

Our ref: 19-014.01L

Dave Haigh
Marsh Design Limited
18 Howard Avenue
Huddersfield
West Yorkshire
HD3 3DJ

26th March 2019

Dear Dave,



Arc Environmental Ltd
Solum House
Unit 1 Elliott Court
St Johns Road
Meadowfield
Durham
DH7 8PN

Re: Land to Rear of 5, Garner Lane, Highburton, Huddersfield

1.0 Introduction:-

Arc Environmental Limited (ARC) were commissioned by Marsh Design Limited on behalf of Mr. Dominic Sobanski, on the 30th January 2018 to undertake a brief programme of intrusive ground investigation works over land located to the rear of 5, Garner Lane situated between Highburton and Kirkburton some 5km south-east of Huddersfield Town Centre to facilitate with future site redevelopment works. The National Grid Reference for the central part of the site is 419040, 413530.

The intrusive investigation works undertaken by ARC were limited to the sinking of three rotary (open hole) boreholes, labelled RBH's 01 to 03. The boreholes were sunk to a maximum depth of c.30.48mm below existing site levels. The intrusive investigation works were generally completed in accordance with the recommendations contained within a Coal Mining Risk Assessment (CMRA) Report completed for the site by JNP Group, during August 2018, reference; B22747 CMRA where they suggested investigation works would be required to further investigate for evidence of unrecorded shallow coal extraction beneath the site

The borehole positions can be seen on the borehole location plan attached and this plan should be used for orientating purposes only, as the positions shown are approximate and the plan is not to a standard scale. This technical report should be read in conjunction with the CMRA Report previously produced for the site by JNP Group.

2.0 Summary of JNP Group CMRA Report:-

Based on geological maps produced by the British Geological Survey (BGS) the site is shown to be situated in an area where bedrock deposits are present at or close to the surface (area of solid outcrop) which consists of the Kirkburton Sandstone unit of the Lower Coal Measures (LCM) of Carboniferous age. The conjectural outcrop position of the Black Bed Coal is shown c.40m to the west of the site, generally with a strike in a north to south direction and dips towards the east below the site. The Black bed Coal locally varies in thickness between c.0.20m to 1.80m.

Re: Land to Rear of 5, Garner Lane, Highburton, Huddersfield (Cont'd)

2.0 Summary of JNP Group CMRA Report (Cont'd):-

In accordance with the Coal Authority Online Interactive Map Viewer, the site is shown to lie within Development High Risk Area (DHRA).

A Coal Authority Consultants Coal Mining Report was procured by JNP Group to further assess the risks posed to the site with respect to possible instability issues arising in the future as a direct result of past shallow coal mining activities. The report concludes the Coal Authority do not hold any records relating to known coal workings beneath the site within the Black Bed Coal. However, they do hold recorded relating to known workings beneath the site within the Better Bed Coal at a depth of 40m below existing site levels, with an extraction thickness of 0.46m. Given the depth to the Better Bed Coal and when considering the seam thickness, this coal seam is thought to be situated at such a depth which does not represent a risk to the site in terms of future surface instability.

The Coal Authority infers the probability of shallow unrecorded workings being present below the site, and this is felt to be associated with the Black Bed Coal. The Coal Authority has also confirmed that within their records there are no mine entries within 100m from the boundaries of the site and there are no opencast mines within 500m from the boundaries of the site.

Whilst the Coal Authority do not hold any records relating to known subjacent workings within the Black Bed Coal, it is possible that this coal seam was exploited prior to the Mines (Coal) Regulations Act of 1872, before which there was no statutory requirement to maintain and preserve plans of abandoned mines. The Black Bed Coal is estimated to be present below the site at a depth <20m below existing site levels and could have a seam thickness of up to c.1.80m and if workings have gone unrecorded within the Black Bed Coal then the overlying competent rock cover ratio to extraction thickness may fall below the conventionally accepted minimum rock cover ratio of 1:10, which is commonly taken as "safe" conditions in accordance with CIRIA Special Publication 32 – Construction over abandoned mine workings. One of the main causes of instability arising from shallow coal workings is void migration which is normally caused by the collapse of shallow abandoned pillar and stall mine workings.

As a result, it was recommended that a brief programme of intrusive ground investigation works in the form of rotary (open hole) boreholes were undertaken to confirm the actual risks posed to the site from possible shallow unrecorded coal workings within the Black Bed Coal. Open hole rotary drilling (probing) is a crude method of drilling and the primary purpose of using this technique is to determine the presence or evidence of coal workings by 'feeling' the ground. During drilling operations cuttings are brought to the surface for identification purposes and drilling rates are observed to determine changes in the strength of the ground.

3.0 Ground Conditions from ARC Rotary (Open Hole) Boreholes, February 2019:-

For an accurate description of the ground conditions encountered at the borehole positions created by ARC, reference should be made to the borehole record sheets attached.

Re: Land to Rear of 5, Garner Lane, Highburton, Huddersfield (Cont'd)

3.0 Ground Conditions from ARC Rotary (Open Hole) Boreholes, February 2019 (Cont'd):-

It should be noted that there is always the possibility of variation in the ground conditions around and between the borehole locations. A summary of the soil profile can be seen in Table 1 below. A permit to enter or disturb The Coal Authority's mining interests was obtained, permit reference 17553, a copy of which can be seen attached.

Table 1

<u>Type of strata</u>	<u>Depths recorded</u>	<u>Description</u>
RESIDUAL SOIL: (Clay Deposits)	From c.0.00m to c.0.46m up to 1.52m	Sandy clay deposits were recorded at the location of RBH's 02 & 03. The natural clay deposits are likely to be representative of completely weathered sandstone deposits.
SOLID GEOLOGY: (Lower Coal Measures)	From c.0.00m to c.1.52m up to c.30.48m (maximum depth penetrated)	The competent bedrock deposits at the borehole locations comprised mainly SANDSTONE (Kirkburton Sandstone) to depths of ranging between c.14.33m to c.18.29m before SILTSTONE deposits were recorded. A thin intact COAL seam c.0.30m in thickness was recorded at the location of RBH03 only at a depth of c.10.67m.

Steady drilling rates were maintained during the drilling process along with 100% water flush returns. There was no evidence within the boreholes to suggest that unrecorded coal extraction has taken place within beneath the site within the depths penetrated by the boreholes.

4.0 Conclusions:-

Only a thin intact coal seam with a thickness of c.0.30m was recorded at the location of RBH03 during the drilling process. Based on published BGS maps and the conjectured outcrop patterns of coal, the seam encountered at the location of RBH03 is thought to be representative of the Black Bed Coal which can be thin an impersistent below this part of West Yorkshire.

The boreholes were sunk to a depth of c.30.48m and consistently maintained steady drilling rates and retained 100% water flush. No ground gasses were recorded, during the gas monitoring which was undertaken during the drilling process.

There was no evidence within the boreholes to suggest that unrecorded workings have taken place at shallow depth within the Black Bed Coal or any other coal seams.

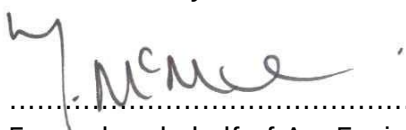
Re: Land to Rear of 5, Garner Lane, Highburton, Huddersfield (Cont'd)

4.0 Conclusions (Cont'd):-

Therefore, based on the drilling works undertaken on site, we feel that the site is not deemed to be at risk from future surface instability issues arising because of historic subjacent unrecorded shallow coal workings within the Black Bed Coal and as such no further works are deemed to be necessary with respect to this geo-hazard.

We trust the contents of this report and attachments are to your satisfaction and if you require any further information or clarification please do not hesitate to contact us.

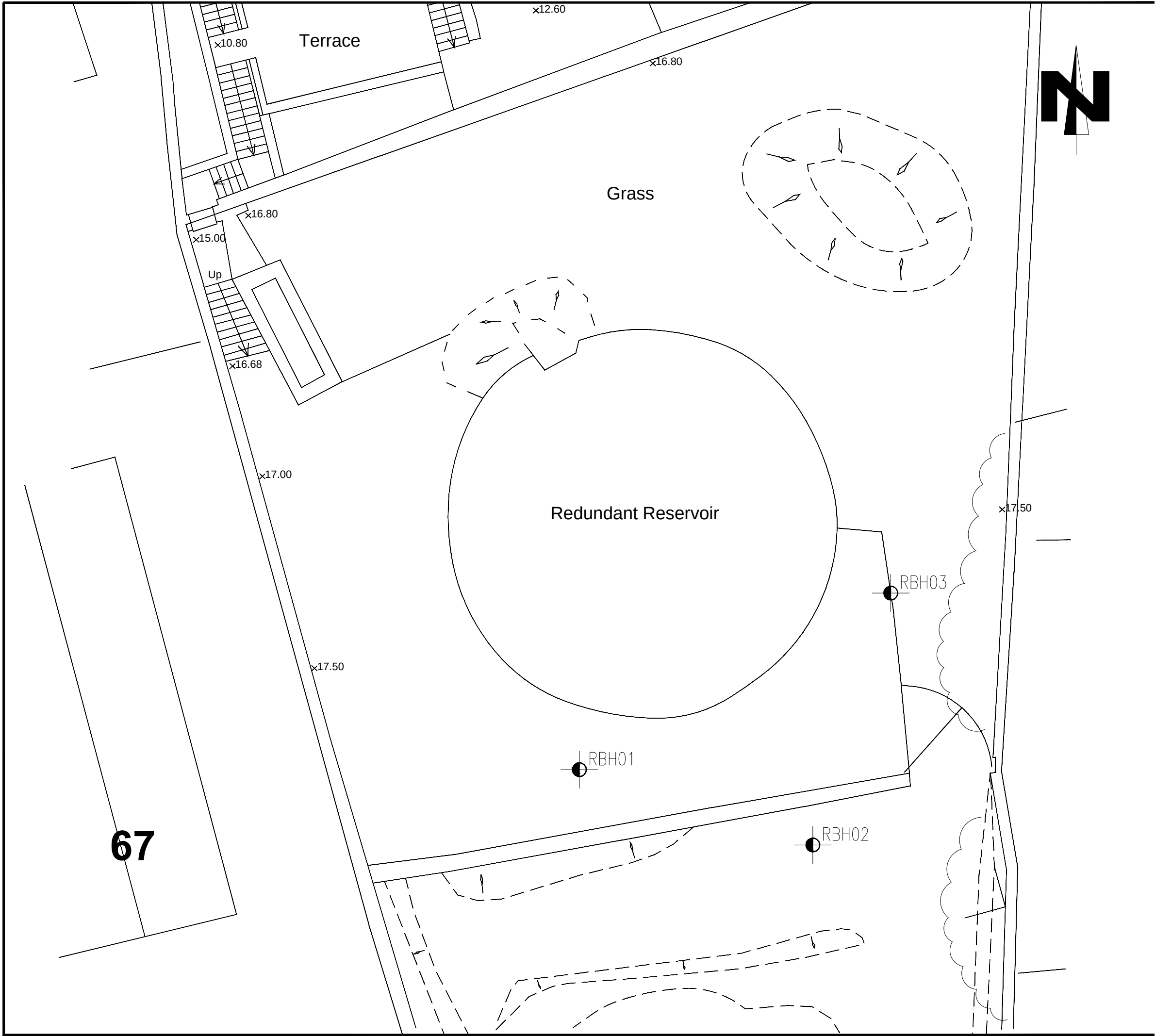
Yours sincerely,



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For and on behalf of Arc Environmental Limited
Terry McMenam BSc (Hons) CSci CEnv FGS MEnvSc FCMI MIOD
Chartered Scientist and Chartered Environmentalist
Director



Borehole Location Plan
Borehole Record Sheets
Coal Authority Permit 17553



ARC ENVIRONMENTAL LTD

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Meadowfield
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Tel: (0191) 378 6380
Fax: (0191) 378 0494
e-mail: admin@arc-environmental.com
web: www.arc-environmental.com

The contractor shall check all dimensions on site before commencement of any works. No dimensions to be scaled off this drawing.
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LEGEND



ROTARY BOREHOLE LOCATION

rev.	date	amendments			drawn chkd

Client:
MARSH DESIGN LIMITED

Project Title:
5 Garner Lane
Highburton
HD8 0QX

Drawing Title:

Borehole Location Plan

Scale at A3: NTS @ A3	Date: 12.02.19	Drawn by: P.D	Approved by: M.P
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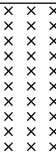
Job Ref: 19-014	Drg no: —	Rev: —
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Telephone: 01913786380

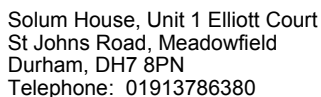
DRILLHOLE LOG

Project Land to the Rear of 5, Garner Lane, Highburton, Huddersfield, West Yorkshire				DRILLHOLE No RBH01	
Job No 19-014	Date 27-02-19 27-02-19	Ground Level (m)	Co-Ordinates ()	Sheet 1	
Contractor Arc Environmental Limited					

RUN DETAILS			STRATA						of 2	
Depth	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION			Geology	Instrument/ Backfill
						Discontinuities	Detail	Main		
					(14.33)			Light brown SANDSTONE (Drillers Description).		
					14.33 (0.91) 15.24			Dark brown MUDSTONE (Drillers Description).		
								Light grey SILTSTONE with MUDSTONE interbeds (Drillers Description).		

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
27-02-19	00.00		1.50	42mm			0	30.48	WATER	100%	WATER: Borehole remained dry and stable.
All dimensions in metres Scale 1:109.375			Client Mr. D. Sobanski			Method/ Plant Used Rotary (Open Hole)				Logged By SAB	

AGS3 UK DH GINT.GPJ AGS3 ALL.GDT 26/3/19



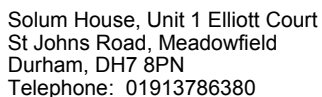
DRILLHOLE LOG

Project Land to the Rear of 5, Garner Lane, Highburton, Huddersfield, West Yorkshire				DRILLHOLE No RBH01
Job No 19-014	Date 27-02-19 27-02-19	Ground Level (m)	Co-Ordinates ()	
Contractor Arc Environmental Limited				Sheet 2

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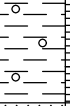
Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS	
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns		
											WATER: Borehole remained dry and stable.	
All dimensions in metres Scale 1:109.375		Client Mr. D. Sobanski				Method/ Plant Used Rotary (Open Hole)					Logged By SAB	

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DRILLHOLE LOG

Project Land to the Rear of 5, Garner Lane, Highburton, Huddersfield, West Yorkshire				DRILLHOLE No RBH02
Job No 19-014	Date 27-02-19 27-02-19	Ground Level (m)	Co-Ordinates ()	
Contractor Arc Environmental Limited				Sheet 1

RUN DETAILS			STRATA				Geology	Instrument/ Backfill	
Depth	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION			
						Discontinuities			Detail
					(1.52)		Dark brown sandy CLAY (Drillers Description).		
					1.52		Light brown SANDSTONE (Drillers Description).		
					(16.77)				

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
27-02-19	00.00		1.50	42mm			0	30.00	WATER	100%	WATER: Borehole remained dry and stable.
All dimensions in metres Scale 1:109.375		Client Mr. D. Sobanski				Method/ Plant Used Rotary (Open Hole)					Logged By SAB

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DRILLHOLE LOG

Project Land to the Rear of 5, Garner Lane, Highburton, Huddersfield, West Yorkshire				DRILLHOLE No RBH02	
Job No 19-014	Date 27-02-19 27-02-19	Ground Level (m)	Co-Ordinates ()		
Contractor Arc Environmental Limited				Sheet 2	

RUN DETAILS			STRATA						of 2	
Depth	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION			Geology	Instrument/ Backfill
						Discontinuities	Detail	Main		
					18.29			Light brown SANDSTONE (Drillers Description). <i>(continued)</i>		
					(11.71)			Light grey SILTSTONE with MUDSTONE interbeds (Drillers Description).		
					30.00			Borehole terminated at a depth of c.30m. The descriptions are based on the drillers interpretation of cuttings brought to the surface and the drilling rates maintained during the drilling process. No gas levels were detected during the creation of the boreholes and upon completion.		

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
											WATER: Borehole remained dry and stable.
All dimensions in metres Scale 1:109.375			Client Mr. D. Sobanski			Method/ Plant Used Rotary (Open Hole)			Logged By SAB		

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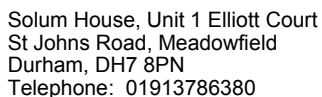
DRILLHOLE LOG

Project Land to the Rear of 5, Garner Lane, Highburton, Huddersfield, West Yorkshire				DRILLHOLE No RBH03	
Job No 19-014	Date 28-02-19 28-02-19	Ground Level (m)	Co-Ordinates ()		
Contractor Arc Environmental Limited				Sheet 1	

RUN DETAILS			STRATA						of 2	
Depth	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION			Geology	Instrument/ Backfill
						Discontinuities	Detail	Main		
					0.46			Dark brown sandy CLAY (Drillers Description).		
					Light brown SANDSTONE (Drillers Description).					
					(10.21)					
					10.67					
					10.97			Black intact COAL (Drillers Description).		
								Light brown SANDSTONE (Drillers Description).		
					(4.27)					
					15.24			Light grey SILTSTONE with MUDSTONE interbeds (Drillers Description).		

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
28-02-19	00.00		1.50	42mm			0	30.00	WATER	100%	WATER: Borehole remained dry and stable.
All dimensions in metres Scale 1:109.375			Client Mr. D. Sobanski			Method/ Plant Used Rotary (Open Hole)			Logged By SAB		

AGS3 UK DH GINT.GPJ AGS3 ALL.GDT 26/3/19



DRILLHOLE LOG

Project Land to the Rear of 5, Garner Lane, Highburton, Huddersfield, West Yorkshire				DRILLHOLE No RBH03
Job No 19-014	Date 28-02-19 28-02-19	Ground Level (m)	Co-Ordinates ()	
Contractor Arc Environmental Limited				Sheet 2

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Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS	
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns		
											WATER: Borehole remained dry and stable.	
All dimensions in metres Scale 1:109.375		Client Mr. D. Sobanski				Method/ Plant Used Rotary (Open Hole)					Logged By SAB	

AGS3 UK DH GINT.GPJ AGS3 ALL.GDT 26/3/19



The Coal
Authority

Permit to Enter or Disturb Coal Authority Mining Interests

Permit Reference Number 17553

Name and Address of Permit Holder:

*Arc Environmental Ltd
Solum House
Unit 1 Elliot Court
St Johns Road
Meadowfield
Durham
DH6 1EB*

Site Location:

*5 Garner Lane
Highburton
HD8 0QX*

This certificate hereby grants the above named Permit Holder a Permit to carry out:-

Ground investigation by 3 boreholes to 30m using water flush, within the Authority's mining interests at the identified site location for the period of 12 months from the granted date shown below. The granting of this Permit does not constitute advice given by the Authority in relation to the proposed operations. It is the Applicant's responsibility to obtain appropriate health, safety, environmental, technical and legal advice.

Signed: *Jake Morris* Granted Date: *19/02/2019*

For and on behalf of The Coal Authority

Nominated Representative: Jake Morris, Permitting Manager;

The Coal Authority, Permitting Office, 200 Lichfield Lane, Mansfield, Notts, NG18 4RG

Tel: 01623 637450; E-Mail: permissions@coal.gov.uk