

Report No. BC/MB/12.19.02

Mining Risk Assessment: Land at Crophorne Stables, Trelewis.

Prepared on behalf of:

AW Properties Ltd.

By:



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Mining Risk Assessment: Land at Crophorne Stables, Trelewis.

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Drawing No:		Scale:
<i>BC/MB/12.19.02.01.</i>	<i>General Location Plan.</i>	<i>1:50,000.</i>
<i>BC/MB/12.19.02.02.</i>	<i>Geology Plan.</i>	<i>1:10,560.</i>
<i>BC/MB/12.19.02.03.</i>	<i>Detailed Location Plan.</i>	<i>1:1,250.</i>

Mining Risk Assessment: Land at Crophorne Stables, Trelewis.

1 Introduction

This report has been prepared on behalf of our client:

***AW Properties Ltd.,
Crophorne House,
Efail Shingrig,
Trelewis,
Treharris,
Merthyr Tydfil, CF46 6DP***

and relates to land at Crophorne Stables, the report supports a planning application to variously retain and expand a ménage, horse walker and wall. It discusses the geology and mining history of the Site and the immediately surrounding area as they may affect the development and thereby assesses the risk from the geology and mining history of the locality. Recommendations are made for site investigation to examine in greater detail the risk from shallow mine workings and from the effects of faulting.

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) Research of The Coal Authority's interactive map, accessed on the 10th December 2019;*
- iv) Research of Public Health England's interactive Radon map and*
- v) 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 southern margins of the settlement of Trelewis and is approximately 2km south-east of the centre of Treharris (see *General Location Plan, drawing no. BC/MB/12.19.02.01*). The Site is located on southerly facing slopes where average groundslopes are 1 in 12. The Site is irregular in outline and occupies an area of approximately 0.7 hectares; it is at approximate elevations of 147m above ordnance datum. Residential dwellings and agricultural enclosures form the north-eastern boundary of the Site, agricultural enclosures and woodland the south-eastern and the B 4255 the western boundary (see Figure 1 and *Detailed Location Plan, drawing no. BC/MB/12.19.02.03*).

Figure 1
Aerial View of Site



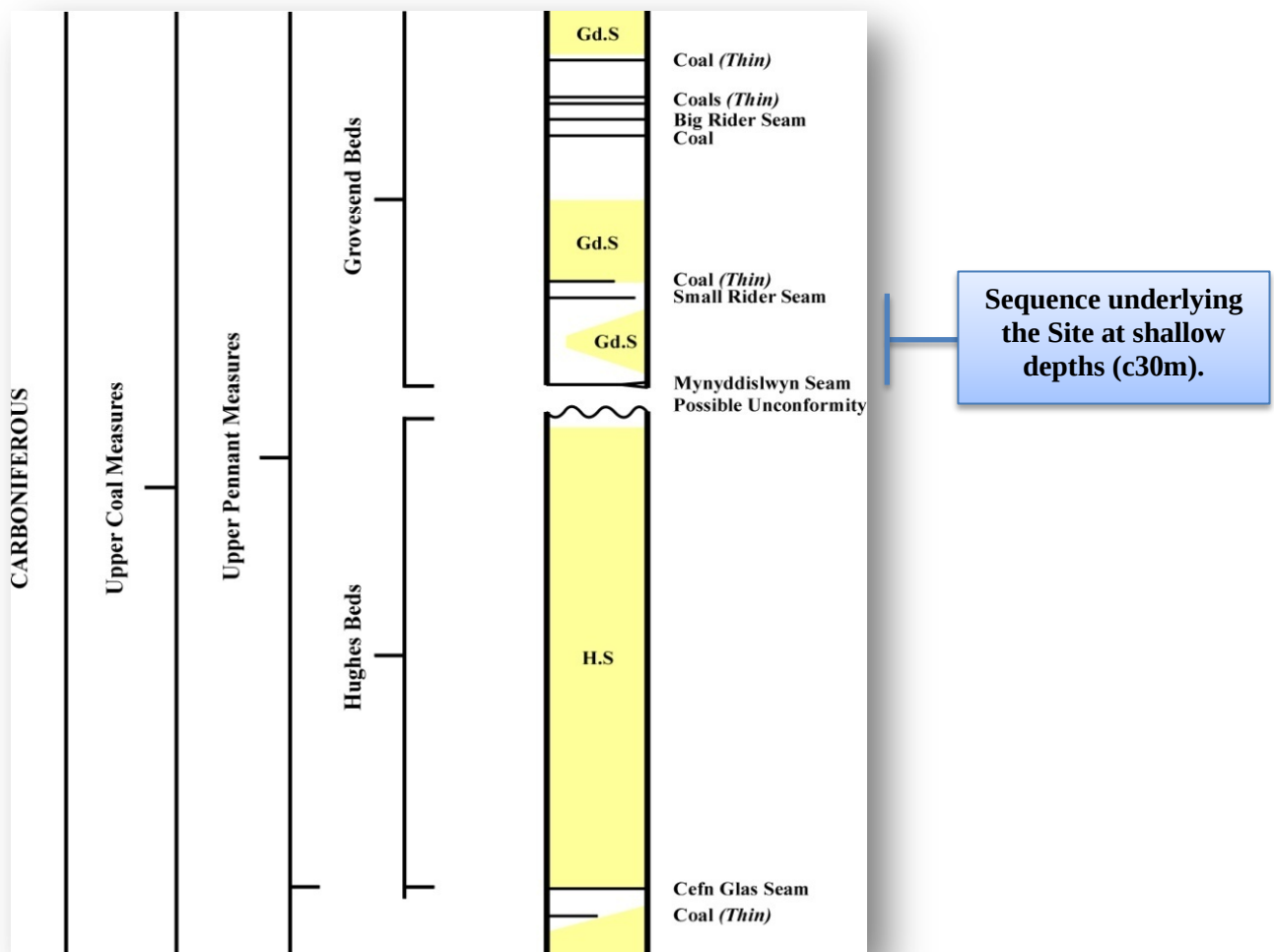
3 Geology of the Site

The published geological sheet for the area at a 1:10,560 scale, ST 19 NW, shows the Site to be underlain at shallow depths by strata assigned to the Grovesend Beds, the topmost subdivision of the Upper Coal Measures (see *Geology Plan, drawing no. BC/MB/12.19.02.02*).

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The inferred position of the outcrop of the Mynyddislwyn Seam is shown to be present approximately 150m west of the Site; 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 southeast, resulting in the position where the Mynyddislwyn Seam underlies the Site, probably at shallow depths.

Figure 2
Part of the Stratigraphic Column.



The coal measures of the former South Wales Coalfield are affected by large normal faults that have a sinuous trace at the surface. In the Trelewis area the faults have a sinuous trace at the surface and an average trend towards the north-west. The Llanfabon Fault is one such

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fault and a branch of the fault is shown on published geological plans and in mining records to be present in the immediate vicinity of the Site.

The published geological sheet shows the Site to be underlain with deposits of glacial till, Sand and Gravels, and that the Site is not affected by landslip conditions.

4 Mining History

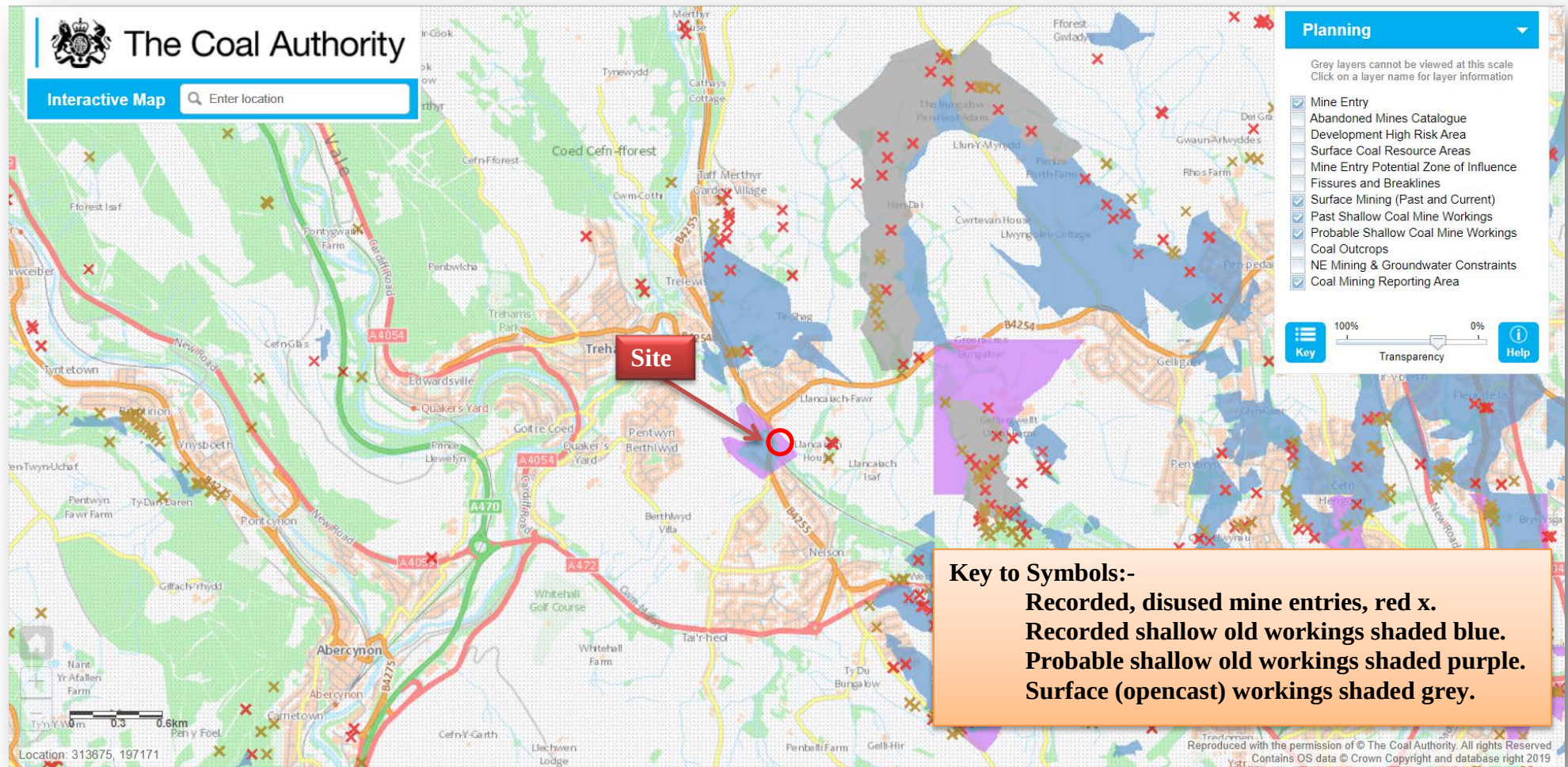
The general area has experienced extensive underground operations for coal dating back at least to the very early part of the twentieth century. The workings were prosecuted from a number of adits driven into the valley sides at or near the outcrops of coal seams or ironstone veins, or else from shafts 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 buildings on the Site. The shallowest lying coal seam that would support underground mining operations beneath the area of the Site is the Mynyddislwyn Seam, which is approximately 1.5m thick. The Seam was worked from the Llancaiach Colliery, which ceased working in the early 1900s. The workings from the Colliery extend north and south of the Site and were prosecuted in the Mynyddislwyn Seam on the downthrown (north-eastern) side of the branch of the Llanfabon Fault. Consequently, these old workings do not extend beneath the Site.

Shallow, unrecorded old workings have been found to be present in the Seam on the west, upthrow side of the fault; the workings were encountered during the construction of the five houses at The Paddocks, immediately beyond the B4255, to the north-west of the Site. Drilling and Grouting operations on the southernmost of the five plots, Plot 5, encountered old workings in the Seam at an approximate depth of 20m with approximately 9m of superficial deposits. The Coal Authority's interactive map identifies shallow and probable (shallow, unrecorded old workings) beneath and in the area immediately surrounding the Site.

Our searches found no record of old workings in the Mynyddislwyn Seam on the upthrown (south-western) side of the branch of the Llanfabon Fault. Such workings, if present,

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Figure 3
Print-out of The Coal Authority's Interactive Map
 (Accessed 10th December 2019)



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would potentially underlie the Site at shallow depths. However, the Site lies very close to the fault plane, which is likely to have severely fractured ground associated with it that would inhibit underground mining operations near the fault. Large faults like the Llanfabon Fault are frequently en eschelon faults that would displace the strata in steps across a disturbed width of ground. This common pattern of faulting suggests that there are no unrecorded old workings beneath the Site in the Mynyddislwyn Seam as a result of the presence of disturbed ground near the fault. It also suggests that the Mynyddislwyn Seam would be affected by the en eschelon faulting and be too deep to pose a risk to the development.

Our searches found no record of a disused shaft or adit within the confines of the Site and the risk of a disused mine entry being present in such close proximity to The Llanfabon Fault is very low. However, the risk of unrecorded air shafts being present 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 buildings on the Site.

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. Many exploration programmes across the district that encountered old workings in the Mynyddislwyn Seam have all found the old workings to be waterlogged, reducing the risk of mine gases being present. Further, collieries that mined the Mynyddislwyn Seam were ‘naked light’ pits as a result of the minimal methane content of the Seam.

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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 referring to the Radon gas map published on Public Health England's website; the interactive map shows the Site to lie in an area NOT affected by Radon gas.

7 Risk Assessment: Discussion and Recommendations

7.1 Solid Geology

Large normal faults such as the Llanfabon Fault can act as a locus for differential vertical ground movement as a result of collapsing old workings either side of the fault, where the pattern of old workings is commonly different on either side of the fault. These large faults can also act as a locus for differential lateral movements during earthquake events. One branch of the Llanfabon Fault may cross the eastern part of the Site. If so, the fault may pose a risk from differential settlement associated with collapsing shallow mine workings that may be present and also a risk of differential lateral movements during earthquake events. The thickness of superficial deposits may provide some protection against differential lateral movements.

The development includes the construction of a new building, any differential ground movement could affect structural integrity of buildings but not soft parts of the development such as the horse walk; any damage that might occur to the latter could be remedied by regrading of the soft surface. It is recommended that exploratory boreholes are drilled with a view to determining whether a branch of the Llanfabon Fault affects the development. If possible, constructing a new building astride the plane of a large fault should be avoided.

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7.2 Mining History

7.2.1 *Shallow Mine Workings*

The locality has experienced extensive mining operations for coal with fairly extensive old workings in the Mynyddislwyn Seam and The Coal Authority's interactive map identified shallow and probable workings across the Site and the surrounding area. Whilst shallow old workings were encountered during the development of The Paddocks, exploratory drilling for a dwelling immediately north of the Site encountered superficial deposits of between 8m and 13m, but no coal to a depth of 30m. The latter drilling indicates that the Seam is too deep to pose a risk of any old workings that might be present collapsing to the surface.

The difference in the evidence from the two drilling operations may indicate that they lie either side of a fault, The Paddock on the upthrown side where the Mynyddislwyn Seam is shallower, and the dwelling to the north on the downthrown side of the fault where the Seam is deeper. This would imply that the fault plane passes through the Site and may result in a position where shallow workings in the Seam affect at least part of the Site. The exploration holes recommended above should be designed to consider the risk from shallow mine workings.

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

7.2.2 *Mine Entries*

No evidence has been found of a disused mine entry being present within the Site and it is highly unlikely that a disused mine entry would be present in the immediate vicinity of a branch of the Llanfabon Fault. The geology of the Site is such that there is no coal seam outcrop that would have afforded an opportunity for a drift mine and the Site lies beyond the westerly extremity of the workings

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from the Llancaiach Colliery so that there is no opportunity for an air shaft from those workings to be present on the Site. If any unusual features are noted during any excavation works, the works should be suspended immediately, and further advice sought from a Chartered Geologist or from The Coal Authority.

7.2.3 Mine Gases

There are no shallow mine workings underlying the Site to act as a source of mine gases and collieries that mined the Mynyddislwyn Seam were naked light. The development is partly in the open air and otherwise in large barn type buildings that are well ventilated. It is considered that there is no risk to the development from mine gases.

7.3 Radon Gas

The Site lies within an area NOT affected by Radon gas, the appropriate response for building control purposes is NONE.

7.4 Summary of Risk Assessment

There is a potential risk of differential ground movement associated with faulting and shallow mine workings. The presence of an unrecorded disused mine entry is considered to be extremely low. There is no risk from Radon gas.

7.5 Summary of Recommendations

A programme of exploration boreholes should be drilled on the Site in order to examine in greater detail the risk from faulting and from shallow mine workings; the boreholes should be monitored for the presence of mine gases. The boreholes should be designed and supervised by a Chartered Geologist and will require a permit from The Coal Authority.

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If any unusual feature that might indicate the presence of a disused mine entry is encountered during excavation works on the Site, the work must be stopped immediately and advice sought from a suitable experienced Chartered Geologist or from The Coal Authority.

7.6 Foundation Options

The findings of the recommended boreholes will be required to inform the appropriate foundation options for new building(s). If possible, building astride a large fault should be avoided; any building constructed astride a large fault must have a reinforced raft foundation.



**Dr Malcolm Blandford,
Chartered Geologist.**

Report Date: 12th December 2019.

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PLANS



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Geologists Working With The Environment....

Study on Land at Crophorne Stables, 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/12.19.02.01.



Study on Land at Crophorne Stables, Trelewis.

Geology Plan.

Plan Scale: 1:10,560.

Key to Symbols:

— Approximate Site Boundary.

Note:
North is at top of plan.

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Study on Land at Crophorne Stables, Trelewis.

Detailed Location Plan.

Plan Scale: Approx. 1:1,250.

Key to Symbols:

— Approximate Site Boundary.

Notes:

North is at top of plan.

*Drawing based on plan supplied by
Monarch Architectural Services.*

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