

12421/RH

11th July 2019

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

For the attention of Miss Emma Jones

Dear Sirs,

Former Merthyr Vale Colliery, Golwg Yr Afon, Merthyr Vale, Merthyr Tydfil, CF48 4ST
NHBC Job Ref: 211366: Plots 6 to 15

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 6 to 15 have recently been inspected on the 1st July 2019 in accordance with the remediation strategy for the site and found to have the required total of 600mm of clean cover over a geotextile 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 areas of plots 7, 10 and 14 covering plots 6 to 15 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,



PP

Roger Hawkins

For

Intégral Géotechnique (Wales) Limited

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

Encs.

APPENDIX A

FIGURES



Plot 7 Excavation Pit



Plot 7 Showing Membrane Placed at Base of Capping

Garden Capping Validation.

Plot 7 Former Merthyr Vale Colliery

Intégral
Géotechnique

Integral House
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 20807991
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Plot 10 Excavation Pit



Plot 10 Showing Membrane Placed at Base of Capping

Garden Capping Validation.

Plot 10 Former Merthyr Vale Colliery

Intégral
Géotechnique

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



Plot 14 Excavation Pit



Plot 14 Showing Membrane Placed at Base of Capping

Garden Capping Validation.

Plot 14 Former Merthyr Vale Colliery

Intégral
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Fax: 029 20862176



Plot 7



Plot 10

Garden Capping Validation.

Plots 7 and 10 Former Merthyr Vale Colliery

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



Plot 14

Garden Capping Validation.

Plot 14 Former Merthyr Vale Colliery

Intégral
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APPENDIX B

SOIL TEST RESULTS



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Analytical Report Number : 19-48080

Project / Site name:	Riverside Merthyr	Samples received on:	02/07/2019
Your job number:	12421	Samples instructed on:	02/07/2019
Your order number:		Analysis completed by:	10/07/2019
Report Issue Number:	1	Report issued on:	10/07/2019
Samples Analysed:	6 soil samples		

Signed: *Karolina Marek*

Karolina Marek
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.

Analytical Report Number: 19-48080
Project / Site name: Riverside Merthyr

Lab Sample Number				1257813	1257814	1257815	1257816	1257817
Sample Reference				Plot 7 Topsoil	Plot 7 Subsoil	Plot 10 Topsoil	Plot 10 Subsoil	Plot 14 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				01/07/2019	01/07/2019	01/07/2019	01/07/2019	01/07/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	25	23	22	18	23
Total mass of sample received	kg	0.001	NONE	0.46	0.53	0.52	0.59	0.51

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	9.6	8.4	7.6	9.2	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1100	1500	1100	1500	1200
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.21	0.15	0.062	0.28	0.028
Sulphide	mg/kg	1	MCERTS	6.2	17	1.9	10	1.5
Total Sulphur	mg/kg	50	MCERTS	1000	770	620	630	590
Total Organic Carbon (TOC)	%	0.1	MCERTS	3.6	2.6	3.1	0.4	3.0
Loss on Ignition @ 450°C	%	0.2	MCERTS	10.4	8.2	9.1	3.5	8.8

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	0.26	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	3.4	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.4	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	5.0	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	3.5	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.7	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.5	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.5	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.60	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.1	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.37	< 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	0.49	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	20.7	< 0.80
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Analytical Report Number: 19-48080
Project / Site name: Riverside Merthyr

Lab Sample Number				1257813	1257814	1257815	1257816	1257817
Sample Reference				Plot 7 Topsoil	Plot 7 Subsoil	Plot 10 Topsoil	Plot 10 Subsoil	Plot 14 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				01/07/2019	01/07/2019	01/07/2019	01/07/2019	01/07/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	8.2	8.2	9.9	7.7
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.1	1.3	0.88	1.2
Boron (water soluble)	mg/kg	0.2	MCERTS	2.2	1.5	2.1	1.2	2.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	48	36	50	32	49
Copper (aqua regia extractable)	mg/kg	1	MCERTS	29	23	27	20	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	36	26	32	29	37
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	40	29	35	22	34
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.4	< 1.0	1.9	< 1.0	2.1
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	60	49	64	33	60
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	68	58	75	75	76

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	2.5	7.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	7.8	15	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	9.4	28	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	26	110	< 8.0
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	< 10	< 10	35	140	< 10
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	30	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	46	160	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	46	190	< 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	4.1	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10	61	< 10
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10	< 10	< 10	27	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	< 8.4	27	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	73	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	< 10	< 10	100	< 10

TPH Total C5 - C44	mg/kg	10	NONE	< 10	< 10	46	290	< 10
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Analytical Report Number: 19-48080
Project / Site name: Riverside Merthyr

Lab Sample Number				1257818				
Sample Reference				Plot 14 Subsoil				
Sample Number				None Supplied				
Depth (m)				0.40				
Date Sampled				01/07/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	19				
Total mass of sample received	kg	0.001	NONE	0.52				

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

pH - Automated	pH Units	N/A	MCERTS	9.7				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	1300				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.30				
Sulphide	mg/kg	1	MCERTS	25				
Total Sulphur	mg/kg	50	MCERTS	490				
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.2				
Loss on Ignition @ 450°C	%	0.2	MCERTS	3.6				

Total Phenols

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

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

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80				
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Analytical Report Number: 19-48080
Project / Site name: Riverside Merthyr

Lab Sample Number				1257818				
Sample Reference				Plot 14 Subsoil				
Sample Number				None Supplied				
Depth (m)				0.40				
Date Sampled				01/07/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.8				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2				
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	31				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	18				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	57				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	30				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	68				

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	4.3				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	10				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	15				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	33				
TPH-CWG - Aliphatic >EC16 - EC35	mg/kg	10	MCERTS	48				
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	62				
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	62				
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	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC35 - EC40	mg/kg	10	NONE	< 10				
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10				
TPH Total C5 - C44	mg/kg	10	NONE	62				

Analytical Report Number : 19-48080

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 *
1257813	Plot 7 Topsoil	None Supplied	0.10	Brown clay with vegetation.
1257814	Plot 7 Subsoil	None Supplied	0.40	Brown clay with vegetation.
1257815	Plot 10 Topsoil	None Supplied	0.10	Brown clay with vegetation.
1257816	Plot 10 Subsoil	None Supplied	0.40	Brown clay with vegetation.
1257817	Plot 14 Topsoil	None Supplied	0.10	Brown clay with vegetation.
1257818	Plot 14 Subsoil	None Supplied	0.40	Brown clay.

Analytical Report Number : 19-48080

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 diphenylcarbazine 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 based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	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.	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
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
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 based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	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 are representative of the samples submitted for analysis.

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Analytical Report Number : 19-48080

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 30°C.

APPENDIX C

SUMMMARY OF CHEMICAL TESTING RESULTS

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)
5	Plot 7 Topsoil	0.10	15	2.2	1.2	< 0.2	48	< 4.0	29	36	< 0.3	40	2.4	60	68
6	Plot 7 Subsoil	0.40	8.2	1.5	1.1	< 0.2	36	< 4.0	23	26	< 0.3	29	< 1.0	49	58
7	Plot 10 Topsoil	0.10	8.2	2.1	1.3	< 0.2	50	< 4.0	27	32	< 0.3	35	1.9	64	75
8	Plot 10 Subsoil	0.40	9.9	1.2	0.88	< 0.2	32	< 4.0	20	29	< 0.3	22	< 1.0	33	75
9	Plot 14 Topsoil	0.10	7.7	2.5	1.2	< 0.2	49	< 4.0	27	37	< 0.3	34	2.1	60	76
10	Plot 14 Subsoil	0.40	9.8	0.9	1.2	< 0.2	31	< 4.0	18	57	< 0.3	24	< 1.0	30	68
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 (%)
5	Plot 7 Topsoil	0.10	< 1	10.4	25	< 1.0	9.6	0.21	1100	6.2	1000	3.6	6.19	Not-detected	#N/A
6	Plot 7 Subsoil	0.40	< 1	8.2	23	< 1.0	8.4	0.15	1500	17	770	2.6	4.47	Not-detected	#N/A
7	Plot 10 Topsoil	0.10	< 1	9.1	22	< 1.0	7.6	0.062	1100	1.9	620	3.1	5.33	Not-detected	#N/A
8	Plot 10 Subsoil	0.40	< 1	3.5	18	< 1.0	9.2	0.28	1500	10	630	0.4	0.69	Not-detected	#N/A
9	Plot 14 Topsoil	0.10	< 1	8.8	23	< 1.0	7.3	0.028	1200	1.5	590	3.0	5.16	Not-detected	#N/A
10	Plot 14 Subsoil	0.40	< 1	3.6	19	< 1.0	9.7	0.30	1300	25	490	0.2	0.34	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)
5	Plot 7 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
6	Plot 7 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
7	Plot 10 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
8	Plot 10 Subsoil	0.40	< 0.05	< 0.05	1.4	1.7	1.1	1.5	0.49	0.60	1.5	< 0.05	5.0	0.26	0.37	< 0.05	3.4	3.5
9	Plot 14 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
10	Plot 14 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
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)
5	Plot 7 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
6	Plot 7 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
7	Plot 10 Topsoil	0.10	< 0.001	< 0.001	< 0.001	2.5	7.8	35	< 8.4	< 0.001	< 0.001	< 0.001	< 1.0	< 2.0	< 10	< 10	< 8.4
8	Plot 10 Subsoil	0.40	< 0.001	< 0.001	< 0.001	7.0	15	140	30	< 0.001	< 0.001	< 0.001	< 1.0	4.1	< 10	61	27
9	Plot 14 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
10	Plot 14 Subsoil	0.40	< 0.001	< 0.001	< 0.001	4.3	10	48	< 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	260.0	1100.0	1100.0
Source of Screening Criteria Value			S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL