

Your Ref:
Our Ref: CRM.1870.001.GE.L.001.A

Date: 31st March 2023

Email: Richard.Reece@enzygo.com

Mark Bishop
Helix
Liberty House
Greenham Business Park
Newbury,
Berkshire,
RG19 6HS

By Email: MarkBishop@helix.limited

Dear Mark,

RE: Northfield Road, Reading, RG1 8AH

Background

Enzygo Geo Environmental Limited undertook an investigation for a proposed development at the above-named site. The site investigation outlined elevated levels of PAH, associated with presence of Ash and Clinker identified within the Made Ground.

As the site is being re-developed for houses with private domestic garden areas, remediation to areas of soft landscaping was proposed, comprising 600mm clean materials within private garden areas over a Geotextile no-dig barrier. This was submitted to Reading Borough Council and was approved. During the works, no subsequent site observations indicated any change was required.

Cover Soil Validation

On 1st March 2023 Enzygo Geo Environmental Limited undertook a site visit to excavate and confirm the presence of 600mm of cover materials over a Geotextile no-dig barrier within the rear garden areas. Six Hand Pits (HPA-HPF) were excavated within the soft landscaping areas. The locations of the Hand Pits are shown in Appendix B.

No further areas of contamination were identified during the construction phase or during the validation inspection, therefor no additional remedial measures were required or undertaken.

Cover Soils

The Hand Pits within the private rear garden areas confirmed the presence of a minimum 600mm of cover soils over a geo textile barrier, meeting the required depth for private garden areas. Photographs are included in Appendix A. Samples were recovered from the Hand Pit and submitted to the laboratories of I2 who are UKAS and MCERTS accredited for testing.

Chemical Analysis

Chemical analysis reports have been supplied by the client prior to the materials being imported to site. These certificates meet the GAC values for residential use with plant uptake. No asbestos was detected. These are included in Appendix C.

Soil samples from the validation pits were collected in appropriate containers provided by the analytical laboratory. Samples were stored in cool boxes prior to dispatch to the laboratory for analysis. All samples were collected using appropriate sampling equipment that is cleaned at each sampling location.

Soil samples were sent to the laboratories of I2 who are UKAS and MCERTS accredited. Samples were tested for the CLEA metal suite, pH, sulphate, cyanide, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAH), organic carbon, Speciated Total Petroleum Hydrocarbon (TPH CWG) and asbestos screen.

Results show the materials used meet the GAC values for residential use with plant uptake. These are shown in Appendix D.

Conclusion

Based on the site inspection undertaken, information provided, and results obtained, it is considered that the remediation works have been undertaken in accordance with the approved Remedial Method Statement.

This letter has been prepared to discharge condition 21 of planning application 191924.

We hope that we have correctly interpreted your requirements.

Yours sincerely,
For and on behalf of Enzygo



Richard Reece
Environmental Consultant

APPENDIX A

HPA



HPB



HPC



HPD



HPE



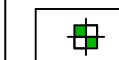
HPF



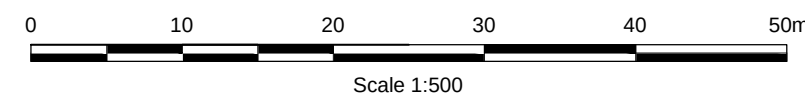
APPENDIX B



Key



Hand Pit Location (HP)
(HPA - HPE)



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:

Elstree Land Ltd &
Carter and Sons (Thatcham) Ltd

SCALE:

1:500@A3

PROJECT REF:

CRM.1726.001

DRAWN:

MG

CHECKED:

SR

DATE:

Nov 2019

PROJECT:

Northfield Road, Reading

TITLE:

Proposed Remediation Plan

FIGURE NO:

CRM.1726.001.GE.D.002

APPENDIX C

Freeland Horticulture Ltd
Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Attention : Philippa Lambourne

Our Ref: 1133-SA

21 February 2023

Dear Philippa

Topsoil Analysis Report : Beenham Topsoil –February 2023

We have completed the analysis of the topsoil sample recently taken from the above site and it has been forwarded to an approved laboratory for analysis and have the pleasure of reporting our findings. The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes and its compliance with the current British Standard for topsoil (BS3882).

SOIL SAMPLING & EXAMINATION

At the time of our sampling visit the topsoil was stored in a stockpile. A series of 10 hand augered trial holes were constructed across the stockpile for the purpose of soil examination and sample collection. As the soil examination confirmed a consistent topsoil composition, the ten samples were combined together to form one composite sample for analysis purposes. The soil was described as dark brown, slightly moist and friable with a well-developed, fine to medium granular structure. The soil contained a low fraction of small stones and no deleterious materials (eg. building waste materials, glass, roots or rhizomes of pernicious weeds) or unusual odours (eg. hydrocarbons) were recorded.

LABORATORY ANALYSIS

The topsoil sample was submitted to a UKAS and MCERTS accredited laboratory for routine physical and chemical parameters to confirm the composition and fertility of the soil. The following parameters were determined:

- ⊕ pH & electrical conductivity values;
- ⊕ major plant nutrients (N, P, K, Mg) & organic matter content;
- ⊕ particle size distribution and stone content;
- ⊕ heavy metals & potentially toxic elements (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- ⊕ sulphate, sulphur, sulphide;
- ⊕ total cyanide and total (mono) phenols;
- ⊕ speciated PAHs (US EPA16)
- ⊕ banded aromatic and aliphatic petroleum hydrocarbons (C5-C35).
- ⊕ Asbestos

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

COMMENTS**pH & Electrical Conductivity (salinity) Values**

The sample was alkaline in nature (pH 8.5) with a pH value that would be considered suitable for general landscaping purposes.

The electrical conductivity (salinity) value using the soil:water extract was (1137 μ S/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

The electrical conductivity values by CaSO₄ extract (BS3882 requirement) fell below the maximum specified value (3300 μ S/cm) given in BS3882:2015.

Organic Matter & Nutrient Status

The sample was rich in organic matter and all major plant nutrients. No further additions of compost or fertiliser are required, or indeed recommended, for at least the first growing season.

The C:N ratio of the sample was acceptable for general landscape purposes.

Particle Size Distribution & Stone Content

The sample contained 81% sand and fell into the Sandy loam texture class. This particle size distribution is considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was Virtually free from stones of 50 mm and upwards in diameter and only contained a slight fraction of smaller stones (0.6%). As such, stones will not restrict the use of the soil for landscaping purposes.

Potential Contaminants

We are not aware of any specified contaminant levels set for the proposed end-use of this topsoil. This includes human health, environmental protection and metals considered toxic to plants. In the absence of any site-specific assessment criteria, the concentrations that affect human health have been compared with the 'residential with homegrown produce land use in the Suitable For Use Levels presented in 'The LQM/CIEH S4UIs' for Human Health Risk Assessment (2015) and DEFRA SP1010: 'Development of Category 4 Screening Levels' for Assessment of Land Affected by Contamination – Policy Companion Document (2014).

Of the potential contaminants determined, none was found at levels that would exceed their respective guideline values.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes. From the soil examination and laboratory analysis, the soil is described as an alkaline, non-saline, Sandy Loam. The organic matter and nutrient levels are acceptable, and no significant contamination was found with respect to the parameters determined. This soil would adhere to the current BS3882 specification for 'multipurpose grade'.

To conclude, based on our findings, the topsoil would be considered well-suited to general landscaping purposes provided the physical condition of the soil is maintained.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if you have any queries or comments.

George Longmuir MSc Soil Sci. M.I Soil Sci.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Beenham, Berkshire
Month/Year	February 23
Our Ref	1133-SA
Date	21 February 2023

Composite sample
pH Value & Salinity

pH value (1:2.5 soil/water ext)	units	8.5
Electrical Conductivity (1:2.5 soil/water ext)	µS/cm	1137
Electrical Conductivity (1:2.5 soil/CaSO ₄ ext)	µS/cm	3043
Neutralising Value (CaCO ₃ equivalent)	%	4.3

Organic Matter & Nutrient Status

Organic Matter (LOI)	%	5.0
Organic Carbon (Derived)	%	2.9
Total Nitrogen	%	0.373
Carbon:Nitrogen Ratio	:1	7.8
Available Phosphorus	mg/l	33.6
Available Potassium	mg/l	1365
Available Magnesium	mg/l	145

Particle Size Analysis & Stones

Clay (<0.002mm)	%	8
Silt (0.063-0.002mm)	%	18
Sand (2.0-0.063mm)	%	81
Texture Class	UK Class	Sandy Loam

Stones 2-20mm	% by DW	0.5
Stones 20-50mm	% by DW	0.1
Stones >50mm	% by DW	0.0

Potential Contaminants

Total Arsenic (As)	mg/kg	8.7
Total Cadmium (Cd)	mg/kg	0.11
Total Chromium (Cr)	mg/kg	42.8
Hexavalent Chromium (Cr ^{VI})	mg/kg	1.1
Total Copper (Cu)	mg/kg	13.9
Total Lead (Pb)	mg/kg	26.8
Total Mercury (Hg)	mg/kg	<0.2
Total Nickel (Ni)	mg/kg	14.5
Total Selenium (Se)	mg/kg	0.25
Total Zinc (Zn)	mg/kg	75.4
Total Beryllium (Be)	mg/kg	<1
Total Barium (Ba)	mg/kg	26.9
Total Vanadium (V)	mg/kg	16.2
Hot Water Soluble Boron (B)	mg/kg	1.5
Total Cyanide (CN)	mg/kg	<1
Elemental Sulphur (S)	mg/kg	6.0
Easily Liberated Sulphide (S ²⁻)	mg/kg	<1
Water Soluble Sulphate (SO ₄ ²⁻)	mg/l	85.0
Total Phenols Index	mg/kg	<1
Asbestos Screen	-	N.D.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Beenham, Berkshire
Month/Year	February 23
Our Ref	1133-SA
Date	21 February 2023

Polyaromatic Hydrocarbons

Naphthalene	mg/kg	<0.05
Acenaphthylene	mg/kg	<0.05
Acenaphthene	mg/kg	<0.05
Fluorene	mg/kg	<0.05
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.05
Fluoranthene	mg/kg	0.2
Pyrene	mg/kg	0.2
Benzo[a]anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo[b]fluoranthene	mg/kg	0.2
Benzo[k]fluoranthene	mg/kg	0.2
Benzo[a]pyrene	mg/kg	0.1
Indeno[1,2,3-cd]pyrene	mg/kg	0.2
Dibenzo[a,h]anthracene	mg/kg	0.1
Benzo[g,h,i]perylene	mg/kg	0.1
Total PAHs sum US EPA 16	mg/kg	1.6

Banded Petroleum Hydrocarbons

Aliphatic TPH >C ₅ -C ₆	mg/kg	<0.05
Aliphatic TPH >C ₆ -C ₈	mg/kg	0.05
Aliphatic TPH >C ₈ -C ₁₀	mg/kg	<0.05
Aliphatic TPH >C ₁₀ -C ₁₂	mg/kg	<10
Aliphatic TPH >C ₁₂ -C ₁₆	mg/kg	<10
Aliphatic TPH >C ₁₆ -C ₂₁	mg/kg	<10
Aliphatic TPH >C ₂₁ -C ₃₅	mg/kg	28.0
Aliphatic TPH >C ₃₅ -C ₄₄	mg/kg	<12

Aromatic TPH >C ₅ -C ₇	mg/kg	<0.05
Aromatic TPH >C ₇ -C ₈	mg/kg	<0.05
Aromatic TPH >C ₈ -C ₁₀	mg/kg	<0.05
Aromatic TPH >C ₁₀ -C ₁₂	mg/kg	<10
Aromatic TPH >C ₁₂ -C ₁₆	mg/kg	<10
Aromatic TPH >C ₁₆ -C ₂₁	mg/kg	<10
Aromatic TPH >C ₂₁ -C ₃₅	mg/kg	41.0
Aromatic TPH >C ₃₅ -C ₄₄	mg/kg	34.0

Total Petroleum Hydrocarbons (C ₅ -C ₄₄)	mg/kg	103
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BTEX

Benzene	mg/kg	<0.02
Toluene	mg/kg	<0.2
Ethyl Benzene	mg/kg	<0.04
m- & p-xylene	mg/kg	<0.2
o-xylene	mg/kg	<0.1

APPENDIX D

Richard Reece

Enzygo Geoenvironmental Ltd
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

e: richard.reece@enzygo.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 23-20613

Project / Site name:	Northfield Road Reading	Samples received on:	02/03/2023
Your job number:	CRM-1870-001	Samples instructed on/ Analysis started on:	02/03/2023
Your order number:	CRM-1870-001	Analysis completed by:	09/03/2023
Report Issue Number:	1	Report issued on:	09/03/2023
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: 23-20613
Project / Site name: Northfield Road Reading
Your Order No: CRM-1870-001

Lab Sample Number				2603156	2603157	2603158	2603159	2603160
Sample Reference				HPA	HPB	HPC	HPD	HPE
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.60	0.00-0.60	0.00-0.60	0.00-0.60	0.00-0.60
Date Sampled				01/02/2023	01/02/2023	01/02/2023	01/02/2023	01/02/2023
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	15	16
Total mass of sample received				kg	0.001	NONE	0.9	0.9

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	SCA	SCA	SCA	SCA	SCA

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3	8.3	8.2	8	8.3
Organic Matter (automated)	%	0.1	MCERTS	4.8	5.2	3.8	4.9	4.3
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.8	3	2.2	2.9	2.5

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.12	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.2	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.1	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.12	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	2.4	0.13	0.11	0.1	0.11
Anthracene	mg/kg	0.05	MCERTS	0.52	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	7	0.34	0.24	0.15	0.18
Pyrene	mg/kg	0.05	MCERTS	6.3	0.25	0.15	0.07	0.11
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.2	0.19	0.13	0.06	0.1
Chrysene	mg/kg	0.05	MCERTS	3.4	0.19	0.12	0.05	0.09
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.1	0.27	0.13	< 0.05	0.12
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	1.8	0.08	0.07	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.7	0.2	0.1	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2	< 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	2.2	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	38.4	1.65	1.05	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	8.6	9.2	7.8	8.1
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	1.1	0.7	1.9	0.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 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	18	11	6.8	7.1	5.8
Copper (aqua regia extractable)	mg/kg	1	MCERTS	64	20	14	24	270
Lead (aqua regia extractable)	mg/kg	1	MCERTS	150	33	19	25	21
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	22	11	9.2	9.3	8.6
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	210	76	45	61	48

Analytical Report Number: 23-20613
Project / Site name: Northfield Road Reading
Your Order No: CRM-1870-001

Lab Sample Number				2603156	2603157	2603158	2603159	2603160
Sample Reference				HPA	HPB	HPC	HPD	HPE
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.60	0.00-0.60	0.00-0.60	0.00-0.60	0.00-0.60
Date Sampled				01/02/2023	01/02/2023	01/02/2023	01/02/2023	01/02/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	NONE	< 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	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	11	13	12	11	17
TPH-CWG - Aliphatic > EC35 - EC44 _{EH_CU_1D_AL}	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	11	15	12	11	19
TPH-CWG - Aliphatic (EC5 - EC44) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	11	15	12	11	19

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	NONE	< 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	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	24	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	49	11	15	21	20
TPH-CWG - Aromatic > EC35 - EC44 _{EH_CU_1D_AR}	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	15	< 8.4
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	73	14	19	24	27
TPH-CWG - Aromatic (EC5 - EC44) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	73	14	19	39	27

TPH (>C5 - C7) _{HS_1D_TOTAL}	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (>C7 - C8) _{HS_1D_TOTAL}	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C8 - C10) _{HS_1D_TOTAL}	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) _{EH_CU_1D_TOTAL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) _{EH_CU_1D_TOTAL}	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
TPH (C16 - C21) _{EH_CU_1D_TOTAL}	mg/kg	1	MCERTS	24	5	4.5	2.7	8.9
TPH (C21 - C35) _{EH_CU_1D_TOTAL}	mg/kg	1	MCERTS	59	23	27	33	37
TPH (C35 - C44) _{EH_CU_1D_TOTAL}	mg/kg	10	NONE	< 10	< 10	< 10	15	< 10
TPH Total C5 - C44 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	84	29	31	50	46

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

Analytical Report Number: 23-20613
Project / Site name: Northfield Road Reading
Your Order No: CRM-1870-001

Lab Sample Number				2603161
Sample Reference				HPF
Sample Number				None Supplied
Depth (m)				0.00-0.60
Date Sampled				01/02/2023
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	13
Total mass of sample received	kg	0.001	NONE	0.9

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.3
Organic Matter (automated)	%	0.1	MCERTS	3.4
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	1.9

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.06
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.31
Anthracene	mg/kg	0.05	MCERTS	0.1
Fluoranthene	mg/kg	0.05	MCERTS	0.77
Pyrene	mg/kg	0.05	MCERTS	0.69
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.52
Chrysene	mg/kg	0.05	MCERTS	0.41
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.63
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.23
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.61
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.39
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.45

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	5.17
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13
Boron (water soluble)	mg/kg	0.2	MCERTS	1.6
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	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20
Lead (aqua regia extractable)	mg/kg	1	MCERTS	54
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	69

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 Project / Site name: Northfield Road Reading
 Your Order No: CRM-1870-001

Lab Sample Number				2603161
Sample Reference				HPF
Sample Number				None Supplied
Depth (m)				0.00-0.60
Date Sampled				01/02/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	8.9
TPH-CWG - Aliphatic >EC35 - EC44 _{EH_CU_1D_AL}	mg/kg	8.4	NONE	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10
TPH-CWG - Aliphatic (EC5 - EC44) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	< 10
TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	NONE	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	19
TPH-CWG - Aromatic >EC35 - EC44 _{EH_CU_1D_AR}	mg/kg	8.4	NONE	12
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	24
TPH-CWG - Aromatic (EC5 - EC44) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	36
TPH (>C5 - C7) _{HS_1D_TOTAL}	mg/kg	1	NONE	< 1.0
TPH (>C7 - C8) _{HS_1D_TOTAL}	mg/kg	1	NONE	< 1.0
TPH (C8 - C10) _{HS_1D_TOTAL}	mg/kg	0.1	NONE	< 0.1
TPH (C10 - C12) _{EH_CU_1D_TOTAL}	mg/kg	2	MCERTS	< 2.0
TPH (C12 - C16) _{EH_CU_1D_TOTAL}	mg/kg	4	MCERTS	< 4.0
TPH (C16 - C21) _{EH_CU_1D_TOTAL}	mg/kg	1	MCERTS	5.4
TPH (C21 - C35) _{EH_CU_1D_TOTAL}	mg/kg	1	MCERTS	28
TPH (C35 - C44) _{EH_CU_1D_TOTAL}	mg/kg	10	NONE	12
TPH Total C5 - C44 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	36

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 *
2603156	HPA	None Supplied	0.00-0.60	Brown loam and sand with gravel and vegetation.
2603157	HPB	None Supplied	0.00-0.60	Brown loam and sand with vegetation.
2603158	HPC	None Supplied	0.00-0.60	Brown clay and sand with gravel and vegetation.
2603159	HPD	None Supplied	0.00-0.60	Brown loam and sand with vegetation.
2603160	HPE	None Supplied	0.00-0.60	Brown loam and sand with gravel and vegetation.
2603161	HPF	None Supplied	0.00-0.60	Brown loam and sand with gravel and vegetation.

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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
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 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
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	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
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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

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

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Project / Site name: Northfield Road Reading

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
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				

Sample Deviation Report



Analytical Report Number : 23-20613

Project / Site name: Northfield Road Reading

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
HPA	None Supplied	S	2603156	c	Hexavalent chromium in soil	L080-PL	c
HPA	None Supplied	S	2603156	c	Organic matter (Automated) in soil	L009-PL	c
HPA	None Supplied	S	2603156	c	Speciated EPA-16 PAHs in soil	L064-PL	c
HPA	None Supplied	S	2603156	c	TPH in (Soil)	L076-PL	c
HPA	None Supplied	S	2603156	c	TPHCWG (Soil)	L088/76-PL	c
HPA	None Supplied	S	2603156	c	Total organic carbon (Automated) in soil	L009-PL	c
HPA	None Supplied	S	2603156	c	pH in soil (automated)	L099-PL	c
HPB	None Supplied	S	2603157	c	Hexavalent chromium in soil	L080-PL	c
HPB	None Supplied	S	2603157	c	Organic matter (Automated) in soil	L009-PL	c
HPB	None Supplied	S	2603157	c	Speciated EPA-16 PAHs in soil	L064-PL	c
HPB	None Supplied	S	2603157	c	TPH in (Soil)	L076-PL	c
HPB	None Supplied	S	2603157	c	TPHCWG (Soil)	L088/76-PL	c
HPB	None Supplied	S	2603157	c	Total organic carbon (Automated) in soil	L009-PL	c
HPB	None Supplied	S	2603157	c	pH in soil (automated)	L099-PL	c
HPC	None Supplied	S	2603158	c	Hexavalent chromium in soil	L080-PL	c
HPC	None Supplied	S	2603158	c	Organic matter (Automated) in soil	L009-PL	c
HPC	None Supplied	S	2603158	c	Speciated EPA-16 PAHs in soil	L064-PL	c
HPC	None Supplied	S	2603158	c	TPH in (Soil)	L076-PL	c
HPC	None Supplied	S	2603158	c	TPHCWG (Soil)	L088/76-PL	c
HPC	None Supplied	S	2603158	c	Total organic carbon (Automated) in soil	L009-PL	c
HPC	None Supplied	S	2603158	c	pH in soil (automated)	L099-PL	c
HPD	None Supplied	S	2603159	c	Hexavalent chromium in soil	L080-PL	c
HPD	None Supplied	S	2603159	c	Organic matter (Automated) in soil	L009-PL	c
HPD	None Supplied	S	2603159	c	Speciated EPA-16 PAHs in soil	L064-PL	c
HPD	None Supplied	S	2603159	c	TPH in (Soil)	L076-PL	c
HPD	None Supplied	S	2603159	c	TPHCWG (Soil)	L088/76-PL	c
HPD	None Supplied	S	2603159	c	Total organic carbon (Automated) in soil	L009-PL	c
HPD	None Supplied	S	2603159	c	pH in soil (automated)	L099-PL	c
HPE	None Supplied	S	2603160	c	Hexavalent chromium in soil	L080-PL	c
HPE	None Supplied	S	2603160	c	Organic matter (Automated) in soil	L009-PL	c
HPE	None Supplied	S	2603160	c	Speciated EPA-16 PAHs in soil	L064-PL	c
HPE	None Supplied	S	2603160	c	TPH in (Soil)	L076-PL	c
HPE	None Supplied	S	2603160	c	TPHCWG (Soil)	L088/76-PL	c
HPE	None Supplied	S	2603160	c	Total organic carbon (Automated) in soil	L009-PL	c
HPE	None Supplied	S	2603160	c	pH in soil (automated)	L099-PL	c
HPF	None Supplied	S	2603161	c	Hexavalent chromium in soil	L080-PL	c
HPF	None Supplied	S	2603161	c	Organic matter (Automated) in soil	L009-PL	c
HPF	None Supplied	S	2603161	c	Speciated EPA-16 PAHs in soil	L064-PL	c
HPF	None Supplied	S	2603161	c	TPH in (Soil)	L076-PL	c
HPF	None Supplied	S	2603161	c	TPHCWG (Soil)	L088/76-PL	c
HPF	None Supplied	S	2603161	c	Total organic carbon (Automated) in soil	L009-PL	c
HPF	None Supplied	S	2603161	c	pH in soil (automated)	L099-PL	c