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Coal Mining Risk Assessment



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Site

A site for a proposed dwelling in the side garden of 3 Fennant Road, Ponciau.

Risk Assessment by
Neil Catlow B.Sc F.G.S Engineering geologist.

Summary of relevant mining information
CIRIA Special Publication C758D 'Abandoned Mineworkings Manual.
Coal Authority Report 51003434808001 dated 2nd July 2024.
Ordnance Survey 1:2500 First Edition 1875.
Geological Survey 1:10560 plans dated 1925.
Mineplans of Ponkey Colliery.

Nkc Geotech Ltd investigations with relevance to this site:
1714 Former Royal Oak redevelopment,100m north-west
1010 Former Ponciau School redevelopment
8928 Redwood, Fennant Road, Rhos in June 1989, adjacent immediately north.

Assessment of risk that coal mining poses to the proposed development

Geology
The site lies on Carboniferous Bettisfield Formation rocks that form the Wrexham Coalfield, dipping to the east at 1 in 8. These rocks are predominantly shales and sandstones laid down in a tropical delta environment when Europe lay on the equator as part of the continent of Pangea between 310M and 320M years ago. The Bettisfield Formation strata varies between 230m and 520m in thickness depending on locality and contains seams of coal upto 4.5m in thickness at vertical intervals typically varying from 4.0m to 20.0m. Those coal seams which were of economic importance were given an identity when they were of sufficient quality and thickness to justify extraction by mining. Typical names for local coal seams reflect primarily on quality and thickness, for example Main Coal, Yard Coal and Sulphur Coal.

The coal seams of relevance to the site are recorded as being:

Main Coal 2.5m thick
6m shales
Brassey Coal 1.2m thick
10m shales
Crank Coal 1.0m thick

The Coal Authority Report states that the site is underlain at the depth of 13.0m by a coal seam of workable thickness known locally as the Main Coal. This seam outcrops east of the site and dips east at 1 in 8. My work on previous sites in Ponciau has shown that a deeper seam known locally as the Brassey Coal lies 6.0m below the Main Coal.
My previous investigations in Ponciau show the geology is complicated by north-south faulting and consequently the depth to the Main Coal can vary by upto 20m between adjacent sites.

Site history
The site is currently occupied by a cottage built between 1820 and 1860, the area formerly being fields east of the village of Ponciau according to the Ponciau estate map of 1826 which shows two mineshafts immediately south and west of the site. See Plan B. There is no other former industrial use.



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Past underground coal mining
Coal mining in Ponciau and Rhos is recorded in 1427 when the area was part of Bersham Waste. Industrial mining deeper than the outcrop workings and simple bell pits of the 'cole farms' in the Waste dates from the 16th century. The last recorded coal mining in Ponciau, other than unofficial strike workings in the early 20th century, was by the Ponciau Colliery which closed in 1862.

There are only records of past mining activity under the site in 3 seams of coal mined in 1860 because the shallowest workings pre-date the 1887 Coal Mine Regulations which required colliery owners to keep and preserve plans. The Main Coal mineplan for workings at an estimated depth of 13m is a simple royalty plan with no detail, the deeper seams for which plans survive, the Yard Coal is at 101m depth, and the Wall & Bench Coal at 126m depth, are similarly devoid of detail and note the 'old workings full of water'. The coal was primarily worked to supply the works at Ponkey (sic) Furnace and Aberderfyn Potteries, 350m south of the site.

Present underground coal workings
There is no current coal mining within 20km of the site.

Future underground coal workings
There are no current coal mining proposals within 20km of the site.

Recorded mine entries on or within 20m of the site boundary
There are two recorded mine entries within 20m of the site. These are shafts with Coal Authority (CA) references 329346-261 located 12m south, and 329346-262 located 16m east of the proposed dwelling.

The shaft positions are sourced solely from the Hon. Fred West Estate Plan of 1826. This plan was prepared on the premature death of Frederick West of Chirk Castle and showed his coal mining interests in Ponciau and Rhos. The plan was variously scaled at about 6" to 1 mile and I remember the shafts on this plan being transferred on to the Ordnance Survey at Bersham Colliery NCB Surveyors Office in 1980 and the difficulty in doing so with precision.

The CA assign a Departure Values to recorded shaft locations. These are the assumed possible errors in the true shaft location, and the departure value varies from 0m in the case of a recent Ordnance Survey position, to 10m for shafts shown only on mineplans of unknown accuracy - as is the case here. The shafts will exist. Not all circles drawn on mineplans are shafts, there can be be chimneys, ponds and boreholes, but in this case the shafts are positively identified. There is no information on the depths of the shafts. Fred West shafts I have investigated over the past 40 years have tended to be between 30m and 100m in depth, and as is to be expected, their true positions have been more accurate when the shafts are close to roads and buildings existing in 1826.

Coal mining geology
The Coal Authority have no records of any damage caused by geological faults.

Past opencast mining
There are no former opencast coal mining sites within 200m of the site.

Present opencast mining
There are no current opencast coal mining sites within 200m of the site.

Future opencast mining
There are no proposed opencast coal mining sites within 800m of the site.

Mine gas emissions
There are no recorded mine gas emissions within the site boundary.



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Surface hazards
There are no recorded remedial works being carried out by the Coal Authority on the site nor any subsidence claims.

Mitigation measures

Mineshafts
The Zone of Influence (ZOI) of a mineshaft is calculated by the CA as being ‘shaft radius’ + ‘rockhead depth’. The depth to rockhead on this site will probably be 4.0m. The ZOI distance is therefore 5.5m (sr 1.5m + rd 4.0m = 5.5m) from the true shaft centre. With a possible inaccuracy of 10m in the shaft locations the theoretically possible ZOI extends into the rear garden and under the corner of the proposed dwelling by 3.0m for Shaft 261 and by 4.0m under the car parking areas for Shaft 262. See Plan A.

The CA will object to any proposed construction within the ZOI unless an investigation proves the shaft lies outside the present Departure Value zone, in which case the ZOI within the site can be reduced accordingly.

Since January 2024 the CA have added conditions which have to be met before their permission to carry out mineshaft investigations can be obtained. One of these new requirements is obtaining the consent of adjacent land owners if the investigation lies with influencing distance of their property, or underground services for example under roads.

Shallow mineworkings
The CA will require an intrusive investigation of the site to determine the geology and prove the depth and condition of the recorded shallow mineworkings in the Main Coal, and the underlying Brassey Coal. The risk to the development is the collapse of open workings in those coal seams which lie within 30m of the surface. The deeper Stone Coal and Nant Coal will very probably be too deep to affect surface stability but the depth of all the seams has to be proved by drilling a programme of 3 holes to 30m depth,

Coal Authority Permit
A site specific Coal Authority Permit will be required before any intrusive investigation work is carried out.

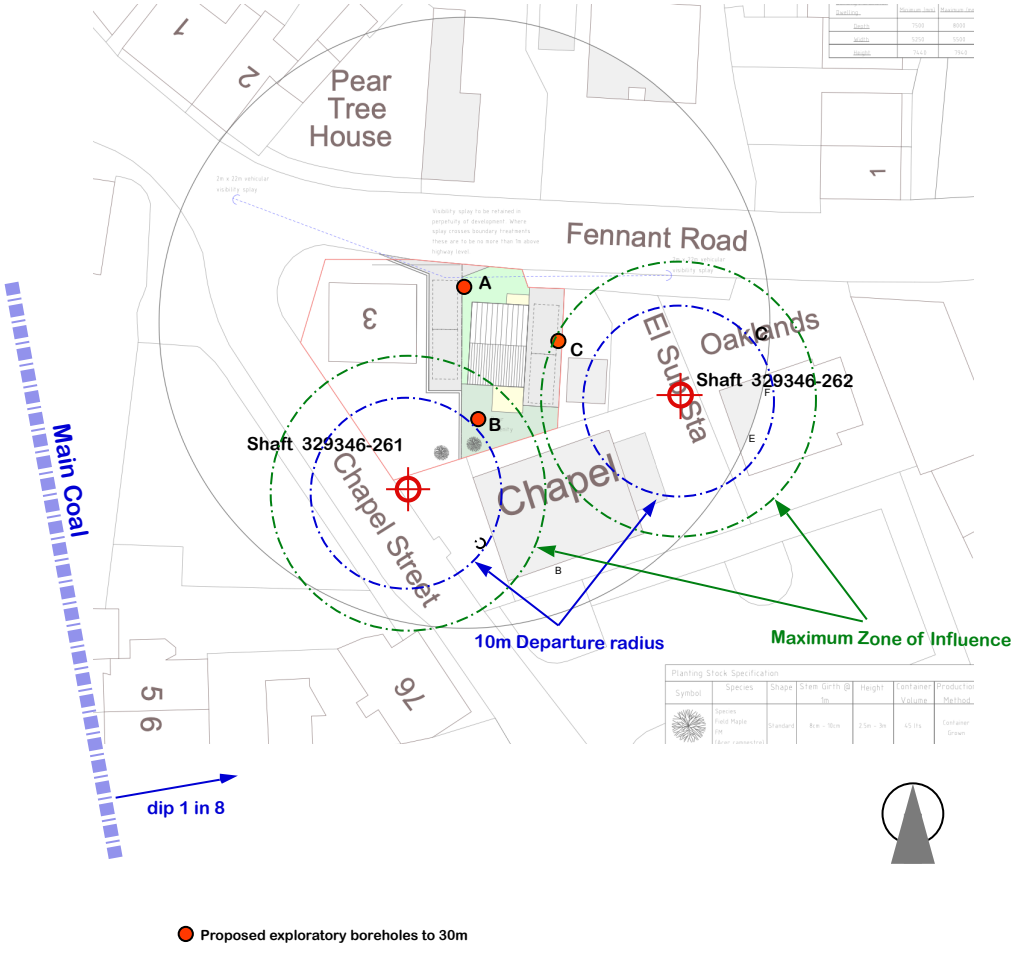
For Nkc Geotech Ltd

Neil Catlow, B.Sc, F.G.S

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Plan A

Geological plan of the locality
Scale 1:750 @ A4



Plan B

Extract from the Plan of the Hon Fred West 1826

Shafts 329346-261 and -262 highlighted in red. The Ponkey Colliery horse drawn tramway running east down the hill to the iron furnaces is shown on the south side of Fennant Road.

