

Twyni Byw - Sands of LIFE (SoLIFE) Gwaith Cadwraeth ym / Conservation Works at Morfa Harlech, Gwynedd

Asesu Desg a Lliniaru Archaeolegol

Desk-based Assessment and Archaeological Mitigation



Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust



Cyfoeth
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Cymru
Natural
Resources
Wales



Llywodraeth Cymru
Welsh Government



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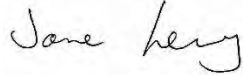


Arglawdd y rheilffordd darged gyda Chastell Harlech yn y pellter (G2790_082)
/ The target railway embankment with Harlech Castle in the distance (G2790_082)

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CRYNHODEB ANHECHNEGOL

Comisiynwyd Ymddiriedolaeth Archeolegol Gwynedd gan Gyfoeth Naturiol Cymru i liniaru archeolegol yn ystod gwaith ar gyfer prosiect cadwraeth Sands of LIFE (SoLIFE) ym Morfa Harlech, Gwynedd. Gosododd y prosiect cadwraeth 1.2km o ffensys i greu ardal bori newydd i gyflwyno pori cynaliadwy i anifeiliaid. Mae ffin ddwyreiniol yr adran pori yn rhedeg ar hyd arglawdd rheilffordd darged ystod arfau'r Ail Ryfel Byd (PRN 83136). Roedd y lliniaru archeolegol yn cynnwys astudiaeth ddesg, cofnod ffotograffig ac arolwg topograffig o'r rhan yr effeithiwyd arni o'r rheilffordd darged (wedi'i ganoli ar NGR SH 5704 3288). Cynhaliwyd prif gwylio ar y gwaith ffensio. Cynhaliwyd y gwaith archeolegol ar y safle rhwng 4ydd ac 8fed o Ragfyr 2023.

Cofnododd yr astudiaeth ddesg leoliad elfennau eraill o'r ystod hyfforddi o ffotograffau hanesyddol o'r awyr, gan gynnwys gweryll, ffyrdd, rheilffordd, siediau injan ac adeiladau cysylltiedig. Cofnodwyd amlinelliad y rheilffordd darged cyfan o ddata LiDAR. Roedd yr arolygon ffotograffig a thopograffig yn darparu darn manwl o 835m o'r rheilffordd gyda'i argloddio. Datgelodd y briff gwylio olion o'r gwely'r trac y rheilffordd a slabiau concrit yn ôl pob tebyg yn ymwneud â defnyddio'r rheilffordd.

NON-TECHNICAL SUMMARY

Gwynedd Archaeological Trust was commissioned by Natural Resources Wales to undertake archaeological mitigation during works for the Sands of LIFE (SoLIFE) conservation project at Morfa Harlech, Gwynedd. The conservation project installed 1.2km of fencing to create a new grazing compartment to introduce sustainable livestock grazing. The eastern boundary of the grazing compartment runs along the embankment of a Second World War gunnery range target railway (PRN 83136). The archaeological mitigation included a desk-based study, a photographic record and a topographic survey of the impacted section of the target railway (centred on NGR SH 5704 3288). A watching brief took place on the fencing works. The archaeological work on site was undertaken between 4th and 8th December 2023.

The desk-based study recorded the location of other elements of the training range from historic aerial photographs, including a camp, roadways, a railway, engine sheds and related buildings. The outline of the whole target railway was recorded from LiDAR data. The photographic and topographic surveys provided a detailed recorded an 835m stretch of the target railway with its embankment. The watching brief revealed traces of the target railway trackbed and concrete slabs presumably relating to the use of the railway.

1. INTRODUCTION

Gwynedd Archaeological Trust (GAT) was commissioned by Natural Resources Wales (NRW) to undertake an archaeological mitigation during works for the Sands of LIFE (SoLIFE) conservation project at Morfa Harlech, Gwynedd (Figure 1). The Sands of LIFE project is being led by NRW and supported by the EU LIFE fund and the Welsh Government, with the aim to restore threatened sand dune sites across Wales. The conservation project at Morfa Harlech installed 1.2km of fencing to create a new grazing compartment to introduce sustainable livestock grazing. This followed the felling of a conifer coupe and other works to restore the sand dune and native woodland habitat.

The fencing project included the following groundwork activities:

- Clearance of brash, fallen timber and scrub along fence line
- Erection of new stock fencing
- Erection of new livestock handling pen.

A desk-based archaeological screening report was completed in 2023 (Davidson 2023). This identified the key archaeological assets within the area and listed 12 sites in the regional Historic Environment Record. One of these is a Second World War gunnery range target railway (Gwynedd Historic Environment Record Primary Reference Number (PRN) 83136). The eastern boundary of the grazing compartment runs along the embankment of this railway (centred on NGR SH 5704 3288). The screening report recommended:-

Avoid direct impact on the former railway (82136). However, it is recognised that the proposed fence line is to run along the west side of the railway, on the lower edge of the east slope of the embankment. This slopes down to an area of waterlogged soils and dense willow. The base of the slope is therefore not easily accessible, and the proposed fence will therefore need to run a short distance up from the base of the slope. The west side of the embankment is a vertical revetment wall constructed from cement-filled sandbags which stand to a height of some 1.5m to 2m. It is important that the works do not impact upon this side, and that accessing the top of the revetment by machine is undertaken carefully, where no damage can occur. *Contractors need to be fully informed of the significance of the site, and the need to take care and avoid damage. If necessary, fence off vulnerable areas to protect them.*

In order to mitigate any potential damage to the archaeological remains the following programme of archaeological mitigation was undertaken:

- Desk-based study of the gunnery range railway (PRN 83136)
- A photographic record of PRN 83136
- A GPS based survey of PRN 83136
- A measured cross-section of PRN 83136
- A watching brief during conservation groundworks
- A report to include methodology and results.

The conservation groundworks were undertaken in accordance with SSSI Assent compliance and the archaeological mitigation on site was undertaken between 4th and 8th December 2023 in accordance with the Written Scheme of Investigation (see Appendix I).

The key aims and objectives of the archaeological mitigation were to:

- Complete a desk-based study and on-site record of gunnery range railway PRN 83136

- Establish the date and nature of any additional archaeological remains identified and assess their implications for understanding the area, in conjunction with the known archaeological record
- To place the results in context.

2. METHODOLOGY

2.1 Introduction

The archaeological mitigation programme comprised the following:

- Desk-based study of the gunnery range railway (PRN 83136), including mapping of features from aerial photographs
- A photographic record of PRN 83136 prior to work starting, and after the removal of vegetation
- A GPS based survey of PRN 83136 and related features
- A measured cross-section of PRN 83136
- A watching brief during conservation groundworks.

In line with the Gwynedd Archaeological Trust Historic Environment Record (HER) requirements, the HER was contacted at the onset of the project to ensure that any data arising is formatted in a manner suitable for accession to the HER. The GAT HER Enquiry Number for this project is GATHER 1906 and the Event PRN is 46675.

2.2 Desk-based study of the gunnery range railway (PRN 83136), including mapping of features from aerial photographs

A desk-based study is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage... Significance is to be judged in a local, regional, national or international context as appropriate” (ClfA 2020a, 4).

The desk-based study focused on the target railway but included the whole of the artillery training range to provide a context for the railway and to fully understand its history and use. The study included the following resources:

The regional Historic Environment Register ((HER) Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, LL57 2RT) and the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, Plas Crug, Aberystwyth SY23 1NJ) were examined for information concerning the gunnery range railway. This included the use of 6-inch and 25-inch OS maps held by the HER.

Aerial photographs from the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) were examined for potential features. These photographs included

1940s RAF vertical aerial photographs. Relevant features were transcribed from the aerial photographs to identify features surviving on the ground.

A search was carried out of the online catalogue of the National Library of Wales (Penglais Rd, Aberystwyth SY23 3BU).

Light Detection and Ranging (LiDAR) data from DataMapWales (<https://datamap.gov.wales/>) was obtained for the relevant area and used to identify the survival and condition of the feature. The outline of the target railway was transcribed from this data to record its overall form and indicate levels of preservation.

Available relevant published sources and on-line information were consulted.

The UXO reports commissioned by NRW provided useful information. Ray Gargan and Johnny Crawford of RPS were consulted for their expert knowledge of the ordnance and weaponry of the period.

2.3 Photographic record of PRN 83136

The route of the target railway (PRN 83136) within the grazing compartment (centred on NGR SH 5704 3288) was cleared of vegetation by contractors employed by NRW. Once the clearance was complete, allowing a good view of relevant features, but prior to the start of the fencing work, the photographic survey was undertaken. Photographic images were taken using a digital SLR (Nikon D3100) camera set to maximum resolution (4,608 × 3,072; 14.2 effective megapixels) in RAW format. Sufficient images were taken to demonstrate the location, composition and orientation of the target railway and embankment.

A photographic record was maintained on site using GAT pro-formas and digitised in Microsoft Excel as part of the fieldwork archive and dissemination process. The location and orientation of photographs taken were recorded on scaled plans and digitised for final reporting. The photographic images have been converted to TIFF format for final archiving.

The photographic record was carried out on 4th December 2023.

2.4 GPS Survey of PRN 83136

A topographic survey was completed using a Trimble R8 GPS unit to record the location, form and orientation of the gunnery railway and embankment within the grazing compartment (centred on NGR SH 5704 3288). The survey data was generated in a dxf format and processed using CAD software; the results were finalised and presented using Affinity Designer 2.

The topographic survey was carried out on 4th and 5th December 2023, after the site had been cleared of vegetation and brash, but prior to the construction of the fence.

The survey included measuring a cross section of the gunnery railway and embankment using the Trimble R8 GPS to record points on a transect across the embankment at a well-preserved and typical location. The data has been processed into a cross section using a CAD programme. The location of the measured cross-section is shown on the topographic survey.

2.5 Watching Brief During Conservation Groundworks

An archaeological watching brief is defined by the Chartered Institute for Archaeologists as “a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons where there is a possibility that archaeological deposits may be disturbed or destroyed” (CIfA 2020b).

The archaeological watching brief was to be carried out on groundworks relating to the erection of stock fencing and field gates. Fence posts were inserted using a machine to drill a hole then the posts were driven in (Plates 1, 2, 3 and 4). The process of inserting posts was assessed, and it was considered that no archaeological evidence could be recovered during this process. Most of the fence posts were inserted through the embankment or through sand overlying this and would cause minimal damage to the archaeology. A few of the posts inserted in the southern area risked cutting into the track bed of the railway, but the insertion process meant that no significant information could be obtained by watching the posts being inserted. Even the larger posts for gateways were being inserted in the same way, meaning that there would be no large hole in which layers or features might be recognised. It was concluded that watching the insertion of the posts was of no archaeological value.

A small area at the southern end of the grazing compartment had previously been stripped of vegetation and topsoil to aid access and the construction of the livestock handling pen. This exposed some deposits and features related to the target railway. Selected parts of this area were cleaned to expose some of these features, and these were recorded by photography, notes on GAT proforma context sheets and surveying with the Trimble R8 GPS. Excavation was restricted to clearing sand and topsoil only, with the object of exposing and characterising the features and deposits. Relationships between layers were not investigated unless these were obvious in cleaning. On completion of recording the features were recovered with sand. Investigation of these features and deposits exposed in the stripped area provided more information about the nature and survival of the deposits relating to the railway than could have been obtained from watching the fencing.

The watching brief took place between 5th and 8th December 2023. During the watching brief all attendances and any identified features were recorded using GAT watching brief pro-formas. Photographic images were taken using a digital SLR (camera set to maximum resolution in RAW format; a photographic record was maintained on site and digitised in *Microsoft Excel* as part of the fieldwork archive. Photographic images will be archived in TIFF format.

Photographs were taken of objects found but all were left *in situ* and not collected.

2.6 Data Management Plan and Selection Strategy

As defined in *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (Chartered Institute for Archaeologists, 2020c) section 3.3.1, a project specific selection strategy and data management plan should be prepared. In support of this, the Chartered Institute for Archaeologist (CIfA), have stated that it is “widely accepted that not all the records and materials collected or created during the course of an Archaeological Project require preservation in perpetuity. These records and materials constitute the Working Project Archive which will be subject to Selection, in order to establish what will be retained for long-term curation”. The aim of selection is to ensure that all the elements retained from the Working Project Archive for inclusion in the Archaeological Archive are appropriate to establish the significance of the project and support “future research, outreach, engagement, display and learning activities”. Selection should be “focused on selecting what is to be retained to support these future needs, rather than deciding what can be dispersed” and can be qualified by a selection strategy, which details the project-specific selection process, agreed by all parties (including GAPS, client and/or landowner), which will be applied to a Working Project Archive prior to its transfer into curatorial care as the Archaeological Archive.

A digital archive was created based on the following task list:

- Pro-formas: all cross referenced and scanned for digital archiving.
- Photographic Metadata: cross-referenced with all pro-formas and completed in Microsoft Excel.
- Photographs numbered with site code and photograph reference number and converted from RAW format to TIFFs.
- Survey data processed and included in digital archive with explanatory document

This data was then used as the basis for the physical and digital dataset archives; information from these were then used to compile the project report. The physical archive is stored in a designated project folder and the location confirmed in the Trust project database; the digital dataset is stored on a dedicated Trust server, with the location confirmed in the Trust project database via a specific hyperlink. There is no de-selected digital data. The following dissemination and archiving of the report and digital dataset has been applied:

- A digital report has been provided to the client, to Gwynedd Archaeological Trust and to the Eryri National Park Authority Archaeologist (draft report then final report).
- A digital report has been provided to the regional HER, along with a digital dataset comprising an Event Primary Reference Number (PRN) summary and new core PRN entries. The report and dataset will be submitted in accordance with the required standards set out in Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) (Version 2).
- A digital report and digital archive dataset have been prepared for submission to the RCAHMW (final report only), in accordance with the RCAHMW Guidelines for Digital Archives Version 1. The dataset has been prepared in the format required by RCAHMW and includes:
 - Photographic metadata (Excel)
 - Photographic archive (TIFF format)
 - Project Information form (Excel)
 - File Information form (Excel) – Microsoft Word report text final
 - File Information form (Excel) – Photographic metadata (general)
 - File Information form (Excel) – Adobe PDF report final
 - File Information form (Excel) - Photographic metadata (detail)
 - File Information form (Excel) – Survey data (DWG file).

The finalised selection strategy is included as [Appendix IV](#) and has taken into account:

- The aims and objectives of the project.
- The brief and/or Written Scheme of Investigation (WSI).
- The Collecting Institution's collection policy and/or deposition guidelines.
- Local and regional research frameworks.
- Relevant thematic or period specific research frameworks.
- The project's Data Management Plan (DMP).
- Internal recording and reporting policies.
- Material-specific guidance documents.

2.7 Gazetteer of Features

A gazetteer has been compiled for existing and newly identified sites located by the desk-based assessment. The gazetteer has been prepared in the following format:

Site name	
PRN number	
Grid reference	
Period	
Site type	
Statutory Designation	
Assessment category	
Description	
Impact	
Recommendation	
GAT Photographic Archive Reference	

The following categories have been used to define the assessment category of each archaeological asset:

Category A - Sites of National Importance.

Scheduled 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. Sites that are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected in situ.

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. Preservation in situ is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

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 merit adequate recording in advance of damage or destruction.

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. For Category D sites, rapid recording, either in advance of or during destruction, should be sufficient.

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, with specific recommendations for further evaluation.

The impact of the works on each identified asset has used the following criteria:

None: There is no construction impact on this asset.

Slight: This has generally been used where the impact is marginal and would not by the nature of the site cause irreversible damage to the remainder of the asset, e.g. part of a trackway or field bank.

Unlikely: This category indicates sites that fall within the band of interest but are unlikely to be directly affected. This includes sites such as standing and occupied buildings at the margins of the band of interest.

Likely: Sites towards the edges of the study area, which may not be directly affected, but are likely to be damaged in some way by the construction activity.

Significant: The partial removal of an asset affecting its overall integrity. Sites falling into this category may be linear features such as roads or tramways where the removal of part of the feature could make overall interpretation problematic.

Considerable: The total removal of an asset or its partial removal which would effectively destroy the remainder of the site.

Unknown: This is used when the location of the asset is unknown but thought to be in the vicinity of the proposed works.

3. RESULTS

3.1 Desk Based Assessment

Introduction

The gunnery range railway or target railway (PRN 83136 (includes PRN 9684)) formed a prominent part of the Harlech anti-tank training range (PRN 7264). This range was used to train troops in tank warfare in the Second World War. The desk-based assessment involved searching for historical evidence on the range as a whole. This included using historic aerial photographs to identify features of the range and transcribing those features into a Global Information System (GIS). The full list of photographs used is included in the Sources Consulted. LiDAR data for the target railway that forms the most prominent feature of this range was obtained and the outline of the target railway was also transcribed into the GIS to record its full form and level of survival. Transcriptions and location of features are shown on Figure 2.

Location and geological summary

See Figure 1

The Harlech Anti-tank Range covered an area of 1,155 acres (Hansard 1946), about 467.4 hectares. Evidence seen by RPS (Gargan 2020, 9) suggests that the War Office commandeered all the land south of Traeth Bach and seaward of the railway line, though the Range appears to have been restricted to land west of the A496. The southern end of the Range was limited by the Royal St David's Golf Course (PRN 35135), founded in 1894, and Ffordd Glan Mor seems to have marked the southern boundary. Along the coast are extensive sand dunes and it is likely that these were also used for training.

The Range was therefore located on the flat plain of Morfa Harlech, with the Dwyryd Estuary and Traeth Bach to the north and the hills rising sharply from the plain to the south-east. The southern corner of the Range was just outside the town of Harlech, before its recent expansion. Harlech Castle, perched on its hill therefore overlooked the troops as they trained (Plate 5).

Much of the area is now covered with forestry plantations, though it also includes pasture fields. In places the conifers have been felled and natural deciduous woodland is growing back. Immediately west of the target railway are the high sand dunes, which the SoLIFE project is helping to conserve and improve (Plate 6).

This area forms the historic landscape characterisation area of Morfa Harlech - fieldscape (PRN 18263) (LANDMAP SNP HL218). This has key historic landscape characteristics of reclaimed marsh, regular field pattern, cut drainage boundaries, and 19th century farmsteads, though a large area was planted with conifers by the Forestry Commission in the 20th century (GAT 2003, 74). Morfa Harlech was originally part of the tidal estuary of the Dwyryd, with Ynys as an island in the estuary. Sand dunes built up on a shingle ridge that developed running north from Harlech, with a salt marsh behind. In the medieval period there were tidal channels through the salt marsh, allowing Harlech Castle to be supplied from the sea, but further development of the shingle ridge blocked access. The salt marsh, known as Harlech Marsh, remained until the Enclosure Act of 1806, when defensive sea banks were built and the area was divided into large rectangular fields (Davidson 2010). Luminescence dating by the Institute of Geography and Earth Sciences, Aberystwyth University suggests that the current sand dunes developed 100 to 500 years ago, though there would have been sand dunes prior to that, and this represents a late medieval increase in the movement of sand and dune development (Davidson 2010).

The bedrock underlying the Range is mostly mudstone and siltstone of the Gamlan Formation formed between 508 and 499 million years ago during the Cambrian period, but towards the coast is silt and clay formed between 66 and 2.588 million years ago during the Palaeogene and Neogene periods. The

Superficial deposits include clay, silt, sand and gravel. The superficial deposits are wind-blown sand formed between 2.588 million years ago and the present during the Quaternary period (Source: British Geological Survey; BGS Geology Viewer (BETA)).

In the eastern part of the Range the soils are naturally wet very acid sandy and loamy soils. Under and around the target railway the soils are loamy and clayey soils of coastal flats with naturally high groundwater, while along the coast the soils are sand dune soils (Source: Soilscales).

Statutory and Non-Statutory Designations

The area of the Range lies within the Eryri National Park (Figure 1). The Morfa Harlech dunes (including the area restored and enclosed by SoLIFE) are part of the Morfa Harlech a Morfa Dyffryn Special Area of Conservation, and Morfa Harlech Site of Special Scientific Interest. The area is also part of Harlech Forest managed by NRW as part of the Welsh Government Woodland Estate and owned by Lord Harlech.

This area is within the historic landscape characterisation areas of Morfa Harlech - fieldscape (PRN 18263) (LANDMAP SNPHL218) and Harlech Dunes (PRN 18265) (LANDMAP SNPHL219).

There are currently no scheduled monuments within the area of the Range, the closest being Harlech Castle (Me044) (Figure 2). There are also no listed buildings in this area, again one of the closest being the castle, a grade I listed building (reference 25500). A barn and a cowhouse on the east side of the A496 (shown as PRN 63899 and 63903 on Figure 2) are grade II listed buildings. Sites recorded in the HER for the general area are shown on Figure 2 with details in Appendix III. Sites related to the Range are discussed below.

Historical Background

See Figure 2 for the location of sites

The Harlech Range was an anti-tank artillery range to train troops in anti-tank warfare during the Second World War. This was one of the main anti-tank training facilities in Britain and played a significant part in improving British capabilities in anti-tank warfare (Darbyshire 2015, 207). It included a camp (PRN 83127 and 83134) with accommodation for troops, lying about 2km north of the town adjacent to Pen y Waen. The Range featured an extensive target railway with associated engine sheds and, unusually, this was connected directly to the main line railway. Access around the Range was provided by a network of concrete roads.

The Range has not been extensively investigated by archaeologists and historians despite its extent and the excellent preservation of many of its features. The Royal Commission on Ancient and Historical Monuments of Wales (RCAHMW) records traces of a relict field system (NPRN 411,087) surviving under the target railway but does not provide a record for the target railway itself. An aerial photograph (RCAHMW image AP_2008_0973) was taken by Toby Driver of parchmarks outlining barrack buildings (NPRN 411,086) at the camp. The Range (PRN 7264) was identified in the GAT Coastal Erosion survey (Gwyn and Dutton 1996, 17, 35), when it was recorded as a Royal Artillery gunnery range serving the gunnery range at Trawsfynydd, but judged to not be threatened by coastal erosion. The target railway is recorded as PRN 83136 and its connection to the main line railway is noted. It is also mentioned in an archaeological assessment (Brookes and Price 1999) and recorded as PRN 9684. Historically information appears to be largely restricted to local historians collecting oral histories and documentary evidence seems to be rare, though a detailed search of the National Record Office at Kew may locate relevant records. Historic aerial photographs are useful in identifying the area of the Range and features relating to it and have been extensively used in this assessment (Plates 7 to 11).

Les Darbyshire (Darbyshire 2015, 204-209) has undertaken the most detailed historical research on the range but complains of the scarcity of information; even the local people had little contact with those training there due to the distance of the camp from the town and the local pubs (Darbyshire 2015, 204, 205). The camp was built in 1941 by John Mowlem and Co., civil engineering contractors, land for the camp and range having been commandeered from Lord Harlech (Darbyshire 2015, 204, 205). However, the target railway does not appear on the 1942 aerial photographs (Plate 8), and must have been built in late 1942 or later, after the camp itself had been completed. The Harlech Camp was linked to the Trawsfynydd Artillery Camp, but it is not known whether the officers or the camp administration for Harlech were based at Trawsfynydd or on site (Darbyshire 2015, 205). Towards the end of the war the camp was used to hold Italian prisoners of war, who were guarded by the Royal Pioneer Corps (Darbyshire 2015, 207).

The Range was used for training troops in anti-tank warfare, with the target railway providing moving targets. The targets were probably cut from steel sheet plates or painted on rail cars (Ray Gargan pers. comm.). These would be towed behind an engine. Darbyshire (2015, 206-207) found evidence of platoons and brigades from various regiments training at Harlech, including 1st Battalion Welsh Guards, 70th Infantry Brigade and 75th Anti-Tank Regiment. There is also a wartime memoir that mentions that the 270th Anti-tank Regiment trained there with 17-pounder anti-tank gun mounted on a tank (Gilbert 2016, 79-82). There are references to the use of two and six-pounder anti-tank guns at the range.

The type of weaponry used in training is indicated by the ordnance found during the UXO surveys for this project. In 2021 a survey was done of the area of the grazing compound by Marine and Land Explosive Ordnance Disposal. In this were found a 105 high explosive shell, a 2-inch mortar round, rifle grenades, an Energa anti-tank grenade, and solid shot armour piercing rounds (Hayward 2021, 16). The grenades were fired from a rifle. A survey undertaken by RPS in 2023 immediately in advance of the current works (Gargan 2023) found a 2-inch smoke mortar, a 2.36-inch anti-tank rocket, 2lb, 6lb, 17lb and 25lb solid shot projectiles (Plate 12), and a 3.7-inch solid shot projectile. The 2.36 rocket was a M7A1 practice variant, which was live and had to be disposed of by explosion. This was an American projectile fired from a bazooka. The 3.7-inch projectile was an adapted anti-aircraft projectile, and it is a rare find. These unusual projectiles may indicate the experimental use of new weapons at Morfa Harlech.

Table of most widely used British Anti-Tank weapons systems in WWII, from Gargan 2020

Equipment Type	Weapon Details and Specification
2lb (Quick Firing) Anti-Tank Gun	This is the smallest of the Anti-Tank guns utilised by British forces. It fired 40-millimetre (1.5 inch) High Explosive (HE) and Amour Piercing (AP) projectiles, with an effective range of approximately 1.4 kilometres, came into service in 1937.
6lb (Quick Firing) Anti-Tank Gun	This vehicle towed weapon system fired 57-millimetre (2.2 inch) High Explosive and Amour Piercing projectiles, with an effective range of approximately 2 kilometres and came into service in 1941.
17lb (Quick Firing) Anti-Tank Gun	This weapon system was both vehicles towed, and vehicle mounted, either on the back of trucks or on light tanks. It fired 76.2-millimetre (3 inch) High Explosive and Amour Piercing projectiles, with an effective range of approximately 3 kilometres and a maximum range of 10.5 kilometres, came into service in 1942.

40mm 'Bofors' Anti-Aircraft Gun	This weapon system was both vehicles towed, and vehicle mounted, either on the back of trucks or on light tanks. It fired 40-millimetre (1.5 inch) High Explosive and Armour Piercing projectiles and has a maximum range of 7 kilometres, came into service in 1939.
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The ordnance found shows that the 2lb, 6lb and 17lb guns were used in training on the Range as well as small rifle-fired projectiles.

While the Range was no longer needed after the end of the war it seems to have taken some time before it was returned to civilian use. The discontinuance of the Range was being discussed in Parliament in October 1945, so presumably it was still open then (Hansard 1945), and the land was not released from military occupation until 1947, as mentioned by Emrys Roberts in the House of Commons (Hansard 1947). The track linking the target railway to the mainline was removed in 1948, and Lord Harlech sold the land to the Deudraeth Rural District Council for the price of agricultural land. Despite agreeing that Lord Harlech could buy the land back if the Council did not develop it, they sold at least some of the land on to a developer at a much higher price. This displeased Lord Harlech, who failed to enforce his claim to be able to buy it back (Darbyshire 2015, 208). A speech given in the Lords by Lord Harlech in 1949 (Hansard 1949) suggested that the War Office still owned some of the land and that Nissen huts were still standing.

By 1969 part of the training range had been planted for forestry, including the southern end of the target railway (Plate 11). The dunes were not initially planted but by 1990 the aerial photographs show the plantation extending west of the target railway over parts of the dunes. Felling of trees inside the southern loop of the target railway took place in the late 1980s and early 1990s and by 1993 this area was largely cleared of conifers, though they still grew on the embankments. Natural regrowth of native species has occurred in this area since then. The conifers growing in the dunes and on the embankment of the target railway were felled in the mid-2010s with some additional felling in 2020 (Hewitt and Ifan 2023). NRW and Sands of LIFE felled 9.5 ha of conifers in Mar 2022 with a further 0.6 ha in Nov 2022, within the new grazing compartment and on the end of the dune ridge. NRW also felled a conifer coupe to the northern part of the forest inside the loop of the target railway embankment in the early 2000s (which is now vigorously growing back as broadleaved woodland) and at a similar time the remaining conifers were removed from the embankment (Kathryn Hewitt, pers. comm.).

Gazetteer of sites

LiDAR data and the historic and modern aerial photographs were used to identify where features relating to the artillery training range were located and whether remains survive. The results are shown on figure 2, which also shows the location of the sites listed below.

Site name	Gunnery Range Railway, Morfa Harlech
PRN	9684/ 83136
Grid reference	SH5699333196 (centre)
Period	Modern
Site type	Target railway

Assessment category	A
Description	<p>The target railway forms a loop covering an area about 2.3km long. It runs north-south, curving towards the SE at its southern end. The overall length of the railway is about 5.3km long. The loop runs in neat semi-circles at each end but between these ends the route is sinuous, except in the area surveyed, where it runs completely straight.</p> <p>The most obvious feature of the target railway is the embankment, which protected the railway and engine from being hit. This generally survives well but was never present round the curves at each end of the loop. The railway would have run on the western side of the embankment on each side of the loop and traces of its route can be seen in the LiDAR data around the ends of the loop showing that earthworks do survive here. In the area that was surveyed the railway could only be defined as a flat area running next to the embankment, but granite chippings could be seen through the vegetation in places indicating that the track bed still survives. The embankment slopes gradually on the eastern side and has a revetment on the western side, which shows that the firing took place from the east.</p> <p>The aerial photographs show a building over the railway on the southern end of the loop. The LiDAR suggests that some traces of this still survive. Presumably this was for storing and changing the targets.</p>
Impact	Slight
Recommendation	Watching brief as necessary, minimise disturbance by machinery
GAT Photographic Archive Reference	G2790_002 to G2790_103
Plate Number	Plates 15 to 39

Site name	Gunnery Range Buildings, Morfa Harlech
PRN	83127 / 83134
Grid reference	SH58483384 / SH58623377
Period	Modern
Site type	Military camp
Assessment category	B

Description	<p>Figure 3</p> <p>Harlech Camp (PRN 83134). The 1948 aerial photographs show the layout of the camp for the anti-tank training range. The camp is also shown on the 6-inch map (revised 1949), though the map does not show the target railway, road-ways or other features of the range. Possibly the lack of up-dating of the map for these features was a security issue.</p> <p>There were ranges of buildings both to the south and the north of the surviving concrete track. With tracks or pathways leading to them. There were two other ranges of buildings (PRN 83127) to the south of the track but further west than the main camp, and another range of buildings to the north accessed directly from the main road appears also to be part of the camp. The buildings are of a variety of sizes. Most are barracks but administration buildings, latrines and stores seem also to have been present. The buried remains of buildings PRN 83127 still survive although these are now under a level pasture field because parchmarks of these were photographed by RCAHMW in 2005 (NPRN 411086). The parchmarks showed up to 10 buildings were arranged in pairs on either side of a metalled track.</p> <p>The location of the main camp is under former forestry plantations now largely regrown as scrub, which would be difficult to access, but it is likely that some physical remains survive.</p>
Impact	None
Recommendation	Further investigation to determine the survival of remains would be useful.

Site name	Military Railway, Morfa Harlech
PRN	103559
Grid reference	SH5780632184
Period	Modern
Site type	Railway
Assessment category	B
Description	<p>A railway linked the target railway directly to the mainline railway. This ran from the mainline just north of Harlech station and can be clearly seen on the 1948 aerial photographs curving north-west, then west to the south-eastern end of the target railway loop. Most of the route has been built over but as it approaches the target railway LiDAR shows that the route still survives as an earthwork. The railway curved to the north to join the target rail but also doubled back to the south running next to a concrete road to the engine sheds (PRN 103561).</p>
Impact	None
Recommendation	Further investigation to determine the survival of remains would be useful.

Site name	Gunnery Range road system, Morfa Harlech
PRN	103560
Grid reference	SH5788033370 (centre)
Period	Modern
Site type	Trackways
Assessment category	B (as part of the evidence for the Range)
Description	Running to the recycling centre and through the forest are a series of concrete roads. These generally run straight and usually at right angles to each other. They ran through to Ffordd Glan Mor in the south, which also originated as one of these concrete roads. These roads can be seen on the 1948 aerial photographs and are clearly related to the artillery training area. They provided access to different parts of the training area and the western road was probably used to fire from towards the targets on the target railway.
Impact	None
Recommendation	None

Site name	Gunnery Range engine sheds, Morfa Harlech
PRN	103561
Grid reference	SH5746531877
Period	Modern
Site type	Engine sheds
Assessment category	B (as part of the evidence for the Range)
Description	Figure 4 The aerial photographs show engine sheds at the southern end of the military railway, as well as other smaller buildings and structures, probably including fuel stores. The aerial photographs show that the sheds were demolished by June 1950, but there appears to be rubble remaining. This area was not inspected on the ground. Some of it is now under Ffordd Glan Mor carpark, the main beach carpark, but much is under trees and scrub and it is likely that some remains of the buildings still survive.
Impact	None
Recommendation	Further investigation to determine the survival of remains would be useful.

Site name	Buildings and water tower, Gunnery Range, Morfa Harlech
PRN	103562
Grid reference	SH5772732455
Period	Modern
Site type	Buildings
Assessment category	B (as part of the evidence for the Range)
Description	The aerial photographs show small buildings in this location. A photograph seen by RPS (Gargan 2020, see appendix V) shows these to be a water tower, a Nissan hut and outbuildings. A concrete military road leads to them. Modern APs suggest that the concrete bases and other remains of these buildings still survive.
Impact	None
Recommendation	Further investigation to determine the survival of remains would be useful.

Site name	X-plan ranges of buildings, Gunnery Range, Morfa Harlech
PRN	103563
Grid reference	SH5781231599
Period	Modern
Site type	Buildings
Assessment category	D (as there appears to be no surviving remains)
Description	Figure 5 The 1941 and 42 aerial photographs show ranges of buildings laid out in an X-shaped ground plan, though by 1948 most of these have been demolished. This site was linked to the military road system by a concrete road and it appears to have been part of the artillery training range but its function is not currently clear. Aerial photographs show that remains of these buildings survived until recently, but the site is now under a caravan park and has presumably been entirely levelled.
Impact	None
Recommendation	None

Site name	Iron structures, Morfa Harlech
PRN	103564
Grid reference	SH5778633257
Period	Modern
Site type	Other structure
Assessment category	D (if these features are not related to the Anti-tank Range)
Description	<p>The lower part of an iron drum or container. Semi-circular in cross section set on feet in the ground. Adjacent to this was another iron structure. This was rectangular measuring about 5.5m by 1.75m and buried under a layer of sand and vegetation. It is aligned ESE-WNW parallel to the road. The WNW end of this was rapidly exposed showing elements of its structure. It had an iron frame and supporting struts with a wooden plank or post in the middle of the WNW end. There were voids inside suggesting that it had a body or cover that prevented it filling with sand. This may be the body of a wagon of some sort rather than a structure fixed in the ground.</p> <p>These objects were found during a rapid walk over to try and locate a tank reported by local residents. Recording was restricted to basic photographs. The tank was not found. Ray Gargan and Johnny Crawford were show photographs of the objects and considered that they did not date from the Second World War. They considered it very unlikely that a tank or other vehicles or large iron structures would have been left on site as the value of metal was very high at the end of the war and tanks were useful for other purposes, such as ploughing.</p>
Impact	None
Recommendation	None
GAT Photographic Archive Reference	G2790_108 to G2790_120
Plate Number	Plate 13

Site name	Iron structure, Morfa Harlech
PRN	103565
Grid reference	SH5754033348
Period	Modern
Site type	Other structure
Assessment category	D (if this feature is not related to the Anti-tank Range)

Description	The upper part of an iron drum or container. Semi-circular in cross section and resting upside down. Heavily corroded. One end had small Perspex window. Probably the upper part of the drum PRN 103564. Recording was restricted to basic photographs. Probably dates to after the Second World War.
Impact	None
Recommendation	None
GAT Photographic Archive Reference	G2790_104 to G2790_107
Plate Number	Plate 14

3.2 Topographic and Photographic Survey

The survey was carried out on a very straight section of the western side of the target railway loop, centred on NGR SH 5704 3288 (Figure 6). This section included the southern end of the embankment on this side and the start of the railway curving round the southern semi-circle of the loop.

The area had previously been cleared of vegetation for the erection of the grazing compartment fence. This made most of the feature clear and easy to record, but in places the eastern base of the embankment was heavily over-grown. Most of the route of the railway, to the west of the embankment, was cleared but in the southern part of the surveyed area the western side of the railway was still over-grown and old timber had been deposited there, making the edge of the railway difficult to determine.

The total length of embankment surveyed was 835m and it was quite consistent in width, varying between 13.5m and 17.0m wide. It runs very straight south-south-east to north-north-west (Figures 7 and 8, Plate 15). The height of the embankment varies between 1.6m high at the southern end and up to 2.22m high towards the northern end. Generally, the embankment is clearly defined but in the middle of the surveyed section, although its rough line could be followed it appeared much broader and had numerous mounds along the top (Plates 16 and 17). This was due to sand encroachment over this area. The large sand dunes reached the western side of the route of the embankment and sand had built up over the embankment making it appear much wider and rather higher than elsewhere. Small sand dunes had formed on the top of the embankment and forestry access routes have caused disturbance, though almost entirely within the recently built-up sand, which has protected the embankment itself.

The southern part of the embankment has been used as a trackway by forestry vehicles. The start of this track at the southern end is shown on modern maps and can be seen on the ground as a deposit of dark grey, broken stone. The same stone has been used to create a ramp on to the embankment (Plate 18). Where the track across the area of sand encroachment the sand has been levelled and in one place stone and sand have been used to create a ramp taking the track down off the sand onto the route of the railway, which was used as the forestry track along the northern part of the surveyed section. Other trackways cut from the east onto the embankment in places (Plate 19), but these are where there has been sand encroachment and although there has been considerable disturbance caused by vehicles the sand has largely protected the embankment from erosion.

Where fully exposed and not covered by sand the embankment has a gradually sloping eastern side (Plate 20), sloping at about 17 degrees, a flat top and a near vertical western side (Figure 9). The western side is revetted by a wall created from sandbags filled with cement (Plates 21 and 22). The

revetment is not entirely vertical but is battered back at an angle of about 74 degrees (Plate 23). The revetment wall is up to 1.75m high at the northern end and 1.6m high at the southern end, though in most places the base of the wall cannot be seen as erosion deposits have built up against it. The sandbags used to make the revetment have entirely eroded away but in places where the concrete is well preserved casts of the hessian of the sandbags can be seen in the concrete (Plate 24). The concrete is of a poor mix, being very soft, and it has extensively eroded. Some sections are heavily eroded with individual bags being hardly visible and much vegetation growth (Plate 25). Elsewhere the surface of the concrete bags has been eroded away (Plate 26), but in some places the revetment is largely uneroded and the individual bags are clearly seen. Generally little stone is visible in the concrete but in places the erosion has revealed the larger components and a white stone, probably limestone can be seen to have been used (Plate 27). Generally, this is in the form of gravel but there are some large pieces up to 120mm long included which have created weaknesses in the concrete. The poor quality of the concrete and the use of large pieces of stone suggests that material to produce good concrete was scarce, as was the case by 1942 as large amounts of concrete had been used to create anti-invasion defences across Britain.

Towards the southern end of the revetment four iron bars projected from the revetment (see Figure 10 for location). These were set horizontally about 0.7m from the top of the revetment, so about halfway up. They had a projection or hook at the end pointing upwards and most had white paint on (Plate 28). It appeared that these were intended to support something like a plank for a shelf. Rifle range target butts often had a roof above where the markers sat supported on brackets to protect them from ricocheting bullets. These fittings may have been brackets for something similar, to provide protection from material falling from above. In this case there must have been many more originally as those that survive are too widely spaced to support planks.

The southern terminal of the embankment was rounded, and the revetment wall did not continue around the terminal. There would have been no vehicle access on to the top of the embankment while it was in use, the current ramp being a later addition. There are slight scarps and ridges in places along the top of the embankment. The southern most of these continues the western side of the ramp and has almost certainly been formed by the creation of a forestry track along the top of the embankment. Further north, where the forestry track avoids the embankment there are also slight scarps and banks, but it is likely that these were also due to forestry disturbance. The whole embankment over the area of sand encroachment and to the north had been planted with conifers. Some of these were planted on top of small sand dunes, showing that the sand encroachment pre-dated the planting, and probably occurred soon after the target railway went out of use. The 1948 aerial photographs show that the sand dunes to the west of the target railway were heavily eroded, possibly by ordnance landing there or by vehicle movement. The aerial photographs of 1969 (Plate 11) show that the vegetation had regrown by that date, stabilising the sand, so sand encroachment must have occurred between the abandonment of the railway and the 1960s.

The trees over the embankment were felled in the 2010s and early 2020s, and now only a single rowan grows on top of the embankment. Willows grow along the foot of the eastern side of the southern part of the embankment, and some birch saplings along the eastern side of the northern part.

The route of the railway itself is not clear. In the northern part of the surveyed area, it is seen as a flat area running alongside the revetment, although there is no definition to its western side so the width of the railway is unclear. The presence of the railway here is only indicated by granite chippings which are visible in several locations where vegetation is scarce and overlying sand has eroded away (Plate 29). This formed the trackbed of the railway and must be present all the way along the route but is rarely visible. The overlying sand suggests that the track bed has not been disturbed and some features relating to the railway may survive. A short section of iron pipe was seen, exposed by the UXO team (Plate 30). This did not run parallel to the railway, and it is not clear whether it was related to the target railway.

The railway is entirely buried under sand in the middle part of the surveyed section and features could well survive here that have been removed elsewhere, though nowhere was there any evidence of the track, which must have been removed at the end of the war for its scrap value. South of the sand encroachment the railway seemed to be defined on the western side by a very slight bank. This was very unclear and may be partly due to depositing cut timber and other debris here, but it was quite consistent and indicated a width of about 6.5m for land levelled for the railway and its track bed, with the track presumably running down the middle of this (Plate 31). No trees had been planted along the line of the railway.

At the southern end of the surveyed area the railway continued where the embankment ended. This area was stripped of vegetation and topsoil for the grazing compartment project (Plate 32) and fencing for a livestock handling pen was inserted here. The stripping revealed features relating to the railway and some of these were exposed and recorded during the watching brief (Figure 10).

The topsoil in this area (context 01) was not more than 0.12m deep and consisted mainly of roots and organic matter. Under this was a pale brown sand (context 02), which was very loose and mixed with stones in places. This was the windblown sand naturally covering the area; the stone being mixed into it from the activity of constructing and using the railway. Overlying or in some places slightly cut into the sand were several features. Areas of granite chippings (context 06) showed where the track bed of the railway ran (Plate 33). These were angular stone pieces, densely packed with a matrix of fine sand. Much of the area of the chippings was covered with a deposit of dark grey angular stones up to 0.3m long (context 08), which formed the surface of the forestry track. This track is no longer used and to the south-east of the surveyed area it is entirely buried in brambles and other vegetation.

On the line of the railway were rough slabs of concrete (contexts (03), (05) and (09)) about 0.1m thick. These were roughly sub-rectangular in plan but had very irregular edges (Plates 34, 35 and 36). There was no trace of shuttering to create a defined form but in places there were straight edges and it appeared that the concrete had been poured into shallow depressions dug into the sand. The surface of the concrete was soft and very sandy and in places the concrete had almost entirely eroded into sand. However, elsewhere the concrete was harder and broken pieces showed it to be made with angular dark coarse sand and gravel. Most of these slabs were not fully exposed but it could be seen that they were not continuous. Another patch of concrete was just visible under a thin spread of sand in the northern part of the stripped area, but this was not cleaned up and recorded. To the west of the line of the other slabs was a similar path of concrete (context 07) measuring 2.6m by 2.0m and about 0.17m thick (Plate 37). This seemed to have stones underneath it to form a foundation but was cast in a shallow hollow in the sand like the others.

None of these concrete slabs had any fixings or attachments set in them or any other indication of their use. Lying flat on feature (03) was an iron door (context 04) with ventilation slits within it (Plate 38). The door measured 0.64m by 0.43m. It appeared to have been discarded on the surface of the slab and was not in any way fixed to it or related to its use. A metal plate was found buried in the sand nearby, uncovered by the UXO team (Plate 39). This is thought to be a plate that would have been fixed to the engine pulling the target for protection (Ray Gargan pers. comm.).

The function of the concrete slabs was not clear but their presence along the line of the railway shows that they were part of this. A much wider excavation would be necessary to determine exactly what took place in this location, but the present work demonstrates that the track bed and other features relating to the railway do survive in this area and probably along most of the route.

4. CONCLUSION AND RECOMMENDATIONS

The anti-tank range represents a rare survival of an extensive Second World War training landscape. The target railway is particularly well-preserved but there are also the concrete roads indicating movement around the site and showing where firing of tanks was taking place from. The site of the camp, although largely levelled, has surviving buried remains, as demonstrated by parchmarks, and it is possible that other remains survive in the scrub to the north of the track. The location of the engine sheds seems to have been largely levelled but some remains may also survive here.

The survey of the area within the grazing compartment has provided a detailed view of a part of the target railway and its protective embankment. This shows the sloping eastern face of the embankment to trap incoming shells and the revetment built of concrete in sandbags alongside the railway. The survey also included the southern end of the embankment in this area and showed where the railway continued unprotected into the semi-circular end of the loop, where targets were probably changed or repaired. The LiDAR suggests that there are remains of the railway trackbed all around this semi-circular end and future clearance of vegetation in this area may reveal more information on how the target railway worked.

Further survey and investigation of the railway and embankment elsewhere along its route would reveal the extent of survival and may uncover other features of interest. It is recommended that if any future clearance occurs the opportunity is taken to record any other sections that are exposed. It is possible that further historical research, particularly a search of record offices and the National Archives in Kew may reveal documentary evidence about the construction and use of the range.

The whole range has features of interest, but the target railway is the best-preserved feature. Second World War anti-tank training ranges were rare in Britain, and this is a particularly well-preserved example with an unusual and extensive track system for the targets. It is recommended that Cadw consider this feature for scheduling to ensure its protection. Local people and visitors walk in the forests and along the dunes, making the southern end of the target railway in an ideal location for presenting it to the public. Allowing visitors to walk along the cleared embankment and providing information would enable this site to be understood by more people and ensure that the history of the area is more widely known.

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Stuart Murphy carried out the photographic survey and Jane Kenney did the topographic survey, and both exposed and recorded features during the watching brief.

6. SOURCES CONSULTED

Published sources and reports

- Brooks, I. and Price, J., 1999. Penllyn Archaeological Assessment, EPRN 41075 (no physical report)
- Chartered Institute for Archaeologists, 2020a, *Standard and guidance for historic environment desk-based assessment*
- Chartered Institute for Archaeologists, 2020b, *Standard and Guidance for Archaeological Watching Brief*
- Chartered Institute for Archaeologists, 2020c, *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives*
- Darbyshire, L., 2015. *Our Backyard War, West Merioneth in World War II*, Y Lolfa Cyf, Talybont
- Davidson, A., 2010. Morfa Harlech, Harlech, unpublished Gwynedd Archaeological Trust Report No. 868
- Davidson, A., 2023. Twyni Byw - Sands of LIFE: Dune rejuvenation at Morfa Harlech, Sands of LIFE Code: SoLife: LIFE17 AT/UK/000023, Archaeological Screening, unpublished Gwynedd Archaeological Trust document
- Gargan, R., 2020. UXO Detailed Risk Assessment (Stage 2): Twyni Byw - Sands Of Life, Morfa Harlech, RPS Report Number EES1078 R-07-01, unpublished report for NRW
- Gargan, R., 2023. UXO Mitigation Completion Report (Stage 4), Twyni Byw - Sands of Life, Harlech Fence Line, RPS Report Number EES1078 R-40-00, unpublished report for NRW
- GAT, 2003. Historic landscape characterisation of Ardudwy, unpublished Gwynedd Archaeological Trust Report No. 473
- Gilbert, V., 2016. *Memoirs of a Reluctant Gunner*, Vocamus Community Publications, Guelph, Ontario
- Gwyn, D. Rh. and Dutton, L. A., 1996. Coastal Erosion Survey: Aberdaron to Aberdyfi, unpublished Gwynedd Archaeological Trust Report No. 198
- Hayward, L., 2021. UXO Survey Report: Intrusive survey report for Twyni Bwy, Sands of LIFE, Harlech Range, unpublished report for NRW
- Hewitt, K. and Ifan, I., 2023. Twyni Byw - Sands of LIFE Specification SoLIFE Morfa Harlech Fencing 2023, Natural Resources Wales

Websites

Coflein

RCAHMW image AP_2008_0973

<https://coflein.gov.uk/en/site/411086/images?term=411086>

Hansard

Anti-tank Range, Harlech, volume 414, debated 16th October 1945

<https://hansard.parliament.uk/Commons/1945-10-16/debates/9d24f62f-176d-4baf-9575-af31121d1870/Anti-TankRangeHarlech>

Training Areas, Merionethshire, volume 419, debated 26th February 1946

<https://hansard.parliament.uk/commons/1946-02-26/debates/7fee405e-464a-4cf3-b7b9-0334de08c7a3/TrainingAreasMerionethshire>

Mr Bellenger's Statement, volume 434, debated 13th March 1947

<https://hansard.parliament.uk/Commons/1947-03-13/debates/a67deb5b-36f3-416d-828b-c7a2429e600e/MrBellengerSStatement>

National Parks and Access to the Countryside Bill, volume 164, debated 19th October 1949

<https://hansard.parliament.uk/Lords/1949-10-19/debates/2841a255-401a-4b33-aece-c446f4fd0896/NationalParksAndAccessToTheCountrysideBill>

BGS Geology Viewer, British Geological Survey

<https://geologyviewer.bgs.ac.uk/>

Soilscapes, LandIS: The Land Information System

<https://www.landis.org.uk/soilscapes/>

Aerial photographs

List of aerial photographs inspected

Library number	Sortie number	Frames	Date
4107/ M2962	S/438	35, 36, 107, 108, 109, 110	24/08/1941
4206/M2324	HLA/489	1 74, 2 74, 2 75	15/04/1942
4631	RAF 106GUK 1468	2414	04/05/1946
4841	540 RAF 39	5071	19/05/1948
5050	540 RAF 359	5159	11/06/1950
6112	58 RAF 4514	0026	05/07/1961
6957	58 RAF 9682	074	11/06/1969
7171	OS 71 210	056	12/05/1971
7176	OS 71 234	145, 183	21/05/1971
8606	JA Story 61-86	0080	01/10/1986
9001	ADAS 40/90	Film 453 frame 035	02/05/1990
9313	39 RAF 6152	0536	04/05/1993

Also NextPerspectives 2009

Historical maps

6-inch OS maps

Merionethshire Sheet XIX.SW, revised 1949, published 1953

Merionethshire Sheet XVIII.SE, revised 1949, published 1953

25-inch County Series maps

Merionethshire sheets XVIII.12 and XVIII.16, second edition 1901

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Figure 2. Plan showing the location of the target railway and other features of the artillery training camp, as well as HER sites of other periods in the area

Figure 3. Map and aerial photograph of training camp (PRN 83127 and 83134)

Figure 4. Photographs of the engine sheds (PRN 103561)

Figure 5. Photographs of the X-plan ranges of buildings (PRN 103563)

Figure 6. Overview of section of target railway surveyed, showing location of detailed figures

Figure 7. Survey of northern part of surveyed section of target railway

Figure 8. Survey of northern part of surveyed section of target railway

Figure 9. Profile across target railway and embankment

Figure 10. Southern end of surveyed section with features exposed and recorded along route of railway

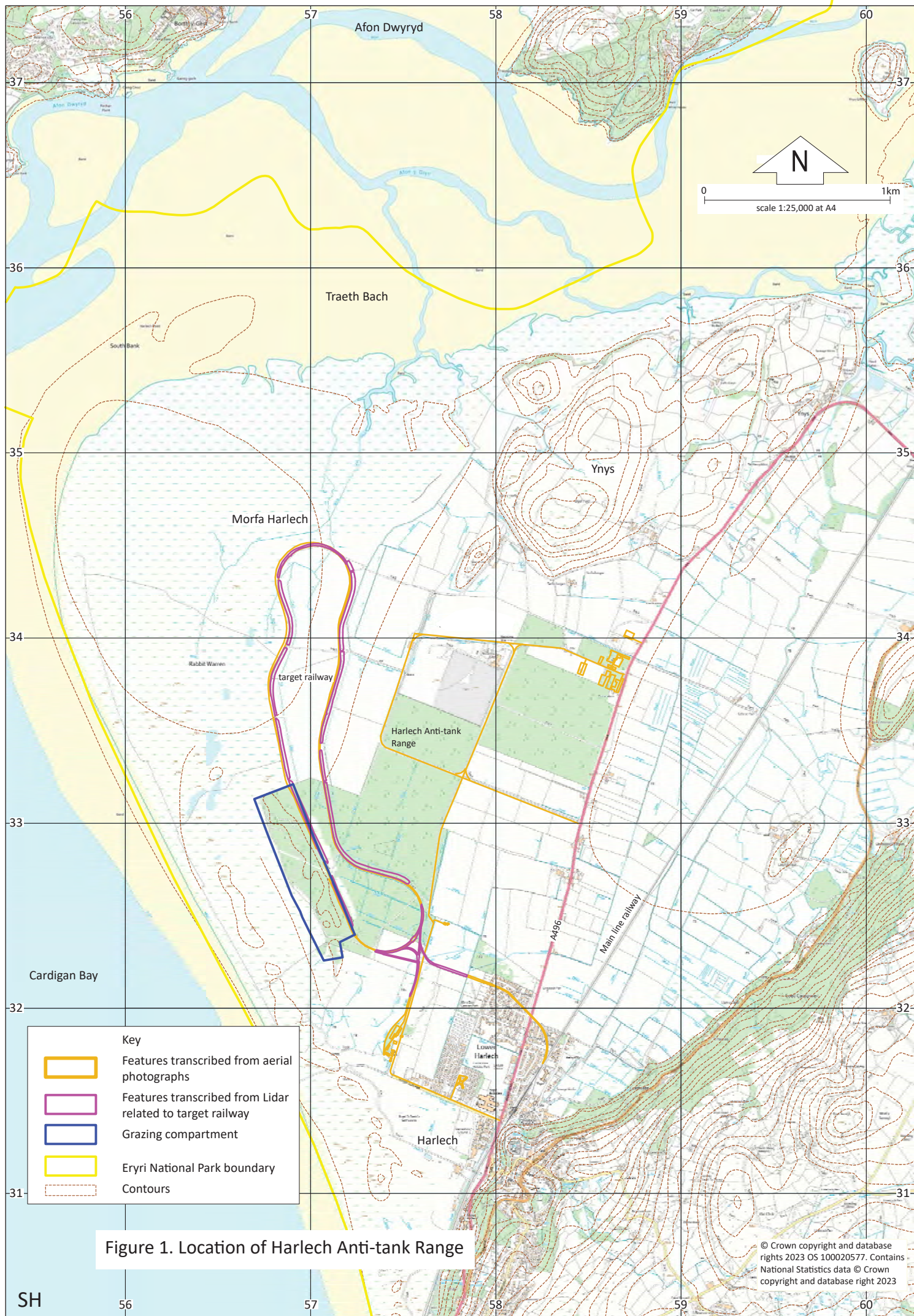
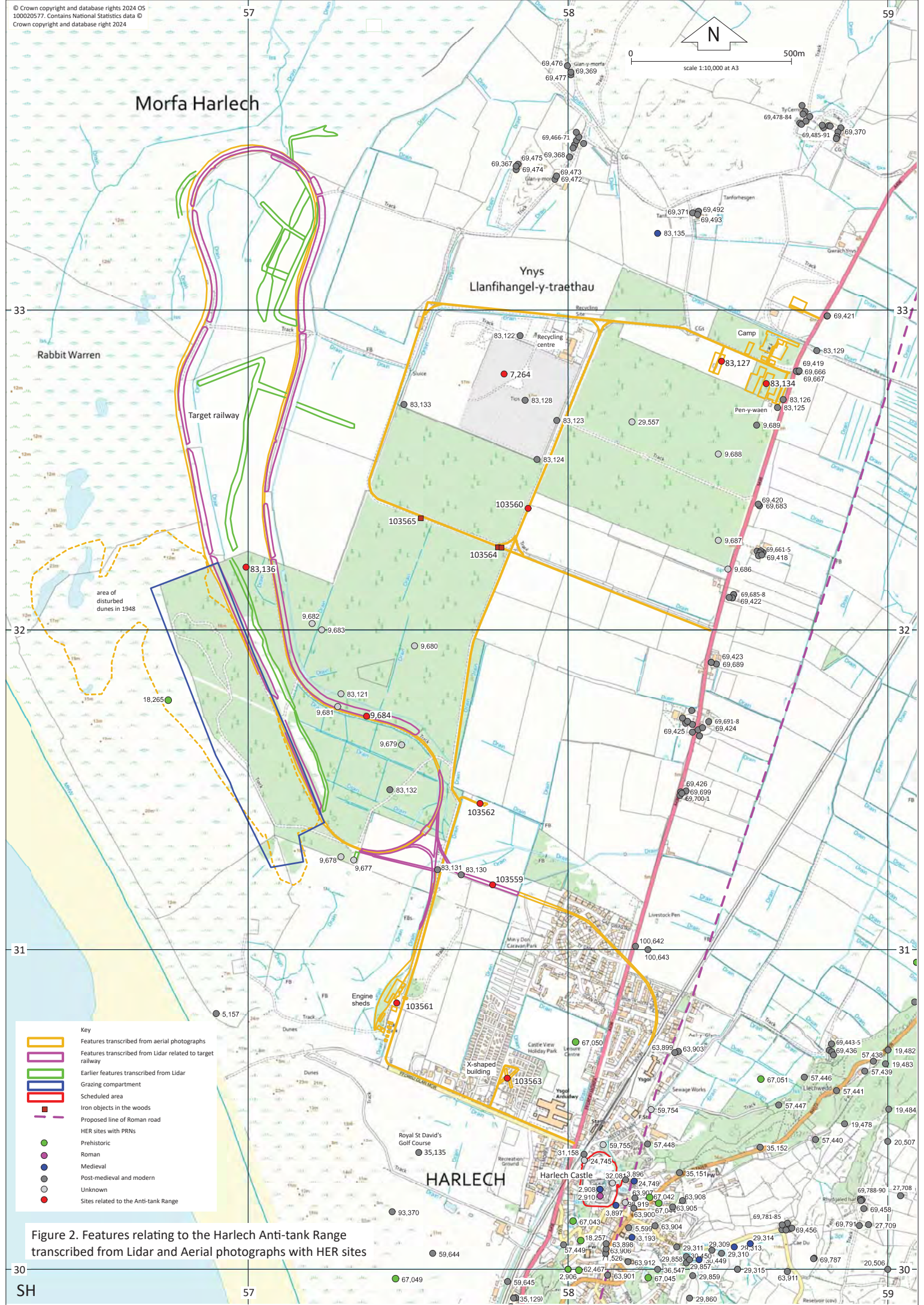


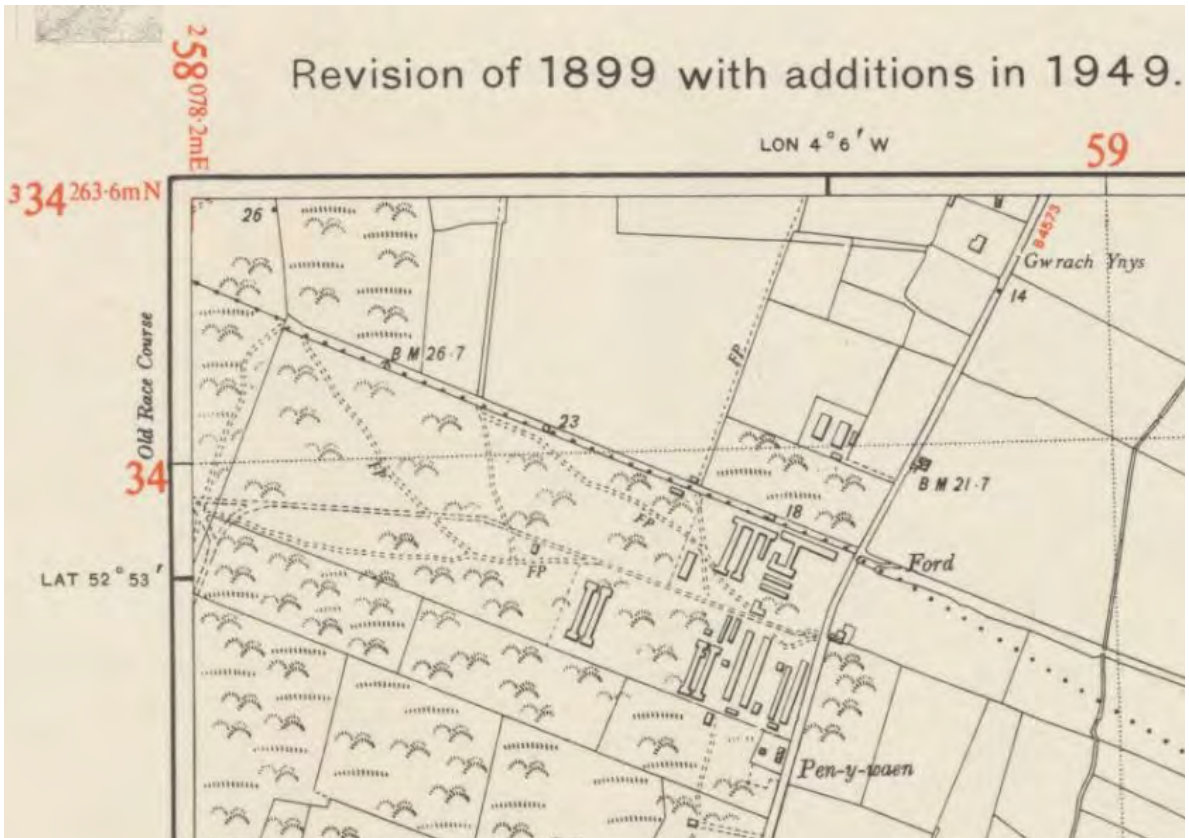
Figure 1. Location of Harlech Anti-tank Range

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- Key
- Features transcribed from aerial photographs
 - Features transcribed from Lidar related to target railway
 - Earlier features transcribed from Lidar
 - Grazing compartment
 - Scheduled area
 - Iron objects in the woods
 - Proposed line of Roman road
 - HER sites with PRNs
 - Prehistoric
 - Roman
 - Medieval
 - Post-medieval and modern
 - Unknown
 - Sites related to the Anti-tank Range

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Detail of 1948 aerial photograph showing layout of artillery training camp (library no 4841, sortie 540 RAF 39, frame 5071, date 19/05/1948)

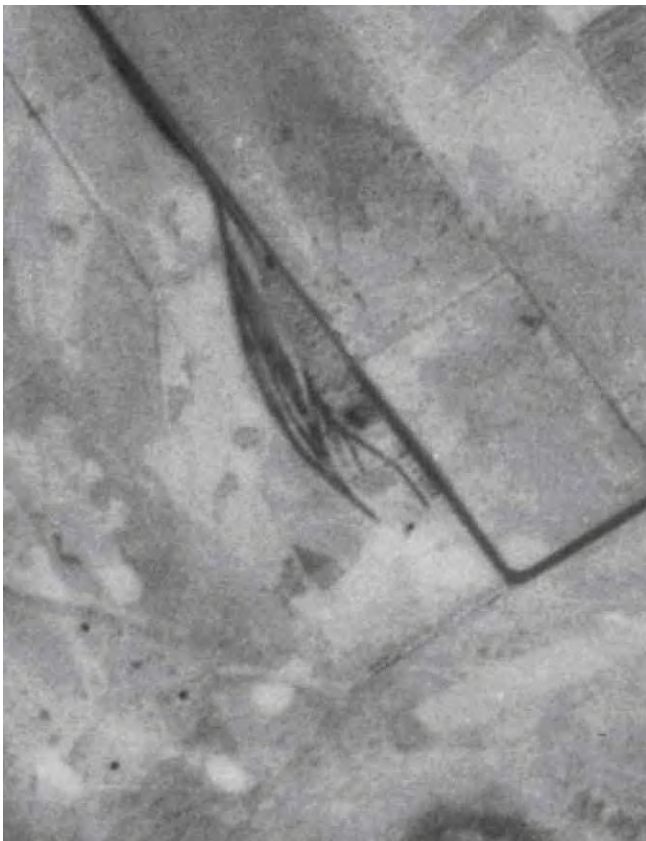
Figure 3. Map and aerial photograph of training camp (PRN 83127 and 83134)



Engine sheds still in good condition and tracks still in place in 1946 (library no 4631, sortie RAF 106GUK 1468, frame 2414, date 04/05/1946)

Figure 4. Photographs of the engine sheds (PRN 103561)

Engine sheds still in good condition but tracks removed in 1948 (library no 4841, sortie 540 RAF 39, frame 5071, date 19/05/1948)



Engine sheds entirely demolished by 1950, but rubble seems to remain (library no 5050, sortie 540 RAF 359, frame 5159, date 11/06/1950)



Buildings constructed by August 1941 (library no 4107/ M2962, sortie S/438, frame 35, date 24/08/1941)

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Oblique view of the buildings August 1941 (library no 4107/ M2962, sortie S/438, frame 110, date 24/08/1941)



The buildings in April 1942 (library no 4206/ M2324, sortie HLA/489, frame 2 75, date 15/04/1942)



The buildings mostly demolished by May 1946 (library no 4631, sortie RAF 106GUK 1468, frame 2414, date 04/05/1946)

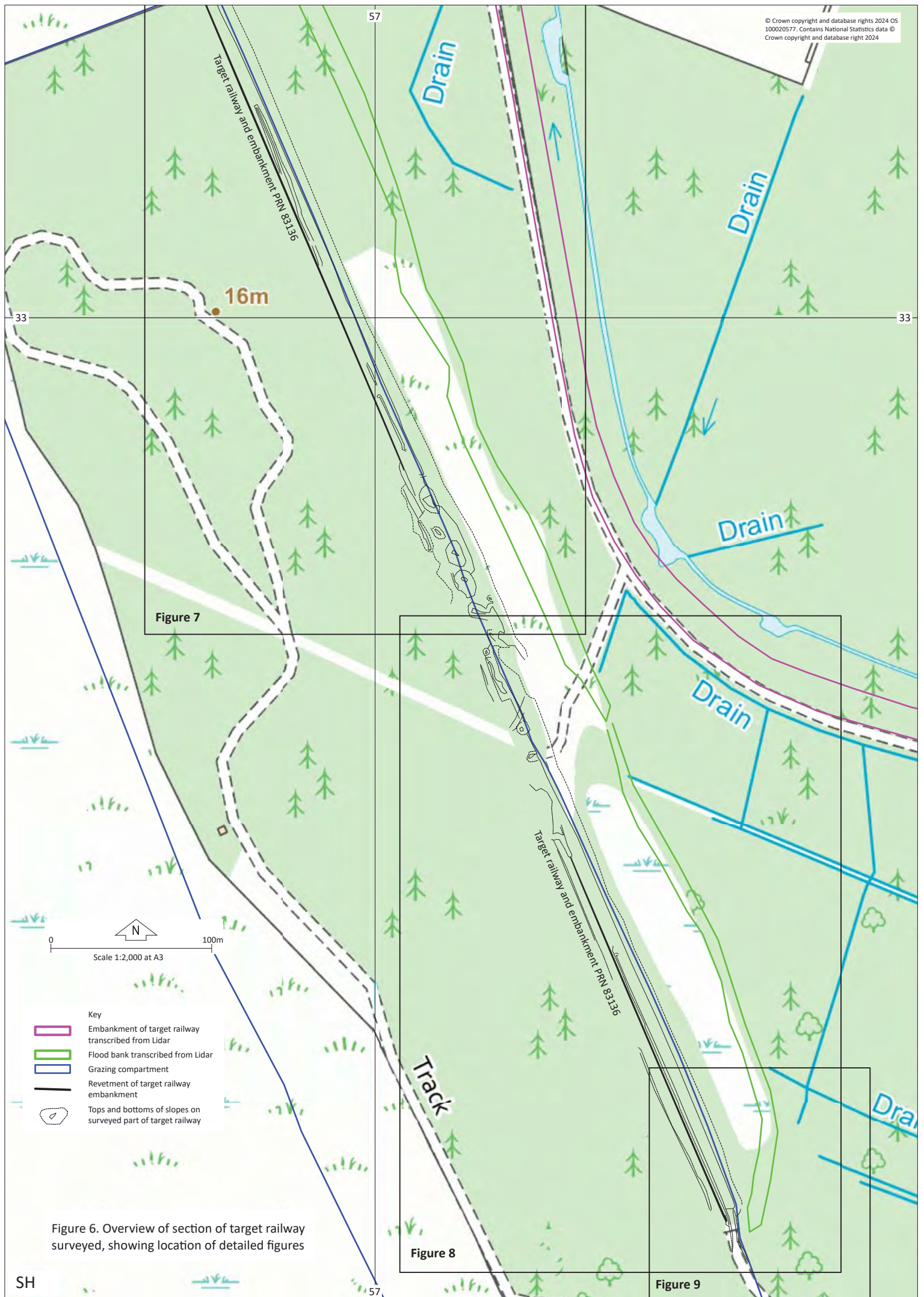


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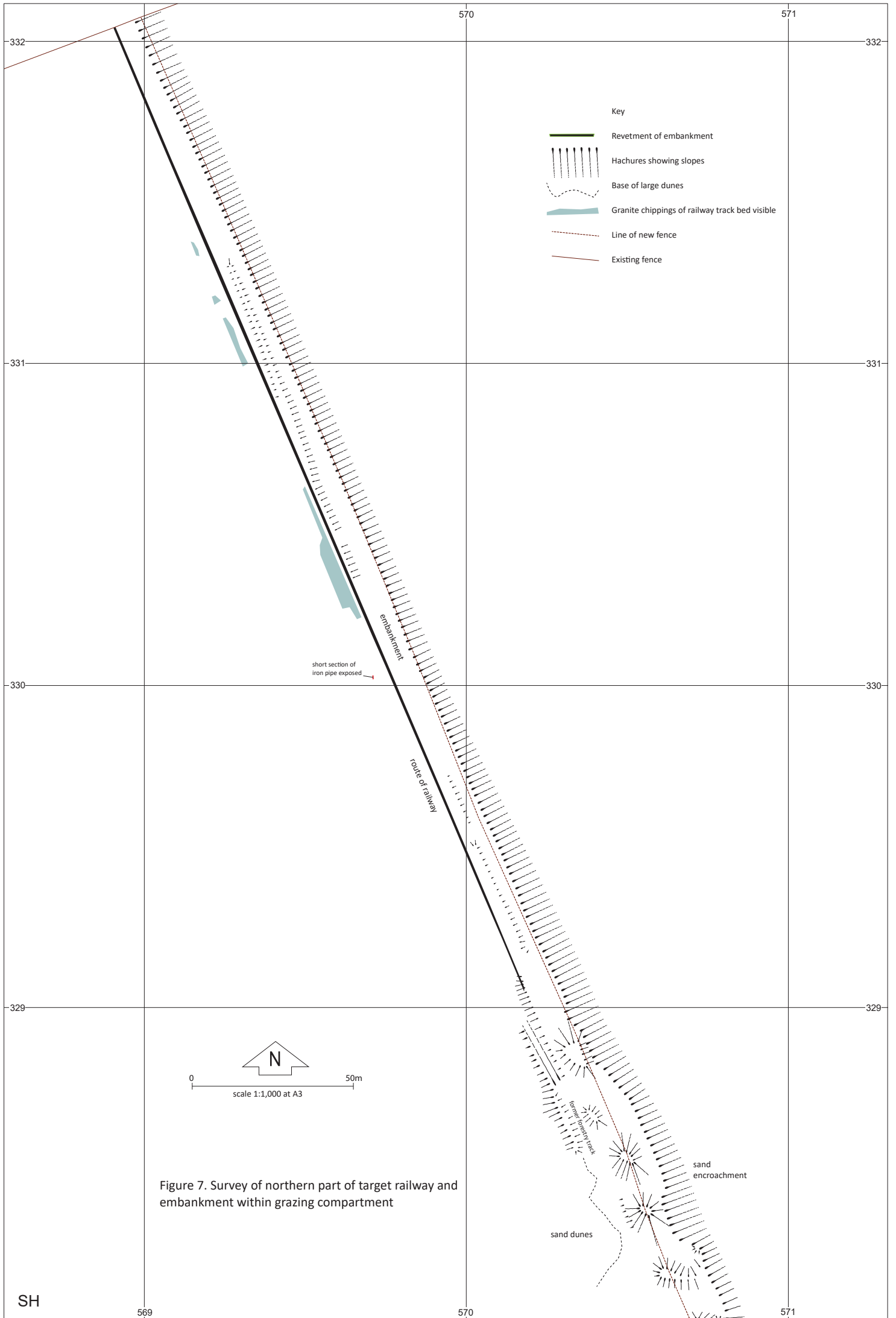


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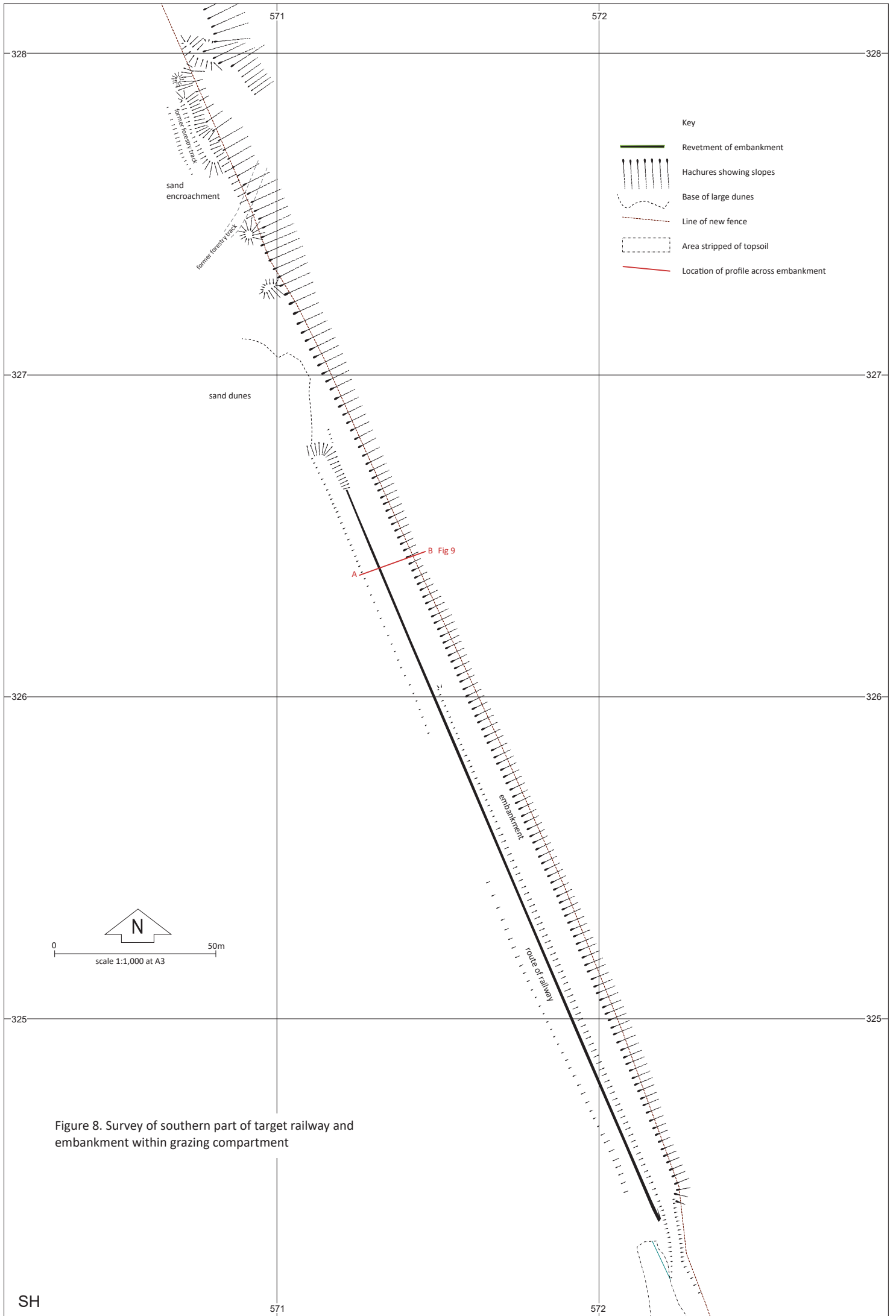


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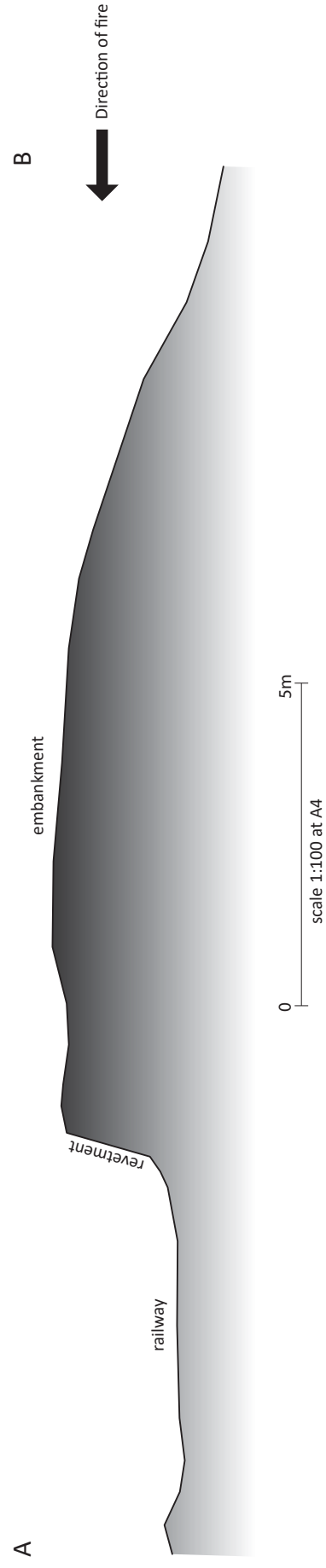


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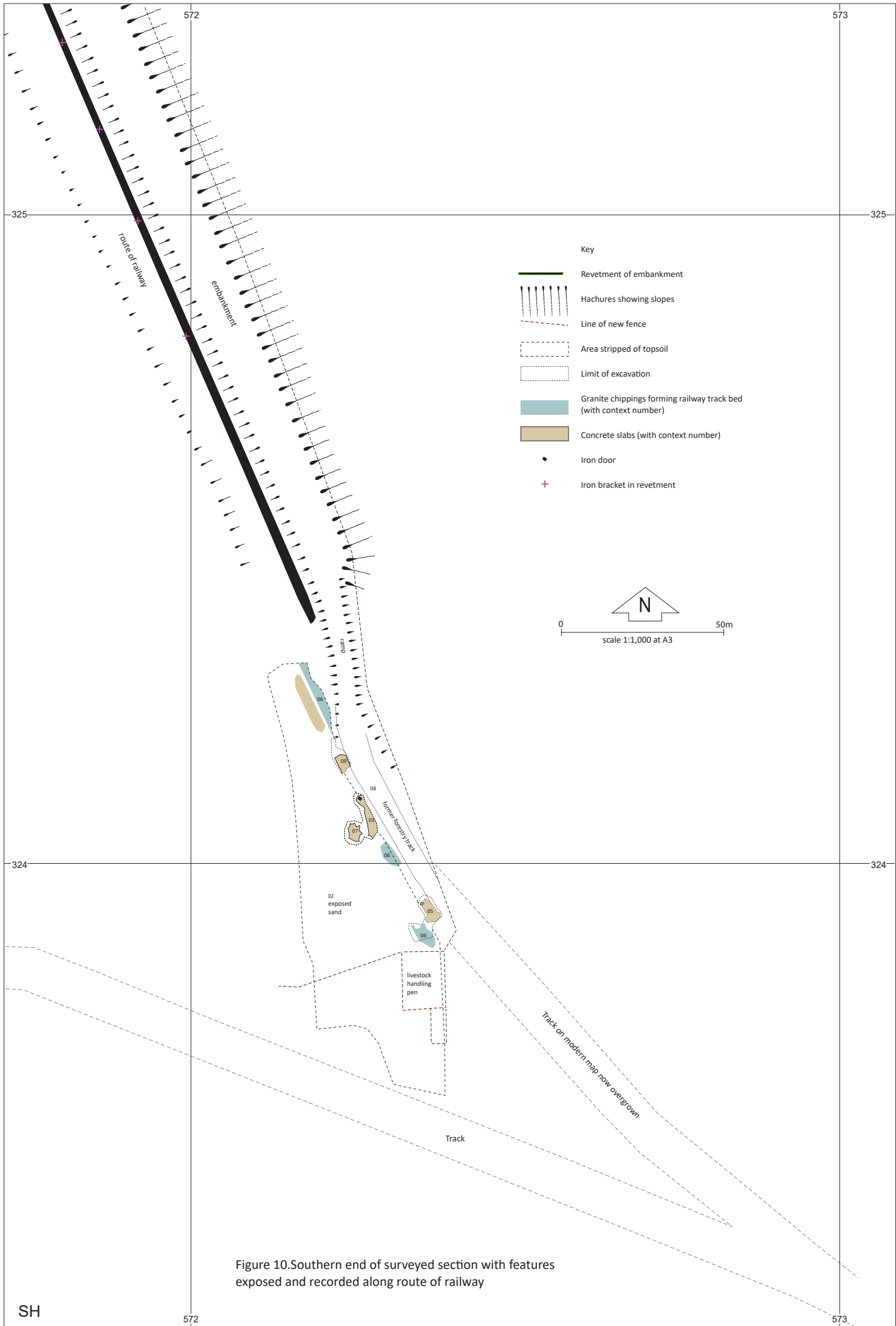


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Gwynedd Archaeological Trust Written Scheme of Investigation

TWYNI BYW - SANDS OF LIFE (SOLIFE):

CONSERVATION WORKS AT MORFA HARLECH, GWYNEDD (G2790)

**WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL
MITIGATION**

Prepared for

Natural Resources Wales

September 2023



Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

TWYNI BYW - SANDS OF LIFE (SOLIFE):

CONSERVATION WORKS AT MORFA HARLECH, GWYNEDD (G2790)

Prepared for *Natural Resources Wales*, September 2023

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INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been commissioned by Natural Resources Wales (NRW) to undertake an archaeological mitigation during works for the Sands of LIFE (SoLIFE) (LIFE17 NAT/UK/000023) conservation project at Morfa Harlech, Gwynedd LL46 2UG (NGR SH57233236; cf. [Figure 01](#)). The Sands of LIFE project is being led by NRW and supported by the EU LIFE fund and the Welsh Government, with the aim to restore threatened sand dune sites across Wales. As detailed in NRW document Twyni Byw - Sands of LIFE (SoLIFE) Specification (dated 02/04/2023; cf. [Appendix I](#)), the aim of the conservation project at Morfa Harlech will be to install 1.2km of fencing and associated works to create a new grazing compartment 17.18ha in size to introduce sustainable livestock grazing. The specification also states that c.18ha of conifer plantation have been removed from the Special Area of Conservation in Harlech Forest, in the mid-2010s and most recently in 2022; following felling, further works were carried out by the Sands of LIFE project to restore the site to sand dune and native woodland habitat and that to ensure the restoration works are sustainable and to enable the habitat to continue to improve in quality, it is essential to introduce sustainable grazing to the site. Only part of the site is currently fenced, so new livestock fencing is required to create a secure grazing compartment.

The project will include the following groundwork activities:

- Clearance of brash, fallen timber and scrub along fence line
- Erection of New Stock Fencing; and
- Erection of New Livestock Handling Pen.

The following will be undertaken as part of the archaeological mitigation:

- Desk-based study of the gunnery range railway (Primary Reference Number (PRN) 82136), including mapping of features from aerial photographs;
- A photographic record of PRN 82136 prior to work starting, and after the removal of vegetation;
- A GPS based survey of PRN 82136 and related features;
- A measured cross-section of PRN 82136;
- A watching brief during conservation groundworks; and
- A report to include methodology and results.

The conservation groundworks will be undertaken in accordance with SSSI Assent compliance and are currently scheduled for the second half of 2023. The archaeological mitigation will be undertaken in accordance with the following standards and guidance:

1. *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) (The Welsh Archaeological Trusts, 2022)*
2. *Guidelines for digital archives (Royal Commission on Ancient and Historical Monuments of Wales, 2015).*

3. *Management of Archaeological Projects (English Heritage, 1991);*
4. *Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide (Historic England, 2015);*
5. *Standard and Guidance for Archaeological Watching Brief (Chartered Institute for Archaeologists, 2020);*
6. *Standard and Guidance for Historic Environment Desk-Based Study (Chartered Institute for Archaeologists, 2020);*
7. *Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures (Chartered Institute for Archaeologists, 2020); and*
8. *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (Chartered Institute for Archaeologists, 2020).*

Gwynedd Archaeological Trust is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists.

Monitoring Arrangements

The watching brief will be monitored by the Chief Archaeologist at the Gwynedd Archaeological Trust; the content of this document and all subsequent reporting by GAT must be approved by the Chief Archaeologist (GAT) prior to final issue. The Chief Archaeologist (GAT) will need to be kept informed of the project timetable and of the subsequent progress and findings. Contact details are:

Andrew Davidson
Chief Archaeologist
Gwynedd Archaeological Trust
Mobile: 07827857545
email: andrew.davidson@heneb.co.uk

Fieldwork Aims and Objectives

The key aims and objectives of the archaeological mitigation are to:

- Complete a desk based study and on site record of gunnery range railway PRN 82136
- Establish the date and nature of any additional archaeological remains identified and assess their implications for understanding the area, in conjunction with the known archaeological record; and
- To place the results in context, reference shall be made if necessary to *A Research Framework for the Archaeology of Wales*.

Historic Environment Record

In line with the Gwynedd Archaeological Trust Historic Environment Record (HER) requirements, the HER has been contacted at the onset of the project to ensure that any data arising is formatted in a manner suitable for accession to the HER and follows the guidance set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (The Welsh Archaeological Trusts, 2022). The HER has been informed of the project start date, location including grid reference, estimated timescale for the work, and further relevant information associated with the project.

The GAT HER Enquiry Number for this project is GATHER 1906 and the Event PRN is 46675. The GAT HER will also be responsible for supplying Primary Reference Numbers (PRN) for any new assets identified and recorded.

Prior to submission of data to the HER on completion of the project, a bilingual event summary document will be prepared in *Microsoft Word* based on the format defined in section 4.2 of *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 2).

BACKGROUND

Screening Report

A desk-based screening report was completed in 2023 by the Chief Archaeologist, Gwynedd Archaeological Trust (Davidson, 2023). The 2.18km² study area that incorporated a 3km long zone from the southwest below Harlech towards the estuary of the Afon Glaslyn in the northeast, and 1km wide running from the foreshore inland. The screening report identified the key archaeological assets within this area, irrespective of where any direct impact may occur. The report stated that earlier studies of the dunes describe the site 'is a fine example of a multi-phase, gravel-based sand spit that has gradually built across a major infilling estuary. Much of its growth has taken place during the last 700 years'. The dune system developed following the construction of the castle in 1283, perhaps during the storms of the 14th century. Prior to the development of the dunes, the report states that it was possible to sail up to the foot of the cliffs below the castle, but within one or two centuries of the construction of the castle, the dunes had developed around a shingle ridge, making the castle land locked. In later centuries the area landward of the dunes was enclosed in piecemeal fashion.

The report states the regional Historic Environment Record (Gwynedd Archaeological Trust, Crag, Beuno, Garth Road, Bangor LL57 2RT) lists twelve sites within the study area:

- Primary Reference Number (PRN) 5157 Crucible, Findspot, Morfa Harlech (NGR SH56903180): a crucible found amongst the dunes of Morfa Harlech by Twm Elias, subsequent inspection of the find spot revealed thin scatter of charcoal;
- PRN 18265 Morfa Harlech Dunes, Landscape (NGR SH56753278): in the medieval period, Harlech castle and town were built on a rocky promontory above the sea. Over the next centuries, the area below the town silted up and was classed as marsh waste. The enclosure and draining of part of Morfa Harlech in 1789 by the Glyn Cywarch estate meant that the burgesses of the town lost rights of common there;
- PRN 35135 Royal St David's Golf Course, Harlech (NGR SH57633087): the golf course was founded in 1894, largely through the encouragement of W H More, Crown Agent for Wales, who introduced George Davison to Harlech, and The Hon. Harold Finch-Hatton, fourth son of the Earl of Winchelsea and Nottingham (cf. PRN 67049);
- PRN 59644 Tramway, Harlech (NGR SH57573105): a horse tramway dating from 1878 which formerly took bathers from Noddfa Cottage (PRN 59645) to the beach. The site is now part of the golf course, opened in 1894. The tramway is evident as an embankment.
- PRN 67049 Golf Course, Harlech, Urban Character Area (NGR SH57463097): Described as crucial to our understanding of the early 20th century development of Harlech. It was initiated by the Finch Hatton family, W H More and others in the 1890's;
- PRN 82132 Enclosure Northeast of Cefn Mine (NGR SH57443250): measures 60m x 30m; shown on 1953 Ordnance Survey 1:10560 map;

- PRN 82136 (inc. PRN 9684) Gunnery Range Railway, Morfa Harlech (NGR SH56993332): A flat-topped bank, 8m wide and several hundred metres long crossing the forestry area roughly from SE to NW. The southern face of the bank was faced with sandbags to a height of 1.7m. Platoons would come from tank regiments and practice their firing on moving bogies over the sand dunes (on rails). Once a week there was always a night shoot. The target railway formed part of the WWII Gunnery Range at Morfa Harlech. The track curved westward to the target railway from a junction to a north of Harlech station. The line of the railway, including to the junction, can be traced on modern APs and LiDAR. 1948 historic imagery shows the railway clearly.
- PRN 9677 Cefn Mine, Harlech (NGR SH57333228): a pile of stone rubble 5m x 17m on a slight rectangular platform 7m x 10m in size;
- PRN 9678 Cefn Mine, Harlech (NGR SH57293229): site of a pump shown on the Ordnance Survey 25-inch to 1-mile 2nd Edition Map;
- PRN 9679 Morfa Harlech Pond 1, Harlech (NGR SH57483264): a sub-rectangular pond aligned N-S 8m x 12m in size and at least 1m deep.
- PRN 9681 Morfa Harlech Pond 2, Harlech (NGR SH57283276): a pond on the Ordnance Survey 25-inch to 1-mile 2nd Edition Map;

Screening Report Recommendations

The following recommendations were made in the screening report:

- PRN 5157 Crucible findspot, Morfa Harlech: avoid direct impact within the area of the findspot; undertake watching brief if there any works in the vicinity of this site.
- PRN 82136 Gunnery Range Railway, Morfa Harlech: avoid direct impact on the former railway (82136). However, it is recognised that the proposed fence line is to run along the west side of the railway, on the lower edge of the east slope of the embankment. This slopes down to an area of waterlogged soils and dense willow. The base of the slope is therefore not easily accessible, and the proposed fence will therefore need to run a short distance up from the base of the slope. The west side of the embankment is a vertical revetment wall constructed from cement-filled sandbags which stand to a height of some 1.5m to 2m. It is important that the works do not impact upon this side, and that accessing the top of the revetment by machine is undertaken carefully, where no damage can occur. *Contractors need to be fully*

informed of the significance of the site, and the need to take care and avoid damage. If necessary, fence off vulnerable areas to protect them.

- Undertake a programme of archaeological work to include:
 - Desk-based study of the gunnery range railway and embankment w(PRN 82136), including mapping of features from aerial photographs;
 - A photographic record of PRN 82136 prior to work starting, and after the removal of vegetation;
 - A GPS survey of PRN 82136 and related features;
 - A measured cross-section of PRN 82136;
 - A watching brief during conservation groundworks; and
 - A report to include methodology and results.

METHODOLOGY

Desk-based study of the gunnery range railway (PRN 82136), including mapping of features from aerial photographs

A desk-based study is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage....Significance is to be judged in a local, regional, national or international context as appropriate” (CIfA 2020, 4).

The desk-based study will involve a study of the following resources:

1. The regional Historic Environment Register ((HER) Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, LL57 2RT) and the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be examined for information concerning the conservation area. Examination of the core HER will be undertaken, including any available mapping;
2. Aerial photographs from the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be examined for potential features. This will include 1946 RAF vertical aerial photographs;
3. The online catalogue search of the National Library of Wales (Penglais Rd, Aberystwyth SY23 3BU);
4. Light Detection and Ranging (LiDAR) data will be examined from the Lle Geo-Portal at <http://lle.gov.wales/home> for information on potential surface features using digital terrain modelling and digital surface modelling;

Photographic record of PRN 82136 prior to work starting, and after the removal of vegetation

Photographic images will be taken using a digital SLR (Nikon D3100) camera set to maximum resolution (4,608 × 3,072; 14.2 effective megapixels) in RAW format. Sufficient images will be taken to demonstrate the location, composition and orientation of the gunnery railway and embankment.

Camera tripods and poles will be used. A photographic record will maintained on site using GAT pro-formas ([Appendix III](#)) and digitised in Microsoft Excel and Access as part of the fieldwork archive and dissemination process; archive numbering will start from G2802_001. The location and orientation of photographs taken will be recorded on scaled plans and digitised for final reporting. The photographic images will then be converted to TIFF for final archiving using Adobe Photoshop.

GPS Survey of PRN 82136 & Related Features

The survey will be completed using a Trimble R8 GPS unit and will record the location, composition and orientation of the gunnery railway and embankment. The survey data will be generated in a dxf format and processed using CAD software; the results will be finalised and presented using Adobe Illustrator. The illustration will be presented with a suitable scale bar and reference, as well as any additional information relevant to the surveyed features; the illustration will be included in the mitigation report.

Measured Cross-Section of PRN 82136

The measured cross section of the gunnery railway and embankment will be completed using a GAT basic record pro-forma ([Appendix II](#)), which will include profile and measurement details. Key dimensions and detailed measurements will be completed using hand tapes and a digital measuring unit (e.g. *Leica Disto*) and included in the mitigation report. The location of the measured cross-section will be included on the report figure prepared from the GPS survey.

Watching Brief During Conservation Groundworks

Introduction

An archaeological watching brief is defined by the Chartered Institute for Archaeologists as a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive (CIfA, 2020).

The archaeological watching brief is required during conservation works for the Sands of LIFE (SoLIFE) (LIFE17 NAT/UK/000023) conservation project and will monitor the following groundwork activities:

- Conservation Work Package 1: Erection of New Stock Fencing, including
 - a. clearance of forestry brush, fallen timber and scrub from along the fence line.
 - b. erection of 1.2 km of livestock-proof post-and-netting fencing;
 - c. erection of 3 new field gates, 3 mammal gates, and 2 kissing gates.
- Conservation Work Package 2: erect of livestock handling pen: Supply all materials to FSC specified standards and erect a stock handling pen to specification laid out below.

The groundworks are scheduled from November 2023 and undertaken by contractors employed by NRW. The schedule is in line with Protected Species Licence and SSSI Assent compliance. The west side of the gunnery range embankment is constructed from cement-filled sandbags which stand to a height of some 1.5m to 2m. It is important that the works do not impact upon this side, and that accessing the top of the revetment by machine is undertaken carefully, where no damage can occur. *Contractors need to be fully informed of the significance of the site, and the need to take care and avoid damage. The contractors will receive a toolbox talk briefing from the attending archaeologist.*

Watching Brief: Fieldwork Methodology

The following watching brief methodology will be applied:

- During the watching brief all attendances and any identified features will be recorded using GAT watching brief pro-formas ([Appendix IV](#));
- Photographic images will be taken using a digital SLR (camera set to maximum resolution in RAW format; a photographic record will be maintained on site using GAT pro-formas ([Appendix III](#)) and digitised in *Microsoft Access* as part of the fieldwork archive and dissemination process. Photographic images will be archived in TIFF format using Adobe Photoshop; the archive numbering system will use archive prefix G2790_ and the next photographic number available (further to the preceding photographic record of PRN 82136 completed prior to work starting and after the removal of vegetation). When practical, a photographic ID board will be used during the watching brief inspection to record site code, image orientation and any relevant context numbers.
- Any subsurface features will be recorded photographically, with detailed notations and a measured survey (completed using a *Trimble R8* GPS unit);
- The archaeological structure will be manually cleaned and examined to help determine visible extent, function, date and relationship to any adjacent activity; and
- Any required plans or sections to be drawn at a minimum 1:10 scale using GAT A4, A3 or A2 pro-forma permatrace.

Watching Brief: Ecofacts

Should any archaeological features and/or sealed deposits be identified that are deemed suitable for post-excavation assessment and analysis, ecofact samples will be taken of not less than 40 litres for bulk samples, or 100% if the feature is smaller.

The samples will be subsequently assessed and analysed by an appropriate palaeoenvironmental specialist for plant species and charcoal, with the results used to inform agrarian practices and wood fuel use, as well as radiocarbon dating strategies.

Any ecofact assessment/analysis proposals will require additional resourcing and cost and will only be undertaken further to agreement with GAT and the client.

Watching Brief: Artefacts

Diagnostic artefacts will be retained for further examination and identification. Pottery sherds of 19th and 20th century date will be examined on site and the context from which they were retrieved noted but the sherds will not be retained. The artefacts will be treated according to guidelines issued by the UK Institute of Conservation (Watkinson and Neal 2001) in particular the advice provided within *First Aid for Finds* (Rescue 1999) and *Historic England*.

Any waterlogged artefacts (e.g. wood or leather) that are to be recovered for post-excavation assessment and analysis will be processed in accordance with *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage, 2011) and specifically in accordance with Brunning and Watson (2010) for waterlogged wood and Historic England (2012) for waterlogged leather. In such cases an external specialist will be contacted to agree an appropriate sampling and recovery strategy via Lucy Whittingham | Project Manager (post-excavation) | AOC Archaeology | telephone: 0208 843 7380 | email: lucy.whittingham@aocarchaeology.com).

All finds are the property of the landowner; however, it is GAT policy to recommend that all finds are donated to an appropriate museum (in this case Storiell, Ffordd Gwynedd, Bangor, Gwynedd LL57 1DT), where they can receive specialist treatment and study. Access to finds must be granted to GAT for a reasonable period to allow for analysis and for study and publication as necessary. GAT staff will undertake initial identification, but any additional advice would be sought from a wide range of consultants used by GAT, including National Museums and Galleries of Wales at Cardiff.

All finds of treasure must be reported to the coroner for the district within fourteen days of discovery or identification of the items. Items declared Treasure Trove become the property of the Crown, on whose behalf the Portable Antiquities Scheme acts as advisor on technical matters and may be the recipient body for the objects.

The Treasure Valuation Committee, based at the British Museum, and informed by the Portable Antiquities Scheme, will decide whether they or any other museum may wish to acquire the object. If no museum wishes to acquire the object, then the Secretary of State will be able to disclaim it. When this happens, the coroner will notify the occupier and landowner that he intends to return the object to the finder after 28 days unless he receives no objection. If the coroner receives an objection, the find will be retained until the dispute has been settled.

GAT will contact the landowner for agreement regarding the transfer of artefacts, initially to GAT and subsequently to the relevant museum (Storiell, Ffordd Gwynedd, Bangor, Gwynedd LL57 1DT). A GAT produced pro-forma will be issued to the landowner where they are given the option to donate the finds or to record that they want them returning to them once analysis and assessment has been completed. Artefacts to be donated will then be transferred to Storiell.

Watching Brief: Human Remains

Whilst human remains are not expected, if any human remains are identified that cannot be preserved in situ, any excavation will take place under appropriate regulations and with due regard for health and safety issues. In order to excavate human remains, a Ministry of Justice licence is required under Section 25 of the Burials Act 1857 for the removal of any body or remains of any body from any place of burial. In accordance with the Ministry of Justice licence, recovered remains will be reburied once the investigation and/or assessment/analysis are complete.

Non-fragmented skeletal remains will be excavated using wooden tools and collected and stored in polyethylene bags (with appropriate references for context, grave number, et al) and placed in a lidded cardboard archive box (note: separate boxes for each grave) and stored in a suitable manner. If significant quantities of human remains are encountered, a human osteologist should be contacted and appointed to advise the team during the fieldwork. The osteologist should also help to ensure that adequate post-excavation processing of human remains is carried out so that the material is in a fit state for assessment during the post-excavation stage. For inhumations, this will involve washing, drying, marking and packing.

If human remains are recovered that are deemed suitable for further assessment/analysis, this will be completed in accordance with the osteologist's requirements and with *Human Bones from Archaeological Sites Guidelines for producing assessment documents and analytical reports* (Historic England, 2004).

Data Management Plan

Archiving will be completed based on following task list;

1. Pro-formas: all cross referenced and scanned for digital archiving;
2. Photographic Metadata: cross-referenced with all pro-formas and completed in *Microsoft Excel*; and
3. Measured drawings (permatrace) (if relevant): all cross referenced and scanned for digital archiving.

This data will then be used as the basis for the physical and digital dataset archives. Information from these will be used to compile the project report. The physical archive will be stored in a designated project folder and the location confirmed in the GAT project database; the digital dataset will be stored on a dedicated GAT server, with the location confirmed in GAT project database via a specific hyperlink. External datasets for the HER and RCAHMW are as defined in the dissemination strategy below. De-selected digital data will be confirmed in an updated digital management plan appended to the final report.

Reporting

A draft report will be submitted within one month of fieldwork completion and a final report will be submitted to the regional Historic Environment Record within six months of project completion. The report will include the following:

1. Non-technical summary (Welsh and English)
2. Introduction
3. Background
4. Methodology
5. Results
6. Conclusion
7. List of sources consulted
8. Illustrations – to include:
 - a) Location plan (general)
 - b) Location and direction of images taken for photographic record of PRN 82136 (both prior to work starting and after the removal of vegetation);

c) Results of the GPS survey of PRN 82136 and related features and location of the measured cross-section of PRN 82136

9. Plates – to include:

a) Images taken for photographic record of PRN 82136 (both prior to work starting and after the removal of vegetation)

b) images taken during the watching brief

10. Appendix I – approved GAT project specification

11. Appendix II – photographic metadata

On final approval, the following dissemination and archiving of the report and digital dataset will apply:

- A draft report will be provided to the client (NRW/Sands of LIFE project) for comment e.g. to check elements related to the site ownership or works delivered are correct;
- A digital report will be provided to the regional Historic Environment Record; this will be submitted within six months of project completion (final report only), along with a digital dataset comprising an Event PRN summary. The report and dataset will be submitted in accordance with the required standards set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) (Version 2)*; and
- A digital report and digital archive dataset will be provided to Royal Commission on Ancient and Historic Monuments, Wales (final report only), in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. The dataset will be prepared in the format required by RCAHMW and will include:
 - Photographic metadata (Microsoft Access);
 - Photographic archive (TIFF format);
 - Project Information form (Excel);
 - File Information form (Excel) – Microsoft Word report text final;
 - File Information form (Excel) – Photographic metadata (general);
 - File Information form (Excel) – Adobe PDF report final; and
 - File Information form (Excel) - Photographic metadata (detail).
- The final report in MS Word format, all photographs in original JPEG format, and GIS Shapefiles and other data in its original format (if requested) will be provided to NRW/Sands of LIFE project.

Selection Strategy

As defined in *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives* (Chartered Institute for Archaeologists, 2020) section 3.3.1, a project specific selection strategy and data management plan should be prepared. In support of this, the Chartered Institute for Archaeologist (CIfA), have stated that it is “widely accepted that not all the records and materials collected or created during the course of an Archaeological Project require preservation in perpetuity. These records and materials constitute the Working Project Archive which will be subject to Selection, in order to establish what will be retained for long-term curation”. The aim of selection is to ensure that all the elements retained from the Working Project Archive for inclusion in the Archaeological Archive are appropriate to establish the significance of the project and support “future research, outreach, engagement, display and learning activities”. Selection should be “focused on selecting what is to be retained to support these future needs, rather than deciding what can be dispersed” and can be qualified by a selection strategy, which details the project-specific selection process, agreed by all parties (including GAT, client and/or landowner), which will be applied to a Working Project Archive prior to its transfer into curatorial care as the Archaeological Archive.

The selection strategy will be confirmed in the watching brief report and will take into account:

- The aims and objectives of the project.
- The brief and/or Written Scheme of Investigation (WSI)).
- The Collecting Institution’s collection policy and/or deposition guidelines.
- Local and regional research frameworks.
- Relevant thematic or period specific research frameworks.
- The project’s Data Management Plan (DMP).
- Internal recording and reporting policies.
- Material-specific guidance documents.

The selection strategy pro-forma is included as A.

PERSONNEL

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section with attendances on-site undertaken by a GAT Project Archaeologist(s). The Project Archaeologist will be responsible for following:

- All archaeological watching brief duties on site;
- Client/contractor liaison;
- GAT liaison, with regular updates;
- Specialist liaison (if relevant);

- Completing all on site pro-formas and the fieldwork archive itemised in [para. 2.5](#);
- Sourcing Primary Reference Numbers (PRN) from the GAT HER for any new features identified;
- Completing an event summary and creating or updating PRN data, dependent on results; and
- For submitting a draft final report (or interim report) for project manager review and approval, to then be submitted as per the arrangements defined in [para. 4](#).

HEALTH AND SAFETY

Copies of the site-specific risk assessment will be supplied to the client and sub-contractor prior to the start of fieldwork. Any risks and hazards will be indicated prior to the start of work via a submitted risk assessment. All GAT staff will be issued with required personal safety equipment, including high visibility jacket, steel toe-capped boots and hard hat. All GAT fieldwork is undertaken in accordance with GAT's Health and Safety Manual, Policy and Handbook which were prepared by WorkNest. All work will be undertaken in accordance with the client and site contractors Health and Safety requirements.

There will be no livestock grazing in the vicinity of the work area. The site is open access to the public and is regularly used by walkers, cyclists and horse riders. The main contractor will ensure appropriate demarcation of work zones via safety signs and warning tape.

SOCIAL MEDIA

One of the key aims in the GAT mission statement is to improve the understanding, conservation and promotion of the historic environment in our area and inform and educate the wider public. To help achieve this, GAT maintains an active social media presence and seeks all opportunities to promote our projects and results. With permission, GAT would like the opportunity to promote our work on this scheme through our social media platforms. This could include social media postings during our attendance on site as well as any postings to highlight results. In all instances, approval will be sought from client prior to any postings.

Any social media output will be further to the agreement of NRW.

INSURANCE

Public/Products Liability

Limit of Indemnity- £5,000,000 any one event in respect of Public Liability

INSURER Ecclesiastical Insurance Office Plc.

POLICY TYPE Public Liability

POLICY NUMBER 000375

EXPIRY DATE 22/08/2024

Employers Liability

Limit of Indemnity- £10,000,000 any one occurrence.

INSURER Ecclesiastical Insurance Office Plc.

POLICY TYPE Public Liability

POLICY NUMBER 000375

EXPIRY DATE 22/08/2024

Professional Indemnity

Limit of Indemnity- £5,000,000 in respect of each and every claim

INSURER AXA Insurance UK Plc

POLICY TYPE Professional Indemnity

POLICY NUMBER TG0275

EXPIRY DATE 22/08/2024

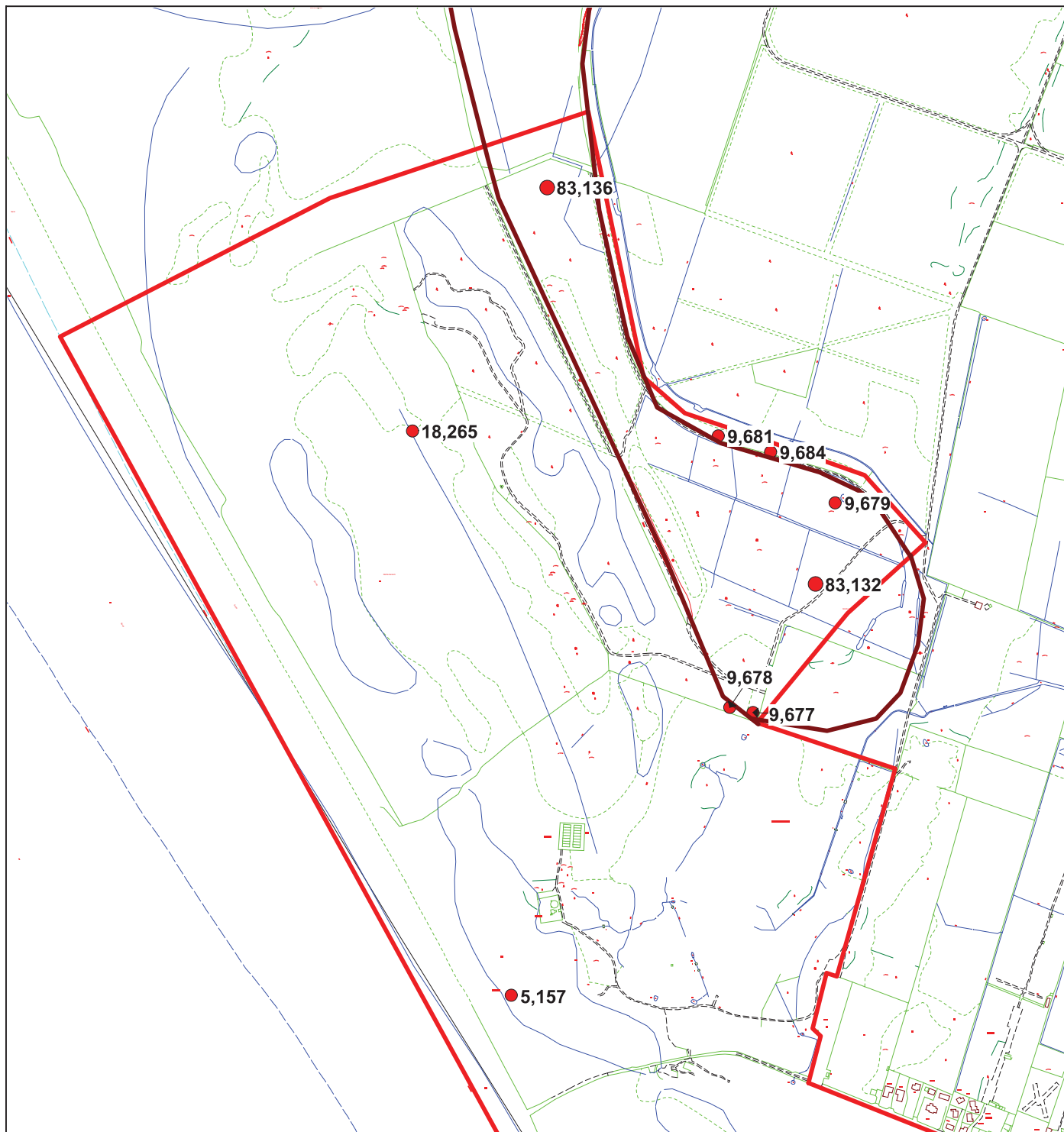
SOURCES CONSULTED

1. Brunning, R and Watson, J 2010, *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood* (3rd edition)
2. Chartered Institute for Archaeologists, 2020, *Standard and Guidance for Archaeological Watching Brief*
3. Chartered Institute for Archaeologists, 2020, *Standard and Guidance for The Collection, Documentation, Conservation and Research of Archaeological Materials*
4. Chartered Institute for Archaeologists, 2020, *Standard and Guidance for The Creation, Compilation, Transfer and Deposition of Archaeological Archives*
5. English Heritage, 1991, *Management of Archaeological Projects (MAP2)*
6. English Heritage, 2011, *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation*
7. English Heritage, 2012, *Waterlogged Organic Artefacts, Guidelines on their Recovery, Analysis and Conservation*
8. Historic England, 2004, *Human Bones from Archaeological Sites Guidelines for Producing Assessment Documents and Analytical Reports*
9. Historic England, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*
10. Natural Resources Wales, 2023. *Twyni Byw - Sands of LIFE (SoLIFE) Specification*
11. Royal Commission on Ancient and Historical Monuments of Wales, 2015, *Guidelines for digital archives*

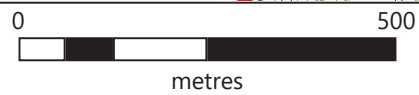
12. The Welsh Archaeological Trusts, 2022, *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 2)
13. Watkinson, D and Neal, V, 2001, *First aid for finds* (3rd edition).
14. Davidson, A. 2023. Twyni Byw - Sands of LIFE: Dune rejuvenation at Morfa Harlech. Sands of LIFE Code: SoLife: LIFE17 AT/UK/000023. Archaeological Screening
15. Chartered Institute for Archaeologists, 2020. *Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures*

FIGURE 01

Plan showing the location of known archaeological assets (Source Davidson, A. 2023. Twyni Byw - Sands of LIFE: Dune rejuvenation at Morfa Harlech. Sands of LIFE Code: SoLife: LIFE17 AT/UK/000023. Archaeological Screening. Not to scale.



- Study area
- Line of gunnery railway



Twyni Byw Sands of LIFE Morfa Harlech

FIGURE 02

Reproduction of Plan 1: Location of Morfa Harlech/Harlech Forest, 2023. Twyni Byw - Sands of LIFE (SoLIFE) Specification - SoLIFE Morfa Harlech Fencing 2023



Legend

□ Project Site / SAC Boundary

Cyfoeth Naturiol Cymru
Natural Resources Wales



Sands of LIFE: LIFE 17 NAT/UK/000023

The project has received funding from the LIFE Programme of the European Union. Part funded by Welsh Government.

The project will run until December 2022.

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Contains Natural Resources Wales Information.
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Jake Burton Sands of LIFE Assistant Project Officer

APPENDIX II

Gwynedd Archaeological Trust Photographic Metadata

Photo Record Number	Core PRN	Description	View From	Scales	Creator of Digital Photo	Date
G2790_001	83,136	Photo of dummy training rounds	N/A	Not Used	Stuart Murphy	04/12/2023
G2790_002	83,136	Area where the corral will be situated	S	Not Used	Stuart Murphy	04/12/2023
G2790_003	83,136	Photo showing cleared Area	S	Not Used	Stuart Murphy	04/12/2023
G2790_004	83,136	Concrete visible under sand in cleared corral area	SE	1m X 1	Stuart Murphy	04/12/2023
G2790_005	83,136	Concrete visible under sand in cleared corral area	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_006	83,136	Iron plate, found during UXO survey. Possibly armour plating added to engine.	W	1m X 1	Stuart Murphy	04/12/2023
G2790_007	83,136	Concrete visible under sand in cleared corral area	W	1m X 1	Stuart Murphy	04/12/2023
G2790_008	83,136	General view of embankment and train line	SE	Not Used	Stuart Murphy	04/12/2023
G2790_009	83,136	Shot of embankment wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_010	83,136	Shot of embankment wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_011	83,136	Shot looking northward up the trainline beside embankment wall	S	Not Used	Stuart Murphy	04/12/2023
G2790_012	83,136	Damaged area within in the wall	W	1m X 1	Stuart Murphy	04/12/2023
G2790_013	83,136	View of wall showing construction	W	1m X 1	Stuart Murphy	04/12/2023
G2790_014	83,136	Metal spike protruding out of embankment wall	SW	Not Used	Stuart Murphy	04/12/2023
G2790_015	83,136	Metal spike protruding out of embankment wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_016	83,136	Shot looking northward up the trainline	S	Not Used	Stuart Murphy	04/12/2023
G2790_017	83,136	Shot showing small embankment to the west of wall	SE	Not Used	Stuart Murphy	04/12/2023
G2790_018	83,136	Shot looking southward down track showing wall to the east and small bank to the west	N	Not Used	Stuart Murphy	04/12/2023
G2790_019	83,136	Photo showing dune encroachment over trainline and onto the embankment	S	Not Used	Stuart Murphy	04/12/2023
G2790_020	83,136	Photo showing dune encroachment over trainline and onto the embankment	SE	Not Used	Stuart Murphy	04/12/2023
G2790_021	83,136	Photo looking northward up the embankment showing dunes formed on the embankment	S	Not Used	Stuart Murphy	04/12/2023

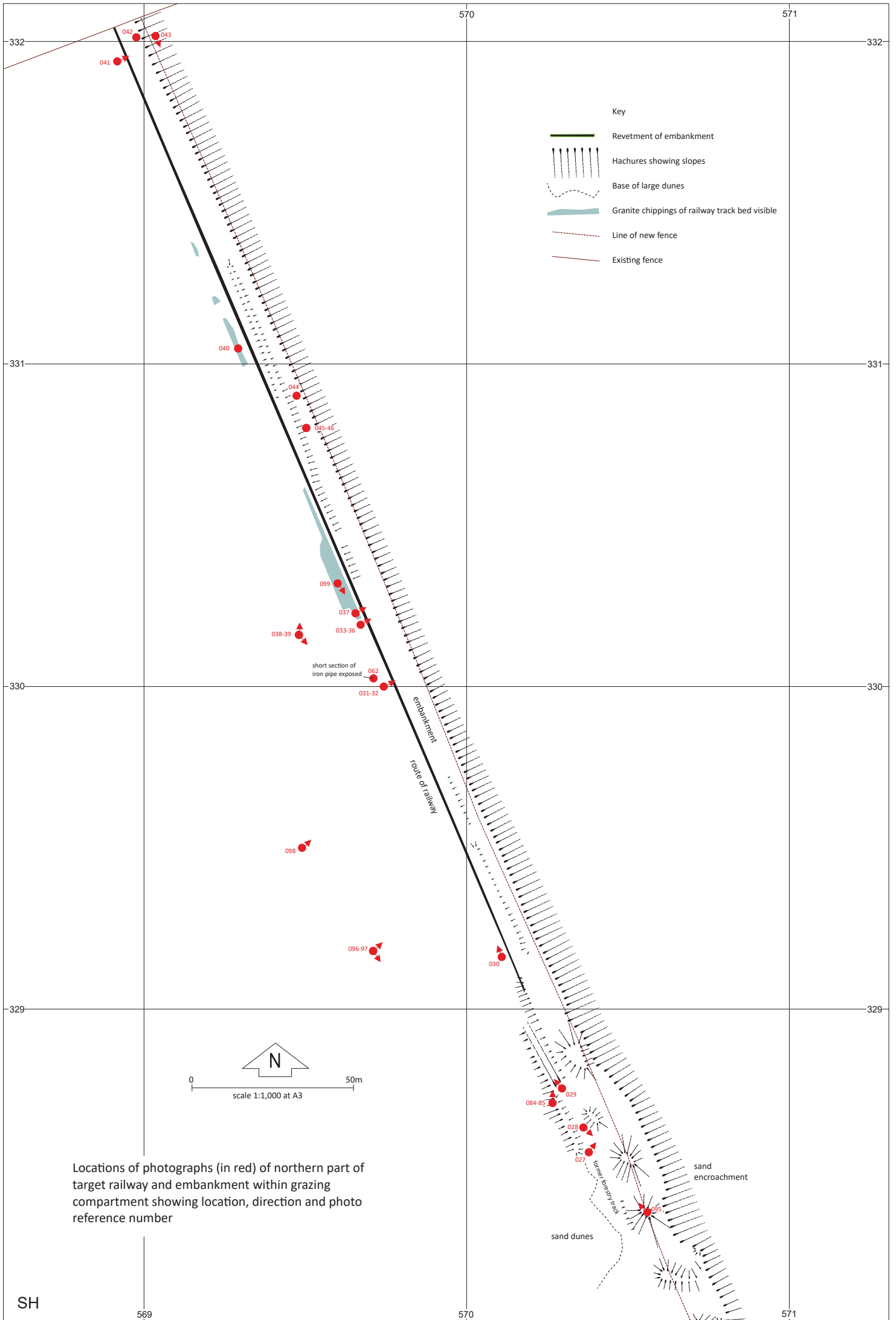
Photo Record Number	Core PRN	Description	View From	Scales	Creator of Digital Photo	Date
G2790_022	83,136	Photo showing area of proposed trackway over the embankment	SW	Not Used	Stuart Murphy	04/12/2023
G2790_023	83,136	Photo showing area of proposed trackway over the embankment	NE	Not Used	Stuart Murphy	04/12/2023
G2790_024	83,136	Area where field gate will be installed	W	Not Used	Stuart Murphy	04/12/2023
G2790_025	83,136	Dune on the embankment	S	Not Used	Stuart Murphy	04/12/2023
G2790_026	83,136	Dune build-up on the embankment	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_027	83,136	Dune build-up on the embankment	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_028	83,136	Dunes on the embankment	NW	Not Used	Stuart Murphy	04/12/2023
G2790_029	83,136	Photo showing wall and embankment running north ward	SE	Not Used	Stuart Murphy	04/12/2023
G2790_030	83,136	Photo showing overgrown section of the wall	S	Not Used	Stuart Murphy	04/12/2023
G2790_031	83,136	Photo showing top and bottom of the wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_032	83,136	Photo showing top and bottom of the wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_033	83,136	Photo showing top and bottom of the wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_034	83,136	Photo showing top and bottom of the wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_035	83,136	Close up of the wall showing imprints of hessian fabric	SW	Not Used	Stuart Murphy	04/12/2023
G2790_036	83,136	Close up of the wall showing imprints of hessian fabric	SW	Not Used	Stuart Murphy	04/12/2023
G2790_037	83,136	Shot of wall running northward	S	Not Used	Stuart Murphy	04/12/2023
G2790_038	83,136	Shot of wall from a wider angle	S	Not Used	Stuart Murphy	04/12/2023
G2790_039	83,136	Shot of wall from a wider angle	NW	Not Used	Stuart Murphy	04/12/2023
G2790_040	83,136	Possible ballast from train track	N	Not Used	Stuart Murphy	04/12/2023
G2790_041	83,136	Damaged section of wall	SW	1m X 1	Stuart Murphy	04/12/2023
G2790_042	83,136	Metal objects	S	Not Used	Stuart Murphy	04/12/2023
G2790_043	83,136	View looking south down the embankment	N	Not Used	Stuart Murphy	04/12/2023
G2790_044	83,136	Metal objects	N/A	Not Used	Stuart Murphy	04/12/2023
G2790_045	83,136	Metal spikes	N/A	1m X 1	Stuart Murphy	04/12/2023
G2790_046	83,136	Metal spikes	N/A	Not Used	Stuart Murphy	04/12/2023
G2790_047	83,136	View of dunes on the embankment	N	Not Used	Stuart Murphy	04/12/2023

Photo Record Number	Core PRN	Description	View From	Scales	Creator of Digital Photo	Date
G2790_048	83,136	Photo looking south down the embankment showing the slope of the bank	N	Not Used	Stuart Murphy	04/12/2023
G2790_049	83,136	Photo looking down the embankment showing the slope down to the flooded area at the base	NW	Not Used	Stuart Murphy	04/12/2023
G2790_050	83,136	View from the base of the bank looking back up	NE	Not Used	Stuart Murphy	04/12/2023
G2790_051	83,136	View looking down the bank showing the slope of the bank	NW	Not Used	Stuart Murphy	04/12/2023
G2790_052	83,136	View looking north showing slope of the bank	SE	Not Used	Stuart Murphy	04/12/2023
G2790_053	83,136	View of the cleared area at the southern end of embankment	NW	Not Used	Stuart Murphy	04/12/2023
G2790_054	83,136	View looking down the embankment	SE	Not Used	Stuart Murphy	04/12/2023
G2790_055	83,136	Photo of rocks forming a ramp onto the embankment	E	1m X 1	Stuart Murphy	04/12/2023
G2790_056	83,136	Area of mixed concrete at the south end of the embankment	N	1m X 1	Stuart Murphy	04/12/2023
G2790_057	83,136	Area of mixed concrete at the south end of the embankment	W	1m X 1	Stuart Murphy	04/12/2023
G2790_058	83,136	Area of mixed concrete at the south end of the embankment	SE	1m X 1	Stuart Murphy	04/12/2023
G2790_059	83,136	Area of ballast at southern end of the embankment	S	1m X 1	Stuart Murphy	04/12/2023
G2790_060	83,136	Close up of in-situ metal spike	SW	Not Used	Stuart Murphy	04/12/2023
G2790_061	83,136	Wider view of in-situ metal spike	SW	Not Used	Stuart Murphy	04/12/2023
G2790_062	83,136	Metal pipe west of the wall	S	1m X 1	Stuart Murphy	04/12/2023
G2790_063	83,136	Metal door sat on top of the concrete foundation	NW	30cm X 1	Stuart Murphy	06/12/2023
G2790_064	83,136	Wider view of metal door sat on top of the concrete foundation	NW	30cm X 1	Stuart Murphy	06/12/2023
G2790_065	83,136	Close up of the metal door showing possible ventilation slits	SE	30cm X 1	Stuart Murphy	06/12/2023
G2790_066	83,136	Granite chip railway track bed	E	30cm X 1	Jane Kenny	06/12/2023
G2790_067	83,136	Granite chip railway track bed	E	30cm X 1	Jane Kenny	06/12/2023
G2790_068	83,136	Granite chip railway track bed	S	30cm X 1	Jane Kenny	06/12/2023
G2790_069	83,136	Concrete Platform	SE	30cm X 1	Jane Kenny	06/12/2023
G2790_070	83,136	Concrete Platform	SE	30cm X 1	Jane Kenny	06/12/2023
G2790_071	83,136	Concrete Platform	SW	30cm X 1	Jane Kenny	06/12/2023







Photo Record Number	Core PRN	Description	View From	Scales	Creator of Digital Photo	Date
G2790_072	83,136	Concrete Platform	NW	30cm X 1	Jane Kenny	06/12/2023
G2790_073	83,136	Photo looking northward along concrete foundation	S	30cm X 1	Stuart Murphy	06/12/2023
G2790_074	83,136	Wide view of section of foundation	W	30cm X 1	Stuart Murphy	06/12/2023
G2790_075	83,136	Close up view of section of foundation	W	30cm X 1	Stuart Murphy	06/12/2023
G2790_076	83,136	Concrete foundation	NW	30cm X 1	Stuart Murphy	06/12/2023
G2790_077	83,136	View over corral area with castle behind	NW	Not Used	Jane Kenny	06/12/2023
G2790_078	83,136	Southern end of target railway embankment from a distance	W	Not Used	Jane Kenny	06/12/2023
G2790_079	83,136	Towards southern end of target railway embankment with hills behind	SW	Not Used	Jane Kenny	06/12/2023
G2790_080	83,136	Towards southern end of target railway embankment with hills behind	SW	Not Used	Jane Kenny	06/12/2023
G2790_081	83,136	Towards southern end of target railway embankment with hills behind	SW	Not Used	Jane Kenny	06/12/2023
G2790_082	83,136	Southern end of target railway embankment with Harlech and castle in distance	NW	Not Used	Jane Kenny	06/12/2023
G2790_083	83,136	Area of sand dunes over target railway with mountains behind	SSW	Not Used	Jane Kenny	06/12/2023
G2790_084	83,136	Northern end of surveyed section of target railway with mountains behind	S	Not Used	Jane Kenny	06/12/2023
G2790_085	83,136	Northern end of surveyed section of target railway with mountains behind	S	Not Used	Jane Kenny	06/12/2023
G2790_086	83,136	Close up of section of platform	SW	30cm X 1	Stuart Murphy	06/12/2023
G2790_087	83,136	Wider view of platform	SW	30cm X 1	Stuart Murphy	06/12/2023
G2790_088	83,136	Wider view of platform	N	30cm X 1	Stuart Murphy	06/12/2023
G2790_089	83,136	View of concrete platform	SW	30cm X 1	Stuart Murphy	06/12/2023
G2790_090	83,136	View of concrete platform	NW	30cm X 1	Stuart Murphy	06/12/2023
G2790_091	83,136	Example of fencing on the embankment	SSE		Jane Kenney	08/12/2023
G2790_092	83,136	Gate in fence in area where sand dunes have covered the embankment	S	1m	Jane Kenney	08/12/2023
G2790_093	83,136	Gate in fence in area where sand dunes have covered the embankment	NW	1m	Jane Kenney	08/12/2023

Photo Record Number	Core PRN	Description	View From	Scales	Creator of Digital Photo	Date
G2790_094	83,136	Gate in fence in area where sand dunes have covered the embankment	NW	1m	Jane Kenney	08/12/2023
G2790_095	83,136	Example of fencing where sand dunes have covered the embankment	SE		Jane Kenney	08/12/2023
G2790_096	83,136	View from sand dunes across target railway	SW		Jane Kenney	08/12/2023
G2790_097	83,136	View from sand dunes across target railway	NW		Jane Kenney	08/12/2023
G2790_098	83,136	View from sand dunes across target railway	SW		Jane Kenney	08/12/2023
G2790_099	83,136	View along route of railway with revetment wall to left and sand dunes to right	NNW		Jane Kenney	08/12/2023
G2790_100	83,136	Drilling hole for fence post	SW		Jane Kenney	08/12/2023
G2790_101	83,136	Setting fence post in drilled hole and driving it in	S		Jane Kenney	08/12/2023
G2790_102	83,136	Setting fence post in drilled hole and driving it in	S		Jane Kenney	08/12/2023
G2790_103	83,136	Driving in an angled post next to a straining post.	S		Jane Kenney	08/12/2023
G2790_104	103565	Top part of iron drum or container	NE	1m	Jane Kenney	08/12/2023
G2790_105	103565	Top part of iron drum or container	E	1m	Jane Kenney	08/12/2023
G2790_106	103565	Top part of iron drum or container	SE	1m	Jane Kenney	08/12/2023
G2790_107	103565	Top part of iron drum or container	W	1m	Jane Kenney	08/12/2023
G2790_108	103564	Bottom part of iron drum or container	NE	1m	Jane Kenney	08/12/2023
G2790_109	103564	Bottom part of iron drum or container	E	1m	Jane Kenney	08/12/2023
G2790_110	103564	Bottom part of iron drum or container	NW		Jane Kenney	08/12/2023
G2790_111	103564	Bottom part of iron drum or container	NE		Jane Kenney	08/12/2023
G2790_112	103564	Gabriel starting to expose 'carriage'	NW		Jane Kenney	08/12/2023
G2790_113	103564	WNW end of the 'carriage'	WNW	1m	Jane Kenney	08/12/2023
G2790_114	103564	WNW end of the 'carriage'	NNE	1m	Jane Kenney	08/12/2023
G2790_115	103564	Corner of the 'carriage'	N	1m	Jane Kenney	08/12/2023
G2790_116	103564	WNW end of the 'carriage', detail	vertical	1m	Jane Kenney	08/12/2023
G2790_117	103564	Corner of the 'carriage'	N	1m	Jane Kenney	08/12/2023

Photo Record Number	Core PRN	Description	View From	Scales	Creator of Digital Photo	Date
G2790_118	103564	WNW end of the 'carriage'	WNW		Jane Kenney	08/12/2023
G2790_119	103564	WNW end of the 'carriage'	WNW		Jane Kenney	08/12/2023
G2790_120	103564	Carriage and container	NNE		Jane Kenney	08/12/2023



Key

-  Revetment of embankment
-  Hachures showing slopes
-  Base of large dunes
-  Granite chippings of railway track bed visible
-  Line of new fence
-  Existing fence

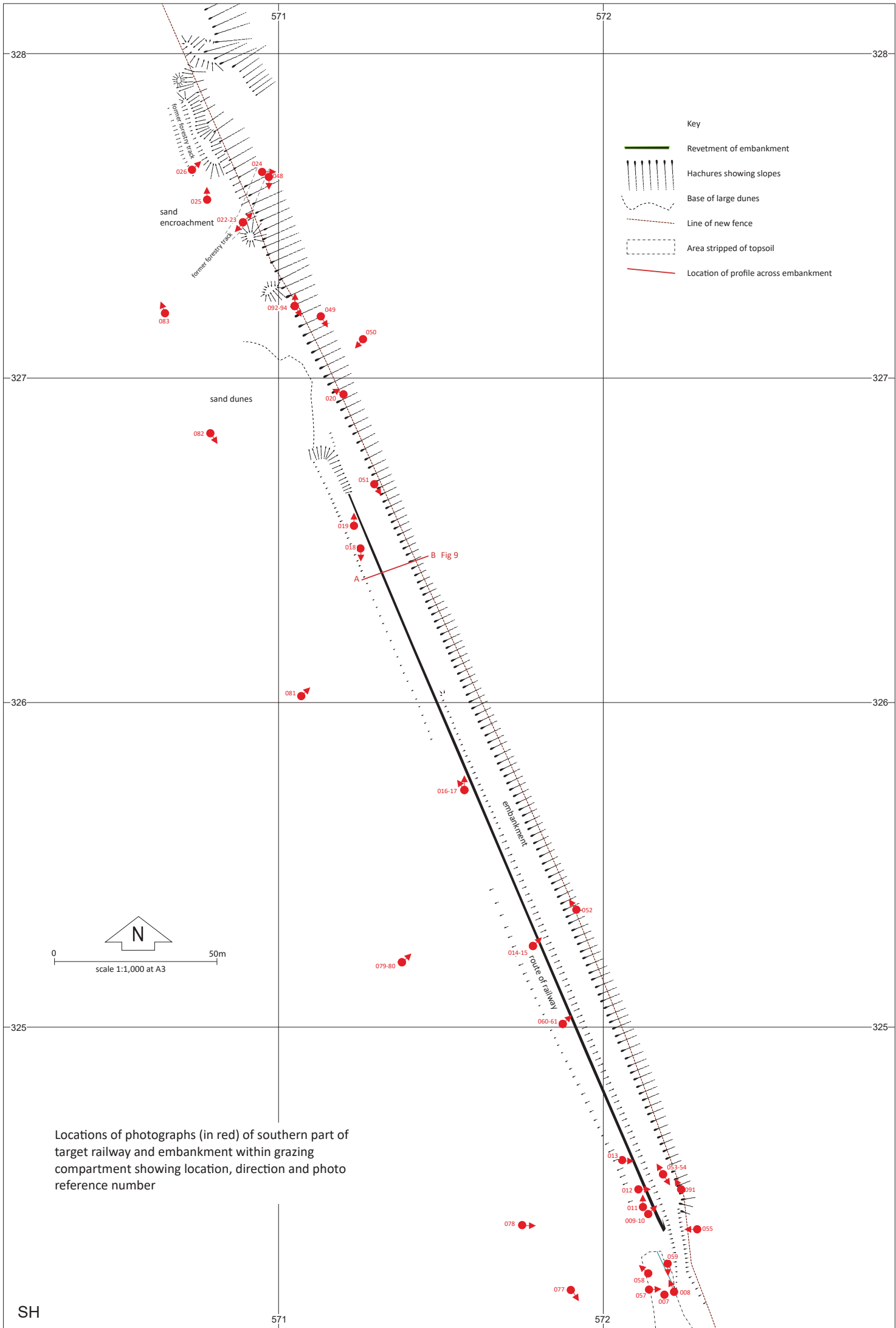
Locations of photographs (in red) of northern part of target railway and embankment within grazing compartment showing location, direction and photo reference number

SH

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570

571



Locations of photographs (in red) of southern part of target railway and embankment within grazing compartment showing location, direction and photo reference number

APPENDIX III

Historic Environment Sites in the area

Sites relating to the Anti-tank Range are shaded grey.

PRN	Name of site	Period	Site Type	NGR
2896	Bronze Age Gold Torc, Findspot, Nr Harlech Castle	Bronze Age	Findspot	SH5831
2906	Hoard of Bronze Age Palstaves, Harlech	Bronze Age	Findspot	SH5831
2908	Harlech Castle, Harlech	Medieval	Castle	SH5810031250
2909	Centurial Stones, Harlech Castle	Roman	Centurial Stone	SH58103125
2910	Urn with Roman Coins, Harlech Castle	Roman	Findspot	SH58103125
3193	Harlech Town, Harlech	Medieval	Town	SH582311
3896	Mill, Site of, Harlech	Post Medieval	Mill	SH58183128
3897	Chapel, Site of, Harlech	Medieval	Chapel	SH58153120
3911	Bronze Sword, Findspot, Nr. Harlech	Bronze Age	Findspot	SH5831
5157	Crucible, Findspot, Morfa Harlech	Post Medieval	Findspot	SH569318
5599	Oven, Garden of Glyndwr, High Street, Harlech	Post Medieval	Hearth	SH58193113
7264	Gunnery Range, Morfa Harlech	Modern	Firing Range	SH578338
9677	Cefn-mine, Harlech	Unknown	Mine	SH57333228
9678	Cefn-mine, Harlech	Unknown	Pump	SH57293229
9679	Morfa Harlech Pond 1, Harlech	Unknown	Pond	SH57483264
9680	Morfa Harlech Pond 3, Harlech	Unknown	Pond	SH57523295
9681	Morfa Harlech Pond 2, Harlech	Unknown	Pond	SH57283276
9682	Morfa Harlech Pond 4, Harlech	Unknown	Pond	SH57203302
9683	Morfa Harlech Pond 5, Harlech	Unknown	Pond	SH57233300
9684	Morfa Harlech Range, Harlech	Modern	Bank (Earthwork)	SH57373273
9686	Ty'n-y-ffordd Well, Harlech	Unknown	Well	SH58503319
9687	Ty'n-y-ffordd Pond, Harlech	Unknown	Pond	SH58473328
9688	Pen-y-waen Pond, Harlech	Unknown	Pond	SH58473355
9689	Pen-y-waen Building, Harlech	Modern	Building	SH58593364
18257	Harlech, Landscape	Multiperiod	Landscape	SH58043109
18265	Morfa Harlech, Dunes, Landscape	Multiperiod	Landscape	SH56753278
19478	Footpath, Coed Llechwedd	Post Medieval	Footpath	SH5886531455
19482	Quarry, Coed Llechwedd	Post Medieval	Quarry	SH5900131686
19483	Quarry, Coed Llechwedd	Post Medieval	Quarry	SH5899331643
19484	Wall, Coed Llechwedd	Post Medieval	Wall	SH5900331501
20506	Manganese Mine, Capel Engedi	Post Medieval	Manganese Mine	SH5931
20507	Manganese Level, Rhyd Galed Nr Harlech	Post Medieval	Level	SH590314
24745	Road, Possible Site of, Harlech	Unknown	Road	SH5805131341
24749	Ty Eiddew, Harlech	Medieval	House	SH5820731276
27708	Farm Building, Garth-fach	Post Medieval	Farm Building	SH59043123
27709	Farm Building, Garth-fach	Post Medieval	Farm Building	SH58943114
29309	Baptismal Well, W of Cae Du, Harlech	Post Medieval	Well	SH58453106

29310	Reservoir, W of Cae Du, Harlech	Modern	Reservoir	SH58483105
29311	Road to Cae Du, Harlech	Post Medieval	Road	SH58343107
29312	Field Boundaries, W of Cae Du, Harlech	Post Medieval	Field Boundary	SH58533100
29313	House Platform, Possible, W of Cae Du	Medieval	House Platform	SH58523107
29314	Clearance Cairn, W of Cae Du, Harlech	Medieval	Clearance Cairn	SH58573108
29315	Wall or Dam, W of Cae Du, Harlech	Post Medieval	Dam	SH58533100
29557	Ty Building, Harlech	Unknown	Building	SH58203365
29857	Drystone Wall and Trackway, Harlech	Post Medieval	Trackway	SH58373102
29858	Drystone Wall, Harlech	Post Medieval	Wall	SH58383103
29859	Drystone Wall, Harlech	Post Medieval	Wall	SH58393098
30449	'Upper Pool' Pond, Harlech	Medieval	Pond	SH58413103
30450	Aqueduct and Leat System, Harlech	Post Medieval	Leat System	SH58373104
31158	Former Shoreline, Harlech	Post Medieval	Feature	SH58053136
32081	Ffynnon Fair, Harlech	Unknown	Spring	SH58133127
32947	Brooch, Findspot, Harlech	Medieval	Findspot	SH59093196
35151	Building, E of Bryn Twyrog	Post Medieval	Building	SH5834931302
35152	Buildings at Ivy Cottage, Harlech	Post Medieval	Building	SH5860131382
36547	Rock Cannon, Bron y Graig, Harlech	Post Medieval	Rock Cannon	SH58283100
57435	Building, SW of Ty-newydd	Post Medieval	Building	SH5908431836
57438	Llechwedd-du-Pellaf, Building, NE of Erinfa	Post Medieval	Building	SH5895531651
57439	Building, E of Erinfa	Post Medieval	Building	SH5892831620
57440	Bron Meini, E of Nyth Bran	Post Medieval	House	SH5877431406
57441	Buildings, NE of Bryntirion	Post Medieval	Building	SH5884031559
57443	Cerrig-y-Gwaenydd, Harlech	Post Medieval	House	SH5883031671
57444	Building, W of Cerrig-y-Gwaenydd	Post Medieval	Building	SH5881731685
57445	Building, N of Cerrig-y-Gwaenydd	Post Medieval	Building	SH5882431705
57446	Glan-gors, SW of Cerrig-y-Gwaenydd	Post Medieval	Building	SH5873931601
57447	Nant-y-tylcau, NW of Bron Meini	Post Medieval	Farmstead	SH5865931514
57448	Building, E of Tan-y-Coed	Post Medieval	Building	SH5824931392
57449	Footbridge, E of Morannedd	Post Medieval	Footbridge	SH5798631077
59644	Tramway, Harlech	Post Medieval	Tramway	SH5757731050
59645	Quarry Cottage, Harlech	Post Medieval	Cottage	SH5781130962
59754	Culvert, Harlech	Unknown	Culvert	SH58263150
59755	Culvert, Harlech	Unknown	Culvert	SH58113139
62467	Harlech, Conservation Area	Multiperiod	Landscape	SH5803430997
63898	The Plas	Post Medieval	Inn	SH5811931080
63899	Cow House S of Ael-y-Glyn	Post Medieval	Cow Shed	SH5833431678
63900	Gweithdy Saer	Post Medieval	Inn	SH5820631191
63901	Harlech Pottery including Forecourt Walls and Railings	Post Medieval	House	SH5812430982
63903	Barn S of Ael-y-Glyn	Post Medieval	Barn	SH5834531682
63904	Bryn Tirion	Post Medieval	Cottage	SH5827231136
63905	Capel Rehoboth	Post Medieval	Chapel	SH5832731195
63906	Spar, adjoining Plas Cafe.	Post Medieval	Shop	SH5811931064

63907	Ty'r Felin	Post Medieval	House	SH5820931223
63908	Bier House at Capel Rehoboth	Post Medieval	Bier House	SH5835831215
63911	Field Barn S of Cae Du	Post Medieval	Barn	SH5868630993
63912	Parish Church of St Tanwg	Post Medieval	Church	SH5818831024
67042	Harlech Castle and Stryd Fawr, Urban Character Area	Multiperiod	Landscape	SH5825531225
67043	Pentre'r Efail and Tryfar, Harlech, Urban Character Area	Multiperiod	Landscape	SH5801631151
67044	Stryd Fawr North of Pendref, Harlech, Urban Character Area	Multiperiod	Landscape	SH5828431207
67045	Bronygraig, Harlech, Urban Character Area	Multiperiod	Landscape	SH5825130974
67049	Golf Course, Harlech, Urban Character Area	Multiperiod	Landscape	SH5746130971
67050	Ffordd Morfa, Harlech, Urban Character Area	Multiperiod	Landscape	SH5802431711
67051	Llechwedd, Harlech, Urban Character Area	Multiperiod	Landscape	SH5860331595
69367	Glan-y-Mor, Morfa Harlech	Post Medieval	Farmstead	SH57833445
69368	Glan-y-Mor, Morfa Harlech	Post Medieval	Farmstead	SH58003447
69369	Glan-y-Morfa, Morfa Harlech	Post Medieval	Farmstead	SH58003474
69370	Ty Cerig, Morfa Harlech	Post Medieval	Farmstead	SH58793457
69371	Tan-forhesgyn, Morfa Harlech	Post Medieval	Farmstead	SH58403429
69418	Ty'n-yr-acrau, Morfa Harlech	Post Medieval	Farmstead	SH58603323
69419	Farm-buildings, North of Pen-y-waen	Post Medieval	Farmstead	SH58723381
69420	Farm-building, North of Ty'n-yr-acrau	Post Medieval	Farmstead	SH58593339
69421	Farm-building, North of Pen-y-waen	Post Medieval	Farmstead	SH58813398
69422	Ty'n-y-ffordd, Morfa Harlech	Post Medieval	Farmstead	SH58503310
69423	Gilarwen, Morfa Harlech	Post Medieval	Farmstead	SH58443289
69424	Ty'n-y-morfa, Morfa Harlech	Post Medieval	Farmstead	SH58373271
69425	Glyn-y-morfa, Morfa Harlech	Post Medieval	Farmstead	SH58423269
69426	Ty'n-y-canol, Morfa Harlech	Post Medieval	Farmstead	SH58353248
69436	Cerig-y-gwaenydd, Harelch	Post Medieval	Farmstead	SH58823168
69456	Cae-du, Harlech	Post Medieval	Farmstead	SH58693112
69457	Farm Building, South-West of Cae-du	Post Medieval	Farmstead	SH58773103
69458	Garth-fach and Rhyd-galed-isaf, Harlech	Post Medieval	Farmstead	SH58923119
69466	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH58053452
69467	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH58023451
69468	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH58023453
69469	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH58033454
69470	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH58013450
69471	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH58023455
69472	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH57963441
69473	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH57963442
69474	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH57833443
69475	Farm building, Glan-y-Mor	Post Medieval	Farm Building	SH57843445
69476	Farm building, Glan-y-Morfa	Post Medieval	Farm Building	SH57993476

69477	Farm building, Glan-y-Morfa	Post Medieval	Farm Building	SH58003473
69478	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58733464
69479	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58743462
69480	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58733461
69481	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58723458
69482	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58733458
69483	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58743459
69484	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58753460
69485	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58793457
69486	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58813457
69487	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58823457
69488	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58853457
69489	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58843455
69490	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58843454
69491	Farm building, Ty-cerig	Post Medieval	Farm Building	SH58833453
69492	Farm building, Tan-forhesgyn	Post Medieval	Farm Building	SH58403431
69493	Farm building, Tan-forhesgyn	Post Medieval	Farm Building	SH58393430
69661	Farm building, Ty'n-yr-acrau	Post Medieval	Farm Building	SH58603324
69662	Farm building, Ty'n-yr-acrau	Post Medieval	Farm Building	SH58603324
69663	Farm building, Ty'n-yr-acrau	Post Medieval	Farm Building	SH58593323
69664	Farm building, Ty'n-yr-acrau	Post Medieval	Farm Building	SH58593324
69665	Farm building, Ty'n-yr-acrau	Post Medieval	Farm Building	SH58613324
69666	Farm building, North of Pen-y-waen	Post Medieval	Farm Building	SH58723380
69667	Farm building, North of Pen-y-waen	Post Medieval	Farm Building	SH58713381
69683	Farm building, North of Ty'n-yr-acrau	Post Medieval	Farm Building	SH58593338
69684	Farm building, North of Pen-y-waen	Post Medieval	Farm Building	SH58813398
69685	Farm building, Ty'n-y-ffordd	Post Medieval	Farm Building	SH58513311
69686	Farm building, Ty'n-y-ffordd	Post Medieval	Farm Building	SH58513310
69687	Farm building, Ty'n-y-ffordd	Post Medieval	Farm Building	SH58513311
69688	Farm building, Ty'n-y-ffordd	Post Medieval	Farm Building	SH58513310
69689	Farm building, Gilarwen	Post Medieval	Farm Building	SH58463289
69690	Farm building, Gilarwen	Post Medieval	Farm Building	SH58443289
69691	Farm building, Ty'n-y-morfa	Post Medieval	Farm Building	SH58393268
69692	Farm building, Ty'n-y-morfa	Post Medieval	Farm Building	SH58353272
69693	Farm building, Ty'n-y-morfa	Post Medieval	Farm Building	SH58363270
69694	Farm building, Ty'n-y-morfa	Post Medieval	Farm Building	SH58393270
69695	Farm building, Ty'n-y-morfa	Post Medieval	Farm Building	SH58383274
69696	Farm building, Glyn-y-morfa	Post Medieval	Farm Building	SH58403268
69697	Farm building, Glyn-y-morfa	Post Medieval	Farm Building	SH58413266
69698	Farm building, Glyn-y-morfa	Post Medieval	Farm Building	SH58443271
69699	Farm building, Ty'n-y-canol	Post Medieval	Farm Building	SH58373249
69700	Farm building, Ty'n-y-canol	Post Medieval	Farm Building	SH58353249
69701	Farm building, Ty'n-y-canol	Post Medieval	Farm Building	SH58353248
69781	Farm Building, Cae-du	Post Medieval	Farm Building	SH58673112

69782	Farm Building, Cae-du	Post Medieval	Farm Building	SH58683112
69783	Farm Building, Cae-du	Post Medieval	Farm Building	SH58703113
69784	Farm Building, Cae-du	Post Medieval	Farm Building	SH58683114
69785	Farm Building, Cae-du	Post Medieval	Farm Building	SH58673114
69787	Farm Building, South-West of Cae-du	Post Medieval	Farm Building	SH58793103
69788	Farm Building, Garth-fach	Post Medieval	Farm Building	SH58913122
69789	Farm Building, Garth-fach	Post Medieval	Farm Building	SH58923121
69790	Farm Building, Garth-fach	Post Medieval	Farm Building	SH58913121
69791	Farm Building, Garth-fach	Post Medieval	Farm Building	SH58913113
71526	Men of Harlech Memorial, Harlech	Modern	War Memorial	SH5811831050
74907	Various Finds, Llechwedd	Bronze Age	Findspot	SH59093196
83121	Hut Circle, Near Llechwedd-Du Mawr	Unknown	Hut Circle	SH57293280
83122	Racecourse, Site of, Morfa Harlech	Post Medieval	Racecourse	SH5785033920
83123	Building, Racecourse, Morfa Harlech	Post Medieval	Building	SH5796533655
83124	Building, Racecourse, Morfa Harlech	Post Medieval	Building	SH5790333533
83125	Pen-y-waen, Morfa Harlech	Post Medieval	House	SH5865533695
83126	Well, North of Pen-y-waen	Post Medieval	Well	SH5867333720
83127	Barracks, Site of, Morfa Harlech	Modern	Barracks	SH58483384
83128	Well, Racecourse, Morfa Harlech	Post Medieval	Well	SH5786633718
83129	Ford, North of Pen-y-waen	Post Medieval	Ford	SH5877833873
83130	Enclosure, East of Cefn-mine	Post Medieval	Rectangular Enclosure	SH5766632234
83131	Building, East of Cefn-mine	Post Medieval	Building	SH5759232250
83132	Enclosure, North-East of Cefn-mine	Post Medieval	Rectangular Enclosure	SH5744332500
83133	Enclosure, Racecourse, Morfa Harlech	Post Medieval	Rectilinear Enclosure	SH5748733705
83134	Gunnery Range Buildings, Morfa Harlech	Modern	Building Complex; Military Training Site	SH58623377
83135	Enclosure, South-West of Tanforhesgan	Medieval	Rectangular Enclosure	SH58283424
83136	Gunnery Range Railway, Morfa Harlech	Modern	Railway; Target	SH5699333196
93370	Field Boundary, Morfa Harlech	Post Medieval	Boundary Wall	SH57453118
98919	Castle Hotel, Castle Square	Unknown	Hotel	SH5817931209
100642	Boundary Wall, Harlech	Post Medieval	Boundary Wall	SH5821132010
100643	Embankment, Harlech	Post Medieval	Embankment	SH5825032000

APPENDIX IV

Gwynedd Archaeological Trust Selection Strategy & Digital Management Plan - Final

G2790_SoLIFE_Morfa_Harlech

17/01/2024 v2.0

Selection Strategy

Project Information

Project Management

Project Manager	John Roberts john.roberts @heneb.co.uk	
Archaeological Archive Manager	John Roberts john.roberts @heneb.co.uk	
Organisation	Gwynedd Archaeological Trust	
Stakeholders		Date Contacted
Collecting Institution(s)	GAT Historic Environment Record	01/08/2023
	RCAHMW	On completion of Project Archive
	Storiell, Ffordd Gwynedd, Bangor, Gwynedd, LL57 1DT	If applicable, post-fieldwork based on artefact recovery
Project Lead / Project Assurance	Chief Archaeologist (GAT)	06/07/2023
Landowner / Developer	NRW	n/a

Resources

Resources required

Describe the resources required to implement this Selection Strategy, particularly if unusual resources are required.

No unusual resources required outside of GAT normal operating equipment and personnel.

Context

Describe below the context of this Selection Strategy. You should refer to:

- The aims and objectives of the project;
- Local Authority guidance (including the brief);
- Research Frameworks;
- The repository collection development policy and/or deposition policy;
- Material-specific guidance documents.

Note: This section may be copied from your Project Design/WSI to ensure all Stakeholders receive this context information.

The full aims and objectives of this project are detailed in the project specific WSI.

Gwynedd Archaeological Trust (GAT) has been commissioned by Natural Resources Wales (NRW) to undertake an archaeological mitigation during works for the Sands of LIFE (SoLIFE) (LIFE17 NAT/UK/000023) conservation project at Morfa Harlech, Gwynedd LL46 2UG (NGR SH57233236; cf. WSI Figure 01). The Sands of LIFE project is being led by NRW and supported by the EU LIFE fund and the Welsh Government, with the aim to restore threatened sand dune sites across Wales. As detailed in NRW document Twyni Byw - Sands of LIFE (SoLIFE) Specification (dated 02/04/2023; cf. WSI Appendix I), the aim of the conservation project at Morfa Harlech will be to install 1.2km of fencing and associated works to create a new grazing compartment 17.18ha in size to introduce sustainable livestock grazing. The specification also states that c.18ha of conifer plantation have been removed from the Special Area of Conservation in Harlech Forest, in the mid-2010s and most recently in 2022; following felling, further works were carried out by the Sands of LIFE project to restore the site to sand dune and native woodland habitat and that to ensure the restoration works are sustainable and to enable the habitat to continue to improve in quality, it is essential to introduce sustainable grazing to the site. Only part of the site is currently fenced, so new livestock fencing is required to create a secure grazing compartment.

Source: Gwynedd Archaeological Trust. 2023. Morfa Harlech: Written Scheme of Investigation for Archaeological Watching Brief. Prepared for NRW. September 2023. Project G2790.

1 – Digital Data

Stakeholders

Name the individual(s) responsible for the Digital Data Selection decisions (i.e. Archaeological Archive Manager, Project Manager, Collections Curator).

John Roberts (GAT Principal Archaeologist)

Selection

Location of Data Management Plan (DMP)

Selection of digital data elements should be considered in your project's DMP. For the purpose of the Selection Strategy, you can either copy the selection section of your DMP below, or attach it as an appendix to this document. Please indicate here if the DMP is attached.

All digital data has been collected, stored and selected in lines with the Gwynedd Archaeological Trust (GAT) Data Management Plan located on GAT's servers (available on request).

Following the completion of the fieldwork, a working project archive has been created based on following task list;

1. Pro-formas: all cross referenced and complete;
2. Photographic Metadata: completed in *Microsoft Excel* and cross-referenced with all pro-formas;
3. Survey data: downloaded using a Computer Aided Design package;
4. Context sheets: checked and scanned.

All relevant site archive data has been added to a digital project register specific to this project, which has been prepared in *Microsoft Excel*. This data has been used as the basis for the physical and digital dataset archives. Information from these has been used to compile the project report. The physical archive has been stored in a designated project folder and the location confirmed in the Trust project database; the digital dataset has been stored on a dedicated Trust server, with the location confirmed in the Trust project database via a specific hyperlink. External datasets for the HER and RCAHMW are as defined in the dissemination strategy below. De-selected digital data has been confirmed in an updated digital management plan appended to the final report.

- A digital report has been provided to the regional Historic Environment Record; this has been submitted within six months of project completion (final report only), along with a digital dataset comprising an Event PRN summary. The report and dataset has been submitted in accordance with the required standards set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 2); and
- A digital report and digital archive dataset has been provided to Royal Commission on Ancient and Historic Monuments, Wales (final report only), in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. The dataset has been prepared in the format required by RCAHMW and included:
 - Photographic metadata (Microsoft Excel);
 - Photographic archive (TIFF format);
 - Project Information form (Excel);
 - File Information form (Excel) – Microsoft Word report text final;
 - File Information form (Excel) – Photographic metadata (general);
 - File Information form (Excel) – PDF scans of context sheets;
 - File Information form (Excel) – Survey data (dwg file);
 - File Information form (Excel) – Adobe PDF report final; and
 - File Information form (Excel) - Photographic metadata (detail).

De-Selected Digital Data

There is no de-selected data

2 – Documents

Stakeholders

Name the individual(s) responsible for the Documents Selection decisions (i.e. Archaeological Archive Manager, Project Manager, Repository Representative).

John Roberts – Principal Archaeologist, Gwynedd Archaeological Trust;
Sean Derby – Historic Environment Record, Gwynedd Archaeological Trust;
Gareth Edwards, *Head of Knowledge and Understanding, RCAHMW*

Selection

Physical documents include context sheets, day sheets and annotated plans. These will be held by GAT.

De-Selected Documents

Describe the procedure for dealing with De-selected material and what specialist advice has informed this procedure.

All paper records are de-selected for long term archiving. The paper recorded will be held by GAT and only the digital versions will be archived with RCAHMW.

3 – Materials

Note: This step should be completed for each material component of the archaeological archive. Copy this table for the various materials as required, providing the 'Material Type' and a section identifier (eg. '3.1') for each.

Material type		Section 3.	
Bulk Finds and soil samples			

Stakeholders

Name the individual(s) responsible for the Materials Selection decisions (i.e. Archaeological Archive Manager, Project Manager, Repository Representative).

APPENDIX V

Historical Aerial Imagery from Gargan 2020

Appendix B

Historic Aerial Imagery



1948 Dated Aerial Imagery with AOI Outlined

Project: Twyni Byw - Sands of LIFE, Morfa Harlech

Project Ref: EES1078

Appendix B: Historical Aerial Imagery



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1948 Dated Oblique Aerial Imagery Detailing Points of Interest

Ser	Detail
.1	Harlech Camp
.2	Nissan Hut with outbuildings and water tower
.3	Nissan Hut with potential concrete firing position
.4	Rail siding leading to Military railway

Note: See enlarged images

Project: Twyni Byw - Sands of LIFE, Morfa Harlech

Project Ref: EES1078

Appendix B: Historical Aerial Imagery



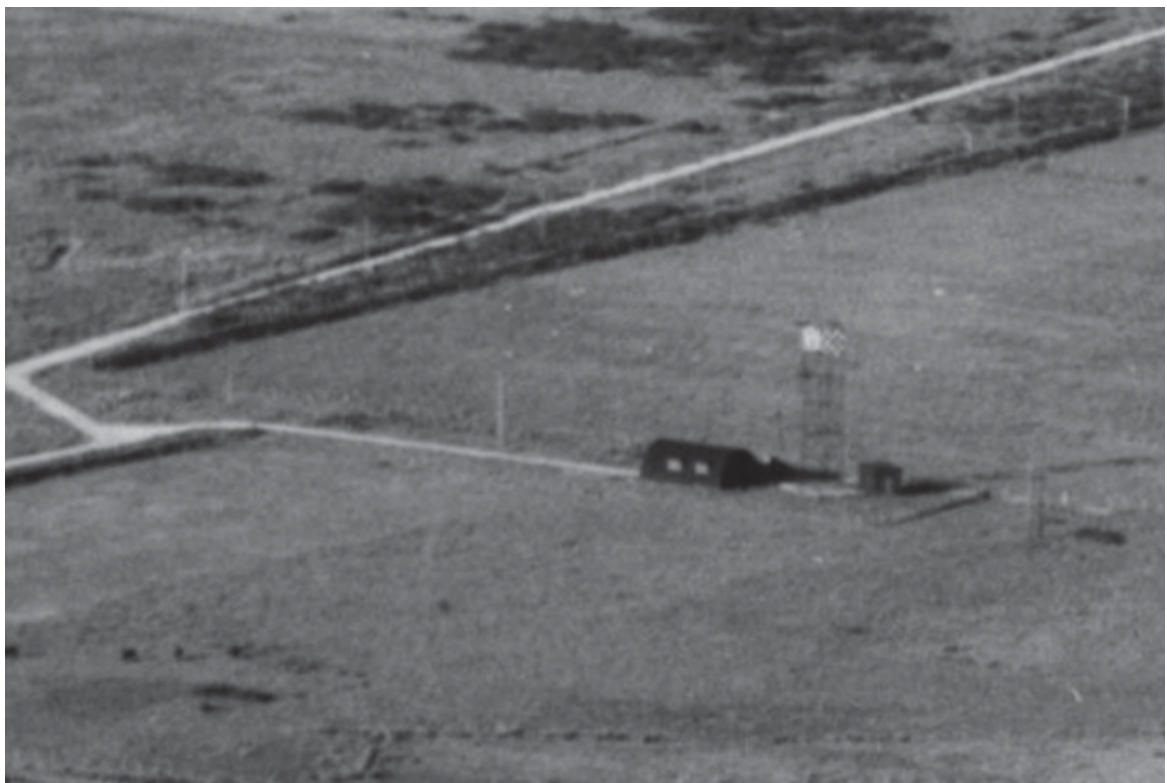
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1. Harlech camp c.1948



2. Nissan Hut, Outbuildings and Water Tower

Project: Twyni Byw - Sands of LIFE, Morfa Harlech

Project Ref: EES1078

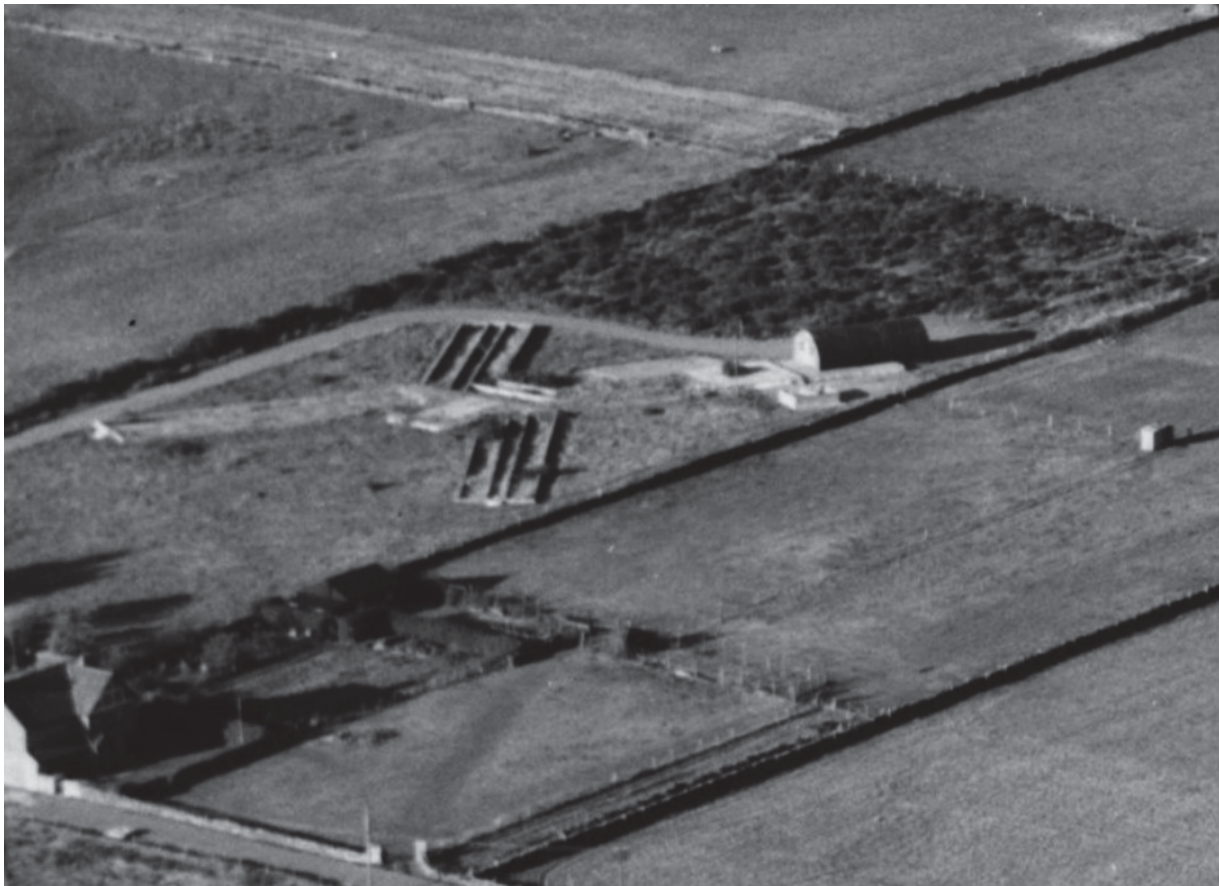
Appendix B: Historical Aerial Imagery



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3. Nissan Hut with Potential Concrete Firing Positions



4. Rail siding leading to Military railway

Project: Twyni Byw - Sands of LIFE, Morfa Harlech

Project Ref: EES1078

Appendix B: Historical Aerial Imagery



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