

COAL MINING RISK ASSESSMENT
REVISED WITH ADDITIONAL MATERIAL
PLANNING APP. P/2019/5117
GARWEN VIEW DEVELOPMENT
FORMER BRYN PRIMARY SCHOOL
NEATH ROAD, BRYN
PORT TALBOT
SA13 2RS
16/07/2019

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COAL MINING RISK ASSESSMENT

1. INTRODUCTION

This Coal Mining Risk Assessment (henceforth C.M.R.A.) has been produced for Steve Williams and Paul Edwards in support of planning application P/2019/5117 to Neath Port Talbot L.P.A. (henceforth N.P.T.). The initial application was for two large detached houses. This was then extended with an additional eleven houses which will be a mix of social and affordable housing. It is the intention of this risk assessment to check the risk to the complete proposed development, not just the initial two houses. The full plans can be viewed on N.P.T.'s planning portal. Some representative drawings are included in Appendix 1 of this report. The site is classed as being partly within a Development High Risk Area. This fact has been communicated to the applicants recently by the L.P.A., in consultation with the Coal Authority. The reason for this classification is the presence of a shallow coal seam under the site and a mine entry on, or close to the site boundary. With such a classification the C.A. become statutory consultees for the application. The original version of this assessment was presented to the C.A. in support of the original application P/2018/0342. The findings were accepted by the C.A. in a letter to N.P.T. dated 5/06/2018 in which they withdrew their objections. With the new application, the C.A. were reconsulted. In a letter to Jon Waters, the agent for the developer, dated 17/05/2019 the C.A. state that they are likely to raise an objection to the proposed scheme. The reason for this is that they consider the original report does not satisfactorily discount the possibility of unrecorded shallow workings and the possible presence of shaft 281192-076 on the site. It is the intention of this revised version to address these two points to the satisfaction of the C.A. The two consultation letters are contained in Appendix 3 of this report.

Richard Davies BSc.(Hons),MSc., F.G.S. of Rhondda Geotechnical Services has been commissioned as the competent person to prepare a revision of the 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).

The site is centred on grid reference 281450, 192500 and is at an average elevation of approximately 170m. A.O.D. The plot is the grounds of a former primary school and roughly trapezoidal in shape, covering an area of approximately 1.3 hectare. The site is bounded on three sides by fields with Neath Road forming the western boundary. There are no surface watercourses although a small spring emerges just off the eastern boundary. The site location and site boundary can be seen overleaf in Figures 1 and 2.

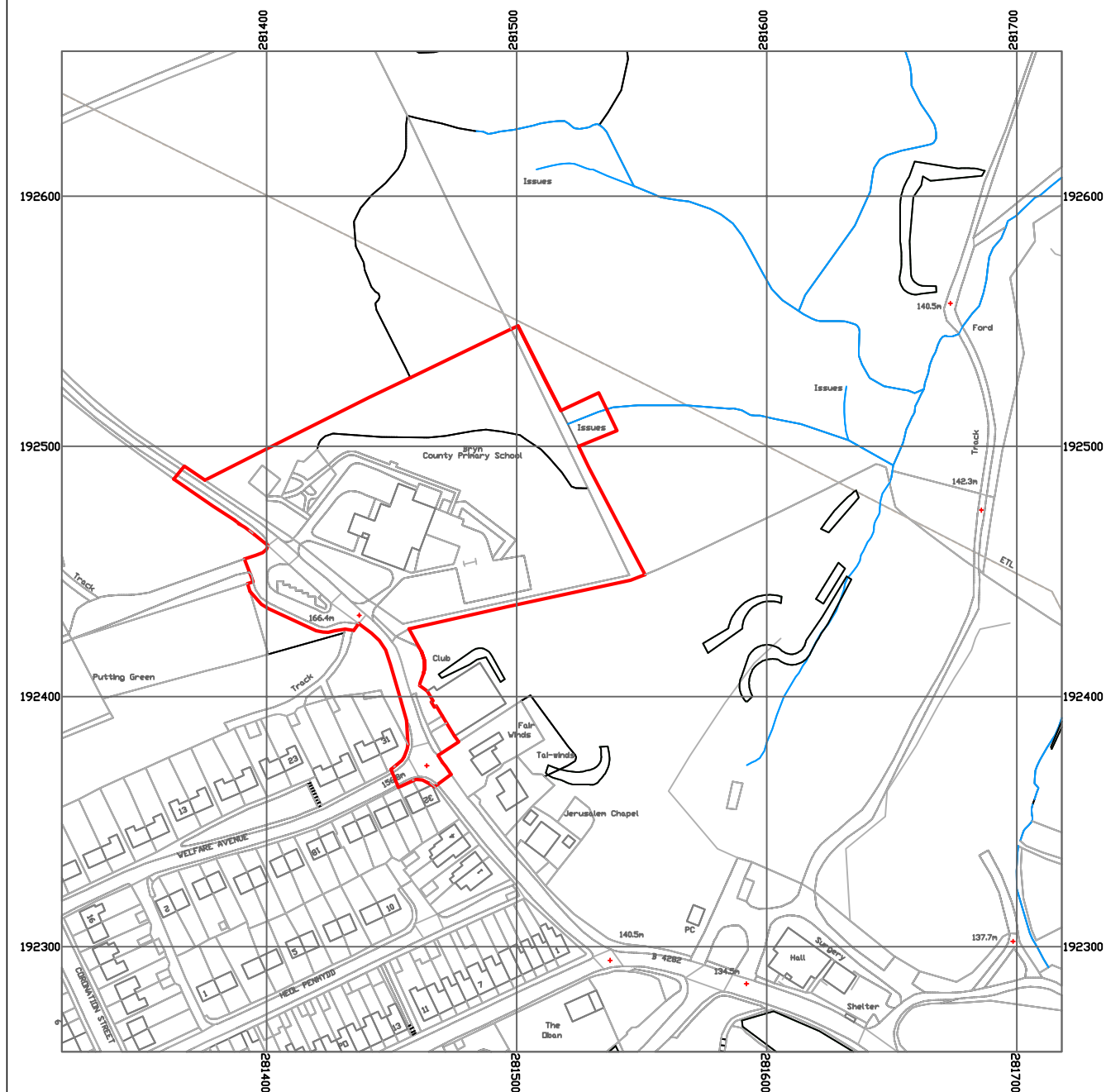


FIGURE 2

SITE BOUNDARY HIGHLIGHTED IN RED

2. SOURCES OF INFORMATION

- a) Consultants Coal Mining Report ref MR-51001797105001-1519301051701
- b) The Coal Authority interactive map viewer.
- c) The 6" to the mile Geological Survey sheet 25NE (1959 revision). In addition the 1905 edition was purchased
- d) The Memoirs of the Geological Survey of The South Wales Coalfield, part IV Pontypridd and Maesteg (first edition 1903 and third edition, 1963) and other mining archive sources
- e) Historical Ordnance Survey maps, Old County Editions for Glamorgan, Sheet 15, 1876 with 1899, 1919, and 1937 revisions. Maps were viewed at 1:2500 scale
- f) Mine Abandonment Plan SW104
- g) An intrusive site investigation in the form of a ground strip to search for shaft 281192-076

2a) The Consultants Report states there is underground mining both directly beneath the site, and close by. These workings were from Bryn Colliery, in the Five Foot and Gellideg seams. It states that the depth to the workings in the Five Foot seam is 358m. with an extraction thickness of 1.98m. and was last worked in 1910. The Gellideg seam is at 499m. depth with an extraction of 1.22m. and last worked in 1927. The report also mentions much shallower workings (48m.) north of the site in the Lower Pentre seam. It also claims the seam dips southwards (i.e. toward the site). It will be shown that this is clearly wrong. The report states there are probably no unrecorded shallow workings under the site. This is slightly contradictory given the previous statement about dip direction. However, in the further information section it states that a risk assessment should further investigate historical coal mining activity. The report also says a seam (the Gorllwyn) outcrops within the site boundary. The report then goes on to say that there are three mine entries on or within 100m. of the site. The report states there are no present underground workings, but the site is within a future license area. The further information section states that this should also be part of any risk assessment. There are no records of gas emissions requiring action. There are no recorded surface hazards that have required remedial action and the C.A. have not received any damage notices or subsidence claims for any property within 50m. since October 1994 (i.e. since the formation of the C.A. to

take liability for legacy mining issues). The C.A. is not aware of any geological faults or other weaknesses that have been affected by coal mining. All these facts will feed into the later quantitative risk assessment. The report is attached as Appendix 2.

To summarise the Coal Authority identify the potential risks to be historical coal mining activity and the C.A. license area. The most relevant facts in the report in relation to this risk assessment as regards historical coal mining are:-

- 1) The presence of the coal seam marked on the Summary of Findings map, and the question of whether it has ever been worked. The evidence will be examined in much greater detail later in this assessment. The seam is marked as the Gorllwyn and as outcropping directly under the site as can be seen in Figure 3. The report suggests the developer seeks appropriate technical advice prior to any works being undertaken.
- 2) The shaft shown on or within the eastern site boundary with the reference 281192-076.

An extract of the summary of findings map showing both these features is reproduced overleaf as Figure 3.

2b) The C.A. interactive viewer contains a vast amount of information from various sources. Figure 4A overleaf is a screenshot of the planning window with the site highlighted. The site can be seen to straddle an area of Development High Risk. The mine entrances in the surrounding area have been omitted for clarity but the southern bulge into the site is due to the buffer zone around the shaft mentioned in the previous section. The linear section of high development risk across the northern half of the site is the buffer zone above the seam outcrop seen in Figure 3.

The mining data window is far superior to the planning window as it is possible to zoom in to a greater magnification. Figure 4B shows the relevant section, with the C.A. seam codes added and explained below the map. Whilst the seam outcrops shown seem to broadly agree with the outcrop pattern shown on other sources of information, there are some crucial differences. Figure 4B should be compared side by side with Figures 5 and 6. These differences will be discussed in much greater detail in the following sections. These differences are absolutely vital to the conclusions of the risk assessment.

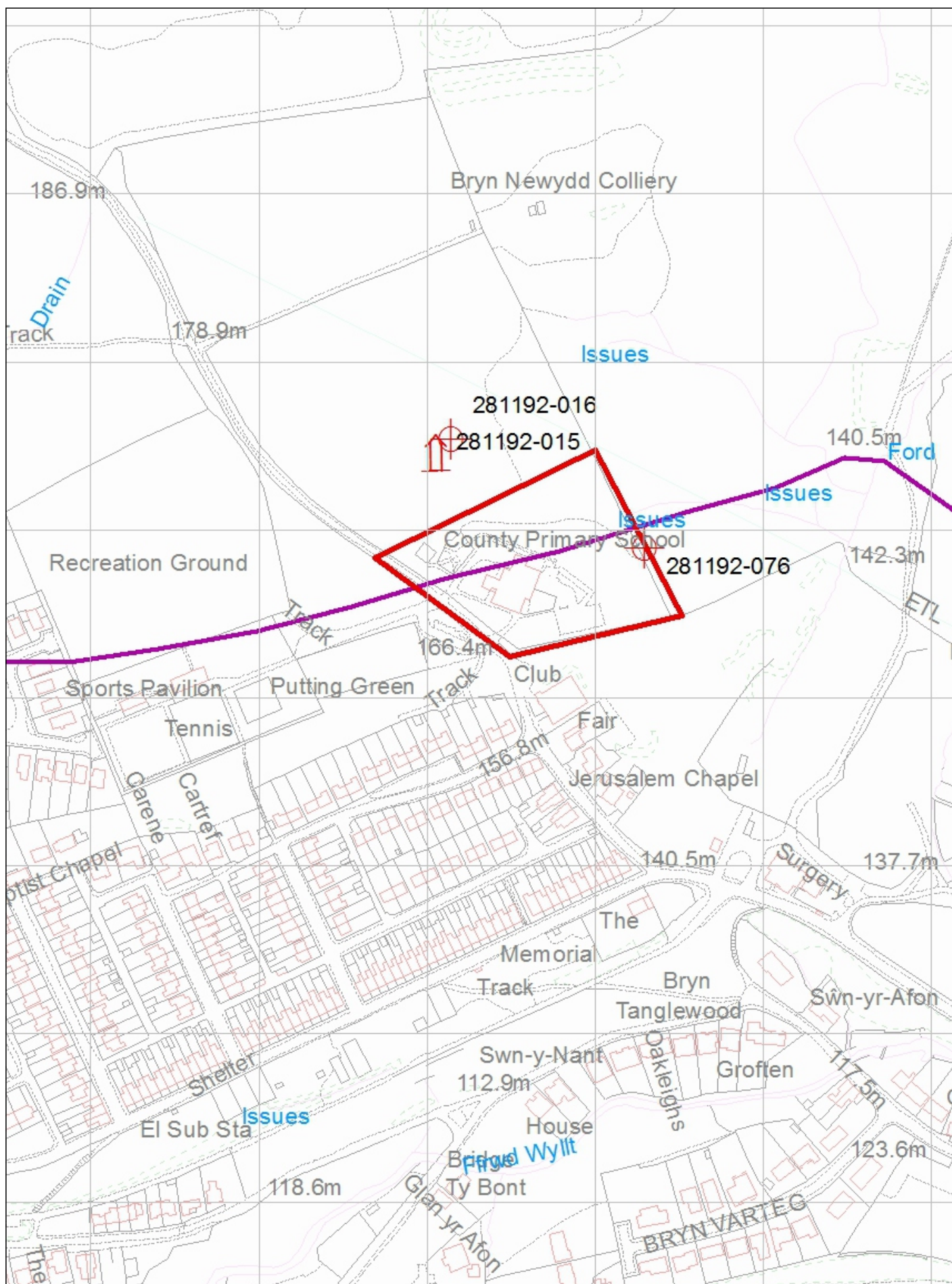


FIGURE 3
EXTRACT OF COAL AUTHORITY SUMMARY MAP

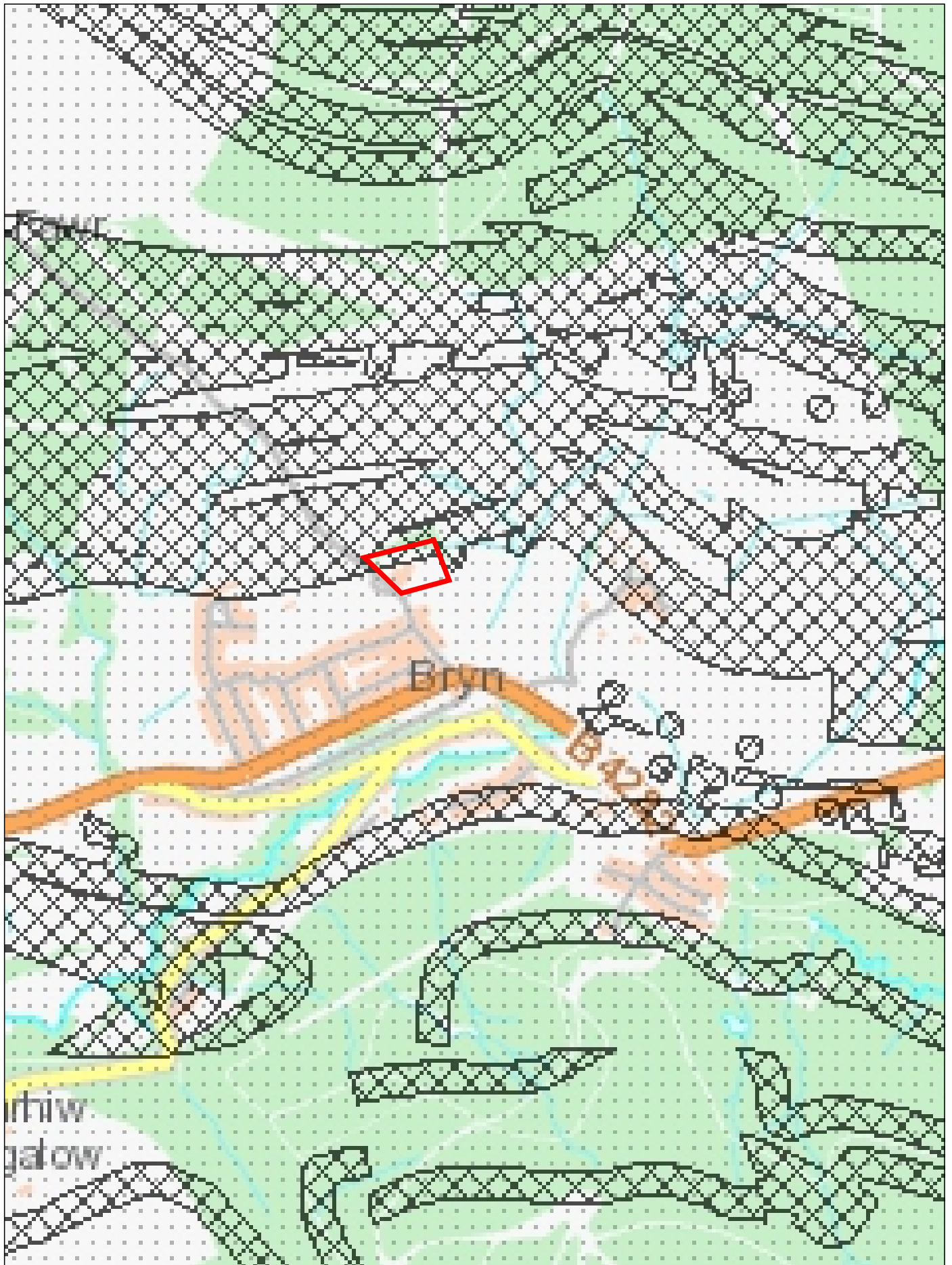


FIGURE 4A

SCREENSHOT OF PLANNING WINDOW ON INTERACTIVE VIEWER. SITE HIGHLIGHTED IN RED. DEVELOPMENT HIGH RISK AREAS HATCHED.

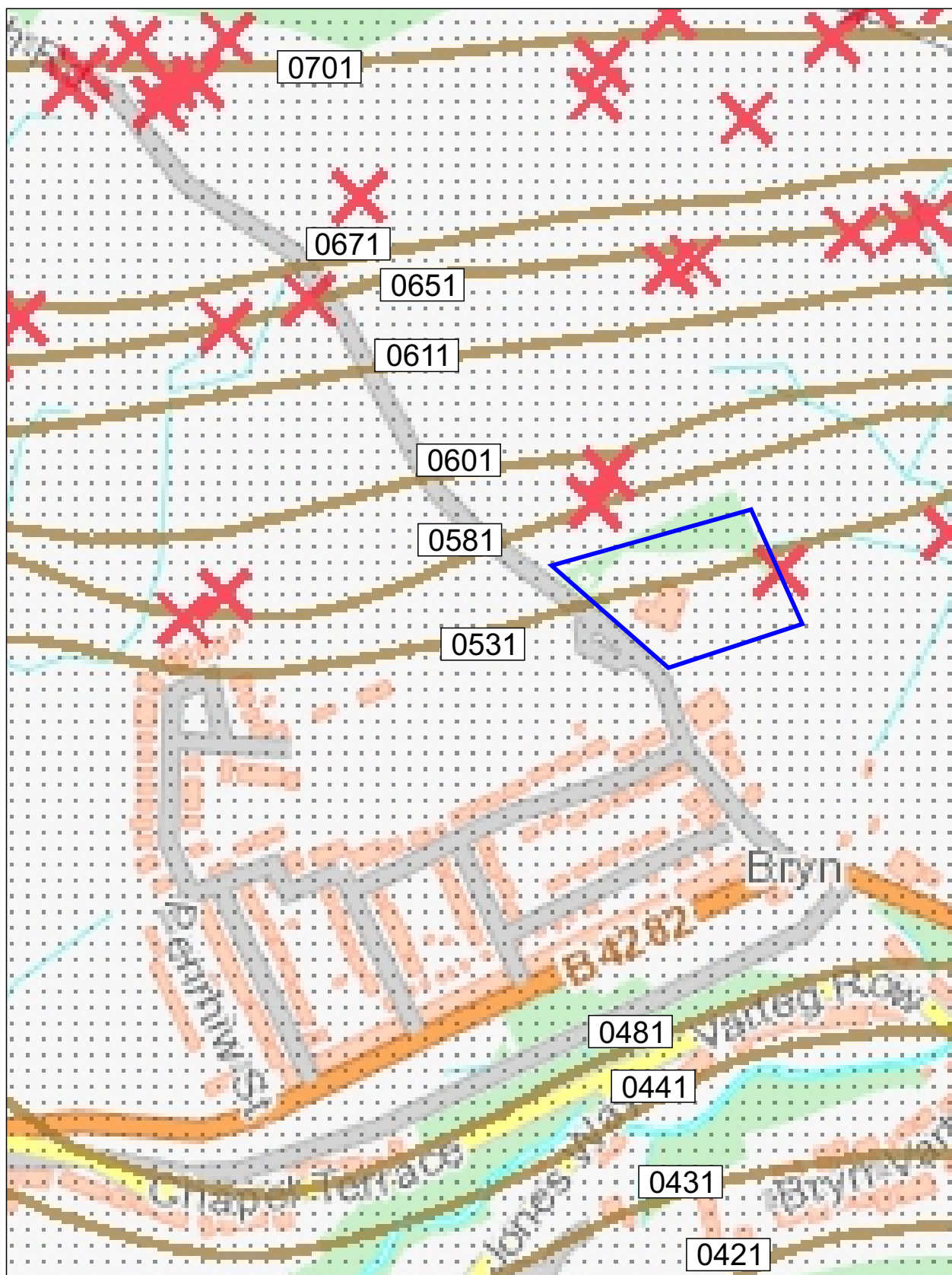


FIGURE 4B
SCREENSHOT OF COAL MINING DATA VIEWER

0701 HAFOD
0671 UNNAMED
0651 ABERGORCHI
0611 PENTRE RIDER
0601 UPPER PENTRE

0581 LOWER PENTRE
0531 GORLLWYN
0481 ALL
0441 UNNAMED
0431
0421 2'9" MID LEAF

SITE HIGHLIGHTED IN BLUE

2c and d) There are differences between the Geological Survey information and Coal Authority Data. These will be analysed in detail in Section 3. For the moment the Survey information will be presented without comment.

The six inch to the mile Geological Survey sheet 25NE covers the area around the site. An extract of the 1905 map has been reproduced as Figure 5A overleaf. An extract of the 1959 map has been reproduced as Figure 5B. A section of the stratigraphic column from the later map is shown in Figure 6 with the level of the site 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. The memoirs state that the bedrock beneath the site is of Upper Carboniferous (Coal Measure) age. More specifically it is underlain by the Middle Coal Measures, which are undifferentiated in this part of the world. Although it is not clear on the section of the map reproduced in Figure 5, the strata is all dipping northward at between 14° and 23°. The survey map shows no seam outcropping on the site. In fact the shallowest significant seam under the site would be the Two Foot Nine. A brief check on the seam geometry indicates this seam would be at a minimum depth of 100m beneath the site.

The 1905 map shows the Golden Seam outcropping across the site. The prominent outcrop of the Cockshot Rock is also shown. There is only a fraction of the detail of the later map. The Blackband Ironstone is marked. At the time this was exposed by a huge trench, the spoil from which is still visible today. The multiple other seams seen in the later map are not marked. This is because their positions were either unknown or unclear.

No shafts reaching the surface are shown on either survey map. A staple pit is shown east of the site boundary on the later map. This is a shaft sunk from an underground starting position. The survey map clearly indicates this with the diagonal cross symbol. Also there are additional annotations alongside the symbol. These notes make it quite clear that the staple pit was sunk 96' (29.1m.) in a vertical section of the Five Foot Seam from a starting depth of 1246' (377.5m.). Note the close correlation with the depth figure for the seam from the consultants report.

The correlation of coal seam names across the geologically complicated South Wales Coalfield has long been a thorny problem. Sometime after Nationalisation of the coal industry a serious attempt was made to correlate the seams of the Lower and Middle Coal Measures across the entire Coalfield. This correlation was done with reference to the names in use in Aberdare and the Rhondda. This brought some order to the chaotic situation. It is important to have an understanding of this as it has an important bearing on the risk assessment. The consultants report names the seam shown running across the site as the Gorllwyn, and also mentions workings in the Pentre seam north of the site. The seam names south of the site can be ignored as they have no bearing on the risk assessment of the site. Using the shaft records of Bryn Colliery 500m. to the south-east of the site the following correlation can be made between the C.A. names, and the names actually used in the mining records of the area, and still in use on the later Survey map.

COAL AUTHORITY		GEOLOGICAL SURVEY AND N.C.B	
SW0701	HAFOD		CLAY
SW0671	UNNAMED		UPPER BLACKBAND IRONSTONE (NOT COAL)
SW0651	ABERGORKI		CWMBYR
SW0611	PENTRE RIDER		CWMMAWR
SW0601	UPPER PENTRE		GOLDEN RIDER
SW0581	LOWER PENTRE		GOLDEN (OR TWO AND A HALF)
SW0531	GORLLWYN		COCKSHOT (WEST OF SITE) CAEDAVID (EAST OF SITE)

From the table above it can be seen that the Gorllwyn correlates with the Cockshot/ Caedavid seam (differently named east and west of the site, an example of the complications in the naming of seams). The Lower Pentre correlates with the Golden/Two and a Half seam. Having established this fact the records for both seams in the Memoirs and on the Survey map can be examined.

Firstly the 1903 Memoirs and the 1905 map. Figure 5A shows the 1905 Survey Sheet with the site highlighted. The Golden Seam is marked running across it. The 1903 Memoirs describe the Golden Seam thus, "The Golden Vein has been worked by level from Cwmavan to Bryn Colliery and is about three foot thick. It is believed to correspond to the Two and a Half Seam of Maesteg".

The Cockshot Seam is described as "resting directly on, or just above the Cockshot Rock consisting of two coals 2 feet and 2_{1/2} feet respectively. It represents the Caedaefid Seam of the Llynfi, Garw and Ogmore Valleys". Note the position of the Cockshot Rock in Figure 5A. This has been quarried just to the

south east of the site. It is also recognisable from the prominent break of slope on the southern boundary of the site.

The 1963 Memoirs go into far more detail. Rather unusually, there was somewhat of a renaissance in small scale coal mining in the area from the Second World War into the late 1950's and so the Memoirs would have been informed by up to date information. Written by Woodland and Evans, its publication followed on from their extensive re-survey of the Coalfield following the end of the war and Nationalisation of the mines. It is noted that the Caedavid is split throughout the area, and is known as the Cockshot and Upper Cockshot. The Memoirs correlate this with the Gorllwyn and Gorllwyn Rider of the Rhondda. It is interesting to note that the Coal Authority also claim that the seam running across the site is the Gorllwyn. The C.A.'s primary source of information is the British Coal Development Plan, which in many cases takes its outcrop information directly from the B.G.S., often in conjunction with data from opencast sites and other C.A. mining records. The Memoirs record that the seam (Cockshot/Caedavid) has been worked near Bryn. This can clearly be seen on the 1959 edition of GLAM 25NE, with two levels marked northeast of Bryn Colliery near the river, at the base of extensive spoil heaps. Moving west toward the site, the outcrop of the Caedavid Seam disappears and is replaced by a thin dashed line indicating a geological boundary, presumably between the Cockshot Rock (sandstone) and the overlying argillaceous beds containing the Golden Seam. The Caedavid then re-emerges at the extreme west of the map sheet on Mynydd Bychan some 2km away. The memoirs clearly describe this feature, saying the position of the seam is obscure between Bryn Colliery and Mynydd Bychan, but that it may be split into three thin (unworkable) coals. A section of the Survey sheet with the site highlighted is in Figure 5B with a section of the stratigraphic column in Figure 6.

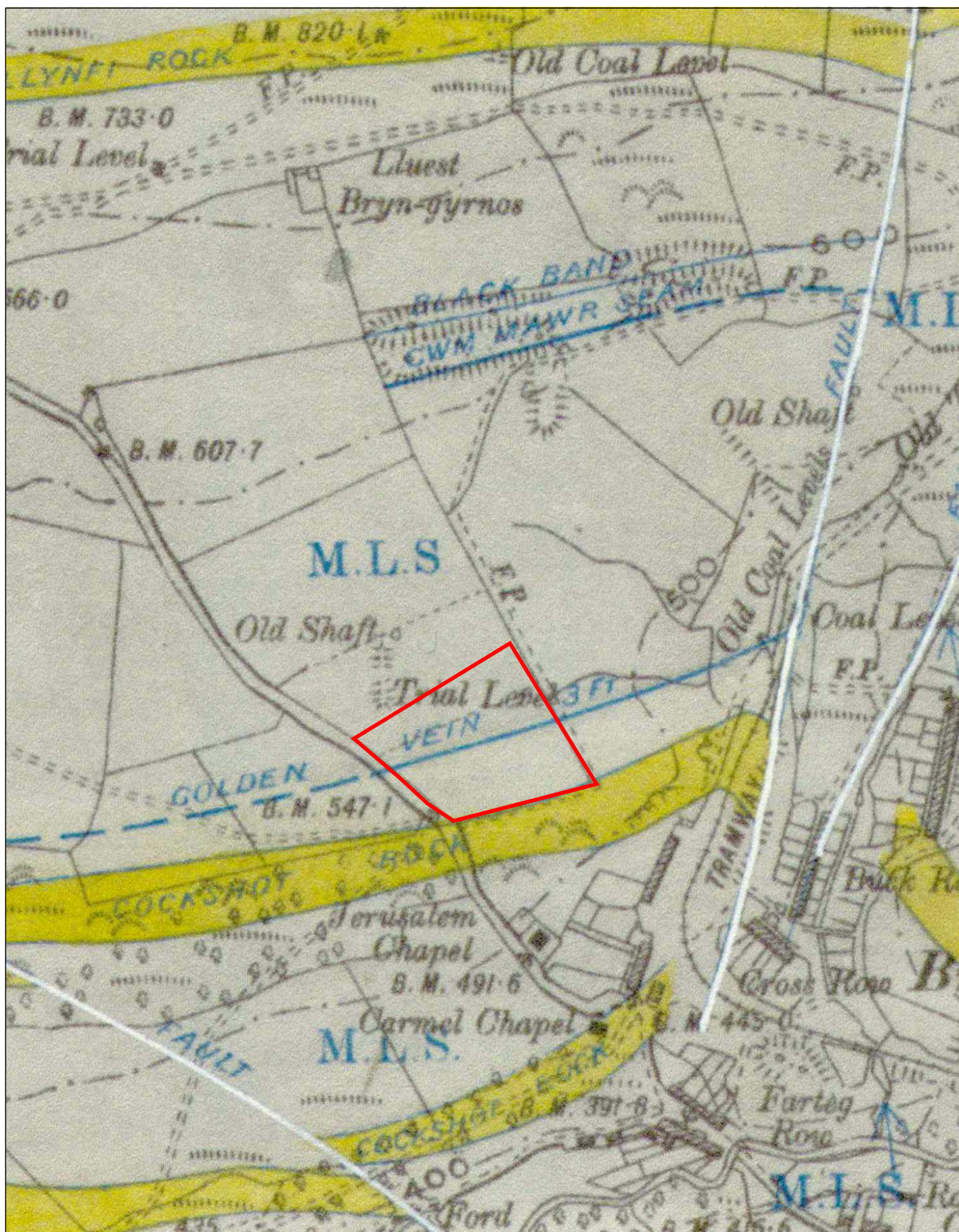


FIGURE 5A

1905 PUBLICATION OF THE 1899 SURVEY. THE SITE IS OUTLINED IN RED WITH THE GOLDEN VEIN RUNNING THROUGH IT. NOTE THE COCKSHOT ROCK OUTCROPS. THE COCKSHOT/CAEDAVID SEAM SOULD BE ABOVE THESE (BEDS ARE DIPPING NORTHWEST)

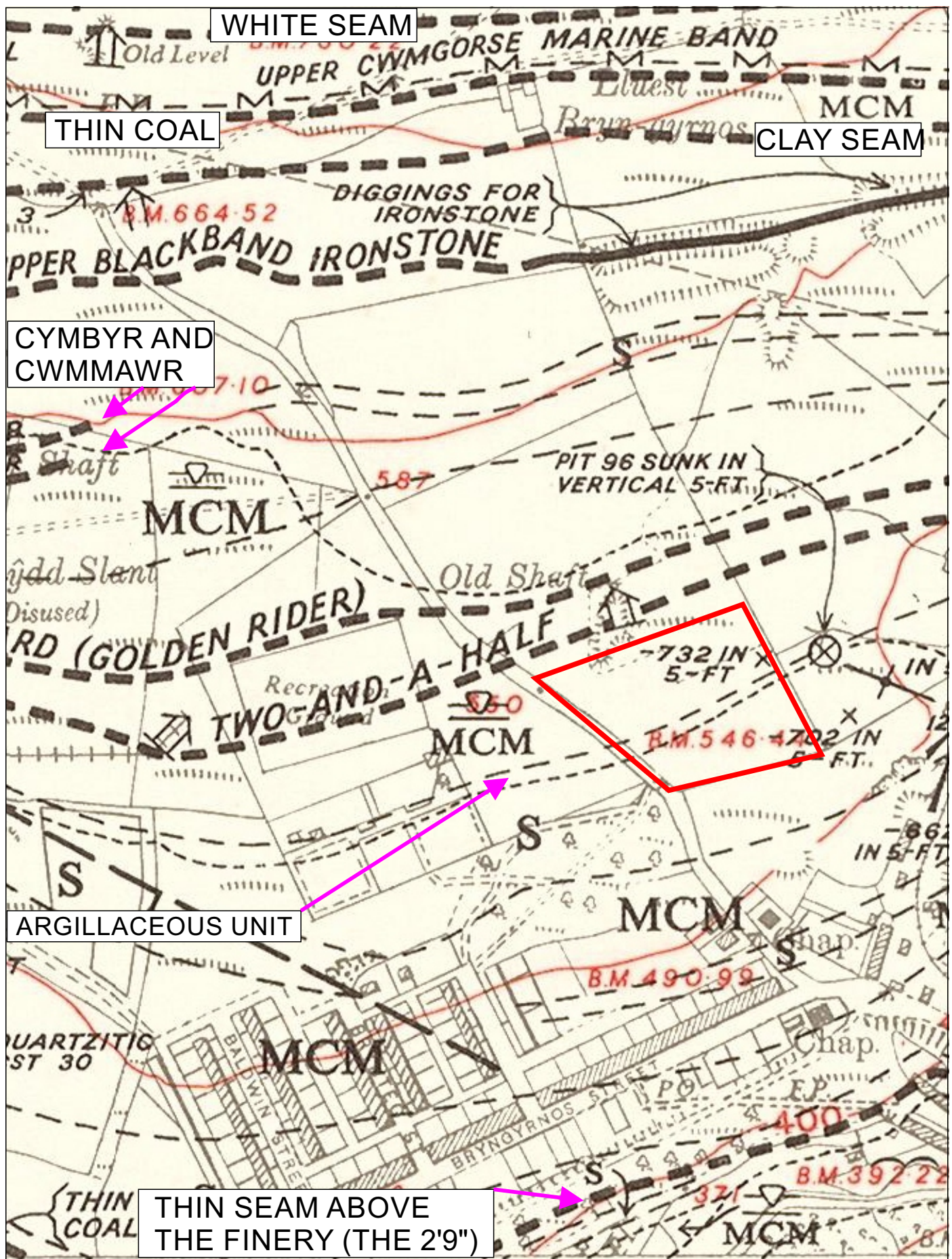


FIGURE 5B
EXTRACT OF 1959 GEOLOGICAL SURVEY SHEET 25NE

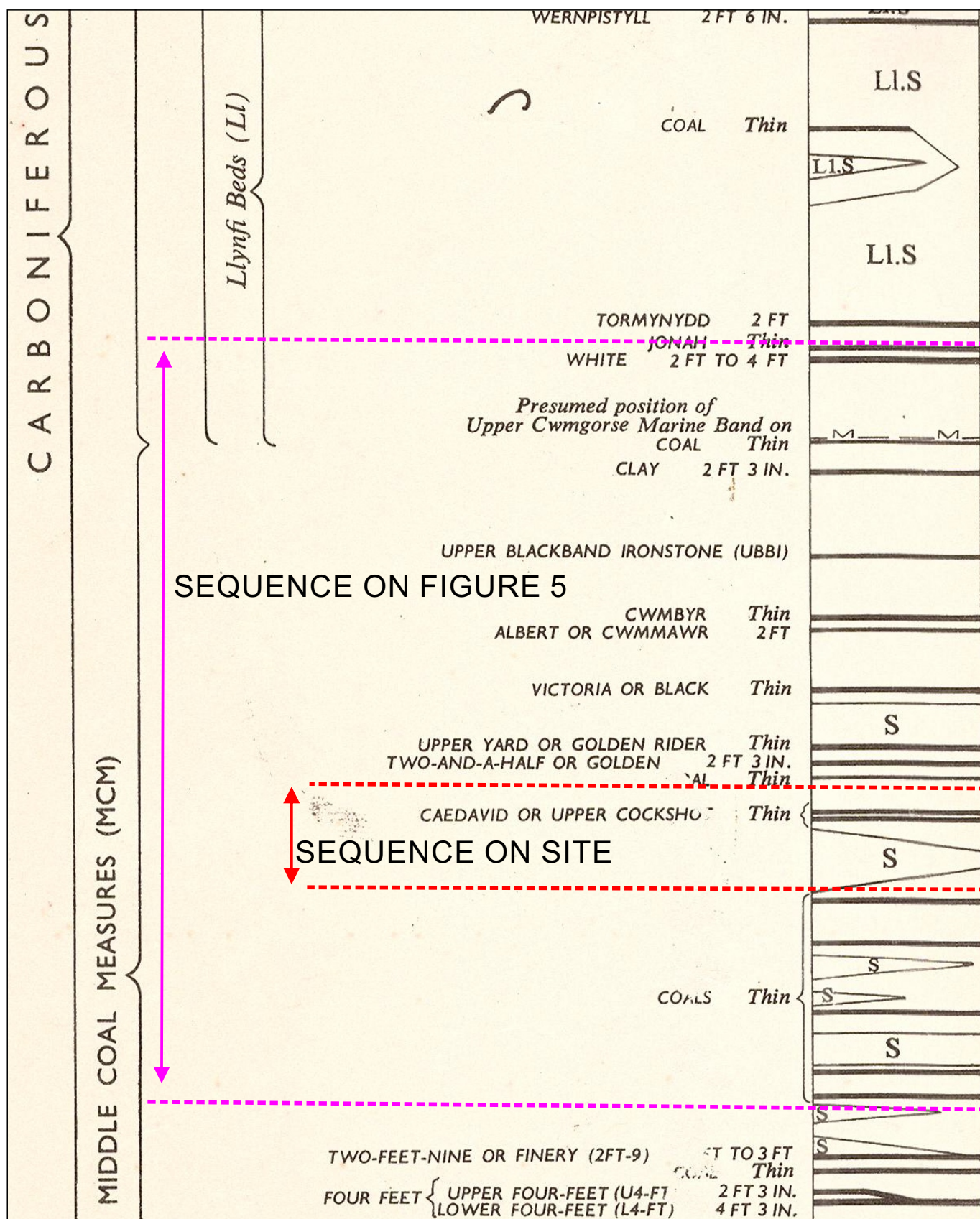


FIGURE 6

SECTION OF STRATIGRAPHIC COLUMN FROM GEOLOGICAL SURVEY SHEET 25NE SHOWING SEAM SEQUENCE IN THE IMMEDIATE VICINITY OF THE SITE