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COAL MINING RISK ASSESSMENT REPORT

< ENVIRONMENTAL > < GEOTECHNICAL >

job number	C4108/24/E/62725	date	26.02.2024
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site address	10 Aireville Avenue, Frizinghall, Bradford, BD9 4EY
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written by	S. Alexander	checked by	R. Palmer
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issued by	S. Alexander
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Environmental
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Specialists

Rogers Geotechnical Services Ltd
Offices 1 & 2 Barncliffe Business Park, Near Bank, Shelley, Huddersfield, HD8 8LU
☎ 01484 604354 Company No. 5130864

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Report on a Coal Mining Risk Assessment

Location: 10 Aireville Road,
Frizinghall, Bradford, BD9 4ED

For: Conmet Connectivity

Report No. C4108/24/E/6275

Report date: February 2024

For and on behalf of **Rogers Geotechnical Services Ltd**

Scott Alexander BSc FGS
Senior Geo-environmental Engineer

Rob Palmer MSc FGS ACIEH
Engineering Director

1. Introduction

It is understood that as part of the planning application at the site, a Coal Mining Risk Assessment has been requested by the planning authority. Consequently, a desktop study was commissioned in order to assess the risk to the development from coal mining. This report presents the findings of the study.

2. Geological Desk Study

The geological desk study has been undertaken using the following sources of information.

- British Geological Survey (BGS) map sheet¹.
- British Geological Survey *Geology of Britain Viewer*².
- Coal Authority Consultants Coal Mining Report³.
- British Geological Survey *Borehole Records*⁴.

¹ Sources: British Geological Survey (NERC) Map Sheet 69; Bradford Solid and Drift Editions

² Sources: British Geological Survey (NERC) Geology of Britain Viewer [online resource from www.bgs.ac.uk]

³ Coal Authority Reference: 51003406048001 dated 19th February 2024.

⁴ Sources: British Geological Survey (NERC) Borehole Records [online resource from <http://www.bgs.ac.uk/>]

2.1 British Geological Survey Maps and Viewer

The appropriate map sheet for the site and the geology viewer has been examined and the following table presents the indicated geology:

Table 1: Geological Data for the Site			
Strata Type	Strata Name ⁵	Parent Unit ⁶	Description
Superficial Geology	Glacial Till	-	Till is unsorted and unstratified drift, generally overconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton).
Solid Geology	South-west of site Stanningley Rock	Pennine Lower Coal Measures Formation	The Stanningley Rock, or 36 Yard Rock, is a fine-grained, thinly bedded, commonly ganisteroid sandstone.
	North-east of site Undifferentiated Pennine Lower Coal Measures Formation		Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part

On the geological map, there are no relevant geological dip indicators within the immediate vicinity of the site, however the regional geological cross-section traverses the fault block upon which the site is located. The cross section indicates that the regional dip is towards the south and south-east at a shallow angle of around 5 degrees.

There are two local coal seams that are shown to outcrop within the local area. These seams are summarised as follows:

Table 2: Summary of Coal Seams Within the Vicinity of the Site			
Seam Name	Seam Thickness ^{5*}	Outcrop Distance from Site ^{5*}	Anticipated Depth below Site
36 Yard Coal	0.1m – 0.3m	85m W	Not anticipated beneath the site
Hard Bed Coal	0.5m – 1.0m	100m E	Approx. 10m of the surface of the site.
Middle Band Coal	0.0m – 0.30m	200m E	Approx. 30m below the surface of the site. .

*All distances are given as approximations only. It should be noted that coal seam thicknesses vary over relatively short distances

In light of the above and taking into account the regional structural geology and the topography of the area, the Hard Bed Coal is anticipated to be present at depths of less than 30m below the surface of the site. The Hard Bed Coal is shown to be present beneath the Stanningley Rock, however this depth varies as the thickness of the Stanningley Rock changes with its location. At the closest point to the east of the region, the Hard Bed Coal is shown on the Generalised Vertical Section to be present approximately 2.5m below the base of Stanningley Rock, and at the widest

⁵ Sources: British Geological Survey (NERC) Map Sheets 69; Bradford; Solid and Drift Edition, and Geology of Britain Viewer [online resource from www.bgs.ac.uk]

⁶ Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [online resource from www.bgs.ac.uk]

point at the west of the region the Hard Bed Coal is approximately 15m below the base of the Stanningley Rock. Given the sites location towards the centre of the region it can be assumed that the Hard Bed Coal will be present approximately 10m below the base of the Stanningley Rock. The 36 Yard Coal is shown to outcrop to the west of the site. According to the Generalised Vertical Section this coal seam is geologically younger than the Stanningley Rock, upon which the site is shown to be situated, thus the 36 Yard Coal is not expected to be present beneath the site.

The Middle Band Coal seam is shown stratigraphically to underlie the Hard Bed Coal and may be present within 30m of the surface of the site.

2.2 Coal Authority Mines Report

As part of this study a Coal Authority Consultants Coal Mining Report has been obtained. The report is presented as Appendix 2 and for the purposes of discussion has been summarised below:

Table 3: Summary of the Consultant's Coal Mining Report		
Has the report highlighted evidence or potential of:		
Mining Feature	Yes/No	Comments
Underground Coal Mining	No	No past mining recorded.
Probable Unrecorded Shallow Workings	Yes	-
Spine Roadways at Shallow Depth	No	No spine roadway recorded at shallow depth.
Mine Entries	No	None recorded within 100m of the enquiry boundary.
Abandoned mine plans	Yes	Plans of abandoned mine workings below the site are suggested to be available by the Coal Authority.
Outcrops	No	No outcrops recorded.
Geological Faults	No	No faults, fissures or breaklines recorded.
Opencast Mines	No	None recorded within 500 metres of the enquiry boundary.
Coal Authority Managed Tips	No	None recorded within 500 metres of the enquiry boundary.
Site Investigations	No	None recorded within 50 metres of the enquiry boundary
Remediated Sites	No	None recorded within 50 metres of the enquiry boundary.
Coal Mining Subsidence	No	The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994. 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.
Mine Gas	No	None recorded within 500 metres of the enquiry boundary.
Mine Water Treatment Schemes	No	None recorded within 500 metres of the enquiry boundary.
Future underground mining	No	For further information please see section 3 of the Consultant's Coal Mining Report.
Coal mining licensing	No	
Court orders	No	
Section 46 notices	No	
Withdrawal of support notices	No	
Payments to owners of former copyhold land	No	

2.3 Geological Survey Borehole Records

The BGS (NERC) keeps borehole records from across Britain which are available for public viewing through their website⁷. As part of this study, the records in the area around the site have been reviewed in order to assist in establishing the geological conditions. The logs of the boreholes can be viewed through the BGS website however the most pertinent features are summarised below:

Borehole	Approx. Distance from Site	Depth of Borehole (m)	Notable Features
SE13NW684 ⁸	20m NE	6.25	Coal (Intact) – 5.80m (0.45m thickness, base not proven)
SE13NW703 ⁹	125m NE	25	Coal (intact) – 10.00m (0.40m thickness)

It should be appreciated that although there are a significant number of boreholes within the immediately vicinity of the site there are only those listed in the above table which have been extended to a suitable depth to determine the presence of coal seams within the local area. It is thought the coal seam encountered in borehole SE13NW684 is likely to represent the Hard Bed Coal and the coal seam encountered in borehole SE13NW703 is likely to represent the Middle Band Coal based on the borehole locations and correlated to the published records in the BGS Generalised Vertical Section.

3. Risk Assessment

The risk to the stability of the proposed residential development has been evaluated from the data obtained and with reference to the following ratings and definitions:

- Low - The possibility of instability is unlikely therefore no further action is necessary.
- Moderate - The possibility of instability is likely and further investigation or remedial action may be required.
- High - The possibility of instability is highly likely and further investigation or remedial action will be necessary.

Item	Risk attributed to	Feature(s) Considered	Risk Rating
3.1	Shallow coal workings	Hard Bed Coal (HB)	Moderate
		Middle Band Coal (MB)	Low
3.2	Coal workings at depth	The Coal Authority report indicates that the property is not within a surface area that could be affected by past underground mining at depth.	Low
3.3	Mine gas	Shallow coal workings	Moderate

⁷ Sources: British Geological Survey (NERC) Onshore Geindex [online resource from <https://mapapps2.bgs.ac.uk/geoindex/home.html>]

⁸ Sources: BGS Borehole Scan SE13NW684 online resource from <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/46954>

⁹ Sources: BGS Borehole Scan SE13NW703 online resource from <https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/46973>

3.1 Risks Posed by Shallow Coal Workings

On the basis of all of the information provided above, two coal seams are anticipated to be present within 30m of the surface at the site. Whilst these seams may be of limited thickness, the possibility of these seams being worked below the site cannot be ruled out. Historic coal mining activity is evident in the nearby area, and therefore it is considered that if coal was known to be close to ground level it could have been removed illicitly via shallow mining methods with relative ease.

It may be noted that guidance available from both the NHBC and the CIRIA publication, SP32 - *construction over abandoned mine workings*, suggests that competent overburden thickness above a coal seam should be greater than 10 times the thickness of a seam plus seam thickness in order that the collapse of workings would pose a low risk to surface structures.

On this basis, assuming a maximum thickness of the coal seams, the table below suggests the thickness of competent overburden required above each seam to mitigate instability at the surface.

Seam Name	Seam Thickness	Anticipated Depth Below Site	Required Thickness of Competent Overburden
Hard Bed Coal (HB)	0.5m – 1.0m	Approx. 10m	11.00m
Middle Band Coal (MB)	0.0m – 0.3m	Approx. 30m	3.30m

Based on the above information, it is considered that there will not be a sufficient thickness of competent overburden above the shallowest seam in order to prevent the risk of instability posed by the presence of any illicit workings. Therefore, a moderate risk rating has been placed on this seam, and further investigation is recommended to prove or disprove the presence of illicit mining activity. The underlying Middle Band Coal is anticipated to be at sufficient depth to not influence developments on the surface of the site.

3.2 Risks Posed by Coal Workings at Depth

In regard to deeper mining which could affect the site, the property is not within a surface area that could be affected by past underground mining.

3.3 Risks Posed by Shallow Workings in Minerals Other Than Coal

It is highlighted that there are recorded workings in the nearby area, named as Northcliffe Park, located approximately 500m north-west of the site. Northcliffe Park has been worked extensively via both underground and opencast methods for sandstone for building stone and fireclay for brickmaking. It is of particular interest as the site is located upon the same geological sequence as is underlying the site. Review of the BGS mineral records indicate the site is located in a mineral resource area for fireclay.

3.4 Risks Posed by Mine Gas

This assessment has identified that there is potential for shallow mine workings to be present beneath the proposed development. Whilst the Consultants Coal Mining Report has not reported any incidents of mine gas within the vicinity of the development, shallow mining activity represents a

credible source of ground gas. As such, a moderate risk rating has been assigned, and further assessment may be required.

4. Conclusions

In light of the potential risks of instability at the site from the working of shallow coal, it cannot be recommended that development takes place without further investigation to conclusively determine the presence of such workings. This work should include physical drilling methods to explore the ground conditions.

General practice is to undertake rotary openhole boreholes at three locations across the site to mitigate against the potential for drilling through intact columns associated with pillar and stall workings. Furthermore, it is normal to investigate the ground to 30m below ground level; any workings below this depth are unlikely to result in significant instability. However, in this case, the risk of instability is due to shallow workings, likely within 10m of the surface of the site. Therefore, drilling to these depths may not be necessary and the objective should be to ensure that the shallow seams are un-worked or have sufficient competent cover. It may therefore be possible, in the first instance, to undertake one borehole to say 30m below the top of the rockhead, with the remaining boreholes proving the depth and continuity of the coal seam(s). In any event, it is considered that approval should be sought with the Local Authority as to the efficacy of this approach.

It is of note that Rogers Geotechnical Services would be happy to assist in any further intrusive investigation that may be required.



Appendix 1

Site Plan



Notes:
Investigation positions approximated from site operative's notes.



Rogers Geotechnical Services Ltd

Offices 1 & 2, Barncliffe Business Park,
Near Bank, Shelley, Huddersfield, HD8 8LU

Telephone: 0843 50 66 87
www.rogersgeotech.co.uk

Client:
Michael Ainsworth Design Partners

Job Number:
C4108/24/E/6275

Project Details:
10 Aireville Avenue, Bradford

Scale: Not to scale - reference only





Appendix 2

Coal Authority Report



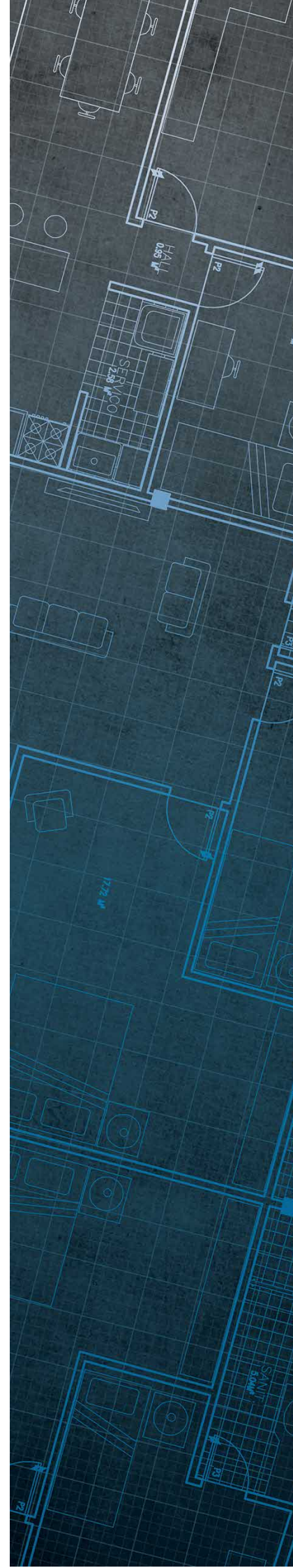
The Coal
Authority

Consultants Coal Mining Report

LAND AT 10 Aireville Avenue
Shipley
West Yorkshire
BD9 4ED

Date of enquiry: 19 February 2024
Date enquiry received: 19 February 2024
Issue date: 19 February 2024

Our reference: 51003406048001
Your reference: C/4108/24/E/6275



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

ROGERS GEOTECHNICAL SERVICES LTD

Enquiry address

LAND AT 10 Aireville Avenue
ShIPLEY
West Yorkshire
BD9 4ED

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

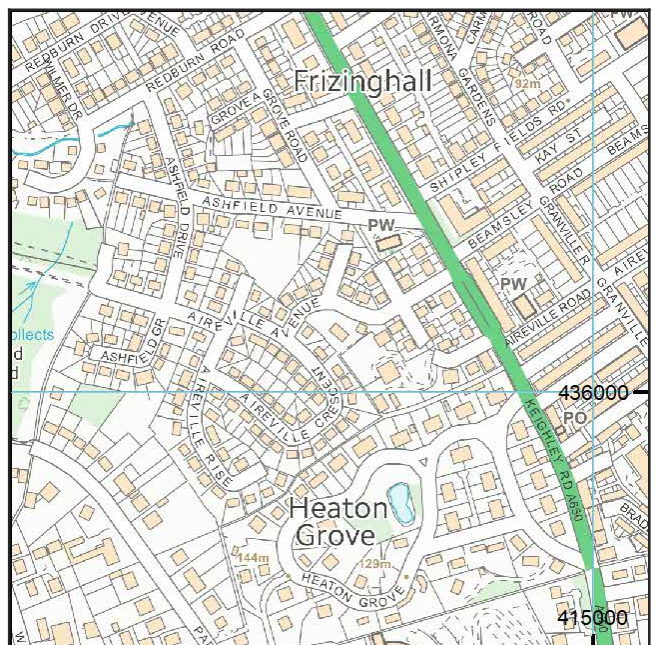
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 –Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

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

PO0		
-----	--	--

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

None recorded 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

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

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.

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 not in an area where a notice to withdraw support has been given.

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

Based on the responses in this report, no further information has been highlighted.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

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. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

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

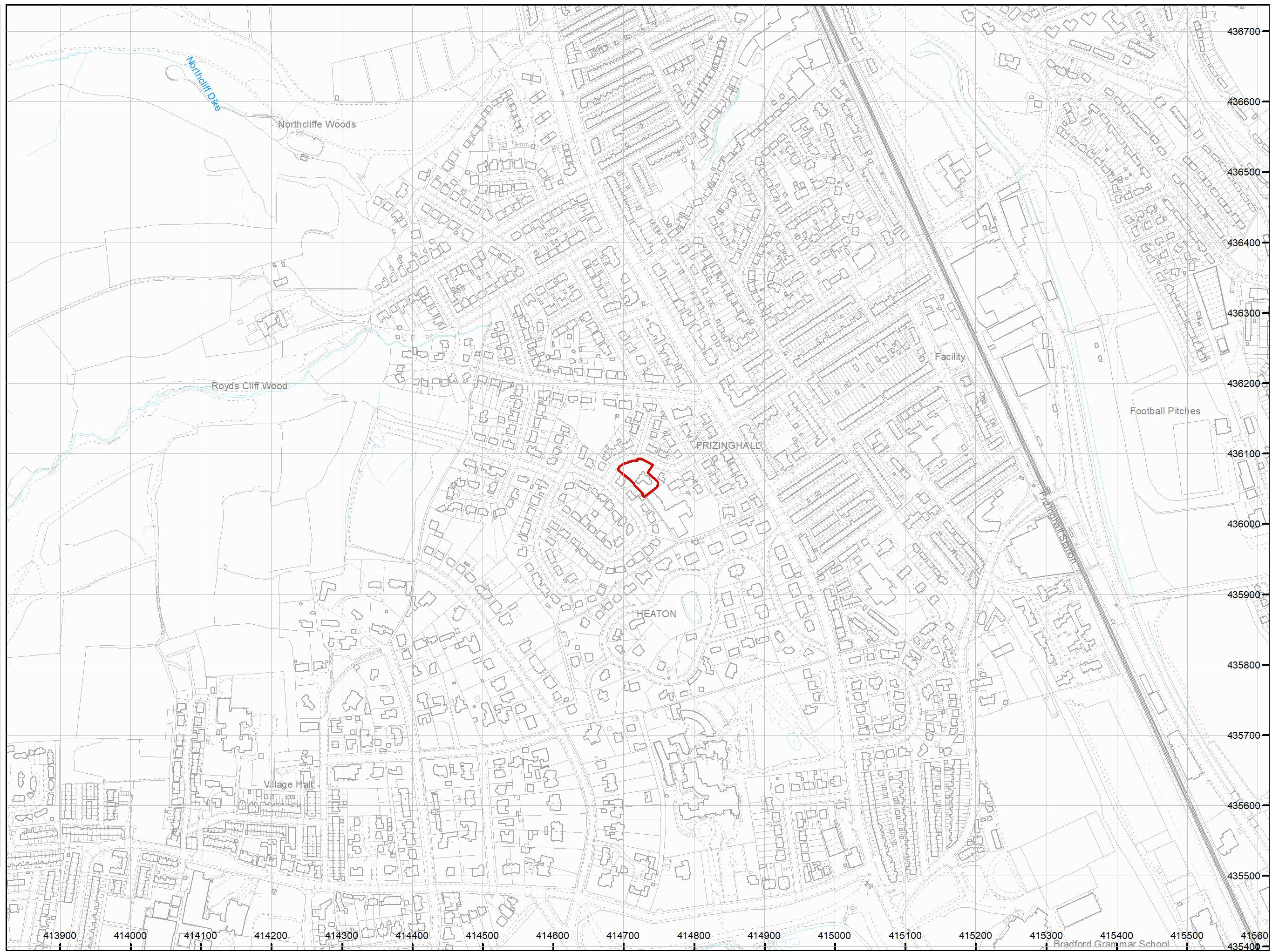
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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 

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





Appendix 3

BGS Borehole Records



SE13NW 684 1475-3608

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD.,
HOLMES CHAPEL ROAD,
MIDDLEWICH, CHESHIRE.
Telephone: Middlewich (STD 0606 84) 4637

BOREHOLE No. 27

Job No.: 3706 Location: HAWORTH ROAD OUTCROP, BRADFORD
Client: CITY OF BRADFORD METROPOLITAN COUNCIL

Sheet 1 of 1
Scale: 1:50
Diam. & Boring Type
LIGHT
150MM PERCUSSION

Description of Strata	Reduced Level	Legend	Thick-ness (m)	Depth (m)	Samples			N Value	Apparent Cohesion kN/m ²	Dilatancy	Penetration	Daily Progress Water Levels Remarks	
					From	To	Type						
Ground Level	112.98												
TALHAC, SANDSTONE & COBBLES.			0.40	0.40								8/6/87	
FINE GREY BROWN SILTY CLAY (HIGHLY TO COMPLETELY WEATHERED MUDSTONE)			1.90	2.30	1.50	1.95	P1	11					
					2.00								
STIFF GREY / BROWN SILTY CLAY (HIGHLY WEATHERED MUDSTONE)			2.00	4.30	2.50	2.95	P2	22					
					3.00								
					3.50	3.95	P3	19					
VERY WEAK GREY, DISCOLOURED BED BROWN MODERATELY WEATHERED SILTY MUDSTONE			1.50	5.80	4.00	4.50	P4	58				9/6/87 W.L. on BRY. 9/6 5/6 4.60 5/6	
					5.00								
COAL			0.45	6.25	5.50	6.25	W1 P5	41				5/6 5.80	
BOREHOLE COMPLETES AT 6.25M													

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration test



SE13NW 703 1485-3614

BOREHOLE RECORD SHEET

STRATA SURVEYS LTD., HOLMES CHAPEL ROAD, MIDDLEWICH, CHESHIRE. Telephone: Middlewich (STD 0606 84) 4637							BOREHOLE No. 68			
Job No.: <u>3706</u> Location: <u>HAWORTH ROAD, WITFALL, BRADFORD</u> Client: <u>CITY OF BRADFORD METROPOLITAN COUNCIL</u>					Sheet <u>1 of 2</u> Scale: <u>1:50</u> Diam. & Boring Type <u>125MM ROTARY OPEN TO HM & LOGGED HOLE.</u>					
Description of Strata	Reduced Level (m)	Legend	Thickness (m)	Depth (m)	Samples		N Value	Apparent Cohesion (kN/m ²)	φ (degrees)	Daily Progress Water Levels Remarks
					from	to				
TARMAC GROUND LEVEL <u>102.50</u>			0.10	0.10						<u>27/2/88</u> 1.00 - 4.50M 125MM DIA OPEN HOLE, ROCK ROLLER AIR FLUSH. TRAIL PIT TO 1.00M.
CINDEL ASH & SANDSTONE FILL			0.60	0.70	0.70				D1	
FINE GRAY TOBY SANDY CLAY			0.80	1.50	1.50					D2
FINE GRAY BROWN CLAY				2.50	2.50					D3
STIFF GRAY BROWN ALUMIN CLAY WITH SOME COBBLES.			1.90	3.40	3.40					D4
				4.40	4.40					D5
				4.80	4.80	33 (10)				
				5.40	5.40					
				5.40	5.40	60 (1)				
				5.90	5.90					
				6.20	6.20	53 (5)				
			2.50	6.20	6.20	70 (1)				
				7.20	7.20					
				7.20	7.20	94 (6)				
				8.10	8.10					
				8.10	8.10	70 (5)				
				9.10	9.10					
				9.10	9.10	97 (6)				
				10.00	10.00					
			3.70	10.00	10.00	70 (5)				
			0.40	10.40	10.40					
COAL & CARBONACEOUS WOODSWE UNDERLAIN BY 0.10M SAND EXPOSED.										

U - undisturbed D - disturbed B - bulk W - groundwater P - standard penetration CP - cone penetration V - vane test