

Date: 24th April 2024
Your ref: (S71 1AR).
My Ref: CMRA 00353

FOR THE ATTENTION OF: Beecroft & Price Properties & Ecogise Properties Ltd.

Dear Sirs,

**COAL MINING RISK ASSESSMENT (CMRA) - FOR PROPOSED RESIDENTIAL
DEVELOPMENT AT LAND TO THE REAR OF 32 QUEENS ROAD, BARNSELY S71 1AR**

Introduction

Planning permission is being sought to develop two separate residential blocks (3 dwellings per block) at the above named site, the location of which can be seen on the attached plan No. 00353/A in Appendix 1. The site is centred around national grid reference 434900E / 406475N. 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 Barnsley MBC.

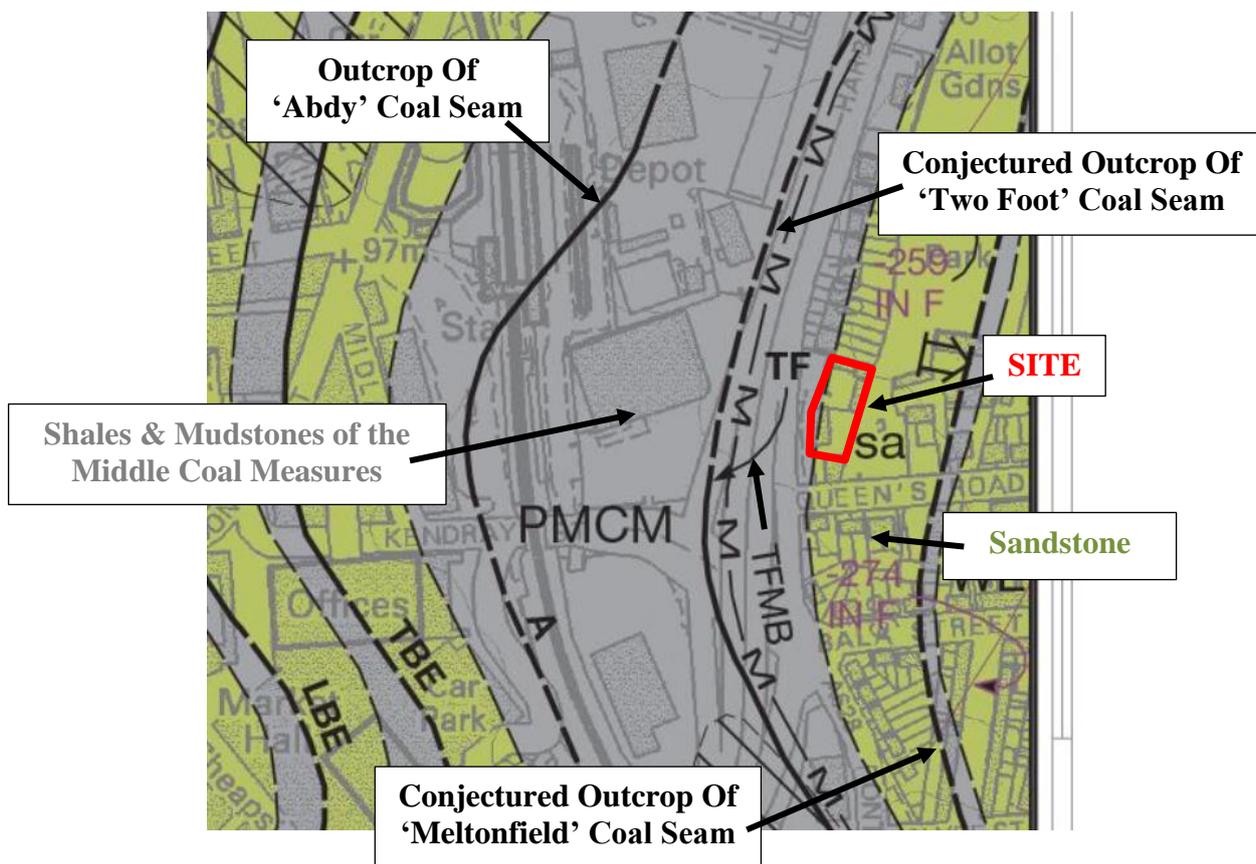
Scope of the Coal Mining Risk Assessment

The purpose of this Coal Mining Risk Assessment Report is to:

- Present a desk-based review of all available information on the 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 the cumulative impact of issues;
- Set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any further works that may be necessary; and
- Demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of national planning policy with regard to development on unstable land.

Surface Geology (inc. any superficial deposits)

Records indicate the site to be located on sandstones, shales and mudstones of the Middle Coal Measure series from the Carboniferous formation. No superficial deposits are indicated in the vicinity of the site itself. Strata is shown to dip towards the east at around 5° (1 in 10) in this vicinity. A summary of the surface geology is illustrated on the image below which is an extract from the BGS Onshore Interactive Viewer:



Fault Planes or Fissures

No geological faulting is known or conjectured in the vicinity of the site and although no fissuring of bedrock is known, the likelihood of natural sandstone fissures that could have been opened out by the past deep coal mining in the area should not be precluded.

Coal Seam Outcrops

As outlined above, the 'Meltonfield' coal seam, of around 0.9m thickness, is conjectured to outcrop some 50m away to the east, which dipping away from the site in the same direction should not be present beneath the site.

The 'Two Foot' coal seam, of around 0.8m thickness, has been proved to outcrop some 45m away to the west. This seam would therefore dip beneath the site at an estimated depth of around 5m deep.

The 'Abdy' coal seam (also known as the 'Winter' seam), of around 1m extraction thickness, is conjectured to outcrop further to the west as indicated. Local information (namely the shaft section detail from the former 'Mount Osbourne Colliery' some 280m away to the south-east) suggests that this seam lies at around 15m below the Two Foot seam; as such it would be estimated at around 20m deep beneath the site.

Made Ground

No made ground is shown in the vicinity of the site.

Opencast Coal Workings.

No opencast coal operations are known within 250m of the site. A slight potential will exist for very historic small scale 'digging out' of shallow coal, given the conjectured geological position. An element of backfill may be an indication of such, if encountered during future ground works.

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 'probable shallow workings' on the southern side of the geological fault line. This will relate to the 'Two Foot' coal seam and possibly the 'Abdy' coal seam, which infers that although no known workings of these seams are recorded, the likelihood of unrecorded, possibly illicit, workings should not be precluded. At anticipated depths, any such old mining voids, if present, may compromise the stability of the development. However, it is likely to be the case that the Abdy seam is at a depth that would not affect surface stability be it worked or otherwise.

Mine Entries

No known mine entries are indicated within 50m of the site. Some potential will exist however for mine entries being encountered of which there are no records considering the shallow workable coal seams.

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 risk for associated gases in relation to the shallow workable coal. These risks will be greater should any shallow workings be proved and far greater should any unrecorded mine entries be discovered within the site.

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) | Moderate to Low |
| Mine entries (shafts and adits) | Low to Moderate |
| Geological faulting | Low |
| Geological fissures | Low to Moderate |
| Fugitive gas emissions | Low to Moderate |
| Surface mining (opencast workings) | Low |
| Aggressive ground | Moderate |
| Coal exposed / near foundation level | Moderate to High |

Defined Risk Assessment

(Where 'Underground Coal Mining' above = Very High to Moderate)

| | |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Extent of known underground mining in this/these shallow coal seam/s in the wider vicinity | (Extensive / Much / Occasional / None Known) Occasional to Much |
| Intrusive Site Investigation of Coal Seam / Mines of Coal (given nature of proposals). | (Required / Recommended / Unnecessary)** Required |
| Advised critical depth beneath rock-head /foundation level to investigate considering geology and nature of the shallow coal/s* | 20m |

Key:

** The critical depth is calculated according to Ciria C758D guidance which details that for the land to be regarded as stable from any voided mineworkings, then a suitable section of competent rock cover above the workings should be proved that is equal or greater than ten times the 'in-tact' coal seam thickness. The advised critical depth to investigate to in this report takes into account the available geological information, any nearby mining records and may include a contingency for the seam to be of a slightly greater thickness than anticipated. Due care and diligence should be employed on-site to ensure that sound information is gathered of the in-tact seam thickness, particularly if concluding that old workings are outside the critical depth of affecting stability for the proposed development.*

*** Where :*

| | |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Required</i> | <i>Intrusive Site Investigation required of the shallow coal/s and/or mine entries to determine any necessary stabilisation works for the given development.</i> |
| <i>Recommended</i> | <i>Intrusive Site investigation recommended – given a lower level of risk in relation to the nature of proposed development some proposals may reduce the risk to an acceptable level via suitable design considerations.</i> |
| <i>Unnecessary</i> | <i>Intrusive Site Investigation deemed unnecessary – given geological/mining information.</i> |

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

Information sources:

- *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*

CONCLUSIONS

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

- 1) Given the **Shallow Coal Mining** position a limited borehole site investigation would be required to determine the depth and nature of the anticipated Two Foot and Abdy coal seams which may be at shallow depth. Given the nature/scaler of current proposals, 6 water-flush rotary boreholes (3 per residential block to minimise the likelihood of drilling through coal pillars) to maximum depths of 20m beneath rock-head would ultimately prove the presence or otherwise of the coal seams, along with any associated workings of which there are no records. It may be the case that only two holes would be required to full depth on the western side of the footprints (to ultimately prove that the Abdy seam is too deep to be of effect) with the remaining holes taken to the base of the Two Foot seam. Any voids encountered may require further design/ground work considerations for safe development (**note informatives 1 & 2 in appendix 2**). It should also be noted that a permit from the Coal Authority would be required to facilitate such an investigation.

- 2) Any coal exposed at the surface beneath surface soils/clays will require appropriate considerations for removal and blinding off to help prevent chemical attack on foundations and reduce the risk of spontaneous combustion risks.

- 3) In terms of the fugitive mine gas risks from the potential shallow coal, the only way to prove whether protection measures are or aren't required would be for a period of gas monitoring via boreholes and stand pipes, usually undertaken over a period of 3 to 6 months (**note informative 3 in appendix 2**). Without this investigation it may be a more pragmatic solution to include gas protection measures (such as a methane membrane and/or positive ventilation layers) within future foundation designs in any case, which could be addressed with radon protection if that is also required. All usual safety precautions should be employed regarding possible fugitive gases in any deep excavation work taking place.

- 4) A watching brief should be employed during future grounds works for any signs of unrecorded mine entries. A site scrape to natural ground is the most effective procedure to check for such features; circular areas of grey fill within bedrock would be an indication. If suspected the Coal Authority (as owners) should be notified immediately for appropriate deliberations.

- 5) A similar watching brief should be employed during future grounds works for any signs of any made ground (that may be associated with small scale 'digging' out of shallow coal), or any opened out fissures in sandstone bedrock. Appropriate foundation design considerations may be required.

Note: should there be any uncertainty of actual conditions during future ground works Lyons CMC or indeed the Coal Authority themselves can be further consulted for on site assessment if necessary.

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.

I trust that this satisfies your requirements, however please do not hesitate to contact myself at any time for further clarification or advice.

Yours Sincerely,

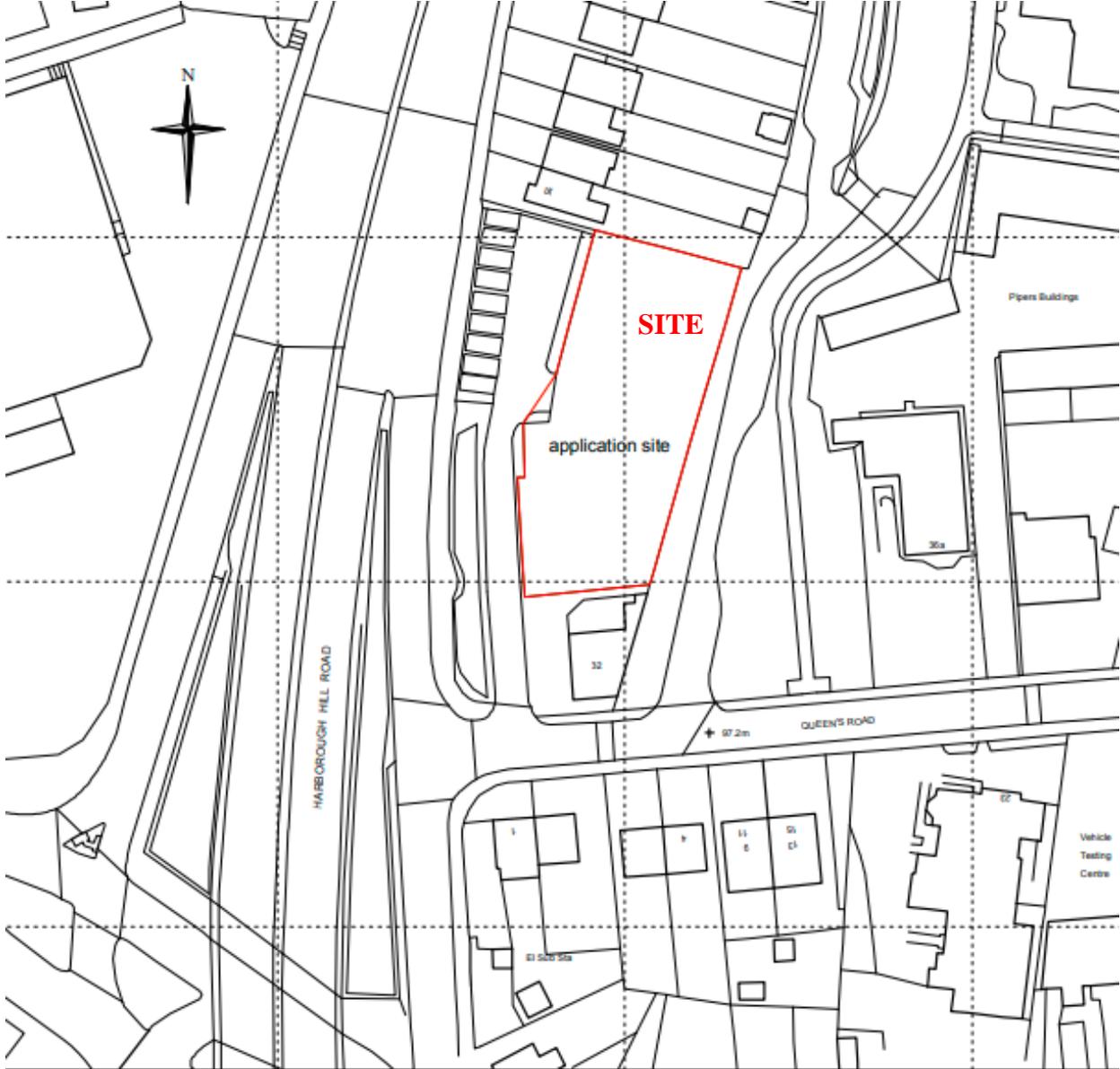
M Lyons

M. Lyons
Consultant Mining Engineer
BSc CSci MIMMM

Enc.

THIS COAL MINING RISK ASSESSMENT IS BASED ON AND LIMITED TO THE INFORMATION IN MY RECORD AT THE TIME THE ENQUIRY IS ANSWERED. It is based on my professional opinion in line with the guidelines set out in CIRIA C758D "Abandoned mine workings manual." The opinion may be overruled by Government Authorities decisions based on other information not in my record. If a site investigation is recommended then this risk assessment will be superseded by the factual findings of that investigation. All site investigation work should be carried out by a competent professional from which independent conclusions and recommendations for safe development should be provided. It should be noted that: no operation should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. The investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases; these risks both under and adjacent the site should be fully considered in any proposals both for personnel and public safety. Copyright in this CMRA belongs to M.A.Lyons. All rights are reserved and unauthorised use is prohibited. Copyright is not transferred to external parties by possession of this report, however, those for whom the report is compiled have the right to use it. If any unauthorised third party comes into possession of this report, they rely upon it entirely at their own risk and the author does not owe them any Duty of Care or Skill.

Appendix 1 – Location Plan No. 00353/A
(Not To Scale)
Site centred at O.S. 434900E / 406475N



Appendix 2 - Informatives

- 1) The relatively recently revised CIRIA document titled 'Abandoned Mine Workings Manual', which replaced Special Publication 32 (1984), indicates that the use of empirical or 'rule of thumb' guides, as the design basis for treatment depth, has been successfully observed for many years for a wide range of abandoned mine workings and overlying rock/soil strata scenarios. As such, the guidance indicates that further design/ground stabilisation considerations will be required if there is less than 10 times the aggregate measured height of mine workings as competent rock cover above the workings.
- 2) For information, should the grouting of any mine workings be required, a 10:1 PFA/cement mix or similar would need to be injected into the workings and any other disturbed strata above it under pressure on an OS coordinated treatment grid approved by the Coal Authority (and Building Control/third-party Warranty provider as required). Specific proposals to treat any mine workings would need to be submitted in the form of a standalone 'Specification', with a separate permit to treat being obtained from the Coal Authority. The method of consolidation is dependent on the nature of the bedrock strata and the underground mining conditions encountered, although fissile strata, such as shales and mudstone deposits, do permit mining voids to migrate upwards to quite high levels. All grouting works would need to be supervised by a competent engineer, with a final validation report being produced to confirm what works were undertaken and whether they were successful or not.
- 3) Ground gas monitoring can be undertaken to confirm or discount the presence of an elevated gassing regime within the underlying soils. Elevated concentrations of mine gases (e.g. CO₂, CH₄) may be present within the coal seams, voids in or above any shallow mine workings, areas of made ground, and in any permeable bedrock strata (and any organic rich surficial soils). The period of monitoring to be undertaken should be broadly completed in accordance with current guidance [BS8485]. Piezometers would need to be installed (during drilling works for example) to facilitate this.