CASTLEMEAD GROUP LTD

RESIDENTIAL DEVELOPMENT AT WOODLANDS FARM, DODDS LANE, GWERSYLLT, WREXHAM, LL11 4NS

PHASE 4 - SITE REMEDIATION VERIFICATION REPORT

REPORT No. E1931.PH4.VER.R1

AUGUST 2024

Client : **CASTLEMEAD GROUP LTD**

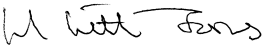
Project Title : **RESIDENTIAL DEVELOPMENT AT WOODLANDS FARM, DODDS LANE, GWERSYLLT, WREXHAM, LL11 4NS**

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Project No. **E1931**
Report No. **E1931.PH4.VER.R1**
Date. **AUGUST 2024**

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

Distribution: **CASTLEMEAD GROUP LTD**

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Prepared by:	Huw Littler-Jones B.Sc.(Eng), M.Sc. FGS		
Checked by:	H.L.J		
Report Ref:	**E1931.PH4.VER.R1**		
Signed:			

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1. INTRODUCTION.

1.1 Background and Terms of Reference

1.1.1 Castlemead Group Ltd has instructed e-geo Solutions Ltd to prepare a Site Remediation Validation Report for site remediation works carried out at a new residential development on land known as Woodlands Farm on Dodds Lane in Gwersyllt, Wrexham.

1.1.2 The site was previously agricultural land for the whole of its recorded history with farm buildings, and a former fishpond in the northeastern corner. The whole proposed development comprises 77 residential units with 23 constructed under the present phase on the west side of the site area.

1.1.3 To allow the safe development of the site remediation activities were carried out to address planning conditions and to ensure the site was 'fit for use'. The site remediation activities undertaken were detailed in a report titled:

Remediation Strategy, Proposed Residential Development, Woodlands Farm, Dodds Lane, Gwersyllt, Wrexham. For Anwyl Partners. Report Reference: 14155/REM/002 dated 23rd May 202 by Robert E Fry & Associates Ltd.

1.1.4 The Remediation Strategy Implementation Plan Report was based on the findings of previous studies at the site which included:

- *Geo-Environmental Investigation Report No. 14155 dated April 2015; by Robert E Fry & Associates Ltd.*

1.1.5 The objective of this Verification Report is to demonstrate and confirm that the site remediation works undertaken in garden areas has been implemented in accordance with the remediation proposals, and that the specific remediation objectives have been met.

1.1.6 This report presents details and evidence of the works carried out and details of placed materials used in the remediation works.

1.1.7 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.

1.1.8 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 The development site is located to the northeast of Dodds Lane and on the east side of Gwersyllt, near Wrexham. There is an existing housing estate to the west and agricultural land to the north and east and Dodds Lane to the south. The site location is shown on Figure 1 and development boundary on Figure 2 and is centred at Grid Reference SJ 32328 53192.

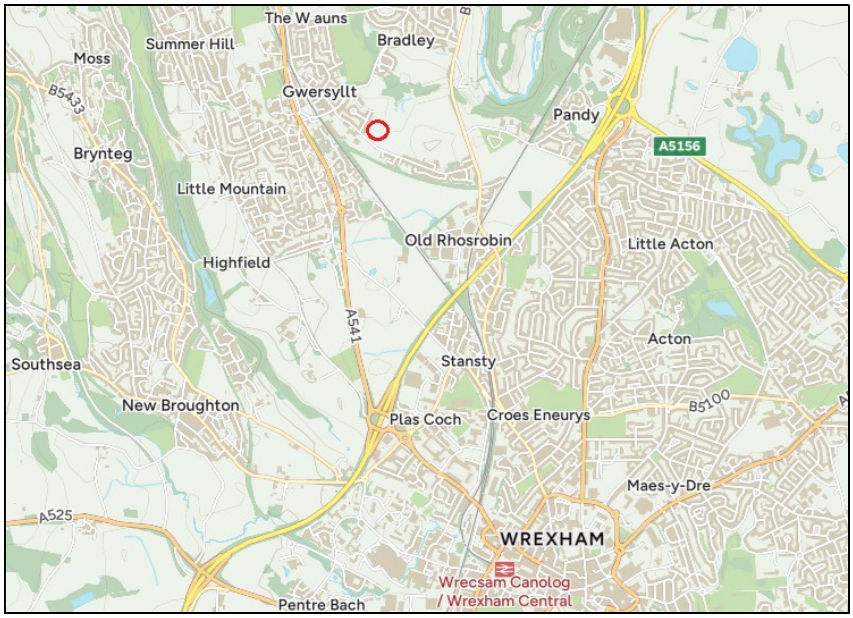
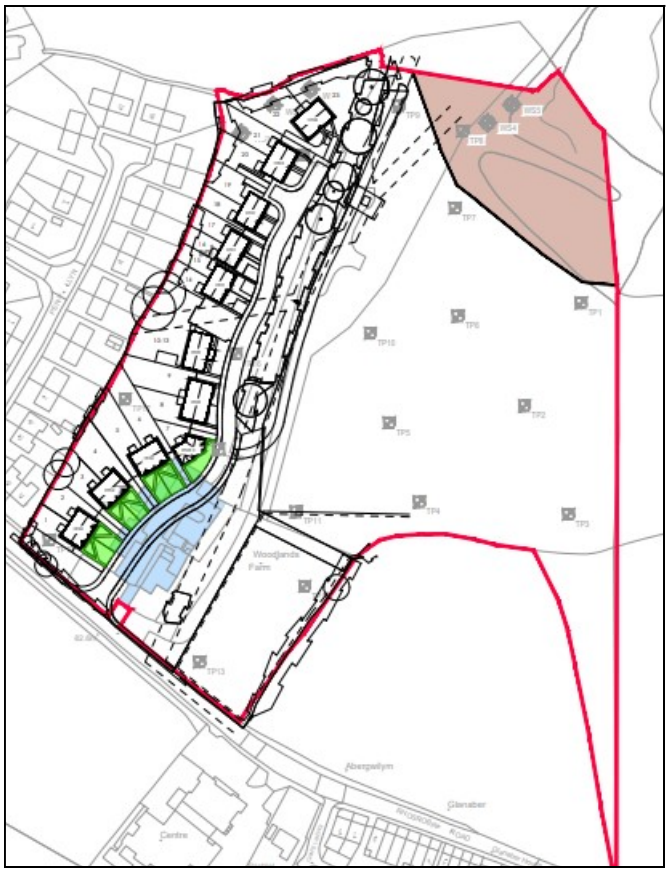


Figure 1 – Site Location


Figure 2 – Development Phase Area and Extent

2. SITE CHARACHTERISTICS

2.1 Site Description and Topography

2.1.1 Prior to commencement of the residential development the site was agricultural land with derelict farm buildings around a farmyard. There was a pond in the northeast corner of the site but off the present development phase.

2.2 Ground and Groundwater Conditions

2.2.1 The site was the subject of a programme of extensive investigation works undertaken by Robert E Fry & Associates Ltd with the findings detailed in a report 'Geo-Environmental Investigation Report No. 14155 dated April 2015'. The investigations which covered the whole site area identified the presence of an upper layer of topsoil varying in thickness of 0.10m – 0.40m, overlying natural strata of glaciofluvial deposits.

2.2.2 A localised area of made ground was identified comprising of silts, sands and gravels with brick, concrete and mudstone, extending to a depth in excess of 3.45m, in the northeast corner of the site and associated with the location of the former fishpond. This was not within the current development phase.

2.3 Site Contamination

2.3.1 The results of sampling and analysis presented in the report '*Geo-Environmental Investigation Report No. 14155 dated April 2015 Robert E Fry & Associates Ltd'* recorded no elevated metals, PAH compounds, Inorganics, Petroleum Hydrocarbons or Organochlorine Pesticides within any of the topsoil or ground samples with the exception of one sample with elevated arsenic in made ground associated with the infilled pond. This is not within the current development phase.

2.3.2 Four gas wells were installed within windowless sample boreholes and monitored by Robert E Fry & Associates Ltd to determine the extent of any potential hazards relating to ground gas from the infilled pond. Low concentrations of methane and carbon dioxide were identified with methane reaching maximum concentration of 0.0% v /v and carbon dioxide reaching a maximum concentration of 6.9% v /v. The gas monitoring programme did not identify any flows of ground gases. Based upon the monitoring data the gsv's indicate characteristic situation 1 (NHBS Green) for the development area.

2.3.3 The desk study information has identified that the site is within a radon affected area where 10 – 30% of properties are subject to elevated radon emissions and therefore all properties will require full radon protective measures.

2.3.4 The farmyard area in the southwest corner of the site, which included an existing residential property and other dilapidated farm buildings, was not investigated and if any visual or olfactory evidence of contamination is noted during development then further investigations including sampling and testing will be required.

2.4 Proposed Development

2.4.1 The current phase of the development comprises 23 residential units with associated car parking and access roads. The layout is shown as Figure 2.

3. REMEDIATION STRATEGY.

3.1 Site Conceptual Model and Risks

3.1.1 The results of the intrusive ground investigation and laboratory analyses did not identify any potential contamination risk from ground materials at the development site.

3.2 Site Remediation Proposals

3.2.1 The proposed remediation works at this whole site involve the following works:-

- Removal of existing buildings and hard standing within the farmyard area in the southeast corner.

- Provision of surface capping as required within the area of deep fill in the northeastern corner of the site. (outside present development phase)

- Removal of unsuitable surface materials of concrete, tarmac, brick from the soft landscaping areas surrounding the deep made ground deposits of the former fishpond in northeast corner (outside present development phase).

3.3 Site Remediation Approach

3.3.1 Details of the approach to remediation for external garden areas are detailed in a report '*Remediation Strategy, Proposed Residential Development, Woodlands Farm, Dodds Lane, Gwersyllt, Wrexham. For Anwyl Partners. Report Reference: 14155/REM/002 dated 23rd May 202 by Robert E Fry & Associates Ltd*'

3.3.2 For the present development phase of Plots 1 to 23 and specifically for Plots 1 to 7 the approach to remediation involved:

Preparatory Works – *Removal of a*rea of concrete & tarmac hard standing prior to construction phase of work.

Garden Areas – In residential front garden areas where levels are to be raised at least 450mm of suitable capping layer should be placed. Capping should comprise of clean inert material which should be confirmed by chemical analysis in accordance with the remediation strategy.

4. REMEDIATION WORKS.

4.1 Remediation Works Undertaken

4.1.1 Site remediation works were undertaken at Plots 1 to 7 at the development site as follows:

- Provision of a clean cover layer in all front garden areas at each property.

4.1.2 The areas where remediation works have been carried out are shown in Figure 3.

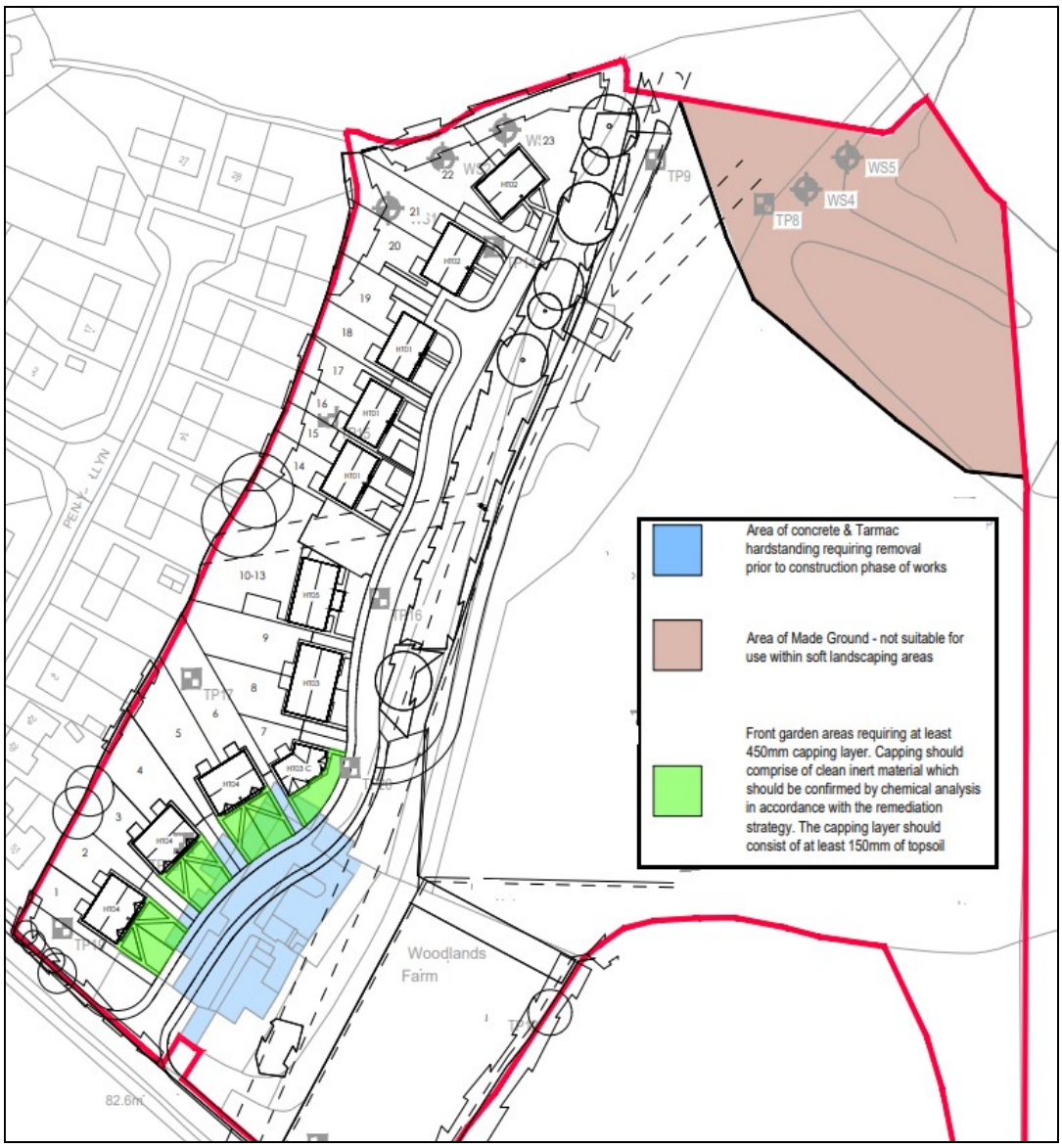


Figure 3 – Areas of Remediation at Plot 1 to 7.

5. VERIFICATION.

5.1 Depth of Placed Clean Cover System Materials

5.1.1 Topsoil and subsoil materials have been imported to the site for use as a clean cover material and placed in the garden areas of properties. Observation pipes comprising 100mm diameter drainage pipe were placed in garden areas during soil placement to allow final depth measurement of placed soils.

5.1.2 A high visibility geotextile has been placed on the original ground surface and below the clean cover system in garden areas and was observed at the base of the observation pipe in each garden area.

5.1.3 The depths of soil materials as measured in the observation pipes is presented below:

PLOT NR	Soil Depth (Subsoil + Topsoil) mm
Plot 1	650
Plot 2	520
Plot 3	520
Plot 4	450
Plot 5	450
Plot 6	450
Plot 7	480

5.1.4 Photographic evidence of soil material placement and the achieved depths is presented below:



Plate 1 – Plot 1



Plate 2 – Plot 1 soil depth 650mm



Plate 3 – Plot 2



Plate 4 – Plot 2 soil depth 520mm



Plate 5 – Plot 3



Plate 6 – Plot 3 soil depth 520mm



Plate 7 – Plot 4



Plate 8 – Plot 4 soil depth 450mm



Plate 9 – Plot 5



Plate 10 – Plot 5 soil depth 450mm



Plate 11 – Plot 6



Plate 12 – Plot 6 soil depth 450mm



Plate 13 – Plot 7



Plate 14 – Plot 7 soil depth 480mm

5.2 Ground Excavation and Disposal

5.2.1 Ground levels have been raised across the site in garden areas. No ground excavation has been undertaken and no soils have been disposed of off-site.

5.3 Chemical Analysis of Clean Cover System Soils

5.3.1 Samples of the placed soils were collected from depths of 0.15m in the front gardens at Plot 1&2, Plot 3&4, Plot 5&6 and Plot7. These samples are taken as representative of soils placed in all garden areas and meet the frequency specified in the *Remediation Strategy, Proposed Residential Development, Woodlands Farm, Dodds Lane, Gwersyllt, Wrexham. For Anwyl Partners. Report Reference: 14155/REM/002 dated 23rd May 202 by Robert E Fry & Associates Ltd* of 1 sample per 50m3 topsoil and 1 sample per 250m³ subsoil. The results of the chemical analysis are presented in Appendix 1.

5.3.2 The analytical results have been assessed against the screening values presented in the *Remediation Strategy, Proposed Residential Development, Woodlands Farm, Dodds Lane, Gwersyllt, Wrexham. For Anwyl Partners. Report Reference: 14155/REM/002 dated 23rd May 202 by Robert E Fry & Associates Ltd* report. 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 below the guideline concentrations
- The concentrations of phenol and total cyanide are not elevated and below the guideline concentrations
- BTEX concentrations are below detection limits
- The PAH concentrations and speciated fractions are below the guideline concentrations or below detection limits
- TPH concentrations and the speciated fractions are below the guideline concentrations or below detection limits
- No asbestos was detected within the soil samples

6. CONCLUSIONS.

6.1 Conclusion

6.1.1 Site remediation works have been carried out on the first phase of a new residential development on land known as Woodlands Farm on Dodds Lane in Gwersyllt, Wrexham.

6.1.2 A clean cover system of imported uncontaminated subsoil has been placed to a depth of at least 450mm in front garden areas to raise site levels. Site measurements of the clean cover system depth has confirmed at least 450mm of placed soils. Validation testing and chemical analysis of representative samples of placed subsoil has confirmed that the soil is uncontaminated with respect to the chemical parameters for which analysis was undertaken and assessed against the screening values presented in the Remediation Strategy, Proposed Residential Development, Woodlands Farm, Dodds Lane, Gwersyllt, Wrexham. For Anwyl Partners. Report Reference: 14155/REM/002 dated 23rd May 202 by Robert E Fry & Associates Ltd.

6.1.3 The findings of the soil depths measurements and chemical analysis of representative soil samples indicate that the remediation objectives have been met.

Appendix 1 - Chemical Analysis Results – Placed Soil EMT-24-13060-Batch-1- Report-202408091025

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

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

Attention :	Huw Littler-Jones
Date :	9th August, 2024
Your reference :	Woodlands
Our reference :	Test Report 24/13060 Batch 1
Location :	Woodlands
Date samples received :	30th July, 2024
Status :	Final Report
Issue :	202408091025

Five samples were received for analysis on 30th July, 2024 of which five 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.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 14.335 kg of CO2

Scope 1&2&3 emissions - 33.878 kg of CO2

Authorised By:



Sean Anglish
Project Coordinator

Please include all sections of this report if it is reproduced

Client Name: E-Geo Solutions
Reference: Woodlands
Location: Woodlands
Contact: Huw Littler-Jones
EMT Job No: 24/13060

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-2	3-4	5-6	7-8	9-10						LOD/LOR	Units	Method No.
Sample ID	P1/P2	P3/P4	P5/P6	P7	P8/P9								
Depth	0.15	0.15	0.15	0.15	0.15								
COC No / misc													
Containers	J B	J B	J B	J B	J B								
Sample Date	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024								
Sample Type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand								
Batch Number	1	1	1	1	1								
Date of Receipt	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024								
Arsenic #M	4.3	4.5	4.4	3.9	3.8						<0.5	mg/kg	TM30/PM15
Cadmium #M	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM30/PM15
Chromium #M	61.4	25.6	28.9	26.9	28.7						<0.5	mg/kg	TM30/PM15
Copper #M	24	20	19	19	21						<1	mg/kg	TM30/PM15
Lead #M	27	29	27	36	28						<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM30/PM15
Nickel #M	11.0	10.7	9.9	10.0	10.4						<0.7	mg/kg	TM30/PM15
Selenium #M	<1	<1	<1	<1	<1						<1	mg/kg	TM30/PM15
Zinc #M	56	57	54	54	56						<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #M	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03						<0.03	mg/kg	TM4/PM8
Acenaphthene #M	<0.05	<0.05	<0.05	<0.05	<0.05						<0.05	mg/kg	TM4/PM8
Fluorene #M	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Phenanthrene #M	<0.03	<0.03	<0.03	<0.03	0.06						<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Fluoranthene #M	0.06	0.06	0.06	0.12	0.11						<0.03	mg/kg	TM4/PM8
Pyrene #	0.05	0.05	0.05	0.09	0.09						<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	0.09	<0.06						<0.06	mg/kg	TM4/PM8
Chrysene #M	<0.02	0.03	<0.02	0.08	<0.02						<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	<0.07	<0.07	<0.07	0.13	<0.07						<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	0.07	<0.04						<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04						<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	<0.6	<0.6	<0.6						<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	0.09	<0.05						<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	0.04	<0.02						<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	113	93	94	99	95						<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 #M	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C6-C8 #M	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C10-C12 #M	<0.2	<0.2	<0.2	<0.2	<0.2						<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #M	<4	<4	<4	<4	<4						<4	mg/kg	TM5/PM8/PM16
>C16-C21 #M	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
>C21-C35 #M	27	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	27	<19	<19	<19	<19						<19	mg/kg	TM5/TM36/PM8/PM12/PM16

Element Materials Technology

Client Name: E-Geo Solutions
Reference: Woodlands
Location: Woodlands
Contact: Huw Littler-Jones
EMT Job No: 24/13060

Report : Solid

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

EMT Sample No.	1-2	3-4	5-6	7-8	9-10							
Sample ID	P1/P2	P3/P4	P5/P6	P7	P8/P9							
Depth	0.15	0.15	0.15	0.15	0.15							
COC No / misc												
Containers	J B	J B	J B	J B	J B							
Sample Date	31/07/2024	31/07/2024	31/07/2024	31/07/2024	31/07/2024							
Sample Type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand							
Batch Number	1	1	1	1	1							
Date of Receipt	30/07/2024	30/07/2024	30/07/2024	30/07/2024	30/07/2024							
TPH CWG												
Aromatics												
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg
>EC8-EC10 #M	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2						<0.2	mg/kg
>EC12-EC16 #	<4	<4	<4	<4	<4						<4	mg/kg
>EC16-EC21 #	9	<7	9	10	9						<7	mg/kg
>EC21-EC35 #	104	73	89	94	88						<7	mg/kg
Total aromatics C5-35 #	113	73	98	104	97						<19	mg/kg
Total aliphatics and aromatics(C5-35)	140	73	98	104	97						<38	mg/kg
MTBE #	<5	<5	<5	<5	<5						<5	ug/kg
Benzene #	<5	<5	<5	<5	<5						<5	ug/kg
Toluene #	<5	<5	<5	<5	<5						<5	ug/kg
Ethylbenzene #	<5	<5	<5	<5	<5						<5	ug/kg
m/p-Xylene #	<5	<5	<5	<5	<5						<5	ug/kg
o-Xylene #	<5	<5	<5	<5	<5						<5	ug/kg
Phenol #M	<0.01	<0.01	<0.01	<0.01	<0.01						<0.01	mg/kg
Natural Moisture Content	16.9	15.1	15.7	16.0	17.2						<0.1	%
Total Cyanide #M	1.3	2.1	0.9	1.3	1.6						<0.5	mg/kg
pH #M	8.23	8.51	8.25	8.23	8.24						<0.01	pH units
Sample Type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand							None
Sample Colour	Medium Brown	Medium Brown	Medium Brown	Medium Brown	Medium Brown							None
Other Items	stones	stones	stones	stones	stones							None
Asbestos Type*	NAD	NAD	NAD	NAD	NAD							None

Please see attached notes for all abbreviations and acronyms

LOD/LOR	Units	Method No.
<0.1	mg/kg	TM36/PM12
<0.1	mg/kg	TM36/PM12
<0.1	mg/kg	TM36/PM12
<0.2	mg/kg	TM5/PM8/PM16
<4	mg/kg	TM5/PM8/PM16
<7	mg/kg	TM5/PM8/PM16
<7	mg/kg	TM5/PM8/PM16
<19	mg/kg	TM5/TM36/PM8/PM12/PM16
<38	mg/kg	TM5/TM36/PM8/PM12/PM16
<5	ug/kg	TM36/PM12
<5	ug/kg	TM36/PM12
<5	ug/kg	TM36/PM12
<5	ug/kg	TM36/PM12
<5	ug/kg	TM36/PM12
<5	ug/kg	TM36/PM12
<0.01	mg/kg	TM26/PM21B
<0.1	%	PM4/PM0
<0.5	mg/kg	TM89/PM45
<0.01	pH units	TM73/PM11
	None	PM13/PM0
	None	PM13/PM0
	None	PM13/PM0
	None	Subcontracted

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 24/13060						

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.
It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/13060

SOILS and ASH

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. Asbestos samples are retained for 6 months.

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. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil 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 overesitimate 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 is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

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 for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

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 requirement of our Accreditation Body 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.
Laboratory records are kept for a period of no less than 6 years.

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.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).
Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitively, with a matrix specific limit of detection. Note, other compounds may be present but are not reported.

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 quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
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: 24/13060

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	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 GCFID. 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 GCFID. 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
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	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
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

EMT Job No: 24/13060

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
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
TM89	Modified USEPA method OIA-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
Subcontracted	See attached subcontractor report for accreditation status and provider.					AR	