

Project No: IV.156.22.Cap.1
Date: 03.04.24

Mr J Perry
Outwood Burbage Ltd
Kirkby Muxloe
Leics

Dear James

Re: Topsoil Cap Validation – Plots – 1 - 5, Outwoods, Burbage.

Background & Scope

As per your instruction, Ivy House Environmental attended site on 7th December 2023 to carry out topsoil cap validation for plots 2 – 5 and on the 17th March 2024 for Plot 1.

The site historically comprised a former Farm for which Ivy House Environmental previously produced the following reports:

- *Phase I Geo-Environmental Assessment: July 2022*
- *Phase II Geo – Environmental Assessment: December 2022*
- *Remediation Method Statement: December 2022*

The above reports concluded that remediation in the form of the laying of an anti – dig membrane across the base of all plots and 0.6m soil cap across all gardens was required.

Topsoil Source

Topsoil was sourced from *Richard Bailey Construction Ltd, Ellistown*. A copy of the BS Topsoil Suite Report accompanying the soils is enclosed.

Cap Validation

As per the approved remedial specification, two trial holes were excavated to 0.6m in the gardens to each plot and a single soil sample was taken and scheduled for chemical analysis for the following chemical analysis suite:

- Metals, pH, SOM, Speciated PAH, Asbestos Screen & TPH.

Two chemical analysis reports are enclosed (Ref. DETS. 23 – 15066 17.12.23) & 24-02924 15.03.24); an assessment of the data confirmed that no contaminants were found to be elevated above the Ivy House GAC for a *Residential With Produce* end use and no asbestos was detected in any of the samples tested.

An assessment of the cap thickness illustrates that the cap layer across the development platform is sufficient (i.e.>0.6m thick). Photographs illustrating the cap validation are illustrated on the enclosed figures.

Conclusions

The results of the chemical analysis and the cap validation indicate that the gardens to Plots 1 – 5 are suitable for use and that the site does not pose a significant risk to end users.

Please do not hesitate to contact us should you have any further queries.

Yours sincerely,



Richard Sutton MRICS
Director

Encl.
Figures
Chemical Laboratory Test Results – Soil
Imported Topsoil Certs
Tier 1 Generic Assessment Criteria



Plot 1 0.7 – 0.8m Cap

KEY:



Scotland Farm, Ockbrook, Derby, DE72 3RX
 rps@ivyhousenv.co.uk • www.ivyhousenv.co.uk • 01332 661 987

DO NOT SCALE

TITLE:

Plot 1 Cap Validation

PROJECT:

The Outwoods, Burbage

PROJECT No:

IV.156.22

DATE:

03.24

SCALE:

NTS

DRAWN:

RPS

DWG No:

Figure B



Plot 2 0.6m Cap

KEY:

DO NOT SCALE



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 rps@ivyhousenv.co.uk • www.ivyhousenv.co.uk • 01332 661 987

TITLE:

Plot 2 Cap

PROJECT:

The Outwoods, Burbage

PROJECT No:

IV.156.22

DATE:

03.24

SCALE:

NTS

DRAWN:

RPS

DWG No:

Figure C



Plot 3 Cap 0.6m

KEY:



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DO NOT SCALE

TITLE:

Plot 3 Cap

PROJECT:

The Outwoods, Burbage

PROJECT No:

IV.156.22

DATE:

03.24

SCALE:

NTS

DRAWN:

RPS

DWG No:

Figure C



Plot 4 Cap 0.6m

KEY:

DO NOT SCALE



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TITLE:

Plot 4 Cap

PROJECT:

The Outwoods, Burbage

PROJECT No:

IV.156.22

DATE:

03.24

SCALE:

NTS

DRAWN:

RPS

DWG No:

Figure D

Plot 5 Cap 0.6m



KEY:

DO NOT SCALE



TITLE:

Plot 5 Cap

PROJECT:

The Outwoods, Burbage

PROJECT No:

IV.156.22

DATE:

03.24

SCALE:

NTS

DRAWN:

RPS

DWG No:

Figure E

Plot 2 & 3 Cap & Anti Dig Layer



KEY:

DO NOT SCALE



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TITLE:

Cap Validation

PROJECT:

The Outwoods, Burbage

PROJECT No:

IV.156.22

DATE:

03.24

SCALE:

NTS

DRAWN:

RPS

DWG No:

Figure F



Richard Sutton
Ivy House Environmental Ltd
Linden
Potter Street
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Derby
DE21 7LH

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-02924

Site Reference: The Outwoods, Burbage

Project / Job Ref: IV.156.22

Order No: IV.156.22

Sample Receipt Date: 20/03/2024

Sample Scheduled Date: 20/03/2024

Report Issue Number: 1

Reporting Date: 26/03/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



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Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate

DETS Report No: 24-02924	~Date Sampled	15/03/24				
Ivy House Environmental Ltd	~Time Sampled	None Supplied				
~Site Reference: The Outwoods, Burbage	~TP / BH No	Plot 1				
~Project / Job Ref: IV.156.22	~Additional Refs	None Supplied				
~Order No: IV.156.22	~Depth (m)	0.00 - 0.60				
Reporting Date: 26/03/2024	DETS Sample No	705274				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected			
pH	pH Units	N/a	MCERTS	8.7			
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	387			
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.04			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	47			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.05			
Organic Matter (SOM)	%	< 0.1	MCERTS	1.7			
Arsenic (As)	mg/kg	< 2	MCERTS	5			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.3			
Chromium (Cr)	mg/kg	< 2	MCERTS	8			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	70			
Lead (Pb)	mg/kg	< 3	MCERTS	46			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	8			
Selenium (Se)	mg/kg	< 2	MCERTS	< 2			
Vanadium (V)	mg/kg	< 1	MCERTS	11			
Zinc (Zn)	mg/kg	< 3	MCERTS	78			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

~ Sample details provided by the customer



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 24-02924	~Date Sampled	15/03/24				
Ivy House Environmental Ltd	~Time Sampled	None Supplied				
~Site Reference: The Outwoods, Burbage	~TP / BH No	Plot 1				
~Project / Job Ref: IV.156.22	~Additional Refs	None Supplied				
~Order No: IV.156.22	~Depth (m)	0.00 - 0.60				
Reporting Date: 26/03/2024	DETS Sample No	705274				

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	0.35			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	1.42			
Pyrene	mg/kg	< 0.1	MCERTS	1.44			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	1.17			
Chrysene	mg/kg	< 0.1	MCERTS	1.09			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	1.63			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.43			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1.22			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.76			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.14			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.60			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	10.3			

~ Sample details provided by the customer



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Soil Analysis Certificate - TPH CWG Banded					
DETS Report No: 24-02924	~Date Sampled	15/03/24			
Ivy House Environmental Ltd	~Time Sampled	None Supplied			
~Site Reference: The Outwoods, Burbage	~TP / BH No	Plot 1			
~Project / Job Ref: IV.156.22	~Additional Refs	None Supplied			
~Order No: IV.156.22	~Depth (m)	0.00 - 0.60			
Reporting Date: 26/03/2024	DETS Sample No	705274			

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10			
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21			
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	4			
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	58			
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	63			
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	63			

~ Sample details provided by the customer



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 24-02924	~Date Sampled	15/03/24				
Ivy House Environmental Ltd	~Time Sampled	None Supplied				
~Site Reference: The Outwoods, Burbage	~TP / BH No	Plot 1				
~Project / Job Ref: IV.156.22	~Additional Refs	None Supplied				
~Order No: IV.156.22	~Depth (m)	0.00 - 0.60				
Reporting Date: 26/03/2024	DETS Sample No	705274				

Determinand	Unit	RL	Accreditation				
Benzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
Toluene : HS 1D MS	ug/kg	< 5	MCERTS	< 5			
Ethylbenzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
p & m-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
o-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
MTBE : HS 1D MS	ug/kg	< 5	MCERTS	< 5			

~ Sample details provided by the customer



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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 24-02924	
Ivy House Environmental Ltd	
~Site Reference: The Outwoods, Burbage	
~Project / Job Ref: IV.156.22	
~Order No: IV.156.22	
Reporting Date: 26/03/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
705274	Plot 1	None Supplied	0.00 - 0.60	10.2	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ¹/s

Unsuitable Sample ^u/s

~ Sample details provided by the customer



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-02924

Ivy House Environmental Ltd

~Site Reference: The Outwoods, Burbage

~Project / Job Ref: IV.156.22

~Order No: IV.156.22

Reporting Date: 26/03/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried

AR As Received

~ Sample details provided by the customer



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Maidstone
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Tel : 01622 850410



List of HWOL Acronyms and Operators

DETS Report No: 24-02924

Ivy House Environmental Ltd

~Site Reference: The Outwoods, Burbage

~Project / Job Ref: IV.156.22

~Order No: IV.156.22

Reporting Date: 26/03/2024

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by the customer

Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS



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Derwentside Environmental Testing Services Ltd
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t: 01622 850410

DETS Report No: 23-15066

Site Reference: The Outwoods, Burbage

Project / Job Ref: IV.156.22

Order No: IV.156.22

Sample Receipt Date: 08/12/2023

Sample Scheduled Date: 08/12/2023

Report Issue Number: 1

Reporting Date: 18/12/2023

Authorised by:

Kevin Old
Operations Director

Dates of laboratory activities for each tested analyte are available upon request.

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Tel : 01622 850410



Soil Analysis Certificate						
DETS Report No: 23-15066	Date Sampled	07/12/23	07/12/23	07/12/23	07/12/23	
Ivy House Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: The Outwoods, Burbage	TP / BH No	PLOT 2	PLOT 3	PLOT 4	PLOT 5	
Project / Job Ref: IV.156.22	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: IV.156.22	Depth (m)	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	
Reporting Date: 18/12/2023	DETS Sample No	689581	689582	689583	689584	

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	7.9	7.8	7.8	7.7
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	909	841	553	336
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.09	0.08	0.06	0.03
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	182	121	21	14
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.18	0.12	0.02	0.01
Organic Matter (SOM)	%	< 0.1	MCERTS	7.6	5.5	5.9	3.5
Arsenic (As)	mg/kg	< 2	MCERTS	11	10	10	10
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	0.3	0.3	0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	20	15	15	15
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	34	30	30	19
Lead (Pb)	mg/kg	< 3	MCERTS	87	105	112	30
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	15	14	15	15
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	26	24	25	24
Zinc (Zn)	mg/kg	< 3	MCERTS	120	111	117	77

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-15066	Date Sampled	07/12/23	07/12/23	07/12/23	07/12/23	
Ivy House Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: The Outwoods, Burbage	TP / BH No	PLOT 2	PLOT 3	PLOT 4	PLOT 5	
Project / Job Ref: IV.156.22	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: IV.156.22	Depth (m)	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	
Reporting Date: 18/12/2023	DETS Sample No	689581	689582	689583	689584	

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	0.27	< 0.1	< 0.1	< 0.1	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	0.57	0.44	0.19	< 0.1	
Pyrene	mg/kg	< 0.1	MCERTS	0.51	0.42	0.19	< 0.1	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.37	0.25	< 0.1	< 0.1	
Chrysene	mg/kg	< 0.1	MCERTS	0.35	0.26	< 0.1	< 0.1	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	0.13	< 0.1	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	2.1	< 1.6	< 1.6	< 1.6	



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Soil Analysis Certificate - TPH CWG Banded						
DETS Report No: 23-15066	Date Sampled	07/12/23	07/12/23	07/12/23	07/12/23	
Ivy House Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: The Outwoods, Burbage	TP / BH No	PLOT 2	PLOT 3	PLOT 4	PLOT 5	
Project / Job Ref: IV.156.22	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: IV.156.22	Depth (m)	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	
Reporting Date: 18/12/2023	DETS Sample No	689581	689582	689583	689584	

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	34	< 10	< 10	< 10	
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	34	< 21	< 21	< 21	
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-15066	Date Sampled	07/12/23	07/12/23	07/12/23	07/12/23	
Ivy House Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: The Outwoods, Burbage	TP / BH No	PLOT 2	PLOT 3	PLOT 4	PLOT 5	
Project / Job Ref: IV.156.22	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: IV.156.22	Depth (m)	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	0.00 - 0.60	
Reporting Date: 18/12/2023	DETS Sample No	689581	689582	689583	689584	

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-15066	
Ivy House Environmental Ltd	
Site Reference: The Outwoods, Burbage	
Project / Job Ref: IV.156.22	
Order No: IV.156.22	
Reporting Date: 18/12/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
689581	PLOT 2	None Supplied	0.00 - 0.60	17.9	Brown sandy clay with stones
689582	PLOT 3	None Supplied	0.00 - 0.60	19.7	Brown sandy clay with stones
689583	PLOT 4	None Supplied	0.00 - 0.60	20.3	Brown sandy clay with stones
689584	PLOT 5	None Supplied	0.00 - 0.60	20.5	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/s}

Unsuitable Sample ^{u/s}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-15066

Ivy House Environmental Ltd

Site Reference: The Outwoods, Burbage

Project / Job Ref: IV.156.22

Order No: IV.156.22

Reporting Date: 18/12/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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List of HWOL Acronyms and Operators
DETS Report No: 23-15066
Ivy House Environmental Ltd
Site Reference: The Outwoods, Burbage
Project / Job Ref: IV.156.22
Order No: IV.156.22
Reporting Date: 18/12/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Kiwa CMT
5.0 Analysis

- 5.1 For compliance to Table 1 of BS3882:2015 the sample submitted has been analysed for the following components:

Contamination Analysis

Metals/Metalloids	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Boron, Zinc, Chromium (VI)
Inorganics/Physical	Moisture Content, Total Cyanide, Loss on Ignition, Asbestos Screen
Organics	Petroleum Hydrocarbons (TPHCWG), BTEX, Phenol, Organic Matter
Polycyclic Aromatic Hydrocarbons	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene, Dibenzo[a,h]anthracene, Benzo[ghi]perylene, Benzo[b]fluoranthene, Benzo[k]fluoranthene

Table 5.1 Contamination Schedule

BS3882:2015 Analysis

Phytotoxic Elements	Total Copper, Total Zinc, Total Nickel
Major Nutrient Analysis	Available Phosphorous, Available Potassium, Available Magnesium, Available Sodium, Available Calcium, Exchangeable Sodium Percentage, Total Nitrogen, Total Carbon, Carbon:Nitrogen Ratio
Physical	Electrical Conductivity, pH, Particle Size Distribution by Hydrometer/Pipette Method to BS ISO 11277: 2009

Table 5.2 BS3882 Schedule

6.0 Results Assessment

- 6.1 The certificates of analysis for the sample are presented in Appendix 3.
- 6.2 The results relate only to the sample tested.
- 6.3 The assessment relates only to the presented results.
- 6.4 The results are assessed to the topsoil criteria below. Where the results do not achieve MULTIPURPOSE compliance then the result is assessed against SPECIFIC USE compliance criteria:

Report No. 87160/66878

kiwa

Report No. 87160/66878

kiwa

port No. 87160/66878

87160/66878

878

David Baxter Paid £1000.00 off
 7.34 - 3.10 = 4.24 £106.00 Mech
 10 x Cement £70.00
 10 - 3.10 = 2.70 £116.10
 2F 1st fill £124.22
 2.64 £66.00
 £571.22

Kiwa CMT

7.0 Conclusion

- 7.1 Sample 66878/1 is compliant with **BS3882:2015** and is classified as a **MULTIPURPOSE TOPSOIL**.
- 7.2 Topsoils should be transported and handled in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (DEFRA, 2009).

Summary

- 7.3 Please see the summary information below:

KCMT Reference	Textural Classification	Sample Classification to BS 3882:2015
66878/1	SANDY SILT LOAM	MULTIPURPOSE to BS 3882:2015 Table 1

Table 7.1 Summary Information

Report No. 87160/66878



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87160/66878

87160/66878

Kiwa CMT

Coarse Fragment Analysis

Particle Size of Aggregate	Threshold	Value in Sample
>50mm	0%	0%
>20mm	<10%	0%
>2mm	<30%	3%
Pass/Fail		Pass

Table 6.3 Coarse Fraction Content

- 6.20 The coarse fragment content is compliant with the requirements of BS3882:2015.

Fine Fraction Analysis and Loss on Ignition Analysis

- 6.21 The clay (<0.002mm) content of the soil is analysed as below:

Analysis	Threshold	Results
Clay Content	8.3%	8.3%
LOI	6%	6%
Pass/Fail		Pass

Table 6.4 Fine Fraction Content and LOI

- 6.22 The Loss on Ignition test is a measure of the organic content of a soil. None of the methods of organic content measurement is definitive. Mass Loss on Ignition of a dried sample over the temperature range c.125°C to 440°C is generally deemed adequate.

Visible Contaminants Analysis

- 23 The visible contaminant concentrations in the material is analysed as below:

Analysis	Threshold	Results
Visible Contaminants >2mm (air-dried soil)	<0.5	0%
... of which plastics	<0.25	0%
Sharps Number (air-dried soil)	0	0%
Pass/Fail		Pass

Table 6.5 Visible Contaminants



Report No. 87160/06878

Donut No. 87160/06878

Report No. 87160/06878

Handwritten notes: Dried Particles 7.34 - 2.10 = 4.24 10 x 0.10 = 1.0 10 - 3.10 = 2.70 1.64 1.06 0.10 0.116 0.10 0.124 0.22 0.66 0.00 0.54 0.00

Kiwa CMT

Contamination Analysis

- 6.10 With reference to BS3882:2015 Table 1 Notes 1 to 5, and the requirements within them, it is necessary to ensure that there is no harm presented to human health for the proposed end use, no release of prohibited plants (Wildlife and Countryside Act 1981, Schedule 9).
- 6.11 With no site-specific criteria to work to the concentrations of the contaminants of concern for human health are assessed to the residential end-use against the Generic Assessment Criteria in the form of SGVs (EA, 2009), C4SLs (DEFRA, 2014) and S4ULs (LQM/CIEH, 2009, 2nd Ed.).
- 6.12 Those criteria are reproduced in Appendix 5.
- 6.13 The exceedances noted from the Tables presented in Appendix 5 are:

Parameter	Relevant GAC	Exceedance Value and Sample Reference	Notes
None	-	-	No exceedances noted.

Table 6.2 Contamination Compliance for Human Health

- 6.14 It is considered that the material presents a **VERY LOW RISK** to human health and is considered suitable for use as a BS3882:2015 Multipurpose Topsoil.

Textural Classification and Stones Content

- 6.15 Soil texture has been analysed in accordance with BS ISO 11277:2009 as noted in BS 3882:2015.
- 6.16 In this standard the particle size distribution (PSD) is determined by a combination of sieving and sedimentation from air dried soil. The >2mm fraction is determined by dry sieving and the <2mm to >0.063mm fraction is determined by a combination of wet and dry sieving. Particles of <0.063mm are determined by sedimentation. The method used for sedimentation is the hydrometer method given in Annex B of the standard.
- 17 This enables a continuous particle size distribution curve to be produced within the limitations and assumptions stated within the standard. The production of a continuous PSD curve is required by the BS ISO 11277 standard, as subsequently the BS 3882 standard.
- 8 Provided the physical condition of the material is maintained then the topsoil material should be suitable for all general landscaping purposes.

Such soils (in the natural state) generally have a healthy balance of water retention and drainage. However, they are prone to structural degradation/damage that may reduce or restrict this property. The structural integrity is most often compromised by the handling of the topsoil, this is enhanced when the soil material is plastic in its consistency. Such damage to the topsoil will likely reduce its propensity to drain and aerate.

Report No. 87160/66878

kiwa

Kiwa CMT
Nutrient Analysis

Sample 66878/1

Report No. 87160/66878
kiwa

Parameter	Result	BS3882:2015 Multipurpose Threshold (Table 1)	BS3882:2015 Multipurpose Topsoil Compliant?	BS3882:2015 Specific Use/Low Fertility Threshold (Table 1)	BS3882:2015 Specific Use/Low Fertility Topsoil Compliant?
Total Nitrogen % m/m	0.177	>0.15%	Pass	No threshold present in BS3882	-
Extractable Phosphorous mg/L	19.2	16 to 140	Pass	≤20	-
Extractable Potassium mg/L	152	121 to 1500	Pass	No threshold present in BS3882	-
Extractable Magnesium mg/L	257	51 to 600	Pass	No threshold present in BS3882	-
Electrical Conductivity µS/cm	124	3300	Pass	3300	-
Carbon:Nitrogen	11.8	<20:1	Pass	<35:1	-
Soil pH	7.5	5.5 to 8.5	Pass	3.5 to 9.0	-
Extractable Zinc mg/kg	82.6	<200 (pH <6.0) <200 (pH 6.0-7.0) <300 (pH >7.0)	Pass	<200 (pH <6.0) <200 (pH 6.0-7.0) <300 (pH >7.0)	-
Extractable Copper mg/kg	17.4	<100 (pH <6.0) <135 (pH 6.0 to 7.0) <200 (pH >7.0)	Pass	<100 (pH <6.0) <135 (pH 6.0 to 7.0) <200 (pH >7.0)	-
Extractable Nickel mg/kg	32.9	<60 (pH <6.0) <75 (pH 6.0 to 7.0) <110 (pH >7.0)	Pass	<60 (pH <6.0) <75 (pH 6.0 to 7.0) <110 (pH >7.0)	-

Table 6.1a Topsoil Compliance to BS3882:2015

Results Analysis – Nutrients, Phytotoxic Elements, pH and Electrical Conductivity.

The samples were noted to be slightly alkaline (pH c.7.5). This pH falls within the threshold and is suitable for general landscaping purposes.

The electrical conductivity of the sample is a measure of the salinity and the value presented is less than the threshold and therefore is unlikely to contain soluble salts that would hinder plant growth.

The sample is well supplied with Carbon and Nitrogen and all other major plant nutrients.

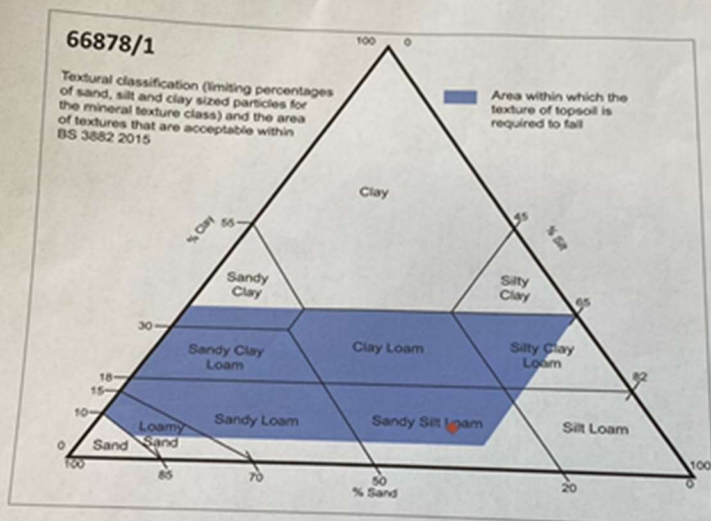
The C:N ratio of the sample is acceptable for general landscape purposes.

The concentrations of phytotoxic elements (Harmful to Plants) were below the required thresholds and are permissible as per Table 1 of BS3882:2015.

Overall Textural Classification

- 6.24 As per BS 3882:2015 a textural classification ternary diagram must be produced to graphically show the correct textural classification of a material with relation to its particle size distribution.
- 6.25 Textural Classification of the samples are shown in the ternary diagram(s) below, in accordance with BS 3882:2015:

Sample 66878/1



- 6.26 The material is classified as a **SANDY SILT LOAM** and does fall within the BS3882:2015 envelope.
- 6.27 The transport, handling and trafficking of topsoils are extremely important subjects and the mishandling of topsoil can have a severe detrimental impact on its performance. Soils should be transported and handled in accordance with the *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites* (DEFRA, 2009).
- 6.28 Following this Code of Practice will maintain the performance of the topsoil, any variation from this will lead to a significant loss of functionality of the original topsoil.

GENERIC ASSESSMENT CRITERIA

SHEET 1	SOIL - INORGANIC GAC
SHEET 2	SOIL ORGANIC & INORGANIC GAC (1 - 6% SOM)
SHEET 3	UK DRINKING WATER STANDARDS (UKDWS)
SHEET 4	ENVIRONMENTAL QUALITY STANDARDS (EQS)
SHEET 5	WHO TPHCWG STANDARDS (Water)
SHEET 6	WATER PIPE INSTALLATION STANDARDS (WRAS)

Generic Assessment Criteria					
Land Use Scenario					
Contaminants	Residential With Produce	Residential Without Produce	POS (Resi)	Commercial	Source
Arsenic	37	40	79	635	S4UL
Cadmium	11	85	120	230	
Chromium VI	6	6	8	34	
Chromium III	910	910	1500	8840	
Copper	2400	7100	12000	71700	
Lead	200	310	630	2300	
Mercury, elemental	1	1	16	83	
Mercury, inorganic	40	56	120	3640	
Mercury, methyl	11	15	40	409	
Nickel	180	180	230	980	
Vanadium	410	1200	2000	9000	
Zinc	3700	40000	81000	730000	
Selenium	250	430	1100	13000	
Asbestos Fibre	>0.001%	>0.001%	>0.001%	>0.001%	LOD

Note:

All figures are in mg/kg
 LQM/CIEH/S4UL Adopted.
 Soil type chosen is sandy loam, pH 7
 LOD - Limit of Detection



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Generic Assessment Criteria													
Contaminants	Land Use Scenario												
	Residential With Produce			Residential Without Produce			POS (Resi)			Commercial			Source
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM	
Arsenic			37			40			79			635	S4UL
Cadmium			11			85			120			190	S4UL
Chromium VI			6			6			8			33	S4UL
Chromium III			910			910			1500			8600	S4UL
Copper			2400			7100			12000			68000	S4UL
Mercury, elemental			1			1			16			58 ^(25.8)	S4UL
Mercury, inorganic			40			56			120			3640	S4UL
Mercury, methyl			11			15			40			407	S4UL
Nickel			180			180			230			980	S4UL
Vanadium			410			1200			2000			9000	S4UL
Zinc			3700			4000		81000	81000			73000	S4UL
Selenium			250			430		1100	1100			12000	S4UL
Benzene*	0.087		0.37			1.4		72	72			47	S4UL
Ethylbenzene*	47	0.17	260	0.38	0.7	440		24000	24000	27 ⁽⁵¹⁸⁾	13, 000 ⁽¹²²⁰⁾	27, 000 ⁽²⁸⁴⁰⁾	S4UL
Phenol	280		550		1300	2300	760 ⁽¹¹⁰⁰⁰⁾	1500 ⁽³⁵⁰⁰⁰⁾	3200 ⁽³⁷⁰⁰⁰⁾	760 ⁽⁹¹⁰⁰⁰⁾	1500 ⁽³⁵⁰⁰⁰⁾	3200 ⁽³⁷⁰⁰⁰⁾	S4UL
*Toluene	130	290	660	880	1900	3900		56000	56000	56000 ⁽⁸⁶⁹⁾	110, 000 ⁽¹⁹²⁰⁾	180, 000 ⁽⁴³⁶⁰⁾	S4UL
*Xylene, o	60	140	330	88	210	480	41000	42000	43000	6600 ⁽⁴⁷⁸⁾	15000 ⁽¹¹²⁰⁾	33000 ⁽¹³⁵⁰⁾	S4UL
*Xylene, m	59	140	320	82	190	450	41000	42000	43000	6200 ⁽⁶²⁵⁾	14000 ⁽¹⁴⁷⁰⁾	31000 ⁽¹³⁵⁰⁾	S4UL
*Xylene, p	56	130	310	79	180	430	41000	42000	43000	5900 ⁽⁵⁷⁶⁾	14000 ⁽¹³⁵⁰⁾	30000 ⁽¹³⁵⁰⁾	S4UL
Benzo(a)pyrene*	2.20		3			3		5.7	5.7	35	35	36	S4UL
Dibenzo(a,h)anthracene*	0.24	0.28	0.3	0.3	0.3	0	0.57	0.57	0.58	4	4	4	S4UL
Acenaphthene*	210	510	1100	3000	4700	6000	15000	1500	1500	84, 000	97000	100, 000	S4UL
Acenaphthylene*	170	420	920	2900	4600	6000	15000	1500	1500	83, 000	97, 000	100000	S4UL
Anthracene*	2400	5400	11000	31000	35000	37000	74000	74000	74000	52, 000	54, 000	54, 000	S4UL
Benzo(a)anthracene*	7.2	11	13	14	15	15	29	29	29	170, 000	170, 000	180, 000	S4UL
Benzo(b)fluoranthene*	2.6	3.3	3.7	4	4	4	7.1	7.2	7.2	44	44	45	S4UL
Benzo(g,h,i)perylene	320	340	350	360	360	360	640	640	640	3900	4000	4000	S4UL
Benzo(k)fluoranthene*	77	93	100	110	110	110	190	190	190	1200	1200	1200	S4UL
Chrysene*	15	22	27	30	31	32	57	57	57	350	350	350	S4UL
Fluoranthene*	280	560	890	1500	1600	1600	3100	3100	3100	23000	23000	23000	S4UL
Fluorene*	170	400	860	2800	3800	4500	9900	9900	9900	63000 ^(30.9)	68, 000	71, 000	S4UL
Indeno(1,2,3-c,d)pyrene*	27	36	41	45	45	46	82	82	82	500	510	510	S4UL
Phenanthrene*	95	220	440	1300	1500	1500	3100	3100	3100	22, 000	22, 000	23, 000	S4UL
Pyrene*	620	1200	2000	3700	3800	3800	7400	7400	7400	54, 000	54K	54, 000	S4UL
Napthalene*	2.3	5.6	13	2	6	13	4900	4900	4900	190 ^(76.4)	1110 ⁽⁴³²⁾	190 ^(76.4)	S4UL
Aliphatic C5 - C6*	42	78	160	42	78	160	570 ⁽³⁰⁴⁾	590, 000	600, 000	3200 ⁽³⁰⁴⁾	5900 ⁽⁵⁵⁸⁾	12000 ⁽¹¹⁵⁰⁾	S4UL
Aliphatic C6 - C8	100	230	530	100	230	530	600, 000	610, 000	620, 000	7800 ⁽¹⁴⁴⁾	17000 ⁽²²²⁾	40K ⁽⁷³⁶⁾	S4UL
Aliphatic C8 - C10	27	65	450	27	65	150	13000	13000	13000	2000 ⁽⁷⁸⁾	4.8K ⁽¹⁹⁰⁾	11K ⁽⁵¹⁾	S4UL
Aliphatic C10 - C12	130 ⁽⁴⁸⁾	330 ⁽¹¹⁸⁾	760 ⁽²⁸³⁾	130 ⁽¹⁸⁾	330 ⁽¹¹⁸⁾	770 ⁽²⁸³⁾	13000	13000	13000	9700 ⁽⁴⁸⁾	47000 ⁽²⁸³⁾	90000 ⁽¹⁴²⁾	S4UL
Aliphatic C12 - C16	1100 ⁽²⁴⁾	2400 ⁽⁵⁹⁾	4300 ⁽¹⁴²⁾	1100 ⁽²⁴⁾	2400 ⁽⁵⁹⁾	4400 ⁽¹⁴²⁾	13000	13000	13000	59K ⁽²⁴⁾	160000	180000	S4UL
Aliphatic C16 - C35	65000 ^(8.48)	92, 000 ⁽²¹⁾	110000	65000 ^(8.48)	92000 ⁽²¹⁾	1100 ⁽²⁴⁾	250000	250, 000	250, 000	1600000	1700000	1800000	S4UL
Aliphatic C35 - C44	65000 ^(8.48)	92, 000 ⁽²¹⁾	110000	65000 ^(8.48)	92000 ⁽²¹⁾	110000	250, 000	250, 000	250, 000	1600000	1700000	1800000	S4UL
Aromatic C5 - C7 (benzene)	70	140	300	370	690	1400	56, 000	56, 000	56, 000	26000 ⁽¹²²⁰⁾	46000 ⁽²²⁶⁰⁰⁾	86000 ⁽⁴⁷¹⁰⁾	S4UL
Aromatic C7 - C8 (toluene)	130	290	660	860	1800	3900	56, 000	56, 000	56, 000	56000 ⁽⁸⁶⁹⁾	110000 ⁽¹⁹²⁰⁾	180000 ⁽⁴³⁶⁰⁾	S4UL
Aromatic C8 - C10	34	83	190	47	110	270	5000	5000	5000	8100 ⁽⁸¹³⁾	17000 ⁽¹⁵⁰⁰⁾	17000 ⁽³⁵⁸⁰⁾	S4UL
Aromatic C10 - C12	74	180	380	250	590	1200	5000	5000	5000	16000 ⁽³⁶⁴⁾	280000 ⁽⁸⁶⁹⁾	34000 ⁽²¹⁵⁰⁾	S4UL
Aromatic C12 - C16	140	330	660	1800	2300 ⁽⁴¹⁹⁾	2500	5100	5100	5000	36, 000 ⁽¹⁶⁹⁾	37, 000	38, 000	S4UL
Aromatic C16 - C21	260	540	930	1900	1900	1900	3800	3800	3800	28, 000	28, 000	28, 000	S4UL
Aromatic C21 - C35	1100	1500	1700	1900	1900	1900	3800	3800	3800	28, 000	28, 000	28, 000	S4UL
Aromatic C35 - C44	1100	1500	1700	1900	1900	1900	3800	3800	3800	28, 000	28, 000	28, 000	S4UL

Notes:
All figures are in mg/kg
LOM/CIEH/S4UL Adopted.
Soil type chosen is sandy loam, pH 7
All inorganic determinands calculated using 6% SOM
^(SOL) Solubility Saturation Limit
^(vap) Vapour Saturation Limit



UK Drinking Water Standards (UKDWS)		
Parameter	Concentration	Units
Acrylamide	0.1	µg/l
Aluminium	200	µgAl/l
Ammonium	0.5	mgNH ₄ /l
Antimony	5	µgSb/l
Arsenic	10	µgAs/l
Benzene	1	µg/l
Benzo(a)pyrene	0.01	µg/l
Boron	1	mgB/l
Bromate	10	µgBrO ₃ /l
Cadmium	5	µgCd/l
Chromium	50	µgCr/l
Chloride (i)	250	mgCl/l
Conductivity (i)	2500	µS/cm at 20°C
Copper(ii)	2	mgCu/l
Cyanide	50	µgCN/l
1, 2 dichloroethane	3	µg/l
Epichlorohydrin	0.1	µg/l
Fluoride	1.5	mgF/l
Hydrogen ion	6.5 - 9.5	pH value
Iron	200	µgFe/l
Lead (ii)	10	µgPb/l
Manganese	50	µgMn/l
Mercury	1	µgHg/l
Mineral Oil (TPH) (x)	10	µg/l
Nickel (ii)	20	µgNi/l
Nitrate (iii)	50	mgNO ₃ /l
Nitrite (iii)	0.5	mgNO ₂ /l
Phenol	0.5	µg/l
Polycyclic aromatic hydrocarbons (vii)	0.1	µg/l
Selenium	10	µgSe/l
Sodium	200	mgNa/l
Sulphate (i)	250	mgSO ₄ /l
Tetrachloroethene and Trichloroethene (viii)	10	µg/l
Tetrachloromethane	3	µg/l
Trihalomethanes: Total (ix)	100	µg/l
Vinyl chloride	0.5	µg/l
Zinc	5000	µg/l

Pesticides (iv, v)		
Aldrin	0.03	µg/l
Dieldrin	0.03	µg/l
Heptachlor	0.03	µg/l
Heptachlor epoxide	0.03	µg/l
other pesticides	0.1	µg/l
Pesticides: Total (vi)	0.5	µg/l

Notes:

i) The parametric value refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water. This is controlled by product specification.

ii) New level for Lead has been in force since 25/12/2013. See also regulation 6(6)

iii) See also regulation 4(2)(d)

iv) See the definition of "pesticides and related products" in regulation 2

v) The parametric value applies to each individual pesticide.

vi) "Pesticides: Total" means the sum of the concentrations of the individual pesticides detected and quantified in the monitoring procedure.

vii) The specified compounds are:

- benzo(b)fluoranthene

- benzo(k)fluoranthene

- benzo(ghi)perylene

- indeno(1,2,3-cd)pyrene.

viii) The parametric value applies to the sum of the concentrations of the individual compounds detected and quantified in the monitoring process.

The parametric value applies to the sum of the concentrations of the individual compounds detected and quantified in the monitoring process.

ix) The specified compounds are:

- chloroform

- bromoform

- dibromochloromethane

- bromodichloromethane.

The parametric value applies to the sum of the concentrations of the individual compounds detected and quantified in the monitoring process.

x) Revoked

References for UKDWS and EQS

Drinking Water Inspectorate Advice for consumers leaflet. DWS, Jan 2010
 Thames Water Drinking Water Standards. TW website, accessed May 2016
 Technical Guidance Manual for Licensing Discharges to Water. Annex G Environmental Quality Standards (EQS) List, Scottish Environmental Protection Agency, October 2004
 Hydrogeological Risk Assessment for Landfills, Appendix B: Selected Water Quality Standards, Environment Agency, 2003
 Petroleum Products in Drinking-water, Background document for development of WHO Guidelines for Drinking-water Quality, WHO (WHO/SDE/WSH/05.08/123)
 Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) (as amended)
 Water Supply (Water Quality) Regulations 2000 (SI 2000/3184) (as amended).
 Directive 2008/105/EC

Environmental Quality Standards (EQS) Groundwater Thresholds for List 1 & 2 Substances

Table 1: Environmental Quality Standards (EQS) for List 1 Dangerous Substances	
Substance	All Freshwater EQS (ug/l)
Mercury	1
Cadmium	5
Hexachlorocyclohexane	0.02
Carbon tetrachloride	12
Total DDT	0.025
pp DDT	0.01
Pentachlorophenol	0.4
Dieldrin	see total
Isodrin	see total
Aldrin	see total
Endrin	see total
Total 'Drins	0.01
Hexachlorobenzene	0.01
Hexachlorobutadiene	0.1
Chloroform	2.5
1,2-dichloroethane	10
Trichlorethylene	10
Perchlorethylene	10
Trichlorobenzene	0.4

Table 2a: Environmental Quality Standards (EQS) for List 2 Dangerous Substances					
Substance	EQS Type	All Freshwater EQS (ug/l)	Substance	EQS Type	All Freshwater EQS (ug/l)
1,1,1-Trichloroethane	Annual average	100	Fenitrothion	Annual average	0.01
1,1,2-Trichloroethane	Annual average	400	Flucifuron	95 percentile	1
2,4-D (ester)	Annual average	1	Iron (dissolved)	Annual average	1000
2,4-D (non-ester)	Annual average	40	Lead (dissolved)	Annual average	Hardness related (see table 2b for details)
2,4-Dichlorophenol	Annual average	20	Linuron	Annual average	2
2-Chlorophenol	Annual average	50	Malathion	Annual average	0.01
4-Chloro-3-methyl-phenol	Annual average	40	Mecoprop	Annual average	20
Arsenic (dissolved)	Annual average	50	Mevinphos	Maximum concentration	0.02
Atrazine & Simazine	Annual average	2	Naphthalene	Annual average	10
Azinphos-methyl	Annual average	0.01	Nickel (dissolved)	Annual average	Hardness related (see table 2b for details)
Bentazone	Annual average	500	Omethoate	Annual average	0.01
Benzene	Annual average	10	PCSDs	95th percentile	0.05
Biphenyl	Annual average	25	Permethrin	95th percentile	0.01
Boron (dissolved)	Annual average	2000	pH	95th percentile	6 - 9
Chloronitroloenes	Annual average	10	Sulcofuron	95th percentile	25
Chromium (dissolved)	Annual average	Hardness related (see table 2b for details)	Toluene	Annual average	50
Copper (dissolved)	Annual average	Hardness related (see table 2b for details)	Triazaphos	Annual average	0.005
Cyfluthrin	95th percentile	0.001	Tributyltin	Maximum concentration	0.02
Demeton	Annual average	0.5	Trifluralin	Annual average	0.1
Dichlorvos	Annual average	0.001	Triphenyltin	Maximum concentration	0.02
Dichlorvos	Maximum concentration	-	Vanadium (dissolved)	Annual average	Hardness related (see table 2b for details)
Dimethoate	Annual average	1	Xylene (m and p, o)	Annual average	30
Endosulphan	Annual average	0.003	Zinc (total)	Annual average	Hardness related (see table 2b for details)
Ammonia (as NH3)		15			

Table 2b: Environmental Quality Standards (EQS) for hardness related List 2 dangerous substances

Substance	EQS type	EQS (ug/l) for Hardness bands (mg/l CaCO3)					
		0-50	>50-100	>100-150	>150-200	>200-250	>250
Freshwaters, suitable for all fishlife							
Copper (dissolved)	Annual average	0.5	3	3	3	8	12
Nickel (dissolved)	Annual average	8	20	20	40	40	40
Vanadium (dissolved)	Annual average	20	20	20	20	60	60
Chromium (dissolved)	Annual average	2	10	10	20	20	20
Lead (dissolved)	Annual average	4	10	10	20	20	20
Zinc (total)	Annual average	8	15	15	50	50	50

TPHCWG WATER VALUES

<u>TPHCWG Fraction</u>	<u>Assessment Value (µg/l)</u>	
Aliphatic > C5 – C6	15,000	
Aliphatic > C6 – C8	15,000	
Aliphatic > C8 – C10	300	
Aliphatic > C10 – C12	300	
Aliphatic > C12 – C16	300	
Aliphatic > C16 – C21	300	
Aliphatic > C21 – C34	300	
Aromatic > C5 - C7 *	10	Assumed to be 100% Benzene
Aromatic > C7 - C8	700	Assumed to be 100% Toluene
Aromatic > C8 - C10	300 / 500	Assumed to be either: Ethylbenzene (300) or Xylenes (500)
Aromatic > C10 – C12	90	
Aromatic > C12 – C16	90	
Aromatic > C16 – C21	90	
Aromatic > C21 – C25	90	

Contaminant Thresholds for Subsurface Water Pipes

Contaminant	Material selection Threshold Level (mg/kg dried soil)
Corrosion	
Sulphate (SO ₄)	2000
Sulphur (S)	5000
Sulphide (S)	250
pH	<pH5, >pH8
Toxic Substances	
Antimony (Sb)	10
Arsenic (As)	10*
Cadmium (Cd)	3
Chromium (hexavalent) (Cr)	25
Chromium (total)	600
Cyanide (free) (Cn)	25*
Cyanide (complexed) (Cn)	250*
Lead (Pb)	500
Mercury (Hg)	1
Selenium (Se)	3
Thiocyanate (SCN)	50
Organic Contaminants	
Coal Tar	50
Cyclohexane extractable	50
Phenol	5
Poly Aromatic Hydrocarbons	50
Toluene extractable	50
TPH DRO (diesel, kerosene)	100
Petrol	10
Mineral oils	1000

* It is not recommended that water pipes should be laid in sites where these substances are identified or suspected

Ref: Water Regulations Advisory Scheme (WRAS) (No. 9-04-03 Issue 1)