Site Analytical Services Ltd.

Site Investigations, Analytical & Environmental Chemists, Laboratory Testing Services.

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F. J. Gibbs, F.I.B.M.S. F.I.F.S.T., F.R.S.H. K. J. Blanchette

Your Ref: O/No. AWAITED
ADAM

Our Ref: 17/27492
JSW/KLB

SAMPLE OF 'TOPSOIL'
EX: NORTH CRAY ROAD, SIDCUP, KENT

SUBMITTED BY STUARTS TOPSOIL

RECEIVED ON 26th OCTOBER 2017

INTRODUCTION

A sample of the above material was received into the laboratory for analysis to assess the following characteristics in accordance with B.S. 3882 : 2007.

a) Nutrient Status, pH Value and Electrical Conductivity

b) Stone Content and Textural Classification

c) Visible Contaminants

d) Contamination Assessment

RESULTS

The results obtained are contained in the Appendix to this report.

Ref: 17/27492

COMMENTS

The exceptions to B.S. 3882:2015, Table 1 for Multipurpose topsoil, Low Fertility topsoil, Acidic topsoil and Calcareous topsoil are indicated on the table contained in i2 Analytical Limited Report No. 17-65541, contained in the Appendix to this report.

Concentrations of the zootoxic heavy metals Total Arsenic, Total Mercury, Total Boron, Total Cadmium, Hexavalent Chromium, Trivalent Chromium, Total Selenium, Total Copper, Total Nickel and Total Zinc in the sample analysed did not exceed the S4UL Generic Guideline Values for a residential scenario with home-grown produce. The concentration of Total Lead encountered did not exceed the Category 4 Screening Level for residential use with home-grown produce of 200mg/kg.

The concentration of Total Cyanide was below the screening value of 20mg/kg and the concentration of Total Phenol was below the S4UL Generic Guideline Value for a residential scenario with home-grown produce.

Elevated concentrations of Polycyclic Aromatic Hydrocarbons including Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(a,h)anthracene were encountered in the sample, in excess of the respective S4UL Generic Guideline Values for a residential scenario with home-grown produce.

The concentrations of Petroleum Hydrocarbons encountered within individual Aromatic and Aliphatic carbon band ranges in the sample analysed did not exceed the S4UL Generic Guideline Values for a residential scenario with home-grown produce.

The concentrations of Benzene Toluene, Ethylbenzene and Xylenes encountered did not exceed the S4UL Screening Levels for residential use with home grown produce. There was no MTBE detected within the sample analysed.

The concentrations of the phytotoxic substances Total Copper, Total Zinc and Boron encountered in the sample were below the CIEH Generic screening values for residential use.

Asbestos was not detected in the sample submitted.

The above conclusions have been drawn on the results of the tests carried out on the sample submitted and address remediation issues for the protection of the end-user only. The comments made in this report do not address any third party liability.

p.p. SITE ANALYTICAL SERVICES LIMITED

7th November 2017

Aubrey Davidson BSc MSc DIC
Environmental Engineer

APPENDIX

Laboratory Test Data

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Analytical Report Number : 17-65538

Project / Site name:	North Cray Road	**Samples received on:**	27/10/2017
Your job number:	17-27492	**Samples instructed on:**	27/10/2017
Your order number:	1526	**Analysis completed by:**	07/11/2017
Report Issue Number:	1	**Report issued on:**	07/11/2017
Samples Analysed:	1 soil sample		

Signed:

Vineetha Meethale Vettil
Senior Account Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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

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Analytical Report Number: 17-65538

Project / Site name: North Cray Road
Your Order No: 1526

Lab Sample Number				845659				
Sample Reference				1				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				27/10/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Moisture Content	%	N/A	NONE	8.3				
Total mass of sample received	kg	0.001	NONE	2.0				
Whole Sample Crushed		N/A	NONE	Crushed				
Asbestos In Soil Screen	Type	N/A	ISO 17025	Not-detected				
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.4				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Complex Cyanide	mg/kg	1	MCERTS	< 1				
Free Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO_4	mg/kg	50	MCERTS	560				
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.050				
Sulphide	mg/kg	1	MCERTS	< 1.0				
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.3				
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.26				
Acenaphthylene	mg/kg	0.05	MCERTS	0.74				
Acenaphthene	mg/kg	0.05	MCERTS	0.61				
Fluorene	mg/kg	0.05	MCERTS	0.70				
Phenanthrene	mg/kg	0.05	MCERTS	7.3				
Anthracene	mg/kg	0.05	MCERTS	2.2				
Fluoranthene	mg/kg	0.05	MCERTS	18				
Pyrene	mg/kg	0.05	MCERTS	16				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	7.8				
Chrysene	mg/kg	0.05	MCERTS	6.4				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	8.2				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.8				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	7.4				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	4.1				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.95				
Benzo(ghl)perylene	mg/kg	0.05	MCERTS	4.1				
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	88.1				
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.84				
Boron (total)	mg/kg	1	MCERTS	11				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	24				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	29				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	69				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	40				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120				

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Analytical Report Number: 17-65538

Project / Site name: North Cray Road
Your Order No: 1526

Lab Sample Number				845659				
Sample Reference				1				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				27/10/2017				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	ug/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.2				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.3				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	100				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	200				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	310				

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Analytical Report Number : 17-65538

Project / Site name: North Cray Road

* 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 topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
845659	1	None Supplied	None Supplied	Brown loam and sand with gravel and vegetation.

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Analytical Report Number : 17-65538

Project / Site name: North Cray Road

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Complex Cyanide in soil	Determination of complex cyanide by calculation.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Crush Whole Sample	Either: Client specific preparation instructions - sample(s) crushed whole prior to analysis; OR Sample unsuitable for standard preparation and therefore crushed whole prior to analysis.	In house method, applicable to dry samples only.	L019-UK	D	NONE
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
Free cyanide in soil	Determination of free 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
Hexavalent chromium in soil	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	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	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
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
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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS

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Analytical Report Number : 17-65538

Project / Site name: North Cray Road

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total sulphate (as SO4 In soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L088/76-PL	W	MCERTS

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.

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Analytical Report Number : 17-65541

Project / Site name:	North Cray Road	**Samples received on:**	27/10/2017
Your job number:	17-27492	**Samples instructed on:**	27/10/2017
Your order number:	1526	**Analysis completed by:**	07/11/2017
Report Issue Number:	1	**Report issued on:**	07/11/2017
Samples Analysed:	1 soil sample		

Signed:

Rexona Rahman
Customer Services Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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Certificate of Analysis

BS 3882:2015 Specification For Topsoil

	Pass BS 3882		client
Report No:	**17-65541**		**Site Analytical Services Ltd**
Location	North Cray Road		Units 14 -15 River Road Business Park 33 River Road Barking Essex IG11 0EA
Lab Reference (Sample Number)	845663		
Sampling Date	27/10/2017		
Sample ID	1		
Depth (m)	**0.00**		**Compliant with range (Y/N)**

		unit	Result	Multi-P	Acid	Calc	Low-F	Low-F(a)	Low-F(c)
Soil texture	<2mm fraction	%w/w	SANDY LOAM	Y	Y	Y	Y	Y	Y
Maximum coarse fragment content:	>2mm	%w/w	4.60	Y	Y	Y	Y	Y	Y
	>20mm	%w/w	0.00	Y	Y	Y	Y	Y	Y
	>50mm	%w/w	0.00	Y	Y	Y	Y	Y	Y
Mass loss on ignition		%	6.60						
	Clay 5-20%		Y	Y	Y	Y	Y	Y	Y
	Clay 20-35%		-	-	-	-	-	-	-
Soil pH:		pH	7.40	Y	N	N	Y	N	N
Carbonate:		%w/w	6.80	-	-	Y	-	-	Y
Available plant nutrients	Nitrogen	%w/w	0.29	Y	Y	Y	-	-	-
	Extractable Phosphate (as P)	mg/l	28.00	Y	Y	Y	N	N	N
	Extractable Potassium	mg/l	607.00	Y	Y	Y	-	-	-
	Extractable Magnesium	mg/l	150.00	Y	Y	Y	-	-	-
Carbon: Nitrogen Ratio:		:1	14.00	Y	Y	Y	Y	Y	Y
Conductivity		us/cm	2200.00	Y	-	-	-	-	-
Phytotoxic contaminants:	** Total Zinc	mg/kg	120.00	Y	Y	Y	Y	Y	Y
	** Total Copper	mg/kg	25.00	Y	Y	Y	Y	Y	Y
	** Total Nickel	mg/kg	18.00	Y	Y	Y	Y	Y	Y
Visible contaminants:	>2mm	%w/w	0.00	Y	Y	Y	Y	Y	Y
	Plastics	%w/w	0.00	Y	Y	Y	Y	Y	Y
	Sharps	no. in 1 kg	0.00	Y	Y	Y	Y	Y	Y
Compliancy:				Pass	Fail	Fail	Fail	Fail	Fail

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and I2 cannot be held responsible for any discrepencies with current legislation

** = MCERTS accrediited

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Project / Site name: North Cray Road

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Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
845663	1	None Supplied	None Supplied	Brown loam and sand with gravel and vegetation.

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Analytical Report Number : 17-65541

Project / Site name: North Cray Road

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Carbon to Nitrogen Ratio (Topsoil - BS3882:2015)	Carbon to Nitrogen ratio (:1) calculated using Loss on Ignition.	BS3882:2015	L01TS2015	W	NONE
Carbonate (Topsoil - BS3882)	Determination of Carbonate as per BS 3882:2015.	BS3882:2015	L01TS2015	D	NONE
Coarse Fragment and Contaminant Analysis	Determination of >2mm contaminants	BS3882:2007 & BS8601:2013 & PAS 100:2005	L01TS	D	NONE
Conductivity (BS3882/BS8601)	Determination of the conductivity of soil in accordance with BS 3882:2007 methodology	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Extractable/Available Metals (BS3882/BS8601)	Determiation of the extractable metals in soil, in accordance with BS3882:2007 methodology.	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Kjeldahl nitrogen in soil	Determination of total nitrogen using the Kjeldahl-digestion method and colorimetric determination.	In house method based on BS 7755-3.7:1995 &	L087-PL	D	NONE
Mass loss on ignition (Topsoil - BS3882)	Determination of Loss on Ignition as per BS 3882:2015.	BS3882:2015	L01TS2015	D	NONE
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
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Nitrogen (TKN)	Determination of total nitrogen by Kjeldahl method.	BS3882:2007	L087-PL	D	NONE
pH (BS3882/BS8601)	Determination of the pH of soil in accordance with BS 3882:2007 methodology	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Phosphorus as PO4 (BS3882/BS8601)	Determiation of the extractable phosphorus in soil, in accordance with BS3882:2007 methodology.	BS3882:2015 & BS8601:2013	L01TS	D	NONE
Sodium (exchangeable %)	Determination of exchangeable sodium (%) by calculation, in accordance with BS3882:2007 methodology.	BS3882:2007	L087-PL	D	NONE
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
Textural Classification (BS3882/BS8601)	Determination of the textural classifcation of soil following BS3882:2007 methodology.	BS3882:2007 & BS8601:2013	L01TS	D	NONE
Textural Classification Diagram	Textural classification Diagram	BS3882:2015		D	NONE

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.
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17-65541

Soil Texture Triangle 845663

