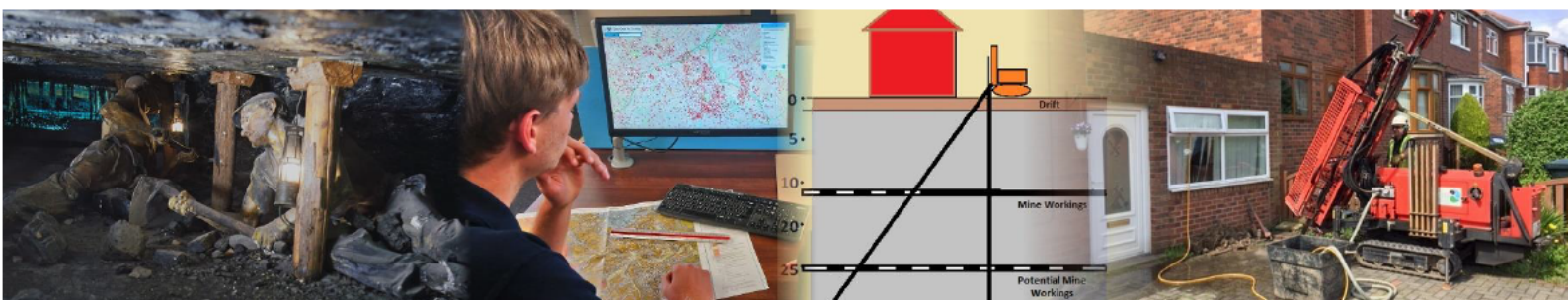




GEOLOGICAL
GEOTECHNICAL
GEOENVIRONMENTAL
CONSULTANCY
DRILLING & DATA ACQUISITION



GEOINVESTIGATE LIMITED

Coal Mining Risk Assessment (CMRA)

LOCATION	19 Church Street, Rhosllanerchrugog, Wrexham LL14 2BN
ISSUE DATE	8 August 2023
FOR	[REDACTED]
CLIENT REF.	
OUR REF.	G23279

Prepared by



Jessica Devine BSc (Hons) MSc
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 is at National Grid Reference 329172 E, 346202 N. The ground height is approximately 178m OD. The site lies to the west of Church Street. 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 garden and driveway. Site images are provided in Appendix B.

It is proposed to erect a single detached residential dwelling within the site as per the development plan provided in Appendix C.

1.2 Historical Maps

A desk study of limited available historical OS maps shows in 1872 the site possibly comprised row housing with Old Pits and mine shafts in the surrounding area. The site images and historic maps suggest one or two buildings may have been removed to the north of No 19. The reason for their absence is unknown.

No surface mining, stone quarrying or clay or gravel pitting is shown within or adjacent to the property though mining occurs in the surrounding area.

1.3 Anticipated Geology

The location of the site is shown on the extract of British Geological Survey (BGS) 1:10,000 solid geology map (SJ24NE) presented in Appendix D. This map and the 1:63360 solid edition (Sheet 121, Wrexham) shows the site underlain by an unknown thickness of Glaciofluvial Deposits perhaps in turn underlain by Glacial Till underlain by Pennine Middle Coal Measures Formation comprising sandstone, interbedded with coal seams of varying thickness.

The tentative elevation of the site relative to the vertical geology column (minus the drift/superficial horizon) is shown in Appendix D.

BGS records to the east of the site record drift/bedrock depth of 3.7m and 6.6m increasing further east so drift depth within the site could be similar or greater.

Outcrop of the Main, Lower Bench and Crown Coals occur nearby to the west of the site. The geology map records seam thicknesses of 0.7 - 1.8m, 1.6m and 0.65m for these coals, respectively. Projecting the Main Coal eastwards down-dip at 6 degrees places it within very shallow depth around 10m depth beneath the new building with the Lower Bench and Crown Coals occurring between 15m to 20m depth.

Borehole SJ24NE44/B some 60m to the east of the site records an unnamed coal horizon and old workings between 19.80 - 20.40m but projection of this information west is uncertain because a geological fault occurs between the borehole and the site, and these depths may not be relevant.

Based on the foregoing analysis more than one level of unrecorded working could occur beneath the new building with the potential to significantly impact surface ground stability within the development area. Therefore, in Geoinvestigate's opinion drilling investigation is required to confirm mine working (if any) depth below the new building and to establish drift/bedrock depth the latter a significant factor is assessing mine risk.

1.4 Mine Workings & Mine Shafts

The CA report in Appendix A identifies one (1) level of past mine workings beneath the site withing the Ruabon Yard (Soft 5 Quarters) at 81m depth with extraction thickness of 100cm. In Geoinvestigate's opinion, such working lies too deep to impact surface ground stability in the development area.

The CA places the site within 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).

As stated in section 1.3 Geoinvestigate is of the opinion that further shallower probable mine workings may occur beneath this site and in this respect, we agree with the findings of the CA report. Owing to the probable presence of unrecorded shallow mine workings beneath the site intrusive investigation is required.

The CA report identifies five mine entries in the vicinity of the property. The nearest (329346-570) and (329346-278) lie 28m and 35m from the site. These are at sufficient distant, in our opinion, to not impact ground stability in the development area. However, their proximity raises further concern about shallow mine working at this locality.

1.5 Site Investigation Activity

The CA report has identified a site investigation 35m southeast of the property raising further concern about shallow mine workings at this locality. No further information on the outcome of this site investigation was available to Geoinvestigate in compiling our CMRA report and the data if subsequently found may be subject to copyright and GDPR in which case it may not be possible to obtain.

1.6 Opencast Activity

The CA report identifies no past or present opencast sites within 500m of the site.

1.7 Geological Faults Fissures & Breaklines

There are no faults, fissures or breaklines within influencing distance of the site.

1.8 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, 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 shallow mine working beneath the site and the proximity of several mine entries. However, the risk may be less if drilling finds no shallow mine working beneath the property and because to date no mine gas incident has been reported at the property.

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	YES	
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 as well as perhaps mine gas risks to the proposed development identified in this CMRA require further assessment but can be mitigated by routine engineering solutions.

Assessed risk level – High, Medium Low, NONE

MGRA – specialist mine gas risk assessment.

3. CMRA OUTCOME & RECOMMENDATIONS

This CMRA has identified increased risk to the proposed development from shallow mine workings and 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, 2 or 3 rotary open boreholes without core sample recovery should be made 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.

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	- 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.

If shallow mine working is identified beneath the site longer term gas monitoring in specially installed gas wells may be required to further assess the ground gas risk.

Alternatively, if longer term gas monitoring is to be avoided the installation of precautionary gas protection measures may be considered 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.

In this instance shallower geotechnical and geo-environmental site investigation is also likely to be required to enable foundation design and to check for ground contamination.

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 27 July 2023 ref. 51003369278001
- B. Site Images.
- C. Proposed Development
- D. Geology Map Extracts
- E. BGS Borehole Records

APPENDIX A

CA REPORT



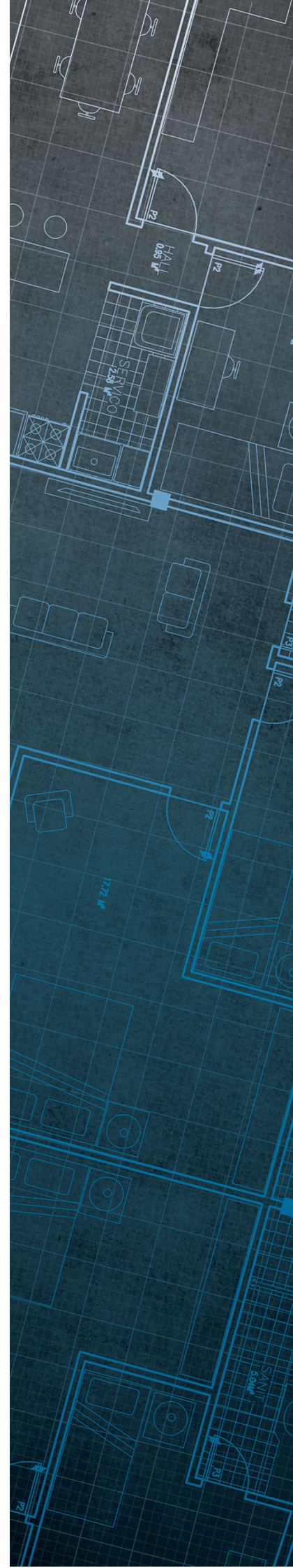
The Coal
Authority

Consultants Coal Mining Report

19 Church Street
Rhosllanerchrugog
Wrexham
Wrexham
LL14 2BN

Date of enquiry:	27 July 2023
Date enquiry received:	27 July 2023
Issue date:	27 July 2023

Our reference:	51003369278001
Your reference:	G23279



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

19 Church Street
Rhosllanerchrugog
Wrexham
Wrexham
LL14 2BN

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

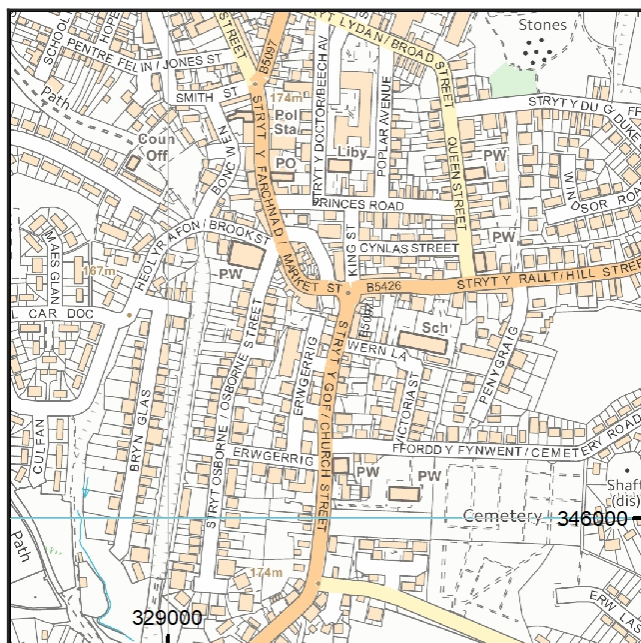
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	RUABON YARD (SOFT 5 QTRS)	Coal	7BNU	81	Beneath Property	6.0	East	100	1862
unnamed	WALL AND BENCH	Coal	7OLD	104	East	6.0	East	110	1860

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
Shaft	329346-278	329222 346204		Coal	
Shaft	329346-279	329278 346217		Coal	
Shaft	329346-284	329249 346145	This shaft was searched for and not found under H4451 by The Coal Authority. The drilling proved stable strata with no voiding	Coal	
Shaft	329346-570	329137 346177		Coal	
Shaft	329346-605	329252 346179		Coal	

Abandoned mine plan catalogue numbers

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

NW1506	NW1508	16713
NW1406	14897	14894
0	NW1505	NW1507

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

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

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

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

Distance to site investigation (m)	Direction
35.0	South-East

See Section 4 for further information.

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.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

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.

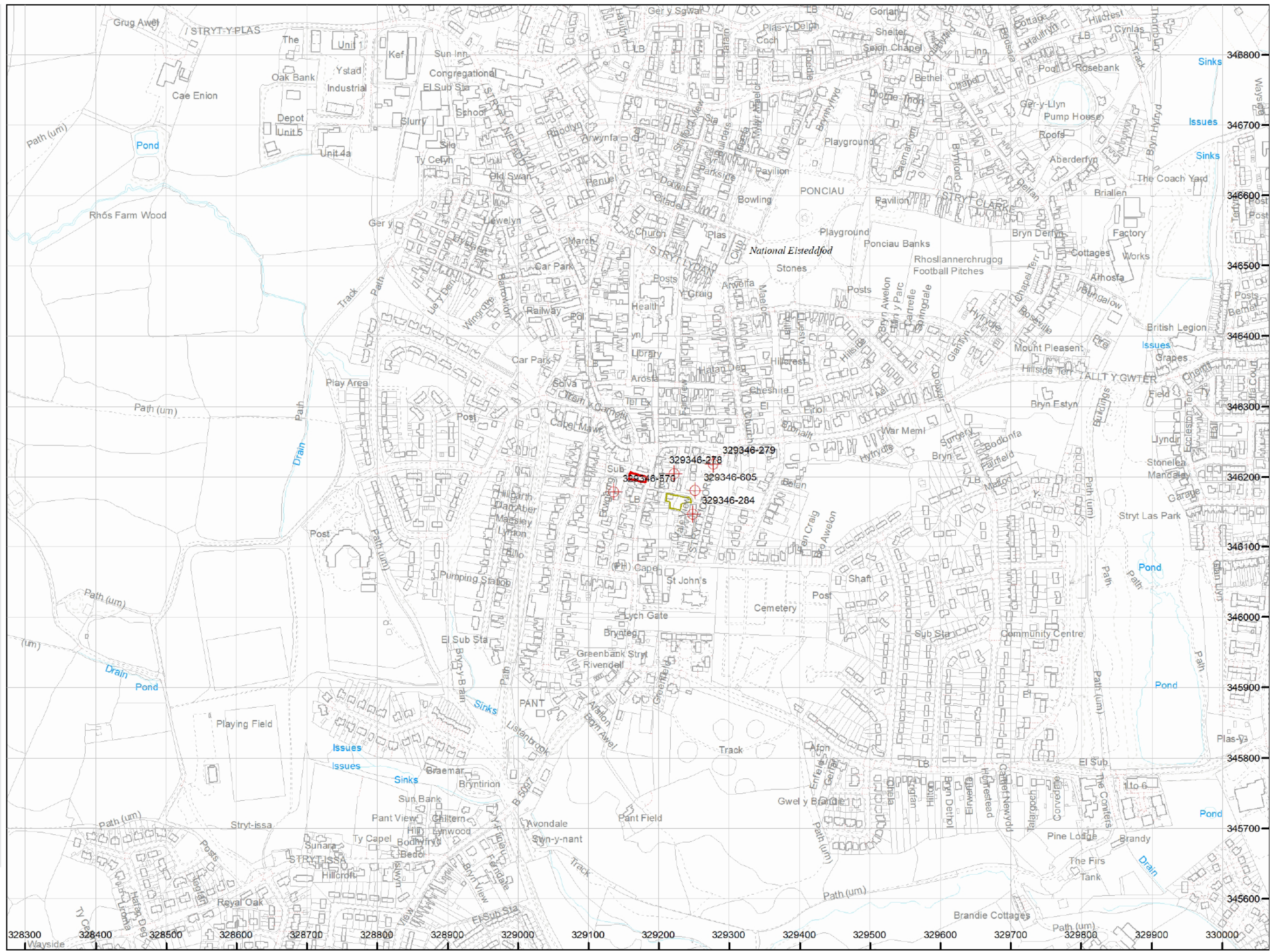
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Disused mine shaft 
- Site investigations 

How to contact us

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



APPENDIX B SITE IMAGES

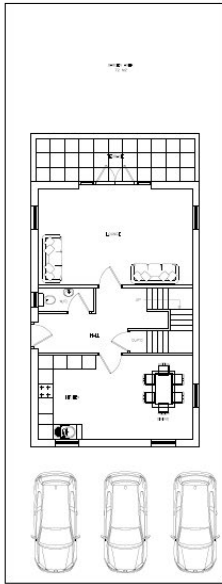




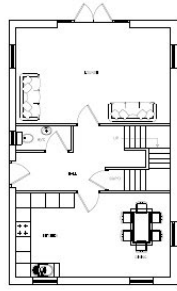
APPENDIX C

PROPOSED DEVELOPMENT

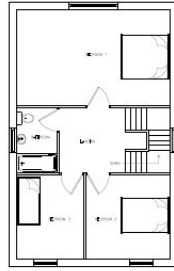
PROPOSED 3 BEDROOM DETACHED HOUSE AT 19 STRYTY GCF, RHOS, WREXHAM, LL14 2BN FOR MR A RICHARDS



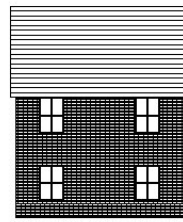
PROPOSED SITE PLAN



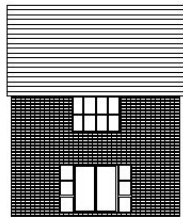
PROPOSED GROUND FLOOR PLAN



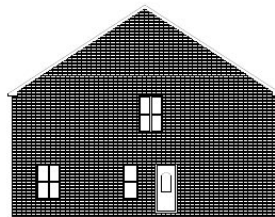
PROPOSED FIRST FLOOR PLAN



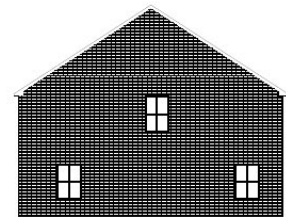
PROPOSED FRONT ELEVATION



PROPOSED REAR ELEVATION



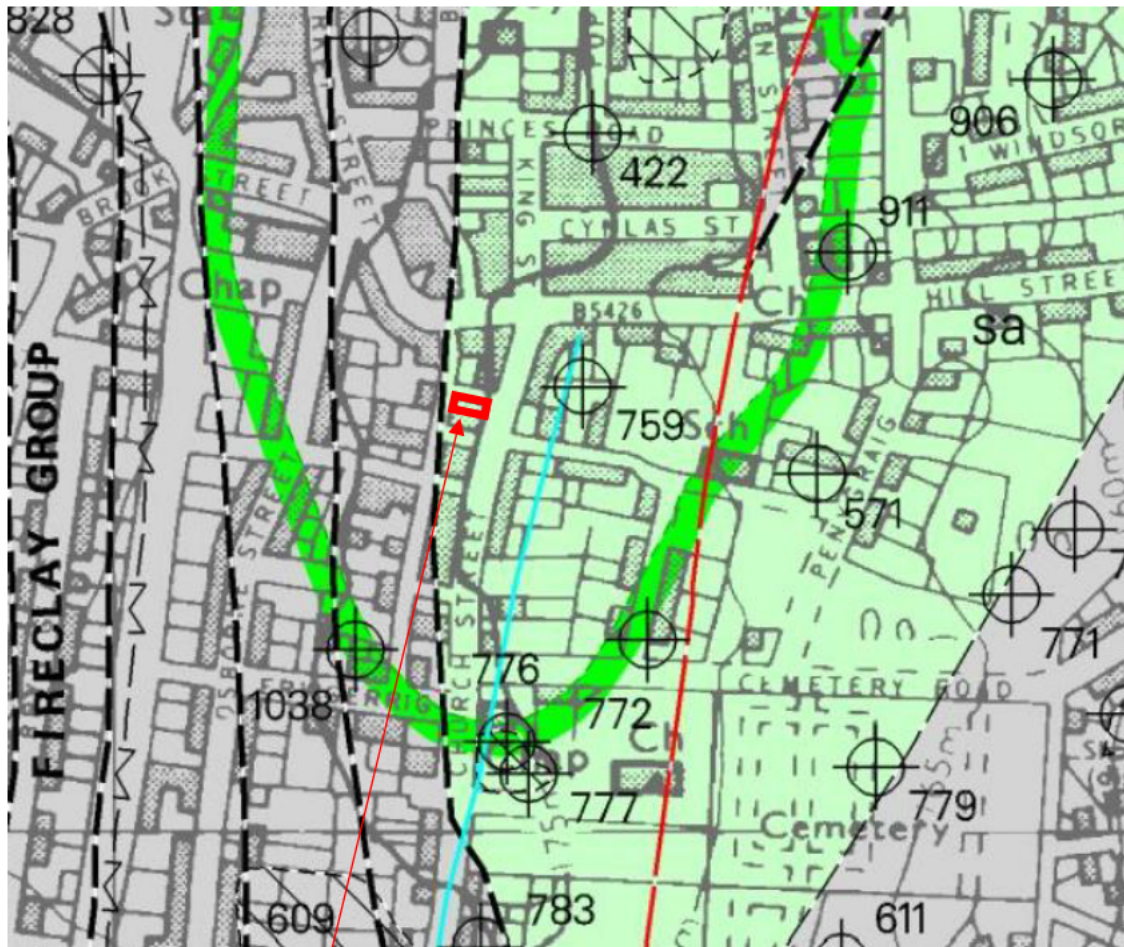
PROPOSED LEFT SIDE ELEVATION



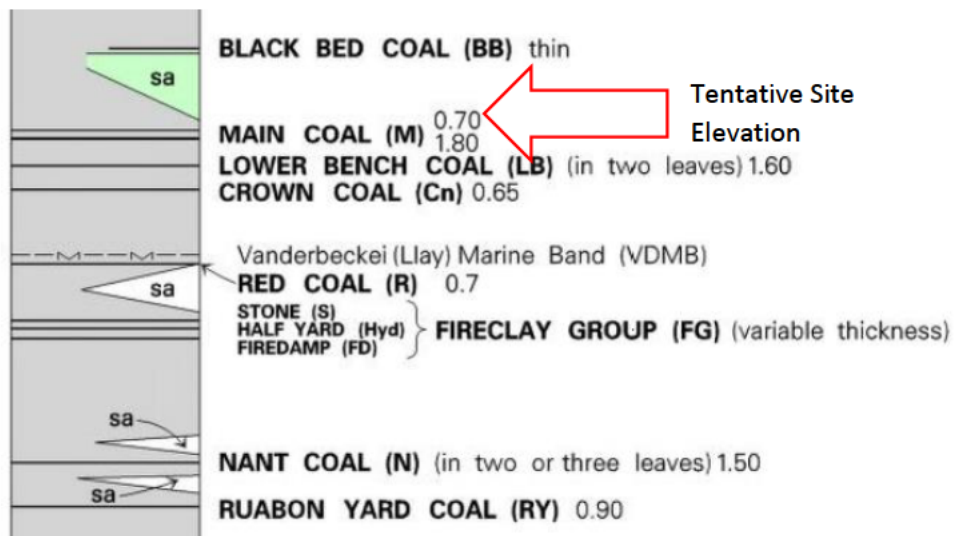
PROPOSED RIGHT SIDE ELEVATION

Building Design Solutions	
www.bdsolutions.co.uk	
Project Name: Mr Alun Richards	
Project Number: B00001008	
DATE: 30.09.2023	SIGN: G Roberts
SCALE: 1:50 @ A2	DRAWING NUMBER
NOTE: Plan and Elevation as Proposed	02

APPENDIX D GEOLOGY MAP EXTRACTS



Approximate
site location



APPENDIX E

BGS BOREHOLE RECORDS



British
Geological
Survey

BGS ID: 142467 : BGS Reference: SJ24NE44/8
British National Grid (27700) : 329240,346180

JOINT LANCs. BORING CO. (U.K.) LTD.

CHAPEL STREET · PEMBERTON · WIGAN

Telephone — Wigan 83237/8

BOREHOLE RECORD SHEET

SJ 24 NE 44
2924 4618 B

Job No. 1972

Date 17.4.73

Location YSGOL Y WERN RHOSLLANERCHRUGOG

Carried out for JAMES WILLIAMSON & PARTNERS

Borehole No. 2

Diameter 4"

Ground Level

Scale 1:125

DESCRIPTION	O.D.	LEGEND	DEPTH	THICK- NESS	SAMPLE	S.P.T. VALUE	WATER LEVELS
Hard grey mudstone fragments.			0.1	0.5			
Loose grey mudstone fragments.			1.8	0.8			
Firm grey mudstone fragments.			2.6	1.1			
Soft yellow silty clay			3.7	3.3			
Firm yellowish brown weathered MUDSTONE			7.0	7.3			
Hard light grey SILTSTONE			14.3	1.6			
Firm yellowish brown MUDSTONE			15.9	3.9			
Hard grey SILTSTONE with occasional 0.1-0.2m thick bands of firm brown mudstone.			19.8	0.4			
Soft black SHALE (OLD WORKINGS)			20.0	0.4			
Firm COAL (OLD WORKINGS)			20.4	1.9			
Firm black SHALE			22.3	1.2			
Firm dark grey MUDSTONE			23.5				

Undisturbed Sample



Disturbed Sample



Water Sample



Standard Penetration



END OF BORE

Contact BGS: ngdc@bgs.ac.uk