T J BOOTH ASSOCIATES

CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

20A Eastgate St
Rochdale
Lancashire
OL16 1DH

FAO Mr M Buczman,
Project Officer
Environmental Management
Rochdale Borough Council
Green Lane
Heywood,
Rochdale,
OL10 2DY.

Monday, 21 December 2020
Ref: rep-tjba-RMBC-land at smallbridge, rochdale-phs II letter-171017.docx

Subject**:** **RMBC land at Smallbridge, Rochdale.**

Environmental Phase II Letter Report: Results of soil chemical testing.

Dear Sirs,

Further to our initial risk assessment and site investigations and as per our recent instruction for further investigations; please find attached the results and certification of all soil chemical testing undertaken to date.

The Application Site is proposed to be developed by RMBC into allotments for the local community from public open space. The Site has been granted planning permission in February 2020, application reference No. 19/00970/FUL, detail below:

PLANNING PERMISSION GRANTED

APPLICATION REFERENCE: 19/00970/FUL

Name and address for correspondence:	Applicant name:
Lorna Cruice Appletons 17 Chorley Old Road Bolton BL1 3AD	Mr Michael Buczman Rochdale Borough Council

Part I - Particulars of Application

Date of Application: 1 October 2019

Proposal:	**Development of allotments including internal access ways and paths, boundary treatment, car parking and landscaping**
Location:	**Land Off Great Howarth, Wardle, Rochdale**

Tel: 01706 868288
Fax: 01706 868288
e-mail: office@tjba.co.uk

Proprietor.
Timothy John Booth
BSc (Hons) C.Eng.C.Env. MICE
t/a T J Booth Associates

VAT Reg. N° 748 6510 09

Site Investigations September 2017.

Prior to planning permission at the Application Site, T J Booth Associates previously authored an earlier version of this Phase II Letter Report, ref: *rep-tjba-RMBC-land at smallbridge, rochdale-phs II letter-271017*.

A limited Environmental Data Search provided by Rochdale MBC at the time was assessed, which indicated the Site had previously only been used as agricultural land. There were historic activities such as collieries within 100m, quarries and mills within 500m, and more recent landfill sites noted with a 250m radius of the Site boundaries.

An investigation into the geo-environmental characteristics of the Site was undertaken by T J Booth Associates on the 18th September 2017. The Site comprised a large field/public open space and was predominantly marshy with wooded areas to the N and SW perimeters. The Site was surrounded by agricultural land to the N/NW/NE, residential development to the E, and the Buckley Brook valley to the SW.

Site investigations comprised 10No. hand excavated trial pits (TP1-10) in which soil samples (S1-10) were obtained respectively. Refer to SI Plan in appendix for trial pit/sample locations.

The samples were undertaken in a grid format to provide a randomly sampled coverage to assess the upper soils for common contaminants, which were pre-approved by the Rochdale MBC Contaminated Land Department.

Summarily the soils encountered comprised the following:

S1-7 Brown, slightly sandy, silty, very rooty TOPSOIL; clay was noted at approximately 200m depth below sample S5.

S8-10 Dark brown, silty/clayey, very rooty TOPSOIL.

The topsoils encountered did not comprise visual or olfactory evidence of a contaminative nature.

Samples were sealed in 1kg white plastic snap top containers, amber jars & vials where appropriate and sent to Scientific Analysis Laboratories Ltd to be tested for a range of common contaminants. Each sample was tested for metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening.

On return the samples were assessed by TJ Booth Associates to common threshold comparison data specifically the Defra Category 4 Screening Levels (C4SL), then to EA/DEFRA SGV (2009) data, and LQM/CIEH GAC 2nd edition (2009) & erratum (2011) where available.

Results indicated that for samples S1-8 & S10, general contaminants were below the contaminant threshold levels for allotments except for lead which was noted to be marginally around the threshold value of 83-130. Sample S9

was considered a 'hotspot', with a lead value of 970mg/kg, and a zinc value of 970mg/kg.

Site Investigations November 2020.

After planning permission was granted, T J Booth Associates were again employed by RMBC to assess the suitability of the Site for planning purposes. It was advised that further samples would be required to satisfy planning condition No.9, avoiding the area around the previous sample 9 location, in which outlier results were noted as this part of the Site was not going to be developed.

A 2nd site investigation into the geo-environmental characteristics of the Site was undertaken by T J Booth Associates on the 20th November 2020. The Site and local environs remained in the same state as in the previous 2017 visit.

Site investigations comprised a further 10No. hand excavated trial pits (TPs 11-20) from which soil samples S11-20 were taken respectively. The trial pits were again undertaken in a grid format – offset to fill in the spaces between the last sampling investigation, and to provide a further randomly sampled supplemental site coverage.

In each location, the samples were excavated to the maximum depth possible by hand excavation, to assess the topsoil and underlying geology. The trial pits as encountered comprised the following:

TP11	0-250	Brown silty TOPSOIL, rooty.	(S11)
	250-400	Orange brown slightly gravelly clay MADE GROUND with gravel sized brick, and fragments of stone & timber, rare cement/plaster.	
TP12	0-200	Brown silty TOPSOIL, rooty.	(S12)
	200-450	Orange brown slightly gravelly silty sand MADE GROUND. A full brick removed from hole, gravel sized stone & rare timber.	
TP13	0-250	Dark brown silty TOPSOIL, rooty. (S13)	
	250-500	Orange-brown firm CLAY (virgin).	
TP14	0-200	Brown silty TOPSOIL, with rare brick/coal fragments. (S14)	
	200-400	Orange-brown firm CLAY (virgin).	
TP15	0-300	Brown silty TOPSOIL, very rooty, rare brick fragments. (S15)	
	300-450	Orange-brown firm CLAY (virgin).	

TP16	0-300	Brown silty TOPSOIL, very rooty. (S16)	
	300-400	Orange-brown firm very slightly gravelly, slightly sandy CLAY (virgin).	
TP17	0-300	Brown silty TOPSOIL, very rooty, very rare brick fragments.	(S17)
	300-450	Firm orange brown slightly gravelly clay (suspect) MADE GROUND. Gravel is sandstone fine to coarse.	
TP18	0-200	Brown silty TOPSOIL, very rooty, with rare brick fragments.	(S18)
	200-350	Brown clayey MADE GROUND with abundant gravel sized brick/stone, and fragments of stone & timber, rare cement/plaster & coal fragments.	
TP19	0-200	Brown silty TOPSOIL, very rooty, with abundant coal fragments to bottom. (S19)	
	200-350	Orange-brown firm to stiff CLAY (virgin).	
TP20	0-200	Brown silty TOPSOIL. (S20)	
	200-400	Orange-brown firm to stiff CLAY (virgin).	

Other than minor building rubble noted on occasion, and some partially burnt coal etc, no major visual or olfactory evidence of contamination was noted on the site investigation.

Soil samples were sealed in 1kg white plastic snap top containers & amber jars and sent to Eurofins Chemtest Ltd to be tested for the following contaminant suites: metals, speciated PAH, inorganics & sulphates, SOM, and asbestos screening.

Final Results

On return the sample results from samples S1-20 were assessed/reassessed by TJ Booth Associates to common threshold comparison data, specifically the Defra Category 4 Screening Levels (C4SLs) where available, then to the LQM/CIEH (S4ULs) thereafter.

The latest round of sampling took both composite (topsoil/underlying clayey made ground), and topsoil only samples in areas where topsoil was underlain by virgin clay.

The latest sampling highlighted elevated levels of dibenz(ah)anthracene in samples S13, S15, and S20 above threshold levels allowed for allotment sites.

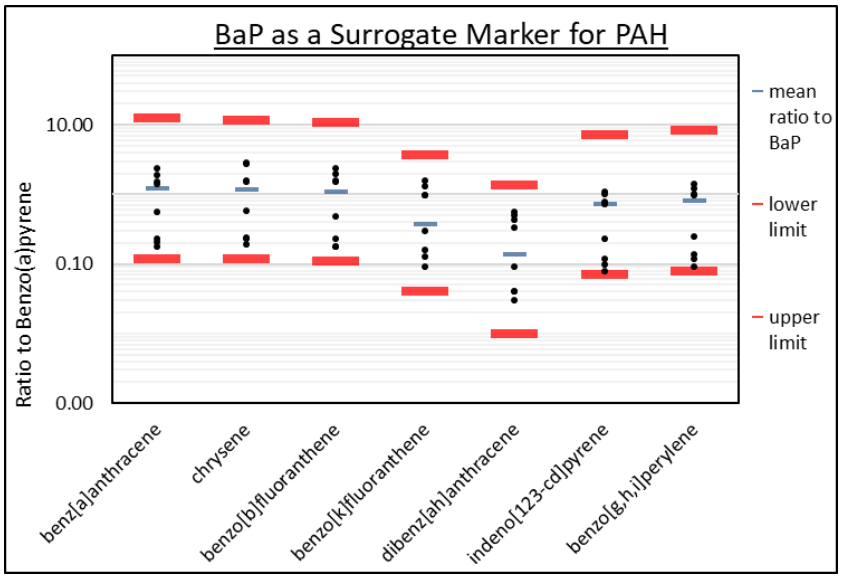
However, current guidance allows for a simplified risk assessment of PAH using benzo(a)pyrene as a surrogate marker for the carcinogenic risk of PAHs

noted in soil, based on the toxicological benchmarks of the coal tar mixtures tested by Culp et al. (1998).

The simplified PAH risk assessment is subject to the ratios of genotoxic PAHs having a signature of not greater than an order of magnitude relative to benzo(a)pyrene in the coal tar mixtures used within the Culp et al. study.

If the risk assessment is adopted, and sample parameters fall within the coal tar PAH signature, benzo(a)pyrene may be used as a surrogate marker of PAH risk for some or all samples noted from the Site.

For the assessment to work, samples with benzo(a)pyrene at or below the LOD were removed so as not to give erroneous results. The remaining samples (S2, S3, S5, S6, S13, S15, S18, & S20) were plotted relative to benzo(a)pyrene and found to correspond with the Culp et al. coal tar signature, indicating that for the Application Site, benzo(a)pyrene could be used as a surrogate marker for PAH, see below graph:



Given the benzo(a)pyrene results for all samples are below the relative C4SLs, then PAH risk from the Site is low.

The only other levels occasionally elevated were lead generally between 53-130mg/kg, with 2 clear outliers to the south corner of the Site of 970mg/kg (S9) & 200mg/kg (S19). The two outliers are considered a hotspot.

Zinc was also elevated above threshold values in sample S9, however, is within UCL95 confidence limits for the Site when compared to allotment thresholds.

With the outlier samples and area removed from the dataset, the average mean lead is 92.67mg/kg slightly above the threshold for allotment land, with a UCL value of 105mg/kg.

Conclusions.

Soil contaminant testing revealed that the Site (when considered separate from the hotspot noted to the south corner), is generally clean with a slight elevation above threshold C4SL limits for lead when compared to allotment land use.

It is highly unlikely that total lead concentrations recorded in soil samples would be 100% bioavailable, and thus given the results it is estimated that approximately 86% of the soil lead would need to be bioavailable to be above the allotment threshold. Current studies suggest that although lead in soil varies, the average is reported to be around 60%. Given the marginal site value (excluding the hotspot area); the overall lead values for the site are not significant.

For the purposes of this assessment, trial pit locations TP9 & TP19 should be considered outliers and a potential minor contamination hotspot above acceptable limits. Should the area between TP9 & TP19 be used for allotment use then it would be prudent to undertake remediation of this area.

The topsoil thickness local to TP9 & TP19 was noted as nominally 200mm thick on to virgin CLAY. It would be prudent to remove and replace with a clean topsoil able to pass general common contaminant testing regarding metals & PAH to mitigate the lead/zinc risk in this area.

We trust that the above clear, but should you require further advice please contact the undersigned.

Sincerely yours,

Daniel Slattery, BSc (Hons).

T J Booth Associates.

Approved

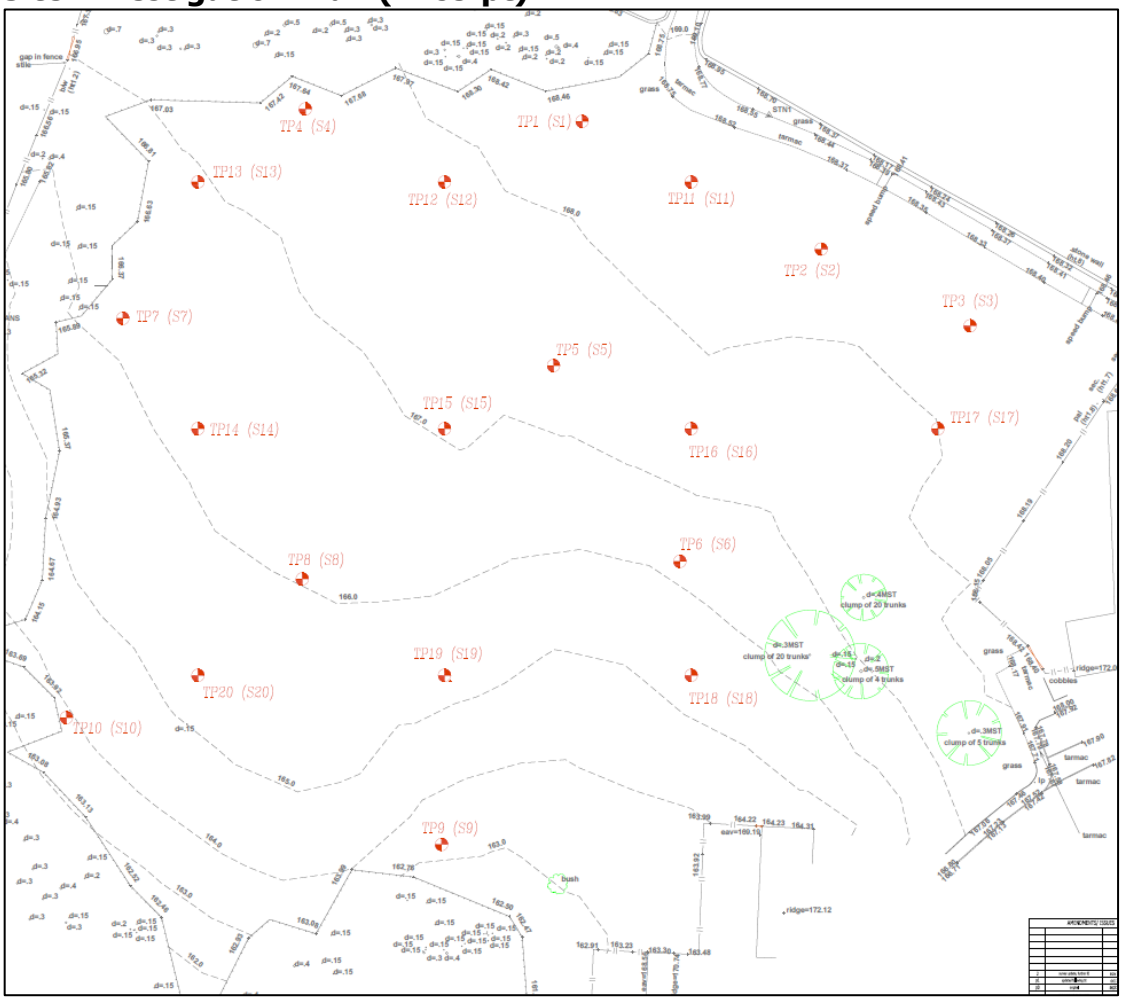
T J Booth BSc (Hons), C. Eng. C. Env. MICE.

T J Booth Associates.

Continued…

Appendix.

Site Investigation Plan (Excerpt).



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Results of Soil Chemical Testing.

TABLE A - Dataset with outliers included.							
Client / Site	***RMBC - Land at Smallbridge***						
Sampling Date	***18.09.17 & 20.11.20***						
Comparison of Contamination Test Results with Thresholds (mg/kg)							
Contaminant		**No**	**Max**	**Mean**	**ALLOTMENT**		
						Pass/Fail	**Comment**
METALS	Arsenic as As, dry weight	20	26	14.26	49	PASS	
	Boron as B, hot water sol dw	20	1.4	0.7945	45	PASS	
	Cadmium as Cd, dry weight	20	1.8	0.708	3.9	PASS	
	chromium as Cr(III) dry weight	20	35	18.55	18000	PASS	
	Chromium as Cr(VI), dry weight	20	1	0.75	170	PASS	
	Copper, as Dry Weight	20	160	44.5	520	PASS	
	Lead, as Dry Weight	20	970	141.9	80	FAIL	S9 & S19 outliers included
	Mercury as Hg, dry weight	19	1	0.6289	21	PASS	
	Nickel as Ni, dry weight	20	23	16.54	53	PASS	
	Selenium as Se, dry weight	20	3	1.714	88	PASS	
	Zinc as Zn, dry weight	20	970	192.1	620	comment	S9 outlier included
INORGANIC	Cyanide (Total)	20	1	0.76	2.5	PASS	
	Sulphate (Total) as SO4	20	0.19	0.119	0.24	PASS	
	Sulphide	20	10	5.6125	250	PASS	
	pH	20	7.7	6.47	6 to 8	NORMAL	
	Sulphur (Elemental)	20	500	259.84	100	comment	
	Asbestos Identification	20	0	0	0	PASS	
ORGANIC	SOM	20	11	6.29			
PAH	acenaphthene	20	0.62	0.121	200	PASS	
PAH	acenaphthylene	20	0.25	0.0705	160	PASS	
PAH	anthracene	20	0.76	0.1905	2200	PASS	
PAH	benzo[a]anthracene	20	2.4	0.7545	13	PASS	
PAH	benzo[a]pyrene	20	1.7	0.383	5.7	PASS	
PAH	benzo[b]fluoranthene	20	2.4	0.4875	3.9	PASS	
PAH	benzo[g,h,i]perylene	20	1.4	0.307	640	PASS	
PAH	benzo[k]fluoranthene	20	1.6	0.3295	130	PASS	
PAH	chrysene	20	2.8	0.8775	19	PASS	
PAH	dibenz[ah]anthracene	20	0.55	0.138	0.43	FAIL	PAH coal tar signature, BaP surrogate marker approach - PASS
PAH	fluoranthene	20	4.1	1.3445	290	PASS	
PAH	fluorene	20	0.51	0.1145	160	PASS	
PAH	indeno[123-cd]pyrene	20	1.1	0.253	39	PASS	
PAH	napthalene	20	0.44	0.094	24	PASS	
PAH	phenanthrene	20	3.6	0.866	90	PASS	
PAH	pyrene	20	4.2	1.3485	620	PASS	
PAH	PAH (Total - SUM EPA16)	20	28	7.4095	1	comment	
SVOC	phenol	20	1.5	0.7435	83	PASS	

Continued…

TABLE B - Dataset with outliers removed.							
Client / Site		RMBC - Land at Smallbridge					
Sampling Date		18.09.17 & 20.11.20					
Comparison of Contamination Test Results with Thresholds (mg/kg)							
Contaminant		No	Max	Mean	ALLOTMENT		
						Pass/Fail	Comment
METALS	Arsenic as As, dry weight	18	26	13.989	49	PASS	
	Boron as B, hot water sol dw	18	1	0.7494	45	PASS	
	Cadmium as Cd, dry weight	18	1	0.6311	3.9	PASS	
	chromium as Cr(III) dry weight	18	25	17.72	18000	PASS	
	Chromium as Cr(VI), dry weight	18	1	0.75	170	PASS	
	Copper, as Dry Weight	18	63	37.722	520	PASS	
	Lead, as Dry Weight	18	130	92.667	80	FAIL	S9 & S19 outliers removed
	Mercury as Hg, dry weight	17	1	0.6353	21	PASS	
	Nickel as Ni, dry weight	18	23	16.378	53	PASS	
	Selenium as Se, dry weight	18	3	1.705	88	PASS	
	Zinc as Zn, dry weight	18	560	140.11	620	PASS	S9 outlier removed
INORGANIC	Cyanide (Total)	18	1	0.75	2.5	PASS	
	Sulphate (Total) as SO4	18	0.19	0.1177	0.24	PASS	
	Sulphide	18	10	5.6083	250	PASS	
	pH	18	7.7	6.4833	6 to 8	NORMAL	
	Sulphur (Elemental)	18	500	260.53	100	comment	
	Asbestos Identification	18	0	0	0	PASS	
ORGANIC	SOM	18	11	6.1389			
PAH	acenaphthene	18	0.62	0.1283	200	PASS	
PAH	acenaphthylene	18	0.25	0.0722	160	PASS	
PAH	anthracene	18	0.76	0.2056	2200	PASS	
PAH	benzo[a]anthracene	18	2.4	0.83	13	PASS	
PAH	benzo[a]pyrene	18	1.7	0.4178	5.7	PASS	
PAH	benzo[b]fluoranthene	18	2.4	0.5339	3.9	PASS	
PAH	benzo[g,h,i]perylene	18	1.4	0.3339	640	PASS	
PAH	benzo[k]fluoranthene	18	1.6	0.3583	130	PASS	
PAH	chrysene	18	2.8	0.9667	19	PASS	
PAH	dibenz[ah]anthracene	18	0.55	0.1472	0.43	FAIL	PAH coal tar signature, BaP surrogate marker approach - PASS
PAH	fluoranthene	18	4.1	1.445	290	PASS	
PAH	fluorene	18	0.51	0.1211	160	PASS	
PAH	indeno[123-cd]pyrene	18	1.1	0.2739	39	PASS	
PAH	napthalene	18	0.44	0.0978	24	PASS	
PAH	phenanthrene	18	3.6	0.955	90	PASS	
PAH	pyrene	18	4.2	1.45	620	PASS	
PAH	PAH (Total - SUM EPA16)	18	28	8.0944	1	comment	
SVOC	phenol	18	1	0.6872	83	PASS	

GAC =LQM residential plant uptake & commercial 2009, BRE = Building Research Establishment, S = typ SNIFFER values, SOM=soil organic material, IC-ICRCL 87(withdrawn), LOD = limit of detection

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Soil Testing Certificates September 2017, Sal Ltd.

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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Concept Life Sciences

Certificate of Analysis

Hadfield House
Hadfield Street
Combrook
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M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 684032-1

Date of Report: 02-Oct-2017

Customer: T J Booth Associates
20A Eastgate
Rochdale
OL16 1DH

Customer Contact: Mr Daniel Slattery

Customer Job Reference:
Customer Purchase Order: tjba-190817-01
Customer Site Reference: RMBC Land Smallbridge Rochdale
Date Job Received at Concept: 21-Sep-2017
Date Analysis Started: 21-Sep-2017
Date Analysis Completed: 02-Oct-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs
All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING
1549

Report checked
and authorised by :
Aneta Dybek-Echtermeyer
Customer Service Advisor

Issued by :
Aneta Dybek-Echtermeyer
Customer Service Advisor

Continued…

Concept Reference: 684032
Project Site: RMBC Land Smallbridge Rochdale
Customer Reference:

Soil Analysed as Soil
Miscellaneous

				Concept Reference	684032 001	684032 002	684032 003	684032 004	684032 005
				Customer Sample Reference	S1	S2	S3	S4	S5
				Date Sampled	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017
Determinand	Method	Test Sample	LOD	Units					
Asbestos ID	T27	AR			N.D.	N.D.	N.D.	N.D.	N.D.
Soil Organic Matter	T287	A40	0.1	%	9.0	10	6.2	8.3	7.9
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	0.11	0.18	0.49	0.08	0.18
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	0.07	0.16	0.30	0.07	0.09

Concept Reference: 684032
Project Site: RMBC Land Smallbridge Rochdale
Customer Reference:

Soil Analysed as Soil
Miscellaneous

				Concept Reference	684032 006	684032 007	684032 008	684032 009	684032 010
				Customer Sample Reference	S6	S7	S8	S9	S10
				Date Sampled	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017
Determinand	Method	Test Sample	LOD	Units					
Asbestos ID	T27	AR			N.D.	N.D.	N.D.	N.D.	N.D.
Soil Organic Matter	T287	A40	0.1	%	12	19	9.5	9.5	<0.1
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	0.23	0.11	0.13	0.04	0.10
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	0.13	0.11	0.09	0.04	0.08

Concept Reference: 684032
Project Site: RMBC Land Smallbridge Rochdale
Customer Reference:

Soil Analysed as Soil
ICRCL (Maxi)

				Concept Reference	684032 001	684032 002	684032 003	684032 004	684032 005
				Customer Sample Reference	S1	S2	S3	S4	S5
				Date Sampled	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017
Determinand	Method	Test Sample	LOD	Units					
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Arsenic	T6	A40	1	mg/kg	16	10	11	12	16
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	T6	A40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	A40	1	mg/kg	25	19	19	18	19
Copper	T6	A40	1	mg/kg	51	40	63	41	37
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1
Cyanide(free)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1
Lead	T6	A40	1	mg/kg	110	93	110	83	89
Mercury	T6	A40	1	mg/kg	<1	<1	<1	<1	<1
Nickel	T6	A40	1	mg/kg	18	17	18	16	17
pH	T7	A40			6.1	6.4	6.6	6.8	5.7
Phenols(Mono)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1
Selenium	T6	A40	3	mg/kg	<3	<3	<3	<3	<3
SO4(Total)	T6	A40	0.01	%	0.13	0.13	0.07	0.19	0.12
Sulphide	T4	AR	10	mg/kg	<10	<10	<10	<10	<10
Sulphur(Free)	T2	AR	500	mg/kg	<500	<500	<500	<500	<500
Thiocyanate	T4	A40	10	mg/kg	<10	<10	<10	<10	<10
Zinc	T6	A40	1	mg/kg	110	95	86	85	86

Continued…

Concept Reference: 684032
Project Site: RMBC Land Smallbridge Rochdale
Customer Reference:

Soil — Analysed as Soil
ICRCL (Maxi)

				Concept Reference	684032 006	684032 007	684032 008	684032 009	684032 010
				Customer Sample Reference	S6	S7	S8	S9	S10
				Date Sampled	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017
Determinand	Method	Test Sample	LOD	Units					
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Arsenic	T6	A40	1	mg/kg	21	18	26	24	17
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1
Cadmium	T6	A40	1	mg/kg	<1	<1	<1	<1	<1
Chromium	T6	A40	1	mg/kg	22	18	24	35	25
Copper	T6	A40	1	mg/kg	48	58	46	160	52
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1
Cyanide(free)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1
Lead	T6	A40	1	mg/kg	120	120	130	970	110
Mercury	T6	A40	1	mg/kg	<1	<1	<1	<1	<1
Nickel	T6	A40	1	mg/kg	23	23	21	20	19
pH	T7	A40			5.7	6.0	5.7	5.8	5.8
Phenols(Mono)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1
Selenium	T6	A40	3	mg/kg	<3	<3	<3	<3	<3
SO4(Total)	T6	A40	0.01	%	0.13	0.16	0.13	0.13	0.13
Sulphide	T4	AR	10	mg/kg	<10	<10	<10	<10	<10
Sulphur(Free)	T2	AR	500	mg/kg	<500	<500	<500	<500	<500
Thiocyanate	T4	A40	10	mg/kg	<10	<10	<10	<10	<10
Zinc	T6	A40	1	mg/kg	110	560	560	970	110

Concept Reference: 684032
Project Site: RMBC Land Smallbridge Rochdale
Customer Reference:

Soil — Analysed as Soil
Total and Speciated USEPA16 PAH

				Concept Reference	684032 001	684032 002	684032 003	684032 004	684032 005
				Customer Sample Reference	S1	S2	S3	S4	S5
				Date Sampled	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T149	AR	0.01	mg/kg	0.01	0.02	0.11	0.01	0.02
Acenaphthylene	T149	AR	0.01	mg/kg	0.01	0.01	0.01	<0.01	0.01
Acenaphthene	T149	AR	0.01	mg/kg	0.02	0.04	0.26	0.02	0.05
Fluorene	T149	AR	0.01	mg/kg	0.01	0.03	0.16	0.01	0.03
Phenanthrene	T149	AR	0.01	mg/kg	0.12	0.27	1.2	0.10	0.30
Anthracene	T149	AR	0.01	mg/kg	0.04	0.07	0.27	0.03	0.08
Fluoranthene	T149	AR	0.01	mg/kg	0.25	0.49	1.4	0.20	0.44
Pyrene	T149	AR	0.01	mg/kg	0.25	0.45	1.1	0.18	0.37
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	0.12	0.23	0.57	0.10	0.18
Chrysene	T149	AR	0.01	mg/kg	0.13	0.24	0.58	0.10	0.19
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	0.18	0.34	0.79	0.15	0.27
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	0.10	0.20	0.45	0.08	0.15
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	0.05	0.10	0.23	0.05	0.08
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	0.02	0.04	0.09	0.02	0.03
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	0.06	0.12	0.25	0.05	0.09
PAH(total)	T149	AR	0.01	mg/kg	1.4	2.7	7.5	1.1	2.3

Continued…

Concept Reference: 684032
Project Site: RMBC Land Smallbridge Rochdale
Customer Reference:

Soil Analysed as Soil
Total and Speciated USEPA16 PAH

				Concept Reference	684032 006	684032 007	684032 008	684032 009	684032 010
				Customer Sample Reference	S6	S7	S8	S9	S10
				Date Sampled	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017	18-SEP-2017
Determinand	Method	Test Sample	LOD	Units					
Naphthalene	T149	AR	0.01	mg/kg	0.02	0.04	0.02	0.02	0.02
Acenaphthylene	T149	AR	0.01	mg/kg	<0.01	0.01	<0.01	<0.01	<0.01
Acenaphthene	T149	AR	0.01	mg/kg	0.03	0.01	0.02	<0.01	0.02
Fluorene	T149	AR	0.01	mg/kg	0.02	0.01	0.01	<0.01	0.01
Phenanthrene	T149	AR	0.01	mg/kg	0.38	0.09	0.11	0.03	0.13
Anthracene	T149	AR	0.01	mg/kg	0.07	0.02	0.03	0.01	0.03
Fluoranthene	T149	AR	0.01	mg/kg	0.60	0.22	0.24	0.07	0.27
Pyrene	T149	AR	0.01	mg/kg	0.51	0.20	0.21	0.07	0.23
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	0.21	0.12	0.13	0.05	0.12
Chrysene	T149	AR	0.01	mg/kg	0.23	0.13	0.14	0.05	0.12
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	0.36	0.22	0.22	0.08	0.18
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	0.20	0.12	0.12	0.04	0.10
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	0.12	0.07	0.07	0.03	0.06
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	0.04	0.03	0.03	0.01	0.02
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	0.14	0.08	0.08	0.03	0.06
PAH(total)	T149	AR	0.01	mg/kg	2.9	1.4	1.4	0.49	1.4

Index to symbols used in 684032-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
N.D.	Not Detected
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos was subcontracted to REC Asbestos.

Method Index

Value	Description
T7	Probe
T287	Calc TOC/0.58
T2	Grav
T4	Colorimetry
T6	ICP/OES
T149	GC/MS (SIR)
T27	PLM

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Chromium VI	T6	AR	1	mg/kg	N	001-010
Arsenic	T6	A40	1	mg/kg	U	001-010
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-010
Cadmium	T6	A40	1	mg/kg	U	001-010
Chromium	T6	A40	1	mg/kg	U	001-010
Copper	T6	A40	1	mg/kg	U	001-010
Cyanide(Total)	T4	AR	1	mg/kg	U	001-010
Cyanide(free)	T4	AR	1	mg/kg	U	001-010
Lead	T6	A40	1	mg/kg	U	001-010
Mercury	T6	A40	1	mg/kg	U	001-010

Continued…

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Nickel	T6	A40	1	mg/kg	U	001-010
pH	T7	A40			U	001-010
Phenols(Mono)	T4	AR	1	mg/kg	U	001-010
Selenium	T6	A40	3	mg/kg	U	001-010
SO4(Total)	T6	A40	0.01	%	N	001-010
Sulphide	T4	AR	10	mg/kg	N	001-010
Sulphur(Free)	T2	AR	500	mg/kg	N	001-010
Thiocyanate	T4	A40	10	mg/kg	N	001-010
Zinc	T6	A40	1	mg/kg	U	001-010
Naphthalene	T149	AR	0.01	mg/kg	U	001-010
Acenaphthylene	T149	AR	0.01	mg/kg	U	001-010
Acenaphthene	T149	AR	0.01	mg/kg	U	001-010
Fluorene	T149	AR	0.01	mg/kg	U	001-010
Phenanthrene	T149	AR	0.01	mg/kg	U	001-010
Anthracene	T149	AR	0.01	mg/kg	U	001-010
Fluoranthene	T149	AR	0.01	mg/kg	U	001-010
Pyrene	T149	AR	0.01	mg/kg	U	001-010
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	U	001-010
Chrysene	T149	AR	0.01	mg/kg	U	001-010
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	U	001-010
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	U	001-010
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	U	001-010
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	U	001-010
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	U	001-010
PAH(total)	T149	AR	0.01	mg/kg	U	001-010
Asbestos ID	T27	AR			SU	001-010
Soil Organic Matter	T287	A40	0.1	%	N	001-010
Benzo(b)fluoranthene	T149	AR	0.01	mg/kg	U	001-010
Benzo(k)fluoranthene	T149	AR	0.01	mg/kg	U	001-010

Continued…

Soil Testing Certificates September 2017, Eurofins Chemtest Ltd.

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING 2183

Final Report

Report No.:	20-32091-1		
Initial Date of Issue:	07-Dec-2020		
Client	TJ Booth Associates		
Client Address:	20a Eastgate Street Rochdale Lancs OL16 1DH		
Contact(s):	Daniel Slattery		
Project	RMBC Land at Smallbridge, Rochdale		
Quotation No.:	Q19-18321	**Date Received:**	24-Nov-2020
Order No.:		**Date Instructed:**	24-Nov-2020
No. of Samples:	10		
Turnaround (Wkdays):	10	**Results Due:**	07-Dec-2020
Date Approved:	07-Dec-2020		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Continued…

Results - Soil

Project: RMBC Land at Smallbridge, Rochdale

Client: TJ Booth Associates	Chemtest Job No.:				20-32091	20-32091	20-32091	20-32091	20-32091	20-32091	20-32091	20-32091	20-32091
Quotation No.: Q19-18321	Chemtest Sample ID.:				1102462	1102463	1102464	1102465	1102466	1102467	1102468	1102469	1102470
Order No.:	Client Sample Ref.:				S11	S12	S13	S14	S15	S16	S17	S18	S19
	Client Sample ID.:				1	2	3	4	5	6	7	8	9
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bottom Depth (m):				0.40	0.45	0.25	0.20	0.30	0.30	0.45	0.35	0.20
	Date Sampled:				20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	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	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	27	30	37	35	45	34	30	30	40
pH	U	2010		4.0	7.5	7.7	6.5	6.5	6.5	6.5	7.0	7.3	6.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40	0.58	1.0	< 0.40	0.51	< 0.40	0.40	1.4
Sulphur (Elemental)	U	2180	mg/kg	1.0	67	7.5	22	11	19	19	14	19	7.2
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.70
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	0.60	2.6	1.0	1.5	1.1	1.2	1.0	1.1	1.3
Sulphate (Total)	U	2430	mg/kg	100	720	1600	860	920	930	670	590	1300	1300
Arsenic	U	2450	mg/kg	1.0	7.4	9.8	21	11	17	7.4	5.9	5.3	9.4
Cadmium	U	2450	mg/kg	0.10	0.16	0.21	0.42	0.23	0.33	0.13	0.14	0.16	1.8
Chromium	U	2450	mg/kg	1.0	14	21	16	11	15	11	11	12	17
Copper	U	2450	mg/kg	0.50	21	27	32	21	29	21	24	29	51
Mercury	U	2450	mg/kg	0.10	0.13	0.14	0.39	0.20	0.35	0.12	0.12	< 0.10	0.15
Nickel	U	2450	mg/kg	0.50	14	16	18	10	15	7.8	11	14	16
Lead	U	2450	mg/kg	0.50	90	84	95	56	90	52	64	52	200
Selenium	U	2450	mg/kg	0.20	0.37	0.32	0.68	0.32	0.58	0.40	0.23	0.23	0.59
Zinc	U	2450	mg/kg	0.50	62	72	110	60	82	59	59	76	350
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
Organic Matter	U	2625	%	0.40	4.8	4.7	11	8.8	7.4	6.0	5.9	4.8	9.3
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.20	< 0.10	0.44	< 0.10	< 0.10	0.19	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.12	< 0.10	0.22	< 0.10	< 0.10	0.25	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.14	< 0.10	0.62	< 0.10	< 0.10	0.27	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.16	< 0.10	0.51	< 0.10	< 0.10	0.23	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	0.74	1.2	0.81	0.94	3.6	1.9	1.3	1.7	< 0.10
Anthracene	U	2700	mg/kg	0.10	0.17	0.28	0.15	0.21	0.76	0.38	0.27	0.35	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	1.1	1.6	1.6	2.0	4.1	2.9	2.2	2.7	0.81
Pyrene	U	2700	mg/kg	0.10	1.2	1.7	1.7	1.9	4.2	3.0	2.4	2.9	0.80
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.66	0.90	1.5	1.3	2.4	1.6	1.5	1.4	< 0.10
Chrysene	U	2700	mg/kg	0.10	0.79	0.95	1.5	1.4	2.7	2.0	1.8	1.6	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	1.5	< 0.10	2.0	< 0.10	< 0.10	1.6	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.96	< 0.10	1.6	< 0.10	< 0.10	0.99	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	1.1	< 0.10	1.6	< 0.10	< 0.10	1.1	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.78	< 0.10	1.0	< 0.10	< 0.10	0.72	< 0.10

Results - Soil

Project: RMBC Land at Smallbridge, Rochdale

Client: TJ Booth Associates	Chemtest Job No.:				20-32091	20-32091	20-32091	20-32091	20-32091	20-32091	20-32091	20-32091	20-32091
Quotation No.: Q19-18321	Chemtest Sample ID.:				1102462	1102463	1102464	1102465	1102466	1102467	1102468	1102469	1102470
Order No.:	Client Sample Ref.:				S11	S12	S13	S14	S15	S16	S17	S18	S19
	Client Sample ID.:				1	2	3	4	5	6	7	8	9
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bottom Depth (m):				0.40	0.45	0.25	0.20	0.30	0.30	0.45	0.35	0.20
	Date Sampled:				20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.44	< 0.10	0.55	< 0.10	< 0.10	0.33	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	1.0	< 0.10	1.2	< 0.10	< 0.10	0.98	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	4.7	6.6	14	7.8	28	12	9.5	17	< 2.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.50	1.5

Continued…

Results - Soil

Project: RMBC Land at Smallbridge, Rochdale

Client: TJ Booth Associates			Chemtest Job No.:		20-32091
Quotation No.: Q19-18321			Chemtest Sample ID.:		1102471
Order No.:			Client Sample Ref.:		S20
			Client Sample ID.:		10
			Sample Type:		SOIL
			Top Depth (m):		0.00
			Bottom Depth (m):		0.20
			Date Sampled:		20-Nov-2020
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Moisture	N	2030	%	0.020	34
pH	U	2010		4.0	6.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40
Sulphur (Elemental)	U	2180	mg/kg	1.0	11
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50
Thiocyanate	U	2300	mg/kg	5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	0.85
Sulphate (Total)	U	2430	mg/kg	100	1700
Arsenic	U	2450	mg/kg	1.0	20
Cadmium	U	2450	mg/kg	0.10	0.58
Chromium	U	2450	mg/kg	1.0	19
Copper	U	2450	mg/kg	0.50	39
Mercury	U	2450	mg/kg	0.10	0.35
Nickel	U	2450	mg/kg	0.50	17
Lead	U	2450	mg/kg	0.50	120
Selenium	U	2450	mg/kg	0.20	0.56
Zinc	U	2450	mg/kg	0.50	140
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	8.1
Naphthalene	U	2700	mg/kg	0.10	0.16
Acenaphthylene	U	2700	mg/kg	0.10	0.12
Acenaphthene	U	2700	mg/kg	0.10	0.31
Fluorene	U	2700	mg/kg	0.10	0.49
Phenanthrene	U	2700	mg/kg	0.10	2.3
Anthracene	U	2700	mg/kg	0.10	0.49
Fluoranthene	U	2700	mg/kg	0.10	3.7
Pyrene	U	2700	mg/kg	0.10	3.6
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.9
Chrysene	U	2700	mg/kg	0.10	2.8
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	2.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	1.3
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.7
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	1.1

Results - Soil

Project: RMBC Land at Smallbridge, Rochdale

Client: TJ Booth Associates			Chemtest Job No.:		20-32091
Quotation No.: Q19-18321			Chemtest Sample ID.:		1102471
Order No.:			Client Sample Ref.:		S20
			Client Sample ID.:		10
			Sample Type:		SOIL
			Top Depth (m):		0.00
			Bottom Depth (m):		0.20
			Date Sampled:		20-Nov-2020
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.51
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	1.4
Total Of 16 PAH's	U	2700	mg/kg	2.0	24
Total Phenols	U	2920	mg/kg	0.30	0.77