

Condition 3 c) 19 pages

GroundSolve Ltd

Consulting Geotechnical, Engineering Geology and Environmental Engineers.

Unit 1 Charter Court,
Well House Barns,
Chester Road, Bretton,
Flintshire, CH4 0DH
Tel: 01244 661361
Mob: 07498 571682

Email: elizabethsmith@groundsolve.com

REF: 2363/JTWN/RepLet/ES

Doug Bailey
Gower Homes
8 Temple Row
Wrexham LL13 8LY

17th January 2022
*revised 28/2/22
with corrected
boundary plan*

Dear Doug,

RE: BELGRAVE COURT, JOHNSTOWN: ADDITIONAL TESTING

1.0 Introduction

Following issue of the geoenvironmental report for the above site, which was undertaken pre demolition. Additional work was agreed post demolition with Wrexham County Borough Council (WCBC), in order to discharge Planning Condition 3.

This work was undertaken and Rev A of the report issued, which included the additional work. However, at the time of the additional investigation one of the agreed test locations was covered by demolition debris. This has since been cleared and the additional chemical testing beneath the previous chemical storage location undertaken.

This letter report supplements, and should be read in conjunction with Rev A of the GSL geoenvironmental report.

This now concludes all of the additional agreed testing; therefore, Condition 3 should now be discharged to allow the development to proceed.

2.0 Site Investigation and Ground Conditions

One trial pit (TP201) was excavated at the site of the old chemical storage area. This area had been overlaid with 0.30m of recently placed demolition debris. This overlies 0.20m of made ground, which existed during the initial investigation from June 2021, which was described as soft, brown, sandy, gravelly clay. This then rests on glacial till described as light brown, mottled grey, slightly sandy, gravelly clay. The trial pit log is presented in Appendix A.

3.0 Chemical Testing

Samples for chemical testing were taken from the made ground and glacial till, placed in the appropriate containers and a cool box, and taken immediately to the laboratories of Derwentside Environmental Testing Services (DETS) Limited for the following testing, which is in line with the original testing schedule:

Metals & Non-metals - Arsenic (As), Boron (B), Cadmium (Cd), Chromium (hexavalent), Chromium (Trivalent), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Phenol, Selenium (Se), and Zinc (Zn).

Petroleum Hydrocarbons - Benzene, Toluene, Ethylbenzene, o-xylene, m-xylene, p-xylene, Aliphatics >C5 – C44, Aromatics >EC5 – EC44.

Polyaromatic Hydrocarbons (PAH) – Acenaphthene, Acenaphthylene, Anthracene, Benz (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Benzo (g, h, i) perylene, Benzo (k) fluoranthene, Chrysene, Dibenzo (a, h) anthracene, Fluorene, Fluoranthene, Indeno (1,2,3-cd) pyrene, Naphthalene, Phenanthrene, Pyrene.

Other Contaminants – Sulphide (easily liberated), Water soluble Sulphate (2:1 extract), Cyanide, pH, Soil Organic Matter (SOM).

In addition, asbestos screening was carried out on all samples.

The results of the chemical testing are summarised below, and presented in full in Appendix B. The trial pit location is presented in Figure 1.

4.0 Chemical Test Results

The soil samples were taken from the made ground, with the sample depths presented in the table below.

Sample Depths:

TP No	Depth (m)	Material
TP201	0.40	Made ground

The depth of the sample is just below the previous ground level in the zone, which would have been impacted by any chemical spills.

The results of the soil analyses are presented below, where they have been compared to suitable generic assessment criteria (GACs), in order to allow a generic quantitative risk assessment (GQRA) to be carried out for the site and the proposed development.

The Category 4 Screening Levels (C4SLs) published by DEFRA (2014) have been adopted in the first instance, which have been published for six substances to date. Where a C4SL is unavailable, the "Suitable 4 Use Levels" (S4ULs) published by LQM/CIEH (2015) have been adopted.

These criteria have been derived using the CLEA model for a range of standard end-use scenarios and a range of soil organic matter (SOM) contents. It should be noted that the C4SL values are derived on the basis of a "low level of toxicological concern", while the S4UL values are based on a "tolerable" or "minimal" level of risk. As such, the S4ULs describe a lower level of risk than the C4SLs, and are equivalent to the former Soil Guideline Values (SGVs, published by the Environment Agency) and the previous editions of the LQM/CIEH GAC values.

A "residential with gardens" end-use has been adopted for this analysis, based on the most-conservative SOM content of 1%. This is the strictest guidance.

Note: the S4UL values presented below are Copyright Land Quality Management Limited, reproduced with permission; Publication Number S4UL3668. All rights reserved.

Metals & Non-Metals	TP201	Adopted Guideline (mg/kg)	Source	Exceedances
	0.4			
Arsenic	11	37	C4SL	0
Boron, Water Soluble	0.7	290	S4UL	0
Cadmium	0.8	22	C4SL	0
Chromium III	17	910	S4UL	0
Chromium, Hexavalent	< 1.0	21	C4SL	0
Copper	55	2400	S4UL	0
Lead	130	200	C4SL	0
Mercury	0.1	1.2	S4UL	0
Nickel	20	130	S4UL	0
Phenol - Monohydric	< 0.3	120	S4UL	0
Selenium	0.7	250	S4UL	0
Zinc	230	3700	S4UL	0

No exceedances of the SGV values for residential with gardens were recorded.

Petroleum Hydrocarbons	TP201	Adopted Guideline (mg/kg)	Source	Exceedances
	0.4			
Aliphatic C5-C6	< 0.01	42	S4UL	0
Aliphatic C6-C8	< 0.01	100	S4UL	0
Aliphatic C8-C10	< 0.01	27	S4UL	0
Aliphatic C10-C12	< 1.5	130	S4UL	0
Aliphatic C12-C16	< 1.2	1100	S4UL	0
Aliphatic C16-C21	< 1.5	65000	S4UL	0
Aliphatic C21-C35	< 3.4	65000	S4UL	0
Aliphatic C35-C40	< 3.4	70	S4UL	0
Aromatic C5-C7	< 0.01	130	S4UL	0
Aromatic C7-C8	< 0.01	34	S4UL	0
Aromatic C8-C10	< 0.01	74	S4UL	0
Aromatic C10-C12	< 0.9	140	S4UL	0
Aromatic C12-C16	< 0.5	260	S4UL	0
Aromatic C16-C21	< 0.6	1100	S4UL	0
Aromatic C21-C35	< 1.4	1100	S4UL	0

No exceedances of the SGV values for residential with gardens were recorded.

Polyaromatic Hydrocarbons (PAH)	TP201	Adopted Guideline (mg/kg)	Source	Exceedances
	0.4			
Acenaphthene	< 0.03	210	S4UL	0
Acenaphthylene	< 0.03	170	S4UL	0
Anthracene	< 0.03	2400	S4UL	0
Benzo(a)anthracene	0.04	7.2	S4UL	0
Benzo(a)pyrene	0.04	5	C4SL	0
Benzo(b)fluoranthene	0.06	2.6	S4UL	0
Benzo(g,h,i)perylene	0.03	320	S4UL	0
Benzo(k)fluoranthene	< 0.03	77	S4UL	0
Chrysene	0.08	15	S4UL	0
Dibenzo(a,h)anthracene	< 0.03	0.24	S4UL	0
Fluoranthene	0.13	280	S4UL	0
Fluorene	< 0.03	170	S4UL	0
Indeno(1,2,3-c,d)pyrene	< 0.03	27	S4UL	0
Naphthalene	< 0.03	2.3	S4UL	0
Phenanthrene	0.09	95	S4UL	0
Pyrene	0.12	620	S4UL	0

No exceedances of the SGV values for residential with gardens were recorded.

Other Contaminants / Testing	TP201	Adopted Guideline (mg/kg)	Source	Exceedances
	0.4			
Organic matter	3.6	-	-	-
pH	7.6	-	-	-
Sulphide	110	-	-	-
Cyanide, Total	0.3	-	-	-
Sulphur (free)	< 0.75	-	-	-
Sulphate Aqueous Extract as SO ₄	310	-	-	-

None of the above values cause any concern. In addition, no asbestos was detected.

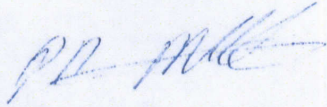
5.0 Conclusions

The results of the chemical testing confirm that there is no contamination within the made ground in the area of the old chemical storage.

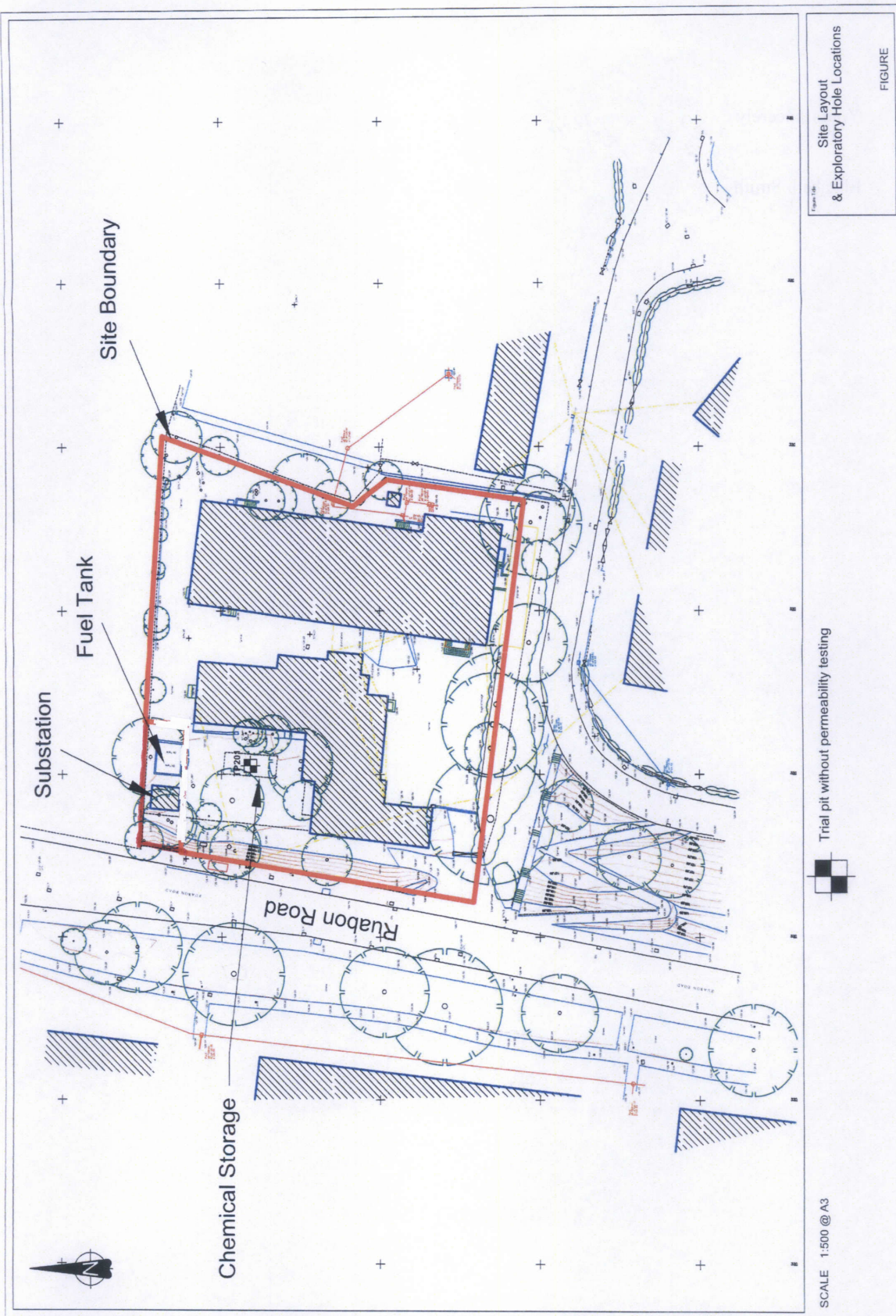
In addition, the previous ground surface has already been covered with 0.30m of inert demolition debris. This will then be capped with imported topsoil. It can therefore be concluded that even if any residual contamination did exist, a sufficient barrier will have been provided to prevent any pathways to potential receptors.

We trust this is satisfactory, should you have any queries please call me on 01244 661361.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Elizabeth Smith', written over a faint, large, rectangular stamp.

Elizabeth Smith



Trial Pit Log

Project Name: Johnstown			Client: Gower Homes			Date: 05/12/2021			
Location: Johnstown, Wrexham			Contractor: Harvey Plant Hire						
Project No. : 2363			Crew Name:			Equipment: JCB 3CX			
Location Number TP201		Location Type TP		Level		Logged By ES		Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.30		Loose brown sandy subangular to angular fine to coarse GRAVEL of brick and masonry with high cobble content. Cobbles are angular of brick. (MADE GROUND)	1	
					0.50		Soft brown gravelly CLAY. Gravel is subangular to angular fine to coarse of brick and sandstone. (MADE GROUND)		
							Firm brown mottled grey slightly gravelly CLAY. gravel is subrounded to rounded fine to coarse of mixed lithologies. (GLACIAL TILL)		
					1.50		End of Borehole at 1.500m		
								2	
								3	
								4	
								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 1.50	Pit Width 1.00	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks						
No groundwater encountered.						





Photograph 1- TP201



DETS

Certificate of Analysis

Certificate Number 22-00024

Issued: 10-Jan-22

Client GroundSolve Limited
Unit 1
Well House Barns
Bretton
Flintshire
FAO Adam Fenwick
CH4 0DH

Our Reference 22-00024

Client Reference 2363

Order No (not supplied)

Contract Title Johnstown

Description One Soil sample.

Date Received 04-Jan-22

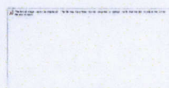
Date Started 04-Jan-22

Date Completed 10-Jan-22

Test Procedures Identified by prefix DETSn (details on request).

Notes 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.

Approved By



Adam Fenwick
Contracts Manager





Summary of Chemical Analysis

Soil Samples

Our Ref 22-00024

Client Ref 2363

Contract Title Johnstown

Lab No	1953862
Sample ID	TP201
Depth	0.4
Other ID	
Sample Type	SOIL
Sampling Date	n/s
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic	DETSC 2301#	0.2	mg/kg	11
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.8
Chromium	DETSC 2301#	0.15	mg/kg	17
Chromium III	DETSC 2301*	0.15	mg/kg	17
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	55
Lead	DETSC 2301#	0.3	mg/kg	130
Mercury	DETSC 2325#	0.05	mg/kg	0.10
Nickel	DETSC 2301#	1	mg/kg	20
Selenium	DETSC 2301#	0.5	mg/kg	0.7
Zinc	DETSC 2301#	1	mg/kg	230
Inorganics				
pH	DETSC 2008#		pH	7.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.3
Organic matter	DETSC 2002#	0.1	%	3.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	310
Sulphide	DETSC 2024*	10	mg/kg	110
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75
Petroleum Hydrocarbons				
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4
Aliphatic C35-C40	DETSC 3072*	3.4	mg/kg	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4
Aromatic C35-C40	DETSC 3072*	1.4	mg/kg	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10
PAHs				
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.



Summary of Chemical Analysis

Soil Samples

Our Ref 22-00024

Client Ref 2363

Contract Title Johnstown

Lab No	1953862
Sample ID	TP201
Depth	0.4
Other ID	
Sample Type	SOIL
Sampling Date	n/s
Sampling Time	n/s

Test	Method	LOD	Units	
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.09
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.13
Pyrene	DETSC 3303#	0.03	mg/kg	0.12
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.04
Chrysene	DETSC 3303	0.03	mg/kg	0.08
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.04
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.53
Phenols				
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3



Summary of Asbestos Analysis

Soil Samples

Our Ref 22-00024

Client Ref 2363

Contract Title Johnstown

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1953862	TP201 0.50	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 22-00024
 Client Ref 2363
 Contract Johnstown

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1953862	TP201 0.50 SOIL		GJ 250ml, GJ 60ml x3	Sample date not supplied, Anions 2:1 (30 days), Aliphatics/Aromatics (14 days), Boron (365 days), BTEX (14 days), Chromium, Hexavalent (365 days), Sulphur (free) (7 days), Mercury (28 days), ICP WS Boron (182 days), Metals ICP (182 days), Metals ICP Prep (182 days), Kone Cr6 (30 days), Naphthalene (14 days), Organic Matter (Manual) (28 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days)	

Key: G-Glass J-Jar

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/- 2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

Blank.