
COAL MINING RISK ASSESSMENT

**REPORT ON PROPOSED
DWELLING AT LAND AT 1
PENNINE VIEW, DARTON
BARNSELEY, S75 5AT**

**ON BEHALF OF MAXINE
WOODCOCK**

JANUARY 2018

Job No. 18-01-823

PREPARED BY

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1 Pennine Way, Darton S75 5AT for One Dwelling**Surveyor - John Carlon B.Eng (Hons) C.Eng C.Env MIMM MRICS****Date of Report 26th January 2018.****Client –. Mr and Mrs Woodcock****Introduction**

The instruction was given by the client via an email dated the 16th January 2018 and since then the mining situation has been considered and a search of the mine records and geology maps of 1866 and 1932 have been inspected. The geology sections through the strata beneath the site have been inspected from the mine records held by the company and from the boreholes information available in the public domain. A site visit was undertaken on the 22nd January and the surrounding former colliery sites and the reclaimed waste site off Woolley Edge Lane have been visited to understand the geology and topography.

The Coal Authority residential report has also been considered providing details on the mining in the area from 9 seams at a shallow depth to 470 metres from the local collieries which closed in 1987.

Summary of the Findings

The geology maps of the area have been inspected and the historical data considered for North Gawber Colliery that was located 1.4 kilometres west of the site and Woolley Colliery that was located 1.23 kilometres to the west. Wheatley Wood Colliery part of Woolley Colliery was also looked at which is 1 kilometre to the north of the site. Both collieries were connected to the railways at the junction of the Wakefield to Barnsley railway. North Gawber colliery was located off Carr Green Lane and consisted of two shafts, workshops and a coking works. Coal was mined from the Barnsley Seam in this area due to the thickness of the seam, it being 10 feet, 3 metres thick and the quality of the coal for coke, household and industrial uses.

The site is located on the bend in the road on what was Darton Lane now Sackup Lane near to Darton Lane Head Farm and this can be located on the first and second edition geology maps of the area and the abandonment plans for coal mines that are near to the site have been obtained from our archive by looking at graticule square F12 on a grid laid over map 262 SW and examining the list.

North Gawber mine worked a number of coal seams until it closed in 1987 with the shallowest recorded being the Mapplewell Coal a 0.6 metre thick seam at 30 metres below the surface. The colliery mainly worked the Barnsley Seam and the Kent's Thick or Mapplewell seam as it is known in the area.

Woolley Colliery to the west and Wheatley Wood Colliery to the north mined the Barnsley seam extensively and also mined the Beamshaw, Winter and Kent's Thick seams. The seams outcropped in the hill side from Woolley Edge Road south to the railway. Coal mining has existed in the area from 1790 to 1988 and there were a number of smaller collieries that worked the Barnsley Seam from 1790 to 1920. The workings in the Barnsley Seam in the area from Woolley and North Gawber were abandoned in April 1955.

Under the area of the site there are workings in the Barnsley seam from Woolley and North Gawber Collieries, Darton Hall that was closed in December 1888, Oaks Farm that closed in February 1920 and Speedwell New that worked the Kent's Thick and Thin seams until June 1937. There has been opencast mining from 1943 until 1957 on the valley to the north east and west of the subject site and also at Staincross common.

The risk of mining subsidence to the proposed detached dwelling is negligible to very low from legacy coal mining due to the 3 to 5 metres of Woolley Edge Rock, mudstone beneath the area and the extrapolated depth to the Mapplewell seam. The site is between two geological faults that formed a step in the strata beneath Mapplewell and Darton where the seams have been displaced downward. The faults are of a sufficient distance from the site as not to influence the ground conditions for the development.

The collieries worked by pillar and stall methods over a period of 115 years until the late 1960's when mechanised longwall mining was introduced. By that time the mines had worked most of the coal seams down to the Barnsley Seam working under land to the north and south of the immediate area of the collieries and the village of Darton. Due to the length of time that has elapsed since coal mining ceased in the area, mining subsidence is unlikely to occur at the surface.

There are minor faults across the area from Haigh to Darton and Mapplewell to the west of the subject site. The faults would have been a boundary to the colliery workings and if coal was worked to the fault then there was likely to have been some movement of strata along the fault plane as the ground subsided as the coal seams were removed.

The first edition geology sheet of 1866 shows the fault positions in the coal seams edged yellow and it is clear these faults were in workings undertaken at the time in 1866 to 1872. The seams will have been worked from the shallowest to the deepest so the ground above will have suffered from subsidence that will have occurred over a number of seam depths and ceased soon after the workings closed in 1955.

To the south of the site are the faults highlighted yellow on the geological plan in appendix B so the properties on Sackup Lane, formerly Darton Lane are located within a step fault block of ground. It is clear that mine workings from New Speedwell Colliery situated to the south of Mapplewell took place in the fault area as the coal seam would have provided a reasonable sized parcel of coal for a small colliery from 1850 to 1937. Any subsidence should have ceased many years ago and the risk of further ground movement is low as the seam was only 0.6 metre thick.

It is advised that trial pits are excavated to ascertain the depth of the solid geology and if need be rock head so that the foundations can be designed to mitigate the risk of any future subsidence in the area. The foundations should be a minimum of 750 mm below the surface, 400 mm wide and 150 mm thick in 28 N concrete.

There is some detail on trial pits excavated in Mapplewell that show 3 metres of competent mudstone which is in the same horizon as the subject site. It is also noted that there have been a number of large housing development in the areas where Woolley and North Gawber collieries were located that have been built from 2000 to 2017.

Location

The property has been visited on the 22nd January 2018 and the land inspected to assess the risk of mining subsidence from the previous mining activity in the area from Wheatley Wood and Woolley Collieries. The site is located off Sackup Lane to the east of the village of Mapplewell near Barnsley. The site is on the west side and corner of Sackup Lane and Pennine View on land that is used for a bungalow and garden. The area is surrounded by detached housing on Pennine View being built about 40 years ago. There are older buildings in the vicinity that can be inspected to see if there has been a history of movement caused by mining.

The site is on the southern flank of the hill known as Haw Top with Wheatley Wood that falls south to the railway line to Sheffield from Wakefield via Barnsley. The postcode is S75 5AT and the national grid coordinates are 432075E and 410670 N.

The Property

The property is on the outskirts of Mapplewell and Darton on Sackup Lane near what was Lane Head Farm and is at an elevation of 127 metres aod.

Please refer to the aerial photograph in appendix A of the site and the gardens.

The land is used for a bungalow and garden and is flat and level at 127 metres above sea level on the hillside rising from Darton to Windhill Lane. The surface geology of the site has been considered from the archives held by the company and information in the public domain on the British Geological Survey Geo Index website.

The property is to be a detached house of modern construction built in brick with a pitched roof that is to replace the existing property that has been on site since 1975, refer to drawing number T953-PL02 and PL05 in appendix A.

It is clear from the historical maps of the area that there has been mining in past from a number of collieries in the area the last being Woolley and North Gawber which were opened in 1869 before the 2nd Edition County Sheet 262 SW was published on 1:2500 scale. The earlier edition of the geological survey shows shafts and mines in the area in the land near to the railway so coal mining has been prevalent in the area since 1850.

There has been mining from Woolley and Gawber collieries from the Barnsley Seam which is infamous due to the seam thickness. Early mines also worked the seam that were located to the south east of the subject site near the railway line to Sheffield known as Speedwell and Belle Vue Collieries.

There was a coal pit shown in the area which became North Gawber Colliery along Carr Green Lane. The first edition map shows many collieries in the area along the outcrop of the Barnsley seam which is shown as a thick black line on the geology map in appendix B. The grey areas are coal measures mudstone and the green areas are beds of sandstone.

Most of the coal mining in the area ceased before the houses were built in the mid 1970's and prior to that the land was in agricultural use.

Background

In December 2012 the Coal Authority published a guidance note on the mine hazards and how they could be mitigated through good planning and design. The Coal Authority divided the coal field areas into two referral areas, high risk and low risk. The high risk referral areas are the parts of the exposed coalfield where there are outcrops of coal, mine shafts, adits and openings, recorded incidents of mine treatment or shallow workings or a belief that there may have been and the workings are un recorded, before there was a requirement to survey mine workings and provide plans in the 1872 Mines Act.

The Coal Authority is responsible for the repair of property under the Coal Mining Subsidence Act 1991 amended in 1994 transferring responsibility from the British Coal Corporation to the Coal Authority. If damage was to occur from past coal mining activity then the Coal Authority are seeking to reduce their liability for repairs since the demise of the coal industry and the subsequent loss of royalty income. They require the developer to find ways to mitigate the risk of mine related damage to new build properties by the construction being engineered to withstand the influence of coal mining damage from subsidence or shallow mine workings.

Coal Mine Working

Most mines in the exposed coalfield in the Darton and Barnsley area were worked from 1850 by a number of colliery companies until nationalisation of the industry in 1947. On nationalisation the coal industry was managed by the NCB later to become the British Coal Corporation. Three collieries remained in the area through to nationalisation of the coal industry, which were North Gawber, Woolley and Wheatley Wood collieries. Further south was Crigglestone Colliery and around Bretton were Bulcliffe Wood, Park Mill and towards Barnsley Redbrook. These collieries all worked under the National Coal Board management and were closed between 1982 and 1988.

The mines were worked by driving shafts from the surface to intersect the coal seams and then driving tunnels underground in the coal seams on a rectangular pattern leaving pillars to allow air flow and transport in the mine to the shaft. Once the boundary of the mine had been worked to the coal in between the rectangles was worked out and the pillar of coal removed. The coal was removed on a retreat method removing pillars from the boundary back to the shaft.

Once the coal was worked the void where the coal was, slowly closed as the strata above the coal seam level pressed down on the supports in the void space, that was mainly wooden props and bars. In most mines the props and bars were removed as the mine workers retreated from the boundary of the mine to the shaft.

Consequently the subsidence caused by old mine workings should have ceased as the strata above pressed down on the void space and closed the void. In some cases the pillars were not removed and the subsidence was prolonged as the pillars of coal slowly deteriorated under the weight of the strata above. The tunnels offer no support to the strata above the coal mine if the props and bars are removed and if they are left in they will eventually rot away causing collapse of the mine tunnels.

The area contained many coal seams so there was interaction between each coal mine horizon in relation to support for the mine and resulting subsidence. In particular this area had a seam that was

3 metres thick and cropped out at the surface near to the railway and Darton. The area of mining the Barnsley seam ceased in 1955 as the collieries sought new area to the north under agricultural land.

From the late 1960's the mining method changed to longwall advance or retreat mining taking panels of coal with a rotating drum shearer over a distance of 100 to 200 metres wide and 1000 metres long.

The area where there were colliery yards, railway connections and shafts were usually not worked and a pillar of coal was left to support the shaft, the headgear, railway and colliery plant. The buildings that were deemed to be important in an area such as the nearby Church were supported by pillars of coal and from inspection there does not appear to be any signs of subsidence damage to the older properties such as the public house and the Church.

The subject site was not developed along with the other houses until the 1970's and most of the area to the east of Mapplewell will have been mined for coal as it was agricultural land until then.

Considerations for Risk from Past Mining

The number of coal seams in the area and the likelihood they would be worked is the first consideration. This can be assessed from mine plans of the area and the depth of the seams. Prior to 1872 most coal mines were mapped to pay the mineral owner a royalty for working coal under his land. Most of the land was owned by the aristocracy such as the Earl of Mexborough who leased coal seams to colliery companies and received a royalty for every ton worked. This was the case until the Coal Act 1938 when the coal interests were purchased by the Government and most of the coal reserves were vested with the State until nationalisation of the industry in 1947.

After 1872 all mines had to be surveyed and plans kept at the mine with information provided on the depth of the workings below the surface to a known level, the depth of any shaft, the location of every working area and the areas of a mine where it was waterlogged. The mine plans had to be kept up to date every three months by a qualified mine surveyor and in the West Riding of Yorkshire there were five companies surveying mines in the area.

The Act in 1872 required the plans to be kept up to date and once a mine was exhausted of mineral then it would be closed and a plan provided to the Mines Department showing the abandoned mine. The plan was signed by the manager of the mine and the mine surveyor as a true record of the workings and a report provided of the mine and the treatment of the surface mine openings by the surveyor. The aforementioned collieries were sunk in 1869 so records do exist of where the coal was worked and what seams.

Many coal mines were opened and worked prior to the 1872 Act and consequently mine plans were not deposited with the Mines Department and were kept with surveyor's records and estate plans out of the public domain. Since 1872 the mine plans have been deposited with various Government Departments and the Coal Authority have a large collection of mine plans from 1872 onwards and plans before 1872 that were deposited with the Mines Department when they came to light. Other archives are available and this firm Fennell Green and Bates, Mining Engineers have a large collection of mine plans. These plans were loaned to the NCB in 1972 and copies of the plans are kept at the Coal Authority.

Despite the legislation there is still a risk that coal mine workings that have not been recorded do exist and are shallow as these were the seams easiest to work, were unlikely to be wet as they were above the water table and could be accessed from the out crop of the coal seam in a hillside.

An assessment of the records for old mine workings on the first edition County Sheet Geology map number 262, a copy of which is included in appendix B, dated 1852 to 1866 and then the second edition of 1932, reference 262SW usually shows more accurate positions of faults in the ground and more mine openings from information gathered over that 60 year period. There are a series of step geological faults either side of Sackup Lane and the subject site which will have controlled the mining areas of the two collieries. An extract of the geological plan is included in Appendix B.

The first edition geological map provides information on the collieries in the area and Woolley Colliery was working the Barnsley Main whilst Wheatley Wood which was part of the Woolley Colliery complex to the north was working the Beamshaw and Mapplewell seams as well. There is information on the first edition as the mines were working in the immediate area in the Mapplewell and Barnsley Seams. The fault system is shown highlighted yellow on the first edition map in appendix B and the area where the site is on Darton Lane 9 (Sackup Lane) is fields. Other than agricultural land and the railway there is little development relating to coal mining part from the shafts and buildings to the south east at New Speedwell, Speedwell and Belle Vue Collieries. North Gawber Colliery is shown by one coal pit and the depth being 50 yards to the Mapplewell Coal and the 97 yards to the Barnsley Main Coal.

The faults between Woolley Colliery to the west and North Gawber to the east of the subject site show that there are parallel step faults trending north northeast. There is a block of ground under Sackup Lane and Pennine View that is stepped down from the strata to the west. The faults are parallel to this block of ground that shows throw of the strata to the east indicated by the small perpendicular dash on the fault. The site is within a faulted block of ground at the surface that extended to the Barnsley seam and deep into the earth's crust and the throw on the south side fault is 14 feet, 5 metres. These faults could be tunnelled through to continue mining on a pillar and stall system from Gawber to Woolley collieries which is proven with the abandonment plan from April 1955.

Both these maps provide information on the geology from the surface to the coal seams and sections of strata. The coal seam that is shallowest from the surface that has been worked is the Kent's Thick / Mapplewell seam which is 30 metres below the surface at North Gawber and the seam section is 0.65 metres. The depth to the seam from Wheatley Wood Mine is 122 metres. The level of the shaft at Wheatley Wood is 161 metres aod and at Gawber is 91.5 metres aod. The Mapplewell seam is at 60 metres aod at the North Gawber mine and at Woolley Wheatley Wood is 40 metres aod. The seam is dipping to the northwest and it is clear that the seam will be 60 metres below the subject site from the surface levels and the dip of the seam.

Quarries in the area can also assist in assessing the strata from the surface to the coal seams. Borehole information is available from the British Geological Society if required but the shaft sections, mine workings and plans usually show the strata.

Further information has been obtained from the publication by the Midland Institute of Mining Civil and Mechanical Engineers 1914 and 1927 on the shaft records for the surrounding collieries and the shaft sections for both North Gawber and Wheatley Wood are included in Appendix B.

Coal Mine Risk Assessment.

The first edition geological map, plan number CWEC/PV/CMRA/2018-01, of the area, reference number 262 has been considered and the property and land lies within the strata above the Mapplewell seam and is a thickly bedded series of shale and mudstone with beds of sandstone. The depth to the Mapplewell seam is 60 metres and the other seams beneath that can be taken from the shaft section for the Wheatley Wood Colliery. The depths are shown on first edition geology sheet published in June 1874. It is quite clear from inspecting the geology map that the mines worked the coal seams that are below the Winter Seam.

The collieries are located in between the fault lines to work the coal seams in blocks of ground that allow large scale mining. Woolley Colliery was west of the step fault, North Gawber was east of the step fault and Crigglestone was south of the railway line. The earlier mines worked smaller blocks of ground from the outcrops in the hillside.

The seams worked in the area and under the subject property are recorded as the

Beamshaw Seam – 0.6 metres at 80 metres

Kent's Thin – 0.56 metres at 103.3 metres

Mapplewell / Kent's Thick - 0.69 metres at 122.5 metres

Barnsley Rider Coal 0.6 metres at 170 metres

Barnsley Seam 3.2 metres at 188.3 metres.

The abandoned mines catalogue for the area shows that the Barnsley seam worked under graticule square F12 that corresponds with the subject property and these workings were abandoned in April 1955.

There are 17 plans listed in the catalogue which are 4 of which are near to the property;

NE 158 – Barnsley Seam, Woolley and North Gawber.

2281 Barnsley Seam, Darton Hall Colliery abandoned December 1888

12079 – Barnsley Seam, Oaks Farm abandoned February 1920

12125 Kent's Thick -, New Speedwell .

Considering the time when the mines were worked and seams abandoned, coal mining subsidence should have ceased and there should be no collapse of ground in the area of the subject property as the seams were between 0.5 and 3 metres thick, so the separation of the strata above the coal mining horizon should not exceed 6 metres from the shallowest seam. That would be from the

Mapplewell seam which is 60 metres below the site and using the usual void migration calculator of 10 times the thickness of the seam there should be no crown holes or collapse of ground.

The site is underlain by the beds of sandstone to the Mapplewell seam, refer to the geological section on plan number CWEC/PV/CMRA/2018-01 in appendix B. The sandstone is denoted by the areas coloured green and references to quarries. In between is mudstone according to the geological plan. In the shaft section for Wheatley Wood Colliery it is denoted as mudstone and various local descriptions such as bind, stone and shale. Within the beds of mudstone are thick beds of sandstone, known locally as spavin, associated with the coal seams such as the Woolley Edge Rock, and thinner seams above the Barnsley seam.

The development should not be affected by the former mining activity. As the site is near to a farm and Darton Lane now Sackup Lane the houses were built in the mid 1970's and this proposal is for a house to be built in the same location once the existing house has been demolished. The Coal Authority residential report in appendix C refers to there being shallow coal mining which is usually within 30 metres of the surface but from the investigation the Winter seam outcrops higher up the hill that the property and the extrapolation of the level of the Mapplewell Seam is at least 30 metres below the surface and the seam is only 0.6 metres thick.

A prudent developer would design the foundations for the house after some trial pit investigations and strengthen the foundations by adding reinforcing mesh to the concrete footings for all load bearing walls and build a concrete beam and block floor for the ground floor inside the walls.

The foundations of the property can be examined by trial pits to assess the disturbance to the ground as the existing property is demolished and the foundations grubbed out. It is advisable that the strata is examined on site once it has been cleared. This exercise would also allow an assessment of disposing of rainwater to a soakaway in the sandstone if it is under the surface if suitable.

The risk from mining subsidence caused by coal mining is very low due to the coal measures mudstone over the sandstone beds underneath the site. The thick sandstone beds shown as spavin in the shaft records over the coal seams will act a plinth to support the overlying strata. The risk of ground migration to the surface from mining is low due to the seam thickness and the depth of the Mapplewell seam below the ground.

The risk to the proposed development is very low due to the location of the site and the distance to the collieries and the shafts. Mining ceased in the area in 1987 according to the Coal Authority residential report in appendix C so all ground movement should have ceased as there are no does not appear to be records of there being any coal seams worked beneath the surface at a depth of 30 metres or less.

LIMITS OF LIABILITY

Cromwell Wood Estate Company Limited has produced this report on land at 1 Pennine View, Darton, S75 5AT solely for the use of the client and their professional advisor on matters appertaining to the design and build of one house in place of the existing one and submission to the planning authority for planning permission. Both the findings and opinions expressed within the report are relevant to the period of site visit and data supplied therefore the information should not be relied upon at a later date that exceeds 2 years from the date below.

No part of report may be re-produced or relied upon by any third party who may subsequently advise the client or undertake his own investigation without the prior written consent of the FGB Fennells Limited. It is recommended that any other potential interested party consult with the writer of this report prior to undertaking work or obtain their own report as the contents of this report cannot be relied upon for the purchase of the property as it is for the client's use named on the front of the report.

Signed

John Carlon

Eur Ing John Carlon B.Eng (Hons) C.Eng MIMM MRICS MIQ MCIWM

Chartered Mineral Surveyor / Chartered Mining Engineer.

January 26th 2018

APPENDIX A –
Aerial Photograph and
Block Plans of the Existing and Proposed House

APPENDIX B - Geological Maps and Shaft Sections

Appendix C

Coal Authority Residential Report

