

12421/RH

7th August 2020

NHBC Building Control Services
NHBC House
Davy Avenue
Knowlhill
Milton Keynes
MK5 8FP

For the attention of Ms Emma Jones

Dear Sirs,

**Former Merthyr Vale Colliery, Golwg Yr Afon, Merthyr Vale, Merthyr Tydfil, CF48 4ST
NHBC Job Ref: 211366: Plot 48 to 60 and 73.**

We write on behalf of our client Lovell Partnerships (South Wales) with regard to the above site and the most recent NHBC Engineering Schedule of Outstanding Conditions:

LQ Conditions Condition 2 and 3

Plots 48 to 60 and 73 have recently been inspected on the 28th August 2020 in accordance with the remediation strategy for the site and found to have the required total of 600mm of clean cover soils placed over a geotextile membrane in garden areas, see attached photographs.

Photographs of capping depth in Appendix A.

Samples of the 'as placed' topsoil and subsoil soil materials in the above garden area of plot 50/51, 54, 60 and 73 have been sampled and sent to the accredited laboratories of i2 Analytical for chemical analysis. The results are now available and attached with this report all contaminants of concern have been found to be below all threshold limits.

This report therefore confirms that the garden capping soils that have been inspected and tested are deemed suitable for their intended end use with respect to the protection of human health.

Chemical soil test reports attached in Appendix B.

The results of the topsoil and subsoils sampled from within plots above have been summarised and compared to the appropriate screening criteria for a residential end use. The results have been compared to appropriate Category 4 Screening Levels (C4SL) in the first instance. In their absence, the results will have been compared to the Suitable 4 Use Levels (S4ULs) derived by LQM, Soil Guideline Values (SGVs) and Soil Screening Values (SSVs) derived by Atkins ATRISKsoil for residential with the consumption of home grown produce end use, to assess the potential risk to human health.

Summary of chemical testing results attached in Appendix C.

We trust that the above is to your satisfaction. However, if you have any queries or require any further information, please do not hesitate to contact us.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'R. Hawkins', with a long horizontal flourish extending to the right.

Roger Hawkins

For

Intégral Géotechnique (Wales) Limited

c.c. James Poole Lovell Partnerships Limited (South Wales)

Encs.

APPENDIX A

TRIAL PIT VALIDATION PHOTOGRAPHS



Plot 50/51 Showing Capping Depth



Plot 50/51 Excavation Trial Pit

Garden Capping Validation.

Plot 50/51

Intégral
Géotechnique

Integral House
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 20807991
Fax: 029 20862176



Plot 50-51 Showing Membrane Placement



Plot 50-51 Infilled Rear Garden

Garden Capping Validation.

Plot 50-51

Intégral
Géotechnique

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Plot 54 Showing Capping Depth



Plot 54 Excavation Trial Pit

Garden Capping Validation.

Plot 54

Intégral
Géotechnique

Integral House
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CF83 2AX
Tel: 029 20807991
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Plot 54 Showing Membrane At Base



Plot 58 Infilled Rear Garden

Garden Capping Validation.

Plot 54/58

Intégral
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Caerphilly
CF83 2AX
Tel: 029 20807991
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Plot 60 Showing Capping Depth Check



Plot 60 Excavation Trial pit Membrane Present (Water Ingress)

Garden Capping Validation.

Plot 60

Intégral
Géotechnique

Integral House
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 20807991
Fax: 029 20862176



Plot 73 Showing Capping Depth



Plot 73 Excavation Trial Pit Membrane Present (Water Ingress)

Garden Capping Validation.

Plot 73

Intégral
Géotechnique

Integral House
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 20807991
Fax: 029 20862176

APPENDIX B

LABORATORY CHEMICAL TEST RESULTS

**Roger Hawkins**

Integral Geotechnique
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CF83 2AX

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i2 Analytical Ltd.
7 Woodshots Meadow,
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Analytical Report Number : 20-22348

Project / Site name:	Riverside Merthyr	Samples received on:	30/07/2020
Your job number:	12421	Sample instructed/ Analysis started on:	30/07/2020
Your order number:		Analysis completed by:	07/08/2020
Report Issue Number:	1	Report issued on:	07/08/2020
Samples Analysed:	8 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 20-22348-1 Riverside Merthyr 12421

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report relate only to the sample(s) submitted for testing.

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Analytical Report Number: 20-22348
Project / Site name: Riverside Merthyr

Lab Sample Number				1579029	1579030	1579031	1579032	1579033
Sample Reference				Plot 54 Topsoil	Plot 54 Subsoil	Plot 50/51 Topsoil	Plot 50/51 Subsoil	Plot 60 Topsoil
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.40	0.10	0.40	0.10
Date Sampled				28/07/2020	28/07/2020	28/07/2020	28/07/2020	28/07/2020
Time Taken				1235	1245	1305	1315	1325
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	23	25	22	24	24
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40

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

pH - Automated	pH Units	N/A	MCERTS	6.5	7.5	7.8	7.8	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	770	720	690	730	640
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.073	0.066	0.080	0.077	0.062
Sulphide	mg/kg	1	MCERTS	1.7	1.2	5.5	2.6	< 1.0
Total Sulphur	mg/kg	50	MCERTS	630	610	650	620	580
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.3	3.1	2.8	2.9	3.3
Loss on Ignition @ 450°C	%	0.2	MCERTS	8.5	8.3	7.9	8.3	8.6

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.35	0.38	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.10	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.31	0.39	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.23	0.29	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.22	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.24	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.25	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.15	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	0.89	2.02	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	16	14	15	16
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.0	1.1	1.0	1.0	1.2
Boron (water soluble)	mg/kg	0.2	MCERTS	2.3	2.4	2.0	1.6	3.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	0.7	0.6	0.6	0.7
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	37	33	34	38
Copper (aqua regia extractable)	mg/kg	1	MCERTS	30	32	32	31	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	32	33	37	33	34
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	28	26	28	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	46	47	41	43	48
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	99	96	85	92	95

Analytical Report Number: 20-22348

Project / Site name: Riverside Merthyr

Lab Sample Number				1579029	1579030	1579031	1579032	1579033
Sample Reference				Plot 54 Topsoil	Plot 54 Subsoil	Plot 50/51 Topsoil	Plot 50/51 Subsoil	Plot 60 Topsoil
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.10	0.40	0.10	0.40	0.10
Date Sampled				28/07/2020	28/07/2020	28/07/2020	28/07/2020	28/07/2020
Time Taken				1235	1245	1305	1315	1325
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	14	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	29	< 10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	42	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	42	< 10

TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	< 10	42	< 10
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Analytical Report Number: 20-22348

Project / Site name: Riverside Merthyr

Lab Sample Number				1579034	1579035	1579036		
Sample Reference				Plot 60 Subsoil	Plot 73 Topsoil	Plot 73 Subsoil		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.40	0.10	0.40		
Date Sampled				28/07/2020	28/07/2020	28/07/2020		
Time Taken				1335	1355	1405		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	22	27	24		
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40		

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

pH - Automated	pH Units	N/A	MCERTS	7.8	7.5	7.6		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Total Sulphate as SO ₄	mg/kg	50	MCERTS	720	660	690		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.055	0.035	0.038		
Sulphide	mg/kg	1	MCERTS	1.2	< 1.0	3.5		
Total Sulphur	mg/kg	50	MCERTS	610	580	590		
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.3	3.3	3.4		
Loss on Ignition @ 450°C	%	0.2	MCERTS	8.2	8.4	9.0		

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	0.82		
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	17	17		
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.2	1.2		
Boron (water soluble)	mg/kg	0.2	MCERTS	2.3	2.4	3.3		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	0.8	0.7		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	38	42	42		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	34	36	33		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	34	38	38		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28	31	30		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	47	54	53		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	95	110	100		

Analytical Report Number: 20-22348

Project / Site name: Riverside Merthyr

Lab Sample Number				1579034	1579035	1579036		
Sample Reference				Plot 60 Subsoil	Plot 73 Topsoil	Plot 73 Subsoil		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				0.40	0.10	0.40		
Date Sampled				28/07/2020	28/07/2020	28/07/2020		
Time Taken				1335	1355	1405		
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10		

TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	< 10		
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Analytical Report Number : 20-22348

Project / Site name: Riverside Merthyr

* 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 *
1579029	Plot 54 Topsoil	None Supplied	0.10	Brown clay and loam with vegetation and gravel
1579030	Plot 54 Subsoil	None Supplied	0.40	Brown clay and loam with vegetation and gravel
1579031	Plot 50/51 Topsoil	None Supplied	0.10	Brown clay and loam with vegetation.
1579032	Plot 50/51 Subsoil	None Supplied	0.40	Brown clay and loam with vegetation and gravel
1579033	Plot 60 Topsoil	None Supplied	0.10	Brown clay and loam with vegetation and gravel
1579034	Plot 60 Subsoil	None Supplied	0.40	Brown clay and loam with vegetation and gravel
1579035	Plot 73 Topsoil	None Supplied	0.10	Brown clay and loam with vegetation and gravel
1579036	Plot 73 Subsoil	None Supplied	0.40	Brown clay and loam with vegetation and gravel

Analytical Report Number : 20-22348

Project / Site name: Riverside Merthyr

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
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 dphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	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. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
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
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.	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.	L009-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

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The results included within the report relate only to the sample(s) submitted for testing.

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Analytical Report Number : 20-22348

Project / Site name: Riverside Merthyr

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
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

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.

APPENDIX C

SUMMARY OF CHEMICAL RESULTS – SOILS

SUMMARY OF LABORATORY SOIL TEST RESULTS

METALS AND SEMI-METALS

Job No.: 12421
 Site: Riverside, Merthyr Vale
 Soil Type: Topsoil/subsoil
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Arsenic (mg/kg)	Boron (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Chromium (VI) (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (Elemental) (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
33	Plot 54 Topsoil	0.10	15	2.3	1.0	0.6	35	< 4.0	30	32	< 0.3	26	< 1.0	46	99
34	Plot 54 Subsoil	0.40	16	2.4	1.1	0.7	37	< 4.0	32	33	< 0.3	28	< 1.0	47	96
35	Plot 50/51 Topsoil	0.10	14	2.0	1.0	0.6	33	< 4.0	32	37	< 0.3	26	< 1.0	41	85
36	Plot 50/51 Subsoil	0.40	15	1.6	1.0	0.6	34	< 4.0	31	33	< 0.3	28	< 1.0	43	92
37	Plot 60 Topsoil	0.10	16	3.3	1.2	0.7	38	< 4.0	32	34	< 0.3	29	< 1.0	48	95
38	Plot 60 Subsoil	0.40	16	2.3	1.1	0.7	38	< 4.0	34	34	< 0.3	28	< 1.0	47	95
39	Plot 73 Topsoil	0.10	17	2.4	1.2	0.8	42	< 4.0	36	38	< 0.3	31	< 1.0	54	110
40	Plot 73 Subsoil	0.40	17	3.3	1.2	0.7	42	< 4.0	33	38	< 0.3	30	< 1.0	53	100
Screening Criteria Value			37.0	290.0	1.7	22.0	-	21.0	2400.0	200.0	1.2	130.0	250.0	410.0	3700.0
Source of Screening Criteria Value			C4SL	S4UL	S4UL	C4SL	-	C4SL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

INORGANIC CHEMICALS & OTHERS

Job No.: 12421
 Site: Riverside, Merthyr Vale
 Soil Type: Topsoil/subsoil
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Cyanide (mg/kg)	Loss on ignition, dried solids (%)	Moisture content at 30 C (%)	Phenol (mg/kg)	pH (pH units)	Water Soluble Sulphate (g/l)	Sulphate Total as SO4 (mg/kg)	Sulphide (mg/kg)	Total Sulphur (mg/kg)	TOC by Ignition in O2 (%)	Equivalent SOM (%)	Asbestos in Soil	Asbestos Quantification (%)
33	Plot 54 Topsoil	0.10	< 1	8.5	23	< 1.0	6.5	0.073	770	1.7	630	3.3	5.68	Not-detected	#N/A
34	Plot 54 Subsoil	0.40	< 1	8.3	25	< 1.0	7.5	0.066	720	1.2	610	3.1	5.33	Not-detected	#N/A
35	Plot 50/51 Topsoil	0.10	< 1	7.9	22	< 1.0	7.8	0.080	690	5.5	650	2.8	4.82	Not-detected	#N/A
36	Plot 50/51 Subsoil	0.40	< 1	8.3	24	< 1.0	7.8	0.077	730	2.6	620	2.9	4.99	Not-detected	#N/A
37	Plot 60 Topsoil	0.10	< 1	8.6	24	< 1.0	7.7	0.062	640	< 1.0	580	3.3	5.68	Not-detected	#N/A
38	Plot 60 Subsoil	0.40	< 1	8.2	22	< 1.0	7.8	0.055	720	1.2	610	3.3	5.68	Not-detected	#N/A
39	Plot 73 Topsoil	0.10	< 1	8.4	27	< 1.0	7.5	0.035	660	< 1.0	580	3.3	5.68	Not-detected	#N/A
40	Plot 73 Subsoil	0.40	< 1	9.0	24	< 1.0	7.6	0.038	690	3.5	590	3.4	5.65	Not-detected	#N/A
Screening Criteria Value			34.0	-	-	280.0	-	-	-	-	-	-	-	-	0.001
Source of Screening Criteria Value			ATRISK	-	-	S4UL	-	-	-	-	-	-	-	-	IOM

SUMMARY OF LABORATORY SOIL TEST RESULTS

POLYAROMATIC HYDROCARBONS (PAH)

Job No.: 12421
 Site: Riverside, Merthyr Vale
 Soil Type: Topsoil/subsoil
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)anthracene (mg/kg)	Benzo(a)pyrene (mg/kg)	Benzo(b)fluoranthene (mg/kg)	Benzo(ghi)perylene (mg/kg)	Benzo(k)fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenzo(ah)anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(123cd)pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
33	Plot 54 Topsoil	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
34	Plot 54 Subsoil	0.40	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
35	Plot 50/51 Topsoil	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.31	< 0.05	< 0.05	< 0.05	0.35	0.23
36	Plot 50/51 Subsoil	0.40	< 0.05	< 0.05	0.10	0.22	< 0.05	0.25	< 0.05	0.15	0.24	< 0.05	0.39	< 0.05	< 0.05	< 0.05	0.38	0.29
37	Plot 60 Topsoil	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
38	Plot 60 Subsoil	0.40	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
39	Plot 73 Topsoil	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
40	Plot 73 Subsoil	0.40	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.28	< 0.05	< 0.05	< 0.05	0.28	0.26
Screening Criteria Value			210.0	170.0	2400.0	7.2	5.0	2.6	320.0	77.0	15.0	0.2	280.0	170.0	27.0	2.3	95.0	620.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL

SUMMARY OF LABORATORY SOIL TEST RESULTS

PETROLEUM HYDROCARBONS

Job No.: 12421
 Site: Riverside, Merthyr Vale
 Soil Type: Topsoil/subsoil
 Soil Organic Matter: 1%

No.	Location	Depth (m)	Aliphatic C5-C6 (mg/kg)	Aliphatic C6-C8 (mg/kg)	Aliphatic C8-C10 (mg/kg)	Aliphatic C10- C12 EPH (mg/kg)	Aliphatic C12- C16 EPH (mg/kg)	Aliphatic C16-C35 EPH (mg/kg)	Aliphatic C35- C44 EPH (mg/kg)	Aromatic C5-C7 (mg/kg)	Aromatic C7-C8 (mg/kg)	Aromatic C8-C10 (mg/kg)	Aromatic C10- C12 EPH (mg/kg)	Aromatic C12- C16 EPH (mg/kg)	Aromatic C16- C21 EPH (mg/kg)	Aromatic C21- C35 EPH (mg/kg)	Aromatic C35- C40 EPH (mg/kg)
33	Plot 54 Topsoil	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
34	Plot 54 Subsoil	0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
35	Plot 50/51 Topsoil	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
36	Plot 50/51 Subsoil	0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	14	29	< 8.4
37	Plot 60 Topsoil	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
38	Plot 60 Subsoil	0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
39	Plot 73 Topsoil	0.10	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
40	Plot 73 Subsoil	0.40	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
Screening Criteria Value			42.0	100.0	27.0	130.0	1100.0	65000.0	65000.0	0.9	130.0	34.0	74.0	140.0	250.0	1100.0	1100.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL