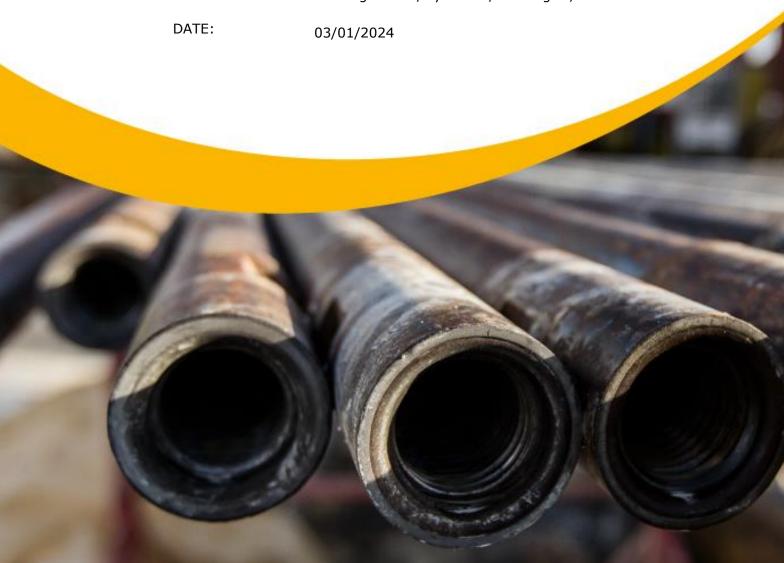


## **GEOSPHERE ENVIRONMENTAL**

REPORT NUMBER: 7213,GI,GROUND,PC,TP,03-01-24,V2

SITE: Rishangles Hall, Eye Road, Rishangles, IP23 7LA





## **DOCUMENT CONTROL SHEET**

Report Number: 7213,GI,GROUND,PC,TP,03-01-24,V2

Client: Mrs. Jane Smith c/o Peter Wells Architects Ltd Project Name: Rishangles Hall, Eye Road, Rishangles, IP23 7LA

Project Number: 7213,GI

Report Type: Phase 2 – Ground Investigation

Status: Final

Date of Issue: 03 January 2024

## **Issued By:**

Geosphere Environmental Ltd, Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ.

T: 01603 298 076 / 01473 353 519. W: www.geosphere-environmental.co.uk

#### **Confidentiality, Copyright and Reproduction:**

This document has been prepared by Geosphere Environmental Ltd in connection with a contract to supply goods and/or services and is submitted only on the basis of strict confidentiality. The contents must not be disclosed to third parties other than in accordance with the terms of the contract. Geosphere Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

#### **Limit of Reliance:**

This report is based on the site findings at the time of the associated walkover/site investigation works and information provided by the client at the time of writing. Should site conditions alter or development proposals alter, a reassessment of the enclosed findings should be undertaken. Refer to Appendix 1 for full details of report limitations.

Prepared By:	Reviewed By:	Authorised By:
Potor Covno	Thomas Dowling	Paul Davies

Peter Coyne Thomas Powling Paul Davies
Environmental Consultant Director Director

Charles Thomas Towning I all I was

#### **VERSION RECORD**

Version	Date	Document Revision Details	Prepared By:	Admin
V1	03/07/23	Original Document	PC	CD
V2	03/01/24	Updates following further investigation	PC	HP



## **Executive Summary**

Project	Geosphere Environmental Ltd was commissioned by Mrs. Jane Smith to
Description	undertake a Phase 2 Site Investigation at Rishangles Hall, Eye Road, Rishangles, IP23 7LA.
	It was understood that an existing modern barn is to be demolished and the adjacent historic barn is to be extended and converted into a single residential dwelling with associated car parking and garden areas.
	At the time of the investigation this area comprised hardstanding yard in the north with two barn structures in the centre and undeveloped land to the south.  A rough track was present to the east of the barns forming access to the south.
Site Location / Description	The site was located at Rishangles Hall, Eye Road, Rishangles, IP23 7LA and may be located by National Grid Reference (NGR) TM 16445 67573.
Site Works	Site works were carried out on 11 to 12 May 2023 and 28 November 2023 and comprised the following:  The formation of 15 windowless sampler boreholes; The installation of two ground gas / groundwater monitoring wells; The formation of a six hand dug pits.  Undertaking environmental and geotechnical soil sampling and soil logging.
Gas Monitoring	Ground gas monitoring was carried out in accordance with current guidance. Six consecutive monitoring visits were undertaken over a period of 16 May 2023 to 19 June 2023 including falling barometric pressure conditions.  Carbon dioxide concentrations in exceedance of 5.0% were consistently recorded and therefore Characteristic Situation CS2 is considered appropriate.
Laboratory Results	Within a sample taken from WS09 at a depth of 0.30m bgl aromatic TPH in the C21-C35 band was recorded at a level of 1627mg/kg compared to the screening value of 1100mg/kg based upon a soil organic matter (SOM) of 1%. Subsequent testing in the surrounding areas did not record elevated concentrations, indicating a localised hotspot.



A marginal exceedance of lead (203mg/kg compared to a screening value of 200mg/kg) was recorded within a single location, WS13 at 0.4m. Cement bound PACM was noted near surface within HP01 within a rough track between the two existing barns, a sample of which was dispatched to the environmental laboratory for testing which confirmed the presence of chrysotile asbestos fibres within the cement bound matrix. Four soil samples taken from along the track (HP02-HP05) tested positive for asbestos fibres, however quantification testing confirmed that this was at very low concentrations with two samples at the limit of reporting, 0.001%, and two below this level. A single sample from WS10 at 0.4mbgl, below the concrete floor slab within the barn, tested positive for the presence of asbestos fibres, however this was at a level below the limit of reporting (<0.001%). **Advanced** Low to moderate risk identified, localised around WS09, to proposed garden areas and controlled waters from TPH contamination. **Conceptual Model** Low risk from cement bound asbestos and low concentrations of loose fibres within the soils along the track. Recommendations A Remediation Method Statement (RMS) should be prepared detailing the remedial measures and validation required to address the TPH and asbestos and Further Works contamination identified at the site. This Executive Summary only provides a summary of the site data and its assessment. It

This Executive Summary only provides a summary of the site data and its assessment. It does not provide a definitive engineering analysis and is for guidance only. It is recommended that the reader reviews the report in its entirety and any material referenced therein.



## **CONTENTS**

		Page No.
EXECU	JTIVE SUMMARY	3
1.	INTRODUCTION	7
1.1	Previous Reports	7
2.	SITE SETTINGS	8
2.1	Site Description	8
3.	SITE WORKS	9
3.1	Methodology	9
3.2	Scope	9
3.3	Ground Conditions Encountered	9
3.4	Visual and Olfactory Evidence of Contamination	10
4.	LABORATORY TESTING	11
4.1	Methodology	11
4.2	Environmental Testing Suite	11
4.2.1	Quality Control	11
4.2.2	Environmental Testing Suite - Soils	11
5.	MONITORING	12
5.1	Ground Gas	12
5.2	Groundwater	12
6.	RISK ASSESSMENT	14
6.1	Risk to Human Health	14
6.1.1	Methodology	14
6.1.2	Soil Quality Screening Values	14
6.2	Elevated Soil Concentrations	14
6.2.1	Asbestos	15
6.3	Ground Gas	15
6.4	Risk to Controlled Waters	16
6.5	Risk to Construction Workers	16
6.6	Risk to Plants	16
6.7	Risk to Services - Pipes	17
6.8	Advanced Conceptual Site Model	17
7	CONCLUSIONS AND RECOMMENDATIONS	10



## **CONTENTS**

## **APPENDICES**

APPENDIX 1 -	REPORT	LIMITATIONS		CONDITIO	NS
ALLFINDIV I -	NLFUNI	CHOTIALIDING	AIND	CONDITIO	

APPENDIX 2 - REFERENCES

APPENDIX 3 - DRAWINGS

APPENDIX 4 - COMPARISON OF CONSEQUENCES AGAINST PROBABILITY

APPENDIX 5 - EXPLORATORY HOLE LOGS

APPENDIX 6 - GAS AND GROUNDWATER MONITORING DATA

APPENDIX 7 - ENVIRONMENTAL LABORATORY TEST RESULT

## **TABLES**

	Page No.
Table 1 – Ground Conditions	9
Table 2 – Ground Gas Monitoring Results Summary	12
Table 3 – Groundwater Monitoring Results	12
Table 4 – Advanced Conceptual Site Model	18



## 1. INTRODUCTION

Geosphere Environmental Ltd was commissioned by Peter Wells Architects Ltd on behalf on the Client, Mrs. Jane Smith to undertake a Phase 2 Ground Investigation for a proposed residential conversion at Rishangles Hall, Eye Road, Rishangles, IP23 7LA.

It was understood that an existing modern barn is to be demolished and the adjacent historic barn is to be extended and converted into a single residential dwelling with associated car parking and garden areas.

A Proposed Development Plan, Peter Wells Architects drawing ref. PW941\_P102-RevD, is provided within Appendix 3.

The primary objectives of this ground investigation were to:

- Assess the ground conditions at the site;
- Assess the potential risk to human health and the environment based on the findings of the investigation.

These were achieved by:

- Undertaking an intrusive investigation of the site, based upon the findings of previous site data, the proposed development layout and the scope agreed with the client;
- Logging and sampling the soils on the site and noting any visual or olfactory evidence of contamination;
- Undertaking laboratory chemical analysis of selected soil samples to assess soil quality at the site;
- Installing monitoring wells for ground gas and groundwater level monitoring;
- Creating a Conceptual Site Model and defining suitable remedial / mitigating and verification actions.

## 1.1 Previous Reports

A Phase I Contaminated Land Assessment (hereafter referred to as 'the Phase I Report', report reference IE19/100, prepared by JPC Environmental Services was provided by the Client to assist in the preparation of this investigation. This report encompassed the subject site and the surrounding areas. The report highlighted the following as potential hazards relevant to the site:

- Potential Made Ground and potential asbestos containing materials (PACM) associated with historic demolition and redevelopment;
- Oil tanks and barrels;
- Potential migration of hazardous ground gases associated with infilled land offsite.



## 2. SITE SETTINGS

## 2.1 Site Description

The subject site was situated in Rishangles and may be located by National Grid Reference (NGR) TM 16445 67573.

The subject site was a rectangular portion of land covering an approximate area of 0.2ha. A full walkover was undertaken in conjunction with the Phase I Report. At the time of the investigation this area comprised hardstanding yard in the north with two barn structures in the centre and undeveloped land to the south. A rough track was present to the east of the barns forming access to the south. Scattered trees were present in the south.

A residential property bordered the site to the west while to the north and east further agricultural development continued. The southern boundary was formed by a drainage ditch, beyond which was undeveloped land.

A Site Location Plan is included within Appendix 3 as drawing reference 7213,GI/001/Rev0.



## 3. SITE WORKS

## 3.1 Methodology

This site investigation was carried out in accordance with the practices set out in BS 10175: 2011+A1:2013, (ref. **R.8**) and BS 5930: 2015 (ref. **R.9**). The location of exploratory holes has been planned, where possible, to give the best possible coverage of the proposed residential development within access restrictions and budgetary constraints while targeting any locations highlighted in the desk study and / or site walkover.

#### 3.2 Scope

Site works were carried out on 11 and 12 May 2023 and comprised the following:

- The formation of 9 windowless sampler boreholes;
- The installation of 2 ground gas / groundwater monitoring wells;
- The formation of a single hand dug pit.

Further investigation was undertaken on 28 November 2023 and comprised the following:

- The formation of 6 windowless sampler boreholes;
- The formation of 5 hand dug pits.

#### 3.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally confirmed the anticipated geology as interpreted from the British Geological Survey (BGS) digital mapping, at a scale of 1:50,000.

The sequence and indicative thickness of the strata encountered are provided below:

Table 1 - Ground Conditions											
Strata	Depth Encou	intered (mbgl)	Strata Thickness	Composition							
Strutu	From	То	(m)	Composition							
Concrete	0.0	0.10 to 0.13	0.10 to 0.13	WS08 and WS09 only.							
Made Ground	0.0	0.20 to 0.40	Unproven to 0.40	HP01: A dark brown silty gravelly sand. Gravel is fine to coarse flint, brick and cement bound ACM.							
				WS09: A greyish brown clayey gravelly sand with organic staining.							



Table 1 - Ground Conditions												
Strata	Depth Encour	ntered (mbgl)	Strata Thickness	Composition								
Strata	From	То	(m)	Composition								
Topsoil	0.0	0.45 to 0.60	0.45 to 0.60	WS01 to WS07.								
Cohesive deposits	0.13 to 0.40	0.40 to 1.20		Generally, an orange, brown sandy clay. Locally with flint gravel.								
Lowestoft Formation – diamicton	0.4 to 1.2	2.0	Unproven	All exploratory holes:  Generally, an orangish brown gravelly clay with chalk and flint, locally mottled grey.								

## 3.4 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of contamination within the recovered soils was noted during the investigation.



## 4. LABORATORY TESTING

## 4.1 Methodology

Representative environmental samples were taken at the depths shown on the exploratory hole records and despatched to the laboratory. The exploratory hole logs are included in Appendix 5.

Samples were collected for environmental purposes in amber glass jars and plastic tubs and kept in a cool box with cooling aid.

Samples were selected to give general coverage across the site including proposed garden areas.

#### 4.2 Environmental Testing Suite

#### 4.2.1 Quality Control

The environmental laboratory used (DETS) is an accredited laboratory by the United Kingdom Accreditation Service (UKAS), and at least 50% of individual parameters are from methods pending accreditation to the Environment Agency Monitoring Certification Scheme (MCERTS) for the range of analyses undertaken as part of this investigation. The MCERTS performance standard for the chemical testing of soil is an application of ISO 17025: 2005, specifically for the chemical testing of soil.

#### 4.2.2 Environmental Testing Suite - Soils

The suite of chemical analyses was based upon the findings of the site observations and the conceptual model. The full suite of chemical analyses were carried out on nine samples of soil. The nature of the analyses is detailed below:

- Metals screen arsenic, cadmium, chromium, lead, mercury, selenium, boron (water soluble),
   beryllium, copper, nickel, vanadium and zinc;
- Organic screen total petroleum hydrocarbons (TPH) with specific carbon banding; benzene, toluene, ethylbenzene and xylenes (BTEX); polyaromatic hydrocarbons (PAH) - USEPA 16 suite; monohydric phenols;
- Inorganics screen cyanide (total), sulphate (water soluble);
- Others pH, organic matter, asbestos;

Asbestos identification was also undertaken on a cement bound fragment of PACM.

A copy of the laboratory test results is included in Appendix 7.



## 5. MONITORING

#### 5.1 Ground Gas

Ground gas monitoring was undertaken by a suitably qualified environmental consultant, using a GFM436 landfill gas analyser and a MultiRaeLite Photo-ionisation detector (PID). The main determinants recorded were methane ( $CH_4$ ), carbon dioxide ( $CO_2$ ), oxygen ( $O_2$ ), VOCs as well as flow.

Ground gas monitoring was carried out in accordance with current guidance (ref. **R.23**). Six consecutive monitoring visits were undertaken over a period of 16 May 2023 to 19 June 2023 including falling barometric pressure conditions.

The results of ground gas monitoring are included in Appendix 6 and a summary is presented in the table below.

Table 2 - Ground Gas Monitoring Results Summary											
		Typi	cal Concent	Flow		Atmospheric					
Location	Methane	Carbon		Oxygen (O <sub>2</sub> ) [% v/v]		Rate	voc	Pressure			
	(CH <sub>4</sub> )	(CO₂) [	% v/v]								
	[% v/v]	(Max.)	(Min.)	(Max.)	(Min.)	(l/hr)	(ppm)	(mb)			
WS06	<0.1	7.3	0.5	21.7	18.5	0	4	1003 - 1022			
WS09	<0.1	0.4	<0.1	21.5	19.9	0	3	1003 - 1023			

## 5.2 Groundwater

Groundwater was not encountered within any of the exploratory holes during the site investigation.

During subsequent monitoring visits the measured groundwater levels were recorded using a dipmeter and the results of monitoring are presented in the table below:

Table 3 – Groundwater Monitoring Results											
Monitoring   Depth of   Groundwater Encountered at (mbgl)											
Well	Monitoring	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6				
	Well (mbgl)	16/05/23	23/05/23	30/05/23	06/06/23	13/06/23	19/06/23				
WS06	1.52	0.46	0.83	0.94	1.05	1.15	0.99				
WS09	1.46	0.18	0.24	0.11	0.03	0.27	0.19				

#### Notes:

Dry - no groundwater encountered.

n/m - not measured.

0 - well filled with water.



Although high water levels within WS09 were recorded, the results are not considered representative of groundwater levels in this area, as significant water ingress from the surface was noted during installation of this well, during a period of heavy precipitation. Due to the cohesive nature of the soils this was then unable to escape.



## 6. RISK ASSESSMENT

#### 6.1 Risk to Human Health

#### 6.1.1 Methodology

The current guidance requires that a conceptual model be formulated, based upon the findings of the research. The conceptual model is limited at this stage to the identification and assessment of potential 'hazards', identified or suspected from the results of the research; the potential 'receptors' that may be affected and the anticipated 'pathways' to those receptors. The findings are summarised in the following subsections.

The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification;
- Hazard Assessment;
- Risk Estimation;
- Risk Evaluation.

#### 6.1.2 Soil Quality Screening Values

A total of six representative soil samples were selected for testing and subjected to a suite of testing as detailed in section 4.2.2. The results of the soil analyses have been compared to soil quality screening values for the proposed end use of residential with plant uptake, where deemed applicable, such as:

- The LQM/CIEH S4ULs for Human Health Risk Assessment, (ref. R.21);
- Defra/CL:AIRE Final C4SLs, (ref. R.20).

Where the concentrations reported by the laboratory analysis (and thus determined onsite) are at or below the respective screening concentrations, they are considered not to pose a risk and are removed from further consideration, unless otherwise stated in the following sections.

#### **6.2 Elevated Soil Concentrations**

A single exceedance was recorded within the results of the initial round of testing. Within a sample taken from WS09 at a depth of 0.30m bgl, aromatic TPH in the C21-C35 band was recorded at a level of 1627mg/kg, compared to the screening value of 1100mg/kg based upon a soil organic matter (SOM) of 1%.



Further investigation and testing was then undertaken in the areas surrounding WS09, including proposed garden areas. The full suite of testing, as detailed within Section 4.2.2, was undertaken on 3 samples with TPH testing undertaken on 4 additional samples from around WS09. No elevated TPH was recorded within any of the samples selected for subsequent testing. However, a single marginal exceedance of Lead (203mg/kg compared to the screening value of 200mg/kg) was recorded within WS13.

#### 6.2.1 Asbestos

No visual evidence of PACM was noted within soils recovered from the windowless sampler boreholes. Nine representative samples selected for testing were also subjected to asbestos screening, with a positive result returned for a single sample from WS10 at 0.4m bgl situated below the concrete floor slab within the barn. Subsequent quantification testing confirmed that asbestos fibres were present at a level below the limit of reporting (<0.001% or <0.1mg/kg).

Cement bound PACM was noted near surface within HP01 within a rough track between the two existing barns, a sample was collected and dispatched to the environmental laboratory for testing which confirmed the presence of chrysotile asbestos fibres within the cement bound matrix. Four samples of the shallow Made Ground from along the length of the track were subsequently screened for asbestos fibres, with positive results returned for each sample. Asbestos quantification was undertaken on all four of these samples, which confirmed very low concentrations of loose fibres within the soil matrix; two samples recorded concentrations of 0.001% and two were below the limit of reporting (<0.001%).

Based upon observations and anecdotal evidence onsite it is likely that this is a result of historic mixed 'hardcore' being laid down to form the track.

This track is outside the fence line of the proposed residential property and therefore will not be directly disturbed as part of the proposed works. However, vehicle movements along this track introduce the risk of disturbance of cement bound ACM, potentially breaking up fragments and releasing asbestos fibres into the air or soil. Although this risk is relatively low, it cannot be ruled out and should be addressed as part of the Remediation Method Statement (RMS) for the site.

#### 6.3 Ground Gas

The results of the soil gas monitoring have been compared with current guidance (ref. R.23).

The results show no methane generation within soils, but limited generation of carbon dioxide. No significant gas flow was detected within the wells across the site.



A Gas Screening Value (GSV) has been equated for each of the monitoring points taking the highest recorded flow, Carbon Dioxide and Methane across the monitoring visits. On the basis of the recorded methane concentration a gas screening value of  $<0.01l_{CH4}/hr$  has been calculated. Similarly, on the basis of the recorded carbon dioxide concentrations, a gas screening value of  $<0.01l_{CO2}/hr$  has been calculated.

Based upon these results, the site would be placed in Characteristic Situation CS1 however, in accordance with BS8485, where carbon dioxide concentrations in exceedance of 5.0% are recorded an increase to CS2 must be considered. In this instance, due to the significant and consistent exceedance of this threshold a Characteristic Situation CS2 is considered appropriate.

#### 6.4 Risk to Controlled Waters

The risks to Controlled Waters from TPH contamination have been assessed with the available soil quality data only, as groundwater analysis was outside the scope of this investigation.

Although elevated concentrations were recorded in a single location, considering the relatively low levels, and the presence of cohesive soils the risk to controlled waters is low from the encountered contamination. Furthermore, additional investigation undertaken in the surrounding areas confirmed that this contamination was likely to be localised to the areas immediately surrounding WS09.

#### 6.5 Risk to Construction Workers

The concentrations do not pose a significant hazard to construction workers assuming that standard health and safety and good hygiene practices are applied during any groundworks.

## 6.6 Risk to Plants

A review of the commonly occurring phytotoxic chemicals, copper, nickel and zinc, has been undertaken based upon the now superseded ICRCL guidance. Although the ICRCL trigger threshold levels have been withdrawn; British Standard BS8601 provides a series of soil concentrations indicating suitable qualities for multipurpose subsoils, including concentrations of <300mg/kg for Zinc, <200mg/kg for Copper and <110mg/kg for Nickel as indicative parameters.

Concentrations of metals were recorded at concentrations below the thresholds considered to have phytotoxic effects. As a result of which, the risk to plants is assessed to be low. This is notwithstanding the quality of the soil utilised within areas of planting; soil quality in terms of nutrients and suitability for the applied planting is outside of the scope of this assessment and specialist advice may need to be sought along with utilising suitable quality landscaping materials.



#### 6.7 Risk to Services - Pipes

An initial comparison of the laboratory results has been made against the Contaminated Land Assessment Guidance, published by Water UK (Ref. **R.13**) also often termed the "UKWIR Guidance". Note, the full range of thresholds given in this guidance have not specifically been tested for within the scope of this investigation; further soil sampling and analysis may be required by the water providing company or designers.

The Made Ground soil analysis undertaken indicates concentrations of some TPH congeners that may have the potential to affect (permeate) standard PE pipes. Two initial options exist for consultation and agreement with the local water supply company prior to further design of the scheme and before laying any services: (1) Removal of all Made Ground or contaminated soil in the vicinity of the proposed routes of potable water pipes, appropriate recording of this and backfilling with clean soil / granular materials; this may also require pipe "wrapping" with geotextile. (2) Use of a "barrier" pipe and fittings throughout the development. As detailed within section 6.4. the removal of contaminated soil in this area is recommended to address potential risks to controlled waters which, depending on the extent of contamination and proposed service routes, may address this risk.

It is advised that the UK Water Industry Research Guidance (ref. **R.13**) is adopted and consultation with the local water company is sought prior to laying any services. In addition, as part of any Discovery Strategy for soil disturbance works, if suspected poor quality or contaminated soils are encountered where potable water pipes are to be laid, further assessment is likely.

## 6.8 Advanced Conceptual Site Model

Following the findings of the site investigation the Preliminary Conceptual Site Model for the site has been reviewed and the conclusions are presented in the Table 4 overleaf.



Table 4 – Advanced Conceptual Site Model																
	PATHWAYS:						RECEPTORS:									
Sources	Root Uptake	Direct Contact	Ingestion	Respiration	Gas Accumulation	Plants	End Users	Structures (Concrete)	Services/Utilities	Construction Workers	Controlled Waters (GW)	Risk Rating	Comments			
Made Ground – Asbestos in track – cement and very low levels of fibres.	N	N	N	U	N	N	Мо	N	N	N	N	LR		l loose fibres i	rack in the form of cement bound n very low concentrations. Low overall S.	
Site activities (inc. oil tanks).	U	L	L	U	U	Mi	Мо	Mi	Мо	Mi	Мо	LR-MR		Localised low to moderate risk identified around WS09 to proposed garden areas and controlled waters.		
Infilled land (offsite).	N	N	N	N	U	N	Mi	N	N	N	N	LR	Low risk ident	ified. CS2 cha	racterisation recommended.	
Legend: -	Prob	abilit	y:			Cons	equei	nce (	Sever	ity):		Risk Ra	ting:			
See Comparison of Consequence Against Probability within Appendix 4												\	Very High Risk	VH		
for Key to Legend.	Negligible (N)					Negligible (N)						High Risk	HR			
			kely (L kely (I				Mod		(Ma)				Medium Risk MR Low Risk LR			
			ely (H				Moderate (Mo) Severe (S)			Г	Negligible Risk NR					
	9	.,	J., (111	-,					5 (5)			<u>'</u>	1033.2.0 11.01			



#### 7. CONCLUSIONS AND RECOMMENDATIONS

Geosphere Environmental Ltd was commissioned by Peter Wells Architects Ltd on behalf on the Client, Mrs. Jane Smith to undertake a Phase 2 Ground Investigation for a proposed residential conversion at Rishangles Hall, Eye Road, Rishangles, IP23 7LA.

Based upon the findings of the desk study and walkover, a number of potential contaminant sources and pathways to sensitive receptors had been identified. These sources that warranted further investigation were potential Made Ground and potential asbestos containing materials (PACM) associated with historic demolition and redevelopment, oil tanks and barrels, and potential migration of hazardous ground gases associated with infilled land offsite.

Subsequent intrusive investigation determined that a single exceedance was recorded within the results of testing. Within a sample taken from WS09 at a depth of 0.30m bgl aromatic TPH in the C21-C35 band was recorded at a level of 1627mg/kg compared to the screening value of 1100mg/kg based upon a soil organic matter (SOM) of 1%. This is unsuitable for proposed garden areas and has the potential to impact groundwater and standard PE pipes. Further investigation of the surrounding areas confirmed that this contamination is likely to be localised to the areas immediately surrounding WS09. It is recommended that a Remediation Method Statement (RMS) is prepared for the site detailing how this risk should be addressed as part of the development process.

A marginal exceedance of lead was recorded within a single location – WS13. However, the risk from this concentration is low and this area is situated below an area of proposed hardstanding car parking, forming a pathway break to end users. No specific remedial measures are recommended, however appropriate PPE should be utilised during any work involving direct contact with soils in this area.

Cement bound PACM was noted near surface within HP01 within a rough track between the two existing barns. Laboratory testing confirmed the presence of chrysotile asbestos fibres within the cement bound matrix and further sampling along the track confirmed fibres at very low concentrations within the shallow soils. This track is outside the fence-line of the proposed residential property and therefore will not be directly disturbed as part of the proposed works. However, as this area of the site falls within the red line boundary it is considered part of the development and the risk of disturbance to asbestos will need to be addressed as part of the RMS.

Ground gas monitoring was carried out in accordance with current guidance. Carbon dioxide concentrations in exceedance of 5.0% were consistently recorded and therefore Characteristic Situation CS2 is considered appropriate.

It is recommended that this report be submitted to the Local Authority as part of the site's planning submission.



Although outside the scope of this investigation, as demolition of the buildings is proposed it would be necessary to undertake a Refurbishment and Demolition (asbestos survey) of the buildings, in accordance with MDHS guidance (ref. **R.8**).



# **APPENDICES**



## **Appendix 1 – Report Limitations and Conditions**

#### **General Limitations and Exceptions**

This report was prepared solely for our Client for the stated purposes only and is not intended to be relied on by any other party or for any other use. No extended duty of care to any third party is implied or offered.

Geosphere Environmental Ltd does not purport to provide specialist legal advice.

The Executive Summary, Conclusions and Recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon until considered in the context of the whole report.

Interpretations and recommendations contained in the report represent our professional opinions, which were arrived at in accordance with currently accepted industry practices at the time of reporting and based upon current legislation in force at that time.

## Environmental and Geotechnical Reporting (including Phase 1, Phase 2 and Site Walkovers) Limitations and Exceptions

The comments given in this report and the options expressed herein are based on the readily available information collated for the report and an assessment based upon the current guidance which for Phase 1 / Phase 2 report is guidance BS 10175: 2011+A1:2013 and BS 5930: 2015.

The report has been prepared in relation to the proposed end-use and should another end-use be intended, reassessment may be required.

No warranty is given as to the possibility of future changes in the condition of the site.

The opinions expressed cannot be absolute due to the limitation of time and resources imposed by the agreed brief.

With regards to any aspect of land contamination referred to, this is limited to those aspects specifically stated and necessarily qualified. No liability shall be accepted for other aspects which may be the result of gradual or sudden pollution incidents, past or present land uses and the potential for associated contamination migration.

Any Desk Study Report / data has been produced largely from the information purchased from The Landmark Information Group. The information is not necessarily exhaustive and further information



relevant to the site may be available from other sources. The information purchased has been assumed to be correct and free from errors; However, there is the possibility that some data may be missing from the report including (but not limited to) unrecorded land uses both onsite and offsite or unrecorded pollution events. No attempt has been made to verify the information.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed onsite, between and subsequent to the various map surveys provided.

Any site walkover undertaken is a snapshot of the site recording the visually evident conditions at the time of the walkover in the areas readily accessible. It is possible that after the walkover, the site was altered (for example by fly-tipping or groundworks) or before the walkover, the site conditions changed removing evidence of potentially contaminative features (such as oil tanks removed).

Any intrusive works only cover a tiny proportion of the site. Where exploratory holes are positioned by GEL, they are located to give as good a coverage of the site as possible and to target features / proposed land use where applicable while allowing for areas that cannot be accesses, Client requested locations and other site / time / budget constraints. While assumptions may have been drawn between exploratory holes on the ground conditions and / or extent or otherwise of any contamination, this is for guidance only and no liability can be accepted on its accuracy.

Foundation design is outside of the remit of Geosphere Environmental unless specifically stated and it is recommended that the services of foundation design specialists are sought as required. Any foundation appraisal contained with the report is limited to foundation optioneering.

Any Conceptual Site Model is based on the information available at the time of conducting this assessment and is an interpretive assessment of the conditions at the site. Redevelopment and / or further investigation of the site may reveal additional information and therefore alter the Conceptual Site Model and the report conclusions.

Any infiltration testing results are considered to be representative of the ground conditions at the locations tested and at the time of testing. As well as lateral variation in ground conditions, seasonal changes in ground water level may affect the results.

Any post-fieldwork monitoring (including ground gas / groundwater) is a snapshot of the conditions at the time of monitoring.



## **Appendix 2 - References**

- **R.1.** Land Contamination Risk Management (LCRM), 2020.
- **R.2.** Health Protection Agency and British Geological Survey, Report HPA-RPD-033 'Indicative Atlas of Radon in England and Wells', 2007.
- **R.3.** BRE Report 211, 'Radon, Guidance on the Protective Measures for New Buildings, 2015.
- **R.4.** BRE Digest 465, 'Cover Systems for Land Regeneration Thickness Cover Systems for Contaminated Land', 2004.
- **R.5.** Nitrates Directive (91/676/EEC) 1991.
- **R.6.** The Environmental Protection Act, Part IIA, Section 78, 1990.
- **R.7.** Environment Act 1995, Section 57, DoE 1995.
- **R.8.** British Standards Institute: BS 10175 'Investigation of Potentially Contaminated Sites', Code of Practice, BSI 2011+A2:2017.
- **R.9.** British Standards Institute: BS 5930 'Code of Practice for Ground Investigations', 2015.
- **R.10.** Asbestos: The Survey Guide, HSG 264, 2<sup>nd</sup> Edition, 2012.
- **R.11.** CL:AIRE 'Guidance on Comparing Soil Contamination Data with a Critical Concentration', The Chartered Institute of Environmental Health, May 2008.
- **R.12.** EIC/AGS/CL:AIRE. Soil Generic Assessment Criteria for Human Health Risk Assessment. Contaminated Land: Applications in Real Environments, London, UK, January 2010.
- **R.13.** Contaminated Land Assessment Guidance Protocols, Published by agreement between Water UK and the Home Builders Federation, Published by Water UK, January 2014.
- **R.14.** UKWIR 'Guidance for the Selection of Water Supply Pipes to be Used in Brownfield Sites, August 2010.
- **R.15.** CIRIA Reports 149 to 152, 'Methane and Associated Hazards to Construction', 1995.
- R.16. CIRIA Report C665, 'Assessing Risks Posed by Hazardous Ground Gases to Buildings', 2007.
- **R.17.** Environment Agency. Performance Standard for Laboratories Undertaking Chemical Testing on Soil, Version 4, March 2012.
- R.18. National Radiological Protection Board, Report NRPB-R290, 1996, 'Radon Atlas of England'.
- R.19. National House-Building Council, Standards, Chapter 4.2, 2018 'Building Near Trees'.
- **R.20.** SP1010 Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, Final Project Report (Revision 2), Contaminated Land: Applications in Real Environments (CL:AIRE) September 2014. Appendix H Lead.
- **R.21.** Land Quality Press, The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015.
- **R.22.** The Environment Agency, Technical Guidance WM3, 'Waste Classification: Guidance on the Classification and Assessment of Waste' 1<sup>st</sup> Edition, May 2015 (V1.1 May 2018).
- **R.23.** British Standards Institute, BS 8485, 'Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings', 2015.



## **Appendix 3 - Drawings**

Site Location Plan – Drawing ref. 7213,GI/001/Rev0

Exploratory Hole Location Plan – Drawing ref. 7213,GI/002/Rev1

Proposed Development Plan – Peter Wells Architects Drawing ref. PW941\_P102 RevD









## **SOURCE**

## © OpenStreetMap contributors

## **PROJECT**

Rishangles Hall, Eye Road, Rishangles, IP23 7LA

## TITLE

Site Location Plan

## **DRAWING NUMBER**

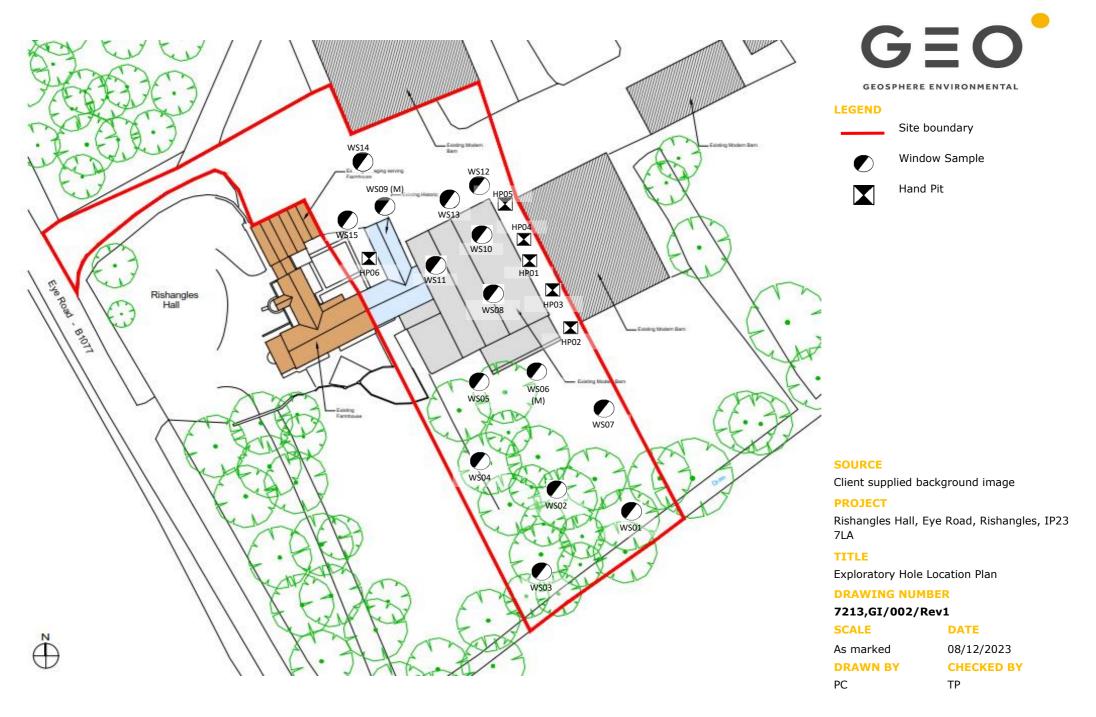
## 7213,GI/001/Rev0

SCALE DATE

As marked 06/06/2023

DRAWN BY CHECKED BY

PC TP







## Appendix 4 – Comparison of Consequences Against Probability

		Consequence (Severity of Linkage)									
		Severe (S)	Moderate (Mo)	Mild (Mi)	Negligible (N)						
	Highly Likely (HL)	Very High Risk (VH)	High Risk (HR)	Moderate Risk (MR)	Moderate/Low Risk (MR-LR)						
(Likelihood of ie from)	Likely (L)	High Risk (HR)	Moderate Risk (MR)	Moderate/Low Risk (MR-LR)	Low Risk (LR)						
Probability (Likeliho linkage from)	Unlikely (U)	Moderate Risk (MR)	Moderate/Low Risk (MR-LR)	Low Risk (LR)	Negligible Risk (NR)						
Prob	Negligible (N)	Moderate/Low Risk (MR-LR)	Low Risk (LR)	Negligible Risk (NR)	Negligible Risk (NR)						

This table is to provide reference information in conjunction with the GEL Conceptual Model attached within the Hazard Risk Assessment section of this report, Table 4 – Conceptual Model.

## Very High Risk (VH)

- There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR there is evidence that severe harm to a designated receptor is happening currently.
- Urgent investigation and remediation are likely to be required and advised.

#### High Risk (HR)

- Harm is likely to arise to a designated receptor from an identified hazard.
- Urgent investigation is required, and remedial works are likely necessary in both the short to long term.

## Moderate Risk (MR)

- It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.
- Investigation is required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.

#### Low Risk (LR)

• It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild. Limited investigation recommended.

Negligible Risk (NR)



•	There is a minimal possibility that harm could arise to a receptor. In the event of such harm realised it is high likely to not be severe. Investigation not deemed necessary.	being



## **Appendix 5 – Exploratory Hole Logs**

Windowless Sample Hole Logs (WS01 to WS15)

Hand Pit Logs (HP01 and HP06)

	CLIENT	: Mr	s Jar	e Smith		PROJECT: Rishan	gles I	Hall, Ris	hangle:	s							GRC	DUND	LEVEI	L m						HOLE No. WS01		
### Standing water level PP20WITE 1   Species and successful places are successful place						EXCAVATION METHOD:											Coo	<u>rdina</u> t	es/Gr	id Re	fere	ence:				SHEET 1 OF 1		
Touch to logic by the property of the property				AGS BH BET.				uncased	to 2.0	m													023			PROJECT NO. 7213,0	GI	
**WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support and submounded clask  **WAITS # Standing water level mizOMITEX Support clask			th [	epth* ਨੂੰ	•	•		Strata	1		Grapl	hical Repi	resenta	ation	Sa	$\overline{}$					L	Labora		esting		Additional Tests and Notes		
**WATEL ** Standing were level PEZONIZIO ***Dispersional Standing and providing party providing for a cold standing party providing for a cold standing party party (processed in the cold standing party party) (processed in the cold standing party party) (processed in the cold standing party				of 글 Water	Description o	f Strata	Leg	Reduced Level	Depth						Depths	Туре	No.	Blows	SPT N	<425 %	wc %	PL %	LL %	ρ Mg/m³	Cu kN/m²			
PANAISE Standing water and PIZOMITIES To Logic same Scale and Standing water and PIZOMITIES To Logic same Standing water and PIZOMITIES To Logic same Standing water and Discover same Standing water and Standing water water and Standing water water water and Standing water wat	-	-			Brown slightly sandy slightly gr	avelly ORGANIC CLAY	_	1	0.00	9		<u>203</u>	04	•	0 -	1				1			,-		,	_		
Orangich brown somey CLAY with fine roots  Orangich brown notice gree gravity CLAY Genetic 1.7.  Orang					with fine and medium roots. G medium subangular flint [TOPS	ravel is fine and OIL				ļ.,						-												
Orangish brown sandy CLAY with fine roots  Orangish brown mostlind grey gravelly CLAY. Gravel is fine to coarse subangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample blow count (35) lind					•	-																						
Orangish brown sandy CLAY with fine roots  Orangish brown mostlind grey gravelly CLAY. Gravel is fine to coarse subangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is subrangular and subrounded chalk  The substitute of sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample is compensation test. Blow. 55T Blows for each 75mm increment (35) lindisturbed sample blow count (35) lind																												
**MATER # Standing water level PIEZOMETER    Specific coarse subsequence of the programment of the programme															0.30	ES	1											
**MATER # Standing water level PIEZOMETER    Specific coarse subsequence of the programment of the programme							L.		0.45							1												
Orangish brown mottled grey gravelly CLAY. Gravel is To fine to coarse subangular and subrounded chalk  The fine to coarse					Orangish brown sandy CLAY wi	th fine roots	<b>-</b>		0.43	-						1												
TWATER ▼ Standing water level PEZOMETER STAND Upper seal SAMPLE D Small disturbed sample S Water strikes STAND IN STANDARD STAND																-												
TWATER ▼ Standing water level PIEZOMETER Standing water level							<b>-</b>									1												
**WATER ** Standing water level PilEZOMETER \$\frac{1}{27}\$ Upper seal \$\frac{5AMPLE}{17}\$ D \$\frac{5}{2}\$ mail disturbed sample \$\frac{5}{2}\$ Standard penetration text Blows \$\frac{5}{2}\$ blows for each 75mm increment (3) Undisturbed sample blow count (3) Undisturbed sample blow count (15) Undis									0.00																			
*WATER * Standing water level PitZOMETER Response zone AND B blik disturbed sample S standard penetration test Blows SPT blows for each 75mm increment (35) undisturbed sample blow count value of the control of the co					Orangish brown mottled grey g fine to coarse subangular and s	gravelly CLAY. Gravel is subrounded chalk	<u>-</u> -		0.80																			
*WATER \$\frac{\pi}{2}\$ Standing water level PIEZOMETER \( \frac{\pi}{2} \) Upper seal SAMPLE \( \text{D S mall disturbed sample} \) S Standard penetration test \( \text{SIONS for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \							E	4								1												
*WATER \$\frac{\pi}{2}\$ Standing water level PIEZOMETER \( \frac{\pi}{2} \) Upper seal SAMPLE \( \text{D S mall disturbed sample} \) S Standard penetration test \( \text{SIONS for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \text{SPT blows for each 75mm increment} \) (35) Undisturbed sample blow count \( \	-	†					<u> </u>		-	+					1 -	1										_		
*WATER \$\frac{1}{2}\$ Standing water level PiezoMeTer \$\frac{1}{2}\$ Upper seal Response zone Area Response zo							ļ	9								1												
*WATER \$\frac{1}{2}\$ Standing water level PIEZOMETER \$\frac{1}{2}\$ Upper seal SAMPLE D Small disturbed sample Response zone AND Lower seal TEST TEST TEST TEST TEST TEST TEST TES							<u> </u>	_								-												
*WATER \$\frac{1}{2}\$ Standing water level PIEZOMETER \$\frac{1}{2}\$ Upper seal SAMPLE D Small disturbed sample Response zone AND Lower seal TEST TEST TEST TEST TEST TEST TEST TES							-	1								1												
*WATER * Standing water level PIEZOMETER Response zone AND B Bulk disturbed sample Lower seal Lower seal Lower seal Fix U upper seal Response zone AND B Bulk disturbed sample K Permeability test SPTN N = SPTN N selections after seating N*120 = Total blows/penetration including seating SPTN N = SPTN N also (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN N also (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating seating SPTN N = SPTN solve (blows/penetration including seating seating SPTN N = SPTN solve (blows/penetration including seating seating SPTN N = SPTN solve (blows/penetration including seating SPTN SPTN SPTN SOlve (blows/penetration including seating SPTN SPTN SPTN SPTN SPTN SPTN SPTN SPTN	47						[ <del>-</del>																					
*WATER * Standing water level PIEZOMETER Response zone AND B Bulk disturbed sample Lower seal Lower seal Lower seal Fix U upper seal Response zone AND B Bulk disturbed sample K Permeability test SPTN N = SPTN N selections after seating N*120 = Total blows/penetration including seating SPTN N = SPTN N also (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN N also (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating seating SPTN N = SPTN solve (blows after seating N*120 = Total blows/penetration including seating seating SPTN N = SPTN solve (blows/penetration including seating seating SPTN N = SPTN solve (blows/penetration including seating seating SPTN N = SPTN solve (blows/penetration including seating SPTN SPTN SPTN SOlve (blows/penetration including seating SPTN SPTN SPTN SPTN SPTN SPTN SPTN SPTN	9						-																					
*WATER ** Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Lower seal Set Standard penetration test Lower seal Lower seal Set Standard penetration test Response zone Lower seal Lower seal Set Standard penetration test SpT N s-SPT Nature (25) Undisturbed sample blow count (35) Undisturbed sample blow count (35) Undisturbed sample blow count (35) Undisturbed sample blow count (25) Piston sample							E			<del>                                     </del>						1												
*WATER ** Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Lower seal Set Standard penetration test Lower seal Lower seal Set Standard penetration test Response zone Lower seal Lower seal Set Standard penetration test SpT N s-SPT Nature (25) Undisturbed sample blow count (35) Undisturbed sample blow count (35) Undisturbed sample blow count (35) Undisturbed sample blow count (25) Piston sample	20							1								1												
*WATER \$\frac{\textbf{Y}}{\text{Standing water level PIEZOMETER}} \begin{array}{ c c c c c c c c c c c c c c c c c c c	0 A C						E	4								-												
*WATER Y Standing water level PIEZOMETER Response zone Lower seal Upper seal Lower seal Piston sample Disturbed jar sample Disturbed ja																1												
*WATER Value Standing water level PIEZOMETER Water strikes  *Water strikes  *Sample D Small disturbed sample Bulk disturbed sample Undisturbed sample Bulk disturbed sample Bulk disturbed sample Conce penetration test K Permeability test  *Priston sample Piston sample Diston S							<u> </u>	4								]												
*WATER Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Disturbed sample Joisturbed sample Joisturbed jar sample Joisturbed sample Joist							<u>_</u> -	1																				
*WATER Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Disturbed sample Joisturbed sample Joisturbed jar sample Joisturbed sample Joist	- - -	Ī							2.00						2.	1										_		
*WATER Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Disturbed sample Joisturbed sample Joisturbed jar sample Joisturbed sample Joist	0															1												
*WATER Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Disturbed sample Joisturbed sample Joisturbed jar sample Joisturbed sample Joist	D N															1												
*WATER Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Disturbed sample Distu																-												
*WATER Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Disturbed sample Distu	۷ 5															1												
*WATER Standing water level PIEZOMETER Response zone Lower seal Lower seal Lower seal Disturbed sample Distu	5 S S S S S S S S S S S S S S S S S S S						L			Ц																		
Water strikes    H   Response zone Lower seal   H   TEST   U Undisturbed sample   K   Permeability test   SPT N   N = SPT N   Value (blows after seating)   N*120 = Total blows/penetration including seating		¥ s	Standi	ng water le	vel PIEZOMETER Depers					S 9	Stand	ard penet	ration	test B	lows SPT	blow	s for ea	ich 75mi	m incre	ment	Ή_	9 6		-	_		≤ I	1 2 7 7
P Piston sample N*120 = Total blows/penetration including seating ES Environmental soil sample <425 Sample % passing 425 micron sieve IP10 0BJ Telephone: 01603 298076	ă 10	ΔV	Water	strikes	H. Respon Lower s	seal TEST U	Undis	turbed san							PTN N=	SPT N	I value	(blows a	after sea	ating)		20		eosph nit 11	ere En Briaht	vironmental Ltd well Barns	VS01	우 [13]
ES Environmental soil sample <425 Sample % passing 425 micron sieve   F U T elepnone: U1603 2980/6   F	200				<del></del>	j	Distur	rbed jar saı							incl	uding	seating	g				N N	, IF	10 0E	J		N N	1 DE
DEPTH All depths, level and thicknesses in metres W Water Sample	לבר <i>י</i>				DEPTH All depths, level and	ES	Enviro	onmental s		e				<					nicron si	ieve			<u> </u>	eiepho	ne: 0'	1603 2980/6	•	Z

CLIENT	T: Mr	rs Ja	ne Smith		PROJECT: Rishan	gles I	Iall, Ris	hangle	s					GR	OUND	LEVE	L m						HOLE No. WS02		
LOGGED FIELDWC				CHECKED BY: TP DATE: 03/07/2023	EXCAVATION METHOD:	•	Window			er				Cod	ordina	tes/Gr	id Re	fere	nce:				SHEET 1 OF 1		
			AGS BH BETA	1 1			Uncased	1 to 2.0	m					DA <sup>-</sup>	TES 11	./05/2	023 -	11/	05/20	023			PROJECT NO. 7213,0	61	
Date/Time	Dep	oth	of Signature of Signature of Signature Signatu				Strata	1		Graphical Rep	resentati	on		ing/In-S	itu Testi				aborat	ory Te	esting		Additional Tests and Notes		
and Depth	of Casi		of ⊠ Water	Description of	of Strata	Leg	Reduced Level	Depth		SPT 'N'		Dep	ths 2	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²			
			Water -	Brown slightly sandy slightly gr with fine and medium roots. G medium subangular flint with of fragmens [TOPSOIL]  Orangish brown slightly gravel fine to coarse subangular flint  Orangish brown slightly sandy occasional sandy pockets. Grav subangular chalk	avelly ORGANIC CLAY ravel is fine and occasional brick  by sandy CLAY. Gravel is  gravelly CLAY with rel is fine and medium	Leg	Level	- 1.00			30 40	0.40	0 -	5 No.	Blows	S N	%*************************************	% % % % % % % % % % % % % % % % % % %	%	出 <u>%</u>	Mg/m³	kN/m²			
*WATER	R ₹ ;	Stand Wate	ing water lev	vel PIEZOMETER Upper: Respor Lower:	se zone AND B seal TEST U KEY P J ES	Bulk d Undis Pistor Distur Enviro	listurbed s turbed san sample bed jar sa onmental s	ample nple mple	C C	standard pene Cone penetrat Permeability t	ion test	SPT N	(35) Ur N = SP <sup>-</sup> N*120 includi	ws for edisturber N value Total Ing seating	ed samp e (blows plows/pe ng	le blow after se enetrati	count ating) on		GEOSPHER ENVIRONMENTAL	Uı IP	nit 11 10 0E	Bright J	nvironmental Ltd well Barns 1603 298076	HOLE No.	7213,GI SHEET 1 OF 1

CLIENT	Γ: Mrs	Jan	e Smith		PROJECT: Rishang	gles F	Iall, Ris	hangle	s			GRO	UND LE	VEL	m						HOLE No. WS03
LOGGED				CHECKED BY: TP	EXCAVATION METHOD:		Window					Coor	dinates	/Grid	d Re	<u>fere</u> ı	nce:				SHEET 1 OF 1
FIELDWC TEMPLAT			GS BH BET	DATE: 03/07/2023		l	Uncased	to 2.0	m	1			ES 11/0!					023			PROJECT NO. 7213,GI
Date/Time							Strata	1		Graphical Representation		ng/In-Situ	u Testing				borat		esting		Additional Tests and Notes
and Depth	of Casing		epth* of Vater	Description o	f Strata	Leg	Reduced Level	Depth		SPT 'N' Value	Depths d → d →	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²	
_				Dark brown sandy ORGANIC CL [TOPSOIL]  Orangish brown sandy CLAY	AY with fine roots			0.45		10 20 30 40	0 -							2			_
_				Orange mottled grey gravelly Omedium subangular and subro	LAY. Gravel is fine and unded chalk			1.20 - 2.00			2 -										_
*WATER	R ▼ Str ▼ W	tandir /ater	g water le strikes	vel PIEZOMETER Upper s Respon Lower s	se zone AND B eal TEST U KEY P J ES	Bulk d Undis Pistor Distur Enviro	listurbed sa turbed san sample bed jar sa onmental s	ample nple mple	C K	,	(35) Und T N N = SPT	disturbed N value ( Total blo g seating	l sample bl blows afte ows/penet	low co er seat tration	ount ting) n		GIIO	Uı IP	nit 11 10 0B	Bright J	nvironmental Ltd WS03 HEET 1 OF 1 1 1603 298076

CLIENT	: Mrs J	lan	e Smit	h		PROJECT: Rishai	ngles Į	Hall, Ris	hangle	5	lor.					GRO	DUND	LEVE	. m						HOLE No. WS04	
LOGGED E		EI			CHECKED BY: TP DATE: 03/07/2023	EXCAVATION METHO	D:	Window		•	ier					Coo	rdinate	es/Gr	id Re	fere	nce:				SHEET 1 OF 1	
FIELDWO TEMPLAT			GS BH B	ETA	DATE. 05/0//2023			Uncased	1 10 2.0	ın						DAT	ES 11/	<u>/05</u> /20	) <u>2</u> 3 -	11/	05/2	023			PROJECT NO. 7213	,GI
ate/Time		De	epth*	.72				Strata	1		Graphica	l Repre	sentation	Sai		g/In-Sit	tu Testin						esting		Additional Tests and Note	es
and Depth	of Casing	v	of Vater	r 162.	Description o	f Strata	Leg	Reduced Level	Depth			T 'N' Va		Depths	Type	No.	Blows	SPT N	<425 %	wc %	PL %	LL %	ρ Mg/m	Cu kN/m²		
-	-		-	+	Dark brown with occasional da	rk orangish brown		- Level	0.00	0_	10 20	30	40	0 -	Ė				70	70	70	/0	1416/111	KI4/III	-	
					Dark brown with occasional da mottling sandy ORGANIC CLAY [TOPSOIL]	with fine roots			0.00	ļ.,.																
					[1013012]																					
															1											
											• • • • • • • • • • • • • • • • • • • •				1											
															-											
														0.50		1										
									0.60	ļ.,.				0.50	_ [5	1										
					Orangish brown sandy CLAY			1	0.60																	
															1											
							<u>:-</u>				• • • • • • • • • • • • • • • • • • • •				1											
					Orangish brown slightly gravell	y sandy CLAY. Gravel is	=	1	0.90						-											
4	-				fine and medium subangular ar 1.00 Becoming grey mottled	nd subrounded chalk	==		-					1 -	-										_	
					rioo becoming givey mothed			1		ļ.,					-											
							<u> </u>																			
							<u></u>	1																		
															1											
								1			• • • • • • • • • • • • • • • • • • • •				1											
										-					-											
								1							-											
										ļ.,					1											
								1																		
					1.80 - 1.90 Pocket of fine and m	nedium sand		1																		
								1			• • • • • • • • • • • • • • • • • • • •															
+	-			H			-	1	2.00			_		2 -	1										-	
										ļ. !					-											
										ļ.,																
															1											
*\^/^TC	▼ C+	al:	<u> </u>	+	L DISTORACTED NO LIGHT		_ <del> </del>	alianumb c -1		Ψ,	Chandaii		ation tost	Dlaws CDT	hlavi	. fau	ab 75::::			_						
"WATER	¥ Star ▼ Wat	ndin ter s	ng water strikes	ieve	PIEZOMETER Upper s Respons Lower s	se zone AND E	B Bulk d	listurbed s	ample	C (	Cone pen	etratio	n test		Undi	sturbe	d sample	blow c	ount		G	<b>)</b> G	eospł	ere Ei	nvironmental Ltd	SHEET 1 OF 1 HOLE No. WS04
					Lowers	KEY F	P Pistor	turbed san n sample	•	K I	Permeabi	lity tes	t		.20 = 1	Total b	lows/per	nter sea netratio	ating) in		RE ENVIROR	" IE			well Barns	
						J F	J Distur	bed jar sai	mple oil samnl	e								icron si	eve			) ï			1603 298076	<u>•</u>
					Lower s  DEPTH All depths, level and	KEY F	P Pistor J Distur ES Enviro	n sample rbed jar sai onmental s	mple		rermeabi	iity tes		N*1	.20 = <sup>-</sup> uding	Total bl	lows/per	netratio	n		0	" IE	10 OE	3J Š		

CLIENT	: Mrs .	lane Smi	ith		PROJECT: Rishang	gles F	Hall, Risl	hangle	s						GROL	UND L	.EVEL	. m						HOLE No. WS05		
LOGGED		-		CHECKED BY: TP	EXCAVATION METHOD:		Window								Coord	dinate	s/Gri	id Re	fere	nce:			]	SHEET 1 OF 1		
FIELDWO TEMPLAT		EL EL AGS BH I	BETA	DATE: 03/07/2023		l	Uncased	to 2.0	m							S 11/0					023			PROJECT NO. 7213,	 31	
Date/Time	Depth						Strata			Graphical R	epresenta	tion		pling/l		Testing			Li	aborat		esting		Additional Tests and Note		
and Depth	of Casing	of Water	Piez.	Description o	f Strata	Leg	Reduced Level	Depth			N' Value		Depths	Туре	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²			
Depth -	Casing	Water		Dark brown slightly gravelly sar Gravel is fine to coarse subangu	dy ORGANIC CLAY. Ilar flint [TOPSOIL]		Level	0.60 0.80	0	10 20	30 40		1 - 2		No. I	BIOWS	N	%	%	%	%	Mg/m <sup>3</sup>	kN/m²			
*WATER	¥ Sta ¥ Wa	nding wate ter strikes	– + r leve	PI PIEZOMETER Upper s Respons Lower s	se zone AND B eal TEST U KEY P J ES	Bulk d Undist Piston Distur Enviro	listurbed sa turbed san sample bed jar sar onmental s	ample nple nple	C (	Standard pe Cone penetr Permeability	ation test	SF	(35) U PTN N = S N*12	Jndistu PT N v 0 = To ding se	urbed s alue (b tal blov eating	sample blows af ws/pend	blow c ter sea etratio	ount iting) in		GEOSPHER ENVIRONMENTAL	l Ui	nit 11 10 0B	Bright\ J	nvironmental Ltd well Barns 1603 298076	HOLE No. WS05	7213,GI SHEET 1 OF 1

CLIENT	: Mrs J	Jane	e Smith	<u>1</u>		PROJECT: Rish	angle	Hall, Ris	hangle	s							GRO	UND L	EVEL	. m						HOLE No. WS06		
LOGGED E					CHECKED BY: TP	EXCAVATION METH	IOD:	Window			ler						Coor	dinate	es/Gri	id Re	fere	nce:				SHEET 1 OF 1		
FIELDWO! TEMPLAT			GS BH BF	ТΔ	DATE: 03/07/2023			Uncased	to 2.0	) m								ES 11/0								PROJECT NO. 7213,0	3I	
ate/Time	Depth							Strata	9		Graphic	al Re	resen	tation	Sar			u Testing		L				esting		Additional Tests and Notes		
and	of		epth*   zie of   zie /ater		Description o	f Strata	Le	Reduced	Depth	$\prod$	SI	PT 'N'	Value		Depths	Туре	No.	Blows	SPT	<425	wc	PL %	LL	ρ,	Cu kN/m²			
Depth	Casing	VV	atei	Ļ.				E Level		d	10 2	20	30	40	Deptils 0 -	ŕ	NO.	biows	N	%	%	%	%	Mg/m	kN/m²	_		
				fi	Dark brown sandy slightly grave ine and medium roots. Gravel	elly ORGANIC CLAY wi is fine to coarse	th		0.00																			
				5	subangular flint [TOPSOIL]					11						1												
										11						-												
															0.40	ES	1											
					Orangish brown slightly gravell medium roots. Gravel is fine to	y sandy CLAY with	n	_	0.50				1	1		1												
				] "	neululii 100ts. Gravei is line to	coarse subangular III	''	-								1												
			淵				<u> </u>									-												
			泪						0.00																			
				fi	Orangish brown mottled grey g fine and medium subangular ch	ravelly CLAY. Gravel i alk	s 📮	-	0.80																			
			[:]	1	-		<u> </u>	_ 3		11				1		1												
+	_		:					-	-	-			·	-	1 -											_		
							<u> </u>	_								-												
							<u> </u>	-								_												
	•	↓	<u>:</u>	:			E	_																				
	-	Ť	Ħ					-		11																		
			[:]	:			Ŀ	_ 3		1						-												
			H	4				-		<b></b>		ļ	<b></b>			-												
							Ŀ																					
								-																				
							E-	_		11						1												
								-		1						-												
							Ŀ	_								-												
	7		.00	L				-	2.00						2 -											_		
20 mins		1.	.30						2.00						_											Inflow of water at 2m		
										11						1												
																1												
																-												
WATER	<b>▼</b> Sta	nding	g water l	evel	PIEZOMETER Depers	eal SAMPLE	D Sm	<del></del> all disturbed	sample	<u> </u>	Standard	d pen	etratio	n test	Blows SPT	blows 1	for ear	ch 75mm	n incre	l ment	$\top$							L (6
. = 1	₹ Wa	ter s	trikes		PIEZOMETER Upper s Respons Lower s	se zone AND eal TEST	B Bul	disturbed s disturbed sar	ample	C (	Cone per Permeak	netra	tion te	st	(35) PTN N =	Undist	urbed	sample	blow c	ount		2		eosph	nere Er	vironmental Ltd	HOLE No.	O퓨
					NAN FOMEL 2	KEY	P Pist	on sample	•		cinical	cy 1		`	N*1	20 = To	tal blo	ows/pen	etratio	n		HNORIVNE	" IP	nit 11 210 OE	⊡ignt\ 3J	well Barns	9 E	[끄띡
							ES Env	urbed jar sa ironmental s		le					incii 425 Sam	uding se ple % p			cron si	eve		C				1603 298076		
					DEPTH All depths, level and	thicknesses in metres	W Wa	ter Sample															•					L

CLIENT	: Mrs .	lane Smith	1	PROJECT: Rishang	gles I	Hall, Risl	hangle	s						GRC	DUND	LEVEL	. m						HOLE No. WS07		
LOGGED			CHECKED BY: TP	EXCAVATION METHOD:		Window					_			Coo	rdinate	es/Gri	id Re	ferer	nce:			]	SHEET 1 OF 1		
FIELDWO TEMPLAT		EL EL AGS BH BE <sup>T</sup>	DATE: 03/07/2023		'	Uncased	1 to 2.0	m	ı						ES 11/					23			PROJECT NO. 7213,	 3I	
Date/Time	Depth					Strata	1		Graphi	ical Repre	esentation	S		ng/In-Sit	tu Testin				borato		esting		Additional Tests and Note		
and Depth	of Casing	Depth* 3 Nater	Description of	Strata	Leg	Reduced Level	Depth			SPT 'N' Va		Depths	Туре	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²			
-			Dark brown slightly gravelly san Gravel is fine and medium suba flint and brick [TOPSOIL]	dy ORGANIC CLAY. ngular and subrounded			0.00					0											-		
			Brown becoming orangish brow	n sandy CLAY			0.50																		
-	_		1.00 Becoming gravelly. Gravel angular to subrounded flint	is fine to coarse			_					1	-										-		
s 3 1.GDT 3/1/24			1.60 With gravel of fine and me	dium chalk		-																			
GPJ GINI SID AGS 3						-							_												
7213,GI RISHANGLES HALL.GPJ							- 2.00					2											_		
_	¥ Sta ∇ Wa	nding water le ter strikes	evel PIEZOMETER Upper s Respons Lower s	e zone AND B eal TEST U KEY P J ES	Bulk of Undis Pistor Distur Enviro	listurbed sa turbed san sample bed jar sar onmental s	ample nple mple	C K	Cone p	rd penetr enetratio ability tes	t	35) SPT N N : N*	5) Und = SPT N 120 = luding	listurbed N value Total bl g seating	d sample (blows a lows/per	blow of fter sea netratio	ount iting) in		G ПО	Ur IP	nit 11 I 10 0B	Brightv J	nvironmental Ltd well Barns 1603 298076	HOLE No. WS07	7213,GI SHEET 1 OF 1

CLIENT	Γ: <b>M</b>	rs Ja	ne Smith		PROJECT: Rishan	gles I	Hall, Ris	hangle	s							GRO	DUND	LEVE	Lm						HOLE No. WS08		
LOGGED FIELDWO				CHECKED BY: TP DATE: 03/07/2023	EXCAVATION METHOD	<b>,</b> .	Window Uncased									Coo	rdinat	es/Gr	id Re	efere	ence:				SHEET 1 OF 1		
			AGS BH BET				Uncased	1 10 2.0								DAT	ES 12	/05/2	023 -	- 12,	/05/2	023			PROJECT NO. 7213,	GI	
Date/Time	Dep	pth	Depth*				Strata			Grap	ohical Re			Sa		g/In-Sit	tu Testir T	T				1	esting		Additional Tests and Note	S	
and Depth	Casi		Water	Descriptio	n of Strata	Leg	Reduced Level	Depth		10	SPT 'N'		40	Depths	Туре	No.	Blows	SPT N	<42! %	5 W(	C PL %	LL %	ρ Mg/m	3 KN/m <sup>2</sup>			
-	t		-	CONCRETE		9 4	4	0.00	Ť	Ť		Ť	Ī	0	1										-		
						A 4	4	0.13							1												
				Brown gravelly slightly sand coarse subangular and subro	CLAY. Gravel is fine to ounded flint		1	0.13							-												
						Ŀ																					
				0.40 - 0.55 With black stainii	ng and organic odour				11						1												
						<u> </u>	_		+					0.50	ES	1											
				Orangish brown mottled gre	v gravelly CLAV Gravel is	-	_	0.60							-												
				fine to coarse subangular an	d subrounded chalk																						
						-																					
						-			11																		
-	ł					<u> </u>		-	-					1	1										_		
				1.10 With coarse flint gravel		-									-												
				1.10 With coarse mint graver																							
															1												
										• • • • • •					1												
									<b>-</b>						-												
						-									-												
						-	4																				
						-																					
						-	4		11						1												
							1			• • • • • •					1												
-	+					+=-	1	2.00	H-	+		+	-	2	+										-		
									11						1												
															1												
	<u> </u>			<u> </u>			1		Ц_			Л			-					<u> </u>							1
*WATER	₹ Ţ	Stand	ling water le r strikes		onse zone AND B	Bulk c	disturbed disturbed s	ample			dard pen penetra						ach 75m d sampl				G	<b>)</b> G	eospl	nere Fr	nvironmental Ltd	동	25 24 1
				Lowe	r seal TEST U	Undis	turbed san				neability			SPTN N =	SPT N	l value		after se	ating)		HERE ENVIR	∎ U	Init 11	Bright	well Barns	8 E	7213,GI SHEET 1 OF 1
					J	Distur	rbed jar sa onmental s		ما					incl 425 San	uding	seating	g				C		P10 0E eleph		1603 298076	No.	7 6
				DEPTH All depths, level a	nd thicknesses in metres W			on samp	ic					3dll	ipie 7	o hassii	18 423 II	110115	icve			•	F	. •	<del>-</del>		

CLIENT	: Mrs J	ane :	mith		PROJECT: Rishan	gles (	Hall, Ris	hangle	S					GRO	DUND	LEVEL	. m						HOLE No. WS09		
LOGGED E		1		CHECKED BY: TP	EXCAVATION METHOD		Window			ei				Coo	rdinate	es/Gri	id Re	fere	nce:				SHEET 1 OF 1		
FIELDWO TEMPLAT			ВН ВЕТ.	DATE: 03/07/2023 A			Uncased	ı to 2.0	m ر					DAT	ES 12/	05/20	)23 -	12/0	05/20	23			PROJECT NO. 7213,GI		
ate/Time		Dept		· '			Strat	a		Graphical R	epresen	ntation	Sampl		tu Testin				borato		sting		Additional Tests and Notes		
and Depth	of Casing	of Wat	∺	Description of	f Strata	Leg	Reduced Level	Depth	١	SPT '	N' Value 30	40	Depths 2	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²			
1	-			CONCRETE		2 A	4	0.00	T	TT.	Ť		0 -										Heavy precipitation and surfa borehole filling from surface	ce water ¡	ροο
				MADE GROUND (Greyish brow (organic) clayey gravelly SAND subrounded fine to coarse flint	n locally stained black Gravel is angular to and chalk)			0.10					-										Ü		
				Grey mottled orangish brown	ravelly CLAY. Gravel is			0.40					0.30 ES	1											
				Grey mottled orangish brown page fine to coarse subangular and s	ubrounded chalk		<u> </u>																		
						 	-																		
1	-						<u> </u>	_					1 -										_		
													_												
			ĽH.																						
													_												
	_					_		2.00					2 -										_		
 WATER	▼ Stan ♀ Wat	ding v er stri	vater lev kes	vel PIEZOMETER Upper s	se zone AND B leal TEST U KEY P	Bulk d Undis Pistor	disturbed s turbed san n sample	ample mple	C (	Standard pe Cone penet Permeability	ration te	st	PT N N = SPT N*120	disturbe N value = Total b	d sample (blows a lows/per	blow of fter sea	ount ating)		GEOSPHERE ENVIRONI	Un	eospheit 11 I	Bright	nvironmental Ltd well Barns	1 OF 1 HOLE NO	SHEET
				DEPTH All depths, level and	ES	Enviro	rbed jar sa onmental s	inple soil sampl	le			<	425 Sample	ng seating % passir		icron si	eve		day.	Те	lepho	ne: 0	1603 298076	۱۰.	SHEET

CLIENT	: Mrs	Jan	e Smith		PROJECT: Rishang	gles	Hall, Risl	hangle	s .					GI	ROU	IND LE	VEL	m					HOLE No. WS10		
LOGGED I		251		CHECKED BY: TP DATE: 03/01/2024	EXCAVATION METHOD:		Window			er				Co	ordi	inates	/Grio	d Ref	eren	ce:			SHEET 1 OF 1		
			GS BH BETA	1 1			Uncased	10 2.0	m					DA	ATES	5 28/1:	1/20	23 -	28/1	1/202	23		PROJECT NO. 72:	L3,GI	
ate/Time	Depth	De	of Signature of Si				Strata	1	1	Graphical Rep	resentati	on		pling/In-	-Situ T			-		orator	y Test	ing	Additional Tests and N	otes	
and Depth	of Casing		of i≟ l	Description o	f Strata	Leg	Reduced Level	Depth		SPT 'N'	Value	De	pths	Type No	o. BI	slows 5	SPT N	<425 %	WC %	PL %	LL % Mį	ρ Cι g/m³ kN/	u m²		
_	-		-	MADE GROUND (Concrete with base).	plastic membrane at			0.00	<u> </u>	10 20	30 40		0 -										-		
				MADE GROUND (Dark greyish b gravelly clay. Gravel is fine to c sub-rounded concrete, chert an	orown /dark brown oarse sub-angular and nd chalk).			0.15					-												
				0.50 Concrete gravel no longer	present							0.40	) ]	ES 1											
													) [	ES 2											
=	_			Firm to stiff light brown gravell coarse sub-angular chalk.	y CLAY. Gravel is fine to	× × ×		1.20					1 -										_		
				coarse sub-angular criaix.		  -  -  -  -  -  -	- - -						-												
_	-		_	END OF EXPLORATORY HOLE		-0_	3	2.00					2 -										_		
*WATER	¥ Sta ∇ Wa	andin ater s	g water lev strikes	VELOPIEZOMETER Upper s Respondence to Lower s	se zone AND B leal TEST U KEY P	Bulk of Undis Pistor Distu	disturbed sa sturbed sam n sample irbed jar sar	ample nple mple	C C	Standard pene Cone penetrat Permeability t	ion test	SPT N	(35) U N = SI N*12 includ	Indisturl PT N valu 0 = Tota ling seat	bed sa ue (blo I blow ting	ample bl lows afte vs/penet	low co er seat tration	ount ing) 1	GEODAMEN BINANCE	III	Unit IP10	11 Brig 0 0BJ	Environmental Ltd htwell Barns	WS10	SHEET 1 OF 1
				DEPTH All depths, level and	ES	Envir	onmental s		le			<425	includ	ling seat	ting	425 micr			SMEENTAL	0	Tele	phone:	01603 298076	, ē	

CLIENT	: Mrs	Jan	e Smith		PROJECT: Rishang	gles	Hall, Risl	hangle	S							GRO	DUND	LEVE	L m						HOLE No. WS11		
LOGGED E		^FI		CHECKED BY: TP DATE: 03/01/2024	EXCAVATION METHOD:		Window									Coo	rdinat	es/Gr	id Re	efere	ence:				SHEET 1 OF 1		
			GS BH BETA	T T			Uncased	1 to 2.0	m							DAT	ES 28,	/11/2	023 -	28/	11/2	023			PROJECT NO. 7213	GI	
Date/Time	Depth	D	epth* ਨੂੰ				Strata	1		Grap	ohical Rep	resent	tation	Sa		g/In-Sit	tu Testir	ng			abora	tory T	esting		Additional Tests and Note	es.	
and Depth	of Casing	g V	epth* zi of zi Vater	Description o	f Strata	Leg	Reduced Level	Depth			SPT 'N'			Depths	Type	No.	Blows	SPT N	<425 %	wc %	PL %	LL %	ρ Mg/m	Cu kN/m²			
-	-			MADE GROUND (Concrete).		$\otimes$	\$	0.00	1		20	304	10	0 -	-								, , , , , , , , , , , , , , , , , , ,	,	-		
						$\bigotimes$	<u>}</u>	0.12					.		-												
				MADE GROUND (Brown sandy a coarse angular to sub-rounded	gravel. Gravel is fine to flint).	$\bowtie$	8	0.12																			
						$\bowtie$	8																				
						$\bowtie$	8							0.30	ES	1											
						$\bigotimes$	Ž	0.45		• • • • • • • • • • • • • • • • • • • •																	
				MADE GROUND (Soft greenish clay. Gravel is fine to coarse su	brown to grey gravelly b-angular and	$\bowtie$	8	0.43	-			<del> </del>	<del>  </del>		-												
				sub-rounded chert and chalk).		$\bowtie$	₹		.				.		-												
						$\bowtie$	K					ļ	.														
						$\bowtie$	8																				
						$\bowtie$	8							0.80	ES	2											
						$\otimes$	8																				
-	_					$\bowtie$	8	-	-			<del> </del>	<del>  </del>	1 ·	1										-		
						$\bowtie$	8						.		-												
						$\bowtie$	\$																				
						$\bowtie$	8																				
						$\bowtie$	8																				
						$\bowtie$	8			• • • • • •																	
				Firm to stiff grey gravelly CLAY.	Gravel is fine to coarse	$\stackrel{\sim}{\mathbb{R}}$	4	1.50	+			+	╁┤		1												
				chalk.		E	4								-												
						<u>_</u>	1						.		-												
						E	4						.[ ]														
							1																				
						E	4		-	• • • • • •		1			1												
+	-			END OF EXPLORATORY HOLE			7	2.00	+	+	+	+	+-+	2 -	1										-		
									ļ.ļ						-												
													.		-												
									11.			1	 		1												
*\\/\\TEP	▼ S+->		L +	vel PIEZOMETER D Uppers	eal SAMPLE D	Fmall	l disturbed :	cample	4	Stans	dard none	tratio	n tost [	lows Spt	hlove	c for co	ch 75~	m incre	mont	4							
WATER	¥ Sta	ater	strikes	vel PIEZOMETER Upper s Respons Lower s	se zone AND B	Bulk	disturbed sa disturbed sa sturbed sam	ample	C (	Cone	penetrat	tion tes	st	(35)	) Undi:	sturbe	d sample	e blow	count		G		eosph	ere Er	nvironmental Ltd	SS HOI	7213,6 SHEET 1 OF :
				<u>[</u> ∕∕∕_ Lower's	KEY P	Pisto	n sample	•	K I	rerm	eability t	esi	3	PTN N = N*1	120 = 1	Total b	lows/pe	netrati	aung) on		II I	I U	nit 11 10 0E	Bright 3J	well Barns	II E	3,GI ET F 1
					ES	Envir	rbed jar sar onmental s		le				<	incl 425 Sam		seating passin		nicron s	ieve			) To	elepho	one: 0	1603 298076	No.	
				DEPTH All depths, level and	thicknesses in metres W	Wate	r Sample	•														•					

CLIENT	T: M	irs Ja	ne Smit	th	_	PROJECT: Rishang	gles F	Iall, Risl	hangle	s							GRC	DUND	LEVEI	L m						HOLE No. WS12		
LOGGED					CHECKED BY: TP	EXCAVATION METHOD:		Window									Coo	rdinate	es/Gr	<u>id Re</u>	<u>fere</u>	nce:				SHEET 1 OF 1		
FIELDWC			. AGS BH B	FΤΑ	DATE: 03/01/2024		ι	Jncased	to 1.0	) m								ES 28/					023			PROJECT NO. 7213,	Gl	
Date/Time		pth			l			Strata			Gra	phical Re	presen	ntation	Sa			tu Testin				aborat		esting		Additional Tests and Note		
and Depth	1 (	of sing	of Water	Piez.	Description of	Strata	Leg	Reduced Level	Depth			SPT 'N	' Value	:	Depths	Туре	No.	Blows	SPT	<425	wc	PL %	LL %	ρ,	Cu kN/m²			
Бери	LCa.	31116	Water	+			1000	Level		d	10	20	30	40	0		140.	Diows	N	%	%	%	%	Mg/m <sup>3</sup>	kN/m²	_		
					MADE GROUND (Concrete).		$\bowtie$		0.00																			
l					MADE GROUND (Brown sandy g coarse sub-angular flint).	ravel. Gravel is fine to			0.10	11						1												
					coarse sub-arigular mirty.		$\bowtie$			11			· ·   · · · · ·		0.20	ES	1											
l					Firm to stiff greyish brown grave	ally CLAV Gravel is fine			0.30							-												
l					to coarse sub-angular and sub-r	ounded chalk.			0.00																			
l							F																					
													1	<del></del>		1												
l							<u> </u>						· -  - · · · ·			-												
1							<u>-</u>									-												
l																												
l																												
l										11						1												
-	+				END OF EXPLORATORY HOLE				1.00	<b>H</b>					1	+										_		
l					2/10 0/1 2/11 2011 11 0/11 11 0/22																							
l																												
l										11						1												
l										11						1												
t 2																-												
5																												
5																												
										11						1												
										1						-												
5																												
- -	Ť								-			+	1		2	1										-		
													· .  · · · ·			-												
2										11						1												
<u> </u>										11			·  ····			1												
				. ‡			<u> </u>			4						-					<u> </u>							
*WATER	₹	Stand	ling water r strikes	leve	I PIEZOMETER Upper se Respons Lower se			disturbed si				dard pen			Blows SPT	blows	for ea	ach 75mr d sample	m incre	ment		( Q	) <u>C</u> .	enenh	ere En	vironmental Ltd	≲ <del>⊼</del>	1 SH 23
	-				Lower se	eal TEST U	Undist	urbed san				neability			SPTN N=	SPT N	value		fter sea	ating)		HIRE ENVI	Uı	nit 11	Brightv	well Barns	S12	7213,GI SHEET 1 OF 1
8						j	Distur	bed jar sar	mple						incl	uding	seating	g				0	IP	10 0B		1603 298076	No.	Ծ <u>Շ</u>
					DEPTH All depths, level and t			nmental s Sample	oil samp	ıe					<425 San	npie %	passin	ng 425 m	ıcron si	ieve			• 16	, cpi io	c. U	1000 200070		2

CLIENT	: Mrs	Jan	e Smith		PROJECT: Rishang	gles	Hall, Risl	nangle	S					GRO	UND	LEVEL	. m						HOLE No. WS13		
LOGGED E		CEI		CHECKED BY: TP DATE: 03/01/2024	EXCAVATION METHOD:		Window Uncased			er				Cooi	rdinate	es/Gri	id Re	fere	nce:				SHEET 1 OF 1		
			GS BH BETA	1			Uncased	10 2.0	, 111					DAT	ES 28/	11/20	)23 -	28/1	1/20	)23			PROJECT NO. 7213,0	GI .	
ate/Time	Depth	n De	of Signature of Si				Strata		1	Graphical Rep	resentation	Sa		g/In-Sit	u Testing				borate	ory Te	esting		Additional Tests and Notes		
and Depth	of Casing		of ide	Description of	of Strata	Leg	Reduced Level	Depth		SPT 'N'	Value 30 40	Depths	Туре	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²			
-				MADE GROUND (Concrete).				0.00		10 20	30 40	. 0	-										-		
				MADE GROUND (Light greyish gravelly SAND. Gravel is fine to sub-rounded chert and concre	brown to dark grey coarse sub-angular and te).			0.16					-												
									 			0.50	ES	1											
			-	Firm to soft dark grey to grey s Gravel is fine to coarse sub-an chert and chalk.	lightly gravelly CLAY. gular and sub-rounded	<u>~</u>		0.60																	
						  -  -  -	•																		
-	=							_	<del> </del>			1											_		
				Firm to stiff greyish brown gra and medium chalk.	velly CLAY. Gravel is fine	  -  -  -  -	•	1.40																	
							4																		
				END OF EXPLORATORY HOLE				2.00				2											-		
*WATER	▼ Sta ▼ Wa	andin ater s	g water lev		se zone AND B	Bulk	disturbed sa	ample	CC	itandard pene	ion test	(35	) Undi	sturbed	d sample	blow c	ount		. <b>Q</b>		eosph	ere Er	nvironmental Ltd	HOLE I	SHI
				Lower  DEPTH All depths, level and	KEY P J ES	Pistor Distur Enviro	sturbed sam n sample rbed jar sar onmental s	nple		Permeability t	est	SPT N N = N* inc <425 Sar	120 = 1 luding	Fotal bl seating	ows/per	etratio	n		III O	Ur IP	nit 11 10 0B	Bright\ J	well Barns 1603 298076	LE No.	유 1

LOGGED B FIELDWOR TEMPLATE	Y: PC				PROJECT: Rishan	gies i	iaii, itisi	iangie	5							GRC	DUND	LEVEL	. m						HOLE No. WS14		
				CHECKED BY: TP	EXCAVATION METHOD	٠.	Window									Cooi	rdinate	es/Gri	id Re	fere	nce:			]	SHEET 1 OF 1		
			BETA	DATE: 03/01/2024		l	Uncased	to 1.0	m								ES 28/					023			PROJECT NO. 7213,	GI	
Date/Time	Depth				·		Strata	ı		Graphic	al Repr	esentat	tion	Sai			u Testin				aborat		esting		Additional Tests and Note		
and	of Casing	of Water	Piez.	Descriptio	n of Strata	Leg	Reduced Level	Depth			PT 'N' V			Depths	Туре	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Mg/m³	Cu kN/m²			
+			+-	MADE GROUND (Concrete).		- XXX	LEVE	0.00	1	10_2	2030	40	#	0 -					/0	70	,0	,0	.716/111				
			N C	MADE GROUND (Dark grey/ lay. Gravel is fine to coarse	greyish brown gravelly chert).			0.20																			
				•	•		1								1												
														0.40	ES	1											
															-												
											·····				1												
											····-				-												
			-	Grey gravelly CLAY. Gravel is	fine and medium chalk	<u> </u>		0.90			ļ				-												
				, • ,		Ĕ	1	1.00	<u> </u>		ļļ			1 -											_		
				IND OF EXPLORATORY HOLI COBBLE	- REFUSAL - POSSIBLE			1.00							_												
															-												
											ļļ				-												
															_												
									<del>    -  </del>																		
															1												
											·····				1												
											·····				1												
	-							_	$\vdash$					2 -	-										_		
											ļ																
															1												
											·····				1												
															-												
*WATER	▼ Star ▼ Wat	ding water er strikes	· level	. <del>  .  .</del> Resp	onse zone AND B er seal TEST U KEY P	Bulk d Undis Pistor	disturbed s listurbed sam turbed sam n sample bed jar sar	ample nple	C (	Standard Cone per Permeab	netratio	n test		(35) PTN N = N*1	Undis SPT N .20 = T	turbed value	d sample (blows a lows/per	blow of fter sea	ount iting)		GEOSPHERE ENVIRONNI	Ur IP	nit 11 10 0B	Brightv J	nvironmental Ltd well Barns	HOLE No. WS14	7213,GI SHEET 1 OF 1
				DEPTH All denths level a		S Enviro	onmental s		е				<4	425 Sam				icron si	eve		CHIAL O	Τε	elepho	ne: 01	1603 298076		

CLIENT	Մ։ Mrs	s Jan	e Smith		PROJECT: Rishang	gles I	Hall, Risl	hangle	s							GRO	UND	LEVEI	L m						HOLE No. WS15		
LOGGED				CHECKED BY: TP	EXCAVATION METHOD:		Window									Cooi	rdinat	es/Gr	id Re	fere	nce:				SHEET 1 OF 1		
FIELDWO TEMPLAT			AGS BH BET	DATE: 03/01/2024			Uncased	to 2.0	m								ES 28/					023			PROJECT NO. 7213,	GI	
Date/Time				i '			Strata			Graphica	l Repre	sentatio	on	Sar			u Testin						esting		Additional Tests and Note		
and Depth	of Casin		of Nater	Description o	f Strata	Leg	Reduced Level	Depth			T 'N' Va			Depths	Туре	No.	Blows	SPT N	<425 %	WC %	PL %	LL %	ρ Ma/m³	Cu kN/m²			
<u> </u>	<u> </u>	+		MADE GROUND (Concrete).		XXX	Level	0.00	9	10 2	30	40	#	0 -				IN	/0	/0	/0	/0	IVIG/III	KIN/III	-		
				WADE GROUND (CONCrete).		$\bowtie$	3	0.00	<b></b>																		
				MADE GROUND (Brown sandy g	gravel. Gravel is fine to			0.13																			
				coarse angular to sub-rounded	flint).	$\bowtie$	3																				
						$\bowtie$	3						0	.30	ES	1											
						$\bowtie$	<b>X</b>		ļ.ļ																		
						$\bowtie$	3	0.50																			
1				Firm to stiff greyish brown grav and medium chalk.	elly CLAY. Gravel is fine			0.50																			
1						[ <del>-</del>	4							•	1												
1						-0_							0	.70	ES	2											
							4		ļ.ļ					-													
				Orangish brown fine and mediu	ım SAND.	<u> </u>		0.85	ļ.,																		
-	Ť					· · ·		_						1 -											=		
1						<b>:</b> :::								-	1												
1				Firm dark grey gravelly CLAY. G	ravel is fine and	<u>-</u> o_	1	1.20			.			-	1												
				medium chalk.	raver is fine and									-													
t t							}																				
5														-													
5							}		-					-													
<u>-</u>							]		ļ.ļ					-	1												
						-	}		ļ																		
						Ĕ.																					
							1																				
						<u> </u>								-	†												
_	+			END OF EXPLORATORY HOLE		<u> </u>	}	2.00	$\vdash$	+		+	$-\parallel$	2 -	1										-		
														•													
2															1												
) 2 3															-												
			<u> </u>	<u> </u>		L_			Щ				_														
*WATER	R ¥ St ∇ va	tandii	ng water le strikes	vel PIEZOMETER Upper s Respons Lower s			disturbed			Standard Cone pen			st Blo				ch 75mi				G		ooch	oro En	nvironmental Ltd	₹	1 1
	~ VI	va (C)	SUINCS	Lowers	eal TEST U	Undis	turbed san			Permeabi			SPT	N N = 9	SPT N	value	(blows a	fter sea	ating)		DHERE ENVIR	U	nit 11	Bright	well Barns	HOLE No. WS15	7213,GI SHEET 1 OF 1
B					j	Distur	n sample rbed jar sar							inclu	uding s	seating					C	. IP	10 0B	J	1603 298076	No.	1 P
SEL,				DEPTH All depths, level and			onmental s r Sample	oil sampl	е				<42	25 Sam	ple %	passin	g 425 m	icron si	ieve		<i>-</i>	• 16	vehil	лю. U	1000 20070		

### GII

Geosphere Environmental Ltd Unit 11 Brightwell Barns IP10 0BJ Telephone: 01603 298076

### **TRIAL PIT LOG**

	Client		TRIAL PIT No
angles	Mrs Jan	e Smith	LIDO1
11-05-23 Grou	nd Level (m)	Coordinates/Grid Reference ()	HP01
11-05-23			
	Logged By		Sheet
	PC		1 of 1
	11-05-23 Grou	Angles Mrs Jan  11-05-23 11-05-23 Logged By	Angles Mrs Jane Smith  11-05-23 Ground Level (m) Coordinates/Grid Reference ()  Logged By

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.20	MADE GROUND (Dark brown silty gravelly SAND. Gravel is fine to coarse subangular flint, concrete and PACM)			ES1ES	
0.20	Terminated due to PACM				
		-			

GEL AGS TP BETA 7213,GI RISHANGLES HALL.GPJ GINT STD AGS 3\_1.GDT 3/1/24 0.3 -**₹** 0.3 Shoring/Support: Stability: Checked By TP All dimensions in metres Scale 1:5 Method Hand Pit Plant Used HAND DUG

GIIO

Geosphere Environmental Ltd Unit 11 Brightwell Barns IP10 0BJ Telephone: 01603 298076

**TRIAL PIT LOG** 

Project			Client		TRIAL PIT No
Rishangles Ha	II, Rishangles		Mrs Jan	e Smith	HP06
Job No	Date 28-11-23	Groun	d Level (m)	Coordinates/Grid Reference ()	ПРОО
7213,GI	28-11-23				
Fieldwork By			Logged By		Sheet
GEL			PC		1 of 1

0.					1 01 1
Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.20	MADE GROUND (Concrete).	-			
0.20-0.40	MADE GROUND (Brown sandy gravel. Gravel is fine to coarse sub-an flint, chert and occasional red brick).		0.30	1ES	
0.40	END OF EXPLORATORY HOLE - NFP PERCHED WATER INGRESS				



### **Appendix 6 – Gas and Groundwater Monitoring Data**

### **GROUND GAS AND GROUNDWATER MONITORING DATA**



Project Number: 7213,GI

**Project Name:** Rishangles Hall, Eye Road, Rishangles, IP23 7LA

**Date:** 03/07/2023

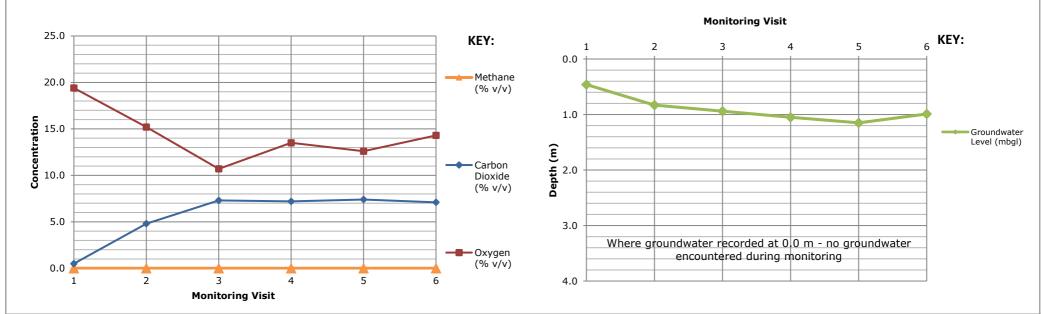
Explorate	ory Hole Loc	ation	WS06										Date of Installation	11/05/2023
Return Visit #	Monitoring Date	Atmospheric Pressure	Methane	Content	Carbon Dioxide	Oxygen	Flow Rate	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level	Base of Well	Weather Conditions	Comments / Pressure Rise or Fall
		(mb)	(% v/v)	(% LEL)	(% v/v)	(% v/v)	(l/hr)		,		(mbgl)	(mbgl)		
1st visit	16/05/2023	1016	<0.1	<2	0.5	19.4	0.0	0	0	1	0.46	1.49	Warm, sunny, dry, breezy	
2nd visit	23/05/2023	1019	<0.1	<2	4.8	15.2	0.0	0	0	0	0.83	1.52	Warm, cloudy, dry, windy	
3rd visit	30/05/2023	1022	<0.1	<2	7.3	10.7	0.0	0	0	0	0.94	1.48	Cool, cloudy, dry, windy	
4th visit	06/06/2023	1017	<0.1	<2	7.2	13.5	0.0	0	0	0	1.05	1.49	Cool, overcast, damp, breezy	Falling pressure
5th visit	13/06/2023	1008	<0.1	<2	7.4	12.6	0.0	0	0	1	1.15	1.41	Hot, sunny, dry, breezy	
6th visit	19/06/2023	1003	<0.1	<2	7.1	14.3	0.0	0	0	4	0.99	1.47	Hot, sunny, damp, breezy	
·	nto Hoodi	CEM426 gas an	alveau / DI	D M I+: D A E	lika				NOTE:	n/n	Not applied	bla		

**Instruments Used:** GFM436 gas analyser / PID MultiRAE lite

REMARKS:

NOTE: n/a Not applicable

**nm** Not measured



### **GROUND GAS AND GROUNDWATER MONITORING DATA**



12/05/2022

Project Number: 7213,GI

Exploratory Hole Location

**Project Name:** Rishangles Hall, Eye Road, Rishangles, IP23 7LA

WSOO

**Date:** 03/07/2023

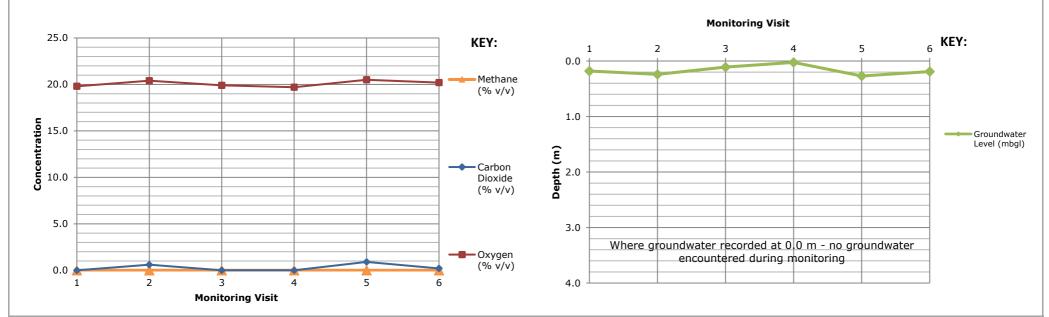
Date of Installation

Hole Loca	ation	W209										Date of Installation	12/05/2023
onitoring Date	Atmospheric Pressure	Methane	Content	Carbon Dioxide	Oxygen	Flow Rate	H2S (ppm)	CO (ppm)	VOC (ppm)	Water Level	Base of Well	Weather Conditions	Comments / Pressure
	(mb)	(% v/v)	(% LEL)	(% v/v)	(% v/v)	(l/hr)		(11 )	(11 )	(mbgl)	(mbgl)		
5/05/2023	1017	<0.1	<2	0.0	19.8	0.0	0	0	1	0.18	1.41	Warm, sunny, dry, breezy	
3/05/2023	1020	<0.1	<2	0.6	20.4	0.0	0	0	0	0.24	1.42	Warm, cloudy, dry, windy	
0/05/2023	1023	<0.1	<2	0.0	19.9	0.0	0	0	0	0.11	1.46	Cool, cloudy, dry, windy	
5/06/2023	1017	<0.1	<2	0.0	19.7	0.0	0	0	1	0.03	1.41	Cool, overcast, damp, breezy	Falling pressure
3/06/2023	1008	<0.1	<2	0.9	20.5	0.0	0	0	0	0.27	1.34	Hot, sunny, dry, breezy	
9/06/2023	1003	<0.1	<2	0.2	20.2	0.0	0	0	3	0.19	1.39	Hot, sunny, damp, breezy	
	)23		023 1003 <0.1	023 1003 <0.1 <2	023 1003 <0.1 <2 0.2	023 1003 <0.1 <2 0.2 20.2	023 1003 <0.1 <2 0.2 20.2 0.0	023 1003 <0.1 <2 0.2 20.2 0.0 0	023 1003 <0.1 <2 0.2 20.2 0.0 0 0	223 1003 <0.1 <2 0.2 20.2 0.0 0 3	023 1003 <0.1 <2 0.2 20.2 0.0 0 0 3 0.19	023 1003 <0.1 <2 0.2 20.2 0.0 0 0 3 0.19 1.39	023 1003 <0.1 <2 0.2 20.2 0.0 0 0 3 0.19 1.39 Hot, sunny, damp, breezy

**Instruments Used:** GFM436 gas analyser / PID MultiRAE lite

REMARKS:

NOTE: n/a Not applicable nm Not measured





### **Appendix 7 – Environmental Laboratory Test Result**





Peter Coyne Geosphere Environmental Ltd Brightwell Barns Ipswich Road Brightwell Suffolk IP10 0BJ

### **Derwentside Environmental Testing Services Ltd**

Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

### **DETS Report No: 23-06248**

Site Reference: Rishangles Hall

Project / Job Ref: 7213, GI

Order No: None Supplied

Sample Receipt Date: 15/05/2023

Sample Scheduled Date: 15/05/2023

Report Issue Number: 1

Reporting Date: 23/05/2023

Authorised by:

Kevin Old Operations Director

KO C

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 1/025 accreditation. Inis certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.





Soil Analysis Certificate						
DETS Report No: 23-06248	Date Sampled	11/05/23	11/05/23	11/05/23	11/05/23	11/05/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	HP01	WS01	WS02	WS04	WS06
Project / Job Ref: 7213, GI	Additional Refs	ES1	ES1	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.10	0.30	0.40	0.50	0.40
Reporting Date: 23/05/2023	DETS Sample No	651569	651570	651571	651572	651573

Determinand	Unit	RL	Accreditation				
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected
рН	pH Units	N/a	MCERTS	7.7	7.7	7.6	7.7
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1
Complex Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1
W/S Sulphate as SO <sub>4</sub> (2:1)		< 10	MCERTS	< 10	< 10	< 10	< 10
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	< 0.01	< 0.01	< 0.01	< 0.01
Organic Matter (SOM)	%	< 0.1	MCERTS	3	3.4	3.6	3.4
Arsenic (As)	mg/kg	< 2	MCERTS	6	8	9	8
Barium (Ba)	mg/kg	< 2.5	MCERTS	20	31	32	34
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5	0.5	0.5	0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	1	1.1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.2	0.3	0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7	10	11	12
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2
Copper (Cu)		< 4		9	13	13	16
Lead (Pb)	mg/kg	< 3	MCERTS	12	28	21	24
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Molybdenum (Mo)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	8	11	12	12
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	15	21	22	22
Zinc (Zn)	mg/kg	< 3	MCERTS	35	71	103	75





Soil Analysis Certificate					
DETS Report No: 23-06248	Date Sampled	11/05/23	11/05/23		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Rishangles Hall	TP / BH No	WS08	WS09		
Project / Job Ref: 7213, GI	Additional Refs	ES1	ES1		
Order No: None Supplied	Depth (m)	0.50	0.30		
Reporting Date: 23/05/2023	DETS Sample No	651574	651575		

Determinand	Unit	RL	Accreditation				
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	8.9	10.1		
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1		
Complex Cyanide	mg/kg	< 1	NONE	< 1	< 1		
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1		
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	171	58		
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	0.17	0.06		
Organic Matter (SOM)	%	< 0.1	MCERTS	3.2	1.2		
Arsenic (As)	mg/kg	< 2	MCERTS	12	8		
Barium (Ba)	mg/kg	< 2.5	MCERTS	45	23		
Beryllium (Be)	mg/kg	< 0.5	MCERTS	0.6	< 0.5		
W/S Boron	mg/kg	< 1	NONE	< 1	< 1		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2		
Chromium (Cr)	mg/kg	< 2	MCERTS	10	9		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	15	14		
Lead (Pb)	mg/kg	< 3	MCERTS	10	10		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1		
Molybdenum (Mo)	mg/kg	< 1	MCERTS	2.8	1.8		
Nickel (Ni)	mg/kg	< 3	MCERTS	18	13		
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2		
Vanadium (V)	mg/kg	< 1	MCERTS	21	18		
Zinc (Zn)	mg/kg	< 3	MCERTS	37	49		





Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-06248	Date Sampled	11/05/23	11/05/23	11/05/23	11/05/23	11/05/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	WS01	WS02	WS04	WS06	WS08
Project / Job Ref: 7213, GI	Additional Refs	ES1	ES1	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.30	0.40	0.50	0.40	0.50
Reporting Date: 23/05/2023	DETS Sample No	651570	651571	651572	651573	651574

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6





Soil Analysis Certificate - Speciated PAHs				
DETS Report No: 23-06248	Date Sampled	11/05/23		
Geosphere Environmental Ltd	Time Sampled	None Supplied		
Site Reference: Rishangles Hall	TP / BH No	WS09		
_				
Project / Job Ref: 7213, GI	Additional Refs	ES1		
Order No: None Supplied	Depth (m)	0.30		
Reporting Date: 23/05/2023	DETS Sample No	651575		

Determinand	Unit	RL	Accreditation			
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	0.27		
Phenanthrene	mg/kg	< 0.1	MCERTS	0.55		
Anthracene	mg/kg	< 0.1	MCERTS	0.24		
Fluoranthene	mg/kg	< 0.1	MCERTS	3.04		
Pyrene	mg/kg	< 0.1	MCERTS	2.50		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	1.18		
Chrysene	mg/kg	< 0.1	MCERTS	1.19		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.99		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.48		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.48		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.42		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	12.3		





Soil Analysis Certificate - TPH CWG B	anded					
DETS Report No: 23-06248	Date Sampled	11/05/23	11/05/23	11/05/23	11/05/23	11/05/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	HP01	WS01	WS02	WS04	WS06
Project / Job Ref: 7213, GI	Additional Refs	ES1	ES1	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.10	0.30	0.40	0.50	0.40
Reporting Date: 23/05/2023	DETS Sample No	651569	651570	651571	651572	651573

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 : HS 1D MS AL	ma/ka	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS 1D MS AL	ma/ka	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34 : EH CU 1D AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34): HS 1D MS+EH CU 1D AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21
Aromatic >C5 - C7 : HS 1D MS AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS 1D MS AR	ma/ka	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH CU 1D AR	ma/ka	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	ma/ka	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH CU 1D AR	ma/ka	< 2	MCERTS	< 2	< 2	< 2	< 2
Aromatic >C16 - C21 : EH CU 1D AR	ma/ka	< 3	MCERTS	< 3	< 3	< 3	< 3
Aromatic >C21 - C35 : EH CU 1D AR	ma/ka	< 10	MCERTS	< 10	< 10	< 10	< 10
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	ma/ka	< 21	NONE	< 21	< 21	< 21	< 21
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42





Soil Analysis Certificate - TPH CWG Banded									
DETS Report No: 23-06248	Date Sampled	11/05/23	11/05/23						
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied						
Site Reference: Rishangles Hall	TP / BH No	WS08	WS09						
Project / Job Ref: 7213, GI	Additional Refs	ES1	ES1						
Order No: None Supplied	Depth (m)	0.50	0.30						
Reporting Date: 23/05/2023	DETS Sample No	651574	651575						

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 :	ma/ka	< 0.01	NONE	< 0.01	< 0.01		
HS 1D MS AL	1119/119	` 0.01	HOME	1 0.01	1 0.01		
Aliphatic >C6 - C8 :	mg/kg	< 0.05	NONE	< 0.05	< 0.05		
HS 1D MS AL Aliphatic >C8 - C10 :							
EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2		
Aliphatic >C10 - C12 :	mg/kg	< 2	MCERTS	< 2	< 2		
EH CU 1D AL	mg/kg	\ 2	MCERTS	\ 2	\ 2		
Aliphatic >C12 - C16 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3		
Aliphatic >C16 - C21 :	mg/kg	< 3	MCERTS	< 3	< 3		
EH CU 1D AL	IIIg/kg	< 3	MCERTS	< 3	< 3		
Aliphatic >C21 - C34 :	mg/kg	< 10	MCERTS	< 10	< 10		
EH CU 1D AL Aliphatic (C5 - C34) :							
HS 1D MS+EH CU 1D AL	mg/kg	< 21	NONE	< 21	< 21		
Aromatic >C5 - C7 :	ma/ka	< 0.01	NONE	< 0.01	< 0.01		
HS 1D MS AR	1119/119	1 0.01	110112	1 0.01	1 0.01		
Aromatic >C7 - C8 : HS 1D MS AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05		
Aromatic >C8 - C10 :	ma/lea	< 2	MCERTS	< 2	< 2		
EH CU 1D AR	mg/kg	< 2	MCERIS	< 2	< 2		
Aromatic >C10 - C12 :	mg/kg	< 2	MCERTS	< 2	< 2		
EH CU 1D AR Aromatic >C12 - C16 :	3, 3						
EH CU 1D AR	mg/kg	< 2	MCERTS	< 2	4		
Aromatic >C16 - C21 :			MOTERTO		26		
EH CU 1D AR	mg/kg	< 3	MCERTS	< 3	26		
Aromatic >C21 - C35 :	mg/kg	< 10	MCERTS	< 10	1627		
EH CU 1D AR	1119/119	. 10	· IOEKIO	110	1027		
Aromatic (C5 - C35) :	ma/ka	< 21	NONE	< 21	1656		
HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	1050		
Total >C5 - C35 :							
HS_1D_MS+EH_CU_1D_Tot	mg/kg	< 42	NONE	< 42	1656		
al							





Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-06248	Date Sampled	11/05/23	11/05/23	11/05/23	11/05/23	11/05/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	WS01	WS02	WS04	WS06	WS08
Project / Job Ref: 7213, GI	Additional Refs	ES1	ES1	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.30	0.40	0.50	0.40	0.50
Reporting Date: 23/05/2023	DETS Sample No	651570	651571	651572	651573	651574

Determinand	Unit	RL	Accreditation					
Benzene: HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	7	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	5	3	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	4	9	8	15	4
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	3	4	3	7	< 2
MTBE : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5





Soil Analysis Certificate - BTEX / MTBE									
DETS Report No: 23-06248	Date Sampled	11/05/23							
Geosphere Environmental Ltd	Time Sampled	None Supplied							
Site Reference: Rishangles Hall	TP / BH No	WS09							
_									
Project / Job Ref: 7213, GI	Additional Refs	ES1							
Order No: None Supplied	Depth (m)	0.30							
Reporting Date: 23/05/2023	DETS Sample No	651575							

Determinand	Unit	RL	Accreditation		
Benzene: HS 1D MS	ug/kg	< 2	MCERTS	< 2	
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	3	
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	
MTBE: HS 1D MS	ug/kg	< 5	MCERTS	< 5	





Bulk Analysis Certificate DETS Report No: 23-06248 Date Sampled 11/05/23 None Supplied Geosphere Environmental Ltd Time Sampled Site Reference: Rishangles Hall TP / BH No HP01 Project / Job Ref: 7213, GI Additional Refs ES1 Order No: None Supplied Reporting Date: 23/05/2023 Depth (m) 0.10 **DETS Sample No** 651569

Determinand	Unit	RL	Accreditation			
Asbestos Type (S)	PLM Result	N/a	ISO17025	Chrysotile		
Sample Matrix (S)	Material Type	N/a	NONE	Cement		

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification) that is in accordance with the Health and Safety Executive HSG 248 Appendix 2.

Subcontracted analysis (S)

This report refers to samples as received, and Dets Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS  $\!\!$  Accreditation.

RL: Reporting Limit





Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-06248	
Geosphere Environmental Ltd	
Site Reference: Rishangles Hall	
Project / Job Ref: 7213, GI	
Order No: None Supplied	
Reporting Date: 23/05/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
651570	WS01	ES1	0.30	18	Brown sandy clay with stones
651571	WS02	ES1	0.40	18.9	Brown sandy clay with vegetation
651572	WS04	ES1	0.50	18.9	Brown sandy clay with vegetation
651573	WS06	ES1	0.40	19.6	Brown sandy clay
651574	WS08	ES1	0.50	24.6	Brown clay
651575	WS09	ES1	0.30	16.1	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test Insufficient Sample  $^{\rm I/S}$  Unsuitable Sample  $^{\rm I/S}$ 





Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-06248

Geosphere Environmental Ltd

Site Reference: Rishangles Hall

Project / Job Ref: 7213, GI

Order No: None Supplied

Reporting Date: 23/05/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR		Determination of BTEX by headspace GC-MS	E001
Soil	D		Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D		Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of	E016
3011	AK		1,5 diphenylcarbazide followed by colorimetry	
Soil	AR		Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR		Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR		Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D		Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesei Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	·	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D		Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR		Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR		Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	C12-C16, C16-C21, C21-C40)		E004
Soil	D		Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D		Determination of TOC by combustion analyser.	E027
Soil	D		Determination of TOC by combustion analyser.	E027
Soil	D AD		Determination of TOC by combustion analyser.	E027
Soil	AR	•	Determination of ammonium by discrete analyser.  Determination of fraction of organic carbon by oxidising with potassium dichromate followed by	E029
Soil	D	FOC (Fraction Organic Carbon)	titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D		Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR		Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D		Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR		Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenois - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D		Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil Soil	D D		Determination of total sulphate by extraction with 10% HCI followed by ICP-OES  Determination of sulphate by extraction with water & analysed by ion chromatography	E013 E009
Soil	D		Determination of sulphate by extraction with water & analysed by foil circumatography  Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR		Determination of water soluble sulphate by extraction with water followed by 1cl OLS  Determination of sulphide by distillation followed by colorimetry	E014
Soil	D		Determination of salphide by distillation followed by Colonined y  Determination of total sulphur by extraction with agua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by	E017
Soil	D	Toluene Extractable Matter (TEM)	addition of ferric nitrate followed by colorimetry Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with	E010
-		TPH CWG (ali: C5- C6, C6-C8, C8-C10,	iron (II) sulphate	
			Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	
Soil	AR		cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
		C12-C16, C16-C21, C21-C35)	cartilage for Co to Coo. Co to Co by ricauspace oc-115	
		TPH LQM (ali: C5-C6, C6-C8, C8-C10,	District Control of the control of the first bank of CC FTD Control of CC FTD Contro	
Soil	AR		Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	E004
			cartridge for C8 to C44. C5 to C8 by headspace GC-MS	
		C12-C16, C16-C21, C21-C35, C35-C44)		
Soil	AR		Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001
	Dried			

D Dried AR As Received





List of HWOL Acronyms and Operators
DETS Report No: 23-06248
Geosphere Environmental Ltd
Site Reference: Rishangles Hall
Project / Job Ref: 7213, GI
Order No: None Supplied
Reporting Date: 23/05/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det Assessment
Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aliphatic C5 - C34 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C35 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C35 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS





Peter Coyne Geosphere Environmental Ltd Brightwell Barns Ipswich Road Brightwell Suffolk IP10 0BJ

### **Derwentside Environmental Testing Services Ltd**

Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

### DETS Report No: 23-14801

Site Reference: Rishangles Hall

Project / Job Ref: 8062

Order No: None Supplied

Sample Receipt Date: 04/12/2023

Sample Scheduled Date: 04/12/2023

Report Issue Number: 1

**Reporting Date:** 08/12/2023

Authorised by:

Kevin Old

Operations Director

KO C

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.





Soil Analysis Certificate						
DETS Report No: 23-14801	Date Sampled	28/11/23	28/11/23	28/11/23	28/11/23	28/11/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	WS10	WS10	WS11	WS13	WS14
Project / Job Ref: 8062	Additional Refs	ES1	ES2	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.40	0.80	0.30	0.50	0.40
Reporting Date: 08/12/2023	DETS Sample No	688458	688459	688460	688461	688462

Determinand	Unit	RL	Accreditation		(n)		
Asbestos Screen (S)	N/a	N/a	ISO17025	Detected		Not Detected	
				Chrysotile			
Sample Matrix <sup>(S)</sup>	Material Type	N/a	NONE	present as fibre			
				bundles			
Asbestos Type (S)	PLM Result	N/a	ISO17025	Chrysotile			
pH	pH Units	N/a	MCERTS	7.8		8.3	
Total Cyanide	mg/kg	< 1	NONE	< 1		< 1	
Complex Cyanide	mg/kg	< 1	NONE	< 1		< 1	
Free Cyanide		< 1	NONE	< 1		< 1	
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS	145		156	
W/S Sulphate as SO <sub>4</sub> (2:1)	g/l	< 0.01	MCERTS	0.14		0.16	
Organic Matter (SOM)	%	< 0.1	MCERTS	3.7		2.8	
Arsenic (As)	mg/kg	< 2	MCERTS	10		10	
Barium (Ba)	mg/kg	< 2.5	MCERTS	44		56	
Beryllium (Be)		< 0.5	MCERTS	< 0.5		< 0.5	
W/S Boron	mg/kg	< 1	NONE	1.2		< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.2		0.3	
Chromium (Cr)	mg/kg	< 2	MCERTS	11		12	
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2		< 2	
Copper (Cu)	mg/kg	< 4	MCERTS	28		52	
Lead (Pb)	mg/kg	< 3	MCERTS	33		203	
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1		< 1	
Molybdenum (Mo)	mg/kg	< 1	MCERTS	< 1	_	< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	15		14	
Selenium (Se)	mg/kg	< 2	MCERTS	< 2		< 2	
Vanadium (V)	mg/kg	< 1	MCERTS	19		20	
Zinc (Zn)	mg/kg	< 3	MCERTS	92		190	

<sup>(</sup>n) 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





Soil Analysis Certificate						
DETS Report No: 23-14801	Date Sampled	28/11/23	28/11/23	28/11/23	28/11/23	28/11/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	WS15	HP02	HP03	HP04	HP05
Project / Job Ref: 8062	Additional Refs	ES1	ES1	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.30	0.10	0.10	0.10	0.10
Reporting Date: 08/12/2023	DETS Sample No	688463	688464	688465	688466	688467

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Detected	Detected	Detected	Detected
					Chrysotile	Chrysotile	Chrysotile	Chrysotile
Sample Matrix <sup>(S)</sup>	Material Type	N/a	NONE		present as fibre	present as fibre	present as fibre	present as fibre
					bundles	bundles	bundles	bundles
Asbestos Type (S)	PLM Result	N/a	ISO17025		Chrysotile	Chrysotile	Chrysotile	Chrysotile
pН	pH Units	N/a	MCERTS	10.1				
Total Cyanide	mg/kg	< 1	NONE	< 1				
Complex Cyanide	5	< 1	NONE	< 1				
Free Cyanide		< 1	NONE	< 1				
W/S Sulphate as SO <sub>4</sub> (2:1)		< 10	MCERTS	129				
W/S Sulphate as SO <sub>4</sub> (2:1)		< 0.01	MCERTS	0.13				
Organic Matter (SOM)	%	< 0.1	MCERTS	1.1				
Arsenic (As)	mg/kg	< 2	MCERTS	8				
Barium (Ba)	mg/kg	< 2.5	MCERTS	36				
Beryllium (Be)		< 0.5		< 0.5				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2				
Chromium (Cr)	mg/kg	< 2	MCERTS	11				
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2				
Copper (Cu)	mg/kg	< 4	MCERTS	103				
Lead (Pb)	mg/kg	< 3	MCERTS	21				
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1				
Molybdenum (Mo)	mg/kg	< 1	MCERTS	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	19				
Selenium (Se)	mg/kg	< 2	MCERTS	< 2				
Vanadium (V)	mg/kg	< 1	MCERTS	16				
Zinc (Zn)	mg/kg	< 3	MCERTS	43		-	-	





Soil Analysis Certificate												
DETS Report No: 23-14801	Date Sampled	28/11/23										
Geosphere Environmental Ltd	Time Sampled	None Supplied										
Site Reference: Rishangles Hall	TP / BH No	HP06										
Project / Job Ref: 8062	Additional Refs	ES1										
Order No: None Supplied	Depth (m)	0.30										
Reporting Date: 08/12/2023	DETS Sample No	688468										

Determinand	Unit	RL	Accreditation	(n)			
Asbestos Screen (S)	N/a	N/a	ISO17025				
Sample Matrix <sup>(S)</sup>	Material Type	N/a	NONE				
Asbestos Type (S)	PLM Result	N/a	ISO17025				
pH	pH Units	N/a	MCERTS				
Total Cyanide	mg/kg	< 1	NONE				
Complex Cyanide	mg/kg	< 1	NONE				
Free Cyanide		< 1	NONE				
W/S Sulphate as SO <sub>4</sub> (2:1)	mg/l	< 10	MCERTS				
W/S Sulphate as SO <sub>4</sub> (2:1)		< 0.01	MCERTS				
Organic Matter (SOM)	%	< 0.1	MCERTS				
Arsenic (As)	mg/kg	< 2	MCERTS				
Barium (Ba)	mg/kg	< 2.5	MCERTS				
Beryllium (Be)	mg/kg	< 0.5	MCERTS				
W/S Boron	mg/kg	< 1	NONE				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS				
Chromium (Cr)	mg/kg	< 2	MCERTS				
Chromium (hexavalent)	mg/kg	< 2	NONE				
Copper (Cu)	mg/kg	< 4	MCERTS				
Lead (Pb)	J, J	< 3	MCERTS				
Mercury (Hg)		< 1	MCERTS				
Molybdenum (Mo)	mg/kg	< 1	MCERTS				
Nickel (Ni)		< 3	MCERTS		·		
Selenium (Se)	mg/kg	< 2	MCERTS				
Vanadium (V)		< 1	MCERTS				
Zinc (Zn)	mg/kg	< 3	MCERTS				





Soil Analysis Certificate - Speciated PAHs					
DETS Report No: 23-14801	Date Sampled	28/11/23	28/11/23	28/11/23	
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	
Site Reference: Rishangles Hall	TP / BH No	WS10	WS13	WS15	
Project / Job Ref: 8062	Additional Refs	ES1	ES1	ES1	
Order No: None Supplied	Depth (m)	0.40	0.50	0.30	
Reporting Date: 08/12/2023	DETS Sample No	688458	688461	688463	

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	< 0.1	MCERTS	0.18	< 0.1	< 0.1	
Phenanthrene	mg/kg	< 0.1	MCERTS	1.09	0.27	< 0.1	
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	< 0.1	MCERTS	0.91	0.62	0.28	
Pyrene	mg/kg	< 0.1	MCERTS	0.70	0.52	0.26	
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.29	0.28	0.16	
Chrysene	mg/kg	< 0.1	MCERTS	0.33	0.29	0.18	
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.29	0.30	0.24	
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.24	0.22	0.21	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.13	0.13	0.16	
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.12	0.13	
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	4.2	2.7	1.6	





Soil Analysis Certificate - TPH CWG Banded											
DETS Report No: 23-14801	Date Sampled	28/11/23	28/11/23	28/11/23	28/11/23	28/11/23					
Geosphere Environmental Ltd	Time Sampled	None Supplied									
Site Reference: Rishangles Hall	TP / BH No	WS10	WS10	WS11	WS13	WS14					
Project / Job Ref: 8062	Additional Refs	ES1	ES2	ES1	ES1	ES1					
Order No: None Supplied	Depth (m)	0.40	0.80	0.30	0.50	0.40					
Reporting Date: 08/12/2023	DETS Sample No	688458	688459	688460	688461	688462					

Determinand	Unit	RL	Accreditation		(n)			
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21 : EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	3	< 2	< 2	< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	3	< 2	< 2	< 2	< 2
Aromatic >C16 - C21 : EH CU 1D AR	mg/kg	< 3	MCERTS	5	< 3	< 3	< 3	< 3
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Total >C5 - C35 : HS_1D_MS+EH_CU_1D_Tot al	0. 0	< 42	NONE	< 42	< 42	< 42	< 42	< 42

<sup>(</sup>n) 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





Soil Analysis Certificate - TPH CWG Bander	d				
DETS Report No: 23-14801	Date Sampled	28/11/23	28/11/23		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Rishangles Hall	TP / BH No	WS15	HP06		
Project / Job Ref: 8062	Additional Refs	ES1	ES1		
Order No: None Supplied	Depth (m)	0.30	0.30		
Reporting Date: 08/12/2023	DETS Sample No	688463	688468		

Determinand	Unit	RL	Accreditation		(n)		
Aliphatic >C5 - C6 :	ma/ka	< 0.01	NONE	< 0.01	< 0.01		
HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01		
Aliphatic >C6 - C8 :	ma/ka	< 0.05	NONE	< 0.05	< 0.05		
HS_1D_MS_AL		. 0.00		1 0.00			
Aliphatic >C8 - C10 :	mg/kg	< 2	MCERTS	< 2	< 2		
EH_CU_1D_AL Aliphatic >C10 - C12 :							
EH CU 1D AL	mg/kg	< 2	MCERTS	< 2	< 2		
Aliphatic >C12 - C16 :	,,	-					
EH CU 1D AL	mg/kg	< 3	MCERTS	< 3	< 3		
Aliphatic >C16 - C21 :	mg/kg	< 3	MCERTS	< 3	< 3		
EH_CU_1D_AL	mg/kg	/ )	MCERTS	\ 3	\ 3		
Aliphatic >C21 - C34 :	mg/kg	< 10	MCERTS	< 10	< 10		
EH_CU_1D_AL	313				. = •		
Aliphatic (C5 - C34):	ma/lea	< 21	NONE	< 21	< 21		
HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21		
Aromatic >C5 - C7 :							
HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01		
Aromatic >C7 - C8 :	ma/lea	< 0.05	NONE	< 0.05	< 0.05		
HS_1D_MS_AR	тіу/ку	< 0.05	NONE	< 0.05	< 0.05		
Aromatic >C8 - C10 :	mg/kg	< 2	MCERTS	< 2	< 2		
EH_CU_1D_AR	1119/119	` -	11021(10	``-	``_		
Aromatic >C10 - C12 :	mg/kg	< 2	MCERTS	< 2	< 2		
EH_CU_1D_AR Aromatic >C12 - C16 :							
EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	2		
Aromatic >C16 - C21 :		_			_		
EH CU 1D AR	mg/kg	< 3	MCERTS	< 3	5		
Aromatic >C21 - C35 :	mg/kg	< 10	MCERTS	< 10	11		
EH_CU_1D_AR	IIIg/kg	< 10	MCERTS	< 10	11		
Aromatic (C5 - C35):	_						
HS 1D MS+EH CU 1D AR	mg/kg	< 21	NONE	< 21	< 21		
Total >C5 - C35 :	pas /les	< 42	NONE	. 43	. 42		
HS_1D_MS+EH_CU_1D_Tot al		< 42	INOINE	< 42	< 42		
dl							





Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-14801	Date Sampled	28/11/23	28/11/23	28/11/23	28/11/23	28/11/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	WS10	WS10	WS11	WS13	WS14
Project / Job Ref: 8062	Additional Refs	ES1	ES2	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.40	0.80	0.30	0.50	0.40
Reporting Date: 08/12/2023	DETS Sample No	688458	688459	688460	688461	688462

Determinand	Unit	RL	Accreditation		(n)			
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	3	< 2	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	4	< 2	< 2	< 2	< 2
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

<sup>(</sup>n) 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





Soil Analysis Certificate - BTEX / MTBE					
DETS Report No: 23-14801	Date Sampled	28/11/23	28/11/23		
Geosphere Environmental Ltd	Time Sampled	None Supplied	None Supplied		
Site Reference: Rishangles Hall	TP / BH No	WS15	HP06		
Project / Job Ref: 8062	Additional Refs	ES1	ES1		
Order No: None Supplied	Depth (m)	0.30	0.30		
Reporting Date: 08/12/2023	DETS Sample No	688463	688468		

Determinand	Unit	RL	Accreditation	(n)	
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2 < 2	
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5 < 5	
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2 < 2	
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2 < 2	
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2 < 2	
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5 < 5	





Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 23-14801	
Geosphere Environmental Ltd	
Site Reference: Rishangles Hall	
Project / Job Ref: 8062	
Order No: None Supplied	
Reporting Date: 08/12/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
688458	WS10	ES1	0.40	15.8	Brown sandy clay with stones
688459	WS10	ES2	0.80	16.8	Grey clay with stones
688460	WS11	ES1	0.30	4.2	Brown gravelly sand with stones
688461	WS13	ES1	0.50	17.4	Brown gravelly sand with stones
688462	WS14	ES1	0.40	11.1	Brown sandy clay
688463	WS15	ES1	0.30	8	Brown gravelly sand with stones
688468	HP06	ES1	0.30	13.2	Brown sandy gravel with stones

Moisture content is part of procedure E003 & is not an accredited test Insufficient Sample  $^{\rm I/S}$  Unsuitable Sample  $^{\rm I/S}$ 





Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-14801

Geosphere Environmental Ltd

Site Reference: Rishangles Hall

Project / Job Ref: 8062

Order No: None Supplied

Reporting Date: 08/12/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR		Determination of BTEX by headspace GC-MS	E001
Soil	D		Determination of cations in soil by agua-regia digestion followed by ICP-OES	E002
Soil	D		Determination of chloride by extraction with water & analysed by ion chromatography	E009
C-:I	AD	Characteristic III and the control of the control o	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of	E016
Soil	AR	Chromium - Hexavalent	1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR		Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D		Determination of TOC by combustion analyser.	E027
Soil	AR		Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D		Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D		Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR		Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES  Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR		Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001





List of HWOL Acronyms and Operators
DETS Report No: 23-14801
Geosphere Environmental Ltd
Site Reference: Rishangles Hall
Project / Job Ref: 8062
Order No: None Supplied
Reporting Date: 08/12/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total





Peter Coyne Geosphere Environmental Ltd Brightwell Barns Ipswich Road Brightwell Suffolk IP10 0BJ

### **Derwentside Environmental Testing Services Ltd**

Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

### **DETS Report No: 23-15162**

Site Reference: Rishangles Hall

Project / Job Ref: 8062

Order No: None Supplied

Sample Receipt Date: 12/12/2023

Sample Scheduled Date: 12/12/2023

Report Issue Number: 1

**Reporting Date:** 18/12/2023

Authorised by:

Kevin Old Operations Director

KO C

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.





4400

Soil Analysis Certificate						
DETS Report No: 23-15162	Date Sampled	28/11/23	28/11/23	28/11/23	28/11/23	28/11/23
Geosphere Environmental Ltd	Time Sampled	None Supplied				
Site Reference: Rishangles Hall	TP / BH No	WS10	HP02	HP03	HP04	HP05
Project / Job Ref: 8062	Additional Refs	ES1	ES1	ES1	ES1	ES1
Order No: None Supplied	Depth (m)	0.40	0.10	0.10	0.10	0.10
Reporting Date: 18/12/2023	DETS Sample No	690058	690059	690060	690061	690062

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	< 0.001	0.001	0.001	< 0.001	< 0.001



Tel: 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-15162

Geosphere Environmental Ltd

Site Reference: Rishangles Hall

Project / Job Ref: 8062

Order No: None Supplied

Reporting Date: 18/12/2023

Soil   AR	Matrix	Analysed	Determinand	Brief Method Description	Method
Soil   AR	Soil	On D	Roron - Water Soluble	Determination of water coluble becomin ceil by 2:1 bet water extract followed by ICD-OES	<b>No</b> F012
Soil   D   Coloride - Water Soluble (2.2) Externmination of catalose in soil by aqual-megal adjection followed by LPC-RES   5001   AR   Chromium - Housevalory   Externmination of heavewhere chromium in soil by extraction in water than by additionation, addition of 5016   AR   Cyanide - Cross   Externmination of heavewhere chromium in soil by extraction in water than by additionation, addition of 5016   AR   Cyanide - Cross   Externmination of free grantide followed by colorimetry   5015   5016   AR   Cyanide - Prices   Cyanide - Price   Cyanide - Cya					
Soil   AR					
Soil AR Chromium - Hesovalent Determination of heavalent dromnium in soil by extraction in water then by additionation of Epide Soil AR Cyanide - Compiler Determination of complex covaried by desillation followed by colorimetry (2015) and AR Cyanide - Chromium - C					
Soil   AR		AR	, ,	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of	
Soil   AR	Soil	AR	Cvanide - Complex		E015
Soil					
Soil   AR					
Soil   AR   Bectrical Conductivity   Bectmentation of electrical conductivity by addition of saturated calcium sulphate followed by   E022	Soil	D			E011
Soil AR Bectrial Conductivity by electrometric measurement (2023)  Soil D Bemental Sulphur Determination of electrical conductivity by addition of water followed by electrometric measurement (2023)  Soil AR BEH (100 - C00) Determination of elemental sulphur by solvent extraction followed by GC-MS (2004)  Soil AR BEH (100 - C00) Determination of elemental sulphur by solvent extraction followed by GC-MS (2004)  Soil AR BEH (100 - C00) Determination of elemental sulphur by solvent extraction followed by GC-MS (2004)  Soil AR BEH (100 - C00) Determination of elemental sulphur by solvent extraction followed by GC-MS (2004)  Soil AR BEH (100 - C00) Determination of elemental sulphur by solvent extraction followed by GC-MD (2004)  Soil D Fraction Organic Carbon (PCC)  Soil D Fraction Organic Carbon (PCC)  Soil D O (Total Organic Carbon (PCC)  Soil AR Exchangeable Ammount Determination of TOC by combustion analyser.  Soil AR Exchangeable Ammount Determination of TOC by combustion analyser.  Soil D D (Fraction Organic Carbon)  FOC (Fraction Organic Carbon)  Soil AR Exchangeable Ammount Determination of TOC by combustion analyser.  Soil D Magnesium - Water Soilobe (2004)  Soil D Magnesium - Water Soilobe (2004)  Magnesium - Water Soilobe (2004)  Soil AR Mineral Oil (C10 - C40)  Soil AR PAH - Speciated (FPA 16)  Soil AR Phenols - Total (monohybrid)  Soil D Sulphate (as SO)) - Water Soilable (21)  Soil AR Phenols - Total (monohybrid)  Soil AR Phenols - Total (mon	Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil AR Biectrical Conductivity Determination of electrical conductivity by addition of water followed by electrometric measurement [523]  Soil AR BEH (CID - C60) Determination of electrical conductivity by addition of water followed by GC-MS [520]  Soil AR BEH (CID - C60) Determination of economic evertractible (vidications by GC-PID [520]  Soil AR CID-CIS, CIS-CID, CID-CID (CID) Determination of acctonomic evertractible (vidications by GC-PID [520]  Soil D CID-CIS, CIS-CID, CID-CID (CID) Determination of acctonomic evertractible (vidications by GC-PID for 8 to C40. C6 to C8 by 100    Soil D Fraction Organic Carbon (CC) Electromination of acctonomic evertractible (vidications by GC-PID for 8 to C40. C6 to C8 by 100    Soil D Fraction Organic Carbon (CC) Electromination of CID provided by extraction with water & analysed by ion chromatography [520]  Soil D TOC (Total Organic Carbon) Celetromination of TOC by combustion analyser.  Soil D FOC (Fraction Organic Carbon) Determination of TOC by combustion analyser.  Soil D FOC (Fraction Organic Carbon) Determination of TOC by combustion analyser.  Soil D Loss on Taphtion @ 4500C    Soil D Magnesium - Water Soluble   Determination of TOC by combustion analyser.  Soil D Magnesium - Water Soluble   Determination of TOC by combustion analyser.  Soil D Magnesium - Water Soluble   Determination of ToC by combustion analyser.  Soil D Magnesium - Water Soluble   Determination of ToC by combustion analyser.  Soil AR Mineral Ol (CID - Mineral Ol	Soil	AR	Electrical Conductivity		E022
Soil   AR   EFH (CID -C40) Determination of actions/hexane extractable hydrocarbons by GC-FID   E004	Soil	AR	Electrical Conductivity		E023
Soil   AR   EPH FEAS (CG-C8, GS-C10, CD-C12, Determination of acetone/heane extractable hydrocarbons by GC-FID for C8 to C40, C6 to C8 by C12-C16, C16-C21, C21-C40) headspace GC-MS   E004	Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil   AR   EPH FEAS (CG-C8, GS-C10, CD-C12, Determination of acetone/heane extractable hydrocarbons by GC-FID for C8 to C40, C6 to C8 by C12-C16, C16-C21, C21-C40) headspace GC-MS   E004	Soil	AR			E004
Soil   D   Flootine - Visite Soluble   Determination of Flootine   Soil   D   Graptic Matter (SoM)   Determination of TOC by combustion analyser.   E027   Soil   D   TOC (Total Organic Carbon)   Determination of TOC by combustion analyser.   E027   Soil   D   TOC (Flootine   Soil   Combustion   Soil   D   ToC (Flootine   Soil   Combustion   Soil   Combustion   Soil   D   Flootine   Soil   Soil   D   Loss on Ignition   & 4500c.   Determination of TOC by combustion analyser.   E027   Soil   D   Loss on Ignition   & 450c.   Determination of Information   Soil   Soil   D   Magnesium - Water Soluble   Determination of fraction of organic carbon by oxidising with potassium dichromate followed by tender   Soil   D   Magnesium - Water Soluble   Determination of fraction of organic carbon by oxidising with potassium dichromate followed by tender   Soil   D   Magnesium - Water Soluble   Soil   D   Magnesium - Water Soluble   Commission of water soluble magnesium by extraction with water followed by ICP-OES   E002   Soil   D   Mineral Oil (C10 - C40)   Determination of metals by acquit-regial dispession followed by ICP-OES   E003   Soil   D   Organic Matter   Soil   AR   PAH - Speciated (EPA 16)   Determination of Intrade by extraction with water followed by GC-MS with the soil   Soil   AR   PAH - Speciated (EPA 16)   Determination of Intrade by extraction in acetone and hexane followed by GC-MS with the soil   AR   Phenols - Total (monohydric)   Determination of Pah   Soil   Soil   AR   Phenols - Total (monohydric)   Determination of Pah   Soil   Soil   AR   Phenols - Total (monohydric)   Determination of Pah   Soil   Soil   Soil   AR   Phenols - Total (monohydric)   Determination of Pah   Soil   Soil   D   Phosphate - Water Soilble (2.1)   Determination of P	Soil	AR			E004
Soil   D		AR	EPH TEXAS (C6-C8, C8-C10, C10-C12,	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by	E004
Soil   D   Fraction Organic Carbon (FOC)   Determination of TOC by combustion analyser.   E027	Soil	D			E009
Soil   D   Organic Matter (SOM)   Determination of TOC by combustion analyser.   6927					
Soil   D					
Soil   AR   Exchangeable Ammonium   Determination of ammonium by discrete analyser.   E029		D			E027
Soil   D					
D			<u>-</u>	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by	
Soil   D   Metals   Determination of metals by aqua-regia digestion followed by ICP-OES   E002	Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle	E019
Soil AR   Mineral Oil (C10 - C40)   Soil AR   Moisture Content   Moi	Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil AR Moisture Content Moisture content: determined gravimetrically  Soil AR Moisture Content Moisture content: determined gravimetrically  Soil D Nitrate - Water Soluble (2:1)  Soil D Organic Matter  Organic Matter  FAH - Speciated (EPA 16)  Soil AR PAH - Speciated (EPA 16)  Soil AR PCB - 7 Congeners  Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the gas of surrogate and internal standards  Soil D Petroleum Ether Extract (EPA 16)  Soil AR Phenols - Total (monohydric)  Soil AR Phenols - Total (monohydric)  Soil AR Phenols - Total (monohydric)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil AR Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil AR Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Sol	Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil   AR	Soil	AR	Mineral Oil (C10 - C40)		E004
Soil   D   Organic Matter   Determination of organic matter by oxidising with potassium dichromate followed by titration with ion (II) subhate ion (II) subhate   Soil   AR   PAH - Speciated (EPA 16)   Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards   Determination of PAH compounds by extraction with acetone and hexane followed by GC-MS   E008   Soil   D   Petroleum Ether Extract (PEE)   Gravimetrically determined through extraction with petroleum ether   E011   Soil   D   Phosphate - Water Soluble (2:1)   Determination of PAH by extraction with petroleum ether   E017   Soil   D   Phosphate - Water Soluble (2:1)   Determination of PAH by extraction with petroleum ether   E018   Soil   D   Sulphate (as SO4) - Total (1:1)   Determination of phenols by distillation followed by colorimetry   E021   Determination of Phenols by distillation followed by colorimetry   E021   Determination of phenols by distillation followed by colorimetry   E023   Determination of Sulphate by extraction with water & analysed by ion chromatography   E009   Sulphate (as SO4) - Water Soluble (2:1)   Determination of sulphate by extraction with water & analysed by ion chromatography   E009   D   Sulphate (as SO4) - Water Soluble (2:1)   Determination of sulphate by extraction with water & analysed by ion chromatography   E009   D   Sulphate (as SO4) - Water Soluble (2:1)   Determination of sulphate by extraction with water & analysed by ion chromatography   E009   D   Sulphate (as SO4) - Water Soluble (2:1)   Determination of sulphate by extraction with water & analysed by ion chromatography   E009   D   Sulphate (as SO4) - Water Soluble (2:1)   Determination of sulphate by extraction with water & analysed by ion chromatography   E009   D   D   Sulphate (as SO4) - Water Soluble (2:1)   Determination of sulphate by extraction with water & analysed by ion chromatography   E009   D   E009   D   E009   D   E009   D   E009   D   E009   D   E009   E009   E009	Soil	AR	Moisture Content		E003
Soil AR PAH - Speciated (EPA 16)  Soil AR PCB - 7 Congeners  Soil D Petroleum Ether Extract (EPE) Gravimetrically determination of PCB by extraction with acetone and hexane followed by GC-MS with the use of surrogate and internal standards  Soil AR Phenols - Todal (monohydric) Determination of PCB by extraction with acetone and hexane followed by GC-MS E008  AR Phenols - Total (monohydric) Determination of pH by addition of water followed by electrometric measurement E011  Soil AR Phenols - Total (monohydric) Determination of phenols by distillation of water followed by electrometric measurement E007  Soil D Sulphate (as SO4) - Total Determination of phenols by distillation of water followed by converted to the phenols of the phenols of the phenols by distillation of water followed by converted to the phenols of the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted to the phenols by distillation of the phenols by distillation of water followed by converted to the phenols by distillation of the phenols by distillation of the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted to the phenols by distillation of water followed by converted by extraction with water & analysed by ion chromatography E009  Soil AR Thiocyanate (as SCN) Sulphur - Total Determination of sulphur by extraction with water & analysed by ion chromatography E009  Soil AR Thiocyanate (as SCN) Sulphur - Total Determination of water soluble sulphate by extraction with water & analysed by ion chromatography E009  Soil AR Thiocyanate (as SCN) Sulphur - Total Determination of the phenols sulphur by extraction with va	Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil AR Petroleum Ether Extract (PE) Gravimetrically determined ton of PCB by extraction with acetone and hexane followed by GC-MS  Soil AR Petroleum Ether Extract (PE) Gravimetrically determined through extraction with petroleum ether  Soil AR Phenols - Total (monohydric)  Determination of pH by addition of water followed by electrometric measurement  E007  Soil AR Phenols - Total (monohydric)  Soil D Phosphate - Water Soluble (2:1)  Soil D Phosphate (as SO4) - Total  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water & analysed by ion chromatography  E009  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water & analysed by ion chromatography  E009  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water & analysed by ion chromatography  E009  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water & analysed by ion chromatography  E009  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water Real analysed by ion chromatography  E009  Soil D Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water Real analysed by ion chromatography  E009  Soil AR Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water Real analysed by ion chromatography  E009  Soil AR Sulphate (as SO4) - Water Soluble (2:1)  Determination of sulphate by extraction with water Real analysed by ion chromatography  E009  Soil AR Sulphate (as SO4) - Water Soluble (2:1)  Total Organic Carbon (TOC)  Color (2:1)  Gravimetrically determined through extraction with acetone and hexane followed by december of the properties of the properties of the properties of the properties o	Soil	D	Organic Matter		E010
Soil   D   Petroleum Ether Extract (PE)   Gravimetrically determined through extraction with petroleum ether   E011   Soil   AR   Phenols - Total (monohydric)   Determination of ph by addition of water followed by electrometric measurement   E007	Soil	AR	PAH - Speciated (EPA 16)		E005
Soil AR Phenols - Total (monohydric) Determination of pH by addition of water followed by electrometric measurement E007 Soil AR Phenols - Total (monohydric) Determination of phenols by distillation followed by colorimetry E013 Soil D Phosphate - Water Soluble (2:1) Determination of phosphate by extraction with water & analysed by ion chromatography E009 Soil D Sulphate (as SO4) - Total Determination of phosphate by extraction with user & analysed by ion chromatography E009 Soil D Sulphate (as SO4) - Water Soluble (2:1) Determination of sulphate by extraction with water & analysed by ion chromatography E009 Soil D Sulphate (as SO4) - Water Soluble (2:1) Determination of water soluble by extraction with water & analysed by ion chromatography E009 Soil AR Sulphide Sulphate (as SO4) - Water Soluble (2:1) Determination of water soluble by extraction with water followed by ICP-OES E014 D Sulphate (as SO4) - Water Soluble (2:1) Determination of sulphate by extraction with water followed by ICP-OES E014 Determination of sulphate by extraction with agua-reala followed by ICP-OES E014 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by Cc-MS Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by Cc-MS Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by Cc-MS Determination of total sulphate by extraction with total sulphate by extraction in acetone and hexane followed by Cc-MS Determination of total sulphate by extraction with sulphate by E018 D Total Organic Carbon (TOC) Determination of organic compounds by extraction in acetone and hexane followed by Cc-MS Determination of organic matter by oxidising with potassium dichromate followed by titration with ion (II) sulphate Determination of organic matter by oxidising with potassium dichromate followed by titration with ion (II) sulphate Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE artiringe for C8	Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil   AR   Phenols - Total (monohydric)   Determination of phenols by distillation followed by colorimetry   E021	Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil D Phosphate - Water Soluble (2:1) Determination of phosphate by extraction with water & analysed by ion chromatography	Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil D Sulphate (as SO4) - Total Determination of total sulphate by extraction with 10% HCl followed by ICP-OES E013 Soil D Sulphate (as SO4) - Water Soluble (2:1) Determination of sulphate by extraction with water & analysed by ion chromatography E009 Soil AR Sulphate (as SO4) - Water Soluble (2:1) Determination of sulphate by extraction with water & analysed by ion chromatography E009 Soil AR Sulphate (as SO4) - Water Soluble (2:1) Determination of sulphate by extraction with water followed by ICP-OES E014 Soil AR Sulphur - Total Determination of sulphide by distillation followed by colorimetry E018 Soil AR Sulphur - Total Determination of sulphur by extraction with aqua-regia followed by ICP-OES E024 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS Soil AR Thiocyanate (as SCN) Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS Determination of total sulphur by extraction with aqua-regia followed by acidification followed by GC-MS Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS Determination of thiocyanate by extraction in caustic soda followed by acidification	Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil D Sulphate (as SO4) - Water Soluble (2:1) Determination of sulphate by extraction with water & analysed by ion chromatography 501 D Sulphate (as SO4) - Water Soluble (2:1) Determination of water soluble sulphate by extraction with water followed by ICP-OES 5014 AR Sulphide Determination of sulphide by distillation followed by colorimetry 5014 Determination of sulphide by distillation followed by colorimetry 5014 Determination of sulphide by distillation followed by colorimetry 5014 Determination of sulphide by distillation followed by colorimetry 5014 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5014 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by 5015 Determination of thiocyanate by extraction in acetone and hexane followed by 5015 Determination of thiocyanate by extraction with adult aguar-regia followed by 5015 Determination of thiocyanate by extraction with aguar-regia followed by 5015 Determination of thiocyanate by extraction with aguar-regia followed by 5015 Determination of thiocyanate by extraction with aguar-regia followed by 5015 Determination of thiocyanate by extraction with aguar-regia followed by 5015 Determination of thiocyanate by extraction with aguar-regia followed by 5015 Determination o	Soil	D			E009
Soil D Sulphate (as SO4) - Water Soluble (2:1) Determination of water soluble sulphate by extraction with water followed by ICP-OES E018 Soil AR Sulphide Determination of sulphide by distillation followed by colorimetry E018 Soil D Sulphur - Total Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry Soil D Toluene Extractable Matter (TEM) Gravimetrically determined through extraction with toluene Soil D Total Organic Carbon (TOC)  Foil AR THIOCY (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate  TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8			Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	
Soil D Sulphate (as SO4) - Water Soluble (2:1) Determination of water soluble sulphate by extraction with water followed by ICP-OES E018 Soil AR Sulphide Determination of sulphide by distillation followed by colorimetry E018 Soil D Sulphur - Total Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry Soil D Toluene Extractable Matter (TEM) Gravimetrically determined through extraction with toluene Soil D Total Organic Carbon (TOC)  Foil AR THIOCY (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate  TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8					
Soil AR Suphur - Total Determination of total sulphur by extraction with aqua-regia followed by ICP-OES E024  Soil AR Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS E006  Soil AR Thiocyanate (as SCN) Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry  Soil D Toluene Extractable Matter (TEM) Gravimetrically determined through extraction with toluene E011  Soil D Total Organic Carbon (TOC) Total Organic Carbon (TOC) Potentination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate  TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C35-C35-C44, aro: C5-C7, C7					
Soil AR Thiocyanate (as SCN)  Soil AR Thiocyanate (as SCN)  Soil D Toluene Extractable Matter (TEM)  Soil D Total Organic Carbon (TOC)  Soil AR TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)  Soil AR TPH LQM (ali: C5-C6, C6-C8, C8-C10)  Soil AR VPH (C6-C8 & C8-C10)  Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-FID fraction followed by acidification followed by acidification followed by colorimetry  addition of ferric nitrate followed by colorimetry  Bettermination of organic matter by oxidising with potassium dichromate followed by titration with length potantial in the properties of organic matter by oxidising with potassium dichromate followed by titration with length potantial in (II) sulphate  E010  Determination of organic matter by oxidising with potassium dichromate followed by titration with length potantial in (II) sulphate  E011  TPH LQM (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)  C12-C16, C16-C21, C21-C35  Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE artridge for C8 to C44. C5 to C8 by headspace GC-MS  Soil AR VPH (C6-C8 & C8-C10) Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID  E001					
Soil AR Thiocyanate (as SCN)  Soil AR Thiocyanate (as SCN)  D Toluene Extractable Matter (TEM)  Gravimetrically determined through extraction with toluene  Soil D Total Organic Carbon (TOC)  Soil D Total Organic Carbon (TOC)  Foil AR THP CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)  Soil AR VPH (C6-C8 & C8-C10)  Determination of thexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE artridge for C8 to C35. C5 to C8 by headspace GC-MS  E004  E005  E006  E007  E007  FOR CR-MS  FOR CR-MS  E008  FOR CR-MS  FOR CR-MS  FOR CR-MS  E009  FOR CR-MS	Soil	D	Sulphur - Total		E024
Soil D Toluene Extractable Matter (TEM) Gravimetrically determined through extraction with toluene  Soil D Total Organic Carbon (TOC)  Soil D Total Organic Carbon (TOC)  Find Cio-Cio Cio Cio Cio Cio Cio Cio Cio Cio Cio	Soil	AR	SVOC	GC-MS	E006
SoilDToluene Extractable Matter (TEM) Gravimetrically determined through extraction with tolueneE011SoilDTotal Organic Carbon (TOC)Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphateE010SoilARTPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE artridge for C8 to C35. C5 to C8 by headspace GC-MSE004SoilARTPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C35, C35-C44)Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE artridge for C8 to C44. C5 to C8 by headspace GC-MSE004SoilARVPH (C6-C8 & C8-C10)Determination of volatile organic compounds by headspace GC-MS & C8-C10 by GC-FIDE001	Soil	AR	Thiocyanate (as SCN)	addition of ferric nitrate followed by colorimetry	
Soil D Total Organic Carbon (TOC) Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate  TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)  AR TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)  Soil AR VPH (C6-C8 & C8-C10) Determination of volatile organic compounds by headspace GC-MS & C8-C10 by GC-FID  Total Organic Carbon (TOC) Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate  E010  E010  E010  E010  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, C10-C12, C12-C16, C16-C35, C35-C44, C10-C12, C12-C16, C16-C35, C35-C44, C5 to C8 by headspace GC-MS  E004  E004  E005  E007  E007  E007  E007  E007  E007	Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil AR C10-C12, C12-C16, C16-C21, C21-C34, Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE artridge for C8 to C35. C5 to C8 by headspace GC-MS  TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)  Soil AR VPH (C6-C8 & C8-C10) Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE artridge for C8 to C44. C5 to C8 by headspace GC-MS  E004  E004  E005  E006  E007  E007  E007  E007  E007  E007  E007  E007  E008  E009  E009  E009  E009	Soil	D	Total Organic Carbon (TOC)	, , , , ,	E010
Soil AR C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44) betermination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS  Soil AR VPH (C6-C8 & C8-C10) Determination of volatile organic compounds by headspace GC-MS & C8-C10 by GC-FID E001  Soil AR VPH (C6-C8 & C8-C10) Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID E001	Soil	AR	C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12,	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE	E004
Soil AR VPH (C6-C8 & C8-C10) Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID E001			C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	cartridge for C8 to C44. C5 to C8 by headspace GC-MS	
D. Dried			VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried AR As Received





245 Appendix-000

List of HWOL Acronyms and Operators
DETS Report No: 23-15162
Geosphere Environmental Ltd
Site Reference: Rishangles Hall
Project / Job Ref: 8062
Order No: None Supplied
Reporting Date: 18/12/2023

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym	



- Ec Ecology.
- Fr Flood Risk.
- Ge Geotechnical.
- Environmental.
- Kw Knotweed.