

Our Ref: DE/14396/GARDEN VAL

Your Ref:

Contact: David Emanuel

4th March 2021

Morganstone Construction Limited

For the attn. of Mr Geoff Elcock

Dear Mr Elcock

VALIDATION OF IMPORTED CAPPING SOILS: PLOTS 19 – 24, PARC NEWYDD, BRITON FERRY

Terra Firma Wales Ltd were retained by Morganstone Construction Limited to assess the chemistry and thickness of soils imported for the purpose of capping at Plots 19 – 24, Parc Newydd, Briton Ferry.

Terra Firma Wales Ltd attended site on 16th February 2021. Terra Firma Wales Ltd observed a make-up comprising 200mm of an organic rich soil underlain by over 400mm of a clayey 'soil'. The soils were underlain by a high visibility 'No-Dig' layer (See **Plates 01 – 03**). Two samples of each soil type were taken from the gardens for chemical analysis for a broad suite of determinants. The results of the testing were compared to residential Generic Assessment Criteria (**Table 01.**).

Project: 14396 Parc Newydd										
Client: Terra Firma (Wales) Ltd		Chemtest Job No.:					21-04931	21-04931	21-04931	21-04931
Quotation No.:		Chemtest Sample ID.:					1143978	1143979	1143980	1143981
		Sample Location:			Residential GAC	Source	Plot 19-22 (TS1)	Plot 19-22 (SS1)	Plot 23/24 (TS2)	Plot 23/24 (SS2)
		Sample Type:					SOIL	SOIL	SOIL	SOIL
		Top Depth (m):					0	0.2	0	0.2
		Bottom Depth (m):					0.2	0.6	0.2	0.6
		Date Sampled:					16-Feb-2021	16-Feb-2021	16-Feb-2021	16-Feb-2021
		Asbestos Lab:					COVENTRY	COVENTRY	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	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A			-	-	-	-
Moisture	N	2030	%	0.020			37	9.4	36	12
Soil Colour	N	2040		N/A			Brown	Brown	Brown	Brown
Other Material	N	2040		N/A			Stones, Roots and Wood	Stones	Stones, Roots and Wood	Stones
Soil Texture	N	2040		N/A			Sand	Sand	Sand	Clay
pH	M	2010		4.0			8.9	9.2	9	9.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	290	S4UL	3.3	0.68	2.9	0.71
Cyanide (Total)	M	2300	mg/kg	0.50	8	CLEA (WITHDRAWN)	0.50	< 0.50	0.5	< 0.50
Sulphate (Acid Soluble)	M	2430	%	0.010			0.50	0.060	0.53	0.047
Arsenic	M	2450	mg/kg	1.0	37	S4UL	13	17	12	14
Cadmium	M	2450	mg/kg	0.10	11	S4UL	2.5	0.60	3.4	0.69
Chromium	M	2450	mg/kg	1.0			18	16	18	15
Mercury Low Level	M	2450	mg/kg	0.05	40	S4UL	0.11	0.05	0.13	0.07
Copper	M	2450	mg/kg	0.50	2400	S4UL	66	100	68	100
Nickel	M	2450	mg/kg	0.50	130	S4UL	15	19	14	18
Lead	M	2450	mg/kg	0.50	200	C4SL	65	46	73	50
Selenium	M	2450	mg/kg	0.20	250	S4UL	< 0.20	< 0.20	< 0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	3700	S4UL	190	93	250	95
Chromium (Trivalent)	N	2490	mg/kg	1.0	910	S4UL	18	16	18	15
Chromium (Hexavalent)	N	2490	mg/kg	0.50	6	S4UL	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	42	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	100	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	27	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	130	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	1100	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	65000	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	65000	S4UL	11	< 1.0	26	65
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	65000	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0			11	< 5.0	26	65
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	70	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	130	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	34	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	74	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	140	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	260	S4UL	4.1	< 1.0	5.2	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	1100	S4UL	56	< 1.0	80	14
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	1100	S4UL	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0			61	< 5.0	85	14
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0			71	< 10	110	79
Naphthalene	M	2700	mg/kg	0.10	2.3	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	170	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	210	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	170	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	95	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	2400	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	280	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	620	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	7.2	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	15	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	2.6	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	77	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	2.2	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	27	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.24	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(g,h,i)perylene	M	2700	mg/kg	0.10	320	S4UL	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0			< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.30	120	S4UL	< 0.30	< 0.30	< 0.30	< 0.30
Organic Matter BS1377	N	2930	%	0.10			8.8	0.60	7.4	0.3

Table 01. Summary of Soil Chemical Testing and GACs

It can be seen from Table 01 that all determinants tested were at concentrations below the corresponding GACs.

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

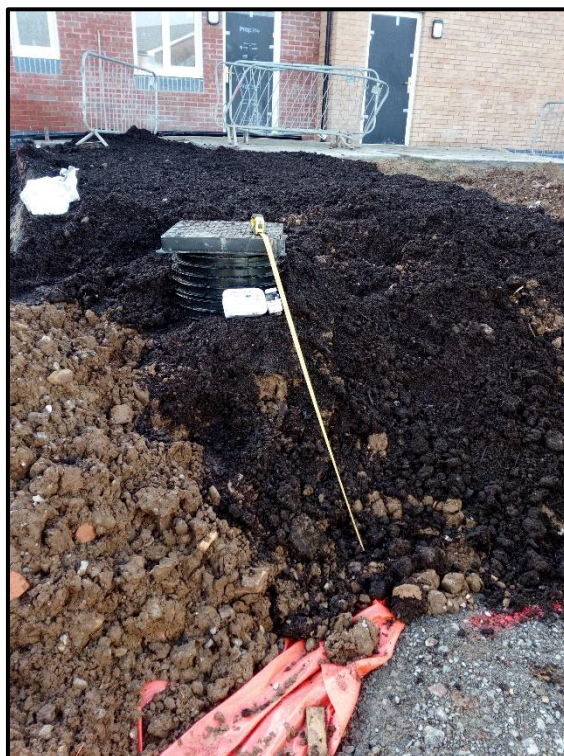


Plate 01. Capping Soils and Barrier Plots 19 – 22



Plate 02 & 03. Capping Soils 23/24 & No Dig Barrier 23/24



Amended Report

Report No.:	21-04931-2		
Initial Date of Issue:	25-Feb-2021	Date of Re-Issue:	03-Mar-2021
Client	Terra Firma (Wales) Ltd		
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA		
Contact(s):	Dave Emanuel		
Project	14396 Parc Newydd		
Quotation No.:	Q19-16176	Date Received:	18-Feb-2021
Order No.:		Date Instructed:	18-Feb-2021
No. of Samples:	4		
Turnaround (Wkdays):	5	Results Due:	24-Feb-2021
Date Approved:	25-Feb-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project: 14396 Parc Newydd

Client: Terra Firma (Wales) Ltd	Chemtest Job No.:				21-04931	21-04931	21-04931	21-04931
Quotation No.: Q19-16176	Chemtest Sample ID.:				1143978	1143979	1143980	1143981
	Sample Location:				Plot 19-22 (TS1)	Plot 19-22 (SS1)	Plot 23/24 (TS2)	Plot 23/24 (SS2)
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0	0.2	0	0.2
	Bottom Depth (m):				0.2	0.6	0.2	0.6
	Date Sampled:				16-Feb-2021	16-Feb-2021	23-Feb-2021	23-Feb-2021
	Asbestos Lab:				COVENTRY	COVENTRY	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	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-
Moisture	N	2030	%	0.020	37	9.4	36	12
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones, Roots and Wood	Stones	Stones, Roots and Wood	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Clay
pH	M	2010		4.0	8.9	9.2	9.0	9.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	3.3	0.68	2.9	0.71
Cyanide (Total)	M	2300	mg/kg	0.50	0.50	< 0.50	0.50	< 0.50
Sulphate (Acid Soluble)	M	2430	%	0.010	0.50	0.060	0.53	0.047
Arsenic	M	2450	mg/kg	1.0	13	17	12	14
Cadmium	M	2450	mg/kg	0.10	2.5	0.60	3.4	0.69
Chromium	M	2450	mg/kg	1.0	18	16	18	15
Mercury Low Level	M	2450	mg/kg	0.05	0.11	0.05	0.13	0.07
Copper	M	2450	mg/kg	0.50	66	100	68	100
Nickel	M	2450	mg/kg	0.50	15	19	14	18
Lead	M	2450	mg/kg	0.50	65	46	73	50
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	190	93	250	95
Chromium (Trivalent)	N	2490	mg/kg	1.0	18	16	18	15
Chromium (Hexavalent)	N	2490	mg/kg	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
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	11	< 1.0	26	65
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	11	< 5.0	26	65
Aromatic TPH >C5-C7	N	2680	mg/kg	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
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 14396 Parc Newydd

Client: Terra Firma (Wales) Ltd	Chemtest Job No.:				21-04931	21-04931	21-04931	21-04931
Quotation No.: Q19-16176	Chemtest Sample ID.:				1143978	1143979	1143980	1143981
	Sample Location:				Plot 19-22 (TS1)	Plot 19-22 (SS1)	Plot 23/24 (TS2)	Plot 23/24 (SS2)
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0	0.2	0	0.2
	Bottom Depth (m):				0.2	0.6	0.2	0.6
	Date Sampled:				16-Feb-2021	16-Feb-2021	23-Feb-2021	23-Feb-2021
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD				
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	4.1	< 1.0	5.2	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	56	< 1.0	80	14
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	61	< 5.0	85	14
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	71	< 10	110	79
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30
Organic Matter BS1377	N	2930	%	0.10	8.8	0.60	7.4	0.30

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-diphenylcarbazine.
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"
SOP	Standard operating procedure
LOD	Limit of detection

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