



Appendix E8

Landscaping – Dandy’s Soil Source Testing

Soils Sampling Record		SHEET NO. 1 of 2	
Project: North Wales Prison		Date of Visit: 20/01/2017	
Contract No.: C14656		Weather Conditions: Dry, cold, windy	
Client: Lend Lease		Site Manager: Wayne Dand	
Work Carried Out By: Terry Wraxton		Also present onsite: Not known	
Stockpile Number: Not applicable		Photographs Taken: Yes / No	
Dimensions: c. 5m w x 5m l x 2m h		Volume: c. 25m ³ (total)	
Stockpile Location:			
			
Samples Collected (Sample Refs): DTS/SS1/01 - DTS/SS1/04			
Suitability Of Use: The testing results (attached) indicate that the soils are chemically suitable for use as topsoil at the NWP site.			
Additional Notes: Potential supply of topsoil sampled at source: Dandy's Topsoil, Yew Tree Farm, Sealand Road, Chester, CH1 6BS. Note that the soils were sampled prior to screening and grading. However, no man-made materials were noted during the sampling.			

Stockpile Sampling Record	SHEET NO. 2 of 2
	
Soil stockpile, Dandy's Topsoil.	Soil stockpile, Dandy's Topsoil.
	
Soil stockpile, Dandy's Topsoil.	

Annex A

Chemical Testing Certificates

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Analytical Report Number : 17-37915

Project / Site name:	Wrexham Prison	Samples received on:	23/01/2017
Your job number:	C14656	Samples instructed on:	23/01/2017
Your order number:	POP003709	Analysis completed by:	27/01/2017
Report Issue Number:	1	Report issued on:	27/01/2017
Samples Analysed:	2 soil samples		

Signed:

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

Signed:

Emma Winter
Assistant Reporting Manager
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

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Analytical Report Number: 17-37915

Project / Site name: Wrexham Prison

Your Order No: POP003709

Lab Sample Number				689184	689185			
Sample Reference				DTS/SS1/01	DTS/SS1/02			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				20/01/2017	20/01/2017			
Time Taken				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	%	N/A	NONE	17	16			
Total mass of sample received	kg	0.001	NONE	0.45	0.43			

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	8.1			
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.084	0.11			
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	0.014	0.013			

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluoranthene	mg/kg	0.1	MCERTS	0.47	0.40			
Pyrene	mg/kg	0.1	MCERTS	0.44	0.42			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	0.26	0.23			
Chrysene	mg/kg	0.05	MCERTS	0.30	0.22			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.28	0.26			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	0.19	0.21			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.30	0.30			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	2.24	2.04			
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.9	6.3			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.34	0.34			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	1.0			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2			
Chromium (III)	mg/kg	1	NONE	13	13			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	13			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	21	27			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	57	60			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	0.6			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	12			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	15	16			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	64	72			

Analytical Report Number: 17-37915

Project / Site name: Wrexham Prison

Your Order No: POP003709

Lab Sample Number				689184	689185			
Sample Reference				DTS/SS1/01	DTS/SS1/02			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				20/01/2017	20/01/2017			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0			
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	ISO 17025	< 10	< 10			
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4			

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	11	< 10			
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4			



Analytical Report Number : 17-37915

Project / Site name: Wrexham Prison

* 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.

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 *
689184	DTS/SS1/01	None Supplied	None Supplied	Brown loam and sand with gravel and vegetation.
689185	DTS/SS1/02	None Supplied	None Supplied	Brown loam and sand with gravel and vegetation.

Analytical Report Number : 17-37915

Project / Site name: Wrexham Prison

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

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
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
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
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon 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	L023-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 (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	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 3, 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
TPH Chromatogram	TPH Chromatogram.	In-house method	L064-PL	D	NONE
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding.	L076-PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

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The results included within the report are representative of the samples submitted for analysis.

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Project / Site name: Wrexham Prison

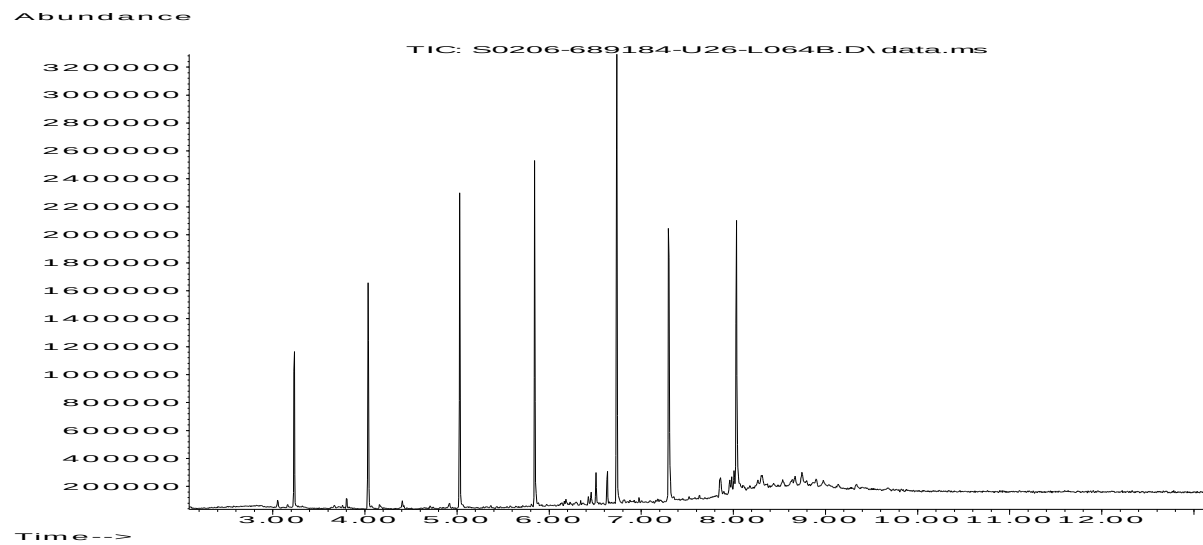
Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

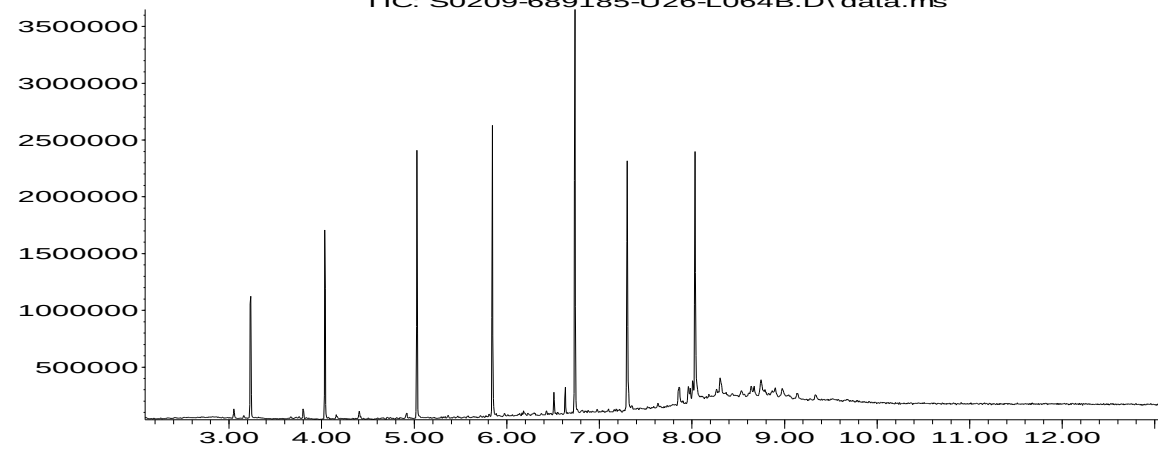
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Abundance

TIC: S0209-689185-U26-L064B.D\data.ms



Time-->

Annex B

Soil Import Criteria



If constant sources are used for the Topsoil and Subsoil and the results recorded are consistently low, consideration may be given to reducing the number of samples tested.

Analysis should be carried out for the following general suite of contaminants:

- As, B (water soluble), Be, Cd, Cr (total), Cr(VI), Cu, Hg, Ni, Pb, S (elemental), Se, V, Zn, cyanide (total), sulfide, pH, asbestos fibres, speciated polycyclic aromatic hydrocarbons (PAH, by GC-FID), total phenols, total TPH and fraction of organic carbon.
- If high total cyanide is detected, this will be re-analysed for “free” and “complex” species if appropriate.

6.6 Import Criteria

The results of chemical testing are to be compared with the site import criteria presented in Table 6.1.

If any of these thresholds are exceeded the material and data shall be reviewed to assess its suitability for use, depending on the proposals / intended use, using these comparison values (CV).

Table 6.1: Import Criteria

Chemical of Concern	Proposed CV mg/kg		Chemical of Concern	Proposed CV mg/kg
Arsenic	32		Acenaphthene	280
Beryllium	51		Acenaphthylene	170
Boron	290		Anthracene	2300
Cadmium	11		Benz(a)anthracene	3.1
Chromium (III)	630		Benzo(a)pyrene	0.83
Chromium (VI)	4.3		Benzo(b)fluoranthene	5.6
Copper	2300		Benzo(ghi)perylene	44
Lead	200		Benzo(k)fluoranthene	8.5
Mercury, inorganic	170		Chrysene	6
Nickel	130		Dibenz(a,h)anthracene	0.76
Selenium	350		Fluoranthene	260
Vanadium	74		Fluorene	160
Zinc	3,700		Indeno(1,2,3,cd)pyrene	3.2
Cyanide (free)	750		Naphthalene	1.5
Phenol (total)	180		Phenanthrene	92
Total TPH	50		Pyrene	560
Asbestos	Nil		Total PAH	50