

REF: 2227/HL/RepLet/tg

Dafydd Edwards
Blueprint Architectural Services
Office 3K4
Redwither Business Tower
Wrexham LL13 9XT

16th July 2020

Dear Dafydd,

RE: 40 HEOL LLEWELYN, COEDPOETH: ADDITIONAL TESTING

Introduction

Following the issue of our geo environmental report for the above site, the Local Authority raised concerns regarding the potential for the underlying natural ground (Glacial Till) on site to be contaminated with lead, which is not GSL experience in this area for the reasons explained in our report.

Therefore, as instructed, we have been back to site to excavate hand dug trial pits to take samples of the underlying natural ground (Glacial Till) and are pleased to present the results below.

This letter report presents the findings of the additional chemical testing, with the results of the testing presented in Appendix A.

Ground Investigation and Ground Conditions

An engineer from GSL visited the site on Tuesday 14th April 2020 to undertake further sampling of the natural glacial till underlying the site.

Four hand dug trial pits were undertaken within the garden area shown on Figure 1, and samples collected, at depths ranging between 0.30 and 0.70m. The samples were then placed in appropriate containers and a cool box, and taken immediately to the laboratories of ALS in Chester for the following testing:

Metals – Lead (Pb).

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.

The testing regime being dictated by the previous results from the topsoil presented in the geo environmental report.

Results of Chemical Testing

Metals & Non-Metals	Average (mg/kg)	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Lead	376	4	200	C4SL	3

Three of the above values exceed the SGV values for residential land use with gardens. These values ranged from 327 to 566 mg/kg within HDTP2, HDTP3 and HDTP4.

Polyaromatic Hydrocarbons (PAH)	Average (mg/kg)	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Acenaphthene	0.03	4	210	S4UL	0
Acenaphthylene	0.12	4	170	S4UL	0
Anthracene	0.41	4	2400	S4UL	0
Benz(a)anthracene	0.72	4	7.2	S4UL	0
Benzo(a)pyrene	0.51	4	5	C4SL	0
Benzo(b)fluoranthene	0.58	4	2.6	S4UL	0
Benzo(g,h,i)perylene	0.3	4	320	S4UL	0
Benzo(k)fluoranthene	0.25	4	77	S4UL	0
Chrysene	0.63	4	15	S4UL	0
Dibenzo(a,h)anthracene	0.08	4	0.24	S4UL	0
Fluoranthene	1.18	4	280	S4UL	0
Fluorene	0.14	4	170	S4UL	0
Indeno(1,2,3-cd)pyrene	0.28	4	27	S4UL	0
Naphthalene	0.05	4	2.3	S4UL	0
Phenanthrene	1.05	4	95	S4UL	0
Pyrene	0.99	4	620	S4UL	0

None of the above values exceed the SGV values for residential land use with gardens.

Discussion and Conclusions

The lead values above in the glacial till are very similar to those recorded in the topsoil, which is a surprise.

Therefore, the final validation will depend on the final development levels chosen. To protect future site users from the risks posed by the low levels on site the Local Authority will expect a 600mm thickness of inert imported soil/ topsoil to be brought to site to act as a cover layer to provide a break between any pathway and future receptors. This could comprise 400mm of inert soil, topped with 200mm of inert topsoil.

However, it will only be necessary to provide this cover in gardens areas. It would therefore be possible to raise the site levels without removing the topsoil from site, if final levels allow.

In which case, the only validation required would be as follows:

- If material is to be taken off site, it will be necessary to provide the removal dockets to ensure it has been taken off site to a suitably licensed landfill facility,
- It will be necessary to identify a suitable source of fill/topsoil, which should be tested prior to import to site,
- Once placed, it will be necessary to excavate hand dug trial pits through this material to ensure that the 600mm of material has been placed,
- The excavations should be photographed and witnessed by an independent third party,
- Delivery dockets for any imported material will also need to be provided to the Local Authority.

The above information should then be submitted in a final validation report to the Local Authority.

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

Yours sincerely

A handwritten signature in black ink, appearing to read 'Tyler Goodrick', written in a cursive style.

T G Goodrick

FIGURES



Site Boundary

Talwrn Road

Existing garage
to be demolished

Access to garage

HDTP4

42 41 40

APPENDIX A

Chemical Test Results



Unit 7-8 Hawarden Business Park

Manor Road (off Manor Lane)

Hawarden

Deeside

CH5 3US

Tel: (01244) 528700

Fax: (01244) 528701

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

Ground Solve
Unit 1
Well House Barns
Chester Road
Bretton
Cheshire
CH4 0DH

Attention: Tyler Goodrick

CERTIFICATE OF ANALYSIS

Date of report Generation: 21 April 2020
Customer: Ground Solve
Sample Delivery Group (SDG): 200414-28
Your Reference: 2227/HLC/TG
Location: Heol Llywelyn Coedpoeth
Report No: 549998

We received 4 samples on Tuesday April 14, 2020 and 4 of these samples were scheduled for analysis which was completed on Tuesday April 21, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG:	200414-28	Client Reference:	2227/HLC/TG	Report Number:	549998
Location:	Heol Llywelyn Coedpoeth	Order Number:	2227/HLC/TG	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22025827	HDTP2	ES	0.70	14/04/2020
22025829	HDTP3	ES	0.45	14/04/2020
22025830	HDTP4	ES	0.30	14/04/2020
22025826	HDTP1A	ES	0.50	14/04/2020

Maximum Sample/Coolbox Temperature (°C) :

13.6

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 200414-28 Client Reference: 2227/HLC/TG Report Number: 549998
Location: Heol Llywelyn Coedpoeth Order Number: 2227/HLC/TG Superseded Report:

Results Legend X Test N No Determination Possible Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other						
	Lab Sample No(s)		22025826	22025830	22025829	22025827
	Customer Sample Reference		HDTP1A	HDTP4	HDTP3	HDTP2
	AGS Reference		ES	ES	ES	ES
	Depth (m)		0.50	0.30	0.45	0.70
	Container		250g Amber Jar (ALE210)	250g Amber Jar (ALE210)	250g Amber Jar (ALE210)	250g Amber Jar (ALE210)
	Sample Type		S	S	S	S
Metals in solid samples by OES	All	NDPs: 0 Tests: 4	X	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 4	X	X	X	X
Sample description	All	NDPs: 0 Tests: 4	X	X	X	X



CERTIFICATE OF ANALYSIS

Validated

SDG: 200414-28 Client Reference: 2227/HLC/TG Report Number: 549998
Location: Heol Llywelyn Coedpoeth Order Number: 2227/HLC/TG Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
22025827	HDTP2	0.70	Light Brown	Loamy Sand	Stones	Vegetation
22025829	HDTP3	0.45	Black	Loamy Sand	Stones	Vegetation
22025830	HDTP4	0.30	Black	Sandy Loam	Stones	Vegetation
22025826	HDTP1A	0.50	Light Brown	Sandy Clay Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



CERTIFICATE OF ANALYSIS

Validated

SDG:	200414-28	Client Reference:	2227/HLC/TG	Report Number:	549998
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Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 200414-28 Client Reference: 2227/HLC/TG Report Number: 549998
Location: Heol Llywelyn Coedpoeth Order Number: 2227/HLC/TG Superseded Report:

Test Completion Dates

Lab Sample No(s)	22025827	22025829	22025830	22025826
Customer Sample Ref.	HOTP2	HOTP3	HOTP4	HOTP1A
AGS Ref.	ES	ES	ES	ES
Depth	0.70	0.45	0.30	0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Metals in solid samples by OES	20-Apr-2020	20-Apr-2020	21-Apr-2020	21-Apr-2020
PAH by GCMS	16-Apr-2020	16-Apr-2020	16-Apr-2020	16-Apr-2020
Sample description	15-Apr-2020	15-Apr-2020	15-Apr-2020	15-Apr-2020



CERTIFICATE OF ANALYSIS

SDG: 200414-28
Location: Heol Llywelyn Coedpoeth

Client Reference: 2227/HLC/TG
Order Number: 2227/HLC/TG

Report Number: 549998
Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2017).

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.