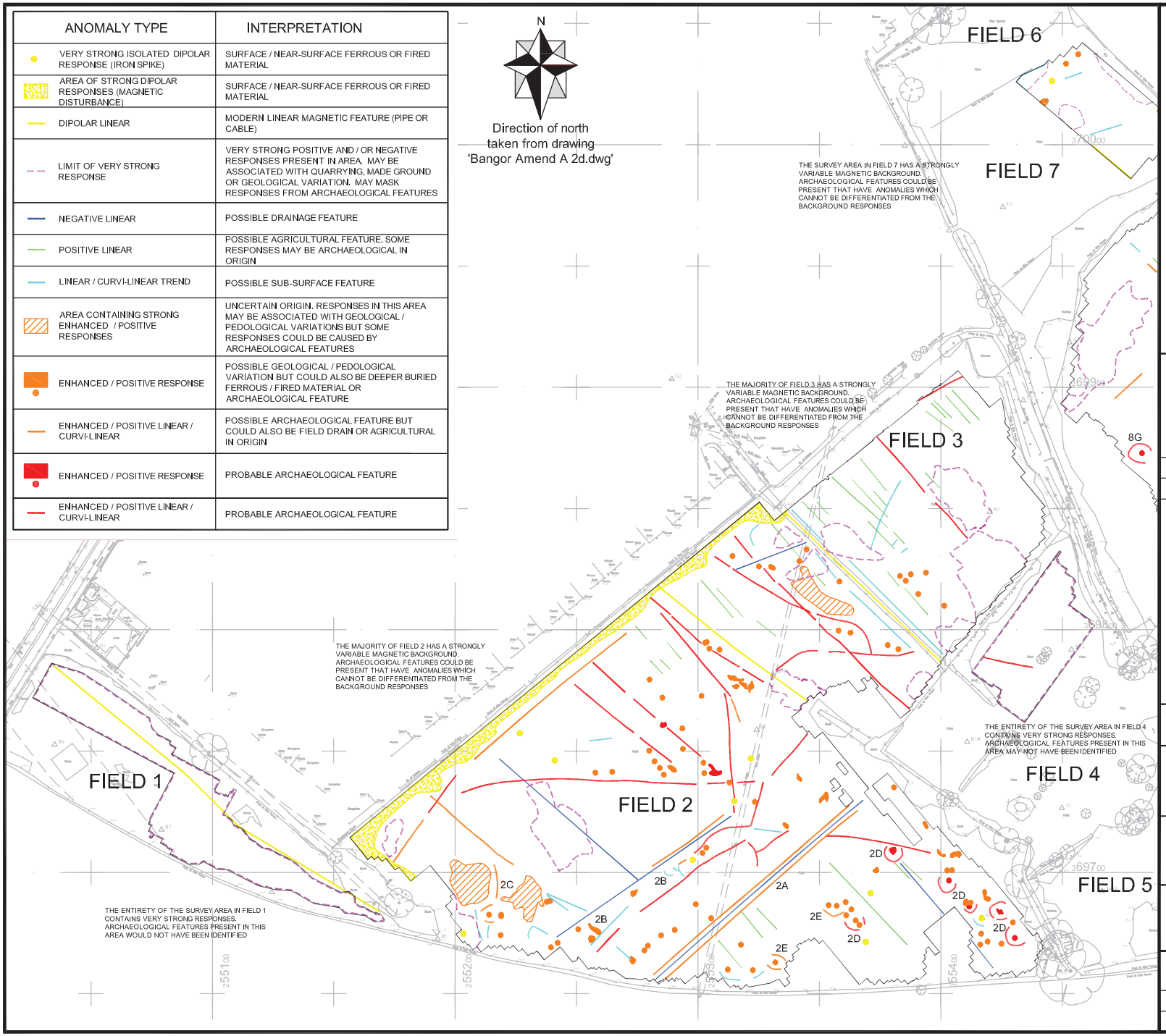
Site
LAND OFF PENRHOS ROAD
BANGOR

Title
GREYSCALE PLOT OF MAGNETIC GRADIENT DATA: WESTERN PART OF SITE

Job No
ARC_854_323

Surveyed	KIT, JMD	Drawn	JMD
Chk.	MW	Date	17/08/2012

ANOMALY TYPE	INTERPRETATION
VERY STRONG ISOLATED DIPOLAR RESPONSE (IRON SPIKE)	SURFACE / NEAR-SURFACE FERROUS OR FIRED MATERIAL
AREA OF STRONG DIPOLAR RESPONSES (MAGNETIC DISTURBANCE)	SURFACE / NEAR-SURFACE FERROUS OR FIRED MATERIAL
DIPOLAR LINEAR	MODERN LINEAR MAGNETIC FEATURE (PIPE OR CABLE)
LIMIT OF VERY STRONG RESPONSE	VERY STRONG POSITIVE AND / OR NEGATIVE RESPONSES PRESENT IN AREA. MAY BE ASSOCIATED WITH QUARRYING, MADE GROUND OR GEOLOGICAL VARIATION. MAY MASK RESPONSES FROM ARCHAEOLOGICAL FEATURES
NEGATIVE LINEAR	POSSIBLE DRAINAGE FEATURE
POSITIVE LINEAR	POSSIBLE AGRICULTURAL FEATURE. SOME RESPONSES MAY BE ARCHAEOLOGICAL IN ORIGIN
LINEAR / CURVI-LINEAR TREND	POSSIBLE SUB-SURFACE FEATURE
AREA CONTAINING STRONG ENHANCED / POSITIVE RESPONSES	UNCERTAIN ORIGIN. RESPONSES IN THIS AREA MAY BE ASSOCIATED WITH GEOLOGICAL / PEDOLOGICAL VARIATIONS BUT SOME RESPONSES COULD BE CAUSED BY ARCHAEOLOGICAL FEATURES
ENHANCED / POSITIVE RESPONSE	POSSIBLE GEOLOGICAL / PEDOLOGICAL VARIATION BUT COULD ALSO BE DEEPER BURIED FERROUS / FIRED MATERIAL OR ARCHAEOLOGICAL FEATURE
ENHANCED / POSITIVE LINEAR / CURVI-LINEAR	POSSIBLE ARCHAEOLOGICAL FEATURE BUT COULD ALSO BE FIELD DRAIN OR AGRICULTURAL IN ORIGIN
ENHANCED / POSITIVE RESPONSE	PROBABLE ARCHAEOLOGICAL FEATURE
ENHANCED / POSITIVE LINEAR / CURVI-LINEAR	PROBABLE ARCHAEOLOGICAL FEATURE



NOTES

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Scale [A3 Sheet]	Drawing	Status
1:1500	ARC_854_323_04	FINAL

Client
OXFORD ARCHAEOLOGY NORTH
LANCASTER

Site
LAND OFF PENRHOS ROAD
BANGOR

Title
INTERPRETATION OF MAGNETIC GRADIENT DATA: WESTERN PART OF SITE

Job No
ARC_854_323

Surveyed	KIT, JMD	Drawn	JMD
Chk.	MW	Date	17/08/2012

NOTES

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Rev	Date	Drawn	Chk.	Description
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Scale [A3 Sheet]	Drawing	Status
1:1500	ARC_854_323_05	FINAL

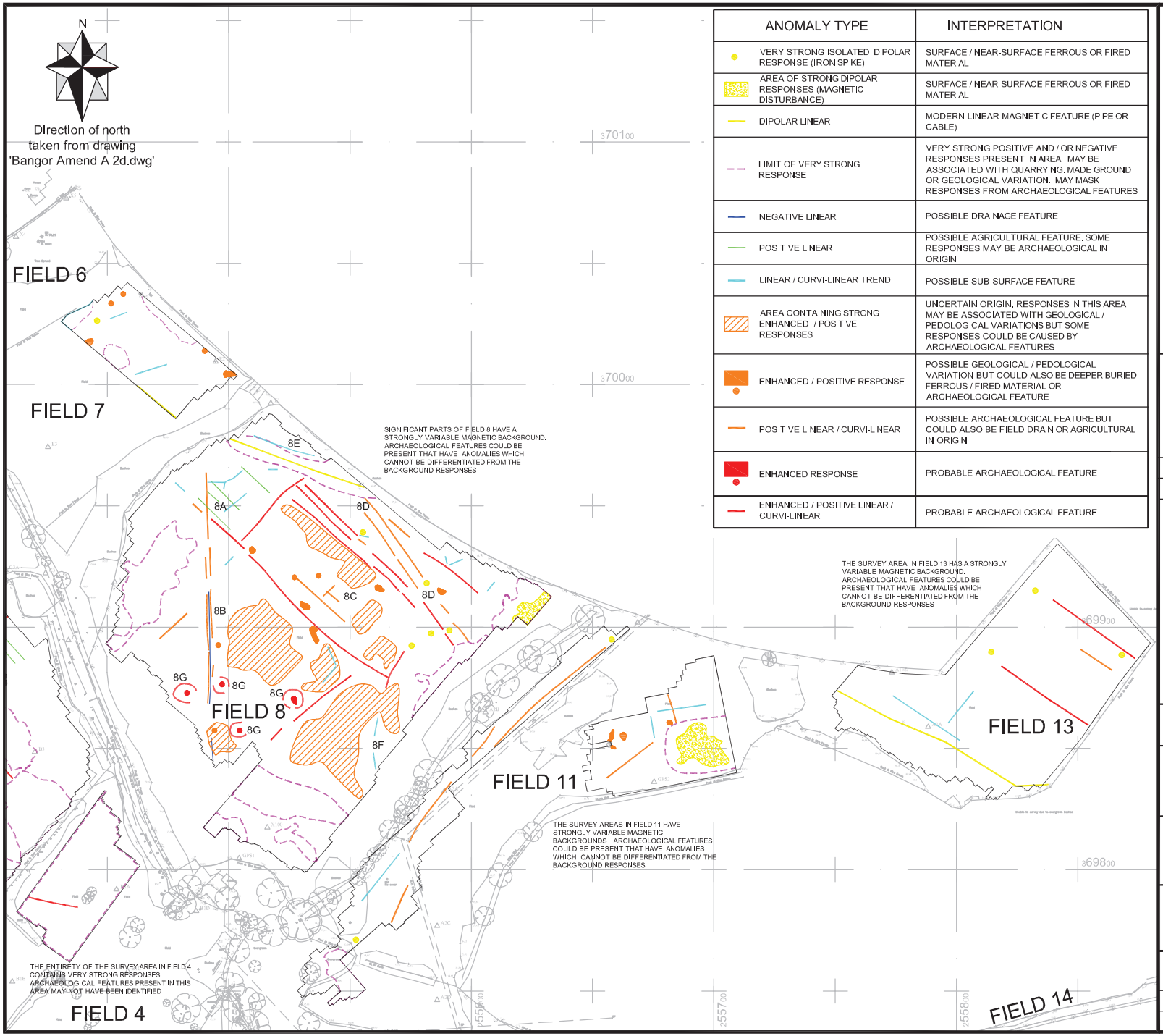
Client
OXFORD ARCHAEOLOGY NORTH
LANCASTER

Site
LAND OFF PENRHOS ROAD
BANGOR

Title
GREYSCALE PLOT OF MAGNETIC GRADIENT
DATA: EASTERN PART OF SITE

Job No
ARC_854_323

Surveyed	KIT, JMD	Drawn	JMD
Chk.	MW	Date	17/08/2012



ANOMALY TYPE	INTERPRETATION
VERY STRONG ISOLATED DIPOLAR RESPONSE (IRON SPIKE)	SURFACE / NEAR-SURFACE FERROUS OR FIRED MATERIAL
AREA OF STRONG DIPOLAR RESPONSES (MAGNETIC DISTURBANCE)	SURFACE / NEAR-SURFACE FERROUS OR FIRED MATERIAL
DIPOLAR LINEAR	MODERN LINEAR MAGNETIC FEATURE (PIPE OR CABLE)
LIMIT OF VERY STRONG RESPONSE	VERY STRONG POSITIVE AND / OR NEGATIVE RESPONSES PRESENT IN AREA. MAY BE ASSOCIATED WITH QUARRYING, MADE GROUND OR GEOLOGICAL VARIATION. MAY MASK RESPONSES FROM ARCHAEOLOGICAL FEATURES
NEGATIVE LINEAR	POSSIBLE DRAINAGE FEATURE
POSITIVE LINEAR	POSSIBLE AGRICULTURAL FEATURE, SOME RESPONSES MAY BE ARCHAEOLOGICAL IN ORIGIN
LINEAR / CURVI-LINEAR TREND	POSSIBLE SUB-SURFACE FEATURE
AREA CONTAINING STRONG ENHANCED / POSITIVE RESPONSES	UNCERTAIN ORIGIN, RESPONSES IN THIS AREA MAY BE ASSOCIATED WITH GEOLOGICAL / PEDOLOGICAL VARIATIONS BUT SOME RESPONSES COULD BE CAUSED BY ARCHAEOLOGICAL FEATURES
ENHANCED / POSITIVE RESPONSE	POSSIBLE GEOLOGICAL / PEDOLOGICAL VARIATION BUT COULD ALSO BE DEEPER BURIED FERROUS / FIRED MATERIAL OR ARCHAEOLOGICAL FEATURE
POSITIVE LINEAR / CURVI-LINEAR	POSSIBLE ARCHAEOLOGICAL FEATURE BUT COULD ALSO BE FIELD DRAIN OR AGRICULTURAL IN ORIGIN
ENHANCED RESPONSE	PROBABLE ARCHAEOLOGICAL FEATURE
ENHANCED / POSITIVE LINEAR / CURVI-LINEAR	PROBABLE ARCHAEOLOGICAL FEATURE

NOTES

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Rev	Date	Drawn	Chk.	Description
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Scale [A3 Sheet]	Drawing	Status
1:1500	ARC_854_323_06	FINAL

Client
OXFORD ARCHAEOLOGY NORTH
LANCASTER

Site
LAND OFF PENRHOS ROAD
BANGOR

Title
INTERPRETATION OF MAGNETIC GRADIENT DATA: EASTERN PART OF SITE

Job No
ARC_854_323

Surveyed	KIT, JMD	Drawn	JMD
Chk.	MW	Date	17/08/2012