

REF: 2346/BR/MinLetRep/TG

Mr Darren Hannaby
Mountain View
Brook Street
Rhosllanerchrugog
Wrexham LL14 2ED

16th June 2020

Dear Darren,

RE: BETHANIA ROAD, ACREFAIR: MINING REPORT

1.0 Introduction

Mr Darren Hannaby (DH) is proposing to build a detached house on land adjacent to Bethania Road, Acrefair, near Wrexham.

However, the Coal Authority have raised the issue of the site being in a High Mining Development Risk zone, and have requested a mining risk assessment report be prepared to issue their concerns prior to granting planning permission.

Blueprint Architectural Services (BAS) are the architects for the scheme, and they have appointed GroundSolve Ltd (GSL) on behalf of DH to carry out a historical mining desk study for the site.

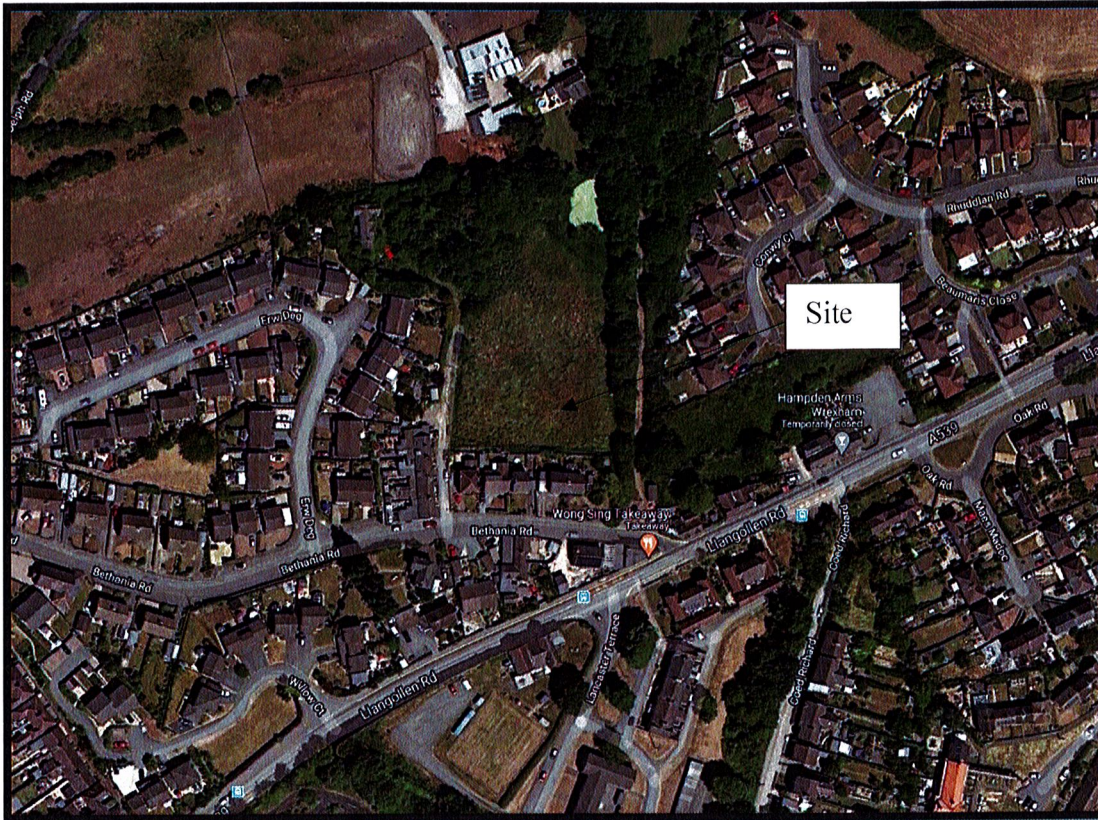
This report presents the findings of the desk study and gives geotechnical comments to cover the mining risk from shallow coal workings.

2.0 Site Location and Description

The site is accessed from Bethania Road, and located to the rear of the properties Hillcrest and Torphin, on the eastern outskirts of Acrefair, near Wrexham, at National Grid Reference SJ 282 434.

It is bounded by residential houses to the south, east and west, and open fields to the north. With the eastern boundary defined by a row of trees.

The site currently comprises a level open field, see below.



Current Site Layout

Photographs of the site are presented in Appendix A.

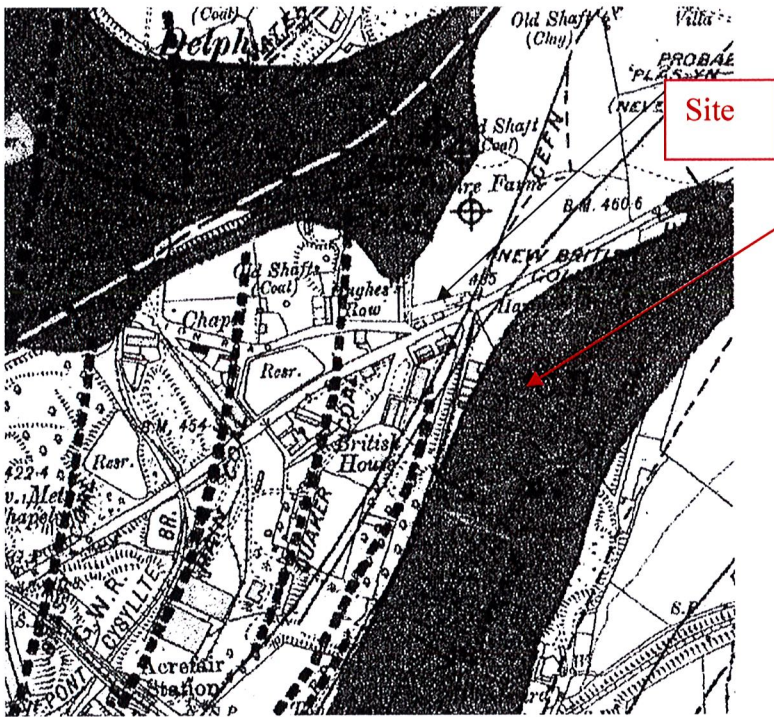
3.0 Geology

The geology of the site has been studied on the 1:50,000 scale geology plan, Sheet 121, Wrexham and the associated geological memoirs. In addition, historical geological plans at a scale of 1:10,560 have been researched.

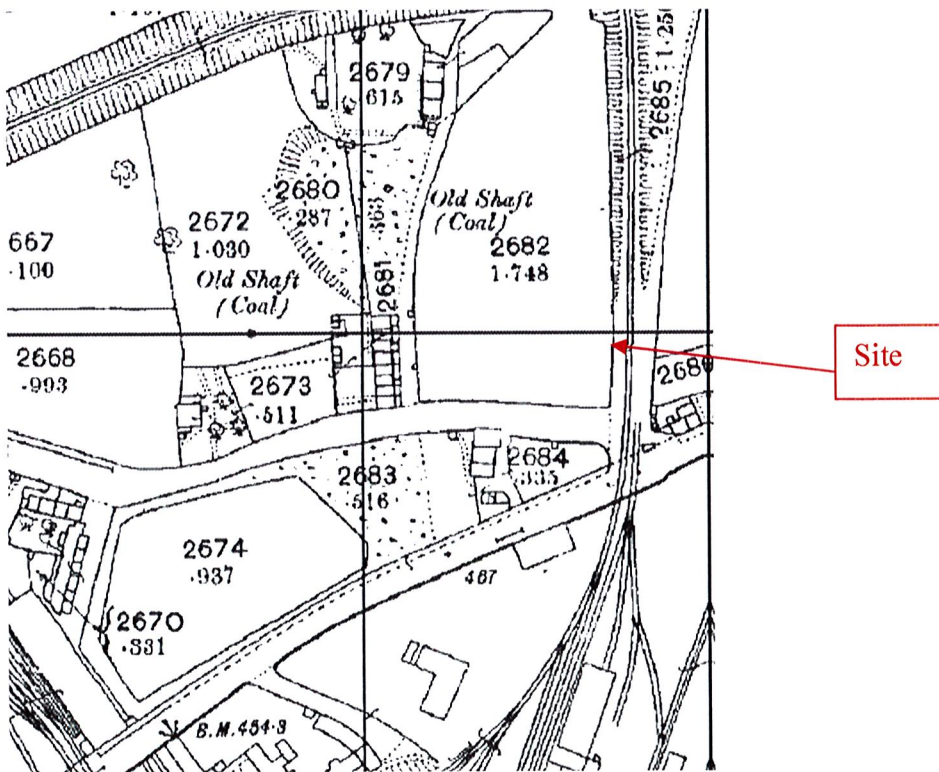
The plans show the site to be underlain by glacial till overlying the Productive Coal Measures of the Bettisfield Formation, which is Carboniferous in age.

The conjectural outcrop of the Quaker Seam is shown outcropping on the western site boundary, with the Main Seam below this outcropping further to the west. The memoirs record the bedrock dipping gently in an easterly direction; therefore, both seams would be anticipated to be at a shallow depth below the site.

The 1:10,560 scale plan dated 1911 shows the Cefn Fault to be immediately east of the site trending in a NNE-SSW direction, with its downthrow to the south east, see below.



In addition, old shafts are shown to the north of the site, which are also shown on the 1874 OS plans, a copy of which is presented below.



4.0 Shallow Mining

A Coal Authority Coal Consultants Report was obtained as part of this commission. The main points are summarised below and the report presented in full in Appendix B.

- The shallowest seam beneath the site is indicated to be the Pin Seam at a depth of around 14m,
- This seam dips at 4.1° in a south east direction,
- The thickness of the seam is 1.00m,
- Unrecorded shallow workings were considered likely,
- The Quaker Coal seam is shown outcropping on the western site boundary,
- The next shallowest seam the Stone is recorded at a depth of 88m,
- There are no known coal mine entries within, or within 20m of the site,
- The site is not located within an area worked by opencast methods.

It should be noted that the Pin seam probably equates to the Quaker seam.

In addition, mine plans and nearby jobs were examined from GSL archives. The Air Products site to the south west of the site revealed the following stratigraphy:

Seam	Thickness (m)	Separation
Quaker	1.60	16.15
Bind	0.60	5.20
Main	2.90	12.20
Brassey		

Dip 1 in 7 to the east 8°.

5.0 Previous Investigation and Ground Conditions

A site investigation was carried out by GSL in September 2016 immediately south of the site. The works comprised:

- Two rotary percussive boreholes to depths up to 22m,
- The boreholes were supervised and logged by an engineer from GSL.

The borehole logs from the previous investigation are presented in Appendix C, with the findings summarised in the table below:

No	Topsoil (m)	Glacial Till (m)	Weathered Bedrock (m)	Bedrock (m)	Coal Seams (m)	Rock Cover (m)
1	0.00-0.20	0.20-2.10	2.10-6.00	6.00-8.80	8.80-10.00 21.00-21.50	6.70 18.90
2	0.00-0.20	0.20-4.00	4.00-7.00	7.00-8.50	8.50-9.20 21.20-22.00	4.50 17.20

Glacial Till

This was described as light greyish brown and brown, locally slightly gravelly, clay.

Bedrock

Weathered bedrock was encountered in both boreholes, with siltstone overlying light grey, gravelly, clay to a maximum depth of 7.00m.

The bedrock predominantly comprised light grey mudstone. Two coal seams were encountered in each of the positions, the upper most seam (Quaker Seam) was encountered between 8.80-10.00m in BH01 and 8.50-9.20m in BH02. The deeper seam (Bind/ Main Seam) was encountered between 21.00-21.50m in BH01 and 21.20-22.00m in BH02.

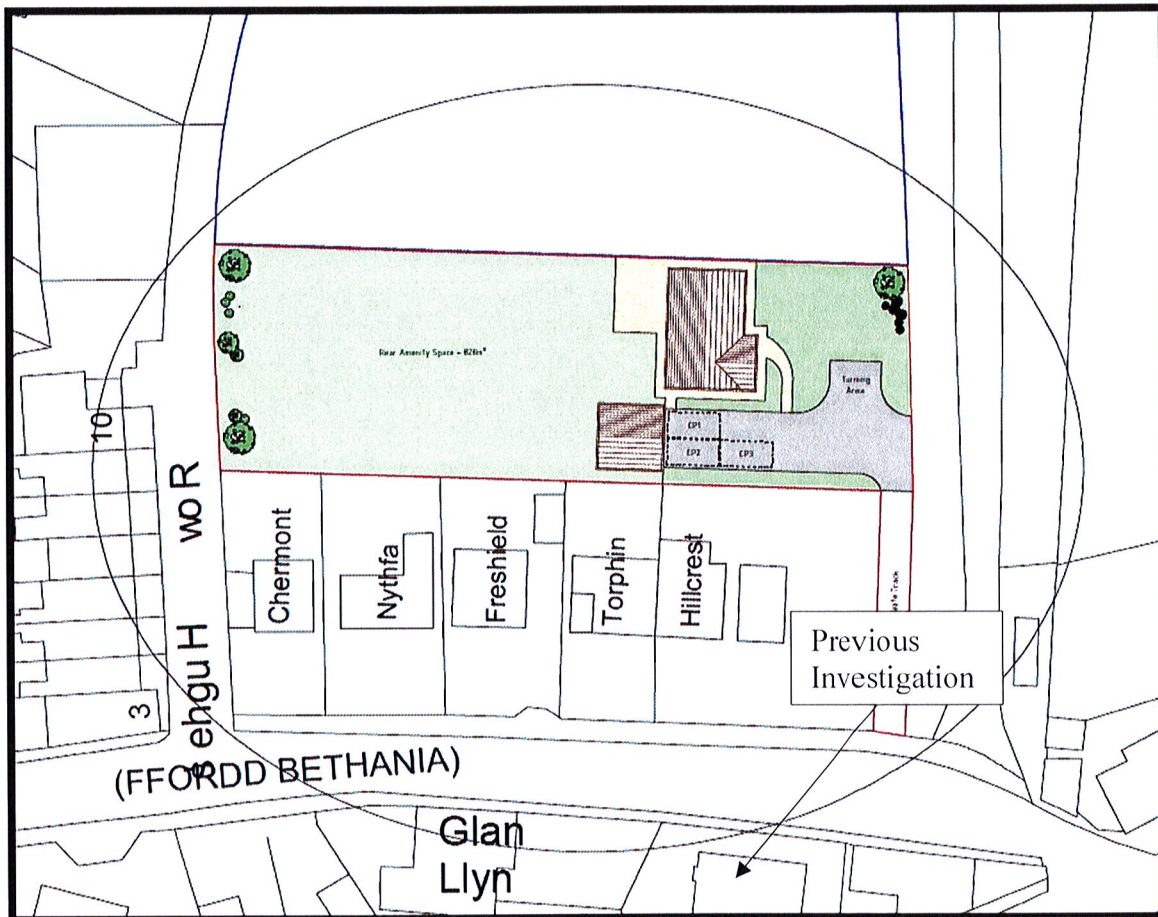
No loss of flush or any voids were encountered in the boreholes.

Groundwater

Groundwater was not encountered in either of the boreholes.

6.0 Proposed Development

The proposed development comprises a single detached house with associated garage in the eastern section of the site, see below:



Proposed Development

7.0 Mining Risk Assessment

It should firstly be noted that the previous investigation is immediately south of the site, consequently given a gentle easterly dip, the same seams would be anticipated at similar depths, although the seams will get shallower in a westerly direction.

When assessing the risk of shallow mining to a development several issues need to be considered, such as the type of working, depth to workings etc.

There are two types of mining, partial and total extraction. Methods of partial extraction are nearly all variations of, "Pillar and Stall" techniques, with pillars of coal being left to support the roof of the mine. Extraction ratios of between 30 to 75% were typical, depending on geological conditions and depths. However, it was common practice to work pillars on withdrawal from the mine, so higher extraction ratios may have been possible.

Total extraction is achieved by long wall working and also by various pillar and stall techniques, where the pillars were removed in a second phase of mining, normally on retreat from the mine.

It is important to know the method of mining employed, as total extraction methods normally result in total collapse of the workings, with the exception of the main roadways. While partial abstraction techniques leave voids in the mine, which can become unstable and migrate to surface. These take the form of "crown holes" at surface, which are generally circular and can be several metres in diameter.

No detailed mine plans showing the method of working have survived, if mined this strata would have been mined prior to 1872 when it became legal to deposit mine plans. Due to the age of the mining and the proximity to outcrop, it must be assumed that it would have been by pillar and stall techniques and potential for voids may exist.

No detailed research into mining subsidence in North Wales has been undertaken. However, extensive research has been carried out in South Wales, where similar pillar and stall mining has taken place, this research revealed:

- Almost all incidents are "crown holes" in form, delayed general subsidence is very rare,
- About 75% of subsidence incidents are caused by the collapse of mine entrances or workings close to outcrop,
- Mine entrances present the greatest risk and account for over 50% of recorded incidents,
- The recorded rate of occurrence is very low.

The remaining subsidence incidents were analysed for their migration ratio (H/T), where H is the thickness of rock above the workings and T is the typical seam/void thickness, taken here as 2m, the height of a typical roadway. Of these 75% of the incidents had an H/T ratio of less than 2 (4m rock cover), with 90% of incidents having an H/T ratio of less than 6 (12m rock cover). The majority of the remaining incidents were related to special events, probably relating to collapses on main roadways, which would have continually been cleared by miners leading to bigger residual voidage.

There is also strong evidence from data gathered from grouting contracts, opencast sites and site investigations that migration of voids above workings generally extends to a limited height above the original void. Records of over 10,000 drill and grout boreholes were collected, in almost every

case, the record of broken ground, workings or voids, occurred at or immediately above the anticipated elevation of the worked horizon.

From the above it can be concluded that the majority of residual voids have already collapsed to a stable profile. Otherwise voids would be encountered at a wide range of depths as they progress to the surface.

To assess the risk from shallow abandoned mining the following risk-based approach is followed, where risk (R) may be defined as: -

$$R = F \times C$$

Where F is the frequency of an undesirable event and C is the consequences of it happening.

The assessment of risk due to mining subsidence is a twofold process, involving first the assessment of probability of a subsidence event happening, i.e. the subsidence potential; secondly the consequences resulting from that event. For a crown hole to occur, the following must coincide at any one point:

- There must be a potential for mining (PM),
- There must be workings under the site (PW),
- A void must remain in the workings (PV),
- The void must be unstable and able to migrate to surface (PI),
- The thickness of rock overburden must be insufficient to choke the collapse feature before hitting rock head (PR),
- The thickness of drift must be insufficient to prevent the void reaching the surface (PD).

Based on the information from the research and the drilling the upper coal seam is considered to be the Quaker, with the lower seam being the Bind or Main coal seam.

PW Workings Exist

No workings or evidence of any workings were encountered in the boreholes to the south of the site.

This may be because the seam was unworked, possible reasons include:

- The seam is very close to a major fault, with a displacement of around 130m; consequently, the strata would be anticipated to be highly disturbed at this location.
- The seam would have to have been worked from the west to allow free drainage of the workings, any shaft being close to or within the faulted zone.
- The Quaker coal seam is close enough to surface to have been highly weathered, which would have affected its quality.

However, at this stage, without further investigation the site must be assumed to have been undermined at shallow depth.

PV Voids remain in Workings

Whilst GSL experience in this area generally confirms old workings to have been backfilled or collapsed. The potential for voids and old roadways could exist beneath the site, roadways typically

being the only well-constructed part of the workings, as they provided access to the mine. The height of a roadway would typically be 2m.

PI Voids become unstable

The potential for voids to become unstable has to be considered.

PR Rock cover insufficient to prevent migration of rock

The site investigation on the adjacent site has indicated that the rock cover above the Bind coal seam was between 17.20 and 18.90m. Given a starting void height of around 2m, this would give an H/T ratio of between 8.60 and 9.45. Consequently, the risk of upward migration of any residual voidage reaching surface from this seam is considered to be negligible.

However, the rock cover to the higher Quaker coal seam was between 4.50 and 6.70m. Given a starting void height of around 2m, this would give an H/T ratio of between 2.25 and 3.35. Consequently, the risk of upward migration of any residual voidage reaching surface needs further consideration and is considered later in this report.

PD Drift cover insufficient to prevent migration to surface

The nearby site investigation confirmed a thin cover of glacial till, being between 2.10 and 4.00m thick. Consequently, the till would only have a minor ameliorating effect on any upward migration of voids through the till.

Conclusions and Recommendations

It is recommended that two to three rotary percussive boreholes be drilled beneath the building footprint to determine the depth and condition of any shallow mine workings beneath the site.

If workings are encountered in the Quaker coal, then it will be necessary to drill and grout the workings to stabilise the ground beneath the site.

Should the Quaker coal prove to be unworked, with workings in the deeper seams then raft foundations designed to span any potential crown holes up to 3m in diameter and cantilever 1.5m at its edge should be sufficient to address the low risk.

We trust this is satisfactory, should you have any queries please call Tyler Goodrick on 01244 661361.

Yours sincerely



T G Goodrick

APPENDIX A

Site Photographs



Photograph 1 Site from the east



Photograph 2 Site from the west



Photograph 3 Site access from the west



Photograph 4 Site access from the east



Photograph 5 showing field site is located in

APPENDIX B

Coal Consultants Report



The Coal
Authority

Consultants Coal Mining Report

Overleigh Farm
Bethania Road
Acrefair
Wrexham
LL14 3UD

Date of enquiry:	2 March 2020
Date enquiry received:	2 March 2020
Issue date:	2 March 2020

Our reference:	51002230768001
Your reference:	2346/BR/TG



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

GROUDSOLVE LTD

Enquiry address

Overleigh Farm
Bethania Road
Acrefair
Wrexham
LL14 3UD

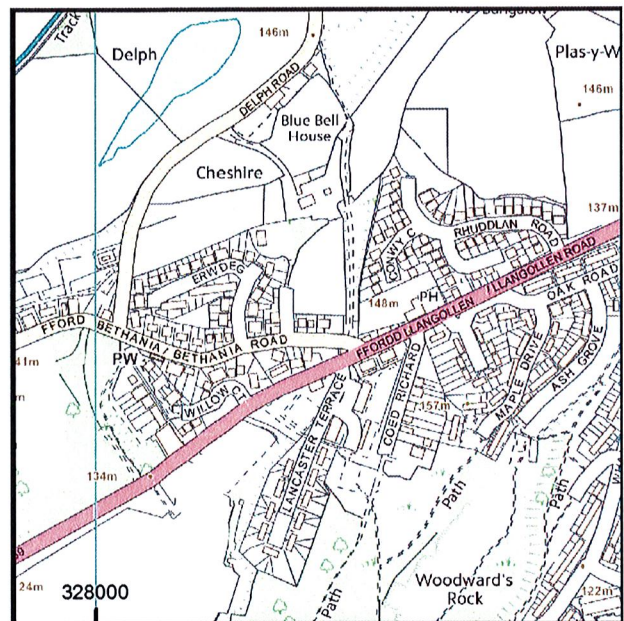
How to contact us

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Mansfield
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www.groundstability.com

 @coalauthority
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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	PIN	Coal	384B	14	Beneath Property	4.1	South-East	100	1868
unnamed	STONE	Coal	38VL	88	Beneath Property	7.0	South-East	150	1868
unnamed	NANT (SOFT 5 QTRS)	Coal	38WJ	114	Beneath Property	7.0	South-East	100	1868
unnamed	RUABON YARD (SOFT 5 QTRS)	Coal	382O	115	Beneath Property	7.0	South-East	100	1868
unnamed	WALL AND BENCH	Coal	380O	124	Beneath Property	7.0	South-East	110	1868

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	328343-168	328208 343451	This entry was filled to an unknown specification at an unknown date. It was capped with a 4.8m x 4.8m concrete slab to NCB specification and finished with Hardstop in 1974.	Coal	
Shaft	328343-169	328163 343404	This entry was filled to an unknown specification at an unknown date. It was capped with a 3.66m x 3.66m concrete slab to NCB specification and finished with Hardstop in 1974.	Coal	
Shaft	328343-170	328183 343317	This entry was searched for in 2002 by NKC Geotech Ltd but was not located.	Coal	
Shaft	328343-171	328260 343322		Coal	
Shaft	328343-193	328374 343456	This entry was located by REFA Consulting Engineers Ltd during development in 2002 and was found to be filled. The shaft was dug out to 1200mm below Rockhead and a 750mm plug was set in the shaft with a 450mm reinforced concrete cap being placed above and tied into the plug. The excavation was backfilled and compacted.	Coal	
Shaft	328343-439	328297 343298		Coal	
Shaft	328343-446	328297 343370		Coal	
Shaft	328343-447	328238 343302		Coal	
Shaft	328343-448	328154 343344	This entry was searched for in 2002 by NKC Geotech Ltd but was not located.	Coal	

Abandoned mine plan catalogue numbers

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

2334	5916	14884
NW1411	NW1503	16713
17956	0	NW1423

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
QUAKER	Coal	Yes	Within	N/A	5

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

Please refer to the "Summary of findings" map (on separate sheet) for details of any opencast areas 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
16.8	East
10.5	South-West

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.

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.

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.

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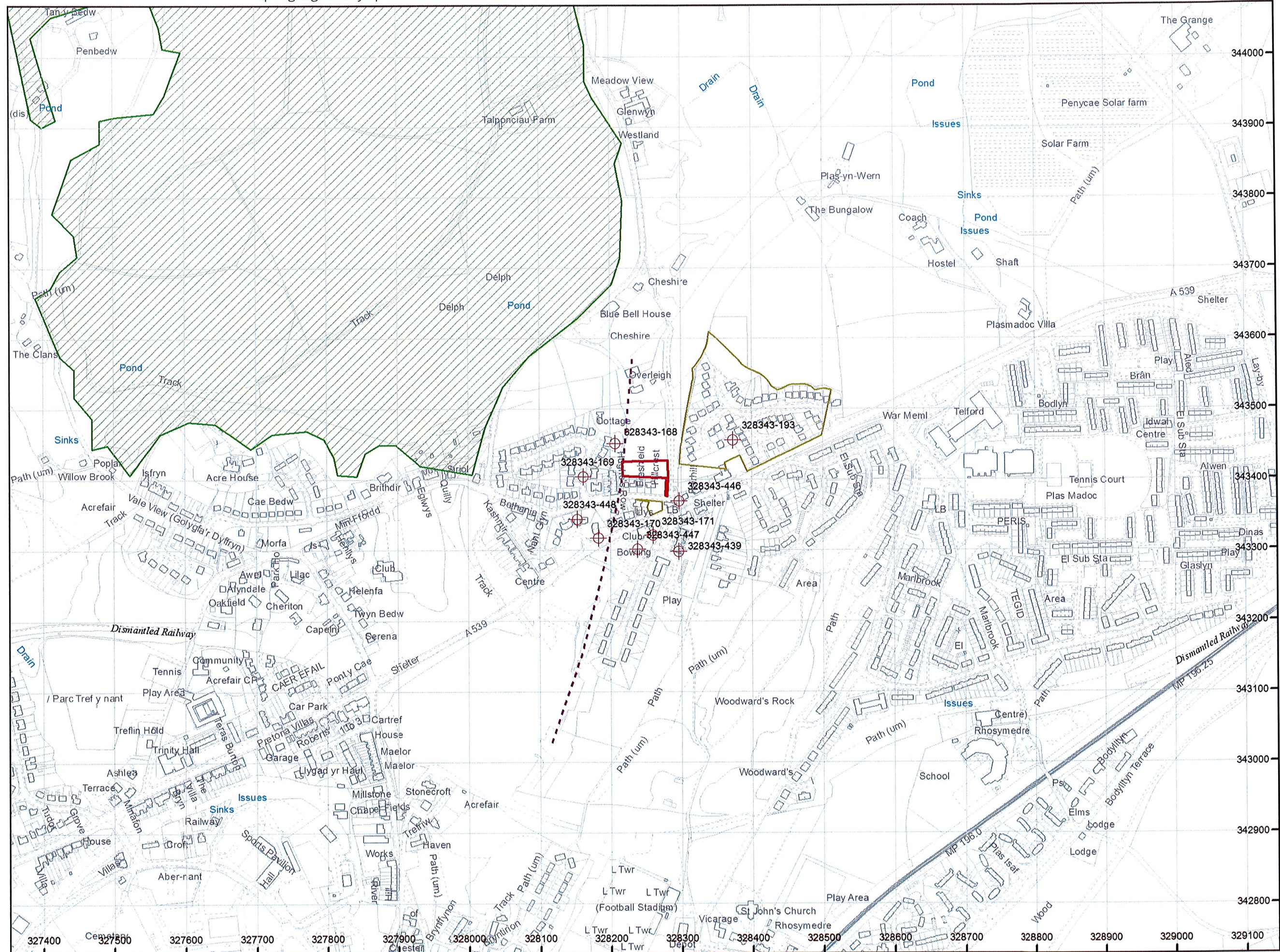
VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	02 March 2020
Issued to	GROUDSOLVE LTD WELL HOUSE BARNS UNIT 1 CHESTER ROAD BRETTON BROUGHTON FLINTSHIRE CH4 0DH
Property search for	OVERLEIGH FARM BETHANIA ROAD ACREFAIR WREXHAM LL14 3UD
Reference number	51002230768001
Date of issue	02 March 2020
Cost	£112.13
VAT @ 20%	£22.43
Total received	£134.56
VAT registration	598 5850 68

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



- | | |
|--|---|
| Approximate position of the enquiry boundary shown |  |
| Disused mine shaft |  |
| Outcrop (Conjectured) |  |
| Unlicensed opencast site |  |
| Site investigations |  |



How to contact us

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

APPENDIX C

Previous Borehole Logs

BOREHOLE LOG

Project Glanllyn, Acrefair				BOREHOLE No BH01	
Job No 1869	Date 30-09-16 30-09-16	Ground Level (m)	Co-Ordinates ()		
Contractor CCG				Sheet 1 of 3	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
						0.20	TOPSOIL		
						(1.00)	Light greyish brown slightly gravelly CLAY (GLACIAL TILL)		
						1.20	Light brown CLAY (GLACIAL TILL)		
						(0.90)			
						2.10	Light brown/ light grey SILTSTONE		
						(0.50)			
						2.60	Brown CLAY (WEATHERED MUDSTONE)		
						2.90	Light grey gravelly CLAY (WEATHERED MUDSTONE)		
						(3.10)			
						6.00	Grey MUDSTONE		
						(2.80)			
						8.80	COAL (QUAKER SEAM)		
						(1.20)			
						10.00			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
30-09-16	09.00	0.00									No voids No loss of flush Groundwater not encountered
All dimensions in metres Scale 1:62.5			Client Gary Knight			Method/ Plant Used Lorry mounted rotary open hole rig			Logged By PG		

BOREHOLE LOG

Project Glanllyn, Acrefair				BOREHOLE No BH01
Job No 1869	Date 30-09-16 30-09-16	Ground Level (m)	Co-Ordinates ()	
Contractor CCG				Sheet 2 of 3

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION		
							Light grey MUDSTONE		
						(9.50)			
						19.50	Brown SILTSTONE		
						19.80	Purplish grey/ grey MUDSTONE		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Dpt	From	To	Hours	From	To	
											No voids No loss of flush Groundwater not encountered
All dimensions in metres Scale 1:62.5			Client Gary Knight			Method/ Lorry mounted rotary open Plant Used hole rig			Logged By PG		

GroundSolve Ltd

Project Glanllyn, Acrefair				BOREHOLE No BH01
Job No 1869	Date 30-09-16 30-09-16	Ground Level (m)	Co-Ordinates ()	
Contractor CCG				Sheet 3 of 3

AGS3 UK BH 1869 GLANLLYN, ACREFAIR BH LOGS.GPJ GINT STD AGS3 1.GDT 17/10/16

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Dpt	From	To	Hours	From	To	
30-09-16	11.30	30.00									No voids No loss of flush Groundwater not encountered
All dimensions in metres Scale 1:62.5			Client Gary Knight			Method/ Lorry mounted rotary open Plant Used hole rig			Logged By PG		

BOREHOLE LOG

Project Glanllyn, Acrefair				BOREHOLE No BH02	
Job No 1869	Date 30-09-16 30-09-16	Ground Level (m)	Co-Ordinates ()		
Contractor CCG				Sheet 1 of 3	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
						0.20		
						(1.00)		
						1.20		
						(2.80)		
						4.00		
						(0.50)		
						4.50		
						(2.50)		
						7.00		
						(1.50)		
						8.50		
						(0.70)		
						9.20		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Dpt	From	To	Hours	From	To	
30-09-16	12.30	0.00									No voids No loss of flush Groundwater not encountered
All dimensions in metres Scale 1:62.5			Client Gary Knight			Method/ Plant Used Lorry mounted rotary open hole rig			Logged By PG		

GroundSolve
Ltd

BOREHOLE LOG

Project Glanllyn, Acrefair				BOREHOLE No BH02
Job No 1869	Date 30-09-16 30-09-16	Ground Level (m)	Co-Ordinates ()	
Contractor CCG				Sheet 2 of 3

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick-ness)		
						(12.00)	Light grey MUDSTONE <i>(continued)</i>	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS	
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To		
												No voids No loss of flush Groundwater not encountered
All dimensions in metres Scale 1:62.5		Client Gary Knight				Method/ Lorry mounted rotary open Plant Used hole rig					Logged By PG	

AGS3 UK BH 1869 GIANI LYN. ACREFAIR BH LOGS.GPJ GINT STD AGS3 1.GDT 17/10/16

BOREHOLE LOG

Project Glanllyn, Acrefair				BOREHOLE No BH02	
Job No 1869	Date 30-09-16 30-09-16	Ground Level (m)	Co-Ordinates ()		
Contractor CCG				Sheet 3 of 3	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
						21.20	Light grey MUDSTONE (<i>continued</i>)		
						(0.80)	COAL (BIND SEAM)		
						22.00			
							Light grey MUDSTONE		
						(8.00)			
						30.00			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Dia. mm	Water Dpt	From	To	Hours	From	To	
30-09-16	15.45	30.00									No voids No loss of flush Groundwater not encountered

All dimensions in metres Scale 1:62.5	Client Gary Knight	Method/ Plant Used Lorry mounted rotary open hole rig	Logged By PG
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