

Report No. BC/MB/03.17.02.

Mining Risk Assessment: Land at Gelligaer Road, Trelewis

Prepared on behalf of:

Ms J Creese



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Mining Risk Assessment: Land at Gelligaer Road, Trelewis.

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List of Plans

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<i>BC/MB/03.17.02.01.</i>	<i>General Location Plan.</i>	<i>1:50,000.</i>
<i>BC/MB/03.17.02.02.</i>	<i>Geology Plan.</i>	<i>1:10,560.</i>
<i>BC/MB/03.17.02.03.</i>	<i>Detailed Location Plan.</i>	<i>1:1,250.</i>
<i>BC/MB/03.17.02.04.</i>	<i>Mining Records Plan: Mynyddislwyn Seam.</i>	<i>1:5,000</i>

Appendix

Copy of Radon Gas Report.

Mining Risk Assessment: Land Gelligaer Road, Trelewis.

1 Introduction

This report has been prepared on behalf of our client:

*Ms J Creese,
Gwynfa,
Penywaun Farm,
Heol Fawr,
Nelson,
Treharris, CF46 6PL*

and relates to a parcel of land on Gelligaer Road in Trelewis where the construction of up to four detached dwellings is planned. This report discusses the geology and mining history of the Site and the immediately surrounding area as they may affect the construction of the proposed dwellings and thereby assesses the mining risk to the development.

Recommendations are made for exploratory boreholes to be drilled in order to determine whether or not the Site is affected by a significant fault.

The following sources of data were used in the compilation of this report:

- i) Research of published geological records;*
- ii) Research of mining records held at The Coal Authority's archive in Mansfield;*
- iii) Interrogation of The Coal Authority's interactive map, accessed on the 22nd March 2017 and*
- iv) the archive records of Blandford Consulting.*

The findings of this report are necessarily based upon the data used in its compilation and may be amended in the future in the light of additional material information. The report must only be used in its entirety for its stated purpose.

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2 Brief Description of the Site

The parcel of land that is the subject of this report ('the Site') is located at the south-eastern fringes of the settlement of Trelewis and is approximately 2km south-east of the centre of Treharris (see *General Location Plan, drawing no. BC/MB/03.17.02.01*). The Site is located on the south side of Gelligaer Road, the B4254, on southerly facing slopes where average ground slopes are 1 in 12. The Site is irregular in outline and with maximum dimensions of approximately 50m by 43m; it is at an approximate elevation of 168m above ordnance datum. The Site lies between a housing estate comprised of semi-detached and detached dwellings and a single, detached dwelling. To the south of the Site there are agricultural enclosures. (see Figure 1 and *Detailed Location Plan, drawing no. BC/MB/03.17.02.03*).

Figure 1
Aerial View of Site



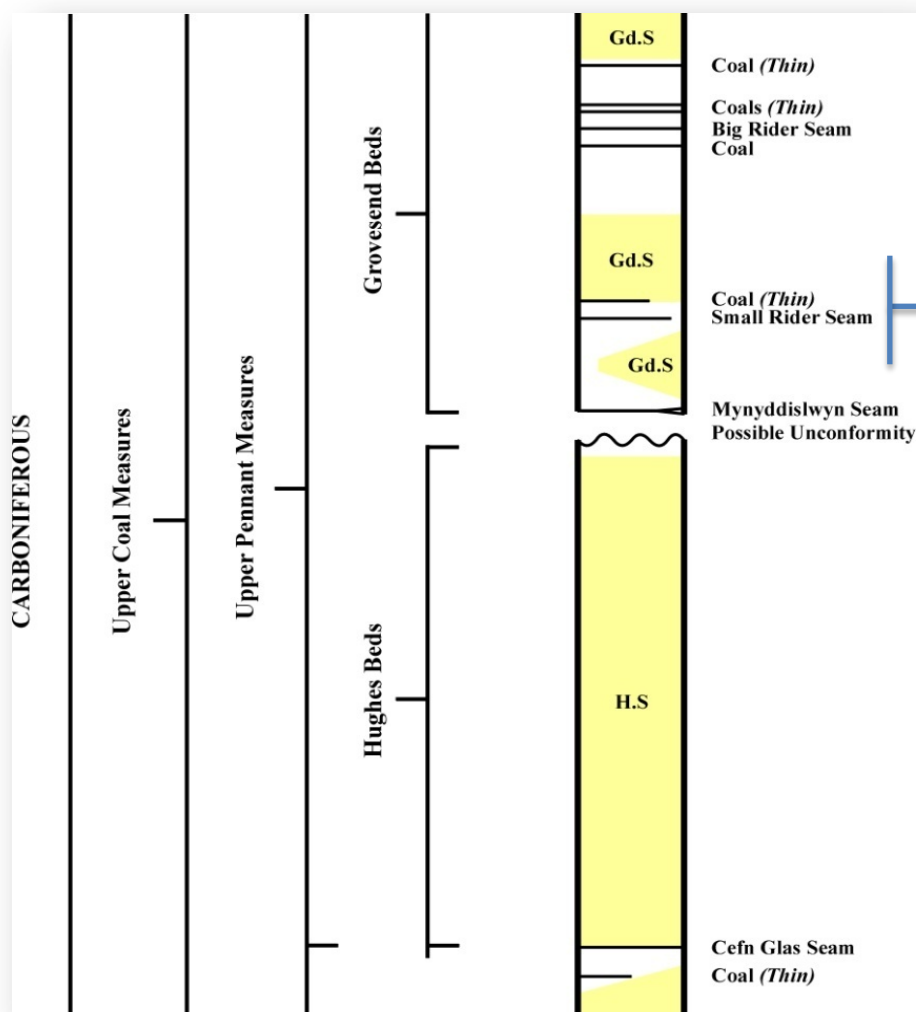
3 Geology of the Site

The Site is situated fairly centrally on the South Wales Coalfield and is underlain at shallow depths with strata assigned to the Grovesend Beds, the uppermost sub-division of the Upper Coal Measures, themselves a sub-division of the Upper Carboniferous Period. The published geological sheet for the area at a 1:10,560 scale, ST 19 NW, shows the inferred

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position of the outcrop of the Mynyddislwyn Seam to be present approximately 900m north-west of the Site (see *Geology Plan, drawing no. BC/MB/03.17.02.02*); the Mynyddislwyn Seam marks the division between the Grovesend Beds and the underlying Hughes Beds. The inferred outcrop follows a V-shaped trace where it crosses the floor of the valley between two large faults. Trelewis lies near the axis of a large synclinal fold (U-shaped) where the strata dips are very shallow and towards the south-east, resulting in the position where the Mynyddislwyn Seam underlies the Site at relatively shallow depths. Other than the Mynyddislwyn Seam, there is no other coal seam underlying the Site at shallow depths that could have supported underground mining operations.

Figure 2
Indicative Stratigraphic Column.
Scale: Not to Scale.



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The coal measures of the South Wales Coalfield have been affected by large normal faults, frequently referred to as 'cross faults'. In the Trelewis area these faults have a sinuous trace at the surface and an average trend towards the north-west. Published geological information indicates that the Site lies within the Llanfabon Trough, a down-faulted block between the Llanfabon Fault to the south-west and the Gelligaer Fault to the north-east. Both faults are complex and comprised of a series of splay faults that make up each of the two faults. There are further fairly large faults in the Llancaiach Trough between the two main faults. The nearest fault to the Site is one such fault, which is shown to be present immediately to the west of the Site. The fault plane dips south-westwards, away from the Site.

Published geological information indicates that the measures are overlain with deposits of glacial sand and gravel; we have no detailed information regarding the thickness and engineering properties of the sand and gravel deposits in the vicinity of the Site.

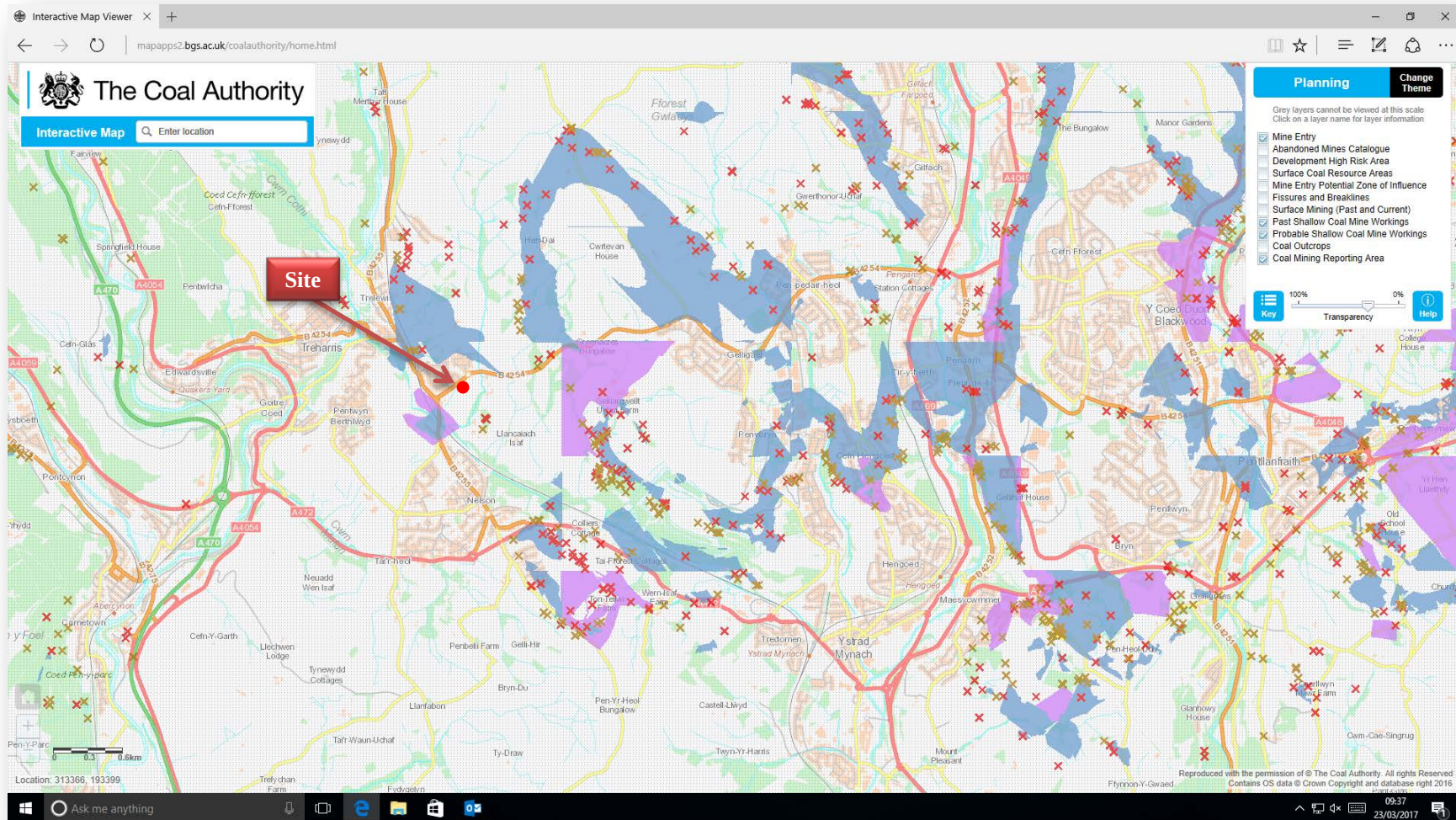
Published geological information also indicates that the Site is not affected by landslip.

4 Mining History

The general area has experienced extensive underground operations for coal dating back at least to the very early part of the twentieth century. The workings were prosecuted from a number of adits driven into the valley sides at or near the outcrops of coal seams or ironstone veins, or else from shafts sunk near the valley floor. Several coal seams have been extensively mined beneath the Site, the last in 1991; many of the old workings are of an age and/or are at depths that will have no impact upon the structural integrity of the proposed dwelling(s). The shallowest lying coal seam worked beneath the area of the Site is the Mynyddislwyn Seam, which is approximately 1.5m thick, and which is at relatively shallow depths beneath the Site. The Seam was worked from the Llancaiach Colliery, which ceased working in the early 1990s. The workings from the Colliery extend beneath the Site (see Figure 3 and *Geology Plan*, drawing no. BC/MB/03.17.02.02).

/Cont....

Figure 3
The Coal Authority's Interactive Map.
 Accessed 23rd March 2017



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The mine plan for the Llancaiach Colliery identifies that the northern shaft is 65 yards deep, 59m (see *Extract From Abandonment Plan of Llancaiach Colliery: Mynyddislwyn Seam, drawing no. BC/MB/03.17.02.04*). The Site is approximately 650m north of the shafts. The main drivages that extended northwards from the shafts towards the Site were, amongst other things, drainage roadways and would have been driven to rise at water-ease, 1 inch in the yard. The workings beneath the Site are calculated to be at a depth of approximately 41m. The Coal Authority's interactive map identified that there are no recorded shallow mine workings beneath the Site (blue shading) and no potential shallow mine workings (shaded purple).

Our searches found no record of a disused shaft or adit within the confines of the Site, a situation confirmed by The Coal Authority's interactive map (Figure 2). There are good mining records for the area that indicate that the risk of unrecorded air shafts being present is extremely low, but cannot be wholly discounted. The Site has not been part of an opencast coal site (OCCS), and there have been no opencast mining operations close enough to the Site to affect the structural integrity of the proposed dwelling(s).

5 Mine Gases

When coal is mined gases, including methane, are released and may accumulate in the voids left by the mining operations. These gases may later vent to atmosphere or be displaced by mine water flooding the mining voids and forced to the surface. Mine gases may, in certain circumstances, accumulate within dwellings and pose a risk of asphyxiation, fire or explosion. A number of studies of the old workings across South Wales and dating back to the mid to late nineteenth century have shown that there is little risk from mine gases. This may be as a result of the nature of the coal seams or because the shallow old workings have vented most of the mine gases to atmosphere or is as a result of the combination of the two.

The only relatively shallow old workings underlying the Site at shallow depth are in the Mynyddislwyn Seam at an estimated depth of 41m. The workings include several disused mine entries that would act as preferential venting routes for mine gases.

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6 Radon Gas

Government guidelines recommend that the potential for Radon gas should be assessed for all new dwellings. The advice has been implemented by obtaining from Public Health England a Radon gas report for the immediately adjacent 24 Gelligaer Road. The geology at 24 Gelligaer Road is the same as at the Site so that the findings of the report can be applied to the Site. The report identifies that the Site is in an area NOT affected by Radon gas.

7 Risk Assessment: Discussion and Recommendations

7.1 Solid Geology

There are large faults present in the locality, the surface position of one is shown to pass immediately to the west of the Site. The fault plane dips south-westwards away from the Site. Large faults can act as the locus for differential ground movement, particularly where mine workings are present on one or both sides of the fault plane and where the pattern of working differs on the two sides of the fault, as is the case with this Site. More rarely, differential movement can occur across large faults in South Wales during earthquakes.

To ensure that the fault is to the west of the Site and does not pass through it, it is recommended that a series of exploratory boreholes are drilled on the Site.

Otherwise, there are no features associated with the solid geology of the Site that would affect the structural integrity of the proposed dwelling(s).

7.2 Mining History

7.2.1 Shallow Mine Workings

The locality has experienced extensive mining operations for both coal and ironstone, some of which are of an age and/or are at depths such that they will not

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affect the structural integrity of the proposed dwelling(s). The Mynyddislwyn Seam has been extensively mined in the locality and the old workings are at an estimated depth of 41m beneath the Site, which is too deep to pose a risk of surface subsidence. The exploratory boreholes recommended to examine the position with regards to faulting should also be used to examine the position with regards to the Mynyddislwyn Seam.

There is no other coal seam in the geological sequence that is present at shallow depths beneath the Site and that could support underground mining operations.

The next lowest seam in the geological sequence that is thick enough to support underground mining operations is too deep beneath the Site to afford a risk of surface subsidence.

Otherwise, there are no active mines in the locality, deep mines or opencast sites, that would affect the structural integrity of the proposed dwelling(s) and the Site has not been part of an opencast coal site.

7.2.2 Mine Entries

Our searches found no record of disused mine entries within the bounds of the Site or 20m of its boundaries. The mine workings in the area are relatively old and are well documented. The Site is not close to the outcrop of a coal seam and so the risk of an adit being present may be dismissed.

Given the details of the local geology, the good quality mining records and the lack of evidence at the surface, the potential for an unrecorded mine entry to be present within the confines of the Site is considered to be extremely low to negligible.

Whilst the risk of an unrecorded mine entry being present is extremely low to negligible, it cannot be entirely dismissed. The situation should be monitored during site clearance works and if any unusual features are observed excavation

/Cont....

work should be stopped immediately and further advice sought from a Chartered Geologist or from The Coal Authority.

7.2.3 Mine Gases

Various studies of the shallow old workings in the County Borough of Merthyr Tydfil have found no particular risk from mine gases. Underground mine workings in the Mynyddislwyn Seam were ‘naked light’; consequently, there is no risk from methane gas. Other mine gases may have accumulated in the working voids but the workings are at an estimated depth of 41m and the workings are served by a number of disused mine entries that could act as a preferential pathway for venting mine gases. The risk from mine gases is extremely low to negligible but it would be prudent to monitor any exploratory boreholes for evidence of mine gases.

7.3 Summary of Risk Assessment

There is a risk of differential ground movement resulting from the presence of a large fault, which is shown to be present immediately to the west of the Site. There is no risk of surface subsidence across the Site as a result of mine workings in the Mynyddislwyn Seam. The risk of an unrecorded disused air shaft or adit being present on the Site is considered to be extremely low to negligible. The risk from mine gases is thought to be extremely low to negligible. There is NO risk from Radon gas.

7.4 Recommendations

A limited programme of exploratory boreholes is recommended in order to establish the position with regard to the large fault and to confirm the position with regard to old workings in the Mynyddislwyn Seam. The boreholes should be monitored for mine gases.

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Any physical examination of mining relics, including shallow mine workings and disused mine entries, will require permission from The Coal Authority. The application to them for permission to examine mining relics will require the appropriate risk assessment.

The exploration recommended above should be designed and supervised by a Chartered Geologist or other competent person.



**Dr Malcolm Blandford,
Chartered Geologist.**

Report Date 24th March 2017.

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PLANS



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Geologists Working With The Environment...

Study on Land at Gelligaer Road, Trelewis.

General Location Plan.

Plan Scale: 1:50,000.

Key to Symbols:



Approximate Position of Site.

Note:

North is at top of plan.

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Drawing No: BC/MB/03.17.02.01.



Study on Land at Gellia'r-gwellt Uchaf, Gelligaer.

Geology Plan.

Plan Scale: 1:10.560.

Key to Symbols:

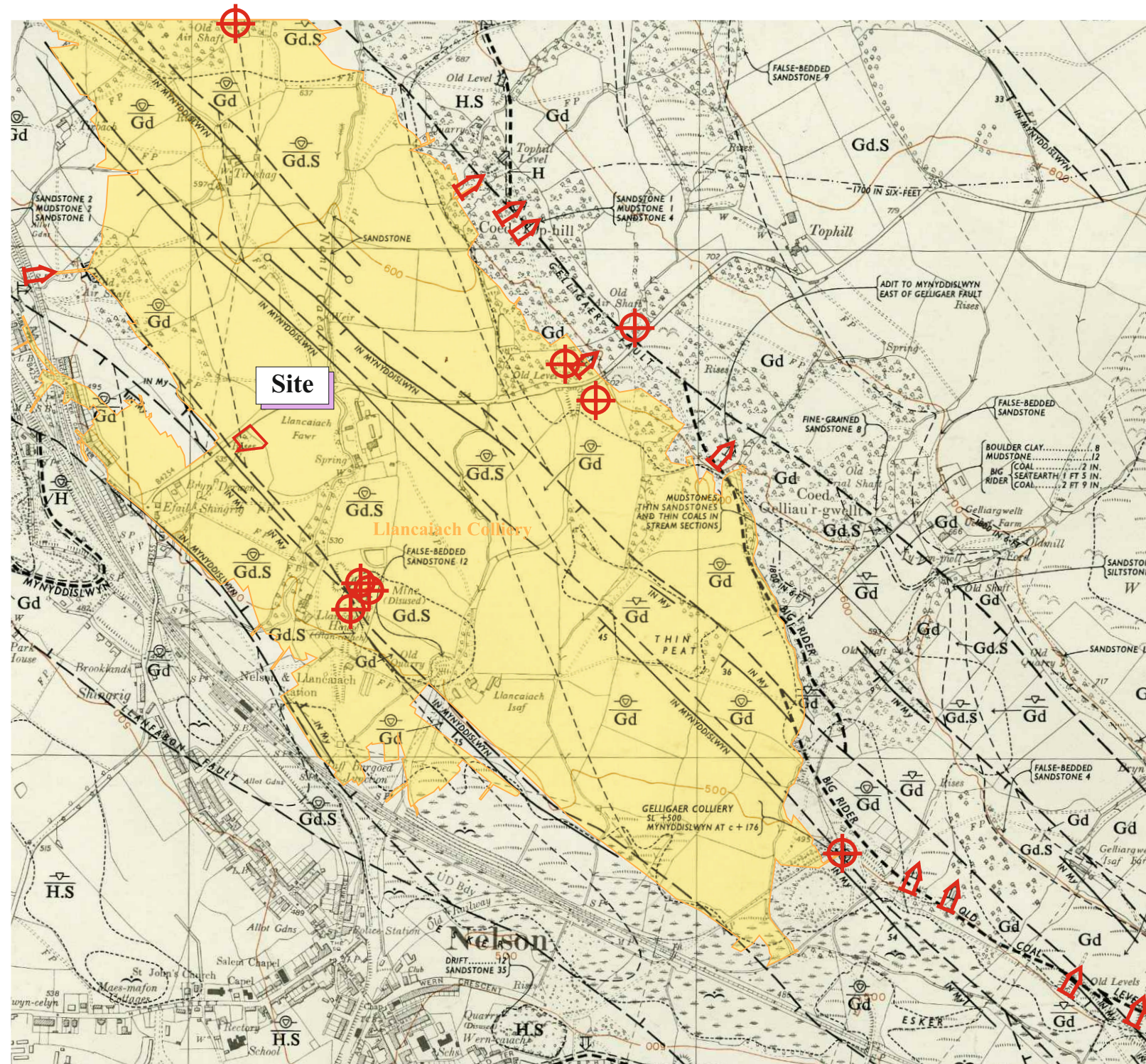
Approximate Boundary of Old Workings in the Mynyddislwyn Seam.

Approximate Position of Disused Shaft.

Approximate Position of Disused Adit.

Note:
North is at top of plan.

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Drawing No: BC/MB/03.17.02.02.

Study on at Gelligaer Road, Trelewis.

Detailed Location Plan.

Plan Scale: Approx. 1:1,250.

Key to Symbols:

 **Approximate Site Boundary.**

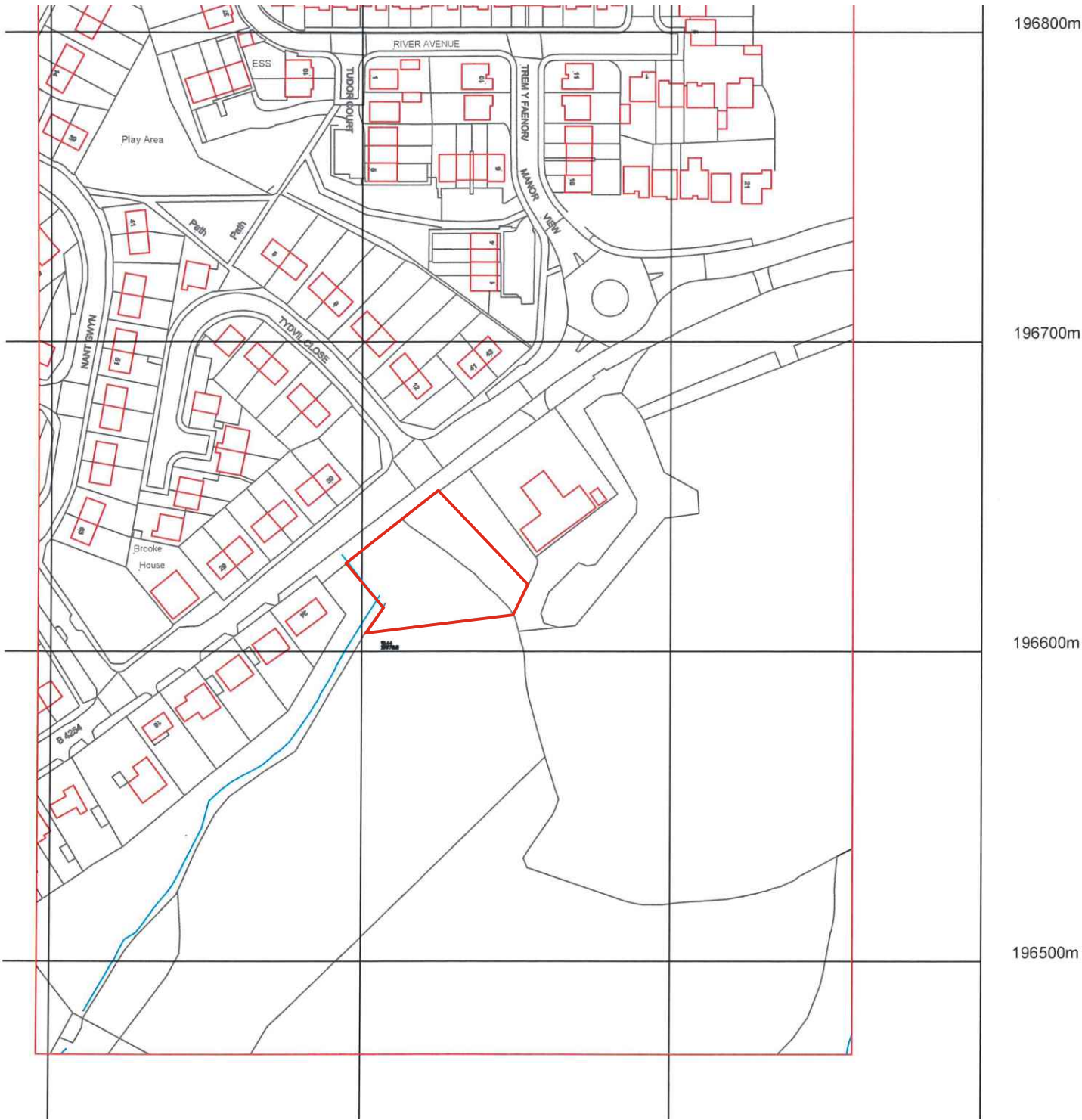
Note:
North is at top of plan.

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Study on at Gelligaer Road, Trelewis.

*Extract From Abandonment
Plan of Llancaiach Colliery:
Mynyddislwyn Seam.*

Plan Scale: 1:5,0000.

Key to Symbols:

 Approximate Site Boundary.

Note:
North is at top of plan.

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Drawing No: BC/MB/03.17.02.04.

APPENDIX

COPY OF RADON GAS REPORT



*The Enterprise Centre,
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Pentrebach,
Merthyr Tydfil,
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CF48 4DR.*

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Geologists Working With The Environment...



Radon Risk Report for addresses in England and Wales

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Address searched: 24 Gelligaer Road, Trelewis, Treharris, CF46 6DN

Grid reference searched:

311086 East

196613 North

Date of report: 22 March 2017

Guidance for existing properties

Is this property in a radon Affected Area? - No

A radon Affected Area is defined as where the radon level in at least one property in every hundred is estimated to exceed the Action Level.

The estimated probability of the property being above the Action Level for radon is: 0-1%

The result may not be valid for buildings larger than 25 metres.

If this site is for redevelopment, you should undertake a GeoReport provided by the British Geological Survey.

This report informs you of the estimated probability that this particular property is above the Action Level for radon. This does not necessarily mean there is a radon problem in the property; the only way to find out whether it is above or below the Action Level is to carry out a radon measurement in an existing property.

Radon Affected Areas are designated by the Public Health England. PHE advises that radon gas should be measured in all properties within Radon Affected Areas.

If you are buying a currently occupied property in a Radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were above the Radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and the results of re-testing confirmed the effectiveness of the measures.

Further information is available from PHE or <http://www.ukradon.org>

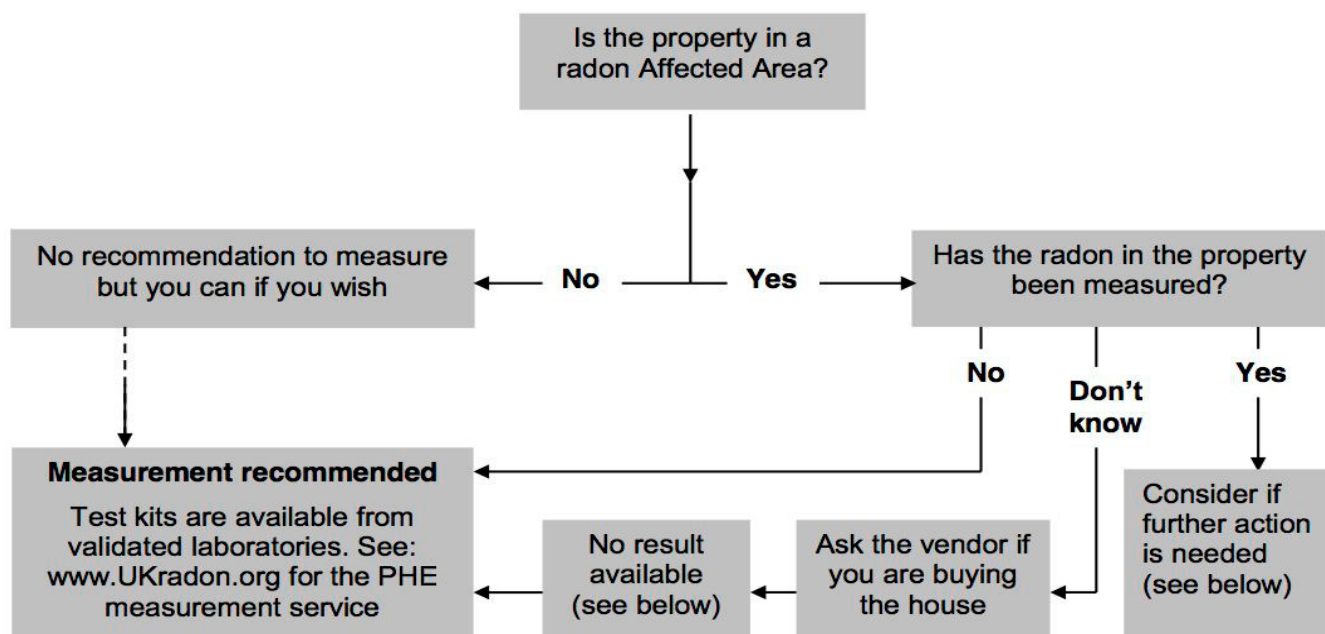
Guidance for new buildings and extensions to existing properties

What is the requirement under Building Regulations for radon protection in new buildings and extensions at the property location? - None

If you are buying a new property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

See the Radon and Building Regulations for more details.

PHE guidance for occupiers and prospective purchases



Existing radon test results: There is no public record of individual radon measurements. Results of previous tests can only be obtained from the seller. Radon levels can be significantly affected by changes to the building or its use, particularly by alterations to the heating and ventilation which can also be affected by changes in occupier. If in doubt, test again for reassurance.

Radon Bond: This is simply a retained fund, the terms of which are negotiated between the purchaser and the vendor. It allows the conveyance of the property to proceed without undue delay. The purchaser is protected against the possible cost of radon reduction work and the seller does not lose sale proceeds if the result is low. Make sure the agreement allows enough time to complete the test, get the result and arrange the work if needed.

High Results: Exposure to high levels of radon increases the risk of developing lung cancer. If a test in a home gives a result at or above the Action Level of 200 Becquerels per cubic metre of air (Bq/m³), formal advice will be given to lower the level. Radon reduction will also be recommended if the occupants include smokers or ex-smokers when the radon level is at or above the Target Level of 100 Bq/m³; these groups have a higher risk. Information on health risks and radon reduction work is available from PHE. Guidance about radon reduction work is also available from some Local Authorities, the Building Research Establishment and specialist contractors.

PHE designated radon website:

<http://www.ukradon.org>

Building Research Establishment:

<http://www.bre.co.uk/page.jsp?id=3137>