COAL MINING RISK ASSESSMENT

25 RICHMOND AVENUE
FARTOWN
HUDDERSFIELD
HD2 2QH

Prepared for:

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Date:

29th June 2023

EnviroSolution Ltd
Document Verification

Site Address	25 Richmond Avenue, Fartown, Huddersfield, HD2 2QH		
Report Title	Coal Mining Risk Assessment		
Job Number	ES02624	**Document Ref.**	ES02624
Date Issued	29th June 2023	**Report Version**	1
Prepared by	Tom Craig MSc, BSc (Hons), FGS	**Signature**	Redacted
Checked by	Phil Shelton PhD BSc CEng MIMMM FGS	**Signature**	Redacted

Disclaimer

This report has been prepared by EnviroSolution Ltd who has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant experienced in preparing reports of a similar scope.

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Appendices

1 Introduction

1.1 Site Location and Description

The site for the proposed residential development is located at 25 Richmond Avenue, Fartown, Huddersfield, HD2 2QH. The National Grid Reference for the development site is GR: 414480 418635. The site location is shown in **Appendix A**.

The site is rectangular in shape and has an approximate area of 200 square meters. The site is currently used as an adjoining driveway in the northern area with a shed and rear garden.

The northern area of the site is covered in concrete paving slabs. The site is bounded by residential dwellings on all sides.

A plan showing the location of the site is shown in **Figure 1**.

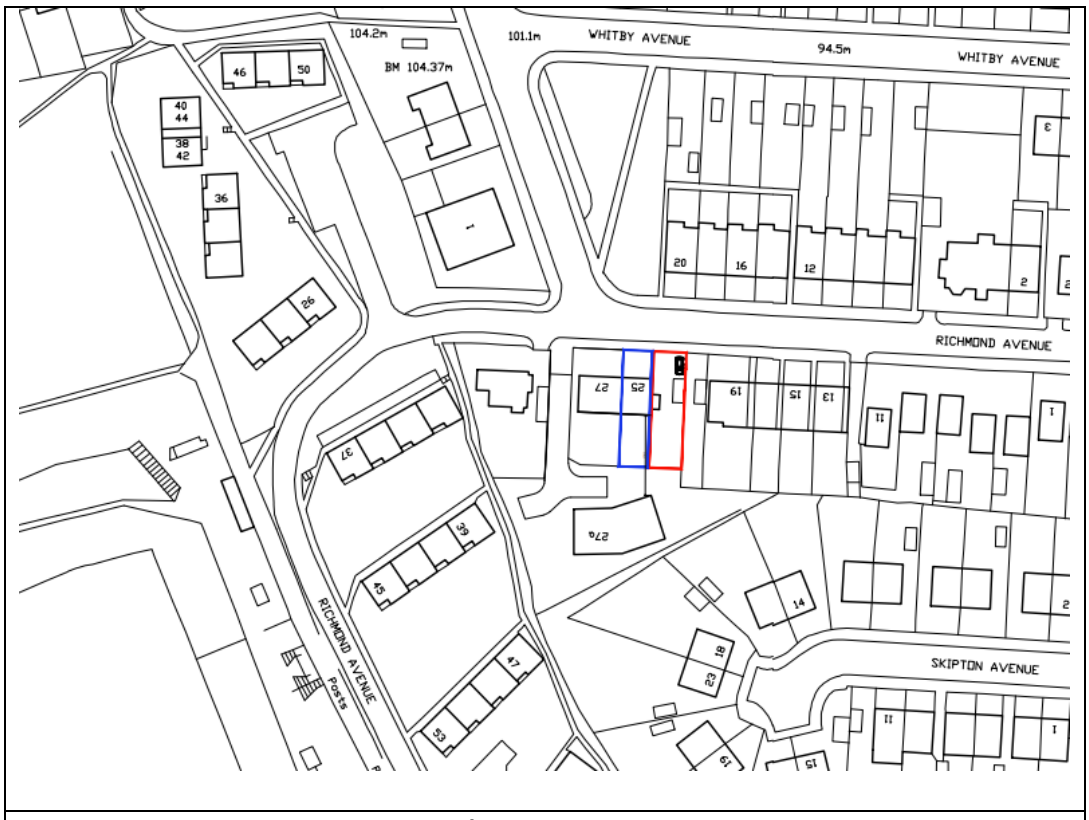

Figure 1) Site Location Map

1.2 Development Proposal

It is understood that the development plans will include the construction of a residential dwelling. Details of the existing and proposed site layouts are shown in **Appendix A**.

1.3 Scope of Coal Mining Risk Assessment

EnviroSolution Ltd has been commissioned to prepare a Coal Mining Risk Assessment Report (CMRA) for the proposed development site, in order to provide the Local Planning Authority with information on the coal mining legacy risk(s), an assessment of their potential impact on land stability, and provide recommendations for the need to carry out any further investigations (including intrusive boreholes) to address these risk(s).

The CMRA has been undertaken in accordance with the principles of best practice including the Coal Authority's guidance document "Risk Based Approach to Development Management - Resources for Developers Version 3" (2014) (Ref. 1), CIRIA "SP32 Construction over Abandoned Mine Workings" (2002) (Ref. 2), CIRIA "C758D Abandoned Mine Workings Manual" (2019) (Ref. 3) and CL:AIRE "Good Practice for Risk Assessment for Coal Mine Gas Emissions (2021) (Ref. 5).

The purpose of the CMRA Report is to:

- present a desk-based review of available information on the coal mining issues that 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 issues;
- set out appropriate mitigation measures to address the 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 the requirements of National Planning Policy with regard to development on unstable land.

1.4 Sources of Information

This report is based on current information of past mining activities relevant to the site. The following information sources have been used:

- Consultants Mining Report dated 19^{h} June 2022 (Ref: 51003361752001 **Appendix B**);
- BGS Geoindex geological map;
- BGS geological 1:50,000 Sheet 77 Huddersfield;
- Coal Authority Interactive Website;
- Historical Ordnance Survey maps.

2 Environmental Setting

2.1 Historic Coal Mining Activity

The development site and surrounding area has been reviewed with reference to historical Ordnance Survey (OS) maps. The history of the site and immediate surrounding area are summarised in Table 1. Copies of the historical OS maps are included in **Appendix C**.

Table 1 - Historic Mapping Review

Date	Scale	Historic Mining Activity
1848	1:10,560	- The site is undeveloped. - Coal pit 330m east of the site.
1887	1:10,560	- Site remains undeveloped. - Old Clay pit 50m south of the site. - Coal pit no longer marked on map.
1904	1:10,560	- Residential development adjacent to site. - Old clay pit no longer marked on map.

2.2 Geological Context

The BGS geological mapping (Geoindex and BGS Sheet 77 Huddersfield) show that the site is not directly underlain by superficial deposits.

The bedrock geology is shown to be the Pennine Lower Coal Measures Formation which is of Carboniferous age. These generally comprise grey coal-bearing mudstones/ siltstones with minor sandstones, **see Appendix D**. According to the BGS Sheet 77, the bedrock around the site has a dip of about 6˚ towards the east.

Geological mapping shows an inferred fault intersecting the site with an approximate trend of 066° (Whole Circle Bearing). The direction of downthrow is towards the north. The Coal Authority Report does show a proven coal outcrop approximately 50m south, which is expected to be the Halifax Yard (aka hard Bed Coal). However, the shown strike of outcrop is not consistent with a general strata dip towards the east. Rather, it should be assumed that the dip is to the north or north-east.

A BGS borehole log (ref: SE11NW405) has been obtained from BGS online records, which is located 120m south of the site. The borehole records 4.0m of firm brown sandy clay (diamicton), overlying interbedded mudstones and sandstone. A 0.50m thick void was recorded between 29.30m and 29.80m bgl.

The position of the borehole is shown in Figure 2. A copy of the borehole records is included in **Appendix E**.

Figure 2) Coal Seam Location Map (Coal Authority Interactive Viewer)

The site is situated within a Secondary Opencast Coal Resource Area (**Appendix F**), defined by the BGS as "one or more zones that contain opencast coal resources, but in which the coals are generally thinner and less concentrated in vertical and areal distribution". It is considered to be very unlikely that there will be any interest in developing open cast coal mining operations at this location in the short or medium-term.

3 Identification and Assessment of Site Specific Coal Mining Risks

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

Table 2 - Coal Mining Hazards Summary

Coal Mining Issues	Yes	No
Coal outcrops		X
Underground coal mining (recorded at shallow depths)		X
Underground coal mining (probable at shallow depths)	X	
Recorded mine entries (shafts and adits)		X
Unrecorded mine entries (shafts and adits)	X	
Coal mining geology (fissures)		X
Record of past gas emissions		X
Recorded coal mining surface hazard		X
Surface mining (opencast workings)		X

The Coal Authority Interactive Map Viewer (**Appendix G**) has identified that the site lies within a Development High Risk Area associated with the potential presence of unrecorded workings beneath the site.

The report obtained from the Coal Authority (Consultants Coal Mining Report, reference 51003361752001, dated 19th June 2023) revealed the property is in a surface area that is not affected by recorded underground mining.

However, the Coal Authority report states that the property is in an area where the Coal Authority believes there is coal at or close to the surface. This relates to the Hard Bed Coal (Halifax Yard) with a recorded thickness of between 0.10m and 0.80m. It is considered that if this seam has been worked in the past, it could present a risk of surface instability.

The Coal Authority report states that they are not aware of any recorded mine entries within 100m of the development site boundary. Notwithstanding this, it is recognised that there may also be mine entries in the vicinity that have not been recorded.

The Coal Authority mining report states that the property does not lie within the boundary of a historic opencast site.

There are no recorded past mining gas emissions recorded in the surrounding area, however, coal seams and coal mine workings pose a potential gas risk which should be considered in any future investigations and development. At development sites with shallow coal workings, probable shallow coal mine workings, or pathway features such as mine entries and geological disturbances on or nearby the site, it is recommended that a detailed gas risk assessment is undertaken in accordance with relevant guidance such as the CL:AIRE “Good Practice for Risk Assessment for Coal Mine Gas Emissions”, October 2021.

4 Proposed Mitigation Strategy

- It is recommended that a minimum of 2 no. rotary boreholes are advanced to a minimum depth of 30.0m below ground level. Water flush should be used to safeguard against oxidation and potential spontaneous combustion of shallow coal. In order to undertake these works it will be necessary to obtain a drilling permit from The Coal Authority.

- The possibility of unrecorded mine shafts has been highlighted in the Coal Authority report. Historical maps do not show evidence of shafts within the site boundary. The potential risk can be dealt with through vigilance during the earthworks stage of construction.

5 Conclusions

The Coal Mining Risk Assessment for the site at Richmond Avenue has concluded that the risk associated with coal mining related issues remains significant due to the information obtained from geological sources, The Coal Authority and the assessment made by EnviroSolution.

The principal risks to the development arise from:

- the potential presence of unrecorded shallow mine workings associated with coal seams of workable thickness that are known to be present beneath the site area;
- unrecorded mine entries;

It is therefore recommended that further intrusive ground investigations are undertaken to investigate and to determine if formal stabilisation works are required beneath the site.

Prior to the commencement of intrusive works, a Coal Authority Permit will be required for intrusive activities, that will disturb or enter any coal seams, coal mine workings or coal mine entries (shafts and adits). The scope of works for the investigation will need to be submitted and approved by the local authority prior to the commencement of the intrusive works.

6 References

1. Coal Authority, 2014, Risk Based Approach to Development Management Resources for Developers, Version 3.
2. CIRIA, 2002, SP32 Construction over Abandoned Mine Workings.
3. CIRIA, 2019, C758D Abandoned Mine Workings Manual.
4. CIRIA, Publication C665, Assessing risks posed by hazardous ground gases to buildings.
5. CL:AIRE, 2021, Good Practice for Risk Assessment for Coal Mine Gas Emissions.

Appendix A – Site Location

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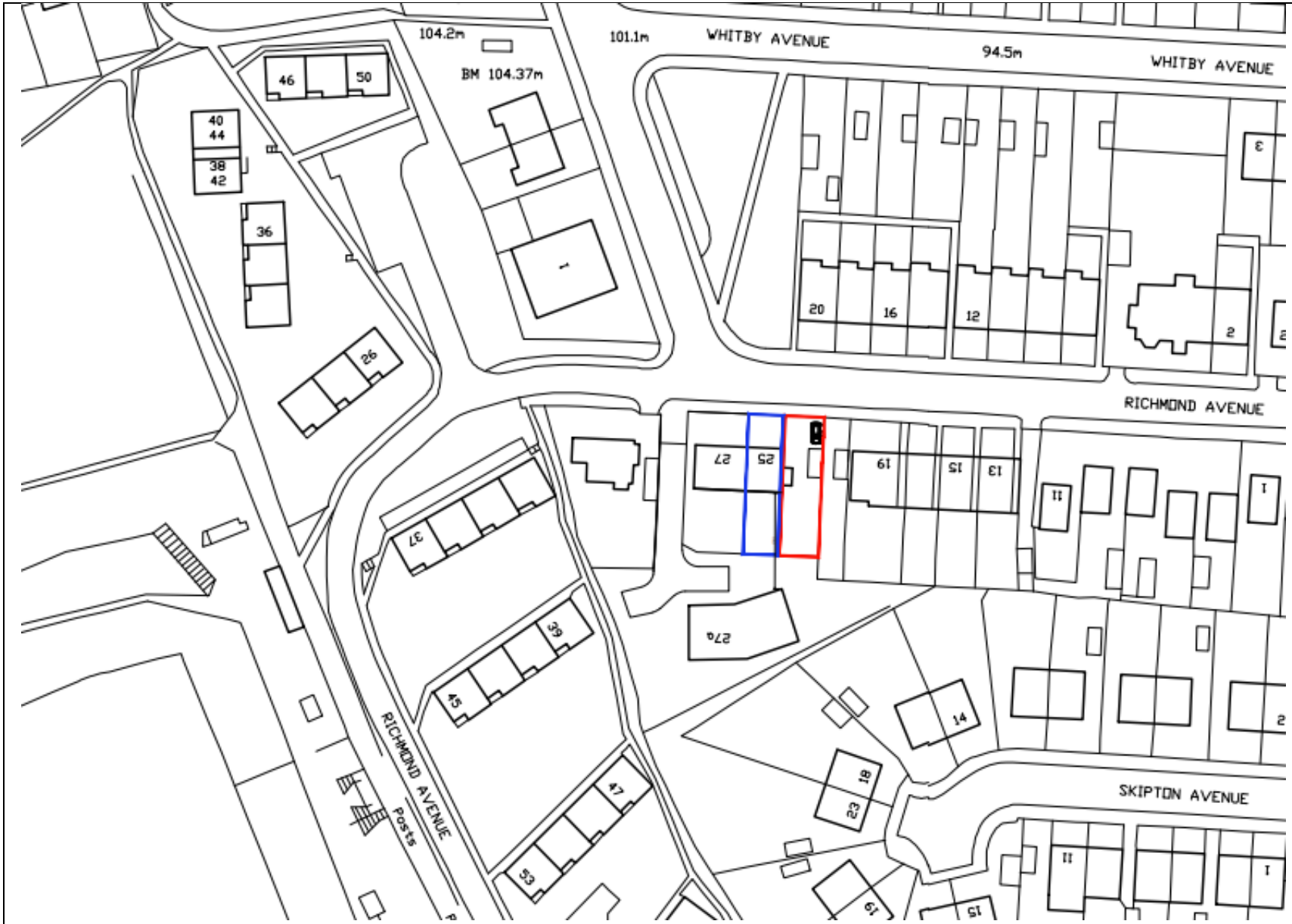
Site Location Map



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Existing Site Plan

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Proposed Development Plan

Appendix B – Coal Authority Report

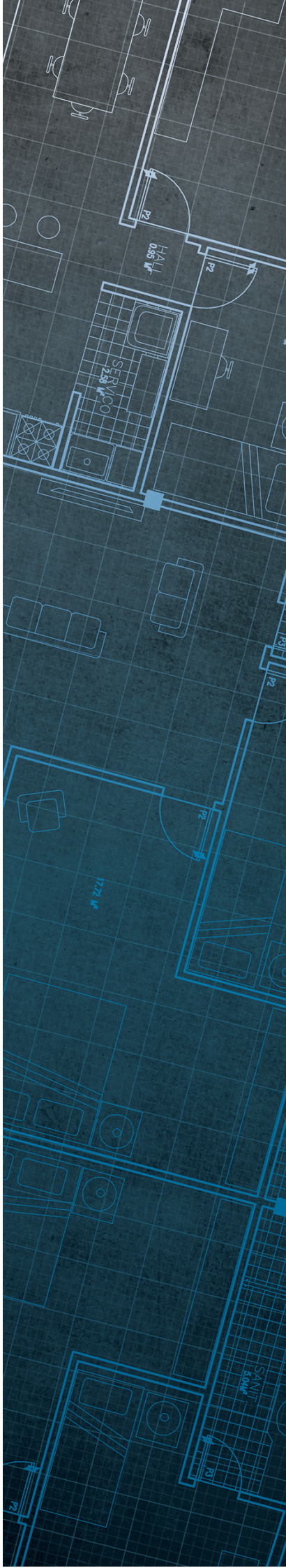
The Coal Authority

Consultants

Coal Mining Report

25 Richmond Avenue
Fartown
Huddersfield
Kirklees
HD2 2QH

Date of enquiry:	**19 June 2023**
Date enquiry received:	**19 June 2023**
Issue date:	**19 June 2023**
Our reference:	**51003361752001**
Your reference:	**Richmond Avenue**



Consultants

Coal Mining Report

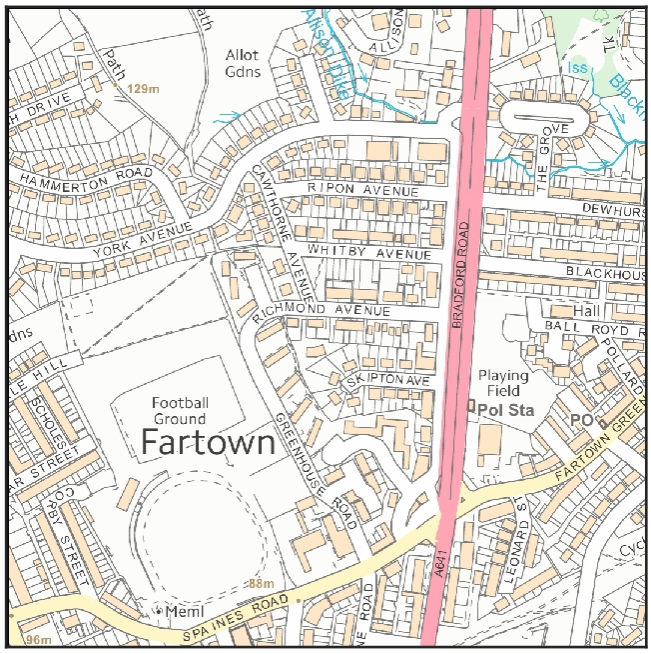
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

EnviroSolution Limited

Enquiry address

25 Richmond Avenue
Fartown
Huddersfield
Kirklees
HD2 2QH



Approximate position of property

How to contact us

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+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

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:

18393 (NR 400045471)		

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

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
HALIFAX HARD	Coal	Yes	49.0	South	84

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 Coal Authority

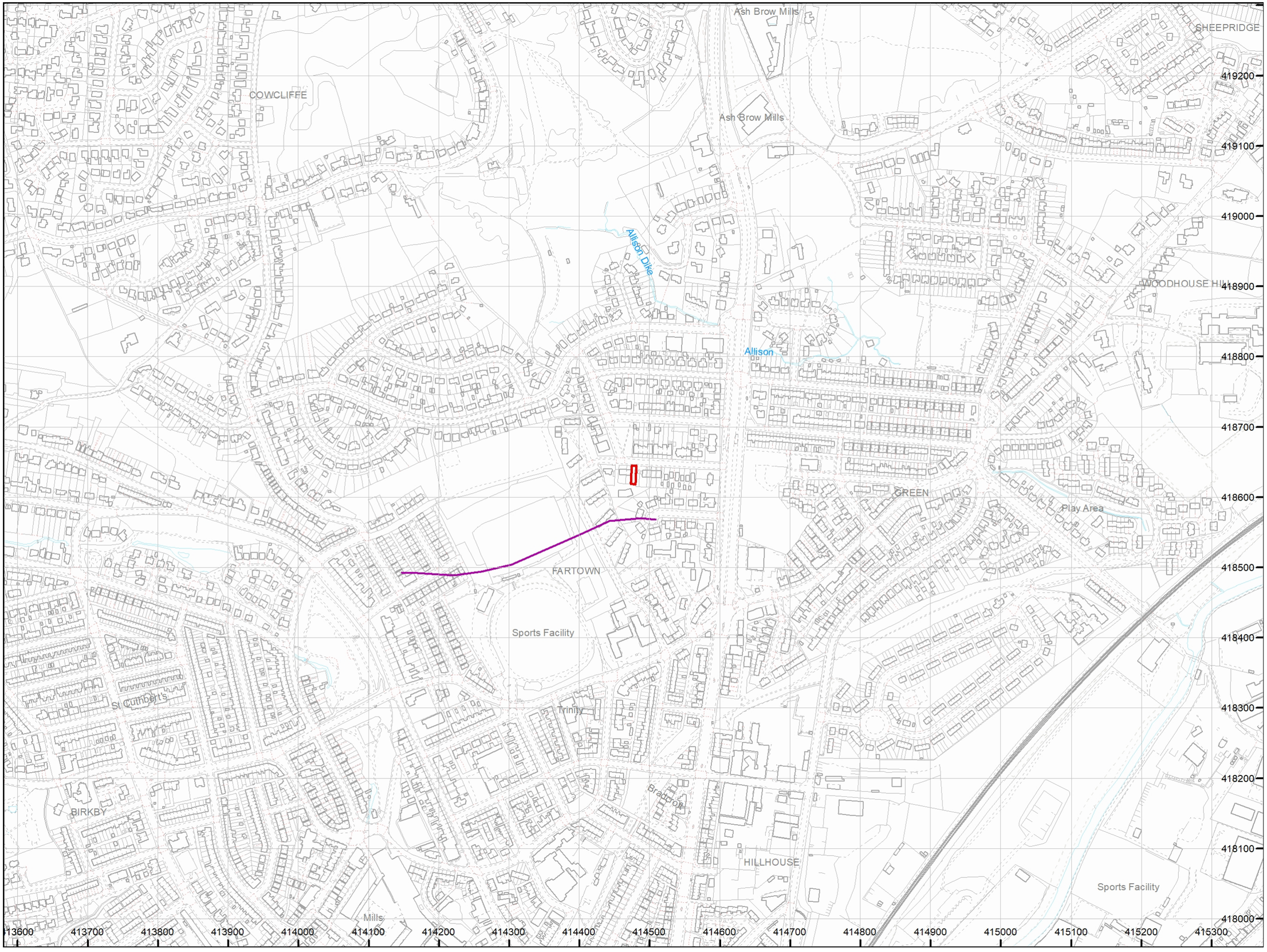
Summary of findings

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

Outcrop (Proven)



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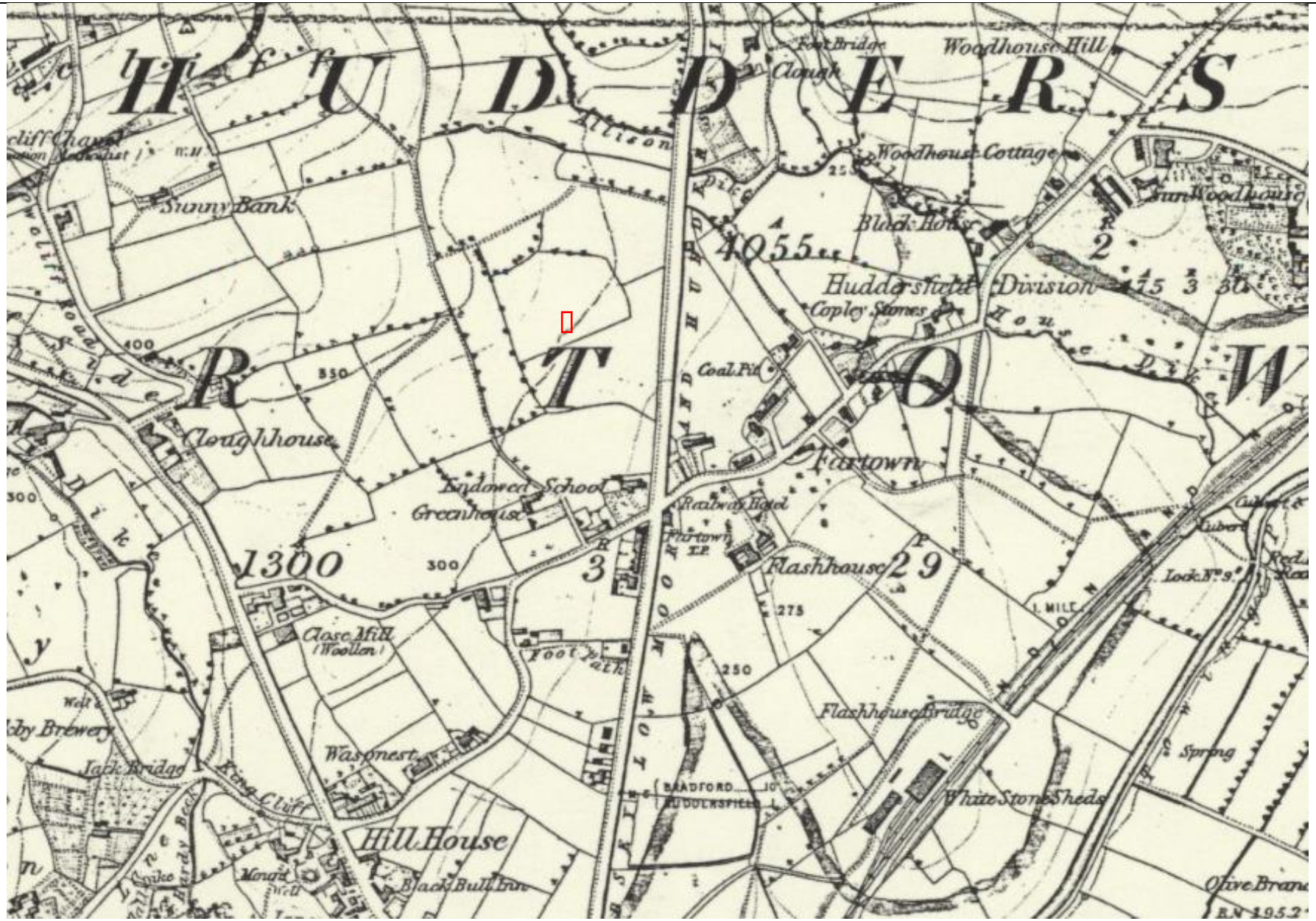
+44 (0)1623 637 000 (International)
www.groundstability.com

Appendix C – Historic Maps



Date: 1848


Nook
COWCLIFFE SIDE
Sunny Bank
B.M. 286·4
F.P.
Black House
Sun Woodhouse
Blackhouse Bridge
Blackhouse Dike
Penns Grounds
Old Clay Pit
FARTOWN GREEN
Clough House Mills
B.M. 325·3
Cricket Ground
Sch.
267·3
FARTOWN
Black House
N.W.R.
B.M. 315·9
B.M. 291·9
Close Mill
Chap.
Old Shaft
B.M. 294·2
B.M. 265·0
B.M. 257·0
North Bank
Brewery
B.M. 271·5
Chap.
Sch.
Engine Shed
SIR JOHN RAMSDEN'S CANAL
Towing Path
Wheat House
Lodge
Dye Works
Arabian Mills
LEE HEAD
BAY HALL
B.M. 236·5

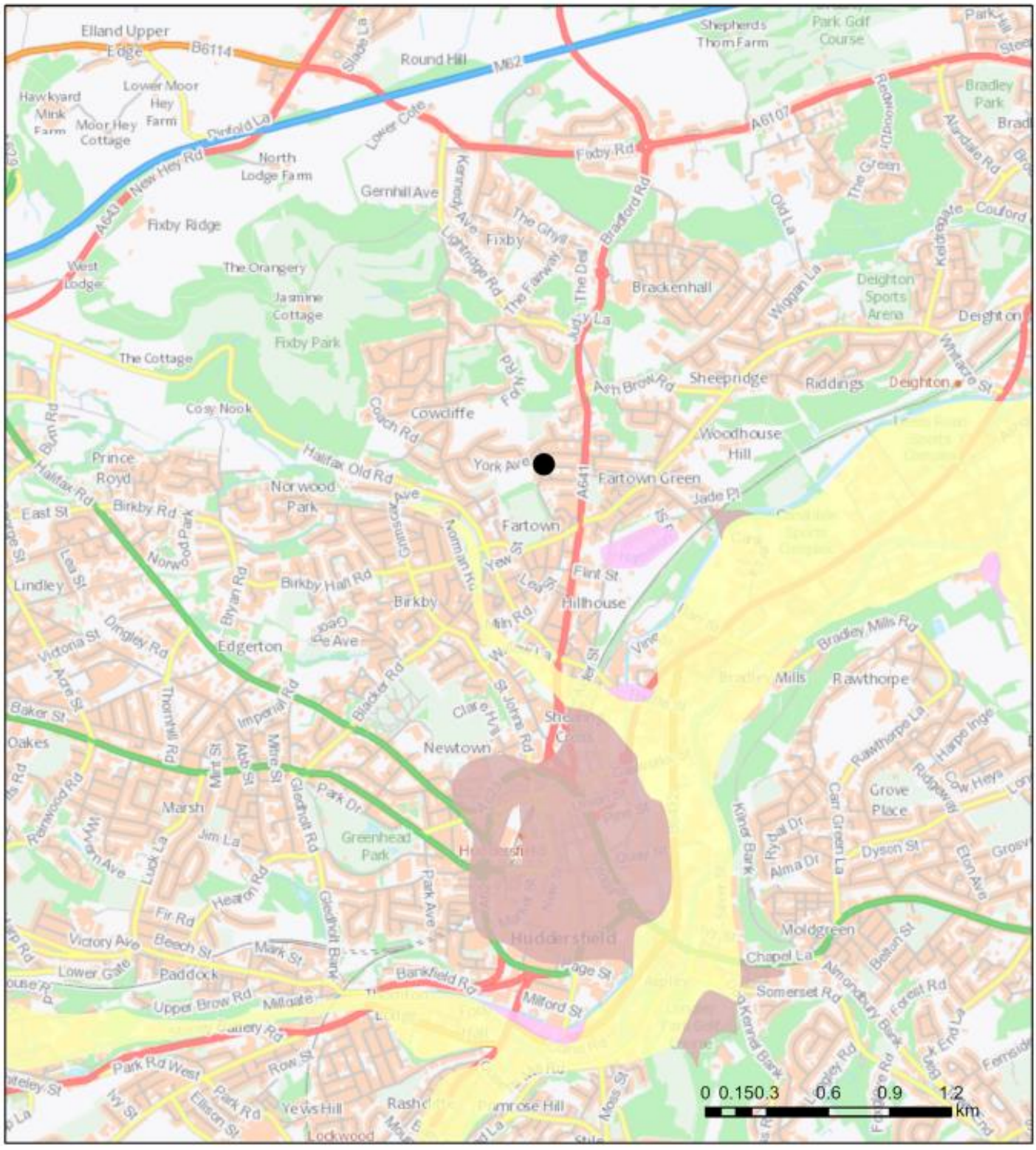
Date: 1887

Sunny Bank
B.M. 286·4
DEWHURST ROAD
BLACKHOUSE ROAD
RICHMOND AVENUE
BALL ROYD ROAD
Sun Woodhouse
M.S Huddersfield 1¼
Blackhouse Bridge
FARTOWN GREEN
Blackhouse Dike
Football Ground
Grammar School
Cycle Track
Cricket Ground
FARTOWN
HALIFAX OLD ROAD
NORMAN PARK
NORMAN AVENUE
SPAINES ROAD
YEW STREET
Chap.
267·3
Flash House
Sibthorpe Terrace
B.M. 268·5
Old Shaft
Tanks
BRADFORD ROAD NORTH
FARTOWN GREEN ROAD
L. & N. W. R.
HUDDERSFIELD & MANCHESTER LINE
Hillhouse Sidings
B.M. 263·5
OLIVE STREET
HONORIA STREET
HILLHOUSE
KING CLIFF ROAD
WHEAT HOUSE ROAD
ARNOLD ROAD
Sch.
Shaft
Brick Works
SIR J. RAMSDEN'S CANAL
Towing Path
Pavilion
Cricket Ground
Dye Works
B.M. 197·2
Lock

Date: 1904

Appendix D – Geological Maps

Superficial Geology



Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, MID PLEISTOCENE - SAND AND GRAVEL
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- LACUSTRINE DEPOSITS - CLAY AND SILT

Bedrock Geology

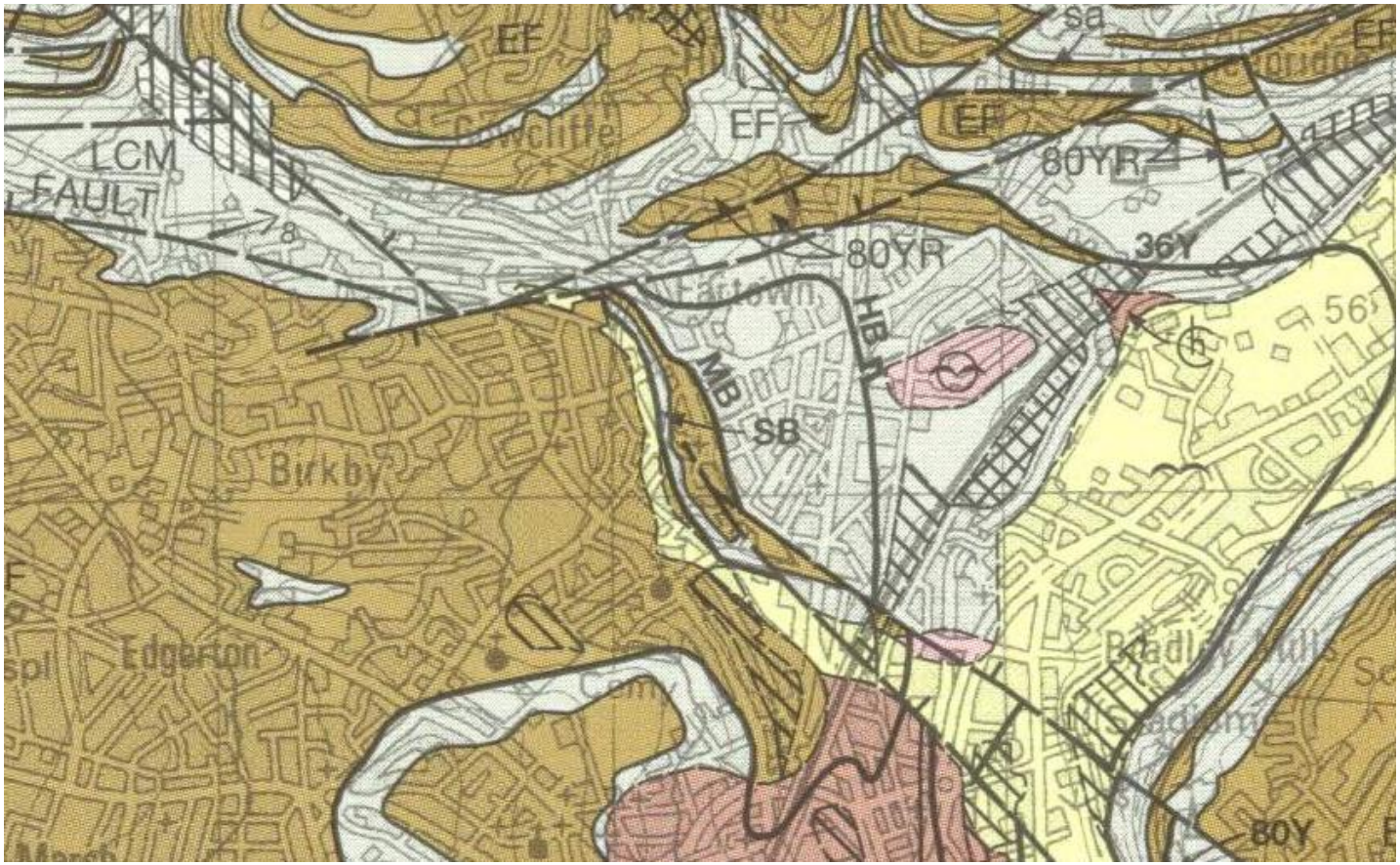
Bedrock geology 1:50,000 scale

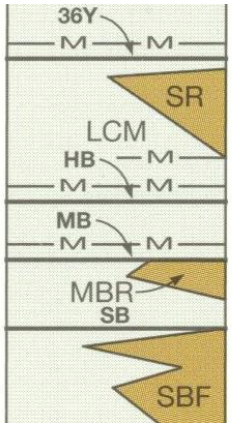
- PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE
- UNNAMED SANDSTONE OF YEADONIAN AGE (IN MILLSTONE GRIT GROUP) - SANDSTONE
- ROUGH ROCK FLAGS - SANDSTONE
- CLIFTON ROCK - SANDSTONE
- HUDDERSFIELD WHITE ROCK - SANDSTONE

Linear features 1:50,000 scale

- Coal_seam_Inf
- Fault_Inf_Crossmark_on_downthrow_side
- Marine_band

BGS Geological Survey 1:50,000 Series England & Wales Sheet 77, Huddersfield





Meadow Farm Marine Band
36 YARD COAL and
HARD BED BAND COAL (36Y) 0 to 0.5 m
STANNINGLEY ROCK (0 to 23 m)
Parkhouse Marine Bands
Listeri Marine Band
HARD BED COAL (HB) 0.1 to 0.8 m
Honley Marine Band
MIDDLE BAND COAL (MB) 0 to 0.6 m
MIDDLE BAND ROCK (0 to 10 m)
SOFT BED COAL (SB) 0 to 0.8 m

SOFT BED FLAGS (0 to 25 m)

Appendix E – BGS Borehole Logs

SE11NW405

Norwest Holst Soil Engineering Ltd.

Borehole No. 1

BOREHOLE LOG

Contract No. F6274
Location Huddersfield Fartown
Client Geoffrey Thompson & Associates
Method of Boring Rotary (Air Flush)
Diameter of Borehole 140mm to 3.0 m, then 105mm

Sheet 1 of 4
Chainage
Ground Level 48.40 m.A.O.D.
Date 14/12/84

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
TOPSOIL		0.40	48.0		TCR%		14/2
Firm, brown, silty, slightly coarse sandy CLAY		4.00	44.4	140mm 14/12	3.00		
Light grey, very silty, slightly fine sandy, thinly laminated highly weathered, shaly, MUDSTONE, very weak and with much iron staining		7.00	41.4		33 6.00 50 7.00	0 0	
Grey, silty, thinly laminated, slightly weathered MUDSTONE, very weak					100 10.00	0	

Type of Sample

S.P.T. Undisturbed
C.P.T. Vane
Jar Water
Bulk Piezometer

Remarks (Observations of Ground Water etc.)

Air returns lost 29.30 - 29.80
Water struck at 4.20 m casing at 3.00 m - medium inflow.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Norwest Holst Soil Engineering Ltd.

Borehole No. **1**

BOREHOLE LOG

Contract No. F6274
Location Huddersfield Fartown
Client Geoffrey Thompson & Associates
Method of Boring Rotary (Air Flush)
Diameter of Borehole 140mm to 3.0m then 105mm

Sheet 3 of 4
Chainage
Ground Level 48.80 m.A.O.D.
Date 14/12/84

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Dark grey, silty, thinly laminated, fresh MUDSTONE, weak and with frequent plant traces					TCR%		
					100	27	
... slightly silty from 20.40-23.10 m							
					22.00		
					100	35	
					25.00		
... very silty and fine sandy from 25.80 m - 26.90 m							
					100	65	
					28.00		
VOID		29.30	19.1				
					83	30	
Grey, slightly silty, fine grained, fresh SANDSTONE, strong and with many random very silty partings		29.80	16.6				

Type of Sample

Is S.P.T. ■ Undisturbed
Ic. C.P.T. × Vane
O Jar Δ Water
● Bulk Piezometer

Remarks (Observations of Ground Water etc.)

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Norwest Holst Soil Engineering Ltd.

Borehole No. **1**

BOREHOLE LOG

Contract No. F6274
Location Huddersfield Fartown
Client Geoffrey Thompson & Associates
Method of Boring Rotary (Air Flush)
Diameter of Borehole 140mm to 3.0 m then 105mm

Sheet 4 of 4
Chainage
Ground Level 48.80 m.A.O.D.
Date 14/12/84

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
Grey, slightly silty, fine grained, fresh SANDSTONE, strong and with many random very silty partings		30.70	17.7		TCR% 83	30	
Dark grey, fresh carbonaceous MUDSTONE, very weak and with many plant traces		31.00	17.4		31.00		14/12

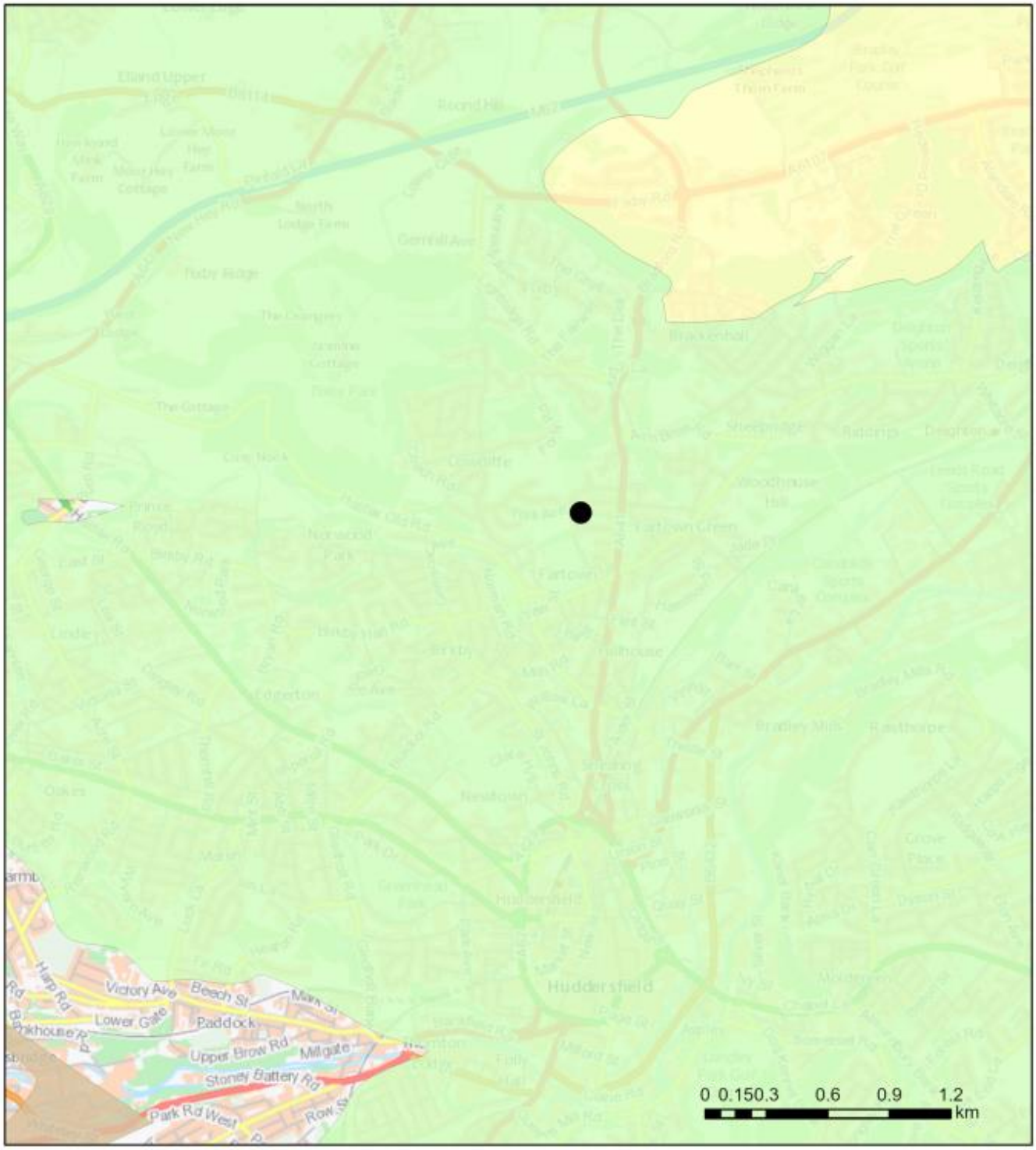
Type of Sample

- Is S.P.T.
- Ic. C.P.T.
- O Jar
- ● Bulk
- ■ Undisturbed
- × Vane
- Δ Water
- Piezometer

Remarks (Observations of Ground Water etc.)

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Appendix F – Coal Resource Map



Deep Coal

Deep coal at more than 1200m

Deep coal between 50m and 1200m

Shallow Coal

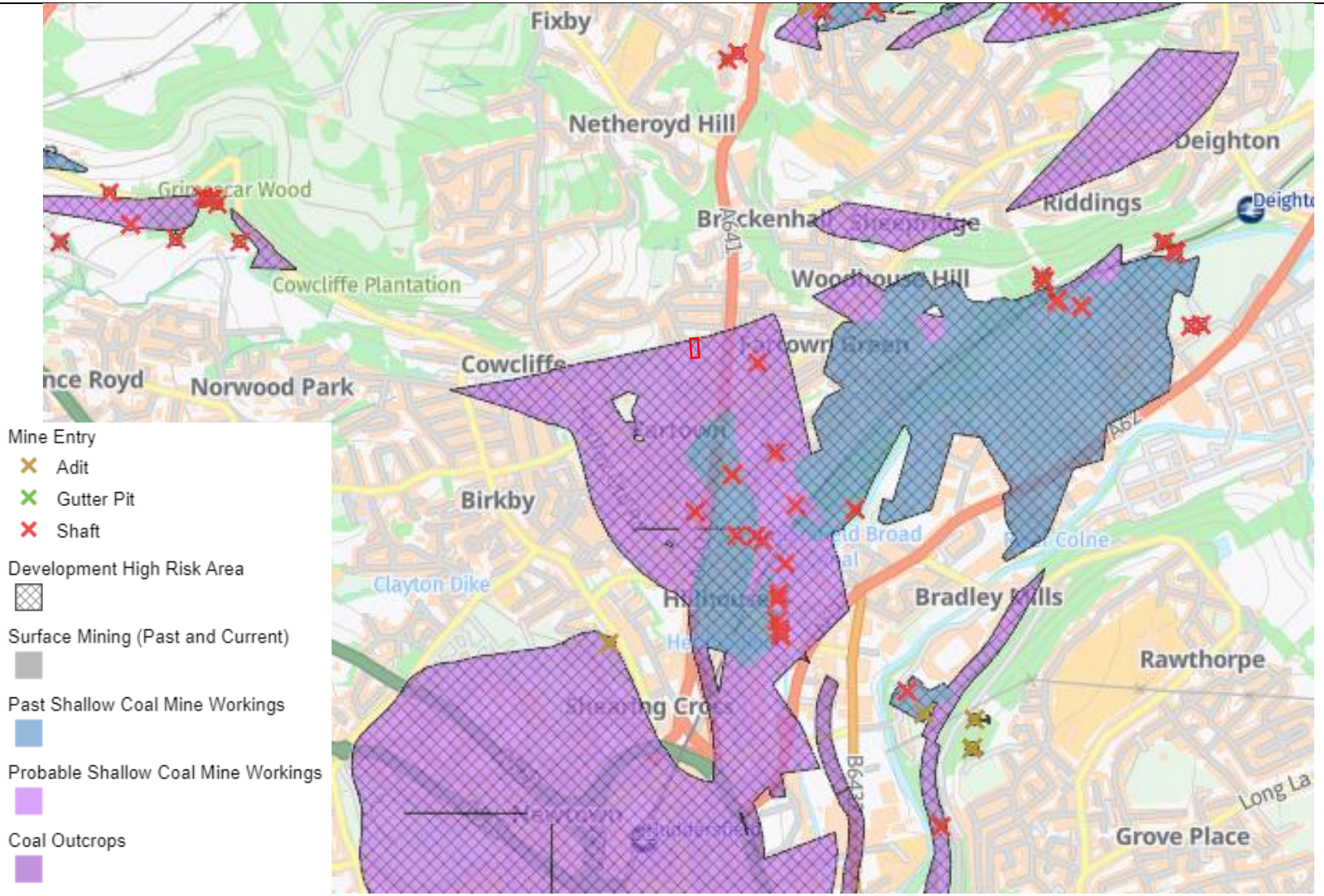
Buried coal resource overlain by up to 50m overburden

Primary opencast coal resource area

Secondary opencast coal resource area

Tertiary opencast coal resource area

Appendix G – Coal Mining Summary Map



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Coal Mining Summary Map