Contaminated Land Appraisals
Brownfield Remediation Solutions
Site Investigation Services
Earthworks Design and Control
Flood Risk Assessments

Mr Mick Miller

20th April 2024

Ref C632/01/ATS

Dear Mr Clark,

Ref: Shallow Mining Investigation on land at 20 Bismarck Street, Worsbrough Common, Barnsley

1. Introduction

On the instructions of Mr Mick Miller, G&M Consulting Ltd have carried out an intrusive mining investigation on land at 20 Bismarck Street, Worsbrough Common, Barnsley. The work was carried out in support of a planning application associated with the development of the site with a single residential dwelling.

The investigation work was undertaken to provide information on the underlying ground conditions and assess the likelihood of historical shallow mine workings affecting the site. G&M Consulting Ltd (G&M) was present on site during the fieldwork, and this report presents the findings of the investigation.

The site has been subject to a coal mining risk assessment (CMRA), prepared by G&M, details of which are summarised in Section 2 of this report and a full copy is presented in Attachment A. A review of the Coal Authority (CA) Interactive Map (http:/mapaps2.bgs.co.uk/coalauthority/home.html), shows the site to lie within a '*development high risk* area'.

The site is located off Bismarck Street in Worsbrough Common, approximately 1.5 km south east of Barnsley town centre. The grid reference for the site is SE 347 053.

The site is currently occupied by a recently constructed residential dwelling, with an associated area of driveway and hardstand car parking and private gardens to the front and rear of the property.

The Chestnuts
Brackenhill Road, East Lound,
Haxey, Doncaster. DN9 2LR
Registered in England No. 5806528
VAT No. 772 3112 51

The comments and opinions presented in this report are based on the findings of a review of available information and ground conditions encountered during the intrusive investigation work. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation. Any diagram or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

2. CMRA

The CMRA prepared by G&M , Report Ref C632, dated February 2024 should be read in conjunction with this report. A summary of the findings from the CMRA are as follows:

Records indicate the site to be located on shales, mudstones and possibly the base of the 'Woolley Edge Rock Sandstone' of the Middle Coal Measure series from the Carboniferous formation (although note the potential for made ground as detailed below). No superficial deposits are indicated in the vicinity of the site itself. Strata is shown to dip towards the SE (south-east) at around 7° (1 in 8) in this vicinity.

The 'Meltonfield' coal seam, of around 0.9m workable thickness in these parts, is conjectured to outcrop just to the north as shown. Given the information it is likely to be the case that the outcrop follows the base of the old brickworks quarry detailed below, or they were within the associated high-wall. This would make for the seam being at shallow depth beneath the dwelling (within 5m or so) rather than at the surface; unless historically removed via the quarrying.

The Two Foot seam, of around 0.8m workable thickness, is shown to outcrop some 170m away to the north-west as indicated. This coal is known locally to lie beneath the Meltonfield seam by around 15m or so.

The Abdy (or 'Winter') coal seam, of around 0.9m thickness) will lie beneath the Two Foot seam by a further 15m or so.

An area of made ground is indicated just to the north of the dwelling which appears to be related to an old 'brick works' quarry according to old historic mapping. Given the historic nature of these operations it is likely that associated made ground may extend to beneath the site of the dwelling.

No opencast coal operations are known within 250m of the site; however, the historic 'brick works' are likely to have removed the coal to some extent.

Deep coal mining (over 50m deep) has taken place beneath the site in various coal seams, all settlement from which will be long complete. As no coalfields now exist, the site should remain stable from the deep coal mining perspective for the foreseeable future.

According to Coal Authority details the site lies in an area of 'past shallow coal workings' which appears to relate to the 'Two Foot' coal seam; although given the geological position it should be considered that the workings may indeed relate to the 'Meltonfield' seam that is likely to have been encountered in the base/wall of the historic brick works quarry. The location of the mine adits, as detailed below, supports this possible scenario.

Two old mine adits (tunnel entrances) are shown to be present within 20m of the dwelling. As can be seen, the mine adits are known to be treated and have an '8m departure' - which is a contingency factor for the features being out of the recorded plan position by. From the available information it is likely that these features are clear of being beneath the dwelling or indeed clear of travelling beneath it. It is also possible that the historic quarrying activity has totally removed the features to beneath land further southwards.

The Conclusions section of the CMRA included the following;

Given the shallow coal mining position and location of the two known mine adits, it would seem a balanced approach to undertake 3 rotary boreholes to 30m deep on/just outside of the southern corners of the building and north-eastern corner in the first instance. Water flush methods should be utilised to reduce gas and spontaneous combustion risks and a permit from the Coal Authority should first be obtained prior to an

investigation of their interests. The boreholes should determine the depth of any made ground associated with the adjacent historic quarry and whether any coal seam/workings are beneath the property at a critical depth from a stability aspect. It is felt unlikely in this instance that there will be any 'interaction' between the different coal seams from a void migration aspect. As such, boreholes could be terminated within the firm ground beneath the first coal seam/workings encountered. If no coal seams or associated workings are noted (beneath any made ground for instance) then holes should be extended to 30m deep to confirm the position. It should be noted that further holes may be necessary should it be difficult to ultimately prove the geological/mining position.

Previous intrusive investigation work undertaken by G&M for a site adjacent to the subject site (Report Ref

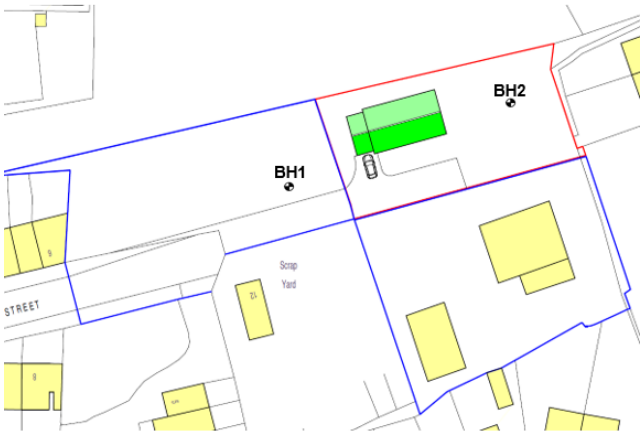
3. Fieldwork

The fieldwork was carried out on the 27th March 2024. Due to the layout of the recently constructed dwelling and external development, two rotary open-holes, referenced BH1 and BH2 were drilled to a maximum depth of 25 m below ground level (bgl), to allow logging of the soils and solid strata through examination of flush returns and rate of penetration of the drill bit. Drilling was initially progressed using 150mm diameter augers through the made ground soils, and a casing set into the underlying bedrock, to aid flush returns.

The drilling works were undertaken by Cape using a Beretta T44 tracked rotary drilling rig and carried out under the Terms and Conditions of the Coal Authority Permission No 28009, a copy of which is presented in Attachment B of this report.

Drilling was undertaken using water flush and the boreholes were backfilled on completion.

The locations of the exploratory holes are shown below.



4. Ground Conditions

Made ground was encountered in both of the boreholes varying between 8.0 m (BH1) and 12.0 m bgl (BH2).

The made ground deposits were underlain by Coal Measures bedrock in both of the boreholes to the full depth of each borehole. The driller records predominantly mudstone, with occasional interbedded sandstone, noted in BH1 between 10.2 m and 23.0 m bgl.

Within the depth of the boreholes one coal seam was recorded, depending on the location of the borehole, as detailed below;

BH No	Depth (m bgl)	Depth to top of Coal (m bgl)	Thickness (mm)	Likely Seam
1	25.0	23.0	600	Two-Foot
2	23.0	21.5	600	Two-Foot

The coal appeared to be intact, with no loss of flush, soft or broken ground noted in either borehole.

Based on the CMRA, and information provided by the CA, it is considered that the seam of intact coal encountered is likely to be the Two-Foot coal.

The exploratory hole records are presented in Attachment C of this report.

During the drilling, monitoring of methane, carbon monoxide, hydrogen sulphide and oxygen was undertaken at the borehole surface. No significant concentrations of methane, carbon monoxide or hydrogen sulphide were recorded, as detailed on the attached logs no gases were noted during drilling.

6. Conclusions/Recommendations

On the instructions of Mr Mick Miller, G&M Consulting Ltd have carried out an intrusive mining investigation on land at 20 Bismarck Street, Worsbrough Common, Barnsley. The work was carried out in support of a planning application associated with the development of the site with a single residential dwelling.

The drilling works were carried out in accordance with the CA permission 28009.

No evidence of soft or voided strata, or significant loss of flush was noted during the drilling.

A single 600mm thick intact coal was encountered in both boreholes at depths of between 21.5 m and 23 m bgl, within a sequence of deep made ground overlying mudstones.

Based on a review of stratigraphic column, it is considered that this seam represents the Two-Foot coal; the next coal in the geological sequence (the Winter or Abdy seam), is likely to underlay the site at a depth of approximately 36 m bgl.

As a general rule of thumb used to assess the risk from pillar and stall mining, the rule is 10x seam thickness for competent rock cover. A 600 mm thick seam would need to have 6 m or less of competent rock cover for workings to affect the surface. The shallowest seam depth recorded at 21.5 m bgl gives 9.5 m of overlying competent rock cover (taking into account the 12.0 m of made ground at this location). This suggests that the seam or any associated workings (not evidenced during the investigation) are outside the zone of influence for a development at ground level and that no further remedial measures are required.

The CMRA, referenced previously, notes that *'The 'Meltonfield' coal seam, of around 0.9m workable thickness in these parts, is conjectured to outcrop just to the north as shown. Given the information it is likely to be the case that the outcrop follows the base of the old brickworks quarry detailed below, or they were within the associated high-wall. This would make for the seam being at shallow depth beneath the dwelling (within 5m or so) rather than at the surface; unless historically removed via the quarrying.'* Based on the findings of this investigation, ie, the depth of made ground and depth to the single underlying coal seam, it is considered that this assumption is correct and that the Meltonfield coal seam has been removed, in the location of the existing property, as part of the historical quarrying of the site. The Two-Foot coal seam is known locally to lie beneath the Meltonfield seam by around 15m or so.

We trust this report and the attachments meet with your approval and are sufficient for your present needs. Your client should submit this document to the local authority for their comment/approval.

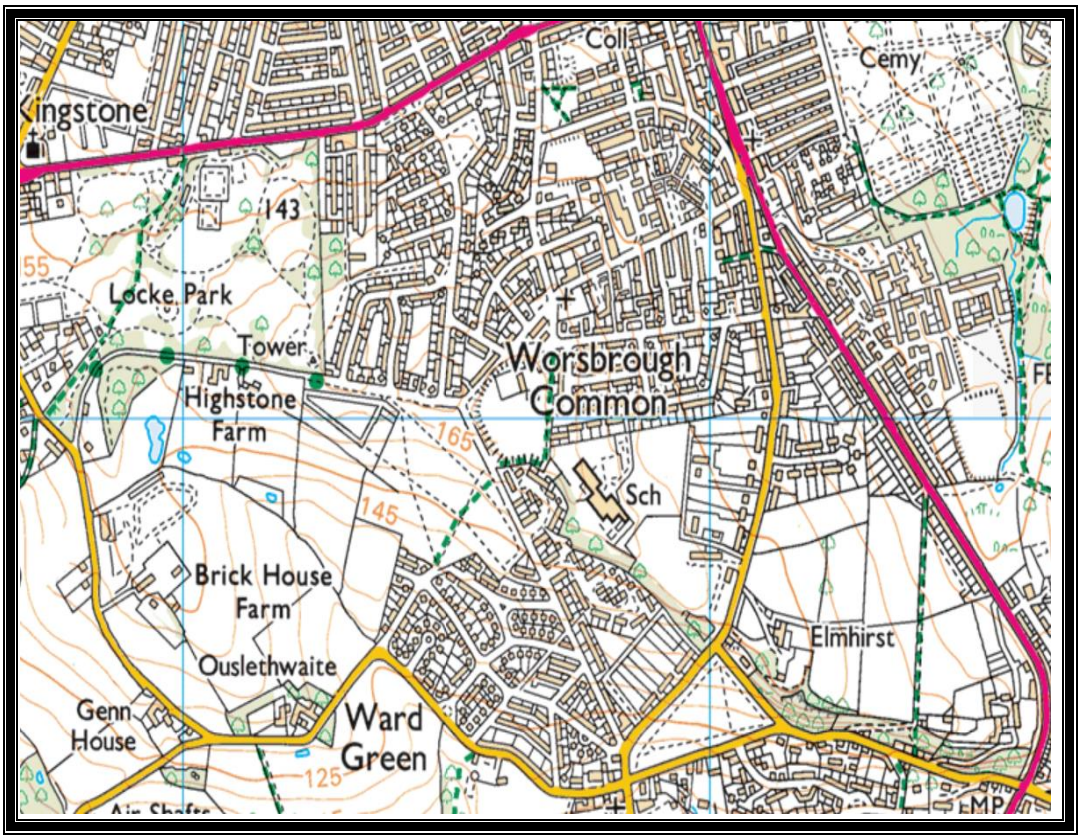
Yours sincerely

Andrew Swinbourne
For and on behalf of **G&M Consulting Ltd**
Attachments

ATTACHMENT A - CMRA

Report No: C632
Date: February 2024

COAL MINING RISK ASSESSMENT
For land at
20 BISMARCK STREET, WORSBROUGH COMMON, BARNSLEY, SOUTH YORKSHIRE, S70 4NA



Prepared for

Mr Michael Miller

Prepared by
G&M Consulting Ltd, The Chestnuts, Brackenhill Road, East Lound, Haxey, Doncaster, DN9 2LR

REPORT NUMBER:	C632	**REPORT STATUS:**	Final
REPORT TYPE:	Coal Mining Risk Assessment		
REPORT DATE:	February 2024		
SITE:	Land at 20 Bismarck Street, Worsbrough Common, Barnsley, South Yorkshire S70 4NA		
PREPARED FOR:	Mr Michael Miller		
PREPARED BY:	G Swinbourne BSc. (Hons) MSc. DIC, FGS		
REVIEWED BY:	A Swinbourne BSc. (Hons) FGS, MiEnvSc ACIEH		

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Introduction

Retrospective planning permission is being sought for the development of a detached dwelling at 20 Bismarck Street, Worsbrough Common, Barnsley, S70 4NA. The assessment is intended to be included as a retrospective supporting document for a planning application to Barnsley Metropolitan Borough Council.

A Coal Mining Risk Assessment is required for the proposals, in order to competently address the mining legacy for the site and determine what impact this may have had upon the land. The assessment is intended to be included as a supporting document to a future planning application to the local authority.

Site Location and Description

The site is located off Bismarck Street in Worsbrough Common, approximately 1.5 km south east of Barnsley town centre. The grid reference for the site is SE 347 053.

The site currently comprises paddock land.

The site location is shown below.

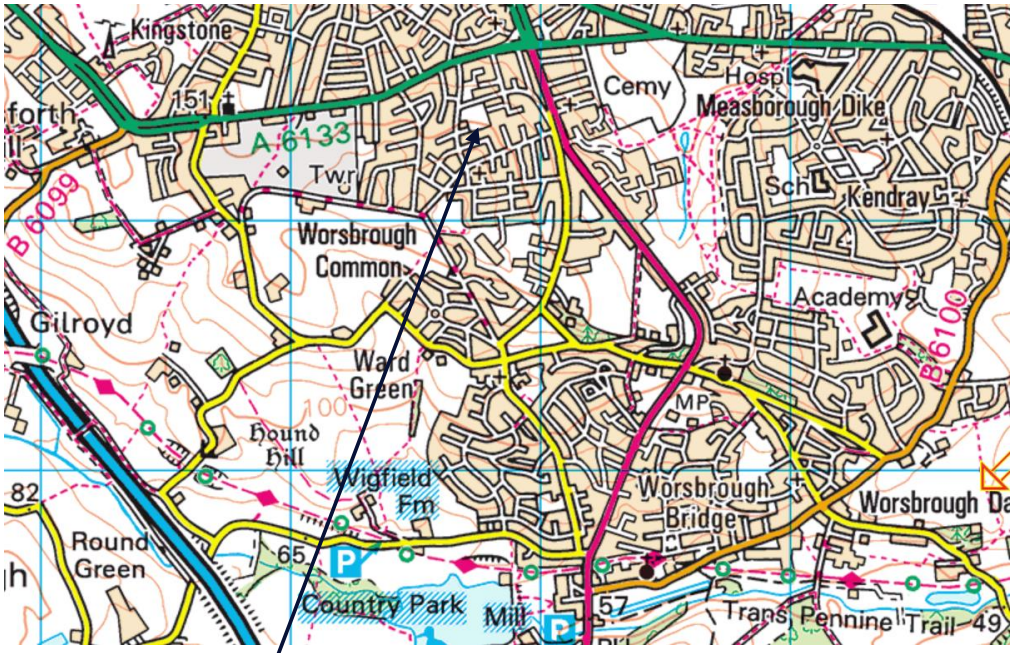


Figure 1

Scope of the Coal Mining Risk Assessment

This coal mining risk assessment is compiled in accordance with the guidance given in the Coal Authority publication *Risk Based Approach to Development Management Guidance for Developers Version 4 2017 (updated 2021)*.

This publication sets out the scope for a CMRA as follows:

- Present a desk-based review of all available information on coal mining issues which are relevant to the application site;
- Use that information to identify and assess the risks to the proposed development from coal mining legacy, including cumulative impact of issues;
- Set out appropriate mitigation measures to address coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development; and
- Demonstrate to the Local Planning Authority that the application site is, or can be made safe and stable to meet requirements of national planning policy with regard to development on unstable land.

Sources of Information

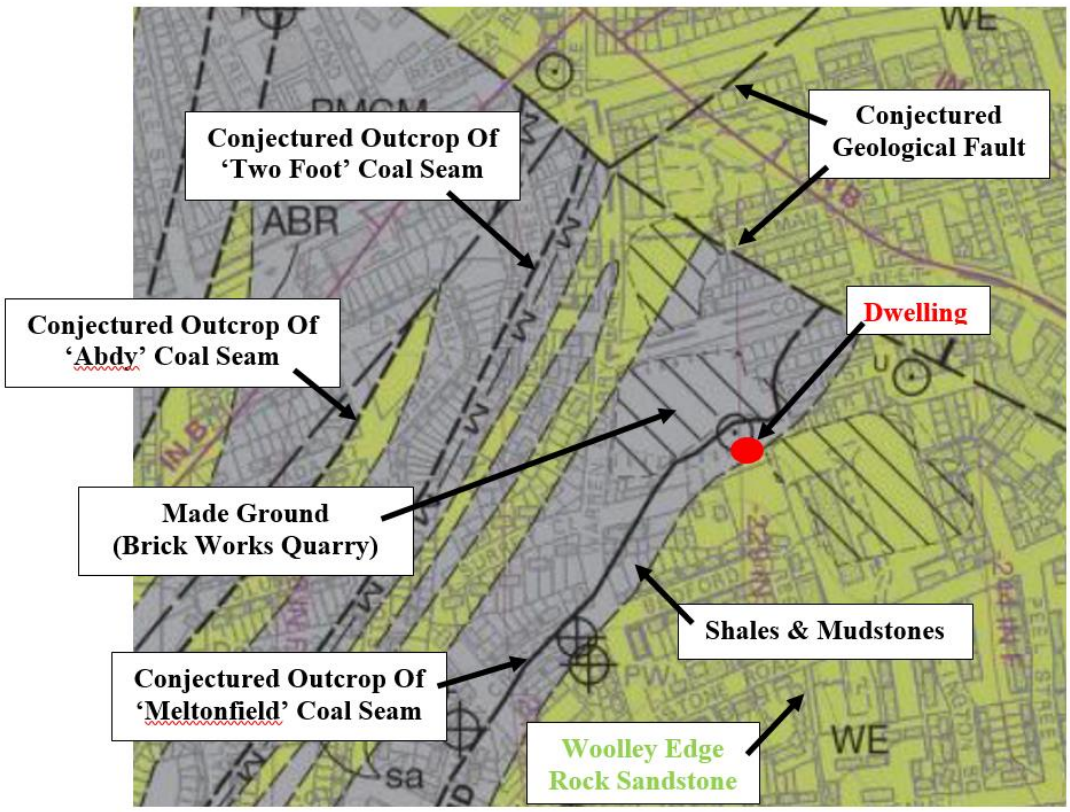
In compiling the CMRA information has been obtain from various sources, including the British Geological Survey (BGS):

- British Geological Survey Map Sheet SE 30 NW 2005 Edition
- British Geological Survey – Geology Of Britain Viewer
- Coal Authority Interactive Viewer and Mine Abandonment Plans
- Historical Mapping – old-maps.co.uk

Published Geology

Surface Geology (inc. any superficial deposits)

Records indicate the site to be located on shales, mudstones and possibly the base of the 'Woolley Edge Rock Sandstone' of the Middle Coal Measure series from the Carboniferous formation (although note the potential for made ground as detailed below). No superficial deposits are indicated in the vicinity of the site itself. Strata is shown to dip towards the SE (south-east) at around 7° (1 in 8) in this vicinity. A summary of the surface geology is illustrated on the image below which is an extract from the BGS SE30NW 2005 Edition:



Fault Planes or Fissures

A geological fault is conjectured to pass clear of the site by over 100m away to the north-east as indicated above, which throws the strata down to the north-east. No fissuring of bedrock is known in the vicinity however a slight risk will exist for such within the Woolley Edge Rock, if present.

Coal Seam Outcrops

As outlined above, the 'Meltonfield' coal seam, of around 0.9m workable thickness in these parts, is conjectured to outcrop just to the north as shown. Given the information it is likely to be the case that the outcrop follows the base of the old brickworks quarry detailed below, or they were within the associated high-wall. This would make for the seam being at shallow depth beneath the dwelling (within 5m or so) rather than at the surface; unless historically removed via the quarrying.

The Two Foot seam, of around 0.8m workable thickness, is shown to outcrop some 170m away to the north-west as indicated. This coal is known locally to lie beneath the Meltonfield seam by around 15m or so.

The Abdy (or 'Winter') coal seam, of around 0.9m thickness) will lie beneath the Two Foot seam by a further 15m or so.

Made Ground

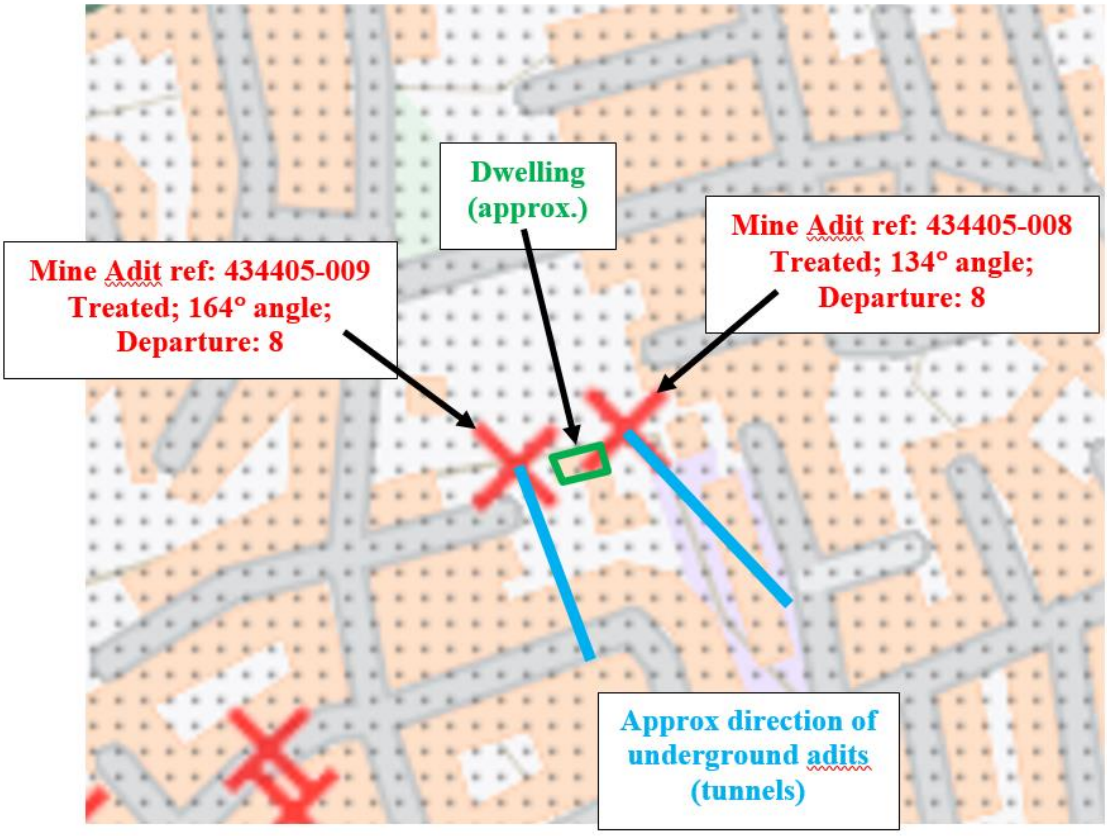
An area of made ground is indicated just to the north of the dwelling which appears to be related to an old 'brick works' quarry according to old historic mapping. Given the historic nature of these operations it is likely that associated made ground may extend to beneath the site of the dwelling.

Opencast Coal Workings.
No opencast coal operations are known within 250m of the site; however, the historic 'brick works' are likely to have removed the coal to some extent.

Underground Coal Workings - Deep
Deep coal mining (over 50m deep) has taken place beneath the site in various coal seams, all settlement from which will be long complete. As no coalfields now exist, the site should remain stable from the deep coal mining perspective for the foreseeable future.

Underground Coal Workings - Shallow
According to Coal Authority details the site lies in an area of 'past shallow coal workings' which appears to relate to the 'Two Foot' coal seam; although given the geological position it should be considered that the workings may indeed relate to the 'Meltonfield' seam that is likely to have been encountered in the base/wall of the historic brick works quarry. The location of the mine adits, as detailed below, supports this possible scenario.

Mine Entries
Two old mine adits (tunnel entrances) are shown to be present within 20m of the dwelling as indicated on the following image which forms an extract of the Coal Authorities interactive viewer information.



As can be seen, the mine adits are known to be treated and have an '8m departure' - which is a contingency factor for the features being out of the recorded plan position by. From the available information it is likely that these features are clear of being beneath the dwelling or indeed clear of travelling beneath it. It is also possible that

the historic quarrying activity has totally removed the features to beneath land further southwards.

Fugitive Gases
As far as we are aware, no evidence of coal mining related fugitive gas emissions are known within 250m of the site. However, there will be some associated risk in relation to the made ground and shallow coal/coal workings.

Coal Mining Risk Assessment
(based on the above).

Coal Seam / Coal Mining Issue	Risk Assessment (VeryHigh/High/Moderate/Low/VeryLow)
Underground coal mining (at shallow depths)	**High**
Mine entries (shafts and adits)	**High**
Geological faulting	**Low**
Geological fissures	**Low**
Fugitive gas emissions	**Moderate**
Surface mining (opencast workings)	**High**
Aggressive ground	**Moderate**
Coal exposed / near foundation level	**Low**

Coal Authority
Prior written permission from The Coal Authority is required for intrusive activities which will disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits). Further information on The Coal Authority's permissions process can be found at:
www.coal.gov.uk/services/permissions/index.cfm

CONCLUSIONS

1) The site can be regarded as stable from both the **Deep & Shallow Coal Mining** perspective, and as no coal fields now remain this position should continue for the foreseeable future.

2) Given the shallow coal mining position and location of the two known mine adits, it would seem a balanced approach to undertake 3 rotary boreholes to 30m deep on/just outside of the southern corners of the building and north-eastern corner in the first instance. Water flush methods should be utilised to reduce gas and spontaneous combustion risks and a permit from the Coal Authority should first be obtained prior to an investigation of their interests. The boreholes should determine the depth of any made ground associated with the adjacent historic quarry and whether any coal seam/workings are beneath the property at a critical depth from a stability aspect. It is felt unlikely in this instance that there will be any 'interaction' between the different coal seams from a void migration aspect. As such, boreholes could be terminated within the firm ground beneath the first coal seam/workings encountered. If no coal seams or associated workings are noted (beneath any made ground for instance) then holes should be

extended to 30m deep to confirm the position. It should be noted that further holes may be necessary should it be difficult to ultimately prove the geological/mining position.

3) Given the made ground and shallow coal/coal workings, all usual safety precautions should be employed regarding the potential for associated fugitive gases in any deep excavation/foundation work taking place. Considerations may also be required from a differential settlement aspect should the dwelling be located over the high-wall of the historic quarry.

4) Although a low risk, a watching brief should be employed during any future grounds works for any signs of the mine adits or other unrecorded mine entries. If suspected the Coal Authority (as owners) should be notified immediately for appropriate deliberations.

Notes: should there be any uncertainty of actual conditions during future ground works, G&M Consulting or indeed the Coal Authority themselves can be further consulted for on site assessment if necessary. This assessment is base upon the current proposals – further assessments would be required should it change. This assessment does not consider other geo-environmental aspects such as contamination.

A suitably qualified and competent professional should be employed to use this report to determine the conditions on site, and ultimately advise on what action, if any, is necessary to safeguard the development. It should be noted that any future works to investigate any coal seam, mines of coal or associated mine entries will need the prior consent of the Coal Authority via their permitting procedure.

ATTACHMENT B – CA DRILLING PERMIT

The Coal Authority

Permit to Enter or Disturb Coal Authority Interests

Permit 28009

Name and Address of Permit Holder:

Michael Miller
20 Bismarck Street
Worsbrough Common
Barnsley
S70 4NA

Site Location:

20 Bismarck Street
Worsbrough Common
Barnsley
S70 4NA

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Ground investigation by three boreholes to 30m depth or as required to confirm ground conditions and to assist foundation design all within the Authority's interests at the identified site location above as shown on the Grant Permit Boundary (overleaf) for the period of **12 months** from the granted date shown below. *The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Permit Holder's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.*

Conditions:

- *Manned entry (i.e.) into mine entries/workings) is strictly prohibited.*
- *Water flush drilling only*
- *Gas Monitoring for CO, CH_4, CO_2, O_2, and H_2S at borehole and rig*
- *Operators undertaking the work must be in possession of this certificate and the Permit boundary plan at the time of works*
- *Appropriate borehole sealing without delay and to withstand site level changes*

Signed: Leigh Sharpe Granted Date: ***11th March 2024***

For and on behalf of The Coal Authority

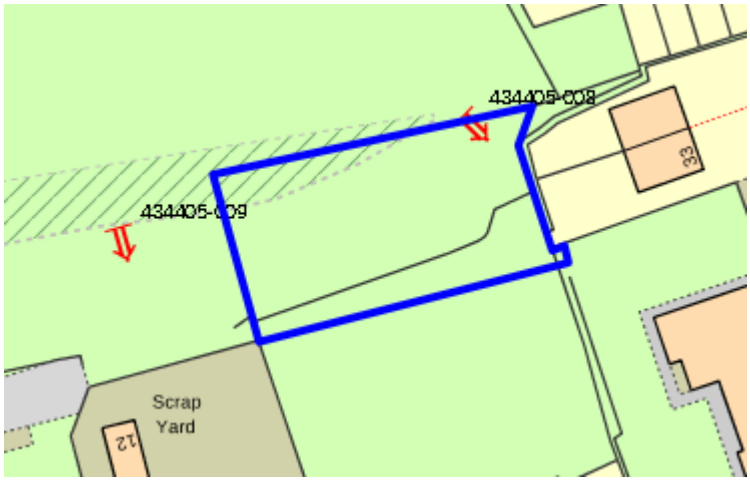
Nominated Representative: Leigh Sharpe, Permitting Manager;
The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG
Tel: 01623 637450; E-Mail: permissions@coal.gov.uk

The Coal Authority

Granted Permit Boundary

Permit Ref: 28009

Permit Boundary:



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ATTACHMENT C – BOREHOLE RECORDS

Client: G&M Consulting Client Order No:Vbl Graeme Sheet No …1…… of …1…….	Site: Bismark Street, Barnsley Date: 27/03/24 METHOD Open hole, Water flush	Cape Site Services Ltd Unit 2, Rear of Castle Buildings. Carlton Road. Carlton. Barnsley, S.Yorks. S71 3HX Tel. 01226 725050

BH no	FROM	TO	THICKNESS	DESCRIPTION
1	0.0	8.0	8.0	Made Ground
	8.0	10.2	2.2	Mudstone Grey
	10.2	23.0	12.8	Mudstone Grey with sandstone bands
	23.0	23.6	0.6	Coal
	23.6	25.0	1.3	Mudstone Grey
				Gas monitoring negative
				Borehole backfilled on completion
2	0.0	12.0	12.0	Made Ground
	12.0	17.8	5.8	Mudstone Grey
	17.8	21.5	12.8	Mudstone dark grey/black
	21.5	22.1	0.6	Coal
	22.1	23.0	1.4	Mudstone grey
				Gas monitoring negative
				Borehole backfilled on completion

Drilling Engineer Simon fish	Assistant Driller Richard Hawkins
Drilling Engineer's Signature	Clients Signature