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Our Ref: 8243G/TPB

11th February 2020

Dear Madam

St Thomas, Hazelbottom – Validation of Plot 7

WML Consulting (WML) has been commissioned by John Southworth Builders Ltd to undertake validation of private gardens in relation to development the former St Thomas' School, located between Chataway Road and Hazelbottom Road, Manchester, M8 5UU.

The development comprised the construction of twelve low-rise residential structures. External areas comprise hardstanding for access and parking together with private gardens.

A copy of the development by the architects Pozzoni, referenced P4674-01_8000, dated January 2018, is presented in Appendix 01.

This report presents the additional validation information for Plot 7 and should be read in conjunction with the WML Validation Report referenced 8243G-WML-00-XX-RP-G-0001, dated 11th December 2019.

Validation

WML attended site to obtain samples of the emplaced soils on 29th November 2019 for chemical analyses. During the inspection four samples of the imported topsoil (Plot 5 – 0.10, Plot 7 – 0.10, Plot 10 – 0.10 and Plot 12 – 0.10), three samples of the imported subsoil (Plot 1 – 0.20, Plot 7 – 0.30 and Plot 12 – 0.30) and three samples of the imported granular break layer (Plot 5 – 0.50, Plot 7 – 0.50 and Plot 10 – 0.50) were obtained from across the entire site. The samples, were submitted for chemical analyses and the test results are presented in Appendix 02.

Comparison of these results with the most stringent Assessment Criteria for 'residential with home-grown produce' as provided within Appendix 03, indicates that majority of the relevant criteria were not exceeded with the following very localised exceptions within Plot 7:-

Contaminant	Number of Exceedances	SL (mg/kg)	Recorded Concentrations (mg/kg)	Samples
Benzo(b)fluoranthene	1	2.6	4.0	Plot 7 – 0.10m
Dibenzo[a,h]anthracene	1	0.24	0.52	Plot 7 – 0.10m

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Registered in England No. 3176267

The exceedances of benzo[b]fluoranthene and dibenz[a,h]anthracene are very slight and localised to a single sample of topsoil from within Plot 7. On closer examination it is inferred that that these are likely attributed to localised fragments of ash and clinker entrained within the soil matrix.

Comparison of the ratios of fluoranthene to pyrene and benzo(a)anthracene to chrysene within the samples using the LQM PAH Double Ratio Tool suggest that the most likely source of the PAH compounds are carbonization and coke oven tar. This supports the visual inspection that noted isolated fragments of ash and clinker within the topsoil matrix.

As previously noted, although these fragments form an extremely small percentage of the Topsoil mass as a whole, as part of laboratory preparation, any such fragment in the analysis sample will be ground with the Topsoil matrix. As a result, elevated concentrations of any elements within the ash and clinker will be measured as a constituent of the matrix rather than as isolated fragments.

Therefore, as the elevated levels of PAH compounds are considered attributable to isolated fragments of ash and clinker in the topsoil matrix, the topsoil was deemed suitable for use at the site.

A copy of the double ratio plot are presented within Appendix 04.

We hope this provides you with the information required at this time. However, please do not hesitate to contact me if you have any queries regarding the above.

Yours sincerely



T P Booth

For WML CONSULTING

**Appendix 01
Drawings**



Notes
The Contractor is to check all dimensions and conditions on site before commencing. Do not scale from this drawing.
This drawing remains the copyright of POZZONI Architecture Ltd.

Scale Bars
TO BE USED ONLY AS GUIDANCE
1:5 mm 50 150 250
1:10 mm 100 300 500
1:20 mm 200 600 1000
1:50 mm 500 1500 2500

LEGEND
Red line site boundary
Outline of existing car parking area
Existing Tree
Existing Tree to be Removed

BOUNDARY KEY

Boundary Type A
A = 435mm brick with vertical railing with hairpin tops above and brick piers (O/A height 900mm).

Boundary Type B
1800m close boarded timber fence

Boundary Type C
1100mm vertical railing with hairpin tops

SCHEDULE OF ACCOMMODATION

Plot	Description	Count	Dwg. No.
01 - 08	3 Bed 5 Person	8	1301
09 - 10	2 Bed 4 Person	2	1302
11 - 12	2 Bed 4 Person	2	1300

Rev	Description	By	Date
Client	St Vincent's Housing Association		
Job	St Thomas' School Site		
Drawing	Tender - Site Plan		
Scale	PZ 1st	Rev	
Date	30/01/18	Scale	As indicated @ A1
By	LB	By	TDY
Project Status	Planning	Tender	Construction
	Design	Contract	As Built

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5 10 15 20 25



GENERAL NOTES

- DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
- NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
- THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH & SAFETY PLAN.

KEY

- SITE BOUNDARY
- PLOT 7
- VALIDATION PITS

P1	FIRST PRELIMINARY ISSUE	AUG '19	SCS	PGD
Rev.	Amendment	Date	By	Chkd

Project	ST THOMAS , HAZELBOTTOM			
Client	JOHN SOUTHWORTH BUILDERS LTD			
Title	VALIDATION PIT LOCATION PLAN			
Drawn	Checked	Date	Scale	
SCS	PGD	06-12-19	1:500@A3	

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Job No.	8243G	Drawing No.	VR-01.
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Appendix 02
Chemical Analyses – Capping Soils on Site



2183

Final Report

Report No.: 19-40580-1

Initial Date of Issue: 11-Dec-2019

Client WML Consulting Ltd

Client Address: No. 8 Oak Green
Stanley Green Business Park
Earl Rd
Cheadle
SK8 6QL

Contact(s): Sam Seddon

Project 8110G St Thomas' School

Quotation No.: **Date Received:** 04-Dec-2019

Order No.: 8110G **Date Instructed:** 04-Dec-2019

No. of Samples: 10

Turnaround (Wkdays): 5 **Results Due:** 10-Dec-2019

Date Approved: 11-Dec-2019

Approved By:



Details: Amy Parekh-Pross, Technical Projects
Manager

Results - Soil

Project: **8110G St Thomas' School**

Client: WML Consulting Ltd	Chemtest Job No.:				19-40580	19-40580	19-40580	19-40580	19-40580	19-40580	19-40580	19-40580	19-40580
Quotation No.:	Chemtest Sample ID.:				937183	937184	937185	937186	937187	937188	937189	937190	937191
Order No.: 8110G	Client Sample Ref.:				SS	TS	SS	TS	GSS	TS	SS	GSS	TS
	Client Sample ID.:				1	2	3	4	5	6	7	8	9
	Sample Location:				Plot 1	Plot 12	Plot 12	Plot 5	Plot 5	Plot 7	Plot 7	Plot 7	Plot 10
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m) (\$):				0.2	0.1	0.3	0.1	0.5	0.1	0.3	0.5	0.1
	Date Sampled (\$):				29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019
	Asbestos Lab:				LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	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	9.2	22	3.4	22	15	9.8	24	3.4	25
pH	U	2010		4.0	7.7	8.5	9.2	8.6	8.4	8.9	8.5	9.4	8.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	0.50
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.38	0.26	0.20	0.12	0.013	0.42	0.33	0.34	0.14
Total Sulphur	U	2175	%	0.010	< 0.010	0.060	0.011	0.041	< 0.010	0.017	0.043	0.014	0.019
Cyanide (Total)	U	2300	mg/kg	0.50	220	0.90	0.70	0.80	< 0.50	< 0.50	0.60	< 0.50	< 0.50
Sulphate (Total)	U	2430	mg/kg	100	120	1200	100	1100	< 100	130	1100	< 100	590
Arsenic	U	2450	mg/kg	1.0	2.5	3.5	33	6.0	1.9	21	4.7	25	3.6
Cadmium	U	2450	mg/kg	0.10	< 0.10	0.12	0.31	0.14	< 0.10	0.38	0.15	0.45	0.11
Copper	U	2450	mg/kg	0.50	4.1	14	1.4	13	3.0	4.9	12	2.2	7.3
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	8.2	9.1	3.0	8.2	5.7	7.5	13	2.8	6.7
Lead	U	2450	mg/kg	0.50	5.5	10	3.3	11	2.3	8.5	12	11	7.1
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	12	12	< 5.0	12	12	7.7	12	< 5.0	12
Zinc	U	2450	mg/kg	0.50	54	44	9.9	35	12	17	36	110	29
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	< 0.40	4.7	0.41	4.8	< 0.40	0.66	3.3	0.52	2.6
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	7.0	< 0.10	8.2	< 0.10	2.4	3.9	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	1.2	< 0.10	0.49	< 0.10	2.0	1.0	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	1.2	< 0.10	2.3	< 0.10	14	4.1	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10	< 0.10	0.83	< 0.10	1.9	< 0.10	13	4.1	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.63	< 0.10	4.8	< 0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.82	< 0.10	3.8	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.77	< 0.10	4.0	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.42	< 0.10	1.7	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.0	< 0.10	4.2	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.19	< 0.10	2.2	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.52	< 0.10	< 0.10	< 0.10

Results - Soil

Project: 8110G St Thomas' School

Client: WML Consulting Ltd	Chemtest Job No.:					19-40580	19-40580	19-40580	19-40580	19-40580	19-40580	19-40580	19-40580
Quotation No.:	Chemtest Sample ID.:					937183	937184	937185	937186	937187	937188	937189	937191
Order No.: 8110G	Client Sample Ref.:					SS	TS	SS	TS	GSS	TS	SS	GSS
	Client Sample ID.:					1	2	3	4	5	6	7	8
	Sample Location:					Plot 1	Plot 12	Plot 12	Plot 5	Plot 5	Plot 7	Plot 7	Plot 7
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m) (\$):					0.2	0.1	0.3	0.1	0.5	0.1	0.3	0.5
	Date Sampled (\$):					29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019	29-Nov-2019
	Asbestos Lab:					LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL	LIVERPOOL
Determinand	Accred.	SOP	Units	LOD									
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.40	< 0.10	2.3	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	10	< 2.0	17	< 2.0	55	13	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.44

Project: 8110G St Thomas' School

Client: WML Consulting Ltd	Chemtest Job No.:				19-40580
Quotation No.:	Chemtest Sample ID.:				937192
Order No.: 8110G	Client Sample Ref.:				GSS
	Client Sample ID.:				10
	Sample Location:				Plot 10
	Sample Type:				SOIL
	Top Depth (m) (\$):				0.5
	Date Sampled (\$):				29-Nov-2019
	Asbestos Lab:				LIVERPOOL
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-
Moisture	N	2030	%	0.020	24
pH	U	2010		4.0	8.2
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO ₄	U	2120	g/l	0.010	0.064
Total Sulphur	U	2175	%	0.010	0.018
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50
Sulphate (Total)	U	2430	mg/kg	100	640
Arsenic	U	2450	mg/kg	1.0	2.9
Cadmium	U	2450	mg/kg	0.10	0.12
Copper	U	2450	mg/kg	0.50	8.1
Mercury	U	2450	mg/kg	0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	6.5
Lead	U	2450	mg/kg	0.50	7.5
Selenium	U	2450	mg/kg	0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	11
Zinc	U	2450	mg/kg	0.50	29
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.9
Naphthalene	U	2700	mg/kg	0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10

Results - Soil

Project: 8110G St Thomas' School

Client: WML Consulting Ltd	Chemtest Job No.:		19-40580		
Quotation No.:	Chemtest Sample ID.:		937192		
Order No.: 8110G	Client Sample Ref.:		GSS		
	Client Sample ID.:		10		
	Sample Location:		Plot 10		
	Sample Type:		SOIL		
	Top Depth (m) (\$):		0.5		
	Date Sampled (\$):		29-Nov-2019		
	Asbestos Lab:		LIVERPOOL		
Determinand	Accred.	SOP	Units	LOD	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.30	0.45

Results - Soil

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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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; Dibenzo[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.

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"
- \$ This information has been supplied by the client and can affect the integrity of test data.

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

Appendix 03
Soil Assessment Criteria

**Screening Levels
for
Residential (with homegrown produce)**

Contaminant	Screening Levels for Residential 6% SOM (mg/kg)	
Metals		
Arsenic	37	
Boron	290	
Cadmium	26	
Chromium III	910	
Chromium VI	21	
Copper	2400	
Lead	200	
Mercury	1.2	
Nickel	130	
Selenium	250	
Vanadium	410	
Zinc	3700	
Non – Metals		
Inorganic Cyanide*	780	
Phenol	120	
Polyaromatic Hydrocarbons (PAH)		
	1% SOM	6% SOM
Benz[a]anthracene	7.2	13
Benzo[a]pyrene	2.2	3.0
Benzo[b]fluoranthene	2.6	3.7
Benzo[ghi]perylene	320	350
Benzo[k]fluoranthene	77	100
Chrysene	15	27
Dibenz[ah]anthracene	0.24	0.30
Fluoranthene	280	890
Indeno[123-cd]pyrene	27	41
Naphthalene	2.3	13
Pyrene	620	2000

Screening Levels for Residential (with homegrown produce) assuming a 6% SOM for hydrocarbons

Contaminant	Screening Levels for Residential with homegrown produce (mg/kg)
Metals	
Arsenic	37
Boron	290
Cadmium	26
Chromium III	910
Chromium VI	21
Copper	2,400
Lead*	200
Mercury	1.2
Nickel	130
Selenium	250
Vanadium	410
Zinc	3,700
Non – Metals	
Phenol	120
Polyaromatic Hydrocarbons (PAH)	
Benz[a]anthracene	13
Benzo[a]pyrene	3.0
Benzo[b]fluoranthene	3.7
Benzo[ghi]perylene	350
Benzo[k]fluoranthene	100
Chrysene	27
Dibenz[ah]anthracene	0.30
Fluoranthene	890
Indeno[123-cd]pyrene	41
Naphthalene	13
Pyrene	2,000

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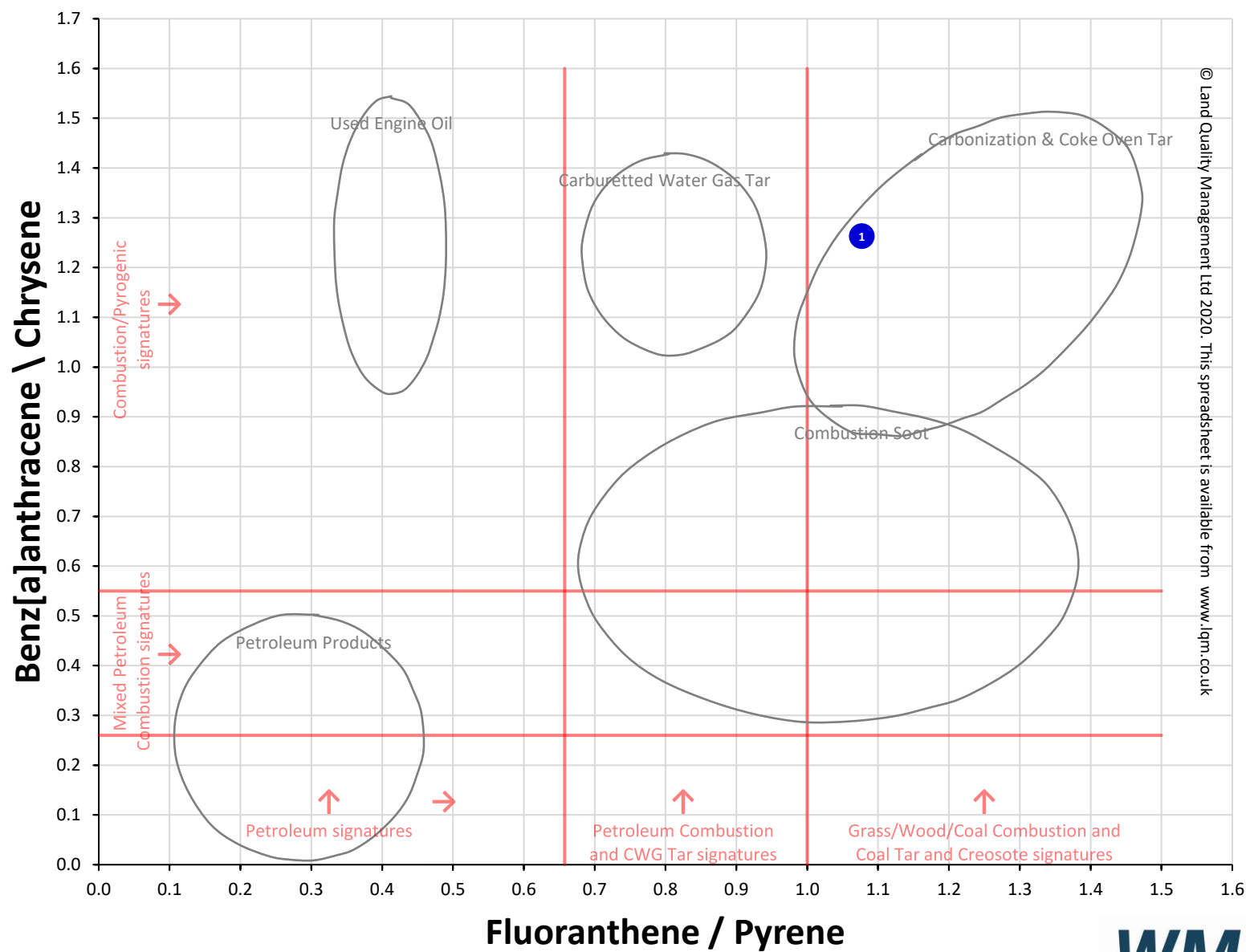
* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

Contaminant	Screening Levels for Residential with homegrown produce(mg/kg)
Volatile Organic Compounds (VOCs)	
Benzene	0.37
Ethylbenzene	260
Toluene	660
Xylene	130
1,2-Dichloroethane	0.019
1,1,1-Trichloroethane	39
Tetrachloroethane	7.5
Tetrachloroethene (PCE)	0.90
Tetrachloromethane	0.13
Trichloroethene (TCE)	0.075
Trichloromethane (Chloroform)	3.4
Chloroethene (Vinyl Chloride)	0.0014
Semi-Volatile Organic Compounds (SVOCs)	
1,2-Dichlorobenzene	130
1,4-Dichlorobenzene	350 ^f
1,2,4-Trichlorobenzene	15
Hexachlorobenzene	4.9 ^{vap}
Total Petroleum Hydrocarbons (TPH)	
Aliphatic C5-6	160
Aliphatic C6-8	530
Aliphatic C8-10	150
Aliphatic C10-12	760(283) ^{vap}
Aliphatic C12-16	4,300 (142) ^{sol}
Aliphatic C16-35	110,000 ^f
Aliphatic C35 - 44	110,000 ^f
Aromatic C5 – 7 (benzene)	300
Aromatic C7 – 8 (toluene)	660
Aromatic C8-10	190
Aromatic C10-12	380
Aromatic C12-16	660
Aromatic C16-21	930 ^f
Aromatic C21-35	1,700 ^f
Aromatic C35 - 44	1,700 ^f

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Appendix 04
LQM PAH Double Ratio Plots



Key:

- Samples collected on site

Based on Figure 6 in Costa & Sauer (2005) with additional details based on a conference presentation by Costa (2005) in San Diego. The potential sources shown are indicative only.

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