

Brascote Road

Investigation of Shallow Ground Contamination
(March 2023)

Prepared for Heatons Ltd

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1 Introduction

Key GeoSolutions Ltd (KGS) has been commissioned by Heaton Planning to undertake an investigation of any potential land contamination at Former Brascote House site in Leicestershire in order to ensure that risks from land contamination to the future users of the land and neighbouring land are minimised.

The development of the land is subject to a planning condition which states:

“No development approved by this permission shall be commenced until a scheme for the investigation of any potential land contamination on the site has been submitted in writing to and agreed in writing by the Local Planning Authority which shall include details of how any contamination shall be dealt with. The approved scheme shall be implemented in accordance with the agreed details and any remediation works so approved shall be carried out prior to the site first being occupied.”

These works are undertaken in accordance with the scope of works provided in quotation 9311-KGS-XX-XX-QT-Z-0101.

2 Summary of Site Investigation

Five trial pits were hand dug in the locations shown on drawing reference 9311-001-001 to allow samples of the ground to be taken. Two samples were taken from each trial pit at approximate depths of 0.3m and 1.1m below ground level. The sampling locations and investigation strategy were agreed with Giles Rawdon, Environmental Health Officer, on 10th February 2023.

The trial pits encountered infilled ground comprising predominantly brown silty, slightly gravelly fine to medium sand from ground level to a depth between 0.3 to 0.6m below ground level (bgl), assumed to be topsoil. Orange brown slightly clayey, gravelly, fine to medium sand with rare cobbles as encountered from approximately 0.6 to 1.2m bgl. Groundwater was encountered during digging in TP03 at 0.35mbgl and a slight seepage in TP01 at 0.4mbgl. TP03 was abandoned at 0.8m bgl due to water preventing clearance of the hole and an inability to perceive what was being dug.

3 Chemical Testing

Samples were scheduled for chemical analysis by KGS. The analysis was carried out by i2 Analytical, a UKAS accredited laboratory. i2 Analytical has MCERTs accreditation for the majority of test scheduled.

The range of chemical analyses was based on generic contamination screening for a range of previous land uses and included asbestos screen, total cyanide, sulphur, polycyclic aromatic hydrocarbons (PAH), soil organic matter (SOM), Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) banded aliphatics and aromatics hydrocarbons, and heavy metals (arsenic, barium, beryllium, boron (water soluble), cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc).

Whilst every effort has been made to schedule tests suitable for the previous land uses, there is no guarantee that other contaminants are not present on site for which analyses have not been carried out or which were not sampled in the programme of exploratory holes.

3.1 Chemical Results

Ten samples of the ground encountered were tested for general contamination levels to determine the risk to potential receptors. The laboratory testing recorded the following contaminants present in the near-surface soils above their relevant laboratory detection limit: heavy metals, sulphide and PAHs these are summarised in Table 3.1-1 below. The table also includes the screening values applicable to residential land with homegrown produce. The full set of chemical analysis is included as Appendix 1. No Asbestos was detected within any of the samples.

Table 3.1-1: Summary of Test Results (excluding results less than detection level, where applicable).

Determinant	Unit	S4UL for residential with home grown produce ^{1,2}	Concentration Range (based on 10No samples of ground encountered)	
			Minimum Value	Maximum Value
Arsenic (total)	mg/kg	37	5.9	8.4
Barium (total)	mg/kg	1300 ⁶	35	53
Beryllium (total)	mg/kg	1.7	0.36	0.92
Boron (water soluble)	mg/kg	290	<0.2	0.8
Cadmium (total)	mg/kg	11	<0.2	0.3
Chromium (total)	mg/kg	910 ⁴	11	17
Copper (total)	mg/kg	2400	10	24
Lead (total)	mg/kg	200 ³	13	46
Nickel (total)	mg/kg	130	8.7	22
Vanadium (total)	mg/kg	410	18	26
Zinc (total)	mg/kg	3700	44	63
pH	unit	-	5.7	7.7
Sulphide	mg/kg	-	<1.0	5.7
Solid Organic Matter	%	-	0.1	3.4
<u>Polyaromatic Hydrocarbons</u>				
Fluoranthene	mg/kg	280	<0.05	0.09
Pyrene	mg/kg	620	<0.05	0.08
Benzo(a)anthracene	mg/kg	7.2	<0.05	0.05

Determinant	Unit	S4UL for residential with home grown produce ^{1,2}	Concentration Range (based on 10No samples of ground encountered)	
			Minimum Value	Maximum Value
Chrysene	mg/kg	15	<0.05	0.06

Notes:

- 1 Copyright Land Quality Management Ltd reproduced with permission: Publication No S4UL3590. All rights reserved.
- 2 Where S4UL value is affected by changes in soil organic matter concentrations the S4ULs relating to 1% SOM.
- 3 Lead values are based on the published C4SL values published by DEFRA for the same land use.
- 4 Hexavalent Chromium values do not exceed laboratory limit of detection.
- 5 A screening for the presence of asbestos was undertaken for all samples tested. No asbestos was detected.
- 6 Barium values are based on EIC/AGS/CL:AIRE GAC Report.

Although some contaminants were present in the near-surface soils above their relevant laboratory detection limit, the contamination levels were all recorded below the relevant screening values for residential land with homegrown produce.

4 Conclusions

Due to the levels of potential contaminants being below the acceptable levels for the intended land use, the site was found to pose no significant long-term risk to human health.

5 Summary of Geotechnical Risks

5.1 Geotechnical Risk Assessment

Table 5.1-1: Risk Classification Matrix

Likelihood		Severity				
		1 Minor	2 Moderate	3 Serious	4 Major	5 Catastrophic
1	Extremely Unlikely	1	2	3	4	5
2	Unlikely	2	4	6	8	10
3	Likely	3	6	9	12	15
4	Extremely Likely	4	8	12	16	20
5	Almost Certain	5	10	15	20	25

Table 5.1-2: Risk Classification Definitions

Risk Classification	
Low (1 to 8)	Ensure assumed control measures are maintained and reviewed as necessary.
Medium (9 to 19)	Additional control measures needed to reduce risk rating to a level that is equivalent to a test of “reasonably required” for.
High (20 to 25)	Activity not permitted. Hazard to be avoided or risk to be reduced to a tolerable level.

Table 5.1-3: Potential Severity Definitions

Potential Severity of Harm Occurring		
1	Minor	Minor damage or loss (no human injury)
2	Moderate	Moderate damage or loss (slight injury or illness)
3	Serious	Substantial damage or loss (serious injury or illness)
4	Major	Major damage or loss (fatal injury or illness)
5	Catastrophic	Catastrophic loss or damage (multiple fatalities)

Table 5.1-4: Risk Matrix

Risk ID	Hazard	Consequence	(L)	(S)	Risk	Mitigation	(L)	(S)	Residual Risk
1	Contaminated materials being found on site.	Could affect the health of site users.	2	4	8	If potentially contaminated material is encountered, appropriate risk measures need to be implemented for contamination. The contaminants tested were below the screening levels for residential land with homegrown produce.	1	4	4

Appendix 1: Chemical Testing Results

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Analytical Report Number : 23-22919

Project / Site name:	Brascote Road	Samples received on:	14/03/2023
Your job number:	9311 001	Samples instructed on/ Analysis started on:	15/03/2023
Your order number:		Analysis completed by:	27/03/2023
Report Issue Number:	1	Report issued on:	27/03/2023
Samples Analysed:	10 soil samples		

Signed:



Dominika Warjan
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-22919
Project / Site name: Brascote Road

Lab Sample Number				2616863	2616864	2616865	2616866	2616867
Sample Reference				TP01	TP01	TP02	TP02	TP03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.15-0.25	1.05-1.15	0.25-0.35	1.05-1.10	0.25-0.35
Date Sampled				10/03/2023	10/03/2023	10/03/2023	10/03/2023	10/03/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	15	14	13	16
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	DSA	DSA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.4	6.9	6.3	7.7	6
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sulphide	mg/kg	1	MCERTS	5.5	2.7	2.5	< 1.0	4.4
Organic Matter (automated)	%	0.1	MCERTS	2.2	0.6	2.6	0.9	0.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.5	6	6.9	8.4	6.3
Barium (aqua regia extractable)	mg/kg	1	MCERTS	51	40	53	40	35
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.41	0.57	0.42	0.51	0.62
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	0.2	< 0.2	0.3	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.3	0.3	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	13	12	13	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	17	12	12	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	22	13	26	17	14
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.9	17	10	16	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	20	19	20	22	22

Analytical Report Number: 23-22919
Project / Site name: Brascote Road

Lab Sample Number				2616863	2616864	2616865	2616866	2616867
Sample Reference				TP01	TP01	TP02	TP02	TP03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.15-0.25	1.05-1.15	0.25-0.35	1.05-1.10	0.25-0.35
Date Sampled				10/03/2023	10/03/2023	10/03/2023	10/03/2023	10/03/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	53	51	57	44	47

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0#	< 5.0#	< 5.0#	< 5.0#
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0#	< 5.0#	< 5.0#	< 5.0#
o-xylene	µg/kg	5	NONE	< 5.0#	< 5.0#	< 5.0#	< 5.0#	< 5.0#
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_ID_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_ID_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_ID_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_ID_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_ID_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7 _{HS_ID_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_ID_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_ID_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_ID_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_ID_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-22919
Project / Site name: Brascote Road

Lab Sample Number				2616868	2616869	2616870	2616871	2616872
Sample Reference				TP03	TP04	TP04	TP05	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-0.80	0.15-0.25	1.05-1.15	0.25-0.35	1.05-1.15
Date Sampled				10/03/2023	10/03/2023	10/03/2023	10/03/2023	10/03/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	23	16	13	13	14
Total mass of sample received	kg	0.001	NONE	0.8	0.8	0.8	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DSA	DSA	DSA	DSA	DSA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	5.9	5.8	5.7	6.2	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sulphide	mg/kg	1	MCERTS	1.7	5.7	1.4	3.8	3.8
Organic Matter (automated)	%	0.1	MCERTS	3.4	2.6	0.1	2.4	0.5

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.08	0.09
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.08	0.07
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.06	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.5	6.7	5.9	7	6.7
Barium (aqua regia extractable)	mg/kg	1	MCERTS	47	40	49	51	49
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.4	0.36	0.92	0.41	0.77
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.2	0.5	0.3	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.3	< 0.2	0.3	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	11	17	11	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	12	10	20	13	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	24	19	30	46
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	10	8.7	22	9.7	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	21	19	26	18	23

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Lab Sample Number				2616868	2616869	2616870	2616871	2616872
Sample Reference				TP03	TP04	TP04	TP05	TP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.70-0.80	0.15-0.25	1.05-1.15	0.25-0.35	1.05-1.15
Date Sampled				10/03/2023	10/03/2023	10/03/2023	10/03/2023	10/03/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	54	45	58	63	62

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0#	< 5.0#	< 5.0#	< 5.0#	< 5.0#
p & m-xylene	µg/kg	5	MCERTS	< 5.0#	< 5.0#	< 5.0#	< 5.0#	< 5.0#
o-xylene	µg/kg	5	NONE	< 5.0#	< 5.0#	< 5.0#	< 5.0#	< 5.0#
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_ID_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_ID_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_ID_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_ID_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_ID_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_ID_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_ID_AL}	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7 _{HS_ID_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_ID_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_ID_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_ID_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_ID_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_ID_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_ID_AR}	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2616863	TP01	None Supplied	0.15-0.25	Brown loam and clay with gravel and vegetation.
2616864	TP01	None Supplied	1.05-1.15	Brown sandy clay with gravel and vegetation.
2616865	TP02	None Supplied	0.25-0.35	Brown loam and sand with gravel and vegetation.
2616866	TP02	None Supplied	1.05-1.10	Brown clay and sand with gravel.
2616867	TP03	None Supplied	0.25-0.35	Brown sandy clay.
2616868	TP03	None Supplied	0.70-0.80	Brown loam and sand with gravel and vegetation.
2616869	TP04	None Supplied	0.15-0.25	Brown loam and sand with gravel and vegetation.
2616870	TP04	None Supplied	1.05-1.15	Brown clay and sand with gravel.
2616871	TP05	None Supplied	0.25-0.35	Brown loam and sand with gravel and vegetation.
2616872	TP05	None Supplied	1.05-1.15	Brown clay and sand with gravel.

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Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS

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Project / Site name: Brascote Road

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	LO80-PL	W	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

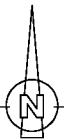
#Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and therefore may be compromised.

Appendix 2: Drawings



Farm

GENERAL NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) & ALL LEVELS ARE IN METRES (m) UNLESS NOTED OTHERWISE.



P01	FIRST ISSUE	VR	WR	22.03.23
REV	AMENDMENTS	DRW	CHK	DATE

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CLIENT

HEATON PLANNING

PROJECT
BRASCOTE ROAD

TITLE
TRIAL PIT LOCATIONS

DRAWN:	VR	DESIGN:	-
CHECKED:	WR	APPROVED:	-
DATE:	MAR '23	SCALE:	1:1000



STATUS	PRELIMINARY	SHEET SIZE	A3
DRAWING NO	9311-001-001	REV	P01