

Date: 8th June 2023

Reference: 15-159

GARDEN VALIDATION – KESWICK CLOSE

Project Name: Keswick Close, Middleton

Project Number: 15-159

Client: Vistry

Date: 08-06-2023

Project Manager: R. Horseman

E3P Engineer: T. Newall

Plots: 5-10 & 12

OVERVIEW

An E3P engineer attended the above site to validate the thickness of the cover system placed within the rear garden of plots 5-10 & 12 at Keswick Close, Middleton.

7 No hand excavated trial pits was advanced, with the resulting strata detailed at the rear of this letter.

All trial pits were completed to highlight the required cover system of 600mm (150mm topsoil and 450mm subsoil).

E3P can confirm that our independent validation demonstrates that all gardens have been installed with 150mm of certified topsoil and at least 450mm subsoil under the NHBC requirements for a site of this nature.

A list of plots requiring validation and their associated validation letters is presented in Table 1 for reference.



Geo-Environmental



Acoustics



Remediation and
Enabling Earthworks
Design



Arboriculture



Compliance
& Due Diligence



Ecology



Industrial Permitting



Geotechnical

TOPSOIL

E3P attended the site on 12th June 2023 to obtain samples of the stockpiled topsoil deposits which were analysed following the Sutcliffe Remediation Strategy. Chemical analysis confirmed that these topsoil deposits were chemically suitable for use within the proposed garden areas.

The topsoil has been imported from Byrchall High school, Warrington Rd, Ashton-in-Makerfield, Wigan WN4 9PQ and a total volume of 150m³ was imported. Therefore, a total of 3 samples were analysed in accordance with the sample frequencies of 1 per 50m³ for topsoil.

Analysis for topsoil undertaken by I2 Analytical Laboratories using UKAS accredited methods where applicable.

The chemical analysis suite comprises heavy metals, sulphates, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAHs), speciated and total Petroleum Hydrocarbons (TPH) and asbestos. The sampling frequency follows the agreed Remediation Strategy. Laboratory analysis certificates are attached to this validation certificate.

Chemical analysis results are included within lab report 23-38886-2 (attached to this letter).

SUBSOIL

E3P attended the site on 12th June 2023 to obtain 3 samples of the stockpiled subsoil deposits which were analysed following the Sutcliffe Remediation Strategy. Chemical analysis confirmed that these Subsoil deposits were chemically suitable for use within the proposed garden areas.

The subsoil has been imported from Byrchall High school, Warrington Rd, Ashton-in-Makerfield, Wigan WN4 9PQ and a total volume of 120m³ was imported. Therefore, a total of 3 samples were analysed in accordance with the sample frequencies of 1 per 100m³ for topsoil.

Analysis for subsoil undertaken by I2 Analytical Laboratories using UKAS accredited methods where applicable.

The chemical analysis suite comprises heavy metals, sulphates, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAHs), speciated and total Petroleum Hydrocarbons (TPH) and asbestos. The sampling frequency follows the agreed Remediation Strategy. Laboratory analysis certificates are attached to this validation certificate.

Chemical analysis results are included within lab report 23-38886-2 (attached to this letter).

CHEMICAL ANALYSIS

TOPSOIL/SUBSOIL	SOURCE	LAB REFERENCE	SAMPLE REFERENCE	PASS/FAIL
Both	Byrchall High school	23-38886-2	TS101 - TS103 SS101 – SS103	Pass

The cover system validation photographs are enclosed within this letter. For information, Table 1 includes references and validation dates of previously validated plots.

The garden validation photographs are enclosed within this letter. For information, Table 1 includes references and validation dates of previously validated plots.

TABLE 1 – VALIDATION LETTER REFERENCE

PLOT NUMBER	DATE	REPORT REFERENCE
5-10 & 12	8 th June 2023	V1

Garden Cover System Validation

Complete

Score	100%
Site Name	Keswick close
Location	212 Bowness Road Manchester England M24 4WU United Kingdom (53.55574459745996, - 2.2139957564938983)
Project Number	15159
Developer	Vistry
Project Manager	Rob Horseman
Conducted By	Tobey Newall
Date of visit	8 Jun 2023 8:44 AM BST

Plot Validation 1 100%

Plot Number 7

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6

Depth of Topsoil (mm) 150

Depth of Subsoil (mm) 450

Depth of Cover System at Ground Level (Photo) ☒



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒



Photo 6



Photo 7

Soil suitable Yes

Geotextile membrane present N/A

Plot Validation 2

100%

Plot Number

9

Is Plot Ready

Yes

Installation Standard

Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole)

0.6

Depth of Topsoil (mm)

150

Depth of Subsoil (mm)

450

Depth of Cover System at Ground Level (Photo)



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo)



Photo 13



Photo 14

Soil suitable

Yes

Geotextile membrane present

N/A

Plot Validation 3

100%

Plot Number

5

Is Plot Ready

Yes

Installation Standard

Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole)

0.6

Depth of Topsoil (mm)

150

Depth of Subsoil (mm)

450

Depth of Cover System at Ground Level (Photo)



Photo 15



Photo 16



Photo 17



Photo 18

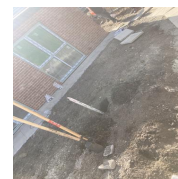


Photo 19

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo)



Photo 20



Photo 21

Soil suitable

Yes

Geotextile membrane present

N/A

Plot Validation 4 100%

Plot Number 6

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6

Depth of Topsoil (mm) 150

Depth of Subsoil (mm) 450

Depth of Cover System at Ground Level (Photo) ☒



Photo 22



Photo 23



Photo 24



Photo 25

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒



Photo 26

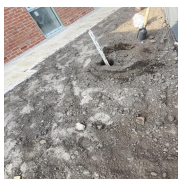


Photo 27

Soil suitable Yes

Geotextile membrane present N/A

Plot Validation 5

100%

Plot Number

8

Is Plot Ready

Yes

Installation Standard

Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole)

0.6

Depth of Topsoil (mm)

150

Depth of Subsoil (mm)

450

Depth of Cover System at Ground Level (Photo)



Photo 28



Photo 29



Photo 30



Photo 31

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo)



Photo 32



Photo 33

Soil suitable

Yes

Geotextile membrane present

N/A

Plot Validation 6

100%

Plot Number

10

Is Plot Ready

Yes

Installation Standard

Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole)

0.6

Depth of Topsoil (mm)

150

Depth of Subsoil (mm)

450

Depth of Cover System at Ground Level (Photo)



Photo 34



Photo 35



Photo 36



Photo 37



Photo 38

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo)



Photo 39



Photo 40

Soil suitable

Yes

Geotextile membrane present

N/A

Plot Validation 7 100%

Plot Number 12

Is Plot Ready Yes

Installation Standard Pass

Depth of Cover System Materials (record the depth and support with Photo down the hole) 0.6

Depth of Topsoil (mm) 150

Depth of Subsoil (mm) 450

Depth of Cover System at Ground Level (Photo) ☒



Photo 41



Photo 42



Photo 43



Photo 44



Photo 45

Depth of Cover System in Relation to Plot (Ensure the whole plot can be seen in the photo) ☒



Photo 46



Photo 47

Soil suitable Yes

Geotextile membrane present N/A

Site Manager or Representative

Name	Lee
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Signature

8 Jun 2023 8:42 AM BST

Media summary



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26



Photo 27



Photo 28



Photo 29



Photo 30



Photo 31



Photo 32



Photo 33



Photo 34



Photo 35



Photo 36



Photo 37



Photo 38



Photo 39



Photo 40



Photo 41



Photo 42



Photo 43



Photo 44



Photo 45



Photo 46



Photo 47

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Analytical Report Number : 23-38886-2

Replaces Analytical Report Number: 23-38886, issue no. 1
Client sampling date amended.
Site name amended as per client's request.
Sampling date for all samples added as per client's request.

Project / Site name:	Keswick Close	Samples received on:	12/06/2023
Your job number:	15159	Samples instructed on/ Analysis started on:	12/06/2023
Your order number:	005027	Analysis completed by:	20/06/2023
Report Issue Number:	2	Report issued on:	20/06/2023
Samples Analysed:	6 soil samples		


Signed:

Joanna Wawrzeczko
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

Excel copies of reports are only valid when accompanied by this PDF certificate.

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: 23-38886
 Project / Site name: Keswick Close
 Your Order No: 005027

Lab Sample Number	2711431	2711432	2711433	2711434	2711435
Sample Reference	SS101	SS102	SS103	TS101	TS102
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	12/06/2023	12/06/2023	12/06/2023	12/06/2023	12/06/2023
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
Moisture Content	%	0.01	NONE	11	13
Total mass of sample received	kg	0.001	NONE	0.3	0.3

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	KWB	KWB	KWB	KWB	KWB

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	8	7.8	6.8	7.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	170	320	340	470	560
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.029	0.061	0.11	0.028	0.045
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	57	120	220	56	91
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	28.5	60.9	112	28.1	45.4
Sulphide	mg/kg	1	MCERTS	1.2	2.7	< 1.0	< 1.0	2.1
Total Sulphur	mg/kg	50	MCERTS	79	130	150	280	450
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.7	0.5	0.6	2.1	3.5

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	0.11	0.14
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.07	0.09
Phenanthrene	mg/kg	0.05	MCERTS	0.06	0.1	0.07	0.82	1.1
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.18	0.2
Fluoranthene	mg/kg	0.05	MCERTS	0.07	0.1	0.09	1.5	1.8
Pyrene	mg/kg	0.05	MCERTS	0.05	0.1	0.08	1.4	1.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.05	< 0.05	0.74	0.84
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.72	0.85
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	0.8	0.93
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	0.37	0.46
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.6	0.75
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.33	0.42
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.08	0.1
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.41	0.55

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	8.06	9.86
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Analytical Report Number: 23-38886
Project / Site name: Keswick Close
Your Order No: 005027

Lab Sample Number	2711431	2711432	2711433	2711434	2711435
Sample Reference	SS101	SS102	SS103	TS101	TS102
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	12/06/2023	12/06/2023	12/06/2023	12/06/2023	12/06/2023
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.3	3.8	3.9	17	23
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	2.5	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	20	21	11	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18	18	18	32	38
Lead (aqua regia extractable)	mg/kg	1	MCERTS	19	20	21	76	73
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	21	19	20	12	13
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	67	64	66	55	64

Petroleum Hydrocarbons

TPH (C5 - C6) HS_ID_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8) HS_ID_TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS_ID_TOTAL	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) EH_CU_ID_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_ID_TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	< 1.0	6.2	4.8	4.8
TPH (C21 - C35) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	< 1.0	25	11	16
TPH (C35 - C40) EH_CU_ID_TOTAL	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	NONE	< 10	< 10	37	19	22

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

Analytical Report Number: 23-38886
 Project / Site name: Keswick Close
 Your Order No: 005027

Lab Sample Number				2711436
Sample Reference				TS103
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				12/06/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	15
Total mass of sample received	kg	0.001	NONE	0.3

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	660
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.053
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	110
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	53.4
Sulphide	mg/kg	1	MCERTS	3
Total Sulphur	mg/kg	50	MCERTS	470
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.1

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.07
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.65
Anthracene	mg/kg	0.05	MCERTS	0.11
Fluoranthene	mg/kg	0.05	MCERTS	1.3
Pyrene	mg/kg	0.05	MCERTS	1.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.68
Chrysene	mg/kg	0.05	MCERTS	0.67
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.79
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.35
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.63
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.35
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.09
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.47

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	7.4
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Analytical Report Number: 23-38886
Project / Site name: Keswick Close
Your Order No: 005027

Lab Sample Number					2711436
Sample Reference					TS103
Sample Number					None Supplied
Depth (m)					None Supplied
Date Sampled					12/06/2023
Time Taken					None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS		25
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS		< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS		< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS		16
Copper (aqua regia extractable)	mg/kg	1	MCERTS		42
Lead (aqua regia extractable)	mg/kg	1	MCERTS		75
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS		< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS		12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS		< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS		61

Petroleum Hydrocarbons

TPH (C5 - C6) HS_ID_TOTAL	mg/kg	1	NONE	< 1.0
TPH (C6 - C8) HS_ID_TOTAL	mg/kg	0.1	NONE	< 0.1
TPH (C8 - C10) HS_ID_TOTAL	mg/kg	0.1	NONE	< 0.1
TPH (C10 - C12) EH_CU_ID_TOTAL	mg/kg	2	MCERTS	< 2.0
TPH (C12 - C16) EH_CU_ID_TOTAL	mg/kg	4	MCERTS	< 4.0
TPH (C16 - C21) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	6.1
TPH (C21 - C35) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	29
TPH (C35 - C40) EH_CU_ID_TOTAL	mg/kg	10	NONE	< 10
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	NONE	44

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

Analytical Report Number : 23-38886

Project / Site name: Keswick Close

* 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 *
2711431	SS101	None Supplied	None Supplied	Brown clay and sand with gravel.
2711432	SS102	None Supplied	None Supplied	Brown clay and sand with gravel.
2711433	SS103	None Supplied	None Supplied	Brown clay and sand with gravel.
2711434	TS101	None Supplied	None Supplied	Brown sand with gravel.
2711435	TS102	None Supplied	None Supplied	Brown sand with gravel.
2711436	TS103	None Supplied	None Supplied	Brown sand.

Analytical Report Number : 23-38886

Project / Site name: Keswick Close

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
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
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
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
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-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 Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
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
Total organic carbon (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
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
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	L080-PL	W	MCERTS

Analytical Report Number : 23-38886

Project / Site name: Keswick Close

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
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	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