Archaeology Wales

Friog Corner, Fairbourne, Dolgellau

Archaeological Watching Brief

By
James Evans BA (hons), PgDip

Report No. 1766

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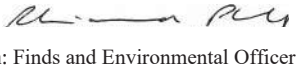
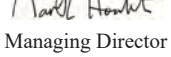
Archaeological Watching Brief

Prepared For: Natural Resources Wales

Edited by: Rhiannon Philp Signed:  Position: Finds and Environmental Officer Date: 25/02/19	Authorised by: Mark Houliston Signed:  Position: Managing Director Date: 26/02/19

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February 2019

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Contents

List of Figures

List of Plates

Appendices

Non-Technical Summary

This report results from work undertaken by Archaeology Wales Ltd (henceforth AW) for Natural Resources Wales (henceforth NRW) at Friog, Fairbourne, near Dolgellau, Gwynedd centred on National Grid Reference (NGR) SH 61091 12019 (see Figure 1).

The report draws upon the results of an archaeological watching brief that took place to ensure the preservation by record of any archaeological remains encountered during groundworks associated with the construction of a new revetment and slipway as part of repairs and improvements to the sea defence scheme. The watching brief also included the repositioning of the Fairbourne Anti-Invasion Defences (Scheduled Ancient Monument ME252).

The site lies within the Scheduled Ancient Monument (SAM) area of Fairbourne Anti Invasion Defences. Scheduled Monument Consent was obtained to allow the movement and replacement of the defences for the work. Consultation between Gwynedd Archaeological Trust (henceforth GAT) and NRW also highlighted the known presence of buried peat deposits at the Friog end of Fairbourne Beach. A palaeoenvironmental investigation carried out by AW in May 2018 was able to characterise these deposits as having been laid down in a fenland environment during the Neolithic period, between c. 3400 cal BC and 2600 cal BC, (Philp 2018). Gwynedd Archaeological Planning Service (henceforth GAPS) recommended that the works be monitored in the form of an archaeological watching brief in order to mitigate the impact on the archaeological resource.

No archaeological features were encountered during the works.

The watching brief complied with the Chartered Institute for Archaeologists Standards and Guidance for an Archaeological Watching Brief (2014).

Crynodeb

Mae'r adroddiad hon yn canlyni o waith a ymgymerwyd gan Archaeology Wales Ltd (AW o hyn ymlaen) ar gais Chyfoeth Naturiol Cymru (CNC o hyn ymlaen), yn Friog, Fairbourne, yn agos i Ddolgellau, Gwynedd, wedi'i chanoli ar Gyfeirnod Grid Cenedlaethol (CGC) SH 61091 12019 (gweld Figure 1).

Mae'r adroddiad yn tynnu ar y canlyniadau o unrhyw olion archeolegol wnaethant ddod ar draws yn ystod y gwaith tir yn gysylltiedig ar adeiladu rhagfur a llithrfa newydd fel rhan o drwsio a gwelliant i'r cynllun amddiffyn mor. Wnaeth y briff gwylio hefyd cynnwys yr ailosod o'r Amddiffynfeydd Gwrth-Oresgyniad (Heneb Gofrestredig ME252).

Mae'r safle yn gorwedd o fewn yr ardal Heneb Gofrestredig (HC) o Amddiffynfeydd Gwrth-Oresgyniad Fairbourne. Cafodd Caniatâd Heneb Gofrestredig ei gafwyd er mwyn caniatáu'r symudiad ar' ailosod o'r amddiffynfeydd ar gyfer y gwaith. Wnaeth ymgynghoriad rhwng Ymddiriedolaeth Archeolegol Gwynedd (YAG o hyn ymlaen) a CNC ywcholeuo y presenoldeb gwybodus o ddyddodion mawn claddedig ar y pen Friog o Draeth Fairbourne. Wnaeth ymchwiliad paleoamgylcheddol, a ymgymerwyd gan AW ym mis Mai 2018, nodweddu'r dyddodion yma i'w cael ei gosod mewn amgylchedd ffendir yn ystod yr Oes Newydd y Cerrig, rhwng tua 3400 cal CC a 2600 cal CC, (Philp 2018). Awgrymwyd y Gwasanaeth Cynllunio Archeolegol Gwynedd (GCAG o hyn ymlaen) dyle'r gwaith cael ei fonitro mewn ffurf briff gwylio er mwyn mantoli effaith ar y chyfoes archeolegol.

Ni wnaethant ddod o hyd i unrhyw nodweddion archeolegol yn ystod y gwaith.

Wnaeth y briff gwylio cydymffurfio gyda'r safonau a chanllawiau'r Chartered Insititute for Archaoelogists ar gyfer Briff Gwylio (2014).

1. Introduction

Location and scope of work

AW was commissioned by NRW to undertake a Watching Brief (WB) during ground work associated with repairs and improvements to sea defence scheme and repositioning of Fairbourne Anti-Invasion Defences (Scheduled Ancient Monument ME252) at Friog Corner, Fairbourne, Gwynedd (NGR SH 61091 12019). The work involves the construction of a new rock armour revetment on the same alignment as the existing sea defences and a new permanent slipway.

GAPS, as archaeological advisors to the local planning authority, stipulated that an archaeological watching brief be undertaken during all ground works associated with the development.

An approved Written Scheme of Investigation (WSI) was produced by AW in accordance with the *Standard and Guidance for Archaeological Watching Briefs* (CIfA, 2014) and was designed to provide an approved methodology of archaeological work to be implemented during the construction works. The WSI was approved by GAPS prior to the commencement of the ground works.

The watching brief was undertaken by AW in November and December 2018 and January and February 2019 under the supervision of James Evans. The project was managed by Rowena Hart.

Topography and Geology

The development area is located at the southern (Friog) end of Fairbourne Beach, approximately 2km south of the mouth of Afon Mawddach, in Barmouth Bay. The site lies partially within the intertidal zone. The sand beach slopes gently upwards to the shingle storm beach. The existing sea defences consist of a concrete sea wall at the top of the shingle beach, which extends northwards along the beach to Fairbourne. Beyond the sea wall to the west the land is flat and low-lying before rising steeply to the crags of Mynydd Graig-wen.

The underlying geology of the area is defined by the Maentwrog Formation and consists of a sedimentary bedrock of mudstone and siltstone formed during the Cambrian Period (BGS 2017).

Archaeological and Historical Background

The site area includes the SAM Fairbourne Anti-Invasion Defences (ME252), which is a single 2.3km line of concrete anti-tank blocks located at the top of the beach in front of the sea wall. It dates to the early period of World War II, between 1940 and 1941, and was part of Western Command's coastal crust defences against a perceived threat of a German invasion from Ireland. Scheduled Monument Consent was obtained from Cadw to include moving the tank traps during the works and replacing them afterwards.

In March 2018, AW were commissioned by NRW to carry out a palaeoenvironmental investigation of the buried deposits within the area of the proposed defences to mitigate the effect of the works. The fieldwork for this was carried out in May 2018, with six cores taken

along the base of the storm beach. A single buried peat deposit was encountered, which was subsequently radiocarbon dated to between c. 3400 cal BC and 2600 cal BC and identified through pollen analysis as a fenland landscape (Philp 2018). Restrictions caused by the presence of the large stones of the storm beach and then the existing sea defences meant that samples were taken lower down the beach, below the storm beach. A borehole survey previously undertaken by Royal Haskoning DHV indicated that the peat deposits extend westward under the storm beach and the development area, and was therefore likely to be impacted during the construction of the revetment toe.

2. Methodology

A watching brief complying with the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for an Archaeological Watching Brief* (2014) was undertaken during all intrusive ground work on the site.

The Watching Brief consisted of three stages: the first stage was the temporary relocation of anti-tank blocks in order to create access points onto the beach, and the excavation of three test pits; the second stage was the monitoring of intrusive groundworks involved in the construction of the revetment scheme; the third stage involved the relocation of the anti-tank blocks that were moved prior to work commencing on site, and also the excavation of four anti-tank traps that were buried by beach material. The anti-tank traps were moved using a 36-tonne tracked excavator and varying between a padded excavator grab and a sling system.

The excavation comprised of an area that measured 235m in length, and approximately 8m in width following the course of the revetment at the top edge of the beach. The excavation was carried out using a mechanical excavator and was undertaken in sections of approximately 3-5m in width. One section was dug at a time using a 21-tonne tracked excavator fitted with a toothed/toothless bucket. Beach material, peat and clay were removed and a geotextile was placed over the excavated area. The rock armour was then placed on top of the geotextile. This process was repeated throughout the groundworks (Plate 1, 2, 3, 4).

The entire process was monitored by a suitably trained archaeologist. Each excavated section was photographed using a 12MP digital camera. All the deposits encountered were recorded by means of a continuous context numbering system and recorded on pro-forma context sheets.

All deposits are described in accordance with CIfA conventions. A register of all contexts and photographs were also made.

3. Watching Brief Results

The general stratigraphy was consistent across the site and comprised of simple horizontal deposits. The basal deposit reached was a very compacted blue/grey clay (003=007=010=014=017) encountered at a depth of between 1.8 – 2.6 m below the surface throughout the area of excavation. Directly overlying this across the entire area of the

excavation was a firm, red/brown peat deposit (002=006=009=011=013=016), which varied in thickness of between c. 0.5-1m. The peat was encountered underneath a loose light grey/yellow sand (001=005=008=012=015) with frequent inclusions of moderate sized stones and small rounded pebbles at depths ranging between c.0.8-1.6m. This was then overlain by This deposit is the beach deposit that is found across Fairbourne Beach.

As well as the above contexts there was an additional context. Context (004) was found within Test Pit 2. This context appears to be similar with the beach deposits (001=005=008=012=015), and the description of it is very similar. Therefore, it is highly likely that they belong to the same context.

Context (018) refers to a structure that appears to have formed part of a slipway, that would have been used to gain access to the sea from the beach. The co-ordinates for the structure are E:261103 N:312632 Level (AOD): 1.262m. The structure measured 3.12m x 2.91m and was constructed using a series of concrete blocks (Plate 5). The structure stood a maximum of 0.56m above the ground level. There is significant damage to the structure, possibly from coastal erosion. There were also several steel rods protruding various parts of the structure and would have been used as part of the construction phase (Plate 6). It is clear to see that the concrete slipway, and the concrete anti-tank blocks differ in their construction. The anti-tank blocks appear cruder in their construction, whilst the slipway seems to have been constructed using modern methods. This suggests that the slipway postdates the anti-tank blocks, and could originate from the later 20th century.

Three of the anti-tank blocks were lifted and temporarily relocated prior to work beginning on site. This was to allow access of heavy machinery onto the beach. Once work was completed these blocks were reinstated (Plate 7). Anti-tank blocks that had to be permanently relocated due to the new coastal defence were placed behind the existing sea defence wall and footpath (Figure 2, Plate 8: before, Plate 9: after). This meant that their alignment was the same as previous, but the set some 8m to the east of their original position on the inland side of the coastal path. Also, prior to work commencing, four anti-tank blocks were identified as being buried under the beach material (Plate 10). This could have been the result of storms over the years. These blocks were excavated under supervision and lifted back into position (Plate 11). All work involving the movement of the anti-tank blocks was monitored by Cadw.

4. Finds and Samples

No artefacts were recovered from any of the contexts recorded during the WB.

Two 40 litre bulk samples of peat were taken at separate locations along the scheme (Figure 3 with reference to Figure 2) to assess whether the peat identified was similar in character to that identified in the earlier palaeoenvironmental survey and to establish if any archaeological material was present. Results from the original investigation suggested that the buried peat deposits range in date from 3400cal BC and 2600cal BC (Philp, 2018).

The peat from both samples was visually assessed by the environmental archaeologist who undertook the original palaeoenvironmental survey and deemed to be very similar in character to that which is located beneath the sand, lower in the intertidal zone. A subsample was taken from one of the samples in case of the need for further analysis. The bulk samples were then processed by flotation in order to separate any potential charred organic material from heavier residues. No archaeological material was identified during this process.

5. Conclusion

No archaeological features or finds were revealed during the watching brief. However, a buried peat deposit was encountered during groundworks.

The peat deposit is the same as that identified during the previous palaeoenvironmental survey lower in the intertidal zone, which was representative of a freshwater fenland environment dated to between 3400-2600cal BC (Philp 2018). There is a difference in thickness, with the peat identified in this investigation much thicker than that discovered in the original survey. This is likely to be because of erosion in the lower intertidal zone and the protection provided by the shingle bank for the upper deposits. This may indicate that the deposits identified during this WB were representative of a longer timespan than was identified in the previous palaeoenvironmental survey, however no features or artefacts were discovered within the peat deposit and it is clear that the peat remains preserved beneath the beach. It can therefore be concluded that the work did not negatively impact the archaeological resource of the area.

6. Bibliography

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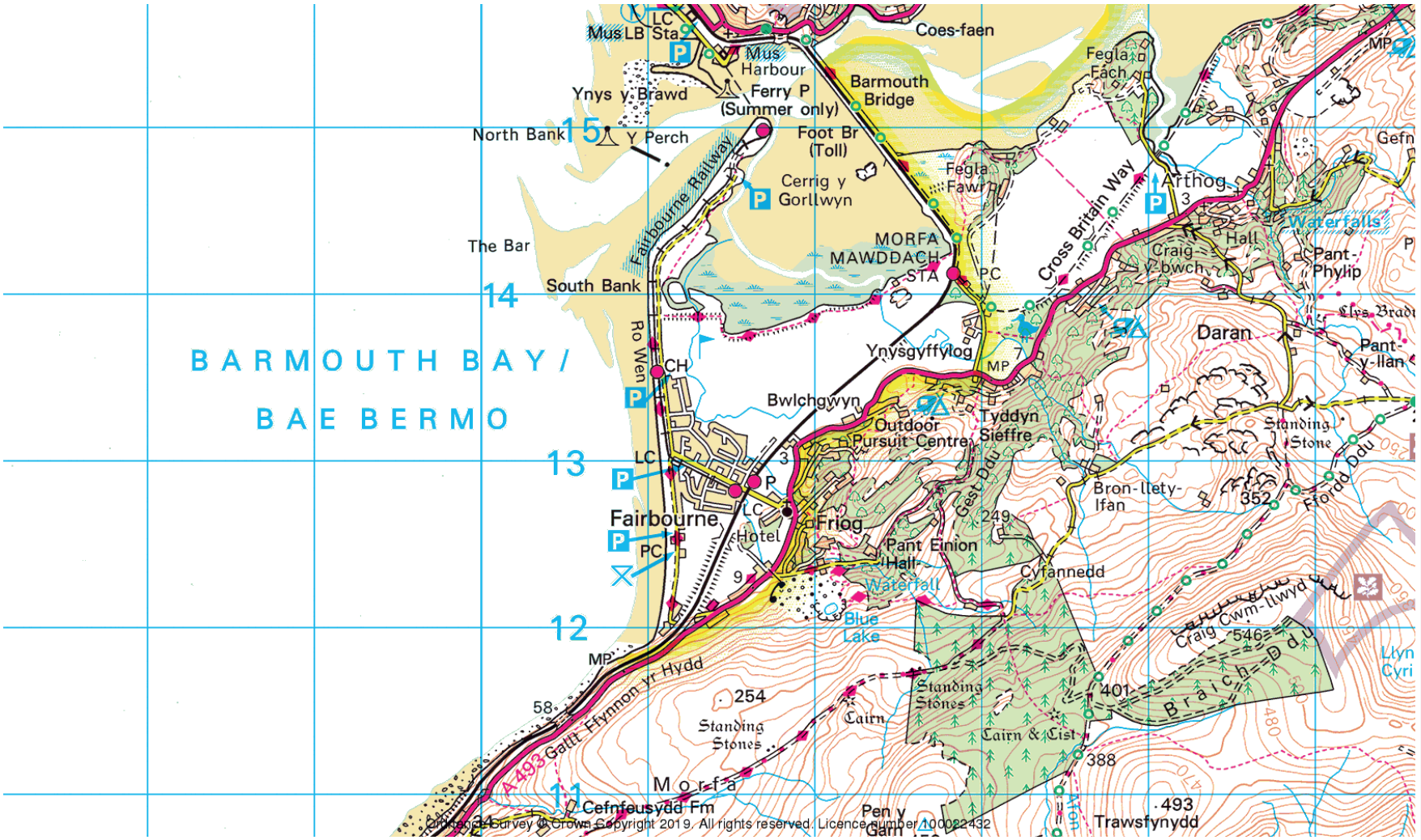

Figure 1: Site Location

0 1km

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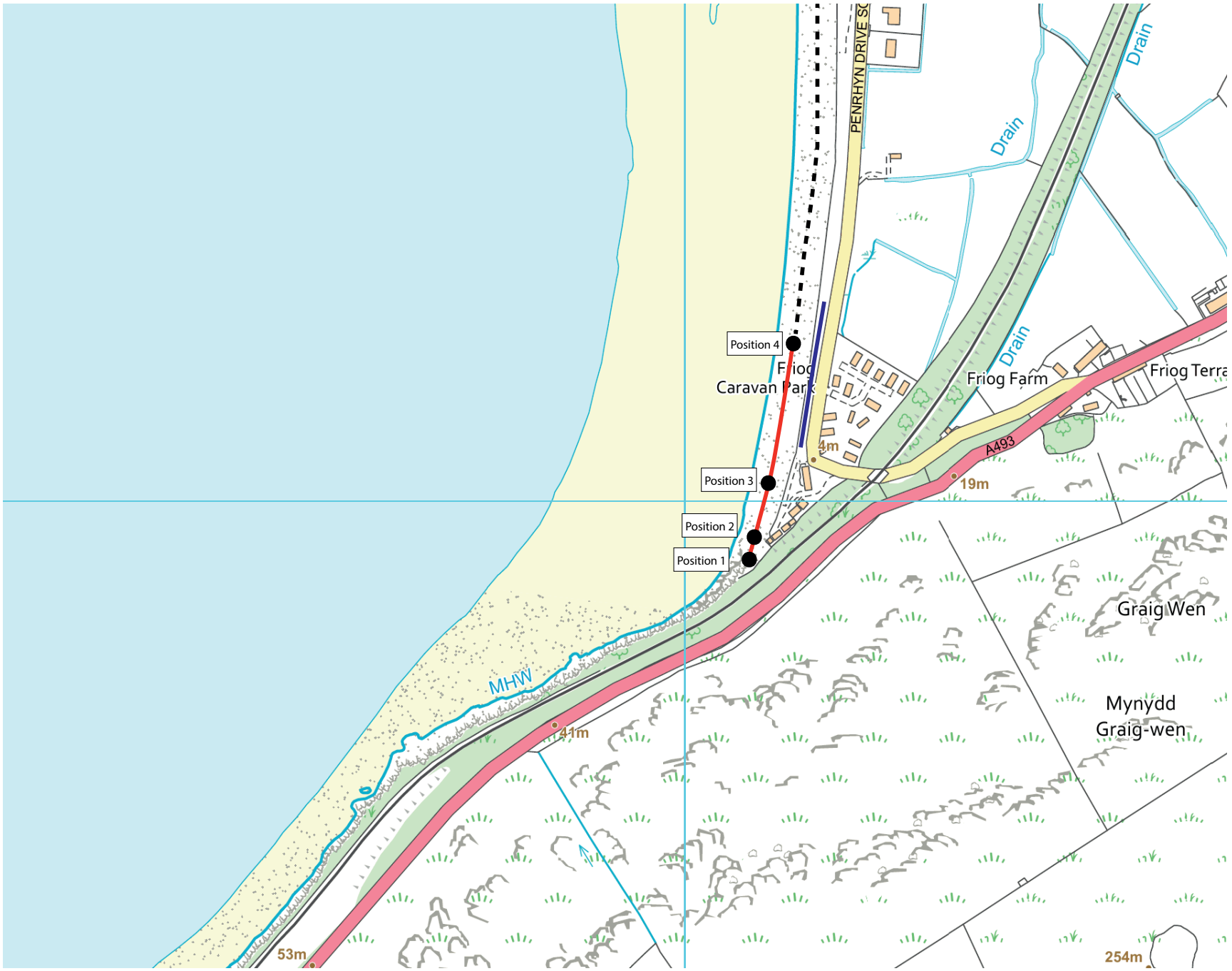
Revealing the past, informing the future



Original line of Anti Tank Defences

New positioning of Anti Tank Defences

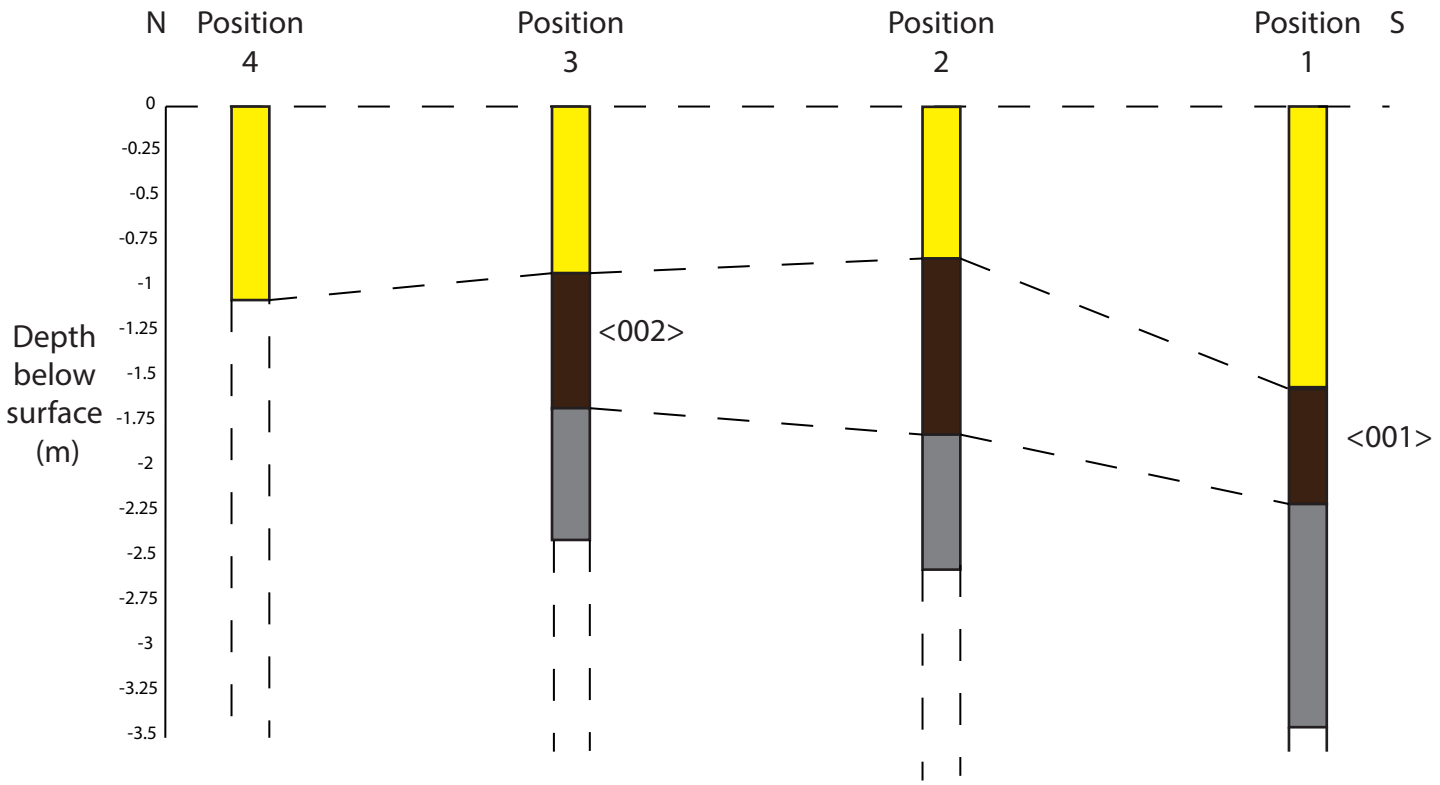
Continuation of Anti Tank Defences

Sediment Description Position relating to Figure x

0 100 m

Figure 2: Map showing original location and relocation of Anti Tank Defences at Friog Corner as well as position of sediment descriptions (see Figure 3).

ARCHAEOLOGY WALES
Revealing the past, informing the future



Distance between positions not to scale.

Beach Material
Peat
Clay

Figure 3: Sediment layer diagram showing depth of deposits along the beach (see Figure 2 for position locations).

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Plate 1: West facing photograph of groundworks

Plate 2: West facing view of groundworks (beginning of revetment)

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Plate 3: West facing view of groundworks (middle of revetment)

Plate 4: West facing photograph of groundworks (end of revetment)

Plate 5: East facing photograph of concrete block structure related to slipway

Plate 6: South- west facing photograph of steel rods related to the construction phase of concrete slipway structure

Plate 7: South-west facing photograph of an anti-tank block being reinstated

Plate 8: South-east facing photograph of anti-tank traps prior to permanent relocation

Plate 9: North-east facing photograph of anti-tank blocks permanent relocation

Plate 10: South-west facing photograph of buried anti-tank blocks

Plate 11: South-west facing photograph of excavated anti-tank blocks reinstated

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APPENDIX I:

Context Register

Context Register

Context Number	Type	Description
1	Deposit	Subsoil/beach
2	Deposit	Peat deposit
3	Deposit	Natural
4	Deposit	Subsoil/beach
5	Deposit	Subsoil/beach
6	Deposit	Peat deposit
7	Deposit	Natural
8	Deposit	Subsoil/beach
9	Deposit	Peat deposit
10	Deposit	Natural
11	Deposit	Peat deposit
12	Deposit	Subsoil/beach
13	Deposit	Peat deposit
14	Deposit	Natural
15	Deposit	Subsoil/beach
16	Deposit	Peat deposit
17	Deposit	Natural
18	Structure	Concrete slipway

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APPENDIX II:

Written Scheme of G l tcqrge_rgm l

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WRITTEN SCHEME OF INVESTIGATION

FOR AN ARCHAEOLOGICAL

WATCHING BRIEF

AT FRIOG CORNER, DOLGELLAU, GWYNEDD

Prepared for:

Natural Resources Wales

Project No: 2599

September 2018

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Contents Page

Figures

Summary

This Written Scheme of Investigation (WSI) details the methodology for a watching brief to be undertaken by Archaeology Wales Ltd (henceforth AW) at the request of Natural Resources Wales (henceforth NRW).

The watching brief will be undertaken during ground works associated with the construction of a new revetment and slipway as part of repairs and improvements to the sea defence scheme at Friog Corner, near Dolgellau, Gwynedd, centred on National Grid Reference (NGR) SH 61091 12019. The watching brief will also include the repositioning of Fairbourne Anti-Invasion Defences (Scheduled Ancient Monument ME252).

The site lies within the Scheduled Ancient Monument (SAM) area of Fairbourne Anti-Invasion Defences. Scheduled Monument Consent has been obtained to allow the movement and replacement of the defences for the work. Consultation between Gwynedd Archaeological Trust (GAT) and NRW also highlighted the known presence of buried peat deposits at the Friog end of Fairbourne Beach. A palaeoenvironmental investigation carried out by AW in May 2018 was able to characterise these deposits as having been laid down in a fenland environment during the Neolithic period (between c. 3400 cal BC and 2600 cal BC) (Philp 2018). Gwynedd Archaeological Planning Service (GAPS) have recommended that the works be monitored in the form of an archaeological watching brief in order to mitigate the impact on the archaeological resource.

All work will be undertaken in accordance with the standards and guidelines of the Chartered Institute for Archaeologists (CIfA) (2014).

1. Introduction and planning background

This WSI details the methodology for a watching brief to be undertaken during ground work associated with repairs and improvements to sea defence scheme and repositioning of Fairbourne Anti-Invasion Defences (Scheduled Ancient Monument ME252) at Friog Corner, near Dolgellau, Gwynedd (NGR SH 61091 12019) (Figure 1). The work involves the construction of a new rock armour revetment on the same alignment as the existing sea defences and a new permanent slipway (Figure 2).

The site lies within the Scheduled Ancient Monument (SAM) area of Fairbourne Anti-Invasion Defences. Scheduled Monument Consent has been obtained to allow the movement and replacement of the defences for the work. Consultation between Gwynedd Archaeological Trust (GAT) and NRW also highlighted the known presence of buried peat deposits at the Friog end of Fairbourne Beach. A palaeoenvironmental investigation carried out by AW in May 2018 was able to characterise these deposits as having been laid down in a fenland environment during the Neolithic period (between c. 3400 cal BC and 2600 cal BC) (Philp 2018). An initial borehole survey undertaken by Royal Haskoning DHV indicates the peat extends under the storm beach and is likely to be impacted during the construction of the revetment toe. Therefore, Gwynedd Archaeological Planning Service (GAPS) have

recommended that the works be monitored in the form of an archaeological watching brief in order to mitigate the impact on the archaeological resource.

This WSI has been prepared by Dr Susan Stratton, Supervisor, AW, at the request of NRW.

The aim of the watching brief is to provide the local planning authority with sufficient information regarding the nature of archaeological remains on the site of the development, the requirements for which are set out in Planning Policy (revised edition 9, November 2016), Section 6.5 and Technical Advice Note TAN24: The Historic Environment (2017). The work is to ensure that all buried artefacts and deposits are fully investigated and recorded if they are disturbed or revealed as a result of activities associated with the development.

All work will be undertaken to the standards and guidance set by the CIfA (2014). AW is a Registered Organisation with the CIfA.

2. Site Description

The development area is located at the southern (Friog) end of Fairbourne Beach, approximately 2km south of the mouth of Afon Mawddach, in Barmouth Bay. The site lies partially within the intertidal zone. The sand beach slopes gently upwards to the shingle storm beach. The existing sea defences consist of a concrete sea wall at the top of the shingle beach, which extends northwards along the beach to Fairbourne. Beyond the sea wall to the west the land is flat and low-lying before rising steeply to the crags of Mynydd Graig-wen.

The underlying geology of the area is defined by the Maentwrog Formation and consists of a sedimentary bedrock of mudstone and siltstone formed during the Cambrian Period (BGS 2017).

3. Archaeological background

The site area includes the SAM Fairbourne Anti-Invasion Defences (ME252), which is a single 2.3km line of concrete anti-tank blocks located at the top of the beach in front of the sea wall. It dates to the early period of World War II, between 1940 and 1941, and was part of Western Command's coastal crust defences against a perceived threat of a German invasion from Ireland. Scheduled Monument Consent has been obtained from Cadw to include moving the tank traps during the works and replacing them afterwards.

In March 2018, AW were commissioned by NRW to carry out a palaeoenvironmental investigation of the buried deposits within the area of the proposed defences to mitigate the effect of the works. The fieldwork for this was carried out in May 2018, with six cores taken along the base of the storm beach. A single buried peat deposit was encountered, which was subsequently radiocarbon dated to between c. 3400 cal BC and 2600 cal BC and identified through pollen analysis as a fenland landscape (Philp 2018). Restrictions caused by the presence of the large stones of the storm beach and then the existing sea defences meant that samples were taken lower down the beach, below the storm beach. A borehole

survey previously undertaken by Royal Haskoning DHV indicates that the peat deposits extend westward under the storm beach and the development area, and is therefore likely to be impacted during the construction of the revetment toe.

4. Objectives

This WSI sets out a program of works to ensure that the watching will meet the standard required by CIfA's *Standard and Guidance for Archaeological Watching Briefs (2014)*.

The objective of the watching brief will be:

- to allow a rapid investigation and recording of any archaeological features that are uncovered during the proposed groundworks within the application area;
- to provide the opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief are not sufficient to support the treatment to a satisfactory or proper standard.
- To ensure that the method statement and the Scheduled Monument Consent for the repositioning of the Fairbourne Anti-Invasion Defences (Scheduled Ancient Monument ME252) is adhered to and any damage to the scheduled monument is avoided.

A written report will be compiled following the fieldwork. Sufficient desk-top research will be undertaken to ensure that the results of this work are properly understood, interpreted and reported.

The report will include a comprehensive assessment of the historic context within which the archaeological evidence rests and will aim to highlight any relevant research issues within regional, national and, if relevant, international research frameworks.

5. Timetable of works

5.1. Fieldwork

The watching brief will be undertaken during all ground works associated with the proposed development as well as during the repositioning of Fairbourne Anti-Invasion Defences (Scheduled Ancient Monument ME252). The work does not yet have a confirmed start date. Archaeology Wales will update GAPS with the exact date when it is known.

5.2. Report delivery

The report will be submitted to NRW and to GAPS within three months of the completion of the fieldwork. A copy of the report will also be sent to the regional Historic Environment Record (HER).

6. Fieldwork

6.1. Detail

An archaeological watching brief will be undertaken during the repositioning of the tank traps and during all intrusive ground works associated with the development. The watching brief will be undertaken using a tracked 360 degree excavated equipped with a flat-bladed bucket, and will be monitored by a suitably qualified archaeologist.

The work will be undertaken to meet the standard required by CIfA's *Standard and Guidance for Watching Briefs* (2014).

The site archaeologist undertaking the watching brief will be afforded the required access by the main contractor in order to observe and where necessary to record any archaeological remains revealed. Groundwork will not be undertaken without the presence of the site archaeologist. The site archaeologist will record finds and less significant archaeological deposits and features without significant delay to the work program.

Where significant or complex archaeological deposits or features are encountered there will be a requirement for those areas to be fenced off and highlighted to all contractors employed on the site. Machines or contractors shall not enter this area until archaeological recording has been completed. If significant archaeological features are revealed during the work a meeting between NRW, GAPS and AW will be called at the earliest convenience.

To comply with professional guidelines, a contingency for additional access to each such area and for a team of additional archaeologists to be employed should be provided. Contingency costs will be agreed in advance before any extension to the programme commences and will follow a site meeting between Archaeology Wales, NRW and GAPS.

6.2. Recording

Recording will be carried out using AW recording systems (pro-forma context sheets etc) using a continuous number sequence for all contexts.

Plans and sections will be drawn to a scale of 1:50, 1:20 and 1:10 as required and related to Ordnance Survey datum and published boundaries where appropriate.

All features identified will be tied in to the OS survey grid and fixed to local topographical boundaries.

Photographs will be taken in digital format with an appropriate scale, using a 12MP camera with photographs stored in Tiff format.

The archaeologist undertaking the watching brief will have access to the AW metal detector and be trained in its use.

6.3. Finds

The professional standards set in the CIfA's *Standard and guidance for the collection, documentation, conservation and research of archaeological* (2014) will form the basis of finds collection, processing and recording.

All manner of finds regardless of category and date will be retained.

Finds recovered that are regarded as Treasure under *The Treasure Act 1996* will be reported to HM Coroner for the local area.

Any finds which are considered to be in need of immediate conservation will be referred to a UKIC qualified conservator (normally Phil Parkes at Cardiff University).

6.4. Environmental sampling strategy

Deposits with a significant potential for the preservation of palaeoenvironmental material will be sampled, by means of the most appropriate method (bulk, column etc). Where sampling will provide a significant contribution to the understanding of the site AW will draw up a site-specific sampling strategy alongside a specialist environmental archaeologist. All environmental sampling and recording and will follow English Heritage's *Guidelines for Environmental Archaeology* (2002).

It is highly likely that significant environmental deposits will be encountered on the site. However, where these deposits can be identified as equivalent to the deposits already sampled in the palaeoenvironmental investigation (Philp 2018) repeat samples will not be necessary.

6.5. Human remains

In the event that human remains are encountered, their nature and extent will be established and the coroner informed. All human remains will be left *in situ* and protected during backfilling. Where preservation *in situ* is not possible the human remains will be fully recorded and removed under conditions that comply with all current legislation and include acquisition of licenses and provision for reburial following all analytical work. Human remains will be excavated in accordance with the CIfA's *Excavation and Post-Excavation Treatment of Cremated and Inhumed Human Remains: Technical Paper Number 13* (1993).

A meeting with GAPS, NRW and AW will be called if the human remains uncovered are of such complexity or significance that the contingency arrangement (6.1 above) would not be of sufficient scope.

6.6. Specialist advisers

In the event of certain finds, features or sites being discovered, AW will seek specialist opinion and advice. A list of specialists is given in the table below although this list is not exhaustive.

Artefact type	Specialist
Flint	Kate Pitt (Archaeology Wales)
Animal bone	Richard Madgwick (Cardiff University)
CBM, heat affected clay, Daub	Rachael Hall (APS)

etc.	
Clay pipe	Hilary Major (Freelance)
Glass	Rowena Hart (Archaeology Wales)
Cremated and non-cremated human bone	Malin Holst (University of York)/Richard Madgwick (Cardiff University)
Metalwork	Kevin Leahy (University of Leicester)/ Quita Mold (Freelance)
Metal work and metallurgical residues	Dr Tim Young (GeoArch)
Neo/BA pottery	Dr Alex Gibson (Bradford University)
IA/Roman pottery	Jane Timby (Freelance)
Roman Pottery	Rowena Hart (Archaeology Wales)/ Peter Webster (Freelance)
Post Roman pottery	Stephen Clarke (Monmouthshire Archaeology)
Charcoal (wood ID)	John Carrot (Freelance)
Waterlogged wood	Nigel Nayling (University of Wales – Lampeter)
Molluscs and pollen	Dr James Rackham
Charred and waterlogged plant remains	Wendy Carruthers (Freelance)

6.6.1. Specialist reports

Specialist finds and palaeoenvironmental reports will be written by AW specialists, or sub-contracted to external specialists when required.

7. Monitoring

GAPS will be contacted approximately five days prior to the commencement of archaeological site works, and subsequently once the work is underway.

Any changes to the WSI that AW may wish to make after approval will be communicated to GAPS for approval on behalf of the Planning Authority.

Representatives of GAPS will be given access to the site so that they may monitor the progress of the field evaluation. No area will be back-filled until GAPS has had the opportunity to inspect it, unless permission to do so has been given in advance. GAPS will be

kept regularly informed about developments, both during the site works and subsequently during post-excavation.

8. Post-fieldwork programme

8.1. Archive assessment

8.1.1. Site archive

An ordered and integrated site archive will be prepared in accordance with: Management of Research Projects in the Historic Environment (MoRPHE) (Historic England 2006) upon completion of the project.

The site archive (including artefacts and samples) will be prepared in accordance with the National Monuments Record (Wales) agreed structure and deposited with an appropriate receiving organisation, in compliance with CIfA Guidelines (*Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives'*, 2014). The legal landowner's consent will be gained for deposition of finds.

8.1.2. Analysis

Following a rapid review of the potential of the site archive, a programme of analysis and reporting will be undertaken. This will result in the following inclusions in the final report:

- Non-technical summary;
- Location plan showing the area/s covered by the watching brief, all artefacts, structures and features found;
- Plan and section drawings (if features are encountered) with ground level, ordnance datum and vertical and horizontal scales;
- Written description and interpretation of all deposits identified, including their character, function, potential dating and relationship to adjacent features. Specialist descriptions and illustrations of all artefacts and soil samples will be included as appropriate;
- An indication of the potential of archaeological deposits which have not been disturbed by the development;
- A discussion of the local, regional and national context of the remains by means of reviewing published reports, unpublished reports, historical maps, documents from local archives and the regional HER as appropriate;
- A detailed archive list at the rear listing all contexts recorded, all samples finds and find types, drawings and photographs taken. This will include a statement of the intent to deposit, and location of deposition, of the archive.

8.2. Reports and archive deposition

8.2.1. Report to client

Copies of all reports associated with the watching brief, together with supporting evidence in appendices as appropriate (including photographs and illustrations) will be submitted to NRW and GAPS upon completion.

8.2.2. Additional reports

After an appropriate period has elapsed, copies of all reports will be deposited with the relevant county Historical Environment Record, the National Monuments Record and, if appropriate, Cadw.

8.2.3. Summary reports for publication

Short archaeological reports will be submitted for publication in relevant journals; as a minimum, a report will be submitted to the annual publication of the regional CBA group or equivalent journal.

8.2.4. Notification of important remains

Where it is considered that remains have been revealed that may satisfy the criteria for statutory protection, AW will submit preliminary notification of the remains to Cadw.

8.2.5. Archive deposition

The final archive (site and research) will, whenever appropriate, be deposited with a suitable receiving institution, usually the relevant Local Authority museums service. Arrangements will be made with the receiving institution before work starts.

Although there may be a period during which client confidentiality will need to be maintained, copies of all reports and the final archive will be deposited no later than six months after completion of the work.

Copies of all reports, the digital archive and an archive index will be deposited with the *National Monuments Record*, RCAHMW, Aberystwyth.

Wherever the archive is deposited, this information will be relayed to the HER. A summary of the contents of the archive will be supplied to GAPS.

8.2.6. Finds deposition

The finds, including artefacts and ecofacts, excepting those which may be subject to the Treasure Act, will be deposited with the same institution, subject to the agreement of the legal land owners.

9. Staff

The project will be managed by Rowena Hart (AW Regional Director) and the fieldwork undertaken by a suitably qualified member of AW field staff. Any alteration to staffing before or during the work will be brought to the attention of GAPS and NRW.

Additional Considerations

10. Health and Safety

10.1. Risk assessment

Prior to the commencement of work AW will carry out and produce a formal Health and Safety Risk Assessment in accordance with *The Management of Health and Safety Regulations* 1992. A copy of the risk assessment will be kept on site and be available for inspection on request. A copy will be sent to the client (or their agent as necessary) for their information. All members of AW staff will adhere to the content of this document.

10.2. Other guidelines

AW will adhere to best practice with regard to Health and Safety in Archaeology as set out in the FAME (Federation of Archaeological Managers and Employers) health and safety manual *Health and Safety in Field Archaeology (2002)*.

11. Community Engagement and Outreach

Wherever possible, AW will ensure suitable measures are in place to inform the local community and any interested parties of the results of the site investigation work. This may occur during the site investigation work or following completion of the work. The form of any potential outreach activities may include lectures and talks to local groups, interested parties and persons, information boards, flyers and other forms of communication (social media and websites), and press releases to local and national media.

The form of any outreach will respect client confidentiality or contractual agreements. As a rule, outreach will be proportional to the size of the project.

Where outreach activities have a cost implication these will need to be negotiated in advance and in accordance with the nature of the desired response and learning outcomes.

12. Insurance

AW is fully insured for this type of work, and holds Insurance with Aviva Insurance Ltd and Hiscox Insurance Company Limited through Towergate Insurance. Full details of these and other relevant policies can be supplied on request.

13. Quality Control

13.1. Professional standards

AW works to the standards and guidance provided by the CIfA. AW fully recognise and endorse the CIfA's *Code of Conduct*, *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology* and the *Standard and Guidance for Archaeological Watching Briefs* currently in force. All employees of AW, whether corporate members of the CIfA or not, are expected to adhere to these Codes and Standards during their employment.

13.2. Project tracking

The designated AW manager will monitor all projects to ensure that agreed targets are met without reduction in quality of service.

14. Arbitration

Disputes or differences arising in relation to this work shall be referred for a decision in accordance with the Rules of the Chartered Institute of Arbitrators' *Arbitration Scheme for the Institute for Archaeologists* applying at the date of the agreement.

15. References

Chartered Institute for Archaeologists, 2014. Standards and guidance for the collection, compilation, transfer and deposition of archaeological archives.

Chartered Institute for Archaeologists, 2014. Standards and guidance for the collection, documentation, conservation and research of archaeological materials.

Chartered Institute for Archaeologists, 2014. Standards and guidance for excavation.

Chartered Institute for Archaeologists, 2014. Standards and guidance for an archaeological watching brief.

English Heritage, 2002. Guidelines for Environmental Archaeology.

English Heritage, 2006. Management of Research Projects in the Historic Environment (MORPHE).

McKinley, J., Roberts C., 1993, Excavation and post-excavation treatment of cremated and inhumed human remains, Technical Paper 13.

Philp, R. 2018. A Palaeoenvironmental Investigation at Friog Corner, Fairbourne, Dolgellau. Final Report. Archaeology Wales Report No. 1708.

Websites

British Geological Survey: Geology of Britain viewer:

www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

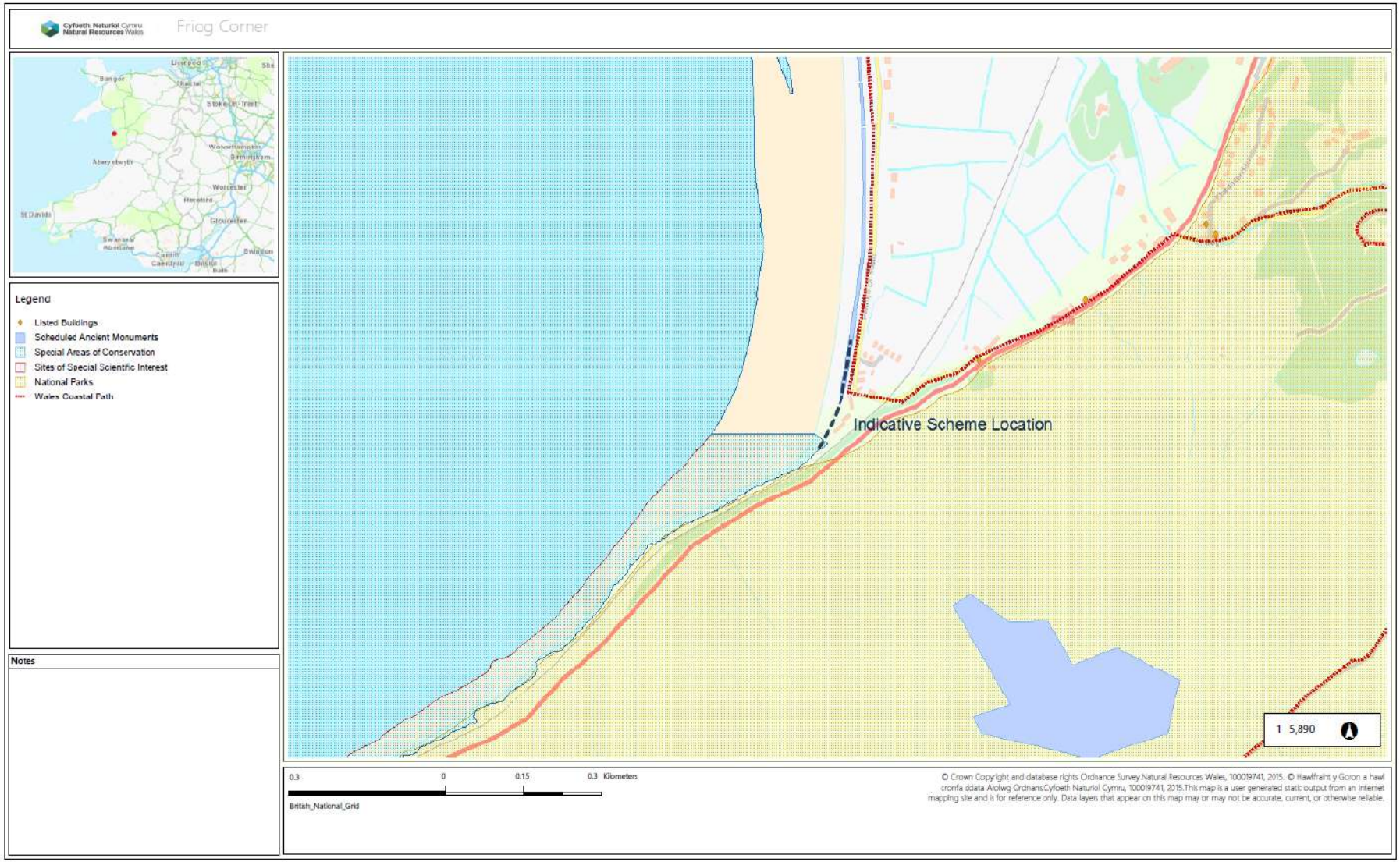
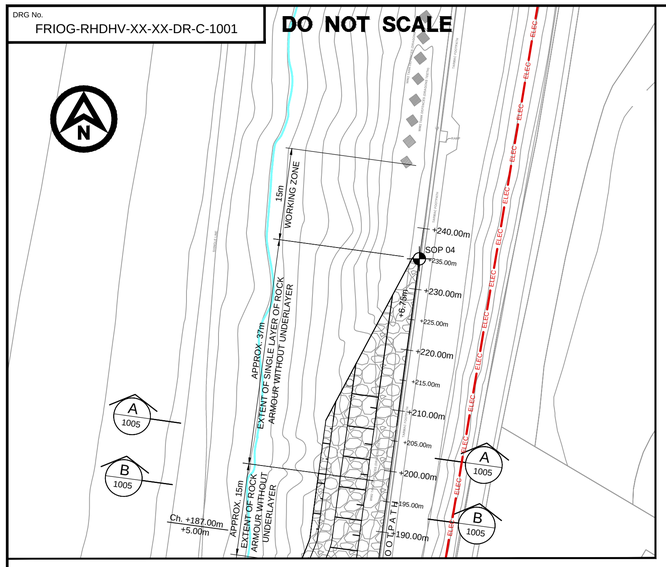


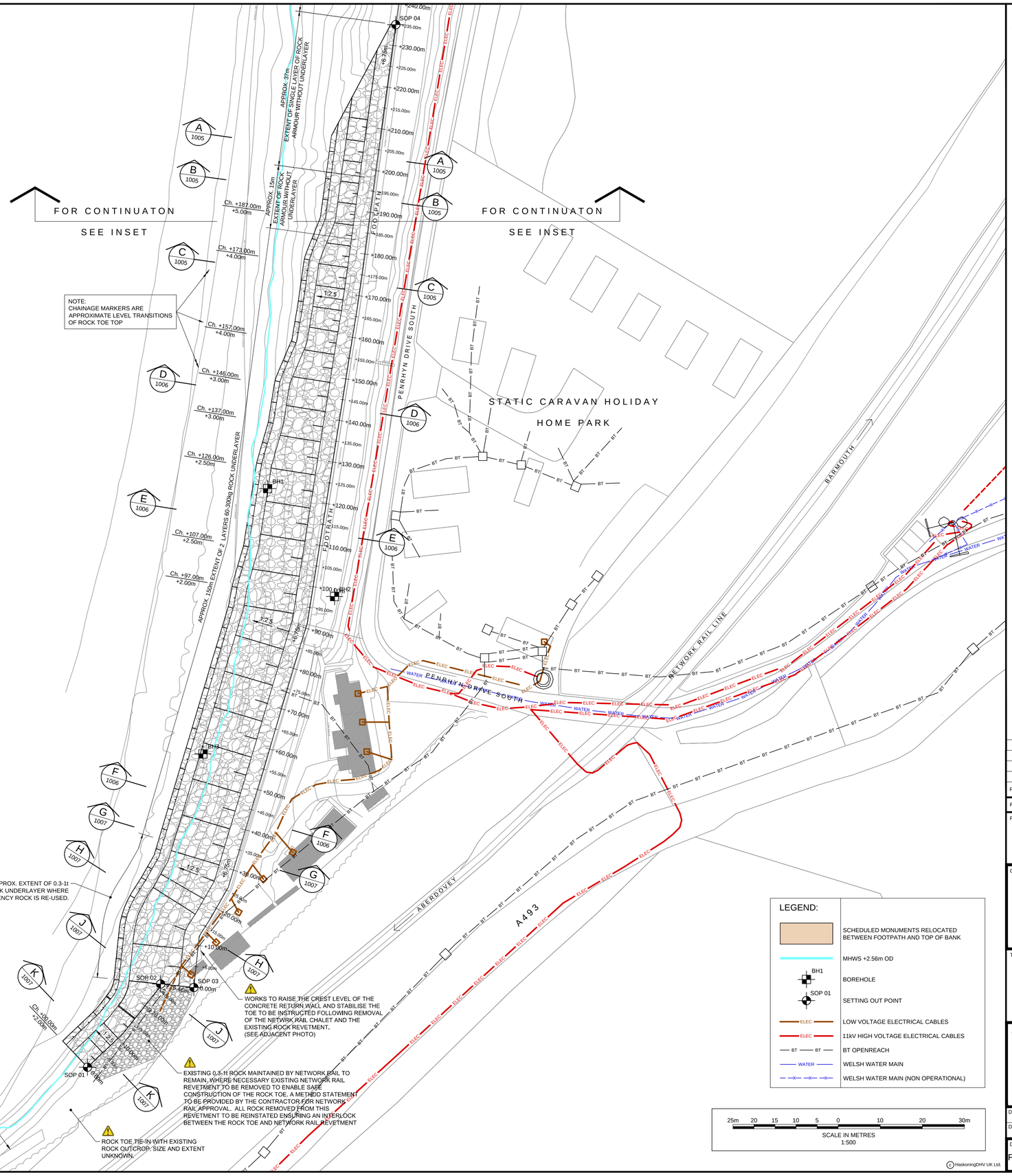
Figure 1 – Scheme Location

DRG No.
FRIOG-RHDHV-XX-XX-DR-C-1001

DO NOT SCALE



INSET CONTINUATION



PHOTOGRAPH OF EXISTING RETURN WALL TO BE RAISED

LEGEND:

- SCHEDULED MONUMENTS RELOCATED BETWEEN FOOTPATH AND TOP OF BANK
- MHWS +2.56m OD
- BH1 — BOREHOLE
- SOP 01 — SETTING OUT POINT
- ELEC — LOW VOLTAGE ELECTRICAL CABLES
- ELEC — 11kV HIGH VOLTAGE ELECTRICAL CABLES
- BT — BT OPENREACH
- WATER — WELSH WATER MAIN
- WELSH WATER MAIN (NON OPERATIONAL)

25m 20 15 10 5 0 10 20 30m
SCALE IN METRES
1:500

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO ORDNANCE DATUM NEWLYN (OD) UNLESS NOTED OTHERWISE.
3. ALL COORDINATES ARE IN METRES RELATIVE TO ORDNANCE SURVEY NATIONAL GRID.
4. ALL MATERIALS AND WORKMANSHIP WILL BE AS DEFINED IN THE SPECIFICATION UNLESS NOTED OTHERWISE.
5. THIS DRAWING IS BASED UPON THE TOPOGRAHIC SURVEY COMPLETED IN MARCH 2018 BY USK LAND SURVEY.
6. THE STATUTORY SERVICES SHOWN HAVE BEEN TAKEN FROM THE WYG GROUP LTD. CONSTRUCTION PHASE PLAN. THE CONTRACTOR IS TO CARRY OUT A FULL UTILITIES SEARCH AND SURVEY OF THE ENTIRE WORKING AREA PRIOR TO COMMENCEMENT OF ANY WORKS.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS:

CONSTRUCTION:

2. PUBLIC INTERFACE: PUBLIC ACCESSING THE BEACH AND FOOTPATH. RISK OF FALLING, ENTRAPMENT OR TRAFFIC ACCIDENTS.
4. TIDAL EXPOSURE: HIGH TIDE, WAVE RUN UP, AND STORM DAMAGE (SEMIDIURNAL TIDE -1.74m OD MLWS, +2.56m OD MHWS).
5. BEACH VARIABILITY: BEACH LEVELS FLUCTUATE, VARIABLE GROUND MAY CAUSE OVERTURNING OF PLANT.
7. DAMAGE TO EXISTING RETURN WALL (WHICH WAS DAMAGED IN 2014): FURTHER DAMAGE TO EXISTING RETURN WALL DURING EXCAVATION WORKS LEADING TO INCREASED RISK OF FAILURE.
8. DAMAGE TO EXISTING CREST WALL: RISK OF UNDERMINING DUE TO EXCAVATION AND PLACEMENT OF ROCK AND INCREASED LOADING BY PLANT.
9. DISTURBANCE TO EXISTING WW2 TANK TRAPS: FURTHER DESTABILISING OF TANK TRAPS DURING RELOCATION. METHODOLOGY FOR RELOCATION TO BE APPROVED BY NRW AND Cadw.
10. DISTURBANCE TO EXISTING ROCK ARMOUR: DESTABILISING OF NETWORK RAIL ROCK ARMOUR AND THE EMERGENCY ROCK ARMOUR. MAINTAIN SAFE DISPLACEMENT AND REINSTATEMENT AT TOE OF NETWORK RAIL ROCK ARMOUR.
11. WORKS FALL WITHIN SSSI: WORKS AT THE SOUTHERN END OF THE SITE FALL WITHIN THE SSSI (AT NETWORK RAIL ROCK ARMOUR). NO ACCESS ON TO PROTECTED REEF LOCATED WITHIN THE SSSI, 135m TO THE SOUTH OF THE WORKS, WHICH IS SENSITIVE TO PROLONGED BURIAL UNDER SEDIMENT.
12. UTILITIES: UTILITIES IDENTIFIED AT THE NETWORK RAIL CHALET TO BE DEMOLISHED. SERVICES SEARCHES AND SURVEY TO BE COMPLETED BY CONTRACTOR PRIOR TO WORKS COMMENCING.

MAINTENANCE /OPERATION:

DEMOLITION:

SETTING OUT INFORMATION

REF	EASTING (m)	NORTHING (m)
SOP 01	261053.20	311939.73
SOP 03	261078.47	311958.67
SOP 02	261070.57	311959.50
SOP 04	261126.44	312187.43

FOR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHK	APP
C2	JUNE '18	MODIFICATIONS TO SUIT CLIENTS COMMENTS	DS	DC	TE
C1	JUNE '18	CONSTRUCTION ISSUE	DS	DC	TE
P2	MAY '18	STATUTORY SERVICES & S.O. INFO ADDED	DS	DC	TE
P1	APRIL '18	FOR CLIENT REVIEW	DS	DC	TE

REVISIONS

PROJECT
FRIOG CORNER SEA DEFENCE REPAIR AND IMPROVEMENT WORKS

CLIENT
Cyfoeth Naturiol Cymru Natural Resources Wales

TITLE
PROPOSED GENERAL ARRANGEMENT PLAN

Royal HaskoningDHV
Enhancing Society Together
Rightwell House, Bretton, Peterborough, PE3 8DW
Tel +44(0)1733 334455
Email info.peterborough@uk.rhdhv.com
Website www.royalhaskoning.com

DRAWN	DS	CHECKED	DC	APPROVED	TE
DATE	APRIL 2018	SCALE	AS SHOWN	REF.	FRIOG-RHDHV-XX-XX-DR-C-1001.dwg

DRAWING No.	SUITABILITY	REVISION
FRIOG-RHDHV-XX-XX-DR-C-1001	A	C2

APPENDIX III:

N_j_cmcltgpmlkclr_jGltcqrge_rgmlPcnmpr

Archaeology Wales

A Palaeoenvironmental Investigation at Friog Corner, Fairbourne, Dolgellau

Final Report

By
Rhiannon Philp

Report No. 1708

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Web: arch-wales.co.uk

REGISTERED CIfA ORGANISATION

Archaeology Wales

A Palaeoenvironmental Investigation at Friog Corner, Fairbourne, Dolgellau

Final Report

Prepared For: Natural Resources Wales

Edited by: Rowena Hart	Authorised by: Rowena Hart
Signed:	Signed:
Position: Project Manager	Position: Project Manager
Date:	Date:

By
Rhiannon Philp

Report No. 1708

September 2018

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Contents

List of Tables

List of Figures

List of Plates

Summary

A palaeoenvironmental investigation was undertaken prior to the proposed works to repair tidal defences at Friog Corner.

Consultation with Natural Resources Wales' (henceforth NRW) Earth Sciences Team and Gwynedd Archaeological Trust (henceforth GAT) confirmed that submerged/buried peat deposits have been identified at Friog in the past, along with potential fossil forest remains within the intertidal zone. Similar deposits have also been identified further south at Tywyn and at Borth, where extensive investigations have been carried out. These deposits contain palaeoenvironmental remains that can provide information about the historic landscape development as well as any human interaction within it.

Archaeology Wales undertook an investigation involving radiocarbon dating and palaeoenvironmental sampling and analysis to gather information about the prehistoric environment represented by the now buried organic peat deposits.

The analysis has revealed the remains of a Neolithic fenland landscape under the modern beach surface, which was preceded by what appears to have been a marine transgression in the early Neolithic period. The presence of a significant microcharcoal signal within the environmental record suggests a sustained human presence throughout the period represented in the deposits.

All work was undertaken in accordance with the standards and guidelines of the Chartered Institute for Archaeologists (2014) and following Historic England's Guidelines for Environmental Archaeology (2002).

1. Introduction

A programme of palaeoenvironmental investigation was undertaken prior to the commencement of flood prevention works at Friog Corner, Dolgellau, (SH6109112019), which will involve the construction of rock armour on the existing sea defence alignment.

The peat deposits at Friog corner are known to become exposed intermittently. The deposits are also listed on the regional HER. No further investigation of these deposits has so far been undertaken. Along the west coast of Wales, a number of further intertidal deposits have been identified. The British Geological Survey (henceforth BGS) memoir identifies peat deposits along with tree remains to the south of Friog at Tywyn. These are suggested to be contiguous with the well-known, 4700-year-old deposits investigated at Borth, however caution should be taken when comparing intertidal deposits from separate locations without further investigation.

2. Site Description

The site is located at the southern (Friog) end of Fairbourne beach at approximate grid reference SH 61091 12019. The site is within the intertidal zone, which is gently sloping, with a shingle storm beach in the upper regions. The site occurs near to the mouth of the Afon Mawddach.

The underlying geology is defined by the Maentwrog Formation and consists of a sedimentary bedrock of mudstone and siltstone formed during the Cambrian Period (BGS 2017).

3. Archaeological background

Two Regional Historic Environment Records exist for the site under investigation:

- PRN 31910: Exposed peat deposit on beach containing roots, stumps, trunks and hazelnut shells.
- PRN 4880: Friog: Findspot: a Neolithic polished stone axe

Furthermore, NRW and GAPS have highlighted similar deposits on the west Wales coast at Tywyn and Borth. Further intertidal deposits have also been identified in both north and south Wales (Nayling 1998, Bell *et al*. 2000, Bell 2007, Brayshay *et al*. 2007, Bennet *et al*. 2010, Murphy *et al*. 2014.) Palaeoenvironmental investigations into these further known sites have revealed dates spanning from the Mesolithic period, through to the Bronze Age and provided valuable information regarding the development of the historic environment at each location. The variation in dates from one site to the next highlights the importance of treating each location as a separate entity until further investigations have been undertaken and not assuming similarities between sites.

The stone axe found at Friog suggests a Neolithic presence in the area, however without further contextual information, it is unclear whether the find was held within specific deposits and so cannot be reliably used to date the peat deposits present at the site. Evidence from other similar sites around the Welsh coast suggest that the deposits at Friog are most likely to range between Mesolithic through to Bronze Age in date.

4. Objectives

The objective of the palaeoenvironmental survey was to identify and record any sediments within the intertidal zone representative of the prehistoric land surface, particularly those with an organic content, within the area selected for the proposed sea defence repairs work.

The objective of the sampling was to obtain material for both radiocarbon dating, to provide date ranges for the earliest and latest organic deposits, and palynological analysis, to provide information about environmental changes related to climate, sea level change and potentially human interaction with the environment.

The investigation addressed key points raised by the Research Framework for the Archaeology of Wales (2011-2017), which emphasises the need to develop new understandings on the prehistory of Wales, with particular mention to chronological refinement. Specific emphasis is also placed on improving the resolution of environmental record in Wales and gaining a better understanding of the evolution of Wales' estuaries and coastlines through mapping, sampling, dating and analysing intertidal deposits.

5. Methodology

5.1 Initial Prospection

Initially prospective cores were taken from 6 boreholes (see figure 1) through the beach at the base of the pebble storm beach using a 20mm gouge corer. Cores could not be taken any closer to the top of beach due to it not being possible to auger through the pebble bank. The prospective cores were then measured and the lithology at each site recorded. Cores 1-3 produced clear sediment sequences, but at borehole sites 4 and 5, coring was not possible due to a thick shingle layer beneath the sand. This suggests the storm beach extended further beneath the sand at this point. Despite further prospection within a 5m radius, the organic deposits could not be identified in this area. Borehole site 6 was therefore chosen to try and identify the most northerly accessible deposits on the beach. Prospection around site 6 indicated that no further deposits were accessible to the

north. A GPS point was taken using a survey grade GPS to record position and surface height of each borehole site from which all depth measurements will related to.

5.2 Sample Extraction

The sample extraction technique initially proposed became problematic due to the level of sand on the beach and the high water table. Even at low tide, the water table level made digging a trench virtually impossible, with the trench continuously infilling with sand and water. This was noted as a potential problem in the initial methodology and led to the adoption of the second proposed approach; using the gouge corer. Once again this proved difficult, as the suction created by the high water table mixed with the highly friable nature of the peat led to cores not holding within the auger chamber. This is a common problem in intertidal investigations and success is dependent on the conditions encountered on the day, which cannot always be predicted. If lower levels of sand had been present on the beach, the initial methodological approaches may have been more successful.

A different approach was therefore adopted, in order to extract material from the beach. The Edelman auger was used to extract spot samples from each of the recorded deposits followed by the 20mm gouge corer when it became too difficult to extract using the Edelman.

Though not ideal, due to the possibility of sample contamination, this approach allowed for samples to be taken from each layer to provide material for radiocarbon dating and pollen analysis.

5.3 Radiocarbon Dating

2cm3 bulk sub samples were extracted from the spot samples pertaining to top and bottom of each peat deposit from borehole sites 1, 2 and 6 for radiocarbon dating. Site 3 was not sampled as it was deemed close enough to site 6 to be related. Site 6 was chosen as it was deemed to have a longer sequence, allowing analysis of a wider timeframe. Radiocarbon dating was undertaken at the ^{14}CHRONO centre, Queen's University Belfast. Samples were pre-treated at the lab prior to radiocarbon dating to remove calcareous contamination and fulvic acids. 4% hydrochloric acid was added, and the sample heated to 80˚C for 2 hours prior to rinsing until the pH returned to neutral (Reimer et al. 2015, 5). Dates were calibrated using OxCal v4.3 (Bronk Ramsey 2009) and the IntCall13 and MARINE13 radiocarbon age calibration curves (Reimer et al. 2013). Calibrated dates were rounded to the nearest 10 years, as recommended by Mook (1986) due to the conventional radiocarbon ages having error margins greater than 25 years.

5.4 Pollen Analysis

Pollen grains are particularly resistant to decay due to the chemical structure of their outer walls, known as the exine. There are also clear variations in the form of the protective exine, which allows

for identification to specific species (Moore *et al.* 1991, 2). These attributes make pollen a very useful tool in the reconstruction of past environments stretching back many thousands of years. Pollen can survive in any environment where microbial activity is suppressed, including waterlogged, saline, anaerobic or desiccated conditions (Moore *et al.* 1991, 2).

By analysing the species of pollen present within sedimentary deposits, it is possible to construct a picture of the environment, and how it changes through time. Changes in pollen levels for specific species can inform on both local and wider area changes in vegetation, which can include transitions between open and enclosed, wet and dry and freshwater and saline environments.

In some cases, the pollen record can also indicate human interaction with the environment, through the introduction of domesticated plant species, such as cereals, or the growth/decline of certain species in archaeological record in conjunction with other factors such as charcoal or evidence of domesticated grazing.

Subsamples measuring $2cm^3$ were extracted from the sampled material and sent to Quaternary Scientific (Quest) at Reading University where the material was processed. Lycopodium tablets were added to samples prior to treatment to act as an exotic marker. Each tablet contains a known quantity of lycopodium spores. These are counted along with the native pollen and spores and used to indicate pollen concentrations. Samples were then sieved, subjected to heavy liquid separation and acetolysis to remove unnecessary organic and minerogenic components and then suspended in glycerol jelly prior to mounting on microscope slides.

Pollen were counted using an Olympus CH2 microscope at x400 magnigication (or x1000 where needed for identification). A sum of Total Land Pollen (TLP) was obtained from each sample. This included arboreal, shrub and herb species, but excluded spores and aquatic species, which were counted alongside separately. From these counts, it was then possible to calculate pollen percentages. Three percentage sums were calculated using the Tilia software package (Grimm 2015): Total Land Pollen (herbs, shrubs and trees), Total Land Pollen + Spores and Total Land Pollen + Aquatics.

Pollen and spores were identified using a combination of Moore *et al.* (1991) and Beug (2004). The latter was not used for initial identification due to it being primarily designed for central European studies, however it served to provide extra clarification where identity could not be acquired using Moore et al alone. Pollen and spore nomenclature used in this report follows Bennett (1994) and vascular plant nomenclature follows Stace (2010). In this investigation, *Corylus avellana* type is assumed to represent hazel in line with suggestions by Edwards (1981). Poaceae pollen grains with a diameter over 40µm are classed as cereal type (Andersen 1979), but it should be noted that these

may also include some wild grasses such as Glyceria (Moore *et al.* 1991, 100). This is an important consideration due to the geographical context of this study, as Glyceria is a species native to coastal environments. Decisions regarding Poaceae vs Glyceria have been made based on the environmental context indicated by both the lithological and pollen record.

Microcharcoal also survives the preparation procedure and can be indicative of human presence in the environment. In accordance with Mooney and Tinner (2011), only completely opaque, black, angular fragments over 10µm in size were counted. Once again counting continued until the specified TLP had been reached. Microcharcoal results are expressed as counts rather than percentages.

Pollen diagrams were plotted using the TILIA and TILIA*GRAPH programmes (Grimm 2015) displaying pollen and microcharcoal values. Zoning was accomplished using the CONISS (Constrained Incremental Sum of Squares) function within the TILIA software package.

6. Results

6.1 Sediment Characterisation

A woody peat layer was identified overlying a mixed organic clay, likely to represent an interface layer between the peat and an underlying grey-blue clay at all sample sites chosen for further analysis. The deposits appeared to be the same across the beach, but varied in thickness, with the most southerly core recording a much thinner peat deposit than those further to the north. This is probably due to the underlying topography, but further information regarding this was unobtainable within the confines of this investigation due to the difficulties faced during coring.

6.2 Radiocarbon Dating

The radiocarbon dates obtained are listed in table 1 below:

Table 1: Radiocarbon dates obtained from peat deposit at Friog Corner

Position in Peat	Borehole 1	Borehole 2	Borehole 6
Top	2810-2680 cal BC	2920-2860 cal BC	3310-2900 cal BC
Bottom	3360-3100 cal BC	3370-3080 cal BC	3100-2900 cal BC

The radiocarbon dates obtained suggest that the peat deposit encountered in each core is very likely to be of the same age and representative of one continuous deposit. The dates returned sit comfortably within the Neolithic period. The dates returned from borehole 6 appear to be inverted, suggesting that the material obtained from this core may have become contaminated. This is not unusual within a dynamic coring environment, such as the intertidal zone, particularly where

deposits struggle to hold within the corer. Younger material can accidentally be dropped into the borehole and mix with the older material below. In this case it would be necessary to discount the results from borehole 6, as they are clearly contaminated. This is unfortunate, as it represented the longest sequence on site, but does not detract from the results of the other two cores, which complement each other well. Despite being inverted, the dates at borehole 6 are not far off those obtained from the other two sample sites, suggesting the material is still part of the same peat deposit.

Due to the inversion of the radiocarbon dates at site 6, subsamples from this borehole were not be included in pollen analysis, as the samples appear to have become contaminated and would therefore not provide accurate data to the investigation. The remaining two cores were analysed in full, as detailed below.

6.3 Pollen

Raw pollen counts are displayed in Appendix 1 (Tables 4 and 5). Pollen diagrams displaying the results from the pollen analysis can be found in Figures 3 and 4. Descriptions of each of the pollen zones identified along with individual dates and interpretations can be seen in Tables 2 and 3 below:

Table 2: Pollen Zone Descriptions for Borehole Position 1

Zone	Associated Radiocarbon Date	Description	Interpretation
FCD_1-1	3360-3100 cal BC	Levels of *Poaceae* (grass) increase from 20% to 40% of the Total Land Pollen (TLP), with *Cyperaceae* (sedge) levels falling slightly from 25% and 13%. *Chenopodiaceae* (goosefoot/fat hen) is present throughout, but in very low quantities (<5%). Further herbaceous species ae present throughout the pollen zone in trace amount only including *Plantago* (plantain) species and *Achillea* (yarrow). Other herbaceous species are present in very low quantities at singular locations within the zone and are too low to be significant within the sequence Tree species are less frequent in the environment, but dominant species include *Alnus* (alder) and *Quercus* (oak), which represent 10% of the TLP each. *Corylus*	**Environment** The pollen present indicates an open fenland environment dominated by grasses, with the presence of sedges suggesting a damp potentially wetland environment. The presence, albeit small, of aquatic species suggests pooling water in the near vicinity, thought this is not a dominant signal. A background woodland signal is present dominated by oak, alder and hazel, suggesting a mixture of dry and wet woodland around the edge of the open grassland.
			Human Impact There is a significant microcharcoal signature present in this zone, which is likely to be relate to human presence within the surrounding landscape. The high

Zone	Associated Radiocarbon Date	Description	Interpretation
		(Hazel) is also present at 14%. Species present in trace amounts include *Betula* (birch), *Tilia* (lime), *Ulmus* (elm), *Fraxinus* (ash), *Salix* (willow), *Hedera Helix* (ivy) and *Ilex* (holly). There is very low presence of Aquatic species including *Typha Latifolia* (bull rushes/reeds), *Potamogeton* (pond weed), *Myriophyllum* (watermilfoils), *Nymphaea alba* (water lily) and *Lemna* (duckweed). All are less than 5%.	levels could potentially suggest vegetation clearance within the surrounding landscape, though direct evidence for this is not available.
			Sea Level The presence, albeit low in quantity, of goosefoot/fat hen is suggested in this instance to be indicative of a potential marine influence.
FCD_1-2	2810-2680 cal BC	*Poaceae* maintains dominance in the environment with a drop off in *Cyperaceae* to <5% TLP. *Chenopodiaceae* remains present in low quantities. Further herbaceous species are still present in very low levels including *Achillea, Apiaceae* (umbellifers)*, Rumex* (docks) and *Ranunculus* (buttercups). The woodland signal is maintained at the same level as in FCD_1-1, as is the aquatic signal. Microcharcoal reduces significantly within this zone.	**Environment** The environment continues as an open grassland, but sedge becomes less dominant suggesting the environment is drying. The background woodland signal remains the same suggesting the surrounding landscape is stable in its environment.
			Human Impact The microcharcoal signal reduces significantly in this zone, which could suggest a reduction of human activity in the local area.
			Sea Level The maintained low levels of Goosefoot/Fat Hen suggest a maintained marine source within the local area.

Table 3: Pollen Zone Descriptions for Borehole Position 2

Zone	Associated Radiocarbon Date	Description	Interpretation
FCD_2-1	3370-3080 cal BC	*Poaceae* dominates rising from 26-40% TLP within the zone. *Cyperaceae* are present at c.15-20% TLP. *Chenopodiaceae* are present in trace amounts throughout the sequence as are a number of herbaceous species	**Environment** The pollen indicates an open fenland landscape dominated by grasses and sedge species.
			Human Impact There is a significant peak in microcharcoal, which suggests human activity

Zone	Associated Radiocarbon Date	Description	Interpretation
		including *Apiaceae*, *Plantago* species and *Urtica* (nettles). Potential *Cerealia* (cereals) have been identified as being present in very low levels, though this could also be identified as *Glyceria* (coastal grass) (see explanation in interpretation). *Alnus* and *Quercus* dominate the Tree species, with *Alnus* nearing 20% TLP in this zone. Low levels of *Ulmus* are also present throughout with a small peak towards the centre of the zone. *Corylus* increases from 5-10% TLP. Very low levels <5% of aquatic species including *Myriophyllum* and *Typha Latifolia* are present throughout the zone. A significant peak in charcoal is present in this zone.	within the surrounding local area.
			Sea Level The low level of goosefoot/fat hen could be indicative of a marine influence within the environment such as a tidal salt marsh or inlet.
FCD_2-2	2920-2860 cal BC	*Poaceae* remains dominant, maintaining levels between 30-40% and C*yperaceae* remains stable between 15-20% TLP. Potential *Cerealia* or *Glyceria* maintains its presence at low levels. Further herbaceous species become less prominent within this zone. *Quercus* and *Ulmus* maintain their levels, but *Alnus* increases to 27% TLP. There is a significant drop in microcharcoal from the previous zone, but a small amount of microcharcoal is still present.	**Environment** The open fenland appears to be maintained, but the slight reduction in sedge species could be indicative of a period of drying.
			Human Impact The reduction in microcharcoal could be indicative of a reduction in local human activity.
			Sea Level Low levels of goosefoot/fat hen are maintained suggesting a marine influence is still present in the wider vicinity.

6.4 Environmental Summary

The analysis has shown that a Neolithic fenland landscape dominated by grass and sedges is represented in the organic layers and overlays evidence for a potential earlier saltmarsh environment indicating potential marine incursion. The marine indicators are in the form of the blue-grey clay lithology and the presence of *Chenopodiaceae*, one of the largest families of halophytic (salt loving) plants (Alghamdi 2012, 9) and which has been used regularly in Welsh intertidal contexts as an indicator of marine influence (Caseldine 2000; Dark 2007; Timpany 2007).

The pollen evidence also indicates a surrounding landscape consisting of a mixture of alder carr, alongside oak and hazel dominated woodland. The microcharcoal record suggests significant burning within the local vicinity during the period related to salt marsh development, which decreases during the fenland period to a much lower background level. This would suggest human activity within the local vicinity may have been more persistent during the salt marsh period and then reduced to background domestic presence during the fenland phase. Burning could be representative of clearance of the local landscape or may be indicative of very localised domestic activity nearby.

7. Discussion

The dating suggests that the Neolithic stone axe identified at Friog Corner is very likely to be contemporary with the landscape represented by the peat deposit present under the sand.

The buried peat appears to be one single deposit representing a fairly stable fenland landscape during the formation of the deposit that is present for at least 120m along the beach from Friog Corner. The radiocarbon dating suggests the peat formed over a period of around 800 years between c. 3400 cal BC and 2600 cal BC, placing the formation of the deposits within the Neolithic period.

The underlying minerogenic sediments are indicative of a differing earlier environment. They suggest that prior to the onset of a grass and sedge fenland, a tidal environment existed at the site. This change occurred within the Early Neolithic, according to the lowest radiocarbon dates and suggest the minerogenic deposits developed within the late Mesolithic to early Neolithic periods.

The presence of this landscape ties in with the mythological Cantre'r Gwaelod story, which describes the submergence of lands belonging to Seithennin, caused by the misdemeanour of Mererdid, the "fountain cup-bearer," in the area now known as Cardigan Bay (Bromwich 1950, 222). Though supposedly based in the 6th century the first versions appear to emerge in the 13th century and was heavily embellished during the 19th and 20th centuries to include themes of temperance (North 1957, 148). Similarities can also be drawn between the Cantre'r Gwaelod story and that of Llys Helig on the north coast of Wales (North 1940). It is likely these stories evolved from an attempt to understand the appearance of past landscapes within the intertidal zone after storms. During the early 12th century, a storm in St. Bride's Bay in south-west Wales led to the exposure of "the surface of the earth that had been covered from many ages and discovered the trunks of trees cut off, standing in the very sea itself" (Cambrensis 1189; 2001 edition, 37). Cambrensis recognised that the sea levels

had risen and cited Noah's flood as a potential reason, but interestingly for the time also suggested it could have been caused by a gradual encroachment due to "the violence of the sea always overflowing its bounds and encroaching on the land" (Cambrensis 1189; 2001 edition, 38). It is likely that similar exposures occurred around the west coast of Wales due to the stormy weather of the time and it is not beyond reason that this may have led to local inhabitants trying to explain the unusual sites on their beaches.

7.1 Wider Context

The Neolithic fenland identified at Friog Corner appears to be very similar to deposits dated to the Neolithic at Port Eynon and Broughton Bay on Gower in south Wales (Philp in Prep.) and Goldcliff on the Severn Estuary.

Similar observations have also been made regarding the identification of marine transgressions and regressions during the Mesolithic to Neolithic transition, resulting in a change from minerogenic sediment to freshwater peat accumulation, on the south Wales coast at Port Eynon (Philp in prep), Goldcliff (Bell 2007) and Lydstep (Murphy et al 2014).

The findings of this investigation also prove the importance of researching discreet deposits around a coastline. The deposits are older than those investigated nearby and show that interpretation should not be based on analogy alone.

7.2 Future Archaeological Potential

At all the comparative sites listed above, direct human interaction with the now buried or submerged landscapes has been identified through the presence of human footprints within earlier Mesolithic peat deposits. Though no Mesolithic deposits have yet been identified at Friog Corner, the potential for the presence of earlier deposits is still high. At most of the comparative sites, Mesolithic deposits have been found in the lower intertidal zone, which was not investigated during this study. The discovery of human footprints would rely on the natural exposure of peat deposits due to significant sand movement on the beach, as the depth of sand present during the investigation indicated any excavation would likely be futile in the conditions presented at the time.

The initial borehole survey undertaken on the current tidal defensive bank by Royal Haskoning DHV indicated the peat identified in this investigation extends beneath the shingle bank and may be encountered during further intrusive works. The potential for archaeological evidence on the surface and within this deposit should be noted and necessary steps taken during the tidal defence repairs to identify and record any archaeological evidence that is present.

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APPENDIX I:

Pollen Counts

Table 4: Pollen Counts from Borehole Location 1

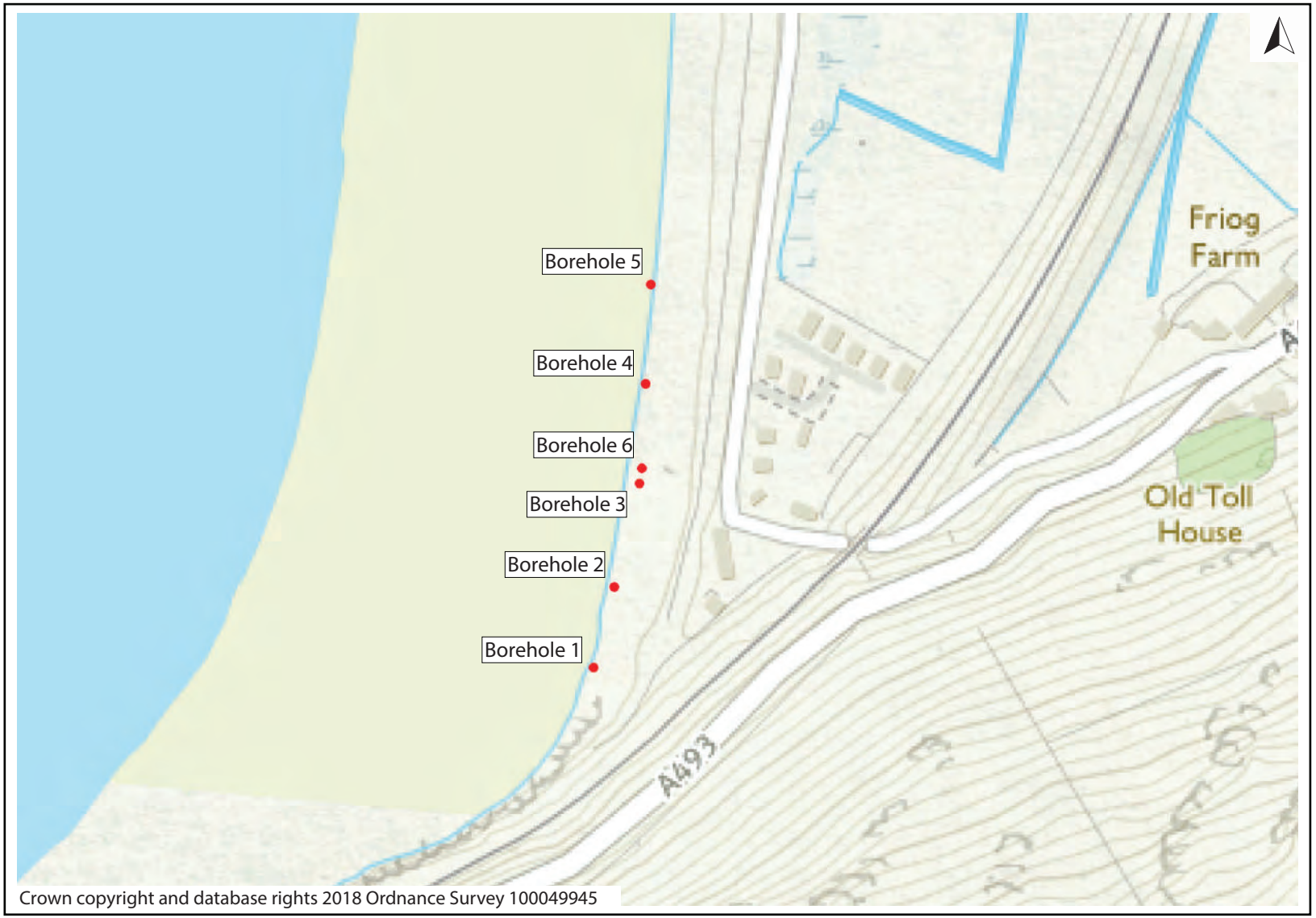
Pollen				Depth:	57	63	78	83	105
Code	Name	Element	Units	Group					
#Samp.Analyst	Rhiannon Philp								
Lyc.tab:quantity added:number	Lycopodium tablets	quantity added	number	CONC	1	1	1	1	1
Lyc.tab:concentration:number/tablet	Lycopodium tablets	concentration	number/tablet	CONC	20848	20848	20848	20848	20848
Lyc.spik:counted:number	Lycopodium counted	counted	number	CONC	50	54	222	149	103
samp.quant:mass:g	Sample quantity	mass	g	CONC	2	2	2	2	2
Aln	Alnus glutinosa	pollen	NISP	Tree/Shrub	31	38	23	30	37
Bet	Betula	pollen	NISP	Tree/Shrub	1	3	1	5	8
Querc	Quercus	pollen	NISP	Tree/Shrub	38	46	30	50	40
TilaCor	Tilia cordata	pollen	NISP	Tree/Shrub	2		1		2
Ulmus	Ulmus	pollen	NISP	Tree/Shrub	14	8	2	6	12
Cory	Corylus avellana-type	pollen	NISP	Tree/Shrub	45	45	22	25	53
Frax	Fraxinus	pollen	NISP	Tree/Shrub	4	4	1	4	7
Sal	Salix	pollen	NISP	Tree/Shrub					1
Heder	Hedera helix	pollen	NISP	Tree/Shrub		1	1	1	
Ilex	Ilex	pollen	NISP	Tree/Shrub		2	1		
Jun	Juniperus	pollen	NISP	Tree/Shrub	2		1		5
Poa	Poaceae undiff	pollen	NISP	HERB	243	229	235	177	95
Cereali	Cerealia-type	pollen	NISP	HERB	5	5	5	7	3
Cyp	Cyperaceae undiff	pollen	NISP	HERB	10	9	57	49	97
Achill	Achillea-type	pollen	NISP	HERB		1	1	7	1
Apia	Apiaceae	pollen	NISP	HERB	2	1		3	
Cheno	Chenopodioideae	pollen	NISP	HERB	5	10	4	7	4
Daph	Daphne	pollen	NISP	HERB			1		

Pollen				Depth:	57	63	78	83	105
Code	Name	Element	Units	Group					
ErynMari	Eryngium maritimum	pollen	NISP	HERB			1		
Fili	Filipendula	pollen	NISP	HERB				1	
Glau	Glaucium	pollen	NISP	HERB				1	
PlanLa	Plantago lanceolata	pollen	NISP	HERB			2	5	8
PlanMaj	Plantago major	pollen	NISP	HERB			2	3	9
PrunDom	Prunus domestica	pollen	NISP	HERB					4
Ranun	Ranunculus-type	pollen	NISP	HERB		1	2		
SambNig	Sambucus nigra	pollen	NISP	HERB					1
Sax	Saxifragaceae undiff	pollen	NISP	HERB				1	
Rumex	Rumex	pollen	NISP	HERB		1			
Urtica	Urtica	pollen	NISP	HERB			3		
Urt	Urticularia	pollen	NISP	HERB				1	
Val	Valeriana	pollen	NISP	HERB				2	
Poly	Polypodium	spore	NISP	SPORE	3	8	3	8	8
Sphag	Sphagnum	spore	NISP	SPORE		3	1	6	
Lemna	Lemna	aquatic	NISP	AQUATIC				2	
TyphaLat	Typha latifolia	aquatic	NISP	AQUATIC		3		1	1
Myrio	Myriophyllum	aquatic	NISP	AQUATIC	7	4		8	2
Nuph	Nuphar	aquatic	NISP	AQUATIC				1	
Nymph	Nymphaea alba type	aquatic	NISP	AQUATIC				3	1
Pot	Potamogeton	aquatic	NISP	AQUATIC	4	2	5	3	12
Indet	Indeterminate	Indeterminate	NISP	INDET				10	
Charcoal	Microcharcoal ≥25µm	Microcharcoal	NISP	CHAR	7	20	68	138	118

Table 5: Pollen Counts from Borehole Position 2

Pollen				Depth:	68	78	82	86
Code	Name	Element	Units	Group				
#Samp.Analyst	Rhiannon Philp							
Lyc.tab:quantity added:number	Lycopodium tablets	quantity added	number	CONC	1	1	1	1
Lyc.tab:concentration:number/tablet	Lycopodium tablets	concentration	number/tablet	CONC	20848	20848	20848	20848
Lyc.spik:counted:number	Lycopodium counted	counted	number	CONC	9	13	24	99
samp.quant:mass:g	Sample quantity	mass	g	CONC	2	2	2	2
Aln	Alnus glutinosa	pollen	NISP	Tree/Shrub	110	62	65	71
Bet	Betula	pollen	NISP	Tree/Shrub	4	3	1	11
Carp	Carpinus	pollen	NISP	Tree/Shrub		1	2	4
PinSyl	Pinus sylvestris	pollen	NISP	Tree/Shrub		2	8	8
Querc	Quercus	pollen	NISP	Tree/Shrub	19	35	27	30
TilaCor	Tilia cordata	pollen	NISP	Tree/Shrub	1	2		2
Ulmus	Ulmus	pollen	NISP	Tree/Shrub	19	10	27	8
Cory	Corylus avellana-type	pollen	NISP	Tree/Shrub	41	39	19	20
Frax	Fraxinus	pollen	NISP	Tree/Shrub	1	3	1	5
Sal	Salix	pollen	NISP	Tree/Shrub	1		2	2
Jun	Juniperus	pollen	NISP	Tree/Shrub		2		4
Poa	Poaceae undiff	pollen	NISP	HERB	136	157	130	107
Cereali	Cerealia-type	pollen	NISP	HERB	8	6	16	12
Cyp	Cyperaceae undiff	pollen	NISP	HERB	55	59	74	63
Achill	Achillea-type	pollen	NISP	HERB		1		
Apia	Apiaceae	pollen	NISP	HERB	2	2		2
Arm	Armeria type	pollen	NISP	HERB				1
AstAst	Asteraceae Asteroideae	pollen	NISP	HERB			1	1
Call	Calluna	pollen	NISP	HERB				1
Cheno	Chenopodioideae	pollen	NISP	HERB	2	7	4	12

Pollen				Depth:	68	78	82	86
Code	Name	Element	Units	Group				
Cirs	Cirsium type	pollen	NISP	HERB	1			
Crat	Crataegus	pollen	NISP	HERB				1
Knau	Knautia	pollen	NISP	HERB				1
PlanLa	Plantago lanceolata	pollen	NISP	HERB	5	6	7	12
PlanMaj	Plantago major	pollen	NISP	HERB	5	1	15	17
Plant	Plantago undiff	pollen	NISP	HERB				1
Sax	Saxifragaceae undiff	pollen	NISP	HERB		1		1
Urtica	Urtica	pollen	NISP	HERB			2	6
Poly	Polypodium	spore	NISP	SPORE	4	3	1	9
Sphag	Sphagnum	spore	NISP	SPORE			3	1
Lemna	Lemna	aquatic	NISP	AQUATIC		2		
TyphaLat	Typha latifolia	aquatic	NISP	AQUATIC	1	3	10	5
Myrio	Myriophyllum	aquatic	NISP	AQUATIC	1	7	1	1
Pot	Potamogeton	aquatic	NISP	AQUATIC	1	4		
Charcoal	Microcharcoal ≥25µm	Microcharcoal	NISP	CHAR	20	8	18	65



Mean High Water Level (MHWL)

● Borehole Site

Figure 1:
Plan showing location of boreholes

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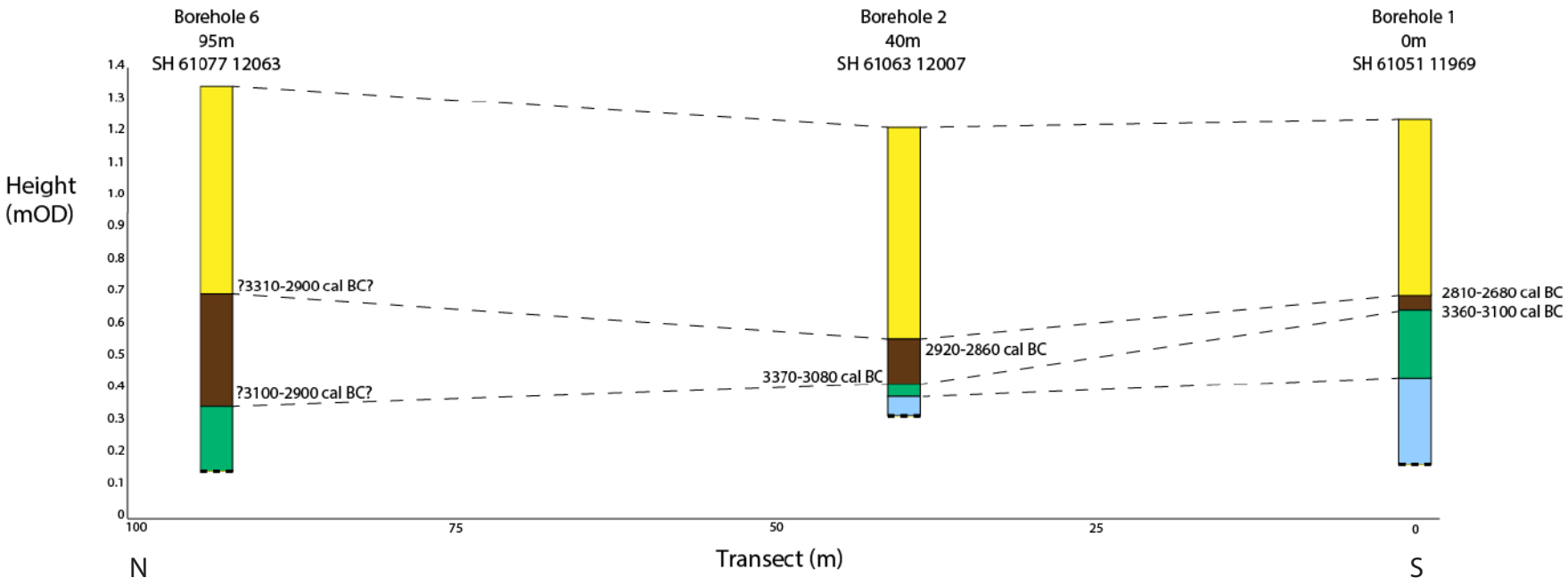
Revealing the past, informing the future



Sand

Woody Peat

Mixed Organic Clay

Grey-Blue Clay

Limit of investigation

Figure 2:
Diagram of sampled sedimentary deposits across transect

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Revealing the past, informing the future

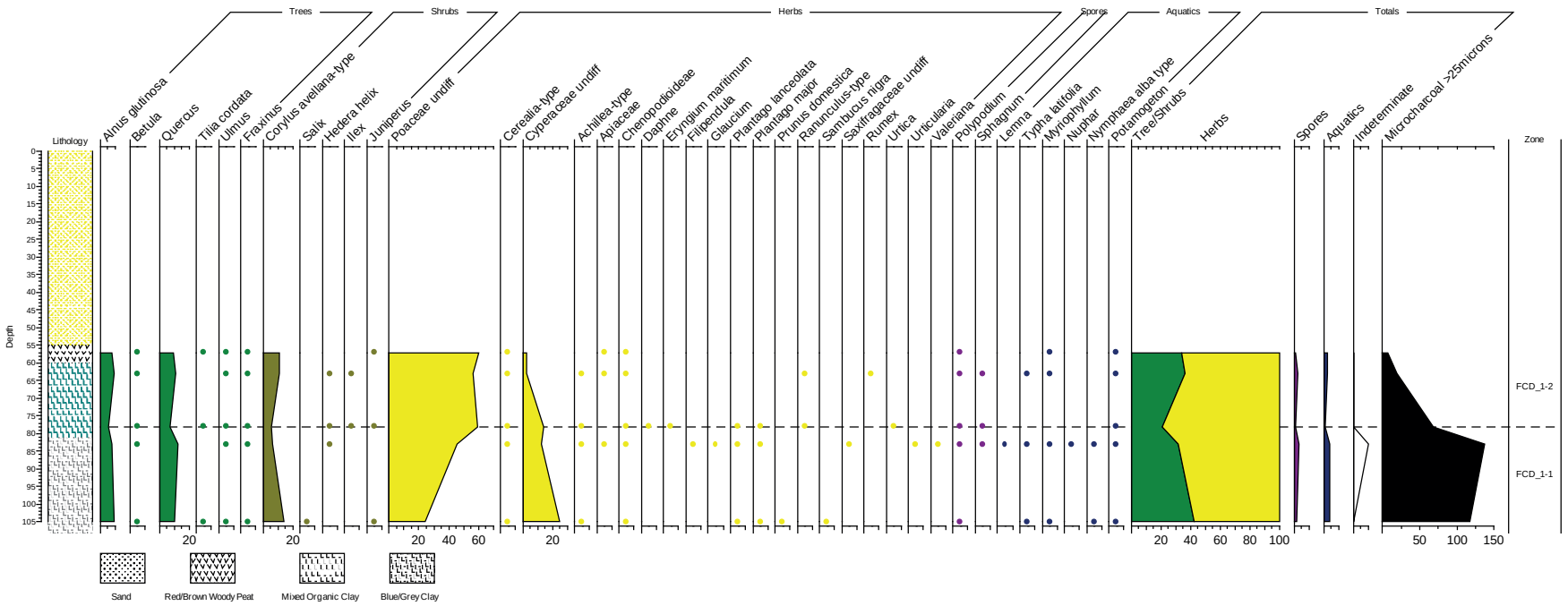

Figure 3:
Pollen Percentage Diagram for Borehole Position 1

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Revealing the past, informing the future

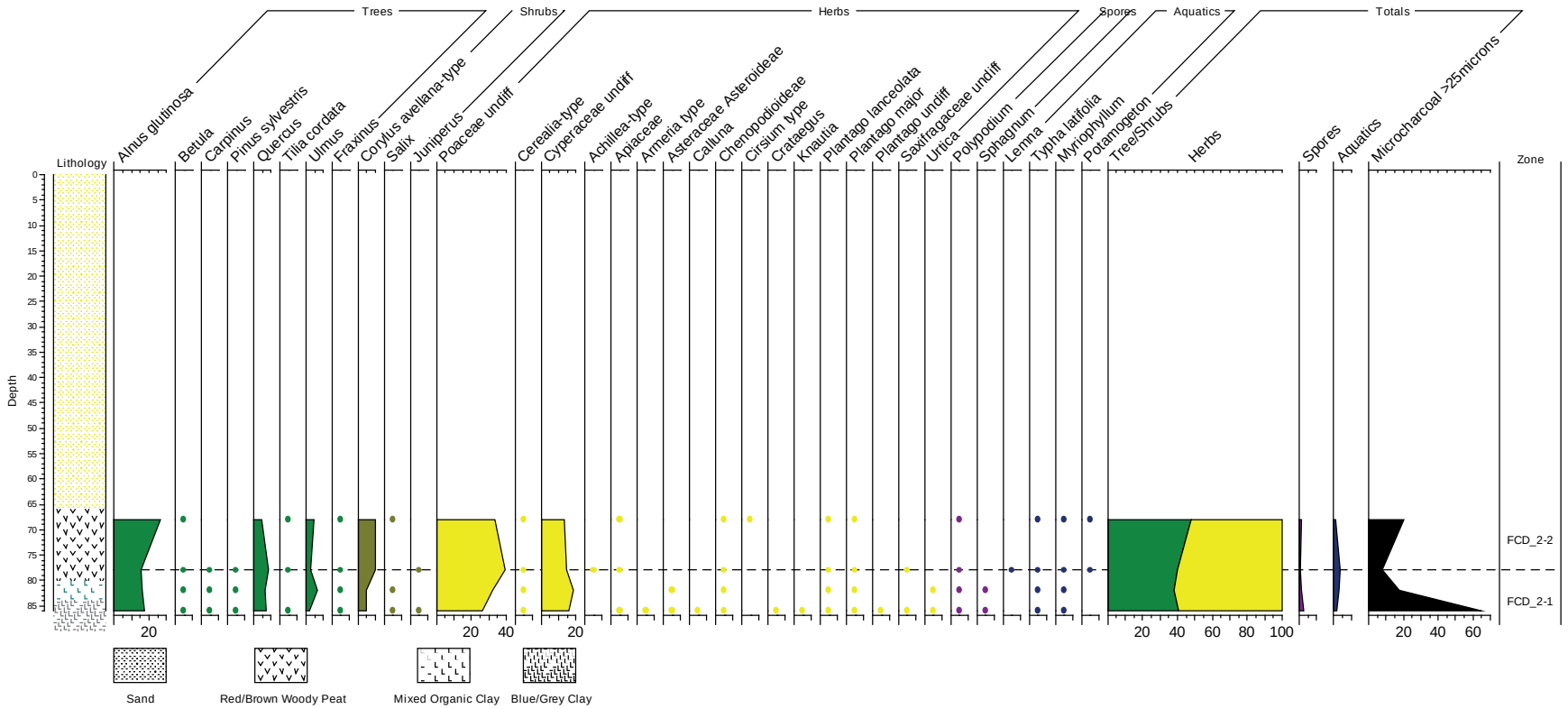

Figure 4:
Pollen Percentage Diagram for Borehole Position 2

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Plate 1: Using 20mm gouge auger to survey underlying deposits

Plate 2: Failed 6mm gouge core

Plate 3: Edelman auger in use for initial spot samples

Plate 4: Core taken with 20mm gouge auger

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APPENDIX IV:

Data Management Plan

Data Management Plan

Section 1: Project Administration

Project ID
2599
Project Name
Friog Corner, Dolgellau
Project Description
Work undertaken by Archaeology Wales Ltd (henceforth AW) for Natural Resources Wales (henceforth NRW) at Friog, Fairbourne, near Dolgellau, Gwynedd centred on National Grid Reference (NGR) SH 61091 12019. The archaeological watching brief took place to ensure the preservation by record of any archaeological remains encountered during groundworks associated with the construction of a new revetment and slipway as part of repairs and improvements to the sea defence scheme. The watching brief also included the repositioning of the Fairbourne Anti-Invasion Defences (Scheduled Ancient Monument ME252). All work conformed to the standards and guidance set by the Chartered Institute for Archaeologists (2020). AW is a Registered Organisation with the CIfA.
Project Funder / Grant reference
National Resources Wales
Project Manager
Rowena Hart
Principal Investigator / Researcher
James Evans
Data Contact Person
Rhiannon Philp (rhiannon.philp@arch-wales.co.uk)
Date DMP created
19/06/2025
Date DMP last updated
As above
Version
V1
Related data management policies
This DMP is guided by the Project Brief, CIfA Standards and guidance, trusted digital repository guidelines (RCAHMW) or other best practice guidance (see brief for details)

Section 2: Data Collection

What data will you collect or create?

The table below provides a summary of the data types, formats and estimated archive volume for data collected / created as part of this project. As the project progresses, more detail regarding files will be added to this DMP.

Type	Format	Estimated volume (Data Archived)
Text/documents	PDF (.pdf)	3
Images	Photographs (.jpg)	456

GIS	Shapefiles (.shp plus associated files)	1 group

How will the data be collected or created?

Data Standards / Methods

- Standard methods of data collection will be applied throughout the project, working to best practice guidance where applicable / available. In general, data acquisition standards are defined against RCAHMW Guidelines. Specific or additional guidance relevant to this project are listed below, and will
- be updated as the project progresses.
- Methods of collection are specified within the Project Design and will meet the requirement set out in the Project Brief, the organisation recording manual and relevant CIfA Standards and guidance.
- Where appropriate, project contributors external to the organisation will be required to include data standards, collection methodology and metadata with individual reports and data.
- Specific guidance:
  - Chartered Institute for Archaeologists, 2020. Standard and guidance for the archaeological investigation and recording of standing buildings or structures.
  - Historic England, 2016. Understanding Historic Buildings: A Guide to Good Recording Practice

Data storage / file naming

- The data produced will be uploaded at regular intervals during the project as a way of backing up the information.
- The working project archive will be stored in a project specific folder on the internal organisational server. The internal organisation server is backed up to a cloud-based storage system to maintain an up-to-date security copy of the organisation wide data.
- Project folders are named following established organisational procedures and the folder hierarchy and organisation devised will be understood by all members of staff involved in the project.
- Data collected will be downloaded and raw data will be stored in the appropriate folder.
- File naming conventions following established organisational procedures, based on RCAHMW file naming guidance, and include version control management.
- The data stored will be checked by the project manager regularly as a means of quality assurance.

Section 3: Documentation and metadata

What documentation and metadata will accompany the data?

- Data collected will include standard formats which maximise opportunities for use and reuse in the future (see Section 2, above).
- A RCAHMW metadata document will be included with the digital archive and include all data types included within the archive. A working copy will be kept on the organisational server in the Project Folder. A copy of the form containing HER required data will also be created.

- Data documentation will meet the requirement of the Project Brief, Museum Deposition Guidelines, Digital Repository Guidelines and the methodology described in the Project Design methodology.
- An archive catalogue documenting both physical and digital archive products will be maintained and submitted with both the Museum and Trusted Digital Repository

Section 4: Ethics and legal compliance

How will you manage any ethical, copyright and Intellectual Property Rights (IPR) issues?

- The project archive will include the names and contact details of individuals who intend to volunteer or participate in the excavation and post excavation stages. We have a GDPR compliant Privacy Policy which underpins the management of personal data; any personal data is managed through a secure cloud-based database and not retained on the project specific folders.
- Personal data will be removed from the archaeological project archive and permission to include individual's names in any reporting is gained prior to use.
- Copyright for all data collected by the project team belongs to the organisation, and formal permission to include data from external specialists and contractors is secured on the engagement of the specialist or contractor.
- Where formal permissions and/or license agreements are linked to data sharing, they will be included in the project documentation folders and will accompany the archaeological project archive.

Section 5: Data Security: Storage and Backup

How will the data be stored, accessed and backed up during the research?

- Organisational IT is managed by an external data management provider, who is also responsible for the management and verification of our daily back-ups and who supports access to security copies as needed
- Sufficient data storage space is available via the organisational server, which includes permissions-based access. The server is accessible by staff on and offsite through a secure log-in
- Off-site access to the project files on the organisation's server is provided to support back-up of raw data while fieldwork is ongoing. Where internet access for data back up is not possible, the raw data will be backed up to a separate media device (such as laptop and portable external hard drive).
- Project files will be shared with external specialists and contractors directly using the same system, with the wider project team gaining access to only the files needed using permissions-based access

Section 6: Selection and Preservation

Which data should be retained, shared, and/or preserved?

- The Selection Strategy and DMP will be reviewed and updated as part of the Post Excavation Assessment and Updated Project Design and following full analysis. Updated documentation will be included in all reporting stages.
- Prior to deposition, the Selection Strategy and DMP will be updated and finalised in agreement with all project stakeholders (including the Local Planning Archaeologist, Client, Museum, RCAHMW).
- Selection will be informed by the Project Design, defined against the research aims, regional and national research frameworks, specialist advice and the significance of the project results.

- The project will be published as an online technical report (accessible via RCAHMW and as part of this archive), with full access to research data.
- The data archive will be ordered, with files named and structured in a logical manner, and accompanied by relevant documentation and metadata, as outlined in Sections 2 and 3 of this DMP.
- Deselection will be undertaken automatically on any duplicate or unusable files, such as blurry or superfluous photographs.

What is the long-term preservation plan for the dataset?

- The digital archive will be deposited with the RCAHMW, which is working towards becoming a certified repository with Core Trust Seal.
- The archive will be prepared for deposition by the project team and the costs for the time needed for preparation, and the cost of deposition have been included in the project budget.

Have you contacted the data repository?

- AW has an ongoing agreement with the RCAHMW who the intended repository for digital data are.

Have the costs of archiving been fully considered?

- A costing estimate has been produced to allow for the preparation of the archive and has been included in the project budget.

Section 7: Data Sharing

How will you share the data and make it accessible?

- The museum and digital archive repository and will be updated as the project progresses.
- The investigations have resulted in the following documents: Project Design, Watching Brief Report
- A final version of the project report will be supplied to the Historic Environment Record, and any data which they request can also be provided directly.
- The location (s) of the final Archaeological Archive will be included in the final report

Are any restrictions on data sharing required?

- A temporary embargo may be required on the sharing of the project results. If this is the case, specific details once agreed will be included in the updated version of this DMP and will be documented in the overarching Project Collection Metadata.
- Data specific requirements, ethical issues or embargos which are linked to particular data formats will be documented within the relevant metadata tables accompanying the project archive

Section 8: Responsibilities

Who will be responsible for implementing the data management plan?

- The Project Manager and Post Excavation Manager will be responsible for implementing the DMP, and ensuring it is reviewed and revised at each stage of the project.
- Data capture, metadata production and data quality is the responsibility of the Project Team, assured by the Project Manager and Post Excavation Manager.
- Storage and backup of data in the field is the responsibility of the field team.
- Once data is incorporated into the organisations project server, storage and backup is managed by an external company.

- Data archiving is undertaken by the project team under the guidance of the Post Excavation Manager, who is responsible for the transfer of the Archaeological Project Archive to the agreed repository.
- Details of the core project team can be found in the Project Design.

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