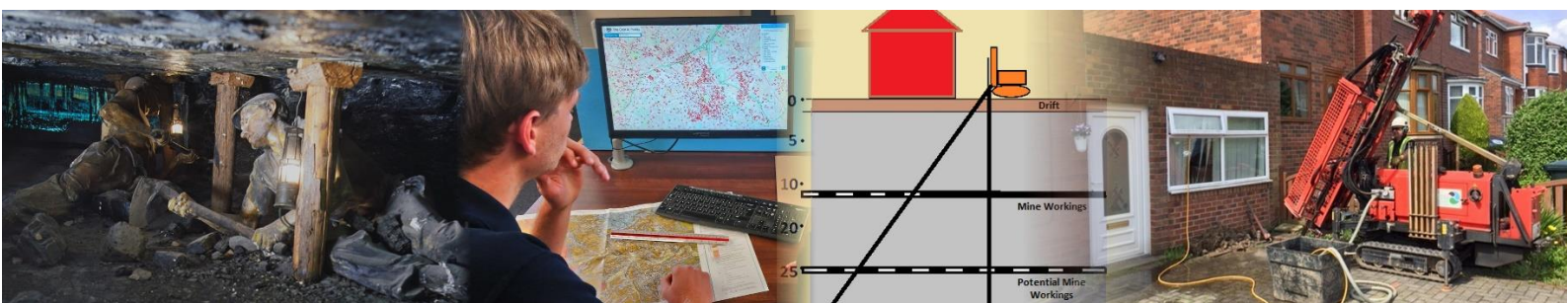




GEOLOGICAL
GEOTECHNICAL
GEOENVIRONMENTAL
CONSULTANCY
DRILLING & DATA ACQUISITION



GEOINVESTIGATE LIMITED

Coal Mining Risk Assessment (CMRA)

LOCATION	Beever Lane, Barnsley S75 2RP
ISSUE DATE	August 2022
FOR	Emma Ottewell
CLIENT REF.	
OUR REF.	G22328

Prepared by

A handwritten signature in black ink, appearing to read "Thomas Goldring".

Thomas Goldring MGeol (Hons) FGS
Geoenvironmental Engineer

Checked by

A handwritten signature in black ink, appearing to read "f. morgan".

Fay Morgan MGeol (Hons) FGS
Senior Geoenvironmental Engineer

SUMMARY FINDINGS

OUTCOME MITIGATION REQUIRED (YES/NO?)

YES. The proposed development is possibly underlain by up to 2 level of very shallow/shallow coal seams, with possible unrecorded underground mine workings, with the potential to significantly impact surface ground stability within the proposed building area.

The site is also surrounded by opencast workings, mine entries and a previous coal mining subsidence claim. All these features raises concern for the potential of unrecorded coal mine workings in the surrounding area and beneath the development.

Whether unrecorded workings will impact the development depends on drift/bedrock depth, mine working (if any) depth and rock cover thickness. Intrusive ground investigation is therefore required to establish these parameters within the site.

Notwithstanding, on the basis of the CMRA work to date, we are of the opinion that the mining stability and mine gas risks posed by the strata beneath this site from coal mining legacy can be mitigated by routinely adopted measures and should not preclude planning permission being registered in the interim with regard to coal mining legacy issues conditional upon the work being carried out at a later date.

WHAT TO DO NEXT

Obtain quotes for the intrusive site investigation works (if considered appropriate). The cost of the SI works should be a **"lump sum" fixed price**. Geoinvestigate can provide advice and assistance with helping you find suitable site investigation & drilling contractors. Call us on 01642 713779 or email enquiries@geoinvestigate.co.uk.

1. CMRA INTRODUCTION

Site Location and Description:

The approximate centre of this site is at National Grid Reference 432452 E, 407389 N with an elevation of 115mOD. The site is generally flat. The boundary shown in RED on the Coal Authority (CA) report provided in Appendix A corresponds with the planning application area.

Google Satellite imagery and Google Street Viewer shows the site is currently occupied by overgrown vegetation, with wooden fencing around the boundaries. The site is located to the southeast of the Beever Lane to Rebrook Road junction. The surrounding area is residential estate.

Proposed Development:

it is proposed to build a detached dwelling within the plot. No development plans have been provided. A site boundary plan is provided in Appendix B.

Historical Development:

The OS map record from 1855 shows the site is occupied by general vegetation. The map notes an old quarry (sandstone) and gravel pit are present to the northeast and northwest, respectively. A hemisphere shaped feature is present to the northwest of the site, the nature of this unknown.

The 1893 OS map notes the unknown feature as an old quarry.

The remaining OS maps do not show any change to the site.

The OS map record provides no evidence that the site itself has been subject to sand, clay or gravel pitting, stone quarrying, or surface mining activity, however, the Coal Authority (CA) report shows records of unlicensed open cast sites to the east and the south of the site, with one unlicensed opencast adjacent to the site's western boundary. Furthermore, as noted above, surface workings have been recorded in the surrounding area.

Anticipated Geology:

The British Geological Survey (BGS) 1:50,000 scale map for the area (Sheet 155, Coalville) indicates that little to no drift deposits will be present at the site with bedrock of the Barnsley Rock (Sandstone) occurring at shallow depth. The

Barnsley Rock is a recognised bed within the Pennine Middle Coal Measures comprising mudstone, siltstone, sandstone, and interbedded coal seam of varying thickness commencing from shallow depth. Although no drift is recorded on site, it is likely that thin topsoil/drift is present.

The location of the site is shown on the extract of BGS solid geology map presented in Appendix C. The tentative elevation of the site relative to the vertical geology column is shown below the map. The drift/soil horizon above the solid geology bedrock is not shown on the column.

Nearby BGS boreholes (Ref: SE30NW153, 154, 161 and 155) records generally shows up to 3.66m of made ground comprising of fill, ash, and rubble.

Risk Methodology Applied: This document and the risk assessment methodology adopted herein is based on CA publication RISK BASED APPROACH TO DEVELOPMENT MANAGEMENT - GUIDANCE FOR DEVELOPERS Version 3, 2014 and Version 4 - 2017. The template contained therein is adopted with minor amendments made by Geoinvestigate Limited.

2. ASSESSMENT OF SITE-SPECIFIC COAL MINING ISSUES

The table below summarises the potential risks associated with coal mining legacy for the proposed development site, identified from list sources of information.

Coal Mining Issues	Yes	No	Risk Assessment/Remarks
Past underground coal mining	Yes		2.1.1
Probable unrecorded shallow workings	Yes		2.1.2
Spine roadways at shallow depth		No	
Mine entries	Yes		2.1.3
Outcrop		No	2.1.4
Geological faults, fissures and breaklines		No	2.1.5
Opencast Mines	Yes		2.1.6
Coal Mining Subsidence		No	
Mine Gas		No	2.1.7
Site investigations		No	
Coal Mining Subsidence Claim	Yes		2.1.8

Note: For those coal mining issues above identified as "Yes" or highlighted "YELLOW" a more detailed discussion and assessment are made of the risks to the application site and the proposed development.

2.1 DETAILED DISCUSSION & ASSESSMENT RESPONSE

2.1.1 Past Underground Mining

According to the Coal Authority (CA) report in Appendix A, five levels of past underground coal mining has occurred beneath the site at depth. The Top Haigh Moor coal seam was mined at a depth of 72m, dipping 4.2 degrees North-East, with an extraction thickness of 114cm. The other four seams have been mined at depths greater than 100m. Although the five seams have been mined directly below the site, they are unlikely to impact the proposed development due to their depth.

However, according to the CA Interactive map the site does fall in an area identified as a 'Probable Unrecorded Shallow Workings'. Although no recorded workings have been identified, it is plausible that unrecorded workings may be present beneath the site which could significantly impact the proposed development.

2.1.2 Probable Unrecorded Shallow Workings

According to the CA report the site falls within a zone of probable unrecorded shallow workings. The CA define Probable Unrecorded Shallow Workings as "Areas where the Coal Authority believes there to be unrecorded coal working that exist at or close to the surface" (i.e., less than 30m).

The vertical geological column shows that the site is underlain by the Barnsley Coal seam. This seam is shown to be located approximately 15m below the surface and the BGS record this seam to be up to 3.90m thick. If workings are present within this seam, then they could impact the site's ground stability and in turn the stability of the proposed development.

2.1.3 Mine Entries

The CA report identifies six mine adits, 432407-033, -034, -035, -036, -057 and -064 and one mine shaft, 432407-056 in the surrounding area of the site. All these features lie outside of 30m of the site. Additionally, the mine adits tunnel directions do not intercept with the development area.

It is our opinion; these mine entries do not impact ground stability of the site. Their presence, however, does raise further concern about the presence of unrecorded shallow mine workings at this locality.

2.1.4 Outcrop

The BGS and the CA record no coal outcrops within the site boundary. The nearest coal outcrop of the Barnsley Coal to the west of the site is projected to occur within very shallow (<10m depth) to shallow (<30m depth) beneath the proposed development. The CA note this seam as workable.

2.1.5 Geological Faults, Fissures and Breaklines

The CA and the BGS do not record any faults running through or within more than 100m of the site.

2.1.6 Opencast Mines

The CA report records a number of opencast mines in the surrounding area of the site, the closest being 100m to the southwest. These are thought to be at great enough distance to not be a risk to the ground stability or act as a hazardous gas source to the site. However, the presence of surface ground workings raises concern for the possible presence of shallow unrecorded mine workings beneath the site.

Nearby BGS boreholes show infilled ground to 3.66m. This area coincides with the old quarry's mapped by the OS maps. This shows that these ground workings were then infilled with "fill, ash and rubble". Considering the proximity of the opencast and quarries to the site, these may act as a source of hazardous gas and contamination to the site.

2.1.7 Mine Gas

No mine gas incident or remediation is recorded within 500m of the proposed development and typically, in the UK mine gas is Low risk. Notwithstanding, given the possible presence of shallow mine working beneath the proposed development area together with a gas pathway provided by a very shallow mine adit and the serious nature of mine gas it is recommended that the risk is raised to **MODERATE** to perhaps High until indicated otherwise by gas testing during drilling.

However, given the very close proximity of the infilled ground workings to the development and the possible presence also of very shallow mine working longer term gas monitoring may be required to establish if hazardous mine gas exists below this property.

Gas monitoring during the drilling investigation will give a further indication of the mine gas risk at the site.

Alternatively, if longer term monitoring is to be avoided the installation of precautionary gas protection measures may be considered in the design of the new buildings and even if the results are favourable a minimum level of gas protection in line with perhaps "CS2" based upon the CIRIA 365 report, may be considered prudent.

2.1.8 Coal Mining Subsidence claim

The CA report states that "There are 2 Claim(s) within 50 metres of the property boundary that do not match the property address.". The location of said claims are shown on the CA summary of findings map.

Regrettably, Geoinvestigate was unable to locate any further information on these claims. Therefore, no comparison could be made to the current development.

The presence of coal mining subsidence claims nearby to the site, raises further concern for the presence of unrecorded shallow coal mining beneath the surrounding area and possibly the site.

3. SUMMARY AND OUTCOME

This CMRA has identified the possible presence of up to two coal seams with possible unrecorded/recorded mine working within very shallow and shallow depth beneath the new building. Furthermore, the presence of opencast workings, mine adits and coal mining subsidence claims nearby to the site, raises further concern for unrecorded workings.

In our opinion, whether shallow mine working poses a significant risk to the development cannot be properly assessed without additional information namely drift depth, coal seam depth and mine working (if any) depth and rock cover thickness at this locality. In our opinion exploratory drilling is required to obtain this information and enable further assessment of the risks posed by shallow mine working at this locality.

In our opinion shallower geotechnical/geo-environmental investigation is also likely to be required to establish the depth, nature and contamination and landfill/mine gas potential of the made/infill ground present from the surrounding opencast/surface ground workings.

Gas monitoring must be carried out during drilling.

4. MITIGATION STRATEGY PROPOSED AND CONCLUSION

To properly determine the coal mining risk at this site it is proposed to drill 2 boreholes at the property to target depths up to 30m (but not necessarily needed to 30m depending on ground conditions encountered) to locate shallow coal seams and mine working (if any) below the new development as well as establishing drift and bedrock depth.

In our opinion shallower geotechnical/geo-environmental investigation is also likely to be required to establish the depth, nature and contamination and landfill/mine gas potential of the made/infill ground present from the surrounding opencast/surface ground workings.

Gas monitoring **MUST** be carried out during drilling.

Risks for Different Drilling Scenarios					
Air flush	Mist flush	Foam flush	Water flush	Mud flush	Additional controls
HIGH	HIGH / MED'M	HIGH / MED'M	LOW	LOW	- Monitoring at rig and other open holes. - Seal boreholes

A Coal Authority Permit needs to be obtained (ahead of) further intrusive exploratory drilling. Water Drill Flush to be used when drilling. The permit application must state **WATER ONLY DRILL FLUSH** for the safety of the public and drill crew.

On the basis of the CMRA work to date, we are of the opinion that the mining stability and mine gas risks posed by the strata beneath this site from coal mining legacy can be mitigated by routinely adopted measures and should not preclude planning permission being registered with regard to coal mining legacy issues.

In conclusion we see no reason why Planning Permission should not be granted in the interim with respect to coal mining legacy issues and that these works form a condition on the planning approval.

Appendices:

- CA Consultants Coal Mining Report issued 29 July 2022 ref.51003256539001.
- Site Location Plans
- Extracts of BGS Geology Map, Sheet 87 – Barnsley at 1:50000 scale

APPENDIX A
COAL AUTHORITY REPORT



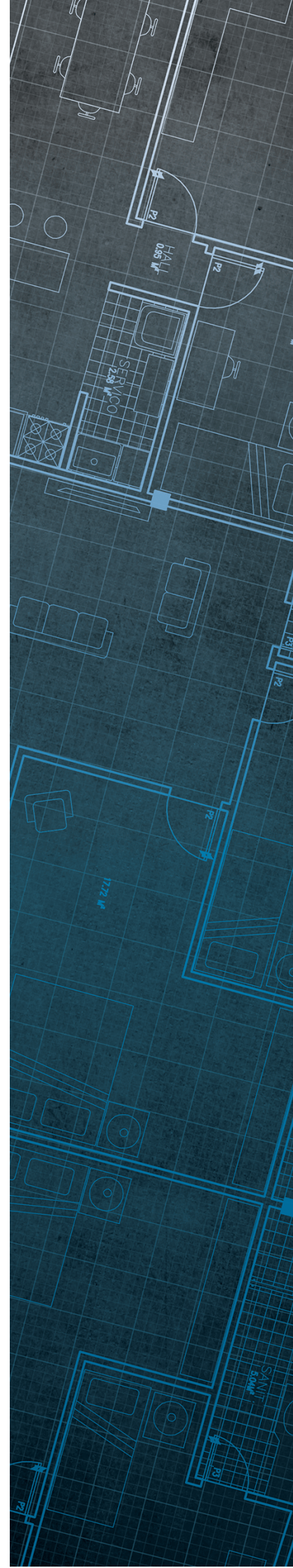
The Coal
Authority

Consultants Coal Mining Report

Land At
Beever Lane
Barsnley
West Yorkshire
S75 2RP

Date of enquiry:	29 July 2022
Date enquiry received:	29 July 2022
Issue date:	29 July 2022

Our reference:	51003256539001
Your reference:	G22338



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GEOINVESTIGATE

Enquiry address

Land At
Beever Lane
Barsnley
West Yorkshire
S75 2RP

How to contact us

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Mansfield
Nottinghamshire
NG18 4RG

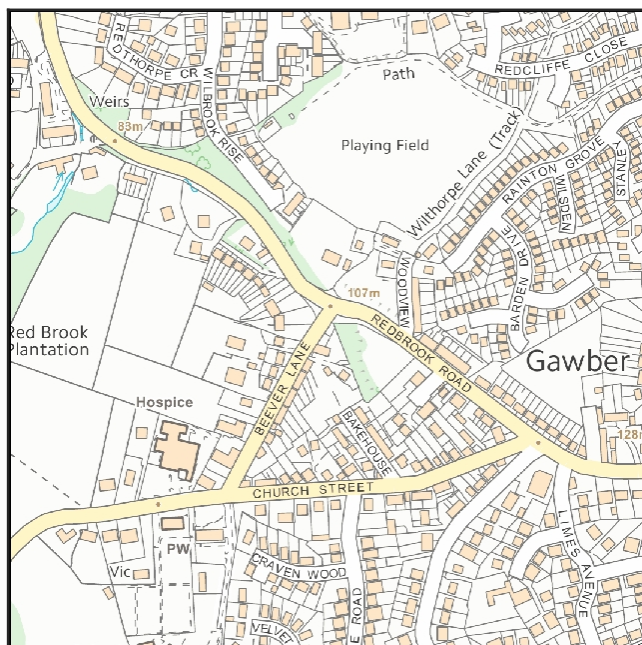
www.groundstability.com

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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
REDBROOK	TOP HAIGH MOOR	Coal	6Z6W	72	Beneath Property	4.2	North-East	114	1921
DODWORTH	FLOCKTON THICK	Coal	6Z6U	164	Beneath Property	4.1	North-East	76	1950
DODWORTH	TOP FENTON	Coal	6Z6S	200	Beneath Property	4.7	North-East	81	1931
DODWORTH	SILKSTONE	Coal	6Z70	302	Beneath Property	4.3	North-East	105	1974
WOOLLEY/REDBROOK	WHINMOOR	Coal	6Z72	352	Beneath Property	4.8	North-East	107	1976
WOOLLEY/REDBROOK	WHINMOOR	Coal	6Z75	355	South-East	4.7	North-East	110	1979
WOOLLEY/REDBROOK	WHINMOOR	Coal	Z89	357	North-East	7.5	North-East	117	1980
WOOLLEY/REDBROOK	WHINMOOR	Coal	6Z74	370	North-East	4.7	North-East	117	1979

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Adit	432407-033	432505 407463		Coal	
Adit	432407-034	432381 407438		Coal	
Adit	432407-035	432418 407343		Coal	
Adit	432407-036	432470 407346		Coal	
Shaft	432407-056	432429 407452		Coal	
Adit	432407-057	432404 407435		Coal	
Adit	432407-064	432377 407429		Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

7198	NE3	FGB6
7698	FGB148	NE584
NE919	BE17	2566

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

Please refer to the “Summary of findings” map (on separate sheet) for details of any opencast areas within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

There are 2 claim(s) within 50 metres of the property boundary that do not match the property address. These are shown on the enquiry boundary plot.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

If further subsidence damage claims information is required, please visit www.groundstability.com.

See Section 4 for further information.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is in an area where notices to withdraw support were given in 1976 and 1977.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Coal mining subsidence

The site is within an area of previous interest. It is close to where the Coal Authority or licensed mine operator has investigated and where necessary remediated issues relating to coal mining subsidence.

The site requires further investigation and may influence your risk assessment. We recommend that you order the appropriate **Coal Authority Subsidence Claims Report**, which will include more information about the hazard.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

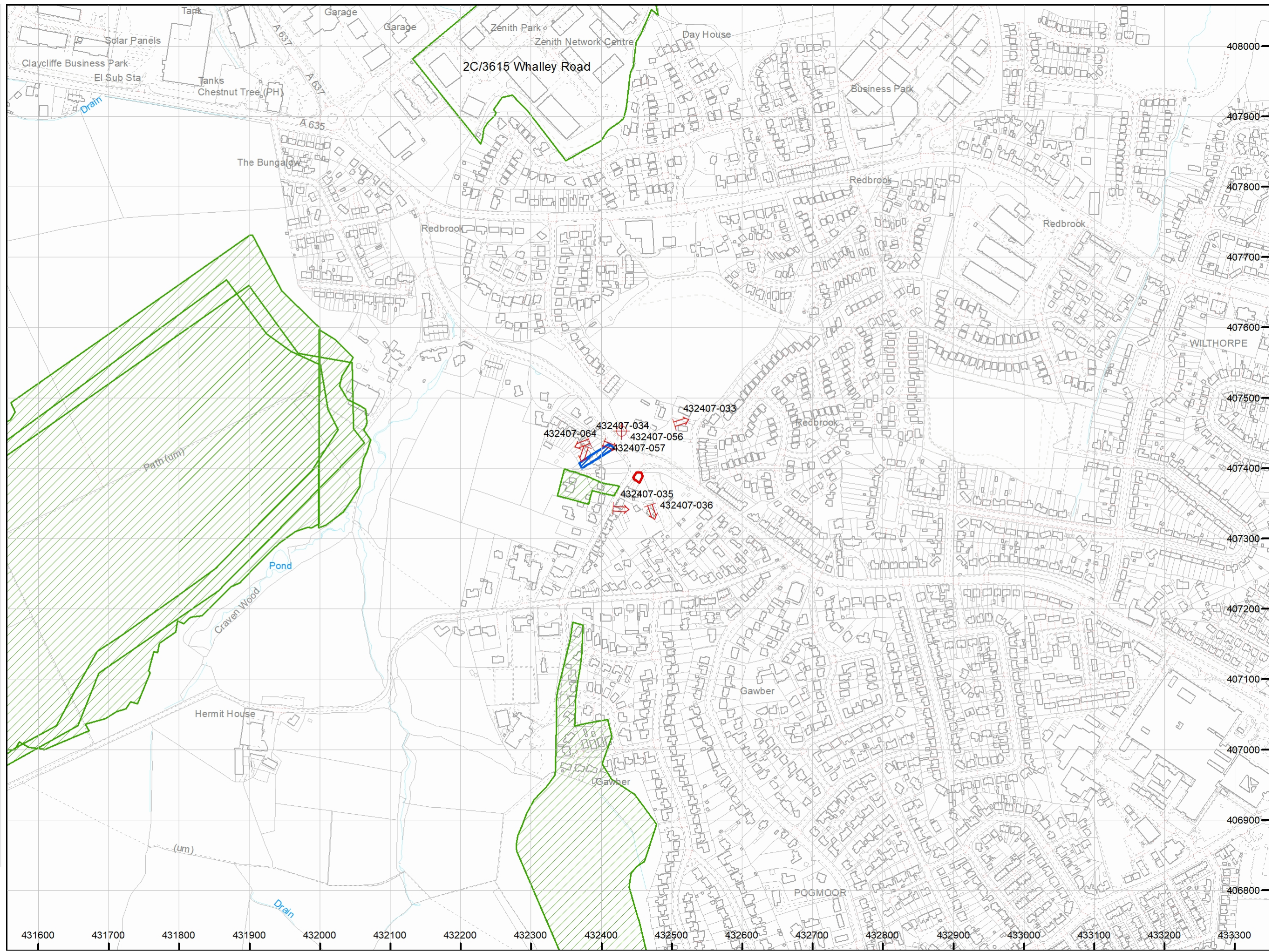
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Disused mine shaft 
- Disused adit 
- Opencast mine licence area 
- Unlicensed opencast site 
- Coal claim 

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com



APPENDIX B
SITE LOCATION PLANS

Beever Lane



0 50
Metres



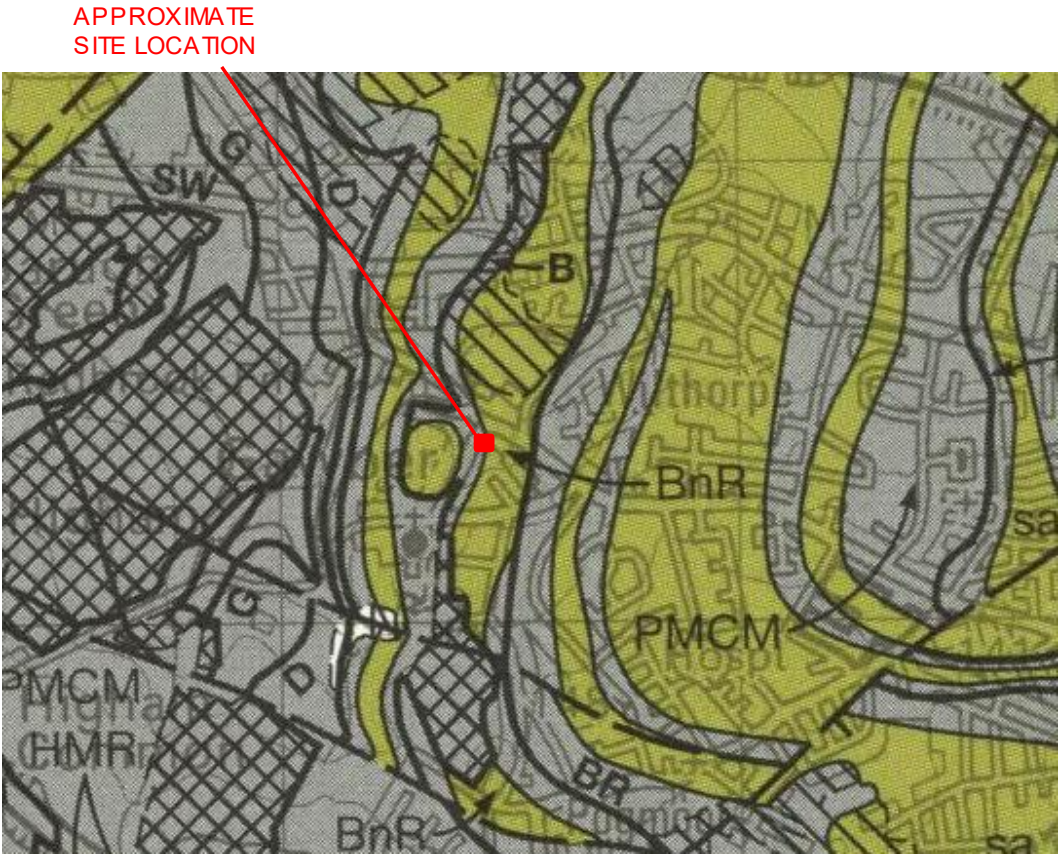
Plan Produced for: Location Plan Beever Lane

Date Produced: 06 Jul 2022

Plan Reference Number: TQRQM22187153634031

Scale: 1:1250 @ A4

APPENDIX C
EXTRACTS OF BGS GEOLOGY MAP



Tentative elevation of site
relative to vertical
geology section

