1020

Gas Pipeline Replacement: Pwllheli City Gate PRI to Blaenau Ffestiniog PRI

Archaeological assessment of potential for analysis report

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

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Project No. G2148

Report No. 1020

Prepared for : RSK Environment Ltd on behalf of Wales and West Utilities

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GAS PIPELINE REPLACEMENT: PWLLHELI CITY GATE PRI TO BLAENAU FFESTINIOG PRI
Archaeological assessment of potential for analysis report (G2148)

1. INTRODUCTION

Gwynedd Archaeological Trust (GAT) has carried out a programme of archaeological work on the route of a replacement gas pipeline from Pwllheli to Blaenau Ffestiniog. The work was commissioned by RSK Environment Ltd (RSK) on behalf of Wales and West Utilities (WWU), and included an archaeological watching brief during removal of top soil and excavation of the pipe trench, and the archaeological excavation of sites identified during the watching brief. The work started on 16th March 2011 and was completed on 22nd September 2011. This document provides a preliminary statement on the results of the archaeological work and an assessment of the potential for further analysis. It is accompanied by a project design proposing what further work will be carried out to complete the study, reporting, publication and archiving of the results of the fieldwork.

2. BACKGROUND

The scheme involved the construction of 39 km of a 6" wide gas pipe, within a 20m wide working corridor from Pwllheli to Blaenau Ffestiniog, Gwynedd, between NGR SH 38533597 and NGR SH 70454573 (figures 1 to 4). The western end of the route runs along the southern side of the Llŷn Peninsula, generally within about 1km from the coast, but avoiding the reclaimed salt marshes that fringe the coast in places. The land here is gently undulating where small rivers and streams have carved narrow valleys. At the eastern end of the peninsula the route ran inland to the head of the western branch of the Traeth Mawr. 'Traeth Mawr' means 'great sands' and was until the early 19th century the tidal estuary of the Afon Glaslyn. The mouth of this estuary was blocked in 1813 by an embankment known as the Cob and the land behind the barrier could be drained and claimed for agriculture.

After the town of Porthmadog the pipe route crossed the Afon Glaslyn and over the spur of land on which Penrhyndeudraeth is built. Crossing this spur it route descended on to the flood plain of the Afon Dwyryd and followed the flat, reclaimed farmland up the river valley past Maentwrog. Where the valley narrows to that of a mountain stream the pipe route headed north across quite steeply undulating upland country to Blaenau Ffestiniog, set in the heart of the mountains of Snowdonia.

RSK prepared an archaeological desk-based assessment of the route and carried out a field reconnaissance survey (RSK 2010a). Geophysical surveys were undertaken along specific parts of the route (Bartlett 2010) and GAT undertook a programme of evaluation trenches (Owen 2010, GAT Report 893). These works informed an Environmental Statement for the pipeline (RSK 2010b).

The desk-based assessment and field reconnaissance identified 618 recorded or potential archaeological sites within a 1km-wide study area, centred on the pipeline centre line. These sites included 5 Scheduled Ancient Monuments, 189 Listed Buildings, four Conservation Areas, three Historic Parks and Gardens and 417 non-scheduled archaeological sites. Sites ranged from negligible to high archaeological importance and dated from the prehistoric to modern periods (RSK 2010a). A possible impact during construction was predicted for 58 of the 618-recorded sites. Of the 33 trial trenches excavated, only 3 contained archaeological features, most significantly a prehistoric burnt mound.

Following the desk-based assessment and evaluation the Archaeological Written Scheme of Investigation (RSK 2011) defined the methodology of the main works, which included a watching brief on the topsoil stripping along the pipe route, controlled stripping of selected areas and the excavation of any archaeological sites exposed.

The project was monitored by Gwynedd Archaeological Planning Service (GAPS) and the Snowdonia National Parks Authority (SNPA) archaeologist.

3. AIMS AND OBJECTIVES

The original aim of the programme of work was to identify any archaeological remains revealed prior to and during the course of the construction works. Appropriate mitigation measures were developed for all archaeological remains revealed, including excavation and recording and/or preservation *in situ* as appropriate.

The current objective is to prepare an archaeological archive of the site to ensure the long-term curation of the recovered data. This is to include the treatment and preservation of any finds, deposition of the archive at an agreed repository or repositories, and the detailed analysis and publication of results to an appropriate level in line with nationally defined guidelines.

The management of this project follows guidelines specified in *Management of Archaeological Projects* (English Heritage, 1991) and The MoRPHE Project Managers' Guide (English Heritage 2009).
. Five stages are specified:

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

The post-excavation stage of the project includes phases 3 to 5. This document reports on phase 3 and is accompanied by an updated project design which specifies the work necessary to complete the analysis, prepare the final archive report and disseminate the results of the project (phases 4 and 5).

The aim of phase 3 is to ensure appropriate post-excavation analyses are undertaken. This involves the careful definition of academic and archaeological objectives, to ensure that appropriate selection is made and a publication produced which accurately reflects the value of the data collection. Reference is made to the regional and national research frameworks for each relevant period to formulate project wide and site specific research questions. The research frameworks can be found at (http://www.archaeoleg.org.uk/index.html).

4. PROJECT METHODOLOGIES

4.1. Fieldwork Methodology

(See appendix VI for original mitigation maps issued by Wales and West Utilities showing plot numbers.)
Archaeologists monitored topsoil stripping along the pipeline easement. The stripping was undertaken with 360-degree excavators, although a bulldozer was also used to clear topsoil in plots 0/1 to 0/4 and 3/1 to 3/6, until this practice was halted on the advice of GAPS. The surface of all stripped areas and spoil heaps was visually searched for archaeological finds and archaeological deposits. The results of the watching brief were recorded in daily site diaries and on pro-forma record sheets. The excavation of the pipe trench was also monitored and where archaeological features were identified the trenching was paused so that these could be investigated and recorded. The monitoring of the pipe trench was negotiated during the works and did not take place from the start of trenching.

Where archaeological remains were identified they were marked and fenced to avoid damage and evaluated for significance. Small, discrete features or other minor sites were excavated and recorded as part of the watching brief programme but Further Archaeological Works Designs (FAWD) were drawn up for more complex sites specifying the methodology to be used in investigating and recording them. These generally involved full or partial excavation and detailed recording with hand drawn plans and sections. Plans were drawn using a local grid located by Global Positioning System equipment by WWU survey support.

Where excavation was necessary each context was recorded on a pro-forma context sheet by written and measured description; principal deposits were recorded by drawn plans (scale 1:20 or 1:50 as

appropriate) and sections (scale 1:10 or 1:20 as appropriate). Photographs (digital SLR) were taken as appropriate, to the maximum resolution available. All significant artefacts were recovered and retained for processing and analysis in accordance with all appropriate standards and guidance. Samples were taken from deposits as appropriate and in conjunction with discussion with the planning archaeologists. All finds and samples were bagged separately with unique numbers related to the context record.

Several areas were identified with archaeological potential (plots 6/10 to 6/11, 6/31 to 6/34, 13/35 to 13/37, 14/16 to 14/19 and 17/13 to 17/15). In these areas the entire easement was subjected to a controlled strip. This involved the stripping of topsoil and subsoil under constant archaeological control to a depth at which either archaeological features or layers were revealed or the natural subsoil was exposed. The stripping was carried out by a 360-degree excavator with a toothless bucket. Features indentified were evaluated and recorded as necessary.

Field boundaries considered of archaeological interest were identified in the desk-based assessment (RSK 2010a), and each of these was recorded as part of the archaeological watching brief during the course of the topsoil strip phase. The boundaries were recorded on a *pro-forma* sheet, along with a measured sketch of its section and appropriate photographs.

In the Traeth Mawr and on the Dwyryd Valley floor deposits were recorded as seen in the pipe trench. In the Traeth Mawr (plots 6/51 to 7/13) and the first part of the Dwyryd (plots 3/6-3/19, 3/23-25) notes were made on the plot in general. The results are listed in appendix V with a grid reference for the approximate centre of the plot on the line of the pipe trench (see figures 1 to 4 for plot locations). Where the pipe route crossed the flood plain of the Dwyryd the deposits were recorded at 50m intervals as listed in appendix V. This recording including plots 13/27-13/30, 13/35-13/37, 14/1, 14/2, 14/4, and 14/7-14/14. Smaller areas of peat or alluvial deposits were also recorded. These included plots 0/8, 3/8, 8/1.1, 9/4, 10/2, 11/3, 11/4, 13/7, 13/8, 15/4, 15/28, 16/1-16/6, 16/9, 17/2, 17/4-17/7, 17/9, 17/10, 17/23, 17/25, and 17/27. The recording was done from the trench edge, describing and measuring the depth of deposits and by photograph. Where peat deposits were encountered the presence of these was also recorded and they are included in appendix V.

4.2. Post excavation methodology

Data collection from site records
A site database has been created in Microsoft Access into which basic site information has been entered. The aim is to allow the data to be searched and interrogated effectively and the print-out of information for the use of specialists. The database includes the drawing, photographic, finds and samples registers and selected information from the context sheets. Context information entered consists of a brief summary, so the paper context records have still been used in analysing the sites. The site records have been checked and cross-referenced and a site matrix drawn up for plot 6/29.4. Photographs, plans, finds and samples have been cross-referenced to contexts. An initial site narrative has been written for each plot and the extent to which this needs to be expanded has been considered in the updated design. The field drawings have been combined to produce basic outline plans of the features in each plot. The requirement for more detailed illustrations including sections and for interpretative drawings has been included in the updated design.

Field boundary records and deposit records have been summarised in appendices IV and V.

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

Finds methodology
The finds have been catalogued and grouped by material type. All finds, where appropriate, have been cleaned. All finds have been packaged in suitable containers and conditions for long-term storage. Objects requiring conservation have been identified. The finds have been assessed by specialists as listed in appendix II to identify and catalogue the collections and identify pieces to be drawn and any requirement for further study. Insignificant items recommended for discard have also been identified.

Environmental samples
The sampling strategy for bulk soil samples was related to the perceived character, interpretational importance and chronological significance of the strata under investigation. This ensured that only significant features were sampled. The aim of the sampling strategy was to recover carbonised macroscopic plant remains and, if the deposit was waterlogged, possibly non-carbonised plant and animal remains, especially insect remains. However, the samples simultaneously enabled the recovery of small artefacts particularly knapping debris and evidence for metalworking.

The bulk soil samples have been processed by flotation and wet sieving by The Environmental Archaeology Consultancy using their standard procedure, with the exception that a 250 micron mesh was used for flotation. They sorted the residues to recover finds and non-floating ecofacts. All residues were tested for magnetic metalworking debris and this was collected where present. Once sorted the fine residues were discarded but the coarse residues from the burnt mounds were retained for analysis.

The flots were weighed and catalogued and assessed by The Environmental Archaeology Consultancy. The flots were rapidly assessed and their potential established in relation to charcoal and other plant macrofossils. The presence of suitable dating material was also recorded. Specific samples are recommended for further work.

A monolith sample (M3) was taken from the wetland adjacent to the large burnt mound in plot 6/29.4 to determine the background pollen history of the site. The sample was obtained by machine excavating a trench into a marshy area at c.SH 52265 39617, close to the stream that ran across the plot. Assessment of this monolith was carried out by taking 5 subsamples and recording 100 grains from each to determine the potential of the monolith for full pollen analysis. Two soil monoliths were collected from the burnt mound site in plot 6/29.4. Monolith M1 was from the possible buried soil layers (6294099/6294100) overlying and filling the upper part of feature [6294098/6294101], thought on site to be a possible trough but argued below to be possibly a natural hollow. Monolith M2 was taken from a layer (6294096) interpreted on site as a buried soil beneath the burnt mound. M2 was assessed for pollen preservation by studying 3 subsamples as above. The assessment of these monoliths was carried out by Sarah Jones of University of Wales Trinity Saint David (see appendix II.8 for full methodology).

Three soil micromorphology samples were taken from deposits within and under the burnt mound site in plot 6/29.4. Sample K1 was taken from the possible buried soil layers (6294099/6294100) adjacent to pollen monolith M2. Sample K2 was from layer (6294004) interpreted on site as a buried soil layer beneath the burnt mound deposit (6294045) (field drawing 94, sheet 27). Sample K3 was from (6294037), a silty deposit filling hollow [6294036], and probably also part of the buried soil pre-dating the burnt mound. These samples were not assessed in this phase but their importance will be discussed and proposals for their study are included in the updated project design.

5. RESULTS

6. QUANTIFICATION OF RESULTS

This section itemises the field records produced and the finds and ecofacts recovered.

Table 1: Total site records

Topsoiling records	220 sheets
Trenching records	171 sheets
Day records	131 sheets
Deposit recording sheets	89 sheets
Field boundary records	78 sheets
Find register	5 sheets
Drawing register	8 sheets
Environmental sample register	4 sheets
Context sheets	388 sheets
Context registers	
Survey data	2 sheets

Digital photographs	3248 shots
Plan and section drawings	151 drawings on 86 sheets

Table 2: Environmental samples

Sample type	**No. of sample type**
Bulk soil	92 (115 bags)
Hand collected charcoal	17
Micromorphology	6
Nuts	1
Stone	1

Table 3: Finds

Material	**No of items**	**Weight**
Bone	6 bags	
Ceramic (PM)	23	
Burnt clay	26	Totalling 50.52g
Copper alloy	4	
Iron	3	
Knapped stone	7	
Leather	1 bag	
Shell	56	
Archaeometallurgical material	14	Totalling 384.65g
Stone	22	
Wood	53	

7. FIELDWORK RESULTS

Thirty-nine sites were investigated and recorded during the fieldwork. These range from post-medieval drains of low significance to an extensive and complex group of features related to burnt mound activity of possible Bronze Age date. On investigation some of the sites proved to be natural features.

Each plot is considered individually below with information from the specialist reports combined with descriptions of features and deposits. A brief summary of the specialist results and recommendations for the project as a whole is then given. The results of recording the field boundaries are also summarised below.

The locations of the sites are shown on figures 1 to 4. The numbers in brackets below are context numbers; those in square brackets are cut numbers and those in round brackets are deposits, fills and other contexts. Numbers prefixed by SF are find numbers and refer to specific artefacts. Where other existing sites are mentioned they are referred to using the Gwynedd Historic Environment Record Primary Record Numbers (PRN).

7.1. Plot 0/1: Probable stone-filled drain (PRN 34075)

Grid Reference: SH 38544 35997 A
Estimated period: Post-medieval
Summary: Linear feature filled with stones.
Mitigation undertaken: Investigated during the watching brief and recorded on the topsoiling sheet.

See plates 1 and 2
A linear stone feature was found running north-north-east to south-south-west parallel to the track. This was composed of large sub-angular stones, up to 0.74m in length, some of which were laid flat. Other stones that lay at an angle had probably originally been flat but had either collapsed into the feature or been disturbed by the plough. Under these was a quantity of densely packed smaller stones.

This feature was exposed for a length of about 5m and was 1.06m wide and 0.49m deep. This feature was initially interpreted as a wall but the densely packed stoned under the flat slabs are suggestive of a stone-filled drain. These drains are not usually capped but in this case a rough capping seems to have been added.

This feature was on flat land below 10m OD and the fact that it ran parallel to the 19th century track to Tan-yr-allt farm suggests a drain created soon after the fields were laid out, probably in the mid-19th century.
Finds: None
Samples: None

7.2. Plot 0/2: Burnt mound feature (PRN 34076)

Grid Reference: SH 38674 36216
Estimated period: Bronze Age
Summary: Layer of burnt mound material seen in pipe trench
Mitigation undertaken: Identified and recorded in section during pipe trench watching brief. Basic recording done on the trench sheet.

See plate 3
Buried beneath between 0.2m and 0.7m of grey-brown stony silt was a black, charcoal rich layer containing burnt stones. For a considerable depth beneath this the natural subsoil had been reddened by the heat. The black layer showed up most clearly in the south-western side of the trench and it extended for 12-13m. It was closest to the ground surface at the south-western end and sloped down towards the north-east.

This site was located at about 5m OD, 30m south-west of a small stream. No other burnt mounds are known in the immediate area.

This site was identified in the pipe trench by the team digging the trench. This occurred before GAT was authorised to monitor the trench digging and no requirement was made for detailed recording of this site. Recording therefore consisted of photographs and brief notes before the pipe trench was backfilled.
Finds: None
Samples: None

7.3. Plot 0/3: Pit/gully terminus (PRN 34077)

Grid Reference: SH 38718 36289
Estimated period: Unknown
Summary: Elongated pit or gully terminus containing burnt clay, burnt stones and charcoal
Mitigation undertaken: Hand excavated and recorded during the watching brief

See figure 5 and plate 4.
An elongated feature [03005] was found, aligned north-west to south-east. This was possibly the terminus of a gully, as continued under the baulk to the north-west. A length of 1.8m was exposed in the trench and its width was 0.86m and the depth 0.27m. The south-eastern terminus was rounded, and the sides sloped gradually to a rounded base. The brown loamy fill included charcoal and burnt clay as well as numerous stones, some of which appeared to be heat-shattered.

Two stones (SF55) were recovered because they were considered to be possible hammerstones (appendix II.3). In fact they are probably unused natural cobbles. There was also a small piece of iron (SF01), which appeared as a corroded mass (appendix II.4), and a small amount of hammerscale was collected from the wet sieving as well as some burnt stone and burnt earth (appendix II.5).

This is a rather irregular feature of uncertain date, although the presence of an iron object and some hammerscale may indicate a fairly late date.

A few fragments of unidentifiable cereal grain, hazelnut, grass (*Bromus* sp.) and dock (*Rumex* sp.) seed were identified among the charred plant remains, but afford little interpretive value. However there was a large amount of charcoal and this would be suitable for identification and quantitative analysis. There are suitable pieces for radiocarbon dating; hazelnut shells being preferred for dating (appendix II.6).

The site lies at about 15m OD on a slight rise in the glacial boulder clay on the edge of a wet, low-lying area forming part of the flood plain of a tributary to the Afon Erch. The Yoke House hut circle (PRN 432) lies about 630m to the north-west, indicating some Iron Age or Roman period activity in the general area.

Finds:

Find No	Context No	Material	Description
1	03003	iron	Small piece of iron
55	03004	stone	2 possible hammerstones, burnt
72	03003	burnt clay	Fired earth
	03003	Hammerscale	Flakes and spheroids
	03003	Burnt stone	433.8g

Samples: sample no 3003

7.4. Plot 0/8: Timber find spot (PRN 34078)

Grid Reference: SH 39047 36352 A
Estimated period: Unknown
Summary: Possibly cut timber from within peat deposit
Mitigation undertaken: Recorded during watching brief, timber sampled.

See plate 5
The pipe trench cut through a marshy area where a layer of light grey clay overlay a thick bed of peat, which was about 1.5m deep. Occasional pieces of wood were visible in the peat, mainly branches up to 0.65m in length and about 0.1m in diameter.
A sample of a large timber was retained for study. This is a piece of non-oak roundwood with no evidence of working and this may represent natural woodland (appendix II.7).

This marsh lies at a height of about 5m OD in the valley of a small tributary to the Afon Erch. It is shown as marsh on the 1889 OS map although there had been considerable efforts by this time to drain it.

Finds

Find No	Context No	Material	Description
54	0	wood	Large piece of timber

Samples: None

7.5. Plot 0/9: Non-archaeological (PRN 34079)

Grid Reference: SH 39260 36328
Estimated period: N/A
Summary: Initially interpreted as a burnt mound, but found to be a burnt out tree root hollow.
Mitigation undertaken: Machine and hand cleaning around the feature, basic recording during watching brief.

See plate 6
An irregular dark area was noted during stripping. This was 0.4-0.6m below the present surface directly on the natural alluvial silts. There was a slightly higher concentration of stones within the dark area than elsewhere but the difference would not have been noticed without the darker colour. The colour was a dark purple brown and therefore mostly due to natural manganese staining, although some charcoal is recorded as being present. It was concluded that this was probably a tree root hollow, which had altered the hydrology and therefore caused the manganese precipitation. Some of the tree or bush seems to have been removed by burning resulting in some charcoal in the deposit.
Finds: None
Samples: None

7.6. Plot 0/11: Possible burnt mound (PRN 34080)

Grid Reference: SH 39424 36386
Estimated period: Bronze Age/unknown
Summary: Thin lens of dark material seen in pipe trench with occasional possibly burnt stones.
Mitigation undertaken: Recorded during watching brief on the trench record sheet.

See plate 7
A dark grey layer was recorded in the side of the pipe trench. This was about 1.6m below the present ground surface and extended for nearly 30m. The layer contained few stones, although occasional stones thought to be burnt were noted towards the edge of the deposit. It is possible that this was the edge of a burnt mound but there does not seem to have been the distinctive burnt stone layer typical of these features.

This site lay at just under 10m OD about 85m north of the Afon Erch, with no small streams nearby. The only burnt mound known in the area is that found in plot 0/2 770m to the west.
Finds: None
Samples: None

7.7. Plot 1/2: Modern coins

Grid Reference: SH 39590 36376 A
Estimated period: Modern
Summary: 2p and 1p coins found in pink leather coin wallet. Coins dated to 1980s
Mitigation undertaken: Recorded during watching brief

Four 2p and 1p coins dating to the 1980s were found in the remains of a leather wallet. These were found in the topsoil and are of no archaeological significance.
Finds:

Find No	Context No	Material	Description
02	12001	Copper alloy	Modern coins

Samples: None

7.8. Plot 3/2: Pits and corn drier (PRN 34081 and 34082)

Grid Reference: SH 41856 36698

Estimated period: Medieval and Iron Age
Summary: A dumb-bell shaped, stone-lined corn drier with adjacent pits containing querns and rubbing stones.
Mitigation undertaken: Area machined down to level where archaeology was exposed, area cleaned and hand excavated and recorded.

See figure 6 and plates 8-12
A feature with a roughly dumb-bell shaped cut [32009] was identified mainly due to the stones lining it projecting into the ploughsoil. The feature measured 6.6m in length and varied between 0.86m and 2.2m in width. It was aligned roughly west-north-west to east-south-east. It swelled into rounded chambers at each end and these were joined by a narrow channel.

The chamber at the west-north-western end was roughly oval measuring 2.1m by 1.5m and had been lined with stones (32007), although some of these had been removed and others seem to have been disturbed and heaped back into the corner of the cut (32030). The chamber seems to have been about 0.5m deep, and the sides were fairly well-defined but sloped quite gradually into a flat base.

The more steeply sided channel opened from this chamber to the east-south-east. The stone lining (32007) continued along the channel, where it was regular and generally well-preserved, with many of the stones carefully set on edge. This channel may have been covered by capping stones; certainly there was one large slab (32006) which lay across the south-eastern end of the channel where it opened into the other chamber. This chamber measured about 2.3m by 2.0m and was 0.5m deep. The sides sloped quite gradually and there was no evidence of stone lining at this end.

Many of the lining stones, especially in the joining channel, appeared heat altered, although stones resistant to heat fracture had obviously been chosen and few were cracked. In the base of the channel, especially under the capstone (32006), was a burnt reddened silt with some charcoal. In the west-north-western chamber there was a layer of fairly flat stones (32025) in its base, which may have formed a rough surface, although it would have been quite irregular. This chamber seems to have filled partly by erosion (32020) then a dense group of stones were dumped into it (32024). These stones were generally not heat-altered, but may have originated from the upper part of the structure. The channel seems also to have filled in by erosion with some structural stones collapsing in. The east-south-eastern chamber had an erosion layer in its base mixed with some charcoal, but with no traces of *in situ* burning. The remainder of the fill was the same as the rest of the feature.

This feature was probably a corn drier (PRN 34081). The fire seems to have been lit under the large capstone. There is no firm evidence for burning in the east-south-eastern chamber so this may have been used mainly for access. The heat of the fire would be drawn through the channel, which would act as a flue, to the west-north-western chamber. A loose layer of branches would probably have been laid over this end on which a cloth containing the grain could be placed.

Nearby and presumably associated with the corn drier were two pits (PRN 34082). One pit [32014] almost touched the disturbed west-north-western end of the corn drier. This pit was nearly circular and measured 1.12m by 1.05m. It was 0.39m deep with fairly steep sides curving gradually into a flat base. In the base of the pit was a patch of heat reddened sandy silt (32021) and a compact dump of small burnt stones (32022). Together these almost seemed to form a rough lining to the cut. The pit was filled with large sub-rounded stones up to 0.5m in length, many of which were heat fractured or reddened (32019/32013). The stones were densely packed into the cut, but did not seem to be either post-packing or lining. A large stone (SF20) was included in the fill. This is a thin slab considered to possibly be used for grinding but more work is necessary to confirm whether this was used. There was no direct relationship between this pit and the corn drier. Both the corn drier and the pit had been disturbed by animal burrowing and the corn drier seems to have had some of its stones removed and dumped back in. These disturbances made the two features appear closer than they were originally, when there could have been 0.3m between the two. This would have enabled both to function together but other evidence discussed below suggests that they were not contemporary.

About 2.8m north-west of the end of the corn drier was another pit [32003] measuring 1.5m in diameter and 0.4m in depth. This had a reddish layer (32023) in its base, probably representing *in situ* heating. Over this was a rough ring of six heat-altered stones (32017), one of which (SF7) was a quern stone (appendix II.3). These were covered by a layer of heat-reddened sand mixed with charcoal (32016),

and the majority of the pit was filled with heat fractured large stones in a brown sandy matrix with charcoal flecks (32012).

Pit [32003] contained a variety of quern stones and rubbing stones, mostly broken. These included two saddle querns (SF7, SF9), one broken, fragments of two other saddle querns (SF14, SF18.1), a saddle quern rubber (SF18.2), a facetted edge utilised pebble rubbing stone (SF10) and a worn cobble (SF12). There are also some pieces of broken boulder that may have been part of broken querns (appendix II.3). Most of these objects have been burnt and seem likely to have been utilised in some later activity, perhaps in creation of a fire-pit or oven.

Hammerscale was found in all three features but the fills of pit [32014] produced the highest densities (although only 1.3g in total) (appendix II.5). This indicates smithing in the area and it may have been contemporary with pit [32014], although this material is small enough to move down through the soils. The wet sieving residues also produced small quantities of unidentifiable burnt animal bone (both sheep and cattle sized fragments) and fired earth or daub from the corn drier (appendix II.6). A flake of crystal quartz (SF64) was found in pit [32003], a flint flake (SF66) came from the corn drier and a possibly utilised flint blade (SF19) came from an animal burrow adjacent to the corn drier (appendix II.2).

The environmental remains show a clear distinction between the corn drier and the pits. Samples from the corn drier are rich in charred cereals, dominated by oats (*Avena* sp.), with barley, bread wheat and rye also present. A range of charred weed seeds probably came in with the cereals, while the absence of chaff from all the corn drier samples might indicate that a cleaned crop was being dried in the structure. Hazelnut fragments were also recorded, possibly introduced with fuel wood. This assemblage supports the interpretation of this feature as a corn drier. As oats are common medieval cereals in the area and have previously been found charred in corn driers this also supports a medieval date (appendix II.6).

In contrast the two pits appear to be dominated by glume wheats, particularly emmer (*Triticum dicoccum*), with pit [32003] being particularly rich. This species becomes less important in Britain during the 1st millennium BC (Greig 1991), and although occasionally turning up in post-Roman contexts, is normally associated with prehistoric sites. The absence of oats and rye from the pits, in association with the emmer wheat strongly suggests that these pits significantly predate the corn drier. Initially a Bronze Age date might be appropriate, but the presence of hammerscale in pit [32014] may indicate an Iron Age or possibly Roman age for the deposits (appendix II.6).

This set of samples is the richest in identifiable charred plant remains (other than charcoal) from the whole pipeline. The charred plant assemblages afford an opportunity to identify the cereals associated with each feature, their date, their relative importance, functional aspects of the features, such as stage of crop processing, and some indication of the crop husbandry.

The samples have produced abundant material that could be used for radiocarbon dating. With the possibility that charcoal, and even hazelnuts could have been derived from earlier deposits on the site it is most appropriate that the oat grains are dated from the corn drier and emmer wheat grains from the two pits. Since these are relatively abundant and therefore clearly reflect contemporary activity, and can fairly confidently be considered as not residual on these grounds and their known chronological distribution their dating will be the most reliable indication of the age of the deposits (appendix II.6).

It initially appeared that this was a coherent group of features relate to the processing of grain. However, while the corn drier is of a type that would fit into the medieval period, but the quern stones in the pits are more reminiscent of prehistory. The charred plant remains confirm that the pits were not contemporary with the corn drier as the latter has an assemblage typical of the medieval period whereas the former are more likely to date to the late prehistoric period. The smithing debris from pit [32014] supports an Iron Age or later date, but the flake of crystal quartz from pit [32003] is an artefact usually only found in Early Neolithic features in the region. The two flints could also support the suggestion of prehistoric activity, with the utilised blade possibly being Neolithic. However all this material might be intrusive in the contexts in which it was found. The quern stones and rubbers from pit [32003] must have been deliberately placed in the pit. They are domestic objects of a type associated with later Iron Age settlement, and overall the finds and charred plant remains support an Iron Age date for the pits. One of the querns is of a neat oval form, a developed type that could be expected to be late in the

occurrence of such objects. Rotary querns are believed to have come into use in north Wales in the late first century BC or first century AD, but saddle querns did continue in use later.

The pits are likely to be domestic. The lower ring of stones in pit [32003] seems to have been *in situ* and probably heated in the pit, perhaps for cooking. The quern stones are clearly reused from elsewhere but are unlikely to have been brought far, indicating a settlement very close by. The querns may just have been conveniently available for reuse in cooking pits, but their use may have been determined by other factors. One of the querns, although massive and not greatly worn, was broken in two. This raises the question of whether the quern was deliberately or accidentally broken, and whether this had some significance in its reuse.

This site is located on a sandy ridge at about 21m OD overlooking the coastal marshes and a stream valley leading into the Afon Ddu. In the stream valley just over 200m south-east of this site Iron Age hearths and a cobbled surface were found (PRN 31145). In the late 19th century the site was within an area of rough ground at the junction of the track from Glan Morfa with what was then the main coastal road. About 800m to the north-west was the Botach medieval settlement (PRN 1825, 7358) beneath the land of Broom Hall. There is therefore both Iron Age and medieval activity in the area which might be related to this site.

Finds

Find No	Context No	Material	Description
4	32005	slag	Piece of slag
6	32012	bone	Frags of bone, sheep sized
7	32017	stone	Saddle quern
8	32017	stone	Small boulder, probably unused
9	32010	stone	Broken saddle quern
10	32012	stone	Rubbing stone
11	32017	stone	Grinding stone?
12	32012	stone	Cobble with one worn surface
13	32012	stone	Grinding stone?
14	32012	stone	Saddle quern fragment
15	32018	bone	Burnt bone, cattle sized
17	32012	bone	Burnt bone, sheep sized
18	32012	stone	Broken quern and rubber
19	32026	knapped stone	Flint flake
20	32019	stone	Grinding stone?
64	32016	Quartz	Flat piece of quartz. Smooth on one side.
66	32018	flint	Small flint flake
68	32007	slag	Possible piece of slag
77	32020	burnt clay	Fired earth? Ceramic building material?
78	32018	ceramic/burnt clay	Fired earth/possible pot fragment?
	32002	Metal-working debris	3g magnetic residue and 1 piece of hammerscale
	32012	Metal-working debris	1.6g magnetic residue
	32013	Metal-working debris	0.6g magnetic residue and 9 pieces of hammerscale
	32016	Metal-working debris	0.8g magnetic residue and 2 pieces of hammerscale
	32018	Metal-working debris	13.6g magnetic residue and 1 piece of hammerscale
	32019	Metal-working debris	0.6g magnetic residue and 15 pieces of hammerscale
	32021	Metal-working debris	0.1g magnetic residue

Samples:

Sample No	Context No	Sample type
2	32002	Bulk soil
3	32018	Bulk soil
4	32016	Bulk soil
5	32012	Bulk soil
6	32013	Bulk soil
7	32019	Bulk soil
8	32018	Bulk soil
9	32020	Bulk soil
11	32021	Bulk soil
12	32022	Stone

7.9. Plot 3/6: Elongated pit and probable root hollow (PRN 34083)

Grid Reference: SH 43718 37356
Estimated period: Bronze Age?
Summary: An elongated pit containing some burnt stones, also a shallow depression, probably a root hollow.
Mitigation undertaken: Hand-excavated during the watching brief.

See figure 8 and plate 13
A sub-rectangular pit [36002] was found, aligned roughly east-west, and measuring 1.70m by 0.58m, with a depth of 0.22m.The long sides were straight and parallel and the short ends were fairly rounded. The sides of the cut were steep and the base flat. The feature was well-defined. Its dark grey silty fill contained numerous stones, many heat-shattered and lenses and patches of charcoal.

The regular rectangular shape of this feature is similar to that of burnt mound troughs, although no trace of a mound was recorded on this site. The presence of burnt stones in the fill of the feature must make it likely that an activity involving similar hot stone technologies had taken place here.

About 58m to the north-east was a shallow hollow, c.0.8m in diameter, containing 4 stones and some charcoal. This was so shallow and poorly defined that it was interpreted as a burnt root hollow of a small bush.

This site lies just below 10m OD about 170m west of the Afon Wen and on its flood plain, and the area was seen to be covered by alluvial silts. A possible burnt mound (PRN 31151) is known about 480m to the west of this site. A spindlewhorl (PRN 19627) of possibly Roman or Iron Age date was found about 300m to the east, possibly hinting at a settlement of this period somewhere in the area.
Finds: None
Samples: None

7.10. Plot 3/10: Two burnt mound troughs (PRN 34084 and PRN 34085)

Grid Reference: SH 44198 37566
Estimated period: Bronze Age
Summary: Two sub-rectangular pits containing burnt stone
Mitigation undertaken: The site was hand excavated and recorded, but the troughs were sampled and not fully excavated.

See figure 7 and plate 14
Two rectangular pits interpreted as burnt mound troughs were found about 9m apart. Pit [310001] (PRN 34084) was sub-rectangular and measured 2.4m by up to 1.7m, and about 0.6m deep. The pit was aligned south-west to north-east; the western side was steep, the eastern side more gradual and the base was flat. The north-eastern end of the cut was quite rounded. There was a grey sandy primary fill (310002), but the rest of the feature was filled with heat-cracked stones in a dark grey or black charcoal-rich matrix (310003/310004). Sealing the pit was a thin burnt stone layer (310005) and this spread out beyond the limits of the trough forming the remains of a mound measuring 5.4m by 3.2m. This was nowhere more than 0.2m deep. Other small patches of burnt mound material hinted that the mound was once much bigger.

To the east was pit [310007] (PRN 34085), which measured 2.2m by 1.2m, and was 0.45m deep. This was also sub-rectangular with rounded ends, aligned west-south-west to east-south-east. The sides at western end were steep and the eastern end was more gradual. There was a large stone, 0.4m in length, in the base of the pit, with burnt stone deposits around it (310008/310009). In the eastern end of the pit was a paler grey fill with numerous heat-cracked stones (310012) and over all these was a black layer (310010) with more charcoal and fewer stones than the other fills. At the western end an orange silt (310011) had washed over the fills making the edge of the cut difficult to see on the surface. There were slight patches of burnt mound material associated with this pit but it is possible that any mound associated with it was outside the stripped easement.

Much of the stone from the pits was heat-altered but there were no finds recovered. Two charred cereal grains were recovered from the fill of pit [310001], but these were in too poor a condition to identify

beyond *Triticum/Hordeum*. The very few charred weeds seeds and rare fragments of charred herbaceous stem were in too poor a condition to identify. The charcoal is relatively abundant and will be identifiable to species, although some is heavily mineralised. (appendix II.6)

Much of the charcoal comprises small fragments derived from larger branch or trunk wood but full analysis should enable the identification of some smaller roundwood material suitable for radiocarbon dating.

The quantity of burnt stone and the shape of the pits strongly suggest that these were burnt mound troughs. Their distance apart implies two separate mounds potentially separated by a considerable period of time. These troughs are located at about 10m OD in a relatively dry area 300m east of the Afon Wen. A burnt mound (PRN 31151) was found about 1km to the west and another similar feature (PRN 24742) over 1km to the east, but no burnt mounds are currently known close to this site.
Finds: None
Samples:

Sample No	Context No	Sample type
15	310010	Bulk soil
16	310003	Bulk soil
17	310004	Bulk soil

7.11. Plot 3/14: Two pits/possible smithing site (PRN 34086)

Grid Reference: SH 45320 37818
Estimated period: Post-medieval/medieval?
Summary: One larger roughly oval pit and a smaller sub-rectangular pit. The smaller pit contained large quantities of smithing debris.
Mitigation undertaken: Hand-excavated, 100% excavation

See figure 9 and plates 15 and 16
A large oval pit [314001] was found measuring 2.1m by 1.4m and 0.4m deep. The long axis of the pit was aligned about south-west to north-east and the sides were variable, being steeper on the western side. It was filled with brown, pebbly silty sand (314004) but had a thin layer of charcoal in the base (314003).

About 3m to the east was a small, irregular hollow [314002], measuring 0.7m by 0.6m and c.0.1m deep. This slight feature had a charcoal-rich fill (314005) and could have been the root hollow of a burnt bush, but some pieces of slag and other artefacts were found that suggested that it was anthropogenic. A piece of copper alloy plate (SF03) was found. This tapers at one end to rounded terminal and has 2 lateral, sub-circular perforations, possibly used to mount the item. A tiny fragment of thin curved copper alloy sheet (SF65) with a concave face and two small parallel indentations may have been part of the larger piece. The function of this item is unknown but the large piece seems too solid and well-preserved to be of great age, and is estimated to date from the 18th or 19th centuries AD (appendix II.4). The pit also produced a piece of vitrified iron hearth or furnace lining (SF61), tentatively identified as a fragment of a tuyère (appendix II.5).

The soil sample from pit [314002] produced a large quantity of magnetic concreted iron rich lumps and thousands of flakes of hammerscale. When seen under the microscope the concreted lumps appeared to be large quantities of hammerscale and small slag concreted together. These are reminiscent of the hard concreted layers that develop on the floor of a smithy and with nearly 3.5 kilogrammes of magnetic material present, in an 8.5kg soil sample, indicate a very high concentration of smithing debris (appendix II.5). Pit [314002] therefore appears to have been the base of a smithing hearth and presumably pit [314001] was also associated.

As well as a reasonably large charcoal component an oat grain, grass seed and a fragment of uncharred hazelnut shell were recovered. The uncharred hazelnut could have been introduced by small mammals, so young roundwood is preferred for dating, although the oat grain should be of sufficient size for an AMS date (appendix II.6).

This site lay at just over 10m OD about 30m west of a small stream just above the edge of the former salt marshes. About 150m to the south-east lies the medieval ringwork of Tomen Fawr (PRN 1329) and

the associated medieval township of Ffriwlwyd (PRN 7351). It is much closer to the road junction at Pen-y-Groes with its 18th century tollgate (PRN 11368), an appropriate position for a smithy.

Finds:

Find No	Context No	Material	Description
60	314005	slag	Pieces of slag or iron working debris
61	314005	slag	Vitrified furnace lining
65	314005	copper alloy?	Copper rich metal or stone.
69	314005	slag	Slag
76	314005	burnt clay	Furnace lining and tuyere fragments
3	314005	cu alloy	Cu alloy sheet with holes in it
	314005	Slag	55.6g
	314005	Metal-working debris	3480g of magnetic residue and 1000s of pieces of hammerscale

Samples:

Sample No	Context No	Sample type
10	314005	Bulk soil

7.12. Plot 3/20: Large ditch or channel (PRN 34087)

Grid Reference: SH 46114 37866
Estimated period: Unknown
Summary: Large ditch with gravelly fill
Mitigation undertaken: First recognised in pipe trench then machine and hand excavated and recorded alongside pipe trench in accordance with a FAWD.

See figure 10 and plate 17
Running nearly north-south across the easement in this plot was a large ditch [320004]. This was up to 3.4m wide and 0.8m deep where the section was recorded. However it seemed to get deeper towards the south as it was recorded as 1.5m deep in the pipe trench. As the ground slopes down from south to north this meant that the ditch became deeper as it continued uphill.

The sides of the ditch were gently sloping, with the western side being shallow and poorly defined. The base was fairly flat. The ditch was filled by a series of brown sandy silts with varying amounts of stones and gravel (320012, 320007, 320006, 320005), which seem to represent gradual erosion from the surrounding hill slope. An iron nail (SF27) was recovered from the upper fill (320005), but this cannot be used to date the ditch. This upper fill on the eastern side was cut by a drainage ditch [320008], the fill of which (320010) produced a sherd of 19th century Buckley ware. About 2m west of the ditch was a stone-filled drain [320009], the fill of which (320011) contained a large nail (SF29), late post-medieval pot sherds and a few marine shells. A copper alloy 19th century button (SF28) was recovered from the ploughsoil over the site.

Even from the sieved residue archaeological finds were limited to a little heated-affected stone, a little vitreous slag, and a few flakes of hammerscale. The environmental remains were even more limited, with very small flots, each producing only a little charcoal (appendix II.6). There is nothing from any of the samples that gives any clue as to the date of the feature, and none of the charred material is secure enough to be suitable for radiocarbon dating.

This site is on the northern end of a slight spur 80m south of the Afon Dwyfach not far from its confluence with the Afon Dwyfor. The ditch was found just to the north of the summit of the spur on the north-facing slope. The broad, rather poorly defined character of the feature makes it possible that this was not a ditch but a natural erosion channel running down the slope.

Finds:

Find No	Context No	Material	Description
27	320005	iron	nail
28	320002	Copper alloy	button
29	320011	iron	large nail
30	320011	ceramic (PM)	Late p-m pot sherds
31	320011	shell	limpet shells
	320006	Metalworking debris	3.6g magnetic residue and 6 pieces of hammerscale

Find No	Context No	Material	Description
	320007	Metalworking debris	0.2g magnetic residue and 0.5g slag
	320012	Metalworking debris	0.2g magnetic residue and 1 piece of hammerscale

Samples:

Sample No	Context No	Sample type
112	320006	Bulk soil
113	320007	Bulk soil
114	320012	Bulk soil

7.13. Plot 3/27: Two possible cremations (PRN 34088)

Grid Reference: SH 47304 38218
Estimated period: Bronze Age/Iron Age
Summary: Two small pits containing large amounts of burnt bone fragments.
Mitigation undertaken: Hand-excavated, 100% excavation

See figure 11 and plates 18 and 19
Two features were identified in this plot. One was a neatly circular pit [327001] measuring 0.52m in diameter and 0.18m deep. The pit had fairly steep sides and a flat base and was filled by a very dark grey sandy silt (327003) that contained charcoal and 52.4g of burnt bone. About 3.7m to the south was small hollow [327002], measuring only 0.22m in diameter and 0.06m deep. This was also filled with a very dark grey sandy silt (327004) with charcoal and 8.6g of burnt bone.

The assessment identified some pieces of the burnt bone which appear to be human cranium suggesting that both features may be cremation burials (appendix II.6). However an initial comment from Jacqueline McKinley of Wessex Archaeology was that the quantities did not seem to be enough to be burials as such (pers. comm. by email). Only a full study of the bone will establish how much is human and whether it is associated with a deliberate funerary rite.

Two small fragments (SF75) were tentatively identified as pottery were recovered from the wet sieving residue from pit [327001], but this proved to be burnt clay (appendix II.5 and appendix II.6). The pit also included some heated affected stone, a single flake of hammerscale and some rounded pebbles and grit cemented by calcareous material (SF71). The latter appeared like mortar and may be related to the cremation process.

The fill of pit [327001] produced a large flot sample containing several charred cereal grains, including wheat and barley, charred hazelnut shell, and seeds of ribwort plantain (*Plantago lanceolata*), bramble/raspberry (*Rubus* sp.) and a legume (*Vicia/Lathyrus* sp.), as well as a charred thorn, a few charred herbaceous stems fragments, an as yet unidentified fruit stone fragment, and large amounts of identifiable charcoal. Pit [327002] produced a smaller flot sample, which contained charred herbaceous stems and unidentified seeds, and an uncharred fragment of hazelnut shell. If these are cremations the charred plant remains could represent food items thrown onto, or placed on, the pyre (appendix II.6).

These features lay at about 19m OD about 70m south-east of the Afon Dwyfawr, just outside Llanystumdwy in the corner of a field. They are c. 2.5km east of 2 cremation urns within a circular ditch (PRN 19659) found in advance of the A497 improvements.

Finds:

Find No	Context No	Material	Description
71	327003	stones and calcareous material	Possible material from cremation.
75	327003	burnt clay	Fired earth frags.
	327003	pot	2 possible pot frags
	327003	Metalworking debris	20.4g magnetic residue and 1 piece of hammerscale
	327003	Bone	52.4g burnt bone, possibly human
	327004	Metalworking debris	0.2g magnetic residue
	327004	Bone	8.6g burnt bone, possibly human

Samples:

Sample No	Context No	Sample type

Sample No	Context No	Sample type
13	327003	Bulk soil
14	327004	Bulk soil

7.14. Plot 5/5: Stone-filled drain? (PRN 34089)

Grid Reference: SH 49288 38986 A
Estimated period: Post-medieval
Summary: Linear cut feature filled with stones seen in trench edge. Probable drain.
Mitigation undertaken: Recorded on trench record sheet during watching brief.

See plate 20
A linear feature was seen in the section of the pipe trench. This had fairly steep sides, which curved into a rounded base. The fill was a grey silty clay with frequent sub-rounded medium sized stones. The feature was about 1m wide and 0.62m deep. Stone-filled drains are usually narrower with vertical sides but this is probably some similar drainage feature, or an open ditch that has been backfilled with stone.

The early OS maps show this field as rough pasture, although improved by 1916. In 1889 a track is shown running across the field but this runs south-west to north-east, whereas the feature seems to be roughly perpendicular to this.
Finds: None
Samples: None

7.15. Plot 6/6: Burnt mound (PRN 34090)

Grid Reference: SH 50241 38912
Estimated period: Bronze Age
Summary: Burnt mound with an oval trough, which cut an earlier pit or hollow.
Mitigation undertaken: Excavated by hand. A sondage was dug through the site but the pits were not fully excavated.

See figure 13 and plates 21 and 22
In this plot was an irregular arc of burnt stone in a dark grey silt matrix (66003), which surrounded the northern and eastern sides of two intercutting pits. Pit [66013] was probably ovoid in plan, but was not fully exposed; however it was 0.5m deep. Lumps of charcoal (66016) were scattered in its base and the pit was filled by a grey clayey silt, containing some stone and charcoal (66012). This fill was cut by an oval pit [66011], measuring 1.7m by 0.9m and 0.55m deep. It had steep sides and a rounded base. This was filled by a dark grey silt with burnt stone and charcoal. There was a lens of charcoal chunks in the base of the pit similar to that in [66013].

The fill of pit [66011] was covered by a layer of dense charcoal (66004), which may represent a hearth or dumping from one. This was sealed by a fine water-borne silt (66005).

The remains represent a small burnt mound with possibly two sequential troughs. This site was investigated by a slot through the middle of the mound and troughs and was not fully excavated. No artefacts were recovered except tiny fragments of vitreous slag, possibly fuel ash slag, and a few magnetised small stones were recorded.

The flots produced from the bulk soil samples were large and dominated by charcoal, with several large roundwood fragments, and occasional small twigs and herbaceous stems, and one fragment of charred hazelnut shell. Single pieces of charcoal were hand collected during excavation of context (66010) and these are not suitable for inclusion in the analysis of species composition and wood type to be undertaken on the charcoal from the bulk samples, but pieces of roundwood charcoal could be used for dating (appendix II.6).

The burnt mound is within 7m of a ditch canalised along a straight field boundary, but the presence of the ditch suggests that there probably was a natural stream in the area before it was formalised into a straight ditch. The area was clearly quite waterlogged as several field drains were also noted in this plot. The site is about 80m south of the Afon Dwyfach not far from its confluence with the Afon Dwyfor. It lies at just over 10m OD, overlooking what must have originally have been the estuary of

the Afon Dwyfor. Burnt mound type pits were found near Glanllynnau (PRN 24742), about 550m to the south-west.

Finds: Tiny amounts of magnetic residue and slag
Samples:

Sample No	Context No	Sample type
19	66004	Bulk soil
20	66010	Bulk soil
21	66012	Hand collected charcoal
22	66010	Hand collected charcoal
23	66010	Hand collected charcoal
24	66010	Hand collected charcoal
25	66010	Hand collected charcoal
26	66010	Hand collected charcoal
27	66010	Hand collected charcoal
28	66012	Hand collected charcoal
29	66010	Hand collected charcoal
30	66010	Hand collected charcoal
31	66010	Hand collected charcoal
32	66010	Hand collected charcoal
33	66010	Hand collected charcoal
34	66010	Hand collected charcoal
35	66012	Hand collected charcoal
36	66010	Hand collected charcoal

7.16. Plot 6/10: Fire pit or oven (PRN 34091)

Grid Reference: SH 50551 38918
Estimated period: Unknown
Summary: Small figure-of-eight shaped pit with evidence of *in situ* burning.
Mitigation undertaken: Investigated and fully recorded as part of the watching brief.

See figure 12 and plate 23
A small, roughly figure-of-eight shaped cut [610001] was found measuring 0.95m by 0.55m, with a depth of 0.12m. The long axis of the pit was aligned north-west to south-east. A thin layer of charcoal (610004) covered the base of the north-west chamber, and partially slumped over this was a burnt orange clay (610003), which appeared to be the remains of a clay lining. The remainder of the pit was filled with brown silty clay, darker and with more charcoal in the north-western than the south-eastern end of the feature.

A very little fired earth and just three flakes of hammerscale were recovered from the wet sieving residue with 11g of magnetic material composed of small stones suggesting that it was heated in a hearth or fire (appendix II.5).

The large charcoal flot included a single fragment of emmer wheat chaff, charred seeds of ribwort plantain, small grasses, bramble/raspberry, medick/clover (*Medicago/Trifolium* sp.), sedge (*Carex* sp.), cinquefoil (*Potentilla* sp.) and bugle (*Ajuga reptans*), with charred tubers and herbaceous stems. These are mainly pasture plants and might indicate hay or even animal dung being burnt. The bulk of the flot is charcoal and roundwood is particularly abundant, in contrast to most of the sample studied along the pipeline route (appendix II.6).

The figure-of-eight shape of the feature suggested its interpretation as a corn drier, although it appeared very small. However the charred plant assemblage from this feature is not consistent with a corn drier in that there is no charred grain and very little chaff. The sample might derive from the fire area/stoke hole of a corn drier, rather than the drying area, and could represent fuel. However with such a small feature is would be unlikely that some grain did not accidentally become charred. It seems probable that the charred plant remains do represent fuel but that the feature was an oven or fire pit. The traces of clay lining support this interpretation.

This feature lies at 63m OD on the east bank of a stream called Nant y Wyddan. The pit is 22m east of the stream. There are no obvious medieval features or buildings in the immediate area but the site is

only about 700m north-east of the town and castle of Criccieth. There are several burnt mounds in this area, including that on plot 6/6, but the lack of burnt stones on this site suggests that it is not a feature of this type.

Finds:

Find No	Context No	Material	Description
74	610002	Burnt clay	Fired earth.
	610002	Metalworking debris	11g magnetic residue and 3 pieces of hammerscale

Samples:

Sample No	Context No	Sample type
18	610002	Bulk soil

7.17. Plot 6/21: Burnt mound (PRN 34092)

Grid Reference: SH 51726 39790
Estimated period: Bronze Age
Summary: Burnt mound spread with oval pit
Mitigation undertaken: Recorded and excavated in width of pipe trench

See figure 14 and plate 24
A burnt mound was seen in the pipe trench. It measured about 7.5m in length and in places covered the full width of the exposed trench (2m wide). The mound was represented by patches of heat-cracked stones in a dark matrix (621001, 621003, 621004, 621007). These were up to 0.4m thick but generally much thinner. In places there was a lower layer of charcoal-rich clayey silt with fewer stones (621002, 621005). At the eastern end a grey brown clay (621012) may have represented the ground surface beneath the mound.

Sealed under the western end of the mound was a sub-circular pit [621008] measuring 1.0m by 0.8m. It was up to 0.28m deep and filled with a charcoal-rich deposit with relatively few stones (621009).

Some heated-affected stone was recovered from the wet sieving residues and some magnetised stones, which reflects the heating of small stones rather than metalworking. Apart from one fragment of charred hazelnut shell the relatively small flots produced only charcoal, with few fragments large enough to justify identification and quantification. The exception was the sample from 621007, which is much bigger than the other three samples and may justify study. Only this latter sample could be used to radiocarbon date the site (appendix II.6).

This site was at about 80m OD on a fairly steep south-east facing slope. The mound was about 10m from a stream channelled down the side of a field boundary, but it is assumed that a natural stream formerly ran in the vicinity. There are other burnt mounds to the west (PRNs 1302, 4055, 5773), PRN 1302 is the closest and is 670m west of the site. There are also the burnt mounds in plots 6/29.4 and 6/33 to the east.
Finds: None
Samples:

Sample No	Context No	Sample type
62	621003	Bulk soil
63	621004	Bulk soil
64	621007	Bulk soil
65	621009	Bulk soil

7.18. Plot 6/22: Midden (PRN 34093)

Grid Reference: SH 51750 39801 A
Estimated period: Post- medieval
Summary: 19th century midden containing pot, leather shoes and other objects
Mitigation undertaken: Recorded during watching brief on trench record sheet.

See plates 25 and 26
At the western end of plot 6/22 a midden (622001) containing 19th century ceramics was found. Fifteen sherds of at least twelve ceramic vessels were retrieved, representing the typical wares and

forms available to most households during the mid-late 19th century (perhaps with a bias towards the end of this period). They comprise a mix of refined, but affordable tea and table wares (some decorated), and more utilitarian forms. At least some of the material probably stems from the Stoke-on-Trent potteries, although other items come from Newcastle-upon-Tyne and Nottinghamshire and/or Derbyshire (appendix II.1).

There were also parts of leather shoes, iron nail and other objects. The shoes were particularly represented by leather soles, and parts of at least two pairs of adult shoes (although small - size 5 or 6) and one possibly belonging to a child was collected. These are presumably also 19th century in date (appendix II.1).

This site is on the hill slope about 100m north of the farm of Eisteddfa, close to a field boundary and probably represents dumping in an out-of-the-way corner of the farm.
Finds:

Find No	Context No	Material	Description
26	621001	Leather	Leather shoe soles
33	621001	Ceramic	Late p-m pot sherds

Samples: None

7.19. Plot 6/29.4: Large burnt mound complex (PRN 34094)

Grid Reference: SH 52254 39574
Estimated period: Bronze Age
Summary: Large burnt mound complex with several pits and other features overlying natural channels and hollows
Mitigation undertaken: The burnt mound was evaluated by hand-dug slots to investigate the depth and stratigraphy of the mound material and detect the presence of features obscured below the mounds. This evaluation established that the stratigraphic sequence was complex and varied, and a design was then proposed for the full excavation and recording of the site. The burnt spread was removed by hand. Features were excavated and recorded, then a possible buried soil layer was removed by machine and the remaining features on site excavated and recorded.

See figures 15 and 16 and plates 27 to 41

Topography
The site lies at an altitude of about 27m OD on the north facing slope of a small stream valley. The stream running in the base of the valley is about 35m north of the northern end of the site but a tributary to this stream runs adjacent to the site on its eastern side. Another smaller stream runs about 35m to the west of the site. The streams join and run east into an area that must originally have been salt marsh. The site lies about 400m west of the head of this marsh. The streams form the boundaries to fields and have probably been channelled although it is assumed that their original courses were not very different to the present ones.

Glacial and peri-glacial deposits and features
The natural subsoil consisted of a pale yellow brown glacial clay with occasional small and medium stones. This was mixed with or overlain by fluvio-glacial sands and fine gravels in places. Over much of the site was a layer of firm light greyish brown silty clay (6294070/6294084/6294089), which contained c..5% small flecks of charcoal. This layer was interpreted on site as a buried soil and it sealed various features. However, the features below this layer were all irregular, rather confused and confusing with fills that were suggestive of deposition by natural processes. It is likely that these features were the result of the uneven surface of the boulder clay, frost action and water erosion. Occasionally the fills of these features contained charcoal and some were more regular shapes. The assessment of the plant remains from soil samples recovered from these features may indicate that some require reconsideration and could potentially have been anthropogenic pits.

Palaeochannels
As well as smaller undulations in the boulder clay the area seems to have been crossed by several palaeochannels carved into the deposits presumably by streams (plate 27).

Down slope to the north of the main burnt mound activity was a broad, shallow channel [6294012], 4.6m wide and 0.6m deep. This was poorly defined with a steep western side and a gently sloping eastern side. Its full extent was difficult to determine as later deposits obscured it along much of its length. Much of the channel was filled with organic silts and degraded peaty deposits with a mottled silty fill in the top.

This channel may have continued south into a more extensively excavated section of a sinuous channel [6294150/6294195]. This varied considerably in width but was up to about 4m wide and a 8.5m length of the channel was excavated. The sides generally sloped gently but were quite steep in places and up to 0.7m deep. The base was fairly flat and there was a large boulder embedded in the northern side of the channel just before it disappeared into the eastern baulk of the site. Some of the fills of the channel were gravelly but some were dark and organic in appearance. Much of this channel was filled with burnt mound material and this will be discussed below.

Channel [6294150/6294195] cut through a pale clayey layer (6294186) and in the sides of the channel could be seen a stony deposit that formed the fill of an earlier channel [6294170], sealed by the clay (6294186). Channel [6294170] (plate 28) was fairly narrow at 1.3m wide and was up to 0.55m deep, although the base varied considerably in depth. Its sides were very steep in places and it was sinuous in plan. The fills were generally very stony but an organic silt had accumulated in the top of the channel. The southern end of the channel faded out but the northern end was eroded away by channel [6294150/6294195]. This shows that the channels were not formed by a single event but were probably created over a long period of time.

Group (6294184)
In the centre of the site were many more or less irregular hollows. When investigated a number of these proved to be undulations in the natural and were not recorded in detail but twelve features were more convincing and were recorded as group (6294184) (plate 29). This group had been truncated by a modern field drain [6294027], so some of the features did not survive in their entirety, but generally they were roughly sub-oval in shape and were filled with dark brown silty gravels. Most were small and very shallow (see table 4 for detailed measurements), but one [6294158] was better defined with steep sides and a depth of 0.4m. This had a collection of fairly large stones (6294161) in its base, but its main fill (6294142) was essentially a continuation of a general stony layer (6294090) covering this area. This layer sealed many of the features in group (6294184). It was composed of c80% stones in a brown silty matrix and initially thought to be a burnt mound layer, however, although many of the stones were angular they were not obviously heat-shattered, and while they were superficially stained brown, they were not heat-reddened. This was overlain by another similar layer but with smaller stones (6294032), which had been covered by a thin gravel deposit (6294026) then sealed under the buried soil horizon (6294070). These deposits had built up with a large irregular hollow [6294031] and the pit-like features were effectively undulations in the base of this hollow. This sequence suggests hollows in the boulder clay being infilled by stony colluvium probably moved by solifluction. Some flooding seems to have occurred depositing gravel before the area stabilised and a soil began to develop. Some charcoal and occasional burnt stones seems to have been introduced to these deposits, probably by bioturbation, but it is suggested that they are natural deposits probably built up from the end of the last glaciation and that all the features below them were entirely natural. The comparison of the stones from bulk samples of these layers with those from clear burnt mound deposits should help to test this interpretation.

Hollow [6294031] (plate 30) merged into the palaeochannel [6294170] and it seems likely that these were part of the same feature, which became deeper and more sharply defined as it continued down slope to the north.

Table 4: Features in group 6294184

Cut No	Description	Filled by	Length	Breadth	Diameter	Depth	Charcoal
6294143	Small sub-oval feature, possibly natural hollow	6294145, 6294144	1.05m	0.8m		0.3m	Small frags
6294146	Small irregular pit/hollow	6294147	0.60m	0.55m		0.25m	Small frags

Cut No	Description	Filled by	Length	Breadth	Diameter	Depth	Charcoal
6294158	Well defined sub-circular pit	6294161			1.0m	0.4m	Small frags, uncharred hazelnut and birch seeds
6294175	Irregular pit/hollow	6294176,6294177	1.25m	0.65m		0.18m	Small frags
6294178	About a quarter of a presumably sub-circular pit/hollow largely cut away by [6294158]	6294179,629180			unknown	0.2m	Small frags
6294181	Small oval pit/hollow	6294182	0.4m	0.3m		0.1m	
6294185	Elongated undulation in the natural.	6294174	2.14m	1.5m		0.15m	
6294205	Small hollow, possibly just an undulation in the natural	6294206	0.54m	0.40m		0.1m	
6294207	Small irregular possible pit	6294208	0.8m	0.4m		0.2m	
6294209	Small pit/hollow	6294210	0.6m	0.5m		0.2m	
6294213	Shallow pit/hollow	6294214	0.9m	0.6m		0.1m	
6294215	Sub-oval pit/hollow	6294216	0.42m	0.28m		0.15m	

Feature [6294087]
Feature [6294087] (plate 31) was located towards the southern end of the site and was sealed under the buried soil (6294070). The cut was an irregular sub-oval in shape, possibly formed from two conjoined hollows. The sides were fairly steep. The feature seems to have been filled by a succession of soft clayey deposits with the main upper fill being brown and organic. The lower fills (6294134, 6294135, 6294136) consisted of patches and alternating lenses soft dark brown clay, fine gravelly clay and pale brown clay. These give the impression of gradual deposition of clay and organic matter probably in a waterlogged hollow. The upper fill (6294088) was a soft dark brown organic clay containing charcoal flecks and patches of organic and fibrous material. This deposit resembled degraded peat and further suggests the infilling of a natural wet hollow with organic material, although the charcoal suggests human activity in the vicinity. A large stone slab (6294138) and some smaller stones lay on the top of the fill. The excavator suggested that these may have been the remains of capping stones, but even the large slab was not long enough to span the cut and there was no evidence that it had been positioned to do so.

Feature [6294133]
At the southern limit of the excavated area a feature was investigated that ran under the baulk. This feature [6294133] was an irregular hollow, 0.38m deep, with poorly-defined edges. It had loose gravel in the base and most of the fill was a grey-brown silt. The irregular form of this feature and the nature of its fill suggests that this was also a natural hollow.

Hollow [6294098/6294101]
At the southern extremity of the site was a large circular hollow [6294098] with a sub-rectangular cut [6294101] in its base (plate 32). This feature was not directly sealed by the buried soil (6294070) but the hollow above this infilled feature held a 0.3m thick layer of friable dark brown silty clay (6294099), which extended some distance beyond the limits of the feature. This layer was similar to and possibly part of the buried soil layer.

The large hollow, which was cut into the natural, was partly obscured under the southern baulk and therefore was not fully excavated, but was probably over 5m in diameter. This upper hollow had fairly gently sloping sides, a flat base and was up to 0.61m deep. Set in the base, slightly off centre towards the south-west, was a sub-rectangular cut [6294101], up to 0.27m deep and 0.85m wide. This feature also continued under the southern baulk and therefore was not fully excavated. The sides of cut

[6294101] were steep, and slightly undercut on the northern side, and its base was flat. It contained a single fill (6294102) of friable mid grey silty clay which contained inclusions of frequent small to medium sized sub-angular and sub-rounded stones, none of which showed any sign of burning. Sealing (6294102) and filling [6294098] was a dark brown silty clay (6294100) with c.40% gravel.

This feature appeared to be a large, shallow fairly irregular hollow. Even the deeper hollow in the base was not as regular in shape as a rectangular burnt mound trough might be expected to be and its full shape in plan was not revealed. The absence of burnt mound material from this feature does suggest that this was also a natural hollow in the boulder clay.

The burnt mound activity

The mounds
Over most of the southern end of the site was an extensive spread of heat-fractured stones that represented the remains of a burnt mound. Other spreads of similar material extended down the slope to the north.

The main burnt mound spread (plate 33) measured about 15m by 13m and was recorded under many different numbers (including 6294024/6294040/6294071). It consisted of a loose dark brown or black silt deposit containing about 80% stone. Most of the stone comprised small angular pieces, occasionally heat reddened, that had been broken by the effects of heat. This had a maximum depth of about 0.4m but was often very much thinner.

Just to the north of the main spread was a separate spread (6294049), measuring 7.2m by 4.5m and up to 0.15m thick. The matrix of this was a dark grey sandy silt but it also had a very high proportion of small heat-fractured stones.

Along the eastern baulk of the site was another, rather irregular spread of burnt mound material (6294061/6294151/6294192). This was nearly black in colour with charcoal and heat-fractured stones. It ran for about 13m along the side of the trench, extended up to 10m into the trench and probably merged with spread (6294049).

These spreads sealed and obscured numerous features, many of which were grouped towards the southern end of the site.

The southern group of burnt mound features
Under the main burnt mound spread in the southern part of the site were several pits and other features related to the use of the burnt mound. These cut thought the buried soil layers.

Pit [6294022] was oval pit was and measured 2.1m by 1.4m and 0.19m in depth. It had moderately sloping sides curving into a flat base. The pit's lower fill (6294130) was a brown peaty silt and the upper fill (6294023) was a very dark brown-grey silt containing charcoal (plate 34).

Pit [6294127] was a rectangular pit which had square corners and near vertical sides. It measured 2.0m by 1.30m, was 0.15m deep and aligned east to west. It contained a single fill (6294126) which consisted of a loose dark grey to black sandy silt with frequent inclusions of orange heat affected stones, up to 150mm in diameter. The fill was also very rich in charcoal. This pit seems to have cut into a natural channel [6294103] into which charcoal was introduced; causing some confusion during excavation as this initially appeared to be part of the feature (plate 35).

Adjacent to pit [6294127] were two straight gullies. Feature [6294107] was c.6.5m long, with a maximum width of 0.68m and a maximum depth of 0.18m. It was aligned roughly east-west, but seemed to curve slightly towards the south at the eastern end. This gully had been cut by a similar but straighter gully [6294108], at least 5.5m long, c.0.5m wide and 0.14m deep. Both gullies had fairly gently sloping sides and flat bases. Their fills contained heat-affected stones.

The eastern end of gully [6294108] was cut by a circular pit [6294111], 0.70m in diameter with a maximum depth of 0.32m (plate 36). The main fill of the pit was grey-brown silty clay with numerous

stones, some of which appeared to have been heat-affected. In the base of the pit was a deposit of greenish grey sand and fine gravels containing some charcoal.

A little further north was a sub-circular pit [6294105] (plate 37), measuring 1.64m in diameter with a maximum depth of 0.46m. The sides of the pit were steep and slightly undercut on the eastern side whereas the western side was more moderately sloping. The pit contained a firm black silty clay containing small pieces of fire-cracked stone with frequent flecks of charcoal.

Adjacent to this was pit [6294053]; an oval pit which measured 0.70m in diameter and up to 0.25m deep. This feature contained one fill (6294054) which was described as being a moderately compacted mid brown sandy silty clay, but no burnt stones. The lack of burnt stones in this feature makes it questionable whether it was associated with the other activity on the site.

Pit [6294033]
To the north of the main mound and sealed under the burnt stone spread (6294049) was a large sub-circular pit [6294033]. The pit measured 1.90m in diameter and had a maximum depth of 0.54m. The sides of the pit were steep and its base was bowl-shaped. Three stakeholes ([6294164], [6294166] and [6294168]) were cut into the bottom of the pit, set in a rough line orientated south-east to north-west (plate 38). The stakeholes were up to 0.1m in diameter and 0.2m deep, and it is probable that they were inserted in the pit base during its use.

Pit [6294033] contained seven fills (plate 39). The basal fills (6294153 and 6294154) were thin deposits rich in charcoal, while the main fills (6294035, 6294152, 6294155, 6294156, 6294157) contained small sub-angular heat fractured stones. These main fills varied slightly in colour and quantity of stones.

It appears likely that the burnt stone generated by the use of this pit was deposited to the east and north-east of the pit in the natural channel (6294150/6294195) (plate 40). The material filling the upper part of this channel (6294051/6294192/6294196) consisted of burnt stones in a very dark brown silty matrix. This had built up over a sequence of organic and erosion deposits (6294193, 6294194) in the base of the hollow.

The northern pits
To the north of the burnt mound spreads were two pits (6294002 and 6294003 (plate 41)). These may originally have had associated burnt stone spreads but if so these had been removed by ploughing or erosion.

Both pits were sub-circular with fairly steep sides and flat bases. They contained significant amounts of fire-cracked stones with occasional pieces of charcoal. Pit [6294002] was 1.1m in diameter and 0.23m deep, while [6294003] was 1.42m in diameter and had a maximum depth of 0.32m. A clayey layer (6294010) in the base and up one side of pit [6294003] was interpreted as possibly remains of a clay lining but seems more likely to be an erosion deposit created during the pit's use.

Artefacts and ecofacts
The only artefacts found were a possibly utilised flint blade (SF23) and an utilised bevelled pebble (SF22). Both were from probable buried soil horizons below the burnt mound, but could relate to the activity producing the mound. However the utilised pebble, the tip of which has been used creating bevelled facets, is a type of tool commonly associated with Mesolithic activity (appendix II.3).

Very little archaeological material other than burnt stone was recovered from any of the samples from this site. Even burnt stone, heat reddened or black, was not very abundant and many samples produced none that was identifiable. Interestingly only one of the fifty two samples produced any magnetic material which suggests that the deposits contained very little 'hearth material' (the fire results in the magnetisation of the iron rich mineral elements in the soil or hearth), so presumably only the burnt stone was being dumped here (appendix II.5). A tiny fragment of possible mussel shell was recorded from context (6294088).

The flots were more productive with volumes of charcoal varying between 1 and 1000ml, although generally less rich than the other burnt mounds sampled. Six of the 52 samples produced a fragment of charred cereal grain or hazelnut shell, with barley being identified from two samples. Three samples

produced some waterlogged plant remains with little apart from wood and bark surviving, although the fill of hollow [6294133] produced seeds of birch, goosefoot, Cyperaceae, buttercup family and bugle, the upper fill of hollow [6294158] produced uncharred hazelnut shell and birch seeds and the lower fill of the possible natural channel [6294103] under trough [6294127] contained wood and a few insect fragments. Two other samples produced uncharred birch seeds that may have been recent and could indicate contamination from intrusive material (appendix II.6).

In many of the samples the charcoal is more fragmented than on the other burnt mound sites and both identifiable fragments and material suitable for radiocarbon dating are more limited. The very variable concentrations of charcoal and burnt stone across the samples from this site may reflect some pattern of contemporary activity, such as the location of the fires and primary dump areas for the ash and stones (appendix II.6).

Small fragments of charcoal were recovered from several of the hollows included in group (6294184) and interpreted as natural hollows. There were also similar small fragments from buried soil contexts. In both these cases it is suggested that the charcoal has been introduced from the activity above by bioturbation. The same explanation might be used for the larger quantities of charcoal in two contexts (6294171 and 6294172) that were the upper fills of a palaeochannel [62941710]. However the quantity of charcoal in the samples from these contexts may suggest that both deposits were forming contemporary with, or postdating, the burnt mound. Feature [6294098/6294101] produced little charcoal, which supports the argument that this was not part of the burnt mound activity. Of particular interest are features [6294087] and [6294133] in the southern part of the site. Both contained some charcoal but also uncharred birch seeds, weeds seeds, moss, wood and bark (appendix II.6), and [6294133] contained two larger pieces of bark (SF 37) (appendix II.7). These features seem to have been waterlogged hollows and the charcoal suggests that they may have been open when the burnt mound was in use. The function and history of these should be considered when the flots are studied in more detail.

A total of fifteen relatively small fragments of oak (SF 56), most radially converted, came from context (6294046), a buried soil layer. These may be woodworking waste or reflect fuel usage at the site (appendix II.7).

A pollen monolith taken from the wetland adjacent to the northern end of the burnt mound showed that there was mixed oak woodland in the vicinity of the site. The sample from the buried soil layer (6294096) contained much the same pollen assemblages, suggesting that the environment immediately prior to the use of the burnt mound was wooded. In both pollen sequences the high counts for *Alnus* pollen suggest the dominance of alder carr woodland locally. Some indications of human activity were detected but they were limited and dating will be necessary to determine how they relate to the use of the burnt mound (appendix II.8).

Discussion

This site is interpreted as a series of activities using hot stone technology, usually but not necessarily in association with a trough or pit that held water, which the stones were used to heat. The burnt stones were discarded to form the burnt mound spreads, and some of this material also backfilled the pits. It is assumed that there was considerable mixing and reworking of the burnt stones and material within the spreads.

Feature [6294127] appears to be a rectangular trough typical of burnt mounds. It is likely that it had a lining of some sort, possibly timber, which has not survived. Charcoal and other material from the fill of this feature had become introduced into the fill of feature [6294103] below but the latter feature was irregular and resembled a natural channel so it is probable that this mixing occurred after the trough was abandoned, possibly through bioturbation. Pits [6294022] and [6294053] did not have as much burnt stone as some of the other features and are not clearly associated with the burnt mound activity, although their regular appearance makes this likely. They perhaps had a subsidiary function and where not water troughs. Pit [6294105] was less regular than [6294127] but was full of burnt stone and is likely to have been a sub-circular trough.

Pit [6294111] was very well-defined and filled with burnt stone. It seems rather small for a trough but small troughs have been found on other sites (e.g. in area E at Parc Cybi (Kenney 2011)), and its depth and steep sides are appropriate for a trough.

It seems to have been closely associated with the shallow gully [6294108]. At Porth Neigwl a burnt mound was found with a wooden launder to feed water into the trough (Smith 2009). The launder was made of a single piece of timber with most of the wood removed to leave the bark and sapwood forming a shallow wooden channel. This was set in a shallow gully similar to [6294108]. No trace of timber was found in [6294108] but its straightness indicates that it may have held a similar launder. If this was the case it is surprising that the launder ran not into a large trough but into a small pit, which would have taken relatively little effort to fill with water. However on excavation it appeared that pit [6294111] cut the gully and that they were not contemporary.

Feature [6294107] may also have held a launder. This gully was earlier than [6294108] and appeared to curve slightly at its eastern end and so may have originally run into trough [6294127]. However it would be difficult to create a curve in a wooden launder of the type found at Porth Neigwl and this may have just been a channel dug to carry water later improved by replacing it by a timber launder. If these features were launders or water channels they should have been running from the stream to the south-east of the site into a trough. If they did carry water from the stream they seem to have been running not into any of the troughs or pits but into the natural channel in the centre of the site. There are therefore problems with this interpretation of these features and they cannot be considered to have been proved to be the remains of launders or water channels.

Pit [6294033] seems to have been the trough for a separate episode of burnt mound activity. The burnt stone from the use of this feature was spread around the pit but was possibly also dumped into the natural channel to the north-east. At least parts of this channel must have been visible when the burnt mound was in use and the upper part of the channel was filled with burnt stone. The channel seems to have continued to the north but this part of the channel contained no burnt stone despite having two pits ([6294002] and [6294003]) filled with burnt stone on its western edge. This part of the channel may have been entirely infilled when the pits were in use but there were few traces of a burnt mound spread associated with these two northern pits so it is possible that they were used in a different way to the other pits on the site and did not produce large amounts of burnt mound material. They were however on slightly more sloping ground than the rest of the site and it is possible that any mound had been eroded down slope to the north.

Many of the features on excavation appeared to have been natural in origin, although it was impossible prior to excavation to securely distinguish archaeological from natural features. Some questions still remain about the identification of some features, such as group 6294184, as entirely natural and these need to be considered in the next phase of analysis. A hollow with a very uneven base [6294031] occupied the centre of the southern part of the site and this seems to have led into a deeper channel [6294170] running down hill to the north-east. A stratigraphically later channel [4150/4195] ran across the northern part of the site and it was this channel that seems to have been at least partially visible as a feature when the burnt mounds were in use. In some cases it has been difficult to securely identify which features were natural and which anthropogenic. Feature [6294101], which was interpreted on site as a possible trough, is particularly uncertain and would benefit from dating, but produced no suitable material. Dating the channels would be problematic as charcoal is most likely to be intrusive from the activity above rather than being related to the filling of the channels.

Finds

Find No	Context No	Material	Description
70	6294002	burnt clay	Fired earth
73	3294011	burnt clay	Fired earth
22	6294096	stone	Bevelled pebble
23	6294128	knapped stone	Flint flake
37	6294139	wood	2 fairly small split pieces from fill of natural hollow [6294133]
56	6294046	wood	Medium sized flat pieces of wood, possible split timber from pre-burnt mound buried soil deposit.

Samples

Sample No	Context No	Sample type
45	6294006	Bulk soil
46	6294010	Bulk soil

Sample No	Context No	Sample type
47	6294011	Bulk soil
53	6294071	Bulk soil

Sample No	Context No	Sample type
54	6294100	Bulk soil
55	6294102	Bulk soil
56	6294054	Bulk soil
57	6294106	Bulk soil
58	6294023	Bulk soil
59	6294112	Bulk soil
60	6294115	Bulk soil
61	6294116	Bulk soil
66	6294049	Bulk soil
67	6294117	Bulk soil
68	6294106	Bulk soil
69	6294104	Bulk soil
70	6294126	Bulk soil
71	6294023	Bulk soil
72	6294088	Bulk soil
73	6294088	Bulk soil
74	6294088	Bulk soil
75	6294134	Bulk soil
76	6294134	Bulk soil
77	6294140	Bulk soil
78	6294100	Bulk soil
79	6294091	Bulk soil
80	6294046	wood
81	6294131	Bulk soil
82	6294106	Bulk soil
83	6294070	Bulk soil
84	6294145	Bulk soil

Sample No	Context No	Sample type
85	6294144	Bulk soil
86	6294147	Bulk soil
87	6294152	Bulk soil
88	6294153	Bulk soil
89	6294032	Bulk soil
90	6294142	Bulk soil
91	6294156	Bulk soil
92	6294165	Bulk soil
93	6294167	Bulk soil
94	6294169	Bulk soil
95	6294172	Bulk soil
96	6294183	Bulk soil
97	6294179	Bulk soil
98	6294176	Bulk soil
99	6294177	Bulk soil
100	6294171	Bulk soil
101	6294032	Bulk soil
102	6294151	Bulk soil
103	6294185	Bulk soil
104	6294204	Bulk soil
105	6294206	Bulk soil
106	6294192	Bulk soil
107	6294193	Micromorphology
108	6294193	Micromorphology
109	6294186	Micromorphology
116	6294185	Hand collected charcoal

7.20. Plot 6/33: Two burnt mounds with an isolated pit (PRNs 34095, 34096, 34097)

Grid Reference: SH 52587 40118
Estimated period: Bronze Age
Summary: Two small burnt mounds associated with pits, troughs and other features, and an isolated pit.
Mitigation undertaken: Both burnt mounds were fully excavated and the isolated pit was half excavated. After the burnt mounds were recorded in plan evaluation slots were dug through them and once the sections of these had been recorded the mounds were removed by hand to reveal any features beneath.

See figures 16-19 and plates 42 to 50
In plot 6/33 two burnt mounds were discovered following removal of the ploughsoil under a supervised archaeological controlled strip. One area had two patches of burnt mound material (group number (633012)) in close proximity in the south-western area of field 6/33. A second burnt mound spread (group number (633015)) was discovered c.24m downslope from (633012) in the eastern side of plot 6/33. A thin layer of burnt mound spread was identified in the pipe trench so some of the burnt mound spread was preserved *in situ* under the running track.

Burnt mound (633012) (PRN 34095)
This feature, which had been detected in evaluation trench T24, consisted of two burnt mound deposits (plate 42); layer (633004) projected 1.7m from the northern baulk of the trench and was 3.2m long, and layer (633005) measured 3.2m by 2.3m. Both deposits were composed of c.60% small sub-angular heat-affected stones in charcoal-rich black silty clay, up to 0.12m thick, and must essentially have been part of the same mound. Patches of largely stone-free charcoal-rich silt (633019, 633021) under-lay parts of deposit (633005).

Under (633004) was the terminus of a possible shallow gully [633006], aligned roughly north-south and measuring 0.30m in width with a depth of 0.09m. The gully had a rounded end, gently sloping sides and its fill was indistinguishable from the mound above. There was also a small, sub-circular, steep-sided hollow [633008] sealed under (633004). This measured 0.25m in diameter and 0.18 metre in depth, with a narrow, tapering base. It was filled by firm black silty charcoal fill (633009) which

contained small fragments of burnt stone. This feature may have been a posthole, although there were no post-packing stones present, and alternatively it may have been a hollow where a stone was removed during the life of the burnt mound.

Deposit (633005) seemed to form the main part of the mound, and initially it was thought to seal various features. However a potential pit [633018] on the western side proved to probably be an animal burrow, and stones set on edge (633020) that appeared to be part of a trough lining were actually embedded in the natural and their presence was purely fortuitous (plates 43 and 44). A charcoal-rich deposit (633019) had built up in a hollow [633032] against these stones but this hollow, which was only 0.15m deep, did not seem to be a deliberately cut feature. Part of layer (633005) filled a shallow, sub-circular hollow [633030] with some small flat stones (633022) lying on it base, but there was no sign of heat-alteration on these and they had probably eroded into the hollow through natural processes.

No obvious trough was therefore identified in association with this mound, nor was there a clear fire site, although the lower, less stony charcoal layers (633019) could represent the remains of a fire.

One sample from (633004) produced a tiny chip of flint (SF67), but other than that only burnt stone was recovered from this mound. Fairly large quantities of charcoal were recovered from the site and posthole [633008] produced a charred bramble/raspberry seed (appendix II.6).

Burnt mound (633015) (PRN 34096)
Burnt mound (633015) was located down slope and to the east of the mound described above. It formed a rough L-shape in plan measuring 4.20m in length north-south and 4.85m in breadth east-west (plates 45 and 46). The mound contained three distinct deposits. The main part of the mound was (633024) which consisted of a friable black silty clay containing c.50% heat-affected stone with charcoal. Underlying this in places was a reddish brown silty clay (633025) with 60% heat-affected stone, and less charcoal than (633024). Also under (633024) on the northern side was a similar dark reddish brown deposit with a high proportion of heat-shattered stones (633027).

Under the northern edge of the mound was a sub-oval trough [633034] with steep sides and a flat base (plate 47). This feature measured 1.70m in length, 1.10m wide and a maximum depth of 0.63m. It was filled by small heat-shattered stones in a dark reddish brown silty clay matrix (633035) (plate 48).

Also on the northern side of the burnt mound, not sealed by the mound layers, but obscured under a grey silt (633036), was a circular pit [633028], with steep sides and a flat base (plate 49). The pit measured 1.04m in diameter and 0.27m in depth. It contained a single fill (633029), which consisted of a firm black silty clay with occasional fragments of burnt stone and frequent small flecks of charcoal.

This mound seemed to have two troughs, presumably in use sequentially and producing the different burnt mound layers. It is tempting to associate pit [633028] with the mound layer (633025) because the layer was mainly seen in the eastern side of the mound near the pit. It could then be claimed that [633028] pre-dated pit [633034] as layer (633025) underlay (633024). However it is likely that considerable reworking of the mound layers occurred and that some of the differences between the layers are due to soil conditions during and after the use of the mound, so defining the stratigraphic relationships is problematic.

No finds other than burnt stone were recovered from this mound. The burnt mound layer (633024) produced two fragments of charred hazelnut shell.

Pit [633010] (PRN 34097)
About 26m east and downslope of burnt mound (633015) was an approximately circular pit [633010], measuring 1.28m in diameter and 0.11m deep. This slight feature was burnt red in its base suggesting an *in situ* fire, and the main fill consisted of heat-fractured stone in a dark grey silty clay with frequent charcoal (633011) (plate 50). The pit contained some identifiable pieces of charcoal but no artefacts.

Charred plant remains and dating
Most of the flots from this plot produced sufficient larger identifiable charcoal for assessing the taxa and relative abundance of each taxa in the fuels used, and should give some indication of the types of wood used. Some of the charcoal is heavily mineralised and this may affect its identifiability and even its potential for radiocarbon dating. The hazelnuts and small roundwood in context (633024) are

suitable for radiocarbon dating and could date the main mound of (633015). From the other contexts most of the charcoal looks like fragments from larger pieces of wood that could be several decades old, so care is necessary in selecting material for dating (appendix II.6).

Location
These features were on an east facing slope at about 48m OD. The closest stream was 33m to the north, and down slope, so the troughs were probably filled with rain water or ground water. The clays into which the troughs were cut certainly seemed able to hold water. There are few burnt mounds known in the immediate area with that found in plot 6/29.4 (640m to the south-west) being the closest.

Finds

Find No	Context No	Material	Description
67	633004	flint	Small flint flake
21	633024	charcoal	Carbonised wood

Samples

Sample No	Context No	Sample type
37	633004	Bulk soil
38	633005	Bulk soil
39	633009	Bulk soil
40	633004	Bulk soil
41	633024	Bulk soil
42	633024	Bulk soil
43	633010	Bulk soil
48	633029	Bulk soil
49	633021	Bulk soil
50	633020	Bulk soil
51	633035	Bulk soil
117	633024	Bulk soil

7.21. Plot 6/38: An organic deposit and a natural hollow (PRN 34098)
Grid Reference: SH 52972 40018
Estimated period: N/A
Summary: An organic deposit and a natural hollow
Mitigation undertaken: Recorded by brief notes and photographs during watching brief

Plates 51 and 52
Two potential features were investigated in this area but both proved to have natural origins. Feature (638001) was an irregular patch of organic staining measuring 0.5m by 0.5m, probably degraded peat. Feature [638002] was an irregular hollow filled with angular stone and grey silt. Investigation suggested that this was a natural feature probably formed by peri-glacial processes. This plot is in a small valley near the stream and although there is little peat it is a wet area and flooded during the works.
Finds: None
Samples: None

7.22. Plot 6/39: Natural stone deposit (PRN 34099)
Grid Reference: SH 53010 40019
Estimated period: N/A
Summary: A layer of flat stones, subsequently found to be natural in origin
Mitigation undertaken: Investigative work and recording undertaken during the watching brief and the feature was found to be natural.

Plate 53
A layer of generally flat stones (639001) lay within or on a pale grey-brown silty clay, covered by a peaty topsoil (639002). The stony area measured c.13.0m by 4.5m and was about 0.15m deep. Some of the stones seemed to form lines but on excavation these proved not to be coherent. Some of the stones were embedded in the gritty glacial clay (639003) below and it is considered most probable that frost action has caused the stones to be lifted out of the substrate and sorted to produce this feature.

This plot is in a small valley near the stream and although the peat layer was only 0.3m deep it is a wet area and flooded during the works.
Finds: None
Samples: None

7.23. Plot 6/44: Tree root hollow (PRN 34100)

Grid Reference: SH 53549 40012
Estimated period: N/A
Summary: Irregular feature with evidence of root activity and rodent burrows
Mitigation undertaken: Recorded by brief notes and photographs during watching brief

Plate 54
Feature (644001) was a very irregular feature, measuring 5m across and 0.45m in depth, filled by mid brown and light grey silty clay with some stones. It appeared to be the result of tree root activity with perhaps some animal burrowing.
Finds: None
Samples: None

7.24. Plot 6/47: Two boundary ditches (PRN 34101)

Grid Reference: SH 53733 40085
Estimated period: Post-medieval
Summary: Two ditches close together identified in section of pipe trench, probably related to a footpath shown on the early OS maps.
Mitigation undertaken: Recorded by brief notes and photographs during watching brief

Plate 55
The pipe trench cut through two ditches about 3m apart. Ditch [647001] was 3.4m wide and 0.6m, while [647003] was about 3.5m wide and 0.4m deep. They were filled was fairly stony brown silty clay (647002, 647004) and seemed to be roughly parallel. These ditches were just east of a boundary that is shown on the 1889 OS map. There is also a footpath shown on this and later maps and the ditches may have flanked the path.
Finds: None
Samples: None

7.25. Plot 6/51: Shells in clay deposit (PRN 34102)

Grid Reference: SH 54327 40092 A
Estimated period: Unknown
Summary: Shells seen in blue grey clay. Possibly former strand-line.
Mitigation undertaken: Recorded during watching brief on trench record sheet. Sample of shelly clay collected.

Plate 56
Shells were seen in blue grey clayey silt (651001) at 1.8-2.0m below the surface and a bulk soil sample was collected. The sample produced an organic flot, with wood, waterlogged seeds, numerous herbaceous stems, moss and leaf fragments, snail shells, insects and a little charcoal. The snail and mollusc shells include species typical of estuaries and salt marshes. This suggests a former salt marsh environment, potentially a former strand line (appendix II.6).

This deposit was recorded at the north-western edge of the Traeth Mawr, less than 20m from the original shore line. The grey clayey silt presumably represents a former strand-line or shoreline. Its position means that this could just pre-date the reclamation of the traeth, but a radiocarbon date would clarify the history of the shoreline in this area. The organic component, either the roundwood or herbaceous stems, would both afford material suitable for radiocarbon dating.

Finds:

Find No	Context No	Material	Description
62	651001	Shell	Shells from lower layers

Samples:

Sample No	Context No	Sample type
110	651001	Shell
111	651001	Bulk soil

7.26. Plot 7/1: Small shell midden (PRN 34103)

Grid Reference: SH 55507 39594
Estimated period: Unknown
Summary: Deposit of marine cockle shells against an outcrop of bedrock with some traces of burning.
Mitigation undertaken: Recorded and samples obtained as part of the watching brief.

See figure 20 and plate 57
A concentrated deposit (71001) of mainly cockle shells with some winkles and a few oyster shells covering a roughly oval areas measuring 2.98m by 1.80m. The deposit was up to 0.36m thick and had built up against an outcrop of bedrock. The shells were in a matrix of dark grey/black silty sand, and some charcoal was also present.

Below the midden was a heat-reddened layer containing burnt stones and charcoal flecks. This layer measured 1.8m by 1.3m and was 0.25m thick and was probably heat-altered natural; many of the stones seemed to be naturally broken bedrock. It is assumed that this was the site of a fire or hearth.

The soil sample from this site included some organic debris, wood and birch and bramble/raspberry seeds, which may be recent material although some bramble/raspberry seeds were also recorded charred. Charcoal was present with a few terrestrial snails suggesting a shaded or woodland environment (appendix II.6).

The most abundant finds are marine shells, including cockle, periwinkles, oyster and rough winkle. The site would appear to have been a shell processing site where the shells were probably boiled, but on the basis of the organic component and the terrestrial snails it was set back from the coast, perhaps in local woodland fringing the bay before reclamation (appendix II.6).

The site lies on the very edge of the Traeth Mawr at about 5m OD. It must have been on the southern shore of the traeth before reclamation. No prehistoric sites have been identified along this shore in this area. The midden was partially buried under a thin layer of soil and colluvium, and seems to have been too shallowly buried to be prehistoric. The coastal section of the Cambrian Railway runs 300m to the south of the site and it is possible that navvies involved in its construction deposited the midden. However the evidence for woodland may indicate that the midden is not so recent as none of the early OS maps shows woodland on this site. It should not be assumed that all shell middens are prehistoric as one found near Minffordd has recently been dated as medieval (GAT project G2108, Porthmadog Bypass). Radiocarbon dating is the only way to determine the date of this midden and therefore the significance of this site. It should be possible to select charcoal suitable for dating from the flot.

Finds:

Find No	Context No	Material	Description
34	71002	shell	cockle shells

Samples:

Sample No	Context No	Sample type
44	71002	Bulk soil

7.27. Plot 7/2: Relict stream channels (PRN 34104)

Grid Reference: SH 55610 39560 A
Estimated period: Post-medieval?
Summary: Relict stream channels initially thought to be ring ditch and other features.
Mitigation undertaken: Channels investigated and recorded during watching brief and recorded on topsoiling sheets

See plate 58
The natural substrate in this plot was a light to mid brownish grey loamy clay. Within this was seen an arcing gully and other less well-defined curves and lines filled with grey silty sands, generally fairly light grey in colour with lenses of darker grey. The main feature formed an arc about 10.55m across

internally, which projected 5.00m from the baulk. The gully was 1.0m wide and up to 0.12m deep. Its sides sloped gradually and its base was irregular and undulating. Although initially thought to be possibly a ring ditch for a barrow investigation showed that the arc was not semi-circular and the gully appeared too shallow and irregular. This plot lies on the Traeth Mawr and it is most likely that these gullies were channels through the former salt marsh that have infilled as the land was reclaimed.

When the pipe trench was dug through this plot marine shells were found in the grey clay at about 1m below the surface towards the western end of the plot. This probably marked the shore-line at this point like the shells in plot 6/51.
Finds: None
Samples: None

7.28. Plot 7/8: Modern drainage ditch (PRN 34015)

Grid Reference: SH 57973 39020
Estimated period: Modern
Summary: A ditch recorded in the pipe trench. Contained slates and is shown on the 1970s OS map.
Mitigation undertaken: Recorded during watching brief on trench record sheet.

See plate 59
A ditch recorded in the pipe trench, measuring about 12.0m wide and 0.5m deep. It contained slates and concrete building debris. This could be a north-south aligned field boundary shown on the early OS maps from 1900 but the broad width recorded in the pipe trench suggests that the ditch cuts the line of the pipe at a very obtuse angle. It is therefore most likely that this an open drain shown on the 1970s 1:10,000 map running east-north-east to west-south-west.
Finds: None
Samples: None

7.29. Plot 7/13: Flint find spot (PRN 34106)

Grid Reference: SH 59460 38800 A
Estimated period: Modern
Summary: Find of piece of chalk flint and 19th century pottery in topsoil.
Mitigation undertaken: Recorded during watching brief

A broken piece of flint (SF24) was found in the topsoil. This is a large fresh flake of imported chalk flint and is most probably a modern import from elsewhere in Britain (appendix II.2). The proximity of the railway line may indicate this was the source of the flint. Nineteenth century pottery was also recorded in this area.

Finds:

Find No	Context No	Material	Description
24	713001	knapped stone/flint	Chunky flint flake with chalk cortex

Samples: None

7.30. Plot 9/6: Topsoil finds (PRN 34107)

Grid Reference: SH 60460 38700 A
Estimated period: Post-medieval
Summary: A small number of post-med pot sherds from the topsoil
Mitigation undertaken: Sherds collected

A small number of post-medieval pot sherds were recovered from the topsoil in the plot next to the Bron y Garth Hospital, previously the Ffestiniog Union Workhouse. There were six sherds of glazed 19th/20th century pottery from five separate vessels, including a fragment of a Marmalade stoneware jar and pieces of transfer printed crockery (appendix II.1).

Finds:

Find No	Context No	Material	Description
25	96001	ceramic (PM)	Late p-m pot sherds from Penrhyn pipe dump

Samples: None

7.31. Plot 11/3: Timber find spot (PRN 34108)

Grid Reference: SH 61196 39191
Estimated period: Unknown
Summary: Widely distributed timbers forming a rough layer
Mitigation undertaken: Recorded during watching brief and timbers sampled

See plate 60
A layer of peat up to 2m thick was seen over much of plot 11/3. At a depth of about 1m within this peat was a rough layer where wood was more densely concentrated. Some of the fragments of wood appeared to be chopped or possibly sawn and some were radially split. Many of the pieces were fairly small but there was also the stump of a tree. The peat was found immediately below the ground surface in this area and the upper parts also contained wood, including remains of modern trees.

A sample of wood was collected and this group of material includes clearly worked items with evidence for removing side branches, conversion through splitting working of points, and in one instance (SF 52) both blind and through peg holes suggesting re-use (appendix II.7).

This plot has been largely surrounded by houses since the 19th century, but has remained very wet through to the present day as it was covered by Himalayan balsam and willows. It is possible that the worked timber originated from earlier buildings demolished as the 19th century town was built.

Finds:

Find No	Material	Description
43	wood	Small cut branch
50	wood	Large branch, probably not worked
51	wood	Large pieces of wood, possibly worked
52	wood	2 large pieces of wood, possibly worked, 2 medium sized pieces
53	wood	Large pieces of wood, possibly worked

Samples: None

7.32. Plot 13/30: Timber find spot (PRN 34109)

Grid Reference: SH 65675 40350
Estimated period: Unknown
Summary: 2 large timbers recovered
Mitigation undertaken: Timber collected

See plates 61 and 62
Two large timbers were found in base of the trench at a depth of about 1.5m below the present surface. These were in a mid-brownish grey silty sand of probable alluvial origin. Most of the layers above were alluvial silts and clays with a band of brown, organic material in places.

One of the timbers (SF 57) is quartered and was subjected to spot dating, but the tree-ring sequence could not be cross-matched against existing dated British or Irish sequences. The second timber (SF 58) is an approximately quartered piece of knotty oak with possible tool mark survival and shows similarities to some of the timbers recovered from plot 14/7 (appendix II.7). Whether this indicates that there was a wooden causeway in this area or whether the timber had washed downstream is not yet clear.

This site is on the flood plain of the Afon Dwyryd about 190m west of the river. The river here is tidal and meanders across its flood plain, but has not changed its course since 1889, partly because there were already flood banks built along each side of the river at this date.

Finds:

Find No	Context No	Material	Description
57	0	wood	Very large timber, worked
58	0	wood	Very Large timber, worked

Samples: None

7.33. Plot 14/1: Timber find spot (PRN 34110)

Grid Reference: SH 66445 40949
Estimated period: Unknown
Summary: Large squared timber recovered from clay
Mitigation undertaken: Recorded during watching brief, timber sampled

See plate 63
A large squared timber was recovered from the mid grey silty clay in the base of the trench. This timber is a radially converted piece of slow-grown (c. 200 rings) oak with a wedge cut point at one end. As part of a selective spot-dating exercise, this timber with its large number of rings, was subjected to dendrochronological analysis. The sample proved difficult to measure with a number of bands of narrow, sometimes anomalous rings in the latter part of the tree-ring sequence, but it is suspected that the date of the outermost surviving ring of this timber is in the mid-13th century (appendix II.7).

This site is on the flood plain of the Afon Dwyryd about 180m north of the river. The river here is just at the tidal limit with the highest point of ordinary tides being under the bridge at Maentwrog. The river meanders across its flood plain, but has not changed its course since 1889, partly because there were already flood banks built along each side of the river at this date.

Finds:

Find No	Material	Description
49	wood	Large squared timber

Samples: None

7.34. Plot 14/4: Possibly worked wood (PRN 34111)

Grid Reference: SH 66605 41061 A
Estimated period: Unknown
Summary: A possibly cut branch and plank shaped timber found in alluvial clay
Mitigation undertaken: Recorded during watching brief, wood samples taken

See plates 64 and 65
A piece of oak roundwood (SF 42) with possible toolmarks was found in alluvial clay. A large unworked branch was also found in this plot. The clay is described as firm dark grey silty clay, and it had alluvial gravels below it.

This site is on the flood plain of the Afon Dwyryd about 180m north of the river. The river here is generally not tidal, but the highest point of ordinary tides is under the bridge at Maentwrog, so on some tides this section of river must still be tidal. The river meanders across its flood plain, but has not changed its course since 1889, partly because there were already flood banks built along each side of the river at this date.

Finds:

Find No	Material	Description
42	wood	Small, possibly cut branch

Samples: None

7.35. Plot 14/7: Deposit of wood and branches, possible foundation for a Roman road (PRNs 34112, 34113 and 34114)

Grid Reference: SH 66907 41219
Estimated period: Roman?
Summary: A thick deposit of branches, some possibly cut under silt deposits, an isolated timber and a cattle skull.
Mitigation undertaken: Recorded during watching brief

See figure 21 and plate 66
Plot 14/7 lies within a bend of the Afon Dwyryd. The field is reclaimed land protected by a flood bank since at least the late 19th century. The 1841 tithe map for Maentwrog parish shows the same course of

the river as in 1889. The bend in the river to the north-east of plot 14/7 was straightened out in the 20th century and now exists as ox-bow lake type ponds. Under about 0.1m of topsoil (147001) was a layer of mid orange-brown silty clay (147002) 0.39m thick. This overlaid a mid grey-brown silty clay (147003), which in turn covered a light grey silty clay (147004/147006). All these deposits appeared to be alluvial silts. About 32m east of the current river bank (SH 66864 41214) a large piece of timber (PRN 34112) was recovered from the silts at a depth of 1.1m below the present surface from context 147006. This timber (SF 59) was a quartered piece of oak with possible axe marks on one end and one face, at least (appendix II.7).

In places beneath 147004, centred on SH 66907 41219, was a deposit composed largely of pieces of wood (147005). This deposit (PRN 34113) was between 0.9m and 1.1m below the present surface and composed of dark grey silt containing a dense concentration of pieces of wood, branches and hazelnuts. Many of the pieces were small but two large timbers were found, the largest was 0.75m in length. Twenty nine pieces were collected for study and these include numerous quartered or radially split oak wood with tool marks. There are also smaller roundwood items with evidence of working such as the cutting of side branches. A number of the pieces exhibit clear woodworking from initial conversion through splitting followed by secondary hewing which implies that at least part of this assemblage represents worked and possibly finished timbers. Some of the smaller items may represent the debris from woodworking (appendix II.7).

The view of this feature in the base of the pipe trench did not allow the identification of any structure and it was initially assumed to be material deposited by the river. However the assessment of the timber strongly suggests that this was a structure and Nigel Nayling considers that "this group of material cannot be explained as natural driftwood, or remnants of simple woodland clearance" (appendix II.7). The exact route of the Roman road from Segontium to Tomen y Mûr is not known but several likely routes are proposed (Hopewell 2007). If a line is drawn between the ends of the most likely routes on either side of the flood plain it crosses almost exactly where the wood deposit was found. It therefore seems probable that the structure was the timber foundation for a causeway leading possibly to a bridge across the river and that this was Roman in date. There was no trace of metalling or any other road surface so the structure was presumably entirely of timber not a brushwood base for a metalled road.

There was a high concentration of hazelnuts. Of the sample collected all bar one of the nutshells are intact, and the single broken shell appears to have broken naturally possibly during or since excavation. They are not therefore shells from consumed nuts but they may indicate that many of the branches used in the structure were cut in autumn with their nuts still attached. However it is also possible that these were nuts from riverside trees that dropped into the water and were deposited amongst the timbers of the structure. In this case the nuts could be of a very different date to the structure . No artefacts, other than wood, were found in this area.

Fourteen meters to the west of the wood deposit was a palaeochannel (SH 66893 41219), c.5.8m wide and over 0.7m deep (it was not fully exposed in the trench). This channel was filled with layers of alluvial gravel and was cut through the grey alluvial silty clay.

Towards the eastern end of plot 14/7 part of a cattle skull with horns was found at a depth of 1.4m (SH 67004 41235, PRN 34114). This was found within what appeared to be a low mound of grey silty clay (147009). The grey clay was sealed by a mid orange-brown silty clay (147008). The skull fragment, comprised the posterior frontal bones with intact horn cores of medium length (Armitage and Clutton-Brock 1976) and the horns themselves still surviving although degrading. The skull is relatively small with the horns pointing slightly upwards and forwards on the skull. Their conformation and size is consistent with a medieval animal, but also could be a small recent breed, such as a Welsh White (appendix II.6).

Finds:

Find No	Context No	Material	Description
35	147009	bone	cattle skull
36	147005	wood	Medium sized piece of cut wood
38	147005	wood	Small cut branch
39	147005	wood	small piece of wood
40	147005	wood	Small plank
41	147005	wood	Small branches and hazelnuts
44	147005	wood	Cut branch, squared wood and other more natural pieces (7 small, 1 medium)
45	147005	wood	Medium sized possible split timber
46	147005	wood	Large timber with (saw) cut end
47	147005	wood	Small flat, possibly split timbers
48	147005	wood	Medium sized possibly split timber
59	147006	wood	Very large timber, worked?
63	147005	nuts in shells	Whole hazel nuts

Samples:

Sample No	Context No	Sample type
115	147005	Nuts

7.36. Plot 14/17: Flint find spot and remains of a wall (PRN 34115)

Grid Reference: SH 68490 41682 A
Estimated period: Prehistoric and post-medieval
Summary: The foundation of a field wall and a single flint flake.
Mitigation undertaken: Recorded during controlled strip

A flint flake (SF32) was found while walking over the stripped plot. This is a short, broad flint flake and was not associated with any recognisable feature.

The base of a wall, aligned south-west to north-east, was uncovered on the north bank of the river, about 10m from the river. Only the base of the wall remained in the spread but its continuation could still be seen upstanding running parallel to the river beyond the easement. The base of the wall was about 0.6m wide and rested on alluvial sediment. The wall foundations were composed of medium and large sub-rounded river stones, and some 19th century china was found amongst the stones.

This is a wall shown on the early OS maps running for a short distance by the river.

Finds:

Find No	Material	Description
32	knapped stone	flint flake

Samples: None

7.37. Plot 17/3: Former stream channel (PRN 34116)

Grid Reference: SH 70318 44195
Estimated period: N/A
Summary: Natural channel initially thought to be possibly a ditch.
Mitigation undertaken: Recorded during watching brief

See plate 67
A channel 3.5m wide and 1.1m deep was noted in the side of the pipe trench. This was aligned north-east to south-west and had peat deposits within its fill. This was initially thought to be a ditch but on closer inspection it was seen to be a natural fluvial channel that had filled in with peat.
Finds: None
Samples: None

7.38. Plot 17/15: Modern dump (PRN 34117)

Grid Reference: SH 70230 45314 C
Estimated period: Modern

Summary: Extensive area of dumping at least 1.9m deep containing demolition rubble and modern finds with early 20th century material lower down.
Mitigation undertaken: Recorded during watching brief on trench record sheet.

See plate 68
A large natural depression has been filled with rubbish and demolition rubble to level the field. Test slots were machined through this deposit to determine its depth. The depth of this deposit meant that this area could not be fully control stripped as had been intended.

The deposit, more than 1.9m deep in places, was dark grey and contained modern brick, stone and slate, as well as large boulders. The upper 0.2m contained plastic piping and bottles probably dating the 1960s and 70s. The lower fill contained finds dating to the early 20th century, including pottery and glass.

Some flat stones slabs exposed in the base of one exploratory slot could be part of a structure and some of the demolition material may have originated from a structure on the site, rather than being dumped from elsewhere.

A disused tip is shown on the 1970s 1:10,000 map about 100m west of the pipe route and this may have extended further than that indicates. The tip is not shown on the 1919 OS map. No buildings are shown in the field, although the OS maps from 1888 show a rectangular earthwork at SH 70259 45313, the destruction of which might have contributed to the rubble.
Finds: None
Samples: None

7.39. Plot 18/3: Wall (PRN 34118)
Grid Reference: SH 70464 45690
Estimated period: Modern
Summary: A large wall probably associated with the gas works
Mitigation undertaken: Recorded during watching brief

See plate 69
A large stone wall was found, about 1m thick and surviving to a height of c.2m, although buried about 0.5m below the present ground surface. The wall ran roughly south-west to north-east and was composed of local mortared stone, strengthened with iron bars. The wall was holding back water on its northern side, which was released as the wall was breached making recording difficult. To the south of the wall was a loose stony backfill, but against the northern side of the wall was a denser deposit of demolition rubble comprising stone, slate and brick, including part of a demolished brick wall. There was also an ash deposit in the northern end of the plot.

In 1889 the northern part of plot 18/3 was occupied by a gas works. A south-west to north-east aligned boundary ran through the location of the wall at this time but this was an ordinary field boundary and there is no reason to assume that it was a substantial stone wall. By 1901 the gas works had expanded further south and a large gas holder was located with its southern edge directly over the location of the wall. It therefore seems likely that the wall was part of revetting to level the ground, and the rubble dumped behind it supported the gas holder.
Finds: None
Samples: None

7.40. Field boundaries

Field boundaries identified in the assessment report as of historical interest were recorded when they were breached by the works. This revealed the construction and nature of these boundaries. Appendix IV lists the boundaries recorded with references to the archive photographs. More detail on each boundary is recorded on the boundary record sheets.

Consideration of the records and the map evidence indicates that while the majority of the boundaries recorded appeared on the tithe maps many probably did not pre-date the 18th century. Several are on reclaimed land such as the salt marsh east of Afon Wen (plots 3/9 to 3/12); the Traeth Mawr (plots 6/51

to 6/54 and the flood plain of the Dwyryd (plot 13/24). William Oakeley was reclaiming the flood plain of the Dwyryd in the late eighteenth century (GAT 2003, 33). The western branch of Traeth Mawr was reclaimed after William Madocks had built an embankment east of the future site of Tremadog in 1800. The larger part of the Traeth was only reclaimed after Madocks had in 1813 finally succeeded in building and consolidating the embankment known as the Cob running across the mouth of the Glaslyn Estuary (Beazley 1985). These field systems on reclaimed land are noticeably regular with large fields and straight boundaries. Many of these boundaries are traditional *clawddiau* (earthen banks faced with stone usually with a hedge growing on top). There is little to indicate that such banks are exclusively early and both clawddiau and drystone walls seem to have been used from the 18th century onwards.

Earlier boundaries can possibly be identified by their irregular or curving line and the small size of the fields they enclose. Of the possibly pre-18th century boundaries most are *clawddiau* but a significant number are drystone walls. Both type of boundary could have been rebuilt but there is evidence of some of the walls having been straightened compared to earlier mapping and they may have originally have been *clawddiau* and have been rebuilt as walls. The suggestion is that most of the earliest boundaries in this area were originally *clawdd* boundaries, although those on higher and rockier ground were probably always drystone walls.

There is a group of small fields with fairly irregular boundaries around Hafod-talog (plots 13/2 to 13/6). These have stone walls but they enclose a small knoll on the edge of the Dwyryd flood plain, which was probably quite suitable for agriculture and settlement. The name Hafod suggests a temporary or secondary settlement from the main hendre farm and could indicate a 16th century origin for the fields.

North of Pentrefelin there are fields with curving boundaries (plots 6/29 to 6/31) which may indicate groups of strips originally within open fields that have been enclosed. Some of the fields to the north of Criccieth, especially plot 6/3 with its curving western boundary also give this impression. Plots 6/23 to 6/25 immediately north of Eisteddfa are regular in shape but are part of a series of fairly narrow fields running along the slope, which again may be enclosed strips. Plots 4/1 to 4/4 and possibly other fields around Llanystumdwy should also be considered in this light.

7.41. Alluvial, marine and peat deposit

The presence of alluvial, peat and marine deposits were recorded in the Traeth Mawr and Dwyryd valley and occasionally elsewhere, see figures 1 to 4 for the locations of recorded plots and appendix V for deposit descriptions. The most significant peat deposit in the western part of the scheme was the marsh in plot 0/8. The western arm of the Traeth Mawr, towards Penmorfa, was largely filled with grey marine clay. Shells were noted within this, with a particular deposit in plot 6/51 apparently representing the former strand-line. This part of the Traeth was the first to be drained after William Madocks built an embankment to the east of the site of Tremadog (Beazley 1985). The grey clay probably represented salt marsh deposits and remains of channels typical of salt marshes were noted in plot 7/2. Within the main part of Traeth Mawr the deposits were mostly sand, representing a more active estuarine environment.

Some perhaps unexpected peat deposits were found in Penrhyndeudraeth in plots 11/3 and 11/4. The pipe crosses on to the flood plain of the Afon Dwyryd at plot 13/6. At the edge of the flood plain in this plot a marsh had developed, but generally the flood plain was composed of alluvial clays and silts. The deep alluvial deposits ending in plot 14/15. Patches of peat of varying depths were found within the north-eastern section of the pipe route as it crossed the higher land near Blaenau Ffestiniog.

8. ARTEFACTUAL AND ECOFACTUAL SUMMARIES

The specialists who carried out the assessments on the artefacts and ecofacts are listed in appendix I. The full assessment reports are included in appendix II and brief summaries only are given below, where possible using direct quotes from the reports.

8.1. Artefacts

Post medieval pottery and associated leather items

See appendix II.1 for full report.

Post medieval pottery was recovered from three plots. These are mostly from the 19th and 20th centuries. The largest assemblage was from a midden in plot 6/22. From this 15 sherds were collected representing at least twelve ceramic vessels. These represent the typical wares and forms available to most households during the mid-late 19th century. They comprise a mix of refined, but affordable tea and table wares, and more utilitarian forms, some of which came from the Stoke-on-Trent potteries, although other items come from Newcastle-upon-Tyne and Nottinghamshire and/or Derbyshire.

There were also parts of leather shoes, iron nail and other objects. The shoes were particularly represented by leather soles, and parts of at least two pairs of adult shoes (although small - size 5 or 6) and one possibly belonging to a child was collected. These are presumably also 19th century in date.

Flint and other stone

See appendices II.2 and 3 for full reports.

Six pieces of flint were found and one tiny flake of quartz crystal. One piece is probably a modern import from elsewhere in Britain. The remainder are made on locally available glacial pebble flint. There are no retouched pieces and so none properly diagnostic of date. However, two pieces (from plots 3/2 and 6/29.4) are probably utilised blade segments, possibly from composite edge cutting tools and potentially diagnostic of Neolithic activity.

Nineteen other stone objects were recovered from seven contexts. Some of these are manufactured objects and some simply utilised. The objects are of a variety of materials but predominantly tough igneous rock and using glacial boulders or cobbles. Some are coarse and others finer and this relates to their type of use and so proper petrological identification is needed, at least to hand specimen standard.

The earliest object (SF22) is an isolated find but from beneath a burnt mound. It is a pebble of which the tip has been utilised creating bevelled facets. This type of tool is commonly associated with Mesolithic activity.

Two objects (SF55) are probably unused natural cobbles but need more detailed study.

The rest of the objects, all from plot 3/2, include two saddle querns, one broken, fragments of two other saddle querns, a saddle quern rubber, a facetted edge utilised pebble rubbing stone and a worn cobble. There are also some pieces of broken boulder that may have been part of broken querns. Most of these objects have been burnt and seem likely to have been utilised in some later activity, perhaps in creation of a fire-pit or oven. The objects are all domestic and the type of objects associated with later Iron Age settlement. The concentration of objects indicates that such settlement was very close by. The re-use of the items in later activity may have been chronologically separate or could have been a continuation in a changed usage of the site. One of the querns, although massive and not greatly worn down has been broken in two, probably deliberately. It is of a neat oval form, a developed type that could be expected to be late in the occurrence of such objects. Rotary querns are believed to have come into use in north Wales in the late first century BC or first century AD, but saddle querns did continue in use later.

Metal objects

See appendix II.4 for full report.

A total of five iron and copper-alloy items recovered from plots 0/3, 3/14 and 3/20. Two nails from plot 3/20 could date to either the medieval or post-medieval periods, whereas a button from this plot was 19th century. A fragment of a copper alloy perforated plate from plot 3/14 was considered to be probably 18th or 19th century in date and a corroded mass of iron from plot 0/3 was undiagnostic of date.

Archaeometallurgical residues
See appendix II.5 for full report.
Much of the material collected was either natural or fired clay of uncertain origin but there was evidence for metallurgical activity at two sites:

Site 3/2 produced a single piece of a smithing hearth cake, presumably indicative of ironworking (smithing) somewhere in the general area, but the piece was recovered from a corn drier.

Site 3/14 had a cut feature which was very likely to have been a floor level smithing hearth and which contained a deposit including hammerscale and other smithing fines. The deposit also yielded two fragments of copper alloy, suggesting some working of copper alloys was undertaken too. The forging of both iron and copper alloys tends to be a feature seen on late medieval and post-medieval sites, but the assemblage is not strictly datable.

Burnt stone
The wet sieving process produced residue <1mm, >1mm and >7mm in size. The former was discarded after sorting for artefacts. For sites where there was a mix of burnt and unburnt stones the former were separated from the coarse residues. On burnt mound sites and other sites where most of the stone was burnt this was all retained in the coarse residue. On these sites the number of samples with brunt stone is not separately itemised.

Table 5: Weights and numbers of samples with coarse residue and burnt stone

Plot	**Site type**	**Weight (g) of residue >1mm**	**Weight (g) of residue >7mm**	**Weight (g) of Fired stone**	**No of samples with coarse residues**	**No of samples with fired stone**
Plot 0/3	Gully or pit with burnt stone	4221	2858	433.8	1	1
Plot 3/10	Burnt mound	16551	13839	10908	3	3
Plot 3/14	Smithing pit	2331	445.6	16.6	1	1
Plot 3/2	Corn drier and pits	40590	10700.6	2229.2	9	9
Plot 3/20	Ditch	39255	24480	1075	3	2
Plot 3/27	Possible cremations	5541.5	3382	425.8	2	1
Plot 6/10	Oven?	2876	880		2	0
Plot 6/21	Burnt mound	12739	8146		4	0
Plot 6/29.4	Burnt mound	345280.5	259505		54	0
Plot 6/33	Burnt mounds	95822	80832		12	0
Plot 6/51	Former shoreline	233	81		1	0
Plot 6/6	Burnt mound	3211	2095		2	0
Plot 7/1	Shell midden	16632	8366		1	0
Totals		**585283**	**415610.2**	**15088.4**	**95**	**17**

Timber
The wood assemblages derive from seven possibly unconnected contexts. With the exception of the burnt mound complex where site form indicates a Bronze Age date, the material's context does not provide an insight into dating. One of the two timbers subjected to dendrochronological spot-dating as part of the assessment may date to the medieval period. The location of the feature in plot 14/7 suggests a Roman date and this could be a timber causeway across the Dwyryd flood plain.

8.2. Ecofacts and environmental data

Charred plant remains

See appendix II.6 for full report.

A total of 117 samples from fourteen archaeological sites were collected and processed. The sampled sites included excavations of a series of burnt mounds (sites 3/10, 6/6, 6/21, 6/29.4 and 6/33), a corn drier and pits (site 3/2), pits with smithing evidence (site 3/14), a ditch (site 3/20), two sites with pits (sites 0/3 and 3/27), a shell midden (site 7/1) and a possible former riverbank (site 14/7), and a possible shoreline (site 6/51). Several of the sites currently remain undated, but Bronze Age, medieval and post-medieval periods are represented among the samples, with the majority of the samples being taken from Bronze Age burnt mounds.

Pollen

See appendix II.8 for full report.

Monolith samples M2 and M3 were assessed, both from plot 6/29.4. Monolith M2 was taken from a layer (6294096) interpreted on site as a buried soil beneath the burnt mound, and monolith M3 was taken from the wetland adjacent to the burnt mound at c.SH 52265 39617. Pollen was extremely well preserved in all of the samples. Assessment level counts of 100 total land pollen (TLP) grains were achieved in all samples.

In both pollen sequences the high counts for *Alnus* pollen suggest the dominance of alder carr woodland locally throughout sediment accumulation. Mixed oak woodland persisted in the vicinity of the site, where *Corylus*, *Quercus* and, to a lesser extent, *Betula* formed the major components. Indications of human activity are limited, although an increase in light-demanding arboreal taxa, such as *Ilex*, *Hedera*, *Lonicera* and *Ulmus* in the M3 pollen sequence accompanied by a decline in *Alnus*, and a more diverse range of herbs, including the representation of well-attested anthropogenic indicators and open-habitat taxa, such as *Lactuceae*, *Plantago*, *Ranunculaceae* and *Pteridium* may reflect small-scale woodland clearance. Other herbs, including *Filipendula* and *Cyperaceae*, are likely to reflect damp grassland possibly forming elements of the alder carr understorey.

It is evident from both pollen profiles that the landscape remained well-wooded throughout the period of sediment accumulation, with only limited evidence for human-induced woodland clearance.

Bone and shell

See appendix II.6 for full report.

Three plots produced marine shells. Only 2 shell fragments came from the ditch in plot 3/20 and the larger samples came from plots 6/51 and 7/1, where they represented a shoreline and a shell midden respectively.

Another 3 plots produced bone. Tiny burnt fragments were found in plot 3/2 in relation to a medieval corn drier and probably earlier pits. Unburnt remains of a cow were recovered from plot 14/7 in alluvial deposits. These remains included part of the skull with horn cores and horns as well as ribs and a vertebra. The remains are considered to be consistent with a medieval or Roman animal, but also could be a small recent breed, such as a Welsh White. The deposit that the bones were recovered from was alluvial clay but was not organic. The conditions may have been sufficient to ensure the survival of the horns for a long period of time but their presence could indicate a fairly recent date for these remains.

The most significant collection came from plot 3/27, where two pits produced significant amounts of burnt bone. This may be human bone and could represent cremations.

Soil micromorphology

Three soil micromorphology samples were taken from deposits within and under the burnt mound site in plot 6/29.4. Sample K1 was taken from the possible buried soil layers (6294099/6294100) adjacent to pollen monolith M2. Sample K2 was from layer (6294004) interpreted on site as a buried soil layer beneath the burnt mound deposit (6294045) (field drawing 94, sheet 27). Sample K3 was from (6294037), a silty deposit filling hollow [6294036], and probably also part of the buried soil pre-dating the burnt mound.

Other palaeoenvironmental evidence

See appendix II.6

Only a small number of samples contained terrestrial snail shells, waterlogged plant remains and insect remains. The presence of these have been recorded.

9. STATEMENT OF POTENTIAL

9.1. Overall potential of the sites

This section will briefly discuss the potential of the excavated data. Each site has been assessed for its archaeological importance according to categories defined in appendix III. The Research Framework for Wales has been considered in this assessment of importance. The national Research Framework was established after a conference in 2004 and was reviewed at a conference in September 2010. The documents are available online at http://www.archaeoleg.org.uk/index.html. Full review documents are only available for a few periods but all periods have notes from the review conference, which the current author attended. A fuller discussion of comparative sites and general context is given in the research questions outlined in the accompanying Updated Project Design.

Table 6 lists the sites and their category of importance. The potential of groups of sites are discussed below considering their stratigraphic and structural data in combination with artefactual and ecofactual evidence. The specific potential of groups of artefactual and ecofactual evidence are also discussed separately.

Table 6: List of archaeological features and their importance

Plot	Archaeological features	Estimated period	Importance	Grid reference
0/1	Stone-filled drain	Post-medieval	D	SH 38544 35997
0/2	Burnt mound feature	Bronze Age	B	SH 38674 36216
0/3	Elongated pit or gully terminus	Unknown	E	SH 38718 36289
0/8	Timber find spot	Unknown	E	SH 39047 36352
0/9	Non-archaeological	N/A	0	SH 39260 36328
0/11	Possible burnt mound	Bronze Age	B	SH 39424 36386
1/2	Modern coins	Modern	0	SH 39590 36376
3/2	Pits and corn drier	Medieval	B	SH 41856 36698
3/6	Possible burnt mound trough	Bronze Age?	E	SH 43744 37378
3/10	Burnt mound	Bronze Age	B	SH 44198 37566
3/14	Smithing site and pit	Post-medieval?	E	SH 45300 37810
3/20	Ditch	Unknown	E	SH 46114 37866
3/27	Two possible cremation burials	Bronze Age/Iron Age?	E	SH 47318 38223
5/5	Stone-filled drain?	Post-medieval	D	SH 49288 38986
6/6	Burnt mound	Bronze Age	B	SH 50241 38912
6/10	Possible pit oven	Unknown	E	SH 50551 38918
6/21	Burnt mound	Bronze Age	B	SH 51726 39790
6/22	Midden	Post- medieval	D	SH 51750 39801
6/29.4	Large burnt mound complex	Bronze Age	A	SH 52254 39574
6/33	Two burnt mounds	Bronze Age	B	SH 52587 40118
6/38	Natural features	N/A	0	SH 52972 40018
6/39	Natural stone deposit	N/A	0	SH 53010 40019
6/44	Tree root hollow	N/A	0	SH 53549 40012
6/47	Two boundary ditches close together	Post-medieval	D	SH 53733 40085
6/51	Shells in clay deposit	Unknown	C	SH 54327 40092
7/1	Small shell midden	Unknown	E	SH 55507 39594
7/2	Relict stream channels	N/A	0	SH 55610 39560
7/8	Modern ditch	Modern	D	SH 57973 39020
7/13	Flint find spot	Modern?	D	SH 59460 38800

Plot	Archaeological features	Estimated period	Importance	Grid reference
9/6	Topsoil finds	Post-medieval	D	SH 60460 38700
11/3	Timber find spot	Unknown	E	SH 61168 39172
13/30	Timber find spot	Unknown	E	SH 65675 40350
14/1	Timber find spot	Unknown	E	SH 66445 40949
14/4	Timber find spot	Unknown	E	SH 66605 41061
14/7	Possible Roman road	Unknown	E	SH 66907 41219
14/17	Flint find spot and remains of a wall	prehistoric and post medieval	D	SH 6849 4168
17/3	Former stream channel	N/A	0	SH 70318 44195
17/15	Modern dump	Modern	D	SH 70230 45314
18/3	Wall	Modern	D	SH 70464 45690

Natural features
Five sites proved on investigation to be natural features. These sites have no archaeological potential but it was important that they were investigated during the works to prove that they were not significant archaeological feature. It is often impossible to identify genuine archaeology from natural features without investigation and the failure to do so would risk the loss of archaeological features unrecorded.

The modern coins found in plot 0/2 are also classed as having no archaeological significance.

Category D sites
Ten sites have been identified as category D. These include drainage features, a wall probably associated with the gasworks and two recent middens or dumps. It is valuable to characterise these features and prove that they are not of greater archaeological significance. The record of the presence of these features, especially the middens, may be of use to specific future studies of the 19th century in this area but without their inclusion in a wider work beyond the limits of this project they are of limited archaeological potential.

Category C sites
The marine clay deposit containing shells identified in plot 6/51 is classed as a category C site and has potential to reveal information of local importance. It might be used along with other environmental data to indicate the former limits of the Traeth Mawr. This site situated on the flat former estuary area near the point that the ground starts to rise indicating the former shoreline. The presence of marine deposits in this area is therefore to be expected and this discovery does not add greatly to the understanding of the limits of the estuary.

Category B sites: Burnt mounds
A clearer understanding and coherent narrative of events at the start of the Bronze Age will only become possible following study and dating of sites either side of the Early Bronze Age. This research is hindered by the scarcity of evidence for Early Bronze Age settlement as highlighted in the Research Framework Review Conference. This makes burnt mounds particularly relevant, because although their functional and physical relationship to settlement is still unclear they are the only common non-ceremonial sites that are found. Previously dated sites demonstrate that burnt mounds can indicate activity over a wide chronological span, from Late Neolithic through to Early Iron Age, so spanning the transition from the Neolithic to the Bronze Age. The potential for palaeoenvironmental and occasionally artefactual information from these sites makes them vital in studying social and cultural change over this period. However the potential of the information they contain is only realised if this can be fitted into a chronological framework by radiocarbon dating.

The individual mounds vary in their potential for providing archaeological information depending on size, the range of activities undertaken and the preservation of charred plant remains and other material. The large burnt mound complex in plot 6/29.4 clearly has the greatest potential, and has been classed as category A, although discussed here with the other mounds. However the other mounds have valuable charred plant assemblages and particularly have potential as a group providing comparisons possibly across a wide date range. The frequency and distribution of the sites along the scheme provides a

valuable snapshot of the density and location of such sites within this region. In this respect the three sites in plot 6/33 are useful in studying densities.

Category B sites: Other sites

The corn drier in plot 3/2 was a well-built and well-preserved example which produced a significant assemblage of charred grain. Its size and substantial nature may indicate its relationship to an important settlement. The two adjacent pits in this plot appear likely to be much earlier and to contain valuable information on the Iron Age. In both periods the features preserved important assemblages of charred plant remains capable of providing information on agricultural regimes. The quern stones in the pits suggest the presence of a settlement nearby but their reuse and breakage may indicate more than prosaic reasons for their deposition in the pits. Closer study of these items may indicate how they were broken and whether any other reuse or reworking has occurred.

Category E sites

Thirteen sites have been classed as category E indicating that their importance cannot currently be estimated. These sites require dating before their importance can be assessed. The ditch in plot 3/20 did not produce suitable material for dating and unless there is good stratification ditches can be difficult to date. This site may therefore have to remain of unknown importance and its potential relies on the information from the current project being available to future projects that might reveal addition parts of this ditch or other features in the area that elucidate the ditch's age and function.

The two possible cremations in plot 3/27 are included in this category until further work has been carried out to determine whether they are indeed cremations and what their date is. If the initial interpretation is correct, especially if they date to the late Bronze Age or early Iron Age, this would be a category A of national importance, but this is still to be proved. The pit in 3/14 containing smithing waste could indicate a rare example of early smithing or could be a relatively unimportant late site, depending on its date. The pit on plot 0/3 appears probably to be late according to the finds it contained and as an isolated feature is probably of minor importance. If the small shell midden in plot 7/1 was proved to date to the 19th century it would have a local importance by possibly indicating the conditions of life of the railway navvies but if it is of earlier date it could be of considerable significance and a study of the shells it contains could give some indication of environmental or selection preferences.

The largest group of sites in this category are the sites with timber finds. The wooden structure in plot 14/7 seems likely, because of its location, to part of the foundations of the Roman road across the flood plain. If this can be confirmed by dendrochronological dates this would make to site of national importance (i.e. category A) as the network of Roman roads is imperfectly known in Wales and no such causeways have previously been recorded. The structure may prove to be of a different date and its position on the probable line of the Roman road may be coincidental but its function was most likely as a causeway and even if it proves to be of the medieval period this would be of considerable significance.

The timbers from plot 11/3 are likely to have originated from structures in Penrhyndeudraeth and could reveal details of long demolished houses or other timber structures. The potential of the other timber finds is less due to their discovery at isolated locations on the Dwyryd flood plain.

9.2. Artefacts

Post-medieval pottery

The assemblage of post-medieval material is of limited potential for further analysis. The assemblage is small and recovered from topsoil or drains with exception of that from plot 6/22 from a midden. It represents a typical collection of largely mass produced, widely distributed ceramics that could be found in most households during the period. The material offers evidence of very broad activities such as general food preparation and storage, beverage consumption and formal dining, but provides little in terms of the specifics of these tasks.

Knapped stone

These few pieces can only contribute in a minor way to knowledge. However, finds of worked flint from inland areas are rare in north-west Wales so these are useful pointers to the existence of prehistoric activity and the topographic locations of the finds deserve studying.

Areas near to water courses are likely to be focuses of activity and can usefully be identified and these add to the regional heritage record.

Other worked stone

The main group of objects, from Site 3/2, form an important group in terms of understanding of the site. Their discrete context adds to their value, in terms of possible dating and for possible associated evidence, for example palaeo-botanical. The objects deserve more detailed study, especially of wear marks as well as of petrological identification of rock types. The results will add to the overall interpretation of the site and may add to the regional dating and understanding of these object types.

Metal objects

The metal finds are unexceptional and poorly preserved. Most of the artefacts are not closely diagnostic of date and are not worthy of further work..

Archaeometallurgical residues

The material possessed little potential to yield further information through detailed metallurgical study. The smithing evidence from site 3/14 is interesting and it has the potential to be of some importance if it can be proved to be of medieval or earlier date. Dating this site is therefore a priority. However, even for this site, the limited amount of metallurgical residue means that little further investigation could be attempted.

Burnt stones

The samples of burnt stone have the potential to demonstrate which rock types were used, particularly if any exotic material introduced to the site; establish whether rock types varied spatially or with time across the site, and establish whether there was any preference in choice of materials, such as those with more favourable thermal properties. On other sites in North Wales it has been observed that there was a degree of preferential selection for cooking purposes of dolerites, which are a relatively uncommon rock type. Presumably the preference relates to the thermal properties of this rock type.

The size and nature of the fracture of the stones may give some indication of the types of activities taking place on the sites. The use hot stones in burnt mounds is well known, but the function of these features is still not understood, so the stone might provide additional information of the types of activities carried out. Although 13 sites produced burnt stone on several of these this was stone locally present incidentally burnt by a fire in or near the feature. For example analysis of the natural broken bedrock burnt under the hearth associated with the midden in plot 7/1 would reveal little useful information. The study of the burnt stone is therefore best restricted to burnt mound sites where stone is deliberately being heated and used. However the feature in plot 0/3 produced burnt stone and might possibly be related to a burnt mound so comparison between the stone from this site and the burnt mounds may be useful in determining the function of this feature. The two pits in plot 3/2 contained quantities of burnt stone but it is assumed that these were used as pit ovens rather than the stones being plunged into water. The comparison of these two different types of use and heating of stones might demonstrate different patterns in stone breakage that could be used to explain differences found on the brunt mound sites.

The large size of the burnt mound in plot 6/29.4 and the variety of features associated with it makes this the obvious focus of work on this material but the other mounds can provide useful comparisons.

Timber

As discussed above for the category E sites the worked timber from plot 14/7 has considerable potential for investigating the possibility of a crossing of the Afon Dwyryd, and plot 11/3 might have preserved remains from long demolished houses or other timber structures from Penrhyndeudraeth. If recovered timber proves to be worked it should receive at least basic recording as described in the English Heritage guidance (English Heritage 2010), otherwise its recovery is unjustified. This is particularly important if the timber is not to be conserved for future analysis. On this project the potential of timbers from plot 14/7 is greater than those from other sites and dendrochronological study should be concentrated on this site, but all the worked timbers require recording.

9.3. Environmental evidence

Charred plant remains
Across the whole project the quantity of charred plant macrofossil remains is small, and only plot 3/2 can be considered to deserve any detailed analysis. Only Plots 0/3, 3/2, 3/10, 3/14 and 6/10 can be considered to have possible occupation, in the sense of domestic and agricultural activities, nearby. The bulk of the burnt mound samples have no evidence for either food items or crop processing debris and it seems clear that the activities undertaken at these sites do not include either food preparation or probably consumption. This is fairly typical of burnt mound sites (e.g. Kenney 2012).

The charred plant macrofossils from Plot 3/2 should be fully identified and quantified, and the material should allow some consideration of the activities and crop processing stages associated with the corn drier feature and the two pits, and also aspects of crop husbandry, including the range of soils being cultivated and sowing times. The assemblages from the corn drier and pits appear to reflect different stages of crop processing and their crop composition suggest that they are of completely different date, one being prehistoric and the other medieval. The weed seed assemblages may indicate similarities or differences between the two periods, and the features should be radiocarbon dated to test the dating suggested from the charred plant remains.

The two features in Plot 3/27 may be cremations and a detailed study the charred plant assemblages in association with the burnt bones should be undertaken, but only if the bones prove to be human.

Finally the most ubiquitous material on the sites is charcoal, occurring on sites probably ranging from the post-medieval, medieval, Iron Age and Bronze Age periods and representing landscapes primarily along the lowland coastal zone. Most of these sites have produced samples sufficient for detailed analysis allowing the taxa represented at each site to be quantifies. This will also enable the identification of intrasite variability, functional selection, and changes through space and time.

Pollen
Pollen evidence can make a considerable contribution to make to our understanding of climate change and vegetation patterns. This in turn informs a wide range of other research issues including farming, cultivation and crop processing. The value of pollen studies can be increased by proximity to specific archaeological features being studied. The pollen monoliths from plot 6/29.4 were taken from next to and within the large burnt mound site and are particularly well located to identify the environment immediately prior to the use of the burnt mound and its development during and after the use of the site.

Pollen preservation from both the buried soil and the marsh was excellent and the prevalence of woodland with only limited evidence for human-induced woodland clearance suggests that the sequences relate to the Bronze Age. Further work on these samples is therefore recommended involving a finer sampling strategy of the deeper sequence (M3), increasing the pollen counts to a statistically significant level (300 TLP) and obtaining radiocarbon dates on sample M3 to confirm the duration of peat accumulation.

Bone
The fragments of burnt bone from plot 3/2 have been identified to species as far as is possible and no further work is recommended. Work on the cow skull from plot 14/7 might be worthwhile within the context of a study of Welsh cattle DNA but is considered to be beyond the requirements of the current project.

It is likely that the burnt bone from the pits in plot 3/27 is human and that these pits held cremations. The discovery of un-urned cremations, which are generally very difficult to locate is of considerable importance. These bones should be fully studied by an expert in cremated human remains.

Marine shells
The shell deposit from lot 6/51 is of importance for the information it represents about the former shore-line. The date of these shells is important to date when shells were last actively deposited on this shore, but the shells themselves give only a general indication that this was a strand-line.

The importance of the shells in midden in plot 7/1 depends on their date. Establishing this date is therefore a priority. If it proves to be early prehistoric the shell assemblage could be studied in more detail. This could include a study of the seasonality of collection.

Soil micromorphology
There is some doubt about the interpretation of several layers and features in plot 6/29.4. The excavators on site interpreted numerous features that lay beneath possible buried soil deposits as anthropogenic pits. The current author, as discussed above, believes that it is more likely that these are glacial or peri-glacial hollows. A micromorphological study of the assumed buried soil deposits will clarify their development and establish whether they are genuine soils developed over a considerable period of time or erosion deposits possibly washed in immediately prior to the burnt mound activity.

This work will also support the pollen study from the buried soils as it will confirm the degree of mixing and disturbance and could possibly detect evidence of agriculture.

Other palaeoenvironmental evidence
A few samples produced terrestrial snail shells, waterlogged plant remains, insects and marine shells. In all these cases it is felt that the data recorded during this assessment is adequate as a record of what the samples produced. Although some enhancement of the data and its interpretation may be possible the additional information, such as accurate quantification of the plant remains or snails, or the specific identification of the beetles will not add significantly to our understanding of the sites.

9.4. Radiocarbon dating
Many of the plots have features which cannot be dated by artefacts and which are of sufficient importance that they should be radiocarbon dated. These plots are listed in table 7. This includes the number of recommended dates for each plot but a detailed discussion of the methodology and choice of features and materials to date is given in the updated design.

Table 7: Number of radiocarbon dates proposed per plot

Plot	**Description**	**Total**
3/2	Pits and corn drier	6
3/10	Burnt mound	2
3/14	Smithing site	1
3/20	Ditch	0
3/27	Two possible cremations	0
6/6	Burnt mound	4
6/21	Burnt mound	2
6/29.4	Large burnt mound complex	15
6/33	Two burnt mounds	6
7/1	Small shell midden	1
Total		**37**

The burnt mounds provide a valuable opportunity to investigate the dates of these features across a broad swath of country. The aim is the study the chronology of the large and complex burnt mound in plot 6/29.4 in detail to establish a duration of use and potentially identify different phases of use. This will then be compared with more general dates on the other mounds from across the scheme. To achieve this 15 dates are proposed from plot 6/29.4 and two dates from each of the other burnt mound pits/troughs. As some sites have more than one trough this will give a considerable number of dated features to allow a thorough comparison potentially identifying differences in spatial distribution over time and changes in contents and form.

Of the other sites the features in plot 3/2 require careful dating. Here existing artefactual and palaeoenvironmental evidence suggests that the corn drier may be of a very difference date to two closely adjacent pits. The latter might be Iron Age in date and could indicate the presence of a settlement. Dates on these features will greatly enhance the understanding of their functions, their relationship to each other and their implications of the presence of other so far undetected archaeology nearby.

9.5. Dendrochronological dating

The possibility that the structure identified in plot 14/7 is part of the Roman road must be fully investigated and this can be best proved by dating the timbers. Despite the lack of pieces with sapwood dendrochronology is likely to give a more precise date than radiocarbon dating as it can probably achieve errors on the dates of about 30 years, much less than calibrated radiocarbon dates. Material from the plots listed below in table 8 is therefore recommended for dendrochronological dating.

10. SUMMARY

Thirty-nine sites were investigated and recorded during the fieldwork. These range from post-medieval drains of low significance to an extensive and complex group of features related to burnt mound activity of possible Bronze Age date. On investigation some of the sites proved to be natural features.

Six of the plots contained burnt mounds, plot 6/33 with two mounds and plot 6/29.4 with extensive burnt mound spreads and numerous associate features. There was also a possible mound spread seen in the trench side in plot 0/11 and a feature resembling a burnt mound trough in plot 3/6, but lacking any mound.

Most of the burnt mounds have one or more pits or troughs and bulk soil samples from these sites produced considerable charcoal assemblages but few other plant remains and very few artefacts were recovered.

A well-preserved corn drier was found in plot 3/2. This probably dates to the medieval period but two adjacent pits were possibly Iron Age. They contained numerous burnt and broken quern stones and rubbers. Two pits in plot 3/27 may contain cremation burials and the burnt bone from these requires study to confirm this. A small shell midden in plot 7/1 requires dating before its importance can be established and the same applies to a smithing site in plot 3/14.

The discovery of worked timbers in peat and alluvial deposits, including the possible remains of a Roman causeway, provides an opportunity to study remains not often preserved and to obtain dates more precise than radiocarbon can achieve.

The pipeline replacement project has been valuable in archaeological terms particularly in identifying burnt mounds. This long section through the landscape provides an opportunity to study the distribution and locations of these sites and potentially to study their changes through time once dates have been obtained. The other sites of various different periods, once these can be placed within their chronological context, have the potential to add considerably the understanding of the use and development of the area.

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12. APPENDIX I: LIST OF SPECIALISTS

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13. APPENDIX II. SPECIALIST REPORTS

13.1. Appendix II.1: Post medieval pottery with comments on leather items

Summary
Post medieval pottery was recovered from three plots. These were initially assessed in house by Kevin Cootes and the most interesting assemblage was sent for assessment by Jon Goodwin of Stoke-on-Trent Museum. The pottery is mostly from the 19th century. No further work is recommended.

Initial assessment
Kevin Cootes

Results
Plot 3/20 Context 320009: fill of drain 320008. Finds number 030.
Two fragments of Black Glazed Ware were recovered. The nearest major producers of these ceramics were at Buckley, although Staffordshire pottery's produced these too. The quality of the two sherds is relatively fine, being even and relatively thin walled, suggesting a date in the first half of the 19th century, or even possibly the closing decades of the late 18th century. Later wares of this type tend to be thicker and less finely made. The Buckley kilns last firing was in 1944.
1 – Rim sherd of a Black Glazed Ware vessel.
2 – Body sherd of a Black Glazed Ware vessel with wheel coils.

Plot 6/22 Context 622001: midden deposit. Finds number 033
Fifteen sherds were recovered from a midden, representing a minimum of 11 vessels, and a maximum of 15.
1 – Base and partial lower body sherd of a Stone Ware Marmalade jar. Transfer print with the legend 'ONLY PRIZE MEDAL FOR MARMALADE. LONDON. 1862'
2 – Rim fragment of a glazed dish with decoration under glaze.
3 – Partial base of a Stoneware vessel. Probably 19th century.
4 – Glazed Lid fragment for jar. 19th century.
5 – Partial rim and body fragment of a salt glazed Stone Ware jar. Glazed both inside and out. Designed to hold some form of liquid.
6 – Decorated Salt Glaze body fragment, with stamped decoration. 19th century.
7 – Rim fragment from a glazed 19th/20th century bowl.
8 – Body fragment of a glazed cup with decoration under glaze. 19th Century.
9 – Partial rim fragment of Lid from 19th century soup bowl.
10 – Two fragments (partial rim and partial base) from a 19th/early 20th glazed mixing bowl.
11 – Three fragments from 19th century chamber pots, all glazed. One consists of a partial rim and body sherd, with transfer print decoration inside and out. The second piece is a rim and body fragment from an undecorated vessel. The final fragment consists of a moulded handle.
12 – Body sherd from a moulded vessel. 19th/20th Century.

Plot 9/6 Context 96001: Topsoil. Finds number 025.
Ceramics consist of six sherds of glazed 19th/20th century ceramic from five separate vessels.
1 – Marmalade stoneware jar fragment. Rim and partial body sherd. Broken into two pieces. This vessel type was common in the first two decades of the Twentieth Century.
2- Transfer print ware dish, rim fragment. Common navy blue decoration. Most commonly dates to the final decades of the 19th century, although continues into the early 20th.
3 – Base of a late 19th/early 20th century Cream ware vessel. Probably from a cup.
4 – Partial base fragment of an early-mid 19th century transfer print cup, depicting Chinese scene.
5 – Rim fragment from a glazed mixing bowl. Late 19th or more probably early 20th century.
6 – Glazed rim of a cup with purple/red banding. Late 19th/20th century.

Assessment of pottery and leather items from plot 6/22
Jon Goodwin

Fifteen sherds of at least twelve ceramic vessels were retrieved from context 622001 (see table II.1.1). These represent the typical wares and forms available to most households during the mid-late 19th century (perhaps with a bias towards the end of this period). They comprise a mix of refined, but affordable tea and table wares (some decorated), and more utilitarian forms. Only one item (a redware

teapot cover) may be of an earlier date, although this is by no means certain. At least some of the material probably stems from the Stoke-on-Trent potteries, although other items come from Newcastle-upon-Tyne and Nottinghamshire and/or Derbyshire.

Also collected from the midden in plot 6/22 were parts of several shoes, particularly leather soles. There seems to be a minimum of two pairs of adult shoes (although small - size 5 or 6) and one possibly belonging to a child. Based on the pottery that was found with them, the shoes date to the mid-late 19th century (probably more 'late' than 'mid') and appear to be typical of that period.

Conclusions and recommendations

The majority of ceramics recovered from the Gwynedd pipeline date from the 19th century. The ceramics themselves are unremarkable in type, form and context, and the assemblages are not large enough to be particularly informative. No further analysis is recommended and it is proposed that the pottery is discarded as not sufficiently important to justify museum storage. The leather shoe pieces would no doubt require remedial conservation if they were to be stored in a museum and it is also proposed that these be discarded.

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Table II.1.1: Pottery from plot 6/22, context 622001, SF033
The following abbreviations/contractions have been used: *e'ware* – earthenware; *C18* – 18th century; *C19* – 19th century.

ware/fabric type	vessel form	component	no. shds	date	notes
undecorated white e'ware	tureen/dish	lid	1	late C19	Moulded form.
undecorated white e'ware	dish/basin	rim/body	1	mid-late C19	Moulded decoration on rim.
undecorated white e'ware	jug/ewer	handle	1	mid-late C19	Moulded form.
transfer-printed white e'ware	dish	rim/body	1	mid-late C19	'Asiatic Pheasants' print in blue.
transfer-printed white e'ware	plate	rim	1	late C19	Foliate print in blue.
transfer-printed white e'ware	cup(?)	body	1	late C19	Blue print.
redware	teapot cover	rim/body	1	late C18/early C19?	Glazed redware cover, similar in form to 18th-century examples, although it is not clear if this is of such an early date.
transfer-printed white e'ware	preserve jar	Base/body	1	c.1890+	Marmalade jar of James Keiller & Sons, produced by C.T. Maling & Sons Ltd. of Newcastle-upon-Tyne, (1890-1963) (Godden 1991, 409-10).
glazed stoneware	jug	body	1	mid C19	Fragment of large ornate jug with moulded decoration on exterior.
yellow ware	bowl	base & rim	2	late C19	Large mixing bowl with white slip beneath glaze on interior, moulded decoration on exterior. A product of T & G

ware/fabric type	vessel form	component	no. shds	date	notes
					Green's Derbyshire factory?
brown stoneware	bowl	base, body & rim	3	mid-late C19	Nottinghamshire/Derbyshire stoneware with moulded decoration on exterior.
grey stoneware	jar	rim/body	1	mid-late C19	Preserve jar?
Total number of sherds: 15					

13.2. Appendix II.2: Flint and Quartz Artefacts

George Smith

Introduction
The seven artefacts consist of pieces of worked flint and quartz from a number of different locations on the route of the pipeline. The objects were studied briefly for the assessment. The preliminary identifications may be altered or extended after further study. The assessment provides a quantitative and descriptive summary of the objects and a statement of potential for further analysis and illustration, if justified. Further analysis would provide a written report with illustrations to full publication standard. The report would provide interpretation of the objects in relation to existing relevant documentation and knowledge; also a database catalogue of all objects with descriptive fields.

Provenance
Four pieces are isolated finds from different areas of the route. The other three pieces came from the same location but from different contexts. The provenance of the objects is summarised in Table II.2.2.

Summary of objects
The objects are summarised in Table II.2.1. One piece is probably a modern import from elsewhere in Britain. The remainder are made on locally available glacial pebble flint. There are no retouched pieces and so none properly diagnostic of date. However, two pieces are probably utilised blade segments, possibly from composite edge cutting tools and potentially diagnostic of Neolithic activity. They come from two different sites, one from a site (3/2) with possible Medieval and Iron Age activity and one from beneath a burnt mound complex (site 6/29.4). One other non-diagnostic waste piece came from another burnt mound deposit (Site 6/33).

Table II.2.1: Summary identification of the objects

Plot		*Flake*	*Flake Under 10mm long*	*Flake frag*	*Irreg frag*	*Core /frag*	*Burnt frag*	*Natural frag*	*Split pebble frag*	*Bipolar piece*	*Utilised piece*	*Casually retouched pce*	*Retouched piece*
3/2	Flint	1									1		
3/2	Quartz		1										
6/24.9	Flint										1		
6/33	Flint		1										
7/13	Flint	1											
14/7	Flint	1											
	Total	*3*	*2*								*2*		

Table II.2.2 Summary list of the provenance of the objects and suggested requirements for illustration

Plot	*Find No*	*Context No*	*Description*	*Provenance*	*Draw?*
3/2	64	32016	Small quartz crystal flake	IA/RB pit fill	
3/2	66	32018	Small flint flake	Medieval corn drier	
3/2	19	32026	?Utilised flint blade	Burrow fill at edge of ?Medieval corn drier	1
6/24.9	23	4128	?Utilised flint blade	?Natural alluvial layer below buried soil beneath burnt mound	1
6/33	67	633004	Flint chip	Burnt mound deposit	
7/13	24	713001	Large fresh flake of	Modern topsoil	

			imported flint		
14/17	32	Unstrat	Short, broad flint flake	Unstratified, adjoining river	

Statement of potential
These few pieces can only contribute in a minor way to knowledge. However, finds of worked flint from inland areas are rare in north-west Wales so these are useful pointers to the existence of prehistoric activity and the topographic locations of the finds deserve studying. Areas near to water courses are likely to be focuses of activity and can usefully be identified and these add to the regional heritage record.

The objects need to be recorded and catalogued but the small size of the assemblage means that no detailed analysis is needed. A catalogue will be prepared for use in an appendix or retention in the archive. Two of the pieces are possible utilised and could be further studied by a use-wear specialist but as neither are part of a wider assemblage or with any contextual or structural associations then such further analysis is not justified.

13.3. Appendix II.3: Other stone artefacts

Introduction
All but three of these objects came from one location on the pipeline route and apart from these three, form an associated group. The objects were examined briefly for the assessment. The preliminary identifications may be altered or extended after closer study. The assessment provides a preliminary quantitative and descriptive summary of the objects and a statement of potential for further analysis and illustration. Further analysis would provide a written report with illustrations to full publication standard. The report would provide a database catalogue of all objects with descriptive fields and a written interpretation of the objects in relation to existing relevant documentation.

Provenance
The provenance of the objects is summarised in Table II.3.1. Three objects were isolated finds but each from usefully discrete contexts. The remaining objects consist of a small associated assemblage from one site and in well-stratified positions, deriving from the fill of two pits thought to be of Late Iron Age or Romano-British date.

Summary of objects
The objects are summarised in Table II.3.1. Three objects (SF5, 16 & 71) were not available at the time of the assessment. Some are manufactured objects and some simply utilised. The objects are of a variety of materials but predominantly tough igneous rock and using glacial boulders or cobbles. Some are coarse and others finer and this relates to their type of use and so proper petrological identification is needed, at least to hand specimen standard.

The earliest object (SF22) is an isolated find but from beneath a burnt mound. It is a pebble of which the tip has been utilised creating bevelled facets. This type of tool is commonly associated with Mesolithic activity.

Two objects (SF55) are probably unused natural cobbles but need more detailed study.

The rest of the objects include two saddle querns, one broken, fragments of two other saddle querns, a saddle quern rubber, a facetted edge utilised pebble rubbing stone and a worn cobble. There are also some pieces of broken boulder that may have been part of broken querns. Most of these objects have been burnt and seem likely to have been utilised in some later activity, perhaps in creation of a fire-pit or oven. The objects are all domestic and the type of objects associated with later Iron Age settlement. The concentration of objects indicates that such settlement was very close by. The re-use of the items in later activity may have been chronologically separate or could have been a continuation in a changed usage of the site. One of the querns, although massive and not greatly worn down has been broken in two, so probably deliberately. It is of a neat oval form, a developed type that could be expected to be late in the occurrence of such objects. Rotary querns are believed to have come into use in north Wales in the late first century BC or first century AD, but saddle querns did continue in use later.

Table II.3.1 Summary of assemblage and suggested requirements for illustration

Plot	*Context*	*Find No*	*Quantity*	*Provenance*	*Description*	*Draw*
0/3	3004	55	2	Pit/gully fill	2 probably unused glacial cobbles	
3/2	32010	9	1	IA/RB pit fill	Broken saddle quern	1
3/2	32012	5		IA/RB pit fill	Not seen	
3/2	32012	10	1	IA/RB pit fill	Facetted pebble rubbing stone	1
3/2	32012	12	1	IA/RB pit fill	Cobble with one worn surface	
3/2	32012	13	1	IA/RB pit fill	Small broken boulder	
3/2	32012	14	1	IA/RB pit fill	Saddle quern fragment	1
3/2	32012	16		IA/RB pit fill	Not seen	
3/2	32012	18	8	IA/RB pit fill	1 broken saddle quern rubber, 2 frags of a broken saddle quern, 4 frags of burnt cobbles/small boulders, 1 cobble. All burnt	2
3/2	32017	7	1	IA/RB pit fill	Saddle quern	1
3/2	32017	8		IA/RB pit fill	Small boulder, probably unused	
3/2	32017	11	1	IA/RB pit fill	Small broken boulder	
3/2	32019	20	1	IA/RB pit fill	Thin natural slab, use uncertain	
6/29.4	6294096	22	1	Buried soil beneath burnt mound	Utilised, bevelled pebble	1

Statement of potential

The main group of objects, from Site 3/2, form an important group in terms of understanding of the site. Their discrete context adds to their value, in terms of possible dating and for possible associated evidence, for example palaeo-botanical. The objects deserve more detailed study, especially of wear marks as well as of petrological identification of rock types. The results will add to the overall interpretation of the site and may add to the regional dating and understanding of these object types.

Seven objects have been identified as suitable for illustration. Of these some could be illustrated by a combination of photography and line drawing, reducing the amount of work.

13.4. Appendix II.4: Assessment of the metal artefacts

Jon Goodwin

Summary
Five iron and copper-alloy items were assessed and found to be unexceptional and poorly preserved. Two items that could be approximately dated are from the 18th or 19th centuries and two nails could have been used at any time within the medieval or post-medieval period. The corroded mass of iron from the pit or ditch terminal 03005 could not be dated or its form identified.

Introduction
A total of five iron and copper-alloy items and fifteen post-medieval ceramic finds were recovered by Gwynedd Archaeological Trust during work on the Pwllheli to Blaenau Ffestiniog pipeline, Gwynedd, North Wales. These finds have been assessed by context and a description of each find, or group of finds, along with a provisional date is presented in the tables below.

Results
The metal finds are unexceptional and poorly preserved, particularly the item from context 03003. Dating the material is difficult - only one find, the button from 320002, can be dated even to a specific century; the other more diagnostic finds, specifically the nails from 320005 and 320009, represent items that retained a consistent form throughout the medieval and post-medieval periods.

Table II.4.1: Metal objects
The following conventions have been used in the table for material types: *Cu* – copper alloy; *Fe* – iron. Abbreviations have also been used for dating: *M* – medieval; *PM* – post medieval; *C18* – 18th century; *C19* – 19th century.

context	SF no	item	material	date	notes
03003	001	corroded mass	Fe	?	Form undiagnostic.
314005	003	plate	Cu	C18/C19 ?	Plate fragment <1mm thick. Tapers at one end to rounded terminal. Two lateral, sub-circular perforations (in addition to those clearly the result of damage/corrosion), at least one of which may have been used to mount the item. Function unknown – furniture or strap fitting/mount?
320002	028	button	Cu	C19	Circular button, 20mm in diameter, slightly flattened. Cast (?) with soldered looped wire shank. Front has relief decoration although very worn.
320005	027	nail	Fe	M/PM?	Corroded fragment of a nail with square (?) head - large in relation to shank. Nails of similar form recovered from Sandal Castle were classified as 'tack nails', used to fasten battens or window casements (Long & Long 1983, 280; Fig. 13: 26). The nail is also comparable to short, square-headed examples from Basing House described as general carpentry nails (Moorhouse 1971, 49; Fig. 22: 96). Such nails featured heads that would remain exposed and act as a form of decoration. Both forms are long-lived and were in use throughout the medieval and post-medieval periods.
320009	029	nail	Fe	M/PM?	Long square-sectioned, tapering shank, square head with lip on one side; a total of 10.4cm long. This is an example of a common carpentry nail known as a 'sprig', which was produced in a range of sizes (Moorhouse 1971, 51; Fig. 22: 101-107.

Recommendations
No further work is recommended on these items, with the exception of SF001. If this feature is dated to an early period x-ray to identify the form of this item may be worthwhile and this may lead to a requirement for conservation or further study.

References
Long, A. and Long, E. 1983. 'Nails', in Mayes, P. and Butler, L. A. S., *Sandal Castle Excavations 1964-1973*. Wakefield Historical Publications, 279-280.
Moorhouse, S. 1971. 'Finds from Basing House, Hampshire (*c*.1540-1645): Part Two'. *Post-Medieval Archaeology* 5, 35-76.

13.5. Appendix II.5: Assessment of the archaeometallurgical residues

Dr T.P. Young

Summary
The materials from many sites were either natural or fired clay of uncertain origin. There was evidence for metallurgical activity at two sites:

Site 3/2 produced a single piece of a smithing hearth cake, presumably indicative of ironworking (smithing) somewhere in the general area, but the piece was recovered from a corn drier.

Site 3/14 had a cut feature which was very likely to have been a floor level smithing hearth and which contained a deposit including hammerscale and other smithing fines. The deposit also yielded two fragments of copper alloy, suggesting some working of copper alloys was undertaken too. The forging of both iron and copper alloys tends to be a feature seen on late medieval and post-medieval sites, but the assemblage is not strictly datable.

Methods
All materials were examined visually with a low-powered binocular microscope where required. As an evaluation, the materials were not subjected to any high-magnification optical inspection, not to any form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional. The summary catalogue of examined material is given in Table II.5.1.

Results
Site 0/3
This site produced two very small fragments of reduced fired clay, tempered with organic material. This material is not necessarily indicative of metallurgical activity.

Site 3/2
This site produced a substantial fragment from a highly vesicular smithing hearth cake. This piece contained no surviving fuel clasts, but a maroon-brown superficial colour on the upper surface would be most compatible with a coal-fuelled hearth (although this is not certain conclusion). The lower surface of the cake was formed by a thin crust with a finely dimpled face – but again the nature of the fuel producing the dimples was uncertain.

A single piece of oxidised fired clay (32018) possessed a temper including both rounded quartz grains and coarse angular grit. This material is not necessarily indicative of metallurgical activity.

Site 3/14
This site produced a small quantity of ironworking (smithing) residues from two contexts (c314005 and c314035).

The majority of material from c314005 comprised well-preserved isolated elements of smithing fines (though mostly too coarse to be termed microresidues), including a variety of slag blebs, slag droplets, slag flats and fragments of vitrified hearth ceramic. A single small fragment of thin copper alloy sheet was recovered from c314005. The piece was slightly curved and had two small indentations or nicks on one face. This context yielded a single piece of vitrified hearth ceramic, which showed evidence for coarse grit temper as well as an organic temper with the appearance of chopped straw.

The material from find #60 (also c314005), in contrast, comprised microresidues cemented by the corrosion products of weathered iron fragments. Three of the pieces actually contained corroded iron, the other 7 appeared to be smithing pan, rich in flake hammerscale, slag fragments and fine charcoal debris. These pieces show that the deposit was probably richer in hammerscale than the isolated samples would suggest, but that the hammerscale assemblage is preserved here with balls of corrosion product around rusting iron debris.

Site 3/27
Context 327003 at this site produced some thirty fragments, of which all but one were probably natural materials. Twenty four of the pieces were of a lime-cemented lithology with poorly sorted rounded

pebbles. This was probably a natural conglomerate (such as a cemented raised beach deposit), but an alternative interpretation as degraded pieces of pebble-rich mortar is possible but unlikely. The assemblage also contained five pieces of natural red-brown siltstone and one small piece of possible oxidised fired clay.

Site 6/10
The single submitted piece from this site was a weathered rock fragment.

Site 6/29.4
The material submitted from this site included four fragments of natural rock, two of which were slightly reddened and might have been burnt.

Interpretation
Site 0/3 (03003) produced tiny fragments of burnt clay, which adds little to current site interpretation.

Site 3/2 yielded a significant piece of a smithing hearth cake (32005) and a single piece of burnt clay (32018). The burnt clay might be derived from the use of the corn drier, but the smithing slag may simply have been dumped as part of the fill. If the slag was coal-fuelled, then it would be most likely to have post-medieval age – but the fuel is not certain.

Site 3/14 produced significant evidence of metalworking from pit fill (314005). This included fines from ironworking (slag, lining slag, flake hammerscale, smithing pan, iron debris) as well as pieces of copper alloy. The smithing pan (a concreted mass of hammerscale and other fines formed by cementation by secondary iron minerals from corroding iron) pieces suggest that the pit fill probably contained much more fine hammerscale that was not recovered.

The presence of these materials in the burnt fill of a shallow pit means that it is moderately likely, although not certain, that the pit was actually a floor-level smithing hearth. Unfortunately the material is not itself closely datable. In general, to find copper alloy debris (as offcuts or other forged waste, rather casting waste) associated with ironworking, tends to indicate a younger (i.e. late- or post-medieval) rather than older age, but this need not necessarily be the case.

Site 3/27 produced materials that were probably natural, apart from one piece of probable fired clay of uncertain, and not necessarily metallurgical, origin.

Material from site 6/10 was natural.

Site 6/29.4 produced materials that were natural rock fragments, but reddened and possibly burnt.

Evaluation of potential and recommendations
The material possessed little potential to yield further information through detailed metallurgical study.

The metalworking evidence from site 3/14 is interesting and the date of this activity (if sufficient suitable material is available to date it) would be useful. However, even for this site, the limited amount of metallurgical residue means that little further investigation could be attempted.

Table II.5.1: Catalogue of archaeometallurgical residues

Site	***Context***	***Sample***	***Find #***	***Number***	***Weight (g)***	***Notes***
site 0/3	03003		072	2	4.21	2 pieces of reduced fired clay with moulds of organic temper, including c3mm diameter rods
site 3/2	32005		004	1	138	fragment from rather deep, highly vesicular SHC with micro dimpled base - very shiny - good fresh slag. Upper parts have deep maroon surface layer, the fuel is uncertain – the maroon colour hints at coal, but no clasts survive.
site 3/2	32007		068	2	0.34	large piece is natural rottenstone, small piece is burnt bone
site 3/2	32018	8	078	1	0.75	small fragment of oxidised fired clay, temper of rounded sand grains and larger (4mm) angular grit
site 3/2	32020		077	1	3.74	brown gritty material with foliation. Probably a natural sandstone or tuff
site 3/14	314005		060	10 (+ bits)	184	7 fragments of very rusty smithing pan (FHS, slag, grit, charcoal) and 3 pieces of concretion around iron.
site 3/14	314005		061	1	6.31	fragment of oxidised fired ceramic with deeply vitrified convex surface with black glassy slag (weathering greenish). Ceramic has coarse grit and probable 'chopped' straw temper. Probably iron hearth or furnace lining. The convexity might just suggest this could be tuyère fragment, but this is very tentative.
site 3/14	314005	10	065	1	0.11	tiny fragment of thin curved copper alloy sheet, concave face has two small parallel indentations.
site 3/14	314005		069	assemblage	56	assemblage of small slag pieces, mainly irregular droplets and slag flats, but also one piece of lining, lining slag blebs, fired clay (+ one piece of cherty rock)
site 3/14	314005		076	10	2.66	8 fragments of oxidised fired clay with dark glassy slag, one unvitrified reduced fired clay piece and one probably burnt stone
site 3/27	327003	13	075	7	1.79	5 pieces or red-brown natural siltstone, 1 piece of grey cemented coarse sand/rounded grit (cf. #71 below), 1 piece possible oxidised fired clay
site 3/27	327003		071	23	42.13	pieces of rounded pebbles and grit cemented by calcareous material. Not absolutely certain if this is a natural calcrete or mortar – but probably natural.
site 6/10	61002		074	1	0.92	small grain of brown material with coarse pale and dark minerals - probably a highly weathered granitic rock
site 6/29.4	6294002		070	1	16.56	pale grey to buff material with rounded cavities (vesicles), probably weathered igneous rock
site 6/29.4	6294011		073	3	20.64	three highly weathered rock fragments, two reddened but not certainly burnt

13.6. Appendix II.6: Assessment of the charred plant remains and charcoal

Dr James Rackham

Summary
The excavations conducted by the Gwynedd Archaeological Trust along the route of the Pwllheli to Blaenau Pipeline Project resulted in a total of 117 samples from fourteen archaeological sites (Table II.6.1). Three micromorphological/pollen samples and three wood samples have been dealt with elsewhere, while the remaining samples and the hand excavated animal bone and shell from the excavations are considered here. The sampled sites included excavations of a series of burnt mounds (sites 3/10, 6/6, 6/21, 6/29.4 and 6/33), a corn drier and pits (site 3/2), pits with smithing evidence (site 3/14), a ditch (site 3/20), two sites with pits (sites 0/3 and 3/27), a shell midden (site 7/1) and a possible former riverbank (site 14/7), and a possible shoreline (site 6/51). Several of the sites currently remain undated, but Bronze Age, medieval and post-medieval periods are represented among the samples (Table II.6.1), with the majority of the samples being taken from Bronze Age burnt mounds.

Methods
The soil samples were processed in the following manner. Sample volume and weight was measured prior to processing. The samples were washed in a 'Siraf' tank (Williams 1973) using a flotation sieve with a 0.25mm mesh and an internal wet-sieve of 1mm mesh for the residue. Both residue and flot were dried, and the residues subsequently re-floated to ensure the efficient recovery of charred material. Some samples were refloated a second time owing to the quantity of charcoal remaining in the residue. The volume and weight of the residue was recorded and the dry volume of the charred element of the flots was measured after removal of roots and mineral material. Five samples included waterlogged remains. The wet first flot was measured wet, and not dried, but the residue was dried and refloated. The dry second flot was measured and recorded separately (see Table II.6.3)

The residue of each sample was sorted by eye, and environmental and archaeological finds picked out, noted on the assessment sheet and bagged independently. A magnet was run through each residue in order to recover magnetised material such as hammerscale and prill. This was repeated until little or no further magnetic material was recovered. The fine residue was then discarded and the coarse and medium residues retained for post-excavation study. The flot of each sample was studied under a low power binocular microscope. The presence of environmental finds (i.e. snails, charcoal, carbonised seeds, bones etc) was noted and their abundance and species diversity recorded on the assessment sheet. Many of the charred flots from the burnt mound sites were large and a proportion (normally 50% of each flot over 250ml or 25% over 600ml) was first sorted and if no identifiable charred material other than charcoal was recorded the remainder was bagged and labelled unsorted, otherwise the remainder was sorted. The flot and finds from the sorted residue constitute the material archive of the samples.

The individual components of the samples have been preliminarily identified and the results are summarised below in Tables II.6.2 and II.6.3.

Hand excavated animal bone and shell was identified and counted and the data are presented in Table II.6.4. Spot charcoal samples taken on site have merely been washed and their suitability for radiocarbon dating or identification considered.

Many of the samples included uncharred seeds, such as *Chenopodium* sp., *Rubus* sp., *Polygonum* sp., *Carex* sp, *Ajuga reptans*, *Betula* sp., etc. which are taken to be contaminants.

Results
Plot 0/3
A small undated pit or gully was sampled in this plot. Unfortunately no dating evidence was recovered from the sample, although the presence of eight flakes of hammerscale in the residue and a few spheroids of hammerscale in the flot, as well as the iron small find would suggest later prehistoric or a more recent date. The residue was composed of mixed angular and pebble stone, shalley water rolled mud or siltstone with occasional quartz and fired earth or siltstone. A few fragments of unidentifiable cereal grain, hazelnut, grass (*Bromus* sp.) and dock (*Rumex* sp.) seed were identified among the charred plant remains, but afford little interpretive value. The charcoal component of the flot is large and would afford a sample suitable for identification and quantitative analysis, but without a better archaeological context is not warranted.

The charred hazelnut fragments could be utilised for AMS radiocarbon dating.

Plot 3/2
Nine samples were taken from this plot from a feature interpreted as a corn drier and two pits lying in close proximity and initially assumed to be contemporary, and tentatively assigned to the medieval period. Four of the samples derive from deposits associated with the corn drier, and two fills from each of the pits were sampled (Table II.6.1).

The residue of the samples comprised rounded shale and pebble gravel, with a little mudstone, slate and occasional flint and quartz, with the flint component somewhat higher in sample <6>. Heat affected or fire-cracked stone was present in all the samples. The magnetic component produced hammerscale from the corn drier and pit 32003, but the fills of pit 32014 produced the highest densities, suggesting some iron smithing in the area, and probably contemporary with the fills of this pit, although this material is small enough to move down through the soils. Two samples produced unidentifiable calcined (burnt) animal bone, and three small quantities of fired earth, or possibly ceramic building material in sample <9>.

The environmental remains from the samples suggest two distinct groups. Samples <2> and <3> from the 'corn drier' are rich in charred cereals, dominated by oats (*Avena* sp.), and oats also dominate the less rich samples <8> and <9>. Barley (*Hordeum* sp.), bread wheat (*Triticum aestivum*) and rye (*Secale cereale*) are also present. A range of charred weed seeds (Table II.6.3) probably came in with the cereals, while the absence of chaff from all the corn drier samples might indicate that a cleaned crop was being dried in the structure. Hazelnut fragments were recorded in three of the samples. (NB absence of chaff in corn drier samples does not necessarily mean a cleaned crop because these samples consisted of free-threshing cereals the chaff of which would have been removed very early on and there are weed seeds in these samples; the pits on the other hand contained hulled wheats the chaff of which is only removed by dehusking late on in the process).

In contrast to the 'drier' the two pits, 32003 being particularly rich, appear to be dominated by glume wheats, particularly emmer (*Triticum dicoccum*) (Table II.6.3). This species becomes less important in Britain during the 1st millennium BC (Greig 1991), and although occasionally turning up in post-Roman contexts, is normally associated with prehistoric sites. The absence of oats and rye from the pits, in association with the emmer wheat strongly suggests that these pits significantly predate the corn drier, and their physical proximity is coincidence. Initially a Bronze Age date might be appropriate, but the presence of hammerscale in pit 32014 may indicate an Iron Age or possibly Roman age for the deposits.

This set of samples is the richest in identifiable charred plant remains (other than charcoal) from the whole pipeline. The charred plant assemblages afford an opportunity to identify the cereals associated with each feature, their date, their relative importance, functional aspects of the features, such as stages of crop processing, and some indication of the crop husbandry such as field ecology and sowing period, for instance *Chrysanthemum segetum*, the most abundant weed in the samples is typical of sands and sandy loams in the west of Britain and prefers spring cultivation (Wilson and King 2003).

All three features indicate domestic and agricultural activities taking place on the site.

The samples have produced abundant material that could be used for radiocarbon dating the three features but with the possibility that charcoal, and even hazelnuts could have been derived from earlier deposits on the site it is most appropriate that the oat grains are dated from the corn drier and emmer wheat grains from the two pits. Since these are relatively abundant and therefore clearly reflect contemporary activity, and can fairly confidently be considered as not residual on these grounds and their known chronological distribution their dating will be the most reliable indication of the age of the deposits.

A few fragments of calcined bone were recovered during excavation at this site. Although none were identifiable to species (Table II.6.4) a small ungulate rib fragment, at least two fragmented sheep sized long bones (one probably a femur), and one fragment of cattle size long bone, probably a metatarsus shaft fragment were recorded.

Plot 3/10
This site comprised two burnt mound troughs from which three environmental samples were collected. Two samples were collected from the fills of trough 31001, and one from trough 31007. The residues from all three samples comprise mud or silt stone, with sandstone, shale and pebbles. Much of the stone residue appears heat

affected, and some of the silt/mudstone is clearly heavily burnt, being much reddened. No archaeological finds were recovered from any of the samples.

Although the flots from the samples were dominated by charcoal (Table II.6.3) two charred cereal grains were recovered from 310004, but were in too poor a condition to identify beyond wheat/barley (*Triticum/Hordeum*), and the very few charred weeds seeds and rare fragments of charred herbaceous stem were in too poor a condition to identify. The charcoal is relatively abundant and all three samples include material that will be identifiable to species, although some is heavily mineralised.

Much of the charcoal comprises small fragments derived from larger branch or trunk wood rather than roundwood. It is expected that some smaller roundwood material will be present that could be used for radiocarbon dating, otherwise interpretation will need to take into account the potential age of the wood prior to burning. All three samples have yielded material that could be used for radiocarbon dating.

Plot 3/14
Two pits of possible medieval or post-medieval date were excavated at this site and a single sample, <10> taken from context 314005. Finds of slag and vitrified furnace lining suggested iron smithing.

The residue of the sample was largely composed of small pebbles, with a little sandstone and concreted material. This latter probably derives from the large quantity of magnetic concreted iron rich lumps that were extracted with the magnet. The magnet also recovered thousands of flakes of hammerscale. Observation of the concreted lumps under the microscope indicate that they include large quantities of hammerscale and small slag concreted together. These are reminiscent of the hard concreted layers that develop on the floor of a smithy and with nearly 3.5 kilogrammes of magnetic material present, in an 8.5kg soil sample, indicate a very high concentration of smithing debris. On the basis of this evidence one might suggest that the large oval pit was actually part of the smithy.

As well as a reasonably large charcoal component an oat grain, grass seed and a fragment of uncharred hazelnut shell were recovered.

Although the uncharred hazelnut might offer a suitable sample for dating this could have been introduced by small mammals and is not secure. Much of the charcoal is from larger wood fragments and could give a date several decades older than the site, so the charcoal sample will need to be scanned for young roundwood to produce the most suitable sample for dating the site. Although the oat grain should be of sufficient size for an AMS date, dating of a single grain from a sample with no other grains is not considered suitable for dating the smithy, the charcoal would be more secure.

Plot 3/20
This site was a large undated ditch or erosion channel. Three samples were taken from the fills of this large feature (Table II.6.1) and are thought to represent the erosional infilling of the feature from the surrounding slopes.

The large sample residues comprised mud/siltstone, shale, pebbles, occasional sandstone and quartz and slate, much of it water rolled. Archaeological finds were limited to a little heated affected stone, a little vitreous slag, and a few flakes of hammerscale.

The environmental remains were even more limited, with very small flots, each producing a little charcoal, but with no further potential.

There is nothing from any of the samples that gives any clue as to the date of the feature, and none of the charred material is secure enough to be suitable for radiocarbon dating.

Plot 3/27
A small pit and a small hollow were excavated at this site and the fills of both were sampled and recorded on site as containing charcoal and burnt bone. The residues of both largely comprised sub-rounded mud/siltstone, with occasional slate, sandstone and shale, and some fired earth or siltstone. Two small fragments were tentatively identified as pottery from 327003, which also included some heat affected stone and a single flake of hammerscale. Both samples produced calcined bone.

In both samples the calcined bone is fragmented, but both include fragments which appear to be human cranium suggesting that both features may be cremation burials. These samples should be submitted to a human osteologist with experience of cremations. None of the fragments could be positively identified as animal rather than human bone but several could possibly be animal although unidentifiable to bone or species.

The large flot from sample <13> produced several charred cereal grains, including wheat and barley, charred hazelnut shell, and seeds of ribwort plantain (*Plantago lanceolata*), bramble/raspberry (*Rubus* sp.) and a legume (*Vicia/Lathyrus* sp.), as well as a charred thorn, a few charred herbaceous stems fragments and an as yet unidentified fruit stone fragment. The much smaller flot from sample <14> produced charred herbaceous stems and unidentified seeds, and an uncharred fragment of hazelnut shell. The large flot from <13> produced lots of identifiable charcoal.

If these are cremations then it would appear that some food items may have been thrown onto, or placed on, the pyre, unless these derive from other activities at the site, or possibly feasting associated with the funeral rites. Confirmatory identification of the calcined bone will be needed from the human osteologist. The charred hazelnut from sample <13> and a selected piece of charcoal should be suitable for radiocarbon dating feature 327001, while charcoal or herbaceous stems would be needed from sample <14> to date feature 327002.

Plot 6/6
The site at Plot 6/6 was a burnt mound of probable Bronze Age date. The site consisted of an arc of burnt stone and two intercutting pits. A spot charcoal sample was taken from the earlier pit, while the later pit fill and an overlying spread were bulk sampled, and a series of fifteen spot charcoal samples taken from context 66010.

No archaeological finds were recovered from the bulk samples although tiny fragments of vitreous slag, possibly fuel ash slag, and a few magnetised small stones were recorded. One fragment of charred hazelnut shell was recovered from sample <19>. The large flots were dominated by charcoal, with several large roundwood fragments in sample <20>, and occasional small twigs and herbaceous stems in <19>.

Samples <21> to <36> were single pieces of charcoal collected during excavation of context 66010. These are probably not suitable for inclusion in any post-excavation analysis of species composition and wood type (timber, branch wood, roundwood, etc) which would be undertaken on the charcoal from the bulk sample, but any suitable piece of roundwood charcoal could be used for dating the context. Twig and roundwood charcoal should be selected from context 66010 for radiocarbon dating.

Plot 6/10
The site at this plot was a figure of eight shaped feature, 610001, interpreted as a corn drier of medieval date. A single bulk sample was taken from context 610002, a charcoal rich fill of the feature. Very few archaeological finds were recovered from the sample, a very little fired earth and just three flakes of hammerscale. The 11g of magnetic material composed of small stones suggests heating of this mineral element in a hearth or fire.

The large charcoal flot (Table II.6.3) included a single fragment of emmer wheat chaff, charred seeds of ribwort plantain, small grasses, bramble/raspberry, medick/clover (*Medicago/Trifolium* sp.), sedge (*Carex* sp.), cinquefoil (*Potentilla* sp.) and bugle (*Ajuga reptans*), with charred tubers and herbaceous stems. These are mainly pasture plants and might indicate hay or even animal dung being burnt. The bulk of the flot is charcoal and roundwood is particularly abundant, in contrast to most of the samples studied along the pipeline route. This charred plant assemblage is not typical of a corn drier in that there is no charred grain and very little chaff, but if the sample derives from the fire area/stoke hole, rather than the drying area, then this absence need not be contradictory.

Although there are no firm indications of date the hammerscale, if contemporary, and the emmer chaff (although only one fragment) might suggest a prehistoric or Roman date, but the roundwood charcoal should afford ample material for radiocarbon dating.

Plot 6/21
This site is a burnt mound spread and an oval pit of probable Bronze Age date. Four bulk samples were collected, three from the spread (621003, 621004 and 621007), and one from the fill of the underlying pit (621009). Samples <64> and <65> (Table II.6.3) produced some heat affected stone, while all produced some magnetised stones, but no finds were recorded. Apart from one fragment of charred hazelnut shell in sample <64> the relatively small flots produced only charcoal, with few fragments large enough to justify identification and quantification although sample <64>, much bigger than the other three may justify study. Only this latter sample could be used to radiocarbon date the site.

Plot 6.29.4
The site in this plot was a large Bronze Age burnt mound complex with pits, other features and natural hollows. This was the most extensive of the burnt mounds excavated along the pipeline and the most heavily sampled with 52 bulk soil samples collected, one charcoal sample and three micromorphological samples (Table II.6.1), the latter are dealt with elsewhere.

Very little archaeological material other than burnt stone was recovered from any of the samples from this site. Even burnt stone, heat reddened or black, was not very abundant and many samples produced none that was identifiable. Interestingly only one of the fifty two samples produced any magnetic material which suggests that the deposits contained very little 'hearth material' (the fire results in the magnetisation of the iron rich mineral elements in the soil or hearth), so presumably only the burnt stone was being dumped here. The little fired earth in three samples (Table II.6.2) is probably burnt silt/mudstone rather than fired earth. A tiny fragment of possible mussel shell was recorded from context 4088.

The flots were more productive with volumes of charcoal varying between 1 and 1000ml, although generally less rich than the other burnt mounds sampled. Six of the 52 samples produced a fragment of charred cereal grain or hazelnut shell (Table II.6.3), with barley being identified from two samples. Three samples produced some waterlogged plant remains with little apart from wood and bark surviving, although context 4140 produced seeds of birch, goosefoot, Cyperaceae, buttercup family and bugle, context 4142 produced uncharred hazelnut shell and birch seeds and context 4131 produced wood and a few insect fragments. Two other samples produced uncharred birch seeds that may have been contemporary. In many of the samples the charcoal is more fragmented than elsewhere and both identifiable fragments and material suitable for radiocarbon dating are more limited than on the other sites. The larger samples with fragments greater than 4mm are the most likely to produce material suitable for radiocarbon dating. Of the samples initially selected for radiocarbon dating, 46, 55, 61, 68, 70, 82, 87, 92, 94, 106 and 109, samples 55 and 94 are not suitable; samples 87 and 92 will probably not have suitable material, and 94 was a micromorphological sample. So only samples 46, 61, 68, 70, 82 and 109 are likely to produce suitable material, although other contexts may be suitable substitutes.

The very variable concentrations of charcoal and burnt stone across the samples from this site may reflect some pattern of contemporary activity, such as the location of the fires and primary dump areas for the ash and stones.

Two contexts were described as palaeochannel fills, samples 95 and 100. The quantity of charcoal in the samples suggests that both deposits may have been forming contemporary with, or post-dating, the burnt mound. If they were earlier such high levels of charcoal would be unlikely.
Plot 6/33
This site produced two burnt mounds of probable Bronze Age date and a pit (633010). A total of six samples were collected from mound 633012 - including one from a posthole, four from mound 633015 – including samples from pits 633028 and 633034, and one sample from pit 633010 some 26m from mound 633015.

One sample, <37>, produced a tiny chip of flint, and other than this and some fired or heat affected stone in most of the samples (Table II.6.3) there were no finds. The flots were generally relatively large with three samples producing over a litre of charcoal. Two samples produced one or two charred seeds, including a bramble/raspberry in posthole <39>. Sample <41> from mound 633015 produced two fragments of charred hazelnut shell. Most of the flots have produced sufficient larger identifiable charcoal for assessing the taxa and relative abundance of each taxa in the fuels used, and should give some indication of the types of wood (trunk, large branch, roundwood, twig, etc) used. There are occasional twigs and small roundwood in two of the samples. Some of the charcoal is heavily mineralised and the dried samples were refloated three times to recover as much as possible of the charcoal by flotation. In sample <49> the residue still contained abundant charcoal after three floats so this was retained. The mineralised condition of some of the charcoal may affect its identifiability and even its potential for radiocarbon dating.

The hazelnuts in context 633024 are suitable for radiocarbon dating and could date the main mound of 633015, likewise the small roundwood in sample <42> from the same context. From the other contexts most of the charcoal looks like fragments from larger pieces of wood that could be several decades old, although this may not be significant for a site of this age. Suitable material for radiocarbon dating could be selected from nearly all of the samples, although samples <39> and <40> may not contain suitable charcoal. The samples with the largest flots, <48> (trough 633028), <49> and <117>, but also <42>, are most likely to produce the best material for radiocarbon dating, but if context 633020 is preferred then it should be possible to select material from sample <50>.

Plot 6/51

A six litre sample was collected from a clay deposit in Plot 6/51 where shells were visible. The deposit was not associated with any archaeology but was thought to possibly reflect a former shoreline and possible salt marsh deposits. A small sample of shells was also collected from the same context, 651001.

The sample produced an organic flot, one of the few from the project, with wood, waterlogged seeds, numerous herbaceous stems, moss and leaf fragments, snail shells, insects and a little charcoal. The wood includes roundwood and small stems, while moss and leaf fragments, grass and birch (*Betula* sp.) seeds are present with a few beetle fragments. The snail and mollusc shells include tellens, small cockles, rough winkle (*Littorina saxatilis*), flat winkle and *Hydrobia ulvae*, the latter in thousands. None of these shells are of economic value. *Hydrobia ulvae* is common in estuaries and salt marshes and is washed up in millions along the strand line. Its abundance in this sample with the small winkles and cockles, and the tellen *Scrobicularia plana* which is common burrowing in the mud of salt marsh channels and estuaries, suggests a former saltmarsh environment, and potentially on the basis of the shell density, a former strand line. The sample of shells collected on site (Table II.6.4) from context 651001 is dominated by the tellens, but also includes a cockle (*Cardium edule*) and a periwinkle (*Littorina littoralis*).

With the sample possibly indicating a former strand line or shoreline it would be useful to date when the coast was at this point. The organic component, either the roundwood or herbaceous stems would both afford material suitable for radiocarbon dating.

Plot 7/1

A single soil sample was collected from a small shell midden deposit in Plot 7/1, and a collection of shells made during excavation of the deposit, which is presently undated. The deposit overlies a possible hearth or fire site. The sample residue is largely composed of plated and angular shale with a little mud/siltstone and small shell fragments. The residue included a little fired/heated stone but no other archaeological finds. The first flot included some organic debris and was kept wet, although only wood, birch and bramble/raspberry seeds have been recorded uncharred. Bramble/raspberry was also recorded charred. Charcoal is present in both flots with several fragments large enough for identification. A few terrestrial snails are present including *Discus rotundatus, Oxychilus cellarius, Punctum pygmaeum*, Clausilidae and *Aegopinella* sp.. These suggest a shaded or woodland environment (Evans 1972; Davies 2008).

The most abundant finds in the sample are marine shells, mainly cockle (*Cardium edule*). Nearly 6 kilogrammes of shell were sorted from the 27.75 litre sample. Approximately 4.5kg were cockles, 340g were periwinkles (*Littorina littorea*), 9.2g of oyster (*Ostrea edulis*), a couple of grammes of rough winkle (*Littorina saxatilis*) and the rest fragmented shell not further identified. A further twenty five shells of cockle were collected during excavation (Table II.6.4).

The site would appear to have been a shell processing site where the shells were probably boiled, but on the basis of the organic component and the terrestrial snails it was set back from the coast, perhaps in local woodland fringing the bay before reclamation.

It should be possible to select charcoal suitable for dating from the flot.

Plot 14/7

The deposits at Plot 14/7 reflected alluvial floodplain sediments but a silt deposit rich in preserved timber, branches and hazelnuts was excavated at a depth of 1.1m below the modern ground surface. Although no samples were collected of the deposit a small collection of 33 hazelnuts (Table II.6.4) was gathered by hand during excavation and a series of timber and wood samples which are dealt with elsewhere. All bar one of the

nutshells are intact, and the single broken shell appears to have broken naturally possibly during or since excavation. It seems likely that the deposit might indicate a channel feature in which timber and organic debris has accumulated, possibly during flood conditions. One of the hazelnuts could be radiocarbon dated but without sediment samples from which data could be recovered to construct the contemporary environment there seems little point except to date the possible worked timber pieces, which could themselves be dated.

At the eastern end of the plot part of the posterior cranium of a cow was recovered along with two rib bones (Table II.6.4). The skull fragment, broken in two comprised the posterior frontal bones with intact horn cores of medium length (Armitage and Clutton-Brock 1976) and the horns themselves still surviving although degrading. The skull is relatively small with the horns pointing slightly upwards and forwards on the skull. Their conformation and size is consistent with a medieval animal, but also could be a small recent breed, such as a Welsh White. Although the finds could be dated by radiocarbon analysis it is difficult to see the immediate value of dating these finds.

Discussion, Potential and Recommendations

There are four principle areas that justify further work on the assemblages recovered from the samples – radiocarbon dating the sites, analysis of the plant macrofossils from Plot 3/2, study of the burnt bone and charred plant remains from the possible cremations in Plot 3/27 and a study of the charcoal from the sites along the whole route.

The primary and most obvious is the use of charred and uncharred plant material, wood and charcoal for radiocarbon dating the sites. This has been briefly discussed within individual plots above and will not be reiterated here although the specific selection of suitable charcoal, wood, charred cereal grain or hazelnut shell will need to be undertaken when the final list of contexts has been decided. For the burnt mound sites the absence of small roundwood and nutshell from many samples need not be a limitation since the dating of charcoal fragments that might predate the activity by a few decades is unlikely to be an interpretive problem, although oak heartwood charcoal from larger timber should clearly be avoided.

Across the whole project the quantity of charred plant macrofossil remains is small, and only Plot 3/2 can be considered to deserve any detailed analysis. The assemblage from the possible corn drier in Plot 6/10 is not consistent with this interpretation, and only Plots 0/3, 3/2, 3/10, 3/14 and 6/10 can be considered to have possible occupation, in the sense of domestic and agricultural activities, nearby. The bulk of the burnt mound samples have no evidence for either food items or crop processing debris and it seems clear that the activities undertaken at these sites do not include either food preparation or probably consumption. This is fairly typical of burnt mound sites (e.g. Flook and Kenney 2008).

The charred plant macrofossils from Plot 3/2 should be fully identified and quantified, and the material should allow some consideration of the activities and crop processing stages associated with the corn drier feature and the two pits, and also aspects of crop husbandry, including the range of soils being cultivated and sowing times. The assemblages from the corn drier and pits appear to reflect different stages of crop processing and their crop composition suggest that they are of completely different date, one being prehistoric and the other medieval. The weed seed assemblages may indicate similarities or differences between the two periods, and the features should be radiocarbon dated to test the dating suggested from the charred plant remains.

The two features in Plot 3/27 may be cremations and a detailed study of the calcined bone and the charred plant assemblages should be undertaken.

A few samples produced terrestrial snail shells, waterlogged plant remains, insects and marine shells. In all these cases it is felt that the data recorded during this assessment is adequate as a record of what the samples produced. Although some enhancement of the data and its interpretation may be possible the additional information, such as accurate quantification of the plant remains or snails, or the specific identification of the beetles will not add significantly to our understanding of the sites.

Finally the most ubiquitous material on the sites is charcoal. This occurs associated with a smithy in Plot 3/14, with a corn drier in Plot 3/2 and another possible corn drier in Plot 6/10, with two possible cremations in Plot 3/27, with a shell midden in Plot 7/1, with probable prehistoric pits in Plots 0/3 and 3/2, and with burnt mounds and associated pits and troughs in plots 3/10, 6/6, 6/21, 6/33 and 6/29.4. These sites are likely to include the post-medieval, medieval, Iron Age and Bronze Age periods and they represent landscapes primarily along the lowland coastal zone. Most of these sites have produced samples that will yield a random selection of at least 30 identifiable fragments that can be used to quantify the taxa represented at each site, and identify intrasite

variability, functional selection, and changes through space and time. Does the density of charcoal in the deposits in anyway reflect contemporary activities on the sites? The character of the wood resource (i.e. trunk, branch, roundwood, twigs) may vary with function and where the charcoal is better preserved and larger fragments survive this information may be recoverable. If any pollen analysis is undertaken on the project then the charcoal analysis will give additional data that can be used to enhance the interpretation of the pollen results. Specifically was there selection of fuel for the smithy, corn driers, the cremations and the burnt mounds or did these make general use of the wood available locally? Did these activities utilise managed coppice woodland, and can we reconstruct to any degree the character of the ancient woodland along the pipeline route?

This latter is the only area of palaeoenvironmental study that can be carried out using these samples. While the snail shells and occasional waterlogged plant remains have given brief clues to local environments on some sites the recovered data is too poor for any useful reconstruction. Small sub-samples were taken from the waterlogged and possibly waterlogged contexts from Plot 6/29.4 (samples 74, 76, 77, 81, 82, 100 and 106) prior to processing which could be used as spot pollen samples to produce a picture of the contemporary vegetation and to compare with the charcoal results, if no other pollen samples are available for this part of the route.

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Tables

Table II.6.1: Pwllheli to Blaenau Pipeline Project – G2148. Samples taken for environmental analysis, in sample number order.

site	sample no.	Cont. no.	Sample vol. in l.	Sample wt kg.	feature	prov. Phase	description
Plot 0/3	1	03003	9.25	12.75	03005	ukn	Fill of pit or gully 03/005
Plot 3/2	2	32002	9..25	16	32009	Med	Fill with charcoal – corn drier
Plot 3/2	3	32018	20.25	30.25	32009	Med	Basal fill of corn drier
Plot 3/2	4	32016	7..5	14	32003	Med	Red burned sand in 32003
Plot 3/2	5	32012	5.75	12	32003	Med	Brown fill of 32003
Plot 3/2	6	32013	5.75	11	32014	Med	Check for magnetic residue
Plot 3/2	7	32019	11.25	16.25	32014	Med	Check for magnetic residue
Plot 3/2	8	32018	9.25	18	32009?	Med	Charcoal rich layer in corn drier
Plot 3/2	9	32020	9. 5	17.25	32009	Med	Base of N chamber of corn drier
Plot 3/14	10	314005	6	8. 5	?	Post-med?	Black charcoal rich fill of 314002-smithy?
Plot 3/2	11	32021	7	9.75	32014	Med	Lining deposit in pit 32014
Plot 3/2	12	32022					stone
Plot 3/27	13	327003	14. 5	20.25	327001	Med	Burnt soil and bone - ?cremation
Plot 3/27	14	327004	550	978.4	327002	ukn	Burnt soil and bone - ?cremation
Plot 3/10	15	310010	7	7	31007	BA	Burnt mound material from trough fill
Plot 3/10	16	310003	10	13	31001	BA	Burnt mound material from trough fill
Plot 3/10	17	310004	8. 5	9	31001	BA	Burnt mound material from trough fill
Plot 6/10	18	610002	6	7	610001	Med	Charcoal rich fill of shallow pit 610001, also contains 610003 and 610004, possible corn drier
Plot 6/6	19	66004	11.25	12	66011	BA	Deposit of charcoal spread
Plot 6/6	20	66010	9. 5	14	66011?	BA	Mid grey silt and burnt stone
Plot 6/6	21	66012			66013	BA	Charcoal – spot sample
Plot 6/6	22	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	23	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	24	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	25	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	26	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	27	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	28	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	29	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	30	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	31	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	32	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	33	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	34	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	35	66010			66011?	BA	Charcoal – spot sample
Plot 6/6	36	66010			66011?	BA	Charcoal – spot sample
Plot 6/33	37	633004	10	17	633012	BA	Burnt mound spread
Plot 6/33	38	633005	8	15.75	633012	BA	Burnt mound spread
Plot 6/33	39	633009	2	5	633008	BA	Fill of posthole/pit 633008
Plot 6/33	40	633004	1. 5	3	633012	BA	Burnt mound spread
Plot 6/33	41	633024	7. 5	13	633015	BA	Charcoal fill of 633015 – sondage 2
Plot 6/33	42	633024	11.25	18.5	633015	BA	Fill of 633015 sondage 1
Plot 6/33	43	633010	16	22.25	633010	BA	Fill of pit
Plot 7/1	44	71002	27.75	29		ukn	Deposit of shell midden
Plot 6/29.4	45	6294006	3.75	8.5	6294002	BA	Charcoal deposit from pit 6294002
Plot 6/29.4	45 *	6294002	31	42	6294002	BA	Pit fill
Plot 6/29.4	46	6294010	2	4. 5	6294003	BA	Deposit from pit 6294003
Plot 6/29.4	46 *	6294002	21.5	36	6294002?	BA	Pit fill?
Plot 6/29.4	47	6294011	5.5	8.25	6294003	BA	Upper fill of pit 6294003
Plot 6/29.4	47*	6294011	28	47.75	6294003	BA	Upper fill of pit
Plot 6/33	48	633029	5. 5	8.75	633015/633028	BA	Fill of pit 633028
Plot 6/33	49	633021	9.75	17	633012	BA	Burnt mound spread
Plot 6/33	50	633020	7	13	633012	BA	Burnt mound spread
Plot 6/33	51	633035	19.25	32.25	633015/633034	BA	Fill of pit 633034
Plot 0/8	52	0					timber sample
Plot 6/29.4	53	4071	26	36	6294090	BA	Burnt mound deposit
Plot 6/29.4	54	4100	4	8	6294098	BA	Lower fill of pit 4098
Plot 6/29.4	55	4102	20.75	40	6294101	BA	Fill of sub-rectangular pit/trough 4101
Plot 6/29.4	56	4054	19	27. 5	6294053	BA	Fill of pit
Plot 6/29.4	57	4106	5.75	8	6294105	BA	Charcoal rich fill of pit

site	sample no.	Cont. no.	Sample vol. in l.	Sample wt kg.	feature	prov. Phase	description
Plot 6/29.4	58	4023	10	16	6294022	BA	Upper fill of pit 4022
Plot 6/29.4	59	4112	3.75	8	6294111	BA	Main deposit within pit 4111
Plot 6/29.4	60	4115	1. 5	2.25	6294111	BA	Fill in pit 4111
Plot 6/29.4	61	4116	7.5	14.75	6294111	BA	Fill in pit 4111
Plot 6/21	62	621003	5. 5	7.75		BA	Part of burnt mound spread
Plot 6/21	63	621004	11	12. 5		BA	Upper burnt mound spread
Plot 6/21	64	621007	5. 5	9. 5		BA	Upper layer of burnt fire cracked stone
Plot 6/21	65	621009	7. 5	6.25	621008	BA	Fill of pit
Plot 6/29.4	66	4049	21	30		BA	Sub-oval burnt mound spread
Plot 6/29.4	67	4117	13	21.5	6294118	BA	Fill of tree hollow
Plot 6/29.4	68	4106	6. 7	13	6294105	BA	Fill of pit/trough 4105
Plot 6/29.4	69	4104	5. 25	9	6294103	BA	Fill of pit
Plot 6/29.4	70	4129	9	16	6294127	BA	Fill of trough 4127
Plot 6/29.4	71	4023	2	2.	6294022	BA	Upper fill of pit
Plot 6/29.4	72	4088	5. 5	8. 75	6294087	BA	‘taken from the middle’ sub-oval hollow
Plot 6/29.4	73	4088	2. 5	3	6294087	BA	‘taken from end of deposit’?
Plot 6/29.4	74	4088	7	8	6294087	BA	‘taken from NW end of the deposit’?
Plot 6/29.4	75	4134	3. 75	7	6294087	BA	Possible clay lining of pit NW end
Plot 6/29.4	76	4134	4	7	6294087	BA	Possible clay lining of pit SE end
Plot 6/29.4	77	4140	11.25	14	6294133	BA	Fill of natural feature
Plot 6/29.4	78	4099	2	3	6294098	BA	Circular hollow fill
Plot 6/29.4	79	4099	2	4. 5	6294098	BA	Circular hollow fill
Plot 6/29.4	81	4131	1.75	2. 5	6294103	BA	Lower fill of pit
Plot 6/29.4	82	4106	8. 5	19	6294105	BA	Fill of pit
Plot 6/29.4	83	4070	11	13		BA	Buried soil horizon
Plot 6/29.4	84	4145	1. 5	5	6294143	BA	Small oval feature fill
Plot 6/29.4	85	4144	2. 5	5	6294143	BA	Small oval feature fill
Plot 6/29.4	86	4147	3. 5	4. 25	6294146	BA	Small irregular pit/hollow fill
Plot 6/29.4	87	4152	1. 5	3	6294033	BA	Main filling of pit
Plot 6/29.4	88	4153	750	1.75	6294033	BA	Basal fill of pit
Plot 6/29.4	89	4032	8	16		BA	Layer
Plot 6/29.4	90	4142	4	8	6294158	BA	Small pit/hollow fill
Plot 6/29.4	91	4156	11	13	6294033	BA	Main fill of pit
Plot 6/29.4	92	4165	1	1.894	6294164	BA	Fill of stakehole
Plot 6/29.4	93	4167	<100	209	6294166	BA	Fill of stakehole
Plot 6/29.4	94	4169	<100	213	6294168	BA	Fill of stakehole
Plot 6/29.4	95	4172	3. 75	7	6294170	BA	Charcoal rich fill of palaeochannel
Plot 6/29.4	96	4183	1. 75	6	6294031	BA	Primary fill of pit
Plot 6/29.4	97	4179	3	6	6294178	BA	Sub-circular pit/hollow fill
Plot 6/29.4	98	4176	1	2	6294175	BA	Irregular pit/hollow fill
Plot 6/29.4	99	4177	8	8	6294175	BA	Irregular pit/hollow fill
Plot 6/29.4	100	4171	9. 25	13.75	6294170	BA	Infill of palaeochannel
Plot 6/29.4	101	4032	1. 5	2. 5		BA	layer, S side
Plot 6/29.4	102	4151	26	28	6294150	BA	Burnt mound deposit
Plot 6/29.4	103	4185	?	?	6294185	BA	Charcoal, dating – fill of undulation in natural
Plot 6/29.4	104	4204	5. 5	10		BA	Fill of hollow
Plot 6/29.4	105	4206	4	7. 5	6294205	BA	Small hollow, possibly natural, fill
Plot 6/29.4	106	4192	42	59. 5	6294195	BA	Burnt mound spread
Plot 6/29.4	107	4193				BA	Micromorph/pollen
Plot 6/29.4	108	4193				BA	Micromorph/pollen
Plot 6/29.4	109	4186				BA	Micromorph/pollen
Plot 6/51	110					BA	Sea shells below layer 651001
Plot 6/51	111	651	6	11. 5		BA	Shelly clay-possibly former shoreline
Plot 3/20	112	320006	11.25	22	32004	ukn	Ditch of channel fill
Plot 3/20	113	320007	7.75	15.75	32004	ukn	Ditch or channel fill
Plot 3/20	114	320012	17	32.75	32004	ukn	Ditch or channel fill
Plot 14/7	115	147005				ukn	Slot 14/7 – hazelnuts
Plot 6/29.4	116	4185				BA	Hand collected charcoal from pit fill
Plot 6/33	117	633024	2	3		BA	charcoal

* discrepancies between labels occurred and therefore tubs with the same sample number were washed separately and reported separately

Table II.6.2: Pwllheli to Blaenau Pipeline Project – G2148. Summary of finds from the processed samples (revised 19/12/11) in site order.

site	sample no.	context no.	samp vol. in l.	sample wt kg.	residue vol. * (ml)	residue wt. g. *	residue wt >7mm	flint no/wt.	pot no/wt.	slag wt. g.	mag. wt. g.	ham's cale no.	fired earth/ daub wt. g.	fired stone wt. g.	bone wt g.	shell wt g.	comment
Plot 0/3	1	03003	9.25	12.75	3000	4221	2858				22.4	8	4. 2	433.8			Coarse residue reserved
Plot 3/2	2	32002	9..25	16	3250	5123	983				3	1		156			Coarse and medium residue reserved
Plot 3/2	3	32018	20.25	30.25	8500	1306	1057	1/0. 2			7. 8	1		35.2	0.2		Coarse and medium residue reserved, flint chip
Plot 3/2	4	32016	7..5	14	2200	3807	3807				0. 8	2		341.2			Coarse and medium residue reserved 1 x charred grain in with charcoal occ coal; quartz flake (0.5g)
Plot 3/2	5	32012	5.75	12	2000	3277	1166				1. 6			584. 2			Coarse and medium residue reserved
Plot 3/2	6	32013	5.75	11	1900	4110	564				0. 6	9		33			Coarse and medium residue reserved
Plot 3/2	7	32019	11.25	16.25	4000	6587	659				0. 6	15		209.2			Coarse and medium residue reserved
Plot 3/2	8	32018	9.25	18	4200	6756	601				5. 8		0.5	19.4	0. 1		Hazelnut and burnt bone
Plot 3/2	9	32020	9. 5	17.25	4000	6741	1316						4	591.4			Coarse and medium residue reserved; fired earth or CBM?
Plot 3/2	11	32021	7	9.75	1500	2883	547.6				0. 1		1. 4	259.6			Coarse and medium residue reserved
Plot 3/10	15	310010	7	7	1500	2698	1853							1461			Coarse and medium residue reserved Occ fired earth in residue
Plot 3/10	16	310003	10	13	6500	9119	8430						1381 (siltstone?)	7049			Coarse and medium residue reserved
Plot 3/10	17	310004	8. 5	9	3200	4734	3556				2		303 (siltstone?)	2398			Coarse and medium residue reserved
Plot 3/14	10	314005	6	8. 5	1400	2331	445.6			55.6	3480	1000's	3. 4	16.6			fired earth includes tuyere fragments as does slag; smithing debris; 0.2g of a green stone; Hazelnut - smithing floor!
Plot 3/20	112	320006	11.25	22	7000	13339	7892				3. 6	6		265			Coarse and medium residue reserved
Plot 3/20	113	320007	7.75	15.75	5000	10046	7391			0.5	0. 2						Coarse and medium residue reserved; possibly fuel ash slag
Plot 3/20	114	320012	17	32.75	11000	15870	9197				0. 2	1		810			Coarse and medium residue reserved
Plot 3/27	13	327003	14. 5	20.25	3400	5378	3330		2/1		20.4	1	1. 8	425.8	52.4		Coarse and medium residue reserved Mortared pebbles 42g; pot very degraded; and waterlogged seed
Plot 3/27	14	327004	550	0.98	100	163.5	52				0. 2				8. 6		Coarse and medium residue reserved Bone is burnt
Plot 6/10	18	610002	6	7	800	1438	440				11	3	1				Coarse and medium residue reserved

site	sample no.	context no.	samp vol. in l.	sample wt kg.	residue vol. * (ml)	residue wt. g. *	residue wt >7mm	flint no/wt.	pot no/wt.	slag wt. g.	mag. wt. g.	fired earth/ daub wt. g.	fired stone wt. g.	bone wt g.	shell wt g.	comment
Plot 6/6	19	66004	11.25	12	210	499	230			<0.1	0. 1					Coarse and medium residue reserved
Plot 6/6	20	66010	9. 5	14	1900	2712	1865			<0.1	0. 3					Coarse and medium residue reserved
Plot 6/10	18	610002	6	7	800	1438	440				11	1				Coarse and medium residue reserved; 3x hammerscale
Plot 6/21	62	621003	5. 5	7.75	1300	2240	966				0.4					Coarse and medium residue reserved
Plot 6/21	63	621004	11	12. 5	2100	3708	1909				1. 2					Coarse and medium fraction reserved
Plot 6/21	64	621007	5. 5	9. 5	3250	4650	4026				7.4		1247			Coarse and medium fraction reserved 003 Burnt mound material
Plot 6/21	65	621009	7. 5	6.25	1200	2141	1245				0.6		196.4			Course and medium fraction reserved 004 pit fill
Plot 6/33	37	633004	10	17	9000	12115	11425	1/0.1								Coarse and medium residue reserved; flint chip/broken flake
Plot 6/33	38	633005	8	15.75	7500	10528	9704				2. 4		11.6			Coarse and medium residue reserved
Plot 6/33	39	633009	2	5	1000	1911	1605						105			Coarse and medium residue reserved
Plot 6/33	40	633004	1. 5	3	1200	1835	1628						63.2			Coarse and medium residue reserved
Plot 6/33	41	633024	7. 5	13	6000	8030	7197				3. 2		917			Coarse and medium residue reserved
Plot 6/33	42	633024	11.25	18.5	7500	11385	10534				5. 2		661			Coarse and medium residue reserved
Plot 6/33	43	633010	16	22.25	10500	16500	15198				1. 4					Coarse and medium residue reserved
Plot 6/33	117	633024	2	3	750	900	680				4					Coarse and medium residue reserved
Plot 6/33	48	633029	5. 5	8.75	1400	1482	502						202.8			Coarse and medium fraction reserved
Plot 6/33	49	633021	9.75	17	7800	6589	1775						1544			Coarse and medium fraction reserved High quantity of charcoal 2456 hand picked
Plot 6/33	50	633020	7	13	2500	4316	3198						195.4			Coarse and medium reserved
Plot 6/33	51	633035	19.25	32.25	11500	20231	17386				0. 4		2753			Coarse and medium residue reserved
Plot 6/51	111	651	6	11. 5	200	233	81								133	Coarse and medium residue reserved
Plot 7/1	44	71002	27.75	29	20000	16632	8366						168		5891	Coarse and medium residue reserved Organic 1 x bag flot 1x bag wood

Site	sample no.	context no.	samp vol. in l.	sample wt kg.	residue vol. * (ml)	residue wt. g. *	residue wt >7mm	flint no/wt.	pot no/wt.	slag wt. g.	mag. wt. g.	fired earth/ daub wt. g.	fired stone wt. g.	bone wt g.	shell wt g.	comment
Plot 6/29.4	45	6294006	3.75	8.5	3400	4292	3522						18.2			Coarse and medium residue reserved
Plot 6/29.4	45 *	6294002	31	42	8500	17348	10599					17	1130			Coarse and medium residue reserved * Charcoal sample
Plot 6/29.4	46	2964010	2	4. 5	900	1359	554									Coarse and medium residue reserved
Plot 6/29.4	46 *	6294002	21.5	36	16000	22941	20715						695			Coarse and medium fraction reserved * Charcoal sample
Plot 6/29.4	47	6294011	5.5	8.25	3500	4683	4041						89.8			Coarse and medium residue reserved
Plot 6/29.4	47*	6294011	28	47.75	25000	31509	29003					21	888			Coarse and medium fraction reserved
Plot 6/29.4	53	4071	26	36	16000	20090	17599*									14g lost while sieving coarse and medium fraction reserved
Plot 6/29.4	54	4100	4	8	5000	8468	5667									Coarse and medium fraction reserved
Plot 6/29.4	55	4102	20.75	40	1800	28500	20257									Coarse and medium fraction reserved
Plot 6/29.4	56	4054	19	27. 5	6200	8078	4583						74.8			Coarse and medium fraction reserved
Plot 6/29.4	57	4106	5.75	8	1450	1993	1305						19			Coarse and medium fraction reserved
Plot 6/29.4	58	4023	10	16	3600	4941	2217						177			Coarse and medium residue reserved
Plot 6/29.4	59	4112	3.75	8	4300	5034	4792						225			Coarse and medium fraction reserved
Plot 6/29.4	60	4115	1. 5	2.25	500	725	426									Coarse and medium fraction reserved
Plot 6/29.4	61	4116	7.5	14.75	4500	6860	4680						487			Coarse and medium residue reserved
Plot 6/29.4	66	4049	21	30	14000	18332	15004				< 1		111			Coarse and medium residue reserved
Plot 6/29.4	67	4117	13	21.5	6400	9059	6247						62.4			Coarse and medium residue reserved
Plot 6/29.4	68	4106	6. 7	13	7000	8980	8024						368			Course and medium fraction reserved
Plot 6/29.4	69	4104	5. 25	9	1400	2325	1892									Course and medium fraction reserved
Plot 6/29.4	70	4129	9	16	7000	9500	9067						33.2			Coarse and medium fraction reserved
Plot 6/29.4	71	4023	2	2.	200	172	34									Coarse and medium residue reserved
Plot 6/29.4	72	4088	5. 5	8. 75	210	289	81						6			Coarse and medium residue reserved
Plot 6/29.4	73	4088	2. 5	3	23	31.5	4. 4								0.1	Coarse and medium fraction reserved
Plot 6/29.4	74	4088	7	8	160	160.7	36						3. 8			Coarse and medium fraction reserved
Plot 6/29.4	75	4134	3. 75	7	270	481	163						29. 2			Coarse and medium fraction reserved
Plot 6/29.4	76	4134	4	7	25	38. 7	3. 8									Coarse and medium residue reserved
Plot 6/29.4	77	4140	11.25	14	1100	1918	769									Coarse and medium residue reserved
Plot 6/29.4	78	4099	2	3	600	926	461									Coarse and medium residue reserved
Plot 6/29.4	79	4099	2	4. 5	1600	2829	1429									Coarse and medium residue reserved
Plot 6/29.4	81	4131	1.75	2. 5	200	351	120.4						1. 4			Coarse and medium residue reserved
Plot 6/29.4	82	4106	8. 5	19	5500	8750	5663						348			Coarse and medium residue reserved
Plot 6/29.4	83	4070	11	13	750	1054	397									Coarse and medium residue reserved
Plot 6/29.4	84	4145	1. 5	5	800	1220	579									Coarse and medium residue reserved
Plot 6/29.4	85	4144	2. 5	5	2700	4022	3380									Coarse and medium residue reserved
Plot 6/29.4	86	4147	3. 5	4. 25	400	1026	554									Coarse and medium residue reserved
Plot 6/29.4	87	4152	1. 5	3	1100	1644	1256						6. 4			Coarse and medium residue reserved
Plot 6/29.4	88	4153	750	1.75	200	335	164									Coarse and medium residue reserved

Site	sample no.	context no.	samp vol. in l.	sample wt kg.	residue vol. * (ml)	residue wt. g. *	residue wt >7mm	flint no/wt.	pot no/wt.	slag wt. g.	mag. wt. g.	fired earth/ daub wt. g.	fired stone wt. g.	bone wt g.	shell wt g.	comment
Plot 6/29.4	89	4032	8	16	6000	8690	3728									Coarse and medium residue reserved
Plot 6/29.4	90	4142	4	8	6600	6367	4561									Coarse and medium residue reserved
Plot 6/29.4	91	4156	11	13	5000	8497	7574									Coarse and medium residue reserved
Plot 6/29.4	92	4165	1	1.894	600	998	284						8. 2			Coarse and medium residue reserved
Plot 6/29.4	93	4167	<100	0.209	27	71. 3	26									Coarse and medium residue reserved
Plot 6/29.4	94	4169	<100	0.213	25	52. 3	20. 4									Coarse and medium residue reserved
Plot 6/29.4	95	4172	3. 75	7	2300	3479	2182						67. 4			Coarse and medium residue reserved
Plot 6/29.4	96	4183	1. 75	6	3100	4351	3236									Coarse and medium residue reserved
Plot 6/29.4	97	4179	3	6	2600	3597	2225						232			Coarse and medium residue reserved
Plot 6/29.4	98	4176	1	2	400	652	292									Coarse and medium residue reserved
Plot 6/29.4	99	4177	8	8	4200	6134	2346									Coarse and medium residue reserved
Plot 6/29.4	100	4171	9. 25	13.75	3500	4947	3906									Coarse and medium residue reserved
Plot 6/29.4	101	4032	1. 5	2. 5	700	1192	372									Coarse and medium residue reserved
Plot 6/29.4	102	4151	26	28	10000	14500	11497									Coarse and medium residue reserved
Plot 6/29.4	104	4204	5. 5	10	5800	7709	5228						127			Coarse and medium residue reserved
Plot 6/29.4	105	4206	4	7. 5	1900	3353	1671									Coarse and medium residue reserved
Plot 6/29.4	106	4192	42	59. 5	20000	30426	25068					981 (fired siltstone)	483			Coarse and medium residue reserved

* greater than 1mm residue

Table II.6.3: Pwllheli to Blaenau Pipeline Project – G2148. Summary of Environmental finds from the processed samples.

site	sample no.	context no.	samp vol. in l.	flot vol. ml.	charcoal $	char'd grain *	char'd chaff *	char'd seed *	hazel-nut no.	snail */&	Some preliminary identifications
Plot 0/3	1	03003	9.25	390	5/5	1		2	2	2/1	Indet cereal frags; hazelnut (2); lots of spores; *Bromus* sp., *Rumex* sp.; charcoal – lots identifiable fragments; charred thorn and herbaceous stem; snail – *Punctum pygmaeum*
Plot 3/2	2	32002	9..25	92.5	5/5	3		2	4		*Avena* sp., *Triticum aestivum, Hordeum vulgare*; hazelnut x4; *Chrysathemum segetum, Galium aparine*, Fabaceae, lots spores; charcoal - a few id. frags, mainly comminuted; indet. calcined bone
Plot 3/2	3	32018	20.25	255	5/5	4		3	6		*Avena* sp., *T. aestivum, Secale cereale, Hordeum vulgare*; hazelnut, *Fallopia convolvulus, Bromus* sp., *Galium aparine, Lapsana communis, Chrysthamemum segetum*, small Poacaea, *Vicia/Lathyrus*; charcoal – lots identifiable fragments; indet calcined and unburnt bone
Plot 3/2	4	32016	7..5	84	3/5	4	3	2			*Hordeum vulgare, Triticum dicoccum/spelta* grain; *T. dicoccum* chaff, *Bromus* sp., *Fallopia convolvulus*; charcoal – includes roundwood, mainly comminuted
Plot 3/2	5	32012	5.75	65	3/5	4	1	1			mainly *T. dicoccum/spelta*, occ free threshing; *H.vulgare; Triticum* spikelet fork and glume base, *Carex* sp., Poaceae; charcoal – few identifiable frags
Plot 3/2	6	32013	5.75	12	3/4	1		1			Indet cereal; *Rumex* sp.; charcoal – mostly small fragments
Plot 3/2	7	32019	11.25	17	3/5	1	1	1		1/1	Indet grain, *T. dicoccum* glume base; charcoal – a few identifiable fragments
Plot 3/2	8	32018	9.25	97	5/5	2		2	3		*Avena* sp., *Hordeum/Triticum* sp, indet cereal; hazelnut, *Vicia/Lathyrus* sp., small Poaceae, *C. segetum,* cf *Athemis cotula, Chenopodium* sp.; charcoal – several identifiable fragments; indet. calcined bone
Plot 3/2	9	32020	9. 5	20	4/5	2		2			*Avena* sp., cf *Hordeum*, indet grain; *Galium aparine, C. segetum, Vicia/Lathyrus* sp.; charcoal – a few id. fragments
Plot 3/2	11	32021	7	14	3/5	1	1	1			Indet grain; chaff- *T. dicoccum* glume base, *Triticum* sp. glume bases & spikelet forks; indet seeds; charcoal- a few id. fragments
Plot 3/10	15	310010	7	54.5	4/5			1			Indet charred seed; charcoal – lots identifiable fragments
Plot 3/10	16	310003	10	161	5/5						Charcoal – lots identifiable fragments- heavily mineralised
Plot 3/10	17	310004	8. 5	99	5/5	1		1			*Hordeum/Triticum* sp.; charcoal – several id. fragments and couple fragments herbaceous stem
Plot 3/14	10	314005	6	153	5/5	1		1	2	1/1	*Avena* sp.; small Poaceae, uncharred hazelnut x1; charcoal – several large fragments; snail – *Punctum pygmaeum*
Plot 3/20	112	320006	11.25	2	1/2						A little charcoal
Plot 3/20	113	320007	7.75	1	1/3						A little charcoal
Plot 3/20	114	320012	17	3	1/3						A little charcoal
Plot 3/27	13	327003	14. 5	828	5/5	2		3	1		cf *Triticum* sp., *Hordeum* sp., indet grain; *Plantago lanceolata, Rubus* sp., *Vicia/ Lathyurus* sp., hazelnut, thorn, fruit stone (x2); charcoal – lots identifiable fragments, small herbaceous stems; cremated bone - including probable human skull fragments
Plot 3/27	14	327004	550	66	4/5			1	1		Uncharred hazelnut; indet seeds, small herbaceous stems; cremated bone – including probable human skull fragments
Plot 6/10	18	610002	6	455	5/5		1	2			*Triticum dicoccum* chaff; *Plantago lanceolata*, small Poaceae, *Rubus* sp., *Medicago/Trifolium, Ajuga reptans, Carex* sp., *Potentilla* sp. ,charred tubers and herbaceous stems; charcoal – lots fragments >4mm and roundwood

site	sample no.	context no.	Samp. vol. in l.	flot vol. ml.	char-coal $	char'd grain *	char'd chaff *	char'd seed *	hazelnut no.	snail */&	Some preliminary identifications
Plot 6/6	19	66004	11.25	522	5/5						Charcoal – lots fragments.4mm, also occasional small twigs and herbaceous stems
Plot 6/6	20	66010	9. 5	357	5/5				1	1/1	Charcoal- lots fragments >6mm, and lots roundwood; snail – Punctum pygmaeum
Plot 6/21	62	621003	5. 5	6	2/5						Charcoal- all small fragments
Plot 6/21	63	621004	11	13	3/5					1/1	Charcoal – a few fragments >4mm; snail -
Plot 6/21	64	621007	5. 5	180	4/5				1		Charcoal – several fragments >4mm
Plot 6/21	65	621009	7. 5	25	3/5						Charcoal – a few fragments >4mm
Plot 6/33	37	633004	10	180	5/5						Charcoal - 40+ >6mm frags
Plot 6/33	38	633005	8	280	5/5						Charcoal - several larger identifiable fragments – worth looking at
Plot 6/33	39	633009	2	28	3/5			1			*Rubus* sp.; charcoal- a few identifiable fragments; ostracod x 1
Plot 6/33	40	633004	1. 5	36.5	4/5						Charcoal- a few identifiable fragments
Plot 6/33	41	633024	7. 5	305	5/5			1	2	1/1	Hazelnut; Charcoal- several larger identifiable frags- rare very small twig; indet poss seed; snail - *Punctum pygmaeum*
Plot 6/33	42	633024	11.25	615	5/5					1/1	Charcoal- lots fragments >4mm, incl occasional small roundwood; snail – *Punctum pygmaeum*
Plot 6/33	43	633010	16	150	5/5						Charcoal – several larger identifiable fragments-heavily mineralised
Plot 6/33	48	633029	5. 5	1200	5/5						Charcoal – lots of identifiable larger fragments
Plot 6/33	49	633021	9.75	3000	5/5						Charcoal- lots larger fragments but heavily mineralised
Plot 6/33	50	633020	7	504	5/5						Charcoal – several larger identifiable fragments
Plot 6/33	51	633035	19.25	705	5/5						Charcoal – several larger identifiable fragments
Plot 6/33	117	633024	2	1000	5/5						Lots of charcoal >4mm
Plot 6/51	111	651	6	40 wet	1/1					5/2	Uncharred (score 3/2) – moss and leaf fragments, Poaceae florets, Poaceae seeds, *Betula* sp., unidentified seeds (identifiable) *; wood several fragments (score 5) lots of herbaceous stems; snails/molluscs – tellens, cockles, rough winkle, *Hydrobia ulvae*
Plot 7/1	44	71002	27.75	40+100 wet	3/5			1		2/2	Charred *Rubus* sp., Uncharred *Betula* sp. *Rubus* sp.; snails – *Discus rotundatus, Oxychilus cellarius, Punctum pygmaeum, Aegopinella* sp., Clausilidae; cockles (very abundant), oyster, periwinkles, rough winkle – cockle shell midden!

site	sample no.	context no.	Samp. vol. in l.	flot vol. ml.	Flot vol. wet	wood	char-coal $	char'd grain *	char'd chaff *	char'd seed *	Hazel-nut no.	snail */&	Some preliminary identifications
Plot 6/29.4	45	6294006	3.75	75			5/5						Charcoal- several identifiable fragments
Plot 6/29.4	45 *	6294002	31	175			5/5						Charcoal – lots of identifiable fragments
Plot 6/29.4	46	2964010	2	3			2/3						Charcoal- mainly small fragments
Plot 6/29.4	46 *	6294002	21.5	441			5/5						Charcoal – lots of identifiable fragments, rare herbaceous stem fragments
Plot 6/29.4	47	6294011	5.5	240			5/5						Charcoal – several larger identifiable fragments
Plot 6/29.4	47*	6294011	28	1000			5/5						Charcoal – lots of identifiable fragments
Plot 6/29.4	53	4071	26	550			5/5						Charcoal – several larger identifiable fragments
Plot 6/29.4	54	4100	4	1			1/3						Charcoal – small fragments only
Plot 6/29.4	55	4102	20.75	5			2/3						Charcoal – mainly small fragments
Plot 6/29.4	56	4054	19	150			5/5						Charcoal – lots fragments >4mm
Plot 6/29.4	57	4106	5.75	510			5/5	1					*Hordeum* sp. (1); charcoal – lots fragments >4mm
Plot 6/29.4	58	4023	10	85			4/5					1/1	Charcoal – several fragments >4mm; snail -
Plot 6/29.4	59	4112	3.75	90			4/5						Charcoal – several fragments >4mm
Plot 6/29.4	60	4115	1. 5	90			5/5						Charcoal – several fragments >4mm
Plot 6/29.4	61	4116	7.5	100			5/5						Charcoal – several fragments >4mm
Plot 6/29.4	66	4049	21	300			5/5						Charcoal – lots fragments >4mm
Plot 6/29.4	67	4117	13	23			4/5				1		Charcoal – several fragments >4mm; hazelnut
Plot 6/29.4	68	4106	6. 7	50			4/5						Charcoal- several fragments >4mm
Plot 6/29.4	69	4104	5. 25	300			5/5						Lots identifiable material
Plot 6/29.4	70	4129	9	302			5/5	1		1		1/1	*Hordeum vulgare*, indet.; a few frags >4mm
Plot 6/29.4	71	4023	2	185			5/5						Lot of frags >4mm
Plot 6/29.4	72	4088	5. 5	30			4/5			1	1		Hazelnut x1; charcoal mainly small frags
Plot 6/29.4	73	4088	2. 5	80			4/5				1		Charcoal – mostly small charcoal; uncharred – *Betula* sp., moss and leaf fragments
Plot 6/29.4	74	4088	7	100			3/5						Charcoal – several fragments >4mm; uncharred *Betula* sp.
Plot 6/29.4	75	4134	3. 75	<1	30	4	1/2						Wood and bark; charcoal – small fragments only
Plot 6/29.4	76	4134	4	10			3/4						Mainly small charcoal
Plot 6/29.4	77	4140	11.25	100			4/5						Uncharred – *Betula* sp., *Chenopodium* sp., Cyperaceae, *Ajuga repens, Ranunculus* sp.; Charcoal – all <4mm
Plot 6/29.4	78	4099	2	3			2/4						Mainly small charcoal
Plot 6/29.4	79	4099	2	1			2/3						Mainly small charcoal
Plot 6/29.4	81	4131	1.75		550	5	1/3						Uncharred – few insects, lots wood; charcoal – a few fragments >4mm
Plot 6/29.4	82	4106	8. 5	250			5/5						Mainly small charcoal
Plot 6/29.4	83	4070	11	20			3/5						Mainly small charcoal
Plot 6/29.4	84	4145	1. 5	4			3/4						Mainly small charcoal
Plot 6/29.4	85	4144	2. 5	1			1/3						Small charcoal
Plot 6/29.4	86	4147	3. 5	3			2/4						Mainly small charcoal
Plot 6/29.4	87	4152	1. 5	10			3/5						Charcoal – a few fragments >2mm
Plot 6/29.4	88	4153	750	12			3/5						Charcoal – several fragments >2mm
Plot 6/29.4	89	4032	8	4			3/5						Charcoal – several fragments >2mm

site	sample no.	context no.	Samp. vol. in l.	flot vol. ml.	Flot vol. wet	wood	char-coal $	char'd grain *	char'd chaff *	char'd seed *	Hazel-nut no.	snail */&	Some preliminary identifications
Plot 6/29.4	90	4142	4		20	1	0/2					1/1	Uncharred – hazelnut, *Betula* sp.; charcoal – small fragments; snail – *Helicigona lapicida* x1
Plot 6/29.4	91	4156	11	80			4/5				1		Hazelnut x1; several charcoal frags >4mm
Plot 6/29.4	92	4165	1	10			3/5						Charcoal- several fragments >2mm
Plot 6/29.4	93	4167	<100	3			2/5						Charcoal – a few fragments .2mm
Plot 6/29.4	94	4169	<100	2			2/4						Charcoal – a few fragments >2mm
Plot 6/29.4	95	4172	3. 75	70			4/5						Charcoal – several larger identifiable fragments
Plot 6/29.4	96	4183	1. 75	<1			-/2						Charcoal – no larger fragments
Plot 6/29.4	97	4179	3	21			3/5						Charcoal – a few fragments >4mm
Plot 6/29.4	98	4176	1	4			2/3						Charcoal – a few fragments >2mm
Plot 6/29.4	99	4177	8	12			3/5						A few charcoal frags >4mm
Plot 6/29.4	100	4171	9. 25	124			5/5				+		Charcoal – lots fragments >4mm
Plot 6/29.4	101	4032	1. 5	15			3/5						Charcoal several identifiable fragments
Plot 6/29.4	102	4151	26	107			5/5						Several frags >4mm
Plot 6/29.4	104	4204	5. 5	12			3/5						Charcoal – several fragments >4mm
Plot 6/29.4	105	4206	4	40			3/5						Several frags >4mm
Plot 6/29.4	106	4192	42	320			4/5						Uncharred – *Chenopodium* sp.; charcoal – lots large fragments >6mm

* = abundance: 1=1-10, 2=11-50, 3=51-150, 4=151-250, 5=250+; $ = abundance >2mm/abundance < 2mm; */& abundance/diversity – diversity scores - 0=0, 1=1-3, 2=4-10, 3=11-25, 4=26-50, 5=50+;

Table II.6.4. Hand collected animal bone, marine shell and nutshell

Plot	**3/2**	**3/2**	**3/2**	**3/20**	**6/51**	**7/1**	**14/7**	**14/7**
Context	**32012**	**32012**	**32018**	**320011**	**651001**	**71002**	**147005**	
Sample no.					**110**		**115**	
Find no	**017**	**006**	**015**	**031**	**062**	**034**	**063**	**035**
Shells								
Scrobicularia plana					27			
Cardium edule					1	25		
Littorina littorea					1			
Patella vulgata				2				
Plants								
Corylus avellana, whole hazelnuts							33	
Bones								
Calcined rib fragment -small ungulate	1							
Calcined long bone shaft-sheep size, fragmented		2+						
Calcined long bone shaft- cattle size – metatarsus?			1					
Cattle ribs								2
Cattle skull with horns cores and horns								1
Cattle size lumbar vertebra-water worn or eroded								1

13.7. Appendix II.7: Assessment of timbers and wood samples for further analysis

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Introduction
This report briefly reviews timbers and wood samples recovered during fieldwork and watching briefs in advance of and during the laying of a gas pipeline between Pwllheli and Blaenau Ffestiniog, defined as Gwynedd Archaeological Trust Project G2148. These timbers and samples have been assessed to define their analysis potential in line with current English Heritage guidance on waterlogged wood and dendrochronology (English Heritage 1998, English Heritage 2010). On the basis of this assessment, recommendations are made for a program of analysis.

Methods
The material was delivered to the offices of University of Wales, Lampeter Archaeological Services, and associated documentation provided on context. Material is generally located by a plot number associated with a particular stretch of the pipeline development, and may also have been assigned a context number. Individual pieces or groups of timber were examined to determine their recording requirements and their analysis potential with reference to wood technology, species identification, tree-ring analysis and dendrochronological dating. Outline information was recorded on individual timber record sheets and then collated in a single table. Individual samples have been assessed to determine whether they are oak, or require formal microscopic wood identification, and ring counts made of the some of the oak timbers to determine if they are suitable for dendrochronological analysis (see Table II.7.1). Two timbers were sampled and their tree-ring patterns measured as a preliminary spot-dating exercise.

Results and Recommendations
Documentation was provided for a total of 23 individually numbered groups of wood. Twenty-two of these were examined during the assessment and details of this provided in Table II.7.1. In some cases, a single find number has been used for several individual pieces of wood collected from the same context. In other cases, two parts of the same timber which appear to have been sawn into two sections during excavation were both issued with the same number (but differentiated by being labelled 1 of 2, 2 of 2 etc). The results of this assessment are provided alongside site descriptions of the relevant plots and contexts as provided by the excavators. Summary quantification of recommendations is provided in Table II.7.2.

Where appropriate, recommendations are made on the level of recording and/or analysis required to provide a basic record of this material prior to its disposal or active conservation. In line with recent English Heritage guidance (2010), a basic record including sketch drawings on a wood record sheet is recommended for a significant percentage of this assemblage. Selective photography is also recommended as a rapid method of recording features such as tool marks. Where such wood technology as tool marks survive in relatively good condition, the size and shape of facets and inferred evidence of wood working practices will also need recording. The majority of the assemblage comprises oak wood which does not require microscopic wood identification due to its characteristic cell structure visible to the naked eye. Non-oak wood requires the preparation of thin sections for species identification through comparison with reference slides and photo micrograph atlases. Tree ring analysis through the counting of annual rings and measurement of average ring widths can be collected relatively rapidly and provides information on the nature of the growing conditions and woodland population that the assemblage represents. A smaller number of items have the potential for tree ring dating where the wood is oak and retains more than 50 annual rings. It is recommended that tree ring dating is undertaken on all samples which retain sufficient rings to merit measurement. At present the date of the majority of this assemblage is unknown and technological features do not provide dating information in this instance.

Plot: 0/8 Timber find spot
Grid: SH 39047 36352 Estimated period: Unknown
A light grey clay overlay a thick bed of peat, which was about 1.5m deep. Occasional pieces of wood were visible in the peat, mainly branches up to 0.65m in length and about 0.1m in diameter. A much larger piece of timber was found and recovered for study. This marsh lies at a height of about 5mOD in the valley of a small tributary to the Afon Erch. It is shown as marsh on the 1889 map although there had been considerable efforts by this time to drain it. Recorded during watching brief, timber sampled.

Wood assessment. Find number 54 as supplied is only some 410 mm in length and thus presumably represents only a sample of the large timber and described above. It is a piece of non-oak roundwood and recording

through wood record sheet, photography, microscopic wood identification and rapid tree ring analysis is recommended prior to disposal. There is no evidence of working on the sample provided and this may well represent natural woodland.

Plot: 11/3 Timber find spot
Grid SH 61196 39191 Estimated period: Unknown
A layer of peat up to 2m thick was seen over much of plot 11/3. At a depth of about 1m within this peat was a rough layer where wood was more densely concentrated. Some of the fragments of wood appeared to be chopped or possibly sawn and some were radially split. Many of the pieces were fairly small but there was also the stump of a tree. The peat was found immediately below the ground surface in this area and the upper parts also contained wood, including remains of modern trees. This plot has been largely surrounded by houses since the 19th century, but has remained very wet through to the present day as it was covered by himalayan balsam and willows. Recorded during watching brief and timbers sampled.

Wood assessment. Five individually numbered items or groups from this plot were listed in the documentation provided. One of these (find number 51), was not noted during the assessment. This group includes clearly worked items with evidence for removing side branches, conversion through splitting working of points, and in one instance (find number 52) both blind and through peg holes suggesting re-use. Of the 11 pieces examined, 10 are recommended for a basic record comprising wood record sheet and selective photography, of which eight exhibit tool mark evidence requiring additional recording, three need microscopic wood identification, seven require tree ring data collection and three have sufficient rings to merit dendrochronological dating.

Plot: 13/30 Timber find spot
Grid SH 65675 40350 Estimated period: Unknown
Two large timbers found in base of the trench at a depth of about 1.5m below the present surface. These were in a mid brownish grey silty sand of probable alluvial origin. Most of the layers above were alluvial silts and clays with a band of brown, organic material in places. This site is on the flood plain of the Afon Dwyryd about 190m west of the river. The river here is tidal and meanders across its flood plain, but has not changed its course since 1889, partly because there were already flood banks built along each side of the river at this date. Timber collected.

Wood assessment. The two large timbers were cut into two pieces during excavation with a saw. One is quartered (find number 57) and was subjected to spot dating. The tree-ring sequence has however not cross-matched against existing dated British or Irish sequences. The second timber is an approximately quartered piece of knotty oak with possible tool mark survival and shows similarities to some of the timbers recovered from plot 14/7. Recommendations include recording on a wood record sheet, selective photography, wood technology and dendrochronological dating.

Plot: 14/1 Timber find spot
Grid SH 66445 40949 Estimated period: Unknown
A large squared timber was recovered from the mid grey silty clay in the base of the trench. This site is on the flood plain of the Afon Dwyryd about 180m north of the river. The river here is just at the tidal limit with the highest point of ordinary tides being under the bridge at Maentwrog. The river meanders across its flood plain, but has not changed its course since 1889, partly because there were already flood banks built along each side of the river at this. Recorded during watching brief, timber sampled.

Wood assessment. This single large timber (find number 49) was cut at one end with a saw during excavation. It is a radially converted piece of slow-grown (c. 200 rings) oak with a wedge cut point at one end. As part of a selective spot-dating exercise, this timber with its large number of rings, was subjected to dendrochronological analysis. The sample proved difficult to measure with a number of bands of narrow, sometimes anomalous rings in the latter part of the tree-ring sequence. Further analysis of the data is required and it is to be hoped that analysis of samples from other contexts may lead to cross-matches confirming a suspected dating position for the outermost surviving ring of this timber in the mid-13th century. Recommendations include recording on a wood record sheet, selective photography, and wood technology.

Plot: 14/4 Possibly worked wood.
Grid SH 66605 41061 Estimated period: Unknown
A possibly cut branch and plank-shaped timber were found in alluvial clay. A large unworked branch was also found in this plot. The clay is described as firm dark grey silty clay, and it had alluvial gravels below it. This site is on the flood plain of the Afon Dwyryd about 180m north of the river. The river here is generally not tidal, but

the highest point of ordinary tides is under the bridge at Maentwrog, so on some tides this section of river must still be tidal. The river meanders across its flood plain, but has not changed its course since 1889, partly because there were already flood banks built along each side of the river at this date. Recorded during watching brief, wood samples taken.

Wood assessment. A single piece of oak roundwood (find number 42) with possible toolmarks. Recommended for wood record sheet, rapid tree-ring analysis and photography.

Plot 14/7 Possible former riverbank with deposit of wood and branches
Grid SH 66907 41219 Estimated period: Unknown
Site description: Plot 14/7 lies within a bend of the Afon Dwyryd. The field is reclaimed land protected by a flood bank since at least the late 19th century. The 1841 tithe map for Maentwrog parish shows the same course of the river as in 1889. The bend in the river to the NE of plot 14/7 was straightened out in the 20th century and now exists as ox-bow lake type ponds. Under about 0.1m of topsoil (147001) was a layer of mid orange-brown silty clay (147002) 0.39m thick. This overlaid a mid grey-brown silty clay (147003), which in turn covered a light grey silty clay (147004/147006). All these deposits appeared to be alluvial silts. About 32m east of the current river bank a large piece of timber was recovered from the silts at a depth of 1.1m below the present surface from context 147006. In places beneath 147004 was a deposit composed largely of pieces of wood (147005). This deposit was between 0.9m and 1.1m below the present surface and composed of dark grey silt containing a dense concentration of pieces of wood, branches and hazelnuts. Many of the pieces were small but two large timbers were found, the largest was 0.75m in length. These pieces had some marks that might indicate working. Some of the smaller pieces also seemed to be cut or sawn and some pieces were radially split timber. There was a high concentration of hazelnuts but none of these seemed to be deliberately broken and they may indicate that many of the branches were deposited in the river in autumn with their nuts still attached. More probably nuts from riverside trees dropped into the water and were deposited in this location along with other debris. No artefacts, other than wood, were found in this area. Fourteen meters to the west of the wood deposit was a palaeochannel, c.5.8m wide and over 0.7m deep (it was not fully exposed in the trench). This channel was filled with layers of alluvial gravel and was cut through the grey alluvial silty clay. Towards the eastern end of plot 14/7 the top of a cattle skull with horns was found at a depth of 1.4m. This was found within what appeared to be a low mound of grey silty clay (147009). The grey clay was sealed by a mid orange-brown silty. Recorded during watching brief.

Wood assessment. A total of eleven individually numbered items were examined from this plot, comprising a total of thirty pieces of wood. The single piece from context 147006 appears to have been cut into two sections during excavation, and comprises a quartered piece of oak was possible axe marks on one end and one face (at least) with sufficient rings (approximately 70) and sapwood suggesting this would merit tree ring dating. The 29 pieces assigned to context 147005 include numerous quartered or radially split oak wood with tool marks. There are also smaller roundwood items with evidence of working such as the cutting of side branches. Contextual information provided is not suggest the presence of clear structure, however a number of the pieces exhibit clear woodworking from initial conversion through splitting followed by secondary hewing which implies that at least part of this assemblage represents worked and possibly finished timbers which may have been displaced, possibly during flood events, from its place of original use. Some of the smaller items may represent the debris from woodworking. This group of material cannot be explained as natural driftwood, or remnants of simple woodland clearance.

Completion of wood record sheets and selective photography of 29 of these pieces is recommended to provide a basic record. 13 of these pieces retain evidence of woodworking which will need to be recorded. The majority of this group is oak, but nine pieces are not and will require microscopic wood identification. Rapid recording of tree ring information is required for 19 pieces, and nine items retain sufficient rings to merit tree ring dating.

Plot: 6/29.4 Large burnt mound complex
Grid SH 52254 39574 Estimated period: Bronze Age
Site includes a group of five small pits adjacent to an extensive spread from one or more burnt mounds. Excavation suggested one large truncated mound up to 25.0m in length, extending the 16m width of the working width. A 5m wide section of the burnt mound is preserved in situ under the running track. A complicated group of features was found under the burnt mound. There were 29 pits and troughs, a posthole and 5 gullies. Other hollows and linear features may have been natural features and some recent drains also cut the area. A layer, which may be a buried soil deposit, divided activity into two rough phases. The area was underlain by natural channels, part of which seems to have been reused by The burnt mound was evaluated by hand-dug slots, then

the burnt spread was removed by hand. Features were excavated and recorded, then the 'buried soil' layer was removed by machine and the remaining features on site

Wood assessment: A total of fifteen relatively small fragments of oak, most radially converted, were assessed. Unfortunately none retained sufficient rings to merit tree-ring dating. These may be woodworking waste or reflect fuel usage at the site. Recording by tree record sheet, selective photography, and tree-ring analysis is recommended for all but the smallest fragment. Comparison with any charcoal analysis from the site should be undertaken.

Conclusion

The wood assemblage assessed here is derived from seven possibly unconnected contexts. In the majority of cases, the excavators have correctly identified the presence of worked material, often in contexts where significant quantities of apparently unworked wood were encountered. With the exception of the burnt mound complex where site form and radiocarbon dates indicate a Bronze Age date, the material's context does not provide an insight into dating. One of the two timbers subjected to dendrochronological spot-dating as part of this assessment, may date to the medieval period although this will only be confirmed by further dendrochronological dating. In addition to the specialist programme of analysis recommended above, topographic and historical research to determine whether military roads associated with medieval or Roman campaigns existed in the vicinity of some of these find spots would be worthwhile. A number of the timbers assessed are similar to timbers found in structures such as the recently excavated trackway in Borth Bog in west Wales where a corduroy of split and roughly finished timbers provided a roadway across a wetland.

Bibliography

English Heritage 2010, *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation, and Curation of Waterlogged Wood*, 3rd edn, English Heritage.
English Heritage 1998, *Dendrochronology: guidelines on producing and interpreting dendrochronological dates*, English Heritage London.

Table II.7.1. G2148 Wood Assessment

Find Number	Assessment Description	Context Number	Plot	Period	No of items	Site Description	Ring Estimate	Pith	Sap-wood	Bark Edge	Dendro Required	Treerings Required	Wood ID Required	Wood technology Required	Wood Record Sheet and Photography Required	Length	Width	Thick
36	Oak branch with chisel cut at one end	147005	14_7	Unknown	1	Medium sized piece of cut wood		Y	Y	Y	0	1	0	1	1	880	50	50
37	2 pieces of bark	6294139	6/29.4	Bronze Age?	2	2 fairly small split pieces		N	N	Y	0	0	0	0	1	240	100	5
38	Roundwood fragment with cut sidebranch	147005	14_7	Unknown	1	Small cut branch		Y	Y	Y	0	1	1	1	1	95	60	35
39	Non-oak small wood fragment	147005	14_7	Unknown	1	small piece of wood		N	N	N	0	0	1	0	0	52	20	5
40	Radial oak fragment with toolmarks	147005	14_7	Unknown	1	Small plank		N	N	N	0	1	0	1	1	110	50	10
41	Three wood fragments (2 radials and one roundwood). One radial piece has possible toolmarks. 7 haselnuts	147005	14_7	Unknown	3	Small branches and hazelnuts		N	N	N	0	3	3	1	4			
42	Oak roundwood fragment labelled 'cut wood from bottom of trench'		14_4	Unknown	1	Small, possibly cut branch		Y	Y	Y	0	1	0	1	1	105	30	25
43	Roundwood fragment		11_3	Unknown	1	Small cut branch		Y	Y	Y	0	1	1	1	1	50	30	25
44	Roundwood and split fragments	147005	14_7	Unknown	8	Cut branch, squared wood and other more natural pieces (7 small, 1 medium)		N	N	N	2	7	3	1	8			
45	Radial oak fragment with possible charring on one face	147005	14_7	Unknown	1	Medium sized possible split timber		N	N	N	1	0	0		1	410	170	50
46	Radial oak timber with possible toolmarks on one face and end. Other end damaged	147005	14_7	Unknown	1	Large timber with (saw) cut end		N	N	N	0	1	0	1	1	850	220	110

47	Multiple oak fragments (20+) with numerous cut marks. Four pieces roundwood	147005	14_7	Unknown	11	Small flat, possibly split timbers		N	N	N	4	5	1	5	10			
48	Oak radial split with cut marks on one face and end. Good dendro potential	147005	14_7	Unknown	1	Medium sized possibly split timber		N	N	N	1	0	0	1	1	360	90	20
49	Radial oak timber with wedge cut end (modern saw cut at other?)	0	14_1	Unknown	1	Large squared timber	200	N	N	N	1	0	0	1	1	630	190	90
50	Radial slow grown oak. Modern saw cut at one end	0	11_3	Unknown	1	Large branch, probably not worked		N	N	N	1	0	0	0	1	1070	130	100
51	Not found	0	11_3	Unknown	2	Large pieces of wood, possibly worked		N	N	N								
52	Two worked non-oak roundwood pieces. Two radial oak pieces worked to points, one with through and blind auger holes	0	11_3	Unknown	4	2 large pieces of wood, possibly worked, 2 medium sized pieces		N	N	N	2	2	2	4	4			
53	Three lengths of oak? Including radial split and two roundwood latter with cut sidebranches. All approx 1100mm long and cut with modern saw at both ends? One smaller branch fragment	0	11_3	Unknown	3	Large pieces of wood, possibly worked		Y	Y	Y		4	0	3	4			
54	Non oak roundwood	0	0/8	Unknown	1	Large piece of timber		Y	N	Y	0	1	1	0	1	410	220	160
56	13 oak fragments. No toolmarks evident	6294046	6/29.4	Bronze Age?	5	Medium sized flat pieces of wood, possible split timber		N	N	N	0	13	0	0	13	280	70	
57	Quartered oak with dried out surface. No toolmarks evident but needs final cleaning. Cut onto two pieces with saw during excavation	0	13/30	Unknown	1	Very large timber, worked?	100	N	N	N	1	0	0	1	1	1130	210	130
58	Approximately quartered	0	13/3	Unknown	1	Very Large timber, worked?	90	N	N	N	1	0	0	1	1	2185	210	110

	knotty oak. Possible toolmarks survival under adhering sediment (not cleaned off during assessment). Possible rebate. Cut into two pieces during excavation with saw.		0															
59	Quartered oak with axe? Cuts at one end and one face (at least). Cut into 2 pieces during excavation with saw?	147006	14_7	Unknown	1	Very large timber, worked?	70	N	Y	N	1	0	0	1	1	1990	200	120
											15	41	13	25	58			

Table II.7.2. Summary of Recommendations grouped by Plot Number

Plot Number	Sum of No of items	Sum of Dendro Required	Sum of Tree-rings Required	Sum of Wood ID Required	Sum of Wood technology Required	Sum of Wood Record Sheet and Photography Required
0/8	1	0	1	1	0	1
11_3	11	3	7	3	8	10
13/30	1	1	0	0	1	1
14_1	1	1	0	0	1	1
14_4	1	0	1	0	1	1
14_7	30	9	19	9	13	29
6/29.4	15	0	13	0	0	14
Grand Total	60	14	41	13	24	57

13.8. Appendix II.8: A pollen assessment of eight sub-samples from monoliths in plot 6/29.4

Sarah Jones

Introduction

This report describes a preliminary palaeoecological assessment of eight sub-samples from the Pwllheli-Blaenau Ffestiniog pipeline in northwest Wales. The sub-samples were selected from two monoliths, M2 and M3. The programme of work carried out aims to establish the state of pollen preservation throughout the sedimentary sequences. It outlines the laboratory procedures and discusses the results of pollen analysis.

Laboratory Procedures

Eight sub-samples were selected for pollen analysis, three from M2 and five from M3. Samples for pollen analysis were prepared using standard techniques (Moore *et al*., 1991), including treatment with HCl to remove carbonates, micro-sieving through a mesh aperture of 10μ, HF digestion to remove silicates and acetolysis to digest organic matter. A known quantity of *Lycopodium* spores were added to each sample to enable the calculation of pollen concentrations within the samples (Stockmarr, 1971). The residues were mounted in silicon oil and analysed under a Leica DMR microscope at a magnification of x400, with critical identifications at x630 and, where necessary, under oil at x1000. Pollen was identified using standard pollen keys (e.g. Andrew, 1980; Moore *et al*., 1991) and type collections. Plant nomenclature follows Stace (1997). The state of pollen preservation is referred to using the categories identified by Jones *et al*. (2007), e.g. corroded (biochemical deterioration) and degraded (chemical deterioration).

Results

Pollen was extremely well preserved in all of the samples. Assessment level counts of 100 total land pollen (TLP) grains were achieved in all samples. The results of the initial assessment are presented in Table II.8.1, and are expressed as a percentage of Total Land Pollen (TLP).

G2148 M2 (plot 6/29.4, context number 6294096, possible buried soil layer under burnt mound)

16-17cm and 8-9cm

The pollen spectra in these levels is dominated by arboreal pollen, with *Alnus* attaining *c*. 60% TLP at 16-17cm, declining to *c*. 55% TLP at 8-9cm. The main difference between these levels and the basal one are the percentages of *Quercus*, which are relatively high, reaching 15% TLP at 8-9cm. Herbaceous pollen remains low in both samples, with Poaceae contributing only c. 5% TLP, whilst *Potentilla* (cinquefoil) and *Plantago* (plantain) are sporadically recorded.

24-25cm

The pollen spectra of this basal level is dominated by tree and shrub pollen, comprising 90% TLP, most notably, *Alnus* (alder, c. 70% TLP). Other tree and shrubs include, *Corylus* t. (most probably hazel), and to a lesser extent, *Betula* (birch), *Ilex* (holly), *Salix* (willow) and *Hedera* (ivy). Open-habitat taxa occur in relatively low percentages, with Poaceae (grass) attaining 8% TLP, whilst Cyperaceae (sedge), Ericaceae (heathers) and *Filipendula ulmaris* (meadowsweet) are also recorded.

G2148 M3 (sample from marsh in plot 6/29.4 at C.SH 52265 39617)

56-57cm, 44-45cm, 24-25cm and 8-9cm

The pollen sequence is dominated by arboreal pollen, with *Alnus* increasing to 75% TLP at 64-65cm, before gradually declining to *c*. 55% TLP at 8-9cm. *Corylus* t. increases (relative to underlying sample at 64-65cm) to *c*. 20% TLP at 44-45cm and remains at similar frequencies for the following levels. Other tree and shrub pollen are relatively low, including *Quercus*, *Ulmus (elm)*, *Betula*, *Salix*, *Ilex*, *Lonicera* and *Hedera*. Herbaceous pollen declines initially to ≤5% TLP before increasing slightly to ≥10% TLP in the upper levels, comprising mainly of Poaceae. The occurence of a range of herbs commonly associated with agricultural activity, are also noted in these levels albeit in low frequencies, such as *Plantago*, Lactuceae (dandelion), and Ranunculaceae (buttercup). *Pteridium* (bracken) is also recorded at 8-9cm.

64-65 cm

The pollen spectra from this basal sample is dominated by tree and shrub pollen, most notably *Alnus* (*c.* 50% TLP), with a significant representation of *Corylus* t. (15% TLP), and to a lesser extent *Quercus*, *Pinus*

(pine) and *Betula*, *Salix* and *Lonicera* (honeysuckle). Poaceae (grass) is relatively well-represented at 13% TLP, and a variety of other herbaceous taxa are recorded albeit at low percentages. These include *Filipendula*, *Aster* (daisy), Cyperaceae, *Plantago* and *Rumex* (dock). The aquatic taxon, *Typha latifolia* (horsetail) is also recorded, together with spores of *Polypodium* (fern).

Interpretation

In both pollen sequences, the high counts for *Alnus* pollen suggest the dominance of alder carr woodland locally throughout sediment accumulation. Mixed oak woodland persisted in the vicinity of the site, where *Corylus*, *Quercus* and, to a lesser extent, *Betula* formed the major components. Indications of human activity are limited, although an increase in light-demanding arboreal taxa, such as *Ilex*, *Hedera*, *Lonicera* and *Ulmus* in the M3 pollen sequence accompanied by a decline in *Alnus*, and a more diverse range of herbs, including the representation of well-attested anthropogenic indicators (Behre, 1986) and open-habitat taxa, such as Lactuceae, *Plantago*, Ranunculaceae and *Pteridium* may reflect small-scale woodland clearance. Other herbs, including *Filipendula* and Cyperaceae und., are likely to reflect damp grassland possibly forming elements of the alder carr understorey.

Conclusions

It is evident from both pollen profiles that the landscape at plot 6/29.4 remained well-wooded throughout the period of sediment accumulation, with only limited evidence for human-induced woodland clearance. Given that pollen preservation was excellent in both profiles, further work may reveal the wider regional significance of the pollen sequences. This would need to include a finer sampling strategy of the deeper sequence, M3 and increasing the pollen counts to a statistically significant level (300 TLP). This should be followed by radiocarbon dating of any key pollen stratigraphic horizons that may be identified during full analysis.

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Table II.8.1. Pollen percentages for M2 and M3

	M2 8-9cm	M2 16-17cm	M2 24-25cm	M3 8-9cm	M3 24-25cm	M3 44-45cm	M3 56-57cm	M3 64-65cm
Pollen type								
Trees								
Alnus	56	63	69	56	56	60	75	54
Betula	5	2	3	11	3	9	3	1
Fraxinus	0	1	0	0	0	0	0	0
Pinus	0	2	0	0	0	0	0	1
Quercus	15	14	0	1	8	4	0	6
Ulmus	0	0	0	1	0	0	0	0
Shrubs								

	M2 8-9cm	M2 16-17cm	M2 24-25cm	M3 8-9cm	M3 24-25cm	M3 44-45cm	M3 56-57cm	M3 64-65cm
Corylus t.	16	10	15	19	17	23	16	15
Hedera	0	0	1	0	0	0	1	0
Ilex	2	0	1	1	1	0	0	0
Lonicera	0	1	0	0	0	0	1	1
Salix	1	1	1	0	0	1	0	1
Total Tree & Shrub	95	94	90	90	86	98	95	79
Herbs								
Aster	0	0	0	0	0	0	0	1
Cyperaceae und.	0	0	1	1	0	0	2	2
Ericaceae	0	0	1	0	0	1	0	0
Filipendula ulmaris	0	0	1	0	2	0	1	3
Lactuceae	0	0	0	0	1	0	0	0
Plantago und.	1	0	0	0	2	1	0	1
Poaceae und.	4	6	8	8	8	1	2	13
Potentilla	0	1	0	1	0	0	0	0
Ranunculaceae	0	0	0	0	2	0	0	0
Rumex	0	0	0	0	0	0	0	3
Total Herbs	5	6	10	10	14	2	5	21
TLP	110	109	105	108	118	129	108	118
Pteropsida								
Polypodium	0	1	3	0	8	2	6	3
Pteridium	0	0	0	1	0	0	0	0
Sparganium erectum t.	0	0	0	1	0	0	0	0
Sphagnum	0	1	0	1	0	0	0	0
Typha latifolia	0	0	0	0	0	0	0	1
Pteropsida monolete undiff.	1	0	0	1	1	2	2	2
Pteropsida trilete undiff.	0	0	1	0	0	0	0	0
Indeterminate grains (Total)	0	0	1	0	1	0	0	2
Degraded	0	0	0	0	0	0	0	1
Concealed	0	0	0	0	0	0	0	1
Charcoal	0	0	1	0	1	0	0	0
Lycopodium	4	1	1	1	1	5	1	27

14. APPENDIX III: DEFINITION OF CATEGORIES OF IMPORTANCE

The following categories were used to define the importance of the archaeological resource.

Category A - Sites of National Importance.
Scheduled Ancient Monuments, Listed Buildings of grade II* and above, as well as those that would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both. This also includes excavated sites with the potential for providing nationally important information.

Category B - Sites of regional or county importance.
Grade II listed buildings and sites which would not fulfil the criteria for scheduling or listing, but which are nevertheless of particular importance within the region. Excavated sites have the potential for providing regionally important information.

Category C - Sites of district or local importance.
Sites which are not of sufficient importance to justify a recommendation for preservation if threatened. Category C sites nevertheless contain information that may contribute to the understanding of the local area.

Category D - Minor and damaged sites.
Sites that are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category. Category D sites contain minimal archaeological information, although the record of their existence may be of use to specific studies.

Category E - Sites needing further investigation.
Sites, the importance of which is as yet undetermined and which will require further work before they can be allocated to categories A - D are temporarily placed in this category. For excavated sites this includes sites that require radiocarbon dating or further specialist analysis to identify their significance.

15. APPENDIX IV: SUMMARY OF FIELD BOUNDARY RECORDS

Note in the list below the pipe route is seen as running from Pwllheli to Blaenau Ffestiniog so a negative boundary is on the side of the field in the direction of Pwllheli along the route and a positive boundary is in the direction of Blaenau Ffestiniog.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
0/01	-	135	0.6	029, 030	238552	335977

Hedge-bank
Clawdd with earthcore and cobble stone revetments. Modern fence on top of bank. Boundary to the road

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
0/01	+	0	0		238580	336040

Fence
Not recorded because only modern fence survives

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
0/02	+	1.9	1	519-523	238690	336250

Hedge-bank
Stone bank covered with earth, some mature trees on bank. Boundary along side canalised stream

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
0/03	+	2.8	0.6	027, 028	238787	336336

Hedge-bank
Clawdd with earthcore and cobble stone revetments. Possibly part of a curving boundary but has been straightened

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
0/04	+	3.25	1.5	503, 504, 514, 515	238873	336345

Hedge-bank
Earth bank with large stones within it. Sinuous boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
0/07	+	0	0		238960	336340

Hedge, fence and stream channel
Not recorded because listed as 0/4 and this was recorded instead

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
0/11	+	0	0	15, 16, 17, 18	239463	336395

Modern fence
Hedge lost to road widening on West side and replaced by modern wire fence. Boundary to road

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
01/01	+	2.9	0.99	19, 20	239547	336397

Hedge-bank
Earth bank with occassional stones within it, small trees and an occassional large tree. Boundary to fairly regular field

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
01/01	-	1.4	1.15	526-528	239473	336395

Hedge-bank
Earth bank with stones in it. Boundary to road

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/05	+	1.05	0.6	553, 554	243638	227289

Hedge-bank

Earth bank with cobbled stone revetment on outer sides. Boundary to group of regular fields

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/05		0	0		243596	337258

No longer visible

Located in middle of present field. Not recorded because no longer visible

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/09	+	2.2	1.05	535, 536	244072	337508

Hedge-bank

Earth core with cobbled stone revetment and modern post and wire fence within it. Boundary to fairly regular field on reclaimed salt marsh

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/10	+	0	0	537, 538	244280	337610

Hedge-bank

Earth bank with cobble-stone revetment. Gorse hedge on top with modern fence.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/11	+	1.9	0.8	539-541	244313	337624

Hedge-bank

Earth core with cobbled stone revetment. Boundary to fairly regular field on reclaimed salt marsh

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/14	+	1.7	0.3	555, 556	245355	337821

Hedge-bank

Wide, shallow earth banked hedge. Irregular boundary but only because it borders a stream

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/15	+	1.4	0.7	557, 558	245476	337837

Drystone wall

Dry stone wall. Straight boundary to regular field on flood plain

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/18	+	1.8	1	559-561	245970	337840

Hedge-bank

Earth core hedgebank with stone revetment. Straight boundary to regular field on flood plain

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/19	+	2.5	1	562, 563	246090	337860

Hedge-bank

Earth core hedgebank with rough cobbled revetment, hawthorn hedge on top. Straight boundary to regular field

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/23	+	0	0		246510	337930

Fence

Not recorded because only modern fence survives

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/24	+	2.6	1.36	108, 109	246910	338042

Hedge-bank, modern fenceline
Earth core hedgebank with stone revetment, modern fence on top. Straight boundary to regular field on flood plain

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/25	+	1.55	0.92	106, 107	247063	338229

Hedge-bank, modern fenceline
Earth core hedgebank with stone revetment, modern wire fence, trees and bushes.Straight boundary to straight track leading from farmyard to river.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/26	+	1.33	0.57	94, 98	247267	338229

Hedge-bank, modern fenceline
Earth core hedgebank stone revetment, and modern fence.Straight boundary to straight track leading to

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/27	+	1.55	1.47	96, 97	247371	338217

Hedge-bank
Earth core hedgebank with stone revetment and a modern fenceline running alongside.Straight boundary to regular field.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/28	+	2.22	0.66	94, 95	247642	338199

Hedge-bank, modern fenceline
Earth core hedgebank with stone revetment and modern fenceline on top. Curving boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/29	+	1.5	0.45	568, 569	247725	338194

Hedge-bank
Cobble sized stone core bank covered in turf. Modern hedgeline on top and some mature trees. Straight boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
03/30	+	2.4	1.3	564, 565	247828	338191

Hedge-bank
Earth core hedgebank with occassional cobble sized sone within it. Cobble revetment, covered in turf with gorse hedge and some mature trees and a modern fenceline on top. Part of curving boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
04/01	+	1.76	0.76	127, 128	247976	338262

Drystone wall
Dry stone wall consists of large boulders with mature trees and shrubs growing on top. Straght section of originally curving boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
04/02	+	2.55	0.97	130, 131	248080	338318

Hedge-bank, modern fenceline
Wide earth core hedgebank with stone revetment. Shrubs and mature trees on top. Straight boundary but part of group of narrow fields, possibly enclosed strips.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
04/03	+	1.8	0.62	165, 166	248140	338350

Hedge-bank, modern fenceline
Earth core hedgebank with some stones within it. Modern fenceline runs along top, some mature trees and shrubs. Straight boundary but part of group of narrow fields, possibly enclosed strips.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
04/04	+	2	0.8	143, 144	248225	338402

Hedge-bank
Earth core hedgebank with some stones within it. Cobbled revetment on both sides with hawthorn hedge, gorse, some mature oaks and a modern fence set into top. Straight boundary but part of group of narrow fields, possibly enclosed strips.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
04/05	+	1.8	1	145, 146	248338	338487

Hedge-bank
Earth core, stone revetted, hawthorn hedge and modern fence on top. Straight boundary part of regular group of fields.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
04/06	+	1.9	1	147, 148	248450	338570

Hedge-bank
Earth core with occassional stones in fill, stone revetted, gorse hedge and some mature trees. Straight boundary
part of regular group of fields.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
05/07	+	1.2	0.53	169,	249549	339072

Drystone wall
Drystone wall with shrubs and occassional mature trees. Straight boundary part of regular group of fields.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/01	+	1.9	0.6	726, 727	249664	339012

Hedge-bank
Earth core with some large boulders on outside. Regular boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/02	+	1.8	0.4	724, 725	249715	339008

Hedge-bank
Earth core with numerous sub-angular stones 250mm-400mm. Mature trees in bank. Part of curving boundary to narrow field. Possible enclosed strips.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/03	+	1.5	0.9	722, 723	249782	339000

Hedge-bank
Earth core with numerous sub-angular stones 250mm-400mm. Mature trees in bank. Part of rather curving boundary to narrow field. Possible enclosed strips.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/04	+	0.7	0.2	728, 729	249900	338918

Hedge-bank, modern fenceline
Earth core, shallow bank with modern fenceline on top. Straight boundary to regular field

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/05	+	1.7	0.9	730, 731	250124	338912

Hedge-bank
Large boulders and earth with mature trees on top. Straight boundary to regular field

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/06	+	0.9	1.1	732, 733	250342	338908

Hedge-bank
Stone revetted, earth core hedgebank with gors hedge and mature trees. Boundary to straight, regular road

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/09	+	2	0.6	182	250520	338915

Hedge-bank, modern fenceline
Earth core hedgebank with modern fenceline on top. Parliamentary boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/11	+	1.1	0.75	741, 742	250718	339020

Hedge-bank
Earth core with drystone wall on either side. Curving boundary to slightly irregular field

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/17	+	1.4	0.75	752, 753	251380	339530

Hedge-bank
Earth core with some stone inclusions, revetted on + side only. Regular boundary part of group of regular fields

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/18	+	1.75	0.95	754, 755	251473	339621

Hedge-bank
Stone core hedgebank with gorse hedge. Regular boundary part of group of regular fields

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/19	+	0	0	236, 237	251525	339689

Drystone wall
Wall built from large boulders. Regular boundary part of group of regular fields

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/20	+	5.5	0	798, 799	251636	339763

Hedge-bank
A clawdd hedgebank with mature hawthorn trees along the top. Regular boundary part of group of regular fields

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/21	+	1.6	0.9	238, 239	251739	339788

Hedge-bank
Hedgebank with gorse on top and stone revetment on negative side. Regular boundary part of group of regular fields

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/22	+	1.4	1.1	800, 801	251822	339806

Hedge-bank
A wide, low earth and stone bank. Regular boundary part of group of regular fields

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/23	+	1.35	0.65	240, 241	251895	339808

Drystone wall
Freestanding drystone wall. Regular boundary but part of group of fairly narrow fields running along the contours.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/24	+	1	0.85	225, 226	252006	339792

Drystone wall
Freestanding drystone wall. Regular boundary but part of group of fairly narrow fields running along the contours.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/25	+	1.3	0.25	223, 224	252078	339816

Hedge-bank
Low bank with earth core, mature trees. Irregular boundary but due to bordering a stream, however the original E boundary of this field was also irregular.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/27	+	1.35	0.65	221, 222	252170	339854

Drystone wall
Freestanding drystone wall. Wall entirely rebuilt between 1915 and 1970s

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/28	+	1.25	0.55	219, 220	252268	339897

Drystone wall
Drystone wall. Boundary to road, possibly early

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/29	+	1.3	0.6	242, 243	252316	339942

Hedge-bank
Shallow earthbank revetted on W sidePart of curving boundary. Suggestions of enclosed strips in this area.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/30	+	0.7	1	802, 803	252398	340012

Drystone wall
Drystone wall. Part of curving boundary. Suggestions of enclosed strips in this area.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/31	+	0.7	2	244, 245	252484	340050

Drystone wall
Drystone wall. Part of rather curving boundary enclosing irregularly shaped large field. Boundary seems to have been straightened in 20th century

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/34	+	0	1	804, 805	252710	340109

Modern fence
Modern fenceline. No boundary prior to late 20th century

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/37		4	0	246, 247	252902	340039

Modern track
Fenced track recorded instead of 6/36+ boundary.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/39	+	1.5	0.5	806, 807	253050	340015

Hedge-bank
Degraded clawdd with mature oaks and holly trees. Rather irregular boundary, although the field is quite large.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/40	+	1.5	0.5	808, 809	253165	339996

Hedge-bank
Hedgebank with earth core and stone revetment, with mature oaks. Rather irregular boundary, although the field is quite large.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/41	+	1.1	0.65	248-250	253235	340061

Drystone wall
Freestanding drystone wall. Rather irregular boundary, although the field is quite large.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/44	+	0.9	0.5	810, 811	253630	340030

Hedge-bank
Earth core bank with stone revetment, turf covered in places. Very straight boundary. Part of a very regular field system.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/45	+	2.4	0.7	251, 252	253723	340084

Hedge-bank
Earth bank with modern fenceline and occassional mature trees. Slightly irregular boundary but only because it borders a stream. Part of a very regular field system. Ynyscynhaiarn-Penmorfa parish boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/49	+	0.5	1.4	828, 829	254047	340205

Drystone wall
Drystone wall. Regular field probably related to Bryn Wern. Boundary within Wern Historic Park and Garden

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/50	+	0.5	0.95	830, 831	254291	340116

Drystone wall
Drystone wall. Boundary to paddocks related to Bryn Wern. Boundary within Wern Historic Park and Garden

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/51	+	3	0.2	832, 833	254484	340064

Hedge-bank
Tree lined bank. Regular field on Traeth Mawr. Boundary within Wern Historic Park and Garden

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/52	+	0	0	847, 848	254793	339831

Hedge and ditch
Hedge and ditch. Regular field on Traeth Mawr. Penmorfa-Ynyscynhaiarn parish boundary

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/53	+	0	0	850, 851	255011	339763

Hedge and ditch
Hedge and ditch. Regular field on Traeth Mawr.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
06/54	+	0	0	852	255386	339629

Hedge-bank
Bank and treeline. Regular field on Traeth Mawr.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
09/05	+	0.7	0.75	916-918	260423	338790

Drystone wall

Freestanding drystone wall in poor condition. Slightly irregular boundary running of a very irregular boundary. Rough pasture, furze and marsh in this area in late 19th century. Possible early enclosure of moorland

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
13/03	+	0.6	1	872-874	262784	339999

Drystone wall

Drystone wall on natural outcrop of rock. Rather irregular boundary amongst smaller irregular fields surrounding Hafod-talog on an island above the flood plain.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
13/06	+	1.4	0.25	1000, 1001	263011	340045

Hedge-bank

Earth core with some stone within fill. Young and mature trees on top of bank. Boundary to track or path with more irregular fields to the west. May be earlier than other regular boundaries to the east.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
13/08	+	0.65	0.95	1002-1004	263112	339972

Drystone wall

Drystone wall with modern fenceline on top.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
13/12	+	1.55	0.25	1005, 1006	263311	339913

Hedge-bank

Shallow bank with mature trees on top, ditch to negative side, track on positive side. Part of regular field system with straight boundaries on flood plain

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
13/24	+	1.02	0.23	477	264710	339895

Hedge-bank

Bank with ditch to positive side. Part of regular field system with straight boundaries on flood plain

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
13/35	+	2.7	0.46	955, 956	266210	340798

Hedge-bank

Shallow bank with built up ground over it, flimsy hedge and some trees were removed. Part of regular field system with straight boundaries on flood plain. Boundary within Plas-Tan-y-Bwlch Historic Park and Garden

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
13/36	+	2.9	0.6	953, 954	266285	340845

Hedge-bank

Earth core, some stones within this. Hedge and trees were removed. Part of regular field system with straight boundaries on flood plain. Boundary within Plas-Tan-y-Bwlch Historic Park and Garden

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
15/01	+	0.6	1.5	1707-1710	269030	342097

Drystone wall

Drystone wall. Boundary to woodland, part of regular field system with straight boundaries

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
15/06	+	0.7	1.4	1703-1706	269251	342157

Drystone wall
Drystone wall, modern wire fenceline to positive side of wall. Part of regular field system with straight boundaries

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
15/09	+	1.05	0.35	1646-1649	269337	342250

Hedge-bank
Shallow bank, earth core with infrequent small stones. Curving boundary part of possible enclosed strip field system.

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
15/17	+	0.5	1.6	1636-1638	269946	342664

Drystone wall
Drystone wall, part of regular field system with straight boundaries

Plot	Boundary (+ or -)	Width (m)	Height	Photos	Eastings	Northings
16/07	+	0.6	1.45	1221-1223	270279	343627

Drystone wall
Drystone wall, boundary of winding road

16. APPENDIX V: SUMMARY OF DEPOSIT RECORDS

Plot and section	Grid reference	Total trench depth (m)	Photos
00/08	SH 39047 36352	1.5	1016-1019

Depth from surface (m)	Description
0	Light grey clay
0.5	Thin layer of black peat
0.7	Brown peat containing occasional pieces of wood, some branches 0.1m in diameter.

Plot and section	Grid reference	Total trench depth (m)	Photos
03/08a	SH 43857 374300	1.39	2587-2588

Depth from surface (m)	Description
0	A light grey-brown sandy silt, friable and containing frequent rounded pebbles and stones.
0.34	A light blue-grey sandy silt. Friable, containing frequent sub-angular and sub-rounded stones.
0.79	A light brown-grey mottled pea grit containing abundant small and medium rounded stones.

Plot and section	Grid reference	Total trench depth (m)	Photos
06/51	SH 54390 40070	2	2134-2137

Depth from surface (m)	Description
0	Blue grey clay, mottled with brown. Shells observed in clay at depth of 1.8-2.0m

Plot and section	Grid reference	Total trench depth (m)	Photos
06/52	SH 54650 39990	1.7	2099-2112

Depth from surface (m)	Description
0	Topsoil
0.5	Grey clay and sand

Plot and section	Grid reference	Total trench depth (m)	Photos
06/53	SH 54900 39800	2.4	2126-9

Depth from surface (m)	Description
0	Mid brown clayey sand
-	Grey sandy clay, no stones
-	Dark grey clayey sand, no stones

Plot and section	Grid reference	Total trench depth (m)	Photos
06/54	SH 55230 39690	2.23	2142-2149,

Depth from surface (m)	Description
0	Grey-brown sandy clay

Plot and section	Grid reference	Total trench depth (m)	Photos

Plot and section	Grid reference	Total trench depth (m)	Photos
07/01	SH 55460 39600	1.7	2179-2184

Depth from surface (m)	Description
0	W end of trench shale only shale visible, E end of trench light orange brown silty clay mixed with pale greyish brown with grit, gravel and small stones

Plot and section	Grid reference	Total trench depth (m)	Photos
07/02	SH 55640 39540	1.7	2177-8, 2185-

Depth from surface (m)	Description
0	Blackish brown silty clay topsoil
0.1	Mottled orange brown clay
0.5	Grey clay with deposit of marine shells at 1.0m

Plot and section	Grid reference	Total trench depth (m)	Photos
07/03	SH 55800 39460	3	2187-2190

Depth from surface (m)	Description
0	Blackish brown silty clay topsoil
0.1	Mottled orange brown clay
0.5	Grey clay with deposits of marine shells in lower part of the trench

Plot and section	Grid reference	Total trench depth (m)	Photos
07/04	SH 55930 39390	1.6	1786-7

Depth from surface (m)	Description
0	Light orange-yellow silty sand
0.5	Mid grey slightly clayey silty sand, fairly firm and plastic

Plot and section	Grid reference	Total trench depth (m)	Photos
07/07	SH 5770 39040	1.6	1788-9

Depth from surface (m)	Description
0	Light yellow-grey sand containing lenses of grey sand towards the base of the trench and lenses of light orange sand towards the top.

Plot and section	Grid reference	Total trench depth (m)	Photos
07/08	SH 58030 39020	1.7	1777-1781

Depth from surface (m)	Description
0	Light yellow-grey sand varying in depth from 0.10m to 0.25m. Contains marine shells
0.25	Orange sand with light yellow-grey mottles, containing marine shells. Varies in depth from 0.2m to 0.4m
0.6	Light-mid grey sand. Contains no inclusions except marine shells.

Plot and section	Grid reference	Total trench depth (m)	Photos
07/09	SH 58780 38990	2	2191-2196

Depth from

Depth from surface (m)	Description
0	Orange sand with mottles of light grey

Plot and section	Grid reference	Total trench depth (m)	Photos
07/10	SH 58530 38980	1.6	2197-9, 1783-

Depth from surface (m)	Description
0	Light yellow-grey sand. No inclusions except marine shells.

Plot and section	Grid reference	Total trench depth (m)	Photos
07/11	SH 58990 38700	1.9	1796-8

Depth from surface (m)	Description
0	Light yellow sand with streaks of dark organic matter
0.2	Irregular layer varying from 0.2m to 1.6m deep. Dark and light grey sand with black streaks
0.4	Light brown-grey sand with black organic streaks

Plot and section	Grid reference	Total trench depth (m)	Photos
07/12	SH 59260 38730	2	1793-5

Depth from surface (m)	Description
0	Light grey sand with bluish patches
0.2	Light yellow sand with grey patches. Varies in depth between 0.3-0.5m . Uneven and mixed with layer below.
0.6	Light blue-grey sand with dark steaks. Strongly laminated with bands of dark to light grey. Irregular patches of light grey sand in the top of the layer may represent in filled channels.

Plot and section	Grid reference	Total trench depth (m)	Photos
07/13	SH 59470 38790	1.9	1799, 2700

Depth from surface (m)	Description
0	Very mixed and patchy deposits, rather than clear layers. Light yellow to grey sand with mottles of varying colours and dark streaks.

Plot and section	Grid reference	Total trench depth (m)	Photos
08/1.1a	SH 59861 38965	1.8	2561

Depth from surface (m)	Description
0	Light grey-brown loam
0.59	Light grey clay
0.84	Shale/slate bedrock. On surface at positive end of field.

Plot and section	Grid reference	Total trench depth (m)	Photos
08/1.1b	SH 59852 38962	2.3	2562

Depth from surface (m)	Description
0	Light brown boggy soil
0.8	Light grey clay with stones
2.3	Light yellow clay with stones

Plot and section	Grid reference	Total trench depth (m)	Photos
08/1.1c	SH 59837 38958		2563-2564

Depth from surface (m)	Description
0	Light brown boggy layer
-	light grey stony layer
-	Light cream (grey) changing to light orange
-	Light grey with small stones and patches of light yellow orange deposit

Plot and section	Grid reference	Total trench depth (m)	Photos
08/1.1d	SH 59818 38953	1.5	2566-2568

Depth from surface (m)	Description
0	Light cream yellow silt clay
0.1	Peat layer
1.3	Grey clay
0.9	light brown clay

Plot and section	Grid reference	Total trench depth (m)	Photos
08/1.1e	SH 59770 38941	1.6	2567

Depth from surface (m)	Description
0	Light grey brown clay
0.2	Light grey brown clay with orange mottling
1	light grey clay with a thick lens of light yellow grey sand
1.3	Light yellow grey sand

Plot and section	Grid reference	Total trench depth (m)	Photos
08/1.1f	SH 59724 38922	1.9	2570

Depth from surface (m)	Description
0	Light grey cream silt clay with light orange mottling
0.8	Light grey clay sand
1.2	Mid grey peaty organic layer with some vegetation visible
1.5	A light blue grey friable sand

Plot and section	Grid reference	Total trench depth (m)	Photos
08/1g	SH 59681 38896	2.5	2571-2572

Depth from surface (m)	Description
0	Light grey brown mottled sand
0.75	Light grey green sand
1.05	Mid brown to very dark brown peat with some visible vegetation.
1.2	Light blue grey clay.
1.4	Light yellow sand with dark grey flecks and lenses

Plot and section	Grid reference	Total trench depth (m)	Photos
09/4	SH 60250 38830	2	2589-2591

Depth from surface (m)	Description
0	Light grey brown silt with angular stone inclusions
0.9	Natural slate/mudstone bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
10/2	SH 60810 38890	1.6	2546-2547

Depth from surface (m)	Description
0	Light to mid brown firm grey sand silt with fragmented shaley stone
0.6	Bedrock made up of shaley sedimentary rock.

Plot and section	Grid reference	Total trench depth (m)	Photos
10/5	SH 60980 39060	1.8	2548-2551

Depth from surface (m)	Description
0	Dark grey silt with modern rubbish mixed in (plastic wood paper)
-	Dark organic peat with a large amount of root material and wood as well as modern material (glass ceramics plastic)

Plot and section	Grid reference	Total trench depth (m)	Photos
11/3c	SH 61191 39188	2	2879.2880,28

Depth from surface (m)	Description
0	Dark peat with local stone inclusions and bog wood. Wood recovered looked to have been sawn, chopped and some split.

Plot and section	Grid reference	Total trench depth (m)	Photos
11/3d	SH 61150 39160	2	2886-2889

Depth from surface (m)	Description
0	Dump of modern material (rising to 1m thick creating a mound)
0.3	Light grey to dark brown organic material
0.65	Dark black peat with an abundant of organic material
1.35	Mid grey green peat with abundant organic material
2	Light green clay

Plot and section	Grid reference	Total trench depth (m)	Photos
11/4a	SH 61234 39232	4	2599-26001

Depth from surface (m)	Description
0	Homogenous peat with lots of organic material such as branches.

Plot and section	Grid reference	Total trench depth (m)	Photos
11/4b	SH 61225 39230	1.54	2875-2875

Depth from surface (m)	Description
0	Dark brown clay peat (topsoil)
0.08	Peat containing large amounts of vegetation and wood remnants.

Plot and section	Grid reference	Total trench depth (m)	Photos
11/4c	SH 61238 39230	6.1	2592-2597

Depth from surface (m)	Description
0	Earth and rubble bank sitting on an area of built up land of the same material. The rubble was a mix of medium to large stones
3.5	Peat layer with lots of organic material including branches, roots and the occasional tree trunk
4.3	Light grey blue river clay (water flooded the bottom of the trench)

Plot and section	Grid reference	Total trench depth (m)	Photos
13/07	SH 63043 40029	3	2526, 2528-

Depth from surface (m)	Description
0	Light brown friable sand silt with many small angular stones
0.3	Dark brown silt with organic material. A narrow pale yellow band was noted within this deposit which measured 0.1m thick and 2m wide.
1.3	Light grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/08	SH 6306 40017	3	2530-2535

Depth from surface (m)	Description
0	Light brown sand silt
0.25	Dark brown silt peat with organic material throughout.
1.15	Light grey brown silt clay
1.45	Light grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/10	SH 63160 39930	1.8	1790-2

Depth from surface (m)	Description
0	Mid grey-brown sandy silt topsoil
0.25	Yellow-grey sandy and silty clay with moderate amounts of stone.
-	Shaly bedrock very close to surface in eastern part of trench.

Plot and section	Grid reference	Total trench depth (m)	Photos
13/12	SH 63270 39910	1.92	2209-2212

Depth from surface (m)	Description
0	Mainly light grey waterlogged clay. At the western end of the trench this meets the rock of a partially buried rocky spur and becomes more gravelly near the rock.

Plot and section	Grid reference	Total trench depth (m)	Photos
13/13	SH 63350 39910	1.8	2205-2208

Depth from surface (m)	Description
0	Grey waterlogged clay with no inclusions

Plot and section	Grid reference	Total trench depth (m)	Photos
13/14	SH 63440 39915	2	1730-1, 1734-

Depth from surface (m)	Description
0	Mid brown silty clay
0.3	Light grey-brown plastic clay
0.6	Light grey silty sand

Plot and section	Grid reference	Total trench depth (m)	Photos
13/15	SH 63580 39920	1.6	1721-2, 1732-

Depth from surface (m)	Description
0	light yellow-brown silty sand
0.3	Yellow-grey clay, slightly plastic with orange flecks
0.85	Mid grey silty clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/16	SH 63710 39920	1.5	1748-9, 1759-

Depth from surface (m)	Description
0	Mid grey-brown sandy silt with root activity
0.3	Light yellow-brown plastic silty clay
0.6	Light grey silty sand

Plot and section	Grid reference	Total trench depth (m)	Photos
13/17	SH 63820 39925	1.7	1764-5, 1773-

Depth from surface (m)	Description
0	Light grey-brown sandy clayey silt
0.3	Light grey silty sand

Plot and section	Grid reference	Total trench depth (m)	Photos
13/18	SH 63930 39930	2.1	1745

Depth from surface (m)	Description
0	Light brown-grey silty clayey sand
0.5	Light grey plastic clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/19	SH 64050 39930	2.1	1719-20

Depth from surface (m)	Description
0	Dark brownish grey silty clayey sand
0.5	Mid grey plastic clay

Plot and section	Grid reference	Total trench depth (m)	Photos

Plot and section	Grid reference	Total trench depth (m)	Photos
13/23	SH 64570 39895	2	1718

Depth from surface (m)	Description
0	Light orange-yellow sandy clay
0.8	Mid grey sandy clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/24	SH 64670 39890	1.8	1743-4, 1750-

Depth from surface (m)	Description
0	Light orange-greyish yellow sandy clay
0.7	Mid grey sandy clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/25	SH 64800 39900	2	1715-7

Depth from surface (m)	Description
0	Light brown silty sand, loosely compacted
1.5	Light grey sandy silt, loosely compacted

Plot and section	Grid reference	Total trench depth (m)	Photos
13/27a	SH 65068 40076	1.5	2707

Depth from surface (m)	Description
0	Mid orange grey sand-silt-clay
0.6	Light grey silt clay with occasional orange flecks

Plot and section	Grid reference	Total trench depth (m)	Photos
13/27b	SH 65110 40104	1.5	2708

Depth from surface (m)	Description
0	Mid orange brown sand-silt-clay
0.7	Light grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/27c	SH 65152 40132	1.5	2709

Depth from surface (m)	Description
0	Dark brown grey sand silt with some clay content. Softly compacted with frequent root material
0.45	Mid grey silt-clay-sand

Plot and section	Grid reference	Total trench depth (m)	Photos
13/27d	SH 65193 40159		2710

Depth from surface (m)	Description
0	Dark brown grey sand silt and root material. A plastic field drain cut through this deposit.
-	Mid grey silt clay with some organic material

Plot and section	Grid reference	Total trench depth (m)	Photos
13/27e	SH 65235 40187	1.5	2716

Depth from surface (m)	Description
0	Dark brown soft grey sand silt with frequent root material from reeds on the surface. A ceramic field drain cut through this deposit.
0.4	Mid grey sand silt clay with some organic material

Plot and section	Grid reference	Total trench depth (m)	Photos
13/28f	SH 65321 40233	1.7	2744-2746

Depth from surface (m)	Description
0	Light grey brown silt clay with plastic and ceramic field drains cutting through.
0.45	Mottled light grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/29a	SH 65538 40304	1.6	2728

Depth from surface (m)	Description
0	Light brown softly compacted grey silt sand with occasional roots.
0.7	Light grey with horizontal dark flecks with a slight orange tinge.

Plot and section	Grid reference	Total trench depth (m)	Photos
13/29b	SH 65490 40289	1.6	2729

Depth from surface (m)	Description
0	Topsoil
0.4	Brown grey softly compacted sand silt with occasional roots
0.8	Light grey silt sand with frequent dark flecks.

Plot and section	Grid reference	Total trench depth (m)	Photos
13/29c	SH 65442 40273	1.3	2730

Depth from surface (m)	Description
0	Light brown grey softly compacted silt sand with some dark horizontal banding
0.6	Light grey silt sand with occasional dark horizontal banding and orange flecks

Plot and section	Grid reference	Total trench depth (m)	Photos
13/29d	SH 65395 40258	1.3	2731

Depth from surface (m)	Description
0	Light grey slight clay silt sand with some horizontal banding
0.5	Light grey slightly clay silt sand with dark horizontal banding, very narrow dark lines

Plot and section	Grid reference	Total trench depth (m)	Photos
13/30	SH 65705 40363	1.5	2723

Depth from surface (m)	Description
0	Light grey brown silt sand with possible charcoal flecks

0.1	Mid grey brown silt sand
0.5	Dark brown with some areas containing lenses of light brown material
0.7	Light brown grey sand silt with brown and black streaks.

Plot and section	Grid reference	Total trench depth (m)	Photos
13/30a	SH 65785 40423	1.6	2720

Depth from surface (m)	Description
0	Mid brown grey silt sand with small amount of root material
1	Mid orange grey silt sand.

Plot and section	Grid reference	Total trench depth (m)	Photos
13/30b	SH 65748 40389	1.5	2721-2722

Depth from surface (m)	Description
0	Mid brown grey soft sand silt with orange flecks and some root material
0.3	Light orange grey clay-silt-sand
0.8	Light orange grey silt sand
1.05	Dark brown with possible charcoal inclusions
1.45	Light brown grey silt sand with brown and black inflections

Plot and section	Grid reference	Total trench depth (m)	Photos
13/30d	SH 65660 40342	1.5	2724, 2726-

Depth from surface (m)	Description
0	Mid brown grey softly compacted silt sand with occasional roots
0.35	Mid orange grey clay-silt-sand
0.9	Light grey clay-silt-sand with frequent dark flecks.
1.1	Mid brown grey silt sand

Plot and section	Grid reference	Total trench depth (m)	Photos
13/30e	SH 65612 40327	1.5	2725

Depth from surface (m)	Description
0	Mid brown-orange-grey softly compacted silt sand. A plastic field drain cut through this deposit.
0.7	Light grey clay-silt-sand with frequent black flecks

Plot and section	Grid reference	Total trench depth (m)	Photos
13/35a	SH 66050 40702	1.75	2574

Depth from surface (m)	Description
0	Mottled dark grey clay silt with very dark bands of peat material. Diffuse with the layer below.
0.75	Light grey brown clay. Diffuse with the deposit above.
1.55	Light blue grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/35b	SH 66092 40729	1.85	2575

Depth from surface (m)	Description

0	Light brown to mid grey peat with abundant organic material in the form of roots and branches
0.7	Light grey brown clay
1.5	Light blue grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/35c	SH 66135 40755	1.55	2576

Depth from surface (m)	Description
0	Dark brown grey clay
0.25	Light brown clay
0.35	Light blue grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/35d	SH 66178 40781	1.65	2577

Depth from surface (m)	Description
0	Light grey clay and loose stones, packing for a ceramic drainage pipe.
0.55	Mid to dark brown peat, truncated by drain.
0.75	Light brown grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/36e	SH 66229 40811	2.5	2580

Depth from surface (m)	Description
0	Light grey brown clay with mid to dark clay bands throughout
1	Light grey clay
1.3	Light blue grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/36f	SH 66272 40837		2581

Depth from surface (m)	Description
0	Light grey yellow clay
0.3	Light brown clay
0.7	Alternating bands of light grey silts with dark grey streaks and light grey brown clay.
	Light grey blue clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/37g	SH 66319 40864	1.75	2585

Depth from surface (m)	Description
0	Light cream yellow silt clay
0.15	Light grey clay
0.35	Light grey brown silt clay
0.55	Dark brown grey peat with some organic material
0.95	Light grey brown clay

Plot and section	Grid reference	Total trench depth (m)	Photos
13/6	SH 62990 40040	2.7	2701-2704,

Depth from

Depth from surface (m)	Description
0	Boggy area restricted to base of hill in eastern end of plot. Homogenous black organic silt with abundant roots and branches of at least 2 species of trees, one probably birch. Large and small pieces of wood present throughout.
2.5	Grey and light brown plastic clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/01h	SH 66436 40942	1.4	2853-2854

Depth from surface (m)	Description
0	Firm mid brown grey silt clay
0.4	Firm light yellow brown silt clay
0.5	Firm mid grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/02g	SH 66475 40970	1.8	2847-2848

Depth from surface (m)	Description
0	Firm light grey brown silt clay with moderate to small sub-rounded stones
0.4	Firm light yellow brown silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/04a	SH 66722 41140	1.45	2824-2825

Depth from surface (m)	Description
0	Light grey brown silt clay with occasional small sub rounded stones
0.3	Mid grey brown clay silt

Plot and section	Grid reference	Total trench depth (m)	Photos
14/04b	SH 66681 41112	1.4	2826-2827

Depth from surface (m)	Description
0	Mid grey brown silt clay
0.6	Light brown grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/04c	SH 66639 41084		2829-2830

Depth from surface (m)	Description
0	Friable light grey brown silt clay
-	Firm mid brown silt clay
-	Firm light yellow brown silt clay
-	Firm mid grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/04d	SH 66597 41056	1.4	2831-2832

Depth from surface (m)	Description
0	Firm light grey silt clay
0.45	Firm dark grey silt clay

0.75	Loose fine alluvial gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/04e	SH 66555 41029	1.4	2833-2834

Depth from surface (m)	Description
0	Firm light grey brown silt clay
0.24	Firm light brown grey silt clay
0.54	Loose fine alluvial gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/07a	SH 66900 41220	0.77	2747-2748,

Depth from surface (m)	Description
0	Friable mid brown silt clay
0.1	Friable mid orange brown silt clay
0.49	Firm mid grey brown silt clay
0.77	Firm light grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/07b	SH 66950 41227	1.4	2750-2751

Depth from surface (m)	Description
0	Friable mid brown silt clay - topsoil
0.1	Friable mid orange brow silt clay.
0.7	Firm mid grey brown silt clay. There was a lens of manganese at the bottom of this layer.
0.95	Firm light grey silt clay. This layer produced the cattle bone remains which were at a depth of 1.4m (see 14/7c.2)

Plot and section	Grid reference	Total trench depth (m)	Photos
14/07c	SH 66999 41234	1.6	2752-2753

Depth from surface (m)	Description
0	Topsoil. Friable mid brown silt clay
0.1	Firm orange brown silt clay
0.37	Firm light brown silt clay
0.57	Firm mid grey silt clay
	Firm dark grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/07c.2	SH 67004 41235	1.5	2756-2758

Depth from surface (m)	Description
0	Firm light grey brown silt clay
-	Firm mid orange brown silt clay
-	Grey silt clay. The remains of a cow skull with horns was recovered from this deposit at a depth of 1.4m

Plot and section	Grid reference	Total trench depth (m)	Photos
14/08d	SH 67048 41241	1.6	2754-2755

Depth from surface (m)	Description
0	Friable mid grey clay silt
0.6	Mid yellow silt clay with lenses of orange, possibly iron pan.
1.2	Firm mid grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/08e	SH 67098 41249	1.6	2761-2762

Depth from surface (m)	Description
0	Light grey brown silt clay
0.34	Firm mid orange brown silt clay
0.77	Alluvial river gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/08f	SH 67147 41259	1.62	2763-2764

Depth from surface (m)	Description
0	Firm mid grey brown silt clay
0.42	Firm mid orange brown silt clay
0.5	Alluvial river gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/09	SH 67199 41269	1.6	2769-2770

Depth from surface (m)	Description
0	Friable dark brown silt clay
0.1	Firm mid brown silt clay with occasional small sub rounded stone inclusions
0.4	Alluvial river gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/09h	SH67249 41274	1.6	2767-2768

Depth from surface (m)	Description
0	Friable mid brown silt clay
0.1	Firm light brown silt clay
0.45	Alluvial river gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/10i	SH 67295 41279	1.8	2775-2776

Depth from surface (m)	Description
0	Firm mid brown silt clay with small sun rounded stone inclusions
0.56	Alluvial gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/10j	SH 67344 41275	1.7	2771-2772,

Depth from surface (m)	Description
0	Alluvial gravels consisting of very small sub rounded stones. A piece of worked wood was

recovered at 0.6m below this gravel level in a mid blue grey silt clay.

Plot and section	Grid reference	Total trench depth (m)	Photos
14/11k	SH 67393 41286	1.7	2777-2778,

Depth from surface (m)	Description
0	Alluvial gravels consisting of very small sub rounded stones. Piece of preserved timber was recovered at 1.9m below this gravel level in a light yellow grey silt clay.

Plot and section	Grid reference	Total trench depth (m)	Photos
14/12f	SH 66515 41000	1.4	2837-2838

Depth from surface (m)	Description
0	Firm mid brown silt clay
0.3	Firm light grey yellow silt clay
0.7	Firm mid grey silt clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/12g	SH 67630 41340	1.8	2258-2259

Depth from surface (m)	Description
0	Grey brown clay silt organic material heavily disturbed by tree roots with the occasional sub angular stone inclusion.
1	Grey loose gravels with the occasional medium rounded stones
1.1	Grey silt with abundant orange stained small to large rounded stones
1.25	Narrow band of manganese with small rounded gravels and small stones. Underneath this was a narrow band of iron panning
1.3	Band of iron pan
1.35	Light grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
14/12h	SH 67580 41333	1.7	2260-2261

Depth from surface (m)	Description
0	Grey brown clay silt with frequent small to medium rounded and flat stones
1	Compact rounded stones of varying sizes within a gravel and silt matrix

Plot and section	Grid reference	Total trench depth (m)	Photos
14/13a	SH 67848 41384	1.91	2239-2240

Depth from surface (m)	Description
0	Mid brown silt clay with regular small/very small flat stone inclusions, gravels were also present
-	Mid brown silt clay with frequent large to small rounded boulders and a mix of flat to rounded gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/13b	SH 67800 41373	1.7	2241-2242

Depth from surface (m)	Description

0	Mid brown silt clay with rare rounded, sub rounded and fine grained stones.
1.2	Light grey green gravel silt with frequent small to medium rounded and sub angular stones

Plot and section	Grid reference	Total trench depth (m)	Photos
14/13c	SH 67751 41362	1.85	2244-2245

Depth from surface (m)	Description
0	Brown silt clay fine grained
1.55	Rounded and sub angular small to medium stones within a grey clay matrix. Water flooded the bottom of the trench

Plot and section	Grid reference	Total trench depth (m)	Photos
14/13d	SH 67702 41352		2246-2247

Depth from surface (m)	Description
0	Brown silt clay with frequent small to medium rounded and sub angular stones.
-	Same as the deposit above but with larger rounded stones and loose flat stones and gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
14/13e	SH 67677 41346	1.9	2254-2255

Depth from surface (m)	Description
0	Mid brown silt clay with occasional very small flat with rounded edge stones
1.5	Manganese band. Black with small rounded stones
-	Iron panning. Orange brown with small flat rounded stones
-	Light grey clay with small rounded small to medium gravels and stones

Plot and section	Grid reference	Total trench depth (m)	Photos
14/13f	SH 67656 41341		2256-2257

Depth from surface (m)	Description
0	Brown clay silt with fine grained frequent gravels and small to medium rounded and sub rounded stones
-	Light brown silt clay gravels
-	Small alluvial river gravels. Almost sand.

Plot and section	Grid reference	Total trench depth (m)	Photos
14/14a	SH 68012 41439	1.8	2247-2248

Depth from surface (m)	Description
0	Brown clay
0.2	River gravels, dark grey brown to light grey brown. Rolled stones, and also some evidence of iron panning

Plot and section	Grid reference	Total trench depth (m)	Photos
14/14b	SH 67966 41420	1.7	2243-2244,

Depth from surface (m)	Description
0	Brown clay
0.5	Dark grey brown gravel with small to large round and sub rounded stones

Plot and section	Grid reference	Total trench depth (m)	Photos
14/14c	SH 67920 41401	1.7	2243-2244,

Depth from surface (m)	Description
0	Dark brown clay
0.5	River gravel small to large rounded and sub angular stones

Plot and section	Grid reference	Total trench depth (m)	Photos
15/04a	SH 69165 42164	2.9	3068-3069

Depth from surface (m)	Description
0	Dark peat with occasion sub angular stones
0.2	Light yellow orange silt clay with occasional sub angular stones
1.5	Grey gravel silt with occasional small to medium sub angular and rounded stones

Plot and section	Grid reference	Total trench depth (m)	Photos
15/04b	SH 69134 42159	2.2	3070-3071

Depth from surface (m)	Description
0	Dark peat with occasion sub angular stones
1.1	Light yellow orange silt clay with occasional sub angular stones

Plot and section	Grid reference	Total trench depth (m)	Photos
15/04c	SH 69110 42154	2.22	3072-3073

Depth from surface (m)	Description
0	Dark peat with occasion sub angular stones
1	Light yellow orange silt clay with occasional sub angular stones
-	Orange brown silt clay with frequent stones and gravel

Plot and section	Grid reference	Total trench depth (m)	Photos
15/28a	SH 70377 43039	1.4	2927-2928

Depth from surface (m)	Description
0	Friable light brown orange sand clay with lots of small to medium shale stones.
0.45	Friable light grey green peat with lots of small rounded stones and degrading bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
15/28b	SH 70365 43084	3.75	2929-2930

Depth from surface (m)	Description
0	A mid grey to black fine grained peat with some organic material such as small branches, also contains sub angular and sub rounded medium stones.
2	Dense small to medium sub angular to sub rounded stones and boulders
3.2	Light grey green with abundant small stones and possibly a clay.

Plot and section	Grid reference	Total trench depth (m)	Photos
15/28c	SH 70329 43119	1.3	2630-2632

Depth from surface (m)	Description
0	Very dark brown grey peat with organic material of roots and tree braches
1	Light orange grey silt sand clay with frequent small sub angular shale stones.
1.5	Light grey silt within natural shale rock.

Plot and section	Grid reference	Total trench depth (m)	Photos
16/1	SH 70210 43220	1	3159-3162

Depth from surface (m)	Description
0	Black brown peat. Land drains cut through this layer approximately every 2m
0.5	Pale green grey gravel clay
0.9	Mottled yellow clay

Plot and section	Grid reference	Total trench depth (m)	Photos
16/2	SH 70210 43260	1	3153-4, 3157-

Depth from surface (m)	Description
0	Black brown peat. Land drains cut through this layer approximately every 2m
0.8	Firm grey gravel clay with occasional large to medium boulders and small to medium sub angular stones

Plot and section	Grid reference	Total trench depth (m)	Photos
16/3	SH 70220 43320	1	3155-3156

Depth from surface (m)	Description
0	Peat layer
0.8	Grey gravel clay
1	Orange yellow clay

Plot and section	Grid reference	Total trench depth (m)	Photos
16/5	SH 70230 43390	2	3169-3172

Depth from surface (m)	Description
0	Peat layer
0.5	Yellow brown clay

Plot and section	Grid reference	Total trench depth (m)	Photos
16/6	SH 70239 43439	2	3173-3176,

Depth from surface (m)	Description
0	Peat with occasional large boulder, peat over 2m deep. Dark black/brown peat with numerous roots in top 0.3m and boulders further down.

Plot and section	Grid reference	Total trench depth (m)	Photos
16/9a	SH 70264 43749		3181-3182

Depth from surface (m)	Description
0	Peat. Black brown with organic material and vegetation.
-	Grey gravel clay with large boulders at the base of the peat layer

Plot and section	Grid reference	Total trench depth (m)	Photos
16/9b	SH 70259 43786		3183-3184

Depth from surface (m)	Description
0	Black brown peat, with organic material and also modern rubbish (pram wheel, oxygen bottle and modern pottery were observed). Plastic and ceramic land drains cut through this layer
-	Grey brown waterlogged layer with very frequent sub angular boulders.

Plot and section	Grid reference	Total trench depth (m)	Photos
17/02a	SH 70303 44147	1	3203-3206

Depth from surface (m)	Description
0	Orange brown black peat layer
0.7	Grey gravel clay with occasional boulder

Plot and section	Grid reference	Total trench depth (m)	Photos
17/04	SH 70220 44280	1.2	3209-3214

Depth from surface (m)	Description
0	Peat with some organic material and some occasional small to medium sub angular stones
0.5	Light grey gravel clay with small to medium sub angular stones and large boulders.

Plot and section	Grid reference	Total trench depth (m)	Photos
17/05	SH 70030 44190	1.2	3223-3228

Depth from surface (m)	Description
0	Bright orange brown silty clay with gravel and small to large stones
0.5	Grey gravel clay with small to large boulders and small to large sub angular stones, also some bedrock in places

Plot and section	Grid reference	Total trench depth (m)	Photos
17/06a	SH 70186 44429	1.5	3249-3250

Depth from surface (m)	Description
0	Brown black peat with rare small to large sub angular stones. Area waterlogged. Peat >1.5m

Plot and section	Grid reference	Total trench depth (m)	Photos
17/07	SH 70170 44500		3253-3258

Depth from surface (m)	Description
0	Waterlogged peat bog of yellow clay and some medium to large sub angular stones and some organic material
-	Gravels

Plot and section	Grid reference	Total trench depth (m)	Photos
17/09a	SH 70099 44675	2	3237-3238

Depth from

Depth from surface (m)	Description
0	Dark black brown peat
-	Mid orange brown
-	Dark black brown peat with organic material
-	Bedrock and grey clay

Plot and section	Grid reference	Total trench depth (m)	Photos
17/10b	SH 70039 44716		3265-3268

Depth from surface (m)	Description
0	Dark organic material with wood and roots.
-	mid brown black with organic material and some medium sub angular stones
-	Grey clay and bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
17/23	SH 69632 45096	2.35	2934-2935

Depth from surface (m)	Description
0	Peat. Mid black brown
0.35	Granite bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
17/24b	SH 69584 45110	2.8	2936-2937

Depth from surface (m)	Description
0	Peat. Dark black brown with occasional large sub angular boulders at the interface between the peat and the layer below
0.8	Granite bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
17/24c	SH 69538 45130	1.8	2938-2939

Depth from surface (m)	Description
0	Mid black brown peat
0.4	Granite bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
17/24d	SH 69496 45155	2	2926

Depth from surface (m)	Description
0	Thin layer of dark grey fine grained peat
0.4	Light grey green sand silt with frequent small to medium rounded stones
0.7	Friable light mottled green orange silt clay sand
1.9	Granite bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
17/24e	SH 69444 45162	2.05	2948-2949

Depth from surface (m)	Description

0	Topsoil of dark black peat
0.05	Mid orange brown silt clay with occasional small sub angular stones
-	Mid grey silt clay with frequent small sub angular stones

Plot and section	Grid reference	Total trench depth (m)	Photos
17/24f	SH 69399 45141	2.4	2950-2951

Depth from surface (m)	Description
0	Black peat
0.1	Mid orange brown silt clay
0.4	Mid grey silt clay with frequent small sub angular stones

Plot and section	Grid reference	Total trench depth (m)	Photos
17/24g	SH 69360 45111	2	2952-2953

Depth from surface (m)	Description
0	Firm black peat
0.4	degrading granite bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
17/25h	SH 69343 45074	2.05	2454-2455

Depth from surface (m)	Description
0	Black peat
0.25	Mid grey silt clay with frequent small to medium sub angular slate stones

Plot and section	Grid reference	Total trench depth (m)	Photos
17/25i	SH 69343 45025	1.7	2456-2457

Depth from surface (m)	Description
0	Fine grained peat layer
0.4	Light orange brown silt sand with abundant small sub rounded stones
0.65	Light grey silt clay with small to medium angular stones
0.85	Granite bedrock

Plot and section	Grid reference	Total trench depth (m)	Photos
17/25j	SH 69309 44990	3.35	2459-2460

Depth from surface (m)	Description
0	Fine grained peat layer
1.8	Shattered bedrock forming a false layer created by previous trenching.
2.8	Light yellow brown clay with very frequent small stones
3.05	Grey sand clay with lots of small stones

17. APPENDIX VI: MITIGATION MAPS AS ISSUED BY WALES AND WEST UTILITIES SHOWING PLOT NUMBERS

Pipeline Route

RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing

Temporary Access Route

30m Working Width

Proposed Above Ground Installation (AGI)

Existing Above Ground Installation (AGI)

Temporary Bridge

1/8 Plot Number

Badger Sett (potential for licence)

Otter Holt (potential for European Protected Specie Licence)

By-Pass CPO Area

Glaslyn SSSI

Meirionnydd Oakwoods and Bat Sites SAC

Morfa Harlech SSSI

Lleyn Peninsula and the Sarnau SAC

Coedydd Dyffryn FFestiniog SSSI

Specification 1

Important Hedgerow

Hedgerow

Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision

Tree Protection Area

Bogmatting of Running Track

Lock Out - No Access

Specification 2

Japanese Knotweed

Indian Balsalm

New Zealand Pygmyweed

Controlled Strip - Specification 3

Specification 4

Specification 5

Afon Teigl - Specification 6

Grassland - Specification 7

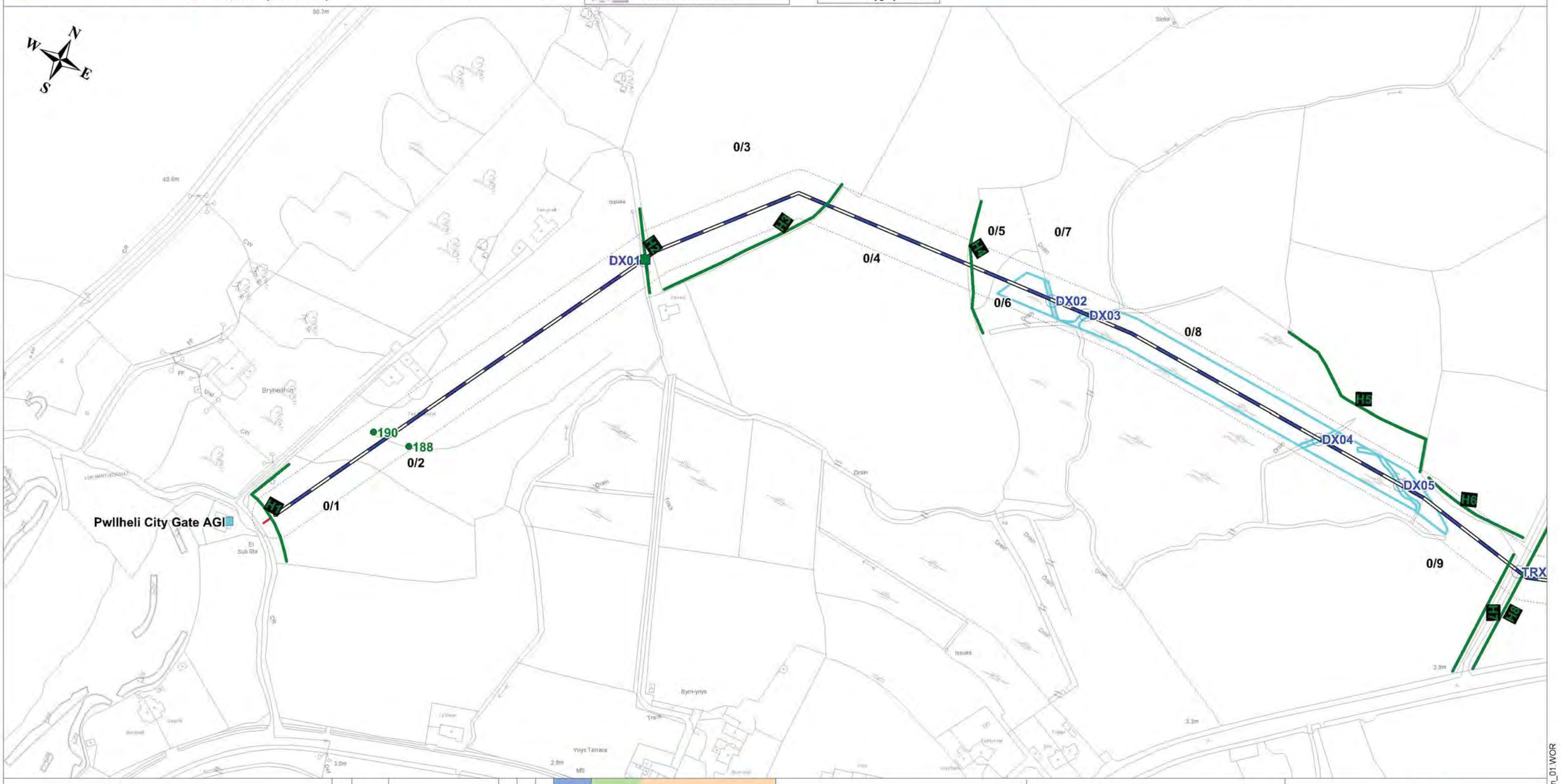
Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9

Low Reptile Population

High Reptile Population

Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 01 of 39)**

Drawing Number: 41330/04/01/01/Mitigation01

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P41330\04 GIS\Mitigation_01 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

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0/11 1/1 1/2 0/10 2/1

RDX01 RDX02 DX06 TRX01

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

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PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 02 of 39)**

Drawing Number: 41330/04/01/01/Mitigation02

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_02.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
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- Hedgerow
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Specification 2
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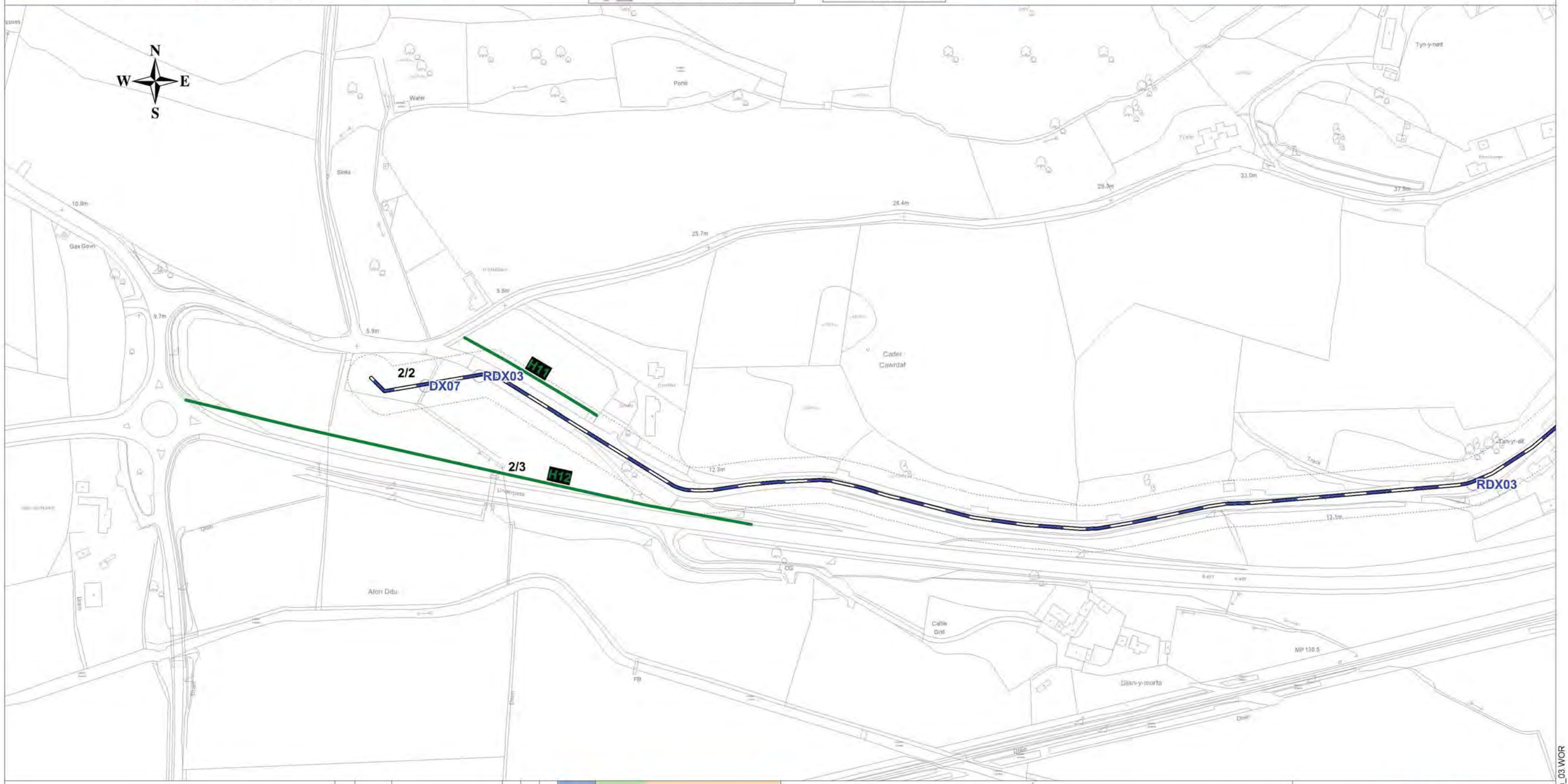
- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 03 of 39)**

Drawing Number: 41330/04/01/01/Mitigation03

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_03 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
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- Existing Above Ground Installation (AGI)
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- 1/8 Plot Number
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- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

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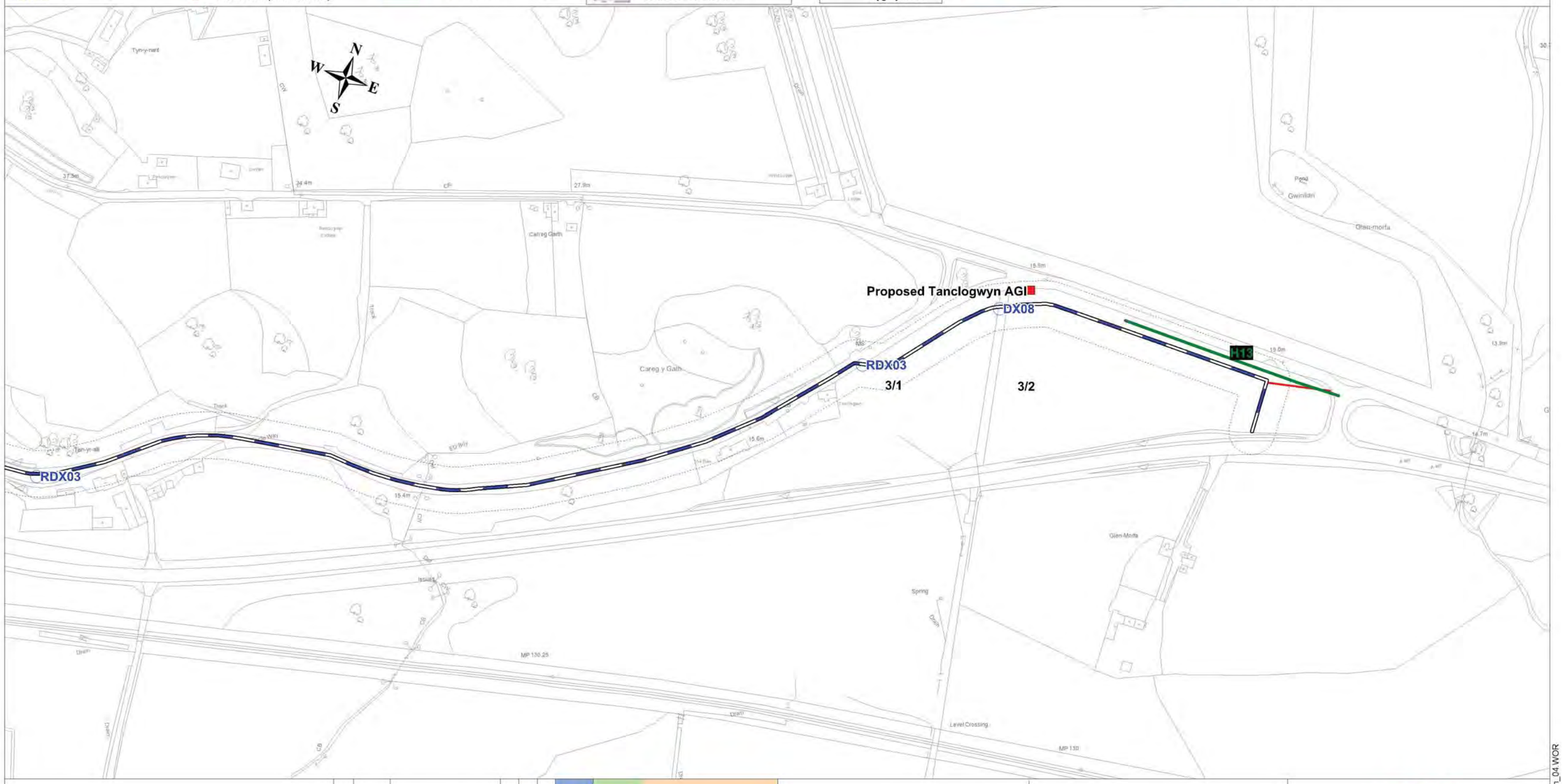
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 04 of 39)**

Drawing Number: 41330/04/01/01/Mitigation04

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_04 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
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- 1/8 Plot Number
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- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

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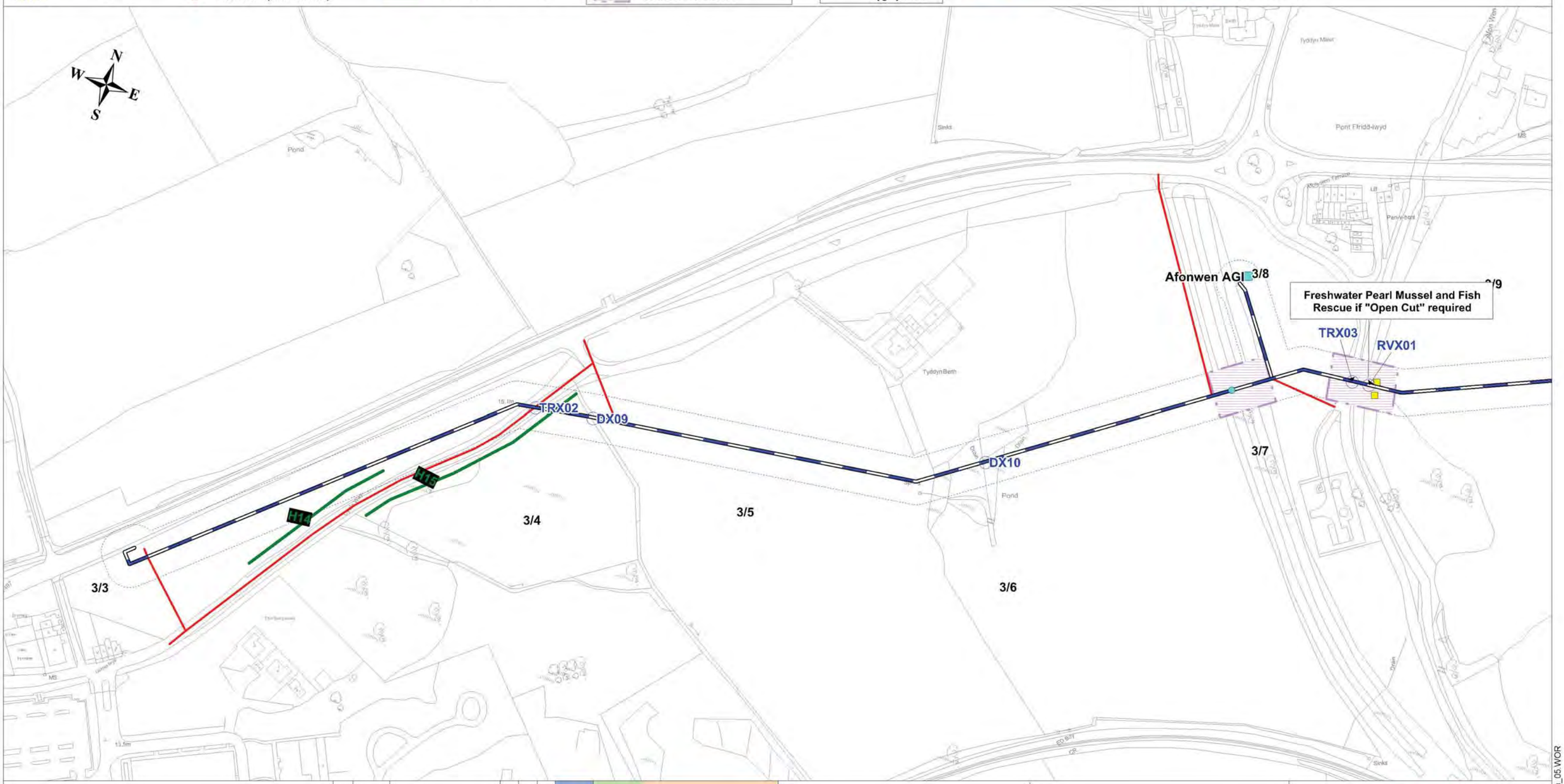
Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 05 of 39)**

Drawing Number: 41330/04/01/01/Mitigation05

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_05.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
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- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

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Specification 9
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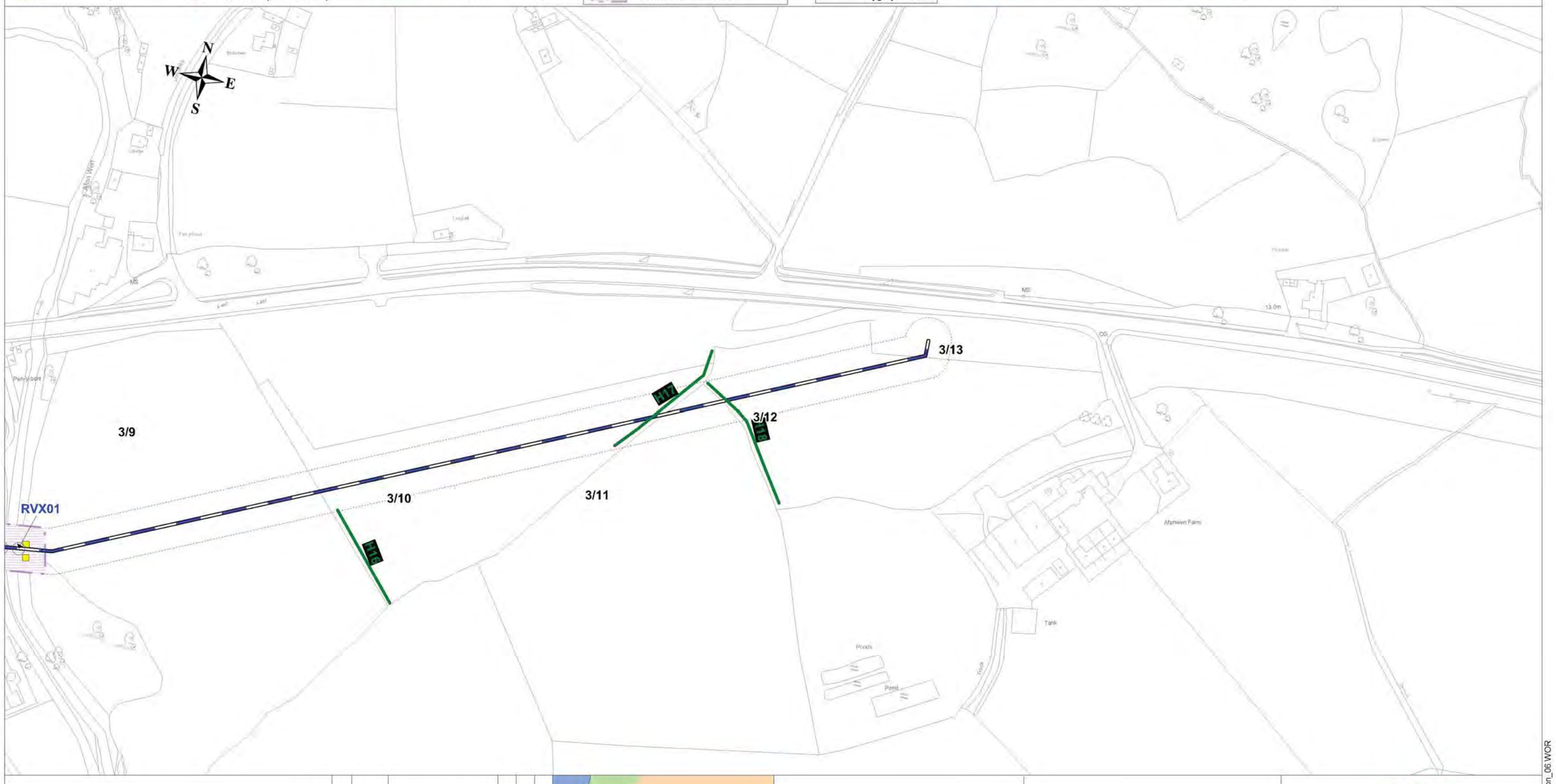
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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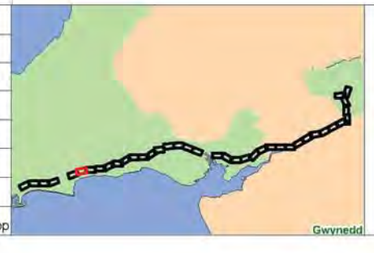
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	



PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 06 of 39)**

Drawing Number: 41330/04/01/01/Mitigation06

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_06.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

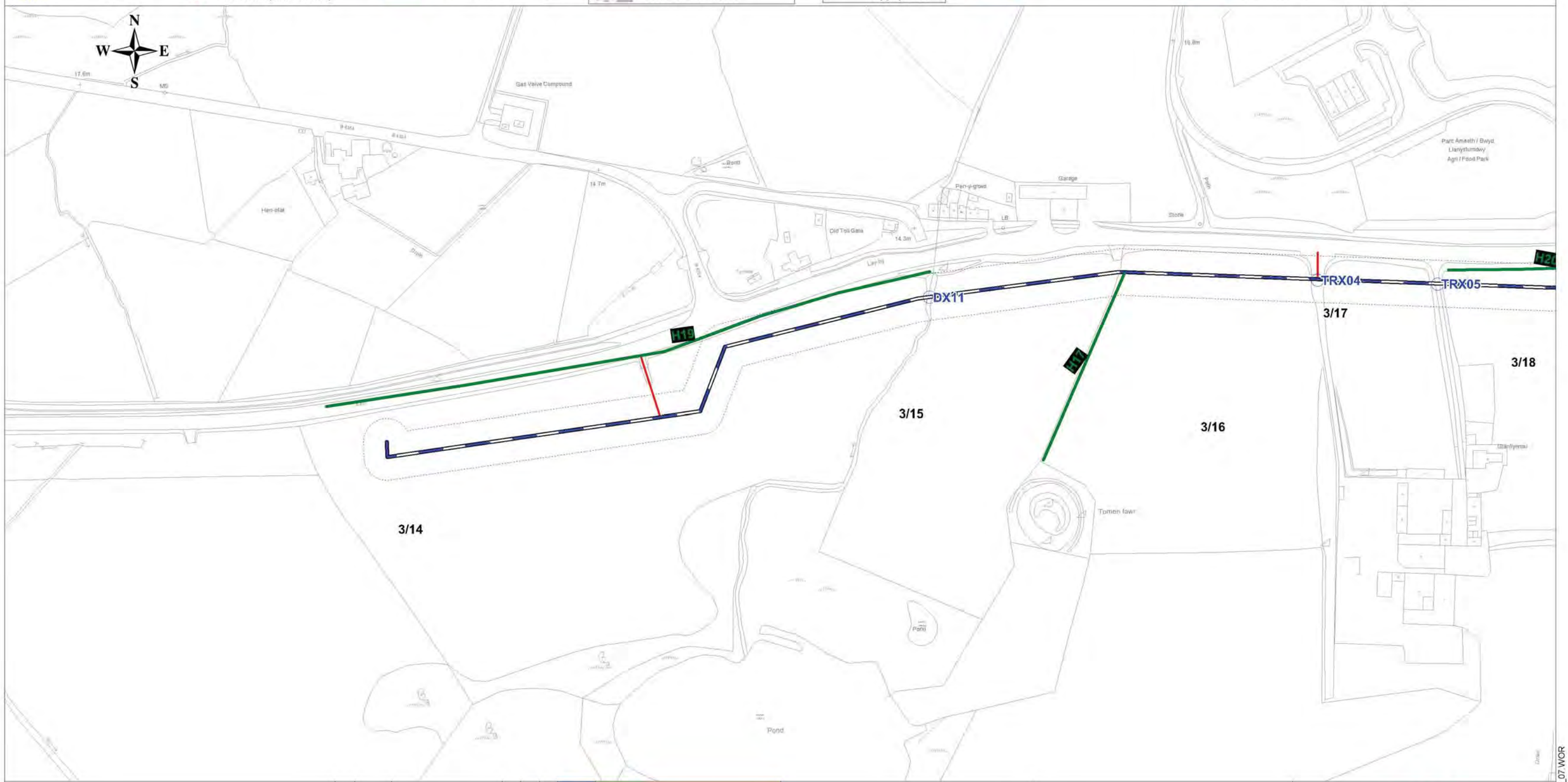
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 07 of 39)**

Drawing Number: 41330/04/01/01/Mitigation07

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_07.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

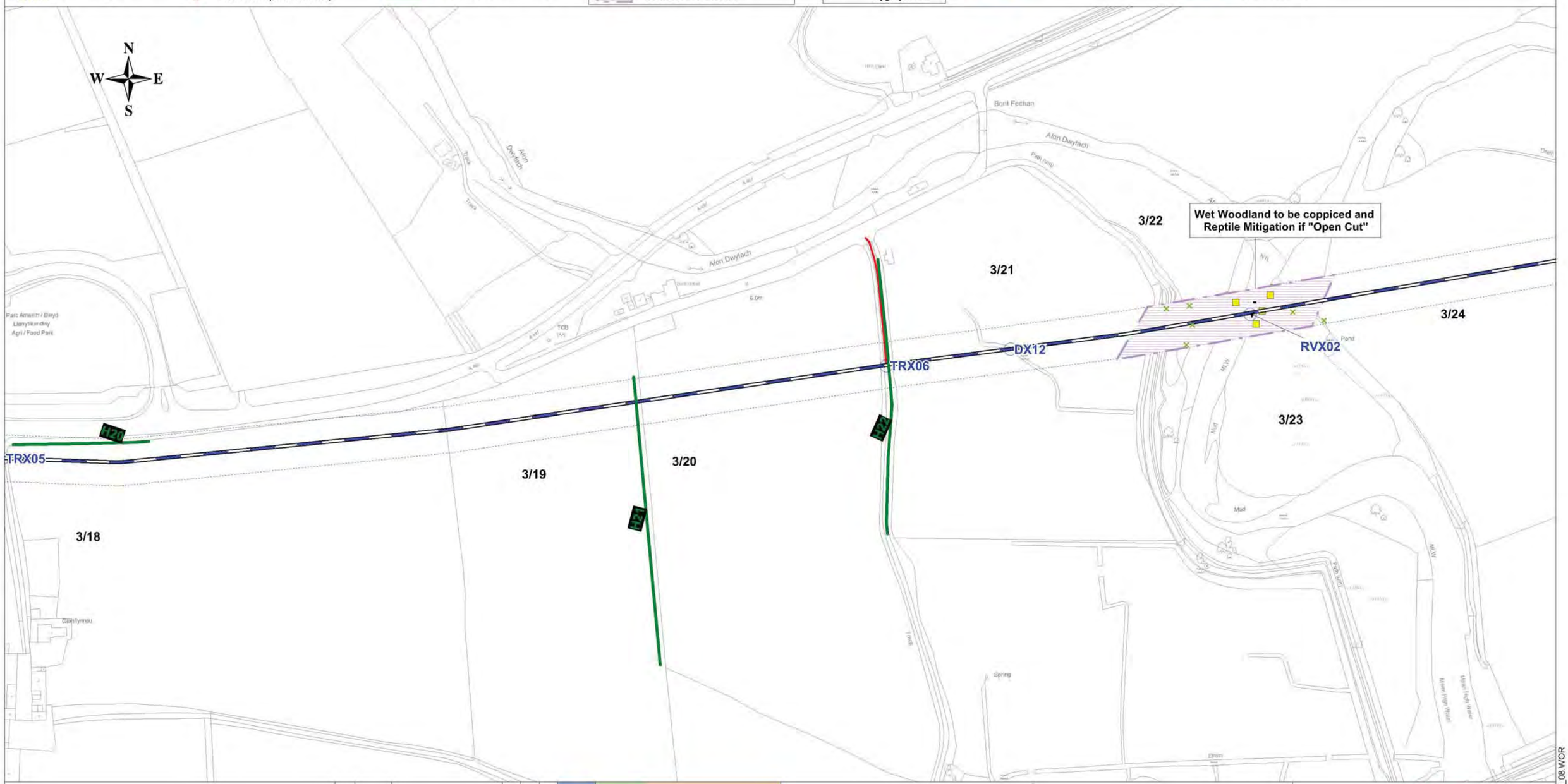
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 08 of 39)**

Drawing Number: 41330/04/01/01/Mitigation08

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_08.WOR

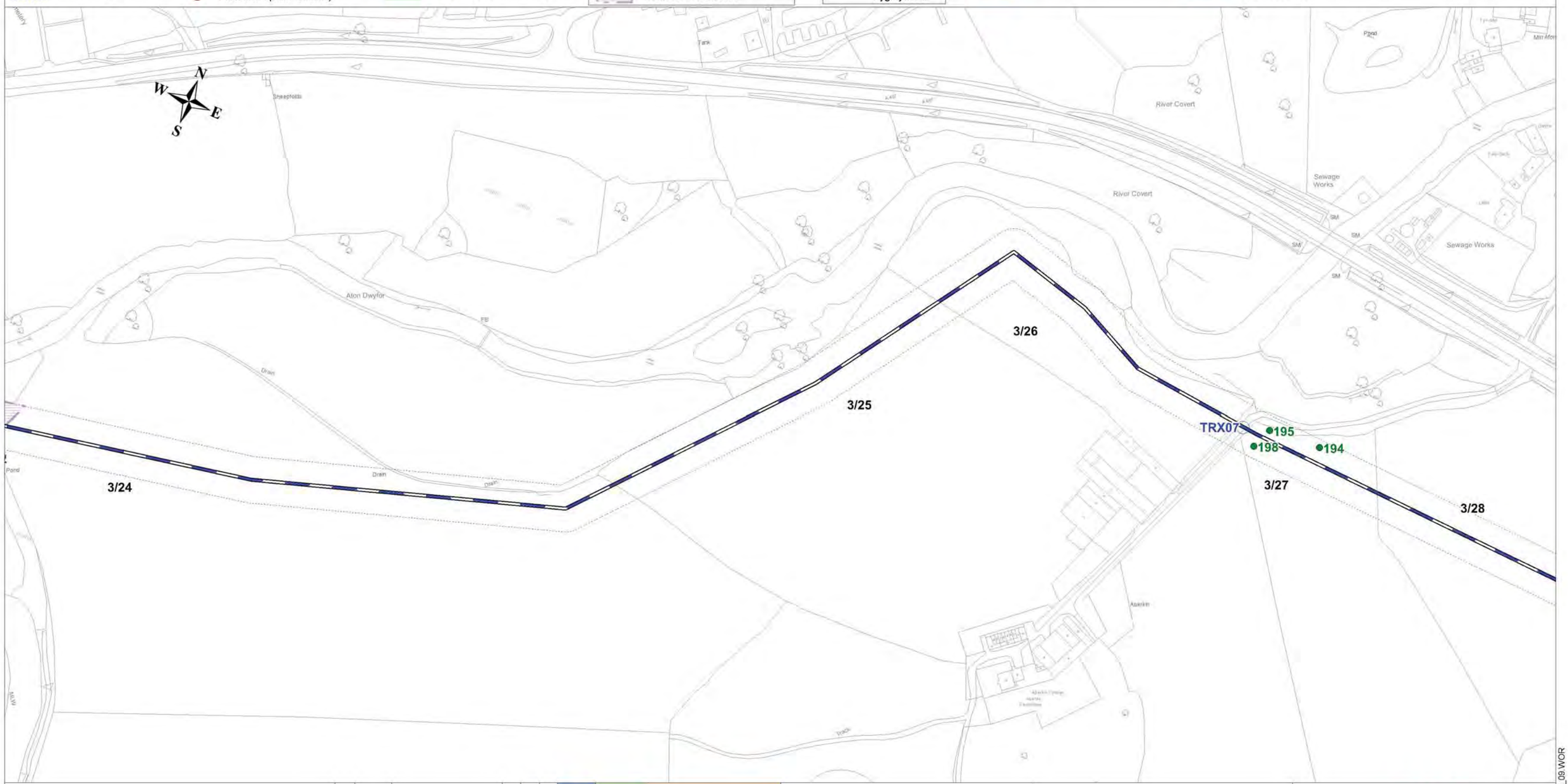
- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

Specification 3
- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population
- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 09 of 39)**

Drawing Number: 41330/04/01/01/Mitigation09

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_09.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

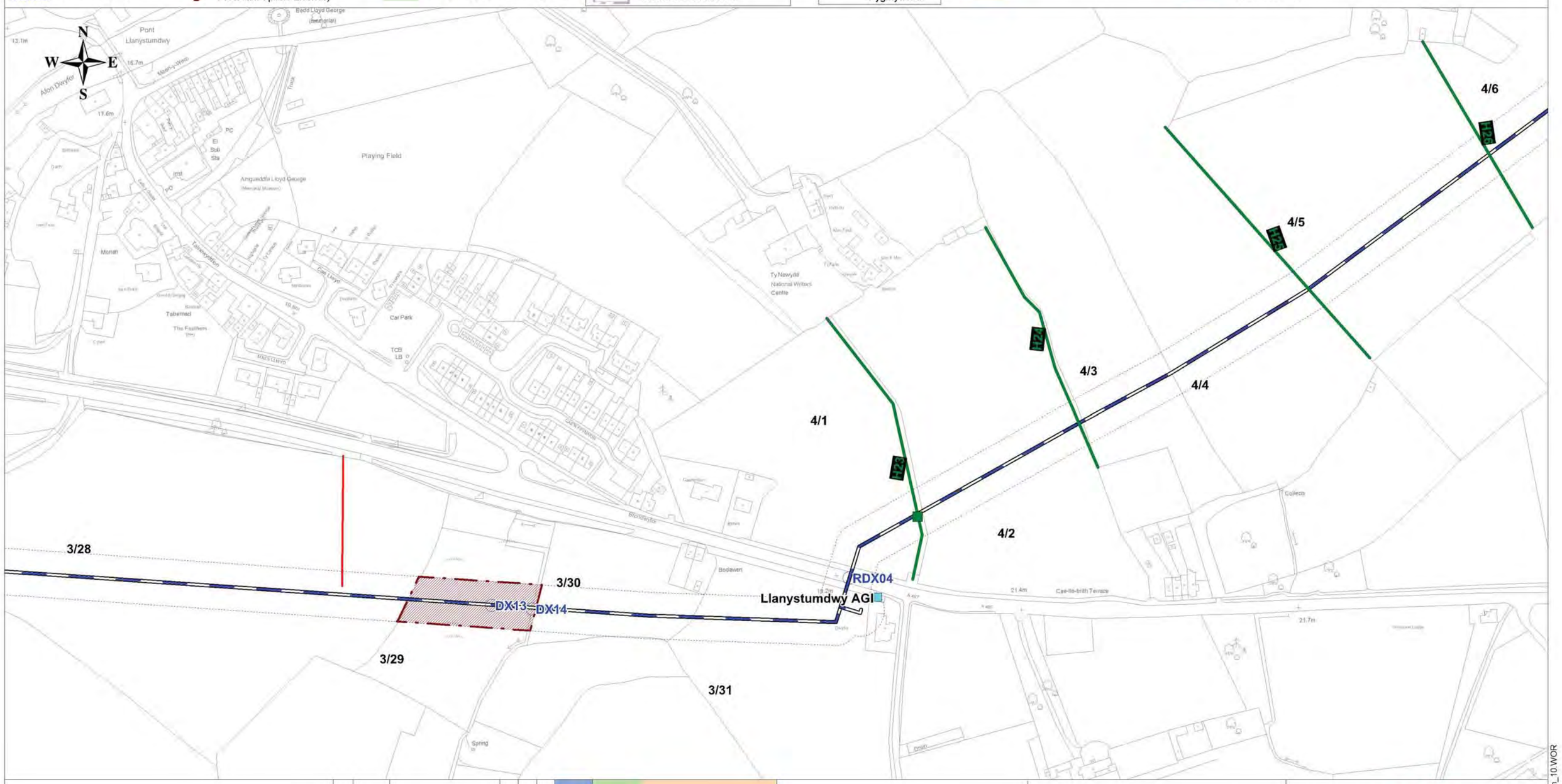
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 10 of 39)**

Drawing Number: 41330/04/01/01/Mitigation10

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_10.WOR

Pipeline Route

RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing

Temporary Access Route

30m Working Width

Proposed Above Ground Installation (AGI)

Existing Above Ground Installation (AGI)

Temporary Bridge

1/8 Plot Number

Badger Sett (potential for licence)

Otter Holt (potential for European Protected Specie Licence)

By-Pass CPO Area

Glaslyn SSSI

Meirionnydd Oakwoods and Bat Sites SAC

Morfa Harlech SSSI

Lleyn Peninsula and the Sarnau SAC

Coedydd Dyffryn FFestiniog SSSI

Important Hedgerow

Hedgerow

Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision

Tree Protection Area

Bogmatting of Running Track

Lock Out - No Access

Specification 1

Japanese Knotweed

Indian Balsalm

New Zealand Pygmyweed

Specification 2

Controlled Strip - Specification 3

Specification 4

Specification 5

Afon Teigl - Specification 6

Grassland - Specification 7

Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Low Reptile Population

High Reptile Population

Specification 9

Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 11 of 39)**

Drawing Number: 41330/04/01/01/Mitigation11

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330/04 GIS\Mitigation_11.WOR

Pipeline Route
RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing
Temporary Access Route
30m Working Width
Proposed Above Ground Installation (AGI)
Existing Above Ground Installation (AGI)
Temporary Bridge
1/8 Plot Number
Badger Sett (potential for licence)
Otter Holt (potential for European Protected Specie Licence)
By-Pass CPO Area
Glaslyn SSSI
Meirionnydd Oakwoods and Bat Sites SAC
Morfa Harlech SSSI
Lleyn Peninsula and the Sarnau SAC
Coedydd Dyffryn FFestiniog SSSI

Specification 1
Important Hedgerow
Hedgerow
Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
Tree Protection Area
Bogmatting of Running Track
Lock Out - No Access

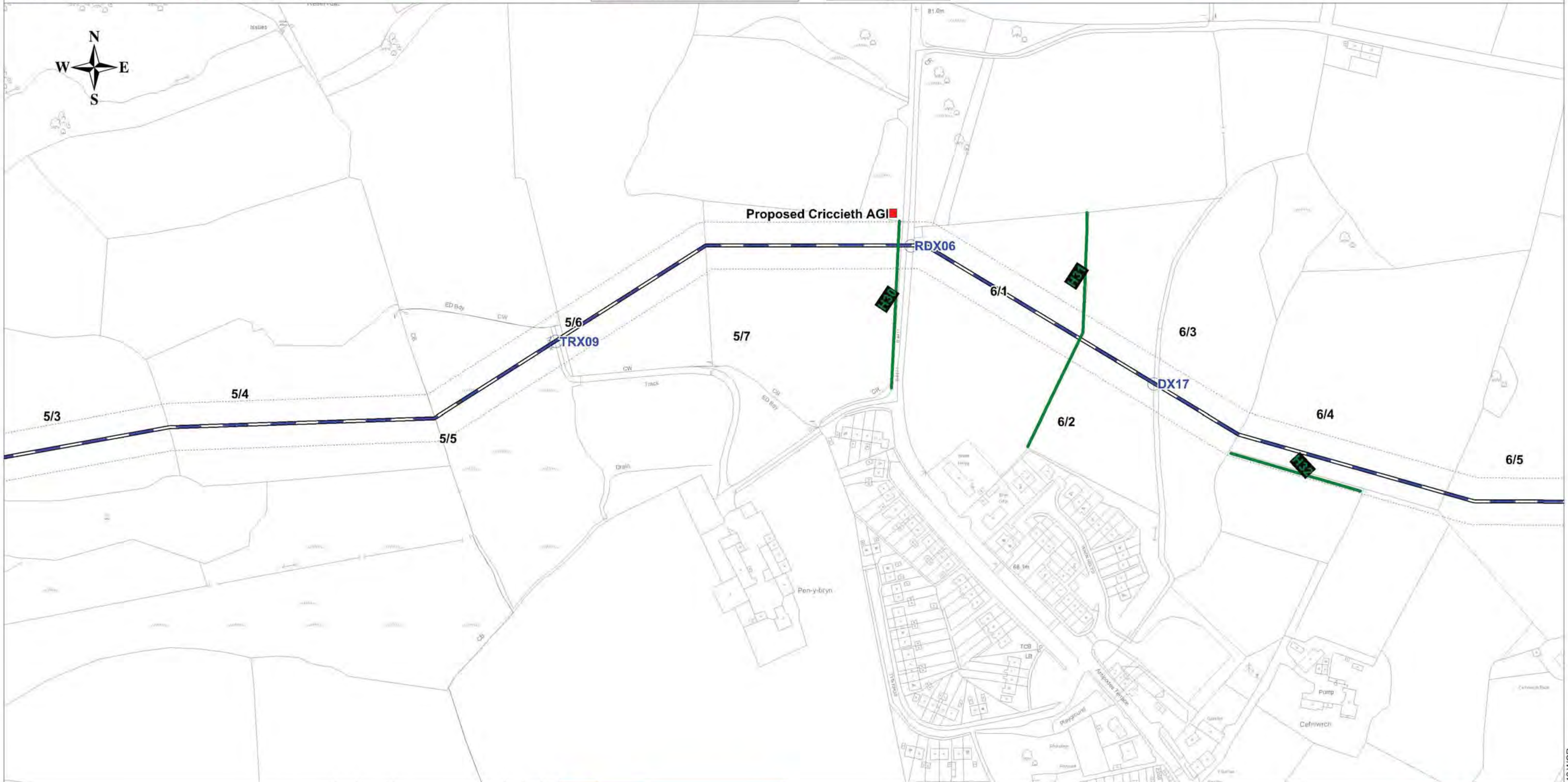
Specification 2
Japanese Knotweed
Indian Balsalm
New Zealand Pygmyweed

Controlled Strip - Specification 3
Specification 4
Specification 5
Afon Teigl - Specification 6
Grassland - Specification 7

Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
Low Reptile Population
High Reptile Population

Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO
BLAENAU FFESTINIOG
PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 12 of 39)**

Drawing Number: 41330/04/01/01/Mitigation12

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P41330\04 GIS\Mitigation_12.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 13 of 39)**

Drawing Number: 41330/04/01/01/Mitigation13

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_13 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 14 of 39)**

Drawing Number: 41330/04/01/01/Mitigation14

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_14.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

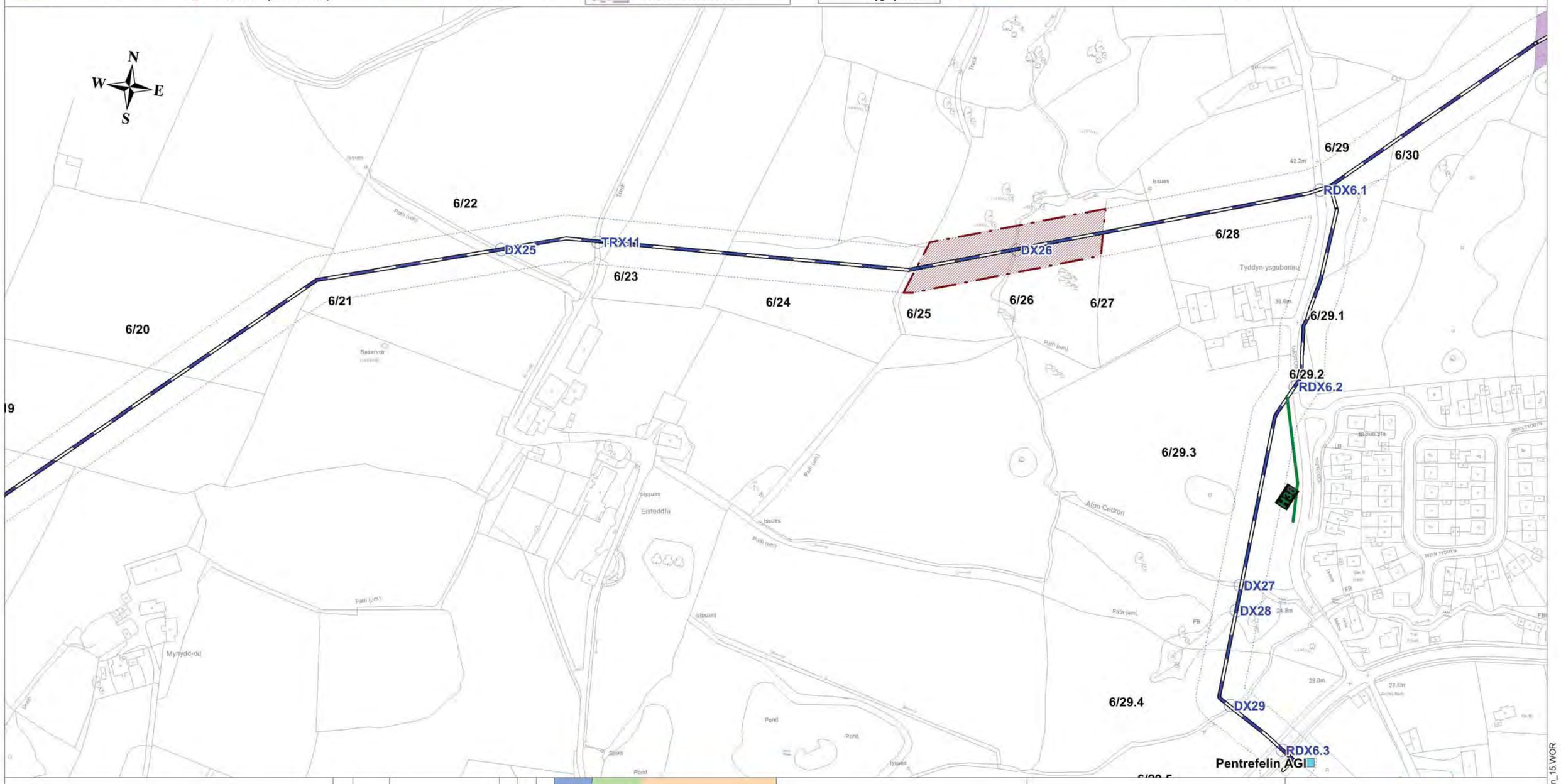
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 15 of 39)**

Drawing Number: 41330/04/01/01/Mitigation15

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_15.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

N W E S

6/31 6/32 6/33 6/34 6/35 6/36 6/37 6/38 6/39 6/40 6/41 6/42 6/43

DX30 DX31 DX32 TRX12.1

153 154 155 157

Cefn-y-meusydd-isaf Hendre-gadredd Y Boncyn Sheepfold

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

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PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 16 of 39)**

Drawing Number: 41330/04/01/01/Mitigation16

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_16.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

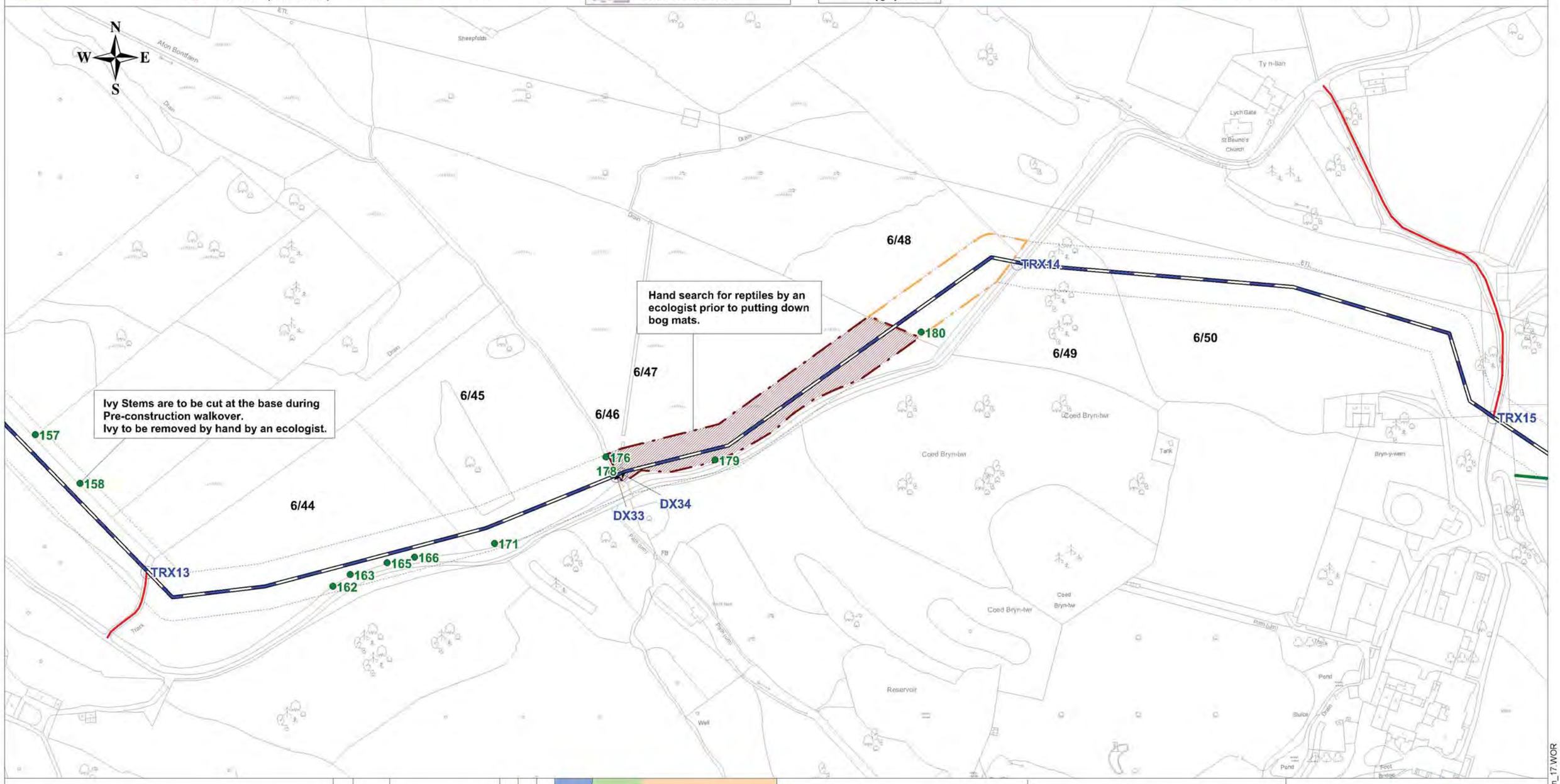
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 17 of 39)**

Drawing Number: 41330/04/01/01/Mitigation17

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_17 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 18 of 39)**

Drawing Number: 41330/04/01/01/Mitigation18

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_18.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

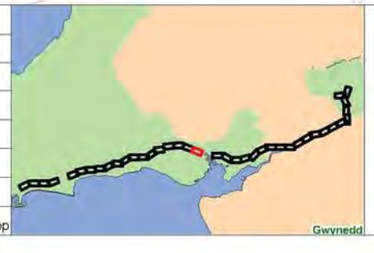
Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	



PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 19 of 39)**

Drawing Number: 41330/04/01/01/Mitigation19

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330/04 GIS\Mitigation_19 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

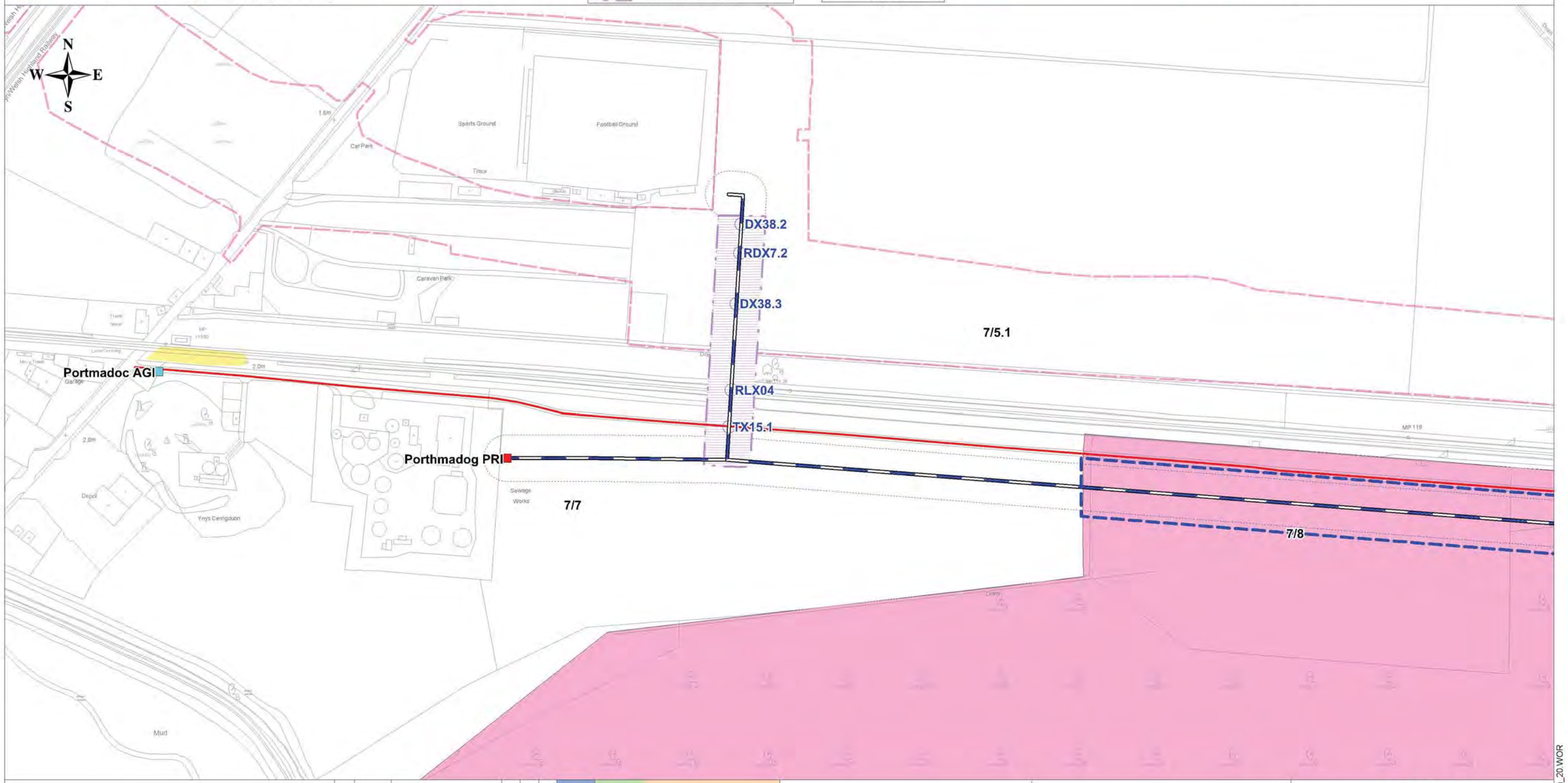
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 20 of 39)**

Drawing Number: 41330/04/01/01/Mitigation20

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_20.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

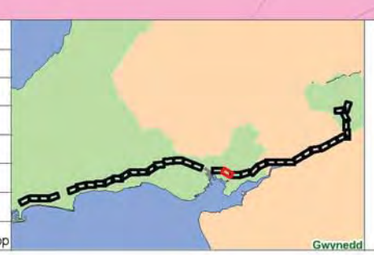
Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	



PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 21 of 39)**

Drawing Number: 41330/04/01/01/Mitigation21

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_21.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 1

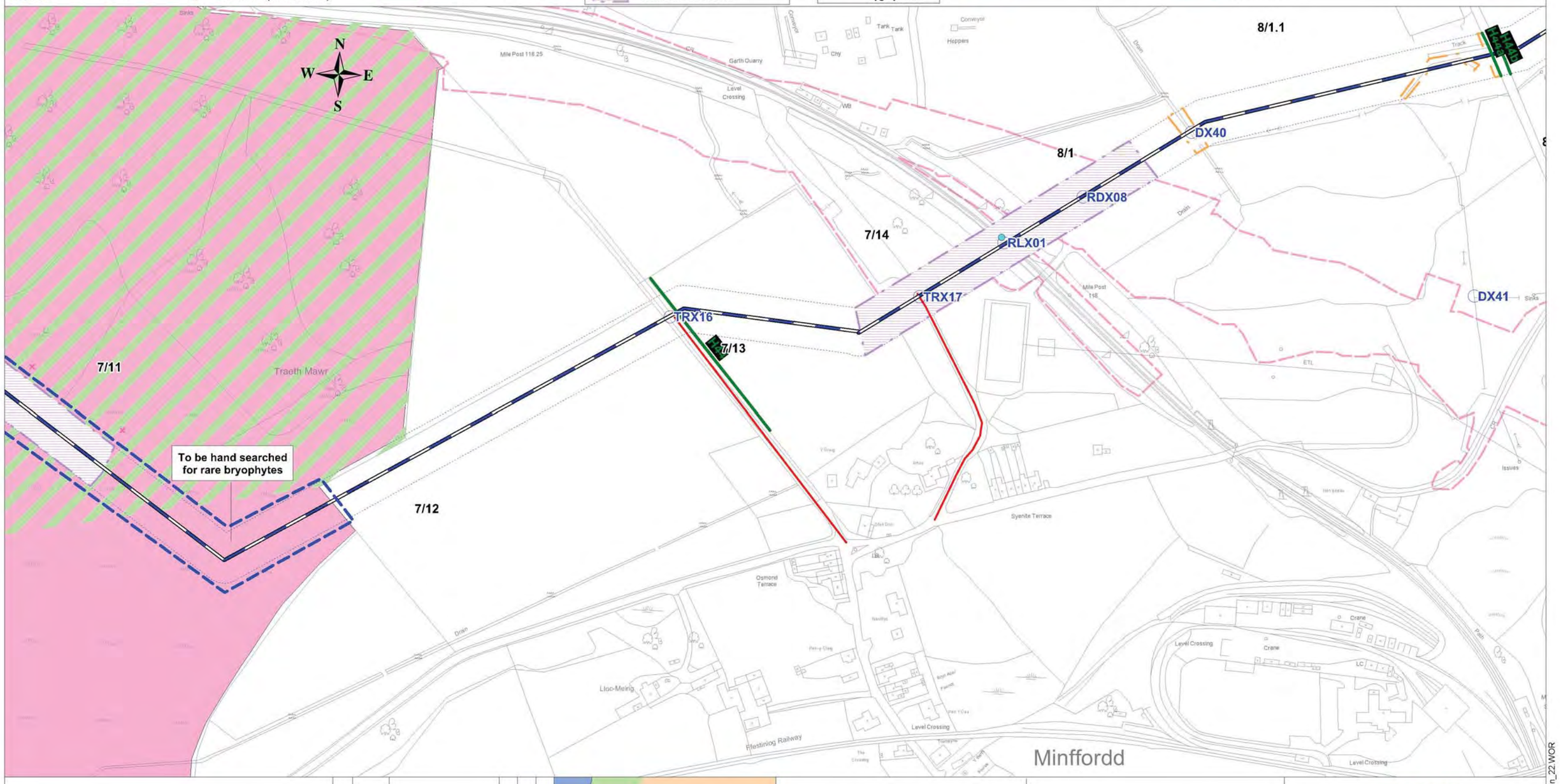
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

Specification 2

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9

- Low Reptile Population
- High Reptile Population
- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

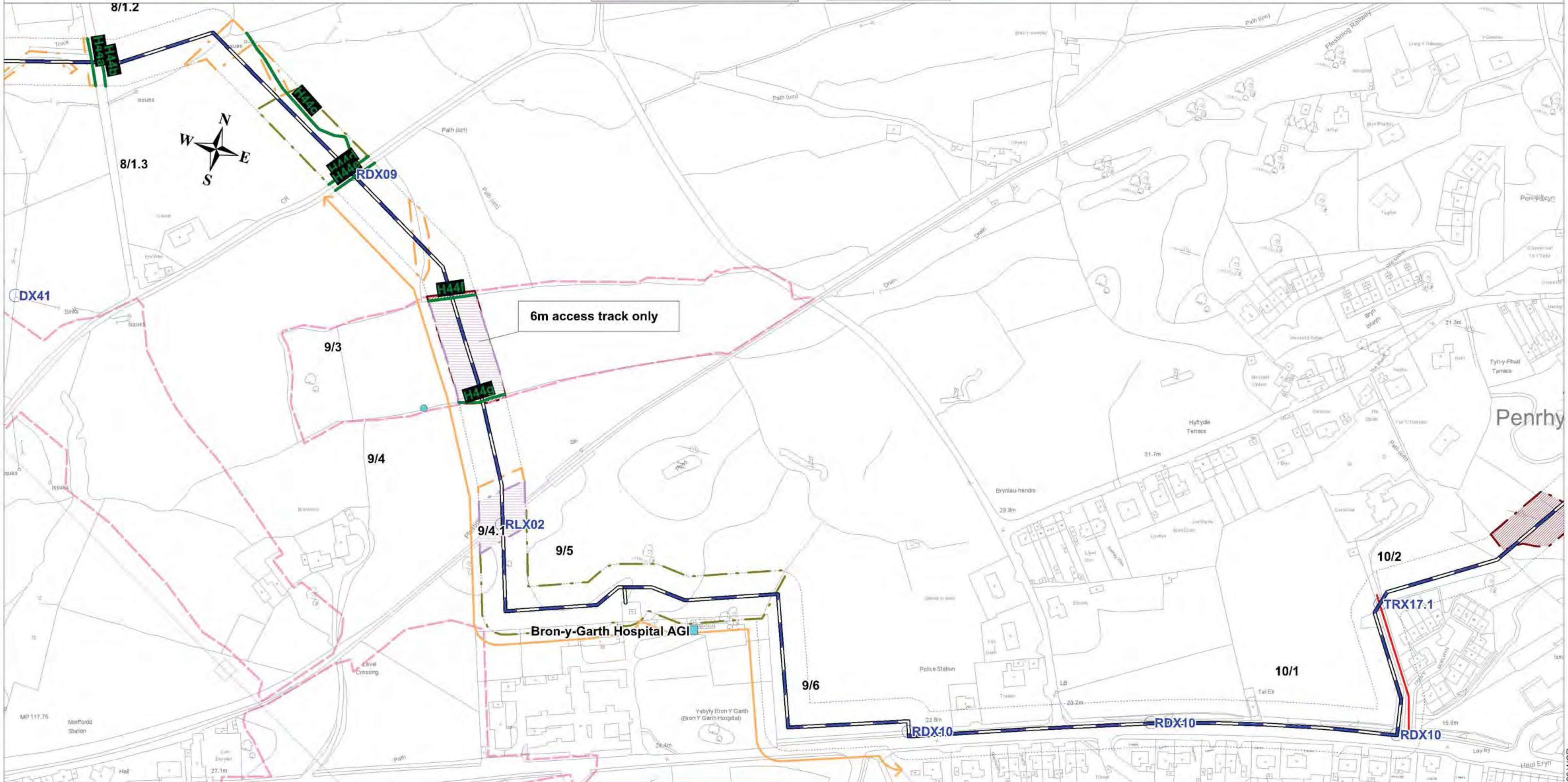
TITLE: **Mitigation Plans (Map 22 of 39)**

Drawing Number: 41330/04/01/01/Mitigation22

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_22.WOR

Pipeline Route
RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing
Temporary Access Route
30m Working Width
Proposed Above Ground Installation (AGI)
Existing Above Ground Installation (AGI)
Temporary Bridge
1/8 Plot Number
Badger Sett (potential for licence)
Otter Holt (potential for European Protected Specie Licence)
By-Pass CPO Area
Glaslyn SSSI
Meirionnydd Oakwoods and Bat Sites SAC
Morfa Harlech SSSI
Lleyn Peninsula and the Sarnau SAC
Coedydd Dyffryn FFestiniog SSSI
Important Hedgerow
Hedgerow
Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
Tree Protection Area
Bogmatting of Running Track
Lock Out - No Access
Specification 1
Japanese Knotweed
Indian Balsalm
New Zealand Pygmyweed
Specification 2
Controlled Strip - Specification 3
Specification 4
Specification 5
Afon Teigl - Specification 6
Grassland - Specification 7
Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8
Low Reptile Population
High Reptile Population
Specification 9
Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: Mitigation Plans (Map 23 of 39)

Drawing Number: 41330/04/01/01/Mitigation23

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P41330\04 GIS\Mitigation_23 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

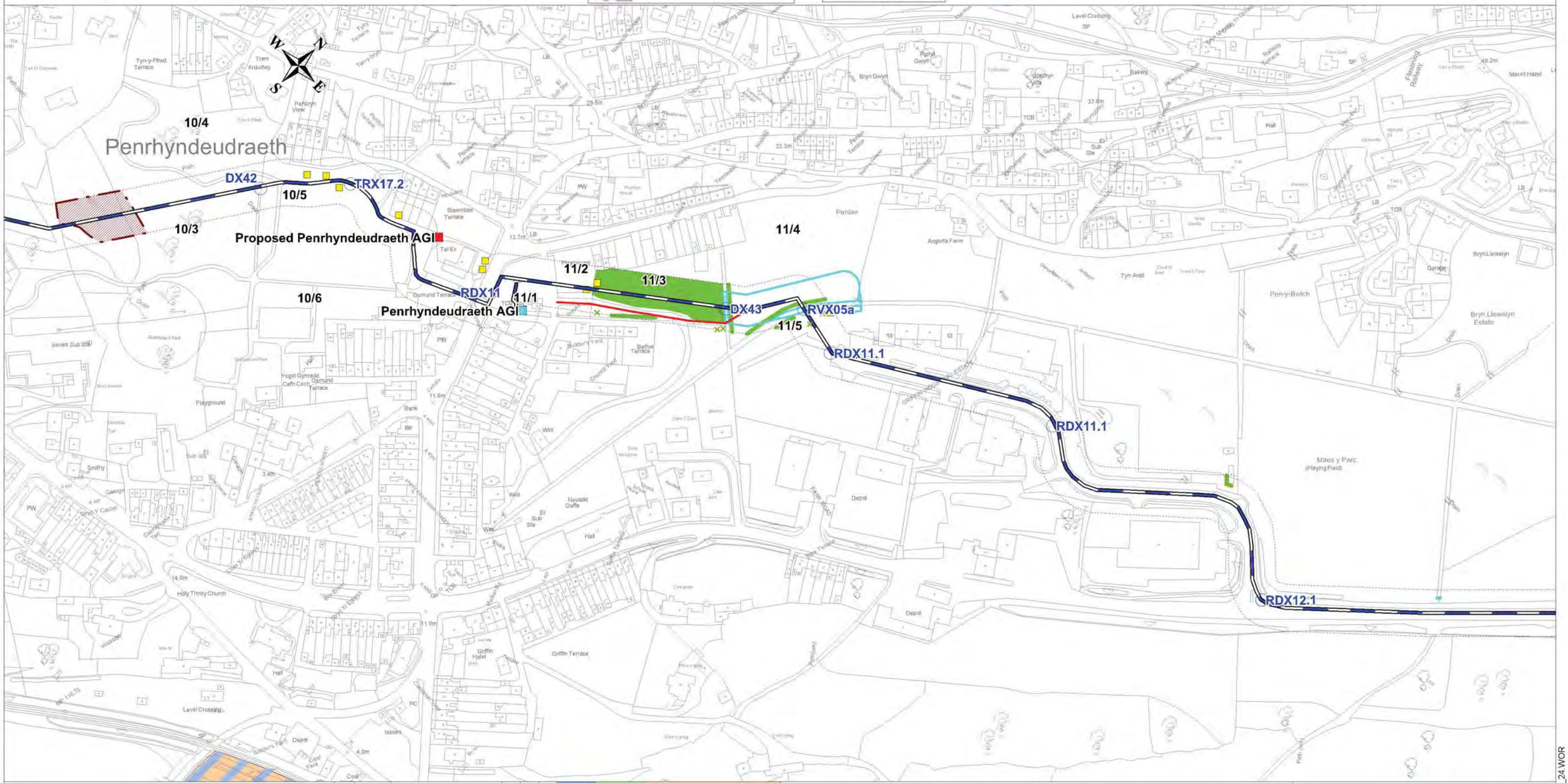
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 24 of 39)**

Drawing Number: 41330/04/01/01/Mitigation24

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_24.WOR

Pipeline Route

RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing

Temporary Access Route

30m Working Width

Proposed Above Ground Installation (AGI)

Existing Above Ground Installation (AGI)

Temporary Bridge

1/8 Plot Number

Badger Sett (potential for licence)

Otter Holt (potential for European Protected Specie Licence)

By-Pass CPO Area

Glaslyn SSSI

Meirionnydd Oakwoods and Bat Sites SAC

Morfa Harlech SSSI

Lleyn Peninsula and the Sarnau SAC

Coedydd Dyffryn FFestiniog SSSI

Important Hedgerow

Hedgerow

Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision

Tree Protection Area

Bogmatting of Running Track

Lock Out - No Access

Specification 1

Japanese Knotweed

Indian Balsalm

New Zealand Pygmyweed

Specification 2

Controlled Strip - Specification 3

Specification 4

Specification 5

Afon Teigl - Specification 6

Grassland - Specification 7

Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Low Reptile Population

High Reptile Population

Specification 9

Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 25 of 39)**

Drawing Number: 41330/04/01/01/Mitigation25

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P41330\04 GIS\Mitigation_25.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 1

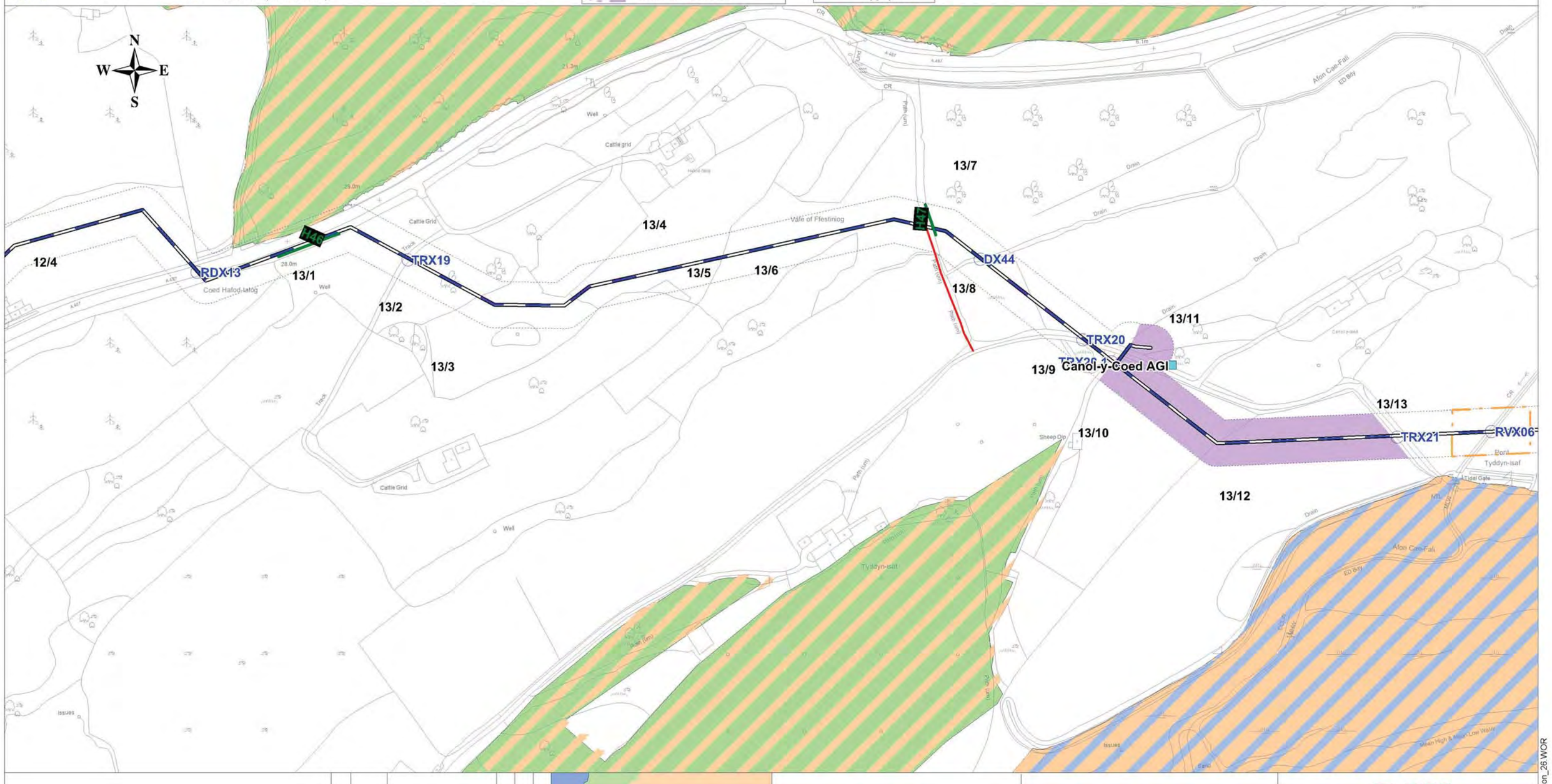
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

Specification 2

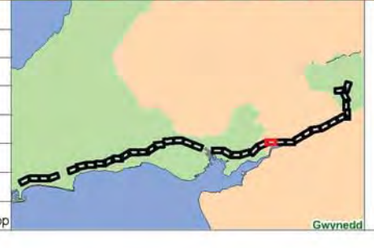
- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8
- Low Reptile Population
- High Reptile Population

Specification 9

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	



PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 26 of 39)**

Drawing Number: 41330/04/01/01/Mitigation26

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_26.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 27 of 39)**

Drawing Number: 41330/04/01/01/Mitigation27

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_27.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 28 of 39)**

Drawing Number: 41330/04/01/01/Mitigation28

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_28 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

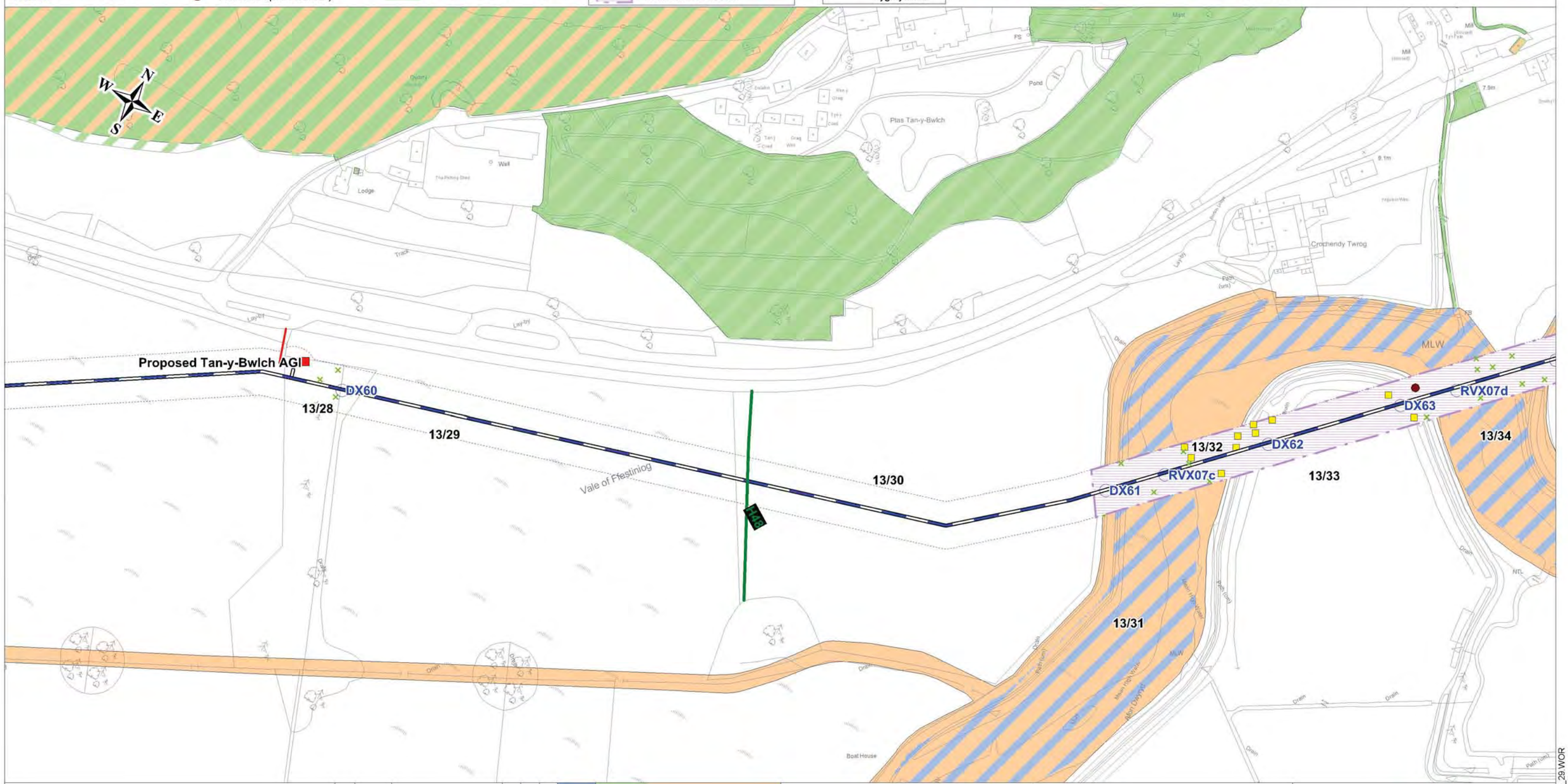
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 29 of 39)**

Drawing Number: 41330/04/01/01/Mitigation29

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_29 WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

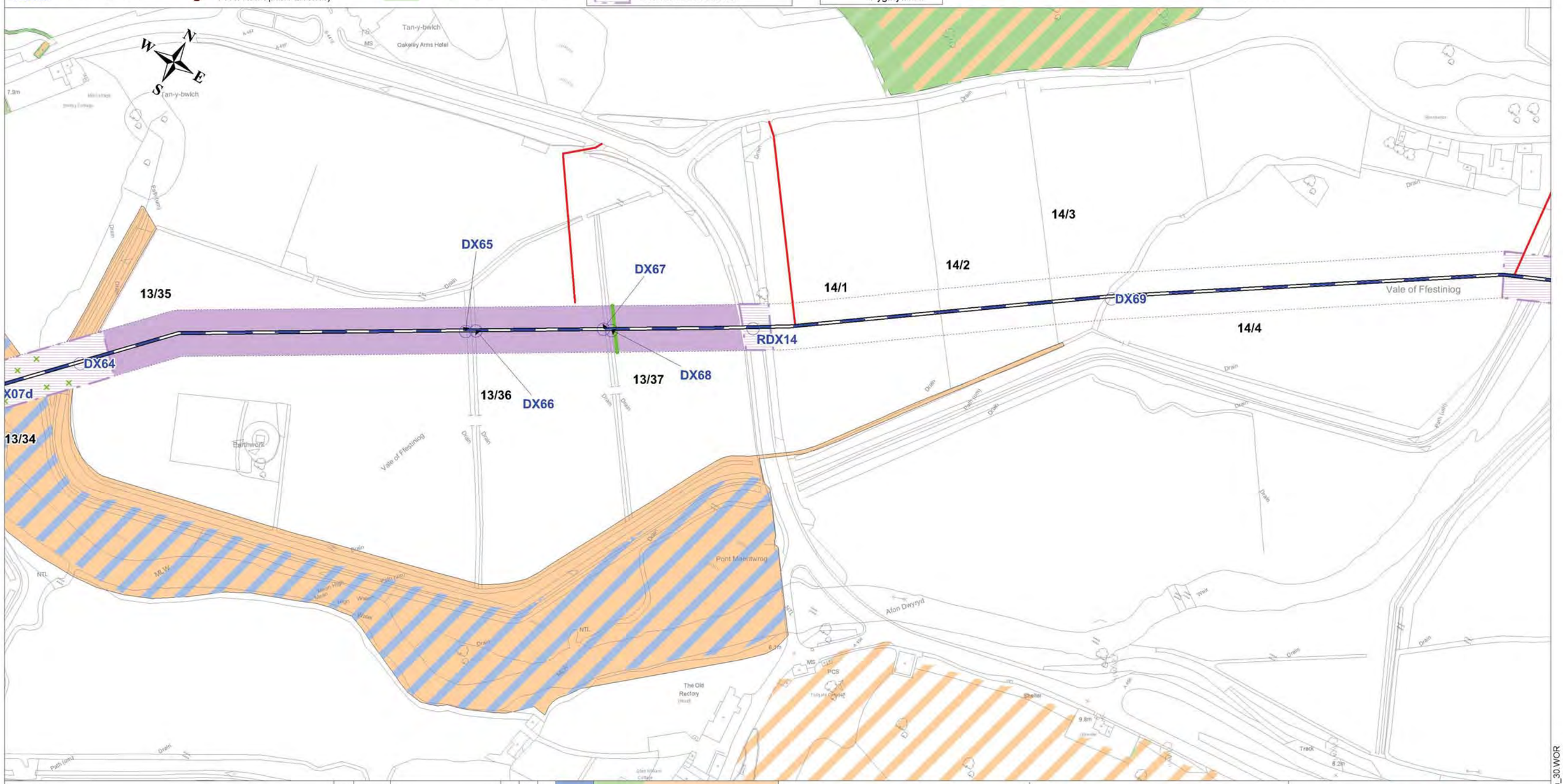
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 30 of 39)**

Drawing Number: 41330/04/01/01/Mitigation30

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330/04 GIS\Mitigation_30.WOR

Pipeline Route

RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing

Temporary Access Route

30m Working Width

Proposed Above Ground Installation (AGI)

Existing Above Ground Installation (AGI)

Temporary Bridge

1/8 Plot Number

Badger Sett (potential for licence)

Otter Holt (potential for European Protected Specie Licence)

By-Pass CPO Area

Glaslyn SSSI

Meirionnydd Oakwoods and Bat Sites SAC

Morfa Harlech SSSI

Lleyn Peninsula and the Sarnau SAC

Coedydd Dyffryn FFestiniog SSSI

Specification 1

Important Hedgerow

Hedgerow

Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision

Tree Protection Area

Bogmatting of Running Track

Lock Out - No Access

Specification 2

Japanese Knotweed

Indian Balsalm

New Zealand Pygmyweed

Controlled Strip - Specification 3

Specification 4

Specification 5

Afon Teigl - Specification 6

Grassland - Specification 7

Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9

Low Reptile Population

High Reptile Population

Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 31 of 39)**

Drawing Number: 41330/04/01/01/Mitigation31

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P4133004 GIS\Mitigation_31.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Temporary Bridge
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

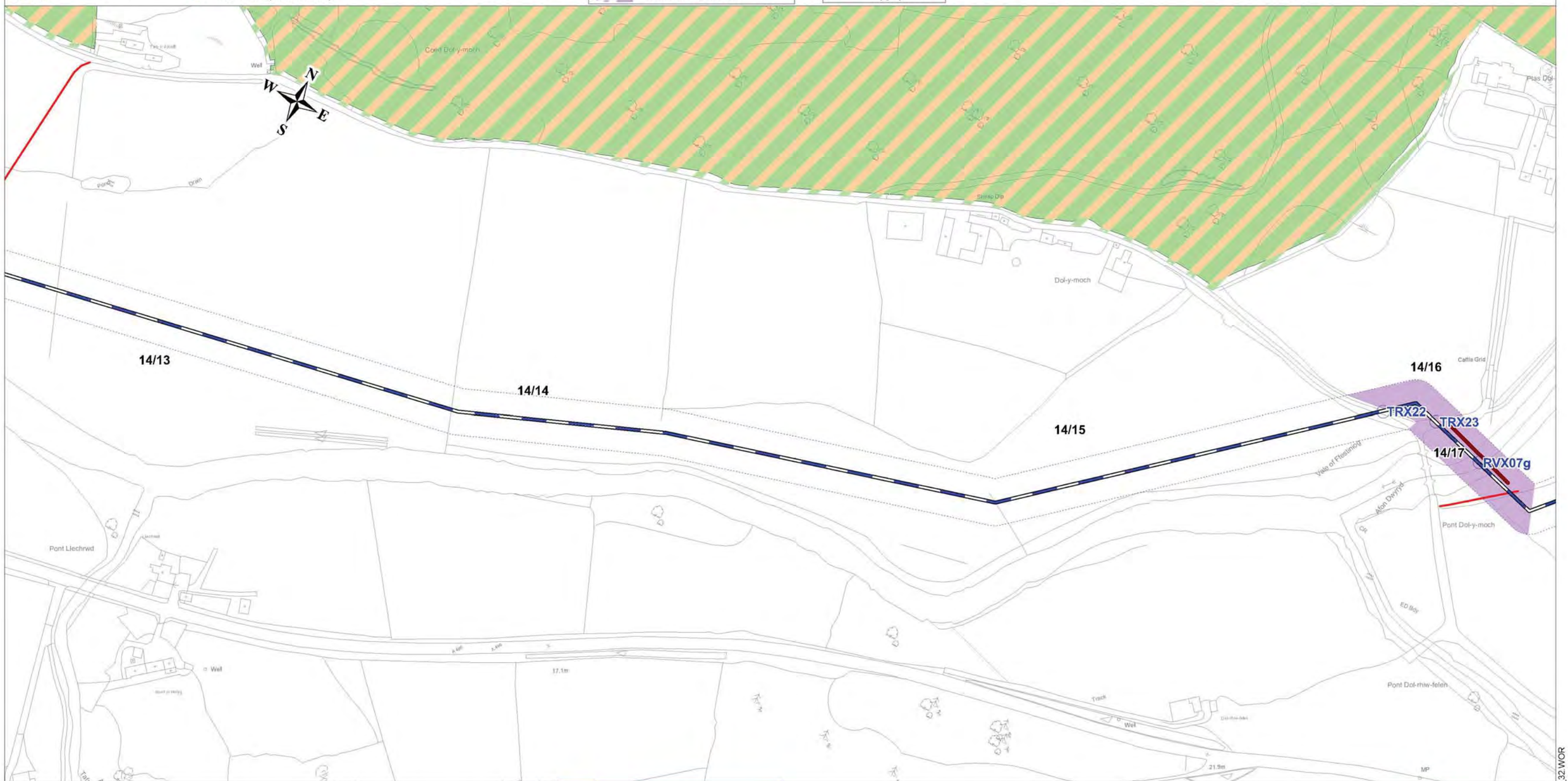
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population

- Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 32 of 39)**

Drawing Number: 41330/04/01/01/Mitigation32

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_32.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- Temporary Bridge
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Stone Walls
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

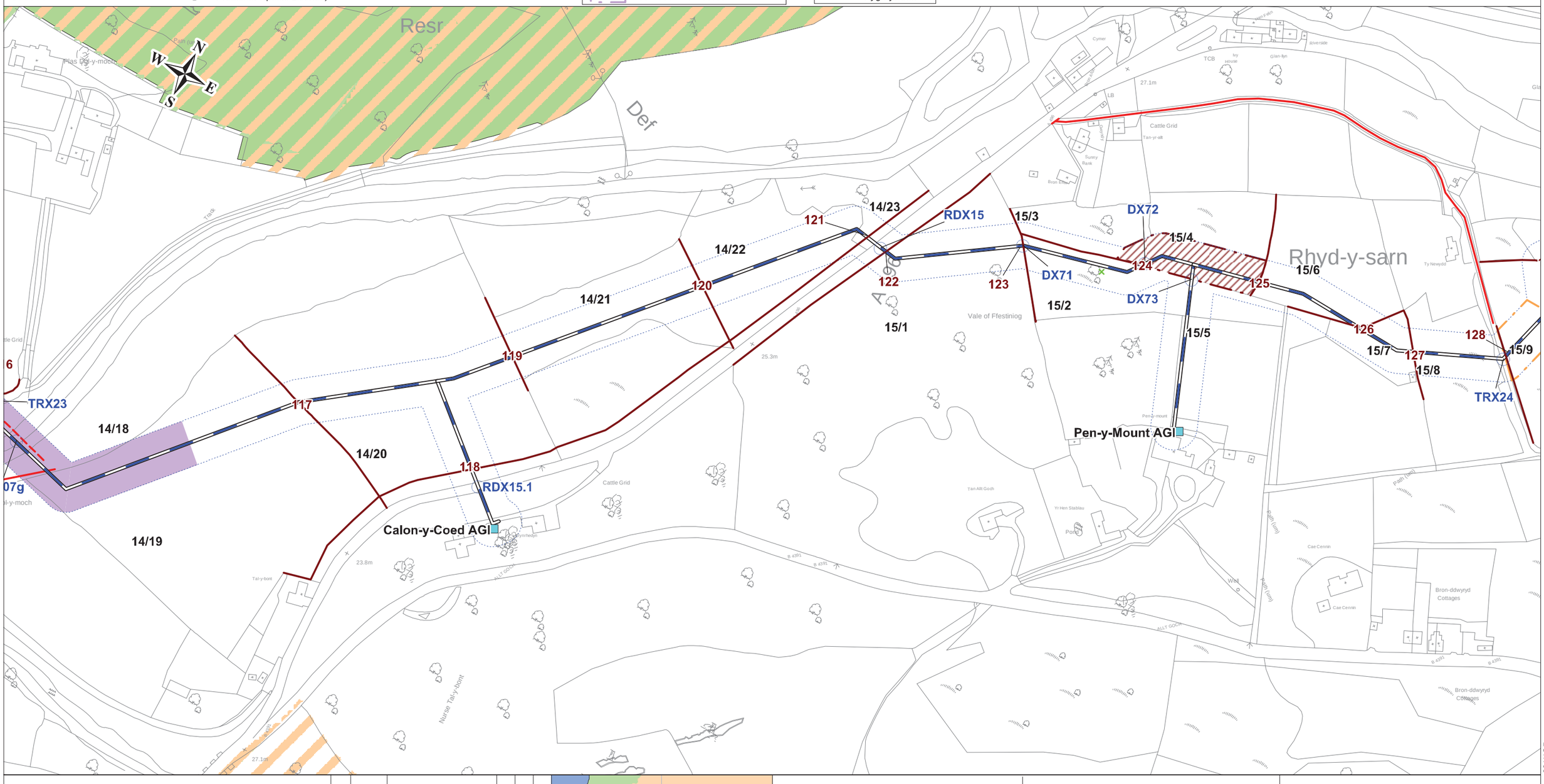
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

Specification 3
- Controlled Strip - Specification 3
- Specification 4
- Specification 5

Specification 6
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population
- Watervole - Specification 10
- Sensitive Bryophyte Walls - Specification 11



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03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 33 of 39)**

Drawing Number: 41330/04/01/01/Mitigation33

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 04

FILE NAME: P41330\04 GIS\Mitigation_33.WOR

- Pipeline Route
- ○ RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing
- Temporary Access Route
- 30m Working Width
- 🟥 Proposed Above Ground Installation (AGI)
- 🟦 Existing Above Ground Installation (AGI)
- Temporary Bridge
- **1/8** Plot Number
- ● Badger Sett (potential for licence)
- ● Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI
- Important Hedgerow
- Hedgerow
- ● Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- ▨ Bogmatting of Running Track
- ▨ Lock Out - No Access

Specification 1

- Japanese Knotweed
- × Indian Balsalm
- × New Zealand Pygmyweed

Specification 2

- Controlled Strip - Specification 3
- Specification 4
- Specification 5
- Afon Teigl - Specification 6
- Grassland - Specification 7
- ↔ Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8
- Low Reptile Population
- High Reptile Population

Specification 9

- Watervole - Specification 10

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Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH		
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 34 of 39)**

Drawing Number: 41330/04/01/01/Mitigation34

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P41330\04 GIS\Mitigation_34.WOR

Pipeline Route
RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing
Temporary Access Route
30m Working Width
Proposed Above Ground Installation (AGI)
Existing Above Ground Installation (AGI)
Temporary Bridge
1/8 Plot Number
Badger Sett (potential for licence)
Otter Holt (potential for European Protected Specie Licence)
By-Pass CPO Area
Glaslyn SSSI
Meirionnydd Oakwoods and Bat Sites SAC
Morfa Harlech SSSI
Lleyn Peninsula and the Sarnau SAC
Coedydd Dyffryn FFestiniog SSSI

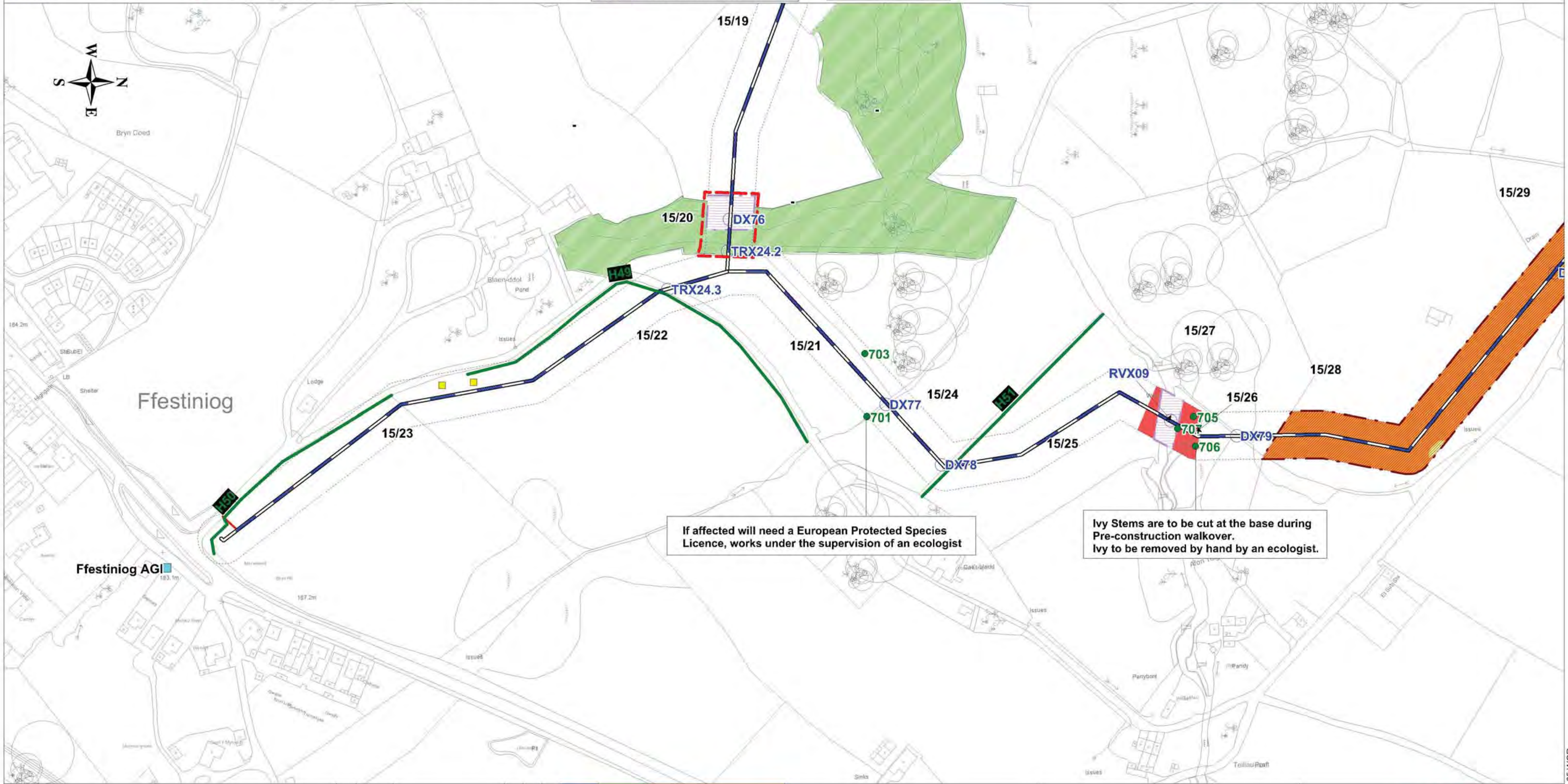
Specification 1:
Important Hedgerow
Hedgerow
Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
Tree Protection Area
Bogmatting of Running Track
Lock Out - No Access

Specification 2:
Japanese Knotweed
Indian Balsalm
New Zealand Pygmyweed

Controlled Strip - Specification 3
Specification 4
Specification 5
Afon Teigl - Specification 6
Grassland - Specification 7
Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9:
Low Reptile Population
High Reptile Population

Watervole - Specification 10



Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: Mitigation Plans (Map 35 of 39)

Drawing Number: 41330/04/01/01/Mitigation35

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P41330\04 GIS\Mitigation_35 WOR

Pipeline Route

RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing

Temporary Access Route

30m Working Width

Proposed Above Ground Installation (AGI)

Existing Above Ground Installation (AGI)

Temporary Bridge

1/8 Plot Number

Badger Sett (potential for licence)

Otter Holt (potential for European Protected Specie Licence)

By-Pass CPO Area

Glaslyn SSSI

Meirionnydd Oakwoods and Bat Sites SAC

Morfa Harlech SSSI

Lleyn Peninsula and the Sarnau SAC

Coedydd Dyffryn FFestiniog SSSI

Important Hedgerow

Hedgerow

Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision

Tree Protection Area

Bogmatting of Running Track

Lock Out - No Access

Specification 1

Japanese Knotweed

Indian Balsalm

New Zealand Pygmyweed

Specification 2

Controlled Strip - Specification 3

Specification 4

Specification 5

Afon Teigl - Specification 6

Grassland - Specification 7

Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Low Reptile Population

High Reptile Population

Specification 9

Watervole - Specification 10

Field 16/2 to 16/4 hand search for reptiles prior to putting down bog matting

15/29 16/1 16/2 16/3 16/4 16/5 16/6 16/7 16/8 16/9 16/10 16/11 17/1 17/2

RDX16 DX80 DX81 DX82 DX83 TRX26 DX84 RDX17

Hafod Coed-y-Cribau Cribau Sheep Dip Bryn-y-rhyg Llwyn-y-cram Clogwyn Rhos Tan Y Rhos Fronlas

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 36 of 39)**

Drawing Number: 41330/04/01/01/Mitigation36

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 03

FILE NAME: P41330\04 GIS\Mitigation_36.WOR

- Pipeline Route
- RDX - Road Crossing
  RLX - Rail Crossing
  RVX - River Crossing
  DX - Ditch Crossing
  TX - Track Crossing
- Temporary Access Route
- Temporary Bridge
- 30m Working Width
- Proposed Above Ground Installation (AGI)
- Existing Above Ground Installation (AGI)
- Stone Walls
- 1/8 Plot Number
- Badger Sett (potential for licence)
- Otter Holt (potential for European Protected Specie Licence)
- By-Pass CPO Area
- Glaslyn SSSI
- Meirionnydd Oakwoods and Bat Sites SAC
- Morfa Harlech SSSI
- Lleyn Peninsula and the Sarnau SAC
- Coedydd Dyffryn FFestiniog SSSI

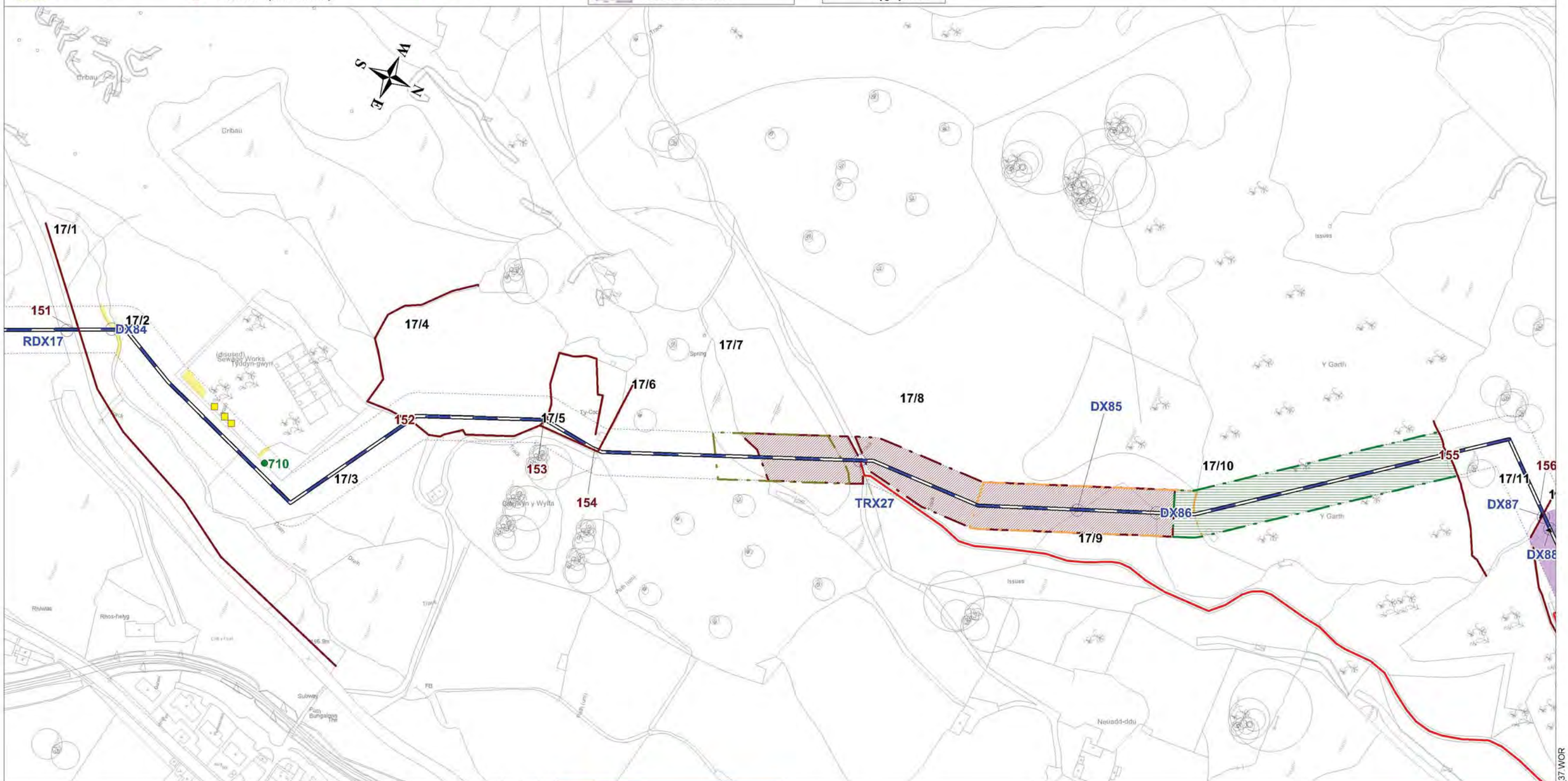
Specification 1
- Important Hedgerow
- Hedgerow
- Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
- Tree Protection Area
- Bogmatting of Running Track
- Lock Out - No Access

Specification 2
- Japanese Knotweed
- Indian Balsalm
- New Zealand Pygmyweed

Specification 3
- Controlled Strip - Specification 3
- Specification 4
- Specification 5

Specification 6
- Afon Teigl - Specification 6
- Grassland - Specification 7
- Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
- Low Reptile Population
- High Reptile Population
- Watervole - Specification 10
- Sensitive Bryophyte Walls - Specification 11



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03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

Gwynedd

PWLLHELI TO BLAENAU FFESTINIOG PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 37 of 39)**

Drawing Number: 41330/04/01/01/Mitigation37

SCALE: 1:2,500 @A3, 1:1,250 @A1 | REV 04

FILE NAME: P4133004 GIS\Mitigation_37 WOR

Pipeline Route
RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing
Temporary Access Route
30m Working Width
Proposed Above Ground Installation (AGI)
Existing Above Ground Installation (AGI)
Temporary Bridge
1/8 Plot Number
Badger Sett (potential for licence)
Otter Holt (potential for European Protected Specie Licence)
By-Pass CPO Area
Glaslyn SSSI
Meirionnydd Oakwoods and Bat Sites SAC
Morfa Harlech SSSI
Lleyn Peninsula and the Sarnau SAC
Coedydd Dyffryn FFestiniog SSSI
Important Hedgerow
Hedgerow
Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
Tree Protection Area
Bogmatting of Running Track
Lock Out - No Access
Specification 1
Japanese Knotweed
Indian Balsalm
New Zealand Pygmyweed
Specification 2
Controlled Strip - Specification 3
Specification 4
Specification 5
Afon Teigl - Specification 6
Grassland - Specification 7
Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8
Low Reptile Population
High Reptile Population
Specification 9
Watervole - Specification 10

Rev	Date	Description	Drn	Chk	App
03	12.1.11	Amended Legend	LH	MD	
02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO
BLAENAU FFESTINIOG
PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans (Map 38 of 39)**

Drawing Number: 41330/04/01/01/Mitigation38

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 03

FILE NAME: P41330\04 GIS\Mitigation_38.WOR

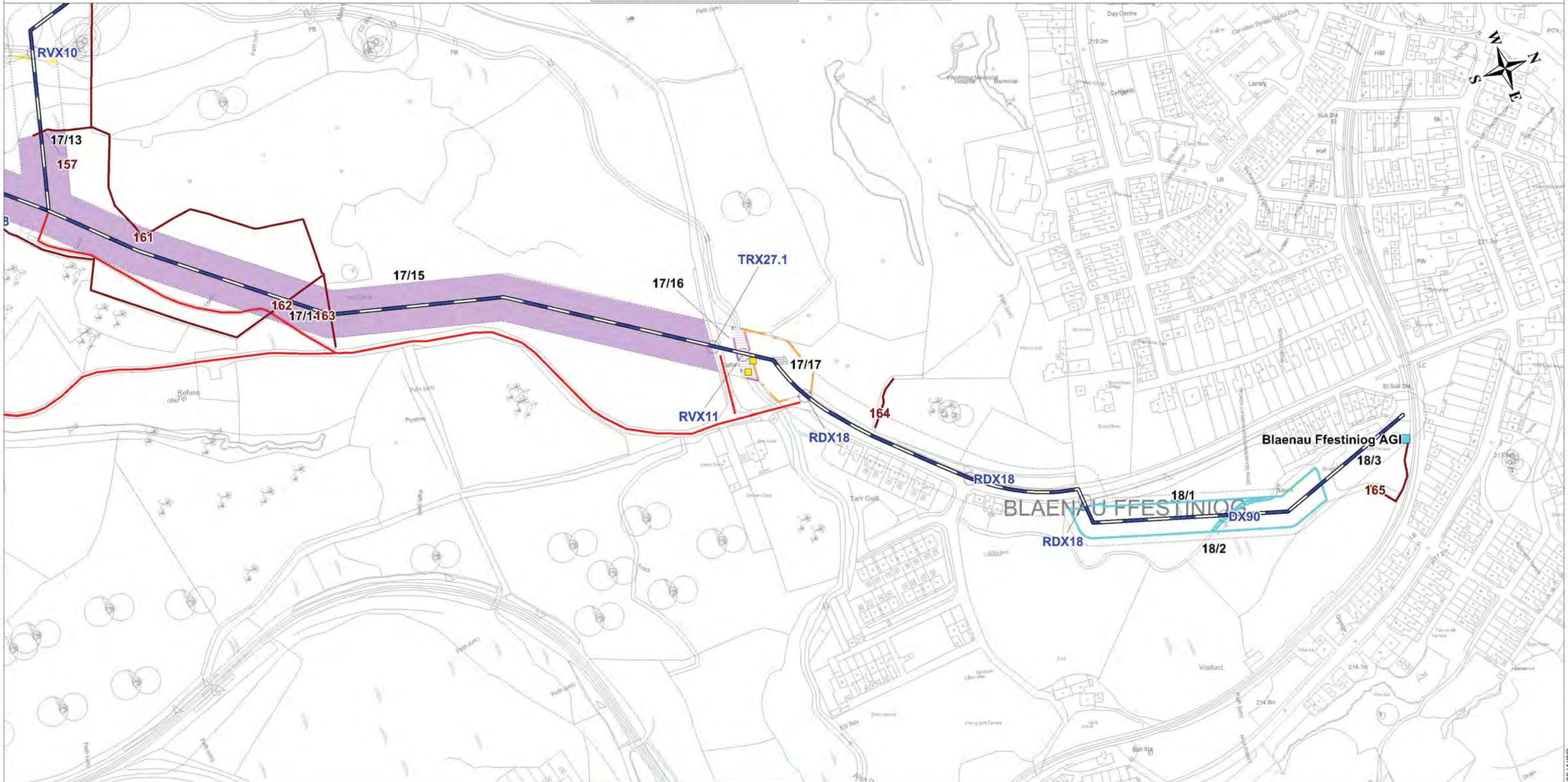
Pipeline Route
RDX - Road Crossing
RLX - Rail Crossing
RVX - River Crossing
DX - Ditch Crossing
TX - Track Crossing
Temporary Access Route
Temporary Bridge
30m Working Width
Proposed Above Ground Installation (AGI)
Existing Above Ground Installation (AGI)
Stone Walls
1/8 Plot Number
Badger Sett (potential for licence)
Otter Holt (potential for European Protected Specie Licence)
By-Pass CPO Area
Glaslyn SSSI
Meirionnydd Oakwoods and Bat Sites SAC
Morfa Harlech SSSI
Lleyn Peninsula and the Sarnau SAC
Coedydd Dyffryn FFestiniog SSSI

Specification 1
Important Hedgerow
Hedgerow
Pre-Construction Check for Bat Roost, Sectional Felling, Ecological Supervision
Tree Protection Area
Bogmatting of Running Track
Lock Out - No Access

Specification 2
Japanese Knotweed
Indian Balsalm
New Zealand Pygmyweed

Controlled Strip - Specification 3
Specification 4
Specification 5
Afon Teigl - Specification 6
Grassland - Specification 7
Bron Y Gorth Special Area (Construction mid March - May only) Replant with Semi - mature plants - Specification 8

Specification 9
Low Reptile Population
High Reptile Population
Watervole - Specification 10
Sensitive Bryophyte Walls - Specification 11



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02	07.1.11	Amended Legend	LH	MD	
01	26.10.10	Amended Colour Scheme	DL	SR	
00	20.10.10	First Draft	CS	SR	

PWLLHELI TO
BLAENAU FFESTINIOG
PIPELINE

WALES&WEST UTILITIES

RSK GROUP PLC

TITLE: **Mitigation Plans**
(Map 39 of 39)

Drawing Number: 41330/04/01/01/Mitigation39

SCALE: 1:2,500 @A3, 1:1,250 @A1

REV 04

FILE NAME: P41330\04 GIS\Mitigation_39.WOR

Figures and plates

Figures

Figure 1. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (west end)
Figure 2. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (Criccieth/Porthmadog)
Figure 3. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (Penrhyndeudraeth/Maentwrog)
Figure 4. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (east end)
Figure 5. Feature 03005 in plot 0/3
Figure 6. Corn drier and pits in plot 3/2
Figure 7. Troughs and burnt mound spreads in plot 3/10
Figure 8. Feature 36002 in plot 3/6
Figure 9. Pits 314001 and 314002 in plot 3/14
Figure 10. Ditch 320004 in plot 3/20
Figure 11. Features 327001 and 372002 in plot 3/27
Figure 12. Possible corn drier in plot 6/10
Figure 13. Burnt mound and troughs in plot 6/6
Figure 14. Burnt mound and trough in plot 6/21
Figure 15. Burnt mounds and related features in plot 6/29.4
Figure 16. Matrix for plot 6/29.4
Figure 17. Location of burnt mounds and pit within plot 6/33
Figure 18. Burnt mound 633012 in plot 6/33
Figure 19. Burnt mound 633015 in plot 6/33
Figure 20. Pit 633010 in plot 6/33
Figure 21. Shell midden 71001 in plot 7/1
Figure 22. Location of finds and deposits in plots 14/4 and 14/7 shown on 1900 OS map

Plates

Plate 1: Probable stone-filled drain in plot 0/1
Plate 2: Section through probable stone-filled drain in plot 0/1
Plate 3: Burnt mound seen in section of pipe trench in plot 0/2
Plate 4: Section through 03005 in plot 0/3
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Plate 6: Natural feature in plot 0/9
Plate 7: Traces of a possible burnt mound seen in the pipe trench section in plot 0/11
Plate 8: Corn drier 32009 and pit 32014 under excavation in plot 3/2
Plate 9: Corn drier 32009 and pit 32014 in plot 3/2, fully excavated with the exception of the lining stones in the corn drier
Plate 10: Corn drier 32009 in plot 3/2, from SE end showing chamber and capping stone 32006
Plate 11: Section of corn drier 32009 in plot 3/2, showing capping stone 32006 and traces of burning in base of flue
Plate 12: Excavation of pit 32003 in plot 3/2, showing burnt stones
Plate 14: Burnt mound trough 310001 in plot 3/10
Plate 13: Feature 36002 in plot 3/6
Plate 15: Pit 314001 in plot 3/14
Plate 16: Shallow hollow 314002 in plot 3/14 containing smithing evidence
Plate 17: Section of ditch 320004 in plot 3/20
Plate 18: Pit 327001 in plot 3/27, half sectioned
Plate 19: Hollow 327002 in plot 3/27, half sectioned
Plate 20: Probable drainage feature seen in section of pipe trench in plot 5/5
Plate 21: Sondage through burnt mound 66003 and trough 66011 in plot 6/6, from the SE
Plate 22: Sondage through burnt mound 66003 and trough 66011 in plot 6/6, from the NE
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Plate 24: Burnt mound in plot 6/21
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Plate 26: Buckley ware from midden in plot 6/22
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Plate 28: Natural palaeochannel 6294170 in plot 6/29.4
Plate 29: Natural hollows forming group 4184 in plot 6/29.4
Plate 30: Natural hollow/channel 4031 in plot 6/29.4
Plate 31: Natural hollow 4087 in plot 6/29.4
Plate 32: Possibly natural hollow 4089/4101 in plot 6/29.4
Plate 33: The main burnt mound in south end of plot 6/29.4
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Plate 35: Trough 4127 in plot 6/29.4, also showing natural feature 6294103
Plate 36: Pit 4111 with gullies 4107 and 4108 in plot 6/29.4 (slot on left of picture is a sondage)
Plate 37: Pit 4105, half sectioned, in plot 6/29.4
Plate 38: Pit 4033 in plot 6/29.4, fully excavated with stakeholes in base
Plate 39: Section of pit 4033 in plot 6/29.4
Plate 40: Natural channel 4195 in plot 6/29.4, with burnt mound material in section#
Plate 41: Pit 4003, half excavated, in plot 6/29.4
Plate 42: Burnt mound 633012 in plot 6/33
Plate 43: Burnt mound 633012 in plot 6/33, with upper layers removed showing stones protruding and animal burrow 633018
Plate 44: Stones 633020 protruding from natural through hollow 633032, in plot 6/33
Plate 45: Burnt mound 633015 in plot 6/33
Plate 46: Burnt mound 633015 in plot 6/33, showing sections of mound
Plate 47: Trough 633034 in plot 6/33
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Plate 49: Pit 633028 in plot 6/33
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Plate 52: Deposit 638002 in plot 6/38
Plate 53: Stone deposit 639001in plot 6/39
Plate 54: Section through root hollow feature 644001 in plot 6/44
Plate 55: Section through ditches 647001 and 647003 in plot 6/47
Plate 56: Blue marine clay exposed in pipe trench in plot 6/51
Plate 57: Section through shell midden 71001 in plot 7/1
Plate 58: Natural salt marsh channel in plot 7/2
Plate 59: Modern ditch seen in trench section in plot 7/8
Plate 60: Woody peat deposit exposed in pipe trench in plot 11/3
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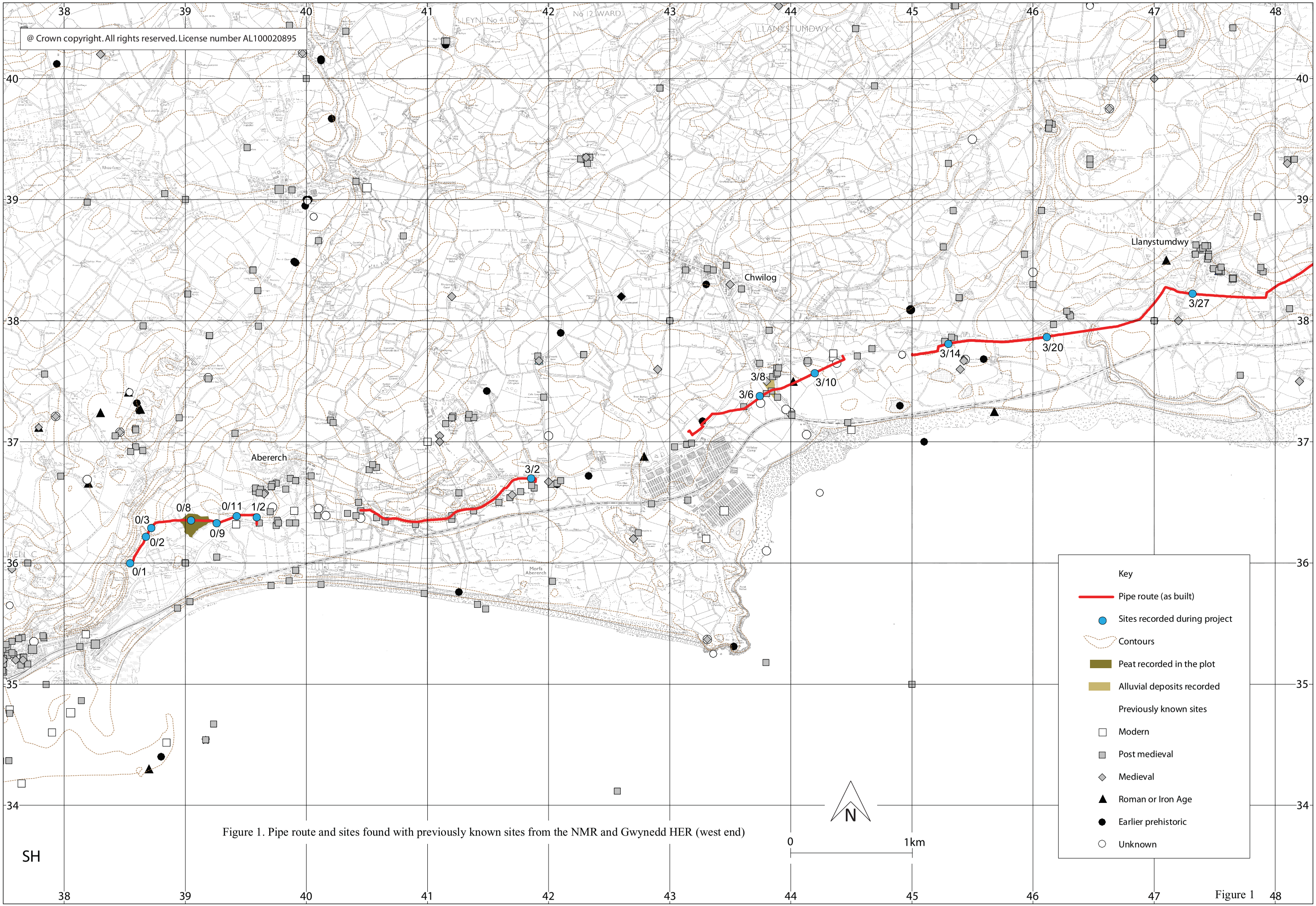

Figure 1. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (west end)

Key

- Pipe route (as built)
- Sites recorded during project
- Contours
- Marine clay recorded
- Marine sands recorded
- National Park Boundary

Previously known sites

- Modern
- Post medieval
- Medieval
- Roman or Iron Age
- Earlier prehistoric
- Unknown
- Multi-period site

National Park

Penmorfa

Tremadog

Traeth Mawr

Porthmadog

Criccieth

Afon Glaslyn

Afon Dwyryd

Traeth Bach

6/21 6/22 6/29.4 6/33 6/38 6/39 6/44 6/47 6/51 6/52 6/53 6/54 7/1 7/2 7/3 7/4 7/7 7/8 5/5 6/6 6/10

N

0 1km

SH

Figure 2. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (Criccieth/Porthmadog)

Figure 2

Figure 3. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (Penrhyndeudraeth/Maentwrog)

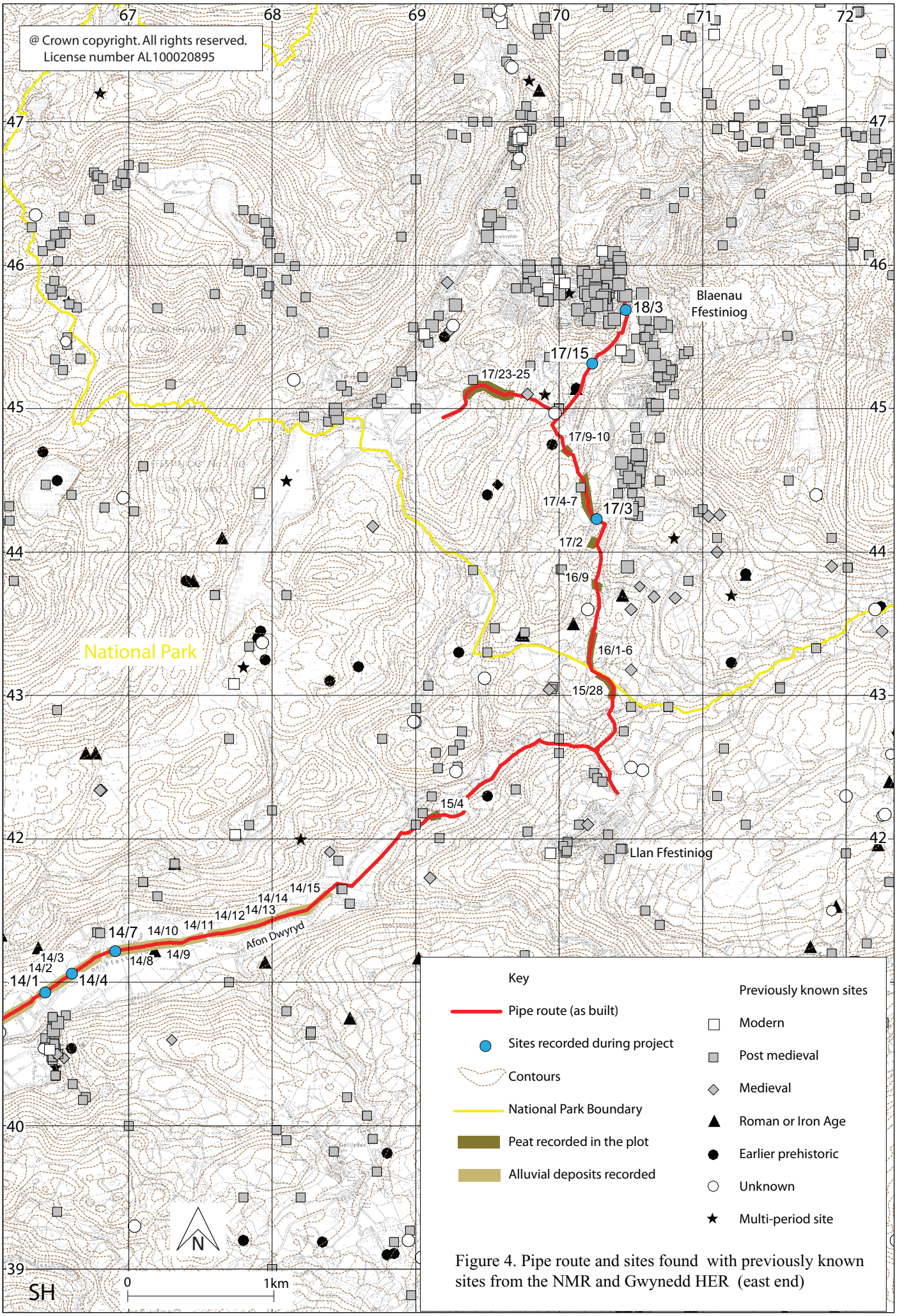

Figure 4. Pipe route and sites found with previously known sites from the NMR and Gwynedd HER (east end)

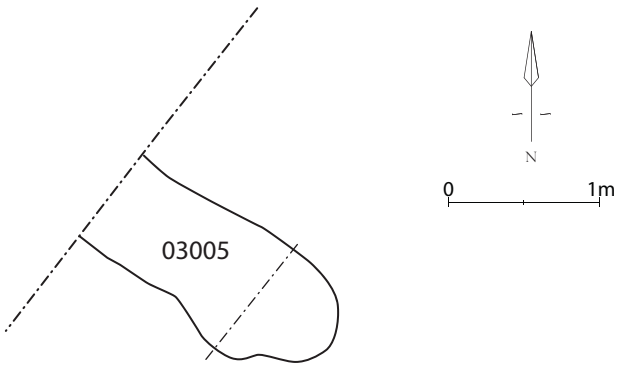

Figure 5. Feature 03005 in plot 0/3

Key

Trench edge

Sondage

Stones

Archaeological features

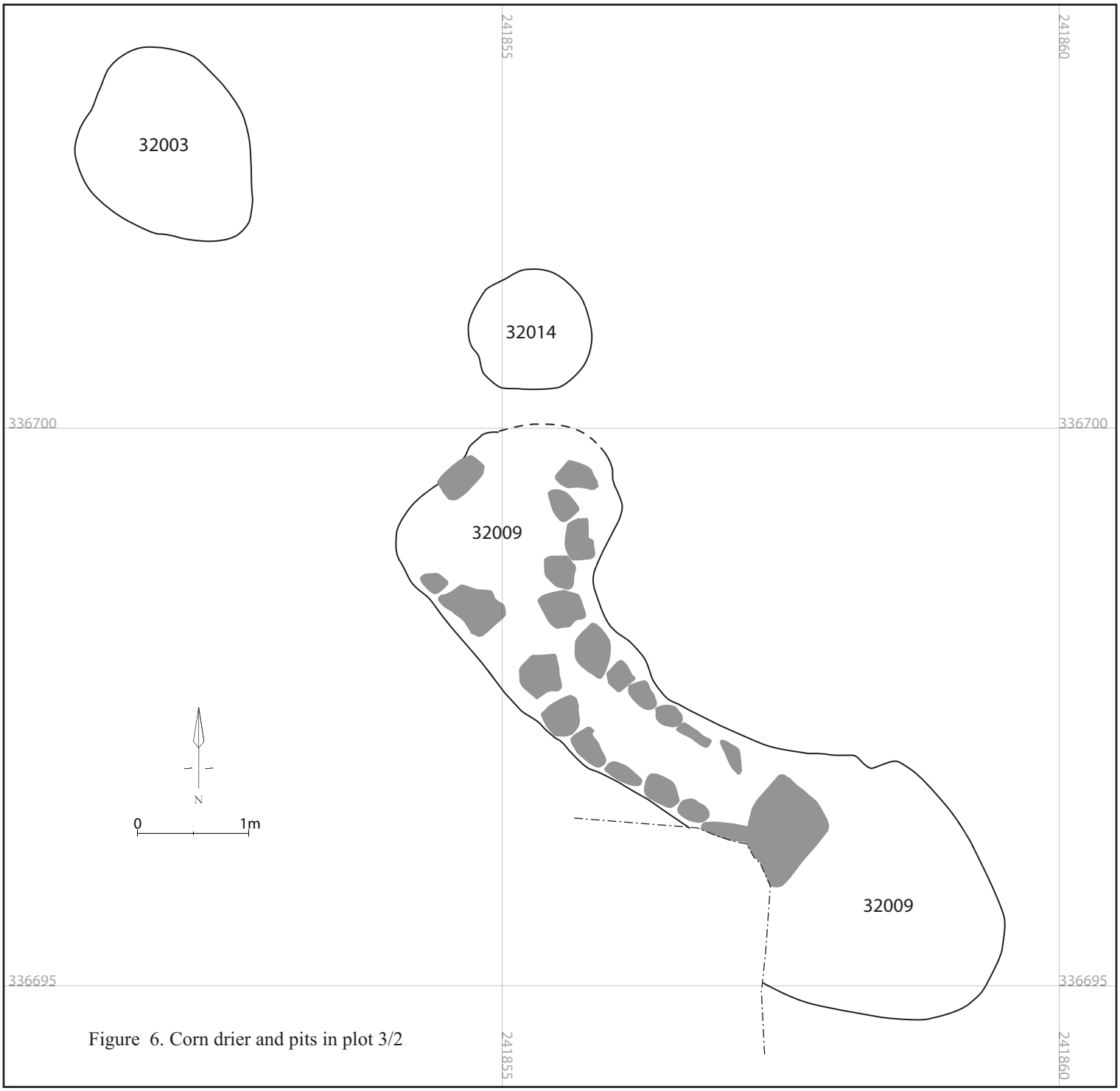

Figure 6. Corn drier and pits in plot 3/2

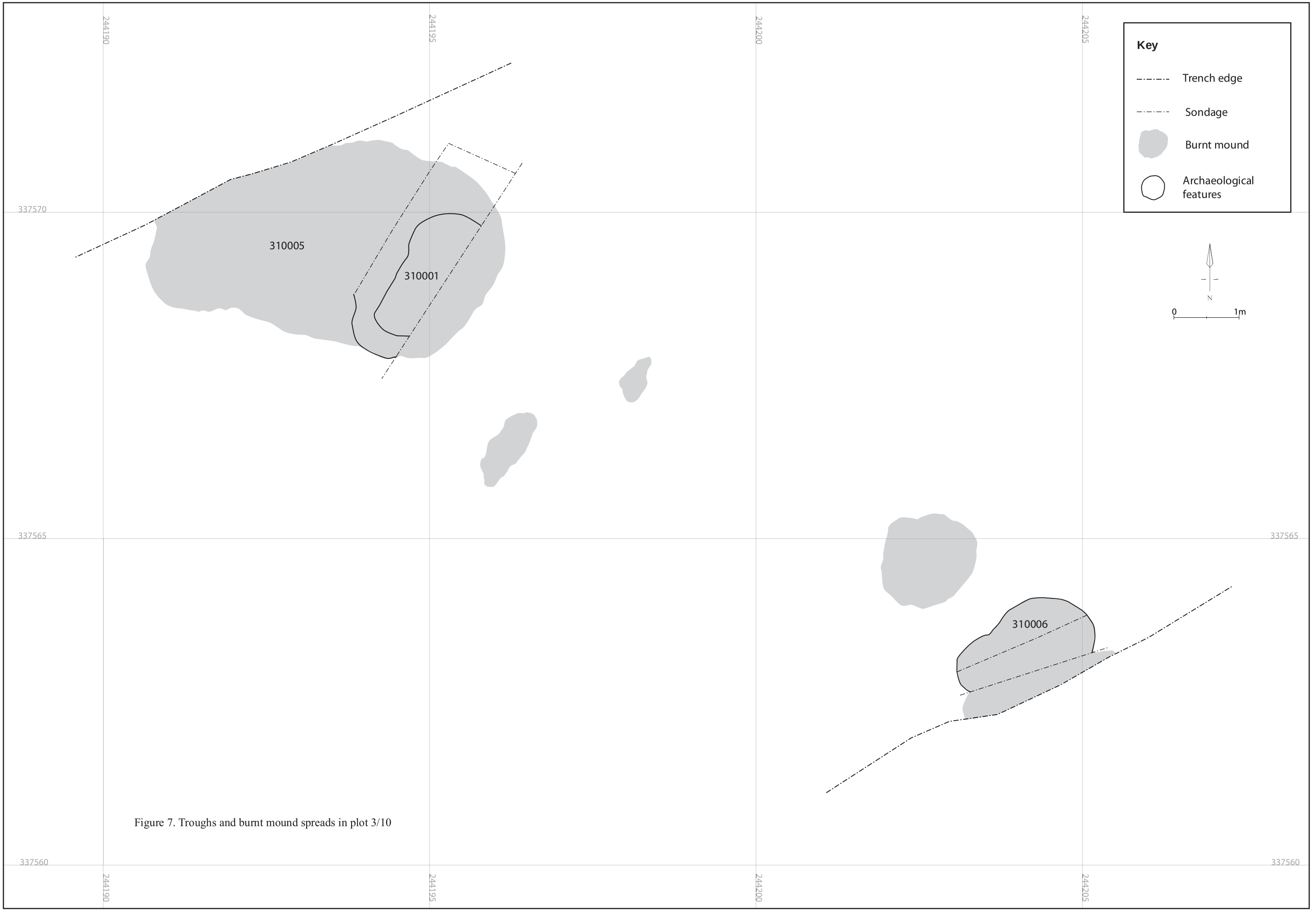

Figure 7. Troughs and burnt mound spreads in plot 3/10

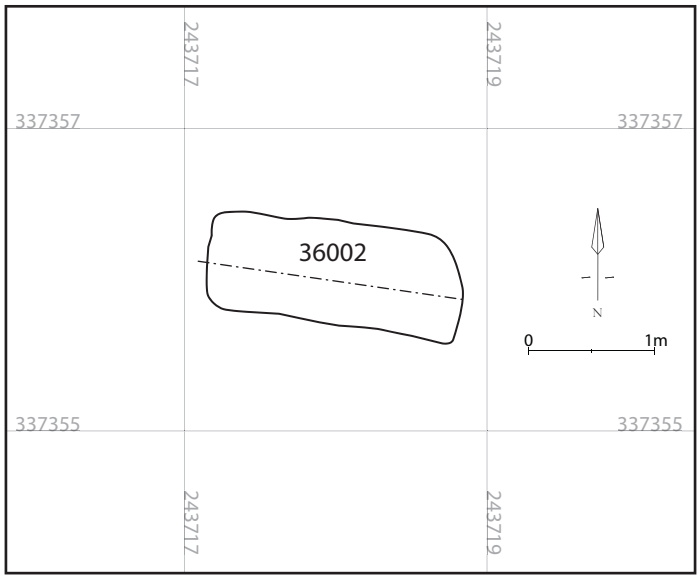

Figure 8. Feature 36002 in plot 3/6

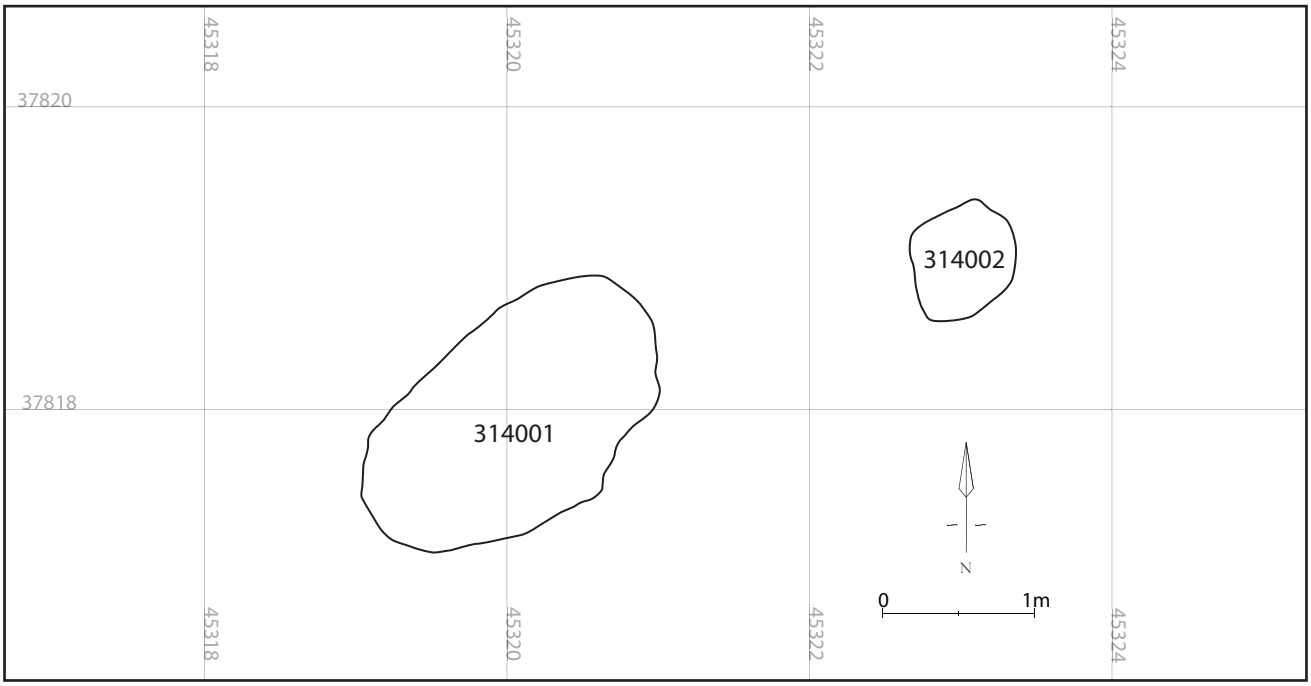

Figure 9. Pits 314001 and 314002 in plot 3/14

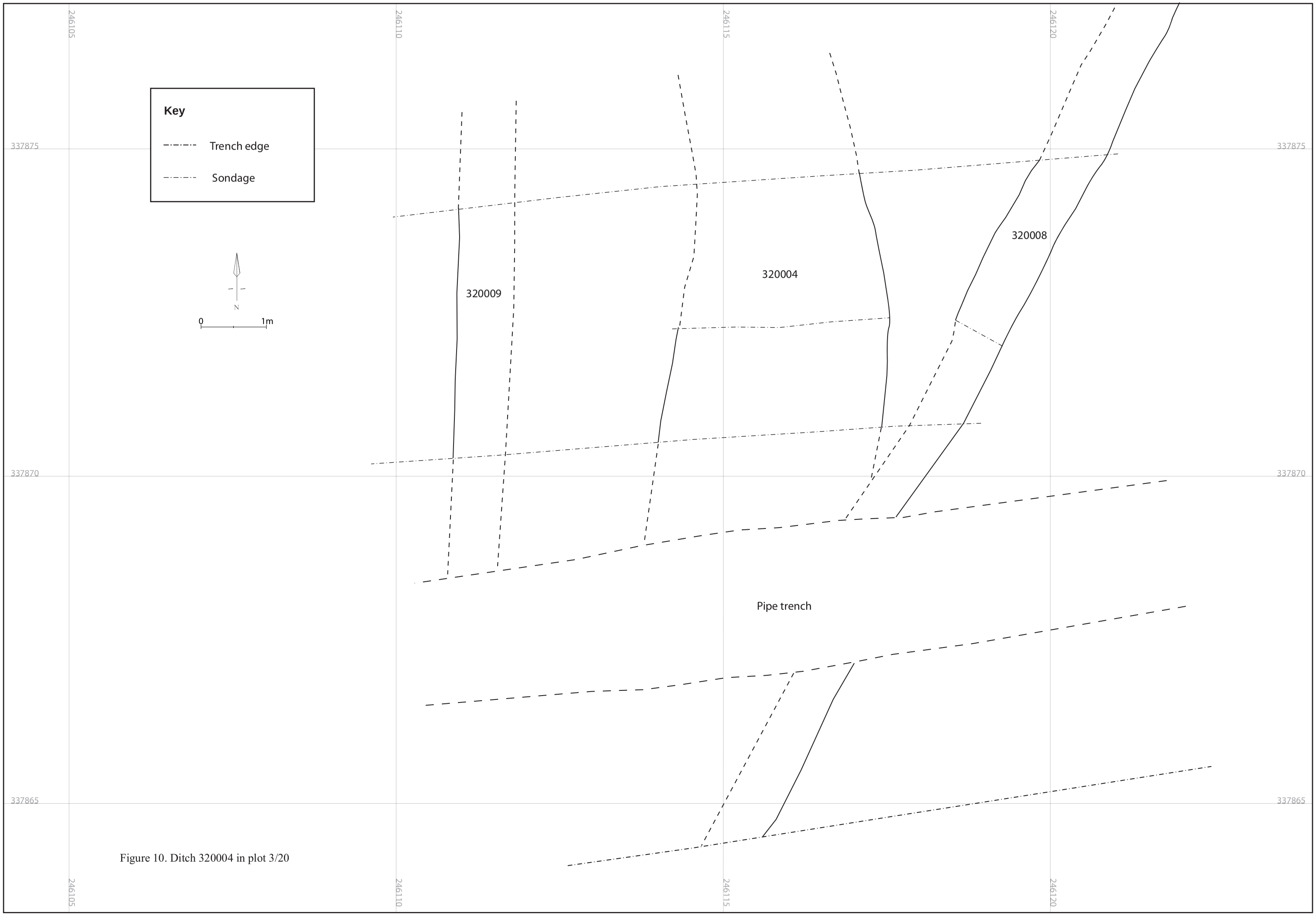

Figure 10. Ditch 320004 in plot 3/20

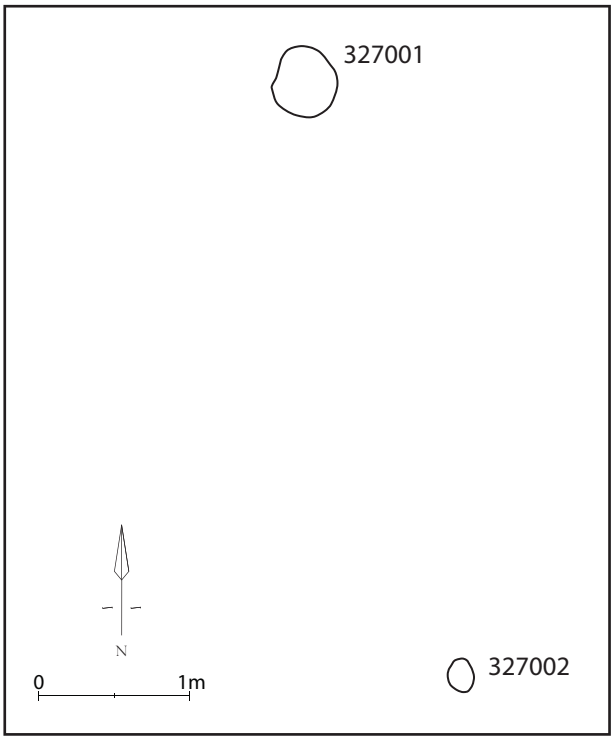

Figure 11. Features 327001 and 372002 in plot 3/27

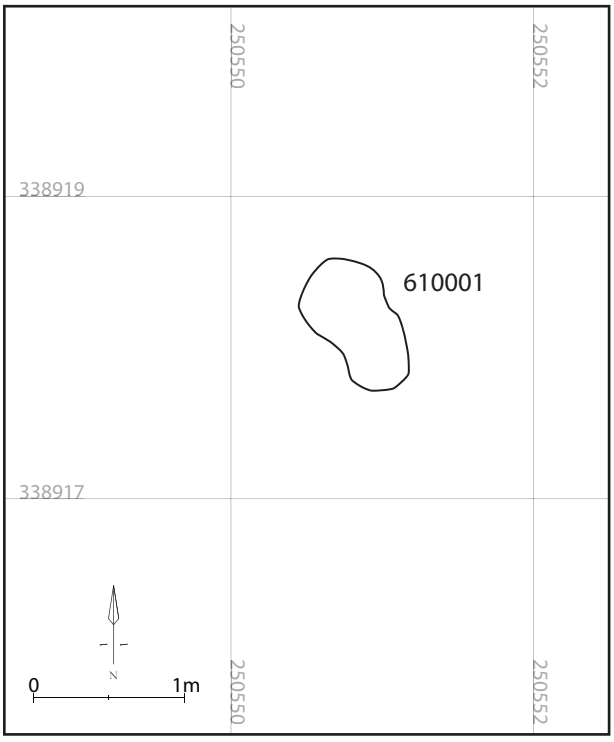

Figure 12. Possible corn drier in plot 6/10

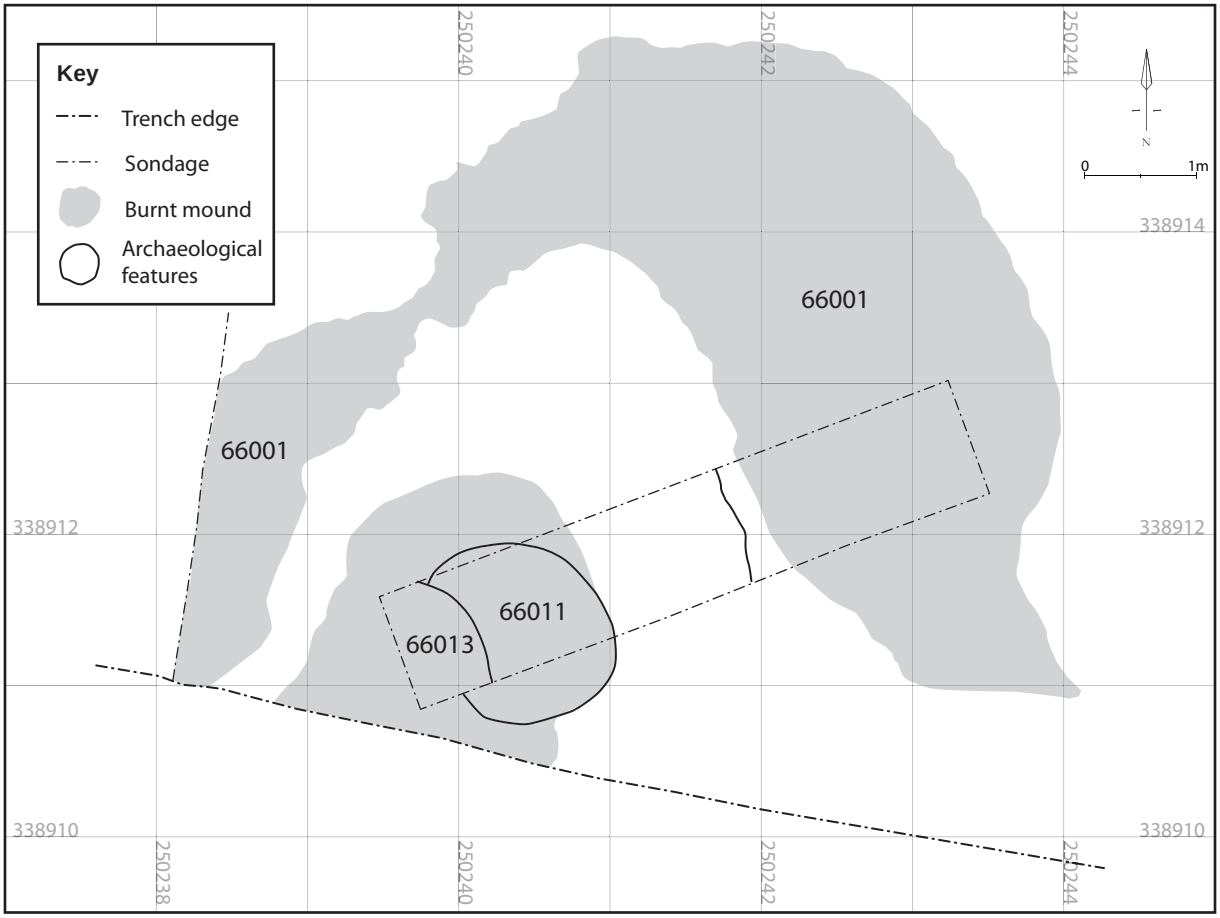

Figure 13. Burnt mound and troughs in plot 6/6

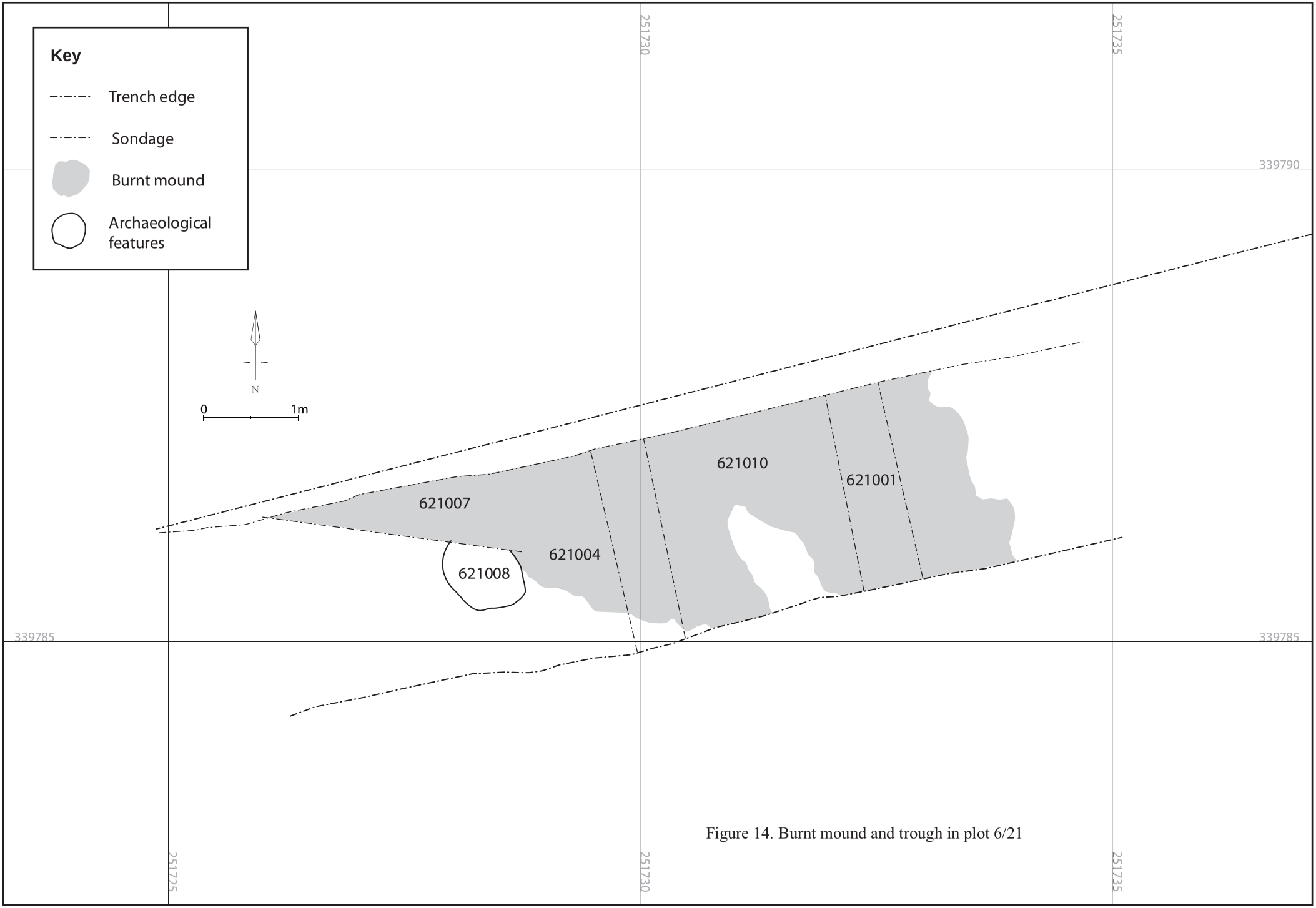

Figure 14. Burnt mound and trough in plot 6/21

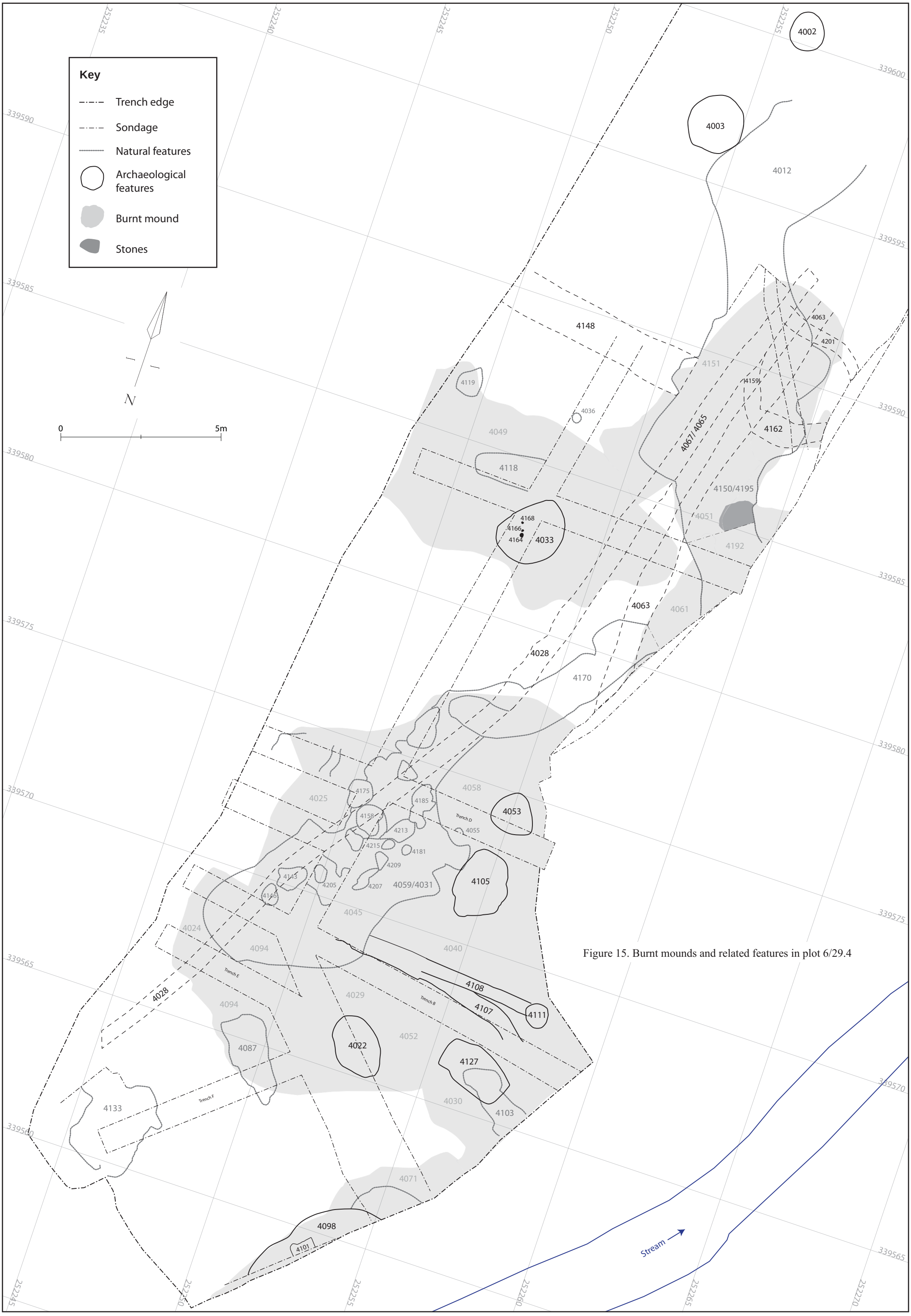

Figure 15. Burnt mounds and related features in plot 6/29.4

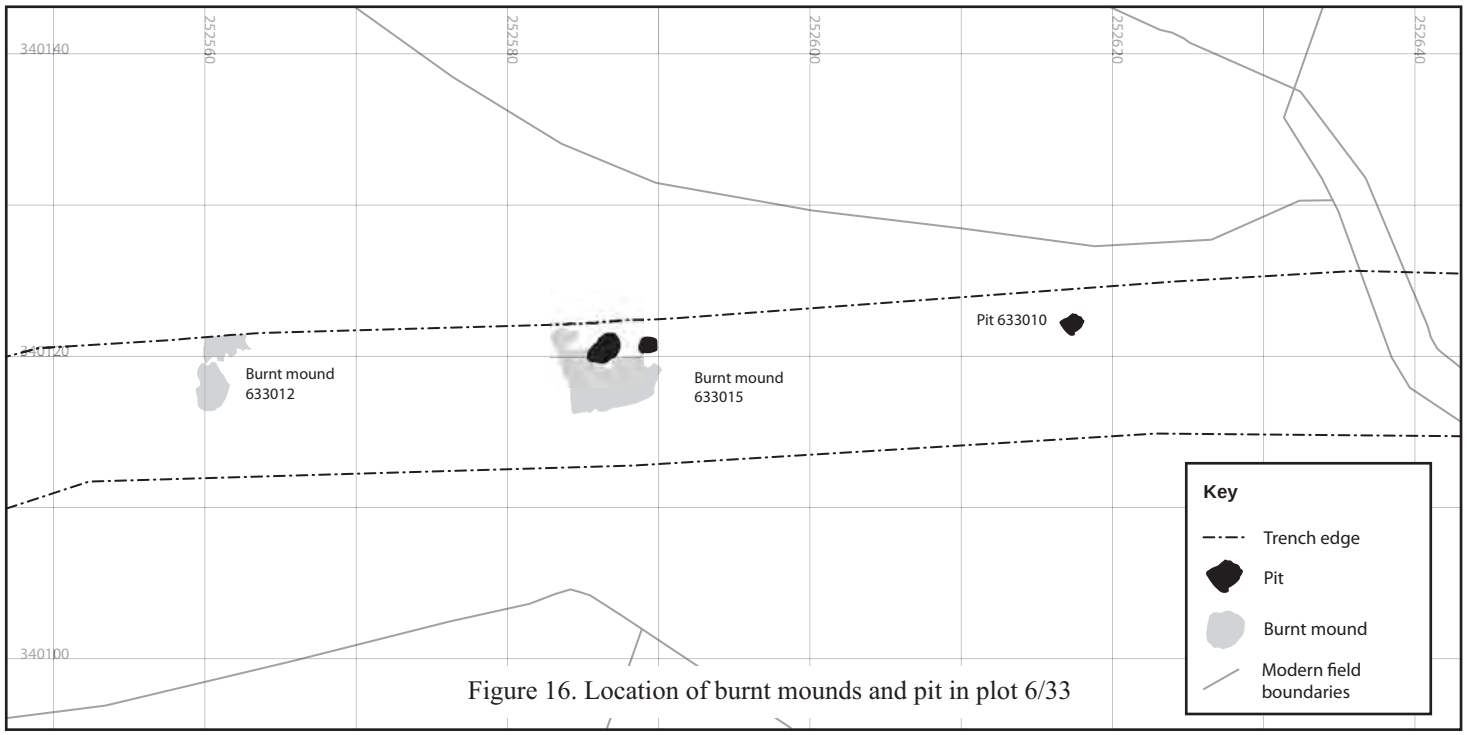

Figure 16. Location of burnt mounds and pit in plot 6/33

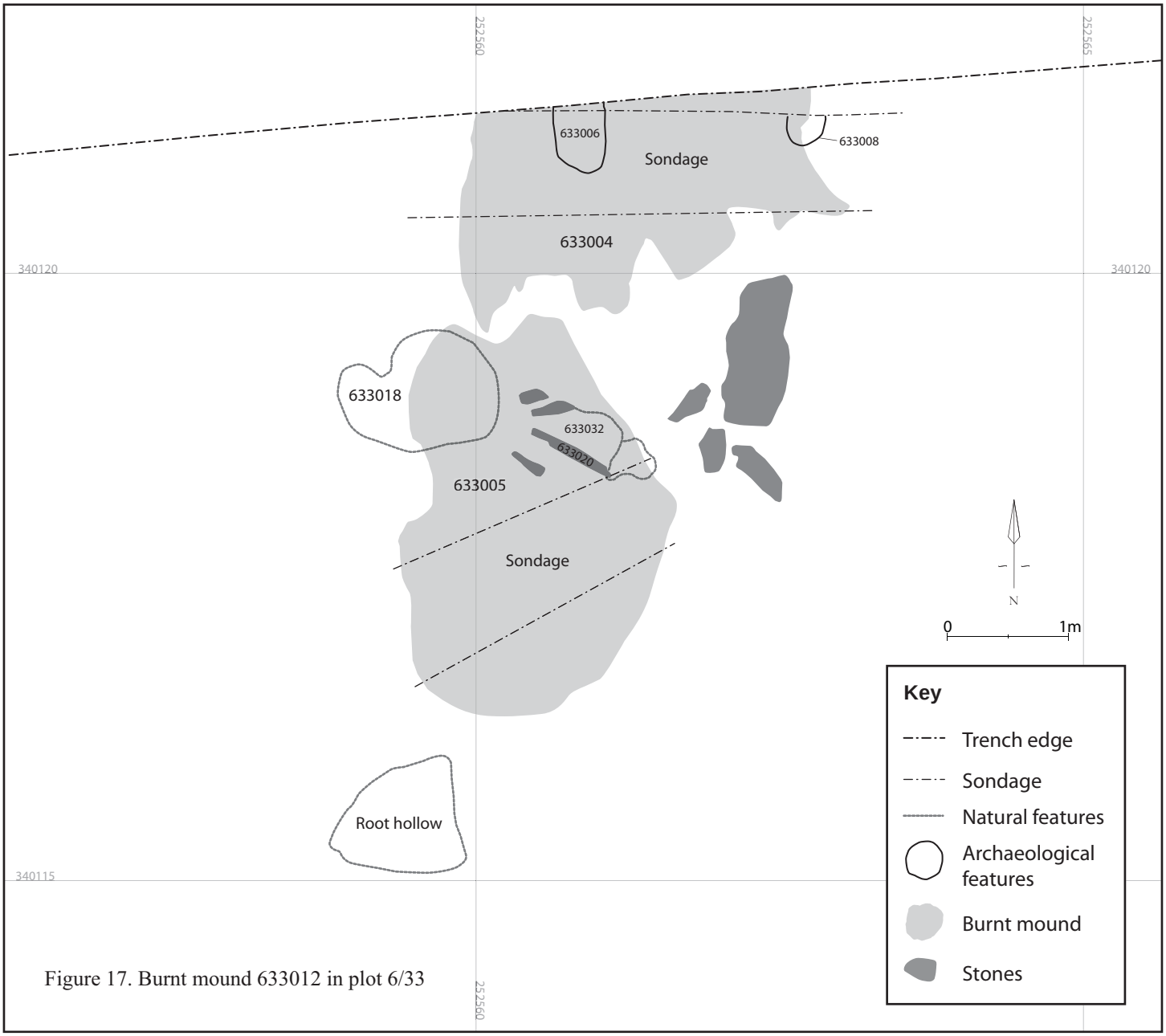

Figure 17. Burnt mound 633012 in plot 6/33

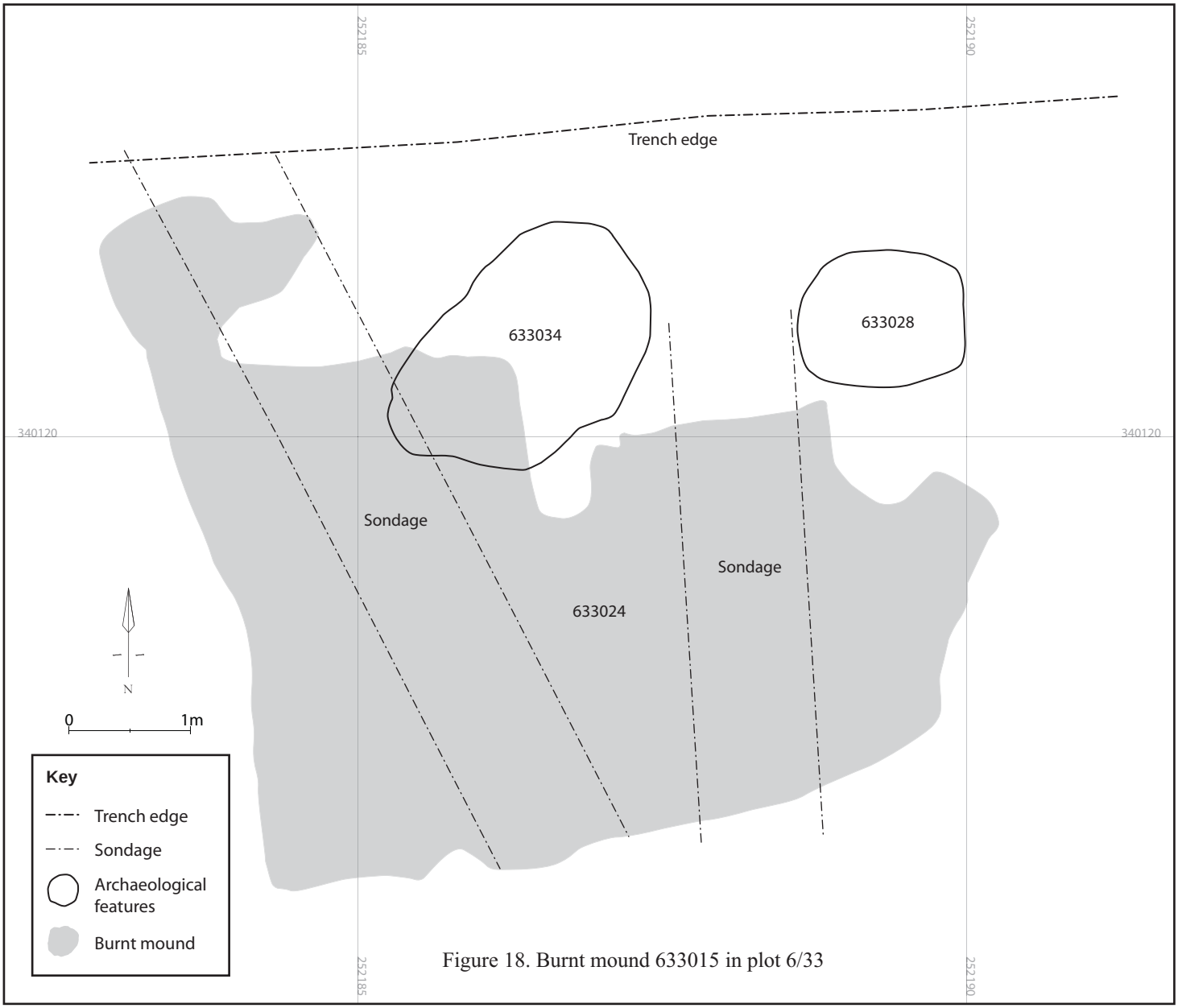

Figure 18. Burnt mound 633015 in plot 6/33

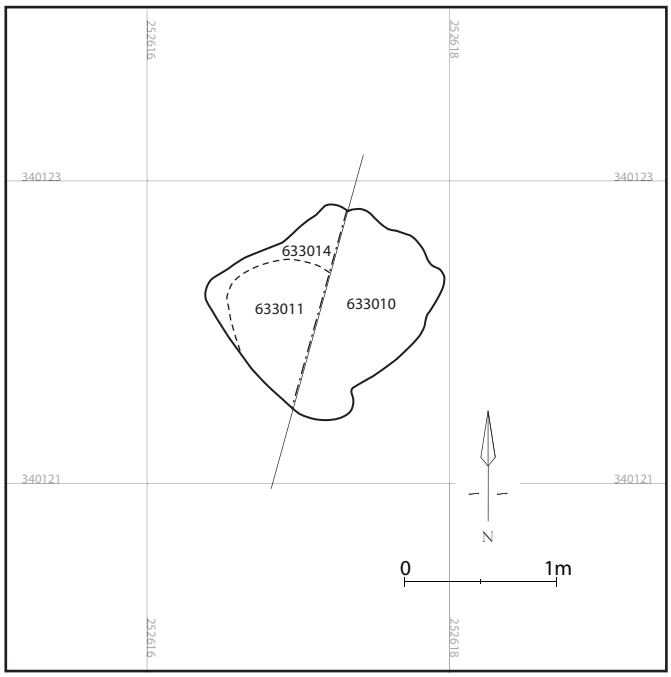

Figure 19. Pit 633010 in plot 6/33

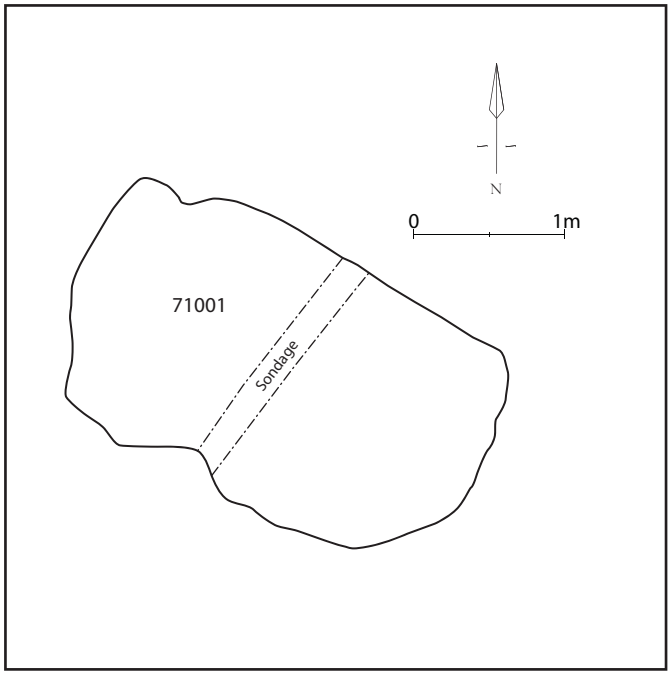

Figure 20. Shell midden 71001 in plot 7/1

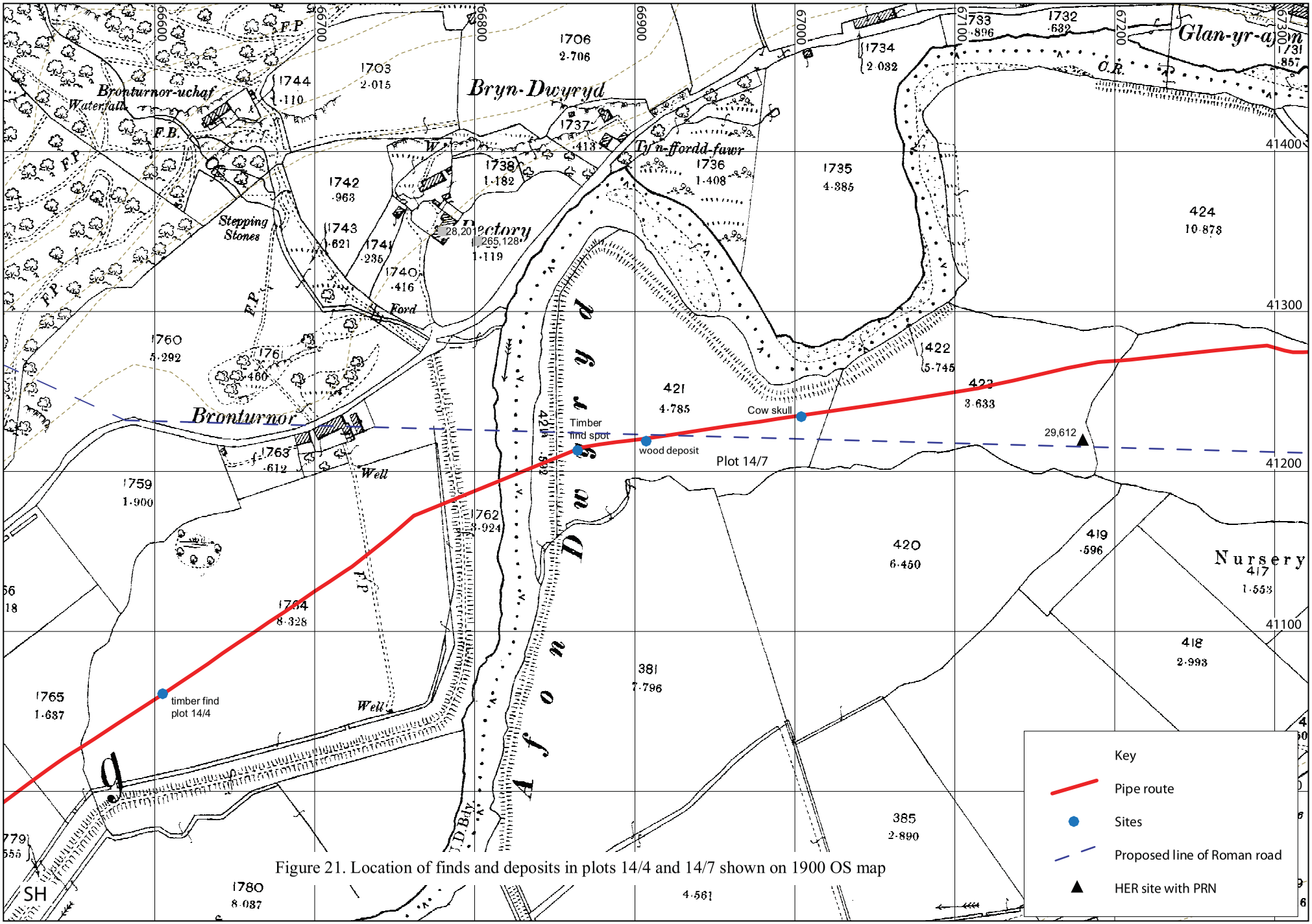

Figure 21. Location of finds and deposits in plots 14/4 and 14/7 shown on 1900 OS map

Plate 1: Probable stone-filled drain in plot 0/1

Plate 2: Section through probable stone-filled drain in plot 0/1

Plate 3: Burnt mound seen in section of pipe trench in plot 0/2

Plate 4: Section through 03005 in plot 0/3

Plate 5: Peat deposit in plot 0/8

Plate 6: Natural feature in plot 0/9

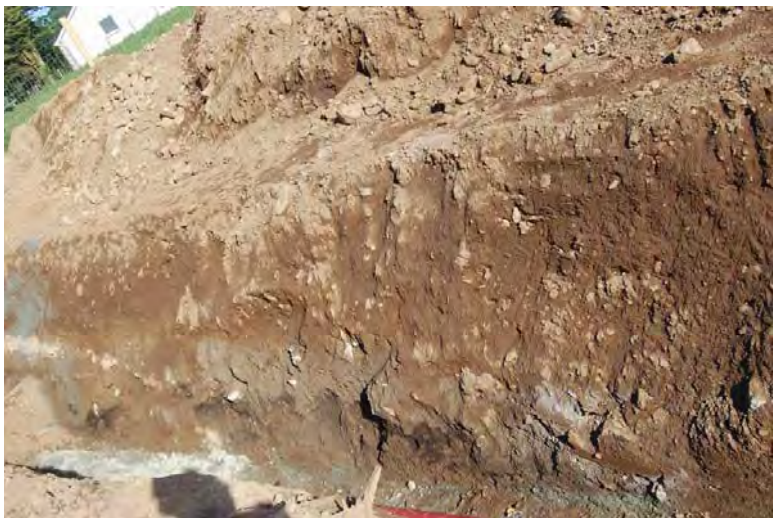

Plate 7: Traces of a possible burnt mound seen in the pipe trench section in plot 0/11

Plate 8: Corn drier 32009 and pit 32014 under excavation in plot 3/2

Plate 9: Corn drier 32009 and pit 32014 in plot 3/2,
fully excavated with the exception of the lining stones in the corn drier

Plate 10: Corn drier 32009 in plot 3/2, from SE end showing chamber and capping stone 32006

Plate 11: Section of corn drier 32009 in plot 3/2, showing capping stone 32006 and traces of burning in base of flue

Plate 12: Excavation of pit 32003 in plot 3/2, showing burnt stones

Plate 13: Feature 36002 in plot 3/6

Plate 14: Burnt mound trough 310001 in plot 3/10

Plate 15: Pit 314001 in plot 3/14

Plate 16: Shallow hollow 314002 in plot 3/14 containing smithing evidence

Plate 17: Section of ditch 320004 in plot 3/20

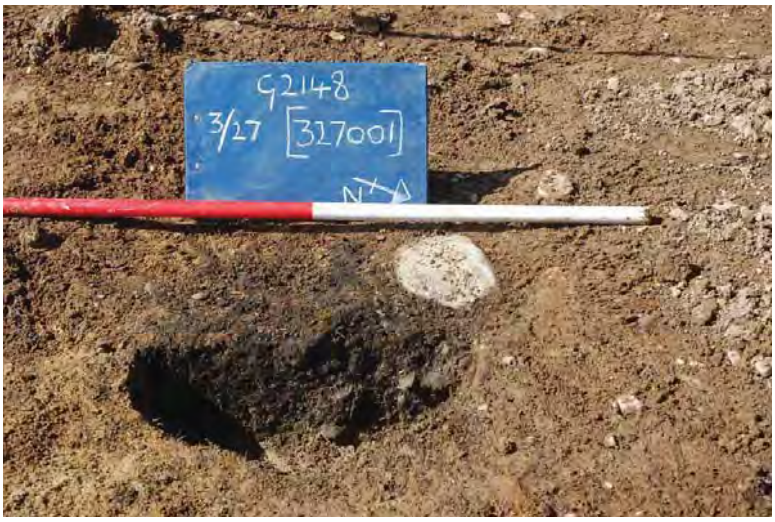

Plate 18: Pit 327001 in plot 3/27, half sectioned

Plate 19: Hollow 327002 in plot 3/27, half sectioned

Plate 20: Probable drainage feature seen in section of pipe trench in plot 5/5

Plate 21: Sondage through burnt mound 66003 and trough 66011 in plot 6/6, from the SE

Plate 22: Sondage through burnt mound 66003 and trough 66011 in plot 6/6, from the NE

Plate 23: Possible small corn drier 610001 in plot 6/10

Plate 24: Burnt mound in plot 6/21

Plate 25: Midden deposit in plot 6/22

Plate 26: Buckley ware from midden in plot 6/22

Plate 27: Natural palaeochannel 6294195 in plot 6/29.4

Plate 28: Natural palaeochannel 6294170 in plot 6/29.4

Plate 29: Natural hollows forming group 4184 in plot 6/29.4

Plate 30: Natural hollow/channel 4031 in plot 6/29.4

Plate 31: Natural hollow 4087 in plot 6/29.4

Plate 32: Possibly natural hollow 4089/4101 in plot 6/29.4

Plate 33: The main burnt mound in south end of plot 6/29.4

Plate 34: Pit 4022 in plot 6/29.4, half sectioned

Plate 35: Trough 4127 in plot 6/29.4, also showing natural feature 6294103

Plate 36: Pit 4111 with gullies 4107 and 4108 in plot 6/29.4 (slot on left of picture is a sondage)

Plate 37: Pit 4105, half sectioned, in plot 6/29.4

Plate 38: Pit 4033 in plot 6/29.4, fully excavated with stakeholes in base

Plate 39: Section of pit 4033 in plot 6/29.4

Plate 40: Natural channel 4195 in plot 6/29.4, with burnt mound material in section

Plate 41: Pit 4003, half excavated, in plot 6/29.4

Plate 42: Burnt mound 633012 in plot 6/33

Plate 43: Burnt mound 633012 in plot 6/33, with upper layers removed showing stones protruding and animal burrow 633018

Plate 44: Stones 633020 protruding from natural through hollow 633032, in plot 6/33

Plate 45: Burnt mound 633015 in plot 6/33

Plate 46: Burnt mound 633015 in plot 6/33, showing sections of mound

Plate 47: Trough 633034 in plot 6/33

Plate 48: Section showing fill of trough 633034 in plot 6/33

Plate 49: Pit 633028 in plot 6/33

Plate 50: Section of pit 633010 in plot 6/33

Plate 51: Deposit 638001 in plot 6/38

Plate 52: Deposit 638002 in plot 6/38

Plate 53: Stone deposit 639001in plot 6/39

Plate 54: Section through root hollow feature 644001 in plot 6/44

Plate 55: Section through ditches 647001 and 647003 in plot 6/47

Plate 56: Blue marine clay exposed in pipe trench in plot 6/51

Plate 57: Section through shell midden 71001 in plot 7/1

Plate 58: Natural salt marsh channel in plot 7/2

Plate 59: Modern ditch seen in trench section in plot 7/8

Plate 60: Woody peat deposit exposed in pipe trench in plot 11/3

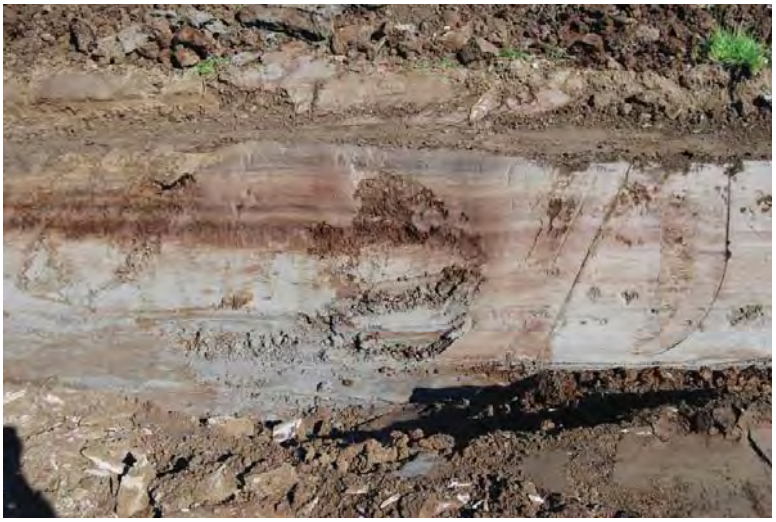

Plate 61: Alluvial silt and clay layer in plot 13/30

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YMDDIRIEDOLAETH ARCHAEOLEGOL GWYNEDD
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GAT Project Report Title: GAS PIPELINE REPLACEMENT: PWLLHELI CITY GATE PRI TO BLAENAU FFESTINIOG PRI Archaeological assessment of potential for analysis report	
GAT Project Name: Pwllheli to Blaenau Pipeline	
GAT Project No: G2148	**GAT Report No:** 1020
Confidential (yes/no): no	**draft/final:** final

Internal Control

	name	**signature**	**date**
prepared by	J Kenney		09/02/2012
approved by	Brigitte Buss		22/06/2012

Revisions

no	**date**	**made by**	**checked by**	**approved by**
01	22/03/2012	J Kenney	Brigitte Buss	22/06/2012

Internal Memo

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