GEO-TECHNICAL AND GEO-ENVIRONMENTAL REPORT

PROPOSED RESIDENTIAL DEVELOPMENT
HEOL Y GLYN
GLYN-NEATH

Prepared for:
Moore Knight Limited

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Executive Summary

Moore Knight Limited are proposing the development of their site off Heol-y-Glyn, Glyn-Neath, for residential and/or commercial use.

Historically, the site remained unoccupied up until between 1938 and 1962, whereby the northern half of the site was woodland and the southern half comprised open fields. By 1962 within the north of the site much of the woodland had been cleared and a large spoil heap was present, with a level plateau alongside Heol-y-Glyn and a steep downwards sloping batter forming its southern and eastern edge. Two buildings had been constructed upon the plateau, but were no longer present by 1977. Since 1977 there have been no apparent changes to the site.

The geological map of the area shows the site to be directly underlain by rocks of the Lower Coal Measures. Across the southern part of the site, running southwest to east-northeast is a major fault. A stream on site follows the same line of this fault. North of the fault the bedrock is shown to comprise mudstone, siltstone of sandstone. South of this fault the bedrock is sandstone. Superficial boulder clay is present north of the fault, whilst alluvial fan sand and gravel deposits are shown to be present south of the fault. Coal seams are shown to be present to the northwest, dipping away from the site. It is considered that there are no risks to the site from past shallow mining.

Investigation of the site, comprising eleven trial pits, five shell and auger boreholes and five rotary probeholes was undertaken. The ground conditions on site were found to comprise made ground of soft to firm becoming stiff gravely sandy clay or medium dense becoming dense gravels and cobbles with brick, timber, glass, coal fragments and asphalt to between 2.6m and 8.5m depth. The made ground was seen to be underlain by stiff but soft in places sandy clay with gravels, cobbles and boulders. Completely weathered to moderately weathered highly fractured mudstone was encountered at between 7.2m and 16.0m depth. Peaty clay was identified in PH2 and peat was present in TP8 (adjacent to the stream) from ground level to the full investigation depth of 3.04m.

Following the re-profiling of the site to obtain the desired levels for the development it is proposed that a raft foundation solution be used for the development. The maximum load beneath the foundation should not exceed 100kN/m^2 on the newly compacted ground. For the foundations, to prevent additional loads being transferred to the any batters or retaining walls, a 45 degree line from the base of the foundations should not impinge across the face of the batters. Allowances should be made for the removal of any 'soft spots' and their replacement with well-compacted granular materials.

On re-profiling of the site levels, in order for there to be tolerable settlements from the placed fill material, it needs to be compacted at or close to its Optimum Moisture Content (+ or – 1.5%). This will ensure that a minimum 95% compaction will be achieved. The natural moisture content of the materials is at present between 2% and 3% higher than the Optimum Moisture Content. In order to meet the above criterion it is clear that the materials will need to be dried. This can be achieved by excavating and allowing the materials to dry naturally.

Four samples were underwent grading analysis. Based upon the results, the samples can be classified as type 7D, 6F1 or 6F2. The compaction requirements for such materials are given in Table 6/4, Method 2 of the Specification for Highway Works. Fpur consolidated drained shear box tests were undertaken in order to assess the appropriate profile angle that can be applied to the sides of any new slopes created during the development. Based on these results it is considered that any batters be constructed at a maximum angle of 29 degrees.

Laboratory chemical testing of soils identified exceedences of arsenic, zinc and benzo(a)pyrene above their respective Tier 1 threshold values. It is therefore recommended that in order to eliminate all human health risks on residential development that all landscaped areas be capped with 600m of inert soils. If or where the site is to be in use commercially, then no mitigation measures will be required to make the site suitable for its proposed end users. Leachate testing identified no exceedences of any substance and as such it is confirmed that there are no risks to the aquatic environment.

In-situ gas monitoring to date has confirmed that no gas protection measures will be required for the development. Basic radon protection measures are required for the site.

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SECTION 1 Introduction and Proposed Development

Moore Knight Limited are proposing the development of a site off Heol-y-Glyn, Glyn-Neath, for residential and/or commercial use.

Jenkins and Potter Limited are the Consulting Civil and Structural Engineers for the development.

Terra Firma (Wales) Limited have been commissioned to carry out a geo-technical site investigation of the above site and a geo-environmental assessment.

The main objectives of the geo-technical site investigation were to:

- Determine the type, strength and bearing characteristics of the shallow superficial and underlying solid geology.
- Provide recommendations for a suitable and economic foundation/floor slab solution for the development.
- Provide recommendations with regard to any other geo-technical aspects pertaining to the development.

The main objectives of the geo-environmental assessment programme were to:

- Identify the potential environmental liabilities at the site associated with any soil and groundwater contamination from past site uses.
- 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 with regard to any other geo-environmental aspects pertaining to the development such as radon gas and ground gas.

In order to achieve the above objectives, Terra Firma (Wales) Limited carried out an assessment programme including a review of existing data, followed by a field investigation to determine the prevailing ground conditions and also to collect and analyse soil samples from selected locations around the site.

It is understood that maximum foundation loads should not exceed 100kN/m run of the walls and that the maximum imposed loads on the floor slabs should not exceed 2.5kN/m^2.

1.1 Limitations and Exceptions of Investigation

Moore Knight Limited have requested that a Geo-environmental Site Assessment (GSA) and Geo-technical Investigation (GI) be performed in order to determine if contamination is present beneath the site, the affect if any of radon gas, and to determine an appropriate foundation solution for the proposed development.

The GSA and GI were conducted and this report has been prepared for the sole internal reliance of Moore Knight Limited 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 Terra Firma (Wales) Limited. 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 geo-environmental and geo-technical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may also be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

The site investigation was limited within the lower south-western part of the site due to the topography and soft ground conditions.

SECTION 2 Review of Existing Data

2.1 Physical Setting

The site is located south of Heol-y-Glyn, Glyn-Neath, at National Grid Reference 288580 206940, see Drawing 01. The site is irregular in shape and covers an area of 2.71 hectares. The boundary of the site along Heol-y-Glyn is defined by trees and temporary herrace fencing. The remainder of the site boundaries are fenced. There is a lower entrance onto the site, leading off Woodland Park Road.

A site layout plan is given in Drawing 02.

2.2 Site History

The recent history of the site has been traced with the aid of Envirocheck Historical Plans (see Annex A). The most relevant editions are summarised below:

1877
In 1877 the northern half of the site was wooded; this woodland extends to the northwest of the site. The lower half of the site situates across field land. A stream, flowing in a south-westerly direction, passes from the east to the southwest of the site towards the River Neath, which is present 150m south of the site. The village of Glyn-Neath centres along two main roads, 100m south and within 50m of the south-eastern corner of the site. Tramways run along the two main streets. At a distance of 180m and further to the northwest of the site numerous old coal levels are shown.

1899
This edition shows no significant changes to the site or immediate surrounding area from the previous map.

1918
This map shows no significant changes to the site or immediate surrounding area from the previous edition. The southern part of the site is denoted as rough grassland.

1938
There has been no change to the site from the previous edition. Glyn-Neath has undergone residential development southwest and northeast of the site.

1962
By 1962 the site has been altered. A road, Heol-y-Glyn, has been constructed along the north-western edge of the site. Within the north of the site much of the woodland has been cleared and a large spoil heap is now present, with a level plateau alongside Heol-y-Glyn and a steep downwards sloping batter forming its southern and eastern edge. Two buildings have been constructed upon the plateau.

1977
There has been little change to the site or surrounding area. The two buildings previously shown on site are no longer present. The south-western and south-eastern boundaries of the site are now defined by adjacent residential housing. Where the stream hits the south-western boundary it may have been culverted, but appears to run along the inside of the site boundary, now heading to the northwest.

1981 and 1993
The site and surrounding area remains unchanged.

2.3 Current Use and Site Conditions

The site is currently disused. Overall the site is spread across two levels. Off Heol-y-Glyn the site enters onto an upper man-made plateau, which is divided into two parts and slopes gently to the south. Around the north-western part of the site a trackway leads down to the lower plateau. This sits approximately between 6.0m to 10m below the upper plateau. The lower plateau, comprised of raised ground in the south-western corner of the site and sits at an approximate maximum of 5.0m above the south-eastern corner of the site. This shallows off towards the south-western site corner where no made ground is present.

A stream is seen to run from adjacent to the site entrance off Heol-y-Glyn and flows around the eastern and then continuing close to the southern boundary of the site. The stream leaves the site where it is culverted away from the south-western corner. A patch of wetland and soft wet ground were evident at the surface on parts of the lower south-western area of the site.

2.4 Environmental Setting

2.4.1 Geology

The 1:50,000 scale geological map of the area (Sheet No 231) and the Envirocheck Geology Report (see Annex B) shows the site to be directly underlain by rocks of the Lower Coal Measures strata, which are Carboniferous in age.

Across the southern part of the site, running southwest to east-northeast is a major fault, although the faulting direction is unclear. The stream located on site follows the same line as this fault. North of the fault the bedrock is shown to comprise mudstone, siltstone and sandstone, dipping at 10 degrees to the northwest. South of this fault the bedrock is sandstone, which dips 40 degrees to the southeast.

Similarly, the superficial deposits vary either side of the fault. Superficial boulder clay is present north of the fault, whilst alluvial fan sand and gravel deposits are shown to be present south of the fault.

Made ground is known to overlie the superficial deposits across the majority of the site.

Coal seams are shown to be present to the northwest, dipping away from the site.

2.4.2 Mining

The Mining Report from the Coal Authority states that records show the site it is not within the zone of likely influence on the surface from past underground workings. However, the report does say that the site is in an area where the Coal Authority believes there is coal at or close to the surface which may have been worked at some time in the past.

The geology map shows no coal seams to be present beneath the site. In addition, given the topography of the site and the fault across the site, it is concluded that there are no risks to the site from past shallow mining.

There are no known mine entries upon or within 20m of the site.

There is no record of mine gas emission requiring action by the Coal Authority within the boundary of the property.

A copy of the mining report is given in Annex C.

2.4.3 Landslips

The Envirocheck Geology Report confirms that there are no landslips in close proximity to the site.

2.4.4 Radon

A BRE 211 Radon Report obtained for the site, entitled 'Advisory report on the requirement for radon protective measures in new buildings and extensions', confirms that basic radon protective measures are required for the site.

The report is given in Annex D.

2.4.5 Hydrology

A stream flows around the site from north to south-west, following the eastern site boundary.

The next nearest surface water body is the River Neath, which situates 150m south of the site.

Any perched groundwater flows from the site within the made ground and superficial deposits will be in a southerly direction following the southward sloping natural topography of the site. The majority of waters will be collected by the stream that runs around the site.

Deeper groundwater flow, within the coal measures bedrock, will be controlled by the dip and any fractures or bedding planes within the rock unit.

2.4.6 Hydrogeology

The Groundwater Vulnerability map for the area classifies the underlying coal measures bedrock as being a Minor Aquifer with variable permeability.

Minor aquifers of this kind are defined as 'being fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits. Although these aquifers will seldom produce large quantities of water for abstraction, they are important both for local supplies and in supplying base flow to rivers'.

The superficial deposits are shown to have low leaching potential.

2.4.7 Pollution, Waste and Groundwater

The Environment Agency website was consulted. The relevant information from this database is summarised below:

Environment Agency and Hydrological
The site does not situate within an area that is at risk of flooding.

There are no groundwater source protection zones within 1km of the site.

Pollution
There are no industrial sites within 1km of the site where pollution is being released or where processes are being undertaken that may pose an environmental risk.

Similarly there are no recorded pollution incidents that have occurred within 1km of the site.

Waste
The Envirocheck confirms that no historical or current landfill sites situates within 1km of the site.

Water Framework Directive
The Water Framework Directive (WFD) is a set of guidelines for managing large bodies of water. Its main aims are to improve water quality and reduce pollution while reducing any danger a water body poses, such as flooding. It's also designed to stop the deterioration of wetlands and improve aquatic habitats for wildlife.

The WFD assesses the risks to rivers, lakes, transitional waters (estuaries and lagoons), coastal waters and groundwater against its objectives. The risk assessments take into account the following:

- Point Sources of Pollution
- Diffuse Sources of Pollution
- Water Abstraction and Flow Regulation
- Physical or Morphological Alteration to Water Bodies
- Alien Species

The groundwater in this area is classed as 'being at risk' of failing the WFD objectives.

The River Neath is classed as 'being at risk' of failing the WFD objectives.

2.5 Risks to Ancient Monuments and Listed Buildings

A search of the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) public record database has shown that there are no historic structures within 100m of the site.

SECTION 3 Preliminary Risk Assessment

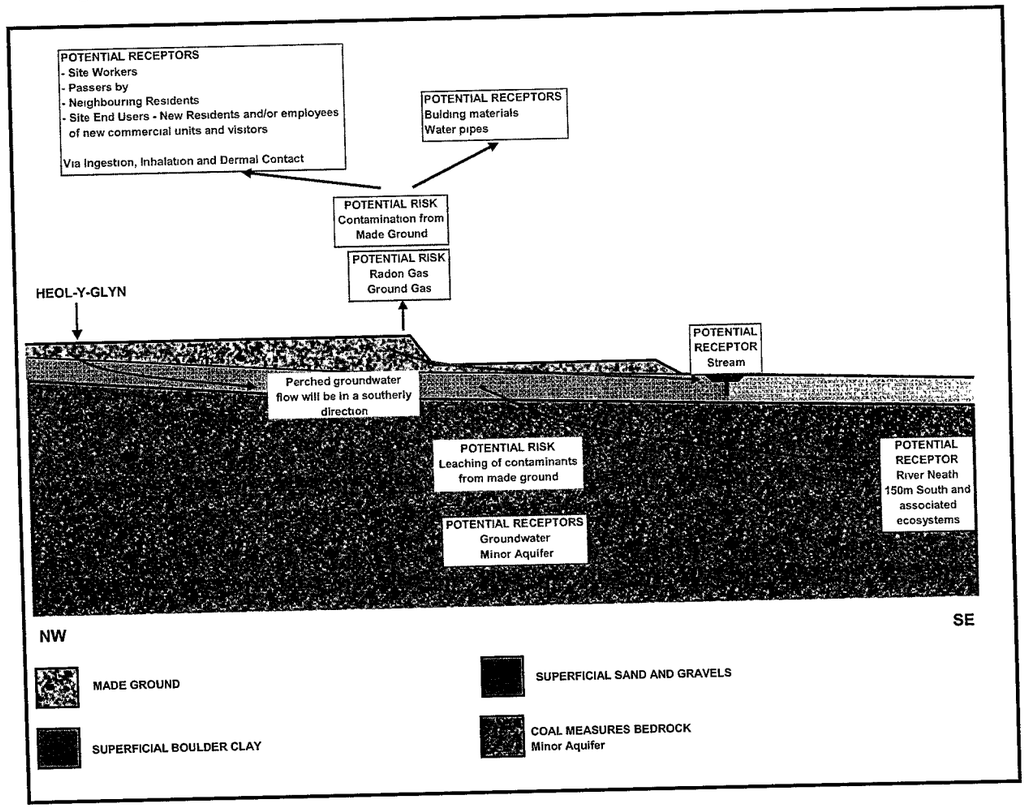
Environmental risk assessment evaluates the risk to receptors via an analysis of the 'source-pathway-target' linkage. In order for a risk to be present, there must be a contaminant source capable of causing a health risk, a vulnerable receptor, and a pathway linking the two.

The following sub-sections detail a preliminary risk assessment, based upon the desk study information.

3.1 Preliminary Site Conceptual Model

The preceding sections enable a preliminary conceptual model of the site to be drawn up, to illustrate the likely ground conditions beneath the site together with a preliminary assessment of the nature of any underlying aquifers and groundwater movement. The preliminary site conceptual model is used as a model for the design and implementation of the site investigation, whereby areas of potential contamination can be targeted as well as investigating the site as a whole.

The following illustration represents a theorised cross section through the site. The drawing is generalised and not to scale.



3.2 Potential Sources of Contamination

The potential contamination beneath the site, whether in the matrix of soil or groundwater will be related to the sites past use.

The site has never been occupied apart from two buildings that are shown to have been constructed on site between 1938 and 1962. The use of these buildings is unknown and they were no longer present by 1977.

The only potential source of contamination is the spoil heap of made ground, which occupies the majority of the site. It is unknown what soils the spoil is comprised of.

As well as potential contamination from the made ground, given its thickness it is likely that ground gas may also be generated from the spoil.

3.3 Potential Pollution Linkages

The potential pollution linkages relating to human health and the protection of the aquatic environment are as follows:

- Ingestion of soil and soil dust and soil on vegetables
- Inhalation of soil particles, dust and vapours, both indoors and outdoors
- Dermal contact with soil and soil dust
- Surface runoff
- Leaching into the groundwater
- Groundwater transport

3.4 Potential Receptors

The potential receptors of any contamination are:

- Construction workers
- Neighbouring site users/passers by
- Site end users
- Surface water - River Neath, stream and associated ecosystems
- Groundwater
- Building Materials - High levels of sulphates in the ground can damage building materials.
- Building Materials - Permeation of pipes

3.5 Qualitative Preliminary Risk Assessment

A Qualitative Preliminary Risk Assessment (QPRA) aims to make initial assumptions about potential risks posed towards the human health and to the aquatic environment during all stages of the development. Where it is assumed that a potential pollution pathway exists, there is a potential source, a potential receptor and a likely pathway, which links the two. The QPRA can be refined into a qualitative and quantitative risk assessment once the site investigation and laboratory soil chemical testing/environmental assessment has been undertaken.

Table 3.1 Preliminary Risk Assessment

Potential Source	Potential Pathway	Potential Target	Preliminary Risk Assessment
Made Ground and contaminated soils	Ingestion Ingestion Dermal contact	Construction workers Site end Users Building Materials	Potential for contamination from any contaminated soils/made ground **Moderate Risk**
Made Ground and contaminated soils	Surface runoff Leaching into the groundwater Groundwater transport	Groundwater River Neath Stream Building Materials	Potential for contamination from any contaminated soils/made ground **Moderate Risk**
Radon gas	Inhalation	Site end users	The site lies within an area where basic radon protection measures are required. This will only impact on site end users. **Moderate Risk**
Methane and carbon dioxide ground gas	Inhalation	Site end users Construction workers Neighbouring site users/passersby	The Made Ground is a potential source of methane and carbon dioxide gas. **Moderate Risk**

SECTION 4 Field Investigation

4.1 Site Works

A geo-technical and geo-environmental site investigation comprising eleven trial pits, five shell and auger boreholes and five rotary probeholes was undertaken during March 2008.

The trial pits were excavated using a JCB 3CX.

The shell and auger boreholes, 200mm in diameter, was sunk using a Cable Percussive drilling rig to a maximum depth of 11.60m. Within the borehole, Standard Penetration (SPT) tests were undertaken at close and regular intervals. The boreholes were terminated at assumed rock head.

The rotary probeholes, 105mm in diameter, were sunk using a Beretta rotary drilling rig. Compressed air was used as the flushing medium.

The fieldworks were supervised by Terra Firma (Wales) Limited, who also logged the trial pits, boreholes to the requirements of BS5930:1999. Summaries of the probeholes were prepared by an examination of the air flush returns and by reference to the driller's logs.

The trial pit logs are given in Annex E, the shell and auger borehole logs are presented in Annex F and the rotary probehole logs are presented in Annex G.

4.2 Exploratory Strategy

No specific areas of concern were identified in the desk study. It is considered that the number and spacing of the boreholes within the accessible areas was adequate to:

- Determine the presence, nature and distribution of contamination on site in an efficient but cost effective manner.
- Optimise the chances of finding contamination hot spots of various sizes and orientations.
- Represent the chemical composition of both made ground and natural soils.
- Represent the ground conditions beneath the entire site.
- Provide sufficient data to determine suitable remedial measures if necessary.

4.3 Sampling Regime

During the intrusive investigation, small disturbed soil samples were collected.

The sampling regime was conducted in accordance with BS5930: 1999 in order to satisfy the following criteria:

- Identify and confirm suspected sources of contamination
- Determine type and concentration of contamination
- Determine lateral and vertical spread of contaminants
- Ensure representativeness of the entire site
- Provide sufficient data to determine suitable remedial measures if necessary

4.3 Sampling Regime (Continued)

The sample locations and depths are illustrated in the following table.

Table 4.1 Sample Locations and Depths

Sample	Depth (m)	MCERTS Sample Description
TP3	0.4	**Made Ground:** Soft to firm brown gravely sandy **SILT**, glass, tarmac, wire, metal, timber
TP5	0.6	**Made Ground:** Soft black brown very sandy gravely **CLAY**, brick, timber, metal, asphalt
TP6	0.5	**Made Ground:** Soft black brown very sandy gravely **CLAY** with cobbles and boulders, concrete, wire, asphalt
TP8	0.7	Soft dark brown **PEAT**
TP9	1.4	**Made Ground:** Soft brown gravely sandy **CLAY**, brick, plastic
TP10	0.7	**Made Ground:** Firm dark brown mottled black gravely sandy **CLAY**, brick, plastic

4.4 Quality Assurance

Care was taken to ensure that sampling quality assurance occurred during site works. This included the following measures:

- The use of nitrile gloves at each sampling point.
- Stainless steel shovels were used to collect soil samples. The tool was cleaned with distilled water between each sample point.
- Soil samples were stored at a temperature below 4 degrees.
- No head space was left in sample containers.
- Samples were submitted for testing on the day of collection.

4.5 Ground Conditions

The ground conditions encountered by boreholes across the entire can in have been summarised as shown in Table 4.2.

Table 4.2 Summary of Ground Conditions

Depth (m)			Thickness (m)	Stratum
GL	-	2.6/8.5	2.6/8.5	**MADE GROUND:** Soft to firm becoming stiff at depth in places dark brown/grey gravely sandy **SILT/CLAY** with gravels and cobbles **or** Medium dense becoming dense brown/greysandy **GRAVELS** and **COBBLES** With brick, glass, timber, concrete, glass, wire, metal bars, ash, fabric, coal fragments, asphalt and occasional roots and rootlets in places
2.6/8.5	-	7.2/16.0	3.7/12.4	Stiff but soft in places (PH3) brown/grey/orange/blue sandy in places **CLAY** with gravels and cobbles and boulders in places. Peaty clay in PH2 from 5.5m to 11.0m depth underlain by blue clay to 16.0m depth
7.2/16.0	-	16.0/27.0	-	Completely weathered to moderately weathered in places highly fractured grey **MUDSTONE**

Within PH1 a horizon of mudstone gravels was identified between 7.0m to 8.5m depth, with the stiff clay both above and below.

No made ground was identified in TP8 (close to the stream), where peat was present from ground level to the full investigation depth of 3.04m.

The weakness of the underlying mudstone may be related to the proximity of the fault that runs through the site.

4.6 Water Strikes

Groundwater was encountered in BH1 at 7.m, in BH3 at 8.0m and in BH5 at 6.0m

4.7 Laboratory Chemical Testing

The soil samples taken were despatched to the laboratories of STL Midlands for laboratory chemical testing. Due to the past usage of the site a broad based chemical analysis was conducted. The following chemical tests were undertaken:

4.7.1 Soils

Metals and Metalloids
Lead
Cadmium
Mercury
Nickel
Zinc
Arsenic
Chromium
Copper
Selenium

In-Organics
Cyanide
Sulphate

Organic Chemicals
Phenols
Aromatic Petroleum Hydrocarbons (PAH)

Others
pH (acidity)

The results of the above chemical tests are presented in Annex H.

4.7.2 Leachates

Metals and Metalloids
Arsenic
Zinc

Organic Chemicals
Aromatic Petroleum Hydrocarbons (PAH)

The leachate results are presented in Annex I.

4.8 In-situ Gas Monitoring

Gas monitoring wells were installed in BH1, BH2 and BH4. The monitoring pipes were 50mm diameter pipe comprising 1m plane pipe and the remainder slotted to the full depth of 4m.

A programme of in-situ gas monitoring for the presence of methane, carbon dioxide and oxygen was implemented following completion of the installations. The barometric pressure of the atmosphere was also measured at the time of monitoring.

The results of the gas monitoring are presented in Annex J.

4.9 Soil Property Testing

During the investigation bulk soil samples were taken and submitted to the laboratories for grading analysis, dry density/moisture content testing and shear box testing.

The results of the tests are presented in Annexes K to M and are discussed in section 8.0.

SECTION 5 Evaluation of Analytical Results

5.1 Methodology

Environmental risk assessment evaluates the risk to receptors via an analysis of the 'source-pathway-target' linkage. In order for a risk to be present, there must be a contaminant source capable of causing a health risk, a vulnerable receptor, and a pathway linking the two.

This sort of risk assessment is usually conducted using a tiered approach. Tier 1 consists of a comparison of the analytical results obtained from the site investigation with Soil Guideline Values (SGV's) specific to the type of development obtained from The Environment Agency Contaminated Land Exposure Assessment (CLEA) Guidelines.

Where SGV values are not available reference has been made to Soil Screening Values (SSV's) developed by Atkins using RISC. All receptor profiles, source inputs and toxicological parameters comply with both peer reviewed literature and CLR 7 to CLR 10.

Where necessary SRCeco values given by BP RIVM (Research for Man and Environment, April 2001) published by the National Institute of Public Health and the Environment have also been used.

Should Tier 1 levels be exceeded, a choice is made either to remediate the site to conservative Tier 1 levels, or proceed to Tier 2. Tier 2 makes use of site-specific data to evaluate acceptable concentrations of chemicals for the particular conditions present at the site. At each tier, the amount and detail of investigation work increases as more site-specific data are needed to refine the characterisation of the site. Conversely, as site conditions are better understood, a more site-specific remediation strategy can be determined.

It should be noted that for contamination concentrations, which are measured to be lower than the detection limits, then the detection limit has been included in the statistical assessment.

In the case of leachate the regulatory guidelines/target concentrations used to undertake a generic risk assessment for the aquatic (freshwater) environment are the Environment Quality Standards for freshwater, or in their absence UK Drinking Water Standards.

The EQS for naphthalene has been used to assess the risk from all sixteen priority polyaromatic hydrocarbons (PAH), in the absence of other guidelines.

The water hardness has been obtained from the 'River Quality Targets' section of the Environment Agency website. The closest monitoring station to the site records an average water hardness of 301mg/l $CaCO_3$ from the River Neath.

5.2 Soils

For Tier 1, the site itself is considered to be the receptor. Therefore, attenuation of contaminants between the source and receptor is not considered.

A summary of the chemical test results which include the regulatory Soil Guideline Values or Soil Screening Values used in the Tier 1 assessment are given in the tables on the following pages.

5.2 Soils (Continued)

Table 5.1 Summary of Soil Chemical Test Results Pathfinder Suite

Substance	SGV/SSV (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		95% UCL	Number of Exceedences
			Minimum	Maximum		
Arsenic	20	CLEA	8.6	57	**	1
Cadmium	8	CLEA	<0.50	2.1		0
Chromium	130	CLEA	6.9	27		0
Copper	653	ATRISK	18	89		0
Lead	450	CLEA	35	160		0
Mercury	8	CLEA	<0.25	0.26		0
Nickel	50	CLEA	15	24		0
Selenium	35	CLEA	<0.30	0.77		0
Zinc	139	ATRISK	73	310		3
Cyanide	8	ATRISK	<2.5	<2.5		0
Phenols	78	ATRISK	<0.75	<0.75		0
Sulphate	2000	BRE	<240	980		0
pH	-	-	7.8	9.0		-
PAH	*	ATRISK	<2.0	11		4 ADL

Notes:

- CLEA-Soil guideline values for residential development
- ATRISK - Atkins Soil Screening Values for residential development
- BRE - British Research Establishment
- A total of 6 samples were tested
- Cadmium based on an average pH of 8.4
- Phenol based on worst case 1% SOM
- PAH - Polyaromatic Hydrocarbons
- - No available guideline value
- ADL - Above detection limit
- * See speciated PAH results
- ** Insufficient Number of samples to undertake a statistical analysis

5.2 Soils (Continued)

Table 5.2 Summary of Soil Chemical Test Results Speciated PAH

Substance	SSV (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		95% UCL	Number of exceedences
			Minimum	Maximum		
Naphthalene	4.4	ATRISK	<0.50	0.89	**	0
Acenaphthylene	-	-	<0.50	<0.50		0
Acenapthene	536	ATRISK	<0.50	<0.50		0
Fluorene	454	ATRISK	<0.50	<0.50		0
Phenanthrene	31	SRCeco	0.8	1.1		0
Anthracene	4300	ATRISK	<0.50	<0.50		0
Fluoranthene	796	ATRISK	0.95	1.4		0
Pyrene	590	ATRISK	0.82	1.6		0
Benzo(a)anthracene	4.79	ATRISK	<0.50	0.87		0
Chrysene	479	ATRISK	<0.50	1.1		0
Benzo(b)fluoranthene	5.54	ATRISK	<0.50	1.1		0
Benzo(k)fluoranthene	55.4	ATRISK	<0.50	0.81		0
Benzo(a)pyrene	0.54	ATRISK	<0.50	1.1		1
Dibenzo(ah)anthracene	0.61	ATRISK	<0.50	<0.50		0
Benzo(ghi)perylene	62.6	ATRISK	<0.50	1.1		0
Indeno(123cd)pyrene	6.04	ATRISK	<0.50	0.98		0

Notes:

- ATRISK - Atkins Soil Screening Values for residential development
- SRCeco - RIVM Ecotoxicological Serious Risk Concentrations for Soils
- A total of 4 samples were tested for speciated PAH
- ** Insufficient number of samples to undertake a statistical analysis

5.3 Leachate

For Tier 1, the site itself is considered to be the receptor. Therefore, attenuation of contaminants between the source and receptor is not considered.

The results of the leachate tests are presented in Table 5.3.

Table 5.3 Summary of Leachate Test Results

Substance	Threshold (mg/l)	Source	Measured Concentrations of Tested Substances (mg/l)		95% UCL	Number of exceedences
			Minimum	Maximum		
Arsenic	0.05	EQS	0.0022	-	**	0
Zinc	0.125*	EQS	<0.005	0.0069		0
PAH						
Napthalene	0.01	EQS	0.00005	0.00031		0
Acenaphthene	0.01	EQS	0.000015	0.000022		0
Acenaphthylene	0.01	EQS	<0.00001	0.000022		0
Fluorene	0.01	EQS	0.000037	0.00017		0
Phenanthrene	0.01	EQS	0.000021	0.000051		0
Anthracene	0.01	EQS	0.000012	0.000066		0
Fluoranthene	0.01	EQS	<0.00001	0.00011		0
Pyrene	0.01	EQS	<0.00001	0.000097		0
Benzo(a)anthracene	0.01	EQS	<0.00001	0.000018		0
Chrysene	0.01	EQS	<0.00001	0.000017		0
Benzo(b)fluoranthene	0.01	EQS	<0.00001	0.000014		0
Benzo(k)fluoranthene	0.01	EQS	<0.00001	<0.00001		0
Benzo(a)pyrene	0.01	EQS	<0.00001	0.000012		0
Dibenzo(ah)anthracene	0.01	EQS	<0.00001	<0.00001		0
Benzo(ghi)perylene	0.01	EQS	<0.00001	<0.00001		0
Indeno(123cd)pyrene	0.01	EQS	<0.00001	0.000016		0

Notes:

- EQS - Environmental Quality Standards (modelled as naphthalene as agreed with EA)
- PAH - Polyaromatic Hydrocarbons
- One sample was tested for arsenic
- Three samples were tested for zinc
- Four samples were tested for speciated PAH
- * Based on water hardness of 301mg/l $CaCO_3$ as given on the EA website for the River Neath.
- ** Insufficient number of samples to undertake a statistical analysis

5.4 Contaminants of Concern in Soils

Contaminants of concern in soils are deemed to be those in which either the maximum value or the 95% Upper Confidence Limit (UCL) value exceeds the threshold value shown. (The 95% UCL is the concentration that 95% of the values for a particular substance is expected to be less than or equal to). There were an insufficient number of samples to undertake a statistical analysis for this assessment.

The substances tested for above their respective Tier 1 threshold values are summaried in Table 5.4.

Table 5.4 Summary of Elevated Contaminants in Soil

Contaminant	Sample	Depth (m)	Measured Concentration (mg/kg)	Tier 1 SGV / SSV	Stratum
Arsenic	TP9	1.4	57	20	Made Ground
Zinc	TP5 TP9 TP10	0.6 1.4 0.7	310 260 140	139	Made Ground
Benzo(a)pyrene	TP3	0.4	1.1	0.54	Made Ground

Measures to deal with these exceeded levels are discussed in Section 7.

5.5 Contaminants of Concern in Leachates

The leachability of contaminants within soils at the site is a measure of their availability, and hence potential risk, to the water environment.

Leachate testing found all substances to be below their respective threshold values.

SECTION 6 Evaluation of In-situ Gas Monitoring Results

As previously discussed in Section 4.8, three gas-monitoring wells were installed to enable monitoring for the presence of methane, carbon dioxide and oxygen following completion of the fieldworks.

To date two rounds of gas monitoring has been undertaken.

This indicates methane levels as being between N/D (non-detectable) and 0.1% by volume (V/V). Carbon dioxide was found to vary between 0.9%V/V and 1.7% V/V.

The oxygen concentration was found at concentrations between 5.3%V/V and 18.2% V/V.

The gas flow rate from the boreholes was also measured at the time of monitoring. The maximum flow rate was confirmed to be 0.1 l/hr.

When these results are compared with table 8.5 of CIRIA report C665, the site can be classified as 'Gas Characteristic situation 1'.

For gas characteristic 1 sites no special precautions are required:

Once the full 6 monitoring visits have been made, this classification will be reviewed and if necessary amended.

The gas monitoring results to date, are presented in Annex J.

SECTION 7 Qualitative Risk Assessment/Mitigation Measures

7.1 Site Summary

Historically, the site remained unoccupied up until between 1938 and 1962, whereby the northern half of the site was woodland and the southern half comprised open fields. By 1962 Heol-y-Glyn had been constructed along the north-western edge of the site. Within the north of the site much of the woodland had been cleared and a large spoil heap was present, with a level plateau alongside Heol-y-Glyn and a steep downwards sloping batter forming its southern and eastern edge. Two buildings had been constructed upon the plateau, but were no longer present by 1977. Since 1977 there have been no apparent changes to the site.

The ground conditions on site were found to comprise made ground of soft to firm becoming stiff gravely sandy clay or medium dense becoming dense gravels and cobbles with brick, timber, glass, coal fragments and asphalt to between 2.6m and 8.5m depth. The made ground was seen to be underlain by stiff but soft in places sandy clay with gravels, cobbles and boulders. Completely weathered to moderately weathered highly fractured mudstone was encountered at between 7.2m and 16.0m depth. Peaty clay was identified in PH2 and peat was present in TP8 (adjacent to the stream) from ground level to the full investigation depth of 3.04m.

The nearest surface water body is the River Neath, which situates 150m south of the site.

Any perched groundwater flows from the site within the made ground and superficial deposits will be in a southerly direction following the southward sloping natural topography of the site. The majority of waters will be collected by the stream that runs around the site.

Given the development of the area over the years the majority of these shallow waters are now probably drained by storm systems.

The underlying coal measures are classified as a minor-aquifer.

7.2 Potential Contaminants

The potential contaminants of concern have been identified as arsenic, zinc and benzo(a)pyrene.

7.3 Potential Receptors

The potential receptors for the site construction workers, neighbouring site users, passers-by, and future site users.

The potential aquatic receptors are taken to be surface waters and perched groundwater, the stream on site and the River Neath.

The underlying bedrock is considered to be a receptor as it is a minor-aquifer.

Local wildlife/plantlife ecosystems are considered to be potential receptors.

Building materials are at potential risk from sulphate levels and permeation of contaminants into water pipes may also be problematic.

7.4 Potential Pathways

How the proposed development finish affects the various possible contamination pathways for the entire site is considered below, and summarised in Tables 7.1 and 7.2 on the following pages.

Ingestion of soil/soil dust and soil on home-grown vegetables/ dermal contact

Potential risks are present during the development to site workers from soil/soil dust ingestion. By adhering to appropriate protection measures any risks to workers can be considered low.

It is considered that the site will be sufficiently fenced off during development, meaning there will be a no risk to passers by or neighbouring site occupants.

In terms of the eventual site end users, if or where the site is to be residential, capping of all garden/landscaped areas with 600mm of inert soils will be required to eliminate all human health risks.

If or where the site is to be in use commercially, then no mitigation measures will be required to make the site suitable for its proposed end users.

Inhalation of soil dust and vapours

It is considered that none of the contaminants identified are of concern as vapours.

Protection of site workers from soil dust inhalation can be minimised by simple health and safety measures and dust suppression.

Passers-by and neighbouring site occupants are not considered to be at risk from inhalation.

Basic radon protection measures are required.

No gas protection measures are required.

Surface water run-off/leaching into the groundwater/groundwater transport

Leachate testing has found no elevated levels of any substance.

It is therefore concluded that there are no risks to the aquatic environment from the site materials.

During development, measures to avoid accidental spillage of materials during earthmoving activities, and to control surface run off should be taken.

7.5 Human Health Risks

A Qualitative Risk Assessment on the potential human health effects is detailed in Table 7.1.

Table 7.1 Human Health Risk Assessment

Source	Pathway	Target	Risk Assessment	Mitigation Measures
In-situ Made Ground	Dermal contact with soil/dust Inhalation of soil/dust Ingestion of soil/dust	Construction workers	Moderate risk to site construction workers involved in excavation phase of development	COSHH assessment and good level of PPE/ hygiene by site workers/ staff; dust suppression measures if required
In-situ Made Ground	Inhalation of fugitive soil dust Ingestion of soil dust Dermal contact with soil dust	Passers by, neighbouring site occupants	Insignificant risk during excavation phase of development and on completion of the development	Site screening and dust suppression measures if required
In-situ Made Ground	Dermal contact with soil dust Inhalation of soil/dust Ingestion of soil/dust	Site end users – Residential: Residents and visitors Commercial: Employees and visitors	Potential risks to the site end users	Residential Use: Human health risks to be eliminated by capping of garden/landscaped areas with 600mm of inert soils Commercial Use: No mitigation measures required
Methane and carbon dioxide gas	Inhalation	Site end users – Residents and visitors	No Risk	No gas protection Measures Required
Coal Measures Bedrock	Radon Gas	Site end users – Residents and visitors	No radon protection required	Not applicable

During construction phases, human health risks should be mitigated by:

- COSHH Assessment and good standards of site hygiene, PPE etc;
- Appropriate H&S instructions being in place to cover the above;
- Dust suppression measures when necessary
- Measures to limit contact with any contaminated groundwater

It should be noted that the appointed contractor should provide Method Statements and Risk Assessments in place to deal with these matters.

During the ground works, the contractor should comply with all current Health and Safety regulations.

7.5 Human Health Risks (Continued)

If during the development materials or abnormal ground conditions are encountered that are significantly different to those encountered in the investigation, the occurrence should be reported to the Engineer and appropriate action taken prior to continuing with the works.

If plastic pipes are to be laid beneath the site an assessment should be made, by the water provider, of soils along the route of the pipe with reference to the material selection criteria quoted in the Water Regulations Advisory Scheme Guidance Note No.9-04-03 (October 2002).

When laying underground services the made ground in the service trench should be removed and replaced with clean fill to prevent human contact during future maintenance works.

Any soils to be removed from site should be subject to Waste Acceptance Criteria (WAC) testing.

7.6 Risks to the Aquatic Environment

A Qualitative Risk Assessment on the potential effects to the aquatic environment is detailed in Table 7.2.

Table 7.2 Risks to the Aquatic Environment

Source	Pathway	Target	Risk Assessment	Mitigation Measures
In-situ Made Ground	Surface water/runoff	Adjacent sites and bodies of water	Insignificant risk during construction and excavation phase of development Post development, there is insignificant risk of contaminant migration into bodies of water	Measures to avoid accidental spillage of materials during earthmoving activities, and to control surface run off Not Applicable
In-situ Made Ground	Leaching into Groundwater	Groundwater	Leachate testing confirms there are no risks to the aquatic environment.	Not applicable Suitable pipes for water supply

In respect of physical effects of the works, there is a risk of accidental spillage of earthmoving materials/groundwater during the earthworks.

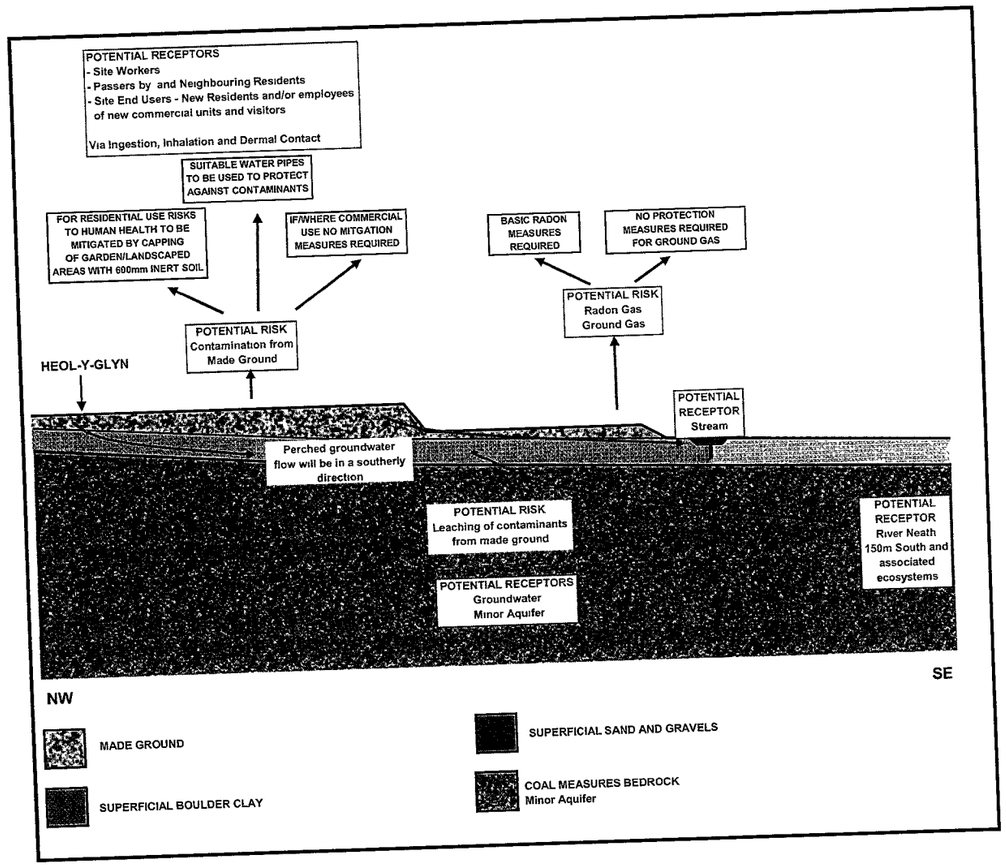
During the construction phase, the following mitigation measures should be applied:

- Measures to avoid accidental spillage of materials during earthmoving activities;
- Measures to control surface run off

It should be noted that the appointed contractor should provide Method Statements and Risk Assessments in place to deal with these matters.

7.7 Site Conceptual Model

The site conceptual model is presented below:



SECTION 8 Soil Property Testing

8.1 Optimum Moisture Content/Maximum Dry Density Test Results

The results of the optimum moisture content and maximum dry density tests are detailed in the table below.

The results of these tests are given in Annex K.

These tests were conducted in accordance with BS 1377: Part 4: 1990.

Table 8.1 Optimum Moisture Content/Maximum Dry Density Test Results

Sample	Initial Moisture Content (%)	Optimum Moisture Content (%)	Maximum Dry Density(mg/m^3)
TP1	17	15	1.84
TP2	17	14	1.82
TP5	16	13	1.84
TP6	17	15	1.83

In order for there to be tolerable settlements from the placed fill materials, it needs to be compacted at or close to its Optimum Moisture Content (+ or – 1.5%). This will ensure that a minimum 95% compaction will be achieved.

It can be seen from table 8.1 that the natural moisture content of the materials is at present between 2% and 3% higher than the Optimum Moisture Content.

In order to meet the above criterion it is clear that the materials will need to be dried. This can be achieved by excavating and allowing the materials to dry naturally.

Once the given moisture content has been achieved then the materials may be used as structural fill beneath the buildings, car park and road areas. The materials have been graded according to the Specification Works for Highways 600 and should be laid and compacted in layers.

A programme of in-situ testing should also be carried out in order to confirm the effectiveness of the compaction procedure.

8.2 Grading Analysis

Four samples were tested in the laboratory by dry and wet sieving analysis to determine their grading characteristics. These tests were conducted in accordance with BS1377: Part 2, Clause 9.2: 1990.

Based upon the soil property test results, and referring to Table 6/1:Acceptable Earthworks Materials: Classification and Compaction Requirements, Series 600 Specification for Highway Works, the samples can be classified as shown in the table below.

The soil type has been determined by comparison of results with Table 6/2: Grading Requirements for Acceptable Earthworks Materials. The type is then classified and the typical use obtained by referring to Table 6/1 of this publication.

8.2 Grading Analysis (Continued)

Table 8.2 Grading Analysis Results

Sample	Type	Soil Description	Classification	Typical Use
TP1	7D	Made Ground: Soft to firm gravely sandy silt with cobbles	Selected Stoney Cohesive Material	Fill to reinforced earth
TP3	7D	Made Ground: Firm slightly sandy and gravely clay with cobbles	Selected Stoney Cohesive Material	Fill to reinforced earth
TP7	6F1	Made Ground: Soft to firm gravely very sandy clay	Selected Granular Material (fine grading)	Capping
TP9	6F2	Made Ground: Soft brown gravely sandy clay	Selected Granular Material (coarse grading)	Capping

The compaction requirements for such materials are given in Table 6/4, Method 2 of the Specification for Highway Works.

The results of these tests are presented in Annex L.

8.3 Shearbox Test Results

A consolidated drained shear box test was undertaken on four representative samples of the made ground in order to assess the appropriate profile angle that can be applied to the sides of any new slopes created during the development..

These tests were conducted in accordance with BS 1377: Part 7: 1990.

These results of these tests are presented in Annex M, and summarised in the table below:

Table 8.3 Shearbox Test Results

Sample	TP1	TP2	TP8	TP10
Effective Angle of Shearing Resistance (θ)	29	30	14	32
Effective Cohesion (kPa)	2	7	0	15

Based on these results it is considered that any batters be constructed at a maximum angle of 29 degrees.

The sample from TP8 was taken from the peat. This material will not be suitable for any slopes created unless they incline at a 14 degree angle or less.

SECTION 9 Engineering Recommendations

9.1 Preparation of Site

All grass and vegetation beneath the proposed building including all roots should be removed from site.

Any reduced levels should be brought up to the required levels with well, compacted imported granular materials. Department of Transport (DoT) Type 2 sub-base or similar may be used and should be compacted in layers, in accordance with the Specification for Highway Works. Alternatively, appropriate selected inert imported fill could be used. Alternatively suitable site won mainly granular materials should be used.

Allowances should be made for removing any 'soft spots/area' and their replacement with well compacted granular materials.

Where cut and fill works are to be carried out, it should be noted that any slope angles should not exceed 29 degrees. The ground surface should be adequately cut and benched, all batters grass seeded and drains installed at top and bottom of batters.

It may be necessary to retain materials on site. Similarly, it is important to ensure that sufficient drainage measures are put in place, behind the wall, prior to development.

It is advised that no additional loads are applied to retaining walls or batters from the new development. Therefore, a 45° line cut from the base of the outermost house foundations should not impinge upon any retaining walls/slopes.

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

Contingencies should also be made for redirection or culverting the stream around the site where necessary.

It is assumed that no development of the area in the southwest of the site, adjacent to the stream, will take place. If this area is to be built upon then the peat will need to be excavated and removed from site.

All materials to be removed from site should be taken to an appropriately licensed tip.

9.2 Foundation and Floor Slab Solution

Following the successful re-profiling of the site to obtain the desired levels for the development it is recommended that a reinforced concrete raft type foundation/floor slab solution be used for the development.

For a raft foundation the maximum load beneath the foundation should not exceed 100kN/m^2 on the newly compacted ground.

In order to prevent the effects of frost heave and or thermal shrinkage, the edge beams should be taken down to 900mm below finished ground level. Alternatively the non frost susceptible materials can be taken down to the above quoted depths.

For the foundations, to prevent additional loads being transferred to the any batters or retaining walls, a 45 degree line from the base of the foundations should not impinge across the face of the batters.

9.2 Foundation and Floor Slab Solution (Continued)

Allowances should be made for the removal of any 'soft spots' and their replacement with well-compacted granular materials. Department of Transport (DoT) Type 2 materials or similar could be used and should be compacted in layers to the specification for Highway Works.

All foundation formations should be inspected by a suitably qualified Engineer before being concreted.

9.3 Excavations and Formations

Most of the shallow excavations should be possible with normal soil excavating machinery.

The shallow excavations are unlikely to encounter significant perched water/groundwater inflows. Any inflows together with rainwater infiltration should be dealt with by conventional pumping techniques.

The sides of any excavations deeper than 1.0m should be supported by planking and strutting or other proprietary means.

The sub-formations/formations will be susceptible to loosening, softening and deterioration by exposure to weather (rain, frost and drying conditions), the action of water (flood water or removal of groundwater) and site traffic.

Formations should never be left unprotected and continuously exposed to rain causing degradation, or left exposed/uncovered overnight, unless permitted by a qualified engineer.

Construction plant and other vehicular traffic should not be operated on unprotected formations.

As a minimum the formation/excavation surfaces must be protected by blinding concrete or a minimum thickness of 200mm of hard cover immediately after exposure.

The capping filling should be compacted in layers not exceeding 150mm thick with suitable mechanical compacting plant of specified weight, in accordance with the Specification for Highways Works. Compaction should be continued until there are no visible signs of fill being pushed up in front of the compacting plant, and all surface voids/unevenness must be filled to create a relatively smooth and even terrain.

Allowances should be made for trimming, re-trimming and re-compaction if necessary

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

Contingencies should also be made for special precautions to prevent formation deterioration in addition to the above.

It is recommended that approval be gained from a qualified engineer of the formation condition before covering them with any subsequent construction.

9.4 Access and Car Parking Areas

The access road and car parking areas will be within the existing fill materials.

Following the proposed earthworks and re-compaction of the made ground it is likely that a California Bearing Ratio (CBR) Value of 5% may be suitable for design purposes.

The local authority may require field testing to confirm the California Bearing Ratio.

Allowances should be made for the removal of any 'soft spots/areas' and their replacement with well compacted granular materials as previously described.

9.5 Retaining walls

Given the topography of the site it is likely that new retaining walls will be required.

The effective angles of shearing resistance of the encountered materials have been determined from the publication BS 6031: 1981 Code of Practise for Earthworks.

Effective Cohesion	Effective Angle of Shearing Resistance
$c'=0kN/m^2$,	$\phi'=25°$ for made ground
$c'=0kN/m^2$,	$\phi'=30°$ for well compacted imported granular materials

Allowances should be made for incorporating drainage behind the walls in order to prevent the build up of hydrostatic pressure.

9.6 Protection of Buried Concrete

The laboratory chemical tests revealed a total sulphate content of between <240mg/kg and 980mg/kg and pH values of between 7.8 and 9.0

Based on these results all buried concrete should as a minimum conform to Class AC-1 of BRE Special Digest 1 (2001).

SECTION 10 Remediation Strategy and Validation Report

10.1 Remediation Strategy

A Remediation Strategy should be submitted to the Local Authority for approval, prior to the remediation of the site. The Remediation Strategy should contain, but not be limited to the following:

- A summary of the significant pollution linkages
- Details of the proposed remedial methods
- Key participants/contractor(s)
- Technical procedures
- Phasing of works and approximate timescales
- Site plans to scale
- Details of consents or license needed (discharge consents, asbestos waste removal license etc)
- Health and Safety, COSHH Assessment, Method Statements and Risk Assessments
- Emergency contingencies

Any changes made to the remedial strategy must be agreed with Neath and Port Talbot Council. The remedial works must be adequately supervised by an independent Specialist/Contractor, with final submission of a Validation Report.

10.2 Validation Report

Once the Remediation Works have been undertaken, and before site occupation, a Validation Report or equivalent documentation should be compiled by the appropriate Specialist/Contractor/Consultant for each of the proposed remedial measures.

The imported inert soils to be used as capping in landscaped areas should also be chemically tested, prior to bringing them to site, to ensure they are suitable for use.

The number of soil samples required to be chemically tested should be discussed and confirmed with Neath and Port Talbot Council.

The soils should be chemically tested for the following determinants: arsenic, cadmium, total chromium, lead, mercury, selenium, boron, copper, nickel, zinc, phenol and polyaromatic hydrocarbons. The chemical test results should be compared to Soil Guideline Values (SGV's) in accordance with the CLEA guidelines. In the absence of SGV's, the chemical test results should be compared to other guidelines which comply with UK guidance and legislation.

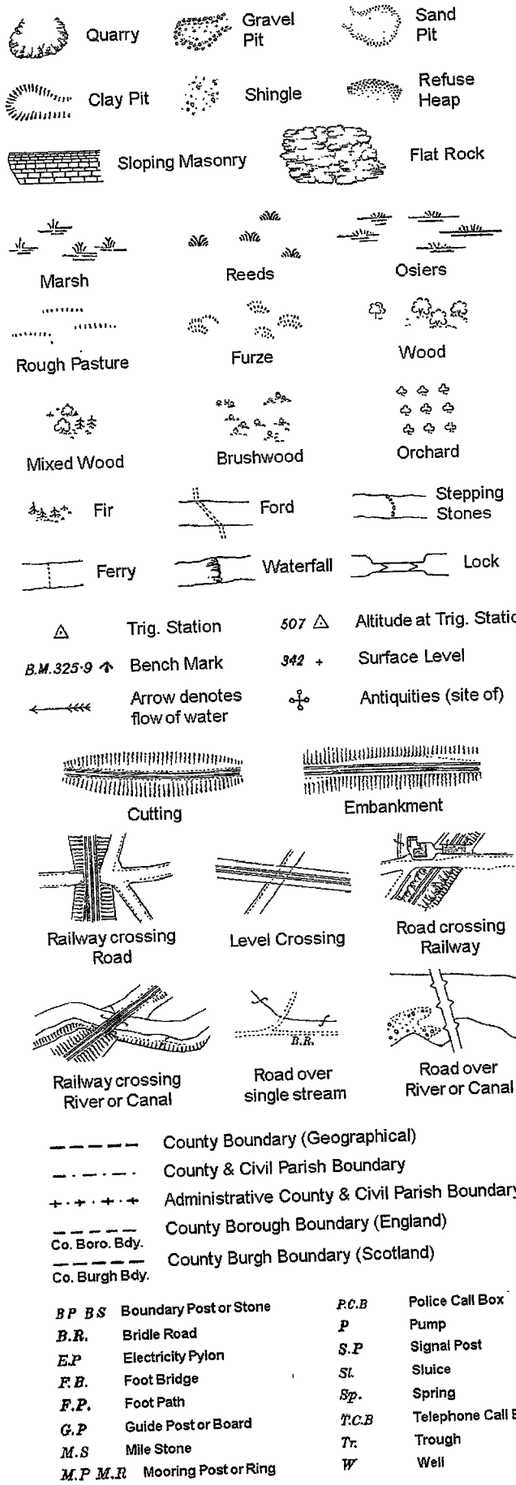
Validation Reports should contain, but not be limited to the following:

- Information as detailed within the Remedial Strategy/Method Statement about works undertaken, including scaled site plans.
- Details and justification of any changes from the original Remedial Strategy/Method Statement.
- Details of who carried out the work.
- Substantiating data, for example, laboratory and in-situ test results, monitoring of performance of remedial measures introduced, scaled plans of the site/area subject to remediation.
- Documentation for asbestos/waste disposal.
- Confirmation that remediation objectives have been met.

Annex A
Envirocheck Historical Plans

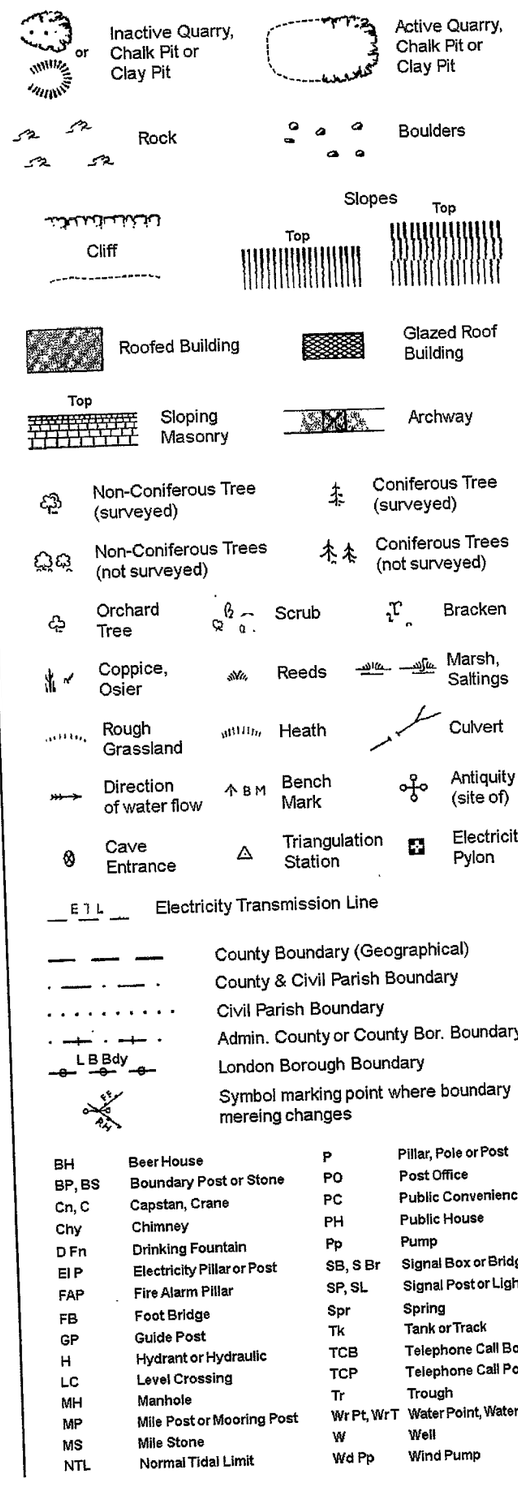
Historical Mapping Legends

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



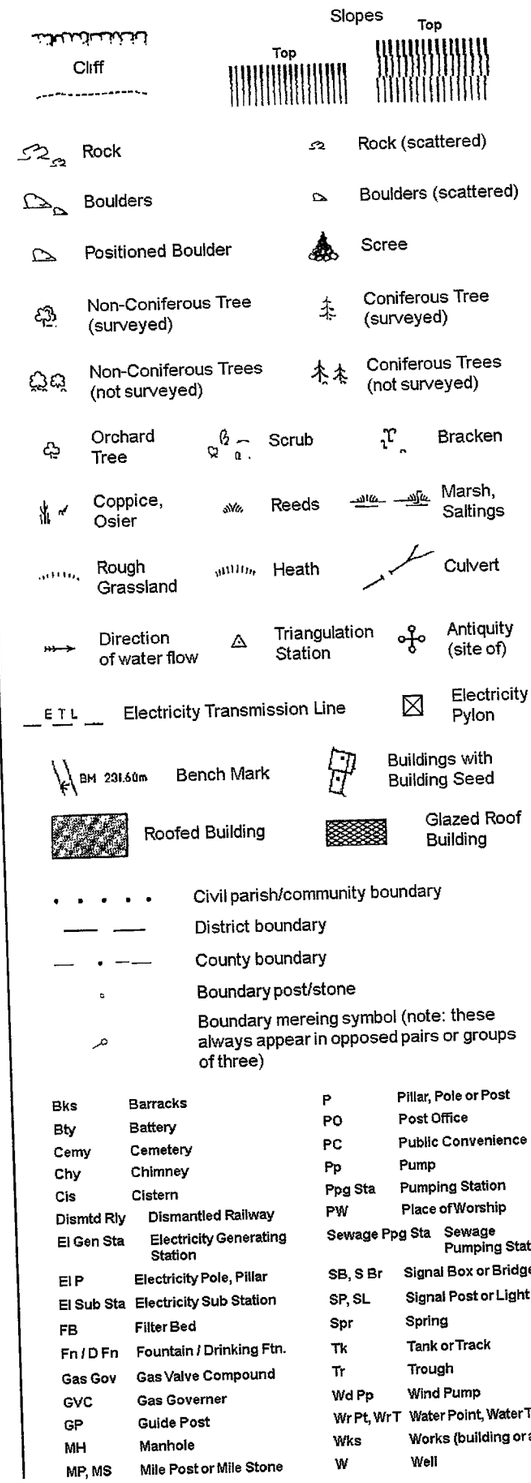
B P	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	Sl.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

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



BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

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



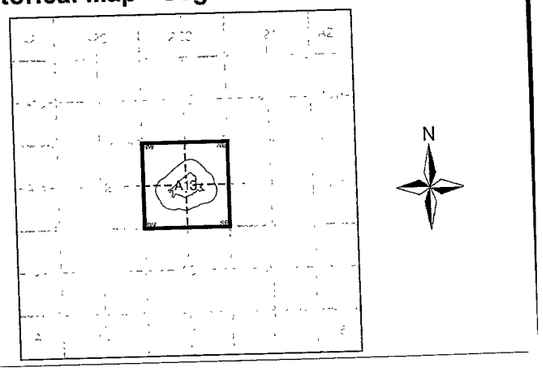
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

Envirocheck®
A Landmark service

Ordnance Survey mapping included:

Mapping Type	Scale	Date	Pg
Glamorganshire	1:2,500	1877	2
Glamorganshire	1:2,500	1899	3
Glamorganshire	1:2,500	1918	4
Ordnance Survey Plan	1:2,500	1962 - 1964	5
Additional SIMs	1:2,500	1977	6
Ordnance Survey Plan	1:2,500	1981	7
Ordnance Survey Plan	1:2,500	1984	8
Large-Scale National Grid Data	1:2,500	1993	9

Historical Map - Segment A13



Order Details

Order Number: 24537603_1_1
Customer Ref: 10287
National Grid Reference: 288580, 206940
Slice: A
Site Area (Ha): 2.71
Search Buffer (m): 100

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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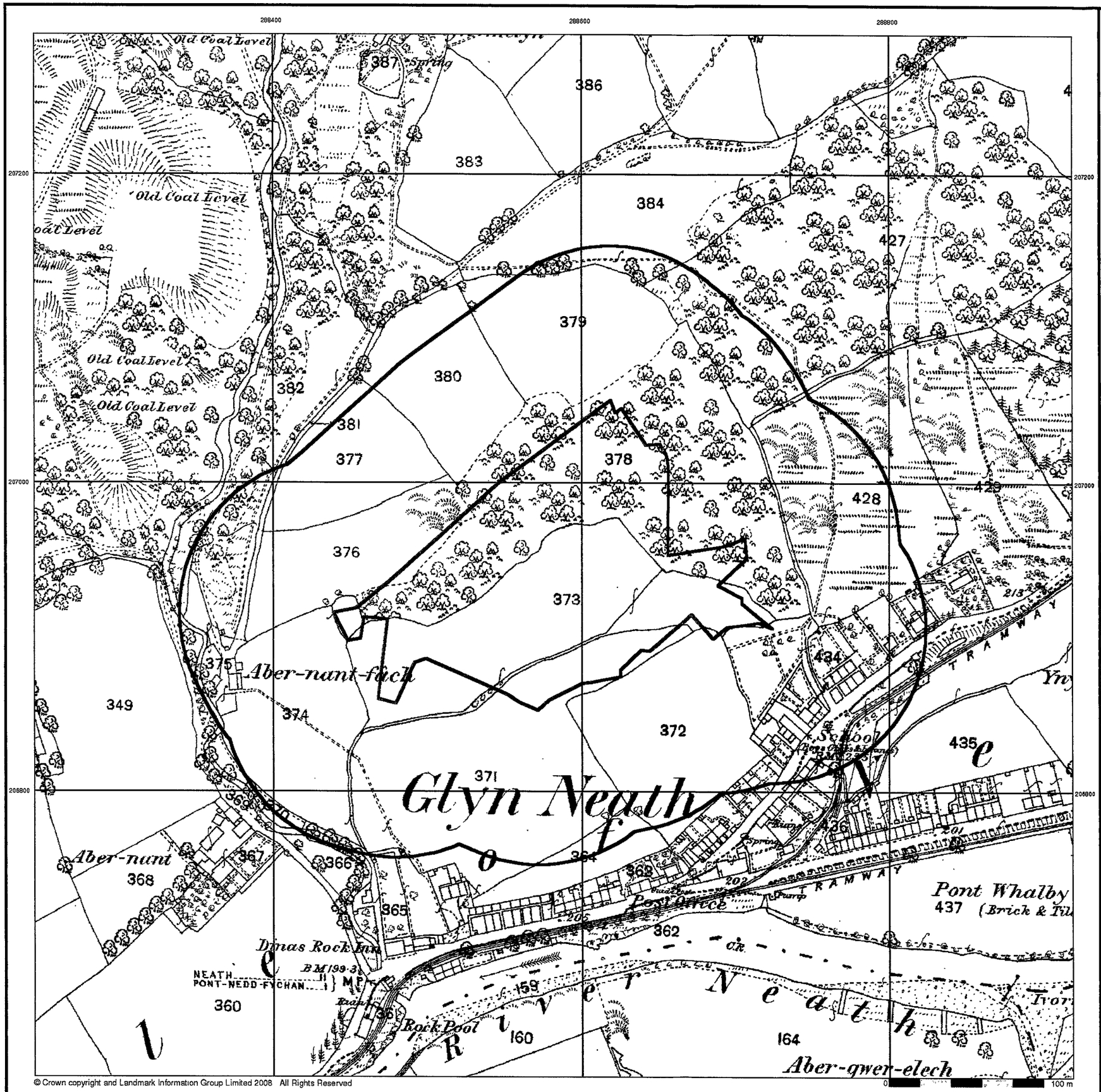
Fax: 0870 850 6671
Web: www.envirocheck.co.uk



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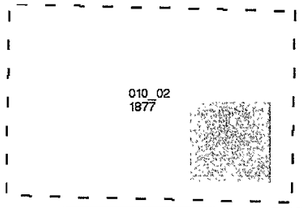
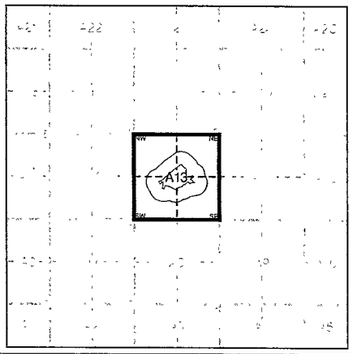
Glamorganshire
Published 1877
Source map scale - 1:2,500

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)



Historical Map - Segment A13



Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	100

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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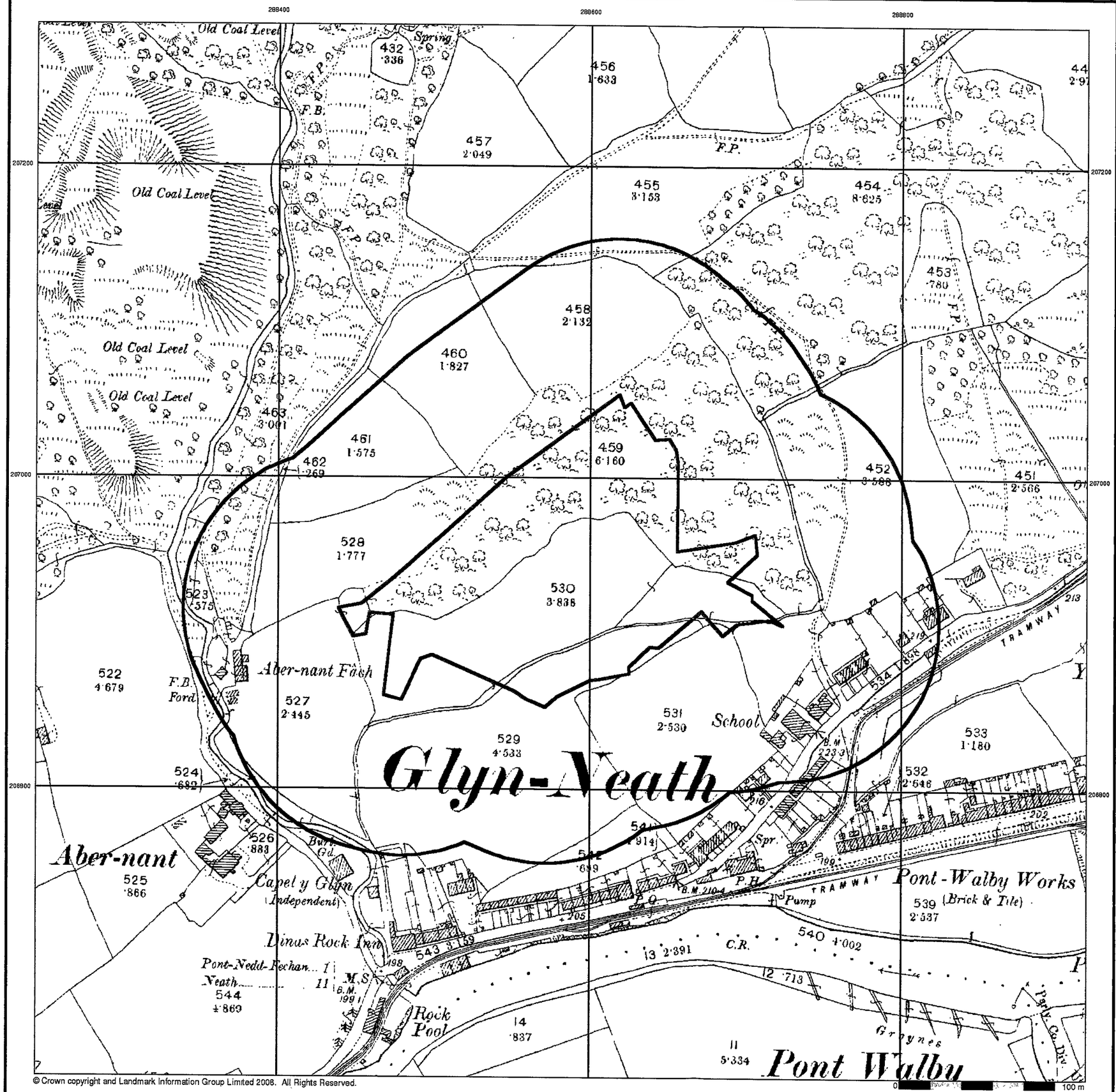
Tel: 0870 850 6670
Fax: 0870 850 6671
Web: www.envirocheck.co.uk



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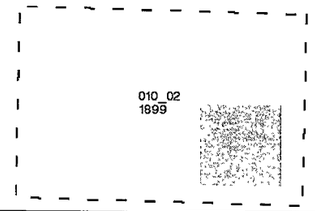
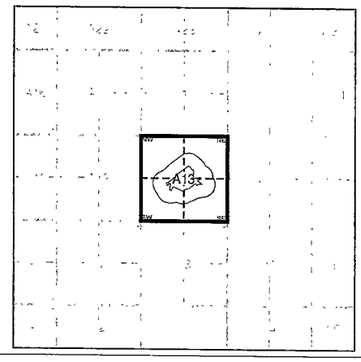
Glamorganshire
Published 1899
Source map scale - 1:2,500

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)



Historical Map - Segment A13



Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	100

Site Details

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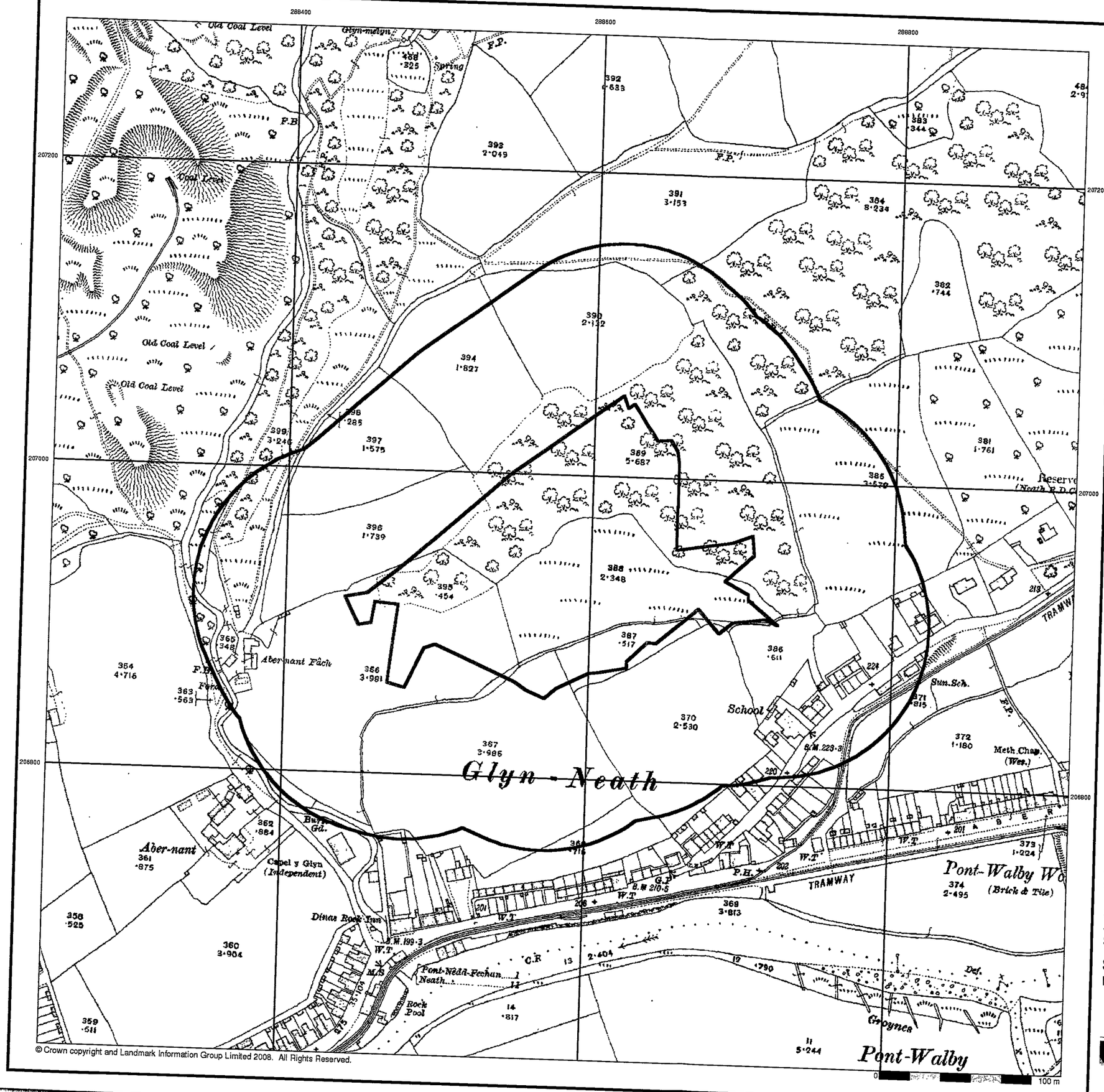

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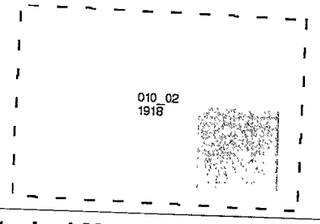
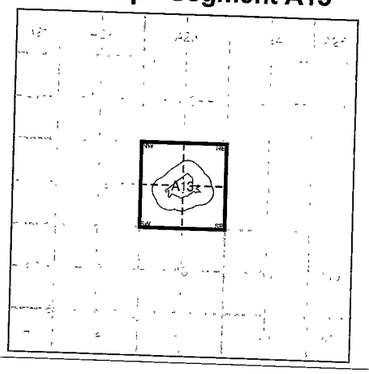
Glamorganshire
Published 1918
Source map scale - 1:2,500

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)



Historical Map - Segment A13



Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	100

Site Details

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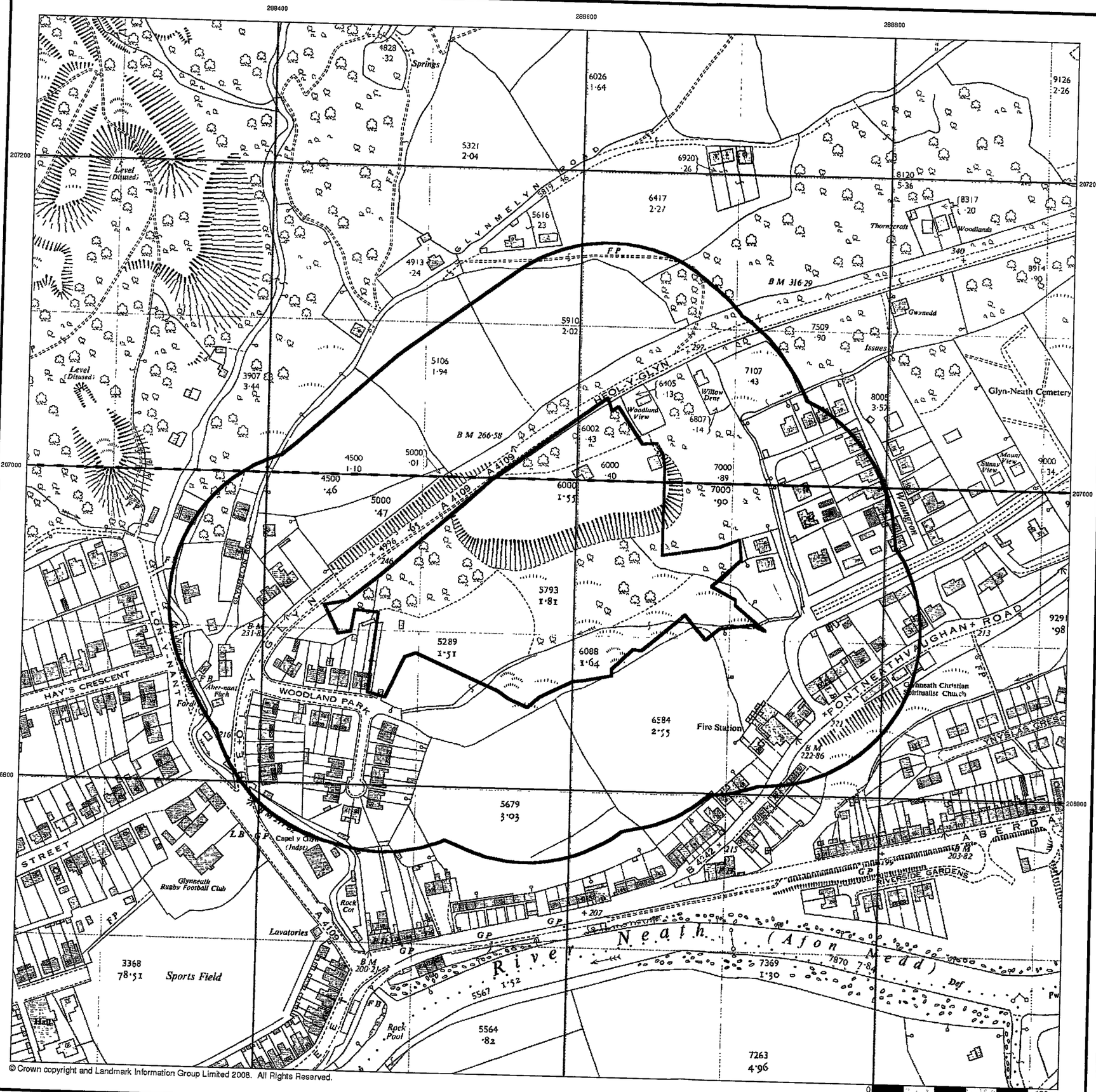

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Ordnance Survey Plan
Published 1962 - 1964
Source map scale - 1:2,500

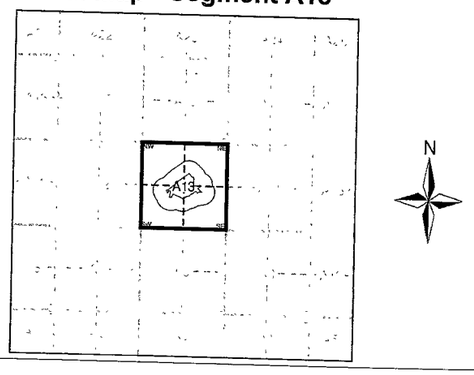
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. 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)

SN8807
1964

SN8806
1962

Historical Map - Segment A13



Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
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Site Details

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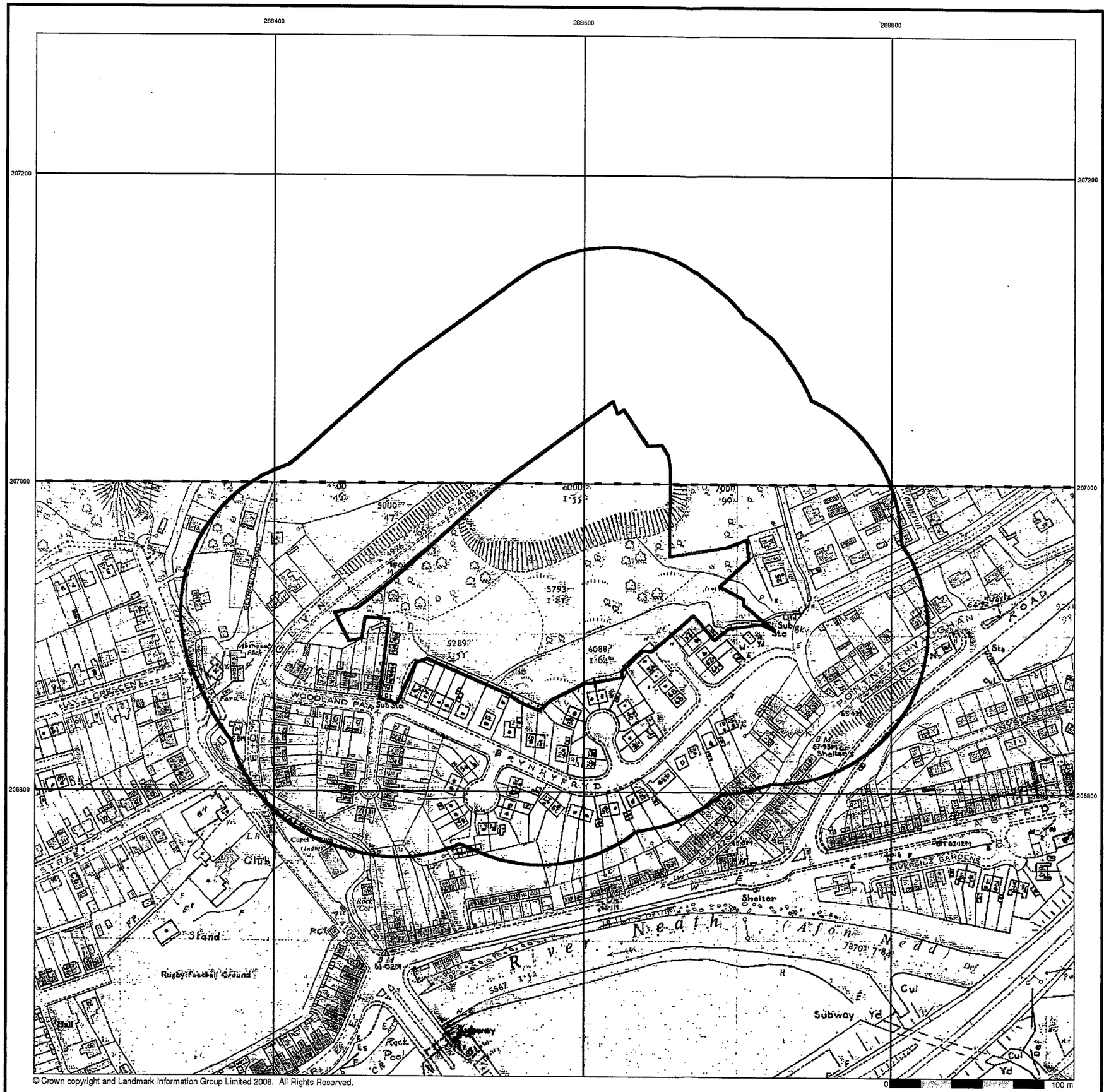

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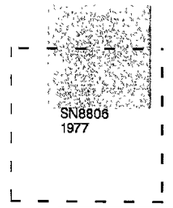
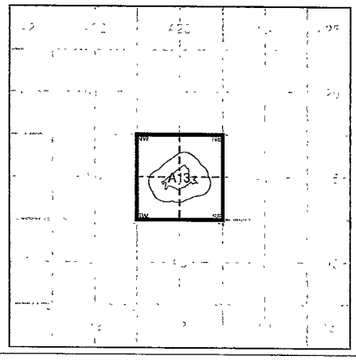
Additional SIMs
Published 1977
Source map scale - 1:2,500

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



Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	100

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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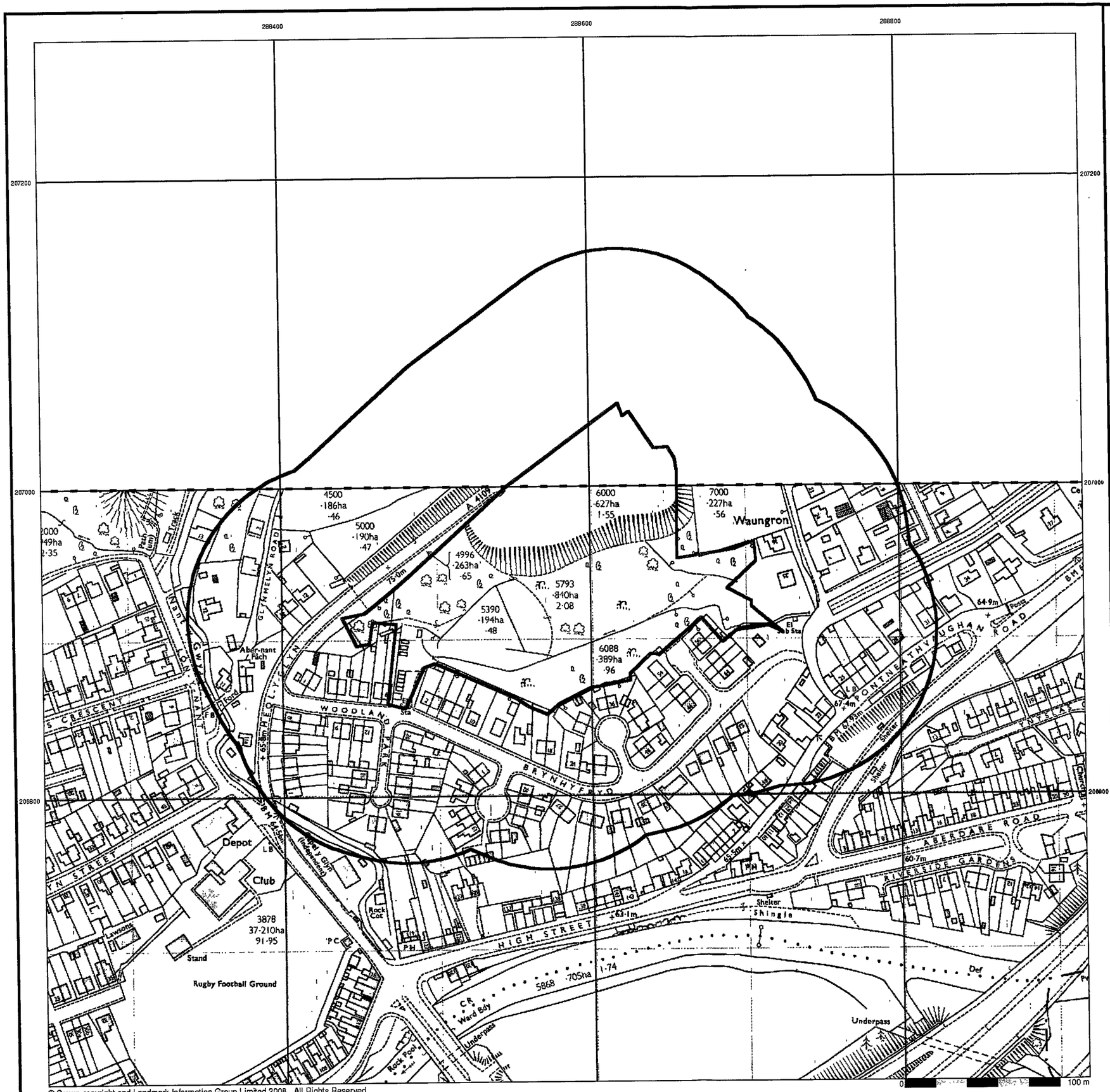

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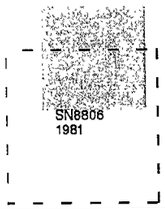
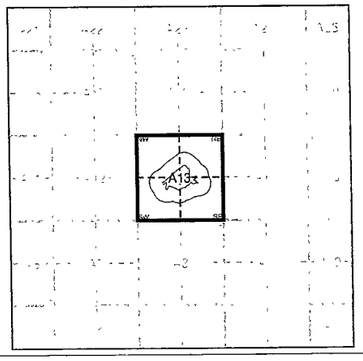
Ordnance Survey Plan
Published 1981
Source map scale - 1:2,500

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)



Historical Map - Segment A13



Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	100

Site Details

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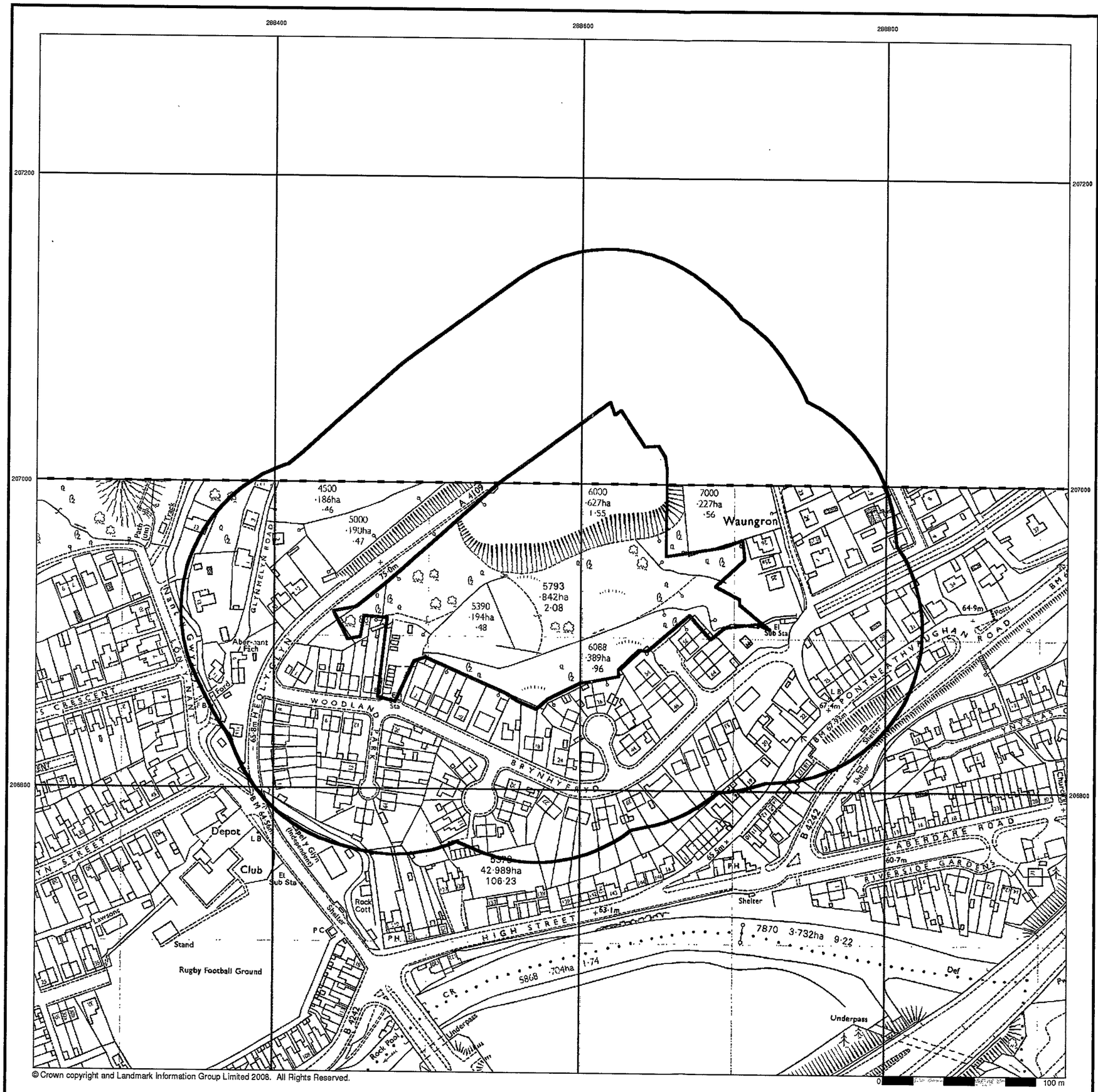

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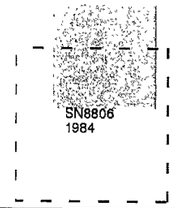
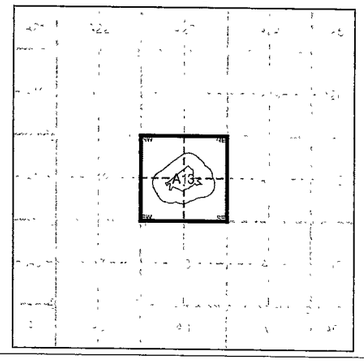
Ordnance Survey Plan
Published 1984
Source map scale - 1:2,500

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)



Historical Map - Segment A13



N

Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	100

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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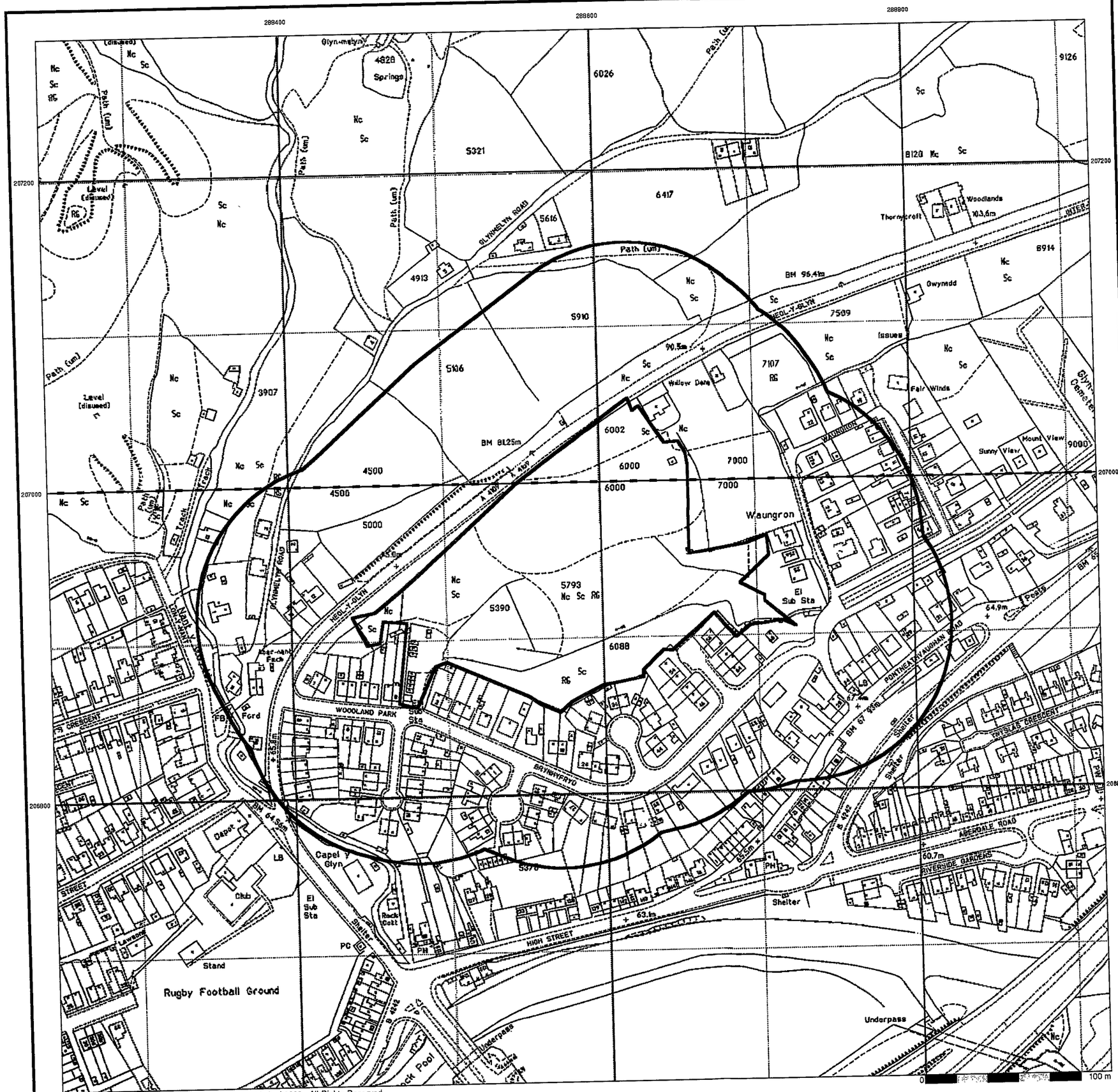

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Large-Scale National Grid Data
Published 1993
Source map scale - 1:2,500

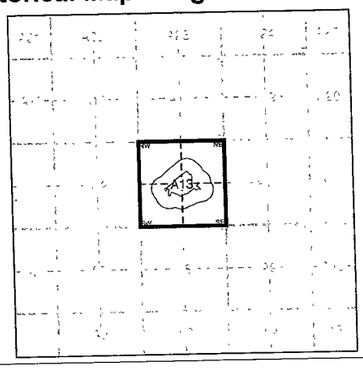
'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic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

Map Name(s) and Date(s)

SN8807
1993

SN8806
1993

Historical Map - Segment A13



N

Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	100

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 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
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
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
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. 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
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Electricity Transmission Line
Pole
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
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
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	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
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m 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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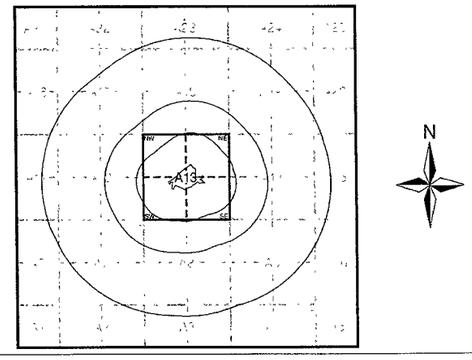
Ordnance Survey mapping included:

Historical Map - Slice A



Order Details

Order Number: 24537603_1_1
Customer Ref: 10287
National Grid Reference: 288580, 206940
Slice: A
Site Area (Ha): 2.71
Search Buffer (m): 1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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Glamorganshire
Published 1883 - 1884
Source map scale - 1:10,560

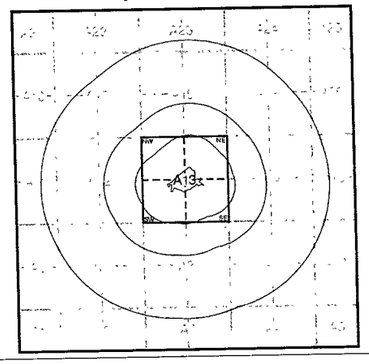
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

004_00
1883

010_00
1884

Historical Map - Slice A



N

Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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Glamorganshire
Published 1900 - 1901
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)

004_SW 1900	004_SE 1901
010_NW 1900	010_NE 1900

Historical Map - Slice A

Order Details

Order Number: 24537603_1_1
Customer Ref: 10287
National Grid Reference: 288580, 206940
Slice: A
Site Area (Ha): 2.71
Search Buffer (m): 1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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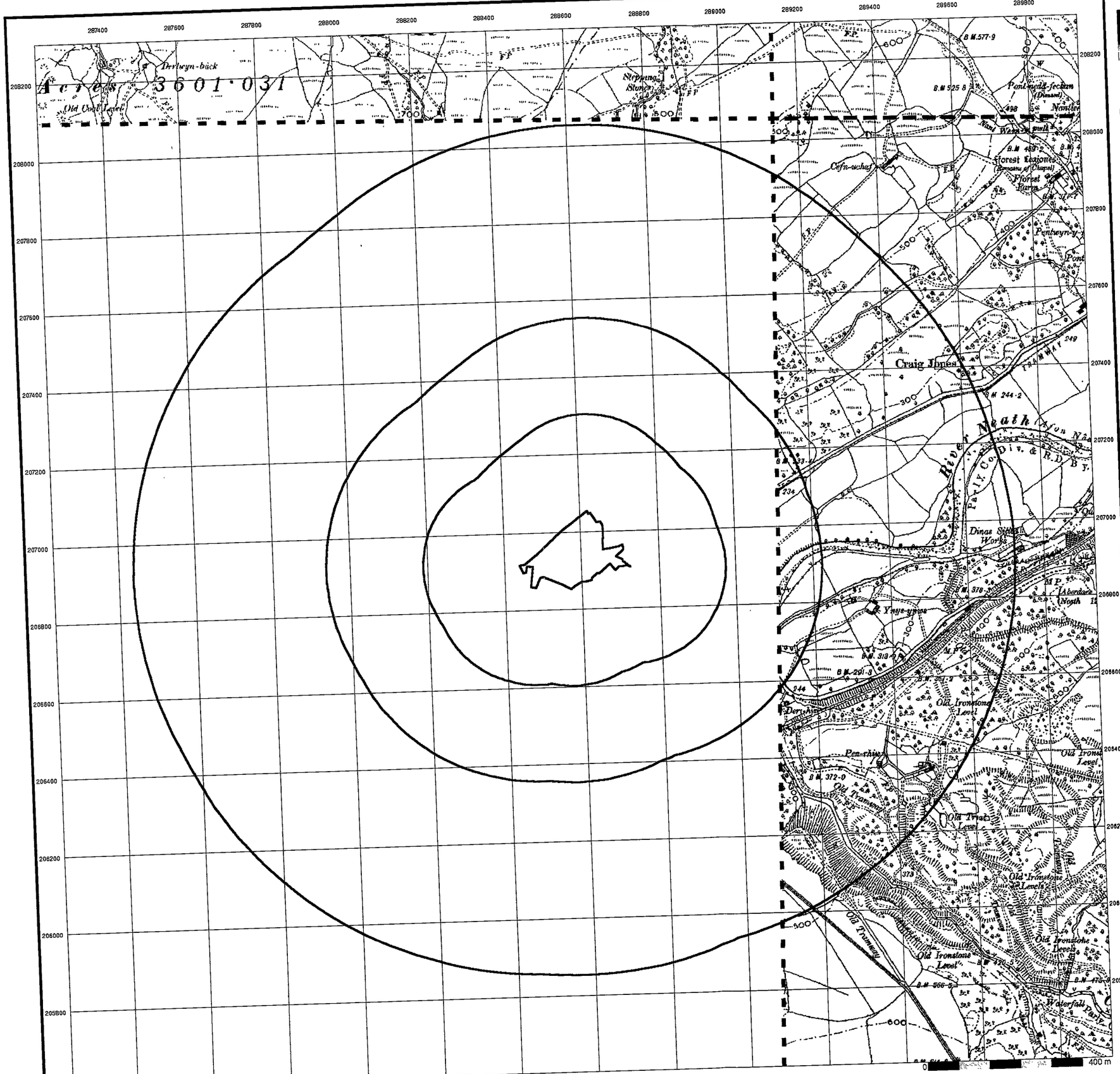

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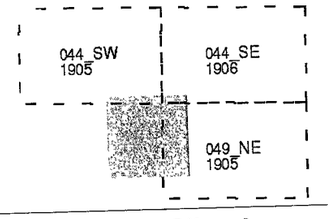
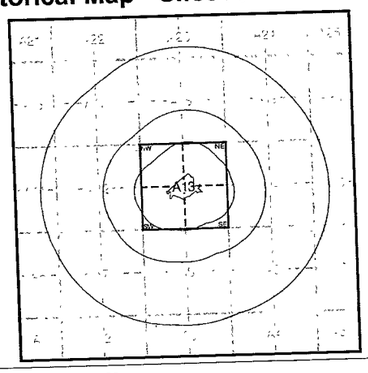
Brecknockshire
Published 1905 - 1906
Source map scale - 1:10,560

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:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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Tel: 0870 850 6670
Fax: 0870 850 6671
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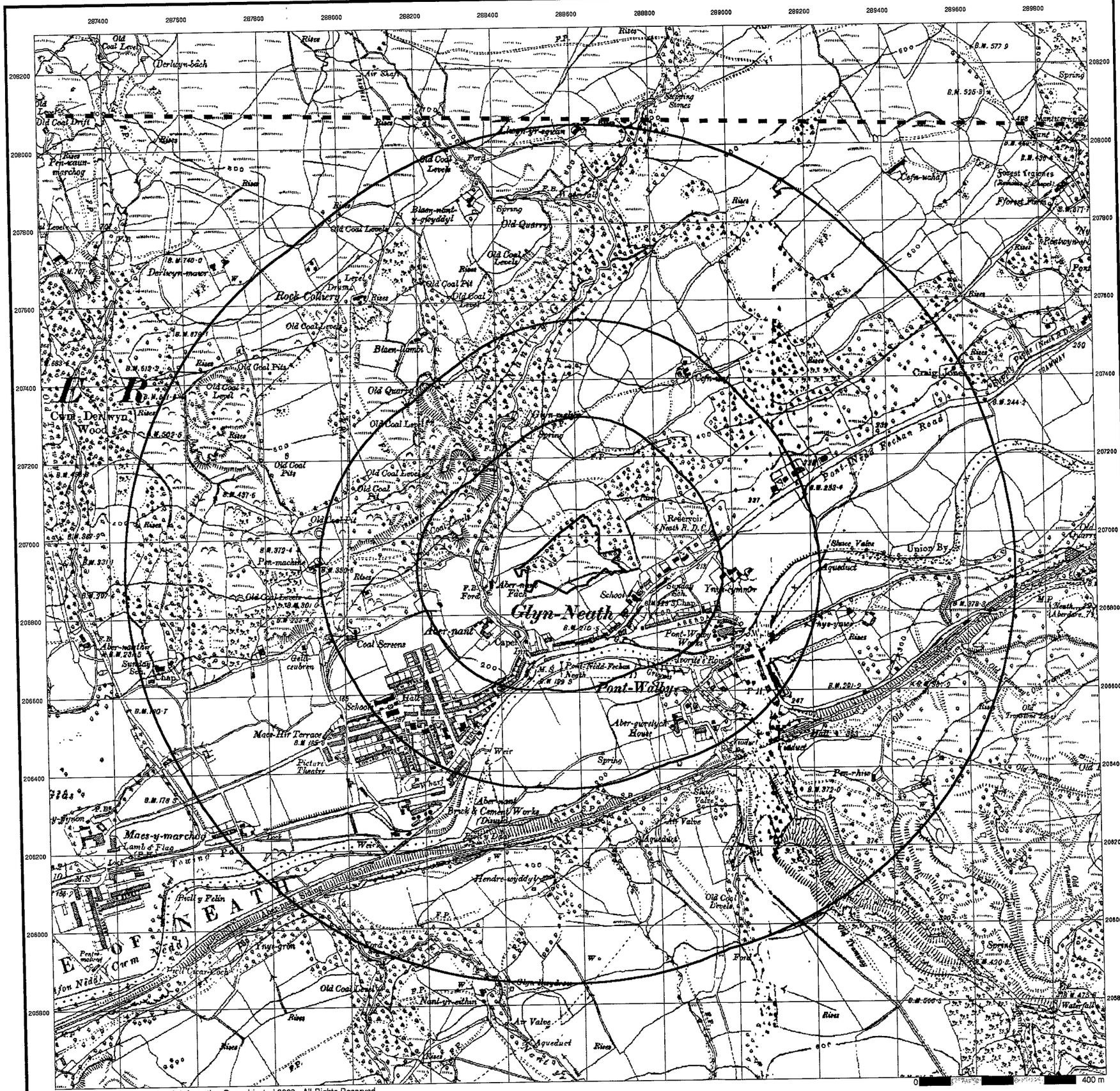

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Brecknockshire
Published 1921
Source map scale - 1:10,560

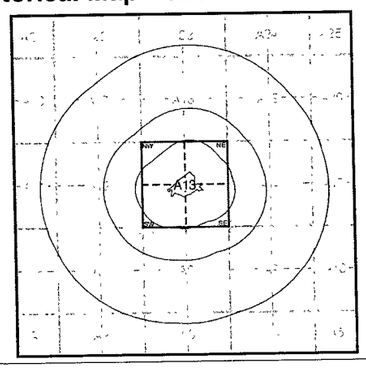
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

044_00
1921

049_00
1921

Historical Map - Slice A

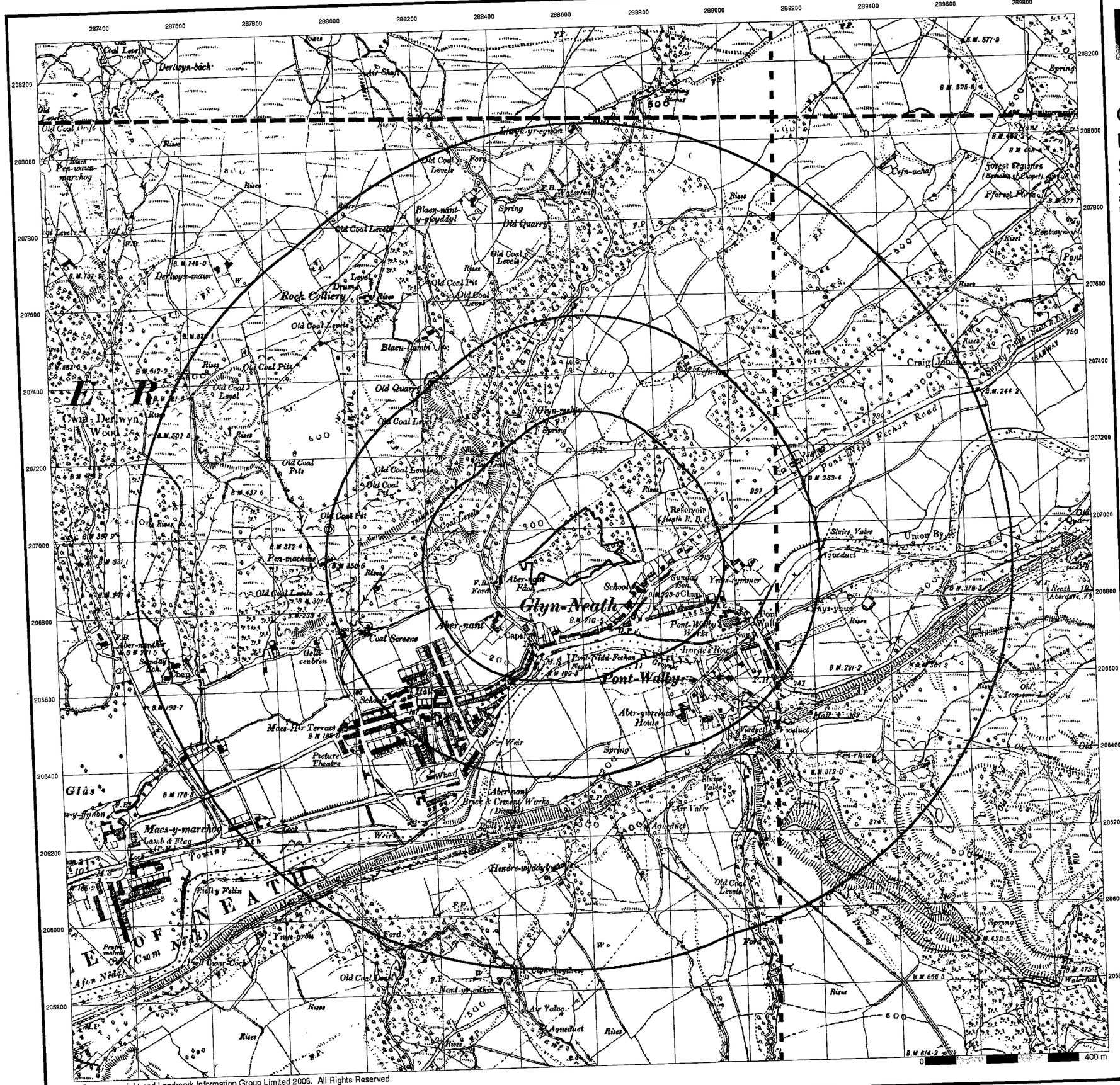


Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU



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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: 24537603_1_1
Customer Ref: 10287
National Grid Reference: 288580, 206940
Slice: A
Site Area (Ha): 2.71
Search Buffer (m): 1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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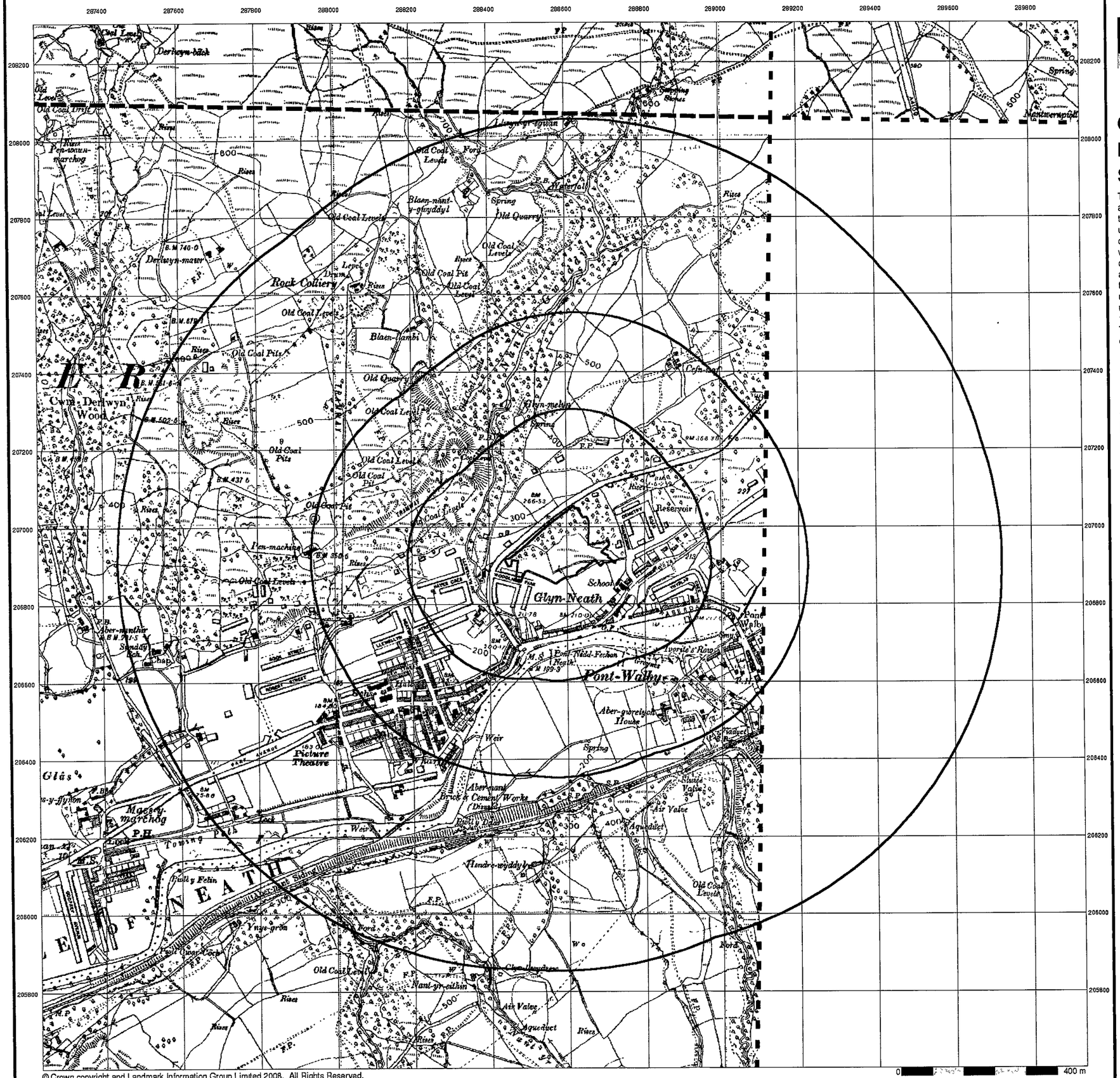

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Glamorganshire
Published 1938 - 1953
Source map scale - 1:10,560

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:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

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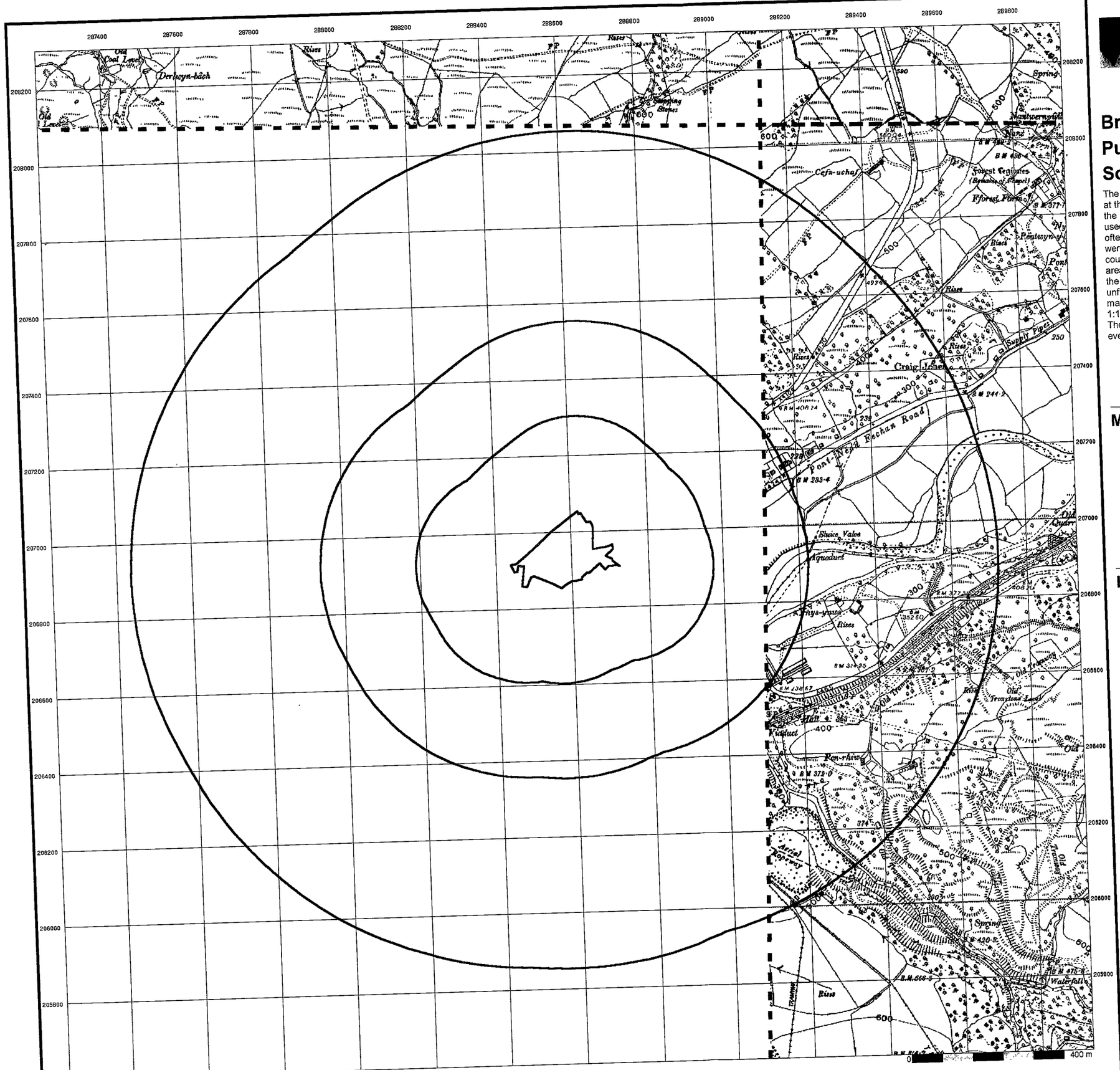

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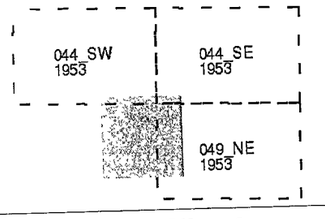
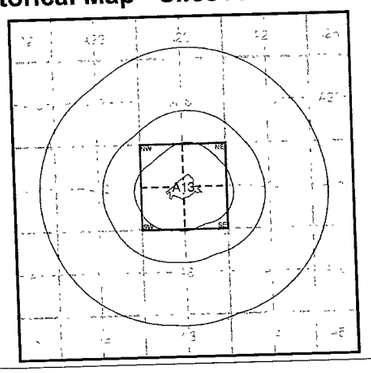
Brecknockshire
Published 1953
Source map scale - 1:10,560

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:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
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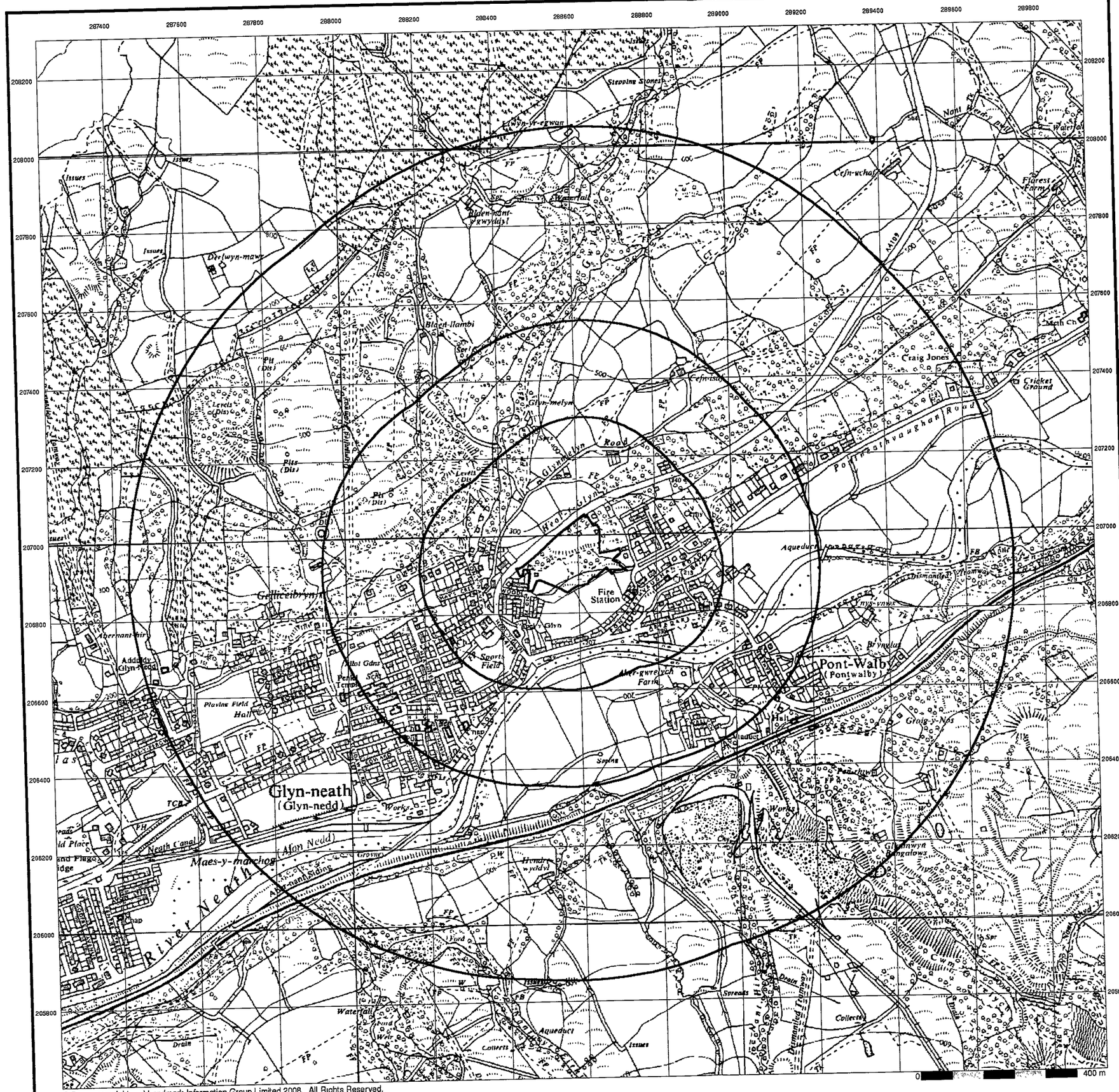

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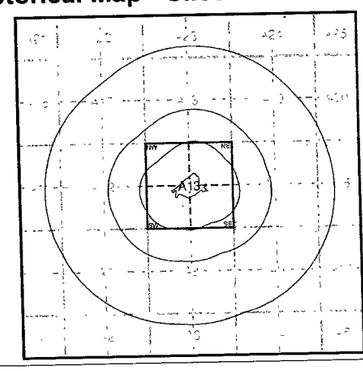
Ordnance Survey Plan
Published 1964
Source map scale - 1:10,560

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)

SN80NE
1964

Historical Map - Slice A



Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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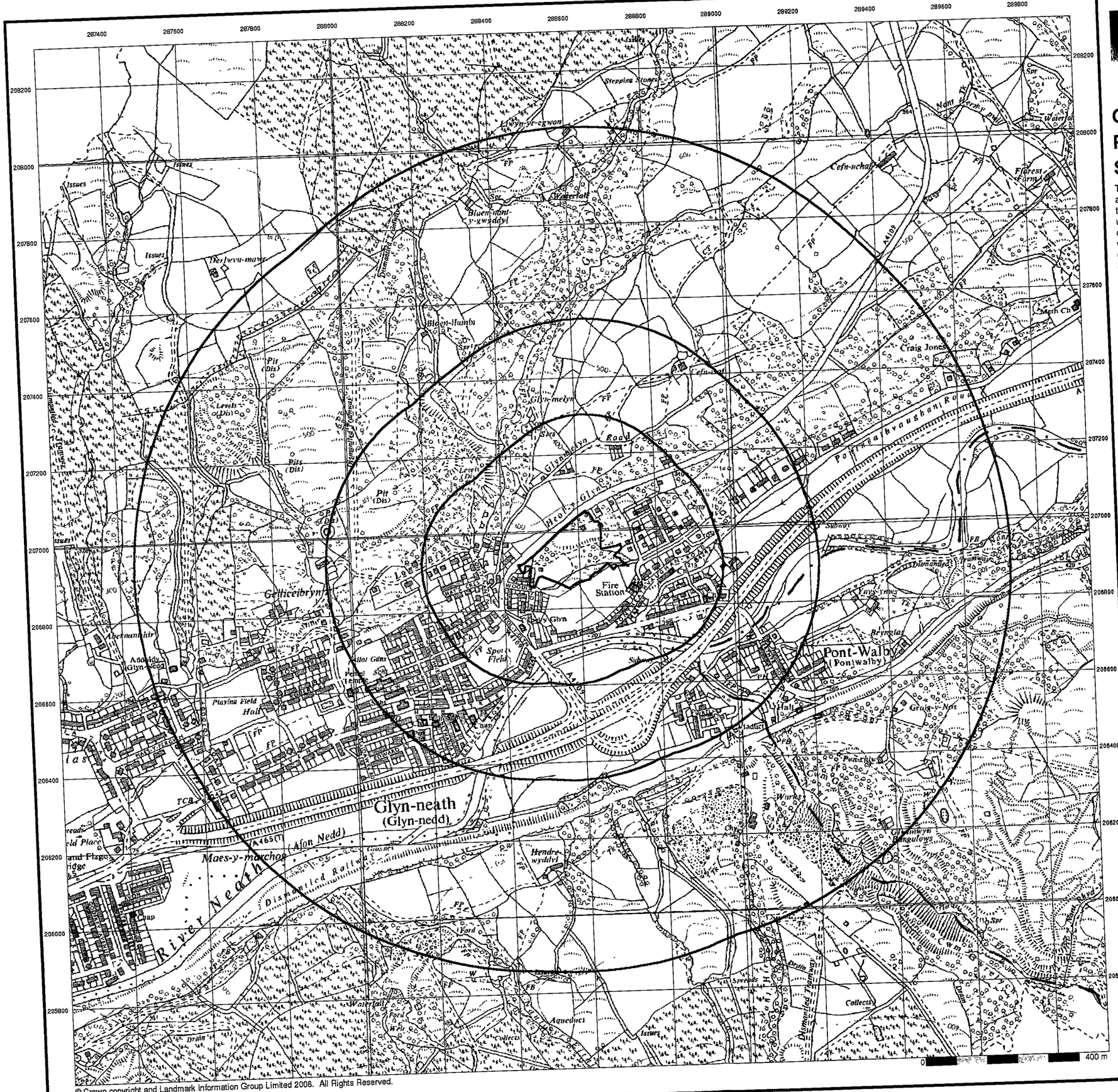

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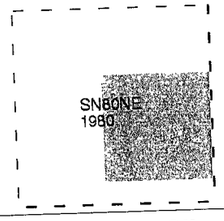
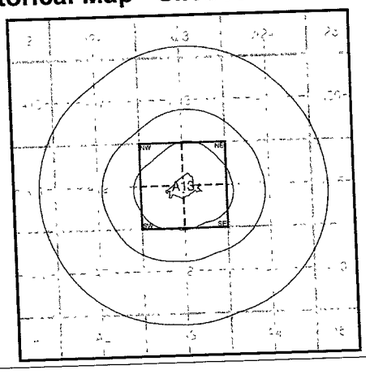
Ordnance Survey Plan
Published 1980
Source map scale - 1:10,560

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:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

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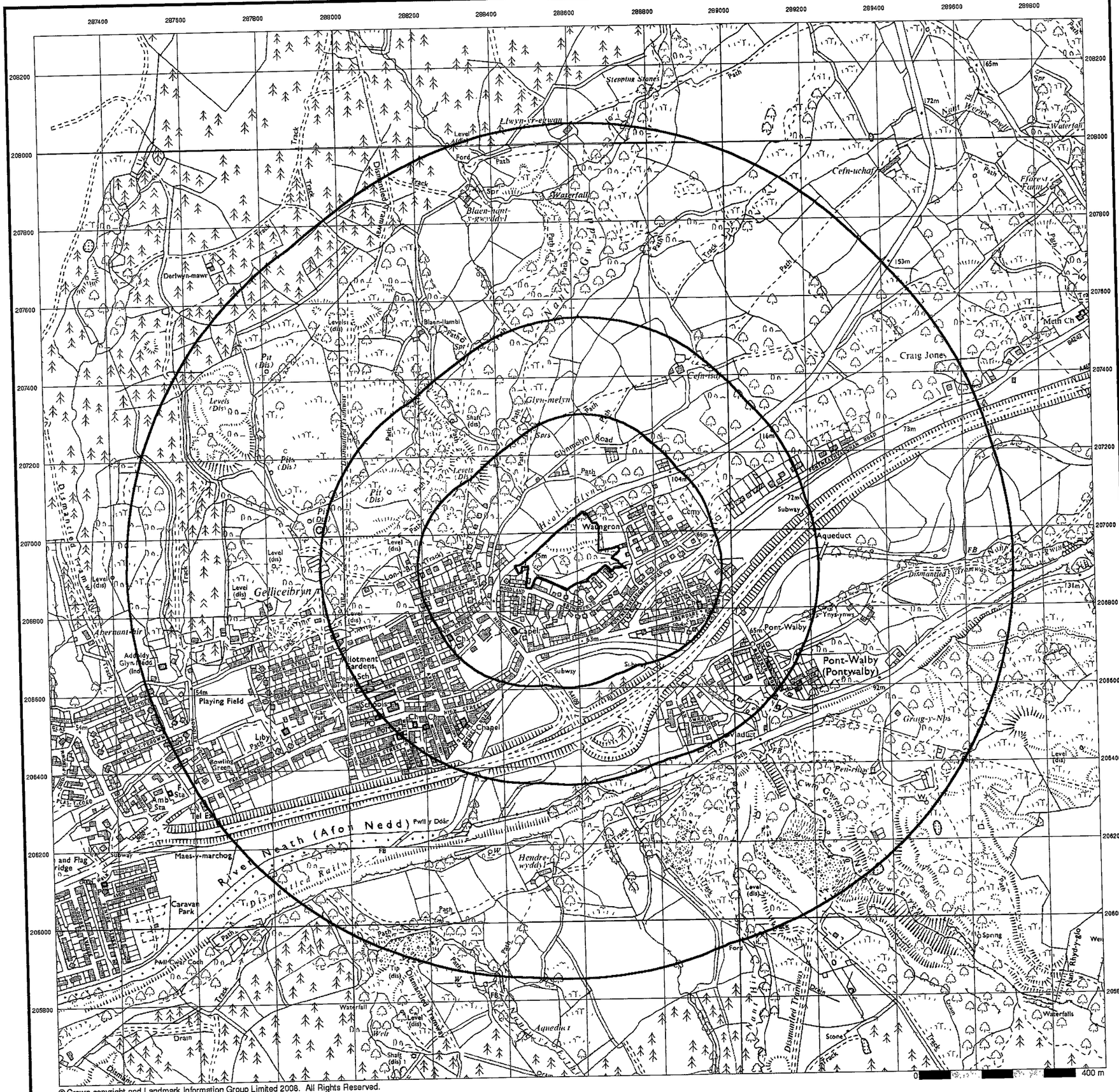

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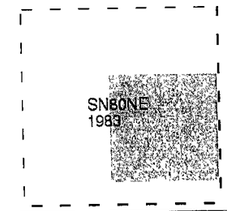
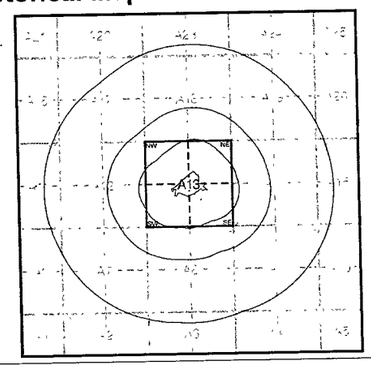
Ordnance Survey Plan
Published 1983
Source map scale - 1:10,000

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:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

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10K Raster Mapping
Published 2000
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan 1:10,000 colour raster mapping which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SN80NE
2000

Historical Map - Slice A

Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

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Information Group

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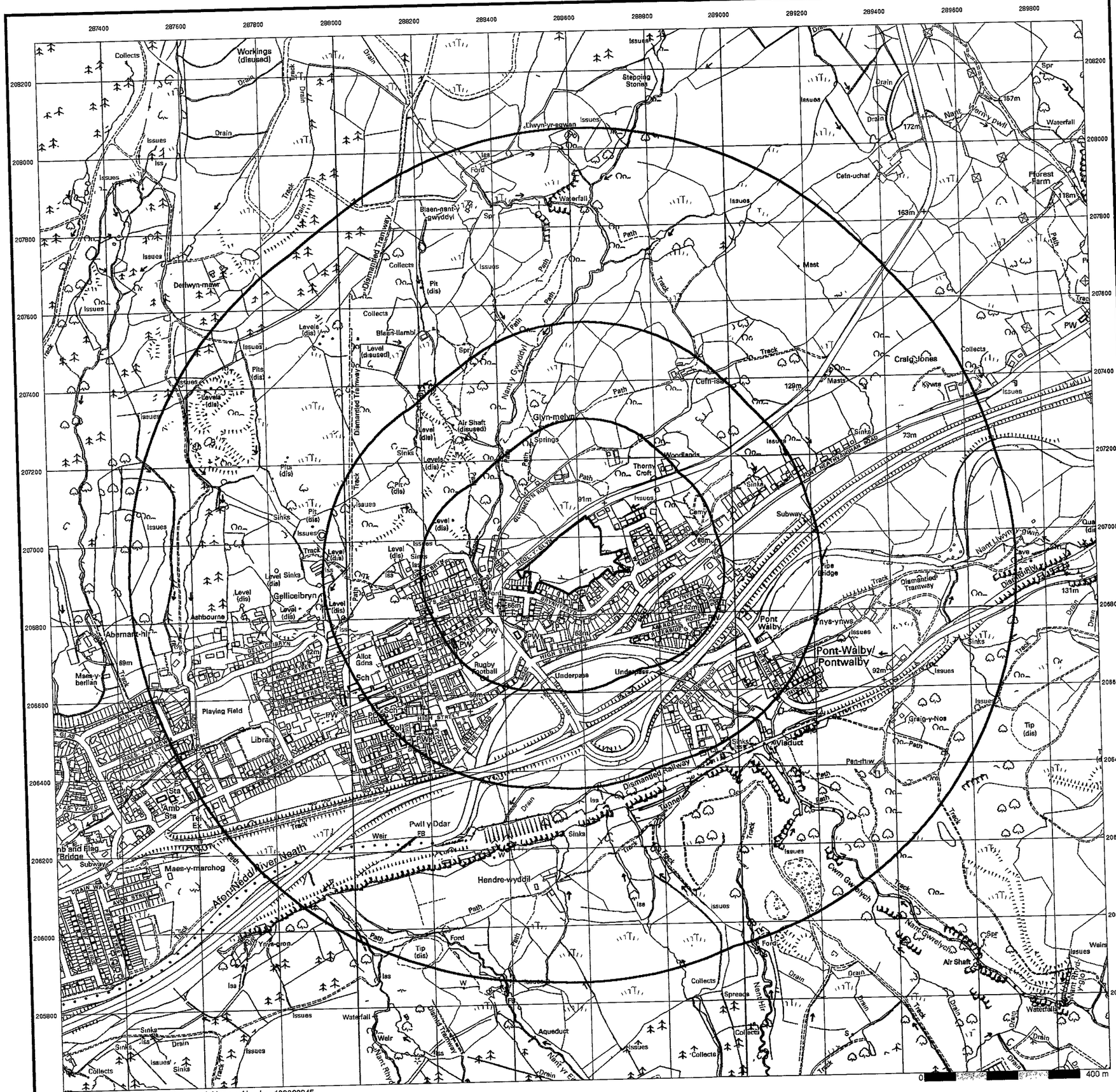
Fax:	0870 850 6671
Web:	www.envirocheck.co.uk



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10K Raster Mapping
Published 2007
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SN80NE
2007

Historical Map - Slice A

Order Details

Order Number:	24537603_1_1
Customer Ref:	10287
National Grid Reference:	288580, 206940
Slice:	A
Site Area (Ha):	2.71
Search Buffer (m):	1000

Site Details

Intervalley Road, Glynneath, Neath, SA11 5TU

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Fax: 0870 850 6671
Web: www.envirocheck co.uk

Annex B
Historical Geology Report

terrafirma

Envirocheck® Report:
Geology 1:50,000 Maps

Order Details:

Order Number:
25093116_1_1

Customer Reference:
10287

National Grid Reference:
288590, 206940

Slice:
A

Site Area (Ha):
2.67

Search Buffer (m):
1000

Site Details:

Site at
Glyn-neath
Neath Port Talbot

Client Details:

Ms R Liley
Terra Firma (Wales) Ltd
5 Deryn Court
Warfdale Road
Pentwyn
Cardiff
CF23 7HB

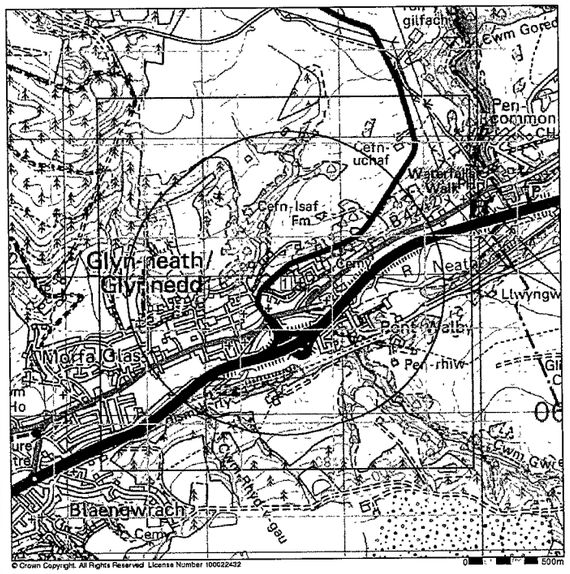
terrafirma

Geological Coverage Map

This report is designed for users carrying out preliminary site assessments who require geological maps for the area around a site. The report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale. This mapping may be more up to date than previously published paper maps.

The various geological layers - artificial (man-made) and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps. The final map, that of 'Combined Surface Geology', superimposes all these distinct layers into one, producing a map that shows the rocks that occur at the surface just beneath the soil. NOTE: The legend is in chronological order in accordance with the BGS geological age index.

Not all of the layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.



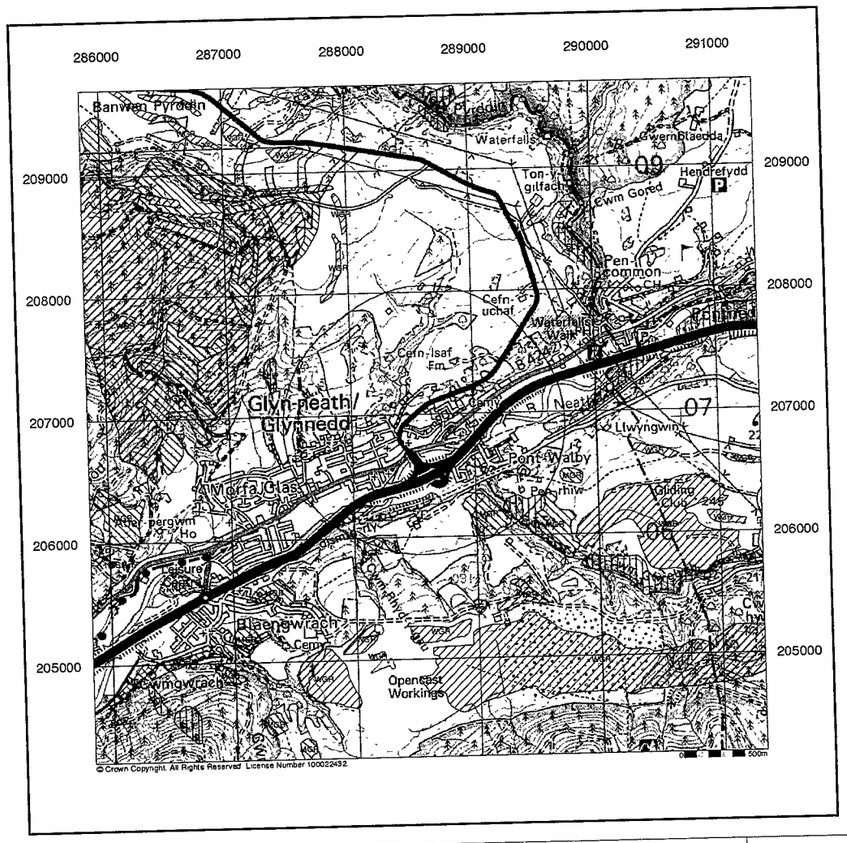
Legend

- 8 Map ID
- Specified Site
- Specified Buffer
- Slice
- Segment within a Slice

BGS 1:50,000 Geological Mapping Coverage	
Map ID:	1
Map Sheet No:	231
Map Name:	Merthyr Tydfil
Map Date:	1979
Bedrock Geology:	Available
Superficial Geology:	Available
Artificial Geology:	Available
Faults:	Available
Landslip:	Available
Rock Segments:	Available

terrafirma

Artificial Ground and Landslip Map



Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WGR	Worked Ground (Undivided)	Void	Present Day - Present Day
	MGR	Made Ground (Undivided)	Made Ground (Composition Unspecified)	Present Day - Present Day
	SLIP	Landslip	Unknown Lithology	Quaternary - Quaternary

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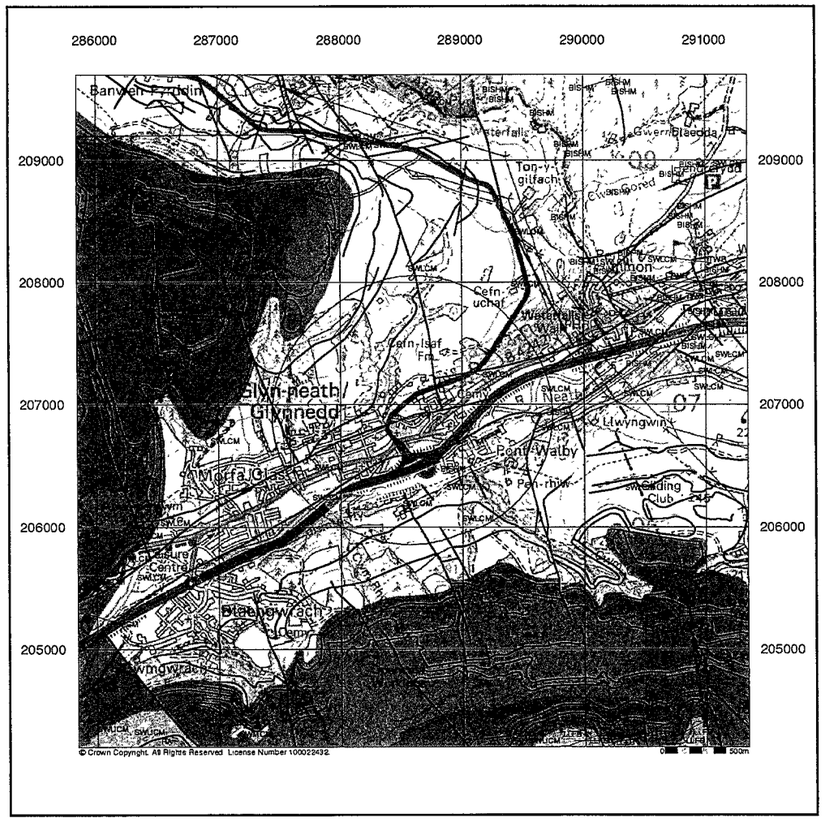
Bedrock and Faults Map



Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	RA	Rhondda Member	Sandstone	Westphalian D - Bolsovian (Westphalian C)
	LLFB	Llynfi Member	Mudstone, Siltstone and Sandstone	Bolsovian (Westphalian C) - Bolsovian (Westphalian C)
	SWUCM	South Wales Upper Coal Measures Formation	Mudstone, Siltstone and Sandstone	Westphalian D - Bolsovian (Westphalian C)
	LLFB	Llynfi Member	Sandstone	Bolsovian (Westphalian C) - Bolsovian (Westphalian C)
	SWMCM	South Wales Middle Coal Measures Formation	Mudstone, Siltstone and Sandstone	Bolsovian (Westphalian C) - Duckmantian (Westphalian B)
	SWMCM	South Wales Middle Coal Measures Formation	Sandstone	Bolsovian (Westphalian C) - Duckmantian (Westphalian B)
	SWLCM	South Wales Lower Coal Measures Formation	Mudstone, Siltstone and Sandstone	Langsettian (Westphalian A) - Langsettian (Westphalian A)

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Bedrock and Faults Map

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	SWLCM	South Wales Lower Coal Measures Formation	Sandstone	Langsettian (Westphalian A) - Langsettian (Westphalian A)
	BISHM	Bishopstone Mudstone Formation	Mudstone, Siltstone and Sandstone	Yeadonian - Pendleian
	BISHM	Bishopstone Mudstone Formation	Sandstone	Yeadonian - Pendleian
	TWR	Twrch Sandstone Formation	Sandstone and Conglomerate, Interbedded	Marsdenian - Pendleian
	PDO	Penderyn Oolite Member	Limestone, Ooidal	Asbian - Asbian
		Rock Segments		
		Faults		

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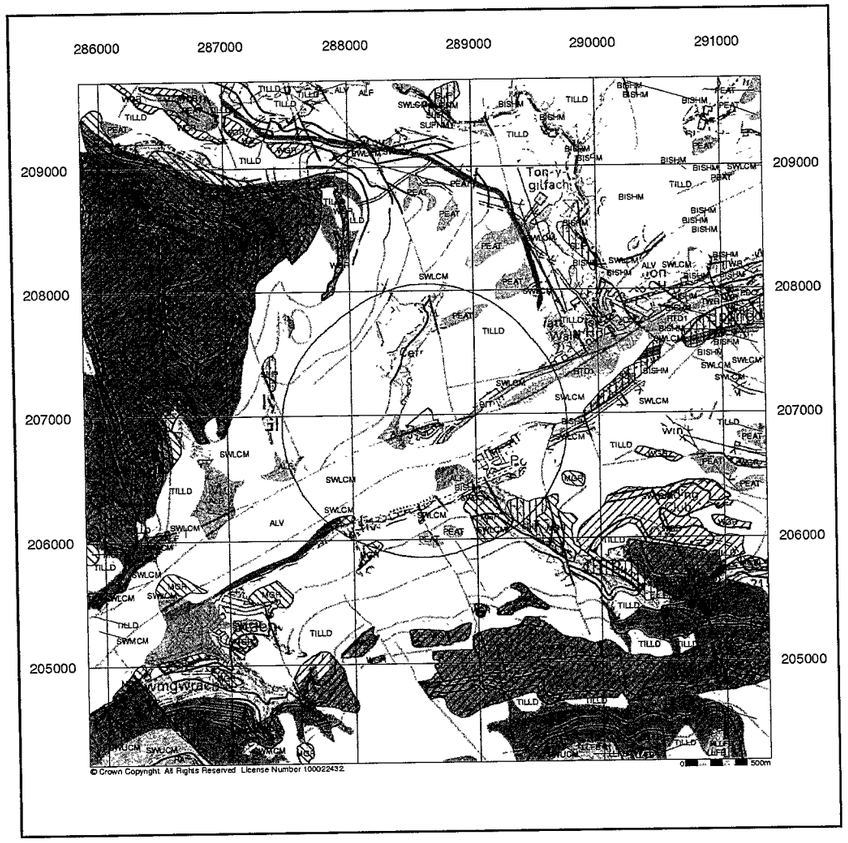
Combined "Surface Geology" Map



Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey - Enquiry Service
British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
Nottinghamshire
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
Email: enquiries@bgs.ac.uk
Website: www.bgs.ac.uk

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Annex C
Coal Mining Report

The Coal Authority

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Issued by:
Ground Stability Report Office, 200 LICHFIELD LANE, BERRY HILL, MANSFIELD, NOTTINGHAMSHIRE, NG18 4RG
Website: www.coalminingreports.co.uk - Phone: 0845 762 6848 - DX 716176 MANSFIELD 5

DR GWYN LAKE,
TERRA FIRMA (WALES) LTD,
5 DERYN COURT,
WHARFEDALE ROAD,
CARDIFF,
SOUTH GLAMORGAN,
CF23 7HA

Person dealing with this matter:	**Paul Heap**
Our reference:	**00016611-08**
Your reference:	GLYN-NEATH
Electronic Ref:	EME_00008935650001_005
RRUID:	005.00008935650001
Date of your enquiry:	**29 February 2008**
Date we received your enquiry:	**29 February 2008**
Date of issue:	**03 March 2008**

This report is for the property described in the address below and the attached plan. The report is issued subject to the terms and conditions attached, which you are strongly advised to read.

Ground Stability Report

Land Off, Heol-Y-Glyn, Woodland Park, Glyn-Neath, Neath Port Talbot

This report is based on and limited to the records in the possession of the Coal Authority; the records and geological interpretation of The British Geological Survey (BGS) and the records of the Cheshire Brine Subsidence Compensation Board, at the time the search is answered.

Coal mining	Yes
Shrinkable clay	Yes
Running sand	Yes
Compressible deposits	No
Collapsible deposits	No
Landslide potential	Yes
Soluble rocks	No
Brine extraction	No

Information from the Coal Authority

Underground Coal Mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

However the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past.

Present
The property is not in the likely zone of influence of any present underground coal workings.

Future
The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.
However reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries
There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal-mining geology
At the surface, there are no known faults or other lines of weakness due to coal mining that have made the property unstable.

Opencast Coal Mining
Past
The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present
The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future
The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal-mining subsidence
The Coal Authority has not received a damage notice or claim for the property since 1 January 1984.
There is no current Stop Notice delaying the start of remedial works or repairs to the property.
The Coal Authority has not received a request to carry out preventive work before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas
There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining
The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of Support
The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working Facilities Orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Comments on Coal Authority information

Where development proposals are being considered, technical advice should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. This is necessary due to the Public Safety implications of any development in these circumstances.

Information from the British Geological Survey on potential for natural ground movement

Shrinkable Clay

The property is in an area underlain by clay. Clay can swell or shrink if the moisture content changes.

However, the clay deposits in this area are considered to be mainly of "low plasticity". This means it is unlikely that they will cause ground movement.

Running sand

The property is in an area underlain by sand. Some sands, if voids are present, may flow if they come into contact with water.

However, the sand deposits in this area are unlikely to cause ground movement.

Deposits which could compress

The property is not in an area underlain by deposits which could compress and cause ground movement.

Deposits which could collapse

The property is not in an area underlain by deposits which could collapse and cause ground movement.

Natural landslide activity

The property is in an area where the local geology and steepness of slope could combine to create the likelihood of landslide activity.

However, landslide activity is unlikely to occur.

Soluble rocks

The property is not in an area underlain by soluble rocks.

Comments on the British Geological Survey information

These features should not necessarily give cause for concern.

Whether or not a property is affected by ground movement can depend on a number of factors such as its age, type of construction, and on its surroundings and such matters as drainage and nearby trees.

Since 1992 buildings should have been designed and constructed according to buildings regulations to ensure natural ground movement will not cause damage to a building.

However, you should consider the possible consequences before you:
- carry out any building or excavation work;
- alter the ground surface or drainage of surface or ground water; or
- plant or remove large shrubs or trees

Ground movement can cause uneven damage or subsidence to a property.

Developers should always carry out an appropriate risk assessment before starting any work on, or around, a property.

If you own the property and it is damaged by ground movement: You should contact your insurance company and anyone else who has an interest in the property, for example, the mortgage lender.

If you are considering buying the property and BGS has identified that ground movement could occur you should tell your professional advisers.

Information from the Cheshire Brine Subsidence Compensation Board

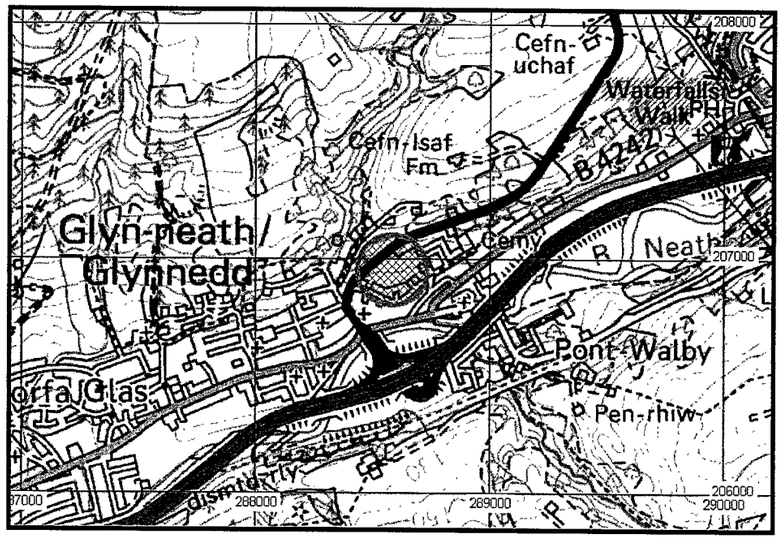
The property lies outside the Cheshire Brine Compensation District.

Additional remarks

This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority, British Geological Survey and the Cheshire Brine Subsidence Compensation Board's Terms and Conditions 2006. These are available to view at www.groundstability.com or by contacting the Coal Authority's customer service team on 0845 762 6848 or by email to groundstability@coal.gov.uk. These terms and conditions apply regardless of the method used to order and receive reports. The report is compliant with Home Information Pack and Purchaser Information Pack requirements.

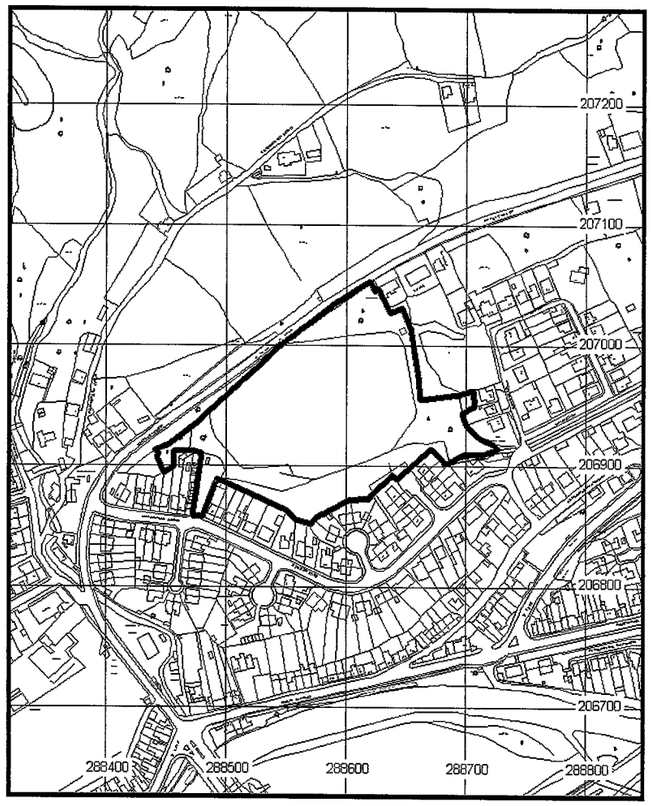
Ordnance Survey (OS) has carried out a Positional Accuracy Improvement Programme to make sure that the maps it produces are accurate. We have no control over who is using the improved information. In some cases, the position of surface features and mining features on the map may have changed. This is because we have updated our database in line with Ordnance Survey's improved maps.

Location map



Approximate position of property

Enquiry boundary



Key

Approximate position of enquiry boundary shown

Mapping sourced from Ordnance Survey

TERMS

DEFINITIONS

In these Terms the following words have the following meanings:

"BGS" means the British Geological Survey of Kingsley Dunham Centre, Keyworth, Nottingham, NG12 5GG, a component organisation of the Natural Environment Research Council;
"CA" means the Coal Authority of 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG;
"Cheshire Brine" means the Cheshire Brine Subsidence Compensation Board of Sir Henry Doulton House, Forge Lane, Etruria, Stoke on Trent, ST1 5BD;
"Customer" means the person, firm or company placing the Order, either on its own behalf as User or as agent for a User;
"Guidance" means the relevant current version of the Guidance Notes and User Guide for the Report, available on request and displayed on the Website;
"Order" means any request for a Report made by the Customer;
"Property" means the address or location specified by the Customer in the Order;
"Report" means a ground stability report (in printed, electronic or any other form) which combines information on coal mining, brine subsidence claims and natural ground movement which has been prepared by CA in respect of the Property using data from, amongst others, the Suppliers and to which these Terms apply;
"Supplier(s)" means all or any of CA, BGS and/or Cheshire Brine;
"these Terms" means these terms and conditions, incorporating the Guidance (if and to the extent of any conflict between these Terms and the Guidance, the provisions of these Terms will prevail);
"User(s)" means the person or persons so described in Clause 15; and
"Website" means CA's website for the provision of the Reports service (currently www.coalminingreports.gov.uk).

TERMS

1. These Terms apply to the provision of Reports by CA to the Customer and/or the User.
2. The Customer and the User agree that the placing of an Order indicates their acceptance of these Terms.
3. These Terms shall apply to the exclusion of all other terms and conditions.
4. CA reserves the right to change these Terms from time to time with immediate effect and without prior notice. Any changes to these Terms will be displayed on the Website. Placement of Orders after any such variation will be deemed to be an acceptance of these Terms as amended in respect of Reports which are provided in response to Orders placed after the variation is made.
5. Where the Customer is acting as an agent for a User, the Customer will provide a copy of the Report and these Terms to the User.

LIMITATIONS OF THE REPORT

General

6. The Report is prepared with due skill and care, but has a number of limitations which are set out in these Terms which the Customer and the User acknowledge and accept when relying on it.

Sources of Information

7. The Report has been prepared by CA using information held by CA, together with information supplied to it by BGS and Cheshire Brine. The Report is based on, and is limited to:

a) the specific features identified in the Report, as more particularly described in the Guidance; and

b) each Supplier's interpretation of the records it holds relating to the particular features for which the Report states that the Supplier is responsible (and, in the case of information from BGS and Cheshire Brine, as provided to CA) at the time the Report is prepared.

The Customer and the User therefore acknowledge and agree that the records used to prepare the Report do not represent an exhaustive or comprehensive list of all records that may exist or may be available for the Property (see further Clause 8). The Customer and the User also acknowledge that no physical inspection of the Property has or will be carried out in the preparation of the Report.

8. Without prejudice to the generality of Clause 7:

a) information from CA is based on records in its possession relating to coal mining activity. There may be information held by others on historical coal mining, and information on other types mining, which is not searched as part of the Report;

b) information from BGS relates solely to the following six natural ground stability hazards: shrinkable clay; running sand; compressible deposits; collapsible deposits; landslide activity; and soluble rocks. It does not cover any other geological hazards, or man-made hazards (such as contaminated land). BGS may hold data on other geological hazards and features that may affect the Property which are not searched as part of the Report and consequently the Report should not be taken as a guarantee that there are no other geological hazards or other issues affecting the Property; and

c) information from BGS is prepared using the BGS GeoSure database which is based on 1:10,000 scale geological mapping reduced to 1:50,000 scale. The Customer and the User therefore acknowledge that BGS may be able to provide a more specific and detailed interpretation relating to the geological conditions and ground stability at the Property than that which is included in the Report. A more detailed interpretation is available via the BGS GeoReports service on BGS's website www.bgs.ac.uk.

9. The information from the Suppliers may be derived from records from a number of disparate sources which vary in age, quantity and quality. Such records may include material donated to the Suppliers by third parties, which may not have been subject to any verification or other quality control process.

10. Raw data used to prepare the Reports may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected, where possible, to quality control to ensure reliability, some raw data may have been processed without human intervention and may in consequence contain undetected errors.

11. The records available to the Suppliers are constantly being updated. The Suppliers cannot be responsible to the Customer or Users for any changes in the information on which the Report is based which occur after the date on which the Report is prepared. Where this Report is for a residential property, insurance is included to cover loss in property value caused and arising from these circumstances. The Report includes a policy and key facts summary which outlines the significant features, benefits and limitations of the cover provided. The full terms, conditions and exclusions are shown in the policy document.

Maps

12. The Customer and the User must take all reasonable steps to check that the details in the Order are correct and that the Report provided by CA has been prepared for the correct location and property type, and that the boundaries of the Property as shown in the Report's plan correspond with those of the Property. Any discrepancies between the Order and the Report must be notified to the CA within 28 days after the issue date of the Report and CA will, in the case of error by CA, issue a revised Report free of charge; otherwise a new Report should be ordered with payment of the appropriate fee.

13. The Property has been located using Ordnance Survey ("OS") mapping. The Suppliers do not warrant that the OS information is complete or accurate and accept no liability for the plotted position of the Property as shown on OS maps. Further, the relative position between surface features and coal mining and other geological features may differ between OS maps and the Suppliers' maps used to prepare the Report, depending upon when the Suppliers' maps were prepared.

14. The plan or plans accompanying the Report must not be enlarged otherwise the accuracy will be affected.

RELIANCE ON THE REPORT

Who may rely on the Report

15. Only the following persons ("Users") may rely on the Report:

a) the owner of the Property at the time the Report is prepared;

b) any purchaser of the whole of the Property from the owner described in a above; and

c) any person who provides funding to the persons in a or b above which is secured on the whole of the Property.

Such reliance will be subject to the provisions of Clauses 17 and 24 to 28 (inclusive).

Extent of Reliance

16. The Report has been prepared for use by the Users only and the Report should not be relied upon by any other third party.

17. Customers or Users may not act in reliance upon the Report (either by purchasing the Property, providing funding secured on the Property or carrying out any works on or affecting the Property) more than ninety (90) days after its date of issue.

18. The Report gives an indication of whether ground movement could occur at the Property. This does not necessarily mean that the Property is or will be affected by ground instability. Such an assessment can only be made by inspection of the Property by a qualified professional, such as a surveyor or engineer. The Report DOES NOT therefore:

a) include any information or warranty relating to the actual state, or the structural or other condition, of the Property;

b) determine the saleability or value, or the safety, of the Property;

c) indicate the suitability of the Property for any particular purpose (including, without limitation, its suitability for development (within the meaning of section 55 of the Town and Country Planning Act 1990 as amended) or any building, excavation or landscaping work); or

d) act as a substitute for any physical inspection, specialist interpretations and/or professional advice.

19. No representations, warranties or terms (whether express or implied by statute, common law, custom, trade usage, course of dealing or otherwise) are given in relation to the Report unless they are expressly set out in these Terms, save to the extent that such terms cannot be excluded by law.

USE OF THE REPORT

20. The Customer and the User acknowledge that the Report is confidential and that it is intended for the purposes of the User only. Accordingly the Customer and the User agree that they are permitted to use and copy the Report for these purposes only.

21. The Customer and the User (or any person who is provided with a copy of the Report) will not:

a) remove, obliterate or alter any trade mark or any copyright or other proprietary notice which is contained in the Report;

b) reformat or otherwise change, add to or enhance the Report, or combine it with or incorporate it into any other information, data or materials; or

c) create any product which is derived directly or indirectly from the data contained in the Report; or

d) resell the Report (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) unless this has been specifically authorised in writing by CA.

22. The copyright and all other intellectual property rights in the Report will remain the property of the Suppliers or other third parties (as appropriate). Neither the Customer nor the User will acquire any rights in respect of the Report other than as expressly provided in these Terms.

EVENTS BEYOND THE SUPPLIERS' CONTROL

23. A Supplier will not be liable to the Customer or the User for any delay or failure in performance of its obligations which result from circumstances beyond its reasonable control (including, without limitation, fire, explosion, flood, tempest, unusually adverse weather conditions, war, hostilities, riot, acts of terrorism, failure or shortage of power supplies, telecommunications or processing failure or computer malfunction) or the acts or omissions of any person for which a Supplier is not legally responsible.

LIABILITY

24. The Report has been prepared for the Property on the basis of information on the Property's location and type provided by the Customer and/or the User, and consequently the Suppliers exclude all liability which may arise from any errors or omissions in the information so provided or from any failure to check for discrepancies pursuant to Clause 12.

25. The Report has been prepared specifically for the Property, and on the basis of the property type specified in the Order. Under no circumstances will the Suppliers be liable if a Report is relied on for any other property, or if a Report on a residential property is used for a non-residential or commercial property or for the development of the Property, and vice versa.

26. Except in the circumstances described in Clause 28 the total liability of the Suppliers to the Customer and the User arising from an error in the Report caused by negligence, breach of contract or in any other way will be limited to:

a) the reasonable costs of carrying out necessary remedial work on the Property reasonably promptly; or

b) the difference between the true market value of the Property and the market value of the Property on the basis of the Report at the time of reliance on the Report in accordance with these Terms.

27. Except in the circumstances described in Clause 28 or to the extent that a Supplier is found to be liable for the losses described in Clause 26 (a) or (b) arising from an error in the Report, the Supplier will not be liable to the Customer or the User for: loss of business, goodwill, profits or savings, loss of use or opportunity, lost or wasted staff time or for any indirect or consequential loss (whether arising from negligence, breach of contract or in any other way) even if the Customer or User was advised of or knew of the likelihood of that loss or type of loss arising.

28. Nothing in these Terms excludes or limits the liability of the Suppliers for death or personal injury caused by their negligence, or for fraud.

GENERAL

29. The headings in these Terms are for ease of reference only and do not affect their interpretation or construction.

30. Use of the singular includes the plural and vice versa, and use of any gender includes the other genders.

31. The benefit of these Terms cannot be assigned or transferred by the Customer or the User without the Suppliers' prior written consent. The Suppliers may assign any or all of their rights and obligations under these Terms without prior notice.

32. These Terms (together with the Order and the Guidance) represent the entire agreement relating to the supply of the Report and the relationship which that supply creates between the Suppliers and Customers and Users. No prior statement, representation or arrangement of any nature (whether written or oral) will add to, vary or waive terms of this agreement and the Customer and the User acknowledge that they have not relied on any

statement or representation made by or on behalf of CA or any other Supplier in agreeing to enter into this agreement. Nothing in this Clause 32 will operate to limit or exclude liability for fraud.

33. The illegality or invalidity of any part of these Terms will not affect the legality or validity of the remainder of these Terms.

34. Except to the extent that these Terms confer benefits on the Suppliers and the Users, no third party is entitled to the benefit of these Terms under the Contracts (Rights of Third Parties) Act 1999.

35. These Terms are governed by English law. The English courts (where the Property is situated in England or Wales) and the Scottish courts (where the Property is situated in Scotland) have exclusive jurisdiction to deal with any dispute which may arise out of or in connection with them.

THESE TERMS ARE AVAILABLE IN LARGER PRINT FOR THOSE WITH IMPAIRED VISION OR AT WWW.COAL.GOV.UK

Annex D
Radon Report

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Ruth Liley
Terra Firma (Wales) Limited
5 Deryn Court
Whafedale Road
Pentwyn
Cardiff
CF23 7HB

BR211 RADON REPORT

Advisory report on the requirement for radon protective measures in new buildings and extensions

Client's Reference:

Glyn, Neath

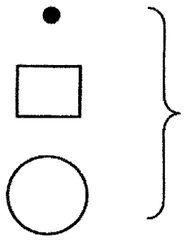
Section 1: Location and extent of report area

Area centred at: 288570,206910

Radius of site area: 50.0 metres

Scale: 1:25000 (1cm = 250m)

KEY:



POINT, RECTANGLE or CIRCLE defines report location or site area (details provided by client).

Section 2: Requirement for radon protective measures

The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2007 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

BASIC RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

The BGS is not able to provide advice on the technical specifications of 'basic' and 'full' radon protective measures. This information is detailed in **BRE Report BR211 :Radon: Protective measures for new buildings** which may be purchased from **brebookshop.com.** BR211 offers guidance on the technical solutions that are required to satisfy Building Regulations requirements. Summary guidance is available on the web at: http://www.bre.co.uk/radon/protect.html.

If you require further information or guidance, you should contact your local authority building control officer or approved inspector.

Contact 020 7944 5758 or Email: partsac.br@communities.gsi.gov.uk for advice on the interpretation of guidance contained in BRE Report BR211 (2007).

Section 3: What is radon ?

Radon is a naturally occurring radioactive gas, which is produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place. Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and do not present a hazard. Radon that enters enclosed spaces such as some buildings (particularly basements), caves, mines, and tunnels may reach high concentrations in some circumstances. The construction method and degree of ventilation will influence radon levels in individual buildings. A person's exposure to radon will also vary according to how particular buildings and spaces are used.
Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. If individuals are exposed to high concentrations for significant periods of time, there may be cause for concern. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in homes of 200 becquerels per cubic metre (Bq m^{-3}). The Government advises householders that, where the radon level exceeds the Action Level, measures should be taken to reduce the concentration.

Section 4: Radon in workplaces

The Ionising Radiation Regulations, 1999, require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293)**: Radon in the workplace.**

BRE publications may be obtained from The BRE Bookshop, I H S Technical Indexes Ltd., Willoughby Road, Bracknell, Berkshire RG12 8DW. Tel: 01344 404407, Fax: 01344 714440, website: www.brebookshop.com

Section 5: Radon in existing buildings

Useful information is given in the following free publications which can be obtained by writing to:

Radon Studies, Radiation Protection Division, Health Protection Agency, Chilton, Didcot, Oxfordshire OX11 0RQ

Radon - A Householder's Guide

Radon - You Can Test for it

Radon - A Guide for Homebuyers and Sellers

Radon - A Guide to Reducing Levels in Your Home

Information in the booklets is also available on the DEFRA website at:
http://www.defra.gov.uk/environment/radioactivity/background/radon.htm

Householders are recommended to follow advice in **Radon - a householder's guide.** The guide outlines simple solutions for dealing with the radon problem depending on whether or not the home has been tested for radon. In radon affected homes, the problem of radon can usually be tackled with simple, effective and relatively inexpensive measures. These measures are comparable in cost to work such as damp-proofing and timber treatment. You can get practical advice about construction work to reduce radon levels from the Building Control Officer at your local council.

Advice about radon, its health risks and details of how to order the radon test may be obtained from the HPA free radon answerphone 0800 614529, HPA Radon Helpline on 01235 822622, website: www.hpa.org.uk or by writing to Radon Studies at the Health Protection Agency, address above.

Annex E
Trial Pit Logs

TERRA FIRMA (WALES) LIMITED

TEL: 02920 735354 FAX: 02920 735433

Trialpit No
TP1
Sheet 1 of 1

Project Name	Project No.	Co-ords: 88581E - 6951N	Date
Glyn-neath	10287	Level: -	-
Location: Glyn-neath		Dimensions: -	Scale 1:25
Client: Moore Knight Limited		Depth 2.80m	Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Soft to firm brown gravelly sandy SILT with common cobbles. Gravel and cobbles are fine to coarse of rounded to angular brick, glass, ceramic pipe, tarmac, wire, metal bars, wood, rootlets and sandstone.
			1.20			MADE GROUND: Soft to firm dark brown gravelly sandy SILT with common cobbles. Gravel and cobbles are fine to coarse of rounded to angular brick, glass, ceramic pipe, tarmac, wire, metal bars, wood, rootlets and sandstone.
			2.80			Trialpit Complete at 2.80 m

1
2
3
4

Remarks:

Groundwater:

AGS

TERRA FIRMA (WALES) LIMITED

TEL: 02920 735354 FAX: 02920 735433

Trialpit No
TP2
Sheet 1 of 1

Project Name: Glyn-neath	Project No.: 10287	Co-ords: 88602E - 6980N Level: 75.00 m AOD	Date: 20/03/2008
Location: Glyn-neath		Dimensions: - Depth 2.44m	Scale 1:25
Client: Moore Knight Limited			Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						TOPSOIL: Soft brown sandy SILT with frequent rootlets.
			0.10	74.90		MADE GROUND: Medium dense sandy fine to coarse of rounded to angular brick, glass, ceramic pipe, tarmac, wire, metal bars, wood, rootlets and sandstone GRAVEL with cobbles.
			0.50	74.50		MADE GROUND: Medium dense brown black sandy clayey fine to coarse of rounded to angular brick, glass, ceramic pipe, tarmac, wire, metal bars, wood, rootlets and sandstone GRAVEL with cobbles.
			1.20	73.80		MADE GROUND: Medium dense light yellow orrange very sandy clayey fine to coarse of rounded to angular brick, glass, ceramic pipe, tarmac, wire, metal bars, wood, rootlets and sandstone GRAVEL with cobbles.
			1.55	73.45		MADE GROUND: Medium dense light yellow orange silty very sandy fine to coarse rounded to angular sandstone and brick fragment GRAVEL.
			1.75	73.25		MADE GROUND: Medium dense grey black sandy silty fine to coarse rounded to angular wood, brick fragments sandstone GRAVEL. Occasional wire.
			2.44	72.56		Trialpit Complete at 2.44 m

1 2 3 4

Remarks:

Groundwater:

AGS

TERRA FIRMA (WALES) LIMITED

TEL: 02920 735354 FAX: 02920 735433

Trialpit No
TP3
Sheet 1 of 1

Project Name	Project No.	Co-ords: 88615E - 7006N	Date
Glyn-neath	10287	Level: 76.00 m AOD	20/03/2008
Location: Glyn-neath		Dimensions: -	Scale 1:25
Client: Moore Knight Limited		Depth 2.10m	Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Soft to firm gravelly sandy SILT with common cobbles. Gravel and cobbles are fine to coarse of rounded to angular brick, glass, ceramic pipe, tarmac, wire, metal bars, wood, rootlets and sandstone.
			1.04	74.96		MADE GROUND: Firm dark brown mottled black slightly sandy slighlty gravelly CLAY with cobbles. Gravel is fine to course of subrounded to angular sandstone. Occasional pockets of sand. Rare plastic, brick and wood fragments.
			2.10	73.90		Trialpit Complete at 2.10 m

Remarks:

Groundwater:

AGS

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Trialpit No
TP4
Sheet 1 of 1

Project Name: Glyn-neath	Project No.: 10287	Co-ords: 88646E - 6987N Level: 74.00 m AOD	Date: 20/03/2008
Location: Glyn-neath		Dimensions: - Depth 1.40m	Scale: 1:25
Client: Moore Knight Limited			Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Medium dence brown mottled black clayey sandy fine to coarse of rounded to angular brick fragments and sandstone GRAVEL and cobbles. With common, glass, plastic, wire and fabric.
			0.61	73.39		MADE GROUND: Firm dark brown mottled black slightly sandy slighlty gravelly CLAY with cobbles. Gravel is fine to course of subrounded to angular sandstone. Occasional pockets of sand. Occasional plastic, brick and wood fragments.
			1.22	72.78		MADE GROUND: Medium dense black sandy fine to coarse mostly fine rounded to angular sandstone coal fragments and ash GRAVEL.
			1.40	72.60		MADE GROUND: Large concrete obstruction. Hole abandoned.
						Trialpit Complete at 1.40 m

1
2
3
4

Remarks:

Groundwater:

AGS

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Trialpit No
TP5
Sheet 1 of 1

Project Name Glyn-neath	Project No. 10287	Co-ords: - Level: -	Date 20/03/2008
Location: Glyn-neath		Dimensions: - Depth 2.70m	Scale 1:25
Client: Moore Knight Limited			Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Firm dark brown mottled black slightly sandy slighlty gravelly CLAY with cobbles. Gravel is fine to course of subrounded to angular sandstone. Occasional pockets of sand. Occasional plastic, brick and wood fragments.
			0.50			MADE GROUND: Soft to firm brown black very sandy gravelly CLAY with cobbles and boulders which become more frequent with depth. Gravel is fine to course mostly medium grained of rounded to angular sandstone, brick fragments. Common wood, concrete nodules, metal, wire and asphalt.
			2.70			MADE GROUND: Large concrete obstruction. Hole abandoned. Trialpit Complete at 2.70 m

1
2
3
4

Remarks:

Groundwater:

AGS

HoleBASE III (Bld 412,232) Standard Trialpit Log V2 Dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Trialpit No
TP7
Sheet 1 of 1

Project Name: Glyn-neath	Project No.: 10287	Co-ords: 88540E - 6931N Level: 66.00 m AOD	Date: 20/03/2008
Location: Glyn-neath		Dimensions: -	Scale: 1:25
Client: Moore Knight Limited		Depth: 2.95m	Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Soft dark brown gravelly sandy CLAY with cobbles. Gravel and cobbles are fine to course of rounde dto subangular sandstone and brick fragments. Common wood, plastic pipe metal bars and roots.
			2.20	63.80		MADE GROUND: Soft to firm grey black gravelly very sandy CLAY. Gravel and cobbles are fine to coarse rounded to angular brick fragments, ash and sandstone. Common pockets of red medium sand.
			2.95	63.05		Trialpit Complete at 2.95 m

Remarks:

Groundwater:

AGS

TERRA FIRMA (WALES) LIMITED TEL: 02920 735354 FAX: 02920 735433			Trialpit No **TP8** Sheet 1 of 1
Project Name Glyn-neath	Project No. 10287	Co-ords: 88531E - 6915N Level: 51.00 m AOD	Date 20/03/2008
Location: Glyn-neath		Dimensions: -	Scale 1:25
Client: Moore Knight Limited		Depth 3.04m	Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			3.04	47.96		PEAT: Soft dark brown fibrous peat with frequent roots and wood fragments.
						Trialpit Complete at 3.04 m

Remarks:

Groundwater:

AGS

HoleBASE III (Bd 412.22) Standard Trialpit Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED

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Trialpit No
TP9
Sheet 1 of 1

Project Name: Glyn-neath	Project No.: 10287	Co-ords: 88519E - 6991N Level: 77.00 m AOD	Date: 20/03/2008
Location: Glyn-neath		Dimensions: - Depth 2.60m	Scale: 1:25
Client: Moore Knight Limited			Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Medium dense dark brown clayey sandy gravelly subangular to angular brick fragements and tablular sandstone COBBLES.
			1.00	76.00		MADE GROUND: Soft brown gravelly sandy CLAY. Gravel is fine to coarse of subrouned to angular brick fragments and sandstone. Frequent wood rootlets and plastic.
			2.60	74.40		Trialpit Complete at 2 60 m

1
2
3
4

Remarks:

Groundwater:

AGS

TERRA FIRMA (WALES) LIMITED TEL: 02920 735354 FAX: 02920 735433			Trialpit No **TP10** Sheet 1 of 1
Project Name Glyn-neath	Project No. 10287	Co-ords: - Level: -	Date 20/03/2008
Location: Glyn-neath		Dimensions: - Depth 1.90m	Scale 1:25
Client: Moore Knight Limited			Logged By

Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
						MADE GROUND: Soft to firm dark brown mottled black gravelly sandy CLAY with cobbles. Gravel is fine to coarse rounded to angular brick fragments and sandstone. Common plastic ceramic.
			0.80			MADE GROUND: Soft to firm light brown mottled black gravelly very sandy CLAY with cobbles. Gravel is fine to coarse rounded to angular brick fragments and sandstone. Common plastic ceramic.
			1.40			MADE GROUND: Soft to firm light brown slightly sandy slightly gravelly CLAY with some cobbles. Gravel is fine to coarse rounded to angular brick fragments and sandstone. Common plastic ceramic.
			1.90			Trialpit Complete at 1.90 m

Scale: 1, 2, 3, 4

Remarks:

Groundwater:

AGS

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Trialpit No
TP11
Sheet 1 of 1

Project Name: Glyn-neath	Project No.: 10287	Co-ords: - Level: -	Date: 20/03/2008
Location: Glyn-neath		Dimensions: - Depth 1.70m	Scale: 1:25
Client: Moore Knight Limited			Logged By

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Medium dence light brown silty sandy fine to coarse subrounded to angular brick fragment and sandstone GRAVEL. Cobbles of large tablular sandstone cobbles.
			1.70			MADE GROUND: Large concrete obstruction. Hole abandoned
						Trialpit Complete at 1.70 m

1
2
3
4

Remarks:

Groundwater:

AGS

HoleBASE III (Bld 412.22) Standard Trialpit Log V2 dated 27th Nov 03

Annex F
Shell and Auger Borehole Logs

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No
BH1
Sheet 1 of 2

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Cable
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 19/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		1.00	CPT	N=24 N=24 (2,5,5,6,6,7)				MADE GROUND: Firm dark brown /grey silty sandy slightly clayey fine to coarse sub-angular to sub-rounded gravels and cobbles with occasional boulders
		2.00	CPT	N=17 N=17 (3,5,5,4,4,4)	2.00			MADE GROUND: Firm black/grey gravely bouldery CLAY
		3.00	CPT	N=29 N=29 (8,9,6,7,8,8)				
		4.00	CPT	N=10 N=10 (1,2,2,3,2,3)				
		5.00	CPT	N=25 N=25 (2,4,5,5,6,9)	4.80			Stiff brown to grey and orange mottled sandy in places BOULDER CLAY, fine to coarse gravels and cobbles
		6.50	CPT	N=27 N=27 (3,3,5,5,9,8)				
		7.00	CPT	N=31 N=31 (4,8,8,8,8,7)	7.00			Stiff brown gravely CLAY
		8.50	CPT	N=39 N=39 (7,8,10,1,14,14)	8.50			Weathered Mudstone GRAVELS
		9.50	CPT	N=99 N=99 (5,10,11,13,25,50)	9.50			Clayey mudstone gravels
		Type		Results				Continued next sheet

Remarks: Chiselling for 1 hour between 10m and 10.2m depth

AGS

HoleBASE III (Bid 412.23) Standard Borehole Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No **BH1**
Sheet 2 of 2

Project Name Glyn-neath	Project No. 10287	Co-ords: -	Hole Type Cable
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 19/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		10.00	CPT	50/75mm 75mm - Abandoned	10.00			End of Borehole at 10.02 m

11
12
13
14
15
16
17
18
19

Type Results

Remarks: Chiselling for 1 hour between 10m and 10.2m depth

AGS

HoleBASE III (Bld 412.22) Standard Borehole Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
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Borehole No
BH2
Sheet 1 of 1

Project Name: Glyn-neath	Project No.: 10287	Co-ords: -	Hole Type: Cable
Location: Glyn-neath		Level: -	Scale: 1:50
Client: Moore Knight Limited		Dates: 26/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MADE GROUND: Firm dark grey/brown silty sandy clayey fine to coarse subangular to sub-rounded GRAVELS and COBBLES, large boulders
		1.00	SPT	N=23 N=23 (2,1,1,5,7,10)	1.00			Stiff becomign very stiff brown/grey or grey and orange mottled silty CLAY, fine to ocarse sub-angular gravels and cobbles of sandstone, old roots between 4m and 5m depth, large boulders at depth
		2.00	CPT	N=38 N=38 (6,6,9,10,11,8)				
		3.00	CPT	N=60 N=60 (6,14,17,16,12,15)				
		4.00	CPT	N=33 N=33 (5,7,7,11,9,6)				
		5.00	CPT	N=34 N=34 (4,8,8,8,9,9)				
		6.50	CPT	50/75mm 75mm (17,29,50)	6.50			End of Borehole at 6.50 m

Type	Results

Remarks: Chiselling for 1 hour at 6.5m depth

AGS

TERRA FIRMA (WALES) LIMITED
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Borehole No **BH3**
Sheet 1 of 2

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Cable
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 17/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MADE GROUND: Firm brown/grey becoming black sandy silty CLAY, fine to coarse sub-angular to sub-rounded gravels and cobbles, brick fragments, boulders
		1.00	CPT	N=21 N=21 (7,6,6,7,4,4)				
		2.00	CPT	N=22 N=22 (4,5,4,4,7,7)				
		3.00	SPT	N=14 N=14 (3,2,2,2,5,5)				
		4.00	SPT	N=15 N=15 (3,5,7,3,3,2)				
					4.80			MADE GROUND: Stiff becoming firm grey green CLAY, wood, mudstone fragments
		5.00	SPT	N=16 N=16 (2,3,3,5,4,4)				
		6.50	SPT	N=25 N=25 (4,6,9,4,5,7)				
		8.00	SPT	N=7 N=7 (5,5,2,2,2,1)				
					8.50			Grey gravelly CLAY
		9.00	CPT	N=30 N=30 (3,5,5,8,8,9)	9.00			Stiff very sandy very gravely CLAY
		9.50	CPT	N=33 N=33 (4,7,7,7,9,10)	9.50			Stiff very sandy silty gravely BOULDER CLAY
		Type		Results				Continued next sheet

Remarks: Chiselling for 30 mins between 0.2m and 0.4m depth, for 1 hour between 0.6m and 0.9m depth and for 1 hour between 11.5m and 11.6m depth

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HoleBASE III (Bld 412.23) Standard Borehole Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
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Borehole No
BH3
Sheet 2 of 2

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Cable
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 17/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Stiff very sandy silty gravely BOULDER CLAY
		11.00	CPT	55/75mm 75mm (10,8,5,50)				
		11.50	CPT	50/75mm				
		11.60	CPT	75mm50/0mm - Abandoned	11.60			End of Borehole at 11.60 m

Type	Results

Remarks: Chiselling for 30 mins between 0.2m and 0.4m depth, for 1 hour between 0.6m and 0.9m depth and for 1 hour between 11.5m and 11.6m depth

AGS

HoleBASE III (Bd 412.22) Standard Borehole Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
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Borehole No **BH4**
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Cable
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 27/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
		1.00	CPT	N=17 N=17 (1,3,3,4,5,5)				MADE GROUND: Firm dark brown /grey sandy silty CLAY, fine to coarse angular to sub-angular gravels and cobbles, brick fragments
		2.00	CPT	N=15 N=15 (11,7,3,4,4,4)				
					2.60			MADE GROUND: Tar fragments
		3.00	SPT	N=12 N=12 (2,2,2,3,4,3)	2.90			MADE GROUND: Medium dense darkbrown clayey silty SAND and fine to coarse angular to sub-rounded gravels, cobbles and boulders, to firm to stiff grey and brown mottled gravely cobbley bouldery CLAY, occasional brick fragments, plastic, timber
		4.00	CPT	N=38 N=38 (4,7,8,8,11,11)				
		5.00	CPT	N=31 N=31 (2,7,3,5,10,13)				
		6.50	CPT	N=28 N=28 (2,2,3,8,8,9)	6.50			Brown CLAY
		7.00	CPT	50/75mm 75mm - Abandoned				
G		7.20	CPT	50/75mm 75mm - Abandoned	7.20			End of Borehole at 7.20 m

Type	Results

Remarks: Chiselling for 1 hour between 0.3 - 0.7m, 1 hour between 2.6 - 1.9m, 30mins between 4.8m and 5.0m and for 1 hour between 7 and 7.2m depth.

AGS

HoleBASE III (Bd 4.12.23) Standard Borehole Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
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Borehole No **BH5** Sheet 1 of 1

Project Name: Glyn-neath	Project No.: 10287	Co-ords: -	Hole Type: Cable
Location: Glyn-neath		Level: -	Scale: 1:50
Client: Moore Knight Limited		Dates: 25/03/2008	Logged By:

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MADE GROUND: Medium dense dark grey/brown clayey silty sandy fine to coarse sub-angular to sub-rounded GRAVELS and COBBLES becoming stiff gravely cobbley CLAY
		1.00	CPT	N=18 N=18 (2,4,4,4,6,4)				
		2.00	SPT	N=27 N=27 (5,9,10,7,5,5)				
		3.00	CPT	N=20 N=20 (4,5,4,4,6,6)	3.00			MADE GROUND: Stiff grey/black CLAY, fine to coarse angular to sub-rounded gravels and cobbles, boulders, ashy in places, occasional plastic
		4.00	CPT	N=32 N=32 (7,10,11,9,6,6)				
		5.00	CPT	N=25 N=25 (4,4,4,6,9,6)				
	▽							
		6.50	CPT	N=28 N=28 (1,5,9,9,6,4)				
					7.80			MADE GROUND: Stiff black CLAY, gravels and boulders, Steel
		8.00	CPT	50/75mm 75mm (11,17,50)	8.00			End of Borehole at 8.30 m
		8.30	CPT	50/75mm 75mm - Abandoned				
			Type	Results				

Remarks: Chiselling for 1 hour between 0.5m and 0.9m depth, for 1 hour between 1.7m and 2.0m depth and for 1 hour between 8.0m and 8.3m depth

AGS

Annex G
Rotary Probehole Logs

TERRA FIRMA (WALES) LIMITED TEL: 02920 735354 FAX: 02920 735433			Borehole No **PH1** Sheet 1 of 2
Project Name Glyn-neath	Project No. 10287	Co-ords: -	Hole Type Rotary
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 20/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MADE GROUND
					5.00			Stiff CLAY
					7.00			MUDSTONE GRAVEL
					8.50			CLAY
					9.50			MUDSTONE

Continued next sheet

Remarks: Casing to 11m depth

AGS

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Borehole No
PH1
Sheet 2 of 2

Project Name: Glyn-neath	Project No.: 10287	Co-ords: -	Hole Type: Rotary
Location: Glyn-neath		Level: -	Scale: 1:50
Client: Moore Knight Limited		Dates: 20/03/2008	Logged By:

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MUDSTONE
					11.00			
		11.00-12.00	50	0 0				Moderately weak grey with slight discolouration MUDSTONE. Initially completely weathered into fine to medium sub-angular gravels becoming highly weathered and broken up into angular gravels along natural fractures during drilling
					12.00			Residual soil: Very stiff becoming dry clay with mudstone lithorelics
		12.00-13.50	33	0 0				
					13.50			Completely weathered grey MUDSTONE which has diintergrated into very weak mudstone gravels becoming highly weathered and very weak, broken up into angular gravels along natural fractures during drilling
		13.50-15.00	66	0 0				
					15.00			Moderately weathered weak dark grey MUDSTONE
		15.00-16.00	100	45 65				
					16.00			End of Borehole at 16.00 m

TCR | SCR | RQD | FI

Remarks: Casing to 11m depth

AGS

TERRA FIRMA (WALES) LIMITED TEL: 02920 735354 FAX: 02920 735433			Borehole No **PH2** Sheet 1 of 3
Project Name Glyn-neath	Project No. 10287	Co-ords: -	Hole Type Rotary
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 18/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MADE GROUND
					5.20			Soft dark grey peaty CLAY

Scale (m): 1, 2, 3, 4, 5, 6, 7, 8, 9

Continued next sheet

Remarks: Casing to 17m depth

AGS

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Borehole No **PH2**
Sheet 2 of 3

Project Name: Glyn-neath	Project No.: 10287	Co-ords: -	Hole Type: Rotary
Location: Glyn-neath		Level: -	Scale: 1:50
Client: Moore Knight Limited		Dates: 18/03/2008	Logged By:

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								Soft dark grey peaty CLAY
					11.00			BLUE CLAY
					16.00			Weathered SANDSTONE
		17.00-18.50	66	0 0	17.00			Completely weathered grey mottled with orange/brown veining MUDSTONE with areas light grey very silty sand with pink veining becoming moderately weak highly weathered light grey MUDSTONE with pink veining
		18.50-20.00	80	0 0	18.50			Highly weathered grey MUDSTONE broken up into angular gravels along natural fractures during drilling becoming weak dark grey highly weathered MUDSTONE with many fractures of random orientation, rough fracture surfaces

TCR | SCR | RQD | FI

Continued next sheet

Remarks: Casing to 17m depth

AGS

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TEL: 02920 735354 FAX: 02920 735433

Borehole No
PH2
Sheet 3 of 3

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Rotary
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 18/03/2008	Logged By

Well	Water Strikes	Rotary Coring Depth (m)	TCR	SCR	RQD	FI	Depth (m)	Level (m AOD)	Legend	Stratum Description
		20.00-21.00	80	0	0		20.00			Highly to completely weathered grey MUDSTONE broken up into angular gravels along natural fractures during drilling. Banded (approx 10cm thick) with damp silty SAND with fine mudstone gravels
		21.00-22.00	100	0	0		21.00			Highly weathered and finely fractured grey MUDSTONE broken up into gravels in places becoming moderately weathered with many fratures of random orientation up to 4mm thick. Some fractures infilled with clay
							22.00			End of Borehole at 22.00 m

21 22 23 24 25 26 27 28 29

TCR	SCR	RQD	FI

Remarks: Casing to 17m depth

AGS

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No
PH3
Sheet 1 of 3

Project Name: Glyn-neath	Project No.: 10287	Co-ords: -	Hole Type: Rotary
Location: Glyn-neath		Level: -	Scale: 1:50
Client: Moore Knight Limited		Dates: 19/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MADE GROUND
					2.60			Soft dark CLAY
					8.30			BOULDER CLAY
			Type	Results				Continued next sheet

Remarks: Borehole collapsing at 24m depth
Casing to 16m

AGS

HoleBASE III (Bd 41223) Standard Borehole Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No **PH3**
Sheet 2 of 3

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Rotary
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 19/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
					10.00			CLAY with SANDSTONE BOULDERS
	▽							
					15.50			SANDSTONE
		16.00-17.50	TCR 26	SCR 0 RQD 0 FI	16.00			Highly weather Mudstone broken up into angular gravels along natural fractures during drilling, becoming completely weathered into gravels
		17.50-19.00	TCR 46	SCR 0 RQD 0	17.50			RESIDUAL SOIL: dark grey silty CLAY with fine to medium angular mudstone gravels grading into moderate to highly weathered MUDSTONE broken up into angular gravels along natural fractures during drilling
		19.00-20.50	TCR 33	SCR 0 RQD 0	19.00			Comletely weathered MUDSTONE into fine to medium weak mudstone gravels

Continued next sheet

Remarks: Borehole collapsing at 24m depth
Casing to 16m

AGS

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No **PH3**

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Rotary
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 19/03/2008	Logged By

Well	Water Strikes	Rotary Coring Depth (m)	TCR	SCR	RQD	FI	Depth (m)	Level (m AOD)	Legend	Stratum Description
										Comletely weathered MUDSTONE into fine to medium weak mudstone gravels
		20.50-21.00	20	0	0		20.50			Completely weathered MUDSTONE into fine to medium soft very weak silty gravels
							21.00			SOFT DRILL
							26.00			MUDSTONE
							27.00			End of Borehole at 27.00 m

Depth scale: 21, 22, 23, 24, 25, 26, 27, 28, 29

Remarks: Borehole collapsing at 24m depth
Casing to 16m

AGS

HoleBASE III (Bld 412.22) Standard Borehole Log v2 dated 27th Nov 03

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No **PH4**
Sheet 2 of 2

Project Name	Project No.	Co-ords: -	Hole Type
Glyn-neath	10287		Rotary
Location: Glyn-neath		Level: -	Scale 1:50
Client: Moore Knight Limited		Dates: 18/03/2008	Logged By

Well	Water Strikes	Rotary Coring Depth (m)	TCR	SCR	RQD	FI	Depth (m)	Level (m AOD)	Legend	Stratum Description
		10.00-11.50	0	0	0					BROKEN MUDSTONE, possible boulders 10.0 - 11.5m cored - no recovery
		12.50-14.00	66	22	0		12.50			Weathered grey MUDSTONE, fragmented into gravels on drilling becoming completely weathered mudstone into grey sand and sub-angular gravels with hard silty clay matrix, grading back into weak highly weatehred grey MUDSTONE with brown veining
		14.00-15.30	66	0	0		14.00			Completely weathered grey with brown discolouration MUDSTONE into wet very silty sandy fine to coarse gravels
		15.30-15.80	80	0	0		15.30			Highly weatehred grey MUDSTONE
		15.80-16.50	71	0	0					
		16.50-17.50	80	0	0		16.50			Moderately weathered grey MUDSTONE, broken into angular gravels on drilling along natyural fractures, no visible frature infill Moderately weathered grey MUDSTONE with a very weathered orange/brown vein and coarse cream/white quartz grains/softy silty sandy veining. Mudstone broken up into angular gravels along natural fractures during drilling. Fractures have rough surfaces and no infill
							17.50			End of Borehole at 17.50 m
			TCR	SCR	RQD	FI				

Depth scale: 11, 12, 13, 14, 15, 16, 17, 18, 19

Remarks: Casing to 12.50m depth

AGS

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No
PH5
Sheet 1 of 2

Project Name: Glyn-neath	Project No.: 10287	Co-ords: -	Hole Type: Rotary
Location: Glyn-neath		Level: -	Scale: 1:50
Client: Moore Knight Limited		Dates: 17/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								MADE GROUND
					5.00			SOFT DRILL
					9.00			BROKEN SANDSTONE, BOULDERS
			Type	Results				Continued next sheet

Remarks: Casing to 11.50m depth

AGS

TERRA FIRMA (WALES) LIMITED
TEL: 02920 735354 FAX: 02920 735433

Borehole No
PH5
Sheet 2 of 2

Project Name: Glyn-neath	Project No.: 10287	Co-ords: -	Hole Type: Rotary
Location: Glyn-neath		Level: -	Scale: 1:50
Client: Moore Knight Limited		Dates: 17/03/2008	Logged By

Well	Water Strikes	Samples & In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Legend	Stratum Description
								BROKEN SANDSTONE, BOULDERS
					10.50			Weathered Broken SANDSTONE
		12.00-13.00	80	30 0	12.00			Dark grey moderately weathered MUDSTONE/SILTSTONE, 5 main fractures but rick completely broken up in places. Fracrures smooth to undulated with diagonal approx 15 degree dip, 1-2mm spaced with silty infill in places.
		13.00-13.70	57	0 0	13.00			High to moderately weathered highly fracturedgrey MUDSTONE with brown/grey discolouration. Broken up into coarse angular gravels along natural fractures during drilling with undulated to rough surfaces
		13.70-14.50	100	0 0	13.70			Highly weathered slightly to moderately weak fine grey laminated MUDSTONE with grey/yellow discolouration throughout. Broken up into coarse angular gravels along natural fratures during drilling
		14.50-15.50	85	0 0	14.50			Moderately weathered grey brown MUDSTONE/SILTSTONE with brown discolouration, broken up into coarse angular gravels along natural fratures during drilling. Fractures have rough to undulated surfaces. 14.5 - 14.6 : highly weathered rock to sub-angular gravels with hard clay/silty matrix
		15.50-17.00	86	10 10	15.50			Moderately weak slightly weathered grey MUDSTONE, 7 main fractures, 1-2mm width with horizontal to 15 degree orientation, many natural randon natural fractures
					17.00			End of Borehole at 17.00 m

TCR | SCR | RQD | FI

Remarks: Casing to 11.50m depth

AGS

HoleBASE III (Bit 41222) Standard Borehole Log v2 dated 27th Nov 03

Annex H
Laboratory Soil Chemical Test Results

Report Summary

1314
0897
1229
1510

Ms Ruth Lilley
Terra Firma
5 Deryn Court
Wharfdale
Pentwyn
Cardiff
CF23 7HB

Date of Issue: **23 April 2008**

Report Number: **MID/502923/2008** Issue **3**

Job Description: Ruth Lilley - General

Job Location: Glyn-Neath

Number of Samples included in this report **6**

Job Received: **27 March 2008**

Number of Test Results included in this report **166**

Analysis Commenced: **27 March 2008**

Signed:

Name: **G. Smith** Date: **23 April 2008**

Title: **Inorg and License Chem Manager**

STL was not responsible for sampling unless otherwise stated. Sampling is not covered by our UKAS accreditation.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory
MCERTS accreditation refers to analysis carried out at our STL Midlands site only
Analysis carried out on air-dried and ground test portion of the sample(s), unless otherwise stated. Air drying is carried out at not greater than 30 degrees C. Samples are not preserved on site, unless otherwise stated.
All results are reported on an air-dried basis following removal of stones.

Certificate of Analysis

1314
0897
1229
1510

Matrix: **Soil**

Report Number: **MID/502923/2008** Issue **3**
Laboratory Number: **10485595** Sample **1** of **6**
Sample Source: **Terra Firma**
Sample Point Description: **Terra Firma**
Sample Description: **TP3 0.40m**
Visual Description: **Brown loam with some stones**
Sample Date: Sample Time: **1** Sample Received: **27 March 2008**

Test Description	Result	Units	Analysis Date	UoM%	Accreditation		Method
Stones BG 2.6/3.0	23	%	31/03/2008		N	Mid	Stones
Moisture content at 30 C	20	%	31/03/2008		N	Mid	33A
Arsenic as As, dry weight	12	mg/kg	01/04/2008		M	Mid	30/30C
Cadmium as Cd, dry weight	<0.50	mg/kg	01/04/2008		M	Mid	30
Chromium as Cr, dry weight	27	mg/kg	01/04/2008		M	Mid	30
Copper, as Dry Weight	20	mg/kg	01/04/2008		M	Mid	30
Lead, as Dry Weight	65	mg/kg	01/04/2008		M	Mid	30
Mercury as Hg, dry weight	<0.25	mg/kg	01/04/2008		M	Mid	30C
Nickel as Ni, dry weight	19	mg/kg	01/04/2008		M	Mid	30
Selenium as Se, dry weight	<0.30	mg/kg	01/04/2008		M	Mid	30C
Zinc as Zn, dry weight	83	mg/kg	01/04/2008		M	Mid	30
Cyanide (Total)	<2.5	mg/kg	03/04/2008		M	Mid	14
Organic matter	1.5	%	08/04/2008		Y	Mid	36
Tot. Steam Dist. Monophenols	<0.75	mg/kg	31/03/2008		M	Mid	40A
Sulphate (Total) as SO4	<0.024	%	31/03/2008		M	Mid	45
pH	7.8	pH units	31/03/2008		Y	Mid	39
naphthalene	<0.50	mg/kg	02/04/2008		M	Mid	307
acenaphthylene	<0.50	mg/kg	02/04/2008		M	Mid	307
acenaphthene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluorene	<0.50	mg/kg	02/04/2008		M	Mid	307
phenanthrene	1.0	mg/kg	02/04/2008		M	Mid	307
anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluoranthene	1.4	mg/kg	02/04/2008		M	Mid	307
pyrene	1.6	mg/kg	02/04/2008		M	Mid	307
benzo(a)anthracene	0.87	mg/kg	02/04/2008		M	Mid	307
chrysene	1.1	mg/kg	02/04/2008		M	Mid	307
benzo(b)fluoranthene	1.1	mg/kg	02/04/2008		M	Mid	307
benzo(k)fluoranthene	0.81	mg/kg	02/04/2008		M	Mid	307
benzo(a)pyrene	1.1	mg/kg	02/04/2008		M	Mid	307
dibenzo(ah)anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
benzo(ghi)perylene	1.1	mg/kg	02/04/2008		M	Mid	307
indeno(123cd)pyrene	0.98	mg/kg	02/04/2008		M	Mid	307
PAH (Total - SUM EPA16)	11	mg/kg	02/04/2008		M	Mid	307

Analyst Comments for 10485595: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered, I/S=Insufficient sample

Certificate of Analysis

1314
0897
1229
1510

Matrix: **Soil**

Report Number: **MID/502923/2008** Issue **3**
Laboratory Number: **10485596** Sample **2** of **6**
Sample Source: **Terra Firma**
Sample Point Description: **Terra Firma**
Sample Description: **TP5 0.60m**
Visual Description: **Brown loam with some stones**
Sample Date: Sample Time: **2** Sample Received: **27 March 2008**

Test Description	Result	Units	Analysis Date	UoM%	Accreditation		Method
Stones BG 2.6/3.0	12	%	31/03/2008		N	Mid	Stones
Moisture content at 30 C	12	%	31/03/2008		N	Mid	33A
Arsenic as As, dry weight	12	mg/kg	01/04/2008		M	Mid	30/30C
Cadmium as Cd, dry weight	2.1	mg/kg	01/04/2008		M	Mid	30
Chromium as Cr, dry weight	12	mg/kg	01/04/2008		M	Mid	30
Copper, as Dry Weight	33	mg/kg	01/04/2008		M	Mid	30
Lead, as Dry Weight	130	mg/kg	01/04/2008		M	Mid	30
Mercury as Hg, dry weight	0.26	mg/kg	01/04/2008		M	Mid	30C
Nickel as Ni, dry weight	24	mg/kg	01/04/2008		M	Mid	30
Selenium as Se, dry weight	0.34	mg/kg	01/04/2008		M	Mid	30C
Zinc as Zn, dry weight	310	mg/kg	01/04/2008		M	Mid	30
Cyanide (Total)	<2.5	mg/kg	03/04/2008		M	Mid	14
Organic matter	3.4	%	08/04/2008		Y	Mid	36
Tot. Steam Dist. Monophenols	<0.75	mg/kg	31/03/2008		M	Mid	40A
Sulphate (Total) as SO4	<0.024	%	31/03/2008		M	Mid	45
pH	8.4	pH units	31/03/2008		Y	Mid	39
PAH (Total - SUM EPA16)	<2.0	mg/kg	02/04/2008		M	Mid	307

Analyst Comments for 10485596: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. I/S=Insufficent sample

Certificate of Analysis

1314
0897
1229
1510

Matrix: **Soil**

Report Number: **MID/502923/2008** Issue **3**
Laboratory Number: **10485597** Sample **3** of **6**
Sample Source: **Terra Firma**
Sample Point Description: **Terra Firma**
Sample Description: **TP6 0.50m**
Visual Description: **Brown clay with occasional stones**
Sample Date: Sample Time: **3** Sample Received: **27 March 2008**

Test Description	Result	Units	Analysis Date	UoM%	Accreditation		Method
Stones BG 2.6/3.0	25	%	31/03/2008		N	Mid	Stones
Moisture content at 30 C	12	%	31/03/2008		N	Mid	33A
Arsenic as As, dry weight	8.6	mg/kg	01/04/2008		M	Mid	30/30C
Cadmium as Cd, dry weight	<0.50	mg/kg	01/04/2008		M	Mid	30
Chromium as Cr, dry weight	10	mg/kg	01/04/2008		M	Mid	30
Copper, as Dry Weight	18	mg/kg	01/04/2008		M	Mid	30
Lead, as Dry Weight	35	mg/kg	01/04/2008		M	Mid	30
Mercury as Hg, dry weight	<0.25	mg/kg	01/04/2008		M	Mid	30C
Nickel as Ni, dry weight	17	mg/kg	01/04/2008		M	Mid	30
Selenium as Se, dry weight	<0.30	mg/kg	01/04/2008		M	Mid	30C
Zinc as Zn, dry weight	73	mg/kg	01/04/2008		M	Mid	30
Cyanide (Total)	<2.5	mg/kg	03/04/2008		M	Mid	14
Organic matter	1.5	%	08/04/2008		Y	Mid	36
Tot. Steam Dist. Monophenols	<0.75	mg/kg	31/03/2008		M	Mid	40A
Sulphate (Total) as SO4	<0.024	%	31/03/2008		M	Mid	45
pH	8.7	pH units	31/03/2008		Y	Mid	39
PAH (Total - SUM EPA16)	<2.0	mg/kg	02/04/2008		M	Mid	307

Analyst Comments for 10485597: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted
Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered I/S=Insufficient sample

Certificate of Analysis

1314
0897
1229
1510

Matrix: **Soil**

Report Number: **MID/502923/2008** Issue **3**
Laboratory Number: **10485598** Sample **4** of **6**
Sample Source: **Terra Firma**
Sample Point Description: **Terra Firma**
Sample Description: **TP8 0.70m**
Visual Description: **Brown loam with many stones and occasional roots**
Sample Date: Sample Time: **4** Sample Received: **27 March 2008**

Test Description	Result	Units	Analysis Date	UoM%	Accreditation		Method
Stones BG 2.6/3.0	71	%	31/03/2008		N	Mid	Stones
Moisture content at 30 C	22	%	31/03/2008		N	Mid	33A
Arsenic as As, dry weight	13	mg/kg	01/04/2008		M	Mid	30/30C
Cadmium as Cd, dry weight	<0.50	mg/kg	01/04/2008		M	Mid	30
Chromium as Cr, dry weight	6.9	mg/kg	01/04/2008		M	Mid	30
Copper, as Dry Weight	54	mg/kg	01/04/2008		M	Mid	30
Lead, as Dry Weight	130	mg/kg	01/04/2008		M	Mid	30
Mercury as Hg, dry weight	<0.25	mg/kg	01/04/2008		M	Mid	30C
Nickel as Ni, dry weight	22	mg/kg	01/04/2008		M	Mid	30
Selenium as Se, dry weight	0.77	mg/kg	01/04/2008		M	Mid	30C
Zinc as Zn, dry weight	130	mg/kg	01/04/2008		M	Mid	30
Cyanide (Total)	<2.5	mg/kg	03/04/2008		M	Mid	14
Organic matter	3.9	%	08/04/2008		Y	Mid	36
Tot. Steam Dist. Monophenols	<0.75	mg/kg	31/03/2008		M	Mid	40A
Sulphate (Total) as SO4	0.026	%	31/03/2008		M	Mid	45
pH	8.2	pH units	31/03/2008		Y	Mid	39
naphthalene	<0.50	mg/kg	02/04/2008		M	Mid	307
acenaphthylene	<0.50	mg/kg	02/04/2008		M	Mid	307
acenaphthene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluorene	<0.50	mg/kg	02/04/2008		M	Mid	307
phenanthrene	0.84	mg/kg	02/04/2008		M	Mid	307
anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluoranthene	1.1	mg/kg	02/04/2008		M	Mid	307
pyrene	0.82	mg/kg	02/04/2008		M	Mid	307
benzo(a)anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
chrysene	<0.50	mg/kg	02/04/2008		M	Mid	307
benzo(b)fluoranthene	<0.50	mg/kg	02/04/2008		M	Mid	307
benzo(k)fluoranthene	<0.50	mg/kg	02/04/2008		M	Mid	307
benzo(a)pyrene	<0.50	mg/kg	02/04/2008		M	Mid	307
dibenzo(ah)anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
benzo(ghi)perylene	<0.50	mg/kg	02/04/2008		M	Mid	307
indeno(123cd)pyrene	<0.50	mg/kg	02/04/2008		M	Mid	307
PAH (Total - SUM EPA16)	2.7	mg/kg	02/04/2008		M	Mid	307

Analyst Comments for 10485598: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bn = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected. For Legionella ND=Not Detected in volume of sample filtered. I/S=Insufficient sample

Certificate of Analysis

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1510

Matrix: **Soil**

Report Number: **MID/502923/2008**
Laboratory Number: **10485599**
Sample Source: **Terra Firma**
Sample Point Description: **Terra Firma**
Sample Description: **TP9 1.40m**
Visual Description: **Brown loam with some stones**
Sample Date:

Issue **3**
Sample **5** of **6**

Sample Time: **5**

Sample Received: **27 March 2008**

Test Description	Result	Units	Analysis Date	UoM%	Accreditation		Method
Stones BG 2.6/3.0	23	%	31/03/2008		N	Mid	Stones
Moisture content at 30 C	14	%	31/03/2008		N	Mid	33A
Arsenic as As, dry weight	57	mg/kg	01/04/2008		M	Mid	30/30C
Cadmium as Cd, dry weight	<0.50	mg/kg	01/04/2008		M	Mid	30
Chromium as Cr, dry weight	14	mg/kg	01/04/2008		M	Mid	30
Copper, as Dry Weight	89	mg/kg	01/04/2008		M	Mid	30
Lead, as Dry Weight	160	mg/kg	01/04/2008		M	Mid	30
Mercury as Hg, dry weight	<0.25	mg/kg	01/04/2008		M	Mid	30C
Nickel as Ni, dry weight	19	mg/kg	01/04/2008		M	Mid	30
Selenium as Se, dry weight	<0.30	mg/kg	01/04/2008		M	Mid	30C
Zinc as Zn, dry weight	260	mg/kg	01/04/2008		M	Mid	30
Cyanide (Total)	<2.5	mg/kg	03/04/2008		M	Mid	14
Organic matter	3.4	%	08/04/2008		Y	Mid	36
Tot. Steam Dist. Monophenols	<0.75	mg/kg	31/03/2008		M	Mid	40A
Sulphate (Total) as SO4	0.098	%	31/03/2008		M	Mid	45
pH	9.0	pH units	31/03/2008		Y	Mid	39
naphthalene	<0.50	mg/kg	02/04/2008		M	Mid	307
acenaphthylene	<0.50	mg/kg	02/04/2008		M	Mid	307
acenaphthene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluorene	<0.50	mg/kg	02/04/2008		M	Mid	307
phenanthrene	1.1	mg/kg	02/04/2008		M	Mid	307
anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluoranthene	1.3	mg/kg	02/04/2008		M	Mid	307
pyrene	1.1	mg/kg	02/04/2008		M	Mid	307
benzo(a)anthracene	0.76	mg/kg	02/04/2008		M	Mid	307
chrysene	0.76	mg/kg	02/04/2008		M	Mid	307
benzo(b)fluoranthene	0.75	mg/kg	02/04/2008		M	Mid	307
benzo(k)fluoranthene	0.58	mg/kg	02/04/2008		M	Mid	307
benzo(a)pyrene	0.60	mg/kg	02/04/2008		M	Mid	307
dibenzo(ah)anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
benzo(ghi)perylene	<0.50	mg/kg	02/04/2008		M	Mid	307
indeno(123cd)pyrene	<0.50	mg/kg	02/04/2008		M	Mid	307
PAH (Total - SUM EPA16)	7.1	mg/kg	02/04/2008		M	Mid	307

Analyst Comments for 10485599: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bn = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. I/S=Insufficient sample

Severn Trent Laboratories Ltd.
Rayner House, 80 Lockhurst Lane, Coventry, CV6 5PZ Tel:+44 (0)24 7658 4800 Fax:+44 (0)24 7658 4848

Certificate of Analysis

1314
0897
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Matrix: **Soil**

Report Number: **MID/502923/2008**
Laboratory Number: **10485600**
Sample Source: **Terra Firma**
Sample Point Description: **Terra Firma**
Sample Description: **TP10 0.70m**
Visual Description: **Brown loam with some stones**
Sample Date: Sample Time: **6**

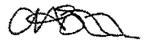
Issue **3**
Sample **6** of **6**

Sample Received: **27 March 2008**

Test Description	Result	Units	Analysis Date	UoM%	Accreditation		Method
Stones BG 2.6/3.0	26	%	31/03/2008		N	Mid	Stones
Moisture content at 30 C	11	%	31/03/2008		N	Mid	33A
Arsenic as As, dry weight	14	mg/kg	01/04/2008		M	Mid	30/30C
Cadmium as Cd, dry weight	<0.50	mg/kg	01/04/2008		M	Mid	30
Chromium as Cr, dry weight	19	mg/kg	01/04/2008		M	Mid	30
Copper, as Dry Weight	36	mg/kg	01/04/2008		M	Mid	30
Lead, as Dry Weight	96	mg/kg	01/04/2008		M	Mid	30
Mercury as Hg, dry weight	<0.25	mg/kg	01/04/2008		M	Mid	30C
Nickel as Ni, dry weight	15	mg/kg	01/04/2008		M	Mid	30
Selenium as Se, dry weight	<0.30	mg/kg	01/04/2008		M	Mid	30C
Zinc as Zn, dry weight	140	mg/kg	01/04/2008		M	Mid	30
Cyanide (Total)	<2.5	mg/kg	03/04/2008		M	Mid	14
Organic matter	4.2	%	08/04/2008		Y	Mid	36
Tot. Steam Dist. Monophenols	<0.75	mg/kg	31/03/2008		M	Mid	40A
Sulphate (Total) as SO4	0.083	%	31/03/2008		M	Mid	45
pH	8.6	pH units	31/03/2008		Y	Mid	39
naphthalene	0.89	mg/kg	02/04/2008		M	Mid	307
acenaphthylene	<0.50	mg/kg	02/04/2008		M	Mid	307
acenaphthene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluorene	<0.50	mg/kg	02/04/2008		M	Mid	307
phenanthrene	0.80	mg/kg	02/04/2008		M	Mid	307
anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
fluoranthene	0.95	mg/kg	02/04/2008		M	Mid	307
pyrene	0.97	mg/kg	02/04/2008		M	Mid	307
benzo(a)anthracene	0.70	mg/kg	02/04/2008		M	Mid	307
chrysene	0.66	mg/kg	02/04/2008		M	Mid	307
benzo(b)fluoranthene	0.75	mg/kg	02/04/2008		M	Mid	307
benzo(k)fluoranthene	0.63	mg/kg	02/04/2008		M	Mid	307
benzo(a)pyrene	0.77	mg/kg	02/04/2008		M	Mid	307
dibenzo(ah)anthracene	<0.50	mg/kg	02/04/2008		M	Mid	307
benzo(ghi)perylene	0.76	mg/kg	02/04/2008		M	Mid	307
indeno(123cd)pyrene	0.71	mg/kg	02/04/2008		M	Mid	307
PAH (Total - SUM EPA16)	8.6	mg/kg	02/04/2008		M	Mid	307

Analyst Comments for 10485600: No Analyst Comment

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Brn = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered I/S=Insufficient sample

Signed: 

Name: **G. Smith** Date: **23 April 2008**

Title: **Inorg and License Chem Manager**

SEVERN TRENT STL

DETERMINAND COMMENTS FOR REPORT MID/502923/2008 ISSUE 3

Date of Issue : 23 April 2008

Sample No	Description	Determinand	Comments

Signed: 

Name: **G. Smith** Date: **23 April 2008**

Title: **Inorg and License Chem Manager**

SEVERN TRENT STL

METHOD COMMENTS FOR REPORT MID/502923/2008 Issue 3

Date of Issue :**23 April 2008**

Method	Statement
14	The cyanides in the sample are determined in two stages. The free cyanide is liberated by heating with pH 4 buffer and the resulting gas collected in sodium hydroxide solution. Complex cyanide is liberated using phosphoric acid under the same conditions. the two portions of sodium hydroxide are then analysed for cyanide content using a discrete autoanalyser.
30	Metals are extracted from land samples by boiling with hydrochloric/nitric acids (3:1 ratio). The measurement of metal concentrations is determined directly on an ICP-OES at defined wavelengths.
30/30C	Metals are extracted from land samples by boiling with hydrochloric/nitric acids (3:1 ratio). For the measurement of metal concentrations is determined on an ICP-OES at defined wavelengths. Where a result is 25mg/kg or above results are obtained directly. Otherwise results are obtained via hydride generation.
307	PAH?s are extracted from land samples using acetone. The samples are shaken mechanically and then centrifuged. An aliquot of the supernatant liquid is then transferred to a separate vial and analysed by HPLC using a variable wavelength programme.
30C	Metals are extracted from land samples by boiling with hydrochloric/nitric acid (3:1 ratio). The measurement of metal concentrations is determined by means of hydride generation / atomic vapour on an ICP-OES at defined wavelengths.
33A	Moisture Content is the weight difference between an as received sample and the air dried sample at 30 degrees C.
36	This method determines the percentage, by dry mass, of natural organic matter present in soil.
39	The test is carried out by extraction using deionised water with agitation. The pH of this suspension is read directly from an electronic pH meter.
40A	This method determines steam distillable phenolic compounds in land materials. Phenol is extracted from air dried soil using steam distillation. The pH adjusted distillate is measured colorimetrically at a defined wavelength.
45	The sulphates are extracted from land samples using boiling hydrochloric acid solution. After cooling and filtration the determination of sulphate is obtained from an aliquot of solution, via a turbidimetric measurement.
Stones	The percentage weight of the stones that are naturally occurring and are greater than 10mm in diameter of the total weight of sample.

Annex I
Laboratory Leachate Test Results

Report Summary

Ms Ruth Lilley
Terra Firma
5 Deryn Court
Wharfdale
Pentwyn
Cardiff
CF23 7HB

UKAS TESTING
1314
0897
1229
1510

SEVERN TRENT STL

Date of Issue: **22 April 2008**

Report Number: **COV/506496/2008** Issue **1**

Number of Samples included in this report **5**

Number of Test Results included in this report **77**

Site Name: **Glyn-Neath**
Job Received: **09 April 2008**
Analysis Commenced: **09 April 2008**
Order No: **FAO Gwyn Lake**

Signed:

Name: **G. Smith** Date: **22 April 2008**

Title: **Inorg and License Chem Manager**

STL was not responsible for sampling unless otherwise stated. Sampling is not covered by our UKAS accreditation.

Information on the methods of analysis and performance characteristics are available on request.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory.

Certificate of Analysis

UKAS TESTING
1314
0897
1229
1510

SEVERN TRENT STL

Report Number: **COV/506496/2008** Issue **1**
Site Name: **Glyn-Neath**

Group	Determinand	Unit	Method/ Accreditation			Leachate				
						10509895 TP3 0.40m	10509896 TP5 0.60m	10509897 TP8 0.70m	10509898 TP9 1.40m	10509899 TP10 0.70m
Sample Preparation	NRA Leachate		NRA Leachate	N	Mid	Y	Y	Y	Y	Y
Metals	Arsenic (Soluble)	ug/l	56	Y	Mid	-	-	-	2.2	-
	Zinc (Soluble)	ug/l	56	Y	Mid	-	6.9	-	<5.0	5.2
PAH	naphthalene	ug/l	331	N	Mid	0.13	-	0.31	0.050	0.18
	acenaphthene	ug/l	331	Y	Mid	0.015	-	0.017	0.022	0.017
	acenaphthylene	ug/l	331	Y	Mid	<0.010	-	0.021	0.022	0.018
	fluorene	ug/l	331	Y	Mid	0.037	-	0.17	0.074	0.052
	phenanthrene	ug/l	331	Y	Mid	0.036	-	0.048	0.021	0.051
	anthracene	ug/l	331	Y	Mid	0.012	-	0.014	0.066	0.015
	fluoranthene	ug/l	331	Y	Mid	<0.010	-	0.010	0.11	0.024
	pyrene	ug/l	331	Y	Mid	<0.010	-	0.011	0.097	0.030
	benzo(a)anthracene	ug/l	331	Y	Mid	<0.010	-	<0.010	0.018	0.013
	chrysene	ug/l	331	Y	Mid	<0.010	-	<0.010	0.013	0.017
	benzo(b)fluoranthene	ug/l	331	Y	Mid	<0.010	-	<0.010	0.014	<0.010
	benzo(k)fluoranthene	ug/l	331	Y	Mid	<0.010	-	<0.010	<0.010	<0.010
	benzo(a)pyrene	ug/l	331	Y	Mid	<0.010	-	<0.010	0.012	<0.010
	dibenzo(ah)anthracene	ug/l	331	Y	Mid	<0.010	-	<0.010	<0.010	<0.010
	benzo(ghi)perylene	ug/l	331	Y	Mid	<0.010	-	<0.010	<0.010	<0.010
	indeno(123cd)pyrene	ug/l	331	Y	Mid	0.012	-	<0.010	0.016	0.012
	PAH (Total)	ug/l	331	N	Mid	0.24	-	0.60	0.53	0.43

Signed: .

Name: **G. Smith** Date: **22 April 2008**

Title: **Inorg and License Chem Manager**

Accreditation Codes: Y = UKAS Accredited, N = Not UKAS Accredited, M = MCERTS, S = Sub-contracted.
Analysed at: Bri = STL Bridgend, Cov = STL Coventry, Mid = STL Midlands, Rea = STL Reading, Run = STL Runcorn.
For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered. I/S=Insufficient sample

SEVERN TRENT STL

ANALYST COMMENTS FOR REPORT COV/506496/2008 Issue 1

Date of Issue: **22 April 2008**

Sample No	Analyst Comments
10509895	
10509896	
10509897	
10509898	
10509899	

Signed: Name: **G. Smith** Date: **22 April 2008**

Title: **Inorg and License Chem Manager**

SEVERN TRENT STL

DETERMINAND COMMENTS FOR REPORT COV/506496/2008 ISSUE 1

Date of Issue : 22 April 2008

Sample No	Description	Determinand	Comments

Signed: .

Name: **G. Smith** Date: **22 April 2008**

Title: **Inorg and License Chem Manager**

Annex J
In-situ Gas Monitoring Results

TERRA FIRMA (WALES) LIMITED

In-situ Gas Monitoring Results

Site: Glyn-neath
Date Monitored: 01/05/2008
Barometric Pressure: 0995
Weather: Sunny
Job No: 10287

Gas Monitoring Well Number	Methane CH_4 (%)	Oxygen O_2 (%)	Carbon dioxide CO_2 (%)	Flow Rate
BH1	0.1	17.7	1.0	0.1
BH2	0.1	11.5	1.7	0.1
BH4	0.1	5.3	1.3	0.0

Notes:

- Gas Measuring Instrument: Geotechnical Instruments monitor
- N/D = Not Detected

TERRA FIRMA (WALES) LIMITED

In-situ Gas Monitoring Results

Site: Glyn-neath
Date Monitored: 07/05/2008
Barometric Pressure: 0995
Weather: Sunny
Job No: 10287

Gas Monitoring Well Number	Methane CH_4 (%)	Oxygen O_2 (%)	Carbon dioxide CO_2 (%)	Flow Rate
BH1	0.0	18.2	0.9	0.0
BH2	0.1	11.2	1.3	0.1
BH4	0.1	7.3	1.3	0.0

Notes:

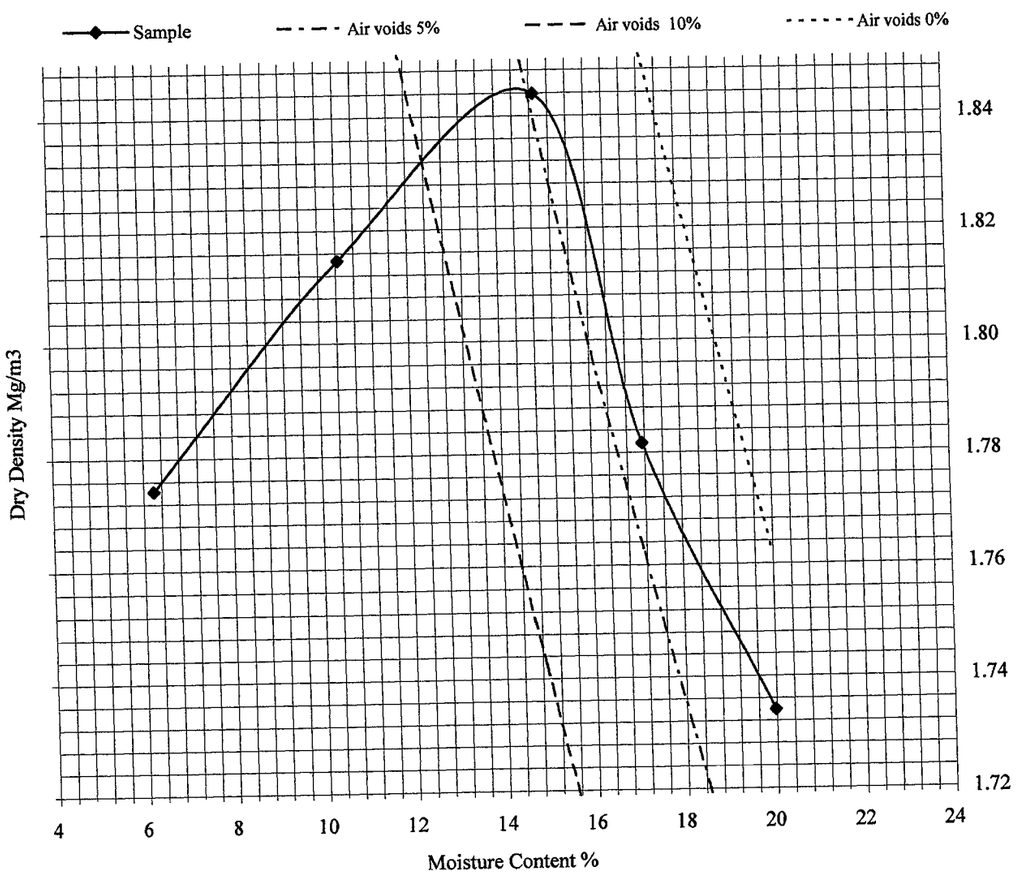
- Gas Measuring Instrument: Geotechnical Instruments monitor
- N/D = Not Detected

Annex K
Optimum Moisture Content/Maximum Dry Density Test Results

Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

Hole Number: TP1 **Depth(m):** 1.35



Initial Moisture Content:	17	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m3):	2.72* Assumed	Material Retained on 37.5 mm Test Sieve (%):	9
Maximum Dry Density (mg/m3):	1.84	Material Retained on 20.0 mm Test Sieve (%):	15
Optimum Moisture Content (%):	15	Sample Preparation Clause :	3.2.5.3

** - not included in laboratory scope of accreditation*

Remarks

Checked by Date 15/04/08

Approved by Date 10/04/08

LABORATORY TESTING SERVICES LIMITED

Glyn-neath

Contract No.: GEO/5840/08

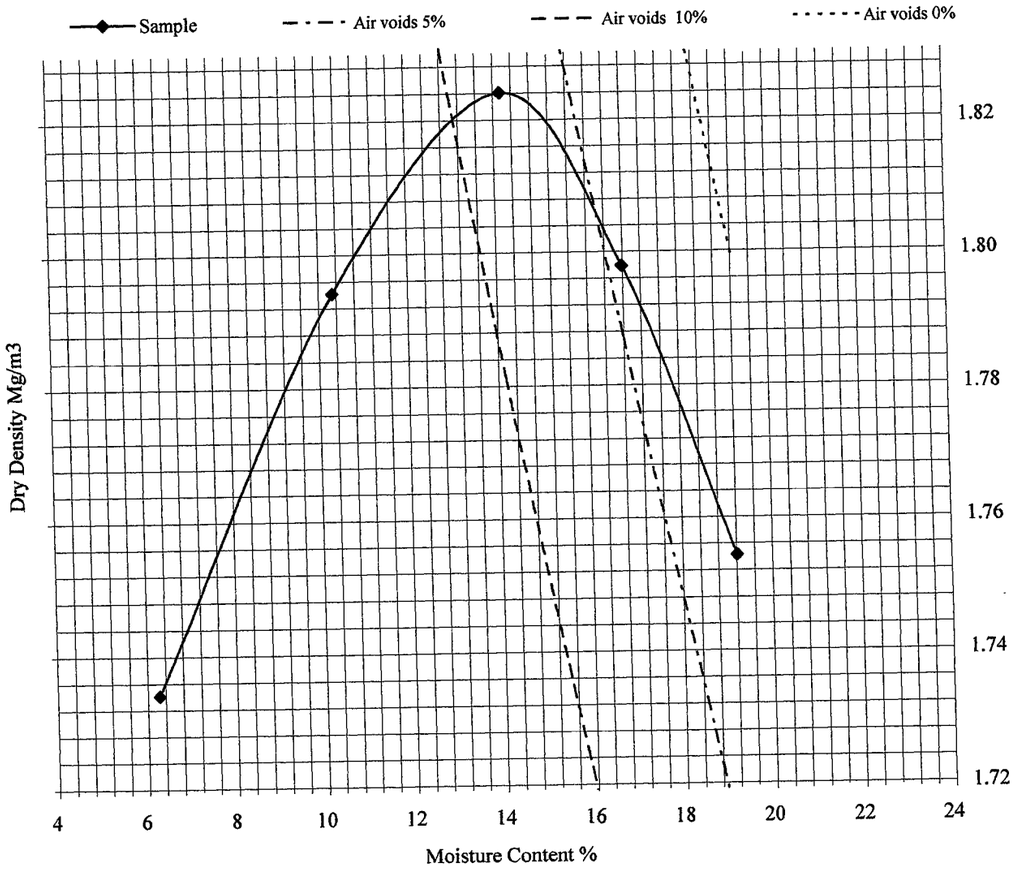
Client Ref No: n/a

UKAS TESTING 2788

Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

Hole Number: TP2 **Depth(m):** 1.45



Initial Moisture Content:		17	Method of Compaction	2.5Kg Rammer / Single Sample	
Particle Density (Mg/m3):	2.75* Assumed		Material Retained on 37.5 mm Test Sieve (%):		9
Maximum Dry Density (mg/m3):		1.82	Material Retained on 20.0 mm Test Sieve (%):		12
Optimum Moisture Content (%):		14	Sample Preparation Clause :		3.2.5.3

** - not included in laboratory scope of accreditation*

Remarks

Checked by Date 10/04/08

Approved by Date 10/04/08

LABORATORY TESTING SERVICES LIMITED

Glyn-neath

Contract No.: GEO/5840/08

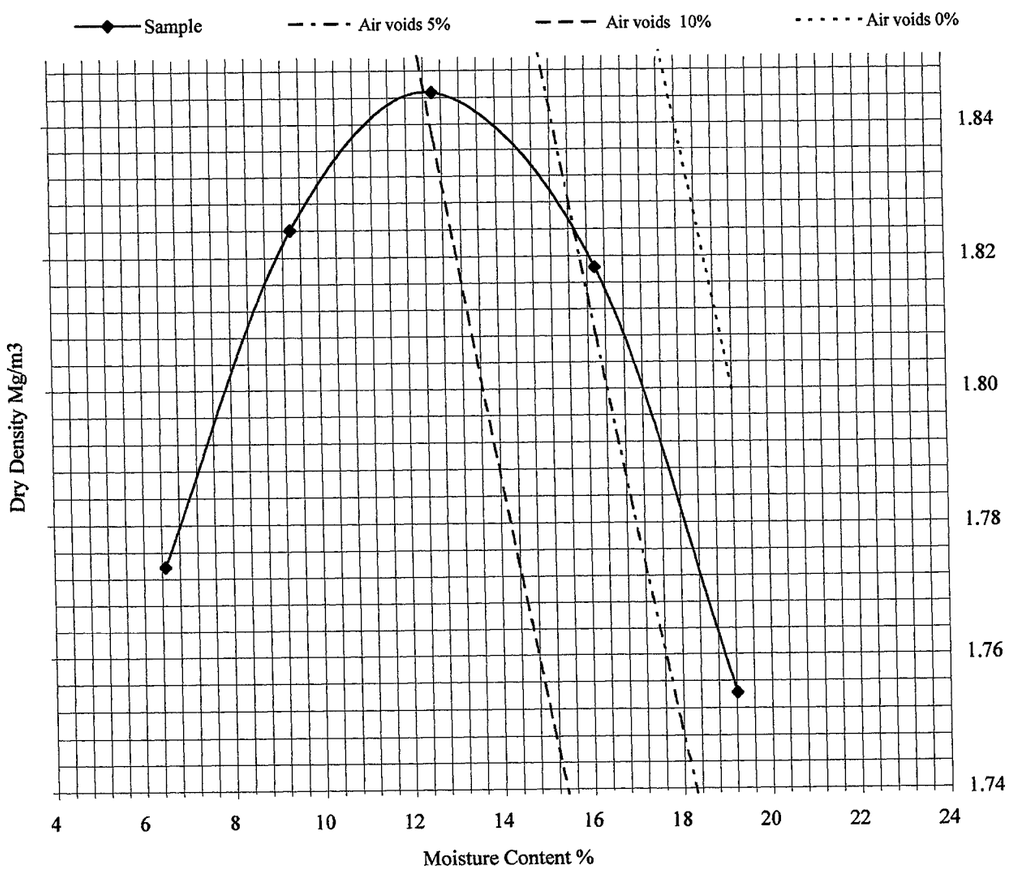
Client Ref No: n/a

UKAS TESTING 2788

Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

Hole Number: TP5 **Depth(m):** 2.60



Initial Moisture Content:	16	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m3):	2.75* Assumed	Material Retained on 37.5 mm Test Sieve (%):	7
Maximum Dry Density (mg/m3):	1.84	Material Retained on 20.0 mm Test Sieve (%):	12
Optimum Moisture Content (%):	13	Sample Preparation Clause :	3.2.5.3

** - not included in laboratory scope of accreditation*

Remarks

Checked by Date 13/5/08

Approved by Date 10/04/08

LABORATORY TESTING SERVICES LIMITED

Glyn-neath

Contract No.: GEO/5840/08

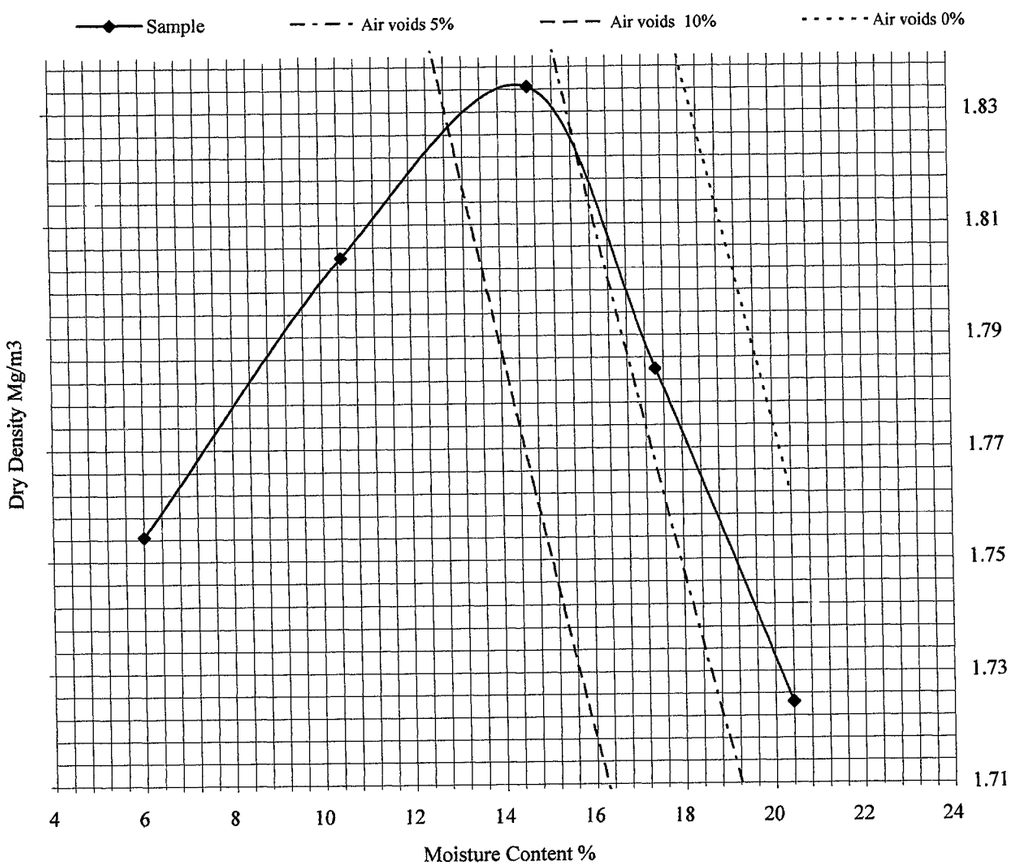
Client Ref No: n/a

UKAS TESTING 2788

Dry Density/Moisture Content Relationship

BS 1377:Part 4:1990

Hole Number: TP6 **Depth(m):** 3.20



Initial Moisture Content:	17	Method of Compaction	2.5Kg Rammer / Single Sample
Particle Density (Mg/m3):	2.75* Assumed	Material Retained on 37.5 mm Test Sieve (%):	6
Maximum Dry Density (mg/m3):	1.83	Material Retained on 20.0 mm Test Sieve (%):	13
Optimum Moisture Content (%):	15	Sample Preparation Clause :	3.2.5.3

** - not included in laboratory scope of accreditation*

Remarks

Checked by 08/04/08 Date

Approved by 08/04/08. Date

LABORATORY TESTING SERVICES LIMITED

Glyn-neath

Contract No.: GEO/5840/08

Client Ref No: n/a

UKAS TESTING 2788

Annex L
Grading Analysis Results

Summary of Laboratory Sample Descriptions

Hole Number	Sample Number	Type	Depth m	Description of Sample*
TP1			1.35	Brown gravelly sandy silty CLAY.
TP1			1.90	Brown very sandy (fine to coarse) silty clayey fine to coarse GRAVEL with cobbles
TP2			1.45	Dark brown gravelly sandy silty CLAY.
TP3			1.45	Brown very gravelly (fine to coarse) very sandy (fine to coarse) SILT/CLAY.
TP5			2.60	Brown gravelly sandy silty CLAY.
TP6			3.20	Brown gravelly sandy silty CLAY.
TP7			2.45	Brown very sandy (fine to coarse) silty clayey fine to coarse GRAVEL.
TP9			2.50	Grey sandy (fine to coarse) slightly silty slightly clayey fine to coarse GRAVEL
				with cobbles.

**: not included in laboratory scope of accreditation*

Note: Results on this table are in summary format and may not meet the requirements of the relevant standards, additional information is held by the laboratory

Checked by Date 10/04/08

Approved by Date 10/04/08

LABORATORY TESTING SERVICES LIMITED

Glyn-neath

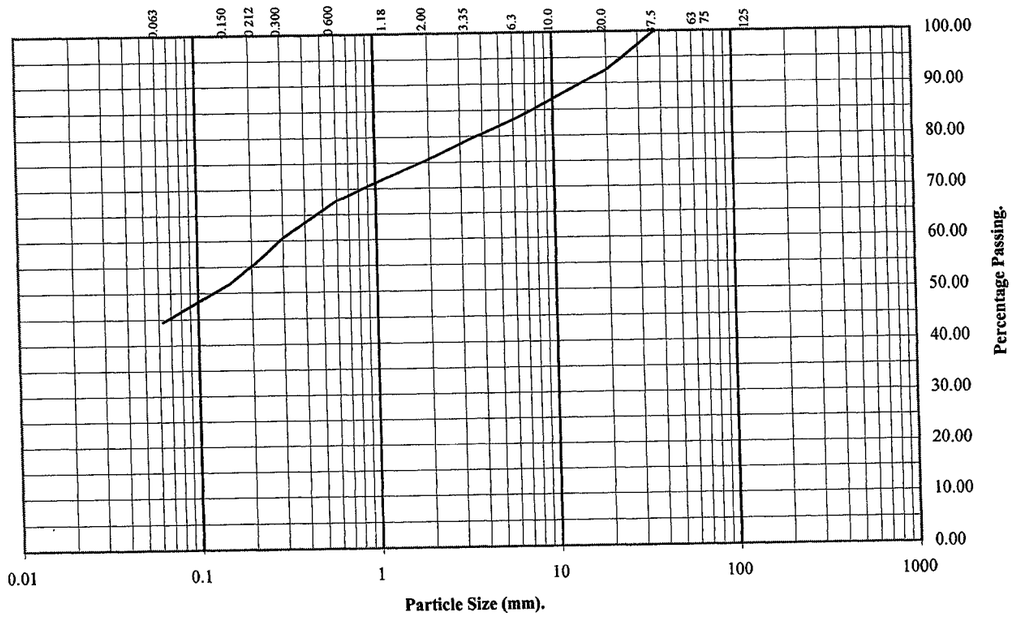
Contract No.:
GEO/5840/08
Client ref:
N/A

PARTICLE SIZE DISTRIBUTION TEST

BS 1377:Part 2:1990.

Wet sieve Clause 9.2

Hole Number: TP3 **Depth (m):** 1.45



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	93
10	87
6.3	84
3.35	79
2	76
1.18	72
0.6	68
0.3	61
0.212	56
0.15	52
0.063	44

Soil Fraction	Total Percentage
Cobbles	0
Gravel	24
Sand	32
Silt and Clay	44

Remarks:

Checked by Date 10/10/08

Approved by Date 10/10/08

LABORATORY TESTING SERVICES LIMITED

GEO/004-1 Dec 05

Glyn-neath

Issue No 1.2

Contract No.: GEO/5840/08

Client Ref No: n/a

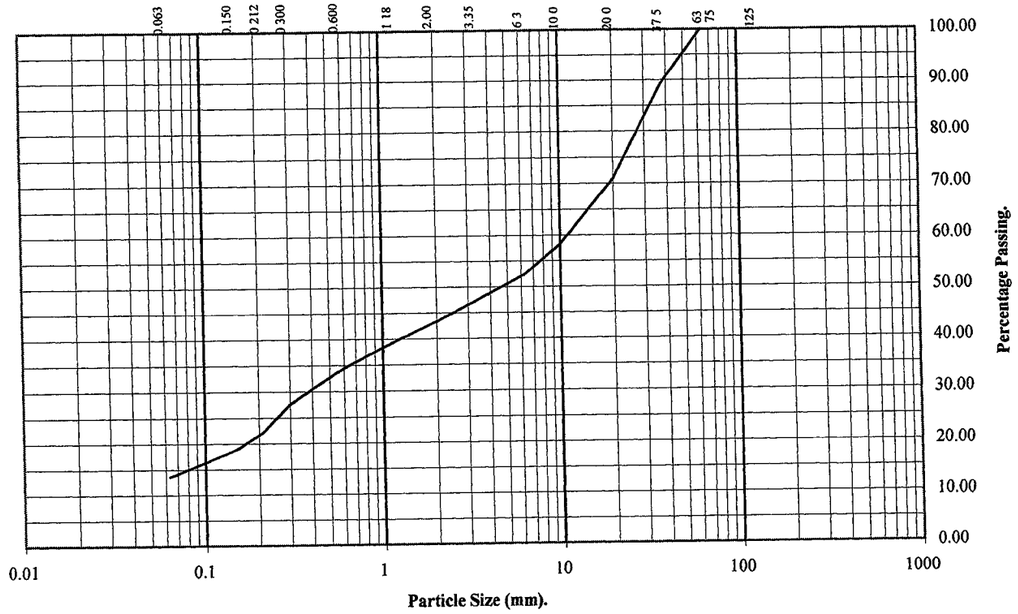
UKAS TESTING 2788

PARTICLE SIZE DISTRIBUTION TEST

BS 1377:Part 2:1990.

Wet sieve Clause 9.2

Hole Number: TP7 **Depth (m):** 2.45



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	89
20	71
10	58
6.3	52
3.35	47
2	43
1.18	40
0.6	34
0.3	28
0.212	22
0.15	19
0.063	14

Soil Fraction	Total Percentage
Cobbles	0
Gravel	57
Sand	29
Silt and Clay	14

Remarks:

Checked by Date 10/04/08

Approved by Date 10/04/08

LABORATORY TESTING SERVICES LIMITED

Glyn-neath

Contract No.: GEO/5840/08

Client Ref No: n/a

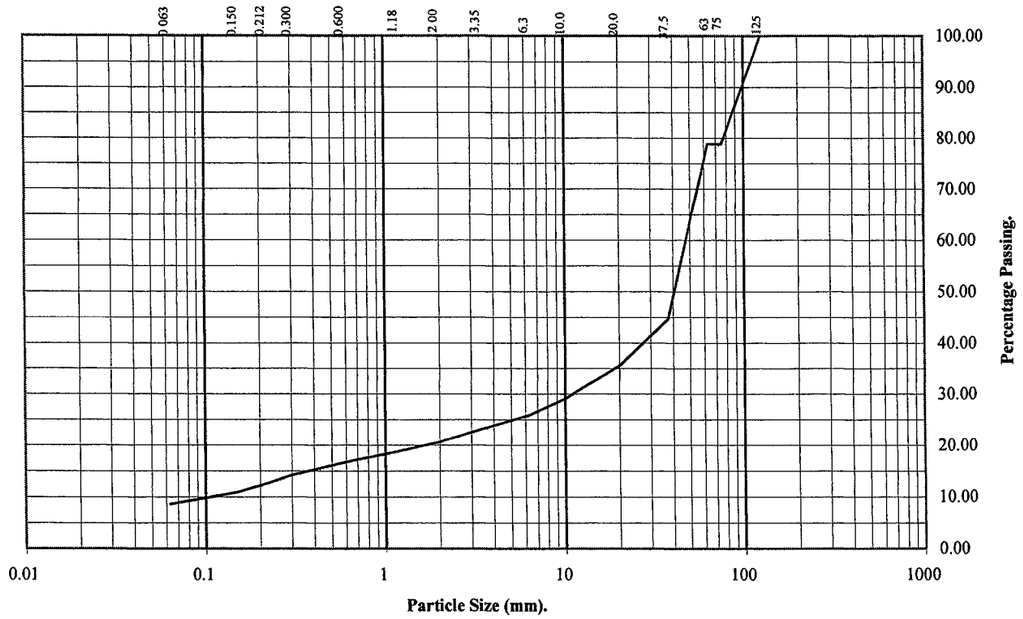
UKAS TESTING 2788

PARTICLE SIZE DISTRIBUTION TEST

BS 1377:Part 2:1990.

Wet sieve Clause 9.2

Hole Number: TP9 **Depth (m):** 2.50



BS Test Sieve	Percentage Passing
125	100
75	79
63	79
37.5	45
20	36
10	29
6.3	26
3.35	23
2	21
1.18	19
0.6	17
0.3	14
0.212	12
0.15	11
0.063	9

Soil Fraction	Total Percentage
Cobbles	21
Gravel	58
Sand	12
Silt and Clay	9

Remarks:

Checked by Date 10/04/08

Approved by Date 10/04/08

LABORATORY TESTING SERVICES LIMITED

Glyn-neath

Contract No.: GEO/5840/08

Client Ref No: n/a

UKAS TESTING 2788

Annex M
Shearbox Test Results

LABORATORY REPORT

LABORATORY TESTING SERVICES LIMITED

Contract Number: GEO/5840/08

LABORATORY TEST REPORT

Determination of Effective Angle of Internal Friction and Effective Cohesion Value
BS1377:Part 7:Clause 5:1990
Peak and Residual Values

Report Date: 15 April 2008

Client's Reference:

Client Name: Terrafirma
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff

For the attention of: Dr Gwyn Lake

Contract Title: **Glyn Neath**

Sample Details

Identification	:	TP1
Depth	:	1.50
Soil Description	:	Brown very gravelly sandy silty CLAY

Result:

		Peak	**Residual**
Effective Angle	:	29 °	20 °
Effective cohesion (C')	:	2 kN/m^2	0 kN/m^2
Test Dry Density	:	1.87 Mg/m^3	
Moisture Content (%)	:	16	
Applied Pressures:	:	25.50,100 kN/m^2	

Deviations from standerd Procedure:
None

Approved Signatories: D V Edwards (Managing Director)
Alun Walters (Technical Manager)
L R Evans (Technical Co-Ordinator).

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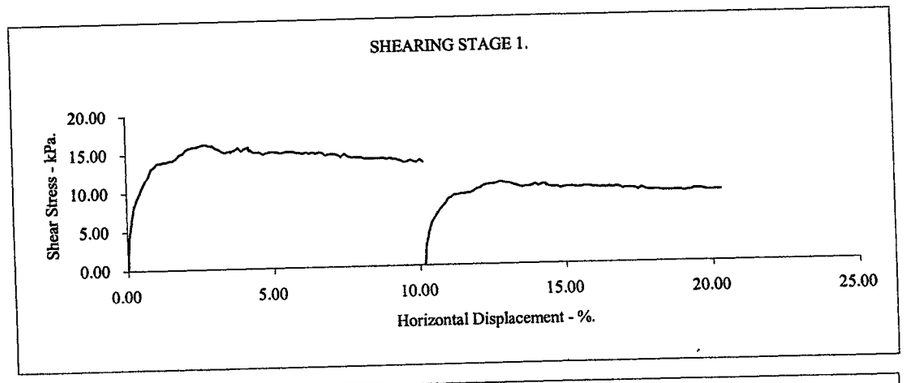
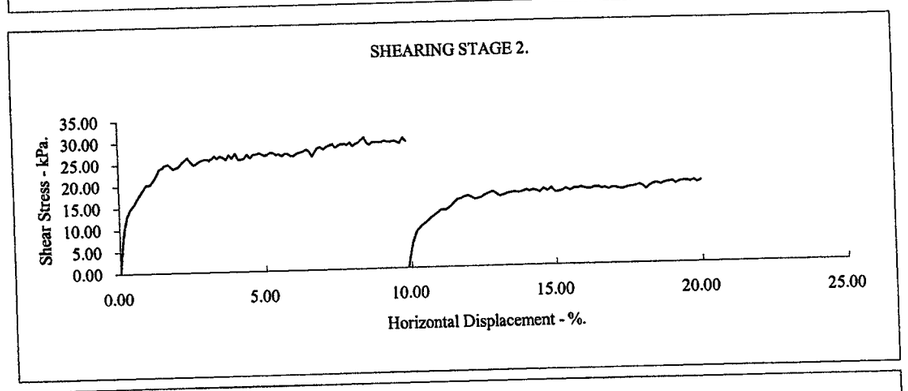
fax: +44 (0)1554 775107
e-mail: info@geolab.org.uk

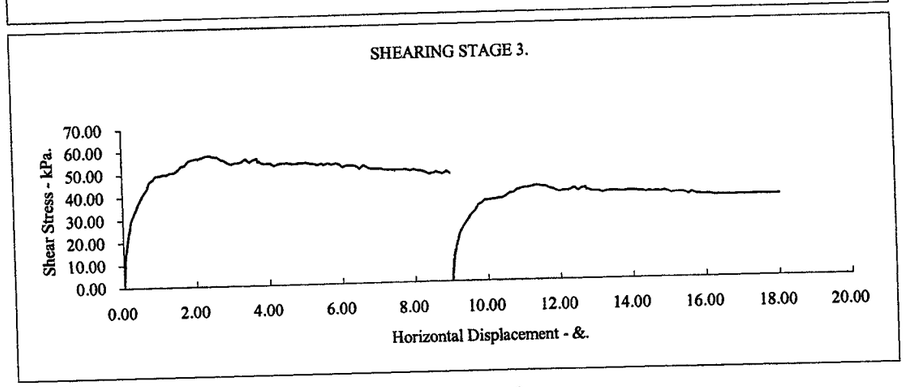
CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7 :1990.

Borehole/Sample Number: TP1 Depth (m): 1.50







Checked by 16/04/08 Date

Approved by 16/04/08 Date

Contract No.:
GEO/5840/08

Client Ref Number:

Glyn Neath

Figure.

Bynea, Llanelli, SA14 9SU

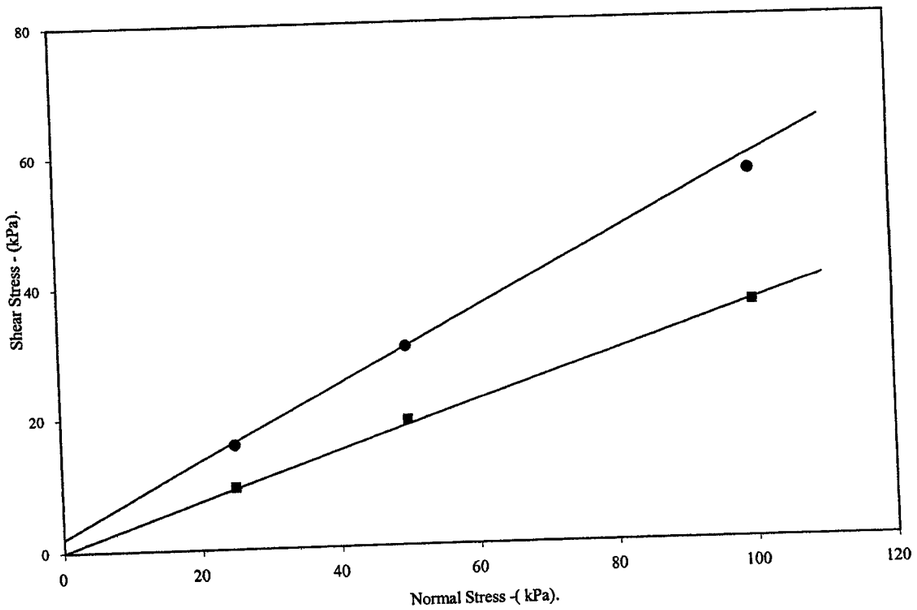
LABORATORY TESTING SERVICES LIMITED

CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7 :1990.

Borehole/Sample Number: TP1 Depth (m): 1.50

FAILURE CONDITIONS



● Peak shear Stress - kPa: —— Best Fit Line ■ Residual shear Stress

Checked by 16/5/05 Date

Approved by 16/5/05 Date

Contract No.:
GEO/5840/08

Client Ref Number:

Figure.

Glyn Neath

Bynea, Llanelli, SA14 9SU.

LABORATORY TESTING SERVICES LIMITED

LABORATORY REPORT

LABORATORY TESTING SERVICES LIMITED

Contract Number: GEO/5840/08

LABORATORY TEST REPORT

Determination of Effective Angle of Internal Friction and Effective Cohesion Value
BS1377:Part 7:Clause 5:1990
Peak and Residual Values

Client's Reference: Report Date: 15 April 2008

Client Name: Terrafirma
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff

For the attention of: Dr Gwyn Lake

Contract Title: **Glyn Neath**

Sample Details

Identification	:	TP2
Depth	:	2.88
Soil Description	:	Brown very gravelly clayey sandy SILT

Result:

		Peak	**Residual**
Effective Angle	:	30 °	16 °
Effective cohesion (C')	:	7 kN/m^2	0 kN/m^2
Test Dry Density	:	1.81 Mg/m^3	
Moisture Content (%)	:	16	
Applied Pressures:	:	25.50,100 kN/m^2	

Deviations from standerd Procedure:
None

16/5/08

Approved Signatories: D V Edwards (Managing Director)
Alun Walters (Technical Manager)
L R Evans (Technical Co-Ordinator).

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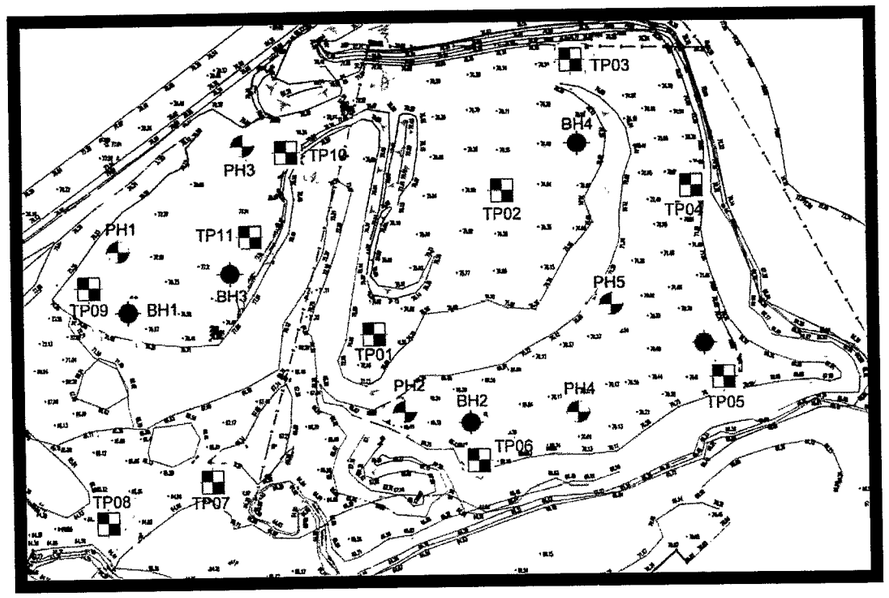

LEGEND

TP1 Location of Machine Excavated Trial Pits

PH1 Location of Roarty Probe Holes

BH1 Location of shell and auger Bore Holes

terrafirma

Project : Glyn- Neath

Drawing No. 02 - Site Layout
Scale NTS