

|

WILLIAMS HOMES (BALA) LTD

NR 2 NANT LAIS, MINERA, WREXHAM, LL11 3YY
PHASE 4 -SITE REMEDIATION VERIFICATION REPORT

REPORT No. E1330.P4.VER.R1

JULY 2021



Client : WILLIAMS HOMES (BALA) LTD

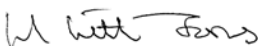
Project Title : NR 2 NANT LAIS, MINERA, WREXHAM, LL11 3YY

Document Title: PHASE 4 -SITE REMEDIATION VERIFICATION REPORT

Project No. E1330
Report No. E1330.P4.VER.R1
Date. JULY 2021

e-geo Solutions Ltd
Glasgow House
High Street
St.Asaph
LL17 0RD
Tel: 01745 828494

Distribution: WILLIAMS HOMES (BALA) LTD

Version:	FINAL		
Date:	30.07.21		
Prepared by:	Huw Littler-Jones B.Sc.(Eng), M.Sc. FGS		
Checked by:	H.L.J		
Report Ref:	E1330.P4.VER.R1		
Signed:			

	Page
1. Introduction	1
1.1 Background and Terms of Reference	
1.2 Site Location	
2. Site Characteristics	3
2.1 Original Site Description and Topography	
2.2 Ground and Groundwater Conditions	
2.3 Site Contamination	
2.4 Proposed Development	
3. Remediation Strategy	5
3.1 Site Conceptual Model and Risks	
3.2 Site Remediation Objectives	
3.3 Site Remediation Approach	
4. Remediation Works	6
4.1 Remediation Works Undertaken	
5. Verification	7
5.1 Depth of Placed Barrier Layer Soils	
5.2 Chemical Analysis of Placed Barrier Layer Soils	
6. Conclusions	10
6.1 Conclusion	

Appendices

Appendix 1	-	Chemical Analysis of Placed Soils
------------	---	-----------------------------------

1. INTRODUCTION.

1.1 Background and Terms of Reference

- 1.1.1 Williams Homes (Bala) Ltd have instructed e-geo Solutions Ltd to prepare a Site Remediation Validation Report for the external area at a residential property at 2 Nant Lais, Minera, Wrexham. The site and development comprises a refurbishment of an existing residential property.
- 1.1.2 The refurbishment involved the conversion of the existing dwelling and double garage into one and two person flats. There were no changes to the existing structures with the only addition the construction of a link between the garage and existing dwelling containing a bathroom. There were no changes to the external garden areas other than provision of additional parking areas to the front of the property.
- 1.1.3 However, during refurbishment of the residential building, remediation activities were carried out in external areas to ensure the property was 'fit for use'. The site remediation activities undertaken were based on the findings of previous studies at the site which included:
- Nr 2 Nant Lais, Minera, Wrexham, LL11 3YY - Stage 1 - Phase 1 – Desk Study and Preliminary Ground Contamination Risk Assessment – Report Ref: E1330.S1.P1.R1 (08/12/20) (Ref 1)*
- Nr 2 Nant Lais, Minera, Wrexham, LL11 3YY - Stage 1 - Phase 2 – Ground Contamination Investigation Report – Report Ref: E1330.S1.P2.R1 (23/12/20) (Ref 2)*
- 1.1.4 The objective of this Verification Report is to demonstrate and confirm that the site remediation in external areas has been implemented in accordance with the remediation proposals, and that the specific remediation objectives have been met.
- 1.1.5 This report presents details and evidence of the works carried out and confirmatory analysis of samples of imported materials used in the remediation works.
- 1.1.6 The report has been prepared by e-geo Solutions Ltd for the sole use of the Client, for the purposes described and no extended duty of care applies to other parties. The comments given, and opinions expressed are based on the information collated from site observations and the analysis of samples, however there may be outstanding information and data which becomes available at a later date which has an impact on the overall conclusions.
- 1.1.7 The copyright of this report and its contents prepared by e-geo Solutions Ltd is solely owned by e-geo Solutions Ltd. Neither this report nor contents prepared by e-geo Solutions Ltd may be reproduced, published or adapted without the express written approval of e-geo Solutions Ltd.

1.2 Site Location

- 1.2.1 Nr 2 Nant Lais is located on Nant Lais at the junction with the B5426 to the northwest of Coedpoeth, near Wrexham. The property location is shown on Figure 1 with the site extent shown on Figure 2 and is bordered by residential properties to the west, south and east, and the B5426 to the north. The property is centred at Grid Ref 327733 351766.

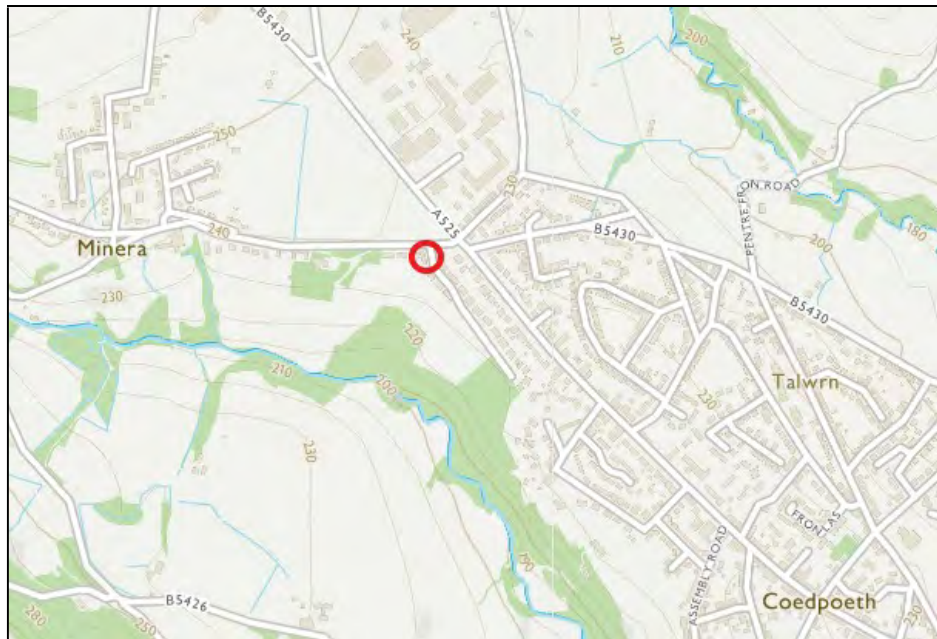


Figure 1 – Site Location



Figure 2 – Site Extent

2. SITE CHARACTERISTICS

2.1 Site Description and Topography

- 2.1.1 The majority of the site is occupied by a relatively new brick built two storey residential property in good condition, but which is being renovated. Surrounding the property were paved paths and a small patio to the west. Adjacent to the house and to the north is a double garage which is being converted for residential use. To the southwest, south and southeast of the main building were areas of lawn.
- 2.1.2 The site area is flat and level with the northern portion slightly 'cut' into the ground relative the ground to the north and northwest. Overall, the site area is at the boundary between agricultural land to the west and north and residential properties to the east and southeast.



Figure 3 – Aerial Photograph

2.2 Ground and Groundwater Conditions

- 2.2.1 The results of the intrusive investigation (Ref 2): Nr 2 Nant Lais, Minera, Wrexham, LL11 3YY - Stage 1 - Phase 2 – Ground Contamination Investigation Report – Report Ref: E1330.S1.P2.R1 indicates that the ground strata in the external garden areas comprised:

Stratum	Description	Depth to base m range (average)
TOPSOIL	Dark brown loamy clayey slightly gravelly TOPSOIL	0.20 to 0.30
GLACIAL TILL - CLAY	Stiff to very stiff light brown with some medium brown and light grey mottling slightly gravelly silty CLAY	1.00+

2.3 Site Contamination

- 2.3.1 The ground contamination investigation identified indicated slightly elevated concentrations of lead within the shallow topsoil and underlying clay at the site with concentrations in the range 323mg/kg to 1104mg/kg.

3. REMEDIATION STRATEGY.

3.1 Site Conceptual Model and Risks

- 3.1.1 Slightly elevated concentrations of contaminants lead were present within the surface topsoil and glacial clay within the lawn areas at the site at concentrations which could be detrimental to human health. With the development of the land site for residential purposes with lawn and ornamental garden areas there is medium likelihood of direct contact, ingestion or dust inhalation of contaminants by site users if the site remains in its present condition.
- 3.1.2 The metal contaminants present a similar health risk to construction workers; however, the use of appropriate PPE will prevent direct contact, and responsible site management and adherence to health and safety plans will prevent ingestion and dust generation.

3.2 Site Remediation Objectives

- 3.2.1 Remediation measures were required at the site to remove and control the risks presented to site end-users from the identified contamination sources. The remediation was formulated with the aim of achieving the following objectives;

- Preventing contact between residents and the contaminated ground on a long term basis;

3.3 Site Remediation Approach

- 3.3.1 The proposed methods include:

- "Import and place uncontaminated subsoil and topsoil within lawn and garden areas to achieve a total thickness of 600mm to provide a barrier layer that breaks feasible exposure pathways between the contamination hazard source and target".

4. REMEDIATION WORKS.

4.1 Remediation Works Undertaken

4.1.1 The various aspects of the site remediation works were undertaken at the site as follows:

- Provision of a barrier layer in lawn and garden areas.

4.1.2 The barrier layer is made up of imported topsoil to achieve a total placed thickness of 600mm. A high visibility coloured geo-textile was placed over the original ground surface to act as warning layer to any future excavations.



Plate 1 – Ground in lawn area prior to barrier layer placement



Plate 2 – Warning layer and soil placement

4.2 Depth of Placed Barrier Layer Soils

- 4.2.1 Soil materials were imported to the site for use as a cover material and placed in the lawn area to the southwest of the building to a depth of 600mm. The areas of soil placement as shown below:



Plate 3 – Lawn area to southwest of residential property

- 4.2.2 Trial pits were excavated through the topsoil and cover/barrier layer down to the geotextile warning layer to prove the placed soil thickness was 600mm. Photographic evidence is presented below:



Plate 4 – Imported soil depth at TP1



Plate 5 - Imported soil depth at TP2



Plate 6 – Imported soil depth at TP3

4.3 Chemical Analysis of Placed Barrier Layer Soils

- 4.3.1 Samples of the placed soils were collected from three trial pits following placement and the results of the chemical analytical are presented in Appendix 1. A summary of the results is presented below.

PROJECT		Nr 2 Nant Lais				
SAMPLE		Ref 1:		Ref 2:		
SAMPLE DEPTH		TP1		TP2		TP3
SAMPLE TYPE		0.50		0.40		0.30
DATE SAMPLED		TS		TS		TS
		05/07/2021		05/07/2021		05/07/2021
		Ref 1:		Ref 2:		
Arsenic	mg/kg	37	210	8.9	8.0	8.0
Cadmium	mg/kg	11		0.4	0.5	0.4
Chromium	mg/kg	910		18.6	18.3	16.8
Chromium (hex)	mg/kg	130		<0.3	<0.3	<0.3
Lead	mg/kg			98	109	95
Mercury	mg/kg	1.2		<0.1	<0.1	<0.1
Selenium	mg/kg	250		<1	<1	<1
Boron (w sol)	mg/kg	290		2.0	2.0	2.2
Copper	mg/kg	2400		25	29	22
Nickel	mg/kg	180		16.0	15.3	14.0
Zinc	mg/kg	3700		111	137	105
PAH (sum of 16)	mg/kg			2.1	4.7	3.4
Phenols	mg/kg	280		<0.01	<0.01	<0.01
Cyanide (total)	mg/kg			<0.5	<0.5	<0.5
Sulphur	%			0.07	0.08	0.08
Sulphide	mg/kg			<10	<10	<10
Sulphate (SO4)	mg/kg			877	826	738
pH	NA			7.57	7.69	7.78
TPH	mg/kg			77	155	178
Asbestos	%			<0.001	<0.001	<0.001

Exceeds LQM/CIEH (S4ULs) residential with home grown produce

Exceeds WAG C4SL – 'residential with consumption of home grown vegetables'

4.3.2 The analytical results have been assessed against human health guideline values from the LQM/CIEH 'Suitable 4 Use Levels' (S4ULs) residential with home grown produce (oral and dermal) and DEFRA/Welsh Assembly Government C4SL – 'residential with potential consumption of home-grown vegetables'. The analytical reports on the soil samples when compared to the screening values indicate the following:

- The concentrations of total metals lead, arsenic cadmium, mercury, selenium, and chromium are below the respective guidelines concentrations for the intended end use
- The concentrations of phytotoxic metals copper, nickel and zinc are not elevated and would not present risk to vegetation growth or human health
- Cyanide and phenol concentrations are below detection limits
- Sulphide, sulphur and sulphate concentrations are below detection limits or very low
- The pH is 7.57 to 7.78 and neutral to alkaline
- The PAH concentrations and speciated fractions are significantly below the guideline concentrations
- TPH concentrations and the speciated fractions are significantly below the guideline concentrations
- The concentration of asbestos within the soil was less than 0.001%

5. CONCLUSIONS.

5.1 Conclusion

- 5.1.1 Site remediation works have been carried out at 2 Nant Lais, Minera, Wrexham as part of refurbishment works to address the risks from elevated lead concentrations in the shallow soils external garden areas.
- 5.1.2 A barrier layer of imported uncontaminated topsoil to a depth of 600mm has been placed on a high visibility layer in lawn and ornamental garden areas to the southwest of the property. Validation testing of ground samples has confirmed that the imported soils are uncontaminated.

Appendix 1 - Chemical Analysis of Placed Soils

E-Geo Solutions
Glasgow House
High Street
St Asaph
Denbighshire
LL17 0UN



Attention : Huw Littler-Jones
Date : 15th July, 2021
Your reference : Coedpoeth
Our reference : Test Report 21/10213 Batch 1
Location : Coedpoeth
Date samples received : 5th July, 2021
Status : Final report
Issue : 2

Four samples were received for analysis on 5th July, 2021 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: E-Geo Solutions
Reference: Coedpoeth
Location: Coedpoeth
Contact: Huw Littler-Jones
EMT Job No: 21/10213

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2	3										
Sample ID	TP1	TP2	TP3										
Depth	0.50	0.40	0.30										
COC No / misc													
Containers	J	J	J										
Sample Date	05/07/2021	05/07/2021	05/07/2021										
Sample Type	Clay	Clay	Clay										
Batch Number	1	1	1										
Date of Receipt	05/07/2021	05/07/2021	05/07/2021										
Please see attached notes for all abbreviations and acronyms													
											LOD/LOR	Units	Method No.
Arsenic	8.9	8.0	8.0								<0.5	mg/kg	TM30/PM62
Cadmium	0.4	0.5	0.4								<0.1	mg/kg	TM30/PM62
Chromium	18.6	18.3	16.8								<0.5	mg/kg	TM30/PM62
Copper	25	29	22								<1	mg/kg	TM30/PM62
Lead	98	109	95								<5	mg/kg	TM30/PM62
Mercury	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM62
Nickel	16.0	15.3	14.0								<0.7	mg/kg	TM30/PM62
Selenium	<1	<1	<1								<1	mg/kg	TM30/PM62
Sulphur as S	0.07	0.08	0.08								<0.01	%	TM30/PM62
Total Sulphate as SO4	877	826	738								<50	mg/kg	TM50/PM129
Water Soluble Boron	2.0	2.0	2.2								<0.1	mg/kg	TM74/PM61
Zinc	111	137	105								<5	mg/kg	TM30/PM62
PAH MS													
Naphthalene ^{#M}	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.11	0.34	0.19								<0.03	mg/kg	TM4/PM8
Anthracene [#]	<0.04	0.11	0.06								<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.29	0.76	0.54								<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.28	0.67	0.50								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.19	0.44	0.32								<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.18	0.38	0.31								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene ^{#M}	0.39	0.82	0.62								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.23	0.44	0.35								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	0.20	0.34	0.25								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	<0.04	0.06	0.05								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.22	0.33	0.24								<0.04	mg/kg	TM4/PM8
PAH 16 Total	2.1	4.7	3.4								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.28	0.59	0.45								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.11	0.23	0.17								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	90	96								<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C10-C12 ^{#M}	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 ^{#M}	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 ^{#M}	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 ^{#M}	24	23	41								<7	mg/kg	TM5/PM8/PM16
Total aliphatics >C10-35 ^{#M}	24	23	41								<19	mg/kg	TM5/PM8/PM16

Element Materials Technology

Client Name: E-Geo Solutions
Reference: Coedpoeth
Location: Coedpoeth
Contact: Huw Littler-Jones
EMT Job No: 21/10213

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Client Name: E-Geo Solutions
Reference: Coedpoeth
Location: Coedpoeth
Contact: Huw Littler-Jones

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/10213	1	TP1	0.50	1	07/07/2021	General Description (Bulk Analysis)	soil
					07/07/2021	Asbestos Fibres	Fibre Bundles
					07/07/2021	Asbestos ACM	NAD
					07/07/2021	Asbestos Type	Amosite
					07/07/2021	Asbestos Level Screen	less than 0.1%
					09/07/2021	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					09/07/2021	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					09/07/2021	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					13/07/2021	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					13/07/2021	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
21/10213	1	TP2	0.40	2	07/07/2021	General Description (Bulk Analysis)	soil
					07/07/2021	Asbestos Fibres	Fibre Bundles
					07/07/2021	Asbestos ACM	NAD
					07/07/2021	Asbestos Type	Chrysotile
					07/07/2021	Asbestos Level Screen	less than 0.1%
					09/07/2021	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					09/07/2021	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					09/07/2021	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					13/07/2021	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					13/07/2021	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
21/10213	1	TP3	0.30	3	07/07/2021	General Description (Bulk Analysis)	soil
					07/07/2021	Asbestos Fibres	Fibre Bundles
					07/07/2021	Asbestos ACM	NAD
					07/07/2021	Asbestos Type	Chrysotile
					07/07/2021	Asbestos Level Screen	less than 0.1%
					09/07/2021	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					09/07/2021	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					09/07/2021	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					13/07/2021	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					13/07/2021	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)

Matrix : Solid

5 of 10

Element Materials Technology

Notification of Deviating Samples

Client Name: E-Geo Solutions

Reference: Coedpoeth

Location: Coedpoeth

Contact: Huw Littler-Jones

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/10213

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

EMT Job No: 21/10213

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GC/FID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GC/FID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	No
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Etra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.	Yes	Yes	AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry). WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec. 1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes

EMT Job No: 21/10213

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2. 1993), o-Phosphate 365.2 (Rev.2. 1993), TON 353.1 (Rev.2. 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2. 1993) – All anions comparable to BS ISO 15923-1: 2013i	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM129	A hot hydrochloric acid digest is performed on an as received sample, and the resulting liquor is analysed.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM005.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM61	As received solid samples are extracted with hot water in a 20:1 ratio of water to soil ready for analysis by ICP.			AR	Yes
TM89	Modified USEPA method OJA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes	Yes	AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM131	Quantification of Asbestos Fibres and ACM based on HSG248 First edition:2006, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM005.	Yes		AR	Yes