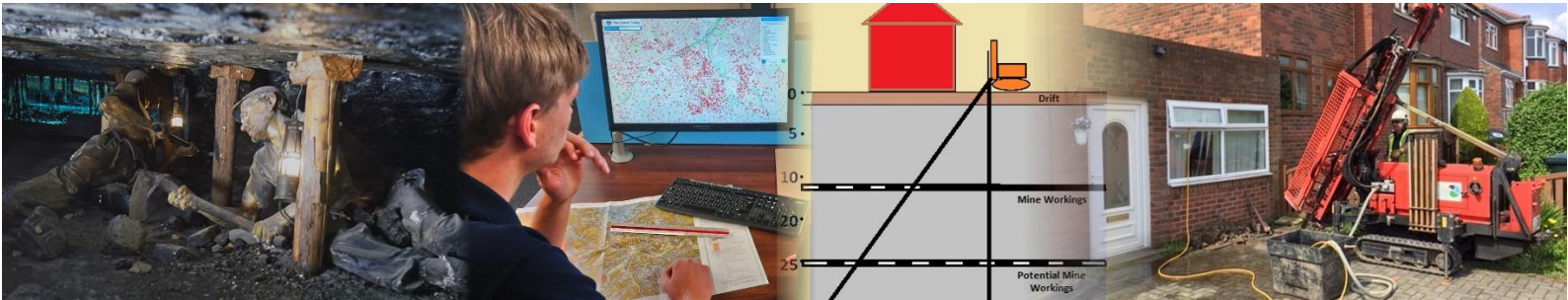




GEOLOGICAL
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 DRILLING & DATA ACQUISITION



GEOINVESTIGATE LIMITED

Coal Mining Risk Assessment (CMRA)

LOCATION	172 Raleigh Road, Ashton, Bristol BS3 2AR
ISSUE DATE	18 December 2023
FOR	Vito Bavetta
CLIENT REF.	
OUR REF.	G23454

Prepared by

Holly Lewis MEarthSci (Hons) FGS AIMMM
 Assistant Geoenvironmental Engineer

Checked by

Ross Nicolson BSc (Hons) MSc (Eng) CEng MIMMM
 Principal Geotechnical Engineer

1. CMRA INTRODUCTION & COAL MINING HAZARDS

1.1 Site Location and Description

The approximate centre of the site lies at 357296 E 171499 N with ground height about 9m aOD.

The boundary shown in RED on the Coal Authority (CA) report provided in Appendix A corresponds with the planning application area.

The site is currently occupied by a single garage and hardstanding patio space to the rear of 172 Raleigh Road. A site image is provided in Appendix B. It is proposed to remove the garage and erect a new two-storey house to the rear of the property as per the development plan in Appendix C.

1.2 Historical Maps

A desk study of limited available historical OS maps shows between 1830s to 1880s the site to be unoccupied open space with a spoil heap (possibly mining associated) to the east, New Colliery to the south and Fraynes Colliery to the southwest. The site remained unoccupied until the current housing development was established in the late 1940s.

No evidence of surface mining activity, clay, sand or gravel pitting or stone quarrying is recorded on the historical maps within, or within influencing distance of the property.

1.3 Anticipated Geology

The location of the site is shown on the extract of British Geological Survey (BGS) 1:10,000 Solid and Drift geology map (Sheet ST57SE) presented in Appendix D. This map shows older alluvial deposit of unknown thickness underlain by Middle Coal Measure Formation including several named coal horizons.

According to the geology map the ASGT Coal is expected around – 85m OD at the site locality or 94m surface ground level while the BEGT Coal is tentatively calculated to lie at around 30m depth. The coal/mine working strike lines shown on the map indicate that the strata dip to the southeast.

The stratigraphic column in Appendix E suggests 25m separation occurs between the BETP and the BEGT, so the BETP coal may lie at a depth of 5m beneath the new building or it may be absent depending on drift/bedrock depth at this locality.

Down-dip projection at 19 to 21 degrees southeast of the BEGT seam outcrop, mapped some 80m to the north of the site, places this coal at a depth of 27m to 36m below the new building and the BETP coal above it, at a depth of 2m to 10m.

The tentative elevation of the site relative to the vertical geology column minus the drift horizon is shown below the geology map.

BGS logs 170m or so to the west of the site record recent alluvial drift deposits to 10.37m depth (including thick and potentially highly compressible) peat, underlain by non-coal bearing Triassic bedrock to 23m in turn underlain by Middle Coal Measures strata, including thinner and thicker coal horizons (the latter found at depths around 30m, 53m and 64m) at this off-site locality. Whether similarly deep drift (including peat) underlies the new building is unknown but is considered, by Geoinvestigate, as unlikely, as the site is expected to be underlain by older drift deposits.

If 10m of superficial deposits are present beneath the site, the BETP coal and any mine workings in it may be absent within very shallow depth (i.e. < 10m) below the new building. However, drilling investigation is required to confirm this.

1.4 Mine Workings & Mine Shafts

The CA report in Appendix A identifies 2 levels of underground mining beneath the site in the Four Feet and Cromhall coals. In Geoinvestigate's opinion, both workings lie too deep to impact surface ground stability.

However, the CA report places the site in an area of probable shallow coal mine workings. The CA define Probable Unrecorded Shallow Workings as "*Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface*" (i.e., less than 30m).

Section 1.3 of this CMRA has identified the possible presence of very shallow, unrecorded, mine workings in the BETP coal horizon beneath the site, concurring with the CA report that a probable shallow mine working hazard exists at this locality.

In Geoinvestigate's opinion the possible presence of unrecorded mine workings within very shallow and shallow depth beneath the proposed new building poses a significant surface ground stability risk, requiring further intrusive site investigation.

Encouragingly the CA report does not identify any known mine shafts within 100m of the site boundary.

1.5 Geological Faults Fissures & Breaklines

The geological mapping and the CA report do not identify any faults, fissures, or breaklines within the site or within influencing distance of it.

1.6 Mine Gas

According to the CA report, no mine gas incident or remediation has been recorded within 500m of the enquiry boundary and typically on the UK coalfields mine gas risk to surface development is low. Circumstances where gas risk increases include proximity (typically < 50m) to mine entries (adits and shafts), proximity to recorded mine gas incidents, where development is located above or adjacent to very shallow and shallow (< 30m) unflooded mine workings or roadway tunnels.

Increased mine gas risk may also be attributable to instances with: coal seams with a history of spontaneous combustion, natural or artificial pathways providing routes for gas migration eg permeable soil cover, pathways created by geological faults, mining induced breaklines/fractures, collapsed mine roof strata, mining subsidence, mining sinkholes/crown holes and unsealed boreholes.

This CMRA has indicated that conditions may exist at this site increasing mine gas risk, namely the possible presence of very shallow mine workings.

However, the risk may be less as there have been no reported mine gas incidents at this locality and typically in the Bristol area mine gas is low risk.

2. RISK ASSESSMENT OF SITE-SPECIFIC COAL MINING ISSUES

The risk assessment methodology adopted in this section is based on CA publication RISK BASED APPROACH TO DEVELOPMENT MANAGEMENT - GUIDANCE FOR DEVELOPERS Version 3, 2014 and Version 4 - 2017. The template contained therein is broadly adopted in the table below with amendments made by Geoinvestigate Limited. The factual information it is based on, is derived mostly from the CA Consultants Coal Mining Report and additional desk study information including available historical maps, geological maps & memoirs, BGS boreholes, online articles etc. It is not an exhaustive desk study review. Therefore, if new information is released or found in the future, this CMRA may require updating.

The table also provides advice on next step mitigation and the likely planning decision.

RISK ASSESSMENT & MITIGATION		
Coal Mining Issues/Hazards	Risk	Next Step Mitigation
Past underground coal mining	L	
Probable unrecorded shallow workings	M	Drilling to enable further assessment
Outcrop	NONE	
Spine roadways at shallow depth	NONE	
Mine entries	NONE	
Geological faults, fissures and breaklines	NONE	
Mine gas	M	Drilling to enable further assessment
Opencast mines within 500m	NONE	
Coal mining subsidence claims within 50m	NONE	
Site investigations within 50m	NONE	
Likely Planning Decision	Yes/No	Reason
Is planning permission likely to be given with respect to coal mining legacy issues CONDITIONAL upon carrying out further intrusive investigation leading to possible building design mitigation at a future date but before construction begins?	Yes	Yes. Because the site is NOT impacted by known mine entry proximity hazard and the site-specific ground stability and possible mine gas risks to the proposed development identified in this CMRA can be mitigated by routine engineering solutions.

Assessed risk level – High, Medium Low, NONE

3. CMRA OUTCOME & RECOMMENDATIONS

This CMRA has identified increased risk to the proposed development from possible shallow mine workings, as well as perhaps mine gas. Drilling investigation is required to further assess both risks. However, as both risks can be mitigated by routine engineering solutions, **planning permission should not in our opinion be withheld with respect to coal mining legacy issues**, providing further intrusive investigation is carried out at a future date and the permission is **CONDITIONED** accordingly.

In Geoinvestigate’s opinion a minimum of 2 or 3 rotary open boreholes (without need for core sample recovery) should be sunk at the site to depths up to 30m (but not necessarily reaching 30m) to establish bedrock depth and mine workings depth (if any) beneath the site. Perhaps one borehole should extend to 35m to check for the presence of working in the BEGT coal horizon expected around 30m depth. This, however, is optional.

A Coal Authority Permit needs to be obtained (ahead of) further intrusive exploratory drilling. As per the table below Water Drill Flush to be used when drilling. The permit application must state **WATER ONLY DRILL FLUSH** for the safety of the public and drill crew. **Failure to do so may result in prosecution by the HSE and a hefty fine.**

Risks for Different Drilling Scenarios					
Air flush	Mist flush	Foam flush	Water flush	Mud flush	Additional controls
HIGH	HIGH / MED'M	HIGH / MED'M	LOW	LOW	<ul style="list-style-type: none"> Monitoring at rig and other open holes. Seal boreholes

Boreholes must be sealed on completion.

Gas monitoring MUST be carried out during drilling and may provide further indication of mine gas risk.

However, if the drilling investigation encounters shallow mine working longer term gas monitoring in specially installed gas wells may be required to further assess the ground gas risk.

Alternatively, longer term gas monitoring may be avoidable if the installation of precautionary gas protection measures are included in the design of the new buildings in line with “Characteristic Situation 2” (CS2) based upon the CIRIA 665 (revised) report – “Assessing the risks posed by hazardous ground gases to buildings”. However, agreement will be required from the Local Planning Authority for this alternative proposal.

WHAT TO DO NEXT? Obtain quotes for the intrusive site investigation works. The cost of the SI works should be a **“lump sum” fixed price**. Geoinvestigate can provide advice and assistance with helping you find suitable site investigation & drilling contractors. Call us on 01642 713779 or email enquiries@geoinvestigate.co.uk.

Appendices:

- A. CA Consultants Coal Mining Report issued 14 December 2023 ref. 51003395110001
- B. Site Image
- C. Proposed Development
- D. Geology Map Extracts
- E. Additional Stratigraphic Information
- F. BGS Borehole Record

APPENDIX A
COAL MINING REPORT



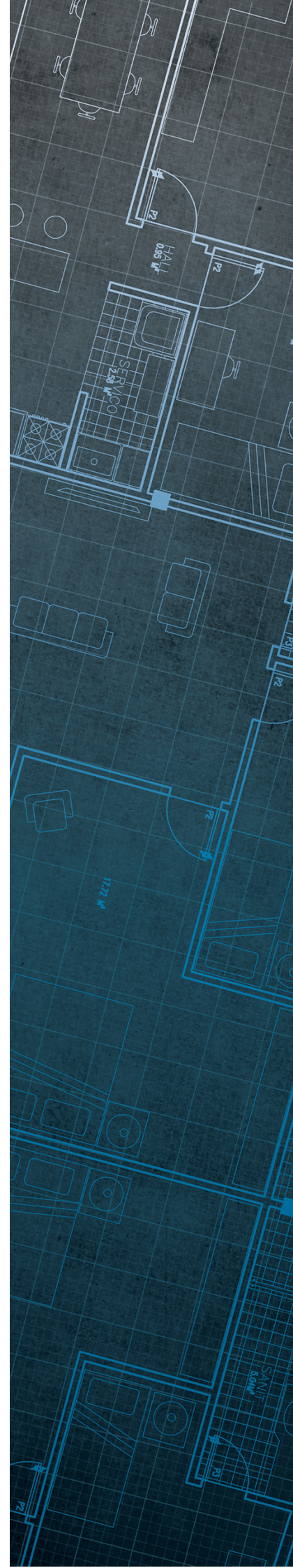
The Coal
Authority

Consultants Coal Mining Report

172 Raleigh Road
Southville
Bristol
Bristol City
BS3 2AR

Date of enquiry: 14 December 2023
Date enquiry received: 14 December 2023
Issue date: 14 December 2023

Our reference: 51003395110001
Your reference: G23454



Consultants

Coal Mining Report

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

Client name

GEOINVESTIGATE

Enquiry address

172 Raleigh Road
Southville
Bristol
Bristol City
BS3 2AR

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

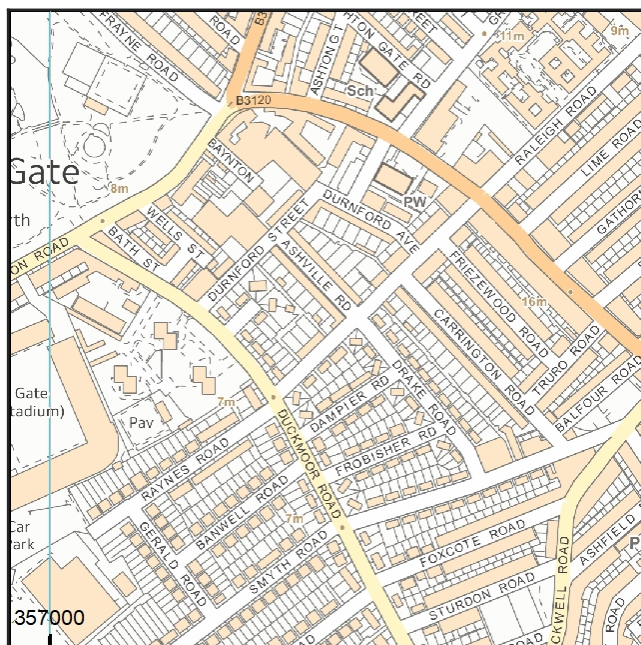
www.groundstability.com

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 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	TWO FOOT NINE	Coal	3804	145	South-West	12.1	East	60	1854
unnamed	FOUR FEET	Coal	3A7G	169	Beneath Property	12.4	East	110	1850
unnamed	CROMHALL	Coal	38NU	318	Beneath Property	21.0	South-East	120	1898
unnamed	SEVEN FOOT RIDER	Coal	3A7S	372	South-West	18.4	South-East	120	1901

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:

SWR3435	5033	SWR3429
5178	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

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

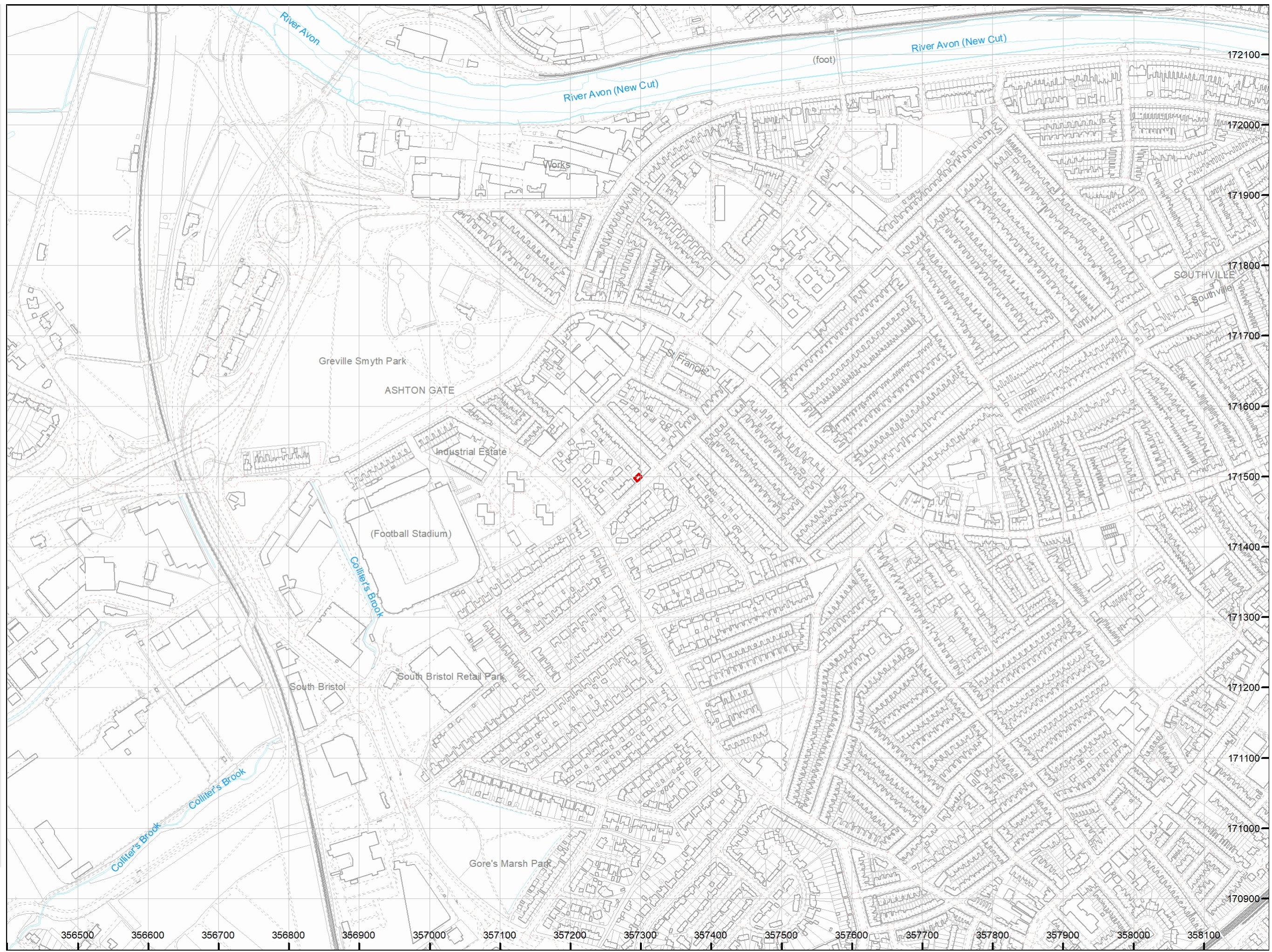
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The 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 B
SITE IMAGE



APPENDIX C PROPOSED DEVELOPMENT

The drawings include:

- Proposed South East Street Elevation (1:50)
- Proposed South West Street Elevation (1:50)
- Proposed North East Street Elevation (1:50)
- Proposed South East Elevation (1:50)
- Proposed North East Elevation (1:50)
- Proposed North West Elevation (1:50)
- Proposed South West Elevation (1:50)
- Proposed Ground Floor Plan (1:50)
- Proposed First Floor Plan (1:50)
- Proposed Flat Roof Layout Plan (1:50)

DATE: 10/10/2023
DRAWN: JLD

1. TO BE DEMOLISHED EXISTING GARAGE
2. TO BE DEMOLISHED EXISTING DWELLING
3. TO BE DEMOLISHED EXISTING DWELLING
4. TO BE DEMOLISHED EXISTING DWELLING

DATE: 10/10/2023
DRAWN: JLD

Class: 10/10/2023
10/10/2023
10/10/2023

PLANNING APPLICATION

**BUILDING PLANS
BY DESIGN
LIMITED**

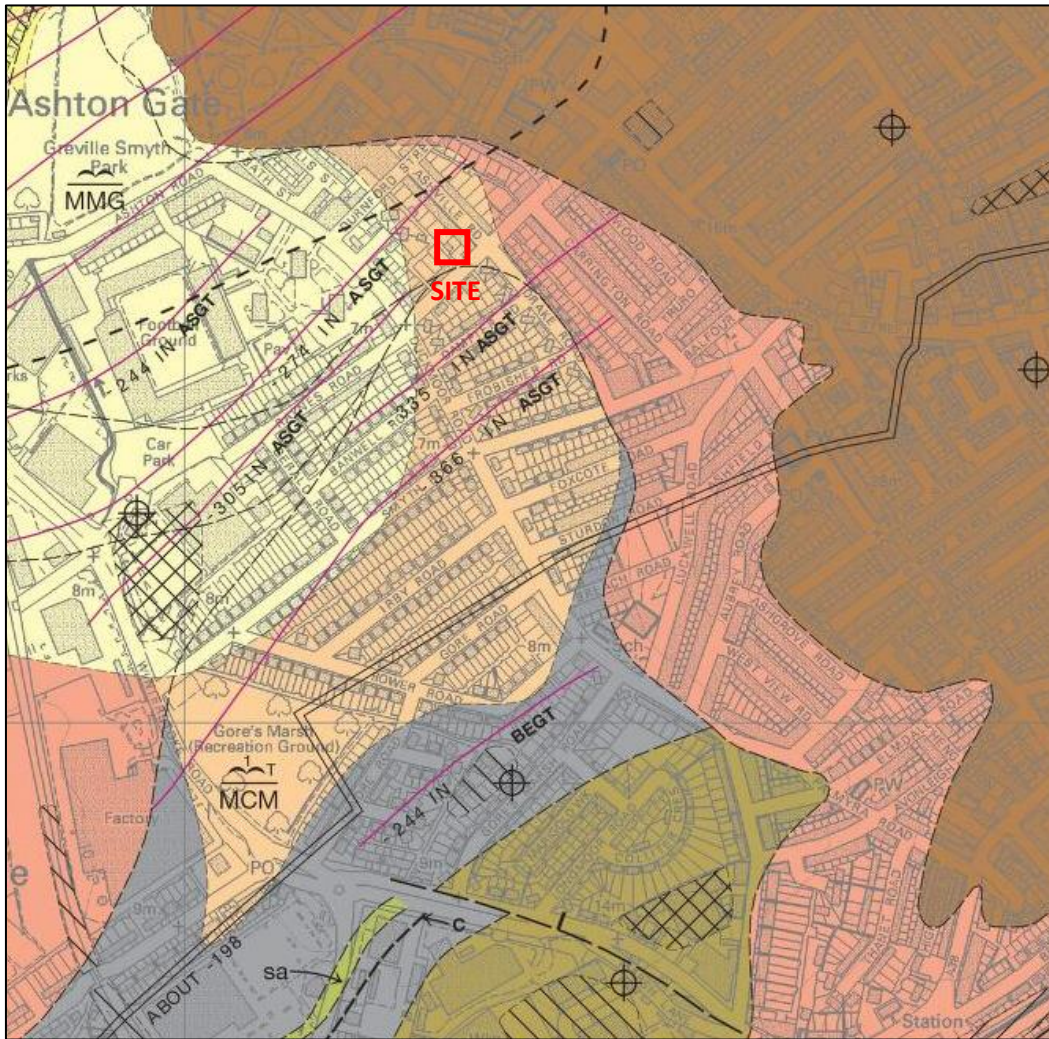
Project Title:
**DEMOLISH GARAGE AND
CREATE NEW DWELLING.
PROPOSED PLANS AND
ELEVATIONS.**

**172 RALEIGH ROAD
ASHTON
BRISTOL
BS3 2AR**

SHEET 2 OF 3

Drawn: JLD
Date: 10/10/2023
Scale: 1:50 @ 1100 x 840
Drawing No: **50648-2** Rev: **B**

APPENDIX D GEOLOGY MAP EXTRACTS



TENTATIVE
SITE
ELEVATION

	Marine Band (AGMB)	
	BEDMINSTER TOP COAL (BETP)	0.6-1.0
	BEDMINSTER GREAT COAL (BEGT)	1.1
	BEDMINSTER LITTLE COAL (BELT)	0.45
	BEDMINSTER TOAD COAL (BETD)	0.6
	Position of Vanderbeckei (Harry Stoke) Marine Band (VDMB)	
M — M — M	ASHTON TOP COAL (ASTP)	0.1-0.9
	ASHTON GREAT COAL (ASGT)	0.9
	ASHTON LITTLE (ASLT)	0.6
LCM	Position of Subcrenatum (Ashton Vale) Marine Band (SBMB)	
M — M — M		

APPENDIX E
ADDITIONAL STRATIGRAPHIC INFORMATION

*British Upper
Carboniferous
Stratigraphy*

C.J. Cleal and B.A. Thomas

Department of Botany
National Museum of Wales, Cardiff

GCR Editor: L.P. Thomas

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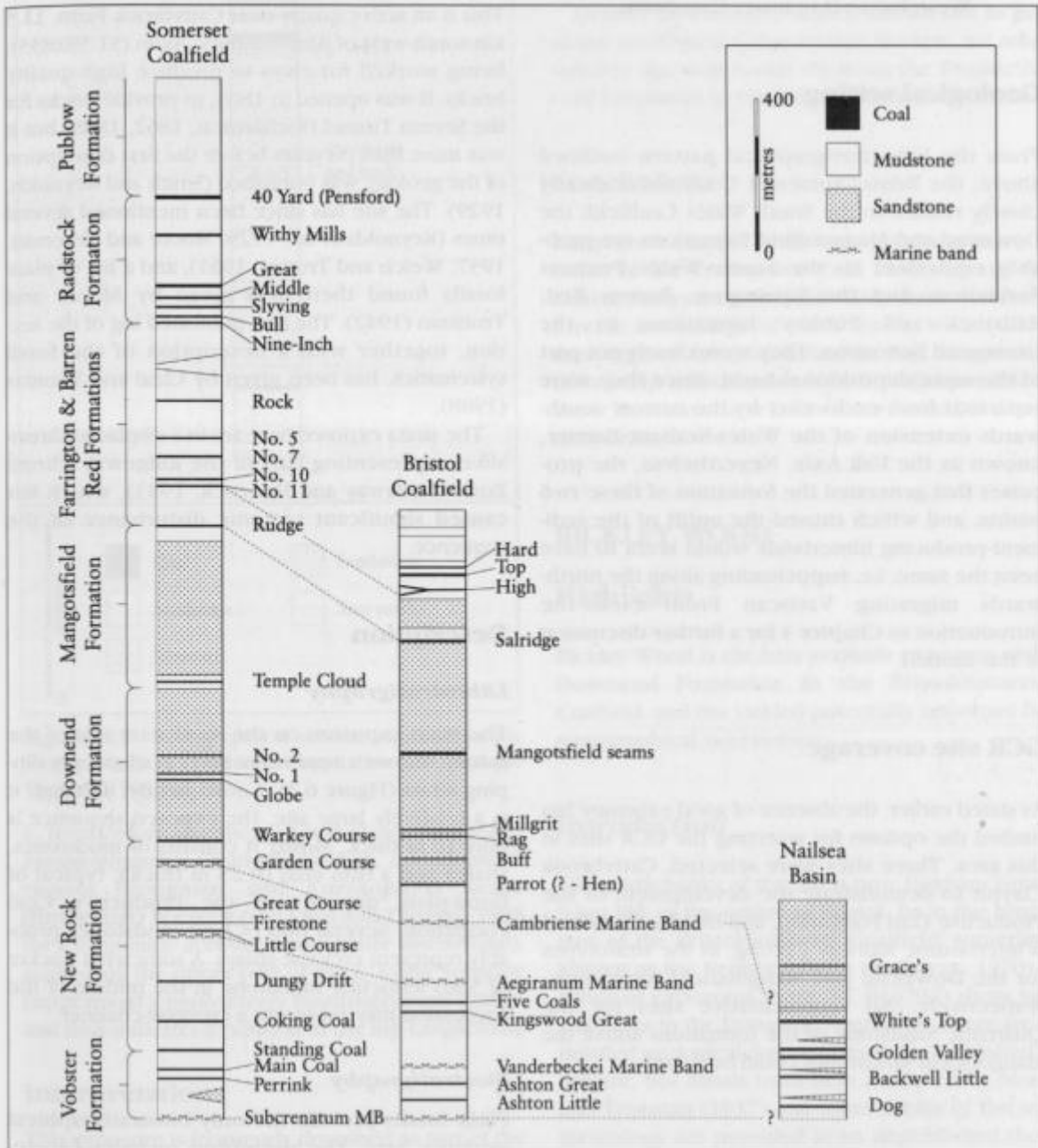


Figure 6.2 Generalized Upper Carboniferous sequence in the Bristol-Somerset Coalfield.

APPENDIX F
BGS BOREHOLE RECORD
ST57SE86



Institute of Geological Sciences
RECORD OF SHAFT OR BOREHOLE

Name and Number of Shaft or Borehole:

Duckmore Road No 1

For whom made John Laing

Town or Village Bristol County Somerset

Exact site (reference to a fixed point on 1-in or 1:50 000 Map)

Purpose for which made

Ground level at ^{shaft}bore relative to O.D. _____ m. If not ground level give O.D. of beginning of ^{shaft}bore _____ m.

Made by Ground Engineering Ltd Date of sinking 1961

Information from Examination of cores Examined by Ian B. Paterson

6-in or 1:10 000 Map Registration No.

ST/57/SE/86

National Grid Reference

57117 71488

1-in or 1:50 000
New Series Map No.

Enter 'C' if
Confidential

264

Specimen Numbers and Additional Notes

Geological Classification	Description of Strata	Thickness metres	Depth metres
Drift	<u>Open hole</u>		
	<u>Made ground</u>	<u>4 0</u>	<u>4 0</u> (1.22m)
	<u>Soft brown silty clay with some peat</u>	<u>8 0</u>	<u>12 0</u> (3.66m)
	<u>Soft brown silty clay with black fibrous peat</u>	<u>22 0</u>	<u>34 0</u> (10.37m)
	<u>Soft red to chocolate brown micaceous marl becoming sandy to base</u>	<u>5 0</u>	<u>39 0</u> (11.90m)
	<u>Soft chocolate brown fine grained millet seed sandstone - friable - occasional dreikanter pebbles</u>	<u>10 0</u>	<u>49 0</u> (14.95m)
		<u>10 0</u>	<u>49 0</u> (14.95m)

Institute of Geological Sciences

Name and Number of Shaft or Borehole:

Duckmore Road No 1

6-in or 1:10 000 Map Registration No.

ST/57/SE/86

National Grid Reference

57117 71488

Page

2

Geological Classification	Description of Strata	Thickness metres		Depth metres	
	Brought Forward			49	0
Trias	Conglomerate with subangular quartzite pebbles up to 1½" diam in sandy matrix	10	0	59	0
				(18.00m)	
	Reddened silt, silty mudstone - slightly micaceous - with rootlets	16	0	75	0
				(22.88m)	
	Fine grained slightly micaceous slightly haematized sandstone with occasional plant fragments - coarser towards base	2	0	77	0
				(23.49m)	
Middle Coal Measures	Dark grey shaly mudstone with abundant rootlets and some good frouds	2	0	79	0
				(24.10m)	
	Complete loss of core - thin coal + fine clay ¹	5	0	84	0
				(25.62m)	
	Silty mudstone with abundant rootlets and stems	3	3	87	3
				(26.61m)	
	Light grey silty mudstone with some rootlets	2	1	89	4
				(27.25m)	
	Soft dark grey mudstone with some rootlets and a few frouds	0	8	90	0
				(27.45m)	
	Very dark grey shaly mudstone with well preserved frouds	1	8	91	8
				(27.96m)	
	Dark grey mudstone with rootlets	0	8	92	4
				(28.16m)	
	Coal with dirt partings	0	8	93	0
				(28.37m)	
	Dark grey carbonaceous mudstone	1	0	94	0
				(28.67m)	

IGS 1805 3000 12/76

Institute of Geological Sciences

Name and Number of Shaft or Borehole:

Ducknore Road No 1

6-in or 1:10 000 Map Registration No.

ST/57/SE/86

Page

3

National Grid Reference

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Brought Forward		94 0
	Soft grey fine clay	3 0	97 0 (29.59m)
	Dark grey - black fine grained mudstone	1 0	98 0 (29.89m)
	Coal with dirt partings	2 0	100 0 (30.50m)
	Grey silty mudstone with abundant rootlets	5 0	105 0 (32.03m)
	Light grey siltstone with few rootlets	1 0	106 0 (32.33m)
Middle Coal Measures	Very hard medium grained quartzite - much jointed - joints carrying pyrite	3 0	109 0 (33.25m)
	Grey silty mudstone with abundant rootlets (dip 15°)	3 0	112 0 (34.16m)
	Bituminous mudstone with pyritous coal	1 0	113 0 (34.47m)
	Light grey fireclay	1 6	114 6 (34.92m)
	Silty, light grey slightly micaceous mudstone with abundant rootlets	5 0	119 6 (36.45m)
	Sideritic mudstone with rootlets	0 6	120 0 (36.60m)
	Silty mudstone, light grey with rootlets	2 0	122 0 (37.21m)
	Dark grey silty mudstone with few plant fragments	0 6	122 0 (37.36m)
	Clay band ironstone	1 4	123 10 (37.77m)
	Dark grey slightly micaceous carbonaceous		

IGS 1805 3000 12/76



Institute of Geological Sciences

Name and Number of Shaft or Borehole:

Duckmore Road No 1

6-in or 1:10 000 Map Registration No.

ST/57/SE/86

National Grid Reference

Page

4

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Brought Forward		123 10
	silty mudstone almost barren - sometimes becomes siltstone		
		6 8	130 6 (39.80m)
	Fine grained sandstone	0 6	131 0 (39.96m)
	Grey slightly micaceous coarse siltstone or fine sandstone with interbanded silt - few plant fragments	2 0	133 0 (40.57m)
	Grey brown fine sandstone with some plant fragments. Joints pyritized and calcitized	1 7	134 7 (41.04m)
Middle Coal Measures	Dark grey mudstone	0 3	134 10 (41.12m)
	Fine grained grey sandstone	1 0	135 10 (41.42m)
	Fine grained dark grey carbonaceous mudstone	1 11	137 9 (42.01m)
	Grey brown fine grained sandstone with pyritous carbonaceous partings	3 11	141 8 (43.21m)
	Fine grained dark grey carbonaceous barren, slightly micaceous mudstone	2 3	143 11 (43.90m)
	Fine grained grey sandstone with numerous carbonaceous partings with pyrite. Occasional thin bands of dark mudstone	5 7	149 6 (45.60m)
	Dark grey carbonaceous mudstone with abundant plant fragments. Silty wisps in top 6". 2' loss 152/- and 155/- and mudstone is broken and slickensided	6 6	156 0 (47.58m)

IGS 1805 3000 12/76



Institute of Geological Sciences

Name and Number of Shaft or Borehole:

Duckmore Road No 1

6-in or 1:10 000 Map Registration No.

ST/57/SE/86

National Grid Reference

Page

5

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Brought Forward		156 0
	Dark grey silty micaceous mudstone with plant fragments (1' 4" loss)	2 7	158 7 (48.36m)
	Fine grey sandstone	0 11	159 6 (48.65m)
	Dark grey fine grained carbonaceous shaly mudstone with plant fragments	2 2	161 8 (49.31m)
	Grey silty micaceous mudstone with small plant fragments	1 1	162 9 (49.64m)
	Dark carbonaceous mudstone	0 3	163 0 (49.72m)
	Dark grey slightly micaceous silty mudstone	3 0	166 0 (50.63m)
Middle Coal Measures	Bright bituminous coal with dirt partings	1 0	167 0 (50.94m)
	Soft dark grey fireclay	1 0	168 0 (51.24m)
	Dark grey firm fireclay with abundant rootlets	2 0	170 0 (51.85m)
	Coal		
	Soft grey fireclay/silty mudstone with abundant rootlets	4 7	174 7 (53.24m)
	Coarse, slightly micaceous siltstone	0 5	175 0 (53.38m)
	Clay band ironstone - septarian with calcite filling fissures	0 6	175 6 (53.53m)
	Soft dark grey fireclay	0 6	176 0 (53.68m)

IGS 1805 3000 12/76

Institute of Geological Sciences

Name and Number of Shaft or Borehole:

Duckmore Road No 1

6-in or 1:10 000 Map Registration No.

ST/57/SE/86

National Grid Reference

Page

6

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Brought Forward		176 0
	Silty mudstone with abundant plants	0 6	176 6 (53.83m)
	Hard dark grey siltstone with plant fragments	2 1	178 7 (54.46m)
	Sideritic mudstone with calcite veins	0 3	178 10 (54.54m)
	Fine grained grey alternating sandstone and siltstone	1 2	180 0 (54.90m)
	Dark grey silty mudstone with bands of silt. Small plant fragments	4 2	184 2 (56.18m)
	Fine grained light grey sandstone	0 10	185 0 (56.43m)
Middle Coal Measures	Dark grey silty mudstone	0 8	185 8 (56.63m)
	Fine grained grey sandstone	0 3	185 8 (56.71m)
	Dark grey slightly micaceous silty mudstone	0 9	186 8 (56.93m)
	Alternating bands of silty mudstone and siltstone with plant fragments	1 4	188 0 (57.34m)
	Dark grey silty mudstone and shaly mudstone with plant fragments	3 5	191 5 (58.39m)
	Clayband ironstone	0 4	191 9 (58.48m)
	Silty micaceous grey mudstone with plant fragments	6 3	198 0 (60.39m)
	Shaly mudstone, micaceous, with plant fragments	5 8	203 8 (62.12m)

IGS 1805 3000 12/76

Institute of Geological Sciences

Name and Number of Shaft or Borehole:

Duckmore Road No 1

6-in or 1:10 000 Map Registration No.

ST/57/SE/86

Page

National Grid Reference

7

Geological Classification	Description of Strata	Thickness metres	Depth metres
	Brought Forward		203 8
	<u>Soft fireclay</u>	2 10	206 6 (62.98m)
	<u>Coal with dirt partings</u>	4 0	210 6 (64.20m)
[? Bedminster Gt. Vein]	<u>Soft fine clay (mostly lost) passing down into silt and silty mudstone with rootlets and sideritic nodules</u>	5 6	216 0 (65.88m)
	<u>Bottom of hole</u>		

IGS 1805 8000 12/76