



Tier 1 Geoenvironmental & Geotechnical Report

Site: Pontrhydyfen RFC

Prepared For: Pontrhydyfen RFC

Issue Date: March 2026

Job No: TF-25-583-CA

REPORT TITLE : Tier 1 Geoenvironmental and Geotechnical Report: Proposed Commercial Development, Pontrhydyfen RFC, Port Talbot

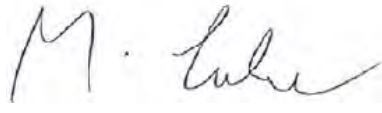
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	Name	Signature
Prepared	Rocio Albertos-Vazquez BSc (Hons), MSc, FGS Engineering Geologist	
Checked	Alan Beattie M.Sci (Hons), FGS Director	
Approved	Gwyn Lake BSc (Hons). PhD, CGeol, FGS Director	



Executive Summary

Site Location and Proposed Development	Pontrhydyfen RFC (the Client) is proposing the construction of a new commercial development at Pontrhydyfen Rugby Football Club at Oakwood Playing Field, Port Talbot. The proposed development will consist of a rugby clubhouse/changing rooms building and associated infrastructure, including disabled parking, bicycle storage and an access footpath. The development site is irregular in shape and located immediately to the west of the current rugby pitch. The site centres on an approximate National Grid Reference of 279410, 193780, occupying a plan area of approximately 0.18 Hectares.
Site History	The earliest edition of the historic maps shows the north of the site to be undeveloped land and an area of spoil in the southern half of the site. There is evidence of topographic modification in the area immediately around the site possibly associated with the Oakwood Iron Works. By the 1900s a rail line has been constructed within the site boundary running north-south through the eastern edge of the site. In the north it is seen in a small cutting and in the south on a small embankment. The site is then an area of rough pasture until the 1980s when the area is reprofiled. There are then no significant changes until the 2025 edition when two small structures anticipated to be dugouts associated with the rugby club are constructed.
Geology	The site is seen to be underlain by Carboniferous sandstone rocks of the Llynfi Member which comprises green-grey and blue-grey, feldspathic, micaceous lithic arenites ('Pennant sandstones') with thin mudstone/siltstone and seatearth interbeds and mainly thin coals. The bedrock geology is seen to dip at approximately 26° to 28° in a northerly direction. The bedrock geology is then overlain by glaciofluvial deposits comprising sands and gravel with lenses of silt and clay. This is then further overlain by made ground soils. The conjectured outcrop of the Wernpistyll Coal Seam is seen to cross the central area of the site in a north west to south east direction. This coal seam will underlie the northern half of the site.
Radon	the site lies within a 1-3% radon affected area; therefore, basic radon protective measures are required for new developments constructed at ground level on the investigation site.
Coal Mining Risk Assessment	The Wernpistyll coal seam is conjectured to outcrop in the north of the site by the Mining Remediation Authority consultants coal mining report. This seam will underlie the northern half of the site. The Mining Remediation Authority confirm there is no recorded mining beneath or within influencing distance of the site, nor is there probable shallow workings or spine roadways beneath the site. It can be seen that the mining activities have been undertaken on the hillsides to the west and east of the site. These are via adits which have been driven into the hillside in orientations away from the site. Therefore the site is not at risk from these features. The site locates adjacent to the River Avan and is anticipated to be covered by thick made ground and fluvio-glacial deposits with a shallow water table. With the coal seam subcropping below the site it is likely to be in a weathered condition at shallow depth below the superficial geology. Given this setting the Wernpistyll coal seam is unlikely to have been worked below the site. The next potentially workable seam, the Tormynydd seam (approximately 0.60 m thick), is located around 115 m stratigraphically below the Wernpistyll seam. Given the depth of this coal seam it will not pose a risk to the surface. The overall risk to surface stability arising from potential recorded or unrecorded legacy mining features is assessed as negligible.
Ground Conditions	0.00-5.00m: Made ground composed of colliery spoil or material from the Oakwood Iron Work. 5.00-10.00m: Glaciofluvial deposits composed of sands and gravels. >10.00m: Llynfi Member – Sandstone.
Sources of Contamination	Four potential sources of contamination have been identified these are Made Ground (Colliery Spoil or Oakwood Iron Works) and infilled land (Metals, Semi-Metals and Non-Metals, Speciated Polycyclic Aromatic Hydrocarbons (PAH), Petroleum Hydrocarbons, Asbestos), Rail lines (dismantled) (Metals, Semi-Metals and Non-Metals, Speciated Polycyclic Aromatic Hydrocarbons (PAH), Petroleum Hydrocarbons), Made ground and infilled land features (Ground Gas) and Bedrock (Radon Gas)
Plausible Pollutant linkages	Future site users and construction and maintenance workers are potentially at risk through direct soil and dust ingestion, dermal contact, inhalation of dust and vapours and inhalation of asbestos fibres from contaminants in the made ground and the former rail lines. There is also a risk from ground gas associated with the infilled land and made ground and radon gas from the bedrock.
Anticipated Foundation Solution	Based upon the desk study information, It is likely that traditional foundations will be feasible for low rise development on site. However given the presence of made ground soils a turn and compact exercise may be required to reengineer the ground and provide sufficient bearing capacity. If the made ground or superficial deposits are found to be of low strength then a deep pile foundation may be required.
Recommended Further Works	It is recommended that an intrusive investigation is undertaken to inspect the ground conditions, to take soil samples for laboratory chemical and geotechnical testing and to install shallow ground gas monitoring wells. A mini percussive borehole investigation should be undertaken to allow the installation of shallow gas monitoring wells. Soakaway testing should also be carried out to aid drainage design.

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Annexes

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ANNEX B Mining Report
ANNEX C Risk Assessment Definitions

SECTION 1 Introduction & Proposed Development

1.1 Background

Pontrhydyfen RFC (the Client) is proposing the construction of a new commercial development at Pontrhydyfen Rugby Football Club at Oakwood Playing Field, Port Talbot. The proposed development will consist of a rugby clubhouse/changing rooms building and associated infrastructure, including disabled parking, bicycle storage and an access footpath. The proposed layout can be seen in **Figure 1.1**.

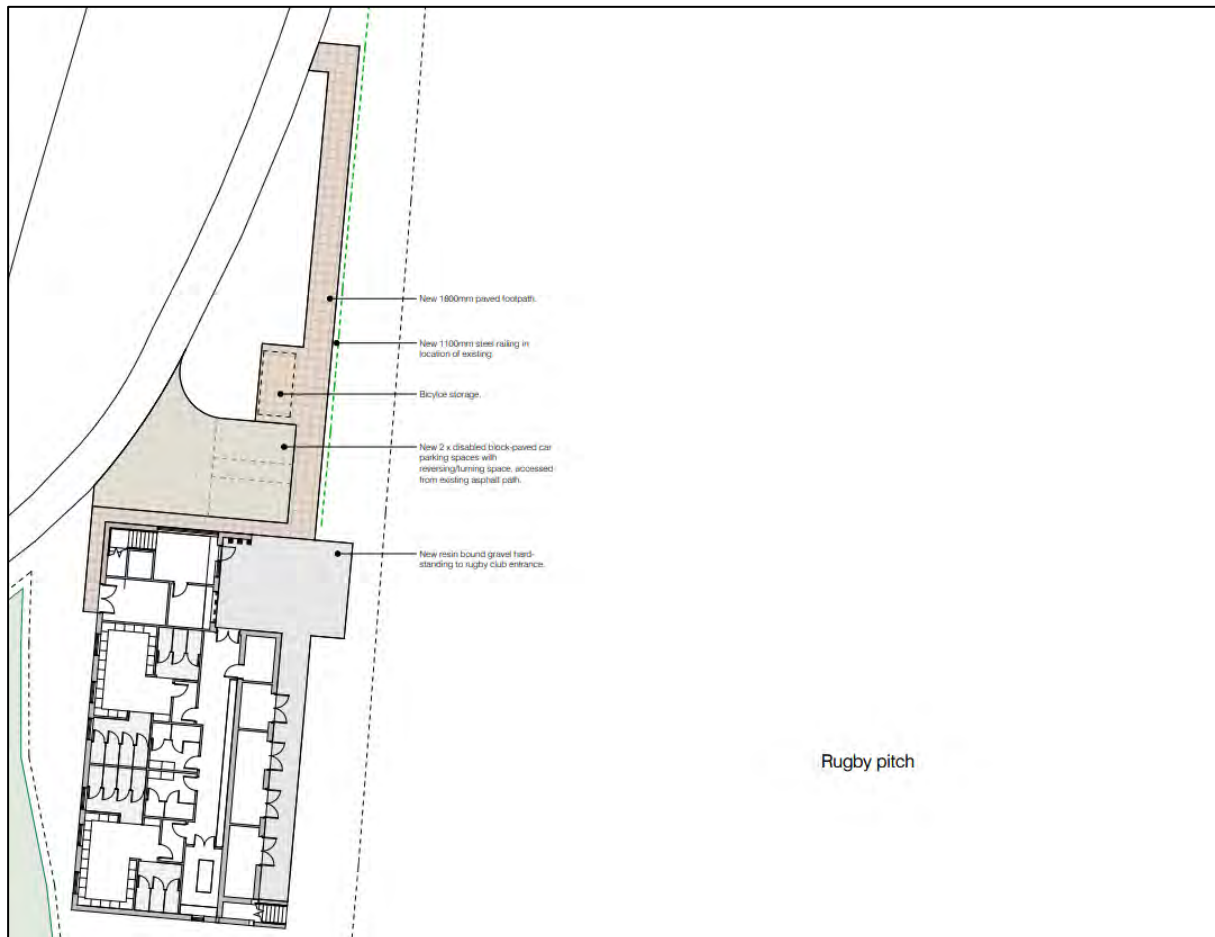


Figure 1.1 Proposed Site Layout

PHG Consulting are the consulting Civil and Structural Engineer for the project.

TFW Group Ltd (Terra Firma) have been commissioned on behalf of the Client to undertake a Geotechnical and Geoenvironmental Report.

This report comprises a Tier 1 (Desk Study) including a Preliminary Geoenvironmental Risk Assessment, Geotechnical and Coal Mining Risk Assessment.

1.2 Objectives

Land Contamination Risk Management (LCRM) guidance provided by the Environment Agency advocates using a tiered approach. This comprises Tier 1; the Preliminary Risk Assessment, Tier 2; the Generic Quantitative Risk Assessment and Tier 3; the Detailed Quantitative Risk Assessment. As each tier is completed a decision is made whether it is necessary to advance to the next tier.

In addition to LCRM, geotechnical aspects of the development also need to be considered and are approached in a similar manner, with the risks identified in the preliminary assessment, and then investigated through subsequent phase of investigation.

1.2.1 Tier 1

The main objectives of the Tier 1 Geoenvironmental Assessment programme are:

- provide information on past and current uses of the site and surrounding area;
- identify the likely potential environmental liabilities at the site associated with any soil, groundwater, vapour and gas contamination from past site and surrounding land uses;
- provide information on the likely ground conditions beneath the site, including soil types, groundwater and if made ground is likely to be present;
- produce an initial conceptual site model, to detail the nature and extent of potential contamination, its source, potential pathways and likely receptors (pollutant linkage);
- prepare a preliminary human health and environmental risk assessment for the site; and
- inform the design of subsequent phases of intrusive site investigation.

The main objectives of the Preliminary Geotechnical Assessment programme are:

- identify possible geotechnical risks pertaining to the development; and
- scrutinise the risk, if any, from legacy coal mining features.

In order to achieve the above objectives, Terra Firma carried out an assessment programme and a review of existing data.

1.3 Geotechnical Category

In accordance with BS EN 1997-1:2004+A1:2013, the proposed development comprises the following geotechnical category:

Geotechnical Category 2: conventional types of structures and foundation with no exceptional risk of difficult soil or loading conditions (e.g., spread, raft & pile foundations; retaining structures; excavations; earthworks and ground anchors).

1.4 Information Sources

The following sources of information have been referenced in support of this assessment:

- Landmark Envirocheck Report (**Annex A**)
- Coal Mining Report (**Annex B**)
- British Geological Map Sheet 248 Drift (Pontypridd) 1:50,000 scale
- Client provided information, plans etc. (**Figure 1.1**);

1.5 Roles & Responsibilities

Table 1.1 Roles and Responsibilities

Role	Organisation
Client/Developer	Pontrhydyfen RFC
Geotechnical/Geoenvironmental Consultant	TFW Group Ltd
Architect/Engineer	PHG Consulting
Local Authority	Neath Port Talbot County Borough Council.

1.6 Limitations & Exceptions of Investigation

The Client has requested that a Tier 1 Geoenvironmental and Geotechnical Risk Assessment (Desk Study) be undertaken to enable the outlined main objectives.

The Tier 1 report was conducted, and this report has been prepared for the sole internal reliance of the Client and their design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of TFW Group Ltd. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geoenvironmental and geotechnical consultants. TFW Group Ltd does not provide legal advice and the advice of lawyers may be required.

Human health and environmental risk assessment outcomes may not take into account the potential for the creation of new contaminant linkages as a result of variation to the proposed development and recommended engineering solutions. It is therefore imperative that the Client engages a geoenvironmental consultant to re-visit the conceptual site model and potential risks upon completion of final designs, prior to development.

1.7 Quality Assurance

The quality, health, safety and environmental aspects of the assessment comply with Terra Firma business management system which is UKAS accredited and complies with the requirements of BS EN ISO 9001:2015, BS EN ISO 14001:2015 and BS EN ISO 45001:2018 standards.

SECTION 2 Review of Existing Data

2.1 Physical Setting & Current Site Use

The development site is irregular in shape and located immediately to the west of the current rugby pitch, which belongs to Pontrhydyfen RFC Oakwood Playing Field at the south of Pontrhydyfen, Port Talbot (SA12 9SD). The site centres on an approximate National Grid Reference of 279410, 193780, occupying a plan area of approximately 0.18 Hectares.

The site currently comprises a hardstanding area with associated dugouts and an asphalt access track. The site boundaries are defined by the existing playing field to the east, residential areas to the north west, Foot paths with the River Avan to the west and south. The north south orientated River Avan is located 50m to the south west at its closest point.

The site elevation is approximately 73m AOD and is generally level, with no significant changes in topography observed.

The site location can be seen on **Figure 2.1**.

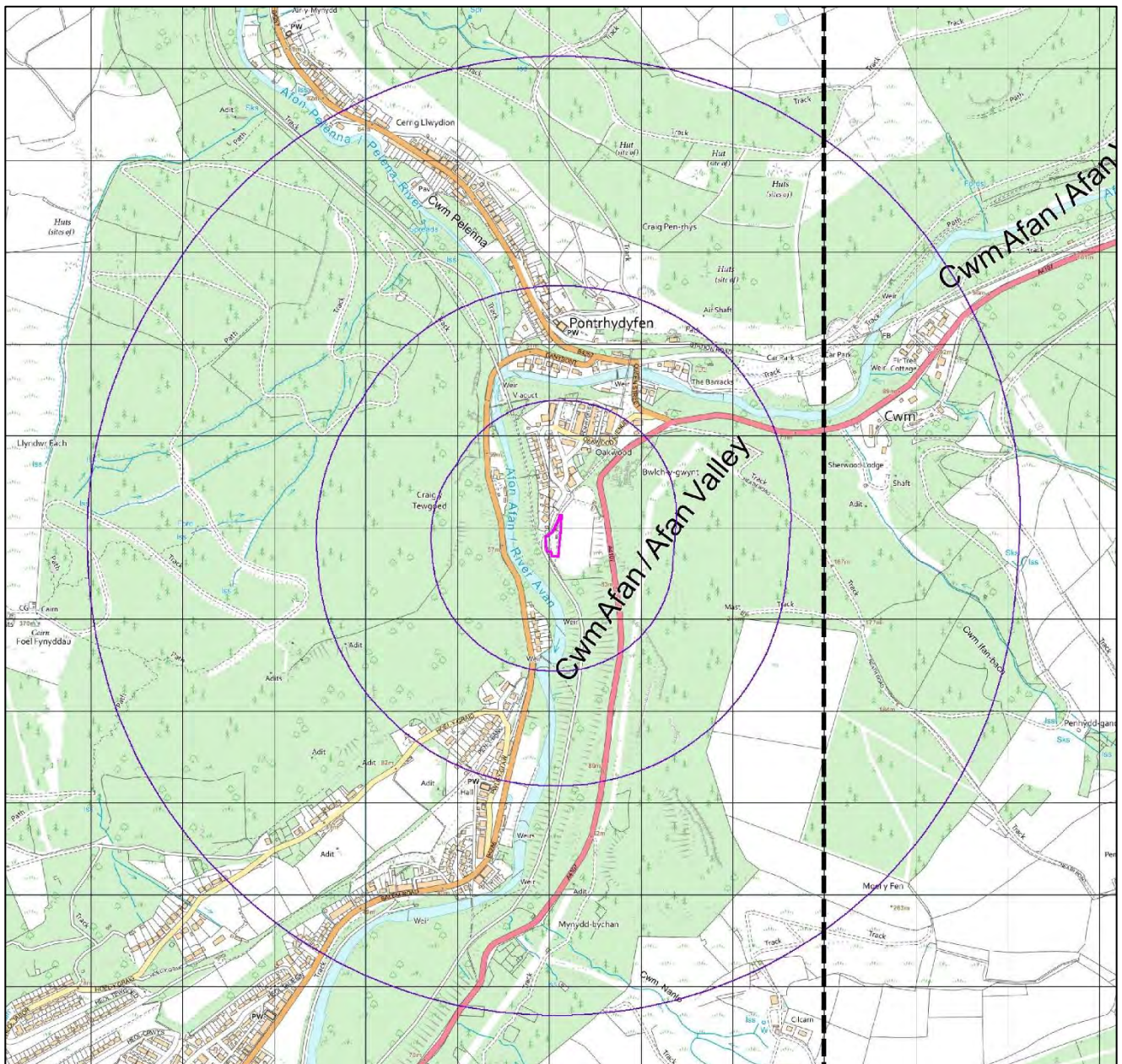


Figure 2.1 Site Location

2.2 Historical Setting

Historical maps of the site have been obtained in an Envirocheck report, provided by Landmark Information Group. The history plans are supplied in **Annex A** of this report, and the most relevant editions are summarised in **Table 2.1**. Distances where quoted are approximate, and any changes in-between map editions may not be recorded.

Table 2.1 Historical Development from Map Information

Map Edition & Scale	Key Features On Site	Key Features Off Site
1877-1878 1:2,500 1884 1:10,560	The site comprises undeveloped land across the northern half of the site and an area of what appears to be spoil in the southern half of the site.	The River Avan locates 80m to the west of the site and is present in a north south orientation. A small residential area is present 100m north of the site. There is evidence of mineral infrastructure present in wider area, including features consistent with extractive industry typical of regional coal mining. There are railway tracks 60m to the east, a school 45m northeast and Oakwood Ironworks to the southeast, the nearest buildings being listed as coke ovens 82m east. There are 5 coal (levels) 120m northwest and west, across the River Afan and these enter the hillside to the west. A coal level is also present 90m to the east of the site and appears to enter the hillside in a north easterly direction. A quarry is present 150m to the north east of the site. The topography of the area around the site has been heavily modified by the industrial activities in the area.
1899 1:2,500 1900 1:10,560	A rail line has been constructed within the site boundary running north-south through the eastern edge of the site. In the north it is seen in a small cutting and in the south on a small embankment.	A large amount of the Oakwood Iron Works has now been dismantled. To the east of the site there are now three coal levels however these are indicated to be 'old'. A north south rail line is also present 30m to the west of the site and the topography in this area has been modified further. The coal mining infrastructure in the area to the west of the River Avan has been removed and the levels are identified as 'old'.
1918-1919 1:2,500 1921 1:10,560	The site is now shown to be an area of rough pasture.	The area to the west of the River Avan is now occupied by a new tramway, and coal levels associated with Wernfawr Colliery. Oakwood Iron Works is now identified as 'Disused'. Further residential development has been undertaken 200m north of the site. An air shaft is indicated 110m east of the site and it appear to be associated with one of the coal levels which is no longer indicated to be old.
1936-1940 1:2,500	No significant changes.	Additional residential development has been undertaken in the area just north of the site. The level to the east of the site is once again 'old' and the A4107 has been constructed. The mining infrastructure in the area to the west has been removed.
1951 1:10,560	No significant changes.	No significant changes.
1964 1:10,000 1965 1:2,500	No significant changes.	Houses have been built 100m to the south west of the site.
1979-1985 1:2,500 1973-1794 1:10,000 (Incomplete)	The Railway is now dismantled. The former railway corridor remains present as an undeveloped linear feature.	The residential development just north of the site has been removed and the area left vacant.
1986 1:2,500 (Incomplete)	The site appears to have been reprofiled and there is no evidence of the rail corridor.	The rugby football ground appears immediately east. The former railway to the west is now a path. The surrounding area has again undergone topographic change.

1993 1:2,500	No significant changes.	The area to the north of the site is once again occupied by residential properties.
1999 & 2006 1:10,000	No significant changes.	No significant changes.
2025 1:10,000	Two small structures are present in the northern area of the site, these are possible dugouts associated with the rugby pitch.	No significant changes.

2.3 Geological Setting

2.3.1 Geological Mapping

The 1:50,000 and 1:10,560 scale British Geological Survey maps of the area, Sheet 248 and Sheet SS79SE respectively, and the online BGS GeoIndex map viewer were consulted for geology underlying the site.

Detailed stratigraphical information beneath the site is provided in **Table 2.2** and illustrated in **Figure 2.2**.

Table 2.2 Detailed Stratigraphical Information

Age	Formation	Description
Modern	Made Ground	Made ground are artificial or reworked natural deposits which often contain or wholly comprise anthropogenic materials.
Quaternary	Glaciofluvial Deposits	Glaciofluvial deposits were deposited by meltwater streams. Includes mostly coarse-grained sediments (i.e. sand and gravel) with some finer-grained layers (i.e. clay and silt). Sand and gravel, locally with lenses of silt, clay or organic material.
Carboniferous	Llynfi Member - Sandstone	Green-grey and blue-grey, feldspathic, micaceous lithic arenites ('Pennant sandstones') with thin mudstone/siltstone and seatearth interbeds and mainly thin coals.

The bedrock geology is seen to dip at approximately 26° to 28° in a northerly direction.

The conjectured outcrop of the Wernpistyll Coal Seam is seen to cross the central area of the site in a north west to south east direction. The Wernpistyll Coal Seam is identified as being 2ft (0.60m) to 2ft 6in (0.75m) in the Generalised Vertical Section. Given the dip of the underlying bedrock this coal seam will underly the northern portion of the site.

An extract of the 1:10,000 scale geological maps can be seen in **Figure 2.2**.

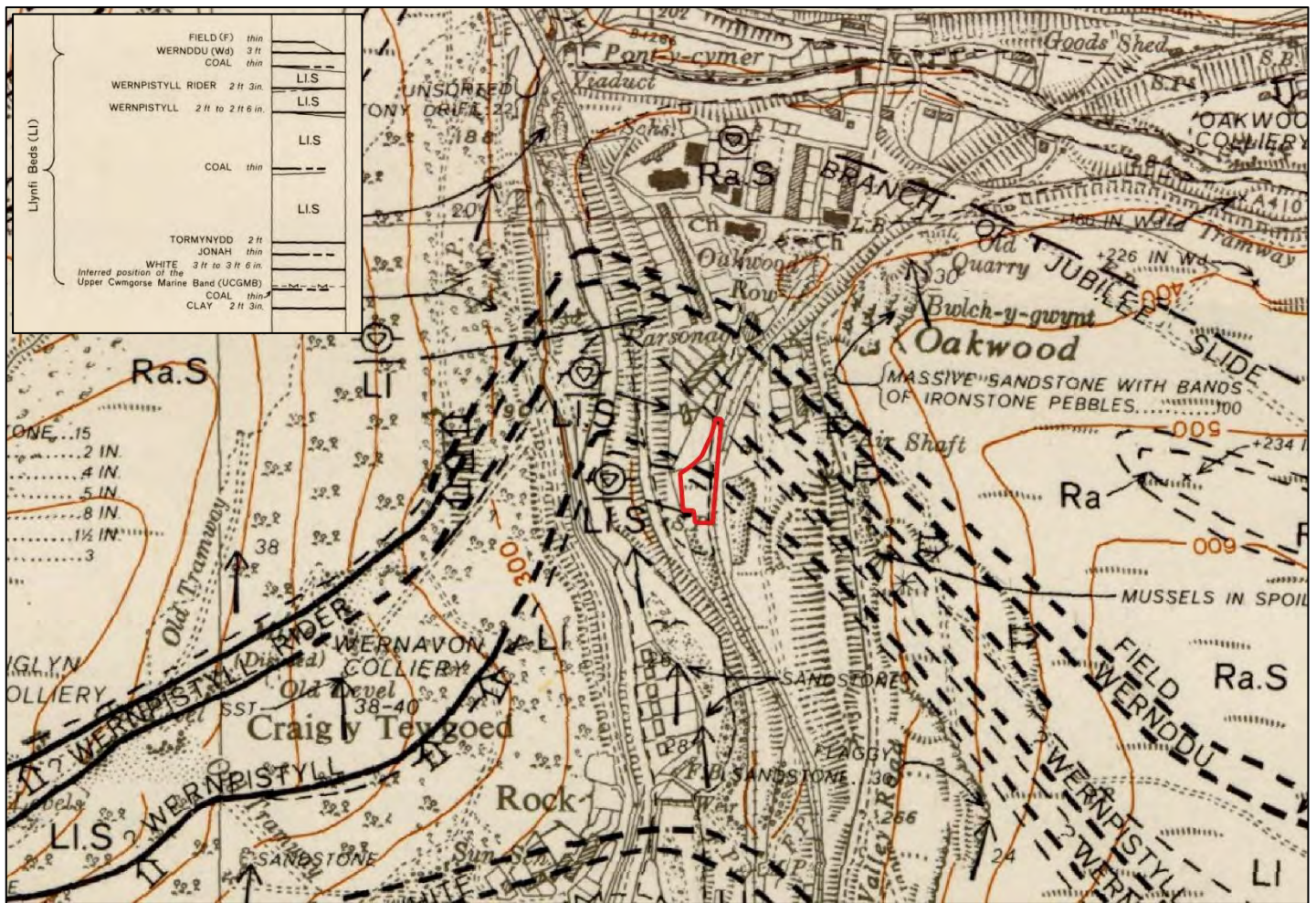


Figure 2.2 Geological Map Extract (SS79SE)

2.3.2 BGS Borehole Information

No relevant British Geological Survey (BGS) borehole records are available for the site or surrounding area.

2.3.3 Mining & Mineral Sites

The site situates within the South Wales Coal Field.

Relevant BGS mineral sites as recorded in the Envirocheck report datasheets (**Annex A**) are summarised in **Table 2.3**.

Table 2.3 BGS Recorded Mineral Sites

Site Name	Distance / Direction	Type	Commodity
Oakwood	80m NE	Underground	Coal - Deep
Ty'n-Y-Graig	110m E	Underground	Coal - Deep
Bwclch-Y-Gwynt	172m NE	Opencast	Sandstone
Oakwood	183m E	Underground	Coal - Deep
Oakwood Row	225m NW	Opencast	Sandstone

2.3.4 The Mining Remediation Authority Coal Mining Data

The Mining Remediation Authority online viewer indicates the site is located within a coal mining reporting area, within a development high risk area.

The map below, taken from the Coal Authority shows the site (represented by a red circle). The area around the site shows mine entries, (shafts or adits) and coal outcrops within an appreciable distance from the site.



Figure 2.3 Coal Authority Viewer Extract

A Mining Remediation Authority consultants coal mining report (**Annex B**) was acquired for the site as part of this Tier 1 Assessment. Pertinent information is summarised below.

Underground Mining

The Mining Remediation Authority consider the probability of unrecorded shallow workings to be none.

Spine roadways are not recorded beneath the site.

Mine Entries

The Mining Remediation Authority identify 4 mine entries within 100m of the site. These have been summarised in **Table 2.4** and additional data available from The Mining Remediation Authority online viewer has also been included.

Table 2.4 Mine Entries

Entry Type	Reference Number & Name	Grid Reference	Treatment Description	Orientation
Adit	279193-004	279505, 193833	Unknown	77°
Adit	279193-005	279525, 193819	Filled at some time in the past. There are no details regarding the type of fill material or the date of filling	82°
Adit	279193-050	279497, 193842	Unknown	80°
Adit	279193-121	279499, 193852	Unknown	41°

Outcrops

Outcrops in proximity to the site, as recorded by the Coal Authority, are summarised in **Table 2.5**.

Table 2.5 Outcrops

Seam Name	Mineral	Workable?	Distance to Outcrop (m)	Direction to Outcrop (m)	Bearing of Outcrop (degrees)
Upper Punchin (Wernpistyll)	Coal	Yes	Within site boundary.	N/A	123

2.4 Natural Hazards

2.4.1 Geotechnical Risks

The following natural hazards have been considered for their potential geotechnical risk to the proposed development.

Table 2.6 Summary of Geotechnical Risks

Hazard	Hazard Potential	Details
Ground Dissolution / Karstic Features	No hazard	The geology underlying the site comprises sandstone, which is not prone to dissolution features.
Collapsible Ground	Very low	The site is not in an area where collapsible ground is anticipated.
Compressible Ground	No hazard	The site is not in an area where compressible ground is anticipated
Landslide	Very low to moderate	The South Wales Coalfield Landslip Survey (Conway BW et al 1980) does not show landslides within 67 m NE of the area.
Running Sand	No hazard to very low	The site is not in an area where running sands are anticipated.
Shrinking and Swelling Clays	No hazard to very low	The site is not in an area where shrinking and swelling clay are anticipated. However, soils should be tested to confirm the soil plasticity.

2.4.2 Radon

The Envirocheck report (**Annex A**) and **Figure 2.4** indicate that the site lies within a 1-3% radon affected area; therefore, basic radon protective measures are required for new developments constructed at ground level on the investigation site.

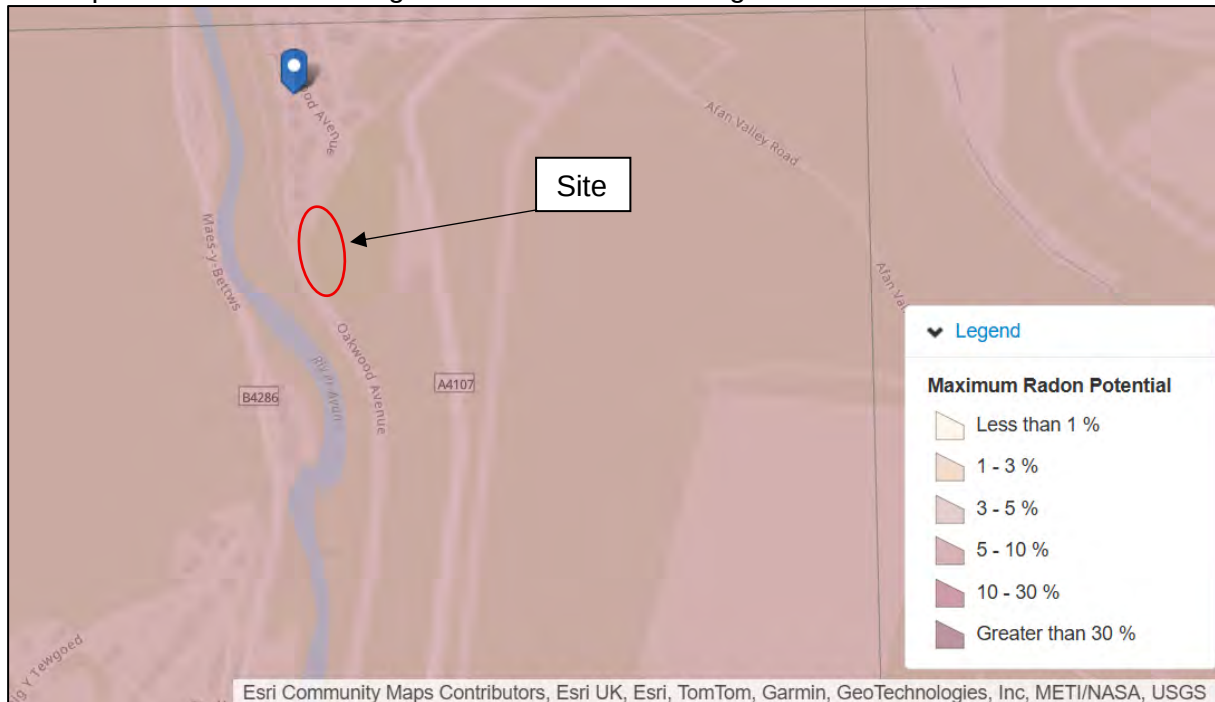


Figure 2.4 UK maps of Radon

Additional consideration will need to be given to the requirement of radon protection within basements or other occupied spaces below ground level.

Further guidance on reducing the concentration of radon in new buildings, extensions, conversions and refurbishment projects, in order to reduce the risk to occupants, is provided in BR:211:2023.

2.4.3 Aggressive Ground Conditions

Made Ground

Based on the available information, made ground is anticipated on the site. This may comprise colliery spoil and spoil associated with the Oakwood Iron Works and may contain elevated levels of sulphates and acids which can be damaging to buried concrete. Therefore, the presence of aggressive agents is considered plausible.

Natural Ground

The geological formation beneath the site comprises Sandstone of Llynfi Member. Therefore, the site is not conducive to the formation of aggressive agents, and their presence is considered unlikely in this formation.

2.5 Environmental Setting

The following sections have been compiled using the Landmark Information Group Envirocheck datasheet and maps which can be found in **Annex A**.

2.5.1 Hydrogeology

Superficial deposits beneath the site have an aquifer designation of secondary aquifer – A.

The bedrock deposits beneath the site have an aquifer designation of secondary aquifer – A.

Deeper groundwater flow within the underlying bedrock will be controlled by the strata dip and any fractures or bedding planes within the rock units. Given the mining setting of the area underground workings are also likely to be acting as conduits for groundwater flow in the general area.

The hydraulic gradient will be at its steepest during periods of heavy rainfall and aquifer recharge.

It is anticipated that the groundwater is in hydrological continuity with the River Avan.

The site does not locate within a groundwater source protection zone.

The nearest groundwater abstraction point is located 1611m southeast, operated by Mr G G James. The water abstracted is used for agriculture (general).

2.5.2 Hydrology

The nearest surface water feature locates off site 52m to the southwest and comprises the River Afan.

The topography of the site slopes west down towards the river. Surface water is likely to drain in this direction.

2.5.3 Flooding

The recorded flood risks to the site are summarised in **Table 2.7**.

Table 2.7 Flood Risk Summary

Hazard	Risk
Extreme flooding from rivers and seas	The site does not fall in an area indicated to be at risk of flooding from river or the sea. Located 51m SW from the site, which is bounded by the River Afan, is an area at risk of flooding (Zone 2).
Groundwater flooding	Limited potential for groundwater flooding to occur.
Surface water flooding 1 in 30-year event	No risk on site.
Surface water flooding 1 in 100-year event	No risk on site. A small linear area outside of the site is distributed to the north on Oakwood Avenue, which is at medium risk of surface water flooding.
Surface water flooding 1 in 1000-year event	No risk on site. Small linear areas distributed in the area north and southwest outside of the site.

2.5.4 Waste

There are no recorded landfill sites within 250m of the site.

There are no licensed waste transfer, waste management facilities, waste treatment or disposal sites within 250m of the site.

There is no discharge consents recorded within 250m of the site.

2.5.5 Infilled Land

Potentially infilled land features within 250m of the site are summarised in **Table 2.8**.

Table 2.8 Potentially Infilled Land

Feature	Distance/Direction
Infilled Land (Non-Water): Unknown Filled Ground (Pit, quarry etc) Historical maps indicate the area is associated with the mining works which were present on the hillside to the west of the site.	39m W
Infilled Land (Non-Water): Unknown Filled Ground (Pit, quarry etc) A point feature associated with a Coal Level.	72m NE
Infilled Land (Non-Water): Unknown Filled Ground (Pit, quarry etc) Historical maps in the area is associated with the deposition of material associated with the historic industrial (mining and ironworks) processes undertaken in the area.	165m SE
Infilled Land (Non-Water): Unknown Filled Ground (Pit, quarry etc) A point feature associated with a Coal Level.	194m NW
Infilled Land (Non-Water): Unknown Filled Ground (Pit, quarry etc) Historical maps indicate the area is associated with the mining works which were present on the hillside to the west of the site.	217m W

2.5.6 Pollution

There are two pollution incidents to controlled waters recorded within 250m of the site.

The first incident has been identified within the site's influencing distance, located at the rugby club 77 m to the north. The incident was classified as Category 3 (minor incident) and occurred on 1 December 1991. The pollutant is unknown.

The second incident was located at the 213m to the north west. The incident was classified as Category 2 (significant incident) and occurred on 18th April 1995. The pollutant was mud/clay/soil pollutants due to a 'burst'.

There are no entries or notices on the Contaminated Land Register and no items of the Substantiated Pollution Incident Register within 250m of the site.

2.5.7 Sensitive Land Use

The site is not located within a sensitive land use area. However, ancient woodland are recorded with the closest 93m west.

Two Forest Parks are located 103m south west and 179m east of the site.

2.5.8 Estimated Urban Soil Chemistry

The British Geological Survey have published estimated urban soil chemistry concentrations locally to the site for a number of common contaminants, i.e. arsenic, cadmium, chromium, lead and nickel. All of the given determinands have anticipated concentrations that are below the recognised trigger levels for a commercial scenario.

2.5.9 Industrial Land Use

Relevant contemporary trade directory entries recorded in proximity of the site are summarised in **Table 2.9**.

Table 2.9 Relevant Contemporary Trade Summary

Company	Distance/Direction	Classification	Status
T R Exterior Cleaning Services	149m South	Cleaning Services – Domestic	Active

There are no recorded Control of Major Accident Hazards Sites (COMAH) and Notifications of Installations Handling Hazardous Substances (NIHHS) within 250m of the site.

2.6 Unexploded Ordnance Risk (UXO)

Based on the historical setting of the site and Zetica UXO Risk Maps, little or no military activity has been recorded within the area. Therefore, the risk from Unexploded Ordnance is considered to be low.

An extract of the Zetica UXO map can be found in **Figure 2.5**.



Figure 2.5 Zetica UXO risk map.

SECTION 3 Preliminary Coal Mining Risk Assessment

3.1 Introduction

The following sections provide a qualitative assessment of the mining legacy beneath the site and is based on the available information detailed in preceding sections of this Tier 1 assessment.

Risks associated with mining legacy are broad and often complex, however, they can largely be summarised into the following categories;

- ground instability & subsidence (geotechnical) – in relation to collapse of recorded and unrecorded shallow mine working, roadways and mine entries; and;
- contamination (geoenvironmental) – mine gas, mine water emissions, and soil contamination associated with mining legacy sites or tips.

3.2 Geotechnical Risk

Recorded Underground Mining

The Mining Remediation Authority consultants coal mining report states that there is no past mining recorded.

Probable Unrecorded Shallow Workings

The Mining Remediation Authority consultants coal mining report states there are no probable unrecorded shallow workings.

Shafts & Adits

There are four adits within 100m of the site, to the east. These have bearings obtained from the Mining Remediation Authority online viewer of between 41° and 82°. These all bear east into the hillside, away from the site so they are likely to have no influence upon the site.

The Adits are seen to be entering the hillside at the level of the Wernddu and Field Coal Seams which are stratigraphically and topographically higher than the site. Given the dip of the geology in the area these seams will not underlie the site.

An extract of the Mining Remediation Authority map can be found in **Figure 2.53.1**.

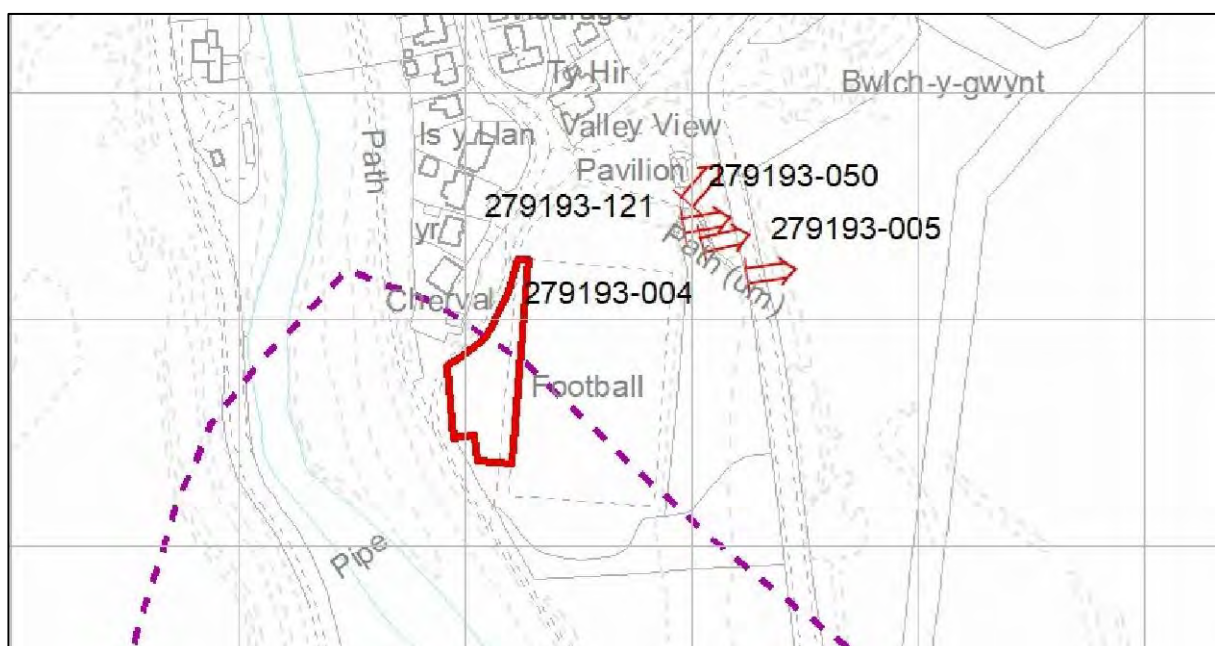


Figure 3.1 Shaft and Adit Locations

Geological Faults, Fissures and Breaklines

No geological faults, fissures or breaklines are present beneath the site.

Outcrops

The Coal Authority records the Upper Punchin (Wernpistyll) Coal Seam to outcrop across the site with a bearing of 123°. The coal seam is indicated to be workable. Given the cover of superficial deposits and made ground the coal seam will be present as a subcrop.

Due to the dip of the underlying bedrock the Wernpistyll Coal Seam will only underlie the northern half of the site.

An extract of the Mining Remediation Authority map with the proposed development overlaid can be found in **Figure 2.53.1**.

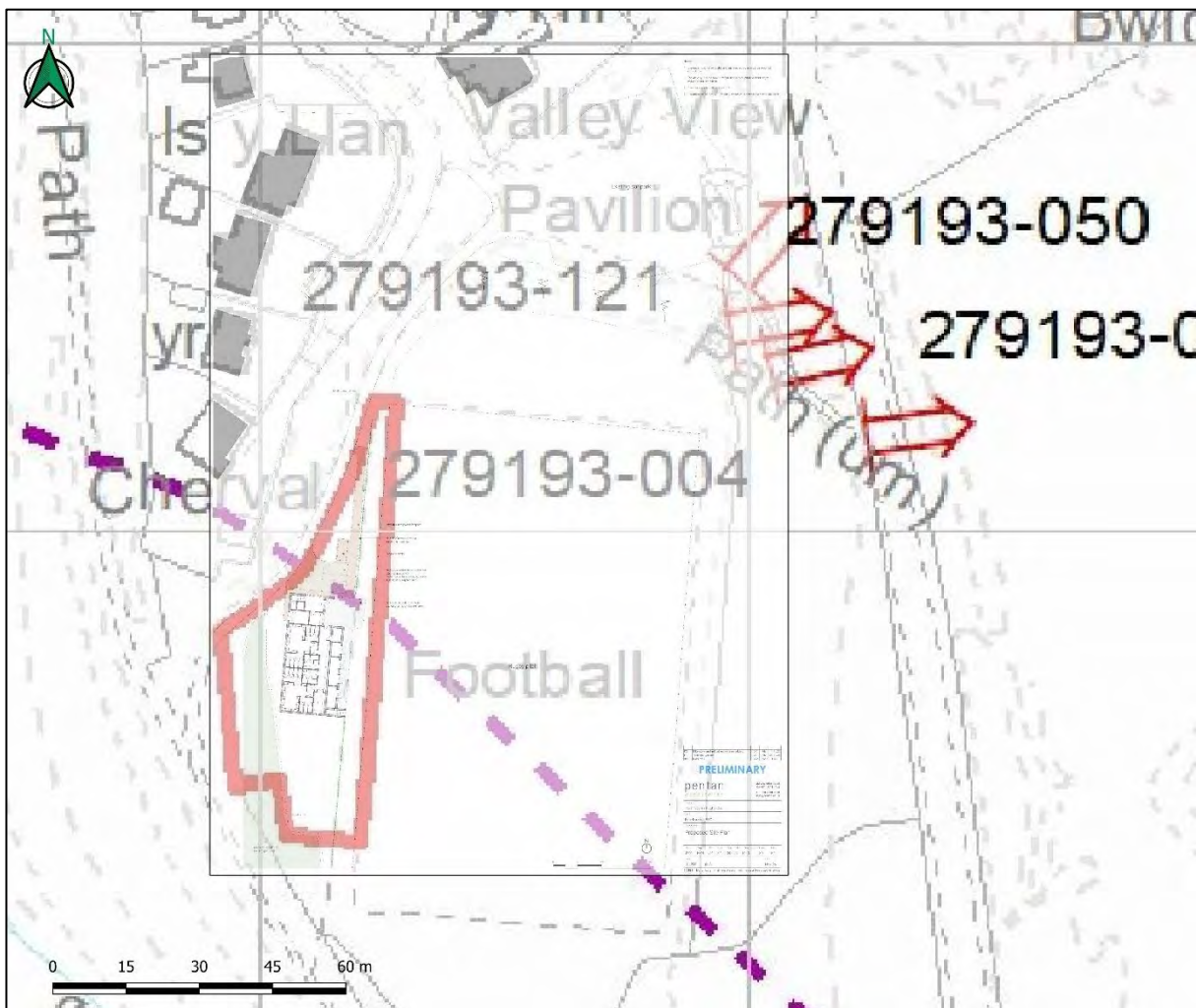


Figure 3.2 Coal Authority Outcrop Location

The Coal Authority mining report can be found in **Annex B**.

3.2.1 Preliminary Ground Model

Based on available data, a preliminary ground model, comprising a stratigraphical sequence within 150m of the ground surface is illustrated in Error! Reference source not found.2.

South Wales Upper Coal Measures	Holocene	MADE GROUND	5.00m
	Quaternary	Glaciofluvial Deposits	10.00m
		Wernpistyll Coal Seam/Upper Punchin (0.60/0.75m thick)	Subcrop 0.00m
		Coal Bearing Sandstone with thin mudstone/siltstone and seatearth interbeds.	
			40.00m
		Coal (Thin)	
		Coal Bearing Sandstone with thin mudstone/siltstone and seatearth interbeds.	
		Tormynydd Coal Seam (0.60m thick)	115.00
		Coal Bearing Sandstone with thin mudstone/siltstone and seatearth interbeds.	
		Jonah Coal Seam (Thin)	124.50
		Coal Bearing Sandstone with thin mudstone/siltstone and seatearth interbeds.	
		White Coal Seam (0.90m to 1.20m)	130.00
		Coal Bearing Sandstone with thin mudstone/siltstone and seatearth interbeds.	
			150.00

Figure 3.3 Preliminary Ground Model

3.2.2 Conclusion

The Wernpistyll coal seam is conjectured to outcrop in the north of the site by the Mining Remediation Authority consultants coal mining report. This seam will underlie the northern half of the site. The Mining Remediation Authority confirm there is no recorded mining beneath or within influencing distance of the site, nor is there probable shallow workings or spine roadways beneath the site.

It can be seen that the mining activities have been undertaken on the hillsides to the west and east of the site. These are via adits which have been driven into the hillside in orientations away from the site. Therefore the site is not at risk from these features.

The site locates adjacent to the River Avan and is anticipated to be covered by thick made ground and fluvioglacial deposits with a shallow water table. With the coal seam subcropping below the site it is likely to be in a weathered condition at shallow depth below the superficial geology. Given this setting the Wernpistyll coal seam is unlikely to have been worked below the site.

The next potentially workable seam, the Tormynydd seam (approximately 0.60 m thick), is located around 115 m stratigraphically below the Wernpistyll seam. Given the depth of this coal seam it will not pose a risk the surface.

The overall risk to surface stability arising from potential recorded or unrecorded legacy mining features is assessed as negligible.

3.3 Geoenvironmental Risk

3.3.1 Mine Gas

This mine gas assessment has been completed in accordance with guidance published in CL:AIRE:2021, Good practice for risk assessment for coal mine gas emissions. In the first instance, the risk assessment process requires the screening out of 'potentially at risk sites' utilising the decision support tool for mine gas risk assessment, provided in Figure 13.1 of the aforementioned publication. A summary of the decision tool and site outcome is presented in **Table 3.1**.

Table 3.1 Decision Support Tool Summary – Site Specific

Step	Qualifier Question	Outcome	Comment
1	Is the site within a Coal Authority defined coal mining reporting area?	Yes	Go to step 2
2	Are all these statements true? • Mine entries >50m from site boundary. • Workings >150m depth. • No faults or other potential pathways connecting surface to deeper unflooded workings. • Outside area of past or probable shallow workings on Coal Authority viewer.	Yes	Negligible Risk Zone
3	Are all these statements true? • Workings between 30m and 150m but permanently flooded or covered by 10m+ of low permeable superficial deposits. • Mine entries > 50m from site boundary. • Low permeability superficial deposits of sufficient thickness - $<1 \times 10^{-6}$ m/s hydraulic conductivity.	-	Not Required
4	Are any of these statements true? • Mine entries on site or <20m from site boundary • Workings below site <30m depth and unflooded or variable water level • Faults or other pathways connecting surface to deeper unflooded workings • Within area of past or probable shallow workings on Coal Authority viewer	-	Not Required

It is determined the site is in a negligible risk zone from mine gas and no mitigation measures are required. No further action with regards to the assessment or mitigation of mine gas is necessary.

SECTION 4 Preliminary Human Health & Environmental Risk Assessment

4.1 General

The Tier 1 preliminary human health and environmental risk assessment is a qualitative evaluation of unacceptable risks to human health or the environment from potential 'contaminated land', based on reviewed information in preceding sections of this report.

For contaminated land to exist as defined in Part 2A of the Environmental Protection Act 1990, a contaminant linkage needs to be identified. Contaminant linkages are defined by having a valid 'source – pathway – receptor' as established in the preliminary conceptual site model.

For our definitions of contaminant linkages and how we define risk please refer to **Annex C** which includes our classifications of consequence and probability, and risk assessment matrix.

4.2 Potential Sources of Contamination

Potential or known sources of contamination associated with the site current and historical land uses are summarised in **Table 4.1**.

Table 4.1 Contamination Sources

ID	Contamination Source	Contaminant	Source of Information
S1	Made Ground (Colliery Spoil or Oakwood Iron Works) and infilled land	Metals, Semi-Metals and Non-Metals, Speciated Polycyclic Aromatic Hydrocarbons (PAH), Petroleum Hydrocarbons, Asbestos	Envirocheck report datasheets and historic maps (Annex A)
S2	Rail lines (dismantled)	Metals, Semi-Metals and Non-Metals, Speciated Polycyclic Aromatic Hydrocarbons (PAH), Petroleum Hydrocarbons.	Envirocheck report datasheets and historic maps
S3	Made ground and infilled land features	Ground gases, methane, carbon dioxide, carbon monoxide and hydrogen sulphide.	Envirocheck report datasheets.
S4	Bedrock	Radon gas	Envirocheck report datasheets.

4.2.1 Omitted Potential Sources

Other potential sources of contamination highlighted in preceding sections of this assessment have been reviewed and omitted from further risk assessment, for the reasoning listed in **Table 4.2**.

Table 4.2 Omitted Contamination Sources

Contaminant & Source	Reasoning
Coal Mining	All mining activities occurred off-site, with no direct evidence of spoil heaps, drainage, or contamination migrating onto the site. Colliery spoil may be present on the site however this is likely to comprise mudstone and is unlikely to be a potential source of contamination.

4.3 Potential Pollution Pathways

Potential contaminant pathways associated with a **commercial development** are summarised in **Table 4.3**.

Table 4.3 Contamination Pathways

ID	Pathway
P1	Direct soil and dust ingestion
P2	Dermal contact
P3	Inhalation of dust and vapours
P4	Vertical migration of leachates/liquid contaminants (unsaturated zone)
P5	Horizontal and vertical migration of contaminants (saturated zone)
P6	Artificial contaminant pathway (borehole, pile, excavation etc)
P7	Surface run-off
P8	Horizontal and vertical migration of ground gasses and vapours
P9	Direct contact with construction materials
P10	Inhalation of asbestos fibres

4.4 Potential Receptors

There are human and hydrological receptors to any contamination that may be present on site. Potential receptors are summarised in **Table 4.4**.

Table 4.4 Contamination Receptor

ID	Receptor
R1	Construction and maintenance workers
R2	Future site users (visitors)
R3	Groundwater (aquifer)
R4	Surface waters (river)
R5	Area of public open space
R6	Construction materials (concrete/potable water pipes)

4.5 Preliminary Conceptual Site Model

The preliminary conceptual site model establishes potential contaminant linkages between contaminants (source), pathways and receptors, realised during the preparation of the Tier 1 assessment. Where a potential contaminant linkage is identified, an assessment of risk is subsequently undertaken. The preliminary conceptual site model is tabulated in **Table 4.5**.

Outcomes of the preliminary conceptual site model are then used as a basis for the design and implementation of the site investigation, whereby point sources of potential contamination can be targeted, as well as investigating more broadly the wider site.

Findings of the site investigation can in turn be used to develop and refine the conceptual site model.

4.5.1 Data Gaps & Uncertainties

Key data gaps and uncertainties identified in the conceptual site model at Tier 1 assessment stage include:

- there are no previous site investigations available for the site, therefore no information is available on actual concentrations of contaminants in soil and groundwater at this stage;
- the precise ground conditions below the site are unknown; and
- groundwater depth and flow direction are conceptual at this stage.

Table 4.5 Preliminary Conceptual Site Model

Source	Pathway	Receptor	Preliminary Risk Assessment		
			Consequence	Probability	Risk & Justification
Human Health					
Contaminated Soils S1 Former railway lines S2	Direct soil and dust ingestion P1 Dermal contact P2 Inhalation of dust and vapours P3 Inhalation of asbestos fibres P10	Construction and maintenance workers R1	Medium	Low Likelihood	Low Risk: COSHH assessment and good level of PPE/ hygiene by site workers/ staff; dust suppression measures to be adopted, if required.
		Future site users (visitors) R2 Area of public open space R5	Medium	Unlikely	Low Risk: The proposed development is to be commercial in nature and the site is to be a changing rooms and club house. Contact with impacted soils is considered unlikely however cannot be ruled out.
Ground Gas S3	Horizontal and vertical migration of ground gasses and vapours P8	Construction and maintenance workers R1	Medium	Low Likelihood	Low Risk: Construction and maintenance workers can be protected by good level of PPE/hygiene by site workers/ staff
		Future site users (visitors) R2	Medium	Unlikely	Near Zero Risk: Due to the anticipated thickness of made ground and potential for ground gas a program of gas monitoring should be undertaken.
Radon Gas S4	Horizontal and vertical migration of ground gasses and vapours P8 Inhalation of dust and vapours P3	Future site users (visitors) R2	Medium	Low Likelihood	Low Risk: Basic radon protection measures are required.
Impacted Groundwaters S1	Horizontal and vertical migration of contaminants (saturated zone) P5 Dermal contact P2	Construction and maintenance workers R1	Medium	Unlikely	Near Zero Risk: Railway infrastructure associated with the coal mining activities were present on the site and impacted groundwater may be present but are considered unlikely. Construction and maintenance workers can be protected by good level of PPE/ hygiene by site workers/ staff.
Soils S1&S2	Direct Contact P10	Construction materials (water pipes) R6	Mild	Low Likelihood	Low Risk: An appropriate water supply pipe material should be chosen after the potable water supplier has completed an assessment in accordance with UK Water Industry Research guidance; Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UKWIR Report Ref: 10/WM/03/21.
		Construction materials (concrete) R6	Mild	Low Likelihood	Low Risk: Chemical analysis of the soils must be undertaken and the appropriate classification of concrete should be specified as per BRE Special Digest 1: Concrete in Aggressive Ground.

Aquatic Environment

Soils (leachate) S1 & S2	Surface run-off P7	Surface waters (river) R4	Mild	Likely	Low Risk: The site has been occupied and possible contamination may be anticipated on site in association with the railway track. While the rail line and coal mining ceased over 50 years ago the presence of contamination remaining in the ground cannot be discounted. Chemical analysis of the soils should be undertaken to identify contamination. Depending on the findings of the initial site investigation additional testing or phases may be required.
	Vertical migration of leachates/liquid contaminants (unsaturated zone) P4	Groundwater (aquifer) R3	Mild	Likely	
	Horizontal and vertical migration of contaminants (saturated zone) P5	Surface waters (river) R4	Mild	Likely	
		Groundwater (aquifer) R3	Mild	Likely	

4.6 Conclusion

It is determined that potential contaminant linkages have been identified/ identified data gaps and more information is needed to refine the conceptual site model. It is therefore necessary to proceed to a Tier 2 generic quantitative risk assessment.

SECTION 5 Preliminary Engineering Recommendations

Recommendations given in this section are based upon the available desk study information and need to be confirmed by a relevant intrusive investigation.

5.1 Preliminary Ground Model

Based on the available desk study information anticipated ground conditions at the site are summarised in **Table 5.1**.

Table 5.1 Anticipated Ground Conditions

Stratum	Depth (m)
Made ground composed of colliery spoil or material from the Oakwood Iron Works	GL-5.00
Glaciofluvial deposits composed of sands and gravels	5.00-10.00
Llynfi Member - Sandstone	>10.00

5.1.1 Groundwater

Groundwater may be anticipated at shallow depth onsite given the presence of the River Avan in the area to the west of the site.

Perched groundwater may also be present in the made ground soils overlying the glaciofluvial deposits.

5.2 Preparation of Site

Prior to site works commencing an appropriate asbestos survey should be carried out in the existing buildings / structures. Any asbestos containing materials identified should be removed and disposed of at appropriate landfill facility by a specialist contractor.

Areas of vegetation including all roots should be stripped and removed from beneath the proposed development site.

Allowances should be made for any temporary/permanent support works to any existing adjacent structure necessary as a result of the proposed works.

Contingencies should be made for the protection/diversion of any underground/overhead services present beneath/above the site brought about as a result of the proposed works.

Any reduced levels should be brought up to the required levels with suitable inert mainly granular materials. Department of Transport (DTP) type 2 sub-base or similar should be used and compacted in layers to the requirements of the Specification for Highway Works.

Allowances should also be made for the excavation of any soft spots/areas and their replacement with well compacted imported granular materials.

In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM3 soils and other materials destined for off-site disposal should be classified on the basis of their hazard phrases prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties.

5.3 Tentative Foundation and Floor Slab Solution

Based upon the desk study information, It is likely that semi traditional foundations will be feasible for low rise development on site.

However given the presence of made ground soils a turn and compact exercise may be required to reengineer the ground and provide sufficient bearing capacity.

If the made ground or superficial deposits are found to be of low strength then a deep pile foundation may be required.

5.4 Excavations and Formations

Shallow excavations will likely be possible with normal soil excavating machinery. Allowances for a breaker attachment should be made when dealing with areas of hardstanding and the existing structures.

Excavations may likely to encounter shallow groundwater flows. Any inflows together with rainwater infiltration should be dealt with by conventional pumping techniques.

5.5 Storm Water Drainage

Soakaway drainage is likely to be viable due to the presence of potentially granular made ground and glaciofluvial deposits, likely comprising mainly sands and gravels.

The suitability of stormwater drainage should however be confirmed by in-situ soakaway testing.

Proposed soakaways should be positioned at least 5.0m away from any structure.

SECTION 6 Recommended Site Investigation

6.1 General

An intrusive site investigation designed and justified in accordance with guidance provided in BS10175:2011+A2:2017 must be undertaken to achieve the following objectives:

- Identify the potential environmental liabilities at the site associated with any soil, gas, vapours and groundwater contamination from past site uses, to substantiate and enhance the conceptual site model, for **a commercial scenario**.
- Provide a summary of the environmental conditions at the site, together with any necessary remediation works to render the site fit for its intended use.
- Provide recommendations regarding any relevant geotechnical aspects pertaining to the development

6.2 Intrusive Investigation

It is recommended that an intrusive investigation is undertaken to inspect the ground conditions, to take soil samples for laboratory chemical and geotechnical testing and to install shallow ground gas monitoring wells.

A mini percussive borehole investigation should be undertaken to allow the installation of shallow gas monitoring wells.

Soakaway testing should also be carried out to aid drainage design.

6.3 Soil Sampling Strategy

Soil sampling locations must be selected on a non-targeted basis to characterise the contamination status of a site.

6.4 Recommended Soil Chemical Analysis

It is recommended that soil samples be taken of the made ground and underlying natural materials and tested at an accredited laboratory for the determinands listed in **Table 6.1**.

Table 6.1 Soil Laboratory Analysis

Metals & Metalloids	In-Organics	Organics	Others
Arsenic	Cyanide	Phenols	pH (acidity)
Cadmium	Sulphate	PAH	Asbestos
Chromium III		Petroleum Hydrocarbons	
Chromium VI			
Copper			
Lead			
Mercury			
Nickel			
Selenium			
Zinc			

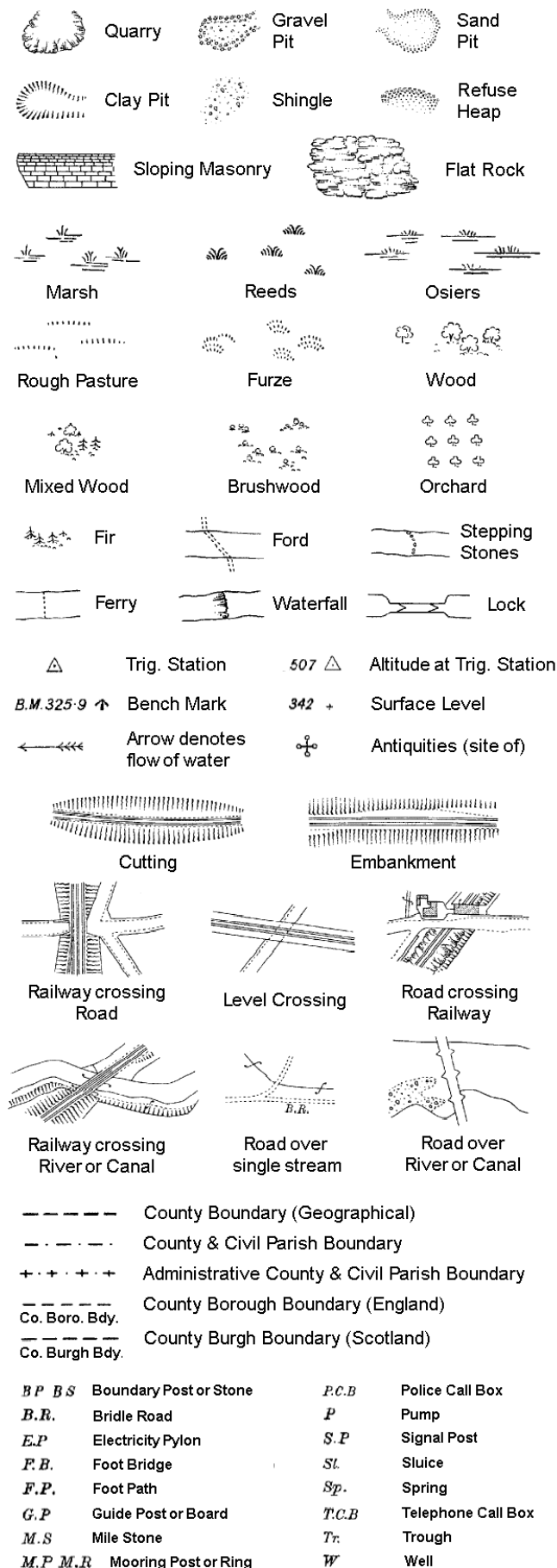
Soil samples exhibiting elevated levels of metal and metalloid determinands should be further schedule for leachate testing of the offending substance.

**ANNEX A
Envirocheck Report**

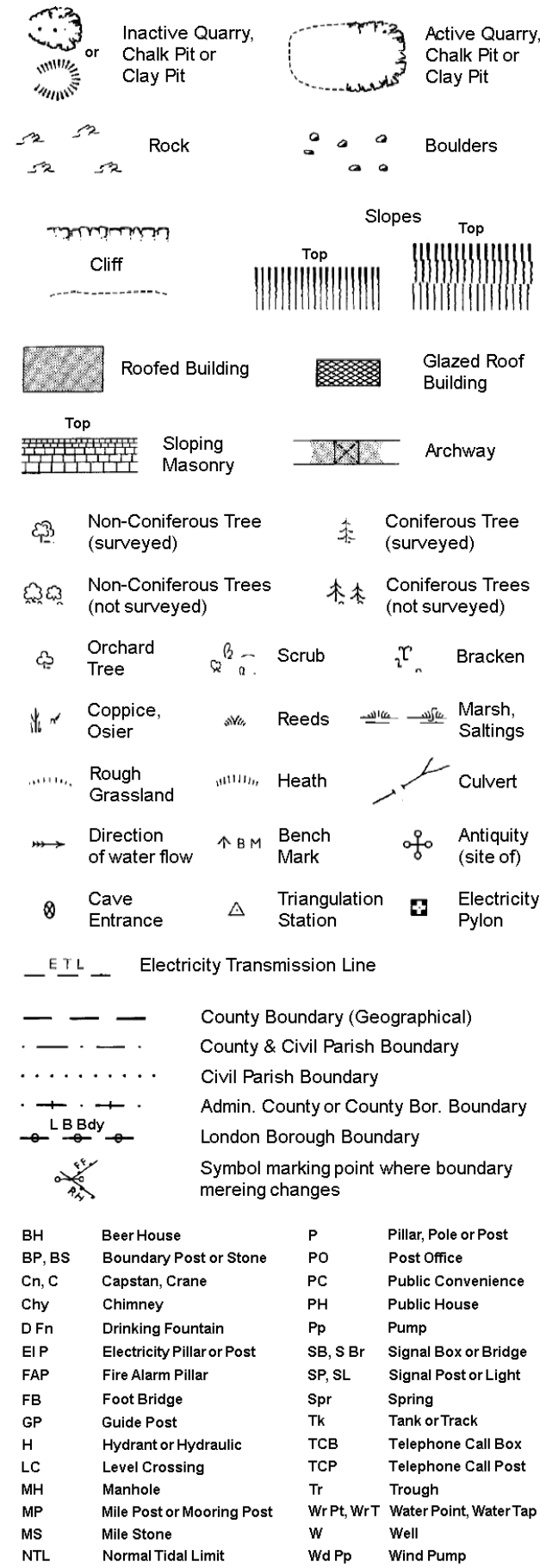


Historical Mapping Legends

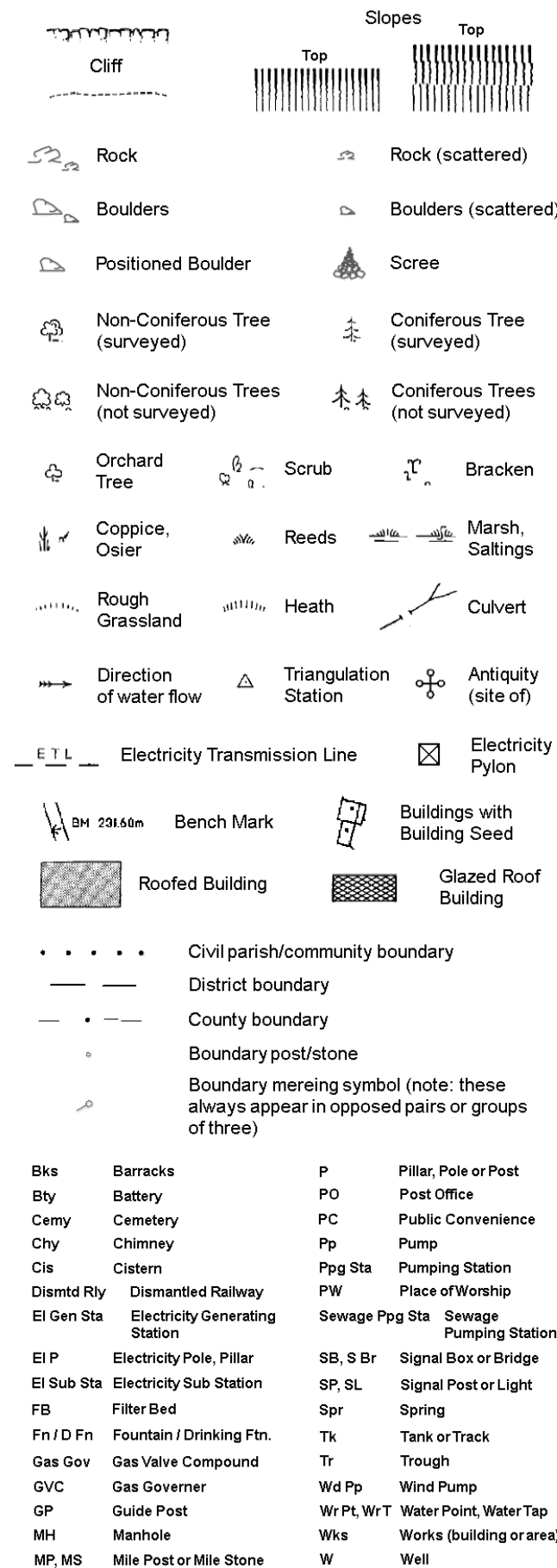
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



Large-Scale National Grid Data 1:2,500 and 1:1,250

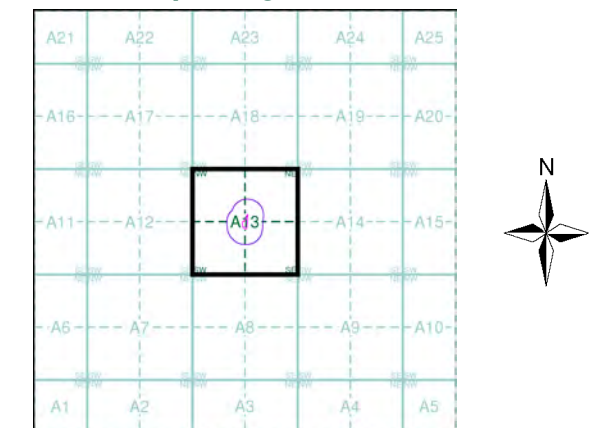


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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
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Glamorganshire	1:2,500	1899	3
Glamorganshire	1:2,500	1918 - 1919	4
Glamorganshire	1:2,500	1936 - 1940	5
Ordnance Survey Plan	1:2,500	1965	6
Additional SIMs	1:2,500	1979 - 1985	7
Additional SIMs	1:2,500	1986	8
Large-Scale National Grid Data	1:2,500	1993	9
Large-Scale National Grid Data	1:2,500	1995	10
Historical Aerial Photography	1:2,500	2000	11

Historical Map - Segment A13



Order Details

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Customer Ref: 25-587
National Grid Reference: 279420, 193780
Slice: A
Site Area (Ha): 0.18
Search Buffer (m): 100

Site Details

Site at 279410, 193780



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Glamorganshire

Published 1877 - 1878

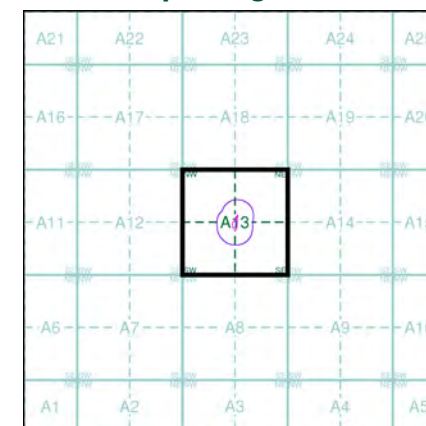
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

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025_06 1878 1:2,500	025_07 1877 1:2,500

Historical Map - Segment A13



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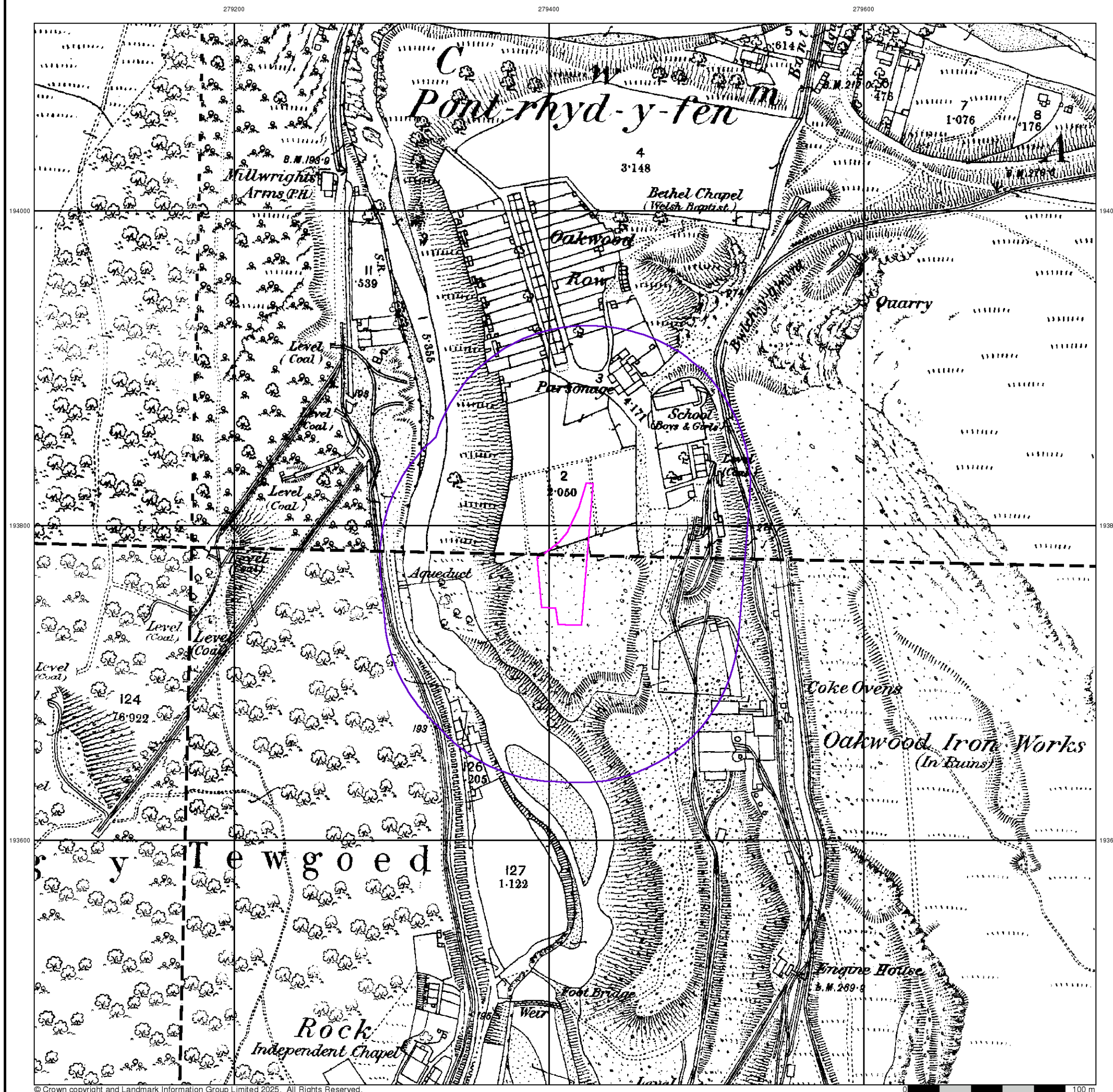
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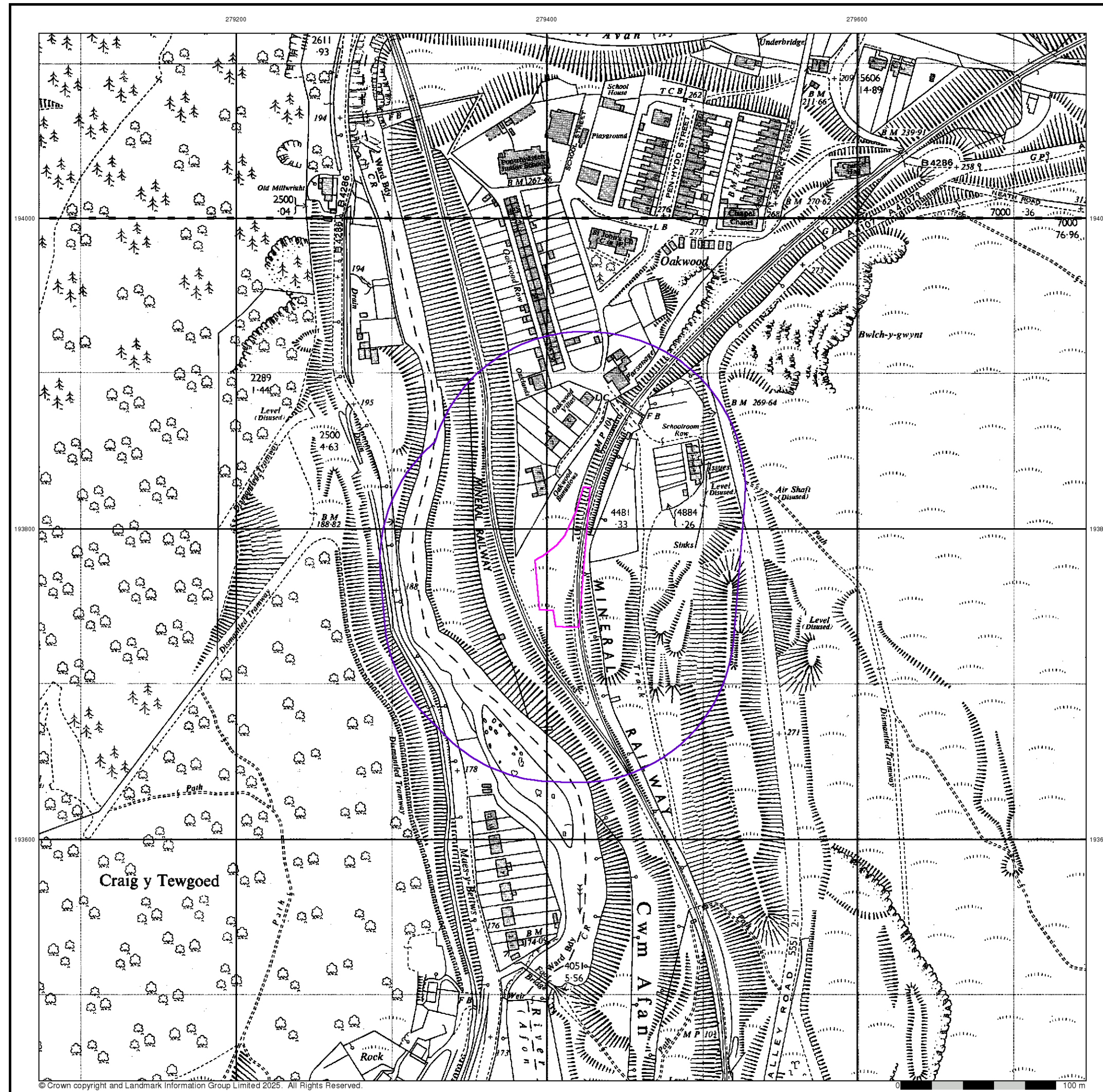
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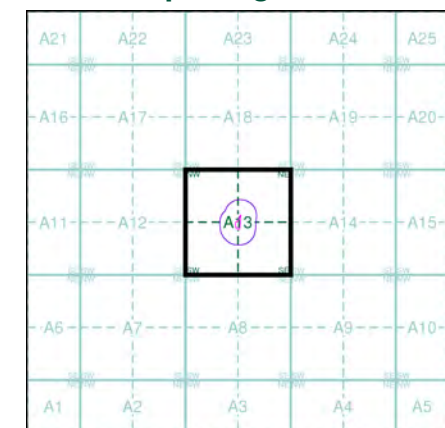
Ordnance Survey Plan
Published 1965
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SS7994
1965
1:2,500
SS7993
1965
1:2,500

Historical Map - Segment A13



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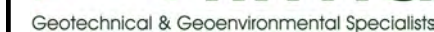
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Site Area (Ha): 0.18
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Site Details

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Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Published 1979 - 1985

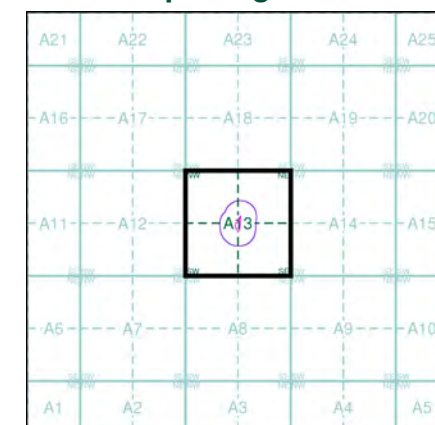
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The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

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SS7993	1979	1:2,500

Historical Map - Segment A13



Order Details

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National Grid Reference: 279420, 193780
Slice: A
Site Area (Ha): 0.18
Search Buffer (m): 100

Site Details

Site at 279410, 193780

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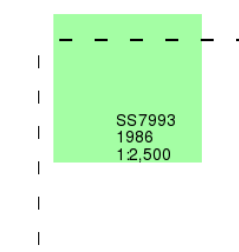
Additional SIMs

Published 1986

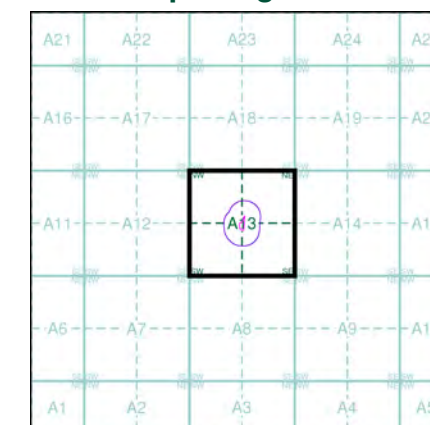
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The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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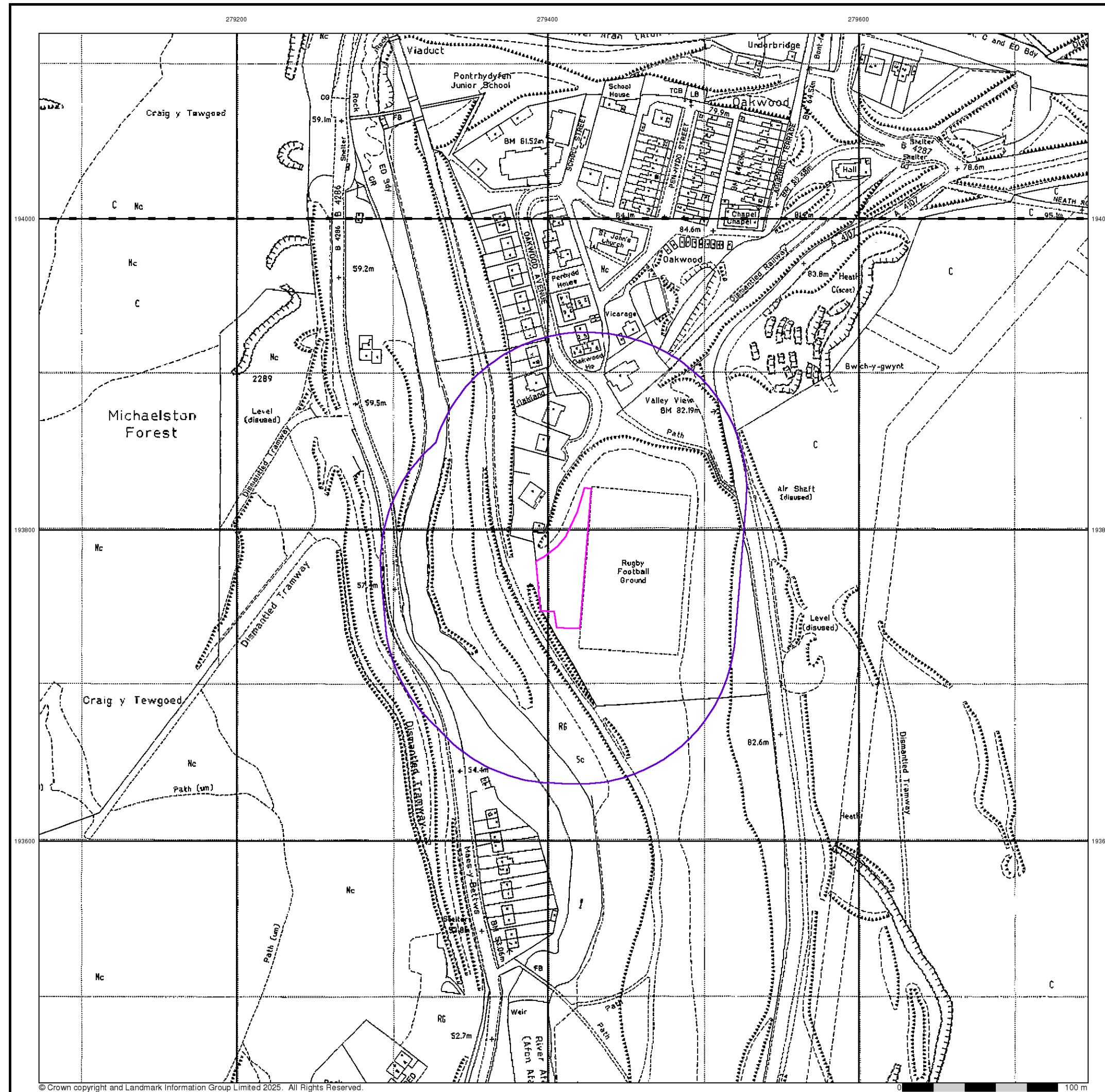
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Slice: A
Site Area (Ha): 0.18
Search Buffer (m): 100

Site Details

Site at 279410, 193780



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Large-Scale National Grid Data

Published 1993

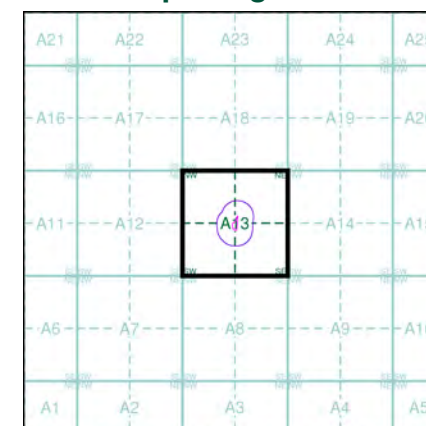
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

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SS7993	1993	1:2,500

Historical Map - Segment A13



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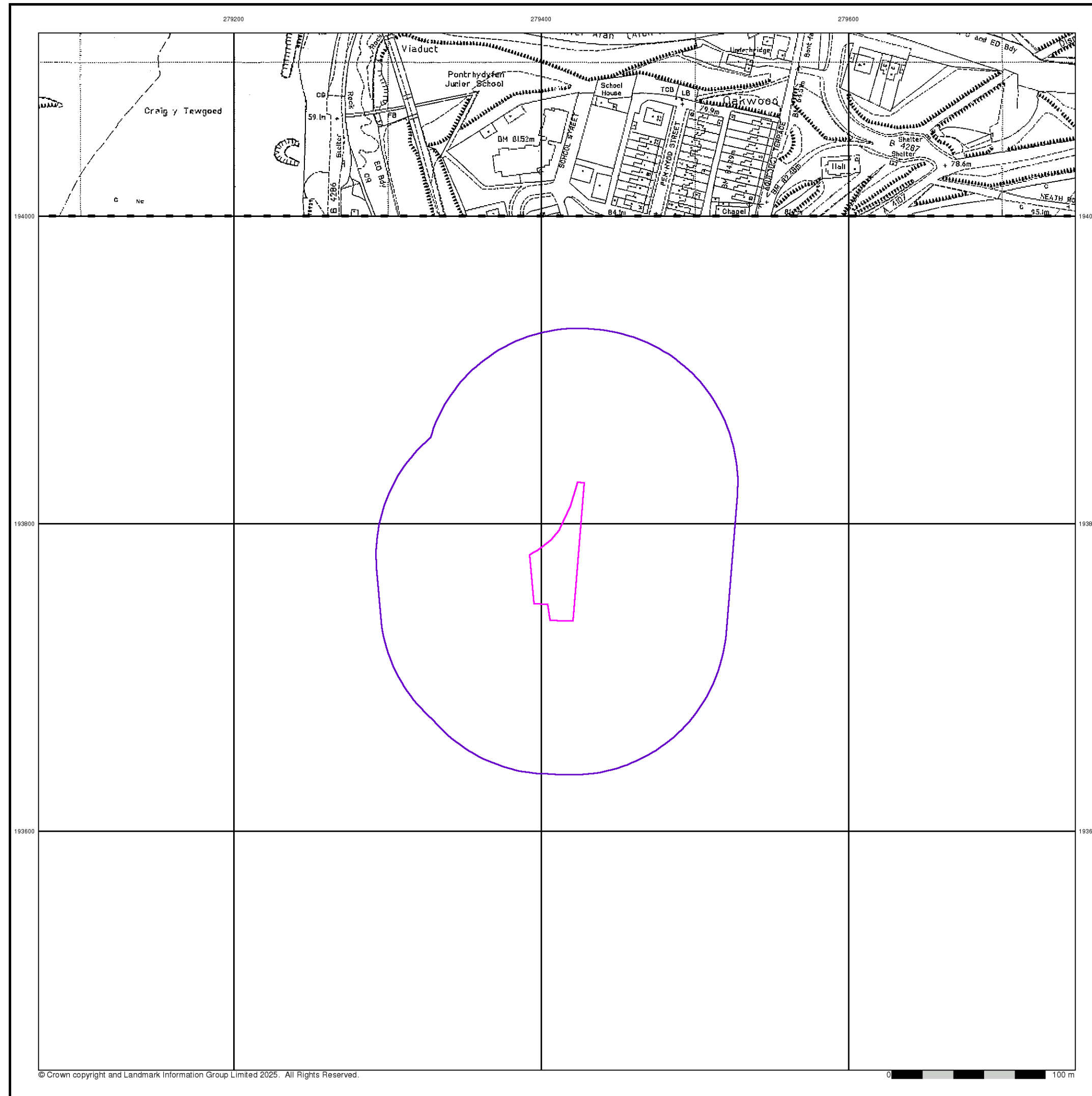
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Customer Ref: 25-587
National Grid Reference: 279420, 193780
Slice: A
Site Area (Ha): 0.18
Search Buffer (m): 100

Site Details

Site at 279410, 193780



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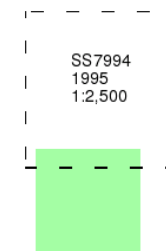
Large-Scale National Grid Data

Published 1995

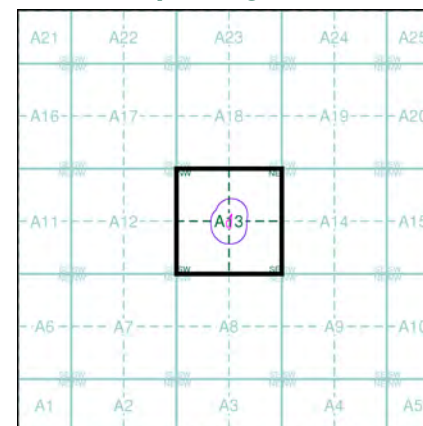
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

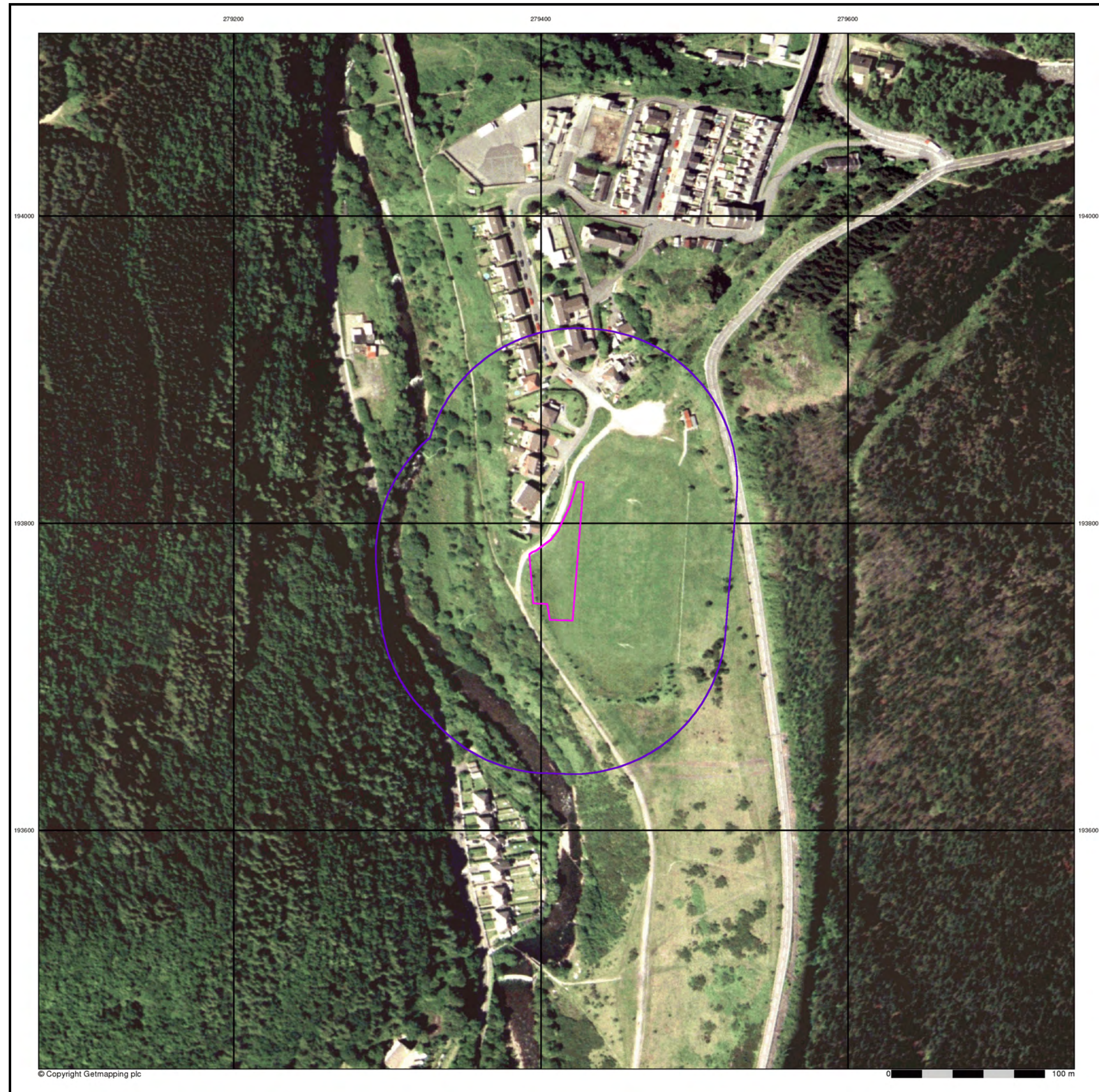
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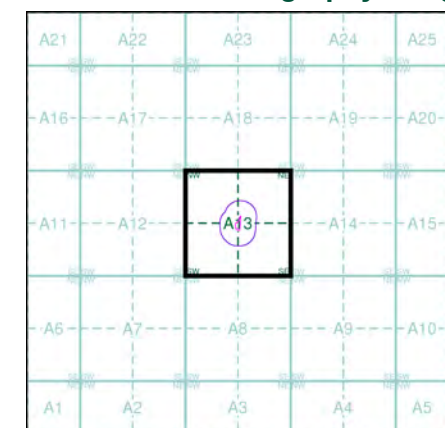


Historical Aerial Photography

Published 2000

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	•285 Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		Administrative County, County Borough or County of City
	Municipal Borough, Urban or Rural District, Burgh or District Council		Borough, Burgh or County Constituency
	Civil Parish		
	BP, BS Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

1:10,000 Raster Mapping

	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	Mean high water (springs)		Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building

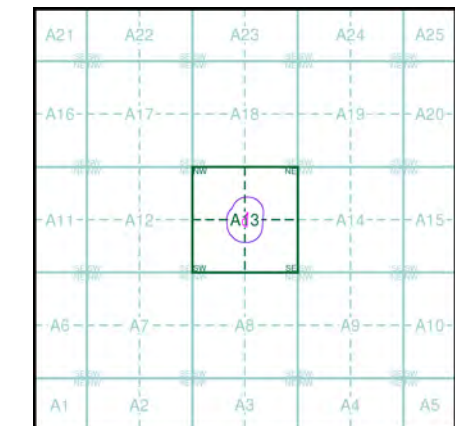


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Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Glamorganshire	1:10,560	1884	2
Glamorganshire	1:10,560	1900	3
Glamorganshire	1:10,560	1921	4
Glamorganshire	1:10,560	1936	5
Historical Aerial Photography	1:10,560	1949	6
Glamorganshire	1:10,560	1951	7
Ordnance Survey Plan	1:10,000	1964	8
Ordnance Survey Plan	1:10,000	1973 - 1974	9
Ordnance Survey Plan	1:10,000	1980 - 1988	10
Ordnance Survey Plan	1:10,000	1990 - 1996	11
10K Raster Mapping	1:10,000	1999	12
10K Raster Mapping	1:10,000	2006	13
VectorMap Local	1:10,000	2025	14

Historical Map - Slice A



Order Details

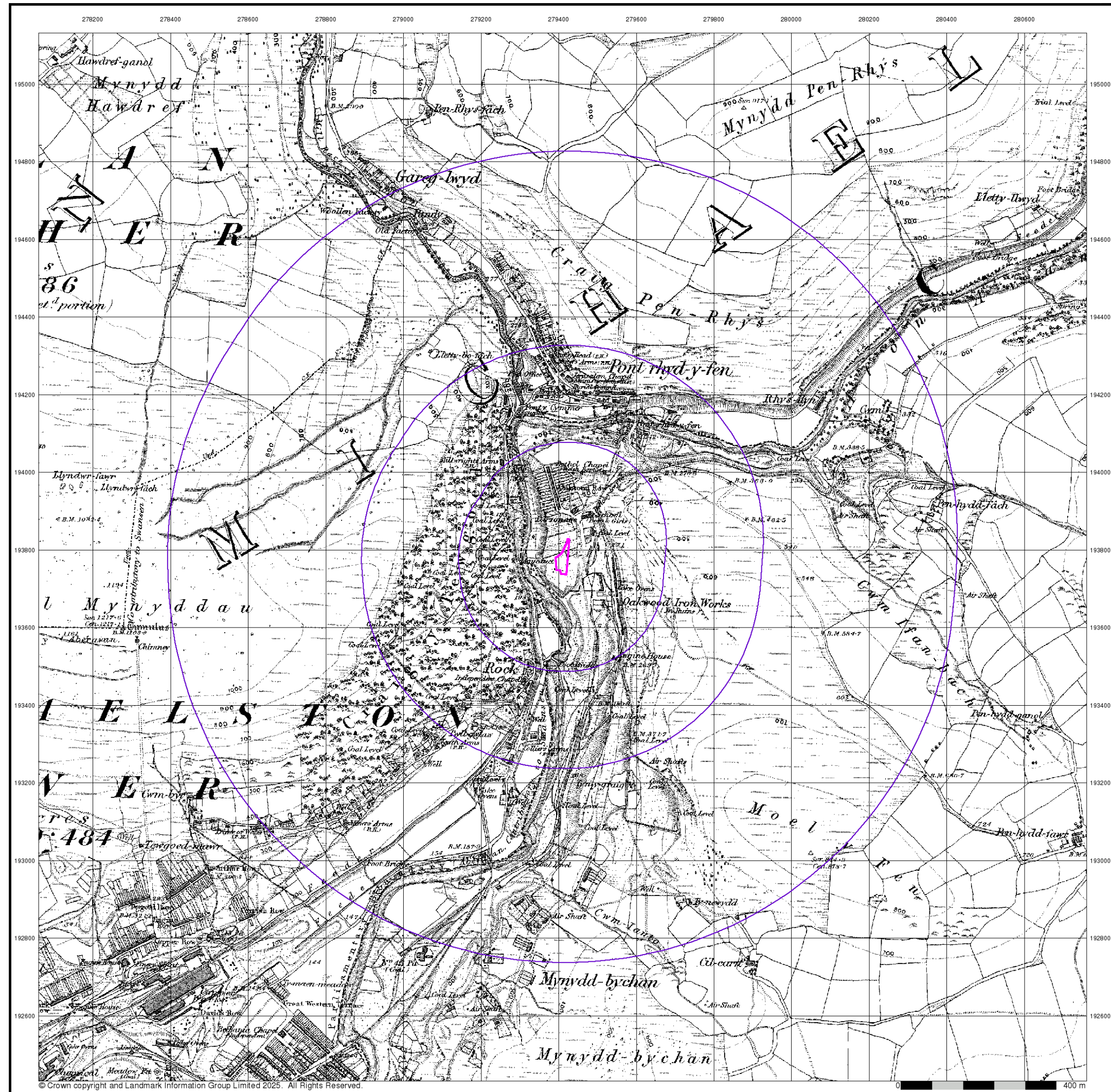
Order Number: 390892070_1_1
Customer Ref: 25-587
National Grid Reference: 279420, 193780
Slice: A
Site Area (Ha): 0.18
Search Buffer (m): 1000

Site Details

Site at 279410, 193780



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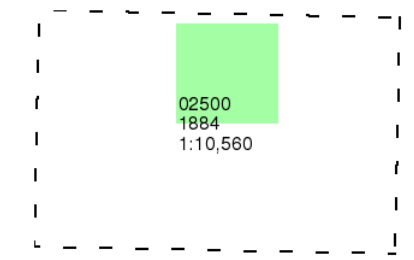
Glamorganshire

Published 1884

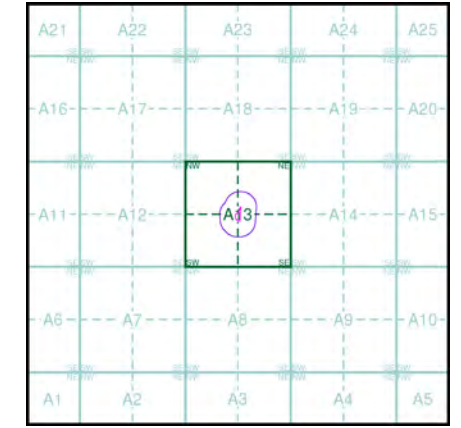
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

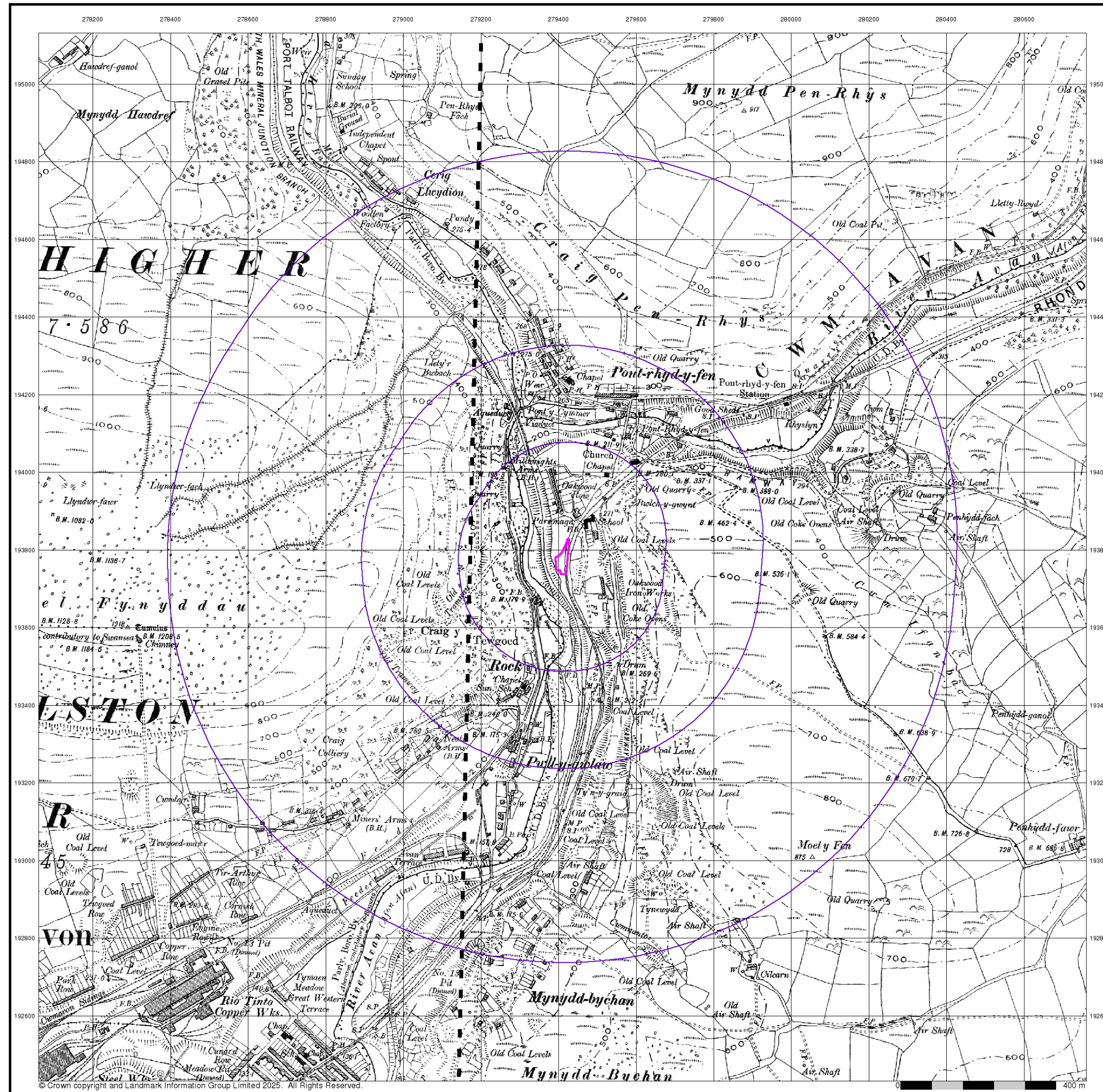
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Customer Ref: 25-587
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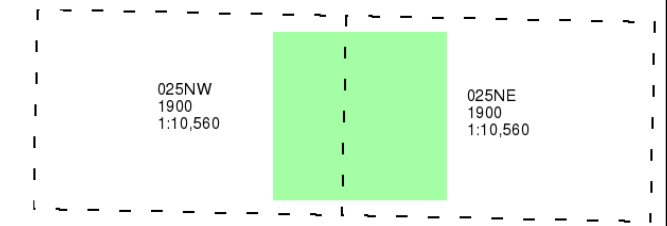
Glamorganshire

Published 1900

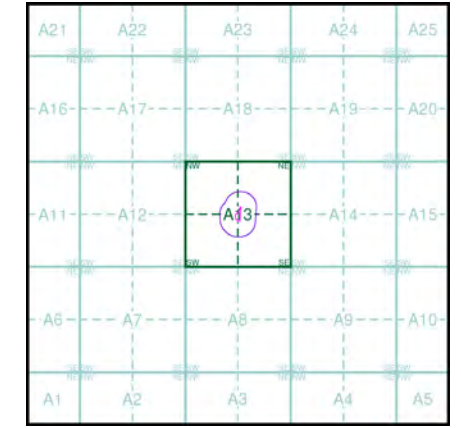
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

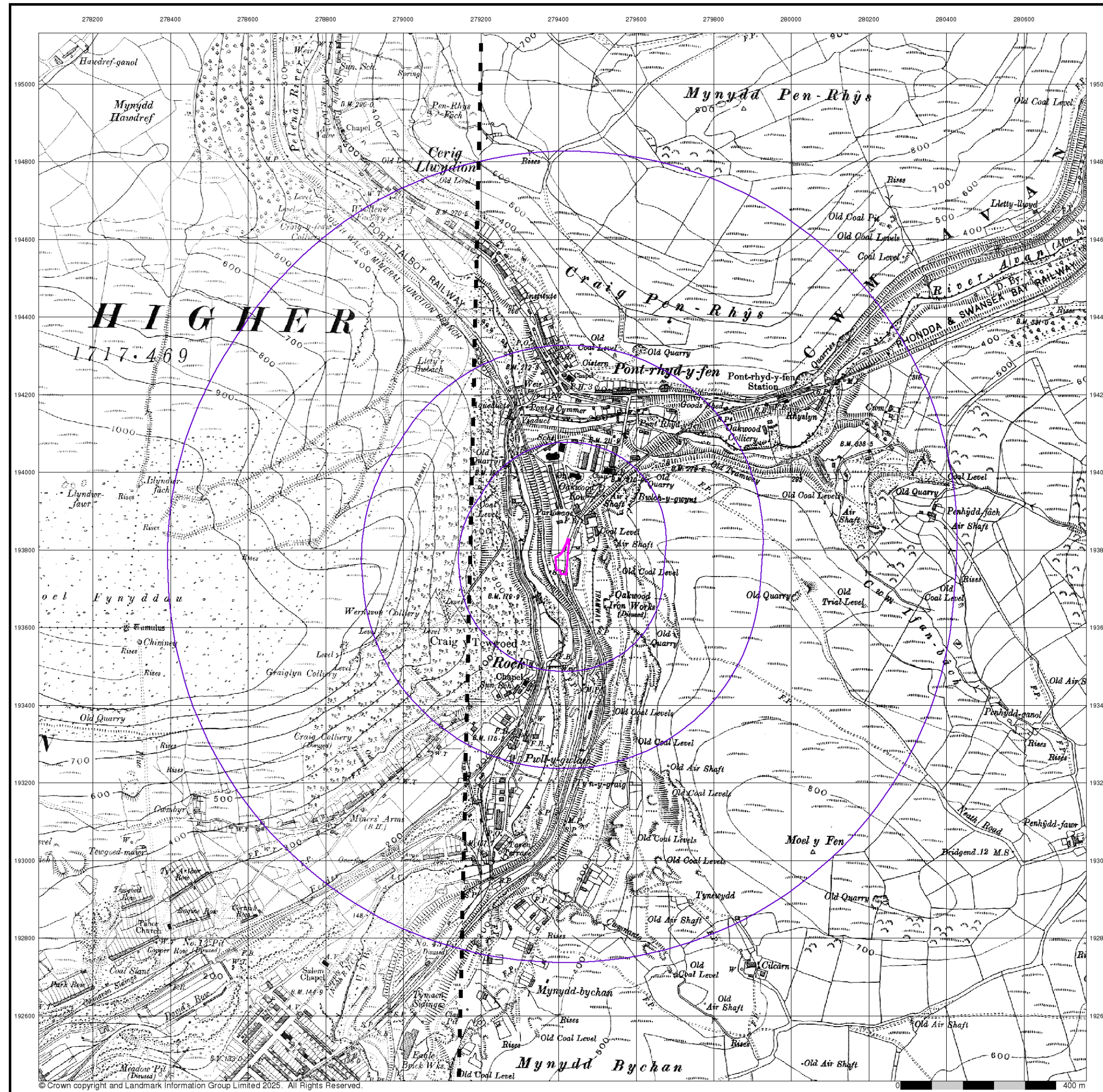
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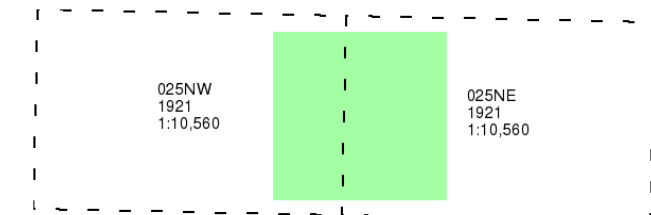
Glamorganshire

Published 1921

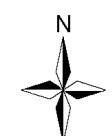
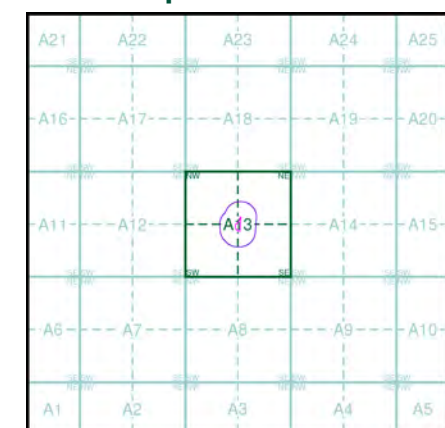
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

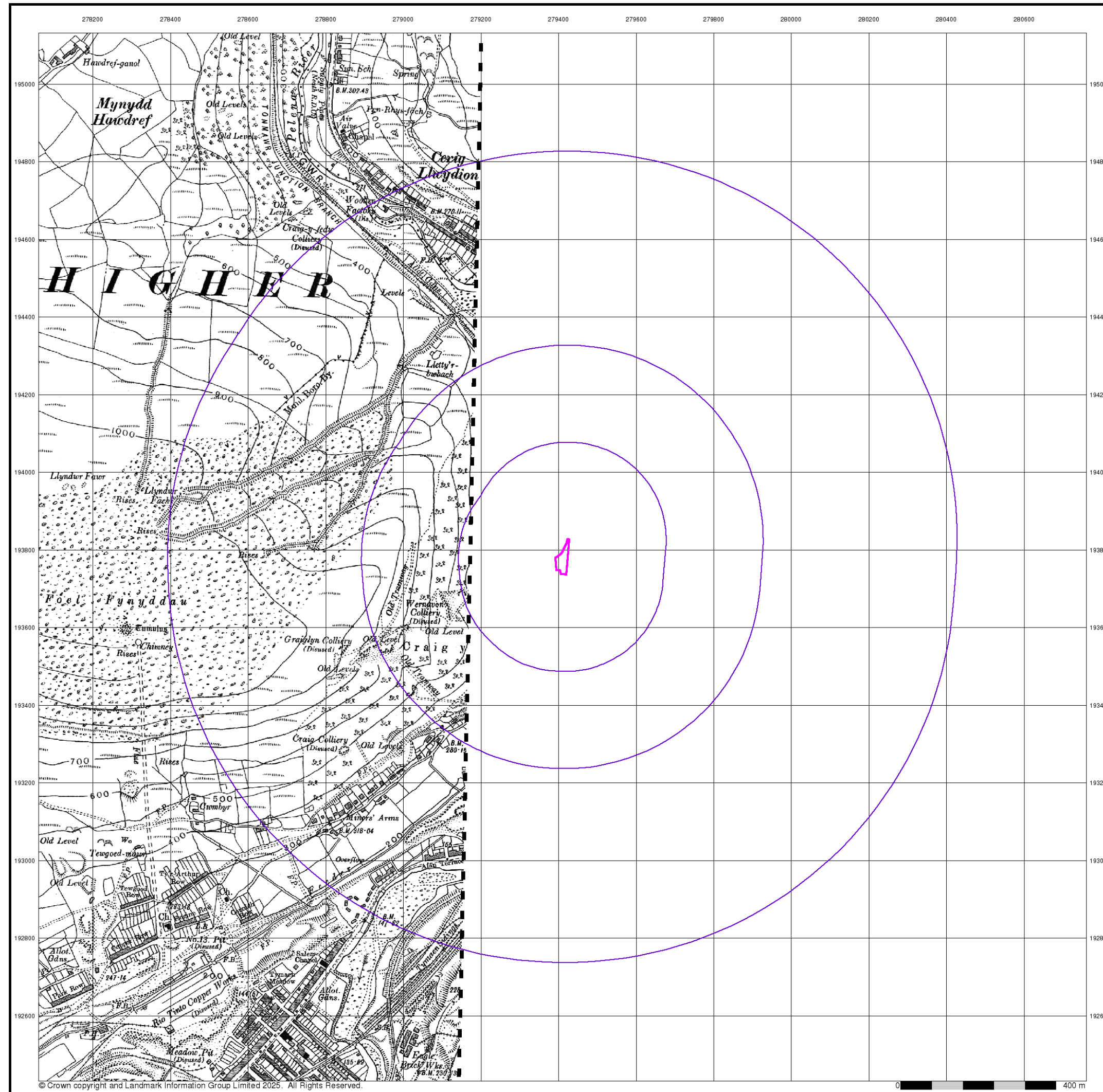
Order Number: 390892070_1_1
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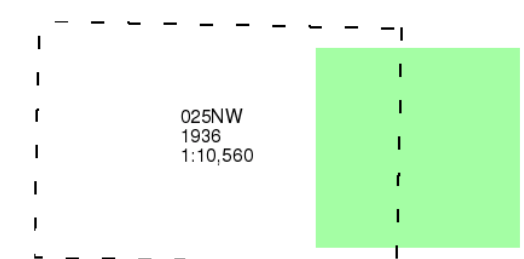
Glamorganshire

Published 1936

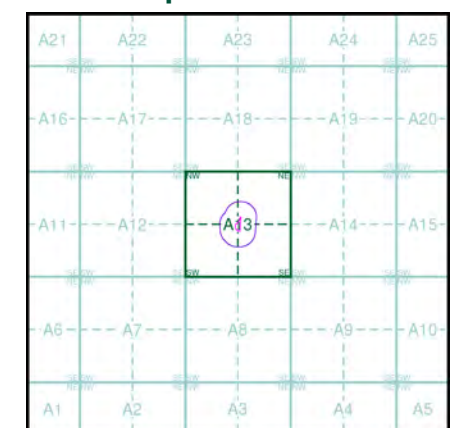
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

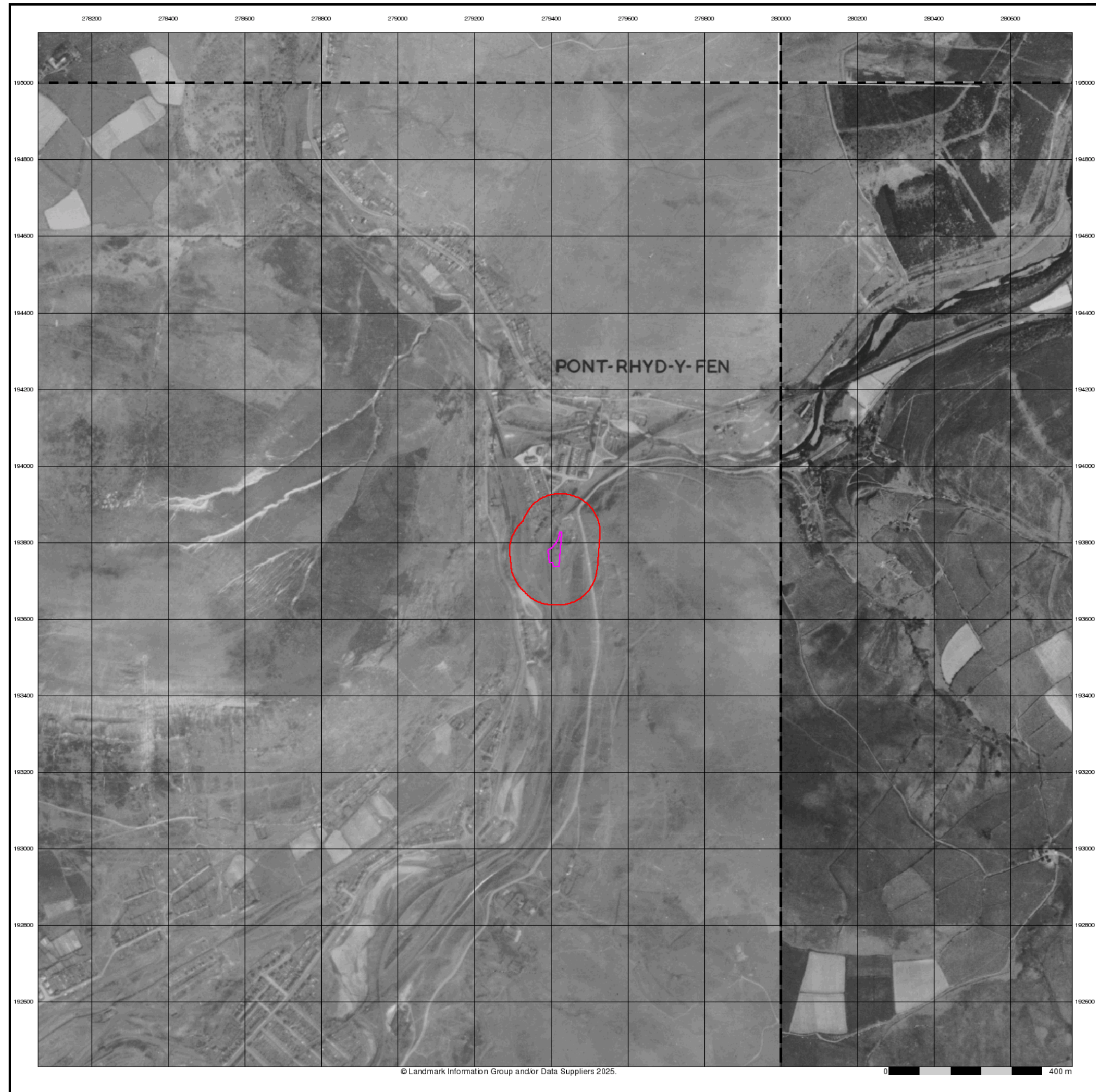
Order Number: 390892070_1_1
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Historical Aerial Photography

Published 1949

Source map scale - 1:10,560

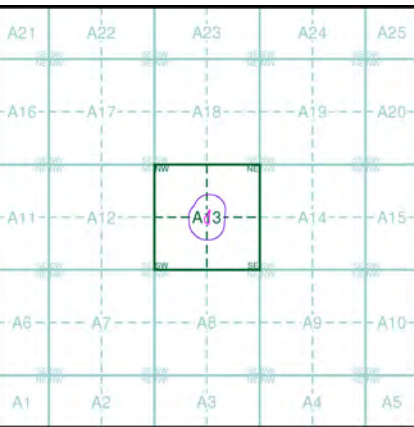
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

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Map Name(s) and Date(s)

SS79NE 1949 1:10,560	SS89NW 1949 1:10,560
SS79SE 1949 1:10,560	SS89SW 1949 1:10,560

Historical Aerial Photography - Slice A



Order Details

Order Number:	390892070_1_1
Customer Ref:	25-587
National Grid Reference:	279420, 193780
Slice:	A
Site Area (Ha):	0.18
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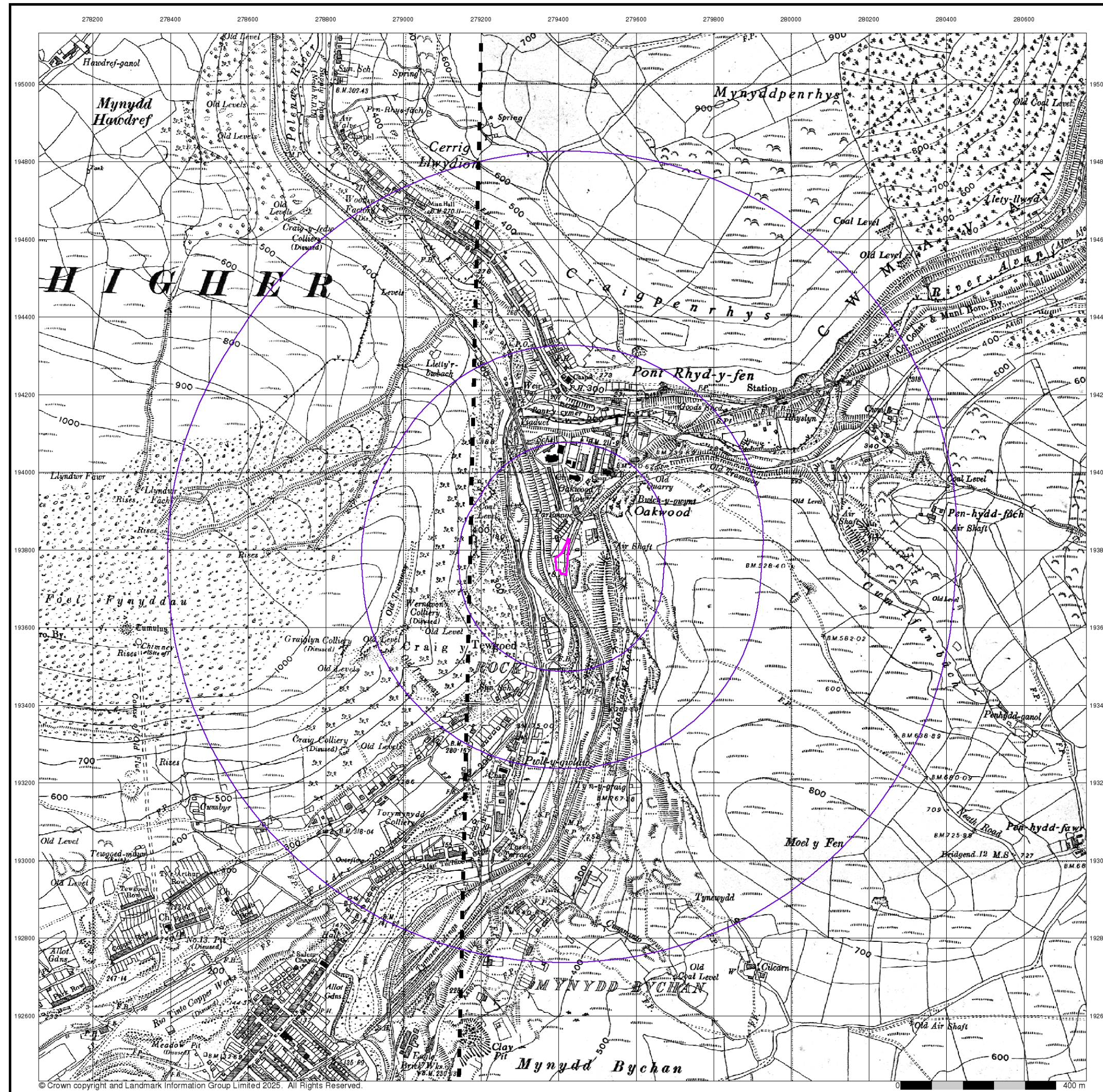
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A Landmark Information Group Service v50.0 25-Nov-2025 Page 6 of 14



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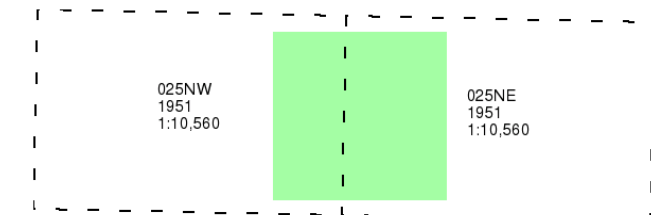
Glamorganshire

Published 1951

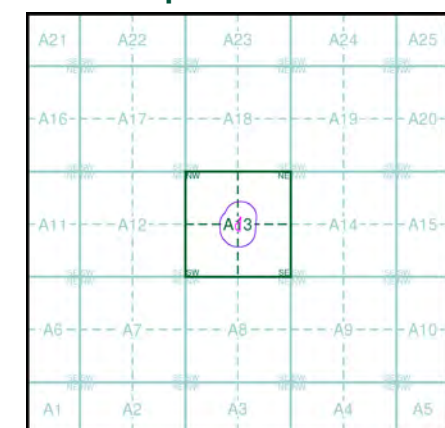
Source map scale - 1:10,560

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