



RHONDDA
GEOTECHNICAL
SERVICES

VALIDATION REPORT

C.A. PERMIT No. 27649

M.T.C.B.C. PLANNING PERMISSION P/19/0064

LAND OPPOSITE

47-50 MARDY STREET

TWYNYRHODYN

MERTHYR TYDFIL

CF47 0LD

4/03/2024

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INTRUSIVE INVESTIGATION VALIDATION REPORT

1. INTRODUCTION

This Validation Report has been produced in support of the closure form for C.A. permit 27649. The land subject to the intrusive investigation has granted planning permission P/19/0064 from Merthyr Tydfil C.B.C. The application is for the construction of two detached residences on land opposite 47-50 Mardy Street, Merthyr. The planning application was supported by a C.M.R.A. prepared by Blandford Consulting. There were no recorded mineworkings, but the C.M.R.A. acknowledged the fact that the area has a long history of mining of both coal and ironstone. The C.M.R.A. recommended an intrusive investigation. This recommendation was based on desk study material which raised the possibility of unrecorded shallow mineworkings beneath the site. The C.M.R.A. stated that the investigation would need to be carried out by a competent contractor considering the findings of the report. The results should then be interpreted by a qualified and competent person so that an appropriate remedial strategy could be developed (if necessary).

Richard Davies BSc. (Hons), MSc., F.G.S. of Rhondda Geotechnical Services was commissioned by Jarryd Jones (the current owner of the land, but not the original applicant) as the competent person to design and carry out an intrusive investigation of the proposed development site. A brief review of relevant desk study information will follow prior to the description of the intrusive investigation findings. This is necessary to place the results of the intrusive investigation in context.

The site is centred on grid reference 306135, 206115 and is at an elevation of approximately 265m. A.O.D. The plot is rectangular, averaging approximately 28m x 20m. The plot sits in a mixed residential area facing a terraced street to the east and bounded by a row of garages to the south. North and west of the site are playing fields and rough ground. There are no surface watercourses. The site location is shown in Figure 1 overleaf and the site boundaries are shown in Figure 2.

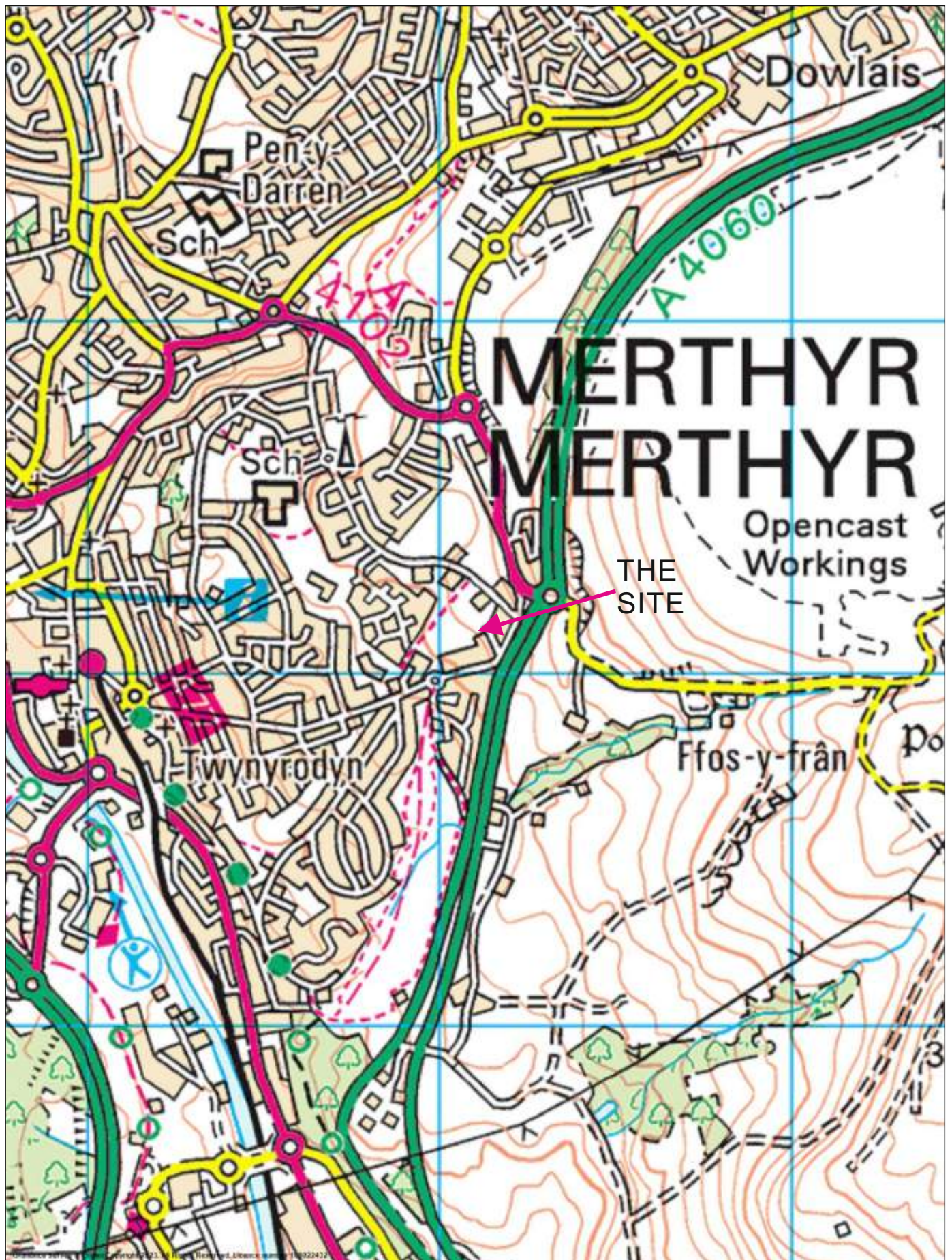


FIGURE 1
SITE LOCATION.

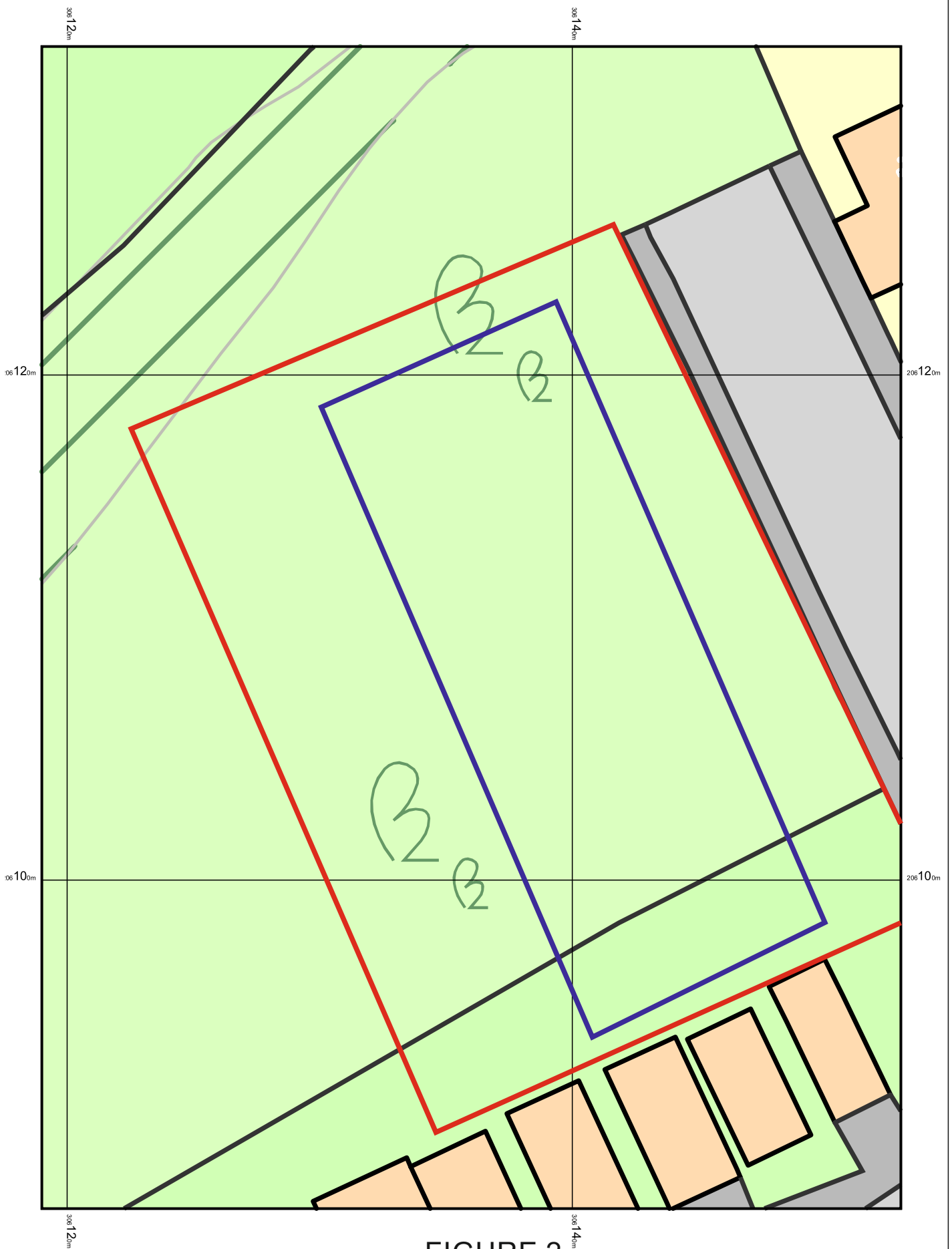


FIGURE 2

SITE BOUNDARIES AT MARDY STREET.
LAND OWNERSHIP IN RED, DEVELOPMENT OUTLINE IN BLUE.

2. C.M.R.A. CONCLUSIONS AND ADDITIONAL GEOLOGICAL INFORMATION

The C.M.R.A. is informed by a broad range of desk study material including a non-residential CON29, THE C.A. Interactive Viewer and published geological records. Rather than use the Blandford Consulting material this report has gone back to the original source material. The CON29, not necessarily the best report as the basis for a C.M.R.A. states that the plot is not within an area of recorded underground coal mining. However, the C.A. qualify this by stating they believe there is coal at or close to the surface that could have been worked in the past. there is little else of value in the report.

The C.A. interactive viewer contains a vast amount of information from various sources, particularly on the mining data window. An extract from the planning window can be seen in Figure 3. Although difficult to distinguish at such a small scale, the area of the site has been circled and is entirely within an area of Development High Risk. The grey areas represent opencast mining, the blue areas denote recorded shallow mining. The site sits within a purple area. This colour represents an area of suspected unrecorded shallow mining. The isolated circular areas are 20m exclusion zones around mine entries not connected to seam outcrops. An extract from the Mining Data Window is reproduced as Figure 4 overleaf. The nearest outcrops to the site have been annotated with their C.A. codes. The fact that the seam codes are ascending to the east is partly influenced by the topography. It could also indicate the strata is dipping to the east or southeast. According to the C.A. Seam Code Directory the seams are:-

SW0131 Five Foot Gellideg

SW0181 Lower Seven Foot Bottom Leaf

SW0211 Upper Seven Foot

The Upper Seven Foot is shown outcropping east of the site. This means it cannot underlie the site. The other two seams will underlie the site. The depth would be determined by strata dip and ground levels. Other datasets on the viewer show huge amounts of recorded mining north, south and east of the site. There is none shown beneath the site. However, everywhere above the outcrop of the Garw Seam (off the western margin of Figure 4 is classified as an area of suspected shallow mining. The red crosses are mine entries. There is a huge amount of them scattered in all directions from the site. This reflects Merthyr's intensive industrial history. Many of them may not be connected to coal mining. Ironstone was the main economic target of mining in the early nineteenth century when Merthyr was the largest iron producer in the world. The main Ironstone veins are between the Gellideg and Garw seams. These are (in

descending order) the Spotted, Yellow, Red, Blue, Big, Lumpy and Rough together with the Rosser Veins beneath the Garw. Coal was mined for fuel for the voracious ironworks, but the mining of “sale coal” did not develop until much later. None of the mine entries are within influencing distance of the site but could indicate the possibility of mining beneath the site.

The six inch to the mile Geological Survey sheet SO 00NE covers the area around the site. An extract of the Survey Sheet has been reproduced as Figure 5 overleaf with the site outlined. A section of the stratigraphic column from the map is shown in Figure 6, with the approximate site level marked. The outcrop pattern for the Gellideg in Figures 4 and 5 is identical. This is not surprising as the primary source for the Interactive Viewer is the British Coal Development Plan which largely drew on the Geological Survey. The outcrop of the Lower Seven Foot has the same orientation as in Figure 4 but the outcrop is not shown from a point just south of the site. This coincides with the right sloping diagonal hatching. This indicates thick Made Ground, mainly coal and ironstone spoil (left sloping hatching indicates opencast mining). The outcrop of the Upper Seven Foot is not shown at all. To avoid overcomplicating a map the Geological Survey will often only show the most economically or stratigraphically important seams. In addition, the Memoirs make it clear that the ground is so disturbed and covered with spoil or urban development that first hand observation of the outcrops is impossible. This also means that there are few observed strata dips. Two low angle (2° and 3°) dips to the southeast are recorded 400m south of the site, and this general trend is confirmed in recorded underground survey levels. On the eastern side of Merthyr there is considerable variation in the coal seams underlying the site from what might be considered the normal. The Gellideg is very closely spaced from the two seams making up the equivalent of the Five Foot. The resulting composite seam was known the Lower Four Foot and was extensively mined. So, to summarise, there is no recorded mining beneath the site. Underground coal mining in Merthyr predates the 1874 compulsory keeping of mine plans by 60-70 years. However, the fiercely competitive nature of the four massive ironworks meant that commercial records were kept from a very early date, mainly to prevent incursions into rival mineral rights. There are probably mineable coal seams at shallow to medium depth beneath the site. These are the Lower Seven Foot and the Five Foot Gellideg (known locally as the Lower Four Foot). The Lower Seven Foot could be as shallow as 20m underground. The depth of superficial deposits is unknown and so the recommendation for intrusive works is justified.

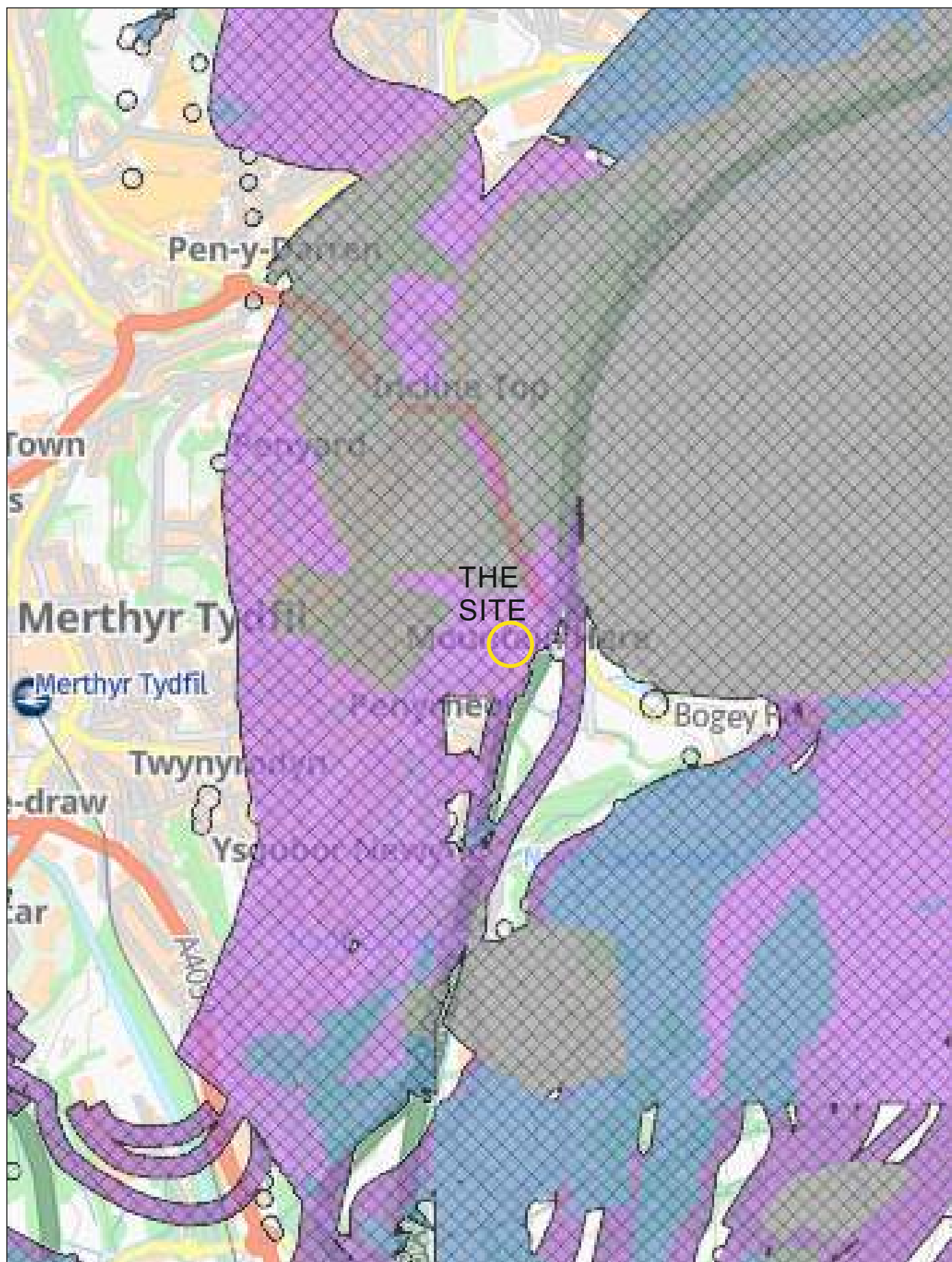


FIGURE 3
COAL AUTHORITY INTERACTIVE VIEWER, PLANNING WINDOW.
HATCHED AREAS ARE DEVELOPMENT HIGH RISK

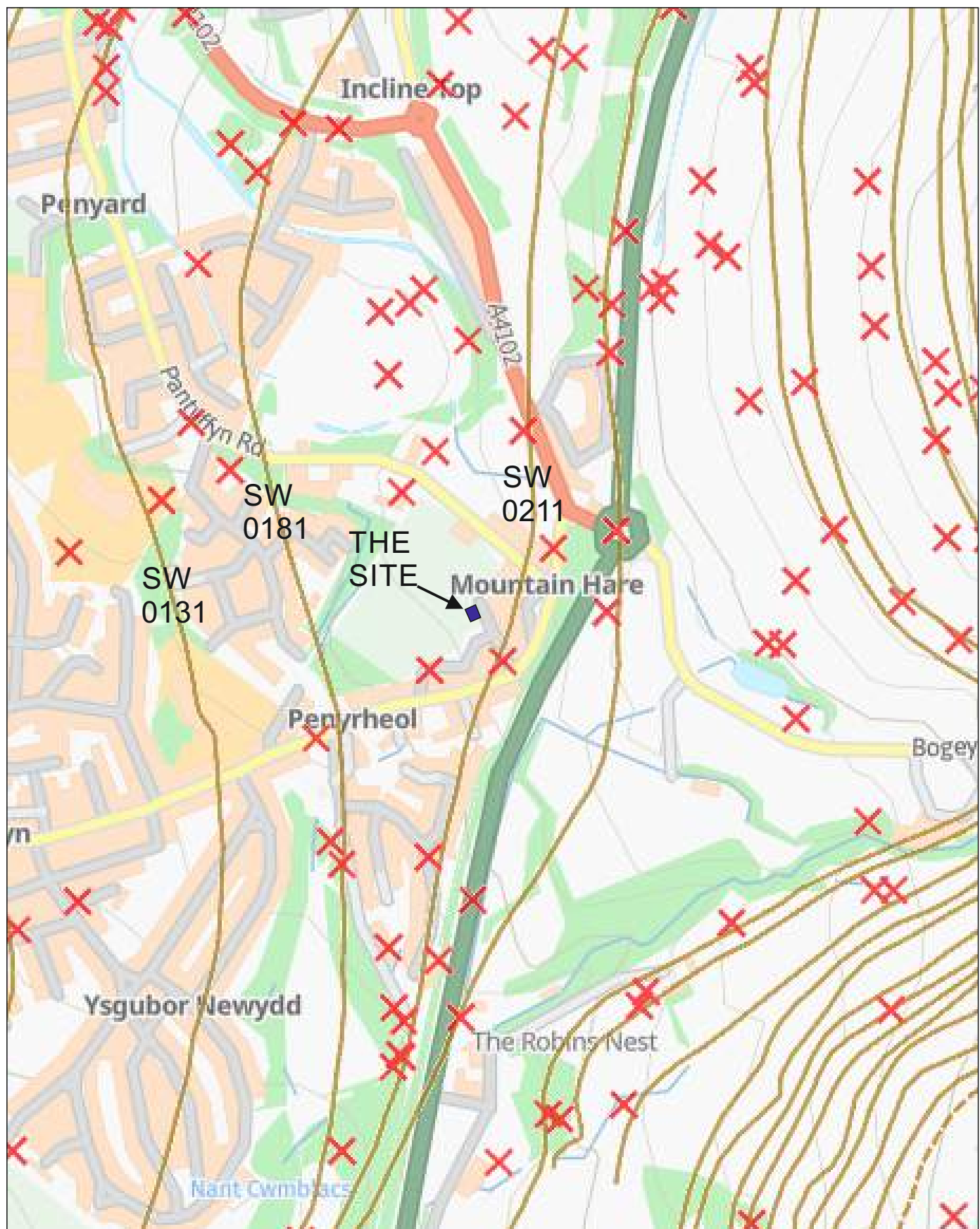


FIGURE 4
C.A. VIEWER, MINING DATA WINDOW. RED CROSSES
ARE MINE ENTRIES, BROWN LINES ARE SEAM
OUTCROPS. THE SITE IS SHOWN IN BLUE.

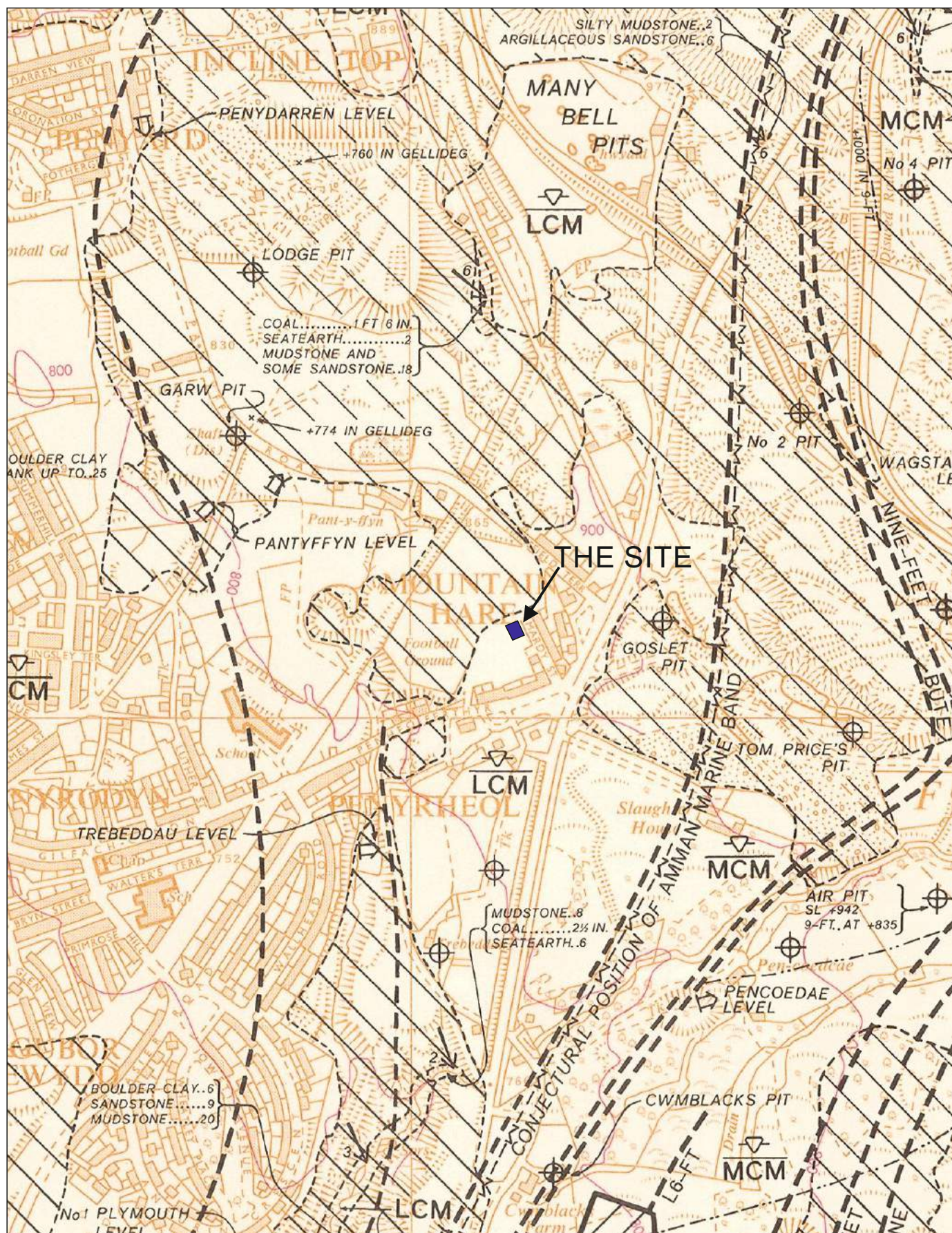


FIGURE 5
SECTION OF GEOLOGICAL SURVEY SHEET SO 00NE.
THE SITE IS OUTLINED IN BLUE.

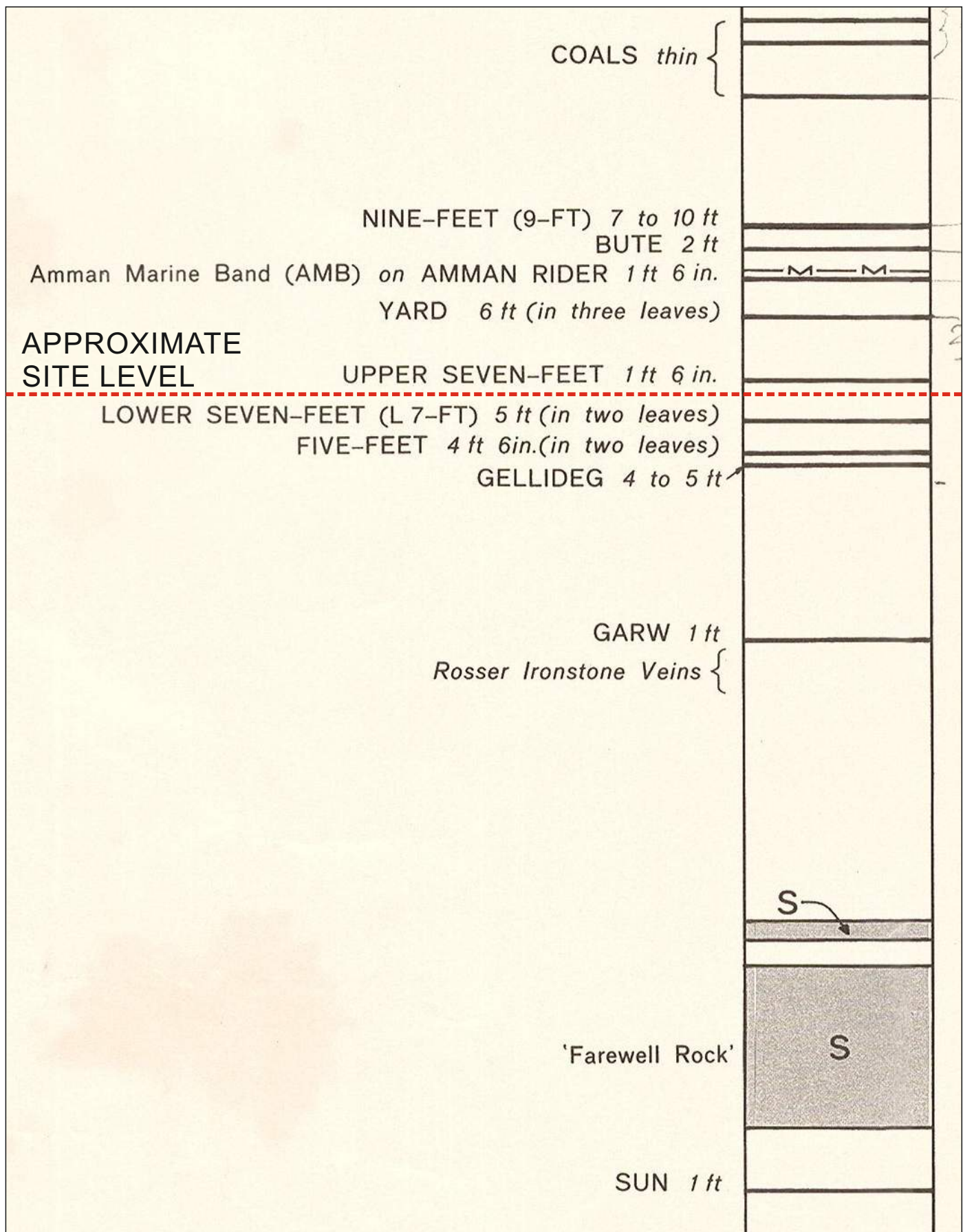


FIGURE 6
SECTION OF THE STRATIGRAPHIC COLUMN FROM SO 00NE.
THE APPROXIMATE SITE LEVEL IS MARKED.

3. SITE INVESTIGATION DESIGN

The thickness of the superficial deposits on the site was unknown at the time of applying for the permit. Past work in the area led to the conclusion Glacial Drift was likely to be thin (1m-3m), but the possibility of Made Ground could not be ruled out. The adjacent playing fields are certainly remodelled spoil heaps. Thirty metres of rock is generally considered safe cover over old workings. This is only a rule of thumb, and conditions can vary enormously due to factors such as extraction thickness, pattern of mining and in particular roof rock. For the purposes of the permit application 40m was chosen as the proposed depth of the boreholes. This was with the intention of proving 30m of rock once the thickness of the superfcials was established on site. The design of the proposed houses is limited by the width of the plot and by current planning regulations regarding off-road parking. Six boreholes were considered adequate for such a relatively small building footprint. These cover the four corners of the combined plots with additional boreholes front and rear between the two plots. Figure 7 is the borehole layout as drilled. This is very similar to the plan submitted with the permit application, except for the borehole numbering. This was done in the order of drilling to avoid confusion with the drillers. The drilling was supervised full-time by the author which gave the option of varying drilling instructions, dependent on the findings.



FIGURE 7 BOREHOLE POSITIONS AS DRILLED AT MARDY ST.

4. RESULTS

The boreholes were drilled on 15-16/01/2024. Apex Drilling used a small Fraste rotary rig to drill the boreholes because of the narrow access into Mardy Street. All permit conditions were adhered to, with water flush being employed from rockhead after the superficals were cased off using air flush. Continuous gas monitoring at the rig, and regular monitoring in the surrounding area detected no mine gases. Full borehole logs are provided in Appendix 1. In summary, five boreholes were drilled to 34m depth, proving a minimum of 30m of rock. BH3 was drilled to 32m as flush was lost. Rockhead was shallow as expected at 2.9m-3.9m. Up to 1.0m of Made ground overlaid glacial till deposits. There was good correlation between the boreholes. Ground levels were not surveyed and varied by approximately 1m. There was a thin (0.5m-0.7m) coal seam at approximately 10m depth. Below this was a compound seam 3.2m-4.2m thick with two significant mudstone partings. The top of the seam was approximately 20m-22m b.g.l. The seam can be tentatively correlated with the Lower Seven Foot. It matches the description in the Memoirs and was at the expected depth when projected from outcrop. There was a second compound seam below the Lower Seven Foot. This was 2.0m-2.2m thick with a significant mudstone parting 0.5m-0.9m thick. This was 24m-27m b.g.l. and can be tentatively correlated with the Five Foot. The Gellideg was not seen although the boreholes were drilled up to 7m below the base of the Five Foot. None of the coal was worked in BHs 1, 2, 4, 5 and 6. In BH3 there was a 0.5m void at 27.5m b.g.l. Below this was 0.7m of broken ground. Returns were lost but from 28.7-32.0m normal penetration rates were maintained. The borehole was then terminated because of the risk of the drillstring jamming. The void and broken ground was at the level of the Five Foot Seam. This could be coincidental. The area has a huge network of drainage adits and cross measure drives associated with the intensive Ironstone mining between the Gellideg and Garw coal seams.

5. CONCLUSIONS

The site investigation proved the only evidence of mining was in the southwest corner of the site. There is no potential for a 0.5m void to migrate to the surface from a depth of 27m. The broken ground beneath the void presumably represents collapsed material from above. No gas was detected coming from the void. Because water flush was being used it was difficult to assess the water table during drilling. On completion of the borehole the water level was at 18m b.g.l. indicating the void was flooded.

As a precaution it is the recommendation of this report that the houses should be built on raft foundations designed by an experienced structural engineer. The rafts should be capable of bridging a 3m void and cantilevering over a 2m void.

This validation report will accompany the Permit Closure Form and will be sent to the Permissions department of the C.A. A copy will also go to M.T.C.B.C. for them to consult with the C.A. about lifting their objections to planning. The evidence in this report should allow them to do this safe in the knowledge that there is minimal threat to ground stability at the site from coal mining legacy issues. With the use of raft foundations, the risk is reduced to negligible.

Richard Davies BSc. (Hons.), MSc., F.G.S.

3/03/2024

APPENDIX 1

ROTARY BOREHOLE LOGS

FROM

MARDY STREET

MERTHYR TYDFIL

BH1 MARDY ST, MERTHYR	
Strata Depth (m)	Strata Description
G.L.-0.7	MADE GROUND.
0.7-3.4	BOULDER CLAY
3.4-10.9	MUDSTONE
10.9-11.4	COAL
11.4-20.8	MUDSTONE
20.8-21.6	COAL
21.6-22.1	MUDSTONE
22.1-24.0	COAL WITH 20cm PARTING
24.0-27.1	MUDSTONE
27.1-27.9	COAL
27.9-28.4	MUDSTONE
28.4-29.3	COAL
29.3-34.0	MUDSTONE

BH2 MARDY ST, MERTHYR	
Strata Depth (m)	Strata Description
G.L.-3.1	BOULDER CLAY
3.1-9.4	MUDSTONE
9.4-10.1	COAL
10.1-19.8	MUDSTONE
19.8-20.4	COAL
20.4-21.6	MUDSTONE
21.6-23.5	COAL WITH 30cm PARTING
23.5-25.1	MUDSTONE
25.1-25.9	COAL
25.9-26.5	MUDSTONE
26.5-27.1	COAL
27.1-34.0	MUDSTONE

BH3 MARDY ST, MERTHYR	
Strata Depth (m)	Strata Description
G.L.-1.0	MADE GROUND.
1.0-3.8	BOULDER CLAY
3.8-10.9	MUDSTONE
10.9-11.5	COAL
11.5-21.1	MUDSTONE
21.1-22.0	COAL
22.0-22.4	MUDSTONE
22.4-24.4	COAL WITH 20cm PARTING
24.4-27.5	MUDSTONE
27.5-28.0	VOID
28.0-28.7	BROKEN GROUND
28.7-32.0	NORMAL DRILL NO RETURNS

BH4 MARDY ST, MERTHYR	
Strata Depth (m)	Strata Description
G.L.-0.8	MADE GROUND.
0.8-3.9	BOULDER CLAY
3.9-11.0	MUDSTONE
11.0-11.6	COAL
11.6-21.6	MUDSTONE
21.6-22.4	COAL
22.4-23.2	MUDSTONE
23.2-24.7	COAL WITH 40cm PARTING
24.7-26.8	MUDSTONE
26.8-27.5	COAL
27.5-28.4	MUDSTONE
28.4-28.9	COAL
28.9-34.0	MUDSTONE

BH5 MARDY ST, MERTHYR	
Strata Depth (m)	Strata Description
G.L.-0.8	MADE GROUND.
0.8-3.7	BOULDER CLAY
3.7-10.9	MUDSTONE
10.9-11.4	COAL
11.4-21.2	MUDSTONE
21.2-23.0	COAL
23.0-23.6	MUDSTONE
23.6-25.4	COAL WITH 50cm PARTING
25.4-27.0	MUDSTONE
27.0-27.8	COAL
27.8-28.5	MUDSTONE
28.5-29.1	COAL
29.1-34.0	MUDSTONE

BH6 MARDY ST, MERTHYR	
Strata Depth (m)	Strata Description
G.L.-2.9	BOULDER CLAY
2.9-9.3	MUDSTONE
9.3-10.0	COAL
10.0-19.5	MUDSTONE
19.5-20.2	COAL
20.2-20.8	MUDSTONE
20.8-22.9	COAL WITH 40cm PARTING
22.9-24.2	MUDSTONE
24.2-25.0	COAL
25.0-25.6	MUDSTONE
25.6-26.4	COAL
26.4-34.0	MUDSTONE