



RHONDDA
GEOTECHNICAL
SERVICES

COAL MINING RISK ASSESSMENT
MERTHYR TYDFIL C.B.C.
DEVELOPMENT AT
MERTHYR MOTOR AUCTIONS
PANT ROAD
DOWLAIS
MERTHYR TYDFIL
CF48 3SH
18/01/2021

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INTRODUCTION

Merthyr Motor Auctions have been established for many years at Pant Road, Dowlais. The planned dualling of the A465 will result in the loss of a significant proportion of their vehicle storage area which is vital to the function of the business. At the request of Dean Davies, the owner of M.M.A., Rhondda Geotechnical Services were commissioned to investigate the possibility of removing an embankment from within the site to create some additional yard space. The brief was to assess slope stability at present, assess how much additional land could be gained and if it is economically feasible. In addition a design for a safe new slope profile was produced for consultation with Merthyr Tydfil C.B.C Planning and Building Control. Subsequently M.T.C.B.C. have requested a Coal Mining Risk Assessment (henceforth C.M.R.A.) should be produced to validate the planning application.

Richard Davies BSc. (Hons), MSc., F.G.S. of Rhondda Geotechnical Services has been commissioned as the competent person to prepare a C.M.R.A. of the proposed development site. The purpose of this is to provide the L.P.A. with information on possible coal mining and an assessment of its impact on the ground stability of the site. The purpose of this C.M.R.A. is to gather all the available information and use it to identify any coal mining risks and then to quantify them. It will then suggest, if necessary, any mitigation measures to satisfy the L.P.A. that the site is, or can be made safe and stable in line with national guidelines. This will be done in line with the template and recommendations of the C.A. document Guidance for Welsh L.P.A.s (version 4, 2017).

1. SITE DESCRIPTION

The site is centred on Grid Reference 306480, 208430 with the yard at an elevation of approximately 330m A.O.D. The top of the existing embankment is approximately four metres higher than the yard. The site is a working commercial yard of featureless gently sloping tarmac. The eastern perimeter of the yard is a high rockface. The yard then narrows and passes to a lower area still under the ownership of M.M.A. There are no surface watercourses. The site location and site boundary (embankment area only) can be seen overleaf in Figures 1 and 2

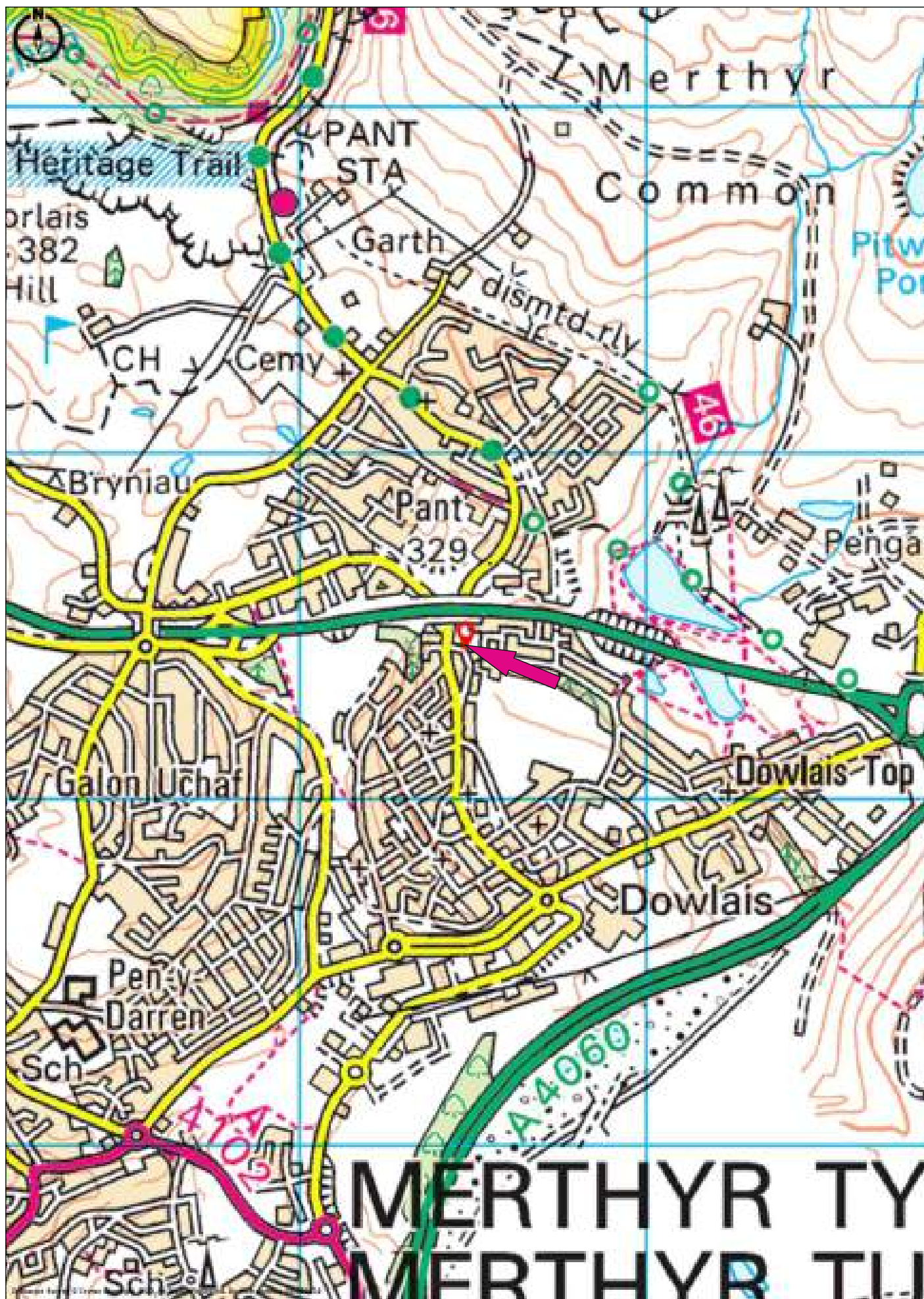


FIGURE 1
SITE LOCATION (ARROWED)

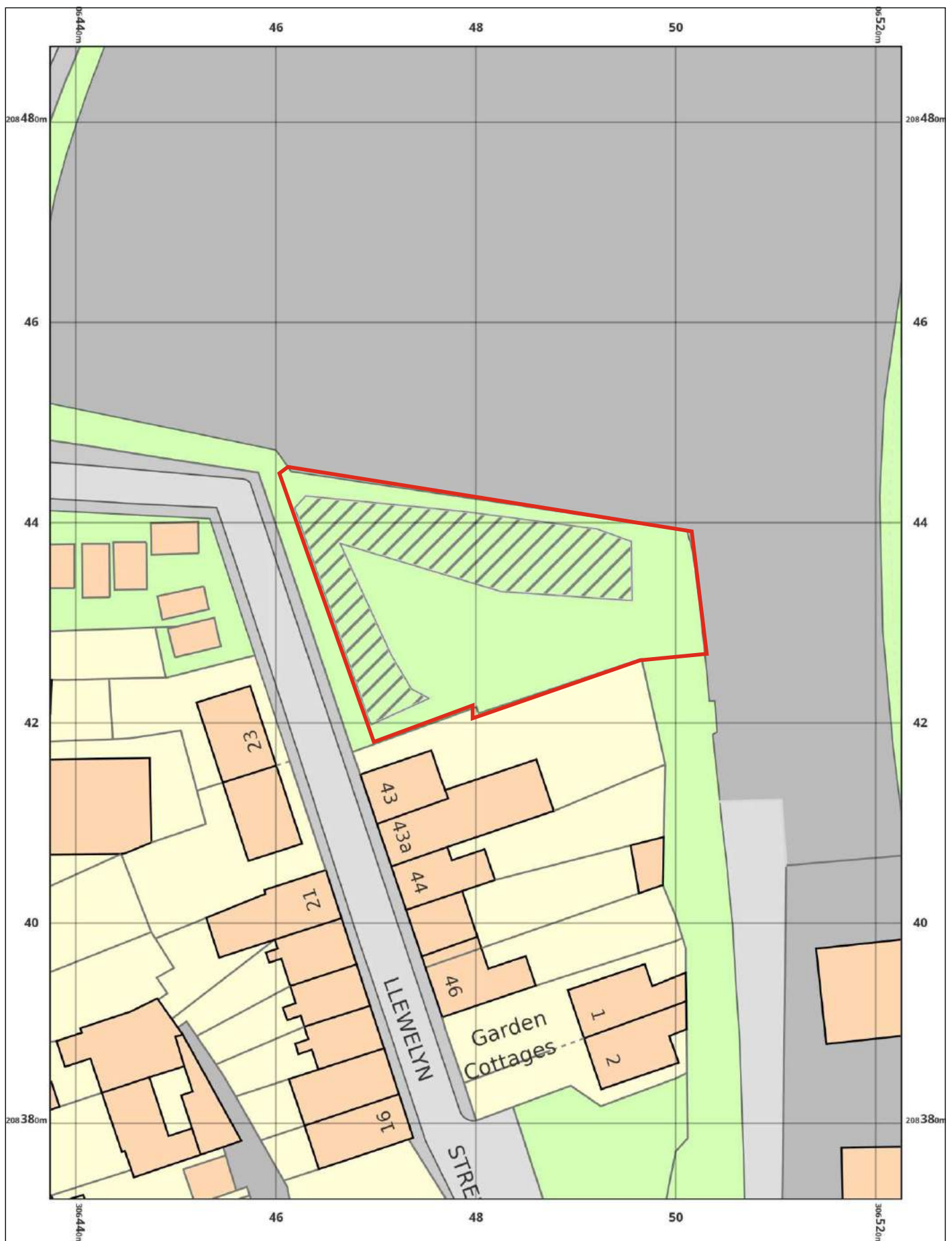


FIGURE 2

THE EMBANKMENT (HIGHLIGHTED) AND SURROUNDING AREA.
GRID SQUARES ARE TWENTY METRES ACROSS.

2. SOURCES OF INFORMATION

- a) The C.A. interactive viewer.
 - b) The 6" to the mile Geological Survey sheet SO 00SE (1967-68 revision, pub. 1972).
 - c) The Memoirs of the Geological Survey of The South Wales Coalfield, part V, The Country around Merthyr Tydfil (First edition 1904 and third edition, 1988) and other mining archive sources.
 - d) Historical Ordnance Survey maps, Old County Editions for Glamorgan, Sheet 6.14, 1879 edition with 1900, 1919, and 1962 revisions. Maps were viewed at 1:2500 scale.
 - e) A walkover survey of the site.
- 2a) 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. It can be seen that the site lies on a linear strip of Development High Risk. From its appearance, and the surrounding areas, this is a buffer zone above a seam outcrop. The small circular areas well to the southwest are 20m exclusion zones around mine entrances. In order to fully understand why sites have a high risk status it is informative to study the Coal Mining Data window. This window is far superior to the planning window as it is at a larger scale. There are multiple datasets which can be turned on and off. An extract from the Mining Data Window is reproduced as Figure 4 overleaf. For clarity only two sets of data are turned on in Figure 4- seam outcrops and mine entries. The brown lines running close to, or through of the site are coal seam outcrops. The seam code for both is SW0101, which means the C.A. believe both outcrops are the Garw Seam. This claim will be analysed in more detail in following sections. There is a marked contrast in Figure 4 between the area around the site and land to the south. The land well to the south is covered with multiple mine entries and tightly packed seam outcrops. In contrast, the area around the site has no mine entries and only the two previously mentioned outcrops. Figure 5 from the data window has two different datasets switched on- recorded and suspected mining. The C.A. have no records of mining anywhere northwest of Dowlais and Dowlais Top. In contrast, the entire area of Merthyr south of that line is underlain by mineworkings, either recorded or suspected.

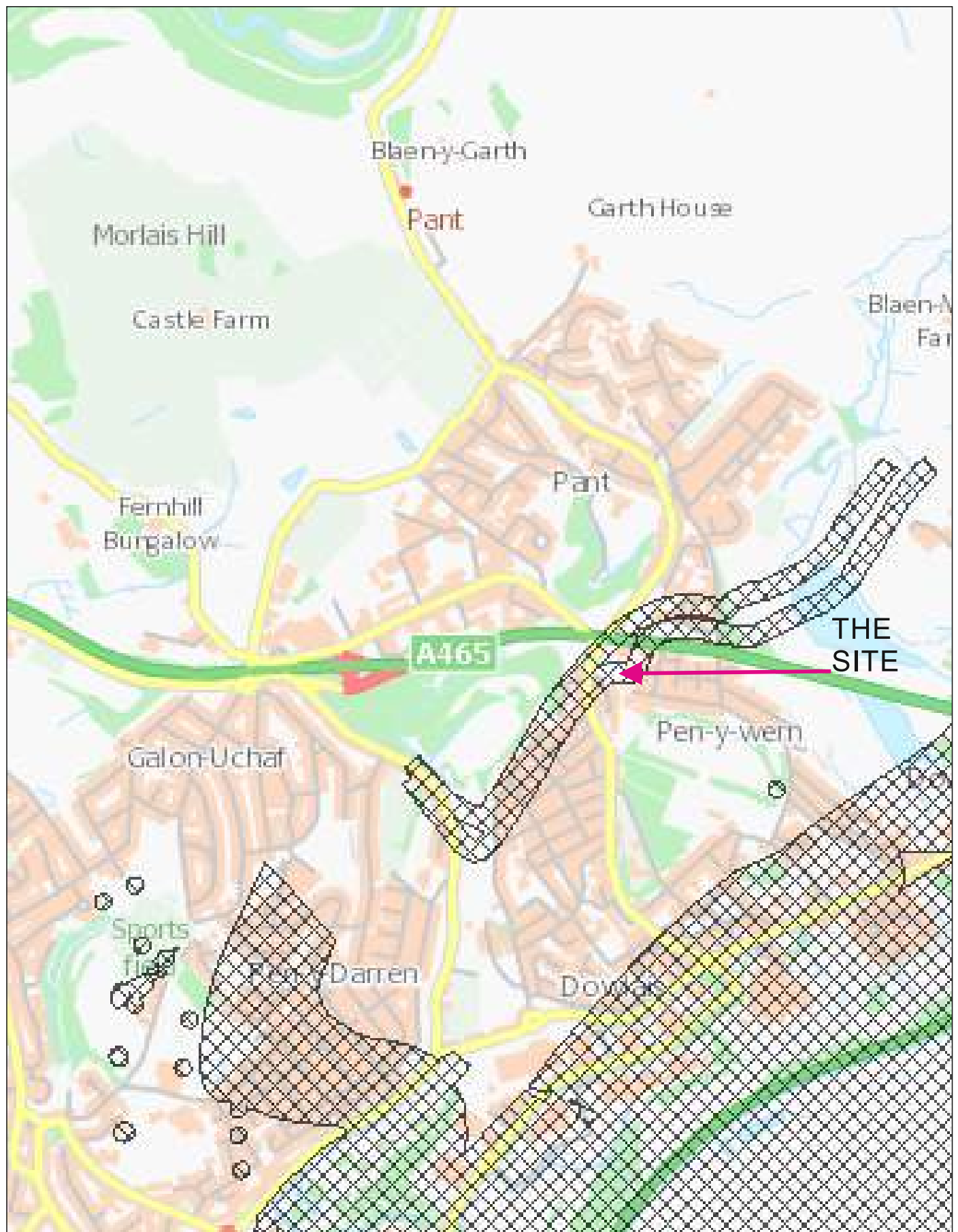


FIGURE 3
 COAL AUTHORITY INTERACTIVE VIEWER, PLANNING WINDOW.
 BLACK HATCHED AREAS ARE DEVELOPMENT HIGH RISK.

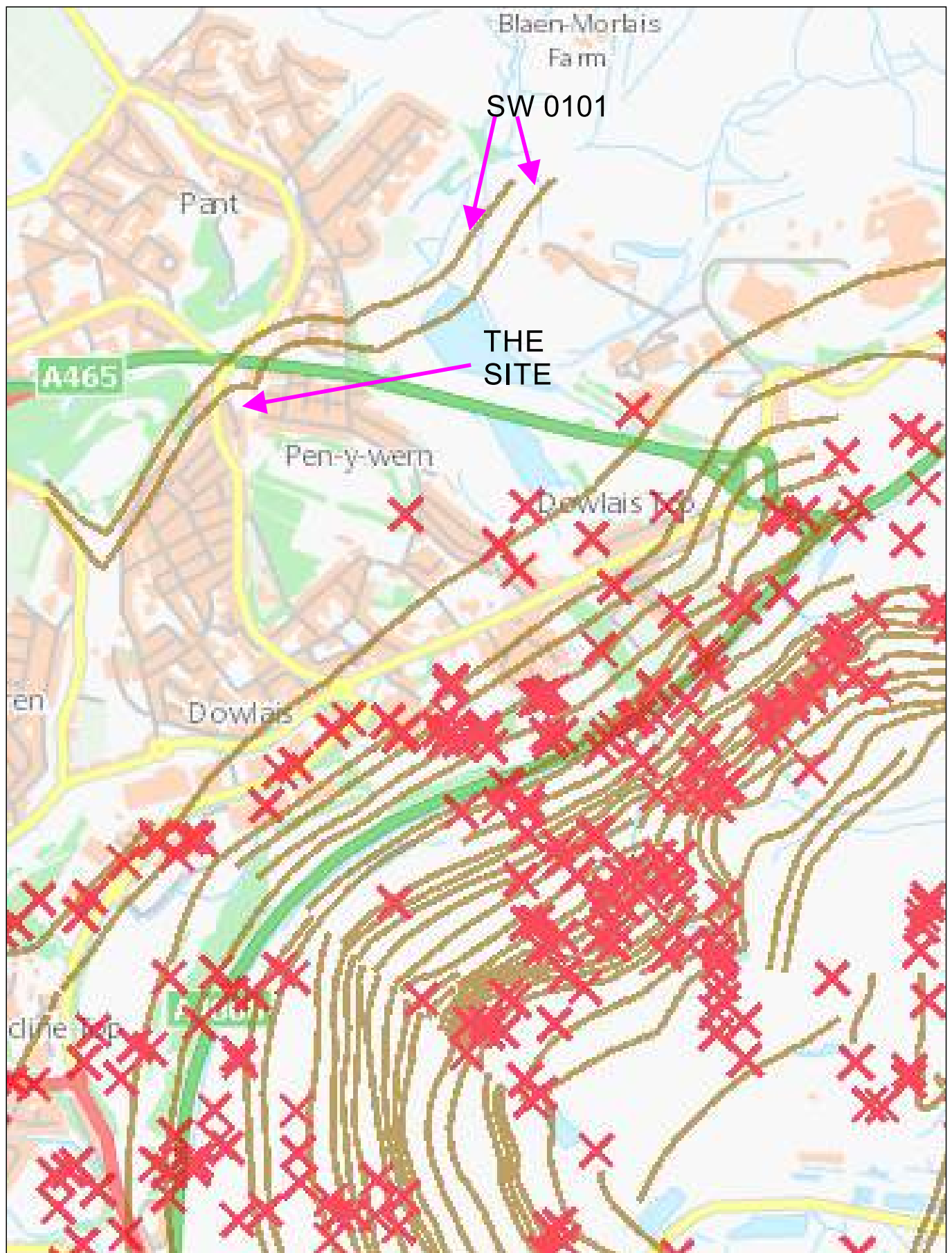


FIGURE 4
EXTRACT OF THE C.A. VIEWER, MINING DATA WINDOW. RED
CROSSES ARE MINE ENTRIES, BROWN LINES ARE SEAM
OUTCROPS. THE SITE POSITION IS SHOWN.

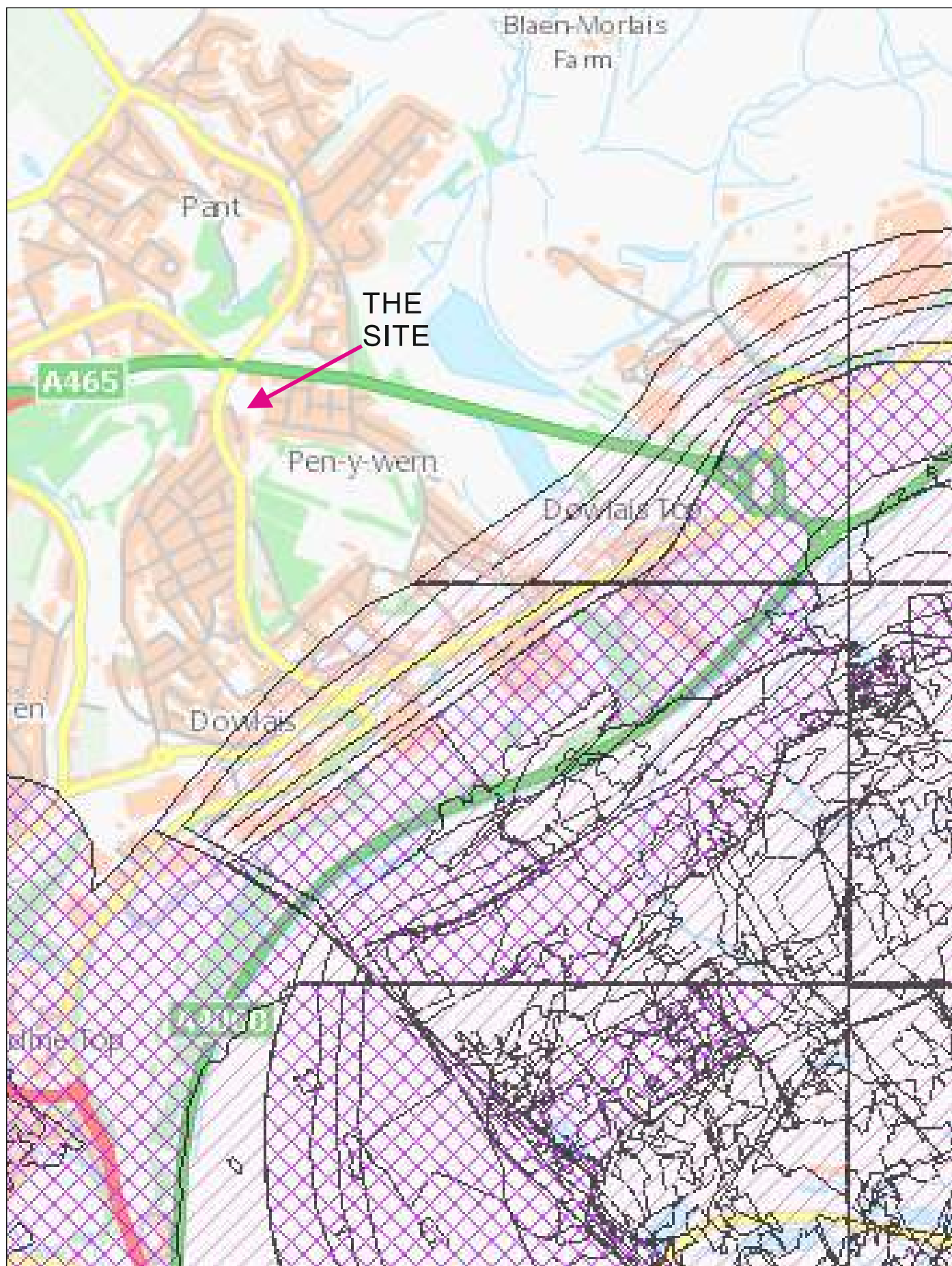


FIGURE 5
C.A. INTERACTIVE VIEWER, MINING DATA WINDOW.
THE DIAGONAL HATCHING COVERS AREAS OF RECORDED MINING,
THE CROSS HATCHING COVERS AREAS OF PROBABLE MINING.

2b and c) The six inch to the mile Geological Survey sheet SO 00SE covers the area around the site. An extract of the map has been reproduced as Figure 6 overleaf. A section of the stratigraphic column from the map is shown in Figure 7 with the site level marked. It is always very useful to study the survey sheets in conjunction with the Memoirs. Used together, the six inch survey sheets and the Memoirs are an invaluable source of much detailed geological information on the area. Much of this has been obtained from mining records. Due to the very high economic importance of the area, extensive government funded geological surveys have been carried out in the past. These were completed in 1845, 1899 and 1954 respectively. Very little information on historical coal mining in the area is missing.

Figure 6 shows a very different picture to Figure 4. This is surprising as the primary data source for the C.A. viewer is the British Coal Rationalised Plan. This itself drew heavily on the Geological Survey with additional information from N.C.B/B.C. records. There is a single seam outcrop marked in Figure 6, and this is the Sun Seam (not the Garw). The Geological Survey have measured and recorded a section of bedrock exposure. This is near the present day main gates of the Auction Grounds and is described in the Memoirs. This section can be seen in Figure 6 and shows the Sun Seam to be 12" (0.3m) thick. This is overlain by 32' (9.75m) of mudstones, thin sandstones and ironstone nodules. Above this is the Farewell Rock. This is the grey shaded area in Figure 6. This is a strong quartzitic sandstone, so called because there were no workable coal seams below it.

Measured dips are not shown on the Interactive Viewer. These are essential in order to fully understand the Geology and apply it to a risk assessment. A dip of 5° towards the southwest is recorded in the exposure mentioned above. When combined with the topography it is clear the Sun Seam will underlie the site at a fairly shallow (<30m) depth. In Figure 7 the Garw Seam (generally considered the lowest workable coal) can be seen a considerable distance above the top of the Farewell Rock, and this places its outcrop approximately 900m south of the site, not on site as in the C.A. data.

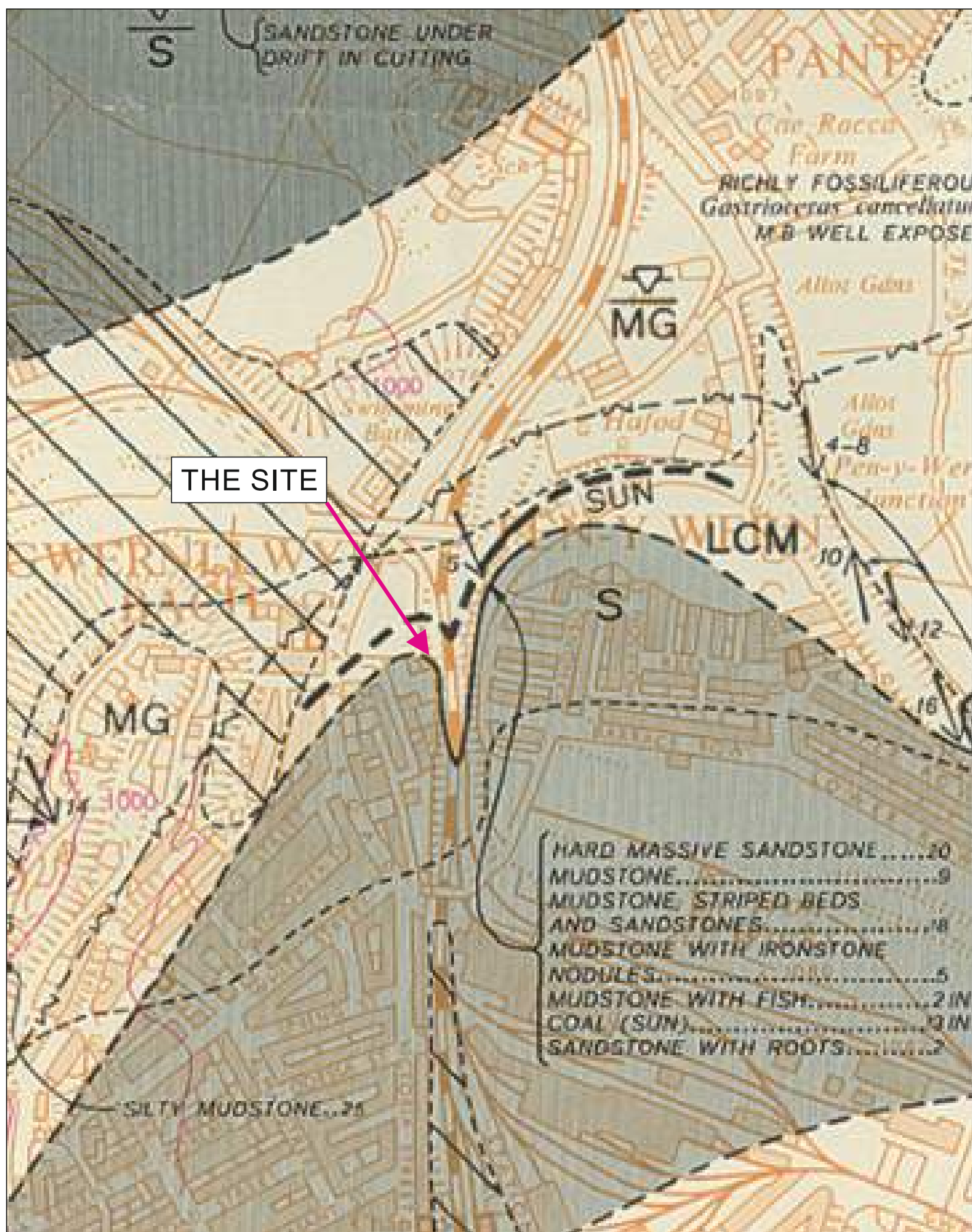


FIGURE 6

EXTRACT OF GEOLOGICAL SURVEY SHEET SO 00NE. THE O.S. BASE MAP IS FROM 1965 AND VERY DIFFERENT TO TODAY. NOTE THE GEOLOGICAL SECTION WITHIN THE AUCTION BOUNDARY.

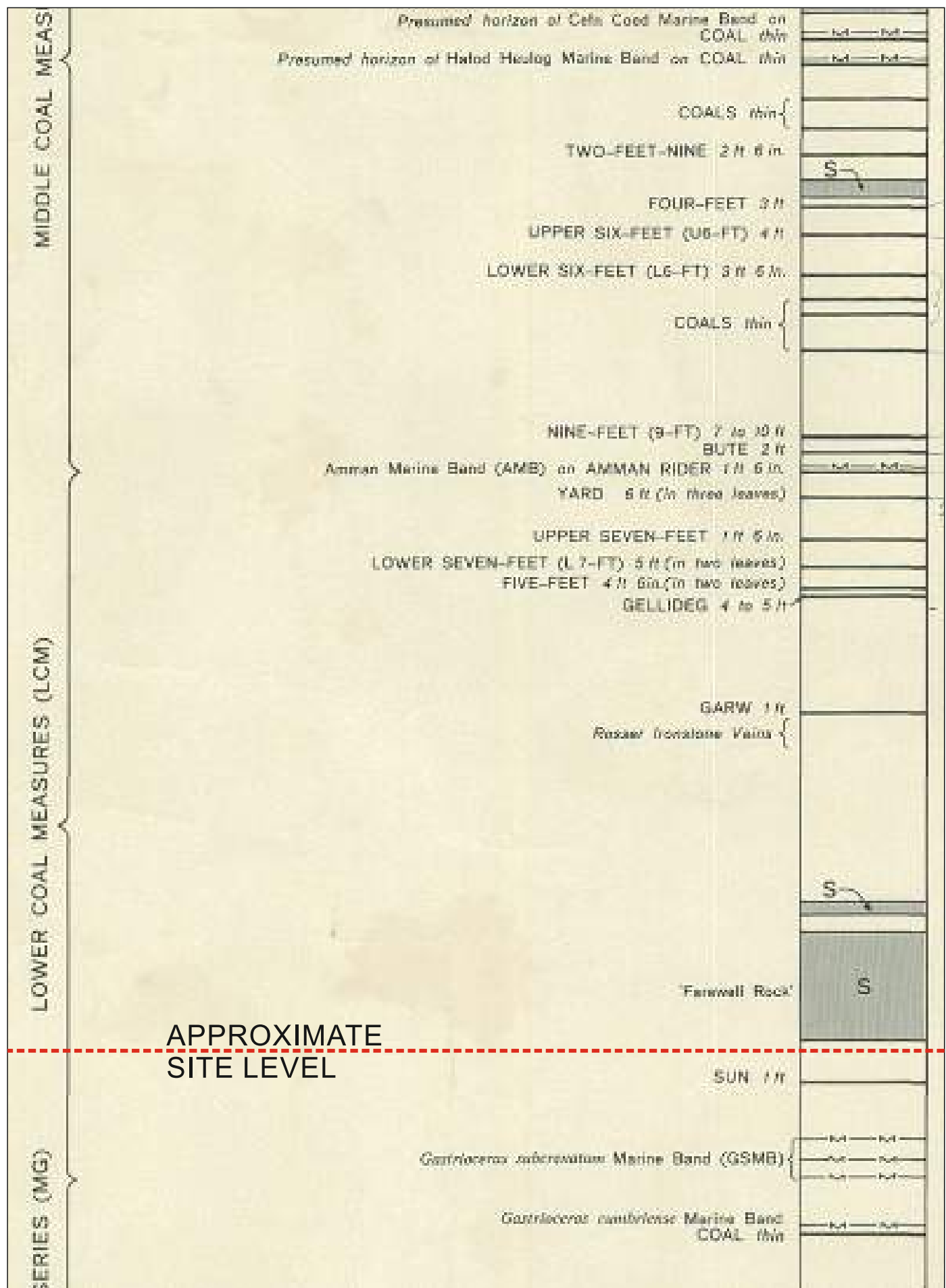


FIGURE 7
SECTION OF THE STRATIGRAPHIC COLUMN FROM SO 00NE.
THE APPROXIMATE SITE LEVEL IS MARKED.

2d) Historical Ordnance Survey maps can prove invaluable in looking for evidence of coal mining activity. Since the first County Series maps were produced in the 1870's nearly all mining features have been recorded, even if they were considered "old" at that time. This is particularly true of the 1:1250 and 1:2500 scale maps. Since the possibility of shallow coal mining is the most important issue in this risk assessment, they are a useful additional source to the geological material. Figure 8 is a section of the 1899 1:10,560 O.S. map. This shows no mining features anywhere near the site. Of course, this is not definitive proof of the absence of any mining, merely another line of evidence. The main reason for including the map is to explain the present day appearance of the site and the unusual shape of the Sun Seam outcrop in Figure 6. Both are due to the very deep railway cutting that passes through the site. The railway is actually still marked in Figure 6. The cliff-like exposure allowed the Geological Survey to produce the detailed description on the map and in the Memoirs. The site was cleared and constructed in its present form in 1994-1995, but the excellent exposures are still very visible.

2e) a detailed inspection of the embankment was carried out on Monday 2/11/2020 in connection with the geotechnical survey mentioned in the introduction. The embankment that is to be removed is at the same level as the elevated garden of no. 43 Llewellyn Street and is separated from it by a steel palisade fence with dense conifers behind it. The houses in Llewellyn Street are at approximately the same level as the yard of the auctions, only the gardens are at a higher level. These back onto the former railway cutting mentioned in the previous section. The embankment has a flat top running away from the palisade fence and ranging from 8m-12m wide before running down to the yard level at an average slope of 30°. On the eastern flank of the embankment the underlying bedrock is exposed. This can be seen in Figure 9. The bedrock is a thinly interbedded series of Siltstones and Mudstones with Ironstone Nodule horizons. This can be seen in Figure 10. The bedrock has been cut back, presumably as part of the railway cutting. In the rockface opposite, on the other side of the yard the base of the Farewell Rock is exposed. The Geological Memoirs record 9.75m of interbedded strata between this and the Sun Seam. This is the material exposed on the side of the embankment. The Sun Seam cannot be seen in the side of the embankment. This means that it is somewhere below the level of the yard, probably at a very shallow depth. This supports the conclusions of Section 2b,c.

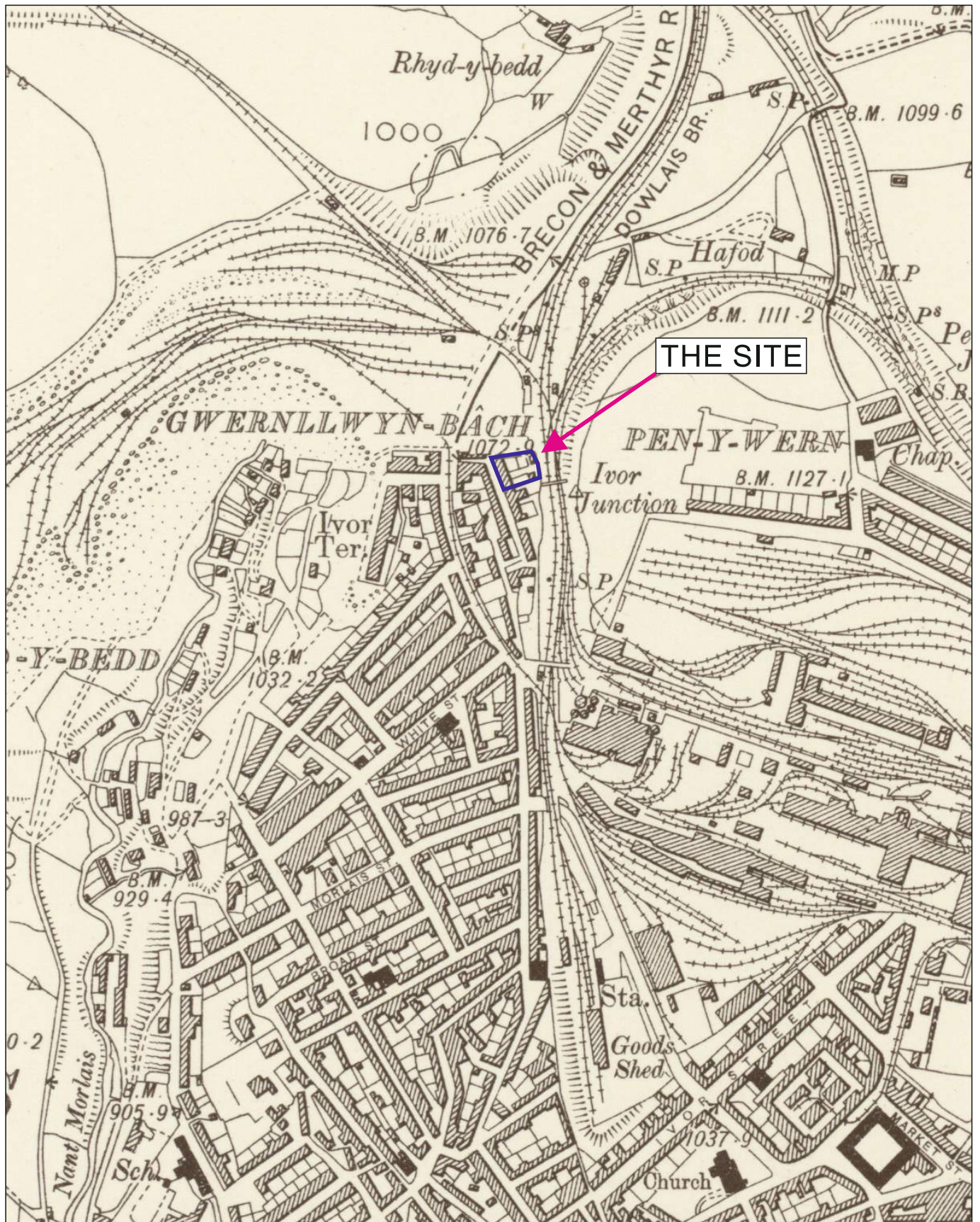


FIGURE 8

1899 O.S. MAP SHOWING THE MASSIVE RAIL COMPLEX SERVING THE IVOR IRONWORKS. THE SITE IS HIGHLIGHTED IN BLUE, OCCUPIED BY TERRACED HOUSING AND GARDENS.

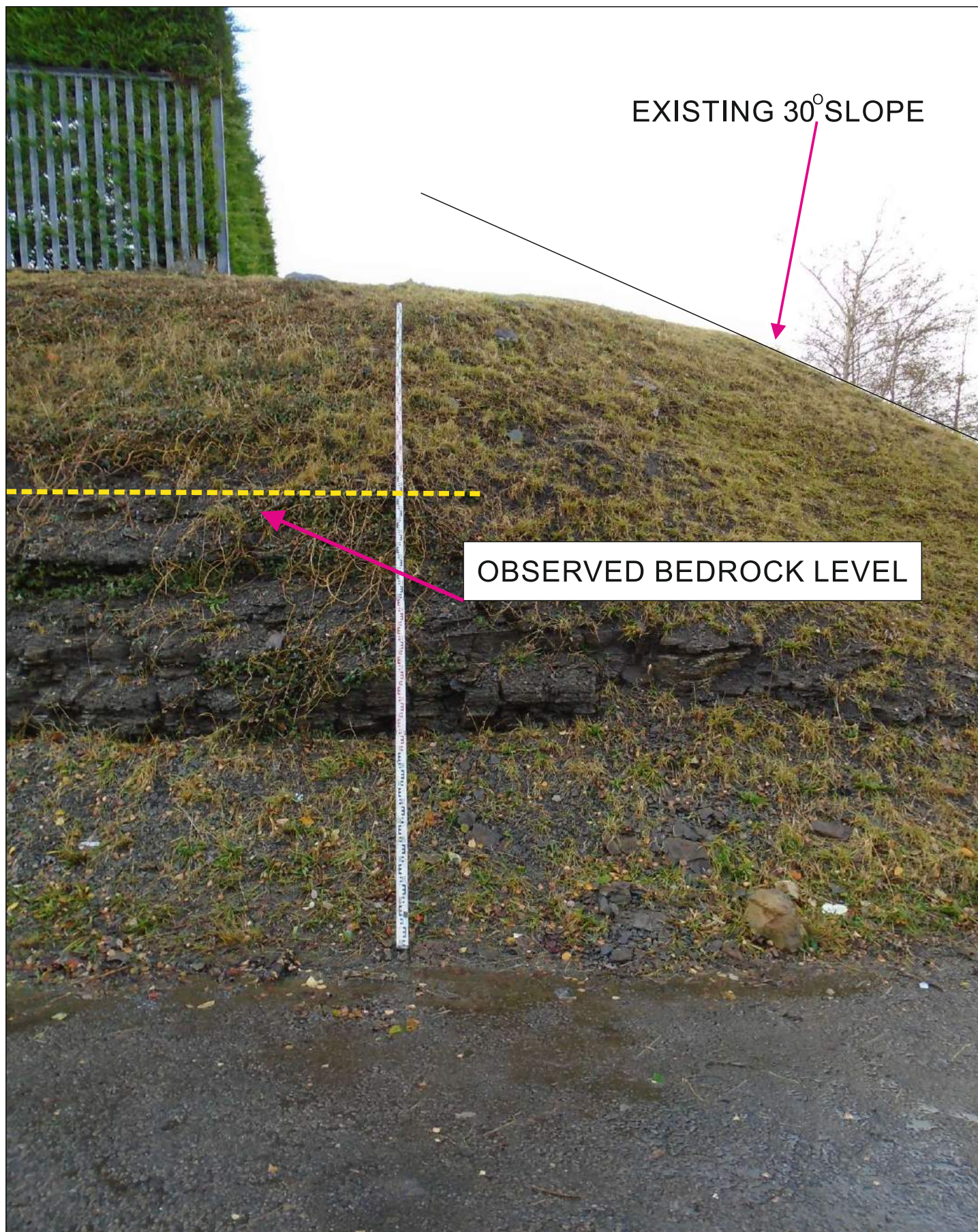


FIGURE 9
THE SURVEY STAFF IS OPEN TO 5m BUT IS LEANING BACK. THE BEDROCK IS SEEN APPROXIMATELY 3m ABOVE THE YARD LEVEL BUT THEN APPEARS TO DROP AWAY TO THE RIGHT (NORTH).



FIGURE 10
INTERBEDDED MUDSTONE, SILTSTONE AND IRONSTONE
NODULES EXPOSED IN THE EMBANKMENT.

COAL MINING ISSUE		YES	NO	R.A?
SHALLOW RECORDED WORKINGS			X	
SHALLOW UNRECORDED WORKINGS		X		X
MINE ENTRIES			X	
FISSURES			X	
GAS EMISSIONS			X	
SURFACE HAZARDS			X	
SURFACE MINING			X	
FUTURE MINING LICENSE			X	

3. SITE SPECIFIC COAL MINING RISKS

From the table above it can be seen that a single issue requires a risk assessment for this site. This is the risk from unrecorded shallow workings under the site. To first briefly deal with the issues marked NO on the table:-

- a) There are no recorded workings beneath the site. This is confirmed by Coal Authority data presented in Section 2a.
- b) There are no recorded mine entries within influencing distance of the site. This is confirmed by C.A. data presented in Section 2a.
- c) There are no fissures, surface hazards or lines of geological weakness affected by underground mining under the site. The C.A database shows the site has not been subject to remedial works carried out by the C.A.
- d) There are no damage notices/ subsidence claim within 50 metres of the site recorded on the C.A. database.
- e) There has been no surface mining (opencast) within 500m of the site. There are no future mining licenses in existence or pending.

The site falls into a development high risk area for one reason only. That is the supposed seam outcrop on site and the associated buffer zone above it. This zone is recorded on the interactive viewer and seen in Figures 3 and 4.

The C.A. Data records two seam outcrops on the site and names both of them as the Garw Seam. Clearly, this is wrong for two reasons.

Firstly for a double outcrop as shown, the seam has to be repeated by one of two causes. Either the top of a very tight, recumbent fold can be removed by erosion or alternatively the seam outcrop can be repeated by a low angle thrust

fault. Both these features are relatively common on the southern rim of the main coalfield and in the Pembrokeshire Coalfield. They are unknown on the northern rim where Merthyr sits. Because there is such a large, good quality exposure on site it is straightforward to confirm that there is no trace of these complex structural features. The strata seen in the high rockface is not structurally deformed in any way, and dips gently south in a uniform way.

The second error in the C.A. Data is naming the seam as the Garw. The Garw is a workable seam in some parts of the Coalfield. Formerly known as the Cnapiog in the Merthyr Area, the Memoirs record it as 0.45m thick with some limited workings from outcrop. However, this seam does not underlie the site and actually outcrops 900m south of the site.

What has been established from the Geological Survey records and the site visit is that there is a thin unworkable seam (The Sun Seam) at shallow depth beneath the site.

4. MITIGATION STRATEGY

It is not proposed to offer any engineering or location based mitigation strategy. The reason for this is that there is no risk to ground stability due to coal mining legacy issues. The proposal is to remove material from site. This will lighten the ground loading. During the final stage of excavation (i.e. slightly below the present yard level) a watching brief will be carried out by the author. The reason for this is that technically the Sun Seam is Coal Authority property. If it is intersected by the works, a retrospective permit will be required. The C.A. have been contacted regarding the proposed groundworks and have confirmed they do not require a C.M.R.A. to be submitted to themselves. They do state that M.T.C.B.C. are entitled to request one.

5. CONCLUSION

This risk assessment has presented abundant evidence from comprehensive research that there is no risk to the proposed development from coal mining legacy issues beneath the site. In particular, the risk from ground instability caused by shallow (<30m) unrecorded workings under the proposed development has been assessed as negligible. There is no reason for the M.T.C.B.C. to object to the planning application in its current form.

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

18/01/2021