

By Email

Our Ref. 25-162

FAO James Bradley
Violet Homes Ltd
Williamson & Croft York House
20 York Street
Manchester
M2 3BB

25th March 2025

Dear James,

RE: Amendment to Planning Permission 2024/91524 for Erection of Two Detached Dwellings at Old Lane, Scapegoat Hill, Huddersfield, HD7 4ND

1.0 Introduction

As requested by Violet Homes Ltd and following a consultation response from Kirklees Council Environmental Health (ref. 2024/93506 Dated 24th January 2025) regarding the potential risk to end users posed by contamination present within any made ground present on site, as detailed in the Phase 1 / Phase 2 Geoenvironmental Investigation Report previously completed by Alan Wood & Partners (Ref. JS/ST/40706-RP001- May 2018). A site visit was conducted by a suitably qualified geoenvironmental engineer from Arc Environmental Ltd (ARC) on 5th March 2025 to recover samples for laboratory contamination screening to allow for an updated ground contamination risk assessment and Conceptual Site Model to be carried out.

In addition, a review of the previously completed Ground Gas Risk Assessment carried out by Alan Wood & Partners (ref. JMS/AC/40706-Lt002 – Dated 3rd August 2018) has been carried out as part of the updated ground contamination risk assessment.

The following documents are attached with this report

- Site Photographic Record Sheet
- Sampling Location Plan
- Alan Wood & Partners Ground Gas Risk Assessment (ref. JMS/AC/40706-Lt002 dated 3rd August 2018)
- Laboratory Screening Results (ref. 25-08009-1)

2.0 Site Visit

The site visit was aimed at confirming that a reduced level dig of c.2.5m had taken place across the site (as indicated by the client), and that all made ground has been removed from the proposed soft landscaped areas of the 2 no. proposed residential houses to be constructed. It also aimed to confirm that the natural strata present is suitable to remain beneath the proposed soft landscaping.



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2.0 Site Visit (Cont'd)

At the time of the site visit, a thin band of topsoil c.0.10m thick overlying natural dark brown weathered mudstone was recorded at the surface in the proposed garden areas with all made ground visibly removed from site. A site photographic record sheet is attached to this report.

3.0 Contamination Screening

During the site visit, 4 no. samples of the topsoil were recovered from the proposed garden areas and submitted for laboratory analysis.

The samples recovered were stored at approximately c.2°C to c.8°C using cool boxes and ice packs prior to delivery to a UKAS / MCERTS accredited laboratory. The catalogue of testing results can be found in the Chemtest Analytical Report (Ref. 25-08009-1) attached to this letter report, with the total analysis carried out summarised below.

- 4 no. soil samples screened for a generic (metals and non-organics) soil suite including Arsenic, Cadmium, Chromium (III & VI), Copper, Lead, Mercury, Nickel, Selenium, Zinc, Cyanide and Total Organic Carbon (TOC).
- 4 no. soil samples screened for Speciated Polycyclic Aromatic Hydrocarbons (PAH's) & Speciated Total Petroleum Hydrocarbons (based on full Aliphatic / Aromatic Split & BTEX).
- 4 no. samples screened for the presence of asbestos.

4.0 Updated Ground Contamination Risk Assessment

4.0.1 Contamination Screening: -

The soil screening results from have been assessed by comparing the maximum values (C_M) recorded for each analyte to the critical concentration values (C_C) adopted for this site i.e., based on a the most sensitive proposed end use of 'residential with home grown produce' at 1% SOM and are summarised in Table 1 below and on the following page.

Table 1

Analyte	Critical Conc. (C_C)	No. of Samples Screened	Max. Conc. (C_M) Recorded	No. of Samples > C_C
Arsenic	37 ⁽¹⁾	4	5.8	0
Cadmium	11 ⁽¹⁾	4	0.41	0
Chromium III	910 ⁽¹⁾	4	67	0
Chromium VI	6 ⁽¹⁾	4	<0.50	0
Copper	2400 ⁽¹⁾	4	61	0
Lead	200 ⁽²⁾	4	32	0
Mercury	40 ⁽¹⁾	4	<0.05	0
Nickel	130 ⁽¹⁾	4	84	0
Selenium	250 ⁽¹⁾	4	1.7	0
Zinc	3700 ⁽¹⁾	4	120	0
Cyanide	34 ⁽³⁾	4	<0.50	0

⁽¹⁾ = LQM/CIEH S4UL's – Residential with Homegrown Produce (1.0% SOM), ⁽²⁾ = CL:AIRE C4SLs – Residential with Homegrown Produce, ⁽³⁾ = Atkins ATRISK SSV (Mar 2011).

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4.0 Updated Ground Contamination Risk Assessment (Cont'd)

4.0.1 Contamination Screening: - (Cont'd)

Table 1 (Cont'd)

Analyte	Critical Conc. (C _c)	No. of Samples Screened	Max. Conc. (C _M) Recorded	No. of Samples > C _c
Speciated PAH's				
Acenaphthene	210 ⁽¹⁾	4	<0.10	0
Acenaphthylene	170 ⁽¹⁾	4	<0.10	0
Anthracene	2400 ⁽¹⁾	4	<0.10	0
Benzo(a)anthracene	7.2 ⁽¹⁾	4	<0.10	0
Benzo(a)pyrene	2.2 ⁽¹⁾	4	<0.10	0
Benzo(b)fluoranthene	2.6 ⁽¹⁾	4	<0.10	0
Benzo(ghi)perylene	320 ⁽¹⁾	4	<0.10	0
Benzo(k)fluoranthene	77 ⁽¹⁾	4	<0.10	0
Chrysene	15 ⁽¹⁾	4	<0.10	0
Dibenz(ah)anthracene	0.24 ⁽¹⁾	4	<0.10	0
Fluoranthene	280 ⁽¹⁾	4	<0.10	0
Fluorene	170 ⁽¹⁾	4	<0.10	0
Indeno(123cd)pyrene	27 ⁽¹⁾	4	<0.10	0
Naphthalene	2.3 ⁽¹⁾	4	<0.10	0
Phenanthrene	95 ⁽¹⁾	4	<0.10	0
Pyrene	620 ⁽¹⁾	4	<0.10	0
Speciated TPH's				
VPH Aliphatic (>C5-C6)	42(1)	4	<0.05	0
VPH Aliphatic (>C6-C8)	100(1)	4	<0.05	0
VPH Aliphatic (>C8-C10)	27(1)	4	<0.05	0
EPH Aliphatic (>C10-C12)	130(1)	4	<2.0	0
EPH Aliphatic (>C12-C16)	1100(1)	4	<1.0	0
EPH Aliphatic (>C16-C35)	65000(1)	4	<5.0	0
EPH Aliphatic (>C35-C44)	65000(1)	4	<20	0
VPH Aromatic (>EC5-EC7)	70(1)	4	<0.05	0
VPH Aromatic (>EC7-EC8)	130(1)	4	<0.05	0
VPH Aromatic (>EC8-EC10)	34(1)	4	<0.05	0
EPH Aromatic (>EC10-EC12)	74(1)	4	<1.0	0
EPH Aromatic (>EC12-EC16)	140(1)	4	<1.0	0
EPH Aromatic (>EC16-EC21)	260(1)	4	7.2	0
EPH Aromatic (>EC21-EC35)	1100(1)	4	<2.0	0
EPH Aromatic (>EC35-EC44)	1100(1)	4	<11.7	0
BTEX				
Benzene	0.087 ⁽¹⁾	4	0.0011	0
Toluene	130 ⁽¹⁾	4	<0.0010	0
Ethylbenzene	47 ⁽¹⁾	4	<0.0010	0
m & p-Xylene	56 ⁽¹⁾	4	<0.0010	0
o-Xylene	60 ⁽¹⁾	4	<0.0010	0
Asbestos	Presence	4	NAD	0

⁽¹⁾ = LQM/CIEH S4UL's – Residential with homegrown produce (1.0% SOM), ⁽²⁾ = CL:AIRE C4SLs – Residential with Homegrown Produce, ⁽³⁾ = Atkins ATRISK SSV (Mar 2011). NAD = No Asbestos Detected.

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RE: Amendment to Planning Permission 2024/91524 for Erection of Two Detached Dwellings at Old Lane, Scapegoat Hill, Huddersfield, HD7 4ND (Cont'd)

4.0 Updated Ground Contamination Risk Assessment (Cont'd)

4.0.1 Contamination Screening: - (Cont'd)

The results have identified the following:

- None of the Maximum Concentration (C_M) values exceed the Critical Concentration (C_C) values taken for the site.
- No asbestos was detected within any of the soil samples tested.

When considering these results, the topsoil below the proposed garden areas does not represent a potential risk to the end users and therefore no treatment, removal, protection measures and / or further detailed quantitative risk assessment will be required.

4.0.2 Hazardous Ground Gas Risk Assessment: -

As part of the previous ground investigation carried out by Alan Wood & Partners, ground gas monitoring wells were installed within 3 no boreholes and a programme of ground gas monitoring was carried out to determine the risk of hazardous ground gas generation / migration. A copy of the risk assessment can be seen attached. The wells were installed to assess potential ground gas migration from the adjacent burial ground to the immediate east of the proposed development, with the response zones targeted over the full borehole depth.

From the results of the ground gas monitoring carried out during periods of rising, fluctuating and falling atmospheric pressure, detectable levels of Methane (CH_4) up to 0.20% v/v and Carbon Dioxide (CO_2) up to 1.20%v/v were recorded along with a maximum peak flow of 0.10l/hr. Based on these results in accordance with CIRIA Report C665, a risk assessment was completed for this site, by converting the results to a gas screening value (GSV) for CH_4 & CO_2 . From this assessment, a GSV of 0.0002l/hr was recorded for CH_4 whilst a GSV value of 0.0012l/hr was recorded for CO_2 . As a result, the GSV values for CH_4 & CO_2 fall below the lower target concentration of 0.07l/hr and equate to a Characteristic Situation 1 site classification, resulting in no gas protective measures being required.

5.0 Updated Conceptual Site Model (CSM)

Based on these findings of the contamination screening and ground gas monitoring carried out, an updated conceptual site model has been developed for the proposed development, which is provided within Table 2 on the following page.

This CSM summarises the various contamination sources, plausible migration pathways and potentially sensitive receptors identified for this site, assuming no remediation, additional protection measures and / or removal of the sources of contamination takes place.

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5.0 Updated Conceptual Site Model (CSM) (Cont'd)

Table 2

*= Not included in the Human Health & Controlled Waters Risk Assessment.

<u>Sources (S)</u>		<u>PATHWAYS (P)</u>		<u>RECEPTORS (R)</u>	
S1	No potential sources present as all made ground has been removed from the proposed soft landscaped garden areas with topsoil / mudstone present. No elevated concentrations identified within the soil samples tested.	P1	Ingestion & Dermal Contact.	R1	Human Health - End user to be taken as.
		P2	Plant uptake and attached soils.		
		P3	Air-inhalation of vapours and direct contact with dust.		
S2	Potential for hazardous ground gases associated with off-site sources. No elevated concentrations recorded.	P4	Migration through existing services / permeable strata.	R2	Controlled Waters: Groundwater – anticipated within the underlying bedrock (Rough Rock Flags) Secondary – A Aquifer. Not considered to be at risk
		P5	Direct contact with building Materials.	R3	Adjacent sites.
		P6	Surface runoff, infiltration & leachate migration.	R4*	Building materials.
				R5*	Flora and fauna.

5.0.1 Sources: -

From the site visit carried out, it is evident that a reduced level dig has been carried out across the proposed development area which has removed the made ground with a thin band of topsoil (c.0.10m thick) overlying natural weathered mudstone recorded, resulting in no sources of ground contamination being present. However, for completeness and to determine the suitability of the topsoil for reuse, representative samples of topsoil were tested for a generic suite of metals, Speciated PAH (Polycyclic Aromatic Hydrocarbons), Speciated TPH (Total Petroleum Hydrocarbons) & Asbestos.

5.0.2 Pathways: -

When considering the proposed end use, and without considering treatment, removal or protection measures, there are some potential plausible pathways available for direct contact, dermal contact, ingestion, inhalation, wind (dust / particulate), volatilization, and vertical and lateral transportation below the site.

Within the CLEA Risk Assessment Model for Human Health, there are 3 exposure mediums considered for on-site receptors, comprising ingestion of soil containing contaminants, inhalation of contaminated dust / vapours and dermal contact, with up to 10 no. exposure pathways considered, as shown on the following page.

RE: Amendment to Planning Permission 2024/91524 for Erection of Two Detached Dwellings at Old Lane, Scapegoat Hill, Huddersfield, HD7 4ND (Cont'd)

5.0 Updated Conceptual Site Model (CSM) (Cont'd)

5.0.2 Pathways (Cont'd): -

1. Ingestion of soil and indoor dust 2. Consumption of homegrown produce and attached soil 3. Dermal contact (indoor) 4. Dermal contact (outdoor) 5. Inhalation of dust (indoor) 6. Inhalation of dust (outdoor) 7. Inhalation of vapour (indoor) 8. Inhalation of vapour (outdoor) 9. Oral background intake 10. Inhalation background intake.

Where the future site has hard cover and below new structures, the majority of these pathways will not be available.

When considering the potential pathways for leachate migration, where either hard cover and / or future surface water drainage systems are present, the potential effects of surface infiltration or contaminated surface water runoff will be greatly reduced. Similarly, when considering the construction work force, exposure pathways through direct contact, ingestion and dust inhalation will be available during part of the construction process, and therefore adequate PPE should be provided to protect the work force during this period.

5.0.3 Receptors: -

Within the CLEA Risk Assessment Model for Human Health, the potential receptors are assessed initially on site end use, followed by a delineation of age category (i.e. child or adult), with default settings for *Residential*, *Allotment* and *Public Open Space (Park)* end uses based on a child aged 0 to 6 years, *Public Open Space (Residential)* based on a child aged 3 to 9 and *Commercial* end uses based upon a working exposure period of up to 49 years (i.e. 16 to 65).

Key generic assumptions for *Residential* and *Public Open Space (Residential)* are based upon a typical residential property, consisting of a two-storey small, terraced house, with private garden, and a *Commercial* end use based upon a typical commercial or light industrial property, consisting of a three-storey office building (pre-1970). No buildings are anticipated for *Allotment* or *Public Open Space (Park)* end uses.

Within the CLEA Risk Assessment Model for Human Health there are 6 no. generic end use categories presently in use, as shown below.

1) *Residential - with home grown produce*, 2) *Residential - without home grown produce*, 3) *Allotments*, 4) *Commercial*, 5) *Public Open Space – Residential*, 6) *Public Open Space – Park*

Proposed development to construct 2 no. residential dwellings with associated car parking and the Level 1 Risk Assessment has taken the end use category as:

1) *Residential - with home grown produce*

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5.0 Updated Conceptual Site Model (CSM) (Cont'd)

5.0.3 Receptors (Cont'd): -

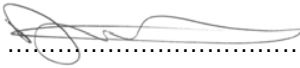
For Controlled Waters the primary receptor for this site is groundwater at depths within the solid geological deposits (Secondary - A Aquifer).

6.0 Conclusions

From the results of the contamination screening, ground gas monitoring and updated ground contamination assessment carried out, the site does not represent a significant risk to the proposed end users and no treatment, removal, protection measures and / or further detailed quantitative risk assessment should be required.

We trust this brief report is to your satisfaction however, if you require any further information or clarification, please do not hesitate to contact us.

Yours sincerely,



For and on behalf of Arc Environmental Ltd
Darren McGrath MEnvSc FGS Tech IOSH
Director

Site Photographic Record Sheet

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The contractor shall check all dimensions on site before commencement
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rev.	date	amendments	drawn chkd

Client:

VIOLET HOMES

Project Title:

Proposed Residential Development
Old Lane, Scapegoat Hill
Huddersfield, HD7 4ND

Drawing Title:

Site Photographic Record Sheet

Scale at A3: NTS	Date: 25/03/25	Drawn by: D.M	Approved by: J.D
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Job Ref: 25-162	Drg no: -	Rev: -
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Sampling Location Plan

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Client:

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Project Title:

Proposed Residential Development
Old Lane, Scapegoat Hill
Huddersfield, HD7 4ND

Drawing Title:

Sampling Location Plan

Scale at A3:	Date:	Drawn by:	Approved by:
NTS	25/03/25	D.M	J.D

Job Ref:	Drw no:	Rev:
25-162	-	-

Alan Wood & Partners Ground Gas Risk Assessment

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3rd August 2018

Our Ref: JMS/AC/40706-Lt002

Unit D2 Elland Riogres Link
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For the attention of Mr Colin Parkin

Dear Sirs,

Ground Gas Risk Assessment: Brierstone Ltd, Scapegoat Hill, Golcar, Huddersfield, HD7 4ND

We are pleased to present a ground gas risk assessment for the proposed scheme. This letter report should be read in conjunction with all other related reports and drawings;

- 1) Alan Wood & Partners; Phase I/II Geo-Environmental Investigation Report (JS/ST/40706-Rp001), dated 3rd May 2018;

Four No. trial pits (TP1 to TP4), three No. hand pits (HP1 to HP3) and four No. rotary cored boreholes (BH1-BH4) were completed between the 14th and 25th of March 2018. Three of the boreholes were completed with ground gas and groundwater monitoring installations. The locations of the boreholes are shown on the attached plan (40706/002), while the installation details are shown on the enclosed borehole logs.

This document has been completed in general accordance with current guidance, listed below:

- Environment Agency (2004), *Guidance on the management of landfill gas*;
- Building Research Establishment (BRE) Report 212 (1991), Construction of new buildings on gas-contaminated land;
- CL:AIRE Research Bulletin RB17, A pragmatic approach to Ground Risk Assessment, November 2012
- CIRIA C665 (2015), Assessing risks posed by hazardous ground gases to buildings;
- BS8485 2015, Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings; and
- "Reliability and risk in gas protection design" by S.A. Wilson and G.B. Card, Ground Engineering (1999).

It is generally accepted that a potential risk to a building development may exist where methane and carbon dioxide concentrations exceed a calculated site-specific Gas Screening Value (GSV). Above these values, consideration should be given to providing some form of gas protective measures within the proposed development.

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As indicated in these documents, the assessment of potential risk associated with a given ground gas regime should also incorporate the atmospheric pressure, atmospheric pressure trends and gas flow rates over the monitoring period, which have significant influence over gas emission and vertical and/or horizontal ground gas migration through the sub-surface environment. These measurements were therefore included with the monitoring works to inform the risk assessment for the proposed development along with a review of atmospheric pressure patterns in the days preceding the monitoring event.

Gas monitoring was undertaken on site as a result of the burial ground adjacent to the site boundary. Radon protective measures are not required in construction.

The intrusive works undertaken encountered ground conditions as summarised below:

Table 1.0 - Summary of Ground Conditions

Lithology	Exploration Location	Approximate proven depth (m) to base from existing ground level	Approximate Thickness (m)	Allowable Safe Bearing Capacity (kN/m²)
Topsoil	HP1 to HP3 and TP1 to TP4	0.20m to 0.80m		Nil
Made Ground	BH4 and TP3	0.75m to 1.60m		Nil
Gravelly Sand	HP1 to HP3 and TP1 to TP4	0.55m to 1.70m	0.25m to 1.25m	80
Clay	TP3	1.80m	0.20m	120
Millstone Grit Group	All BH Locations	20.00m	Base not encountered	500+
Groundwater	Groundwater was not encountered during the site investigation works. Groundwater was recorded at between 8.95m bgl (BH2), 20.80m bgl (BH3) and 19.34m bgl (BH4) during the first round of ground gas monitoring.			

Made Ground:

Made ground was encountered across the site to depths ranging between 0.20m and 0.80m.

A deposit of made ground was encountered within TP3 up to 0.75m bgl; comprising 'Medium dense, dark brown, clayey, slightly silty, gravelly, SAND. Gravel is fine to coarse, including cobbles, angular to sub-rounded, sandstone brick and glass. Made ground was recorded within BH4 however, this material comprised a level drilling platform which was constructed in order to ensure the drilling rig stability during the works.

Natural Strata:

The site surface comprises a layer of topsoil which was encountered up to 0.80m bgl. A granular superficial deposit was encountered beneath the topsoil up to 1.70m bgl. This deposit generally comprised sand with a sandstone gravel component. This is considered to be fully weathered mantle of the underlying bedrock.

Bedrock was recorded as mudstone, siltstone and sandstone of the Millstone Grit Group, and was encountered between 1.76m and 20.50m bgl.

Groundwater.

Groundwater was not encountered during the site investigation works. However, groundwater was recorded at between 8.92m bgl (BH2), 20.80m bgl (BH3) and 19.34m bgl (BH4) during the first round of ground gas monitoring.

Hazardous Ground Gas Risk Assessment

Fugitive ground gases associated with the adjacent burial site may present a risk to development on the basis of available information. In accordance with BS8485:2007, BS8576:2013, NHBC (2007) and CIRIA C665 (2007), a period of ground gas monitoring appropriate for the proposed end use of the site should be undertaken.

The revised conceptual model rated the risk associated with hazardous ground gases as being 'moderate/low'. The likely generation potential for ground gas at the site is 'very low', in accordance with CIRIA C665 (2007) Tables 5.5a and 5.6b. It is considered that, with high sensitivity classification for the proposed development (residential with gardens), that 6 monitoring visits are required over a period of 3 months, in order to determine the minimum level of ground gas protection required.

Ground Gas Monitoring

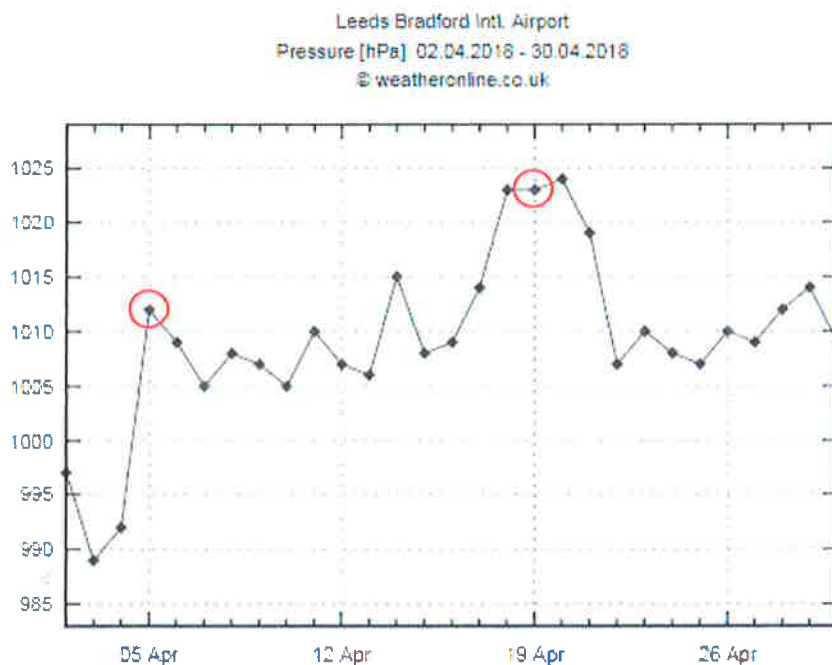
6 no. rounds of gas monitoring were proposed and have been completed on the basis of the Phase I information.

Round 1; 6th April 2018; (973mb to 975mb) during a period of rising barometric pressure;

Borehole	CH ₄ %v/v	CO ₂ %v/v	O ₂ %v/v	H ₂ S %v/v	Flow l/hr	Water m	GSV l/hr
BH2	0.1	0.5	20.7	0	0.1	8.92	0.0005
BH3	0.1	0.4	20.5	0	0	20.95	0
BH4	0.1	0.2	20.3	0	0.1	19.34	0.0002
AIR	0.1	0.1	20.4	0	-	-	-

Round 2; 19th April 2018; (987mb to 1001mb) during a period of rising barometric pressure;

Borehole	CH ₄ %v/v	CO ₂ %v/v	O ₂ %v/v	H ₂ S %v/v	Flow l/hr	Water m	GSV l/hr
BH2	0.2	0.2	16.8	1	0	15.51	0
BH3	0.2	0	18.2	1	-0.1	20.98	0
BH4	0.2	0.3	18.6	2	0	19.37	0
AIR	0.2	0	19.2	2	-	-	-

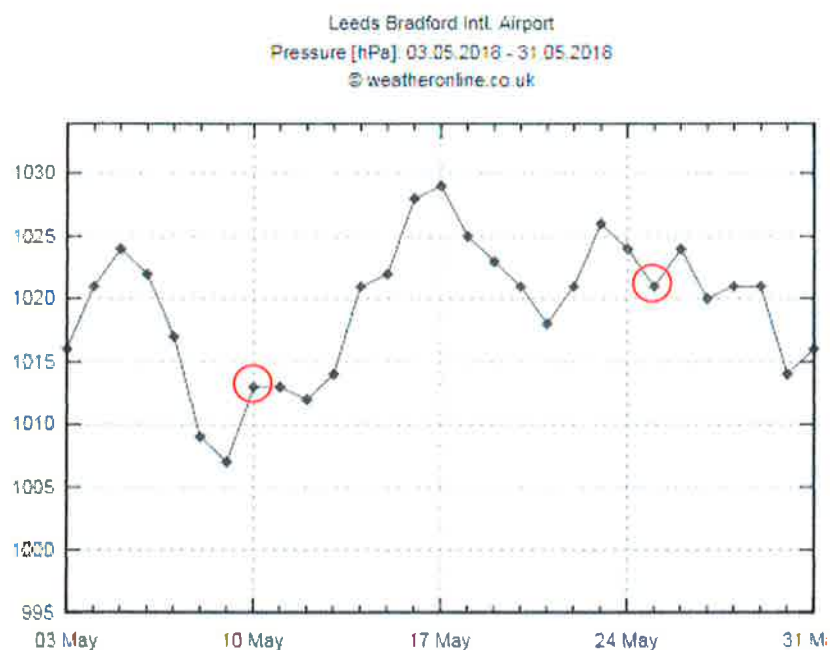


Round 3; 11th May 2018; (976mb to 977mb) during a period of rising barometric pressure;

Borehole	CH ₄ %v/v	CO ₂ %v/v	O ₂ %v/v	H ₂ S %v/v	Flow l/hr	Water m	GSV l/hr
BH2	0	0.4	20.8	0	0.1	8.92	0.0004
BH3	0	0.5	20.6	0	0.1	20.99	0.0005
BH4	0	0.4	20.9	0	0	19.68	0
AIR	0	0.2	21.2	0	-	-	-

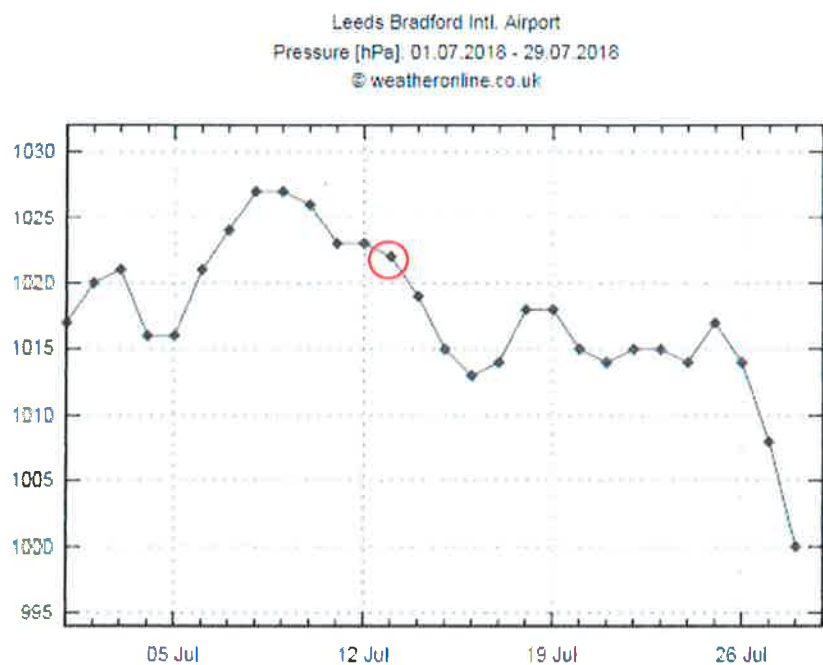
Round 4; 25th May 2018 (989mb to 985mb) during a period of fluctuating barometric pressure;

Borehole	CH ₄ %v/v	CO ₂ %v/v	O ₂ %v/v	H ₂ S %v/v	Flow l/hr	Water m	GSV l/hr
BH2	0	0.4	21.1	0	0	9.1	0
BH3	0	0.5	20.6	0	0	20.98	0
BH4	0	0.5	21.1	0	0	19.68	0
AIR	0	0.2	21.3	0	-	-	-



Round 5; 13th July 2018 (987mb to 988mb) during a period of falling barometric pressure;

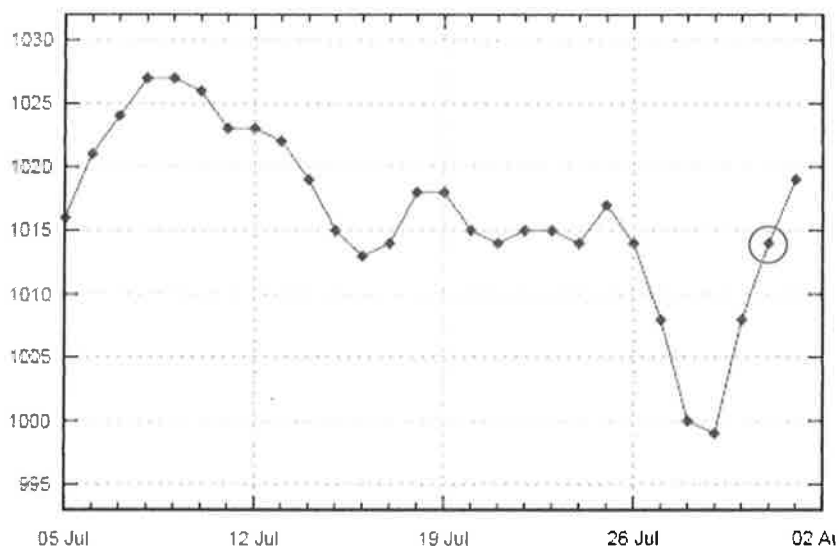
Borehole	CH ₄ %v/v	CO ₂ %v/v	O ₂ %v/v	H ₂ S %v/v	Flow l/hr	Water m	GSV l/hr
BH2	0	0.4	20.9	0	0	6.90	0
BH3	0	1.2	20.3	0	0	Dry	0
BH4	0	0.9	19.9	0	0	Dry	0
AIR	0	0.1	20.7	0	-	-	-



Round 6; 1st August 2018 (984mb to 985mb) during a period of falling barometric pressure;

Borehole	CH ₄ %v/v	CO ₂ %v/v	O ₂ %v/v	H ₂ S %v/v	Flow l/hr	Water m	GSV l/hr
BH2	0	0.2	20.9	1	0	6.90	0
BH3	0	0.7	19.4	1	0	Dry	0
BH4	0	0.2	21.0	0	0	Dry	0
AIR	0	0.1	20.3	0	-	-	-

Leeds Bradford Airport
 Pressure [hPa]: 05.07.2018 - 02.08.2018
 © weatheronline.co.uk



CH₄ - Methane Concentration

l/hr - Litres per hour

CO₂ - Carbon Dioxide Concentration

BD - Below detection limit

CO - Carbon Monoxide Concentration

NR - Not Recorded

O₂ - Oxygen Concentration

MP - Monitoring Point

%v/v - Percent by volume in air

ppm - Parts per million

VOC – Volatile Organic Compounds

$$\text{GSV (l/hr)} = \text{BH Flow rate (l/hr)} \times \text{Gas concentration (\%)}$$

The peak concentration of **methane (CH₄)** was recorded as **0.20%v/v** from BH2-BH4 on the 19th April 2018.

The peak concentration of **carbon dioxide (CO₂)** was detected in BH3 on the 13th July 2018 at **1.20%v/v**.

A maximum peak flow reading of 0.10l/hr was recorded within BH4 and BH5 on the 6th April 2018, and BH2 and BH3 on the 11th of May 2018. Monitoring measurements were taken at atmospheric pressures between 973mb and 1001mb.

Ground gas monitoring visits have been undertaken during periods of rising, fluctuating, and falling barometric pressures, as highlighted on the annotated barometric pressure graphs from a local weather station at the Leeds-Bradford Airport.

The results of the monitoring indicate that a GSV of **0.0012 l/hr** applies for carbon dioxide and **0.0002 l/hr** for methane at this site, based on the highest recorded CO₂ concentration (i.e. 1.20%v/v) and methane concentration (i.e. 0.20%v/v). The maximum flow rate (i.e. 0.10l/hr) has been recorded during a period of fluctuating pressure, and a period of rising barometric pressure.

The worst case GSV indicates that the ground gas regime complies with Characteristic Situation 1 (very low risk) (defined in CIRIA C665 Tables 8.5 and 8.6). This means that no gas precautionary measures are required.

Basic Radon protective measures are not required in construction.

We have not submitted this letter report to the planners or regulators, but should you require it, we would be happy to do so, on your behalf.

We trust that the above is satisfactory, but should you have any questions or wish clarification of the above, please do not hesitate to contact us.

Yours faithfully,

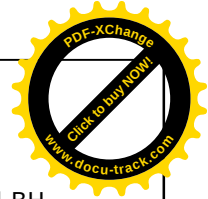
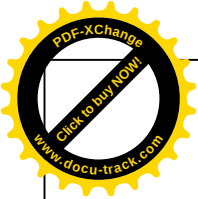


A. Clark, BSc (Hons), MSc, FGS
Geotechnical Engineer



J. M. Saunders, BSc (Hons), MSc (Eng), CEng, MIMMM, FGS
Director
For and on behalf of Alan Wood and Partners

Enc.



Key



Rotary Cored BH
Locations



Trail Pit / Hand Pit
Locations



DO NOT SCALE



Client.			Brierstone Ltd		
Project.			Scapegoat Hill		
Drawing.			Borehole Location Plan		
Date.		02.08.18	Scale.		NTS
Drawn by.		ST	Check by.		SR
			Approved by.		JS
Status:			FINAL		
Job no.		40706	Fig. no.		002
			Rev.		



Rotary Core Log

Borehole No.

BH1

Sheet 1 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 98.60

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 20/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							0.40	98.20		TOPSOIL	
										Yellow / brown, sandy, gravelly CLAY. Gravel is sandstone (Drillers Description).	1
							1.80	96.80		Extremely weak to medium strong, thinly laminated, grey, inter bedded MUDSTONE & SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, stepped, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	2
		2.45 2.00 - 3.00	C 17	100	93	30					
		2.95	C								3
		3.00 - 3.50	7	70	64	0					
		3.50 - 4.00		40	0	0					4
		4.45 4.00 - 5.00	C	92	13	0					5
										Continued on next sheet	

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH1

Sheet 2 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 98.60

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 20/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.30	C								
		5.00 - 6.00	9	95	64	39					
		6.30	C								
		6.00 - 7.00	30	85	39	44					
		7.00 - 7.20	4	100	100	100					
		7.40	C				7.20	91.40			
		7.50 - 7.65	C								
		7.20 - 7.90	30	100	64	34				Weak to strong, laminated to thinly bedded SANDSTONE. Fractures are smooth, stepped, sub-horizontal and with no infill [MILLSTONE GRIT GROUP].	
		7.80 - 7.90	C								
		7.90 - 8.00	2	100	100	100	7.90	90.70			
		8.00 - 8.80	15	74	11	0	8.00	90.60		Extremely weak, thinly laminated, grey, MUDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, stepped, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	
		8.00 - 8.80	15	74	11	0				Weak medium strong, thinly laminated to thinly bedded, brown SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	
		8.80 - 9.00	2	100	0	0	8.80	89.80			
		9.00 - 9.50	C	91	64	27					
		10.00	C								

Continued on next sheet

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH1

Sheet 3 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 98.60

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 20/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		10.15	C				11.00	87.60			11
		10.00 - 11.00		87	56	10					
		11.20	C								
		11.00 - 12.00		95	84	49					
		11.60	C								
		12.00 - 13.00		86	45	0					
		13.35	C				14			Weak to strong, laminated to thinly bedded, brown SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	12
		13.00 - 14.00		98	79	65					
		14.30	C								
		14.00 - 15.00		93	83	58	15				13
										Continued on next sheet	14
											15

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH1

Sheet 4 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 98.60

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 20/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.30	C						xxxxxx		
		15.00 - 16.00		60	54	23			xxxxxx		
									xxxxxx		
		16.00 - 17.00		94	65	0			xxxxxx		16
									xxxxxx		
		17.00 - 17.45		97	68	24			xxxxxx		17
		17.47	C				17.45	81.14	xxxxxx		
		17.45 - 18.00		100	81	0				Medium strong, very thinly bedded to thinly bedded, brown SANDSTONE. Fractures are smooth, sub-horizontal with no infill [MILLSTONE GRIT GROUP].	
		18.00 - 18.22		100	63	0					18
		18.22 - 19.00		100	85	14	18.22	80.38		Weak to medium strong, very thinly bedded to thinly bedded, inter bedded SILTSTONE & SANDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, smooth, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].	
		19.30	C								19
		19.00 - 20.00									
							20.00	78.60		End of borehole at 20.00 m	20

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH2

Sheet 1 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 106.23

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 21/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description			
				TCR	SCR	RQD							
							0.40	105.83		TOPSOIL	1		
										Weak, yellow, brown, weathered sandstone (drillers description)			
		2.00 - 3.00		57	57	48	2.00	104.23		Very strong, thinly bedded to medium bedded, brown SANDSTONE. Fractures are smooth, sub-horizontal with no infill [MILLSTONE GRIT GROUP].	2		
		3.00 - 3.50		68	68	68					3		
		3.50 - 4.00		88	88	88	3.50	102.73		Extremely weak, thinly laminated, grey, MUDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	4		
		4.00 - 4.40		100	100	0	4.40	101.83		Weak to strong, laminated to thinly bedded SANDSTONE. Fractures are smooth, sub-horizontal with no infill [MILLSTONE GRIT GROUP].	5		
		4.40 - 4.80		95	95	52	4.80	101.43		Extremely weak, thinly laminated, grey, MUDSTONE. Fractures are extremely closely			
		4.80 - 5.00		89	0	0	5.00	101.23					
		Continued on next sheet											

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH2

Sheet 2 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 106.23

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 21/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / Fl	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.00		100	90	12				spaced to closely spaced, sub-horizontal, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP]. Extremely weak to very weak, laminated to thinly bedded, brown SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].	
		6.00 - 7.00		86	51	11					6
		7.00 - 8.00		79	71	30					7
		8.00 - 9.00		89	78	27	8.00	98.23		Extremely weak, thinly laminated, grey, MUDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].	8
		9.00 - 10.00		95	54	14					9
											10

Continued on next sheet

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH2

Sheet 3 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 106.23

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 21/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		10.00 - 11.00		83	83	34					
		11.00 - 11.60		100	100	58					11
		11.60 - 12.00		100	100	50	11.60	94.63		Strong, very thinly bedded to thinly bedded SANDSTONE. Fractures are smooth, sub-horizontal with no infill and no groundwater [MILLSTONE GRIT GROUP].	12
		12.00 - 13.00		79	9	22					13
		13.00 - 13.47		100	78	57					13
		13.47 - 14.00		81	35	0	13.47	92.76	Extremely weak, thinly laminated to thinly bedded, brown SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].		14
		14.00 - 15.50		73	50	41					15
Continued on next sheet											

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH2

Sheet 4 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 106.23

Scale
1:25

Client: Brierstone Ltd

Dates: 20/03/2018 - 21/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD						
							15.25	90.98		Extremely weak, thinly laminated, grey, MUDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].	16	
							15.50	90.73				
		15.50 - 17.00		86	56	20				Weak to strong, very thinly bedded to thinly bedded, brown SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].	17	
							17.10	89.13				
		17.00 - 18.50		93	93	76				Very strong, thinly bedded SANDSTONE. Fractures are smooth, stepped, sub-horizontal with no infill and dry [MILLSTONE GRIT GROUP].	18	
							18.40	87.83				
							18.50	87.73		Extremely weak, thinly laminated, grey, MUDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, stepped, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].	19	
		18.50 - 20.00		91	70	17						Weak to strong, laminated to thinly bedded SANDSTONE. Fractures are smooth, stepped, sub-horizontal with no infill and dry [MILLSTONE GRIT GROUP].
							20.00	86.23		End of borehole at 20.00 m		20

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH3

Sheet 1 of 5

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 99.43

Scale
1:25

Client: Brierstone Ltd

Dates: 21/03/2018 - 22/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							0.40	99.03		TOPSOIL	1
							1.00	98.43		Yellow/brown, weathered sandstone (drillers description)	
							1.35	98.08		Medium strength, thinly bedded, brown Sandstone COBBLES	2
							1.66	97.77		Soft, brown, very sandy CLAY	
		1.66 - 1.76		100	10	0	1.76	97.67		Weak to medium strong, laminated SANDSTONE. Fractures are smooth, stepped, sub-horizontal with no infill [MILLSTONE GRIT GROUP].	
		1.76 - 2.50		32	10	0				Extremely weak, thinly laminated, grey, MUDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	
		2.50 - 4.00		92	52	20	2.50	96.93		Extremely weak, thinly laminated to very thinly bedded, brown, MUDSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	3
		4.00 - 5.50		74	50	25				Continued on next sheet	4
											5

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH3

Sheet 2 of 5

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 99.43

Scale
1:25

Client: Brierstone Ltd

Dates: 21/03/2018 - 22/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / Fl	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.50 - 7.00		81		17					6
		7.00 - 8.50		96	59	24					7
		8.50 - 10.00		99	82	36	8.50	90.93		Weak to strong, very thinly bedded to thinly bedded SANDSTONE. Fractures are smooth, sub-horizontal with no infill [MILLSTONE GRIT GROUP].	8
											9
											10

Continued on next sheet

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH3

Sheet 3 of 5

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 99.43

Scale
1:25

Client: Brierstone Ltd

Dates: 21/03/2018 - 22/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		10.00 - 11.50		98	70	30					11
							11.45	87.98		Very weak, very thinly bedded to thinly bedded, grey SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, and slight orange staining [MILLSTONE GRIT GROUP].	12
		11.50 - 13.00		95	91	40					13
		13.00 - 14.50		94	94	47					14
							14.50	84.93		Weak to strong, very thinly bedded to thinly bedded SANDSTONE. Fractures are smooth, sub-horizontal with no infill [MILLSTONE GRIT GROUP].	15

Continued on next sheet

Remarks

No groundwater encountered.





Rotary Core Log

Borehole No.

BH3

Sheet 4 of 5

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 99.43

Scale
1:25

Client: Brierstone Ltd

Dates: 21/03/2018 - 22/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		14.50 - 16.00		90	86	50					
		16.00 - 17.50		91	66	46					16
		17.50 - 19.00		71	71	30					17
		19.00 - 20.50		86	62	6					18
											19
							20.00	79.43		Continued on next sheet	20

Remarks

No groundwater encountered.







Rotary Core Log

Borehole No.

BH4

Sheet 1 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 96.68

Scale
1:25

Client: Brierstone Ltd

Dates: 25/03/2018 - 25/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / Fl	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
										MADE GROUND: Fill	
							1.60	95.08		Yellow/brown, weathered SANDSTONE [ROUGH ROCK]	1
							2.10	94.58		Very weak to weak, thinly bedded to medium bedded, brown SILTSTONE. Fractures are extremely closely spaced to closely spaced, sub-horizontal, with no infilling, no groundwater, and slight orange staining [MILLSTONE GRIT GROUP].	2
		2.00 - 3.50		93	66	35					3
		3.50 - 5.00		85	80	20					4
										Continued on next sheet	5

Remarks

No groundwater encountered.









Rotary Core Log

Borehole No.

BH4

Sheet 4 of 4

Project Name: Scapegoat Hill

Project No.
Scapegoat Hill

Co-ords: -

Hole Type
RC

Location: Scapegoat Hill

Level: 96.68

Scale
1:25

Client: Brierstone Ltd

Dates: 25/03/2018 - 25/03/2018

Logged By

Well	Water Strikes	Depth (m)	Type / Fl	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.50 - 17.00		86	79	28					16
		17.00 - 18.50			18	0					17
		18.50 - 20.00									18
											19
							20.00	76.68		End of borehole at 20.00 m	20

Remarks

No groundwater encountered.



Laboratory Results

T: 0191 378 6380
E: admin@arc-environmental.com
W: www.arc-environmental.com
Registered in England No. 05539784





Final Report

Report No.: 25-08009-1

Initial Date of Issue: 17-Mar-2025

Re-Issue Details:

Client Arc Environmental Ltd

Client Address: Solum House
Unit 1 Elliott Court
St Johns Road
Meadowfield
Durham
DH7 8PN

Contact(s): Results

Project 25-162 Old Lane, Scapegoathill

Quotation No.: Q24-36354

Date Received: 10-Mar-2025

Order No.:

Date Instructed: 10-Mar-2025

No. of Samples: 4

Turnaround (Wkdays): 5

Results Due: 14-Mar-2025

Date Approved: 17-Mar-2025

Approved By:

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: 25-162 Old Lane, Scapegoathill

Client: Arc Environmental Ltd		Chemtest Job No.:				25-08009	25-08009	25-08009	25-08009
Quotation No.: Q24-36354		Chemtest Sample ID.:				1944114	1944115	1944116	1944117
		Sample Location:				SP01	SP02	SP03	SP04
		Sample Type:				SOIL	SOIL	SOIL	SOIL
		Top Depth (m):				0.10	0.10	0.10	0.10
		Date Sampled:				05-Mar-2025	05-Mar-2025	05-Mar-2025	05-Mar-2025
		Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD				
Moisture		N	2030	%	0.020	8.4	8.0	12	11
Arsenic		M	2455	mg/kg	0.5	5.8	3.3	3.1	3.3
Cadmium		M	2455	mg/kg	0.10	0.30	0.41	0.16	0.23
Chromium		M	2455	mg/kg	0.5	67	52	49	54
Chromium (Trivalent)		N	2490	mg/kg	1.0	67	52	49	54
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Copper		M	2455	mg/kg	0.50	61	50	40	34
Mercury		M	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel		M	2455	mg/kg	0.50	84	74	41	44
Lead		M	2455	mg/kg	0.50	32	27	21	30
Selenium		M	2455	mg/kg	0.25	1.7	1.2	1.1	0.99
Zinc		M	2455	mg/kg	0.50	120	100	77	100
pH at 20C		M	2010		4.0	7.5	7.2	6.2	5.9
Sulphate (2:1 Water Soluble) as SO4 mg/l		M	2120	mg/l	10.000	< 10	14	19	16
Cyanide (Free)		M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon		M	2625	%	0.20	1.4	1.3	1.7	1.9
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthalene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's		N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
ACM Type		N	2192		N/A	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown
Other Material		N	2040		N/A	Stones and	Stones and	Stones, Roots and	Stones, Roots and

Results - Soil

Project: 25-162 Old Lane, Scapegoathill

Client: Arc Environmental Ltd		Chemtest Job No.:		25-08009	25-08009	25-08009	25-08009
Quotation No.: Q24-36354		Chemtest Sample ID.:		1944114	1944115	1944116	1944117
		Sample Location:		SP01	SP02	SP03	SP04
		Sample Type:		SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.10	0.10	0.10	0.10
		Date Sampled:		05-Mar-2025	05-Mar-2025	05-Mar-2025	05-Mar-2025
		Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD		
Soil Texture		N	2040		N/A	Sand	Sand
Aliphatic VPH >C5-C6	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C7	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aliphatic VPH >C7-C8	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aliphatic VPH >C6-C8 (Sum)	HS_2D_AL	N	2780	mg/kg	0.10	< 0.10	< 0.10
Aliphatic VPH >C8-C10	HS_2D_AL	U	2780	mg/kg	0.05	< 0.05	< 0.05
Total Aliphatic VPH >C5-C10	HS_2D_AL	U	2780	mg/kg	0.25	< 0.25	< 0.25
Aliphatic EPH >C10-C12 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0
Aliphatic EPH >C12-C16 MC	EH_2D_AL_#1	M	2690	mg/kg	1.00	< 1.0	< 1.0
Aliphatic EPH >C16-C21 MC	EH_2D_AL_#1	M	2690	mg/kg	2.00	< 2.0	< 2.0
Aliphatic EPH >C21-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	3.00	< 3.0	< 3.0
Aliphatic EPH >C35-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10	< 10
Aliphatic EPH >C40-C44 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	< 10	< 10
Total Aliphatic EPH >C10-C35 MC	EH_2D_AL_#1	M	2690	mg/kg	5.00	< 5.0	< 5.0
Total Aliphatic EPH >C10-C40 MC	EH_2D_AL_#1	N	2690	mg/kg	10.00	< 10	< 10
Aromatic VPH >C5-C7	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aromatic VPH >C7-C8	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05
Aromatic VPH >C8-C10	HS_2D_AR	U	2780	mg/kg	0.05	< 0.05	< 0.05
Total Aromatic VPH >C5-C10	HS_2D_AR	U	2780	mg/kg	0.25	< 0.25	< 0.25
Aromatic EPH >C10-C12 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0
Aromatic EPH >C12-C16 MC	EH_2D_AR_#1	U	2690	mg/kg	1.00	< 1.0	< 1.0
Aromatic EPH >C16-C21 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	7.2	5.6
Aromatic EPH >C21-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	2.00	< 2.0	< 2.0
Aromatic EPH >C35-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	1.00	1.7	< 1.0
Aromatic EPH >C40-C44 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	< 10	< 10
Total Aromatic EPH >C10-C35 MC	EH_2D_AR_#1	U	2690	mg/kg	5.00	7.7	5.6
Total Aromatic EPH >C10-C40 MC	EH_2D_AR_#1	N	2690	mg/kg	10.00	< 10	< 10
Total VPH >C5-C10	HS_2D_Total	U	2780	mg/kg	0.50	< 0.50	< 0.50
Total EPH >C10-C35 MC	EH_2D_Total_#1	U	2690	mg/kg	10.00	< 10	< 10
Total EPH >C10-C40 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	< 10	< 10
Total EPH >C10-C44 MC	EH_2D_Total_#1	N	2690	mg/kg	10.00	< 10	< 10
Benzene		M	2760	mg/kg	0.0010	< 0.0010	0.0011
Toluene		M	2760	mg/kg	0.0010	< 0.0010	< 0.0010
Ethylbenzene		M	2760	mg/kg	0.0010	< 0.0010	< 0.0010
m & p-Xylene		M	2760	mg/kg	0.0010	< 0.0010	< 0.0010
o-Xylene		M	2760	mg/kg	0.0010	< 0.0010	< 0.0010

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection	
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.	
2780	VPH A/A Split	Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10	Water extraction / Headspace GCxGC FID detection	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at $\leq 30^{\circ}\text{C}$ prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

NEW_ASB	Eurofins Chemtest Limited, 11 Depot Road, Newmarket, CB8 0AL
DURHAM	Eurofins Chemtest Limited, Unit A North Wing, Prospect Business Park, Crookhall Lane, Consett, Co Durham, DH8 7PW

Sample Deviation Codes

As a result of any of the below deviations applying, the test results may be unreliable

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - The required amount of sample for analysis was not received

H - Appropriate cooling measures were not taken for sample transportation

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.

All water samples will be retained for 14 days from the date of receipt.

Charges may apply to extended sample storage.

Report Information

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable
PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

Asbestos Tests LOD = LOQ

Limit of Detection = Limit of Quantification for asbestos results only

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com