



NKC Geotech Ltd

engineering geologist specialising in the investigation and treatment of disused mineworkings

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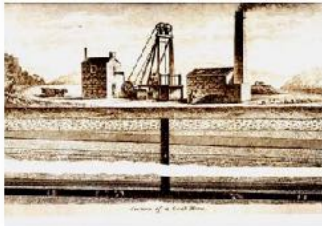
Coal Mining Risk Assessment



Esclusham Mill, Llwyneinion, Rhos

Blueprint Architectural Services
Office 3K4
Redwither Business Tower
Wrexham
LL13 9XT

1941/2
9 December 2019



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Site

A site for residential development at the former Esclusham Mill, Llwyneinion, Rhos.

Risk Assessment by

Neil Catlow B.Sc F.G.S Engineering geologist.

Summary of relevant mining information

Publication CIRIA32 'Construction over Abandoned Mineworkings'
Coal Authority Report 51000908546001 dated 23rd June 2015
Coal Authority Report 51002177409001 dated 26th September 2019
Coal Authority Report 51002202951001 dated 9th December 2019
Ordnance Survey 1:2500 First Edition 1875
Geological Survey 1:10560 plans

Nkc Geotech Ltd investigations with relevance to this site:

1802 Llwyneinion Acid Tar Lagoon. December 2017
9914 Haulfryn, Llwyneinion. July 1999
4082 Llwyneinion former brickworks site September 1982
2782 Hafan y Coed, Llwyneinion. May 1982

Assessment of risk that coal mining poses to the proposed development

Geology

The site lies on Carboniferous Westphalian rocks that form the Wrexham Coalfield, dipping to the south-east at 1 in 9. 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. Westphalian strata 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 Half Yard Coal, Yard Coal and Wall & Bench Coal.

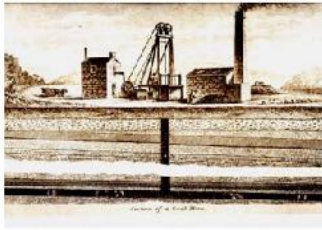
The deepest worked coal seam is the Llwyneinion Half Yard Coal. From previous investigations in Llwyneinion, this seam will be present at depths increasing from 15m to 40m from north-west to south-east across the site. The next highest coal seam is 20m above the Half Yard and locally known as the Wall & Bench Coal, now termed the Premier Coal by the Geological Survey, which outcrops across the northern part of the site. I encountered the outcrop of this seam during shaft investigations at the former brickworks in 1982. The next highest coal seam is the Ruabon Yard Coal, 25m above the Wall & Bench, which outcrops 50m south of the site.

Past underground coal mining

Coal mining in Rhos is recorded in 1410, most probably in the Main Coal at the Delph immediately east of High Street when the area was part of the medieval Bersham Waste, ie common land. 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 legal coal mining in Rhos was at Coppi Brickworks where the Llwyneinion Half Yard Coal was mined in conjunction with the underlying fireclay in 1971. The Wall & Bench Coal was mined illegally by robbing historic old workings and sold locally during the miners' strike of 1985 from outcrops 200m west of the site.

There are no records of past mining activity under the site of workings which pre-date the 1887 Coal Mine Regulations which required colliery owners to keep and preserve plans of their workings. The Ordnance Survey First Edition shows several shafts south-east of the Llwyneinion Half Yard Coal outcrop within 100m of the site. The coal was worked to supply local brick making operations using fireclay from below the coal seam.

The Wall & Bench Coal is recorded as being mined immediately east of the site at a depth of 8m in 1887 from Pentre Bychan Colliery.



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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 eight recorded mine entries on or within 20m of the site and all the shafts were sunk to work the Wall & Bench Coal.

Shaft 328347-475 is shown 18m east of the site under the adjacent Bush House and has a probable depth of 30m.

Shaft 328347-474 is recorded as being under the south-eastern corner of the site and will be under 50m deep.

Shaft 328347-473 is recorded in the north-eastern corner of the site.

Shaft 328347-024 is a shaft of Pentre Bychan Colliery which worked the Wall & Bench Coal

Shaft 328347-025 also a shaft of Pentre Bychan Colliery.

Shaft 328347-026 Pentre Bychan Colliery Upcast Shaft.

Shaft 328347-027 Pentre Bychan Colliery Downcast Shaft.

Shaft 328347-476 also a shaft of Pentre Bychan Colliery.

None of the shafts have been physically located and there may be an error of 20m in the true position of the shafts, and there is also a possibility that any shaft could be absent or a duplicate location for an existing shaft.

There are only Ordnance Survey positions for Shafts 026 and 027. All the other Coal Authority positions are derived from mineplans.

Shafts 025, 0237 and 476 have been noted as depressions by former NCB surveyors.

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 although coal in the Wall & Bench seam was extracted until 1965 from the brickworks quarry immediately west of the site down to a depth of 18m.

Present opencast mining

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

Future opencast mining

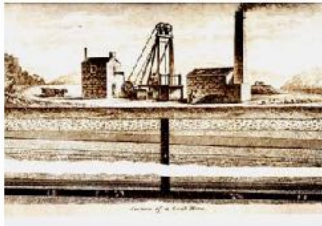
There are no proposed opencast coal mining sites within 800m of the site.

Mine gas emissions

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

Surface hazards

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



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Further information

The risk to any proposed development is subsidence caused by the collapse of shallow mining tunnels where there is less than 15m of rock cover to underground workings. As there is known to be a coal seam of economic importance outcropping across the site, with a deeper seam also known to be present at 15m depth, there is a risk of potential instability due to past shallow coal mining activity. An intrusive investigation by rotary drilling at least 8 holes to 30m depth will be required over the area proposed for development to determine the extent of any hazards.

A physical search for the eight mineshafts shown on Coal Authority records should be carried out with a tracked 13 tonne excavator supervised by a suitably qualified and experienced person. The search for Shafts 475 and 476 will be confined to an area within 20m of the recorded shaft position, and may prove the shafts to be absent from the site. Shaft 474 will be located if it is present. Shaft 025, 026 and 027 will definitely be located.

Mitigation measures

Those areas on the site where there is less than 15m rock cover to the Half Yard Coal and the Wall & Bench Coal will require remedial works by drilling and grouting the old workings under the bearing areas of the proposed buildings to prevent collapse. A specific Coal Authority Permit will be required for this work.

All the located shafts will require remedial treatment by drilling and capping, with grouting of the shaft fill if rockhead cannot be reached by excavation. The capping of any mineshaft will have to be to the design of a structural engineer which has been approved in advance by the Coal Authority. A Coal Authority Permit specific to each shaft will be required.

If public access can be totally prevented to the proposed open spaces in the east of the site it is possible the Coal Authority will agree to a simplified remedial scheme for Shafts 024, 025 and 473, subject to negotiation with the structural engineers appointed for the development.

For Nkc Geotech Ltd



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



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Geological plan of the locality
Scale 1:2000 @ A4

