

Our Ref: DE/15232/Oct Trial Pits

Your Ref:

Contact: David Emanuel

3rd November 2020

Enzo Homes Limited

For the attn. of Mr Enzo Sauro

Dear Sir

ADDITIONAL SOIL TESTING, PHASE 1: HEOL Y GLYN, GLYNNEATH (PLANNING REFERENCE P2020/0195)

Terra Firma (Wales) Limited has been retained by Enzo Homes to undertake further soil chemical testing in the Phase 1 area of their proposed development at Heol Y Glyn, Glynneath (See **Figure 01**).



Figure 01. Phase 1 Area

4. Several minor exceedances of PAHs were recorded although these were High Molecular Weight PAHs, characterised as Non-Volatile, Low Aqueous Solubility and High Propensity to bind to Soil Organic Matter (i.e. low mobility in aquatic environment)

Base on the current data, we anticipate that the original recommendations of 600mm of clean capping in gardens and landscaped areas will address the issue of soil contamination. However, the additional chemical data will need to be presented in a revised Geo-Environmental Report for assessment when the additional gas monitoring is completed.

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us.

Yours sincerely

for: Terra Firma (Wales) Ltd

David Emanuel

OCTOBER 2020 - SOIL CHEMICAL TEST RESULTS



Final Report

Report No.: 20-27772-1
Initial Date of Issue: 20-Oct-2020
Client: Terra Firma (Wales) Ltd
Client Address: 5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HA
Contact(s): Dave Emanuel
Project: 15232 HEOL Y GLYN
Quotation No.: **Date Received:** 15-Oct-2020
Order No.: **Date Instructed:** 15-Oct-2020
No. of Samples: 11
Turnaround (Wkdays): 5 **Results Due:** 21-Oct-2020
Date Approved: 20-Oct-2020

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 15232 HEOL Y GLYN

Client: Terra Firma (Wales) Ltd		Chemtest Job No.: 20-27772											
Quotation No.:		Chemtest Sample ID.:											
Sample Location:		20-27772											
Sample Type:		20-27772											
Top Depth (m):		20-27772											
Bottom Depth (m):		20-27772											
Date Sampled:		20-27772											
Asbestos Lab:		20-27772											
Determinand	Accred.	SOP	Units	LOD	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	7.7	9.7	9.9	11	11	13	9.9	13	12
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Clay	Clay	Sand	Clay	Clay	Clay	Clay
pH	M	2010		4.0	10.1	9.0	9.0	8.8	9.2	9.0	8.7	8.7	8.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.69	0.77	< 0.40	< 0.40	< 0.40	0.40	0.48	0.68	0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	M	2430	%	0.010	0.43	0.054	0.066	0.015	0.057	0.030	0.038	0.047	0.019
Arsenic	M	2450	mg/kg	1.0	19	27	35	12	26	23	26	26	11
Cadmium	M	2450	mg/kg	0.10	0.62	0.80	1.2	0.20	0.49	0.43	1.6	0.51	0.21
Chromium	M	2450	mg/kg	1.0	14	16	20	17	24	18	20	21	14
Mercury Low Level	M	2450	mg/kg	0.05	0.07	0.13	0.28	0.07	0.15	0.11	0.12	0.12	0.08
Copper	M	2450	mg/kg	0.50	46	98	90	23	58	52	54	48	25
Nickel	M	2450	mg/kg	0.50	15	24	30	25	27	30	28	31	23
Lead	M	2450	mg/kg	0.50	54	200	260	28	110	83	120	110	56
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	0.26	0.25	< 0.20	0.30	0.22	0.27	0.27
Zinc	M	2450	mg/kg	0.50	100	470	430	77	180	190	240	230	75
Chromium (Trivalent)	N	2490	mg/kg	1.0	14	16	20	17	24	18	20	21	14
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	27	9.7	4.4	< 1.0	14	7.1	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	9.7	3.5	1.6	< 1.0	4.9	2.9	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	6.0	2.7	< 1.0	< 1.0	2.6	1.8	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	4.2	2.1	< 1.0	< 1.0	1.3	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	26	7.8	2.9	< 1.0	9.5	9.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	2.5	1.8	< 1.0	< 1.0	1.0	1.5	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	75	28	11	< 5.0	33	23	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	77	28	13	< 1.0	39	28	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	26	9.7	4.4	< 1.0	13	9.5	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	19	8.7	3.1	< 1.0	9.1	6.3	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	15	8.6	2.1	< 1.0	6.5	3.7	< 1.0	< 1.0	2.4

Results - Soil

Project: 15232 HEOL Y GLYN

Client: Terra Firma (Wales) Ltd		Chemtest Job No.:											
Quotation No.:		Chemtest Sample ID.:											
		Sample Location:											
		Sample Type:											
		Top Depth (m):											
		Bottom Depth (m):											
		Date Sampled:											
		Asbestos Lab:											
Determinand	Accred.	SOP	Units	LOD	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772	20-27772
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	220	40	19	< 1.0	82	53	< 1.0	< 1.0	34
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	40	4.2	1.3	< 1.0	4.5	5.8	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	400	99	43	< 5.0	150	110	< 5.0	< 5.0	37
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	470	130	54	< 10	190	130	< 10	< 10	37
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.37
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.46
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.78
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.0
Phenanthrene	M	2700	mg/kg	0.10	1.1	2.7	2.2	< 0.10	1.4	0.96	< 0.10	1.4	5.4
Anthracene	M	2700	mg/kg	0.10	0.25	0.90	0.56	< 0.10	0.34	0.22	< 0.10	0.32	1.9
Fluoranthene	M	2700	mg/kg	0.10	2.4	5.3	4.3	0.80	2.5	1.7	0.80	2.4	14
Pyrene	M	2700	mg/kg	0.10	2.5	5.0	3.7	0.54	2.0	1.7	0.57	2.0	12
Benzo[a]anthracene	M	2700	mg/kg	0.10	1.3	3.5	3.4	< 0.10	1.2	0.66	< 0.10	2.1	9.6
Chrysene	M	2700	mg/kg	0.10	0.88	2.7	2.8	< 0.10	0.83	0.28	< 0.10	1.8	8.5
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	2.6	4.2	4.8	< 0.10	2.2	1.6	< 0.10	2.4	12
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	1.1	1.7	1.7	< 0.10	0.93	0.66	< 0.10	1.1	4.3
Benzo[a]pyrene	M	2700	mg/kg	0.10	1.8	3.1	2.8	< 0.10	1.5	1.2	< 0.10	1.8	7.7
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	1.6	3.1	2.2	< 0.10	1.1	0.25	< 0.10	1.0	5.0
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.87	2.1	1.2	< 0.10	0.69	0.22	< 0.10	0.63	2.1
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	2.6	2.5	2.4	< 0.10	1.1	0.90	< 0.10	1.5	5.1
Total Of 16 PAH's	M	2700	mg/kg	2.0	19	37	32	< 2.0	16	10	< 2.0	19	90
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Organic Matter BS1377	N	2930	%	0.10	2.6	3.1	2.9	1.3	2.9	2.3	1.9	2.3	2.0

Results - Soil

Project: 15232 HEOL Y GLYN

Client: Terra Firma (Wales) Ltd		Chemtest Job No.:		20-27772	20-27772	
Quotation No.:		Chemtest Sample ID.:		1080789	1080790	
		Sample Location:		TP1-7	TP1-7	
		Sample Type:		SOIL	SOIL	
		Top Depth (m):		0	0.60	
		Bottom Depth (m):		0.60	2.00	
		Date Sampled:		13-Oct-2020	13-Oct-2020	
		Asbestos Lab:		COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-
Moisture	N	2030	%	0.020	9.9	9.7
Soil Colour	N	2040		N/A	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones
Soil Texture	N	2040		N/A	Clay	Sand
pH	M	2010		4.0	8.9	9.3
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.58	0.49
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	M	2430	%	0.010	0.052	0.053
Arsenic	M	2450	mg/kg	1.0	17	20
Cadmium	M	2450	mg/kg	0.10	1.5	0.70
Chromium	M	2450	mg/kg	1.0	18	65
Mercury Low Level	M	2450	mg/kg	0.05	0.19	0.21
Copper	M	2450	mg/kg	0.50	38	37
Nickel	M	2450	mg/kg	0.50	30	28
Lead	M	2450	mg/kg	0.50	99	81
Selenium	M	2450	mg/kg	0.20	0.28	< 0.20
Zinc	M	2450	mg/kg	0.50	230	150
Chromium (Trivalent)	N	2490	mg/kg	1.0	18	65
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0

Results - Soil

Project: 15232 HEOL Y GLYN

Client: Terra Firma (Wales) Ltd		Chemtest Job No.:		20-27772	20-27772	
Quotation No.:		Chemtest Sample ID.:		1080789	1080790	
		Sample Location:		TP1-7	TP1-7	
		Sample Type:		SOIL	SOIL	
		Top Depth (m):		0	0.60	
		Bottom Depth (m):		0.60	2.00	
		Date Sampled:		13-Oct-2020	13-Oct-2020	
		Asbestos Lab:		COVENTRY	COVENTRY	
Determinand	Accred.	SOP	Units	LOD		
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	0.48	0.83
Pyrene	M	2700	mg/kg	0.10	0.72	0.71
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30
Organic Matter BS1377	N	2930	%	0.10	2.2	2.4

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com