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**T/A Cromwell Mining Consultants**

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Our Ref: JC/ZEC/Grove Street Worsborough Barnsley

15<sup>th</sup> October 2018

The Coal Authority  
200 Berry Hill  
Mansfield

CC - Planning Department  
Barnsley Council

Dear Sirs,

**Plot of Land for 10 Dwellings - Grove Street Worsborough near Barnsley S70 4SN**

1.0 Introduction

- 1.1 The client LMW Developments Limited is applying for planning permission to build 10 houses on land that was formerly developed for housing in the past. The houses were built circa 1960 and demolished at the end of the 1990's. The reason for demolition is unknown but on excavating trial pits in the footprints of the houses the foundations were on a loamy sandstone and were 75 mm thick concrete. The foundations were on the horizon of the bottom of the Woolley Edge rock and it is soft weathered sandstone over stiff mottled brown clay. No planning permission has been granted for the erection of the dwellings and the applicant is undertaking the investigation of the site before submission of the planning application so all the details can be submitted. It is likely that a planning condition would be included that required an intrusive investigation is carried out on site to ascertain the depth to the shallow coal mine workings that may exist under the subject site due to the comments in the Coal Authority report appended to the MET Engineering phase 1 geo-environmental report.
- 1.2 A phase 1 desk top study has been undertaken by MET Engineering and in the report it was identified that there are 3 coal seams that are within 30 metres of the surface which are the Meltonfield, the 2 Foot and the Winter or Abdy seam. The report contains responses from the Coal Authority and the South Yorkshire Mining Advisory Service and this document discusses the outcrop of the Two Foot seam being near to the surface and the Abdy (Winter) outcropping to the south. A copy of the plan is included in appendix 3 of this risk assessment, method statement and application for

a permit to carry out a site investigation that will enter coal seams or mine workings. From the records of borings in the area the thickness of strata between the Wathwood (Meltonfield) seam and the Two Foot is 1.5 metres and the Two Foot to the Abdy is 20.6 metre and these have been taken from Wombwell Main Colliery Shaft Section that is included in appendix 4.

- 1.3 It is well documented that there were shallow coal mine workings in the area especially around what is Barrow Colliery, Wombwell Main and older collieries such as Darley Main NGR 435870,404070 and Lewden Bridge, NGR 436730, 403720. These mines are shown on the first edition geological plan 274 in appendix 2.
- 1.4 Further investigation has been undertaken on the coal mining history around the area to inform the engineer of the risks during the site investigation. The records at the Coal Authority were reviewed on the 2<sup>nd</sup> October and the archives of our sister company Fennell Green and Bates for the mining plans and we have had sight of a Coal Mining Risk Assessment prepared by MET engineers within their Geo Environmental Report which will be included within the planning application documents.
- 1.5 Permission is sought from the Coal Authority to undertake drilling on site into the coal seam horizons beneath the subject site for a depth of 30 metres to intersect the 2 Foot seam at 5 to 10 metres depth and then to 30 metres to check if there are deeper seams such as the Abdy / Winter (Scale) Coal as a number of seams exist close together in the Worsborough area. Geological map 274 SE in appendix 2 shows the shafts for Darley Dale Colliery and the depth to the Barnsley seam being 130 Yards. The Winter seam, 2 Foot and Meltonfield (Wathwood) seam are further up the hill from Darley Dale Colliery so this mine would not have worked those coal seams. There was residential development in the area between Bank End Road and Grove Street at the time which was between 1851 and 1866 so it is likely that the properties would have prevented coal mining at shallow depth due to the development and the surrounding land use which appears to be market gardening.
- 1.6 It is proposed to drill 3 boreholes to 30 metres using water flush to investigate the ground conditions and the depth to the coal seams and whether they have been worked by pillar and stall methods.

## 2.0 Method

- 2.1 The layout of the dwellings will be located on site so that boreholes can be drilled in or near the footprint to inspect the ground conditions and design the foundations of the houses to avoid differential settlement. There are no records of any shafts, adits or crop workings and the site is not within the zone of influence from Darley Main Colliery to the site boundary so it is not intended to investigate for mine entries within the curtilage of the site. The location of Darley Main is shown as a disused shaft on the SYMAS plan in appendix 3.
- 2.2 It is proposed to mark out the dwellings from the layout plan in appendix 1 to be submitted in the planning permission where the dwellings are located in the northern part of the land where houses were built before and demolished. The architect has confirmed the properties will be in the position 3 metres further south than the original

houses shown on the maps in the phase 1 desk top study, subject to the coal mining investigation. The coordinates will be taken off the plan manually by measurement and will be set out from the boundaries of the site so the borehole locations can be set out outside the property foundation footprint with the first borehole drilled in the centre of the plots 1 and 2 the second one in plot 5 and the third in plot 9.

- 2.3 Trial pits have been excavated on the site as part of the assessment of the ground conditions, the geology at the surface and any evidence of contamination due to past uses of the land as required by the planning permission. The trial pits were excavated in the footprints of the previous housing plots 7 metres from the back of the footpath on Grove Street and competent ground consisting of mudstone was found at 2 metres. The ground above was foundations for the previous houses and demolition soil.
- 2.4 The trial pits have confirmed the condition of the ground and there was no sign of mining as there would be a distinct difference in the ground if it has been subjected to void migration from old coal mine workings to the undisturbed ground of exposed coal measures strata. Plate load tests can be undertaken on the ground where there is evidence of void migration to the surface to assess the compaction and settlement of the ground which consists of undisturbed mudstone, shale and siltstone laid in layers. Further assessment will be undertaken if need be once the coal mine drilling is concluded. From the present information available it would appear the coal seams should be intact.
- 2.5 If there has been shallow coal mining the strata is likely to have been disturbed prior to 1860 in the Winter and 2 foot seams which will be investigated. The seams are shown to be between 5 and 25 metres below the surface and the full extraction thickness is possibly 1.8 metres so the surface is in the zone of influence of the void migration to the surface from the Two Foot and Winter seams.
- 2.6 It is proposed to drill 3 boreholes in the footprint of the buildings where there is natural strata down to the Winter seam at 20 metres depth and the first hole will be extended to a depth of 30 metres to investigate the strata beneath the Winter seam and possibly intersect the Beamshaw seam. The boreholes will be drilled with water flush to reduce the risk of igniting mine gas in the seams and old workings as the rock bit drills the strata. The drilling contractor will be Ace Drilling Limited who will provide a track or 4 wheel drive rig and also provide the water bowser, the tanks and the pumps. The company have undertaken drilling on a number of sites in the past, the most recent being Stanton Ilkeston football fields in Derbyshire.
- 2.7 Gas readings for methane and carbon di-oxide will be taken on site in the drains, sumps and manholes before site investigation works commence to assess if there is mine gas migrating to the surface from the old workings through the strata to the surface. It is unlikely that mine gas will migrate through the overlying strata of mudstone and clay unless it has been affected by crown holing above any mine roadways which could form a pathway from the seam horizons to the surface. The trial pits will be tested for gas emissions using a gas monitor and if need be a Flame Ionisation Detector, FID.

- 2.8 The old mine workings were recorded on the abandoned mines record of plans for the Darley Main Colliery that illustrates that parts of the mine were worked prior to the requirements for abandoned mine plans to be deposited with the Mines Inspectorate and to keep plans at the mines. The working was in the Barnsley seam which is 160 metres below the surface at this site.
- 2.9 From the site investigation the condition of the ground can be ascertained for shallow coal workings in the 2 Foot and Winter seams for competence by standard penetration tests (SPT's) whilst drilling to the 30 metres below the surface horizon will confirm the presence or absence of old unrecorded mine workings in the two seams of coal.
- 2.10 The abandoned mine plans register has been examined for Barrow Colliery that was sunk in 1873 and closed in May 1985. The colliery worked deeper seams in the area such as the Thornccliffe and the Silkstone and was one of the deepest mines in the Barnsley Coalfield. The mine did not work shallow seams under the village. Seams are recorded in the shaft section for Wombwell Main Colliery and the shaft was sunk through 36.8 metres of Woolley Edge Rock before intersecting the seams and the section of strata through the coal seams gives a good indication of the shallow seams beneath this site as the outcrop of the Woolley Edge Rock runs along Grove Street. There are no records of workings in the seams at the Coal Authority Mines Records Office only the deeper seams from Barrow and Wombwell Main.
- 2.11 The first edition geological map 274 for the coalfield shows small collieries at Worsborough and it is noted that the depth to the Barnsley Seam is 130 yards at the valley bottom where Darley Main and Bell Ing Collieries are located which were sunk near the outcrop of the Kents Thick and Kents Thin seam also known as the Beamshaw beds. Faults are shown on the geological plan in appendix 2 to the east and west of Grove Street and it is clear that the eastern one is a down throw fault as the Woolley Edge Rock is further down the hill. The fault will have presented a barrier to working the seams under Grove Street from the collieries to the west, east and south. Darley Main was well established by the time the geology was surveyed in 1866 to 1878 and was sunk to the Barnsley seam. There are numerous small mines in Worsborough Vale to the south of the subject site located in what is now Darley Yard off the High Street and a housing estate to the east. The desk top coal mining risk assessment is included in planning application and the SYMAS report in appendix 3 of this method statement.
- 2.12 The other seams worked in the area have been recorded and plans are held at the Mines Records Office and the plans deal with the underground mines to the east and north of the site. The seams are at depths of 140 feet, 43 metres to 1739 feet, 530 metres below the surface. The plans have the seam levels on the gate roads and coal faces so will be accurate.
- 2.13 When the strata sunk through in the Wombwell Main shaft in appendix 4 is considered there are no workable seams beneath the Winter until the Kent's Thin 45 metres below the Winter or Abdy seam. It is likely there aren't any underground workings in the site beneath the Winter (Abdy) coal horizons at 22 metres depth until the Kent's Thin seam extrapolated at 67 metres deep.

- 2.14 The only seams recorded as being worked from Barrow are the deeper seams beneath the Barnsley Seam.
- 2.15 Drilling of the strata below the Winter / Abdy to 30 metres is unlikely to find the Kent seams near to the surface. The Winter Abdy is recorded as being 0.8 metres thick and the seam if worked is not within the criteria of void migration to the surface of 10 times the seam thickness extracted. Looking at the seam thicknesses the cumulative thickness of 1.2 metres for the Two Foot and the Abdy seams there is potential for damage to the ground from the Two Foot seam as it is projected to be 5 metres beneath the surface. The Two Foot Seam is a 0.8 metre thick seam and is recorded to a depth of less than 5 metres below the surface, the Abdy coal is beneath the Two Foot coal seam and is 20.25 metres depth when projected from the shaft record and the outcrop location on map 274 SE.
- 2.16 From the investigation the drilling on site needs to go to the Winter / Abdy seam which is about 20 metres below the surface and to 30 metres so as to intersect any unrecorded seams. Permission is sought from the Coal Authority to enter the coal seams and any unrecorded unworked underground areas if they exist. Permission is not usually required to excavate trial pits on site at the surface as the trial pits are not entering any coal mining infrastructure or coal seams. The pits will provide evidence of the ground geology near to the surface and at foundation level.
- 2.17 Once the site investigation has been completed the foundations of the houses can be designed but it is likely to be strip footings if the ground is found not to be disturbed. If treatment is required of the old workings and the ground due to void migration then the method of treatment will be agreed with the Coal Authority before any work takes place. It is likely that all mining subsidence damage will have ceased long ago as the last coal mining in the seams worked from Barrow Colliery 270 metres beneath the surface and was completed in 1970. Most of the mining will have taken place in the mid 1800's in the Barnsley seam and then deeper seams from Barrow. Coal working did take place in the rudimentary collieries such as Darley Main in the Barnsley seam as that was over 2 metres thick. Details will be provided in the final report for the Coal Authority of the site investigation, findings and conclusions.
- 2.18 If there are old workings in the seams within 30 metres below the site and they are likely to affect the development and could have been worked there is likely to have been void migration and subsidence over 50 years ago which will have stabilised and settled the ground. The SPT's and the plate load testing should provide details on the ground conditions under the footprint of the dwellings the concrete strip or slab and the bearing pressure designed accordingly based on the site conditions.
- 2.19 If required a scheme describing the stabilisation works for the site based on the investigation will be agreed with the Coal Authority once the site investigation has been completed and sent to the Coal Authority and commented on by their engineers. The site will be signed off by a Chartered Mining Engineer and Surveyor after agreement with the Coal Authority.

### 3.0 Conclusion

- 3.1 The published information for the site and the abandonment plans for Barrow Colliery have been examined of all the recorded underground workings on the 2<sup>nd</sup> October 2018 at the Mine Heritage Centre at the Coal Authority in Mansfield. The abandonment plans show the faults either side of Grove Street that will have acted as a barrier to early working and have been proved at depth on the plans of Barrow Colliery.
- 3.2 The method statement described in this letter should mitigate the risk of differential settlement to the 10 semi-detached dwellings when the ground conditions are examined from the boreholes, trial pits, SPT's and plate load tests undertaken to determine the degree of compaction.
- 3.3 We would be obliged if the Coal Authority could agree the proposal and advise the Local Planning Authority accordingly. The applicant can then seek permission to drill the site with the Coal Authority and organise the rig and site investigation at the earliest opportunity.

Signed

*John Carlon*

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

Principal Mining Engineer.

# BLOCK PLAN OF THE SITE WITH BOREHOLE LOCATIONS



Figure 1 showing the 1<sup>st</sup> Edition Geology Sheet 274 with the site shown by the red arrow. Note the shaft to the south west of the site is possibly Darley Main Pit. Note it is 130 yards to the Barnsley Coal and the Winter Coal is further up the hill from the Colliery so cannot have been worked from this colliery. Note the fault to the east that throws the Rock down and displaces the 3 seams south.

APPENDIX 3 – South Yorkshire Mining Advisory Service  
Report on the Site for Barnsley MBC.

APPENDIX 4 – WOMBWELL MAIN COLLIERY SHAFT  
SECTION TO THE SEAMS.