



Sean Croft
De Trafford Estates Group
Sky Gardens
Phoenix House
Ellesmere Street
Manchester
M15 4JY

24th January 2021

Dear Sean,

VERIFICATION REPORT – CHURCHGATE – SKY GARDENS

Background and Objectives

Ensafe have been commissioned by DeTrafford to complete a validation report following completion of works on the Churchgate site.

The site has been developed for a residential end use (apartments), and is subject to conditions as presented in Planning Application No 114961/FO/2017, condition 4(b):

b) When the development commences, the development shall be carried out in accordance with the previously agreed Remediation Strategy and a Completion/Verification Report shall be submitted to and approved in writing by the City Council as local planning authority. In the event that ground contamination, groundwater contamination and/or ground gas, not previously identified, are found to be present on the site at any time before the development is occupied, then development shall cease and/or the development shall not be occupied until, a report outlining what measures, if any, are required to remediate the land (the Revised Remediation Strategy) is submitted to and approved in writing by the City Council as local planning authority and the development shall be carried out in accordance with the Revised Remediation Strategy, which shall take precedence over any Remediation Strategy or earlier Revised Remediation Strategy.

Ensafe (Formerly REC) produced the following report detailing the findings of a site investigation undertaken to assess the geotechnical and geo-environmental conditions at the site:

- Geo-Environmental Site Investigation, Churchgate Block D, Chester Road, Manchester. REC Ref:100951p1r1, dated July 2016.

The above investigation did not indicate the requirement for any remedial activities to be undertaken, therefore a site-specific remediation strategy has not been produced. In a letter of 22nd May 2018 REC reappraised the findings of the report based on a change in development plans which included for areas of soft landscaping. REC recommended the following:

- *Should the Made Ground remain in situ, a clean cover system comprising of 150mm of topsoil with the remainder comprising of subsoil underlain by granular break layer (total cover system depth of 450mm as per Section 5.1.1 of the GD01 ("Contaminated Land Information for Developers v.6") should be installed within soft landscaped areas to break the contamination pathway and reduce the risk to Human Health.*

In order to discharge the above conditions, the following will be included in this report:

1. Validation of imported materials; and
2. Validation of soft landscaping.

1. Validation of Imported Materials

The following material were imported onto site to facilitate construction:

- Topsoil 240 tonnes, (144m³)

DEPTH REQUIREMENT FOR SOFT LANDSCAPING

The site requires a clean cover system comprising of 150mm of topsoil with the remainder comprising of subsoil underlain by granular break layer (total cover system depth of 450mm as per Section 5.1.1 of the GD01 ("Contaminated Land Information for Developers v.6").

VALIDATION REQUIREMENT

- Independent validation of works by Geo-Environmental Consultant;
- Visual inspection and chemical laboratory validation sampling; and
- Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

Table 1 - Chemical Validation Testing Requirement

Material Use	Testing Frequency			
	Greenfield	Brownfield	Remediated	Unknown
Imported fill materials	1 Sample Per 1000m ³			
	Minimum of 3 No. samples per source			
Sub-Soil Cover	1 Sample Per 200m ³	1 Sample Per 150m ³	1 Sample Per 150m ³	1 Sample Per 150m ³
	Minimum of 3 No. samples per source			
Topsoil Cover	1 Sample Per 200m ³	1 Sample Per 150m ³	1 Sample Per 150m ³	1 Sample Per 150m ³
	Minimum of 3 No. samples per source			
Site Generated Bulk Fill Materials	1 sample per 1000m ³			
	Minimum of 3 No. samples per source			

ORIGIN OF MATERIAL

A total of 240T (144m³) Topsoil has been obtained from a site in Astley Manchester.

Freeland Horticulture Limited undertook testing of the topsoil in October 2021. They undertook a series of 10No. hand augered trial holes across a stockpile of the material, sampling at each locations. The aguering revealed a consistant topsoil composition. The samples were combined to form one sample for analysis.

The soils were analysed for a range of metals, polyaromatic hydrocarbons and banded petroleum hydrocarbons (including BTEX) and Asbestos.

Ensafe have reviewed the results and compared them against the criteria for a residential development without plant uptake. All determinands were below the required GAC value.



Ensafe attended site on 12th January 2021 and took an additional 3No. samples for analysis for testing in accordance with the determinands above. All determinands were below the required GAC value.

VALIDATION VISIT – 12TH JANUARY 2022

Ensafe attended site on 12th January 2022 to confirm the correct thickness of topsoil and subsoil has been used in soft landscaped areas.

Ensafe's independent inspection shows that on completion of the works the required 450mm of total clean cover was installed within soft landscaped areas as per the Remediation Strategy. A visual inspection of the topsoil and subsoil confirmed them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

SUMMARY

Ensafe can confirm that the topsoil and subsoil installed in the softlandscaping areas meet the specified requirements as a suitable growing medium and is suitable for its intended use.

Yours Sincerely,

For and on behalf of Ensaf Consultants

A handwritten signature in blue ink, appearing to read 'P. Thompson', is written over a light blue horizontal line.

Philip Thompson
Deputy Operations Director - North

Enclosed:

Location Plan of Exploratory Locations

Plot Inspection Records (including photographs and description)

Chemical Analysis Certificates



DRAWINGS

KEY:



 Hand Pit

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In the event that such written permission is not obtained in advance of the amendments being made, Ensafe Consultants Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or other intellectual property.





PLOT INSPECTION RECORDS

PIT NUMBER: HP01

Developer: DeTrafford Estates Group
Pit Location: Sky Gardens

Date: 12/01/2022
Consultant: NH

Capping Requirements	Required Total Depth	Capping Observed	Total Depth
Topsoil	>150 mm bgl	Topsoil	450 mm bgl
Subsoil	>300 mm bgl	Subsoil	N /A
TOTAL DEPTH	> 450mm bgl	TOTAL DEPTH	450 mm bgl

Validation Photograph	Locational Photograph
	

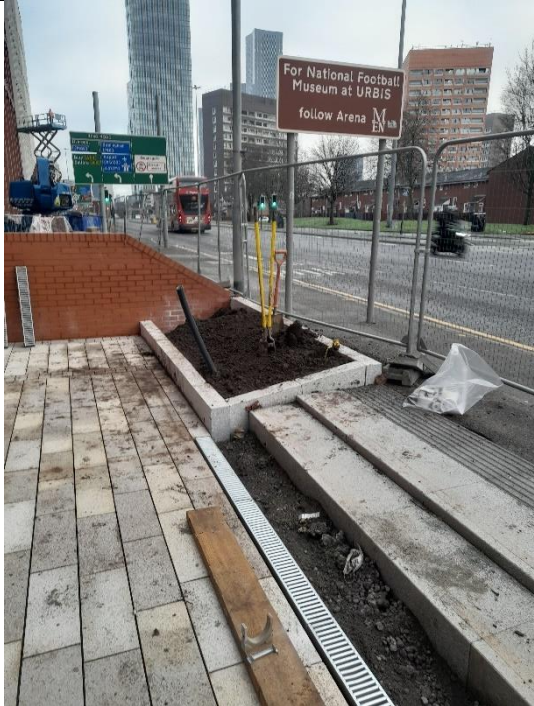
Additional Comments:
Sampled at 0.30m and 0.50m bgl

PIT NUMBER: HP02

Developer: DeTrafford Estates Group
Pit Location: Sky Gardens

Date: 12/01/2022
Consultant: NH

Capping Requirements	Required Total Depth	Capping Observed	Total Depth
Topsoil	> 150 mm bgl	Topsoil	450 mm bgl
Subsoil	>300 mm bgl	Subsoil	N /A
TOTAL DEPTH	> 600mm bgl	TOTAL DEPTH	450 mm bgl

Validation Photograph	Locational Photograph
	

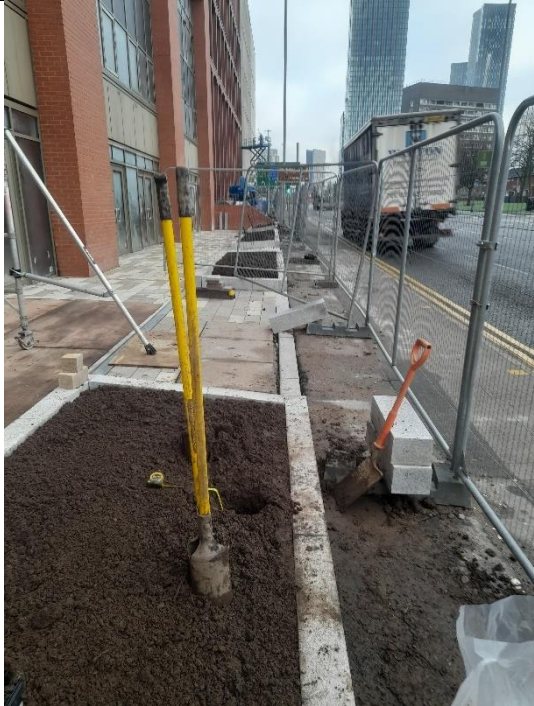
Additional Comments:
Sampled at 0.20m bgl

PIT NUMBER: HP03

Developer: DeTrafford Estates Group
Pit Location: Sky Gardens

Date: 12/01/2022
Consultant: NH

Capping Requirements	Required Total Depth	Capping Observed	Total Depth
Topsoil	> 150 mm bgl	Topsoil	450 mm bgl
Subsoil	>300 mm bgl	Subsoil	N /A
TOTAL DEPTH	> 600mm bgl	TOTAL DEPTH	450 mm bgl

Validation Photograph	Locational Photograph
	

Additional Comments:
Sampled at 0.30m bgl

PIT NUMBER: HP04

Developer: DeTrafford Estates Group
Pit Location: Sky Gardens

Date: 12/01/2022
Consultant: NH

Capping Requirements	Required Total Depth	Capping Observed	Total Depth
Topsoil	> 150 mm bgl	Topsoil	600 mm bgl
Subsoil	>300 mm bgl	Subsoil	N /A
TOTAL DEPTH	> 600mm bgl	TOTAL DEPTH	600 mm bgl

Validation Photograph	Locational Photograph
	

Additional Comments:
Sampled at 0.50m bgl

PIT NUMBER: HP05

Developer: DeTrafford Estates Group
Pit Location: Sky Gardens

Date: 12/01/2022
Consultant: NH

Capping Requirements	Required Total Depth	Capping Observed	Total Depth
Topsoil	> 150 mm bgl	Topsoil	600 mm bgl
Subsoil	>300 mm bgl	Subsoil	N /A
TOTAL DEPTH	> 600mm bgl	TOTAL DEPTH	600 mm bgl

Validation Photograph	Locational Photograph
	

Additional Comments:
Sampled at 0.40m bgl



CHEMICAL TESTING SUMMARY

Table 2 – Chemical testing summary

Determinand	Units	Screening Value for Residential without plant uptake	Concentration within Freeland Topsoil	Screening Value Source
Arsenic	mg/kg	40	4.9	(i)
Cadmium	mg/kg	11	0.2	(i)
Chromium VI	mg/kg	6.0	1.6	(i)
Lead	mg/kg	200	32	(iv)
Inorganic Mercury	mg/kg	40	<0.3	(i)
Nickel	mg/kg	180	11	(i)
Selenium	mg/kg	250	<1.0	(i)
Copper	mg/kg	2400	21	(i)
Zinc	mg/kg	3700	54	(i)
Cyanide	mg/kg	530	<1.0	(v)
Asbestos	%	None Detected	None Detected	N/A
Phenol	mg/kg	1300	<1.0	(ii)
Naphthalene	mg/kg	6	<0.05	(ii)
Acenaphthylene	mg/kg	4600	<0.05	(ii)
Acenaphthene	mg/kg	4700	<0.05	(ii)
Fluorene	mg/kg	3800	<0.05	(ii)
Phenanthrene	mg/kg	1500	0.48	(ii)
Anthracene	mg/kg	35000	<0.05	(ii)
Fluoranthene	mg/kg	1600	0.65	(ii)
Pyrene	mg/kg	3800	0.61	(ii)
Benzo(a)Anthracene	mg/kg	14	0.47	(ii)
Chrysene	mg/kg	31	0.37	(ii)
Benzo(b)Fluoranthene	mg/kg	3.9	0.38	(ii)
Benzo(k)Fluoranthene	mg/kg	110	0.31	(ii)
Benzo(a)Pyrene	mg/kg	3.2	0.37	(ii)
Indeno(123-cd) Pyrene	mg/kg	46	<0.05	(ii)
Dibenzo(a,h)Anthracene	mg/kg	0.32	<0.05	(ii)
Benzo(ghi)Perylene	mg/kg	360	<0.05	(ii)
TPH C ₅ -C ₆	mg/kg	78	<0.001	(iii)
TPH C ₆ -C ₈	mg/kg	230	<0.001	(iii)
TPH C ₈ -C ₁₀	mg/kg	65	<0.001	(iii)
TPH C ₁₀ -C ₁₂	mg/kg	590	<1.0	(iii)
TPH C ₁₂ -C ₁₆	mg/kg	2300	13	(iii)
TPH C ₁₆ -C ₂₁	mg/kg	1900	37	(iii)
TPH C ₂₁ -C ₃₅	mg/kg	1900	28	(iii)
Screening Value Source (i) LQM/CIEH Suitable For Use Level (S4UL) (2015); (ii) S4UL –Assessment Approach of 2.5% SOM; (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; (iv) Defra Category 4 Screening Level (2014); (v) CLEA v1.06 Derived Value.				



CHEMICAL ANALYSIS CERTIFICATES

Philip Thompson

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Analytical Report Number : 22-32724

Project / Site name:	Sky Gardens	Samples received on:	13/01/2022
Your job number:	G73010	Samples instructed on/ Analysis started on:	13/01/2022
Your order number:	PO 518	Analysis completed by:	20/01/2022
Report Issue Number:	1	Report issued on:	20/01/2022
Samples Analysed:	5 soil samples		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
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: 22-32724
Project / Site name: Sky Gardens
Your Order No: PO 518

Lab Sample Number				2135529	2135530	2135531	2135532	2135533
Sample Reference				HP01	HP02	HP03	HP04	HP05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.20	0.30	0.50	0.40
Date Sampled				12/01/2022	12/01/2022	12/01/2022	12/01/2022	12/01/2022
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	22	23	23	28	21
Total mass of sample received	kg	0.001	NONE	1.0	1.0	1.0	1.0	1.0

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	SFS	SFS	SFS	MLO	MLO

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.4	8.5	8.2	8.4	8.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	220	270	230	210	220
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.11	0.14	0.12	0.11	0.11
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	109	136	116	107	110
Organic Matter (automated)	%	0.1	MCERTS	4.9	4.8	5.3	4.9	4.8
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.029	0.028	0.031	0.028	0.028

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	0.39	0.27	0.35	0.48
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.63	0.40	0.65	0.53
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.61	0.35	0.60	0.48
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.42	0.28	0.47	0.22
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.32	0.21	0.37	0.20
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.32	0.24	0.38	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.19	0.18	0.31	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.34	0.25	0.37	< 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	MCERTS	< 0.80	3.22	2.18	3.50	1.91
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Analytical Report Number: 22-32724
Project / Site name: Sky Gardens
Your Order No: PO 518

Lab Sample Number	2135529	2135530	2135531	2135532	2135533
Sample Reference	HP01	HP02	HP03	HP04	HP05
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30	0.20	0.30	0.50	0.40
Date Sampled	12/01/2022	12/01/2022	12/01/2022	12/01/2022	12/01/2022
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

Antimony (aqua regia extractable)	mg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.9	4.0	4.9	3.6	3.9
Barium (aqua regia extractable)	mg/kg	1	MCERTS	48	47	50	41	39
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.46	0.41	0.46	0.44	0.42
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.5	0.8	1.3	0.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	0.2	0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	1.4	1.6	< 1.2	1.3	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	10	10	12	11	10
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	21	18	16	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	24	32	27	24	28
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	9.3	11	9.8	8.9
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	13	13	14	13	13
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	46	54	48	45	43

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	13
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	37
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	26	16	21	28
TPH-CWG - Aliphatic > EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	< 8.4	30	14	24	58
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	MCERTS	< 10	27	20	26	78
TPH-CWG - Aliphatic (EC5 - EC44) EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	57	33	50	140

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	6.4	3.8	6.8	110
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	12	< 10	13	260
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	24	38	27	29	51
TPH-CWG - Aromatic > EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	38	15	9.6	< 8.4	30
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	MCERTS	31	56	38	49	420
TPH-CWG - Aromatic (EC5 - EC44) EH_CU+HS_1D_AR	mg/kg	10	NONE	69	71	48	49	450

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-32724

Project / Site name: Sky Gardens

* 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 *
2135529	HP01	None Supplied	0.3	Brown clay and sand with vegetation.
2135530	HP02	None Supplied	0.2	Brown clay and sand with gravel.
2135531	HP03	None Supplied	0.3	Brown clay and loam with vegetation.
2135532	HP04	None Supplied	0.5	Brown clay and loam with vegetation.
2135533	HP05	None Supplied	0.4	Brown clay and loam with vegetation.

Analytical Report Number : 22-32724

Project / Site name: Sky Gardens

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
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
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion 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
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
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
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.	In-house method based on USEPA8260	L0738-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
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	NONE
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
Fraction Organic Carbon FOC Automated	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method	L009	D	MCERTS
Sulphate, water soluble, in soil	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

Analytical Report Number : 22-32724
Project / Site name: Sky Gardens

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
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For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' 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.

Analytical Report Number : 22-32724

Project / Site name: Sky Gardens

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
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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