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Coal Mining Risk Assessment

Park Barn

Hopton Hall Lane

Mirfield

WF14 8EP

Date: 2nd December 2024

Version 1

ENVIROSOLUTION LTD

Suite 53
3a Bridgewater Street
Liverpool
L1 0AB

enviro|solution

EnviroSolution Ltd

Document Verification

Site Address	Park Barn, Hopton Hall Lane, Mirfield, WF14 8EP		
Report Title	Coal Mining Risk Assessment		
Job Number	ES03459	Document Ref.	ES03459
Date Issued	2nd December 2024	Report Version	1
Prepared by	Angel Arantegui PhD MSc BSc FGS	Signature	
Checked by	Tom Craig MSc BSc (Hons) FGS	Signature	
Checked by	Phil Shelton PhD BSc CEng MIMMM FGS	Signature	

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 new development is located at Park Barn, Hopton Hall Lane, Mirfield, WF14 8EP. The British National Grid Reference for the approximate site centre is GR: 419735 418690.

The site is irregular in shape and covers an area of approximately 660 square metres. The site is currently used as a small football playing field covered in artificial turf. An area of soft landscaping is present in the eastern half of the site.

The site is located on the northwestern slope of a topographic spur that plunges towards the east northeast. The elevation at the site is approximately 130m aOD. The site then falls to the north and east and rises to the south and west.

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

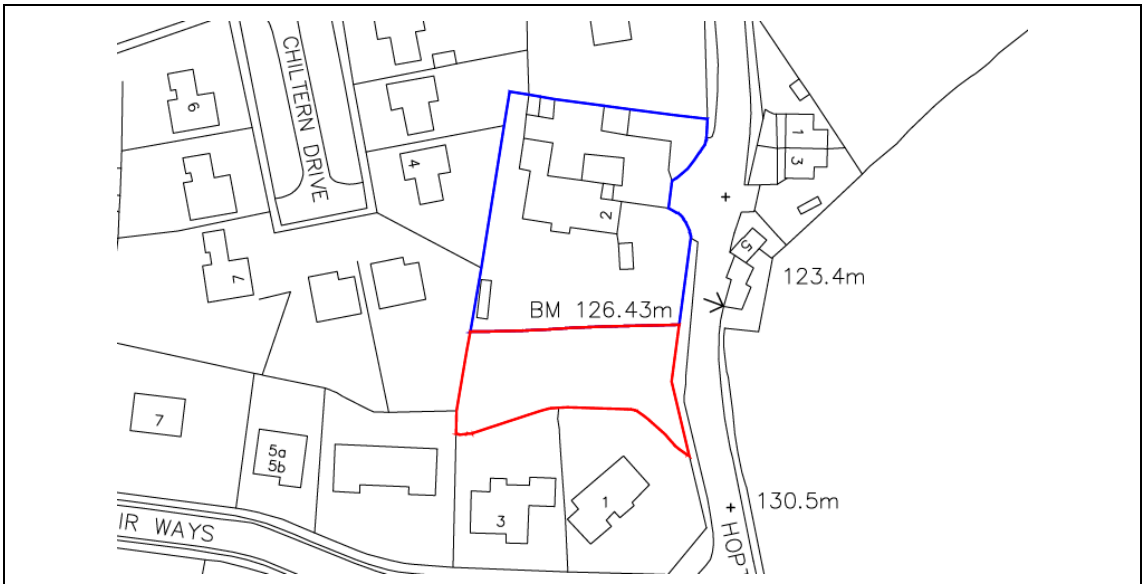


Figure 1) Site Location Map

1.2 Development Proposal

It is understood that the development proposal includes the construction of a detached dwelling with associated vehicle access along with parking and landscaping.

The development plans are included in **Figure 3** in **Appendix A**.

1.3 Scope of Coal Mining Risk Assessment

EnviroSolution Ltd (ES) 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 if necessary) to address these risk(s).

The CMRA has been undertaken in accordance with the principles of best practice including the Mining Remediation 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) and CIRIA "C758D Abandoned Mine Workings Manual" (2019) (Ref. 3), CIRIA, Publication C665, Assessing risks posed by hazardous ground gases to buildings (Ref. 4) and CL:AIRE "Good Practice for Risk Assessment for Coal Mine Gas Emissions", October 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 2nd December 2024 (Ref: 51003466522001 **Appendix B**);
- BGS Geoindex geological map;
- BGS geological 1:50,000 England and Wales Sheet 77 Huddersfield;
- Geology of the Huddersfield district — a brief explanation of the geological map Sheet 77 Huddersfield. 2005;
- Mining Remediation 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 D**.

Table 1 - Historic Mapping Review

Date	Scale	Historic Mining Activity
1850	1:10,560	- The site is undeveloped and lies within an agricultural field. - Sandstone quarries are located along strike parallel to the site. - Coal pit located 150m southeast of the site.
1888	1:10,560	- Coal pit and quarries no longer marked on the map.
1904	1:10,560	- No significant change.
1948	1:10,560	- No significant change.

2.2 Geological Context

The BGS geological mapping (Geoindex and BGS Sheet 77 Huddersfield) shows that natural superficial deposits are absent and that the site is directly underlain by bedrock consisting of the Pennine Lower Coal Measures Formation, which is of Carboniferous age. The Pennine Lower Coal Measures Formation in the local area generally consists of interbedded grey micaceous mudstones and siltstones with thick pale grey sandstones, ironstone, coal seams and seatearths. According to the BGS, the bedrock has a regional dip of about 4° towards the east/southeast – **See Appendix D**.

The nearest geological fault is located approximately 390m southwest of the site boundary with an approximate trend of 100° (Whole Circle Bearing). The fault downthrows towards the south.

A BGS borehole record (SE11NE167) has been obtained from BGS online records from 1.68km west of the site. The borehole shows 1.50m of medium dense sandy soil and firm clay overlying weathered deposits of shale.

Coal outcrops are shown to be located in close vicinity to the site (see **Figure 2**) that may be encountered at shallow depths beneath the site and could potentially have unrecorded abandoned workings. EnviroSolution notes a discrepancy between the BGS 1:50,000 scale geological map and the Coal Authority records in the name of the proximate seam, noted as both the Whinmoor (0 – 0.90m) and Shertcliffe Coal (0 – 0.80m), both labelled as being within the 'Beeston Group of Coals'. The BGS note that the various local names used in the past were not applied consistently across the district which may explain the discrepancy in seam name. The Beeston Group of coals was widely worked underground and from opencast sites around Lepton.

None of the proximate coal seams in this area have a history of spontaneous combustion.

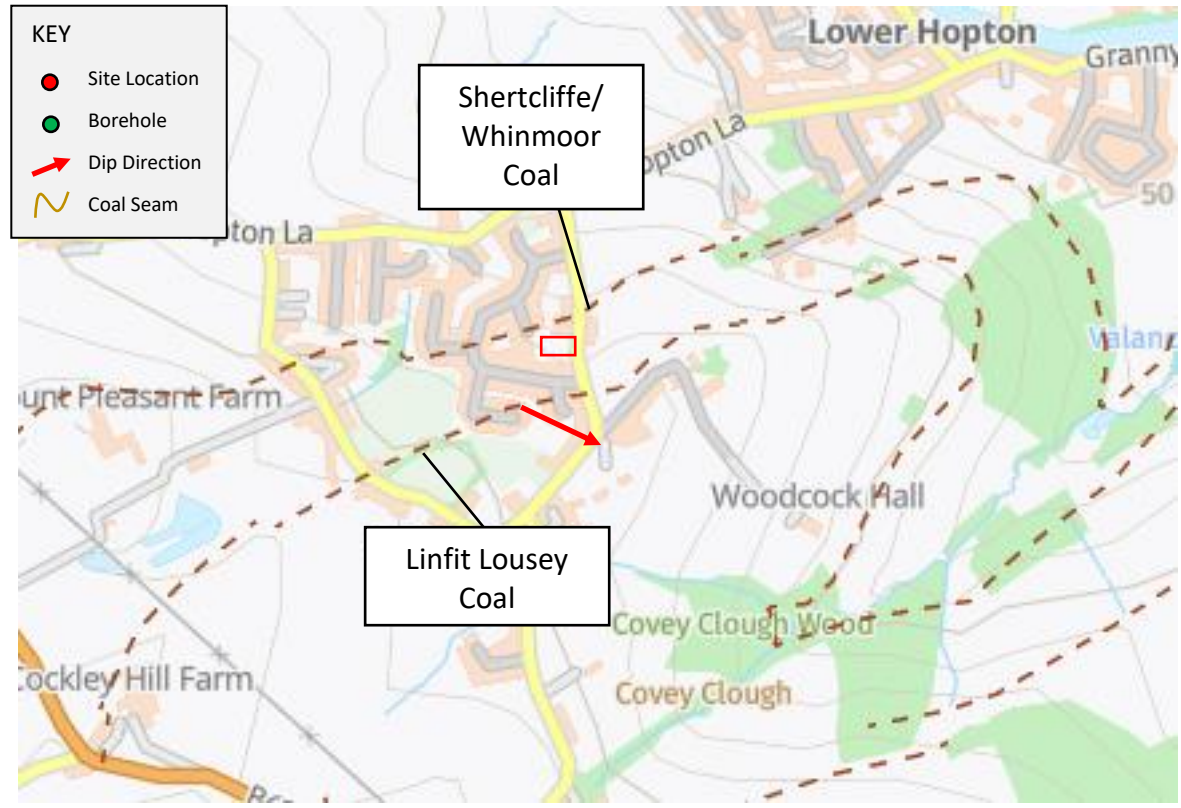


Figure 2) Coal Seam Location Map (Coal Authority Interactive Viewer)

The site is situated within a Primary Opencast Coal Resource Area (**Appendix F**). The Primary Opencast Coal Resource Area is defined by the BGS as "an area that constitutes the main target for opencast coal extraction and comprises a relatively closely spaced succession of variable but generally thick coals". Notwithstanding this, 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

Table 2 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 (DHRA) associated with the presence of a nearby coal seam and the potential presence of unrecorded historic shallow coal mine workings.

The report obtained from the Coal Authority revealed that the property is in a surface area that is affected by recorded underground mining in 2 no. seams of coal at depths of between 75m and 113m bgl. The seams were last worked in 1912.

Using the generally accepted 'rule-of-thumb' guidance that a competent rock strata thickness equivalent to at least ten times the extraction thickness provides adequate protection against crown-hole development and surface instability (Refs 2 and 3), the workings can be considered to be at such a depth that the recorded workings would not result in surface subsidence and/or crown-hole development.

The Coal Authority report states that the property is in an area where the Coal Authority believe there is coal at or close to the surface, which may have been worked in the past (see Section 2.2). The Coal Authority has drawn attention to this and has stated that the presence of unrecorded shallow coal mine workings should be considered.

The Coal Authority report states that they are aware of a single recorded mine entry within 100m of the development site boundary. This relates to an adit (419418-002) located 70m southwest of the site. The zone of influence around adits is generally less onerous than vertical shafts and therefore the adit can be considered to be at a sufficient distance from the site so that it does not pose a risk.

Notwithstanding this, there may be mine entries in the vicinity that have not been recorded.

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.

The Coal Authority mining report states the property is not within the boundary of a historic or current opencast site, and there are no license requests outstanding to remove coal via this method in the future. The risk posed to the site from opencast mining methods is therefore considered to be negligible.

4 Proposed Mitigation Strategy

- The area of influence of recorded mine entries around the site do not intersect with the site boundary. However, the presence of unrecorded mine entries is possible. The potential risk can be dealt with through vigilance during the earthworks stage of construction.
- It is recommended that a minimum of 3 no. rotary boreholes are advanced to a minimum depth of 20m 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.

5 Conclusions

The Coal Mining Risk Assessment for the site at Park Barn in Mirfield has concluded that the potential risk associated with coal mining related issues cannot be ruled out based on information from the Coal Authority and geological interpretation.

The principal risks to the development arise from:

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

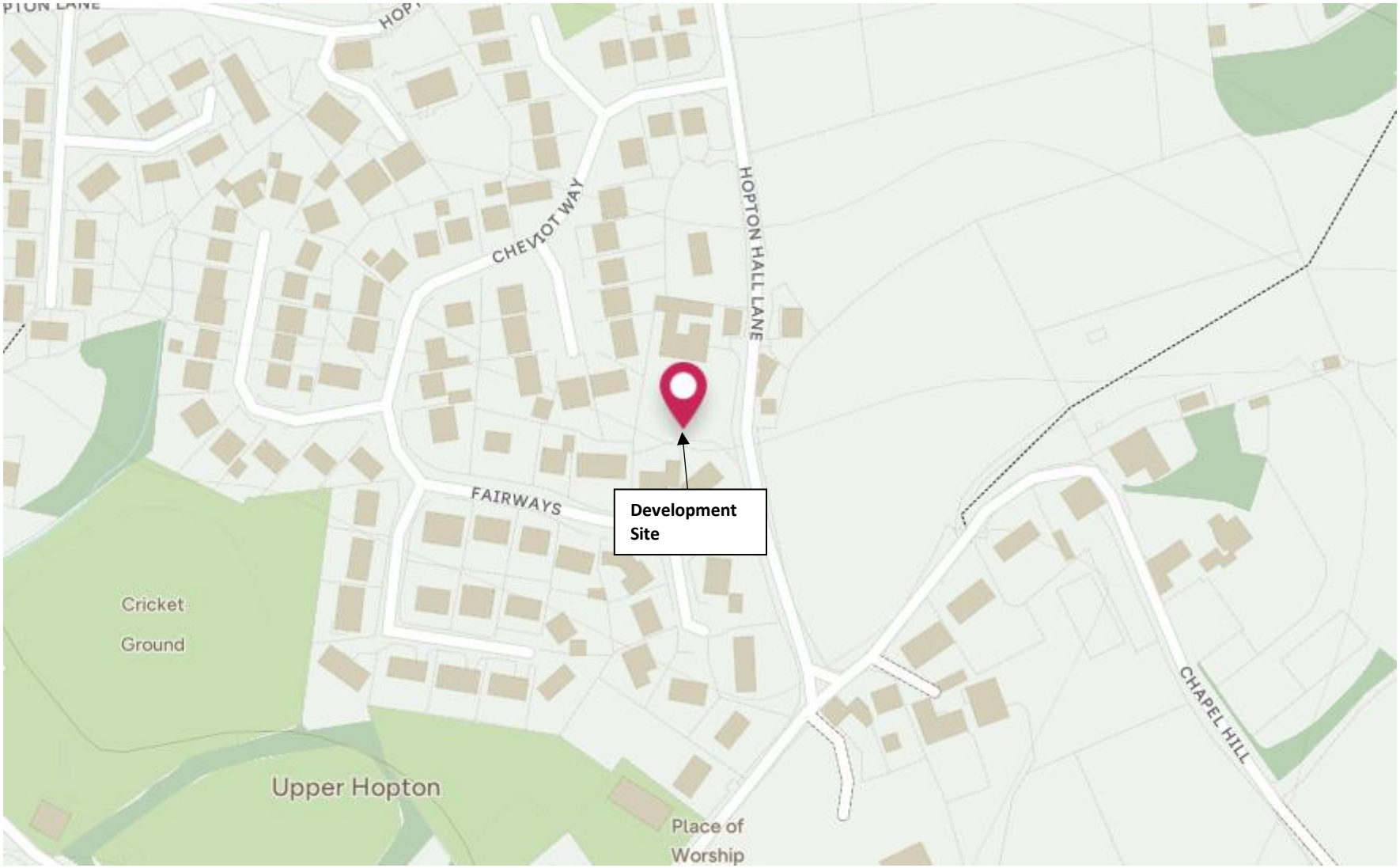
It is therefore recommended that further intrusive ground investigations are undertaken. These might include the drilling of a minimum of 3 no. rotary probe borehole(s) to a minimum depth of 20m bgl, located close to the proposed development to obtain evidence of potential unrecorded coal mine workings.

Prior to the commencement of intrusive works, a Coal Authority Permit will be required for drilling 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.

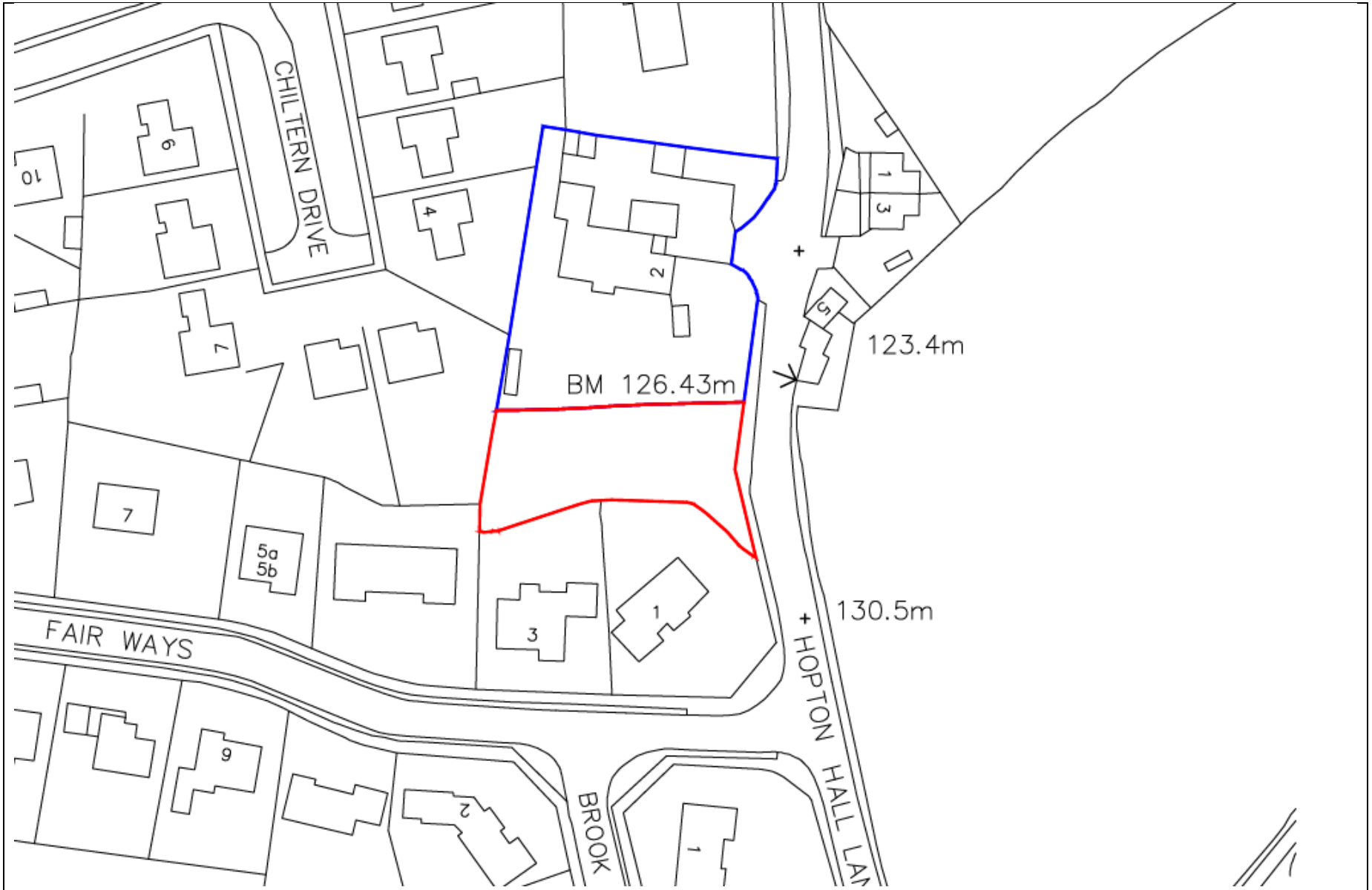
6 References

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.
6. Geology of the Huddersfield district — a brief explanation of the geological map Sheet 77 Huddersfield. 2005.

Appendix A – Site Location



enviro | solution	**Site Location Map**



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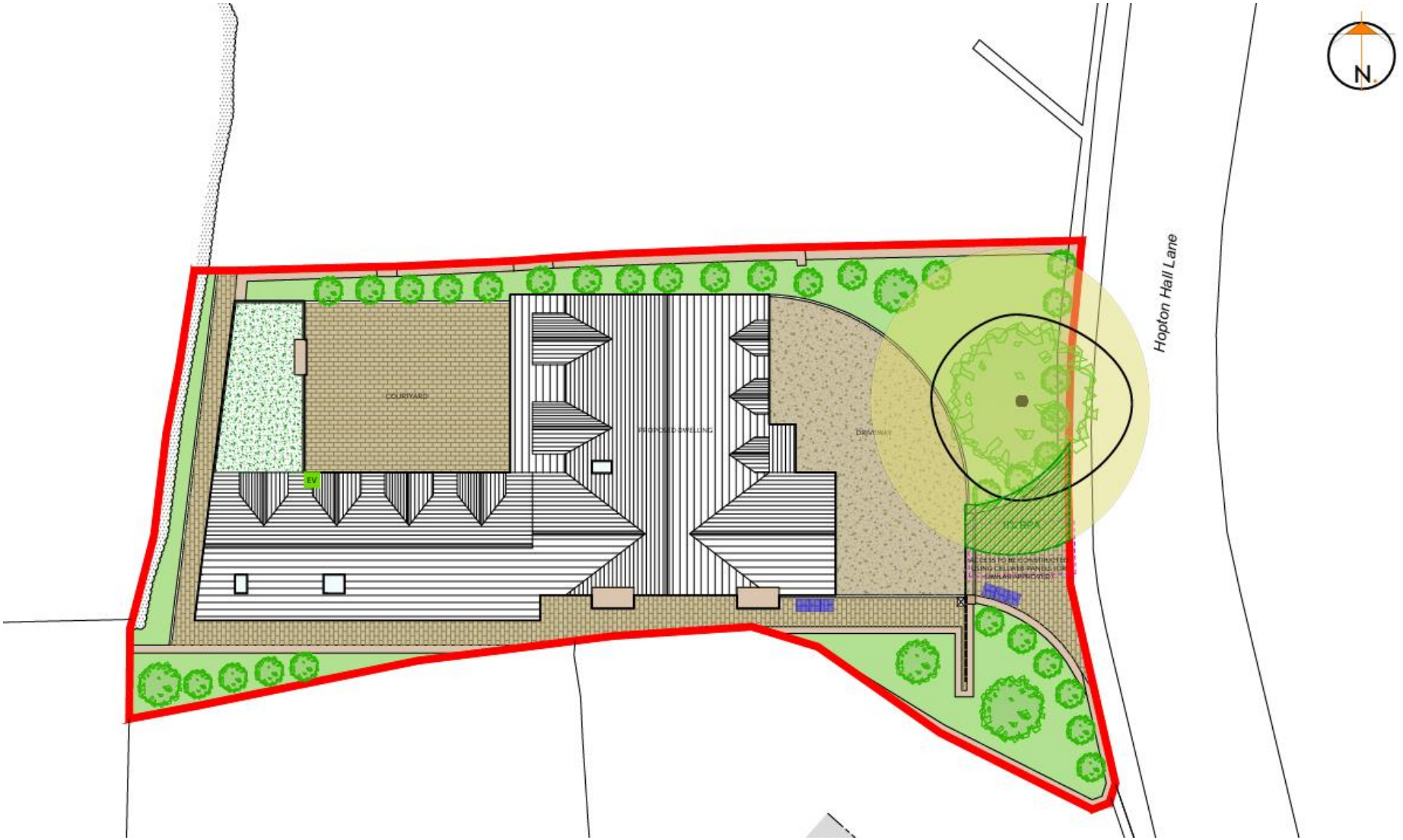
Existing Site Plan



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Proposed Development Plan

Appendix B – Coal Authority Report

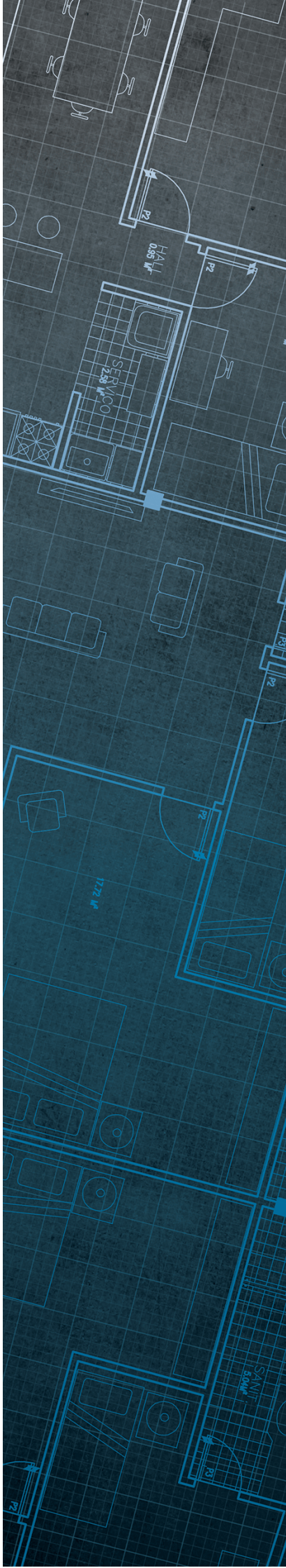
The Coal Authority

Consultants

Coal Mining Report

PARK BARN Hopton Hall Lane
Upper Hopton
Mirfield
Kirklees
WF14 8EP

Date of enquiry:	**2 December 2024**
Date enquiry received:	**2 December 2024**
Issue date:	**2 December 2024**
Our reference:	**51003466522001**
Your reference:	**Park Barn**



Consultants

Coal Mining Report

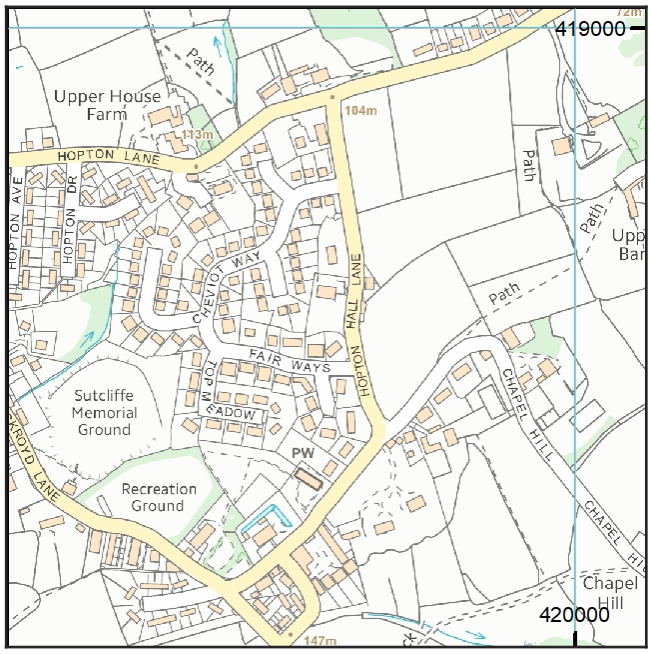
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

EnviroSolution Limited

Enquiry address

PARK BARN Hopton Hall Lane
Upper Hopton
Mirfield
Kirklees
WF14 8EP



Approximate position of property

Map data

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

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
unnamed	BLACK BED	Coal	6HDW	75	Beneath Property	4.2	East	76	1873
unnamed	BETTER BED	Coal	6HE3	113	Beneath Property	4.2	East	46	1912

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	419418-002	419675 418623		Coal	

Abandoned mine plan catalogue numbers

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

LF23	LF26	FGB462
PO0	LF20	11054
LF25	2056	1366

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

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
WHINMOOR	Coal	Yes	34.1	North	72

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

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

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.

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.

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. 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

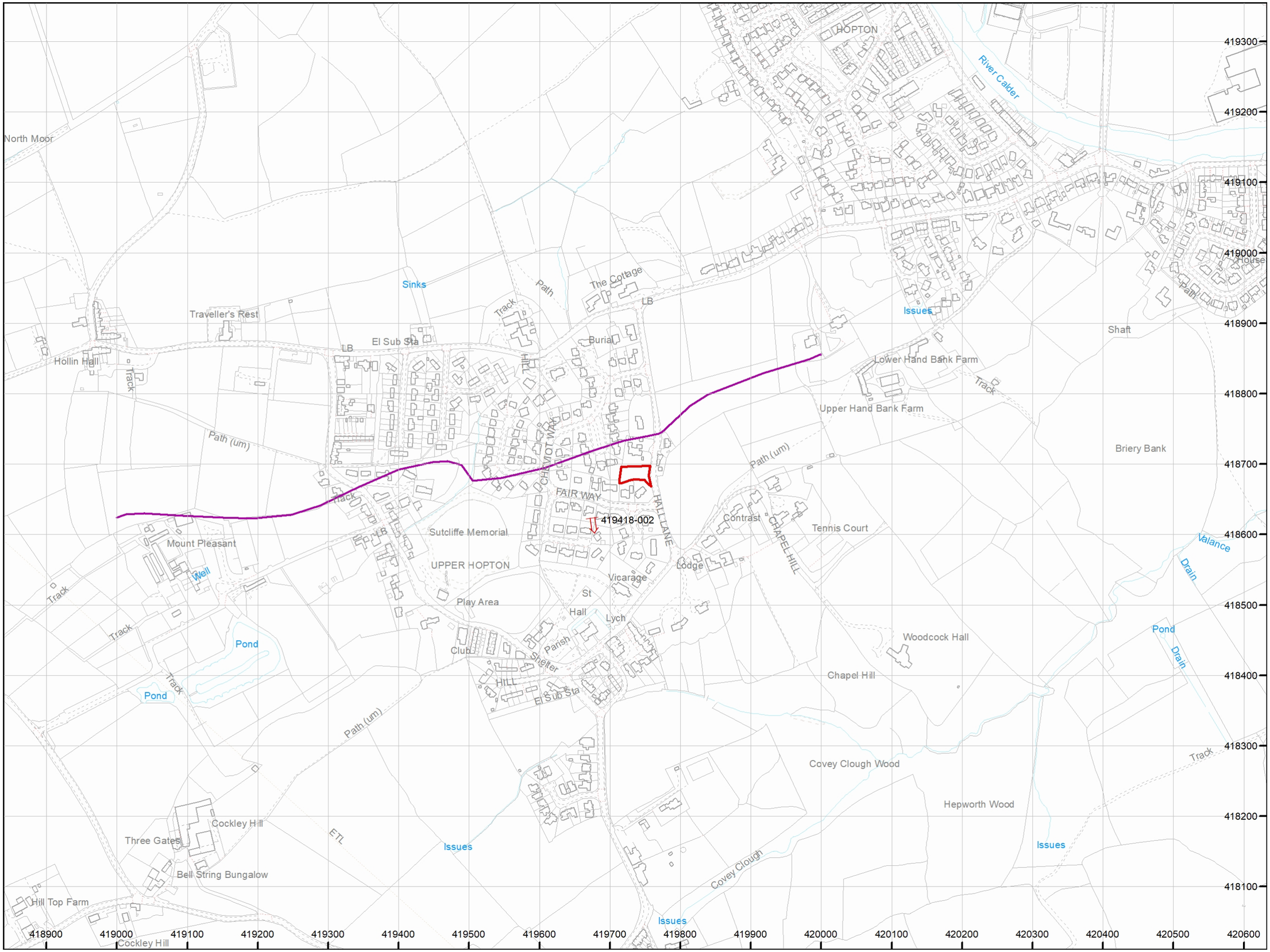
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown

Disused adit

Outcrop (Proven)



How to contact us
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+44 (0)1623 637 000 (International)
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Appendix C – Historic Maps

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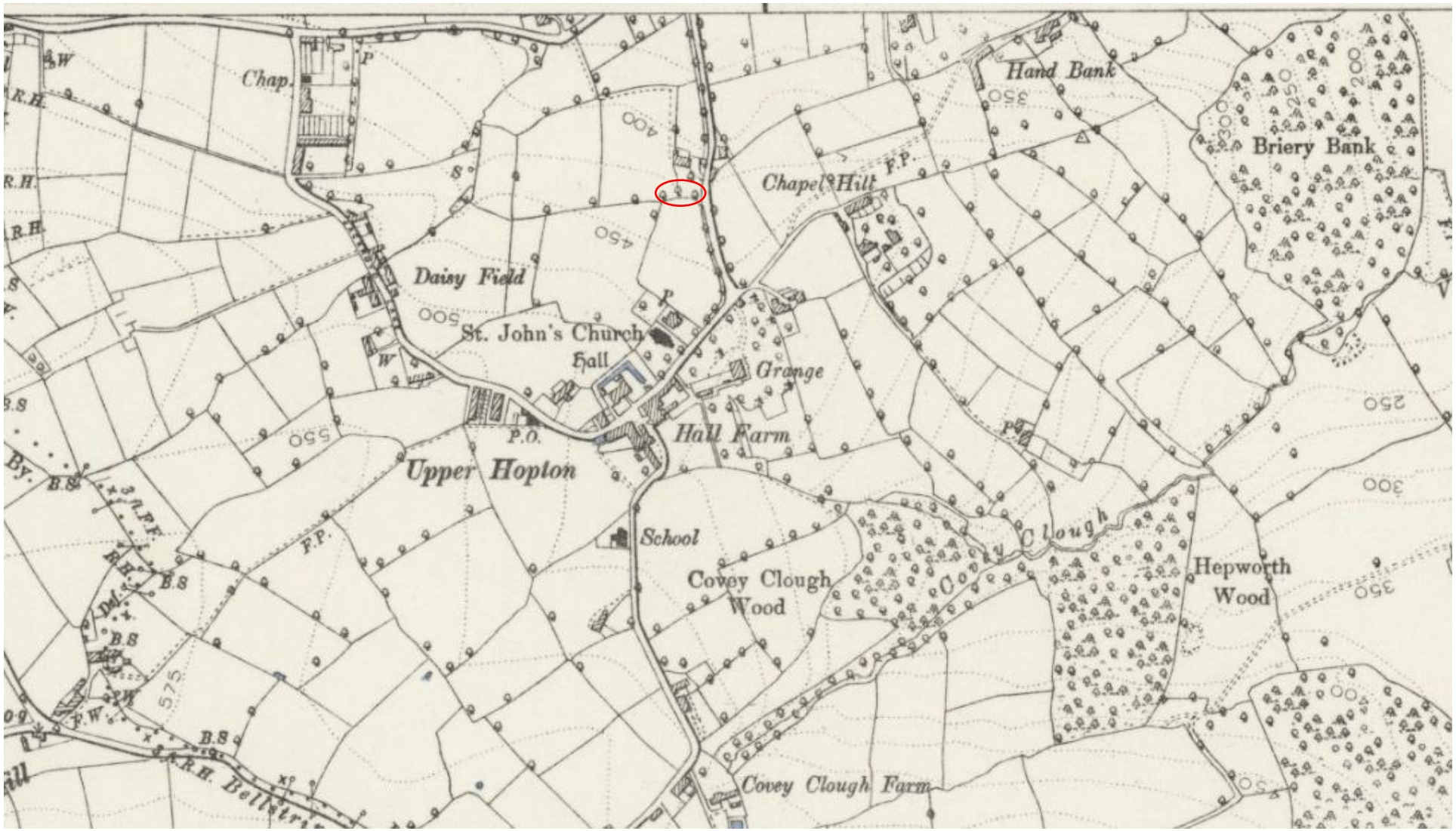
Date: 1850
Scale 1:10,560



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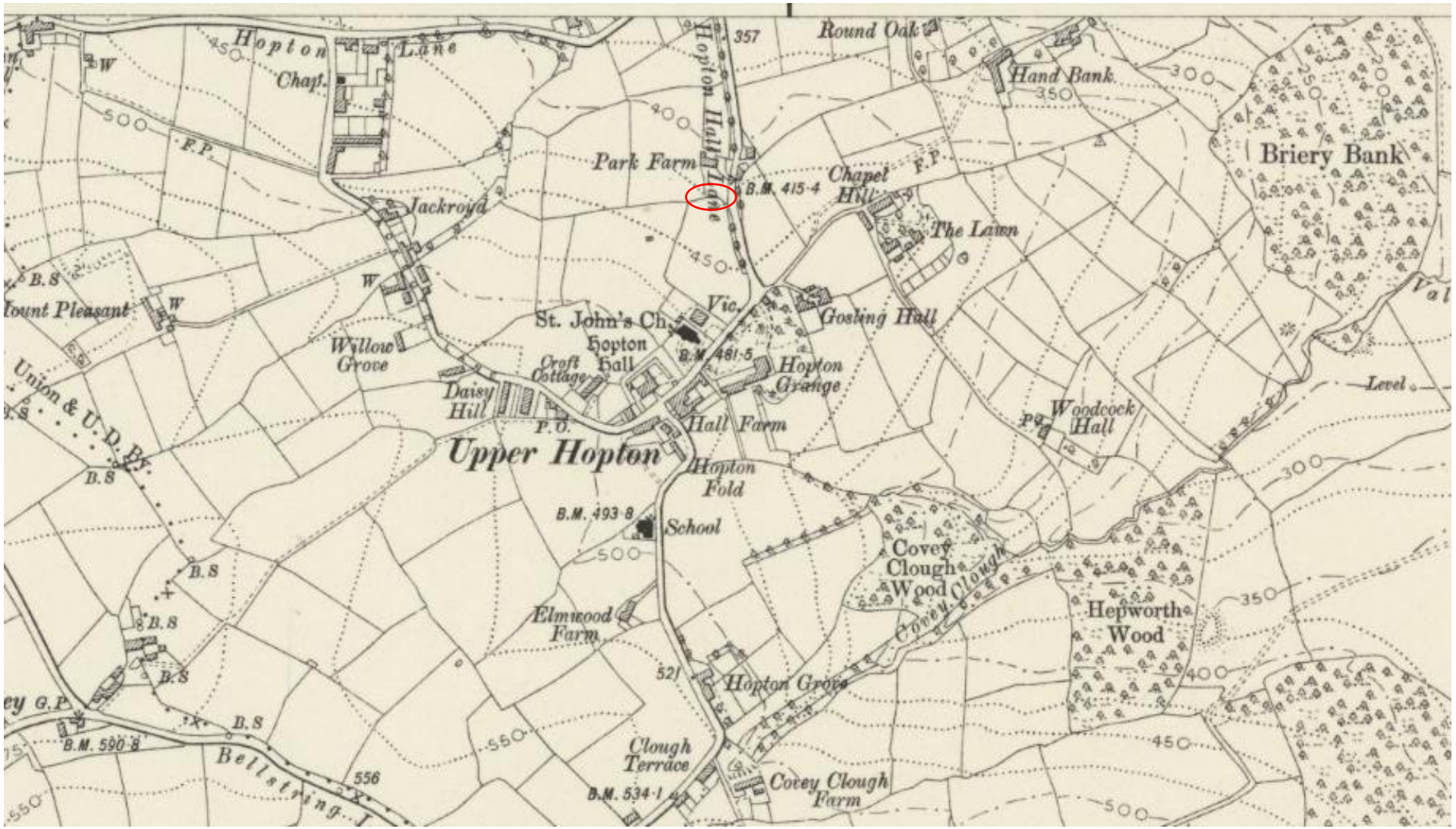
Date: 1888
Scale 1:10,560



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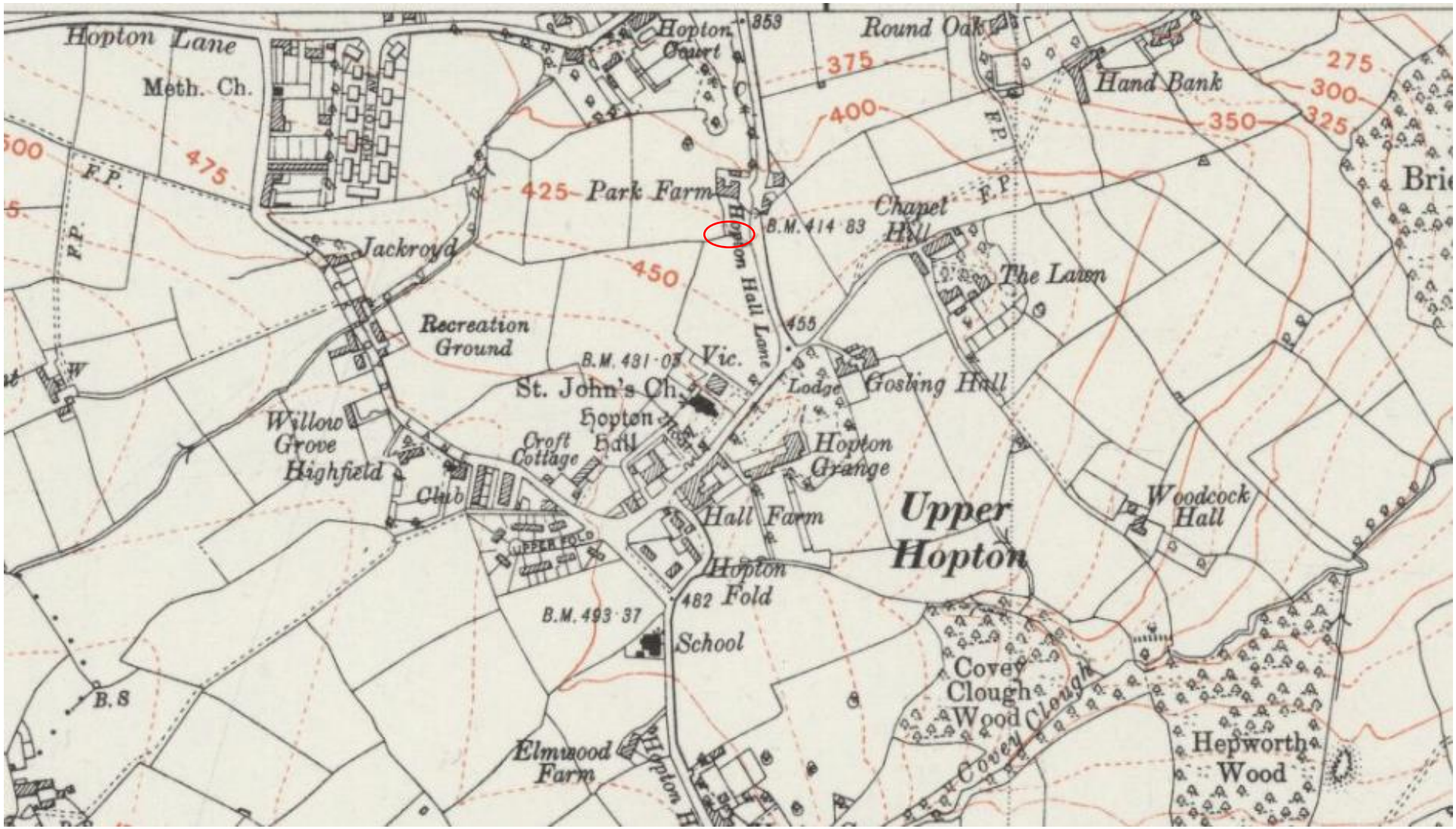
Date: 1904
Scale 1:10,560



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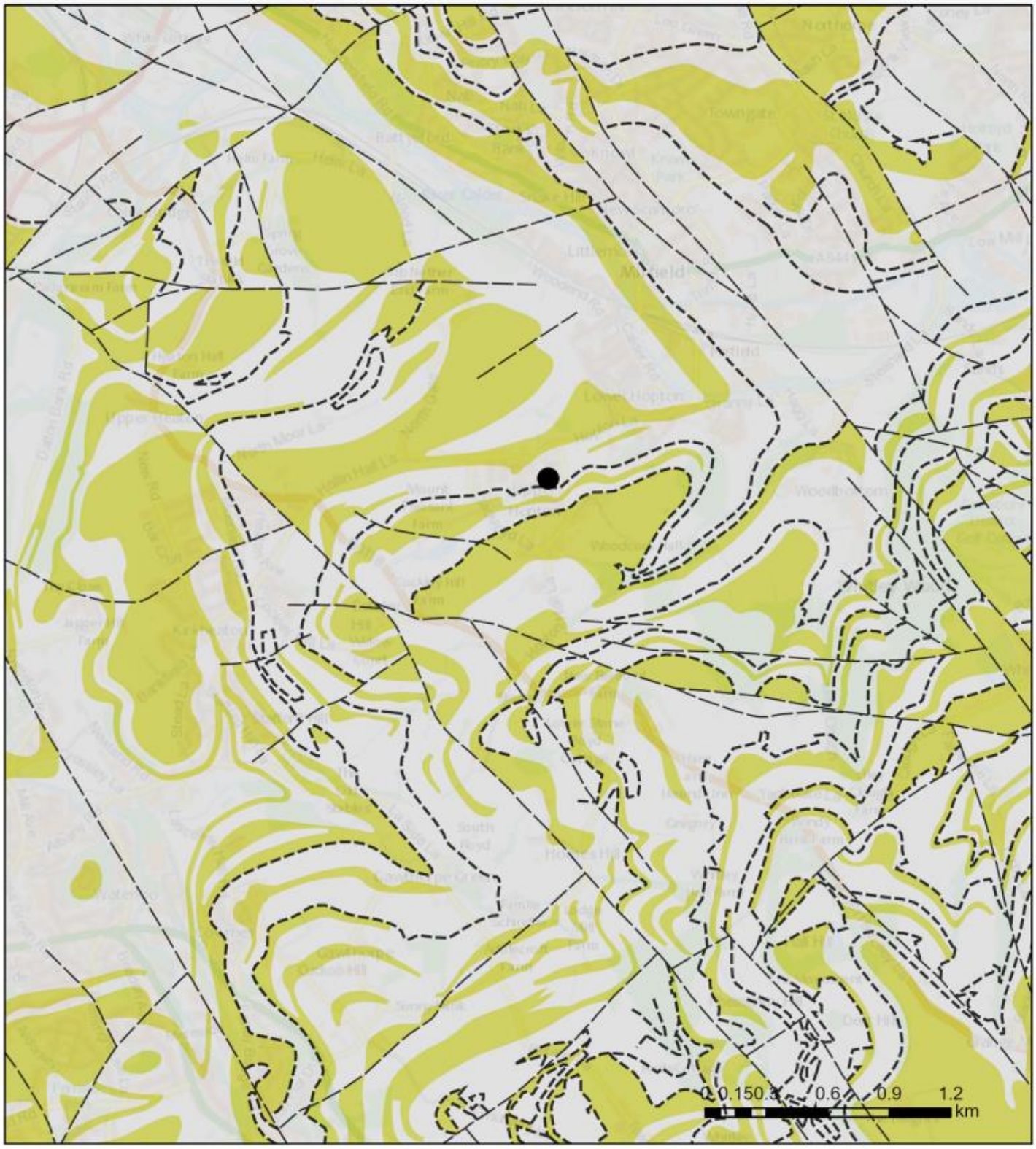
Date: 1948
Scale 1:10,560

Appendix D – Geological Maps

Bedrock Geology



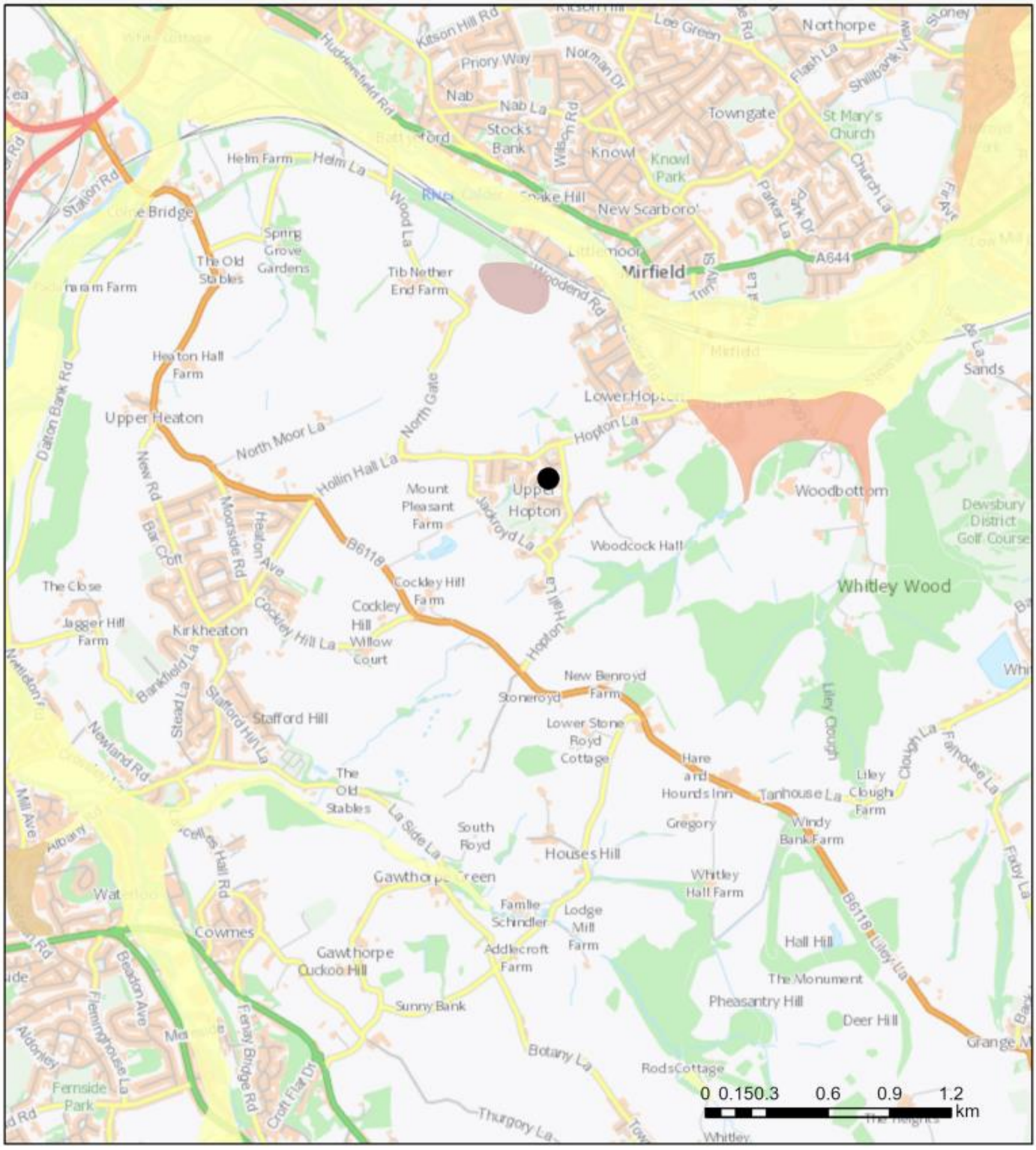
Linear features 1:50,000 scale

- Coal_seam_Inf
- Fault_Inf_Crossmark_on_downthrow_side
- Fault_Inf_Downthrow_unspecified
- Ironstone_bed_Inf
- Marine_band

Bedrock geology 1:50,000 scale

- PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- ROUGH ROCK - SANDSTONE
- PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- BIRSTALL ROCK - SANDSTONE
- CLIFTON ROCK - SANDSTONE
- ELLAND FLAGS - SANDSTONE
- EMLEY ROCK - SANDSTONE
- 80 YARD ROCK - SANDSTONE
- FALHOUSE ROCK - SANDSTONE
- GREENMOOR ROCK - SANDSTONE
- GRENOSIDE SANDSTONE - SANDSTONE
- KIRKBURTON SANDSTONE - SANDSTONE
- LEPTON EDGE ROCK - SANDSTONE
- MIDDLE BAND ROCK - SANDSTONE
- PENNINE LOWER COAL MEASURES FORMATION - SANDSTONE
- SOFT BED FLAGS - SANDSTONE
- STANNINGLEY ROCK - SANDSTONE
- THICK STONE - SANDSTONE
- PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE
- THORNHILL ROCK - SANDSTONE

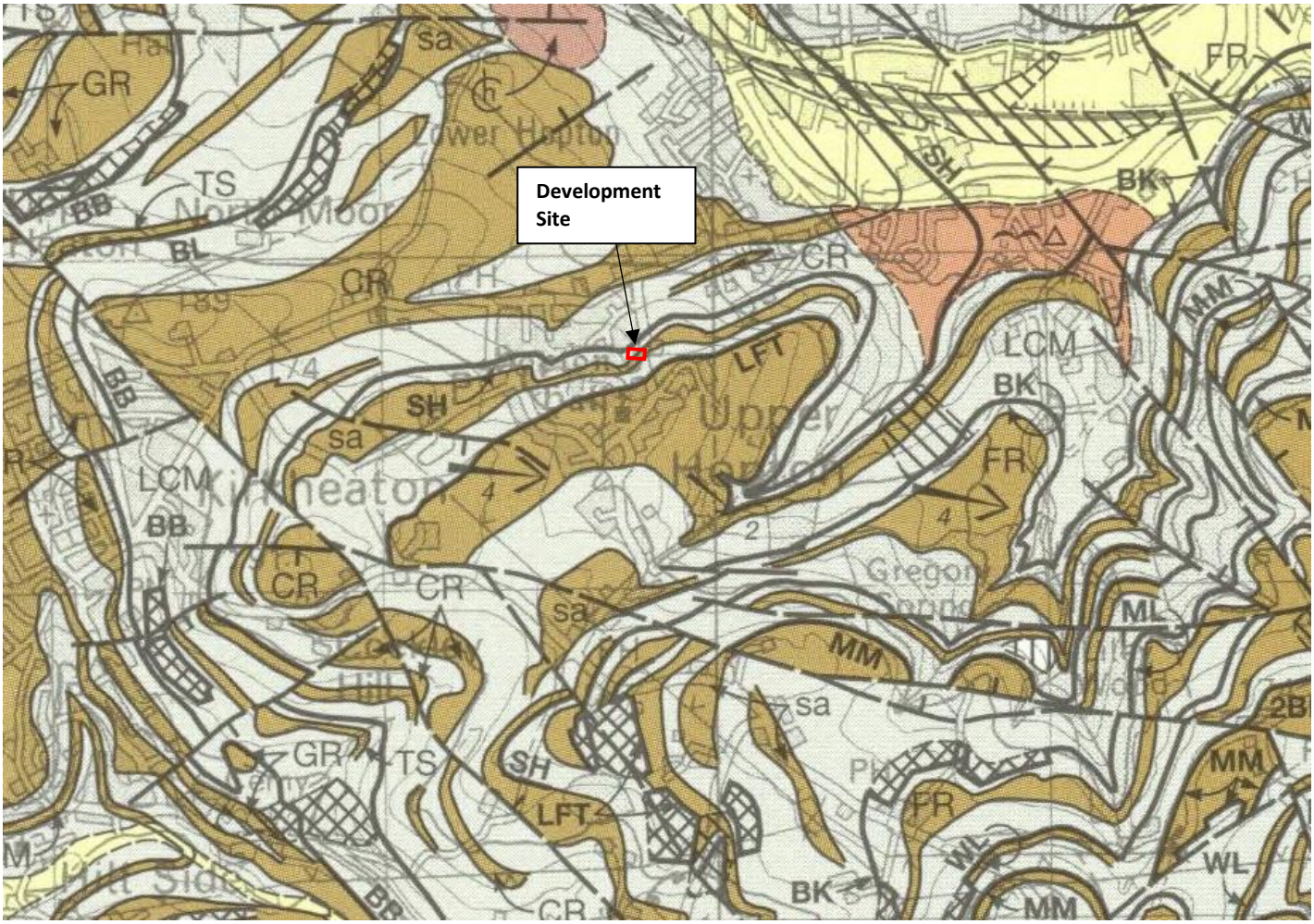
Superficial Geology



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
- RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) - SAND AND GRAVEL
- ALLUVIAL FAN DEPOSITS - SAND AND GRAVEL
- LACUSTRINE DEPOSITS - CLAY AND SILT

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



Appendix E – BGS Borehole Logs

SE11NE167

LOCATION: STAINCLIFFE WAY, KIRKHEATON

T.P.1

Method: EXCAVATED BY JCB

SE11NE 167

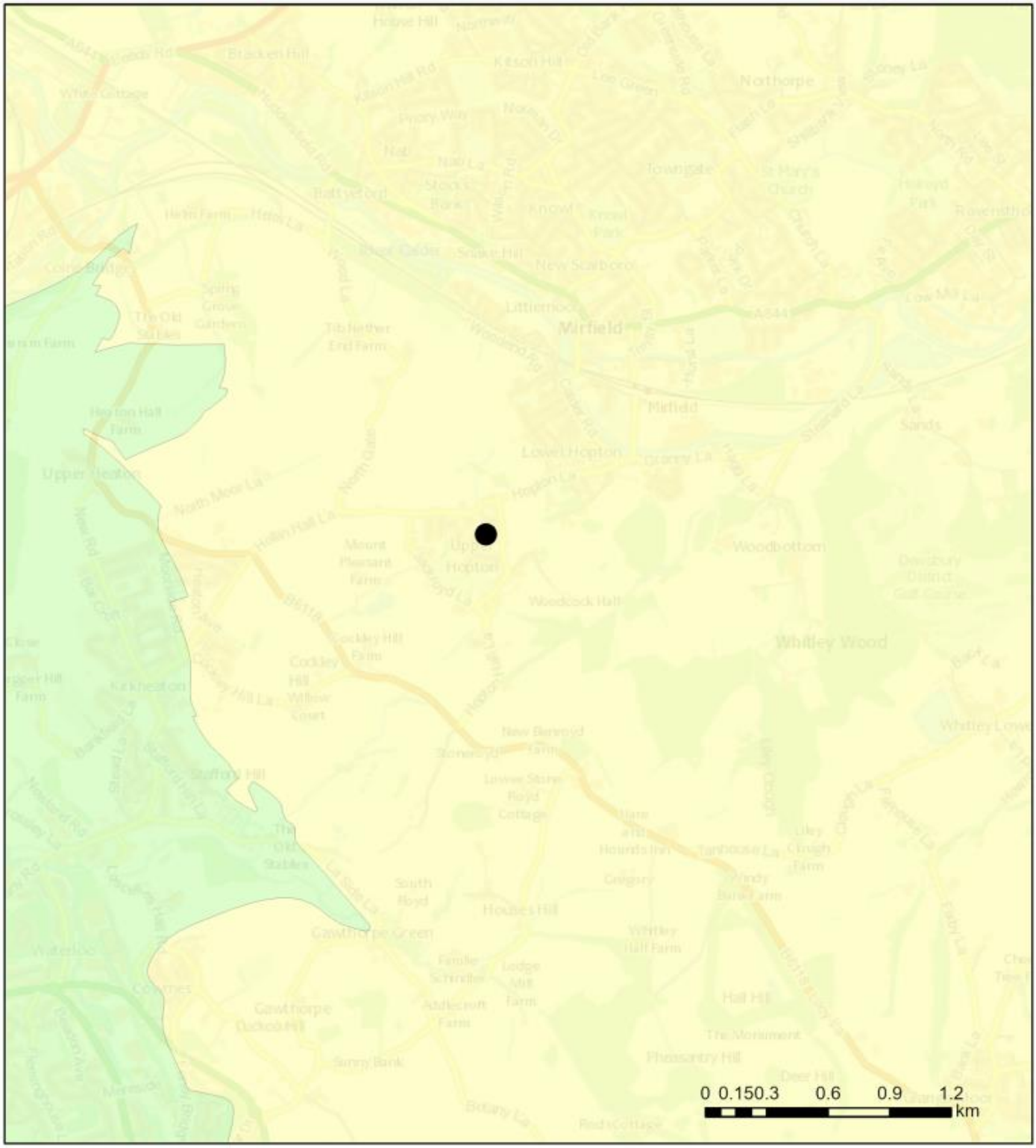
Date: 9 February 1988

Casing:

Sheet 1 of 2

R.L. m A.O.D.	DEPTH m	SOIL DESCRIPTION VERTICAL SCALE 1 : 25	SAMPLING No.	SAMPLING Depth	TEST	RESULT
0.0						
0.2		Dark Brown TOPSOIL				
0.9		Medium dense brown sandy and silty SOIL				
1.5		Firm light brown and grey silty CLAY (Slight seepage of water 1.45m)				
2.6		Dark grey and brown ironstained clayey SHALE Becoming less clayey below 2.0m				
		End of trial pit : dry Soakaway Test: Pit dimensions (plan) : 0.8m x 1.4m Time — Water level (m) 11.03 — 2.31 11.13 — 2.31 11.25 — 2.30 11.38 — 2.29				

Appendix F – Coal Resource Map



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

enviro | solution	**Coal Mining Summary Map**