Our Ref: 16LPL040/PH/SV/19

10th December 2018

FAO Richard Seddon @ Lovell
(Via Ema[redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 45 - 46

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the material on site was first inspected on the 27th November 2018 when undertaking validations for plots 47 – 51, inspection confirmed that the topsoil is generally debris free and subsoil material is natural clayey sand, both are physically suitable for their proposed end use.

Plots 45 – 46 were not fully placed during this initial visit. Physical suitability of the material placed within plots 45 – 46 was re-assessed on 7th December 2018. Inspection confirmed that both topsoil and subsoil were physically suitable for their proposed end use

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown slightly clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 7th December 2018 in the garden areas of plots 45 - 46, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plots 47 on 27th November 2018 at a sample rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plots 47 on 27th November 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 45





Plot 46

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 26/11/2018

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
pH	7.57	8.05	7.62	7.29	7.18	7.12
Sulphate (water sol 2:1)	0.48	0.1	0.45	0.03	0.05	0.06
Organic matter	2.2	0.5	2.6	<0.1	2.8	1.2
Arsenic	5	<1	4	<1	5	3
Cadmium	0.7	0.7	<0.5	0.5	0.6	1.3
Copper	17	6	14	3	16	20
Chromium (hexavalent)	<1	<1	<1	<1	<1	<1
Lead	43	16	37	11	43	17
Mercury	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Nickel	18	13	10	8	11	31
Selenium	<1	<1	<1	<1	<1	<1
Zinc	45	35	40	27	45	54
Asbestos in Soil	NAD	NAD	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A	N/A	N/A
Quantification	NAD	NAD	NAD	NAD	NAD	NAD
Organic matter	2.2	0.5	2.6	<0.1	2.8	1.2

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.76	8.05	7.12			-
Sulphate (water sol 2:1)	0.37	0.48	0.03			-
Organic matter	2.50	2.80	<0.1			
Arsenic	4.68	5.00	<1	32	32	37
Cadmium	0.96	1.30	<0.5	10	10	22.1
Copper	18.16	20.00	3.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	39.95	43.00	11.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	22.14	31.00	8.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	48.66	54.00	27.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 26/11/2018

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<1	<1	<1	<1	1	<1
Ali >C10-C12	<1	<1	<1	<1	<1	<1
Ali >C12-C16	<1	<1	<1	<1	<1	<1
Ali >C16-C21	<1	<1	<1	<1	<1	<1
Ali >C21-C35	8	2	6	<1	7	<1
Total Aliphatics	8	2	6	<1	8	<1
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C8-C10	1	<1	<1	<1	<1	<1
Aro >C10-C12	<1	<1	<1	<1	<1	<1
Aro >C12-C16	<1	<1	<1	<1	1	<1
Aro >C16-C21	1	<1	<1	<1	1	<1
Aro >C21-C35	14	4	16	<1	13	1
Total Aromatics	17	4	16	<1	17	1
TPH (Ali & Aro)	25	6	23	<1	25	1
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Organic Matter	2.2	0.5	2.6	<0.1	2.8	1.2

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	1.00	1.00	<1	13.9	204	-
Ali >C10-C12	1.00	<1	<1	81.7	1180	-
Ali >C12-C16	1.00	<1	<1	385	4130	-
Ali >C16-C21	1.00	<1	<1	210000	210100	-
Ali >C21-C35	6.79	8.00	<1			
Total Aliphatics	7.12	8.00	<1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C10	1.00	1.00	<1	20.5	232	-
Aro >C10-C12	1.00	<1	<1	70	468	-
Aro >C12-C16	1.00	1.00	<1	165	830	-
Aro >C16-C21	1.00	1.00	<1	319	1040	-
Aro >C21-C35	13.85	16.00	1.00	1120	1710	-
Total Aromatics	16.01	17.00	1.00			
TPH (Ali & Aro)	23.40	25.00	1.00			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 26/11/18

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Acenaphthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.1	<0.04	0.06	<0.04	0.08	<0.04
Benzo(a)pyrene	0.1	<0.04	0.07	<0.04	0.08	<0.04
Benzo(b)fluoranthene	0.13	<0.05	0.08	<0.05	0.12	<0.05
Benzo(ghi)perylene	0.06	<0.05	<0.05	<0.05	0.06	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chrysene	0.11	<0.06	0.08	<0.06	0.11	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.17	<0.08	0.11	<0.08	0.14	<0.08
Fluorene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	0.07	<0.03	0.06	<0.03	0.07	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.08	<0.03	0.07	<0.03	0.08	<0.03
Pyrene	0.14	<0.07	0.09	<0.07	0.13	<0.07
Organic Matter	2.2	0.5	2.6	<0.1	2.8	1.2

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	<0.01	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.02	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.08	0.10	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.08	0.10	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.11	0.13	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.06	0.06	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	84.4	100	-
Chrysene	0.10	0.11	<0.06	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.14	0.17	<0.08	983	2980	-
Fluorene	0.01	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.07	0.07	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.07	0.08	<0.03			-
Pyrene	0.12	0.14	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Betts Geo Environmental, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, UK, CH5 2LY

Project: Miles Platting Area 5, Manchester

Clients Project No: 16LPL040

Project No: 18/09981

Date Instructions Received: 28/11/2018 (am)

Cool Box Temperatures (°C): 9.1

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/09981
Issue Number: 1 **Date:** 04 December, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Robert Davies
Project Name: Miles Platting Area 5, Manchester
Project Ref: 16LPL040
Order No: BG3096
Date Samples Received: 27/11/18
Date Instructions Received: 28/11/18
Date Analysis Completed: 04/12/18

Prepared by:

G Walker

Gill Walker
Director/Laboratory Manager

Approved by:

John Gustafson
Managing Director

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
% Stones >10mm$_A$	<0.1	4.5	3.9	<0.1	<0.1	1.0			% w/w	A-T-044
pH$_D$$^{M\#}$	7.57	8.05	7.62	7.29	7.18	7.12			pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.48	0.10	0.45	0.03	0.05	0.06			g/l	A-T-026s
Organic matter$_D$$^{M\#}$	2.2	0.5	2.6	<0.1	2.8	1.2			% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	5	<1	4	<1	5	3			mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	0.7	0.7	<0.5	0.5	0.6	1.3			mg/kg	A-T-024s
Copper$_D$$^{M\#}$	17	6	14	3	16	20			mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-040s
Lead$_D$$^{M\#}$	43	16	37	11	43	17			mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17			mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	18	13	10	8	11	31			mg/kg	A-T-024s
Selenium$_D$$^{\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	45	35	40	27	45	54			mg/kg	A-T-024s
VPH total (>C5-C10)	1	<1	<1	<1	1	<1			mg/kg	Calc-stone+mois

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A				

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.10	<0.04	0.06	<0.04	0.08	<0.04			mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.10	<0.04	0.07	<0.04	0.08	<0.04			mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.13	<0.05	0.08	<0.05	0.12	<0.05			mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.06	<0.05	<0.05	<0.05	0.06	<0.05			mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07			mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.11	<0.06	0.08	<0.06	0.11	<0.06			mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.17	<0.08	0.11	<0.08	0.14	<0.08			mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.07	<0.03	0.06	<0.03	0.07	<0.03			mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.08	<0.03	0.07	<0.03	0.08	<0.03			mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.14	<0.07	0.09	<0.07	0.13	<0.07			mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.96	<0.08	0.62	<0.08	0.87	<0.08			mg/kg	A-T-019s

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1	<1	<1	1	<1			mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C21-C35$_A$	8	2	6	<1	7	<1			mg/kg	A-T-055s
Total Aliphatics$_A$	8	2	6	<1	8	<1			mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C12-C16$_A$	<1	<1	<1	<1	1	<1			mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	1	<1	<1	<1	1	<1			mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	14	4	16	<1	13	1			mg/kg	A-T-055s
Total Aromatics$_A$	17	4	16	<1	17	1			mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	25	6	23	<1	25	1			mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/20

14th December 2018

FAO Richard Seddon @ Lovell
(Via Email: richard.seddon@Lovell.co.uk)

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plot 37

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the material on site was inspected on the 7th December 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural clayey sand, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown slightly clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 7th December 2018 in the garden area of plot 37, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plot 37 on 7th December 2018 at a sample rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plot 37 on 7th December 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,



Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results







Plot 37

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 07-Dec-18

SOIL TYPE	TS	SS
SAMPLE LOCATION	P37	P37
DEPTH (m)	0.10	0.40
pH	7.72	7.59
Sulphate (water sol 2:1)	0.06	0.01
Organic matter	3	0.5
Arsenic	3	<1
Cadmium	<0.5	<0.5
Copper	18	5
Chromium (hexavalent)	<1	<1
Lead	40	12
Mercury	<0.17	<0.17
Nickel	13	11
Selenium	<1	<1
Zinc	51	38
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	N/A	N/A
Organic matter	3	0.5

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.72	7.59			-
Sulphate (water sol 2:1)	0.06	0.01			-
Organic matter	3.00	0.50			
Arsenic	3.00	<1	32	32	37
Cadmium	<0.5	<0.5	10	10	22.1
Copper	18.00	5.00	4730	4790	-
Chromium (hexavalent)	<1	<1	3.62	3.63	20.5
Lead	40.00	12.00			200
Mercury	<0.17	<0.17	8.81	15.8	-
Nickel	13.00	11.00	EA/ATRisk withdrawn Aug 2015		
Selenium	<1	<1	375	375	-
Zinc	51.00	38.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 07-Dec-18

SOIL TYPE	TS	SS
SAMPLE LOCATION	P37	P37
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<1	<1
Ali >C10-C12	<1	<1
Ali >C12-C16	<1	<1
Ali >C16-C21	<1	<1
Ali >C21-C35	4	<1
Total Aliphatics	4	<1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C10	<1	<1
Aro >C10-C12	<1	<1
Aro >C12-C16	<1	<1
Aro >C16-C21	<1	<1
Aro >C21-C35	9	<1
Total Aromatics	9	<1
TPH (Ali & Aro)	13	<1
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	3	0.5

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<1	<1	13.9	204	-
Ali >C10-C12	<1	<1	81.7	1180	-
Ali >C12-C16	<1	<1	385	4130	-
Ali >C16-C21	<1	<1	210000	210100	-
Ali >C21-C35	4.00	<1			
Total Aliphatics	4.00	<1			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C10	<1	<1	20.5	232	-
Aro >C10-C12	<1	<1	70	468	-
Aro >C12-C16	<1	<1	165	830	-
Aro >C16-C21	<1	<1	319	1040	-
Aro >C21-C35	9.00	<1	1120	1710	-
Total Aromatics	9.00	<1			
TPH (Ali & Aro)	13.00	<1			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX & MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 07-Dec-18

SOIL TYPE	TS	SS
SAMPLE LOCATION	P37	P37
DEPTH (m)	0.10	0.40
Acenaphthene	<0.01	<0.01
Acenaphthylene	<0.01	<0.01
Anthracene	<0.02	<0.02
Benzo(a)anthracene	0.08	<0.04
Benzo(a)pyrene	0.08	<0.04
Benzo(b)fluoranthene	0.1	<0.05
Benzo(ghi)perylene	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07
Chrysene	0.1	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	0.14	<0.08
Fluorene	<0.01	<0.01
Indeno(123-cd)pyrene	0.05	<0.03
Naphthalene	<0.03	<0.03
Phenanthrene	0.04	<0.03
Pyrene	0.13	<0.07
Organic Matter	3	0.5

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.08	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.08	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.10	<0.05	7.72	9.86	-
Benzo(ghi)perylene	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	<0.07	<0.07	84.4	100	-
Chrysene	0.10	<0.06	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	0.14	<0.08	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.05	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.04	<0.03			-
Pyrene	0.13	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/10358
Issue Number: 1 **Date:** 13 December, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5, Manchester
Project Ref: 16LPL040
Order No: BG3120
Date Samples Received: 07/12/18
Date Instructions Received: 07/12/18
Date Analysis Completed: 13/12/18

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Danielle Brierley
Client Manager

Envirolab Job Number: 18/10358

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/10358/1	18/10358/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	P37	P37								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	07-Dec-18	07-Dec-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	4A								
% Stones >10mm$_A$	0.7	<0.1							% w/w	A-T-044
pH$_D$$^{M\#}$	7.72	7.59							pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.06	0.01							g/l	A-T-026s
Organic matter$_D$$^{M\#}$	3.0	0.5							% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	3	<1							mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	<0.5	<0.5							mg/kg	A-T-024s
Copper$_D$$^{M\#}$	18	5							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D$$^{M\#}$	40	12							mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17							mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	13	11							mg/kg	A-T-024s
Selenium$_D$$^{\#}$	<1	<1							mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	51	38							mg/kg	A-T-024s
VPH total (>C5-C10)	<1	<1							mg/kg	Calc-stone+mois

Envirolab Job Number: 18/10358

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/10358/1	18/10358/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	P37	P37								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	07-Dec-18	07-Dec-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	4A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 18/10358

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/10358/1	18/10358/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	P37	P37								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	07-Dec-18	07-Dec-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	4A								
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.08	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.08	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.10	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.10	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.14	<0.08							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.05	<0.03							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.04	<0.03							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.13	<0.07							mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.72	<0.08							mg/kg	A-T-019s

Envirolab Job Number: 18/10358

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/10358/1	18/10358/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	P37	P37								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	07-Dec-18	07-Dec-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	4A								
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C21-C35$_A$	4	<1							mg/kg	A-T-055s
Total Aliphatics$_A$	4	<1							mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C12-C16$_A$	<1	<1							mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	9	<1							mg/kg	A-T-055s
Total Aromatics$_A$	9	<1							mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	13	<1							mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/RD/SV/21

11th February 2019

FAO Richard Seddon @ Lovell
(Via Email: richard.seddon@Lovell.co.uk)

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 38 – 42

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the material on site was inspected on the 30th January 2019, inspection confirmed that the topsoil is brown clayey sand and subsoil material is a light brown clayey SAND, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 30th January 2019 in the garden areas of plots 38 – 42, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Old Marsh Farm Barns, Welsh Road,
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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plots 38 and 41 on 30th January 2019 at a sample rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plots 38 and 41 on 30th January 2019 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,



Robert Davies
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results






Plot 38






Plot 39









Plot 40









Plot 41









Plot 42

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 30/01/2019

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	Plot 38	Plot 38	Plot 41	Plot 41
DEPTH (m)	0.10	0.40	0.10	0.40
pH	7.49	7.32	7.49	7.86
Sulphate (water sol 2:1)	0.05	0.09	0.06	0.12
Organic matter	2.4	1.5	3	2.2
Arsenic	<1	<1	<1	<1
Cadmium	<0.5	<0.5	<0.5	<0.5
Copper	10	19	14	16
Chromium (hexavalent)	<1	<1	<1	<1
Lead	27	17	32	29
Mercury	<0.17	<0.17	<0.17	<0.17
Nickel	12	22	13	19
Selenium	1	<1	<1	3
Zinc	37	45	41	47
Asbestos in Soil	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A
Quantification	NAD	NAD	NAD	NAD
Organic matter	2.4	1.5	3	2.2

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.81	7.86	7.32			-
Sulphate (water sol 2:1)	0.12	0.12	0.05			-
Organic matter	3.00	3.00	1.50			
Arsenic	1.00	<1	<1	32	32	37
Cadmium	0.50	<0.5	<0.5	10	10	22.1
Copper	19.19	19.00	10.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	33.90	32.00	17.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	22.14	22.00	12.00	EA/ATRisk withdrawn Aug 2015		
Selenium	2.68	3.00	<1	375	375	-
Zinc	47.72	47.00	37.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 30/01/2019

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	Plot 38	Plot 38	Plot 41	Plot 41
DEPTH (m)	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<1	<1	<1	<1
Ali >C10-C12	<1	<1	<1	<1
Ali >C12-C16	<1	<1	<1	<1
Ali >C16-C21	<1	<1	<1	<1
Ali >C21-C35	5	4	4	1
Total Aliphatics	5	4	4	1
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01
Aro >C8-C10	<1	<1	<1	<1
Aro >C10-C12	<1	<1	<1	<1
Aro >C12-C16	<1	1	<1	<1
Aro >C16-C21	1	4	<1	<1
Aro >C21-C35	10	12	9	4
Total Aromatics	12	17	9	4
TPH (Ali & Aro)	17	21	13	5
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01
Organic Matter	2.4	1.5	3	2.2

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	1.00	<1	<1	13.9	204	-
Ali >C10-C12	1.00	<1	<1	81.7	1180	-
Ali >C12-C16	1.00	<1	<1	385	4130	-
Ali >C16-C21	1.00	<1	<1	210000	210100	-
Ali >C21-C35	5.54	5.00	1.00			
Total Aliphatics	5.54	5.00	1.00			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C10	1.00	<1	<1	20.5	232	-
Aro >C10-C12	1.00	<1	<1	70	468	-
Aro >C12-C16	1.00	1.00	<1	165	830	-
Aro >C16-C21	3.52	4.00	<1	319	1040	-
Aro >C21-C35	12.75	12.00	4.00	1120	1710	-
Total Aromatics	16.91	17.00	4.00			
TPH (Ali & Aro)	22.04	21.00	5.00			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 30/01/19

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	Plot 38	Plot 38	Plot 41	Plot 41
DEPTH (m)	0.10	0.40	0.10	0.40
Acenaphthene	<0.01	0.04	<0.01	0.06
Acenaphthylene	<0.01	<0.01	<0.01	<0.01
Anthracene	<0.02	0.09	0.04	0.16
Benzo(a)anthracene	0.09	0.12	0.15	0.2
Benzo(a)pyrene	0.09	0.1	0.15	0.16
Benzo(b)fluoranthene	0.07	0.12	0.16	0.2
Benzo(ghi)perylene	<0.05	<0.05	0.08	0.09
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07
Chrysene	0.09	0.12	0.15	0.19
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.19	0.34	0.27	0.62
Fluorene	<0.01	0.02	<0.01	0.05
Indeno(123-cd)pyrene	0.05	0.07	0.1	0.11
Naphthalene	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.05	0.24	0.1	0.52
Pyrene	0.15	0.26	0.23	0.46
Organic Matter	2.4	1.5	3	2.2

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.06	0.06	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.15	0.16	<0.02	10200	26200	-
Benzo(a)anthracene	0.20	0.20	0.09	4.52	8.54	-
Benzo(a)pyrene	0.17	0.16	0.09	1.51	2.05	4.95
Benzo(b)fluoranthene	0.20	0.20	0.07	7.72	9.86	-
Benzo(ghi)perylene	0.09	0.09	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	84.4	100	-
Chrysene	0.19	0.19	0.09	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.58	0.62	0.19	983	2980	-
Fluorene	0.04	0.05	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.11	0.11	0.05	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.48	0.52	0.05			-
Pyrene	0.43	0.46	0.15	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Betts Geo Environmental, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, UK, CH5 2LY

Project: Miles Platting Area 5

Clients Project No: 16LPL040

Project No: 19/00931

Date Instructions Received: 01/02/2019 (am)

Cool Box Temperatures (°C): 5.1

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

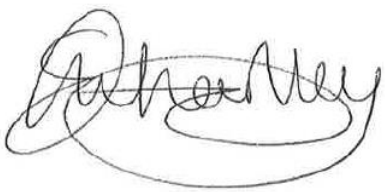
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/00931
Issue Number: 1 **Date:** 07 February, 2019

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Robert Davies
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG3176
Date Samples Received: 31/01/19
Date Instructions Received: 01/02/19
Date Analysis Completed: 07/02/19

Prepared by:



Elisha Hartley
Admin Assistant

Approved by:



Georgia King
Admin & Client Services Supervisor

Envirolab Job Number: 19/00931

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/00931/1	19/00931/2	19/00931/3	19/00931/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	Plot 38	Plot 38	Plot 41	Plot 41						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	30-Jan-19	30-Jan-19	30-Jan-19	30-Jan-19						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5E	5E	5E	5						
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1					% w/w	A-T-044
pH$_D$$^{M\#}$	7.49	7.32	7.49	7.86					pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.05	0.09	0.06	0.12					g/l	A-T-026s
Organic matter$_D$$^{M\#}$	2.4	1.5	3.0	2.2					% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	<0.5	<0.5	<0.5	<0.5					mg/kg	A-T-024s
Copper$_D$$^{M\#}$	10	19	14	16					mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1					mg/kg	A-T-040s
Lead$_D$$^{M\#}$	27	17	32	29					mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17					mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	12	22	13	19					mg/kg	A-T-024s
Selenium$_D$$^{\#}$	1	<1	<1	3					mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	37	45	41	47					mg/kg	A-T-024s
VPH total (>C5-C10)	<1	<1	<1	<1					mg/kg	Calc-stone+mois

Envirolab Job Number: 19/00931

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/00931/1	19/00931/2	19/00931/3	19/00931/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	Plot 38	Plot 38	Plot 41	Plot 41						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	30-Jan-19	30-Jan-19	30-Jan-19	30-Jan-19						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5E	5E	5E	5						
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A						

Envirolab Job Number: 19/00931

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/00931/1	19/00931/2	19/00931/3	19/00931/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	Plot 38	Plot 38	Plot 41	Plot 41						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	30-Jan-19	30-Jan-19	30-Jan-19	30-Jan-19						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5E	5E	5E	5						
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	0.04	<0.01	0.06					mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	0.09	0.04	0.16					mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.09	0.12	0.15	0.20					mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.09	0.10	0.15	0.16					mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.07	0.12	0.16	0.20					mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	0.08	0.09					mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.09	0.12	0.15	0.19					mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.19	0.34	0.27	0.62					mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	0.02	<0.01	0.05					mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.05	0.07	0.10	0.11					mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.05	0.24	0.10	0.52					mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.15	0.26	0.23	0.46					mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.78	1.52	1.43	2.82					mg/kg	A-T-019s

Envirolab Job Number: 19/00931

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/00931/1	19/00931/2	19/00931/3	19/00931/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	Plot 38	Plot 38	Plot 41	Plot 41						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	30-Jan-19	30-Jan-19	30-Jan-19	30-Jan-19						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	5E	5E	5E	5						
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-055s
Ali >C21-C35$_A$	5	4	4	1					mg/kg	A-T-055s
Total Aliphatics$_A$	5	4	4	1					mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-055s
Aro >C12-C16$_A$	<1	1	<1	<1					mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	1	4	<1	<1					mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	10	12	9	4					mg/kg	A-T-055s
Total Aromatics$_A$	12	17	9	4					mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	17	21	13	5					mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/RD/SV/22

4th March 2019

FAO Richard Seddon @ Lovell
(Via Email: richard.seddon@Lovell.co.uk)

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 43 – 44

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the material on site was inspected on the 21st February 2019, inspection confirmed that the topsoil is brown clayey sand and subsoil material is a light brown clayey SAND, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 21st February 2019 in the garden areas of plots 43 – 44, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plot 44 on 21st February 2019 at a sample rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plot 44 on 21st February 2019 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,



Robert Davies
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results






Plot 43









Plot 44

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 21/02/2019

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 44	Plot 44
DEPTH (m)	0.10	0.40
pH	7.53	8.11
Sulphate (water sol 2:1)	0.07	0.05
Organic matter	4.3	1.4
Arsenic	3	<1
Cadmium	<0.5	<0.5
Copper	23	7
Chromium (hexavalent)	<1	<1
Lead	44	20
Mercury	<0.17	<0.17
Nickel	16	12
Selenium	1	1
Zinc	56	42
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	NAD	NAD
Organic matter	4.3	1.4

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	-	8.11	7.53			-
Sulphate (water sol 2:1)	-	0.07	0.05			-
Organic matter	-	4.30	1.40			
Arsenic	-	3.00	<1	32	32	37
Cadmium	-	<0.5	<0.5	10	10	22.1
Copper	-	23.00	7.00	4730	4790	-
Chromium (hexavalent)	-	<1	<1	3.62	3.63	20.5
Lead	-	44.00	20.00			200
Mercury	-	<0.17	<0.17	8.81	15.8	-
Nickel	-	16.00	12.00	EA/ATRisk withdrawn Aug 2015		
Selenium	-	1.00	1.00	375	375	-
Zinc	-	56.00	42.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 21/02/2019

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 44	Plot 44
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<1	<1
Ali >C10-C12	<1	<1
Ali >C12-C16	<1	<1
Ali >C16-C21	<1	<1
Ali >C21-C35	<1	<1
Total Aliphatics	<1	<1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C10	<1	<1
Aro >C10-C12	<1	<1
Aro >C12-C16	<1	<1
Aro >C16-C21	<1	<1
Aro >C21-C35	1	2
Total Aromatics	1	2
TPH (Ali & Aro)	1	2
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	4.3	1.4

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	-	<0.01	<0.01	42.7	369	-
Ali >C6-C8	-	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	-	<1	<1	13.9	204	-
Ali >C10-C12	-	<1	<1	81.7	1180	-
Ali >C12-C16	-	<1	<1	385	4130	-
Ali >C16-C21	-	<1	<1	210000	210100	-
Ali >C21-C35	-	<1	<1			
Total Aliphatics	-	<1	<1			
Aro >C5-C7	-	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	-	<0.01	<0.01	113	780	-
Aro >C8-C10	-	<1	<1	20.5	232	-
Aro >C10-C12	-	<1	<1	70	468	-
Aro >C12-C16	-	<1	<1	165	830	-
Aro >C16-C21	-	<1	<1	319	1040	-
Aro >C21-C35	-	2.00	1.00	1120	1710	-
Total Aromatics	-	2.00	1.00			
TPH (Ali & Aro)	-	2.00	1.00			
BTEX - Benzene	-	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	-	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	-	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	-	<0.01	<0.01	24	312	-
BTEX - o Xylene	-	<0.01	<0.01	26.4	336	-
MTBE	-	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 21/02/19

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 44	Plot 44
DEPTH (m)	0.10	0.40
Acenaphthene	0.01	0.08
Acenaphthylene	<0.01	<0.01
Anthracene	0.03	0.21
Benzo(a)anthracene	0.13	0.24
Benzo(a)pyrene	0.12	0.15
Benzo(b)fluoranthene	0.13	0.18
Benzo(ghi)perylene	0.06	0.06
Benzo(k)fluoranthene	<0.07	<0.07
Chrysene	0.14	0.23
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	0.23	0.83
Fluorene	<0.01	0.07
Indeno(123-cd)pyrene	0.08	0.08
Naphthalene	<0.03	<0.03
Phenanthrene	0.1	0.59
Pyrene	0.21	0.62
Organic Matter	4.3	1.4

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	-	0.08	0.01	608	2760	-
Acenaphthylene	-	<0.01	<0.01			-
Anthracene	-	0.21	0.03	10200	26200	-
Benzo(a)anthracene	-	0.24	0.13	4.52	8.54	-
Benzo(a)pyrene	-	0.15	0.12	1.51	2.05	4.95
Benzo(b)fluoranthene	-	0.18	0.13	7.72	9.86	-
Benzo(ghi)perylene	-	0.06	0.06	96.2	103	-
Benzo(k)fluoranthene	-	<0.07	<0.07	84.4	100	-
Chrysene	-	0.23	0.14	585	927	-
Dibenzo(ah)anthracene	-	<0.04	<0.04	0.838	1	-
Fluoranthene	-	0.83	0.23	983	2980	-
Fluorene	-	0.07	<0.01	735	2610	-
Indeno(123-cd)pyrene	-	0.08	0.08	7.31	9.75	-
Naphthalene	-	<0.03	<0.03	0.829	12.2	-
Phenanthrene	-	0.59	0.10			-
Pyrene	-	0.62	0.21	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

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FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/01786
Issue Number: 1 **Date:** 01 March, 2019

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Robert Davies
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG3200
Date Samples Received: 22/02/19
Date Instructions Received: 25/02/19
Date Analysis Completed: 01/03/19

Prepared by:

Holly Neary-King
Sales Executive

Approved by:

Iain Haslock
Analytical Consultant

Envirolab Job Number: 19/01786

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/01786/1	19/01786/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 44	Plot 44								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	21-Feb-19	21-Feb-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
% Stones >10mm$_A$	<0.1	<0.1							% w/w	A-T-044
pH$_D$$^{M\#}$	7.53	8.11							pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.07	0.05							g/l	A-T-026s
Organic matter$_D$$^{M\#}$	4.3	1.4							% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	3	<1							mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	<0.5	<0.5							mg/kg	A-T-024s
Copper$_D$$^{M\#}$	23	7							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D$$^{M\#}$	44	20							mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17							mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	16	12							mg/kg	A-T-024s
Selenium$_D$$^{M\#}$	1	1							mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	56	42							mg/kg	A-T-024s
VPH total (>C5-C10)	<1	<1							mg/kg	Calc-stone+mois

Envirolab Job Number: 19/01786

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/01786/1	19/01786/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 44	Plot 44								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	21-Feb-19	21-Feb-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 19/01786

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/01786/1	19/01786/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 44	Plot 44								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	21-Feb-19	21-Feb-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.01	0.08							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.03	0.21							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.13	0.24							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.12	0.15							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.13	0.18							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.06	0.06							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.14	0.23							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.23	0.83							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	0.07							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.08	0.08							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.10	0.59							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.21	0.62							mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	1.24	3.34							mg/kg	A-T-019s

Envirolab Job Number: 19/01786

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/01786/1	19/01786/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 44	Plot 44								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	21-Feb-19	21-Feb-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6AE	5A								
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C21-C35$_A$	<1	<1							mg/kg	A-T-055s
Total Aliphatics$_A$	<1	<1							mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C12-C16$_A$	<1	<1							mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	1	2							mg/kg	A-T-055s
Total Aromatics$_A$	1	2							mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	1	2							mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratlry.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Betts Geo Environmental, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, UK, CH5 2LY

Project: Miles Platting Area 5

Clients Project No: 16LPL040

Project No: 19/01786

Date Received: 25/02/2019 (am)

Cool Box Temperatures (oC): 13.3

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Our Ref: 16LPL040/RD/SV/23

28th March 2019

FAO Richard Seddon @ Lovell
(Via Email: [redacted])

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 65 – 66 & 69 – 72

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the material on site was inspected on the 15th March 2019, inspection confirmed that the topsoil is brown clayey sand and subsoil material is a light brown clayey SAND, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 15th March 2019 in the garden areas of plots 65 – 66 & 69 - 72, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Old Marsh Farm Barns, Welsh Road,
Sealand, Flintshire, CH5 2LY
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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plots 66, 69 and 72 on 15th March 2019 at a sample rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plots 66, 69 and 72 on 15th March 2019 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,

[redacted]

Robert Davies
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results







Plot 65







Plot 66







Plot 69







Plot 70







Plot 71







Plot 72

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 15/03/2019

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	P72	P72	P69	P69	P66	P66
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
pH	7.5	7.54	7.41	7.6	7.38	7.52
Sulphate (water sol 2:1)	0.06	0.03	0.03	0.04	0.03	0.04
Organic matter	1.9	1.4	2.3	0.5	2.8	0.5
Arsenic	<1	<1	2	<1	2	<1
Cadmium	<0.5	<0.5	<0.5	0.5	<0.5	0.6
Copper	13	9	15	7	16	7
Chromium (hexavalent)	<1	<1	<1	<1	<1	<1
Lead	36	26	38	15	38	18
Mercury	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Nickel	9	11	10	20	10	20
Selenium	<1	<1	<1	<1	<1	<1
Zinc	40	41	43	51	43	53
Asbestos in Soil	NAD	NAD	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A	N/A	N/A
Quantification	NAD	NAD	NAD	NAD	NAD	NAD
Organic matter	1.9	1.4	2.3	0.5	2.8	0.5

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.56	7.60	<1			-
Sulphate (water sol 2:1)	0.05	0.06	<0.5			-
Organic matter	2.34	2.80	0.50			
Arsenic	1.76	2.00	2.00	32	32	37
Cadmium	0.55	0.60	0.50	10	10	22.1
Copper	14.47	16.00	7.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	37.01	38.00	15.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	17.61	20.00	9.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	49.65	53.00	40.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 15/03/2019

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	P72	P72	P69	P69	P66	P66
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<1	<1	<1	<1	<1	<1
Ali >C10-C12	<1	<1	<1	<1	<1	<1
Ali >C12-C16	<1	<1	<1	<1	<1	<1
Ali >C16-C21	<1	2	<1	<1	<1	<1
Ali >C21-C35	5	38	2	<1	1	<1
Total Aliphatics	5	41	2	<1	1	<1
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C8-C10	<1	1	<1	<1	<1	<1
Aro >C10-C12	<1	<1	<1	<1	<1	<1
Aro >C12-C16	<1	1	<1	<1	<1	<1
Aro >C16-C21	1	2	<1	<1	<1	<1
Aro >C21-C35	3	34	4	<1	2	<1
Total Aromatics	4	39	4	<1	2	<1
TPH (Ali & Aro)	10	80	7	<1	4	<1
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Organic Matter	1.9	1.4	2.3	0.5	2.8	0.5

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	1.00	<1	<1	13.9	204	-
Ali >C10-C12	1.00	<1	<1	81.7	1180	-
Ali >C12-C16	1.00	<1	<1	385	4130	-
Ali >C16-C21	1.50	2.00	<1	210000	210100	-
Ali >C21-C35	20.16	38.00	<1			
Total Aliphatics	21.66	41.00	<1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C10	1.00	1.00	<1	20.5	232	-
Aro >C10-C12	1.00	<1	<1	70	468	-
Aro >C12-C16	1.00	1.00	<1	165	830	-
Aro >C16-C21	1.50	2.00	<1	319	1040	-
Aro >C21-C35	18.22	34.00	<1	1120	1710	-
Total Aromatics	20.84	39.00	<1			
TPH (Ali & Aro)	42.65	80.00	<1			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 15/03/19

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	P72	P72	P69	P69	P66	P66
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Acenaphthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Benzo(b)fluoranthene	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chrysene	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoranthene	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Fluorene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	<0.03	0.03	<0.03	<0.03	<0.03	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Organic Matter	1.9	1.4	2.3	0.5	2.8	0.5

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	<0.01	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.02	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.04	<0.04	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.04	<0.04	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.06	0.06	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.05	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	84.4	100	-
Chrysene	0.06	<0.06	<0.06	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.08	<0.08	<0.08	983	2980	-
Fluorene	0.01	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.03	0.03	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.03	<0.03	<0.03			-
Pyrene	0.07	<0.07	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/02653
Issue Number: 1 **Date:** 26 March, 2019

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG3241
Date Samples Received: 18/03/19
Date Instructions Received: 19/03/19
Date Analysis Completed: 26/03/19

Prepared by:	**Approved by:**
[redacted]	[redacted]
Laboratory Coordinator	Client Manager

Envirolab Job Number: 19/02653

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/02653/1	19/02653/2	19/02653/3	19/02653/4	19/02653/5	19/02653/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	P72	P72	P69	P69	P66	P66				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4A	4A	4A	4A	4A	5A				
% Stones >10mm$_A$	9.6	<0.1	<0.1	<0.1	1.6	<0.1			% w/w	A-T-044
pH$_D^{M\#}$	7.50	7.54	7.41	7.60	7.38	7.52			pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.06	0.03	0.03	0.04	0.03	0.04			g/l	A-T-026s
Organic matter$_D^{M\#}$	1.9	1.4	2.3	0.5	2.8	0.5			% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	<1	<1	2	<1	2	<1			mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5	0.5	<0.5	0.6			mg/kg	A-T-024s
Copper$_D^{M\#}$	13	9	15	7	16	7			mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-040s
Lead$_D^{M\#}$	36	26	38	15	38	18			mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17			mg/kg	A-T-024s
Nickel$_D^{M\#}$	9	11	10	20	10	20			mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-024s
Zinc$_D^{M\#}$	40	41	43	51	43	53			mg/kg	A-T-024s
VPH total (>C5-C10)	<1	1	<1	<1	<1	<1			mg/kg	Calc-stone+mois

Envirolab Job Number: 19/02653

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/02653/1	19/02653/2	19/02653/3	19/02653/4	19/02653/5	19/02653/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	P72	P72	P69	P69	P66	P66				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4A	4A	4A	4A	4A	5A				
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{A}^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A				

Envirolab Job Number: 19/02653

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/02653/1	19/02653/2	19/02653/3	19/02653/4	19/02653/5	19/02653/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	P72	P72	P69	P69	P66	P66				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4A	4A	4A	4A	4A	5A				
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	0.06	<0.05	<0.05	<0.05	<0.05			mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07			mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06			mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08			mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	0.03	<0.03	<0.03	<0.03	<0.03			mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07			mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	0.09	<0.08	<0.08	<0.08	<0.08			mg/kg	A-T-019s

Envirolab Job Number: 19/02653

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	19/02653/1	19/02653/2	19/02653/3	19/02653/4	19/02653/5	19/02653/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	P72	P72	P69	P69	P66	P66				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19	15-Mar-19				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4A	4A	4A	4A	4A	5A				
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	2	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C21-C35$_A$	5	38	2	<1	1	<1			mg/kg	A-T-055s
Total Aliphatics$_A$	5	41	2	<1	1	<1			mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	<1	1	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C12-C16$_A$	<1	1	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	1	2	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	3	34	4	<1	2	<1			mg/kg	A-T-055s
Total Aromatics$_A$	4	39	4	<1	2	<1			mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	10	80	7	<1	4	<1			mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Betts Geo Environmental, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, UK, CH5 2LY

Project: Miles Platting Area 5

Clients Project No: 16LPL040

Project No: 19/02653

Date Received: 19/03/2019 (am)

Cool Box Temperatures (oC): 8.0

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Our Ref: 16LPL040/LH/SV/24

11th April 2019

FAO Richa
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 67 – 68

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the material on site was inspected on the 8th April 2019, inspection confirmed that the topsoil is brown clayey sand and subsoil material is a light brown clayey SAND, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 8th April 2019 in the garden areas of plots 67 – 68, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plot 67 on 8th April 2019 at a sample rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plot 67 on 8th April 2019 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,

[redacted]

Lucy Hayes
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results









Plot 67









Plot 68

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 19LPL040
Date 11/04/2019

SOIL TYPE	Topsoil	Subsoil
SAMPLE LOCATION	Plot 67 (TS)	Plot 67 (SS)
DEPTH (m)	0.10	0.40
pH	7.69	8
Sulphate (water sol 2:1)	0.0212	0.0182
Organic matter	1.9	0.5
Arsenic	6.1	2.3
Cadmium	<0.1	<0.1
Copper	14	6
Chromium (hexavalent)	<0.3	<0.3
Lead	24	13
Mercury	<0.1	<0.1
Nickel	16.5	14.2
Selenium	<1	<1
Zinc	63	46
Asbestos in Soil	NAD	NAD
Asbestos Matrix	0	0
Quantification	0	0
Organic matter	1.9	0.5

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	8.82	8.00	7.69			-
Sulphate (water sol 2:1)	0.03	0.02	0.02			-
Organic matter	5.62	1.90	0.50			
Arsenic	16.20	6.10	2.30	32	32	37
Cadmium	0.10	<0.1	<0.1	10	10	22.1
Copper	35.26	14.00	6.00	4730	4790	-
Chromium (hexavalent)	<0.3	<0.3	<0.3	3.62	3.63	20.5
Lead	53.23	24.00	13.00			200
Mercury	<0.1	<0.1	<0.1	8.81	15.8	-
Nickel	22.61	16.50	14.20	EA/ATRisk withdrawn Aug 2015		
Selenium	<1	<1	<1	375	375	-
Zinc	108.17	63.00	46.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 19LPL040
Date 11/04/2019

SOIL TYPE	Topsoil	Subsoil
SAMPLE LOCATION	Plot 67 (TS)	Plot 67 (SS)
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.1	<0.1
Ali >C6-C8	<0.1	<0.1
Ali >C8-C10	<0.1	<0.1
Ali >C10-C12	<0.2	<0.2
Ali >C12-C16	<4	<4
Ali >C16-C21	<7	<7
Ali >C21-C35	<7	<7
Total Aliphatics	<19	<19
Aro >C5-C7	<0.1	<0.1
Aro >C7-C8	<0.1	<0.1
Aro >C8-C10	<0.1	<0.1
Aro >C10-C12	<0.2	<0.2
Aro >C12-C16	<4	<4
Aro >C16-C21	<7	<7
Aro >C21-C35	<7	<7
Total Aromatics	<19	<19
TPH (Ali & Aro)	<38	<38
BTEX - Benzene	<0.005	<0.005
BTEX - Toluene	0.039	<0.005
BTEX - Ethyl Benzene	<0.005	<0.005
BTEX - m & p Xylene	<0.005	<0.005
BTEX - o Xylene	<0.005	<0.005
MTBE	<0.005	<0.005
Organic Matter	1.9	0.5

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.10	<0.1	<0.1	42.7	369	-
Ali >C6-C8	0.10	<0.1	<0.1	99.3	1240	-
Ali >C8-C10	0.10	<0.1	<0.1	13.9	204	-
Ali >C10-C12	0.20	<0.2	<0.2	81.7	1180	-
Ali >C12-C16	4.00	<4	<4	385	4130	-
Ali >C16-C21	7.00	<7	<7	210000	210100	-
Ali >C21-C35	7.00	<7	<7			
Total Aliphatics	19.00	<19	<19			
Aro >C5-C7	0.10	<0.1	<0.1	0.137	0.871	-
Aro >C7-C8	0.10	<0.1	<0.1	113	780	-
Aro >C8-C10	0.10	<0.1	<0.1	20.5	232	-
Aro >C10-C12	0.20	<0.2	<0.2	70	468	-
Aro >C12-C16	4.00	<4	<4	165	830	-
Aro >C16-C21	7.00	<7	<7	319	1040	-
Aro >C21-C35	7.00	<7	<7	1120	1710	-
Total Aromatics	19.00	<19	<19			
TPH (Ali & Aro)	38.00	<38	<38			
BTEX - Benzene	0.01	<0.005	<0.005	0.0493	0.33	0.871
BTEX - Toluene	0.13	0.04	<0.005	113	780	-
BTEX - Ethyl Benzene	0.01	<0.005	<0.005	50.7	453	-
BTEX - m & p Xylene	0.01	<0.005	<0.005	24	312	-
BTEX - o Xylene	0.01	<0.005	<0.005	26.4	336	-
MTBE	0.01	<0.005	<0.005	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 19LPL040
Date 11/04/19

SOIL TYPE	Topsoil	Subsoil
SAMPLE LOCATION	Plot 67 (TS)	Plot 67 (SS)
DEPTH (m)	0.10	0.40
Acenaphthene	<0.05	<0.05
Acenaphthylene	<0.03	<0.03
Anthracene	<0.04	<0.04
Benzo(a)anthracene	0.12	<0.06
Benzo(a)pyrene	0.07	<0.04
Benzo(b)fluoranthene	0.11	<0.05
Benzo(ghi)perylene	0.07	<0.04
Benzo(k)fluoranthene	0.04	<0.02
Chrysene	0.07	<0.02
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	0.15	0.03
Fluorene	<0.04	<0.04
Indeno(123-cd)pyrene	0.07	<0.04
Naphthalene	<0.04	<0.04
Phenanthrene	0.05	0.03
Pyrene	0.13	<0.03
Organic Matter	1.9	0.5

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.05	<0.05	<0.05	608	2760	-
Acenaphthylene	0.03	<0.03	<0.03			-
Anthracene	0.04	<0.04	<0.04	10200	26200	-
Benzo(a)anthracene	0.28	0.12	<0.06	4.52	8.54	-
Benzo(a)pyrene	0.15	0.07	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.27	0.11	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.15	0.07	<0.04	96.2	103	-
Benzo(k)fluoranthene	0.09	0.04	<0.02	84.4	100	-
Chrysene	0.20	0.07	<0.02	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.47	0.15	0.03	983	2980	-
Fluorene	0.04	<0.04	<0.04	735	2610	-
Indeno(123-cd)pyrene	0.15	0.07	<0.04	7.31	9.75	-
Naphthalene	0.04	<0.04	<0.04	0.829	12.2	-
Phenanthrene	0.10	0.05	0.03			-
Pyrene	0.40	0.13	<0.03	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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Tel: +44 (0) 1244 833780
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Betts Geo
Unit 6-7
Old Marsh Farm Barns
Welsh Road
Sealand
CH5 2LY

Attention :	Robert Davies
Date :	11th April, 2019
Your reference :	16LPL040
Our reference :	Test Report 19/5752 Batch 1
Location :	Miles Platting Area 5 Manchester
Date samples received :	8th April, 2019
Status :	Final report
Issue :	1

Two samples were received for analysis on 8th April, 2019 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

[redacted]

Bruce Leslie
Project Co-ordinator

Client Name: Betts Geo
Reference: 16LPL040
Location: Miles Platting Area 5 Manchester
Contact: Robert Davies
JE Job No.: 19/5752

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6									LOD/LOR	Units	Method No.
Sample ID	Plot 67 (TS)	Plot 67 (SS)											
Depth	0.10	0.40											
COC No / misc													
Containers	V J T	V J T											
Sample Date	08/04/2019	08/04/2019											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	08/04/2019	08/04/2019											
Arsenic #	6.1	2.3									<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Copper #	14	6									<1	mg/kg	TM30/PM15
Lead #	24	13									<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Nickel #	16.5	14.2									<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1									<1	mg/kg	TM30/PM15
Zinc #	63	46									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.05	0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.15	0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	0.13	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.12	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	0.07	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.15	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.07	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.07	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.07	<0.04									<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.9	<0.6									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.11	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.04	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	97									<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	<19									<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics >C5-C10	<0.3	<0.3									<0.3	mg/kg	TM36/PM12
Total aliphatics >C10-C16 #	<4.2	<4.2									<4.2	mg/kg	TM5/PM8/PM16
Total aliphatics >C16-C35 #	<14	<14									<14	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Betts Geo
Reference: 16LPL040
Location: Miles Platting Area 5 Manchester
Contact: Robert Davies
JE Job No.: 19/5752

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6											
Sample ID	Plot 67 (TS)	Plot 67 (SS)											
Depth	0.10	0.40											
COC No / misc													
Containers	V J T	V J T											
Sample Date	08/04/2019	08/04/2019											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	08/04/2019	08/04/2019											

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	<19	<19									<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aromatics >C5-C10 #	<0.3	<0.3									<0.3	mg/kg	TM36/PM12
Total aromatics >C10-C16 #	<4.2	<4.2									<4.2	mg/kg	TM5/PM8/PM16
Total aromatics >C16-C35 #	<14	<14									<14	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics(C5-35)	<38	<38									<38	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics >C5-C10	<0.6	<0.6									<0.6	mg/kg	TM36/PM12
Total aliphatics and aromatics >C10-C16	<8.4	<8.4									<8.4	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics >C16-C35	<28	<28									<28	mg/kg	TM5/PM8/PM16
GRO (>C4-C8) #	0.1	<0.1									<0.1	mg/kg	TM36/PM12
GRO (>C8-C12) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
GRO (>C4-C12) #	0.1	<0.1									<0.1	mg/kg	TM36/PM12
MTBE #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
Benzene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
Toluene #	0.039	<0.005									<0.005	mg/kg	TM31/PM12
Ethylbenzene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
m/p-Xylene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
o-Xylene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
Natural Moisture Content	18.7	8.6									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0212	0.0182									<0.0015	g/l	TM38/PM20
Organic Matter	1.9	0.5									<0.2	%	TM21/PM24
pH #	7.69	8.00									<0.01	pH units	TM73/PM11

Client Name: Betts Geo
Reference: 16LPL040
Location: Miles Platting Area 5 Manchester
Contact: Robert Davies

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

[redacted]
Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/5752	1	Plot 67 (TS)	0.10	3	09/04/2019	**General Description (Bulk Analysis)**	soil-stones
					09/04/2019	**Asbestos Fibres**	NAD
					09/04/2019	**Asbestos ACM**	NAD
					09/04/2019	**Asbestos Type**	NAD
					09/04/2019	**Asbestos Level Screen**	NAD
19/5752	1	Plot 67 (SS)	0.40	6	09/04/2019	**General Description (Bulk Analysis)**	soil-stones
					09/04/2019	**Asbestos Fibres**	NAD
					09/04/2019	**Asbestos ACM**	NAD
					09/04/2019	**Asbestos Type**	NAD
					09/04/2019	**Asbestos Level Screen**	NAD

Client Name: Betts Geo
Reference: 16LPL040
Location: Miles Platting Area 5 Manchester
Contact: Robert Davies

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 19/5752						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/5752

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

JE Job No: 19/5752

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 19/5752

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

Our Ref: 16LPL040/RD/SV/25

29th April 2019

FAO Rich
(Via Emai[redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plot 73

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the material on site was inspected on the 16th April 2019, inspection confirmed that the topsoil is brown clayey sand and subsoil material is a light brown clayey SAND, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 16th April 2019 in the garden area of plot 73, the trial hole confirmed that the topsoil thickness was 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plot 73 on 16th April 2019 at a sample rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plot 73 on 16th April 2019 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,

[redacted]

Robert Davies
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results









Plot 73

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 16/04/2019

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 73	Plot 73
DEPTH (m)	0.10	0.40
pH	7.59	7.9
Sulphate (water sol 2:1)	0.05	<0.01
Organic matter	4	0.3
Arsenic	4	<1
Cadmium	<0.5	<0.5
Copper	16	2
Chromium (hexavalent)	<1	<1
Lead	43	8
Mercury	<0.17	<0.17
Nickel	14	15
Selenium	<1	<1
Zinc	48	38
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	NAD	NAD
Organic matter	4	0.3

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	-	7.90	7.59			-
Sulphate (water sol 2:1)	-	0.05	<0.01			-
Organic matter	-	4.00	0.30			
Arsenic	-	4.00	<1	32	32	37
Cadmium	-	<0.5	<0.5	10	10	22.1
Copper	-	16.00	2.00	4730	4790	-
Chromium (hexavalent)	-	<1	<1	3.62	3.63	20.5
Lead	-	43.00	8.00			200
Mercury	-	<0.17	<0.17	8.81	15.8	-
Nickel	-	15.00	14.00	EA/ATRisk withdrawn Aug 2015		
Selenium	-	<1	<1	375	375	-
Zinc	-	48.00	38.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 16/04/2019

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 73	Plot 73
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<1	<1
Ali >C10-C12	<1	<1
Ali >C12-C16	<1	<1
Ali >C16-C21	<1	<1
Ali >C21-C35	8	<1
Total Aliphatics	8	<1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C10	2	<1
Aro >C10-C12	<1	<1
Aro >C12-C16	<1	<1
Aro >C16-C21	2	<1
Aro >C21-C35	15	<1
Total Aromatics	20	<1
TPH (Ali & Aro)	29	<1
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	4	0.3

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	-	<0.01	<0.01	42.7	369	-
Ali >C6-C8	-	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	-	<1	<1	13.9	204	-
Ali >C10-C12	-	<1	<1	81.7	1180	-
Ali >C12-C16	-	<1	<1	385	4130	-
Ali >C16-C21	-	<1	<1	210000	210100	-
Ali >C21-C35	-	8.00	<1			
Total Aliphatics	-	8.00	<1			
Aro >C5-C7	-	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	-	<0.01	<0.01	113	780	-
Aro >C8-C10	-	2.00	<1	20.5	232	-
Aro >C10-C12	-	<1	<1	70	468	-
Aro >C12-C16	-	<1	<1	165	830	-
Aro >C16-C21	-	2.00	<1	319	1040	-
Aro >C21-C35	-	15.00	<1	1120	1710	-
Total Aromatics	-	20.00	<1			
TPH (Ali & Aro)	-	29.00	<1			
BTEX - Benzene	-	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	-	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	-	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	-	<0.01	<0.01	24	312	-
BTEX - o Xylene	-	<0.01	<0.01	26.4	336	-
MTBE	-	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 16/04/19

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 73	Plot 73
DEPTH (m)	0.10	0.40
Acenaphthene	<0.01	<0.01
Acenaphthylene	<0.01	<0.01
Anthracene	<0.02	<0.02
Benzo(a)anthracene	<0.04	<0.04
Benzo(a)pyrene	<0.04	<0.04
Benzo(b)fluoranthene	<0.05	<0.05
Benzo(ghi)perylene	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07
Chrysene	<0.06	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	<0.08	<0.08
Fluorene	<0.01	<0.01
Indeno(123-cd)pyrene	<0.03	<0.03
Naphthalene	<0.03	<0.03
Phenanthrene	<0.03	<0.03
Pyrene	<0.07	<0.07
Organic Matter	4	0.3

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	-	<0.01	<0.01	608	2760	-
Acenaphthylene	-	<0.01	<0.01			-
Anthracene	-	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	-	<0.04	<0.04	4.52	8.54	-
Benzo(a)pyrene	-	<0.04	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	-	<0.05	<0.05	7.72	9.86	-
Benzo(ghi)perylene	-	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	-	<0.07	<0.07	84.4	100	-
Chrysene	-	<0.06	<0.06	585	927	-
Dibenzo(ah)anthracene	-	<0.04	<0.04	0.838	1	-
Fluoranthene	-	<0.08	<0.08	983	2980	-
Fluorene	-	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	-	<0.03	<0.03	7.31	9.75	-
Naphthalene	-	<0.03	<0.03	0.829	12.2	-
Phenanthrene	-	<0.03	<0.03			-
Pyrene	-	<0.07	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/03832
Issue Number: 1 **Date:** 26 April, 2019

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Robert Davies
Project Name: Miles Platting Area 5, Manchester
Project Ref: 16LPL040
Order No: BG3281
Date Samples Received: 17/04/19
Date Instructions Received: 18/04/19
Date Analysis Completed: 26/04/19

Prepared by:	**Approved by:**
[redacted]	
Laboratory Coordinator	Analytical Consultant

Envirolab Job Number: 19/03832

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	19/03832/1	19/03832/2						Units	Limit of Detection	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 73	Plot 73								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	16-Apr-19	16-Apr-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
% Stones >10mm$_A$	2.7	2.1						% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	7.59	7.90						pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.05	<0.01						g/l	0.01	A-T-026s
Organic matter$_D$$^{M\#}$	4.0	0.3						% w/w	0.1	A-T-032 OM
Arsenic$_D$$^{M\#}$	4	<1						mg/kg	1	A-T-024s
Cadmium$_D$$^{M\#}$	<0.5	<0.5						mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	16	2						mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1						mg/kg	1	A-T-040s
Lead$_D$$^{M\#}$	43	8						mg/kg	1	A-T-024s
Mercury$_D$	<0.17	<0.17						mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	14	15						mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1	<1						mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	48	38						mg/kg	5	A-T-024s
VPH total (>C5-C10)	2	<1						mg/kg	1	Calc-stone+mois

Envirolab Job Number: 19/03832

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	19/03832/1	19/03832/2						Units	Limit of Detection	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 73	Plot 73								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	16-Apr-19	16-Apr-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{A}^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 19/03832

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	19/03832/1	19/03832/2						Units	Limit of Detection	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 73	Plot 73								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	16-Apr-19	16-Apr-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01						mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01						mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02						mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04						mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04						mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05						mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05						mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07						mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06						mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04						mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08						mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01						mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03						mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	<0.03						mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03						mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07						mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	<0.08						mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/03832

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	19/03832/1	19/03832/2						Units	Limit of Detection	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 73	Plot 73								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	16-Apr-19	16-Apr-19								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1						mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1						mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1						mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1						mg/kg	1	A-T-055s
Ali >C21-C35$_A$	8	<1						mg/kg	1	A-T-055s
Total Aliphatics$_A$	8	<1						mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
Aro >C8-C10$_A^{M\#}$	2	<1						mg/kg	1	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1						mg/kg	1	A-T-055s
Aro >C12-C16$_A$	<1	<1						mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	2	<1						mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	15	<1						mg/kg	1	A-T-055s
Total Aromatics$_A$	20	<1						mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	29	<1						mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01						mg/kg	0.01	A-T-022s

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Betts Geo Environmental, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, UK, CH5 2LY

Project: Miles Platting Area 5, Manchester

Clients Project No: 16LPL040

Project No: 19/03832

Date Received: 18/04/2019 (am)

Cool Box Temperatures (oC): 10.2

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Our Ref: 16LPL040/PH/SV/11

13th September 2018

FAO Richard Seddon @ Lovell
(Via Ema[redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 8 - 9 & 57 - 61

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 21st May 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Brown clayey SAND – Source – Salterforth Gardens
Subsoil – Light yellowish-brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 21st May 2018, in the garden of the plots and confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Photos of plots 9 and 57 have been provided by Lovell as these gardens weren't finished when Betts visited site on the 21st May. Photographs confirm that topsoil thicknesses are 150mm or greater over at least 450mm subsoil with a no-dig membrane present beneath.

Old Marsh Farm Barns, Welsh Road,
Sealand, Flintshire, CH5 2LY
Telephone: 01244 288 179
Fax: 01244 288 516
www.betts-associates.co.uk
enquiries@betts-associates.co.uk

Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil and subsoil within plots 9, 59 and 61 on 21st May 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results









Plot 8







Plot 9





Plot 57









Plot 58









Plot 59









Plot 60



Plot 61

Our Ref: 16LPL040/PH/SV/12

15th June 2018

FAO Richard Seddon @ Lovell
(Via Ema[redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plot 10

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was initially inspected on the 21st May 2018, Betts inspected the material again on 12th June 2018 once the garden area had been fully placed, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Brown clayey SAND – Source – Salterforth Gardens
Subsoil – Light yellowish-brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 12th June 2018, in the garden of the plots and confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Old Marsh Farm Barns, Welsh Road,
Sealand, Flintshire, CH5 2LY
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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil and subsoil within plot 9 on 21st May 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 10

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 21/05/2018

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 9	Plot 9	Plot 59	Plot 59	Plot 61	Plot 61
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
pH	7.01	7.53	7.44	7.53	7.52	7.76
Sulphate (water sol 2:1)	<0.01	0.05	0.01	0.05	<0.01	<0.01
Organic matter	3.7	0.6	3.6	1.5	3.2	0.2
Arsenic	4	3	4	4	5	2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	16	9	17	14	19	6
Chromium (hexavalent)	<1	<1	<1	<1	<1	<1
Lead	35	17	35	29	39	5
Mercury	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Nickel	8	7	8	8	8	5
Selenium	<1	<1	<1	<1	<1	<1
Zinc	37	32	40	37	41	19
Asbestos in Soil	NAD	NAD	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A	N/A	N/A
Quantification	NAD	NAD	NAD	NAD	NAD	NAD
Organic matter	3.7	0.6	3.6	1.5	3.2	0.2

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.67	7.76	7.01			-
Sulphate (water sol 2:1)	0.04	0.05	<0.01			-
Organic matter	3.42	3.70	0.20			
Arsenic	4.52	5.00	2.00	32	32	37
Cadmium	0.50	<0.5	<0.5	10	10	22.1
Copper	17.62	19.00	6.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	37.45	39.00	5.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	8.33	8.00	5.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	41.03	41.00	19.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 21/05/2018

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 9	Plot 9	Plot 59	Plot 59	Plot 61	Plot 61
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1	<0.1	48.4
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1	<0.1	62.3
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1	<0.1	4.4
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1	<0.1	3.2
Total Aliphatics	<0.1	<0.1	<0.1	<0.1	<0.1	118
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1	<0.1	10.2
Aro >C12-C16	<0.1	<0.1	<0.1	<0.1	<0.1	14.6
Aro >C16-C21	0.8	<0.1	1.4	2.3	2.6	0.5
Aro >C21-C35	0.5	<0.1	0.8	2	3.5	<0.1
Total Aromatics	1.3	<0.1	2.1	4.3	6.1	25.5
TPH (Ali & Aro)	1.3	<0.1	2.1	4.3	6.1	144
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Organic Matter	3.7	0.6	3.6	1.5	3.2	0.2

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	0.01	<0.01	<0.01	13.9	204	-
Ali >C10-C12	24.37	48.40	<0.1	81.7	1180	-
Ali >C12-C16	31.36	62.30	<0.1	385	4130	-
Ali >C16-C21	2.26	4.40	<0.1	210000	210100	-
Ali >C21-C35	1.66	3.20	<0.1			
Total Aliphatics	59.35	118.00	<0.1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C9	0.01	<0.01	<0.01	20.5	232	-
Aro >C9-C10	0.01	<0.01	<0.01	20.5	232	-
Aro >C10-C12	5.18	10.20	<0.1	70	468	-
Aro >C12-C16	7.39	14.60	<0.1	165	830	-
Aro >C16-C21	2.11	2.60	<0.1	319	1040	-
Aro >C21-C35	2.27	3.50	<0.1	1120	1710	-
Total Aromatics	14.40	25.50	<0.1			
TPH (Ali & Aro)	73.78	144.00	<0.1			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 21/05/18

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 9	Plot 9	Plot 59	Plot 59	Plot 61	Plot 61
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Acenaphthene	0.02	0.04	0.03	0.02	0.03	<0.01
Acenaphthylene	<0.01	0.01	0.01	0.01	0.01	<0.01
Anthracene	0.14	0.09	0.09	0.08	0.1	<0.02
Benzo(a)anthracene	0.45	0.24	0.4	0.35	0.43	<0.04
Benzo(a)pyrene	0.4	0.23	0.44	0.36	0.48	<0.04
Benzo(b)fluoranthene	0.54	0.26	0.6	0.44	0.62	<0.05
Benzo(ghi)perylene	0.21	0.11	0.28	0.19	0.27	<0.05
Benzo(k)fluoranthene	0.22	0.11	0.22	0.18	0.24	<0.07
Chrysene	0.47	0.27	0.5	0.41	0.46	<0.06
Dibenzo(ah)anthracene	0.04	<0.04	0.06	<0.04	0.06	<0.04
Fluoranthene	0.92	0.51	0.91	0.7	0.94	<0.08
Fluorene	0.02	0.03	0.02	0.02	0.02	<0.01
Indeno(123-cd)pyrene	0.24	0.12	0.3	0.2	0.31	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.29	0.35	0.36	0.32	0.37	<0.03
Pyrene	0.81	0.5	0.81	0.67	0.84	<0.07
Organic Matter	3.7	0.6	3.6	1.5	3.2	0.2

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.03	0.04	<0.01	608	2760	-
Acenaphthylene	0.01	0.01	<0.01			-
Anthracene	0.12	0.14	<0.02	10200	26200	-
Benzo(a)anthracene	0.45	0.45	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.46	0.48	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.60	0.62	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.26	0.28	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.23	0.24	<0.07	84.4	100	-
Chrysene	0.50	0.50	<0.06	585	927	-
Dibenzo(ah)anthracene	0.06	0.06	<0.04	0.838	1	-
Fluoranthene	0.95	0.94	<0.08	983	2980	-
Fluorene	0.03	0.03	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.29	0.31	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.39	0.37	<0.03			-
Pyrene	0.86	0.84	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/03957
Issue Number: 1 **Date:** 29 May, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5, Manchester
Project Ref: 16LPL040
Order No: BG2794
Date Samples Received: 21/05/18
Date Instructions Received: 22/05/18
Date Analysis Completed: 29/05/18

Prepared by: **Approved by:**

[redacted]

Envirolab Job Number: 18/03957

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/03957/1	18/03957/2	18/03957/3	18/03957/4	18/03957/5	18/03957/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 9	Plot 9	Plot 59	Plot 59	Plot 61	Plot 61				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4	4AE	4E	4AE	1				
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	A-T-044
pH$_D^{M\#}$	7.01	7.53	7.44	7.53	7.52	7.76			pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	0.05	0.01	0.05	<0.01	<0.01			g/l	A-T-026s
Organic matter$_D^{M\#}$	3.7	0.6	3.6	1.5	3.2	0.2			% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	4	3	4	4	5	2			mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			mg/kg	A-T-024s
Copper$_D^{M\#}$	16	9	17	14	19	6			mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-040s
Lead$_D^{M\#}$	35	17	35	29	39	5			mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17			mg/kg	A-T-024s
Nickel$_D^{M\#}$	8	7	8	8	8	5			mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-024s
Zinc$_D^{M\#}$	37	32	40	37	41	19			mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s

Envirolab Job Number: 18/03957

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/03957/1	18/03957/2	18/03957/3	18/03957/4	18/03957/5	18/03957/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 9	Plot 9	Plot 59	Plot 59	Plot 61	Plot 61				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4	4AE	4E	4AE	1				
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A				

Envirolab Job Number: 18/03957

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/03957/1	18/03957/2	18/03957/3	18/03957/4	18/03957/5	18/03957/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 9	Plot 9	Plot 59	Plot 59	Plot 61	Plot 61				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4	4AE	4E	4AE	1				
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.02	0.04	0.03	0.02	0.03	<0.01			mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	0.01	0.01	0.01	0.01	<0.01			mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.14	0.09	0.09	0.08	0.10	<0.02			mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.45	0.24	0.40	0.35	0.43	<0.04			mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.40	0.23	0.44	0.36	0.48	<0.04			mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.54	0.26	0.60	0.44	0.62	<0.05			mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.21	0.11	0.28	0.19	0.27	<0.05			mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.22	0.11	0.22	0.18	0.24	<0.07			mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.47	0.27	0.50	0.41	0.46	<0.06			mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.04	<0.04	0.06	<0.04	0.06	<0.04			mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.92	0.51	0.91	0.70	0.94	<0.08			mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.02	0.03	0.02	0.02	0.02	<0.01			mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.24	0.12	0.30	0.20	0.31	<0.03			mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.29	0.35	0.36	0.32	0.37	<0.03			mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.81	0.50	0.81	0.67	0.84	<0.07			mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	4.77	2.86	5.03	3.97	5.18	<0.08			mg/kg	A-T-019s

Envirolab Job Number: 18/03957

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/03957/1	18/03957/2	18/03957/3	18/03957/4	18/03957/5	18/03957/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 9	Plot 9	Plot 59	Plot 59	Plot 61	Plot 61				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18	21-May-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4	4AE	4E	4AE	1				
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	48.4			mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	62.3			mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	4.4			mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	3.2			mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	118			mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	10.2			mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	14.6			mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	0.8	<0.1	1.4	2.3	2.6	0.5			mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	0.5	<0.1	0.8	2.0	3.5	<0.1			mg/kg	A-T-023s
Total Aromatics$_A$	1.3	<0.1	2.1	4.3	6.1	25.5			mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	1.3	<0.1	2.1	4.3	6.1	144			mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/13/Rev A

23rd August 18 – Revised – Updated photographs.

19th June 2018 – Original report date.

FAO Richard Seddon @ Lovell
(Via Email [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 11 & 12.

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was initially inspected on the 12th June 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Adlington Road, Wilmslow
Subsoil – Light yellowish-brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 12th June 2018 in the garden of the plots confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil and subsoil within plot 11 on 12th June 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 11





Plot 12

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Planting Area 5
Project No 16LPL040
Date 12/06/2018

SOIL TYPE	TS	SS
SAMPLE LOCATION	P11	P11
DEPTH (m)	0.10	0.40
pH	6.78	8.5
Sulphate (water sol 2:1)	0.0409	0.0047
Organic matter	4.1	0.3
Arsenic	7.8	2.1
Cadmium	0.2	<0.1
Copper	23	8
Chromium (hexavalent)	<0.3	<0.3
Lead	42	13
Mercury	<0.1	<0.1
Nickel	13.4	18.2
Selenium	<1	<1
Zinc	73	43
Asbestos in Soil	NAD	NAD
Asbestos Matrix	NAD	NAD
Quantification	NAD	NAD
Organic matter	4.1	0.3

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	8.50	6.78			-
Sulphate (water sol 2:1)	0.04	0.00			-
Organic matter	4.10	0.30			
Arsenic	7.80	2.10	32	32	37
Cadmium	0.20	<0.1	10	10	22.1
Copper	23.00	8.00	4730	4790	-
Chromium (hexavalent)	<0.3	<0.3	3.62	3.63	20.5
Lead	42.00	13.00			200
Mercury	<0.1	<0.1	8.81	15.8	-
Nickel	18.20	13.40	EA/ATRisk withdrawn Aug 2015		
Selenium	<1	<1	375	375	-
Zinc	73.00	43.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Planting Area 5
Project No 16LPL040
Date 12/06/2018

SOIL TYPE	TS	SS
SAMPLE LOCATION	P11	P11
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.1	<0.1
Ali >C6-C8	<0.1	<0.1
Ali >C8-C10	<0.1	<0.1
Ali >C10-C12	<0.2	<0.2
Ali >C12-C16	<4	<4
Ali >C16-C21	<7	<7
Ali >C21-C35	<7	<7
Total Aliphatics	<19	<19
Aro >C5-C7	<0.1	<0.1
Aro >C7-C8	<0.1	<0.1
Aro >C8-C9	<0.1	<0.1
Aro >C9-C10	<0.1	<0.1
Aro >C10-C12	<0.2	<0.2
Aro >C12-C16	<4	<4
Aro >C16-C21	<7	<7
Aro >C21-C35	<7	<7
Total Aromatics	<19	<19
TPH (Ali & Aro)	<38	<38
BTEX - Benzene	<0.005	<0.005
BTEX - Toluene	0.037	<0.005
BTEX - Ethyl Benzene	<0.005	<0.005
BTEX - m & p Xylene	<0.005	<0.005
BTEX - o Xylene	<0.005	<0.005
MTBE	<0.005	<0.005
Organic Matter	4.1	0.3

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.1	<0.1	42.7	369	-
Ali >C6-C8	<0.1	<0.1	99.3	1240	-
Ali >C8-C10	<0.1	<0.1	13.9	204	-
Ali >C10-C12	<0.2	<0.2	81.7	1180	-
Ali >C12-C16	<4	<4	385	4130	-
Ali >C16-C21	<7	<7	210000	210100	-
Ali >C21-C35	<7	<7			
Total Aliphatics	<19	<19			
Aro >C5-C7	<0.1	<0.1	0.137	0.871	-
Aro >C7-C8	<0.1	<0.1	113	780	-
Aro >C8-C9	<0.1	<0.1	20.5	232	-
Aro >C9-C10	<0.1	<0.1	20.5	232	-
Aro >C10-C12	<0.2	<0.2	70	468	-
Aro >C12-C16	<4	<4	165	830	-
Aro >C16-C21	<7	<7	319	1040	-
Aro >C21-C35	<7	<7	1120	1710	-
Total Aromatics	<19	<19			
TPH (Ali & Aro)	<38	<38			
BTEX - Benzene	<0.005	<0.005	0.0493	0.33	0.871
BTEX - Toluene	0.037	<0.005	113	780	-
BTEX - Ethyl Benzene	<0.005	<0.005	50.7	453	-
BTEX - m & p Xylene	<0.005	<0.005	24	312	-
BTEX - o Xylene	<0.005	<0.005	26.4	336	-
MTBE	<0.005	<0.005	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Planting Area 5
Project No 16LPL040
Date 12/06/18

SOIL TYPE	TS	SS
SAMPLE LOCATION	P11	P11
DEPTH (m)	0.10	0.40
Acenaphthene	<0.05	<0.05
Acenaphthylene	<0.03	<0.03
Anthracene	<0.04	<0.04
Benzo(a)anthracene	0.15	<0.06
Benzo(a)pyrene	0.18	<0.04
Benzo(b)fluoranthene	0.24	<0.05
Benzo(ghi)perylene	0.14	<0.04
Benzo(k)fluoranthene	0.09	<0.02
Chrysene	0.18	<0.02
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	0.29	<0.03
Fluorene	<0.04	<0.04
Indeno(123-cd)pyrene	0.13	<0.04
Naphthalene	<0.04	<0.04
Phenanthrene	0.13	<0.03
Pyrene	0.28	<0.03
Organic Matter	4.1	0.3

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.05	<0.05	608	2760	-
Acenaphthylene	<0.03	<0.03			-
Anthracene	<0.04	<0.04	10200	26200	-
Benzo(a)anthracene	0.15	<0.06	4.52	8.54	-
Benzo(a)pyrene	0.18	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.24	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.14	<0.04	96.2	103	-
Benzo(k)fluoranthene	0.09	<0.02	84.4	100	-
Chrysene	0.18	<0.02	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	0.29	<0.03	983	2980	-
Fluorene	<0.04	<0.04	735	2610	-
Indeno(123-cd)pyrene	0.13	<0.04	7.31	9.75	-
Naphthalene	<0.04	<0.04	0.829	12.2	-
Phenanthrene	0.13	<0.03			-
Pyrene	0.28	<0.03	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

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Betts Geo
Unit 6-7
Old Marsh Farm Barns
Welsh Road
Sealand
CH5 2LY

Attention :	Paul Harrison
Date :	18th June, 2018
Your reference :	16LPL040
Our reference :	Test Report 18/9145 Batch 1
Location :	Miles Planting Area 5
Date samples received :	13th June, 2018
Status :	Final report
Issue :	1

Two samples were received for analysis on 13th June, 2018 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

[redacted]

Lucas Halliwell
Project Co-ordinator

Client Name: Betts Geo
Reference: 16LPL040
Location: Miles Planting Area 5
Contact: Paul Harrison
JE Job No.: 18/9145

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6									LOD/LOR	Units	Method No.
Sample ID	P11	P11											
Depth	0.10	0.40											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/06/2018	12/06/2018											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	13/06/2018	13/06/2018											
Arsenic #	7.8	2.1									<0.5	mg/kg	TM30/PM15
Cadmium #	0.2	<0.1									<0.1	mg/kg	TM30/PM15
Copper #	23	8									<1	mg/kg	TM30/PM15
Lead #	42	13									<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1									<0.1	mg/kg	TM30/PM15
Nickel #	13.4	18.2									<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1									<1	mg/kg	TM30/PM15
Zinc #	73	43									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05									<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.13	<0.03									<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.29	<0.03									<0.03	mg/kg	TM4/PM8
Pyrene #	0.28	<0.03									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.15	<0.06									<0.06	mg/kg	TM4/PM8
Chrysene #	0.18	<0.02									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.33	<0.07									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.18	<0.04									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.13	<0.04									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.14	<0.04									<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.8	<0.6									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.24	<0.05									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.09	<0.02									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	96	94									<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	<19	<19									<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics >C5-C10	<0.3	<0.3									<0.3	mg/kg	TM36/PM12
Total aliphatics >C10-C16 #	<4.2	<4.2									<4.2	mg/kg	TM5/PM8/PM16
Total aliphatics >C16-C35 #	<14	<14									<14	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Betts Geo
Reference: 16LPL040
Location: Miles Planting Area 5
Contact: Paul Harrison
JE Job No.: 18/9145

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6									LOD/LOR	Units	Method No.
Sample ID	P11	P11											
Depth	0.10	0.40											
COC No / misc													
Containers	V J T	V J T											
Sample Date	12/06/2018	12/06/2018											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	13/06/2018	13/06/2018											
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	<19	<19									<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aromatics >C5-C10 #	<0.3	<0.3									<0.3	mg/kg	TM36/PM12
Total aromatics >C10-C16 #	<4.2	<4.2									<4.2	mg/kg	TM5/PM8/PM16
Total aromatics >C16-C35 #	<14	<14									<14	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics(C5-35)	<38	<38									<38	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics >C5-C10	<0.6	<0.6									<0.6	mg/kg	TM36/PM12
Total aliphatics and aromatics >C10-C16	<8.4	<8.4									<8.4	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics >C16-C35	<28	<28									<28	mg/kg	TM5/PM8/PM16
GRO (>C4-C8) #	0.1	<0.1									<0.1	mg/kg	TM36/PM12
GRO (>C8-C12) #	0.1	<0.1									<0.1	mg/kg	TM36/PM12
GRO (>C4-C12) #	0.2	<0.1									<0.1	mg/kg	TM36/PM12
MTBE #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
Benzene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
Toluene #	0.037	<0.005									<0.005	mg/kg	TM31/PM12
Ethylbenzene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
m/p-Xylene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
o-Xylene #	<0.005	<0.005									<0.005	mg/kg	TM31/PM12
Natural Moisture Content	28.0	3.5									<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3									<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0409	0.0047									<0.0015	g/l	TM38/PM20
Organic Matter	4.1	0.3									<0.2	%	TM21/PM24
pH #	6.78	8.50									<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Betts Geo
Reference: 16LPL040
Location: Miles Planting Area 5
Contact: Paul Harrison

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

[redacted]

Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
18/9145	1	P11	0.10	3	14/06/2018	**General Description (Bulk Analysis)**	Soil/Stones
					14/06/2018	**Asbestos Fibres**	NAD
					14/06/2018	**Asbestos Fibres (2)**	NAD
					14/06/2018	**Asbestos ACM**	NAD
					14/06/2018	**Asbestos ACM (2)**	NAD
					14/06/2018	**Asbestos Type**	NAD
					14/06/2018	**Asbestos Type (2)**	NAD
					14/06/2018	**Asbestos Level Screen**	NAD
18/9145	1	P11	0.40	6	14/06/2018	**General Description (Bulk Analysis)**	Soil/Stones
					14/06/2018	**Asbestos Fibres**	NAD
					14/06/2018	**Asbestos Fibres (2)**	NAD
					14/06/2018	**Asbestos ACM**	NAD
					14/06/2018	**Asbestos ACM (2)**	NAD
					14/06/2018	**Asbestos Type**	NAD
					14/06/2018	**Asbestos Type (2)**	NAD
					14/06/2018	**Asbestos Level Screen**	NAD

Client Name: Betts Geo

Matrix : Solid

Reference: 16LPL040

Location: Miles Planting Area 5

Contact: Paul Harrison

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
18/9145	1	P11	0.10	1-3	GRO	Solid Samples were received at a temperature above 9°C.
18/9145	1	P11	0.40	4-6	GRO	Solid Samples were received at a temperature above 9°C.

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

Please include all sections of this report if it is reproduced

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 18/9145

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 18/9145

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 18/9145

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

Our Ref: 16LPL040/KR/SV/14

20th July 2018

FAO Ric
(Via Emai[redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 13 - 14.

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was initially inspected on the 28th June 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Adlington Road, Wilmslow
Subsoil – Light yellowish-brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 28th June 2018 in the garden of the plots confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil and subsoil within plot 14 on 28th June 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

Kris Rodway
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results







Plot 13







Plot 14

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 28-Jun-18

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P11	P11	P14	P14
DEPTH (m)	0.10	0.40	0.10	0.40
pH	6.99	7.3	7.15	7.79
Sulphate (water sol 2:1)	0.04	0.02	0.05	0.01
Organic matter	3	1.6	2.7	0.8
Arsenic	4	<1	4	3
Cadmium	<0.5	<0.5	<0.5	<0.5
Copper	17	8	19	18
Chromium (hexavalent)	<1	<1	<1	<1
Lead	40	19	30	12
Mercury	0.22	<0.17	<0.17	<0.17
Nickel	13	15	21	31
Selenium	1	2	2	1
Zinc	66	44	180	53
Asbestos in Soil	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A
Quantification	N/A	N/A	N/A	N/A
Organic matter	3	1.6	2.7	0.8

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.71	7.79	6.99			-
Sulphate (water sol 2:1)	0.05	0.05	0.01			-
Organic matter	3.22	3.00	0.80			
Arsenic	4.66	4.00	<1	32	32	37
Cadmium	0.50	<0.5	<0.5	10	10	22.1
Copper	21.46	19.00	8.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	39.74	40.00	12.00			200
Mercury	0.21	0.22	<0.17	8.81	15.8	-
Nickel	29.51	31.00	13.00	EA/ATRisk withdrawn Aug 2015		
Selenium	2.18	2.00	1.00	375	375	-
Zinc	160.44	180.00	44.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 28-Jun-18

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P11	P11	P14	P14
DEPTH (m)	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aliphatics	<0.1	<0.1	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aromatics	<0.1	<0.1	<0.1	<0.1
TPH (Ali & Aro)	<0.1	<0.1	<0.1	<0.1
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01
Organic Matter	3	1.6	2.7	0.8

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	0.01	<0.01	<0.01	13.9	204	-
Ali >C10-C12	0.10	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	0.10	<0.1	<0.1	385	4130	-
Ali >C16-C21	0.10	<0.1	<0.1	210000	210100	-
Ali >C21-C35	0.10	<0.1	<0.1			
Total Aliphatics	0.10	<0.1	<0.1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C9	0.01	<0.01	<0.01	20.5	232	-
Aro >C9-C10	0.01	<0.01	<0.01	20.5	232	-
Aro >C10-C12	0.10	<0.1	<0.1	70	468	-
Aro >C12-C16	0.10	<0.1	<0.1	165	830	-
Aro >C16-C21	0.10	<0.1	<0.1	319	1040	-
Aro >C21-C35	0.10	<0.1	<0.1	1120	1710	-
Total Aromatics	0.10	<0.1	<0.1			
TPH (Ali & Aro)	0.10	<0.1	<0.1			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 28-Jun-18

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P11	P11	P14	P14
DEPTH (m)	0.10	0.40	0.10	0.40
Acenaphthene	<0.01	<0.01	0.02	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01
Anthracene	<0.02	<0.02	0.07	<0.02
Benzo(a)anthracene	0.11	<0.04	0.16	<0.04
Benzo(a)pyrene	0.12	<0.04	0.16	<0.04
Benzo(b)fluoranthene	0.15	<0.05	0.18	<0.05
Benzo(ghi)perylene	0.07	<0.05	0.08	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07
Chrysene	0.18	<0.06	0.22	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.21	<0.08	0.36	<0.08
Fluorene	<0.01	<0.01	0.02	<0.01
Indeno(123-cd)pyrene	0.08	<0.03	0.1	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.08	<0.03	0.23	<0.03
Pyrene	0.21	<0.07	0.32	<0.07
Organic Matter	3	1.6	2.7	0.8

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.02	0.02	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.06	0.07	<0.02	10200	26200	-
Benzo(a)anthracene	0.16	0.16	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.16	0.16	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.19	0.18	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.08	0.08	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	84.4	100	-
Chrysene	0.23	0.22	<0.06	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.34	0.36	<0.08	983	2980	-
Fluorene	0.02	0.02	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.10	0.10	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.20	0.23	<0.03			-
Pyrene	0.31	0.32	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/05145
Issue Number: 1 **Date:** 05 July, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5
Project Ref: TBC
Order No: BG2845
Date Samples Received: 28/06/18
Date Instructions Received: 28/06/18
Date Analysis Completed: 05/07/18

Prepared by:	**Approved by:**
[redacted]	
Danielle Brierley	Iain Haslock
Client Manager	Analytical Consultant

Envirolab Job Number: 18/05145

Client Project Name: Miles Platting Area 5

Client Project Ref: TBC

Lab Sample ID	18/05145/1	18/05145/2	18/05145/3	18/05145/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P11	P11	P14	P14						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	28-Jun-18	28-Jun-18	28-Jun-18	28-Jun-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4E	4AE	5AE	5A						
% Stones >10mm$_A$	<0.1	1.1	1.0	<0.1					% w/w	A-T-044
pH$_D$ M#	6.99	7.30	7.15	7.79					pH	A-T-031s
Sulphate (water sol 2:1)$_D$ M#	0.04	0.02	0.05	0.01					g/l	A-T-026s
Organic matter$_D$ M#	3.0	1.6	2.7	0.8					% w/w	A-T-032 OM
Arsenic$_D$ M#	4	<1	4	3					mg/kg	A-T-024s
Cadmium$_D$ M#	<0.5	<0.5	<0.5	<0.5					mg/kg	A-T-024s
Copper$_D$ M#	17	8	19	18					mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1					mg/kg	A-T-040s
Lead$_D$ M#	40	19	30	12					mg/kg	A-T-024s
Mercury$_D$	0.22	<0.17	<0.17	<0.17					mg/kg	A-T-024s
Nickel$_D$ M#	13	15	21	31					mg/kg	A-T-024s
Selenium$_D$ M#	1	2	2	1					mg/kg	A-T-024s
Zinc$_D$ M#	66	44	180	53					mg/kg	A-T-024s
VPH total (>C5-C10)$_A$ #	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

Envirolab Job Number: 18/05145

Client Project Name: Miles Platting Area 5

Client Project Ref: TBC

Lab Sample ID	18/05145/1	18/05145/2	18/05145/3	18/05145/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P11	P11	P14	P14						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	28-Jun-18	28-Jun-18	28-Jun-18	28-Jun-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4E	4AE	5AE	5A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A						

Envirolab Job Number: 18/05145

Client Project Name: Miles Platting Area 5

Client Project Ref: TBC

Lab Sample ID	18/05145/1	18/05145/2	18/05145/3	18/05145/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P11	P11	P14	P14						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	28-Jun-18	28-Jun-18	28-Jun-18	28-Jun-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4E	4AE	5AE	5A						
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	0.02	<0.01					mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	0.07	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.11	<0.04	0.16	<0.04					mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.12	<0.04	0.16	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.15	<0.05	0.18	<0.05					mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.07	<0.05	0.08	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.18	<0.06	0.22	<0.06					mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.21	<0.08	0.36	<0.08					mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	0.02	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.08	<0.03	0.10	<0.03					mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.08	<0.03	0.23	<0.03					mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.21	<0.07	0.32	<0.07					mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	1.21	<0.08	1.92	<0.08					mg/kg	A-T-019s

Envirolab Job Number: 18/05145

Client Project Name: Miles Platting Area 5

Client Project Ref: TBC

Lab Sample ID	18/05145/1	18/05145/2	18/05145/3	18/05145/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P11	P11	P14	P14						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	28-Jun-18	28-Jun-18	28-Jun-18	28-Jun-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4E	4AE	5AE	5A						
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
BTEX - Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/15

20th August 2018

FAO Richard Seddon @ Lovell
(Via Email: richard.seddon@Lovell.co.uk)

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 15 & 16.

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was initially inspected on the 12th July 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Adlington Road, Wilmslow
Subsoil – Light yellowish-brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 12th July 2018 in the garden of the plots confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Plot 16 topsoil was not fully placed during Betts visit on 12th July, additional photographs provided by Lovell illustrate that 150mm or greater topsoil has been placed over greater than 450mm subsoil. A no-dig layer is present beneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

BETTS ASSOCIATES
GEO ENVIRONMENTAL

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil and subsoil within plot 16 on 12th July 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results







Plot 15







Plot 16 - Betts





Plot 16 – Photos provided by Lovell

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 12/07/2018

SOIL TYPE	TS	SS
SAMPLE LOCATION	P16	P16
DEPTH (m)	0.10	0.40
pH	7.04	7.84
Sulphate (water sol 2:1)	0.08	0.02
Organic matter	3.8	0.5
Arsenic	5	<1
Cadmium	<0.5	<0.5
Copper	23	4
Chromium (hexavalent)	<1	<1
Lead	37	15
Mercury	<0.17	<0.17
Nickel	14	11
Selenium	<1	<1
Zinc	50	27
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	NAD	NAD
Organic matter	3.8	0.5

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	-	7.84	7.04			-
Sulphate (water sol 2:1)	-	0.08	0.02			-
Organic matter	-	3.80	0.50			
Arsenic	-	5.00	<1	32	32	37
Cadmium	-	<0.5	<0.5	10	10	22.1
Copper	-	23.00	4.00	4730	4790	-
Chromium (hexavalent)	-	<1	<1	3.62	3.63	20.5
Lead	-	37.00	15.00			200
Mercury	-	<0.17	<0.17	8.81	15.8	-
Nickel	-	14.00	11.00	EA/ATRisk withdrawn Aug 2015		
Selenium	-	<1	<1	375	375	-
Zinc	-	50.00	27.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 12/07/2018

SOIL TYPE	TS	SS
SAMPLE LOCATION	P16	P16
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1
Total Aliphatics	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1
Total Aromatics	<0.1	<0.1
TPH (Ali & Aro)	<0.1	<0.1
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	3.8	0.5

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	-	<0.01	<0.01	42.7	369	-
Ali >C6-C8	-	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	-	<0.01	<0.01	13.9	204	-
Ali >C10-C12	-	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	-	<0.1	<0.1	385	4130	-
Ali >C16-C21	-	<0.1	<0.1	210000	210100	-
Ali >C21-C35	-	<0.1	<0.1			
Total Aliphatics	-	<0.1	<0.1			
Aro >C5-C7	-	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	-	<0.01	<0.01	113	780	-
Aro >C8-C9	-	<0.01	<0.01	20.5	232	-
Aro >C9-C10	-	<0.01	<0.01	20.5	232	-
Aro >C10-C12	-	<0.1	<0.1	70	468	-
Aro >C12-C16	-	<0.1	<0.1	165	830	-
Aro >C16-C21	-	<0.1	<0.1	319	1040	-
Aro >C21-C35	-	<0.1	<0.1	1120	1710	-
Total Aromatics	-	<0.1	<0.1			
TPH (Ali & Aro)	-	<0.1	<0.1			
BTEX - Benzene	-	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	-	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	-	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	-	<0.01	<0.01	24	312	-
BTEX - o Xylene	-	<0.01	<0.01	26.4	336	-
MTBE	-	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 12/07/18

SOIL TYPE	TS	SS
SAMPLE LOCATION	P16	P16
DEPTH (m)	0.10	0.40
Acenaphthene	<0.01	<0.01
Acenaphthylene	<0.01	<0.01
Anthracene	0.02	<0.02
Benzo(a)anthracene	0.11	<0.04
Benzo(a)pyrene	0.14	<0.04
Benzo(b)fluoranthene	0.17	<0.05
Benzo(ghi)perylene	0.1	<0.05
Benzo(k)fluoranthene	<0.07	<0.07
Chrysene	0.15	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	0.21	<0.08
Fluorene	<0.01	<0.01
Indeno(123-cd)pyrene	0.11	<0.03
Naphthalene	<0.03	<0.03
Phenanthrene	0.11	<0.03
Pyrene	0.2	<0.07
Organic Matter	3.8	0.5

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	-	<0.01	<0.01	608	2760	-
Acenaphthylene	-	<0.01	<0.01			-
Anthracene	-	0.02	<0.02	10200	26200	-
Benzo(a)anthracene	-	0.11	<0.04	4.52	8.54	-
Benzo(a)pyrene	-	0.14	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	-	0.17	<0.05	7.72	9.86	-
Benzo(ghi)perylene	-	0.10	<0.05	96.2	103	-
Benzo(k)fluoranthene	-	<0.07	<0.07	84.4	100	-
Chrysene	-	0.15	<0.06	585	927	-
Dibenzo(ah)anthracene	-	<0.04	<0.04	0.838	1	-
Fluoranthene	-	0.21	<0.08	983	2980	-
Fluorene	-	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	-	0.11	<0.03	7.31	9.75	-
Naphthalene	-	<0.03	<0.03	0.829	12.2	-
Phenanthrene	-	0.11	<0.03			-
Pyrene	-	0.20	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/05637
Issue Number: 1 **Date:** 23 July, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 51 Manchester
Project Ref: 16LPL040
Order No: BG2865
Date Samples Received: 13/07/18
Date Instructions Received: 16/07/18
Date Analysis Completed: 23/07/18

Prepared by: **Approved by:**

[redacted]

Melanie Marshall
Laboratory Coordinator

Richard Wong
Client Manager

Envirolab Job Number: 18/05637

Client Project Name: Miles Platting Area 51 Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/05637/1	18/05637/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	P16	P16								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	12-Jul-18	12-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	2AE	5A								
% Stones >10mm$_A$	4.8	<0.1							% w/w	A-T-044
pH$_D^{M\#}$	7.04	7.84							pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.08	0.02							g/l	A-T-026s
Organic matter$_D^{M\#}$	3.8	0.5							% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	5	<1							mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5							mg/kg	A-T-024s
Copper$_D^{M\#}$	23	4							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D^{M\#}$	37	15							mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17							mg/kg	A-T-024s
Nickel$_D^{M\#}$	14	11							mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1							mg/kg	A-T-024s
Zinc$_D^{M\#}$	50	27							mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

Envirolab Job Number: 18/05637

Client Project Name: Miles Platting Area 51 Manchester

Client Project Ref: 16LPL040

Lab Sample ID	**18/05637/1**	**18/05637/2**							**Units**	**Method ref**
Client Sample No	**TS**	**SS**								
Client Sample ID	**P16**	**P16**								
Depth to Top	**0.10**	**0.40**								
Depth To Bottom										
Date Sampled	**12-Jul-18**	**12-Jul-18**								
Sample Type	**Soil - ES**	**Soil - ES**								
Sample Matrix Code	**2AE**	**5A**								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	**NAD**	**NAD**								**A-T-045**
Asbestos ACM - Suitable for Water Absorption Test?	**N/A**	**N/A**								

Envirolab Job Number: 18/05637

Client Project Name: Miles Platting Area 51 Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/05637/1	18/05637/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	P16	P16								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	12-Jul-18	12-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	2AE	5A								
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.11	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.14	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.17	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.10	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.15	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.21	<0.08							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.11	<0.03							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.11	<0.03							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.20	<0.07							mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	1.32	<0.08							mg/kg	A-T-019s

Envirolab Job Number: 18/05637

Client Project Name: Miles Platting Area 51 Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/05637/1	18/05637/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	P16	P16								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	12-Jul-18	12-Jul-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	2AE	5A								
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1							mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1							mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/16

13th November 2018

FAO Richard Seddon @ Lovell
(Via Emai[redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 52 - 56.

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was inspected on the 6th November 2018 for plots 54 – 56 and the 13th November for plots 52 - 53, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Woolston – Provided by W Mayer & Sons Ltd
Subsoil – Light yellowish-brown SAND – Source – Weaste - Provided by W Mayer & Sons Ltd

Cover System Depth Validation

Trial holes were undertaken on 6th and 13th November 2018 in the garden of the plots 52 – 56 confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Old Marsh Farm Barns, Welsh Road,
Sealand, Flintshire, CH5 2LY
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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil and subsoil within plots 52 and 55 on 6th November 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the topsoil and subsoil within plots 52 and 55 on 19th October 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 52





Plot 53







Plot 54







Plot 55





Plot 56

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 06-Nov-18

SOIL TYPE	TS	TS
SAMPLE LOCATION	P52	P55
DEPTH (m)	0.10	0.10
pH	7.7	7.7
Sulphate (water sol 2:1)	0.05	0.03
Organic matter	4.7	5.8
Arsenic	6	5
Cadmium	0.8	0.8
Copper	28	32
Chromium (hexavalent)	<1	<1
Lead	65	67
Mercury	0.21	0.26
Nickel	12	12
Selenium	<1	<1
Zinc	58	56
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	N/A	N/A
Organic matter	4.7	5.8

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.70	7.70			-
Sulphate (water sol 2:1)	0.05	0.03			-
Organic matter	5.80	4.70			
Arsenic	6.00	5.00	32	32	37
Cadmium	0.80	0.80	10	10	22.1
Copper	32.00	28.00	4730	4790	-
Chromium (hexavalent)	<1	<1	3.62	3.63	20.5
Lead	67.00	65.00			200
Mercury	0.26	0.21	8.81	15.8	-
Nickel	12.00	12.00	EA/ATRisk withdrawn Aug 2015		
Selenium	<1	<1	375	375	-
Zinc	58.00	56.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 06-Nov-18

SOIL TYPE	TS	TS
SAMPLE LOCATION	P52	P55
DEPTH (m)	0.10	0.10
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<1	<1
Ali >C10-C12	<1	<1
Ali >C12-C16	<1	<1
Ali >C16-C21	1	1
Ali >C21-C35	10	11
Total Aliphatics	11	12
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C10	1	1
Aro >C10-C12	<1	<1
Aro >C12-C16	2	2
Aro >C16-C21	10	10
Aro >C21-C35	52	60
Total Aromatics	66	74
TPH (Ali & Aro)	77	86
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	4.7	5.8

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<1	<1	13.9	204	-
Ali >C10-C12	<1	<1	81.7	1180	-
Ali >C12-C16	<1	<1	385	4130	-
Ali >C16-C21	1.00	1.00	210000	210100	-
Ali >C21-C35	11.00	10.00			
Total Aliphatics	12.00	11.00			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C10	1.00	1.00	20.5	232	-
Aro >C10-C12	<1	<1	70	468	-
Aro >C12-C16	2.00	2.00	165	830	-
Aro >C16-C21	10.00	10.00	319	1040	-
Aro >C21-C35	60.00	52.00	1120	1710	-
Total Aromatics	74.00	66.00			
TPH (Ali & Aro)	86.00	77.00			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 06-Nov-18

SOIL TYPE	TS	TS
SAMPLE LOCATION	P52	P55
DEPTH (m)	0.10	0.10
Acenaphthene	0.04	0.03
Acenaphthylene	0.01	0.02
Anthracene	0.11	0.11
Benzo(a)anthracene	0.38	0.39
Benzo(a)pyrene	0.43	0.44
Benzo(b)fluoranthene	0.55	0.52
Benzo(ghi)perylene	0.19	0.28
Benzo(k)fluoranthene	0.26	0.25
Chrysene	0.54	0.53
Dibenzo(ah)anthracene	0.05	0.06
Fluoranthene	0.89	0.91
Fluorene	0.03	0.03
Indeno(123-cd)pyrene	0.21	0.27
Naphthalene	<0.03	<0.03
Phenanthrene	0.47	0.4
Pyrene	0.86	0.86
Organic Matter	4.7	5.8

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.04	0.03	608	2760	-
Acenaphthylene	0.02	0.01			-
Anthracene	0.11	0.11	10200	26200	-
Benzo(a)anthracene	0.39	0.38	4.52	8.54	-
Benzo(a)pyrene	0.44	0.43	1.51	2.05	4.95
Benzo(b)fluoranthene	0.55	0.52	7.72	9.86	-
Benzo(ghi)perylene	0.28	0.19	96.2	103	-
Benzo(k)fluoranthene	0.26	0.25	84.4	100	-
Chrysene	0.54	0.53	585	927	-
Dibenzo(ah)anthracene	0.06	0.05	0.838	1	-
Fluoranthene	0.91	0.89	983	2980	-
Fluorene	0.03	0.03	735	2610	-
Indeno(123-cd)pyrene	0.27	0.21	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.47	0.40			-
Pyrene	0.86	0.86	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 19/10/2018

SOIL TYPE	SS	SS
SAMPLE LOCATION	P52	P55
DEPTH (m)	0.40	0.40
pH	7.82	8.21
Sulphate (water sol 2:1)	0.04	0.01
Organic matter	2.3	0.1
Arsenic	<1	<1
Cadmium	0.6	<0.5
Copper	22	4
Chromium (hexavalent)	<1	<1
Lead	23	14
Mercury	<0.17	<0.17
Nickel	19	14
Selenium	<1	<1
Zinc	49	36
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	N/A	N/A
Organic matter	2.3	0.1

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	9.25	8.21	7.82			-
Sulphate (water sol 2:1)	0.12	0.04	<0.01			-
Organic matter	8.15	2.30	0.10			
Arsenic	1.00	<1	<1	32	32	37
Cadmium	0.87	0.60	<0.5	10	10	22.1
Copper	69.82	22.00	4.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	46.91	23.00	14.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	32.28	19.00	14.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	83.54	49.00	36.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 19/10/2018

SOIL TYPE	SS	SS
SAMPLE LOCATION	P52	P55
DEPTH (m)	0.40	0.40
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<1	<1
Ali >C10-C12	<1	<1
Ali >C12-C16	<1	<1
Ali >C16-C21	<1	<1
Ali >C21-C35	<1	<1
Total Aliphatics	<1	<1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C10	<1	<1
Aro >C10-C12	<1	<1
Aro >C12-C16	<1	<1
Aro >C16-C21	<1	<1
Aro >C21-C35	<1	2
Total Aromatics	<1	2
TPH (Ali & Aro)	<1	2
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	2.3	0.1

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	1.00	<1	<1	13.9	204	-
Ali >C10-C12	1.00	<1	<1	81.7	1180	-
Ali >C12-C16	1.00	<1	<1	385	4130	-
Ali >C16-C21	1.00	<1	<1	210000	210100	-
Ali >C21-C35	1.00	<1	<1			
Total Aliphatics	1.00	<1	<1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C10	1.00	<1	<1	20.5	232	-
Aro >C10-C12	1.00	<1	<1	70	468	-
Aro >C12-C16	1.00	<1	<1	165	830	-
Aro >C16-C21	1.00	<1	<1	319	1040	-
Aro >C21-C35	4.66	2.00	<1	1120	1710	-
Total Aromatics	4.66	2.00	<1			
TPH (Ali & Aro)	4.66	2.00	<1			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 19/10/18

SOIL TYPE	SS	SS
SAMPLE LOCATION	P52	P55
DEPTH (m)	0.40	0.40
Acenaphthene	<0.01	<0.01
Acenaphthylene	<0.01	<0.01
Anthracene	<0.02	<0.02
Benzo(a)anthracene	<0.04	0.04
Benzo(a)pyrene	<0.04	<0.04
Benzo(b)fluoranthene	<0.05	0.05
Benzo(ghi)perylene	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07
Chrysene	<0.06	0.07
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	<0.08	0.09
Fluorene	<0.01	<0.01
Indeno(123-cd)pyrene	<0.03	0.03
Naphthalene	<0.03	<0.03
Phenanthrene	<0.03	0.05
Pyrene	<0.07	0.09
Organic Matter	2.3	0.1

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	0.00	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.02	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.04	0.04	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.04	<0.04	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.05	0.05	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.05	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	84.4	100	-
Chrysene	0.10	0.07	<0.06	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.12	0.09	<0.08	983	2980	-
Fluorene	0.01	0.00	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.03	0.03	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.10	0.05	<0.03			-
Pyrene	0.14	0.09	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/09261
Issue Number: 1 **Date:** 09 November, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG3067
Date Samples Received: 06/11/18
Date Instructions Received: 06/11/18
Date Analysis Completed: 09/11/18

Prepared by: **Approved by:**

[redacted]

Melanie Marshall
Laboratory Coordinator

Gill Walker
Director/Laboratory Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 18/09261

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09261/1	18/09261/2							Units	Method ref
Client Sample No	TS	TS								
Client Sample ID	P52	P55								
Depth to Top	0.10	0.10								
Depth To Bottom										
Date Sampled	06-Nov-18	06-Nov-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
% Stones >10mm$_A$	5.0	5.3							% w/w	A-T-044
pH$_D$$^{M\#}$	7.70	7.70							pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.05	0.03							g/l	A-T-026s
Organic matter$_D$$^{M\#}$	4.7	5.8							% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	6	5							mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	0.8	0.8							mg/kg	A-T-024s
Copper$_D$$^{M\#}$	28	32							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D$$^{M\#}$	65	67							mg/kg	A-T-024s
Mercury$_D$	0.21	0.26							mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	12	12							mg/kg	A-T-024s
Selenium$_D$$^{\#}$	<1	<1							mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	58	56							mg/kg	A-T-024s
VPH total (>C5-C10)	1	1							mg/kg	Calc-stone+mois

Envirolab Job Number: 18/09261

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09261/1	18/09261/2							Units	Method ref
Client Sample No	TS	TS								
Client Sample ID	P52	P55								
Depth to Top	0.10	0.10								
Depth To Bottom										
Date Sampled	06-Nov-18	06-Nov-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{A}^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 18/09261

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09261/1	18/09261/2							Units	Method ref
Client Sample No	TS	TS								
Client Sample ID	P52	P55								
Depth to Top	0.10	0.10								
Depth To Bottom										
Date Sampled	06-Nov-18	06-Nov-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.04	0.03							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.01	0.02							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.11	0.11							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.38	0.39							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.43	0.44							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.55	0.52							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.19	0.28							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.26	0.25							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.54	0.53							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.05	0.06							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.89	0.91							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.03	0.03							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.21	0.27							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.47	0.40							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.86	0.86							mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	5.02	5.10							mg/kg	A-T-019s

Envirolab Job Number: 18/09261

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09261/1	18/09261/2							Units	Method ref
Client Sample No	TS	TS								
Client Sample ID	P52	P55								
Depth to Top	0.10	0.10								
Depth To Bottom										
Date Sampled	06-Nov-18	06-Nov-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	1	1							mg/kg	A-T-055s
Ali >C21-C35$_A$	10	11							mg/kg	A-T-055s
Total Aliphatics >C5-C35$_A$	11	12							mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	1	1							mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C12-C16$_A$	2	2							mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	10	10							mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	52	60							mg/kg	A-T-055s
Total Aromatics >C5-C35$_A$	66	74							mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	77	86							mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/08682
Issue Number: 1 **Date:** 26 October, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area
Project Ref: 16LPL040
Order No: BG3084
Date Samples Received: 19/10/18
Date Instructions Received: 19/10/18
Date Analysis Completed: 26/10/18

Prepared by: **Approved by:**

[redacted]

Melanie Marshall
Laboratory Coordinator

Georgia King
Admin & Client Services Supervisor

Envirolab Job Number: 18/08682

Client Project Name: Miles Platting Area

Client Project Ref: 16LPL040

Lab Sample ID	18/08682/1	18/08682/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P52	P55								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	19-Oct-18	19-Oct-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6A	4A								
% Stones >10mm$_A$	16.2	<0.1							% w/w	A-T-044
pH$_D$$^{M\#}$	7.82	8.21							pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.04	0.01							g/l	A-T-026s
Organic matter$_D$$^{M\#}$	2.3	0.1							% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	<1	<1							mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	0.6	<0.5							mg/kg	A-T-024s
Copper$_D$$^{M\#}$	22	4							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D$$^{M\#}$	23	14							mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17							mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	19	14							mg/kg	A-T-024s
Selenium$_D$$^{\#}$	<1	<1							mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	49	36							mg/kg	A-T-024s
VPH total (>C5-C10)	<1	<1							mg/kg	Calc-stone+mois

Envirolab Job Number: 18/08682

Client Project Name: Miles Platting Area

Client Project Ref: 16LPL040

Lab Sample ID	18/08682/1	18/08682/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P52	P55								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	19-Oct-18	19-Oct-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6A	4A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{A}^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 18/08682

Client Project Name: Miles Platting Area

Client Project Ref: 16LPL040

Lab Sample ID	18/08682/1	18/08682/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P52	P55								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	19-Oct-18	19-Oct-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6A	4A								
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	0.04							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	0.05							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	0.07							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	0.09							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	0.03							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	0.05							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	0.09							mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	0.42							mg/kg	A-T-019s

Envirolab Job Number: 18/08682

Client Project Name: Miles Platting Area

Client Project Ref: 16LPL040

Lab Sample ID	18/08682/1	18/08682/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P52	P55								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	19-Oct-18	19-Oct-18								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6A	4A								
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Ali >C21-C35$_A$	<1	<1							mg/kg	A-T-055s
Total Aliphatics >C5-C35$_A$	<1	<1							mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C12-C16$_A$	<1	<1							mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1	<1							mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	<1	2							mg/kg	A-T-055s
Total Aromatics >C5-C35$_A$	<1	2							mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	<1	2							mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

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For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/17

22nd November 2018

FAO Richard Seddon @ Lovell
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 62 – 64.

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was inspected on the 19th November 2018 for plots 62 - 64, inspection confirmed that the topsoil is generally debris free and subsoil material is natural clayey sand, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown slightly clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 19th November 2018 in the garden areas of plots 62 – 64, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Old Marsh Farm Barns, Welsh Road,
Sealand, Flintshire, CH5 2LY
Telephone: 01244 288 179
Fax: 01244 288 516
www.betts-associates.co.uk
enquiries@betts-associates.co.uk

Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plot 63 on 19th November 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plot 63 on 13th November 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 62





Plot 63





Plot 64

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 19-Nov-18

SOIL TYPE	TS
SAMPLE LOCATION	P63
DEPTH (m)	0.10
pH	7.24
Sulphate (water sol 2:1)	0.01
Organic matter	2.9
Arsenic	2
Cadmium	0.7
Copper	15
Chromium (hexavalent)	<1
Lead	40
Mercury	<0.17
Nickel	13
Selenium	1
Zinc	47
Asbestos in Soil	NAD
Asbestos Matrix	N/A
Quantification	N/A
Organic matter	2.9

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.24	7.24			-
Sulphate (water sol 2:1)	0.01	0.01			-
Organic matter	2.90	2.90			
Arsenic	2.00	2.00	32	32	37
Cadmium	0.70	0.70	10	10	22.1
Copper	15.00	15.00	4730	4790	-
Chromium (hexavalent)	<1	<1	3.62	3.63	20.5
Lead	40.00	40.00			200
Mercury	<0.17	<0.17	8.81	15.8	-
Nickel	13.00	13.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	1.00	375	375	-
Zinc	47.00	47.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 19-Nov-18

SOIL TYPE	TS
SAMPLE LOCATION	P63
DEPTH (m)	0.10
Ali >C5-C6	<0.01
Ali >C6-C8	<0.01
Ali >C8-C10	<1
Ali >C10-C12	<1
Ali >C12-C16	<1
Ali >C16-C21	<1
Ali >C21-C35	3
Total Aliphatics	3
Aro >C5-C7	<0.01
Aro >C7-C8	<0.01
Aro >C8-C10	<1
Aro >C10-C12	<1
Aro >C12-C16	<1
Aro >C16-C21	<1
Aro >C21-C35	10
Total Aromatics	10
TPH (Ali & Aro)	14
BTEX - Benzene	<0.01
BTEX - Toluene	<0.01
BTEX - Ethyl Benzene	<0.01
BTEX - m & p Xylene	<0.01
BTEX - o Xylene	<0.01
MTBE	<0.01
Organic Matter	2.9

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<1	<1	13.9	204	-
Ali >C10-C12	<1	<1	81.7	1180	-
Ali >C12-C16	<1	<1	385	4130	-
Ali >C16-C21	<1	<1	210000	210100	-
Ali >C21-C35	3.00	3.00			
Total Aliphatics	3.00	3.00			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C10	<1	<1	20.5	232	-
Aro >C10-C12	<1	<1	70	468	-
Aro >C12-C16	<1	<1	165	830	-
Aro >C16-C21	<1	<1	319	1040	-
Aro >C21-C35	10.00	10.00	1120	1710	-
Total Aromatics	10.00	10.00			
TPH (Ali & Aro)	14.00	14.00			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX & MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

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*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 19-Nov-18

SOIL TYPE	TS
SAMPLE LOCATION	P63
DEPTH (m)	0.10
Acenaphthene	<0.01
Acenaphthylene	<0.01
Anthracene	<0.02
Benzo(a)anthracene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.05
Benzo(ghi)perylene	<0.05
Benzo(k)fluoranthene	<0.07
Chrysene	<0.06
Dibenzo(ah)anthracene	<0.04
Fluoranthene	<0.08
Fluorene	<0.01
Indeno(123-cd)pyrene	<0.03
Naphthalene	<0.03
Phenanthrene	<0.03
Pyrene	<0.07
Organic Matter	2.9

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	<0.04	<0.04	4.52	8.54	-
Benzo(a)pyrene	<0.04	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	<0.05	<0.05	7.72	9.86	-
Benzo(ghi)perylene	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	<0.07	<0.07	84.4	100	-
Chrysene	<0.06	<0.06	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	<0.08	<0.08	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	<0.03	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	<0.03	<0.03			-
Pyrene	<0.07	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

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NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/09699
Issue Number: 1 **Date:** 21 November, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG3083
Date Samples Received: 19/11/18
Date Instructions Received: 19/11/18
Date Analysis Completed: 21/11/18

Prepared by:	**Approved by:**
[redacted]	
Holly Neary-King	Danielle Brierley
Sales Executive	Client Manager

UKAS TESTING
1247

Envirolab Job Number: 18/09699

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09699/1								Units	Method ref
Client Sample No	TS									
Client Sample ID	P63									
Depth to Top	0.10									
Depth To Bottom										
Date Sampled	19-Nov-18									
Sample Type	Soil - ES									
Sample Matrix Code										
% Stones >10mm$_A$	<0.1								% w/w	A-T-044
pH$_D$$^{M\#}$	7.24								pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.01								g/l	A-T-026s
Organic matter$_D$$^{M\#}$	2.9								% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	2								mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	0.7								mg/kg	A-T-024s
Copper$_D$$^{M\#}$	15								mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1								mg/kg	A-T-040s
Lead$_D$$^{M\#}$	40								mg/kg	A-T-024s
Mercury$_D$	<0.17								mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	13								mg/kg	A-T-024s
Selenium$_D$$^{\#}$	1								mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	47								mg/kg	A-T-024s
VPH total (>C5-C10)	<1								mg/kg	Calc-stone+mois

Envirolab Job Number: 18/09699

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	**18/09699/1**								**Units**	**Method ref**
Client Sample No	**TS**									
Client Sample ID	**P63**									
Depth to Top	**0.10**									
Depth To Bottom										
Date Sampled	**19-Nov-18**									
Sample Type	**Soil - ES**									
Sample Matrix Code										
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A$#	**NAD**									**A-T-045**
Asbestos ACM - Suitable for Water Absorption Test?	**N/A**									

Envirolab Job Number: 18/09699

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09699/1								Units	Method ref
Client Sample No	TS									
Client Sample ID	P63									
Depth to Top	0.10									
Depth To Bottom										
Date Sampled	19-Nov-18									
Sample Type	Soil - ES									
Sample Matrix Code										
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08								mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08								mg/kg	A-T-019s

Envirolab Job Number: 18/09699

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09699/1								Units	Method ref
Client Sample No	TS									
Client Sample ID	P63									
Depth to Top	0.10									
Depth To Bottom										
Date Sampled	19-Nov-18									
Sample Type	Soil - ES									
Sample Matrix Code										
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01								mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01								mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C21-C35$_A$	3								mg/kg	A-T-055s
Total Aliphatics >C5-C35$_A$	3								mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01								mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01								mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	<1								mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1								mg/kg	A-T-055s
Aro >C12-C16$_A$	<1								mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1								mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	10								mg/kg	A-T-055s
Total Aromatics >C5-C35$_A$	10								mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	14								mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01								mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01								mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.
Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 13.11.18

SOIL TYPE	SS
SAMPLE LOCATION	Plot 63
DEPTH (m)	0.40
pH	8.4
Sulphate (water sol 2:1)	0.07
Organic matter	1.2
Arsenic	<1
Cadmium	0.6
Copper	18
Chromium (hexavalent)	<1
Lead	17
Mercury	<0.17
Nickel	27
Selenium	<1
Zinc	49
Asbestos in Soil	NAD
Asbestos Matrix	-
Quantification	N/A
Organic matter	1.2

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	8.40	8.40			-
Sulphate (water sol 2:1)	0.07	0.07			-
Organic matter	1.20	1.20			
Arsenic	<1	<1	32	32	37
Cadmium	0.60	0.60	10	10	22.1
Copper	18.00	18.00	4730	4790	-
Chromium (hexavalent)	<1	<1	3.62	3.63	20.5
Lead	17.00	17.00			200
Mercury	<0.17	<0.17	8.81	15.8	-
Nickel	27.00	27.00	EA/ATRisk withdrawn Aug 2015		
Selenium	<1	<1	375	375	-
Zinc	49.00	49.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

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**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

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SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 13.11.18

SOIL TYPE	SS
SAMPLE LOCATION	Plot 63
DEPTH (m)	0.40
Ali >C5-C6	<0.01
Ali >C6-C8	<0.01
Ali >C8-C10	<1
Ali >C10-C12	<1
Ali >C12-C16	<1
Ali >C16-C21	<1
Ali >C21-C35	3
Total Aliphatics	3
Aro >C5-C7	<0.01
Aro >C7-C8	<0.01
Aro >C8-C10	1
Aro >C10-C12	<1
Aro >C12-C16	1
Aro >C16-C21	2
Aro >C21-C35	8
Total Aromatics	12
TPH (Ali & Aro)	16
BTEX - Benzene	<0.01
BTEX - Toluene	<0.01
BTEX - Ethyl Benzene	<0.01
BTEX - m & p Xylene	<0.01
BTEX - o Xylene	<0.01
MTBE	<0.01
Organic Matter	1.2

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<1	<1	13.9	204	-
Ali >C10-C12	<1	<1	81.7	1180	-
Ali >C12-C16	<1	<1	385	4130	-
Ali >C16-C21	<1	<1	210000	210100	-
Ali >C21-C35	3.00	3.00			
Total Aliphatics	3.00	3.00			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C10	1.00	1.00	20.5	232	-
Aro >C10-C12	<1	<1	70	468	-
Aro >C12-C16	1.00	1.00	165	830	-
Aro >C16-C21	2.00	2.00	319	1040	-
Aro >C21-C35	8.00	8.00	1120	1710	-
Total Aromatics	12.00	12.00			
TPH (Ali & Aro)	16.00	16.00			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX & MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 13.11.18

SOIL TYPE	SS
SAMPLE LOCATION	Plot 63
DEPTH (m)	0.40
Acenaphthene	<0.01
Acenaphthylene	<0.01
Anthracene	<0.02
Benzo(a)anthracene	0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.05
Benzo(ghi)perylene	<0.05
Benzo(k)fluoranthene	<0.07
Chrysene	0.07
Dibenzo(ah)anthracene	<0.04
Fluoranthene	0.1
Fluorene	<0.01
Indeno(123-cd)pyrene	<0.03
Naphthalene	<0.03
Phenanthrene	0.07
Pyrene	0.1
Organic Matter	1.2

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.04	0.04	4.52	8.54	-
Benzo(a)pyrene	<0.04	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	<0.05	<0.05	7.72	9.86	-
Benzo(ghi)perylene	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	<0.07	<0.07	84.4	100	-
Chrysene	0.07	0.07	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	0.10	0.10	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	<0.03	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.07	0.07			-
Pyrene	0.10	0.10	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT
SUPPLEMENT TO TEST REPORT 18/09511/1

Envirolab Job Number: 18/09511
Issue Number: 2 S1 **Date:** 21 November, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG3078
Date Samples Received: 13/11/18
Date Instructions Received: 13/11/18
Date Analysis Completed: 18/11/18

Prepared by:	**Approved by:**
[redacted]	[redacted]
Melanie Marshall	Georgia King
Laboratory Coordinator	Admin & Client Services Supervisor

Envirolab Job Number: 18/09511

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09511/2								Units	Method ref
Client Sample No	SS									
Client Sample ID	Plot 63									
Depth to Top	0.40									
Depth To Bottom										
Date Sampled	13-Nov-18									
Sample Type	Soil - ES									
Sample Matrix Code	5A									
% Stones >10mm$_A$	4.1								% w/w	A-T-044
pH$_D$$^{M\#}$	8.40								pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.07								g/l	A-T-026s
Organic matter$_D$$^{M\#}$	1.2								% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	<1								mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	0.6								mg/kg	A-T-024s
Copper$_D$$^{M\#}$	18								mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1								mg/kg	A-T-040s
Lead$_D$$^{M\#}$	17								mg/kg	A-T-024s
Mercury$_D$	<0.17								mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	27								mg/kg	A-T-024s
Selenium$_D$$^{\#}$	<1								mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	49								mg/kg	A-T-024s
VPH total (>C5-C10)	1								mg/kg	Calc-stone+mois

Envirolab Job Number: 18/09511

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	**18/09511/2**								**Units**	**Method ref**
Client Sample No	**SS**									
Client Sample ID	**Plot 63**									
Depth to Top	**0.40**									
Depth To Bottom										
Date Sampled	**13-Nov-18**									
Sample Type	**Soil - ES**									
Sample Matrix Code	**5A**									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{A}^{\#}$	**NAD**									**A-T-045**
Asbestos ACM - Suitable for Water Absorption Test?	**N/A**									

Envirolab Job Number: 18/09511

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09511/2								Units	Method ref
Client Sample No	SS									
Client Sample ID	Plot 63									
Depth to Top	0.40									
Depth To Bottom										
Date Sampled	13-Nov-18									
Sample Type	Soil - ES									
Sample Matrix Code	5A									
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02								mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.04								mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05								mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07								mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.07								mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04								mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.10								mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01								mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03								mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.07								mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.10								mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.38								mg/kg	A-T-019s

Envirolab Job Number: 18/09511

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/09511/2								Units	Method ref
Client Sample No	SS									
Client Sample ID	Plot 63									
Depth to Top	0.40									
Depth To Bottom										
Date Sampled	13-Nov-18									
Sample Type	Soil - ES									
Sample Matrix Code	5A									
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01								mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01								mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1								mg/kg	A-T-055s
Ali >C21-C35$_A$	3								mg/kg	A-T-055s
Total Aliphatics >C5-C35$_A$	3								mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01								mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01								mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	1								mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1								mg/kg	A-T-055s
Aro >C12-C16$_A$	1								mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	2								mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	8								mg/kg	A-T-055s
Total Aromatics >C5-C35$_A$	12								mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	16								mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01								mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01								mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01								mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/RD/SV/18

27th November 2018

FAO Rich
(Via Email [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 47 – 51

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was inspected on the 27th November 2018 for plots 47 – 51, inspection confirmed that the topsoil is generally debris free and subsoil material is natural clayey sand, both are physically suitable for their proposed end use.

Topsoil – Brown clayey SAND – Source – Wincham – Provided by DHI Excavations
Subsoil – Light brown slightly clayey SAND – Provided by DHI Excavations

Cover System Depth Validation

Trial holes were undertaken on 27th November 2018 in the garden areas of plots 47 – 51, the trial holes confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Chemical Validation of Topsoil

Soil samples were collected from the topsoil within plots 47, 48 and 50 on 27th November 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

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Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

BETTS ASSOCIATES
GEO ENVIRONMENTAL

Chemical Validation of Subsoil

Soil samples were collected from the subsoil within plots 47, 48 and 50 on 27th November 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving us a call.

Yours Sincerely,

[redacted]

Robert Davies
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results







Plot 47







Plot 48







Plot 49







Plot 50







Plot 51

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 26/11/2018

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
pH	7.57	8.05	7.62	7.29	7.18	7.12
Sulphate (water sol 2:1)	0.48	0.1	0.45	0.03	0.05	0.06
Organic matter	2.2	0.5	2.6	<0.1	2.8	1.2
Arsenic	5	<1	4	<1	5	3
Cadmium	0.7	0.7	<0.5	0.5	0.6	1.3
Copper	17	6	14	3	16	20
Chromium (hexavalent)	<1	<1	<1	<1	<1	<1
Lead	43	16	37	11	43	17
Mercury	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Nickel	18	13	10	8	11	31
Selenium	<1	<1	<1	<1	<1	<1
Zinc	45	35	40	27	45	54
Asbestos in Soil	NAD	NAD	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A	N/A	N/A
Quantification	NAD	NAD	NAD	NAD	NAD	NAD
Organic matter	2.2	0.5	2.6	<0.1	2.8	1.2

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.76	8.05	7.12			-
Sulphate (water sol 2:1)	0.37	0.48	0.03			-
Organic matter	2.50	2.80	<0.1			
Arsenic	4.68	5.00	<1	32	32	37
Cadmium	0.96	1.30	<0.5	10	10	22.1
Copper	18.16	20.00	3.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	39.95	43.00	11.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	22.14	31.00	8.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	48.66	54.00	27.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 26/11/2018

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<1	<1	<1	<1	1	<1
Ali >C10-C12	<1	<1	<1	<1	<1	<1
Ali >C12-C16	<1	<1	<1	<1	<1	<1
Ali >C16-C21	<1	<1	<1	<1	<1	<1
Ali >C21-C35	8	2	6	<1	7	<1
Total Aliphatics	8	2	6	<1	8	<1
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C8-C10	1	<1	<1	<1	<1	<1
Aro >C10-C12	<1	<1	<1	<1	<1	<1
Aro >C12-C16	<1	<1	<1	<1	1	<1
Aro >C16-C21	1	<1	<1	<1	1	<1
Aro >C21-C35	14	4	16	<1	13	1
Total Aromatics	17	4	16	<1	17	1
TPH (Ali & Aro)	25	6	23	<1	25	1
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Organic Matter	2.2	0.5	2.6	<0.1	2.8	1.2

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	1.00	1.00	<1	13.9	204	-
Ali >C10-C12	1.00	<1	<1	81.7	1180	-
Ali >C12-C16	1.00	<1	<1	385	4130	-
Ali >C16-C21	1.00	<1	<1	210000	210100	-
Ali >C21-C35	6.79	8.00	<1			
Total Aliphatics	7.12	8.00	<1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C10	1.00	1.00	<1	20.5	232	-
Aro >C10-C12	1.00	<1	<1	70	468	-
Aro >C12-C16	1.00	1.00	<1	165	830	-
Aro >C16-C21	1.00	1.00	<1	319	1040	-
Aro >C21-C35	13.85	16.00	1.00	1120	1710	-
Total Aromatics	16.01	17.00	1.00			
TPH (Ali & Aro)	23.40	25.00	1.00			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 26/11/18

SOIL TYPE	TS	SS	TS	SS	TS	SS
SAMPLE LOCATION	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50
DEPTH (m)	0.10	0.40	0.10	0.40	0.10	0.40
Acenaphthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.1	<0.04	0.06	<0.04	0.08	<0.04
Benzo(a)pyrene	0.1	<0.04	0.07	<0.04	0.08	<0.04
Benzo(b)fluoranthene	0.13	<0.05	0.08	<0.05	0.12	<0.05
Benzo(ghi)perylene	0.06	<0.05	<0.05	<0.05	0.06	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chrysene	0.11	<0.06	0.08	<0.06	0.11	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.17	<0.08	0.11	<0.08	0.14	<0.08
Fluorene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	0.07	<0.03	0.06	<0.03	0.07	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.08	<0.03	0.07	<0.03	0.08	<0.03
Pyrene	0.14	<0.07	0.09	<0.07	0.13	<0.07
Organic Matter	2.2	0.5	2.6	<0.1	2.8	1.2

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	<0.01	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.02	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.08	0.10	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.08	0.10	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.11	0.13	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.06	0.06	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	84.4	100	-
Chrysene	0.10	0.11	<0.06	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.14	0.17	<0.08	983	2980	-
Fluorene	0.01	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.07	0.07	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.07	0.08	<0.03			-
Pyrene	0.12	0.14	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Betts Geo Environmental, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, UK, CH5 2LY

Project: Miles Platting Area 5, Manchester

Clients Project No: 16LPL040

Project No: 18/09981

Date Instructions Received: 28/11/2018 (am)

Cool Box Temperatures (°C): 9.1

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/09981
Issue Number: 1 **Date:** 04 December, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Robert Davies
Project Name: Miles Platting Area 5, Manchester
Project Ref: 16LPL040
Order No: BG3096
Date Samples Received: 27/11/18
Date Instructions Received: 28/11/18
Date Analysis Completed: 04/12/18

Prepared by:	**Approved by:**
[redacted]	
Gill Walker	John Gustafson
Director/Laboratory Manager	Managing Director

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
% Stones >10mm$_A$	<0.1	4.5	3.9	<0.1	<0.1	1.0			% w/w	A-T-044
pH$_D$$^{M\#}$	7.57	8.05	7.62	7.29	7.18	7.12			pH	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.48	0.10	0.45	0.03	0.05	0.06			g/l	A-T-026s
Organic matter$_D$$^{M\#}$	2.2	0.5	2.6	<0.1	2.8	1.2			% w/w	A-T-032 OM
Arsenic$_D$$^{M\#}$	5	<1	4	<1	5	3			mg/kg	A-T-024s
Cadmium$_D$$^{M\#}$	0.7	0.7	<0.5	0.5	0.6	1.3			mg/kg	A-T-024s
Copper$_D$$^{M\#}$	17	6	14	3	16	20			mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-040s
Lead$_D$$^{M\#}$	43	16	37	11	43	17			mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17			mg/kg	A-T-024s
Nickel$_D$$^{M\#}$	18	13	10	8	11	31			mg/kg	A-T-024s
Selenium$_D$$^{\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-024s
Zinc$_D$$^{M\#}$	45	35	40	27	45	54			mg/kg	A-T-024s
VPH total (>C5-C10)	1	<1	<1	<1	1	<1			mg/kg	Calc-stone+mois

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A				

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.10	<0.04	0.06	<0.04	0.08	<0.04			mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.10	<0.04	0.07	<0.04	0.08	<0.04			mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.13	<0.05	0.08	<0.05	0.12	<0.05			mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.06	<0.05	<0.05	<0.05	0.06	<0.05			mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07			mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.11	<0.06	0.08	<0.06	0.11	<0.06			mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.17	<0.08	0.11	<0.08	0.14	<0.08			mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.07	<0.03	0.06	<0.03	0.07	<0.03			mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.08	<0.03	0.07	<0.03	0.08	<0.03			mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.14	<0.07	0.09	<0.07	0.13	<0.07			mg/kg	A-T-019s
Total PAH-16MS$_A^{M\#}$	0.96	<0.08	0.62	<0.08	0.87	<0.08			mg/kg	A-T-019s

Envirolab Job Number: 18/09981

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: 16LPL040

Lab Sample ID	18/09981/1	18/09981/2	18/09981/3	18/09981/4	18/09981/5	18/09981/6			Units	Method ref
Client Sample No	TS	SS	TS	SS	TS	SS				
Client Sample ID	Plot 47	Plot 47	Plot 48	Plot 48	Plot 50	Plot 50				
Depth to Top	0.10	0.40	0.10	0.40	0.10	0.40				
Depth To Bottom										
Date Sampled	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18	26-Nov-18				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4A	4AE	4A	6E	5A				
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C8-C10$_A^{M\#}$	<1	<1	<1	<1	1	<1			mg/kg	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Ali >C21-C35$_A$	8	2	6	<1	7	<1			mg/kg	A-T-055s
Total Aliphatics$_A$	8	2	6	<1	8	<1			mg/kg	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C8-C10$_A^{M\#}$	1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	<1			mg/kg	A-T-055s
Aro >C12-C16$_A$	<1	<1	<1	<1	1	<1			mg/kg	A-T-055s
Aro >C16-C21$_A^{M\#}$	1	<1	<1	<1	1	<1			mg/kg	A-T-055s
Aro >C21-C35$_A^{M\#}$	14	4	16	<1	13	1			mg/kg	A-T-055s
Total Aromatics$_A$	17	4	16	<1	17	1			mg/kg	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	25	6	23	<1	25	1			mg/kg	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/01

6th October 2017

FAO Richard Seddon @ Lovell
(Via Email: [redacted])

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment Plots 27 – 29.

Please find below our clean-cover system validation data at the above mentioned site / plots.

Overview

Betts Geo-environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 26th September 2017, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Dark brown clayey SAND – Source – Little Hulton.
Subsoil – Light yellowish brown SAND – Source – Scout Moor Quarry

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil (at 0.1mbgl) and subsoil (at 0.4mbgl) within plot 28 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

No visual or olfactory evidence of contamination was noted within any of the samples.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability.

All results fall below relevant standard guidance levels.

Old Marsh Farm Barns, Welsh Road,
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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Cover System Depth Validation

Trial holes were undertaken on 26th September 2017 in the garden of the plots and confirmed that the topsoil thicknesses was 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Summary

Betts Geo Environmental confirms that the soil is acceptable for use within gardens as such the capping requirements for the above mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 27





Plot 28





Plot 29

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting, Area 5
Project No 16LPL040
Date 26/09/2017

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 28	Plot 28
DEPTH (m)	0.10	0.40
pH	7.04	7.82
Sulphate (water sol 2:1) (g/l)	<0.01	0.03
Organic matter	7.9	0.2
Arsenic	5	<1
Cadmium	0.8	<0.5
Copper	27	7
Chromium (hexavalent)	<1	<1
Lead	49	14
Mercury	<0.17	<0.17
Nickel	20	17
Selenium	<1	<1
Zinc	56	35
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	N/A	N/A

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.82	7.04			-
Sulphate (water sol 2:1) (g/l)	0.030	<0.01			-
Organic matter	7.90	0.20			-
Arsenic	5.0	<1	32	32	37
Cadmium	0.80	<0.5	10	10	22.1
Copper	27.0	7.0	4730	4790	-
Chromium (hexavalent)	<1	<1	3.62	3.63	20.5
Lead	49.0	14.0			200
Mercury**	<0.17	<0.17	8.81	15.8	-
Nickel	20.0	17.0	EA/ATRisk withdrawn Aug 2015		
Selenium	<1	<1	375	375	-
Zinc	56.0	35.0	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content....'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting, Area 5
Project No 16LPL040
Date 26/09/17

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 28	Plot 28
DEPTH (m)	0.10	0.40
Acenaphthene	<0.01	<0.01
Acenaphthylene	<0.01	<0.01
Anthracene	<0.02	<0.02
Benzo(a)anthracene	0.11	<0.04
Benzo(a)pyrene	0.13	<0.04
Benzo(b)fluoranthene	0.16	<0.05
Benzo(ghi)perylene	0.08	<0.05
Benzo(k)fluoranthene	0.1	<0.07
Chrysene	0.16	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	0.17	<0.08
Fluorene	<0.01	<0.01
Indeno(123-cd)pyrene	0.12	<0.03
Naphthalene	<0.03	<0.03
Phenanthrene	0.11	<0.03
Pyrene	0.14	<0.07
Organic Matter	7.9	0.2

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.11	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.13	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.16	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.08	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.10	<0.07	84.4	100	-
Chrysene	0.16	<0.06	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	0.17	<0.08	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.12	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.11	<0.03			-
Pyrene	0.14	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting, Area 5
Project No 16LPL040
Date 26/09/17

SOIL TYPE	TS	SS
SAMPLE LOCATION	Plot 28	Plot 28
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.01	0.01
Ali >C6-C8	0.01	<0.01
Ali >C8-C10	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1
Total Aliphatics	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	0.02	<0.01
Aro >C8-C9	0.02	<0.01
Aro >C9-C10	0.06	<0.01
Aro >C10-C12	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1
Total Aromatics	<0.1	<0.1
TPH (Ali & Aro)	0.1	<0.1
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	0.02	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	7.9	0.2

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	99.3	1240	-
Ali >C8-C10	<0.01	<0.01	13.9	204	-
Ali >C10-C12	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	<0.1	<0.1	385	4130	-
Ali >C16-C21	<0.1	<0.1	210000	210100	-
Ali >C21-C35	<0.1	<0.1			
Total Aliphatics	<0.1	<0.1			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.02	<0.01	113	780	-
Aro >C8-C9	0.02	<0.01	20.5	232	-
Aro >C9-C10	0.06	<0.01	20.5	232	-
Aro >C10-C12	<0.1	<0.1	70	468	-
Aro >C12-C16	<0.1	<0.1	165	830	-
Aro >C16-C21	<0.1	<0.1	319	1040	-
Aro >C21-C35	<0.1	<0.1	1120	1710	-
Total Aromatics	<0.1	<0.1			
TPH (Ali & Aro)	0.10	<0.1			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.02	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/06548
Issue Number: 1 **Date:** 03 October, 2017

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Jenny Skues/Kris Rodway/Nikos Misyris/Paul Harriso
Project Name: Miles Platting, Area 5
Project Ref: 16LPL040
Order No: BG2446
Date Samples Received: 26/09/17
Date Instructions Received: 27/09/17
Date Analysis Completed: 03/10/17

Prepared by:	**Approved by:**
[redacted]	
Laboratory Coordinator	Director

Envirolab Job Number: 17/06548

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06548/1	17/06548/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 28	Plot 28								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	26-Sep-17	26-Sep-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
% Stones >10mm$_A$	3.6	1.4							% w/w	A-T-044
pH$_D^{M\#}$	7.04	7.82							pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	0.03							g/l	A-T-026s
Organic matter$_D^{M\#}$	7.9	0.2							% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	5	<1							mg/kg	A-T-024s
Cadmium$_D^{M\#}$	0.8	<0.5							mg/kg	A-T-024s
Copper$_D^{M\#}$	27	7							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D^{M\#}$	49	14							mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17							mg/kg	A-T-024s
Nickel$_D^{M\#}$	20	17							mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1							mg/kg	A-T-024s
Zinc$_D^{M\#}$	56	35							mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	0.12	0.01							mg/kg	A-T-022s

Envirolab Job Number: 17/06548

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06548/1	17/06548/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 28	Plot 28								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	26-Sep-17	26-Sep-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 17/06548

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06548/1	17/06548/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 28	Plot 28								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	26-Sep-17	26-Sep-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.11	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.13	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.16	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.08	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.10	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.16	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.17	<0.08							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.12	<0.03							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.11	<0.03							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.14	<0.07							mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.27	<0.08							mg/kg	A-T-019s

Envirolab Job Number: 17/06548

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06548/1	17/06548/2							Units	Method ref
Client Sample No	TS	SS								
Client Sample ID	Plot 28	Plot 28								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	26-Sep-17	26-Sep-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4AE	4A								
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^\#$	0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C10-C12$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C5-C7$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^\#$	0.02	<0.01							mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	0.02	<0.01							mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	0.06	<0.01							mg/kg	A-T-022s
Aro >C10-C12$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1							mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	0.1	<0.1							mg/kg	A-T-023s
BTEX - Benzene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	0.02	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/02

20th October 2017

FAO Richard Seddon @ Lovell
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment Plots 23 – 26.

Please find below our clean-cover system validation data at the above mentioned site / plots.

Overview

Betts Geo-environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 12th October 2017, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Dark brown clayey SAND – Source – Little Hulton.
Subsoil – Light yellowish brown SAND – Source – Scout Moor Quarry

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil (at 0.1mbgl) and subsoil (at 0.4mbgl) within plot 23 and 25 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

No visual or olfactory evidence of contamination was noted within any of the samples.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability.

All results fall below relevant standard guidance levels.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Cover System Depth Validation

Trial holes were undertaken on 12th October 2017, in the garden of the plots and confirmed that the topsoil thicknesses was 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Summary

Betts Geo Environmental confirms that the soil is acceptable for use within gardens as such the capping requirements for the above mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 23





Plot 24





Plot 25





Plot 26

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting, Area 5
Project No 16LPL040
Date 12-Oct-17

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P25	P25	P23	P23
DEPTH (m)	0.10	0.40	0.10	0.40
pH	7.37	8.18	7.02	8.07
Sulphate (water sol 2:1)	0.11	0.07	0.07	0.05
Organic matter	8.6	2.4	7.8	1.2
Arsenic	8	<1	8	<1
Cadmium	0.7	<0.5	0.6	2.2
Copper	34	13	29	13
Chromium (hexavalent)	<1	<1	<1	<1
Lead	78	22	64	19
Mercury	<0.17	<0.17	<0.17	<0.17
Nickel	23	24	22	26
Selenium	<1	<1	<1	<1
Zinc	74	53	63	215
Asbestos in Soil	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A
Quantification	N/A	N/A	N/A	N/A
Organic matter	8.6	2.4	7.8	1.2

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	8.32	8.18	7.02			-
Sulphate (water sol 2:1)	0.10	0.11	0.05			-
Organic matter	9.40	8.60	1.20			
Arsenic	9.26	8.00	<1	32	32	37
Cadmium	1.95	2.20	<0.5	10	10	22.1
Copper	35.05	34.00	13.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	80.74	78.00	19.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	25.76	26.00	22.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	191.05	215.00	53.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting, Area 5
Project No 16LPL040
Date 12-Oct-17

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P25	P25	P23	P23
DEPTH (m)	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aliphatics	<0.1	<0.1	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aromatics	<0.1	<0.1	<0.1	<0.1
TPH (Ali & Aro)	<0.1	<0.1	<0.1	<0.1
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01
Organic Matter	8.6	2.4	7.8	1.2

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	0.01	<0.01	<0.01	13.9	204	-
Ali >C10-C12	0.10	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	0.10	<0.1	<0.1	385	4130	-
Ali >C16-C21	0.10	<0.1	<0.1	210000	210100	-
Ali >C21-C35	0.10	<0.1	<0.1			
Total Aliphatics	0.10	<0.1	<0.1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C9	0.01	<0.01	<0.01	20.5	232	-
Aro >C9-C10	0.01	<0.01	<0.01	20.5	232	-
Aro >C10-C12	0.10	<0.1	<0.1	70	468	-
Aro >C12-C16	0.10	<0.1	<0.1	165	830	-
Aro >C16-C21	0.10	<0.1	<0.1	319	1040	-
Aro >C21-C35	0.10	<0.1	<0.1	1120	1710	-
Total Aromatics	0.10	<0.1	<0.1			
TPH (Ali & Aro)	0.10	<0.1	<0.1			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting, Area 5
Project No 16LPL040
Date 12-Oct-17

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P25	P25	P23	P23
DEPTH (m)	0.10	0.40	0.10	0.40
Acenaphthene	0.01	<0.01	0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01
Anthracene	0.03	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.12	<0.04	<0.04	<0.04
Benzo(a)pyrene	0.09	<0.04	0.06	<0.04
Benzo(b)fluoranthene	0.14	<0.05	0.07	<0.05
Benzo(ghi)perylene	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07
Chrysene	0.12	<0.06	<0.06	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.24	<0.08	0.11	<0.08
Fluorene	0.01	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	0.07	<0.03	0.04	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.14	<0.03	0.06	0.05
Pyrene	0.22	<0.07	0.1	<0.07
Organic Matter	8.6	2.4	7.8	1.2

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	0.01	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.03	0.03	<0.02	10200	26200	-
Benzo(a)anthracene	0.11	0.12	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.09	0.09	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.13	0.14	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.05	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	84.4	100	-
Chrysene	0.11	0.12	<0.06	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.22	0.24	<0.08	983	2980	-
Fluorene	0.01	0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.06	0.07	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.13	0.14	<0.03			-
Pyrene	0.20	0.22	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/06962
Issue Number: 1 **Date:** 19 October, 2017

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Beverley Lewis/Gina Smith/Jenny Skues/Kris Rodway/
Project Name: Miles Platting, Area 5
Project Ref: 16LPL040
Order No: BG2464
Date Samples Received: 12/10/17
Date Instructions Received: 13/10/17
Date Analysis Completed: 19/10/17

Prepared by:	**Approved by:**
[redacted]	
Admins & Client Services Supervisor	Analytical Consultant

Envirolab Job Number: 17/06962

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06962/1	17/06962/2	17/06962/3	17/06962/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P25	P25	P23	P23						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	12-Oct-17	12-Oct-17	12-Oct-17	12-Oct-17						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6E	6A	6AE	6A						
% Stones >10mm$_A$	<0.1	<0.1	<0.1	<0.1					% w/w	A-T-044
pH$_D$	7.37	8.18	7.02	8.07					pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.11	0.07	0.07	0.05					g/l	A-T-026s
Organic matter$_D^{M\#}$	8.6	2.4	7.8	1.2					% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	8	<1	8	<1					mg/kg	A-T-024s
Cadmium$_D^{M\#}$	0.7	<0.5	0.6	2.2					mg/kg	A-T-024s
Copper$_D^{M\#}$	34	13	29	13					mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1					mg/kg	A-T-040s
Lead$_D^{M\#}$	78	22	64	19					mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17					mg/kg	A-T-024s
Nickel$_D^{M\#}$	23	24	22	26					mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-024s
Zinc$_D^{M\#}$	74	53	63	215					mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

Envirolab Job Number: 17/06962

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06962/1	17/06962/2	17/06962/3	17/06962/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P25	P25	P23	P23						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	12-Oct-17	12-Oct-17	12-Oct-17	12-Oct-17						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6E	6A	6AE	6A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A						

Envirolab Job Number: 17/06962

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06962/1	17/06962/2	17/06962/3	17/06962/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P25	P25	P23	P23						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	12-Oct-17	12-Oct-17	12-Oct-17	12-Oct-17						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6E	6A	6AE	6A						
PAH 16										
Acenaphthene$_A^{M\#}$	0.01	<0.01	0.01	<0.01					mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.03	<0.02	<0.02	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.12	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.09	<0.04	0.06	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.14	<0.05	0.07	<0.05					mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.12	<0.06	<0.06	<0.06					mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.24	<0.08	0.11	<0.08					mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.07	<0.03	0.04	<0.03					mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.14	<0.03	0.06	0.05					mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.22	<0.07	0.10	<0.07					mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.21	<0.08	0.47	<0.08					mg/kg	A-T-019s

Envirolab Job Number: 17/06962

Client Project Name: Miles Platting, Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/06962/1	17/06962/2	17/06962/3	17/06962/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P25	P25	P23	P23						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	12-Oct-17	12-Oct-17	12-Oct-17	12-Oct-17						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6E	6A	6AE	6A						
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/03

13th December 2017

FAO Richard Seddon @ Lovell
(Via Emai[redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment - Plots 21 - 23

Please find below our clean-cover system validation data at the above mentioned site / plots.

Overview

Betts Geo-environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 22nd November 2017, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Dark brown clayey SAND – Source – Little Hulton.
Subsoil – Light yellowish brown SAND – Source – Scout Moor Quarry

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil (at 0.1mbgl) and subsoil (at 0.4mbgl) within plot 22 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

No visual or olfactory evidence of contamination was noted within any of the samples.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability.

All results fall below relevant standard guidance levels.

Old Marsh Farm Barns, Welsh Road,
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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Cover System Depth Validation

Trial holes were undertaken on 22nd November 2017, in the garden of the plots and confirmed that the topsoil thicknesses was 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Summary

Betts Geo Environmental confirms that the soil is acceptable for use within gardens as such the capping requirements for the above mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 21





Plot 22





Plot 23

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting 5
Project No 16LPL040
Date 22-Nov-17

SOIL TYPE	TS	SS
SAMPLE LOCATION	P22	P22
DEPTH (m)	0.10	0.40
pH	7.51	8.7
Sulphate (water sol 2:1)	<0.01	0.11
Organic matter	3.1	0.5
Arsenic	2	<1
Cadmium	<0.5	<0.5
Copper	16	7
Chromium (hexavalent)	<1	<1
Lead	39	17
Mercury	<0.17	<0.17
Nickel	9	13
Selenium	<1	<1
Zinc	50	36
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	N/A	N/A
Organic matter	3.1	0.5

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	11.86	8.70	7.51			-
Sulphate (water sol 2:1)	0.38	0.11	0.11			-
Organic matter	10.01	3.10	0.50			
Arsenic	4.66	2.00	<1	32	32	37
Cadmium	0.50	<0.5	<0.5	10	10	22.1
Copper	39.91	16.00	7.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	97.45	39.00	17.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	23.63	13.00	9.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	87.20	50.00	36.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting 5
Project No 16LPL040
Date 22-Nov-17

SOIL TYPE	TS	SS
SAMPLE LOCATION	P22	P22
DEPTH (m)	0.10	0.40
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1
Total Aliphatics	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1
Aro >C16-C21	0.4	<0.1
Aro >C21-C35	2.7	<0.1
Total Aromatics	3.1	<0.1
TPH (Ali & Aro)	3.1	<0.1
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	3.1	0.5

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<0.01	<0.01	13.9	204	-
Ali >C10-C12	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	<0.1	<0.1	385	4130	-
Ali >C16-C21	<0.1	<0.1	210000	210100	-
Ali >C21-C35	<0.1	<0.1			
Total Aliphatics	<0.1	<0.1			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C9	<0.01	<0.01	20.5	232	-
Aro >C9-C10	<0.01	<0.01	20.5	232	-
Aro >C10-C12	<0.1	<0.1	70	468	-
Aro >C12-C16	<0.1	<0.1	165	830	-
Aro >C16-C21	0.40	<0.1	319	1040	-
Aro >C21-C35	2.70	<0.1	1120	1710	-
Total Aromatics	3.10	<0.1			
TPH (Ali & Aro)	3.10	<0.1			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting 5
Project No 16LPL040
Date 22-Nov-17

SOIL TYPE	TS	SS
SAMPLE LOCATION	P22	P22
DEPTH (m)	0.10	0.40
Acenaphthene	<0.01	<0.01
Acenaphthylene	<0.01	<0.01
Anthracene	<0.02	<0.02
Benzo(a)anthracene	0.21	<0.04
Benzo(a)pyrene	0.23	<0.04
Benzo(b)fluoranthene	0.28	<0.05
Benzo(ghi)perylene	0.13	<0.05
Benzo(k)fluoranthene	0.13	<0.07
Chrysene	0.19	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	0.22	<0.08
Fluorene	<0.01	<0.01
Indeno(123-cd)pyrene	0.13	<0.03
Naphthalene	<0.03	<0.03
Phenanthrene	0.06	0.04
Pyrene	0.19	<0.07
Organic Matter	3.1	0.5

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	0.21	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.23	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.28	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.13	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.13	<0.07	84.4	100	-
Chrysene	0.19	<0.06	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	0.22	<0.08	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.13	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.06	0.04			-
Pyrene	0.19	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/08005
Issue Number: 1 **Date:** 29 November, 2017

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting 5
Project Ref: Not specified
Order No: BG2532
Date Samples Received: 24/11/17
Date Instructions Received: 24/11/17
Date Analysis Completed: 29/11/17

Prepared by:	**Approved by:**
[redacted]	[redacted]
Melanie Marshall	Richard Wong
Laboratory Coordinator	Client Manager

Envirolab Job Number: 17/08005

Client Project Name: Miles Platting 5

Client Project Ref: Not specified

Lab Sample ID	17/08005/1	17/08005/2							Units	Method ref
Client Sample No	1	SS								
Client Sample ID	P22	P22								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	22-Nov-17	22-Nov-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6E	4A								
% Stones >10mm$_A$	<0.1	<0.1							% w/w	A-T-044
pH$_D$	7.51	8.70							pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	0.11							g/l	A-T-026s
Organic matter$_D^{M\#}$	3.1	0.5							% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	2	<1							mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5							mg/kg	A-T-024s
Copper$_D^{M\#}$	16	7							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D^{M\#}$	39	17							mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17							mg/kg	A-T-024s
Nickel$_D^{M\#}$	9	13							mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1							mg/kg	A-T-024s
Zinc$_D^{M\#}$	50	36							mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

Envirolab Job Number: 17/08005

Client Project Name: Miles Platting 5

Client Project Ref: Not specified

Lab Sample ID	17/08005/1	17/08005/2							Units	Method ref
Client Sample No	1	SS								
Client Sample ID	P22	P22								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	22-Nov-17	22-Nov-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6E	4A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A$ #	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 17/08005

Client Project Name: Miles Platting 5

Client Project Ref: Not specified

Lab Sample ID	17/08005/1	17/08005/2							Units	Method ref
Client Sample No	1	SS								
Client Sample ID	P22	P22								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	22-Nov-17	22-Nov-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6E	4A								
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.21	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.23	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.28	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.13	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.13	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.19	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.22	<0.08							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.13	<0.03							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.06	0.04							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.19	<0.07							mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.79	<0.08							mg/kg	A-T-019s

Envirolab Job Number: 17/08005

Client Project Name: Miles Platting 5

Client Project Ref: Not specified

Lab Sample ID	17/08005/1	17/08005/2							Units	Method ref
Client Sample No	1	SS								
Client Sample ID	P22	P22								
Depth to Top	0.10	0.40								
Depth To Bottom										
Date Sampled	22-Nov-17	22-Nov-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	6E	4A								
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	0.4	<0.1							mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	2.7	<0.1							mg/kg	A-T-023s
Total Aromatics$_A$	3.1	<0.1							mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	3.1	<0.1							mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/04

13th December 2017

FAO Richard Seddon @ Lovell
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment Plots 20 & 30 - 34.

Please find below our clean-cover system validation data at the above mentioned site / plots.

Overview

Betts Geo-environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 4th December 2017, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Dark brown clayey SAND – Source – Ashton Hayes
Subsoil – Light yellowish brown SAND – Source – Scout Moor Quarry

Chemical Validation of Topsoil

As per report ref. 16LPL040/KR/SV/SP1 Betts attended site on the 13th December 2017 to undertake sampling on a stockpile of topsoil.

The stockpile was approximately 300m^3; the material's origin was Ashton Hayes Topsoil (Greenfield sourced). Samples were taken at a sample ratio of 1 sample per 150m^3 therefore three (3 no.) samples were taken.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Old Marsh Farm Barns, Welsh Road,
Sealand, Flintshire, CH5 2LY
Telephone: 01244 288 179
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www.betts-associates.co.uk
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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Subsoil

Soil samples were collected from the subsoil (at 0.4mbgl) within plot 30 and 33 at a rate of 1 sample per strata within every 3 plots. It is noted that plot 20 is situated adjacent to plot 30.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

No visual or olfactory evidence of contamination was noted within any of the samples.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability.

All results fall below relevant standard guidance levels.

Cover System Depth Validation

Trial holes were undertaken on 4th December 2017, in the garden of the plots and confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Summary

Betts Geo Environmental confirms that the soil is acceptable for use within gardens as such the capping requirements for the above mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 20 – Stone Pick Required





Plot 30





Plot 31





Plot 32





Plot 33

Our Ref: 16LPL040/KR/SV/SP1

13th December 2017

FAO Richard Seddon @ Lovell
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 2 & 5 – Topsoil Stockpile Testing

Please find below our clean-cover system validation data at the above-mentioned site / stockpile.

Overview

Betts Geo-Environmental Ltd were instructed to assess a stockpile of imported topsoil for reuse, which is required to form the clean capping within the gardens, as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil Stockpile

The composition of this material on site was visually inspected on 30th November 2017, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Dark brown slightly clayey SAND

Chemical Validation of Topsoil Stockpile

The topsoil is sourced from a greenfield site in Ashton Hayes, therefore, samples were taken at a rate of 1:150m^3 or a minimum of 3 samples i.e. 3 samples were taken from the stockpile.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG and Speciated PAH's.

No visual or olfactory evidence of contamination was noted within any of the samples.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability.

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Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Summary

Betts Geo Environmental confirms that the soil is acceptable for use within gardens as part of the capping requirements.

Should you require any further clarification, please do not hesitate in giving us a call.

Yours Sincerely,

[redacted]

BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Stockpile Photograph
Chemical Validation Test Results



Topsoil Stockpile

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 08/12/2017

SOIL TYPE	TS	TS	TS
SAMPLE LOCATION	TSP1	TSP2	TSP3
DEPTH (m)	-	-	-
pH	7.3	7.14	7.16
Sulphate (water sol 2:1)	<0.01	<0.01	<0.01
Organic matter	2.8	2.6	3
Arsenic	2	3	1
Cadmium	<0.5	<0.5	<0.5
Copper	13	15	15
Chromium (hexavalent)	<1	<1	<1
Lead	31	38	36
Mercury	<0.17	<0.17	<0.17
Nickel	9	9	10
Selenium	<1	<1	<1
Zinc	36	41	43
Asbestos in Soil	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A
Quantification	N/A	N/A	N/A
Organic matter	2.8	2.6	3

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.35	7.30	7.14			-
Sulphate (water sol 2:1)	0.01	<0.01	<0.01			-
Organic matter	3.14	3.00	2.60			
Arsenic	3.69	3.00	1.00	32	32	37
Cadmium	0.50	<0.5	<0.5	10	10	22.1
Copper	16.28	15.00	13.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	41.08	38.00	31.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	10.31	10.00	9.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	46.08	43.00	36.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 08/12/2017

SOIL TYPE	TS	TS	TS
SAMPLE LOCATION	TSP1	TSP2	TSP3
DEPTH (m)	-	-	-
Ali >C5-C6	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1	<0.1
Total Aliphatics	<0.1	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1	0.5
Aro >C21-C35	<0.1	<0.1	0.6
Total Aromatics	<0.1	<0.1	1.2
TPH (Ali & Aro)	<0.1	<0.1	1.2
BTEX - Benzene	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01
Organic Matter	2.8	2.6	3

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	0.01	<0.01	<0.01	13.9	204	-
Ali >C10-C12	0.10	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	0.10	<0.1	<0.1	385	4130	-
Ali >C16-C21	0.10	<0.1	<0.1	210000	210100	-
Ali >C21-C35	0.10	<0.1	<0.1			
Total Aliphatics	0.10	<0.1	<0.1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C9	0.01	<0.01	<0.01	20.5	232	-
Aro >C9-C10	0.01	<0.01	<0.01	20.5	232	-
Aro >C10-C12	0.10	<0.1	<0.1	70	468	-
Aro >C12-C16	0.10	<0.1	<0.1	165	830	-
Aro >C16-C21	0.62	0.50	<0.1	319	1040	-
Aro >C21-C35	0.75	0.60	<0.1	1120	1710	-
Total Aromatics	1.54	1.20	<0.1			
TPH (Ali & Aro)	1.54	1.20	<0.1			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 08/12/17

SOIL TYPE	TS	TS	TS
SAMPLE LOCATION	TSP1	TSP2	TSP3
DEPTH (m)	-	-	-
Acenaphthene	<0.01	<0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01
Anthracene	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.15	0.16	0.21
Benzo(a)pyrene	0.2	0.21	0.26
Benzo(b)fluoranthene	0.2	0.2	0.25
Benzo(ghi)perylene	0.08	0.11	0.13
Benzo(k)fluoranthene	<0.07	<0.07	<0.07
Chrysene	0.14	0.17	0.21
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04
Fluoranthene	0.14	0.16	0.22
Fluorene	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	0.1	0.13	0.15
Naphthalene	<0.03	<0.03	<0.03
Phenanthrene	0.04	0.05	0.06
Pyrene	0.13	0.14	0.21
Organic Matter	2.8	2.6	3

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	<0.01	<0.01	**608**	**2760**	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.02	<0.02	<0.02	**10200**	**26200**	-
Benzo(a)anthracene	0.23	0.21	0.15	**4.52**	**8.54**	-
Benzo(a)pyrene	0.28	0.26	0.20	**1.51**	**2.05**	**4.95**
Benzo(b)fluoranthene	0.27	0.25	0.20	**7.72**	**9.86**	-
Benzo(ghi)perylene	0.15	0.13	0.08	**96.2**	**103**	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	**84.4**	**100**	-
Chrysene	0.23	0.21	0.14	**585**	**927**	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	**0.838**	**1**	-
Fluoranthene	0.24	0.22	0.14	**983**	**2980**	-
Fluorene	0.01	<0.01	<0.01	**735**	**2610**	-
Indeno(123-cd)pyrene	0.17	0.15	0.10	**7.31**	**9.75**	-
Naphthalene	0.03	<0.03	<0.03	**0.829**	**12.2**	-
Phenanthrene	0.07	0.06	0.04			-
Pyrene	0.23	0.21	0.13	**668**	**2120**	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/08199
Issue Number: 1 **Date:** 06 December, 2017

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area J
Project Ref: Not specified
Order No: BG2542
Date Samples Received: 01/12/17
Date Instructions Received: 01/12/17
Date Analysis Completed: 06/12/17

Prepared by: **Approved by:**

[redacted]

Holly Neary-King
Administrative Assistant

Iain Haslock
Analytical Consultant

Envirolab Job Number: 17/08199

Client Project Name: Miles Platting Area J

Client Project Ref: Not specified

Lab Sample ID	17/08199/1	17/08199/2	17/08199/3						Units	Method ref
Client Sample No	TS	TS	TS							
Client Sample ID	TSP1	TSP2	TSP3							
Depth to Top										
Depth To Bottom										
Date Sampled	30-Nov-17	30-Nov-17	30-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6E	6E	6E							
% Stones >10mm$_A$	<0.1	<0.1	<0.1						% w/w	A-T-044
pH$_D$	7.30	7.14	7.16						pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	<0.01	<0.01						g/l	A-T-026s
Organic matter$_D^{M\#}$	2.8	2.6	3.0						% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	2	3	1						mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5						mg/kg	A-T-024s
Copper$_D^{M\#}$	13	15	15						mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1						mg/kg	A-T-040s
Lead$_D^{M\#}$	31	38	36						mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17						mg/kg	A-T-024s
Nickel$_D^{M\#}$	9	9	10						mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1						mg/kg	A-T-024s
Zinc$_D^{M\#}$	36	41	43						mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s

Envirolab Job Number: 17/08199

Client Project Name: Miles Platting Area J

Client Project Ref: Not specified

Lab Sample ID	17/08199/1	17/08199/2	17/08199/3						Units	Method ref
Client Sample No	TS	TS	TS							
Client Sample ID	TSP1	TSP2	TSP3							
Depth to Top										
Depth To Bottom										
Date Sampled	30-Nov-17	30-Nov-17	30-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6E	6E	6E							
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A							

Envirolab Job Number: 17/08199

Client Project Name: Miles Platting Area J

Client Project Ref: Not specified

Lab Sample ID	17/08199/1	17/08199/2	17/08199/3						Units	Method ref
Client Sample No	TS	TS	TS							
Client Sample ID	TSP1	TSP2	TSP3							
Depth to Top										
Depth To Bottom										
Date Sampled	30-Nov-17	30-Nov-17	30-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6E	6E	6E							
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02						mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.15	0.16	0.21						mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.20	0.21	0.26						mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.20	0.20	0.25						mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.08	0.11	0.13						mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07						mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.14	0.17	0.21						mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04						mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.14	0.16	0.22						mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.10	0.13	0.15						mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.04	0.05	0.06						mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.13	0.14	0.21						mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.19	1.33	1.69						mg/kg	A-T-019s

Envirolab Job Number: 17/08199

Client Project Name: Miles Platting Area J

Client Project Ref: Not specified

Lab Sample ID	17/08199/1	17/08199/2	17/08199/3						Units	Method ref
Client Sample No	TS	TS	TS							
Client Sample ID	TSP1	TSP2	TSP3							
Depth to Top										
Depth To Bottom										
Date Sampled	30-Nov-17	30-Nov-17	30-Nov-17							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6E	6E	6E							
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	0.5						mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	0.6						mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	1.2						mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	1.2						mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 04-Dec-17

SOIL TYPE	SS	SS
SAMPLE LOCATION	P30	P33
DEPTH (m)	0.40	0.40
pH	7.79	7.5
Sulphate (water sol 2:1)	0.02	<0.01
Organic matter	0.2	0.2
Arsenic	<1	<1
Cadmium	<0.5	<0.5
Copper	2	<1
Chromium (hexavalent)	<1	<1
Lead	7	7
Mercury	<0.17	<0.17
Nickel	10	7
Selenium	<1	1
Zinc	22	15
Asbestos in Soil	NAD	NAD
Asbestos Matrix	N/A	N/A
Quantification	N/A	N/A
Organic matter	0.2	0.2

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	8.56	7.79	7.50			-
Sulphate (water sol 2:1)	0.05	0.02	0.02			-
Organic matter	0.20	0.20	0.20			
Arsenic	1.00	<1	<1	32	32	37
Cadmium	0.50	<0.5	<0.5	10	10	22.1
Copper	4.66	2.00	<1	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	7.00	7.00	7.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	17.97	10.00	7.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	1.00	<1	375	375	-
Zinc	40.60	22.00	15.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 04-Dec-17

SOIL TYPE	SS	SS
SAMPLE LOCATION	P30	P33
DEPTH (m)	0.40	0.40
Ali >C5-C6	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1
Total Aliphatics	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1
Total Aromatics	<0.1	<0.1
TPH (Ali & Aro)	<0.1	<0.1
BTEX - Benzene	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01
MTBE	<0.01	<0.01
Organic Matter	0.2	0.2

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<0.01	<0.01	13.9	204	-
Ali >C10-C12	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	<0.1	<0.1	385	4130	-
Ali >C16-C21	<0.1	<0.1	210000	210100	-
Ali >C21-C35	<0.1	<0.1			
Total Aliphatics	<0.1	<0.1			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C9	<0.01	<0.01	20.5	232	-
Aro >C9-C10	<0.01	<0.01	20.5	232	-
Aro >C10-C12	<0.1	<0.1	70	468	-
Aro >C12-C16	<0.1	<0.1	165	830	-
Aro >C16-C21	<0.1	<0.1	319	1040	-
Aro >C21-C35	<0.1	<0.1	1120	1710	-
Total Aromatics	<0.1	<0.1			
TPH (Ali & Aro)	<0.1	<0.1			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

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NOTES:

For the Purpose of this investigation- results will be assessed against RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 04-Dec-17

SOIL TYPE	SS	SS
SAMPLE LOCATION	P30	P33
DEPTH (m)	0.40	0.40
Acenaphthene	<0.01	<0.01
Acenaphthylene	<0.01	<0.01
Anthracene	<0.02	<0.02
Benzo(a)anthracene	<0.04	<0.04
Benzo(a)pyrene	<0.04	<0.04
Benzo(b)fluoranthene	<0.05	<0.05
Benzo(ghi)perylene	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07
Chrysene	<0.06	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04
Fluoranthene	<0.08	<0.08
Fluorene	<0.01	<0.01
Indeno(123-cd)pyrene	<0.03	<0.03
Naphthalene	<0.03	<0.03
Phenanthrene	<0.03	<0.03
Pyrene	<0.07	<0.07
Organic Matter	0.2	0.2

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	<0.04	<0.04	4.52	8.54	-
Benzo(a)pyrene	<0.04	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	<0.05	<0.05	7.72	9.86	-
Benzo(ghi)perylene	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	<0.07	<0.07	84.4	100	-
Chrysene	<0.06	<0.06	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	<0.08	<0.08	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	<0.03	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	<0.03	<0.03			-
Pyrene	<0.07	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

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NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/08239
Issue Number: 1 **Date:** 08 December, 2017

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG2544
Date Samples Received: 04/12/17
Date Instructions Received: 04/12/17
Date Analysis Completed: 08/12/17

Prepared by: **Approved by:**

[redacted]

Richard Wong
Client Manager

Georgia King
Admins & Client Services Supervisor

Envirolab Job Number: 17/08239

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/08239/1	17/08239/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P30	P33								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	04-Dec-17	04-Dec-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4A								
% Stones >10mm$_A$	<0.1	<0.1							% w/w	A-T-044
pH$_D$	7.79	7.50							pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.02	<0.01							g/l	A-T-026s
Organic matter$_D^{M\#}$	0.2	0.2							% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	<1	<1							mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5							mg/kg	A-T-024s
Copper$_D^{M\#}$	2	<1							mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1							mg/kg	A-T-040s
Lead$_D^{M\#}$	7	7							mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17							mg/kg	A-T-024s
Nickel$_D^{M\#}$	10	7							mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	1							mg/kg	A-T-024s
Zinc$_D^{M\#}$	22	15							mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01							mg/kg	A-T-022s

Envirolab Job Number: 17/08239

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/08239/1	17/08239/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P30	P33								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	04-Dec-17	04-Dec-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4A								
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 17/08239

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/08239/1	17/08239/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P30	P33								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	04-Dec-17	04-Dec-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4A								
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02							mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05							mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05							mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06							mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04							mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08							mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01							mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03							mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07							mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08	<0.08							mg/kg	A-T-019s

Envirolab Job Number: 17/08239

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	17/08239/1	17/08239/2							Units	Method ref
Client Sample No	SS	SS								
Client Sample ID	P30	P33								
Depth to Top	0.40	0.40								
Depth To Bottom										
Date Sampled	04-Dec-17	04-Dec-17								
Sample Type	Soil - ES	Soil - ES								
Sample Matrix Code	4A	4A								
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C6-C8$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Ali >C10-C12$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C5-C7$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C7-C8$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
Aro >C10-C12$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	<0.1	<0.1							mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1							mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1							mg/kg	A-T-023s
BTEX - Benzene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01							mg/kg	A-T-022s

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All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/06

23rd March 2018

FAO Richard Seddon @ Lovell
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment - Plots 17 - 19

Please find below our clean-cover system validation data at the above mentioned site / plots.

Overview

Betts Geo-environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 8th March 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Plot 17 - Reddish brown clayey SAND – Source – Chadderton, Oldham
Topsoil – Plots 18 & 19 - Dark brown clayey SAND – Source – Astley, Greater Manchester
Subsoil – Plots 17 – 19 - Light yellowish brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 8th March 2018, in the garden of the plots and confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil

Soil samples were collected from the topsoil (at 0.1mbgl) within plot 17, and plot 18. Soil samples were taken from the subsoil (at 0.4mbgl) within plot 18 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels with the exception of plot 18 at 0.10mbgl which showed slightly elevated Benzo a Pyrene, with levels of 1.70/kg respectively against GAC of 1.51mg/kg (1% organic content).

Double ratio plot analysis indicates the elevated level to be coal derived. Small fragments of coal were noted within the topsoil on site which correlates with this. Given this the risk to site end users is deemed negligible in this case.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 17





Plot 18







Plot 19

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 08-Mar-18

SOIL TYPE	TS	TS	SS
SAMPLE LOCATION	P17	P18	P18
DEPTH (m)	0.10	0.10	0.40
pH	8.26	7.86	8.44
Sulphate (water sol 2:1)	<0.01	0.21	0.03
Organic matter	3.3	4.6	0.4
Arsenic	1	11	2
Cadmium	<0.5	0.8	<0.5
Copper	8	30	6
Chromium (hexavalent)	<1	<1	<1
Lead	11	114	13
Mercury	<0.17	0.49	<0.17
Nickel	7	14	8
Selenium	<1	<1	<1
Zinc	30	93	23
Asbestos in Soil	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A
Quantification	N/A	N/A	N/A
Organic matter	3.3	4.6	0.4

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	8.69	8.44	7.86			-
Sulphate (water sol 2:1)	0.27	0.21	0.03			-
Organic matter	6.39	4.60	0.40			
Arsenic	13.95	11.00	1.00	32	32	37
Cadmium	0.89	0.80	<0.5	10	10	22.1
Copper	37.12	30.00	6.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	145.29	114.00	11.00			200
Mercury	0.59	0.49	<0.17	8.81	15.8	-
Nickel	16.05	14.00	7.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	113.66	93.00	23.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 08-Mar-18

SOIL TYPE	TS	TS	SS
SAMPLE LOCATION	P17	P18	P18
DEPTH (m)	0.10	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1	<0.1
Total Aliphatics	<0.1	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1
Aro >C12-C16	<0.1	1.5	0.5
Aro >C16-C21	<0.1	18.6	0.8
Aro >C21-C35	<0.1	39.3	3.4
Total Aromatics	<0.1	59.4	4.7
TPH (Ali & Aro)	<0.1	59.4	4.7
BTEX - Benzene	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01
Organic Matter	3.3	4.6	0.4

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<0.01	<0.01	13.9	204	-
Ali >C10-C12	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	<0.1	<0.1	385	4130	-
Ali >C16-C21	<0.1	<0.1	210000	210100	-
Ali >C21-C35	<0.1	<0.1			
Total Aliphatics	<0.1	<0.1			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C9	<0.01	<0.01	20.5	232	-
Aro >C9-C10	<0.01	<0.01	20.5	232	-
Aro >C10-C12	<0.1	<0.1	70	468	-
Aro >C12-C16	1.50	<0.1	165	830	-
Aro >C16-C21	18.60	<0.1	319	1040	-
Aro >C21-C35	39.30	<0.1	1120	1710	-
Total Aromatics	59.40	<0.1			
TPH (Ali & Aro)	59.40	<0.1			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Manchester
Project No 16LPL040
Date 08-Mar-18

SOIL TYPE	TS	TS	SS
SAMPLE LOCATION	P17	P18	P18
DEPTH (m)	0.10	0.10	0.40
Acenaphthene	0.03	0.12	<0.01
Acenaphthylene	<0.01	0.05	<0.01
Anthracene	0.03	0.4	0.03
Benzo(a)anthracene	0.09	2	0.15
Benzo(a)pyrene	0.07	1.7	0.15
Benzo(b)fluoranthene	0.12	2.09	0.18
Benzo(ghi)perylene	<0.05	0.74	0.07
Benzo(k)fluoranthene	<0.07	0.77	<0.07
Chrysene	0.12	1.85	0.17
Dibenzo(ah)anthracene	<0.04	0.19	<0.04
Fluoranthene	0.23	4.23	0.27
Fluorene	0.03	0.08	<0.01
Indeno(123-cd)pyrene	0.05	0.97	0.1
Naphthalene	<0.03	<0.03	<0.03
Phenanthrene	0.18	1.31	0.1
Pyrene	0.2	3.89	0.26
Organic Matter	3.3	4.6	0.4

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.12	<0.01	608	2760	-
Acenaphthylene	0.05	<0.01			-
Anthracene	0.40	0.03	10200	26200	-
Benzo(a)anthracene	2.00	0.09	4.52	8.54	-
Benzo(a)pyrene	1.70	0.07	1.51	2.05	4.95
Benzo(b)fluoranthene	2.09	0.12	7.72	9.86	-
Benzo(ghi)perylene	0.74	<0.05	96.2	103	-
Benzo(k)fluoranthene	0.77	<0.07	84.4	100	-
Chrysene	1.85	0.12	585	927	-
Dibenzo(ah)anthracene	0.19	<0.04	0.838	1	-
Fluoranthene	4.23	0.23	983	2980	-
Fluorene	0.08	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.97	0.05	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	1.31	0.10			-
Pyrene	3.89	0.20	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

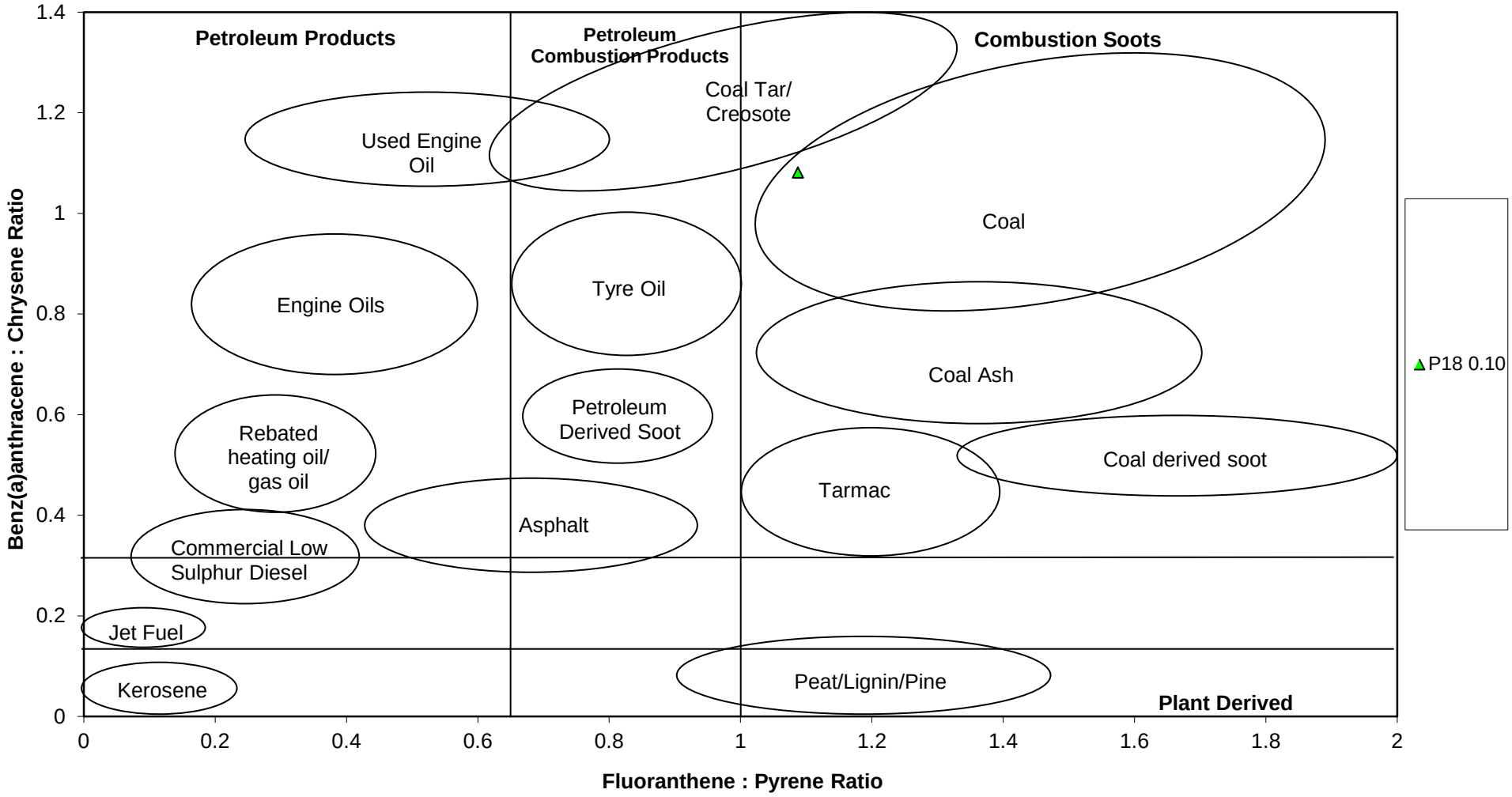
* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

Double Ratio Plot of Benz(a)anthracene : Chrysene versus Fluoranthene : Pyrene



envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/01758
Issue Number: 1 **Date:** 15 March, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5, Manchester
Project Ref: Not specified
Order No: BG2682
Date Samples Received: 08/03/18
Date Instructions Received: 09/03/18
Date Analysis Completed: 15/03/18

Prepared by: **Approved by:**

[redacted]

Melanie Marshall
Laboratory Coordinator

Richard Wong
Client Manager

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 1247

Envirolab Job Number: 18/01758

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: Not specified

Lab Sample ID	18/01758/1	18/01758/2	18/01758/3						Units	Method ref
Client Sample No	TS	TS	SS							
Client Sample ID	P17	P18	P18							
Depth to Top	0.10	0.10	0.40							
Depth To Bottom										
Date Sampled	08-Mar-18	08-Mar-18	08-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5AE	6A	4A							
% Stones >10mm$_A$	<0.1	<0.1	16.0						% w/w	A-T-044
pH$_D$	8.26	7.86	8.44						pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	0.21	0.03						g/l	A-T-026s
Organic matter$_D^{M\#}$	3.3	4.6	0.4						% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	1	11	2						mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	0.8	<0.5						mg/kg	A-T-024s
Copper$_D^{M\#}$	8	30	6						mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1						mg/kg	A-T-040s
Lead$_D^{M\#}$	11	114	13						mg/kg	A-T-024s
Mercury$_D$	<0.17	0.49	<0.17						mg/kg	A-T-024s
Nickel$_D^{M\#}$	7	14	8						mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1						mg/kg	A-T-024s
Zinc$_D^{M\#}$	30	93	23						mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s

Envirolab Job Number: 18/01758

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: Not specified

Lab Sample ID	18/01758/1	18/01758/2	18/01758/3						Units	Method ref
Client Sample No	TS	TS	SS							
Client Sample ID	P17	P18	P18							
Depth to Top	0.10	0.10	0.40							
Depth To Bottom										
Date Sampled	08-Mar-18	08-Mar-18	08-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5AE	6A	4A							
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{A}^{\#}$	NAD	NAD	NAD							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A							

Envirolab Job Number: 18/01758

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: Not specified

Lab Sample ID	18/01758/1	18/01758/2	18/01758/3						Units	Method ref
Client Sample No	TS	TS	SS							
Client Sample ID	P17	P18	P18							
Depth to Top	0.10	0.10	0.40							
Depth To Bottom										
Date Sampled	08-Mar-18	08-Mar-18	08-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5AE	6A	4A							
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.03	0.12	<0.01						mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	0.05	<0.01						mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.03	0.40	0.03						mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.09	2.00	0.15						mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.07	1.70	0.15						mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.12	2.09	0.18						mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	0.74	0.07						mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	0.77	<0.07						mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.12	1.85	0.17						mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	0.19	<0.04						mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.23	4.23	0.27						mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.03	0.08	<0.01						mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.05	0.97	0.10						mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.18	1.31	0.10						mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.20	3.89	0.26						mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.17	20.4	1.55						mg/kg	A-T-019s

Envirolab Job Number: 18/01758

Client Project Name: Miles Platting Area 5, Manchester

Client Project Ref: Not specified

Lab Sample ID	18/01758/1	18/01758/2	18/01758/3						Units	Method ref
Client Sample No	TS	TS	SS							
Client Sample ID	P17	P18	P18							
Depth to Top	0.10	0.10	0.40							
Depth To Bottom										
Date Sampled	08-Mar-18	08-Mar-18	08-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	5AE	6A	4A							
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	1.5	0.5						mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	18.6	0.8						mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	39.3	3.4						mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	59.4	4.7						mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	59.4	4.7						mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/08

28th March 2018

FAO Richard Seddon @ Lovell
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plot 5

Please find below our clean-cover system validation data at the above mentioned site / plots.

Overview

Betts Geo-environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 27th March 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Reddish brown clayey SAND – Source – Chadderton, Oldham
Subsoil – Light yellowish brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 27th March 2018, in the garden of the plots and confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil within plot 4 on 14th March 2018 at a rate of 1 sample per strata within every 3 plots.

Soil samples were collected from the subsoil within plot 3 and plot 6 on the 14th March at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 5

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 14-Mar-18

SOIL TYPE	TS	SS	SS
SAMPLE LOCATION	Plot 4	Plot 3	Plot 6
DEPTH (m)	-	-	-
pH	8	6.72	7.8
Sulphate (water sol 2:1)	0.06	0.05	0.02
Organic matter	4.5	0.2	<0.1
Arsenic	1	<1	<1
Cadmium	<0.5	<0.5	<0.5
Copper	10	5	5
Chromium (hexavalent)	<1	<1	<1
Lead	15	16	11
Mercury	<0.17	<0.17	<0.17
Nickel	8	14	18
Selenium	<1	<1	<1
Zinc	39	34	40
Asbestos in Soil	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A
Quantification	N/A	N/A	N/A
Organic matter	4.5	0.2	<0.1

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	8.00	6.72			-
Sulphate (water sol 2:1)	0.06	0.02			-
Organic matter	4.50	<0.1			
Arsenic	1.00	<1	32	32	37
Cadmium	<0.5	<0.5	10	10	22.1
Copper	10.00	5.00	4730	4790	-
Chromium (hexavalent)	<1	<1	3.62	3.63	20.5
Lead	16.00	11.00			200
Mercury	<0.17	<0.17	8.81	15.8	-
Nickel	18.00	8.00	EA/ATRisk withdrawn Aug 2015		
Selenium	<1	<1	375	375	-
Zinc	40.00	34.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 14-Mar-18

SOIL TYPE	TS	SS	SS
SAMPLE LOCATION	Plot 4	Plot 3	Plot 6
DEPTH (m)	-	-	-
Ali >C5-C6	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1	<0.1
Ali >C16-C21	<0.1	2.3	2.3
Ali >C21-C35	<0.1	19.5	14
Total Aliphatics	<0.1	21.8	16.3
Aro >C5-C7	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1	<0.1
Total Aromatics	<0.1	<0.1	<0.1
TPH (Ali & Aro)	<0.1	21.8	16.3
BTEX - Benzene	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01
Organic Matter	4.5	0.2	<0.1

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<0.01	<0.01	13.9	204	-
Ali >C10-C12	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	<0.1	<0.1	385	4130	-
Ali >C16-C21	2.30	<0.1	210000	210100	-
Ali >C21-C35	19.50	<0.1			
Total Aliphatics	21.80	<0.1			
Aro >C5-C7	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C9	<0.01	<0.01	20.5	232	-
Aro >C9-C10	<0.01	<0.01	20.5	232	-
Aro >C10-C12	<0.1	<0.1	70	468	-
Aro >C12-C16	<0.1	<0.1	165	830	-
Aro >C16-C21	<0.1	<0.1	319	1040	-
Aro >C21-C35	<0.1	<0.1	1120	1710	-
Total Aromatics	<0.1	<0.1			
TPH (Ali & Aro)	21.80	<0.1			
BTEX - Benzene	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 14-Mar-18

SOIL TYPE	TS	SS	SS
SAMPLE LOCATION	Plot 4	Plot 3	Plot 6
DEPTH (m)	-	-	-
Acenaphthene	<0.01	<0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01
Anthracene	<0.02	<0.02	<0.02
Benzo(a)anthracene	<0.04	<0.04	<0.04
Benzo(a)pyrene	<0.04	<0.04	<0.04
Benzo(b)fluoranthene	<0.05	<0.05	<0.05
Benzo(ghi)perylene	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07
Chrysene	0.08	<0.06	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04
Fluoranthene	<0.08	<0.08	<0.08
Fluorene	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	<0.03	<0.03	<0.03
Naphthalene	<0.03	<0.03	<0.03
Phenanthrene	0.07	0.04	<0.03
Pyrene	<0.07	<0.07	<0.07
Organic Matter	4.5	0.2	<0.1

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	<0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	<0.02	<0.02	10200	26200	-
Benzo(a)anthracene	<0.04	<0.04	4.52	8.54	-
Benzo(a)pyrene	<0.04	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	<0.05	<0.05	7.72	9.86	-
Benzo(ghi)perylene	<0.05	<0.05	96.2	103	-
Benzo(k)fluoranthene	<0.07	<0.07	84.4	100	-
Chrysene	0.08	<0.06	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	<0.08	<0.08	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	<0.03	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.07	<0.03			-
Pyrene	<0.07	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/01926
Issue Number: 1 **Date:** 22 March, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5
Project Ref: 16LPL040
Order No: BG2690
Date Samples Received: 15/03/18
Date Instructions Received: 16/03/18
Date Analysis Completed: 22/03/18

Prepared by:

[redacted]

Holly Neary-King
Administrative Assistant

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 18/01926

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/01926/1	18/01926/2	18/01926/3						Units	Method ref
Client Sample No	SS	TS	SS							
Client Sample ID	Plot 3	Plot 4	Plot 6							
Depth to Top										
Depth To Bottom										
Date Sampled	14-Mar-18	14-Mar-18	14-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6E	4A							
% Stones >10mm$_A$	2.1	<0.1	<0.1						% w/w	A-T-044
pH$_D$	6.72	8.00	7.80						pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.05	0.06	0.02						g/l	A-T-026s
Organic matter$_D^{M\#}$	0.2	4.5	<0.1						% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	<1	1	<1						mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	<0.5	<0.5						mg/kg	A-T-024s
Copper$_D^{M\#}$	5	10	5						mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1						mg/kg	A-T-040s
Lead$_D^{M\#}$	16	15	11						mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17						mg/kg	A-T-024s
Nickel$_D^{M\#}$	14	8	18						mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1						mg/kg	A-T-024s
Zinc$_D^{M\#}$	34	39	40						mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s

Envirolab Job Number: 18/01926

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/01926/1	18/01926/2	18/01926/3						Units	Method ref
Client Sample No	SS	TS	SS							
Client Sample ID	Plot 3	Plot 4	Plot 6							
Depth to Top										
Depth To Bottom										
Date Sampled	14-Mar-18	14-Mar-18	14-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6E	4A							
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A							

Envirolab Job Number: 18/01926

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/01926/1	18/01926/2	18/01926/3						Units	Method ref
Client Sample No	SS	TS	SS							
Client Sample ID	Plot 3	Plot 4	Plot 6							
Depth to Top										
Depth To Bottom										
Date Sampled	14-Mar-18	14-Mar-18	14-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6E	4A							
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02						mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04						mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	<0.04						mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	<0.05						mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05						mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07						mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	0.08	<0.06						mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04						mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	<0.08						mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03						mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.04	0.07	<0.03						mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	<0.07						mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08	0.15	<0.08						mg/kg	A-T-019s

Envirolab Job Number: 18/01926

Client Project Name: Miles Platting Area 5

Client Project Ref: 16LPL040

Lab Sample ID	18/01926/1	18/01926/2	18/01926/3						Units	Method ref
Client Sample No	SS	TS	SS							
Client Sample ID	Plot 3	Plot 4	Plot 6							
Depth to Top										
Depth To Bottom										
Date Sampled	14-Mar-18	14-Mar-18	14-Mar-18							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6E	4A							
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	2.3	<0.1	2.3						mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	19.5	<0.1	14.0						mg/kg	A-T-023s
Total Aliphatics$_A$	21.8	<0.1	16.3						mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1						mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	21.8	<0.1	16.3						mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01						mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/KR/SV/09

17th April 2018

FAO Richard Seddon @ Lovell
(Via Email: [redacted])

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 1-5

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 6th April 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Brown clayey SAND – Source – Salterforth Gardens
Subsoil – Light yellowish-brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 6th April 2018, in the garden of the plots and confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil and subsoil within plots 2 and 4 on 6th April 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

[redacted]

Kris Rodway
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results







Plot 1







Plot 2







Plot 3







Plot 4







Plot 5

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5
Project No 16LPL040
Date 16/04/2018

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P2	P2	P4	P4
DEPTH (m)	0.10	0.40	0.10	0.40
pH	7.66	8.03	7.6	7.4
Sulphate (water sol 2:1)	<0.01	0.02	<0.01	0.16
Organic matter	4	0.5	<0.1	4.2
Arsenic	5	<1	6	1
Cadmium	<0.5	0.7	0.7	0.8
Copper	16	4	14	12
Chromium (hexavalent)	<1	<1	<1	<1
Lead	30	13	28	36
Mercury	<0.17	<0.17	<0.17	<0.17
Nickel	7	14	8	16
Selenium	<1	<1	<1	<1
Zinc	30	40	29	53
Asbestos in Soil	NAD	NAD	NAD	NAD
Asbestos Matrix	-	-	-	-
Quantification	-	-	-	-
Organic matter	4	0.5	<0.1	4.2

Metals	Mean Value Test *	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.98	8.03	7.40			-
Sulphate (water sol 2:1)	0.14	0.16	<0.01			-
Organic matter	4.79	4.20	<0.1			
Arsenic	6.34	6.00	<1	32	32	37
Cadmium	0.82	0.80	<0.5	10	10	22.1
Copper	17.69	16.00	4.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	38.25	36.00	13.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	16.46	16.00	7.00	EA/ATRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	51.14	53.00	29.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 16/04/2018

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P2	P2	P4	P4
DEPTH (m)	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aliphatics	<0.1	<0.1	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aromatics	<0.1	<0.1	<0.1	<0.1
TPH (Ali & Aro)	<0.1	<0.1	<0.1	<0.1
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01
Organic Matter	4	0.5	<0.1	4.2

TPH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	42.7	369	-
Ali >C6-C8	0.01	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	0.01	<0.01	<0.01	13.9	204	-
Ali >C10-C12	0.10	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	0.10	<0.1	<0.1	385	4130	-
Ali >C16-C21	0.10	<0.1	<0.1	210000	210100	-
Ali >C21-C35	0.10	<0.1	<0.1			
Total Aliphatics	0.10	<0.1	<0.1			
Aro >C5-C7	0.01	<0.01	<0.01	0.137	0.871	-
Aro >C7-C8	0.01	<0.01	<0.01	113	780	-
Aro >C8-C9	0.01	<0.01	<0.01	20.5	232	-
Aro >C9-C10	0.01	<0.01	<0.01	20.5	232	-
Aro >C10-C12	0.10	<0.1	<0.1	70	468	-
Aro >C12-C16	0.10	<0.1	<0.1	165	830	-
Aro >C16-C21	0.10	<0.1	<0.1	319	1040	-
Aro >C21-C35	0.10	<0.1	<0.1	1120	1710	-
Total Aromatics	0.10	<0.1	<0.1			
TPH (Ali & Aro)	0.10	<0.1	<0.1			
BTEX - Benzene	0.01	<0.01	<0.01	0.0493	0.33	0.871
BTEX - Toluene	0.01	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	0.01	<0.01	<0.01	24	312	-
BTEX - o Xylene	0.01	<0.01	<0.01	26.4	336	-
MTBE	0.01	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5
Project No 16LPL040
Date 16/04/18

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P2	P2	P4	P4
DEPTH (m)	0.10	0.40	0.10	0.40
Acenaphthene	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01
Anthracene	0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.12	<0.04	0.06	<0.04
Benzo(a)pyrene	0.15	<0.04	0.07	<0.04
Benzo(b)fluoranthene	0.19	<0.05	0.1	<0.05
Benzo(ghi)perylene	0.09	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07
Chrysene	0.17	<0.06	0.08	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.28	<0.08	0.13	<0.08
Fluorene	<0.01	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	0.1	<0.03	0.05	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.11	<0.03	0.05	<0.03
Pyrene	0.26	<0.07	0.13	<0.07
Organic Matter	4	0.5	<0.1	4.2

PAH	Mean Value Test *	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	<0.01	<0.01	**608**	**2760**	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.02	0.02	<0.02	**10200**	**26200**	-
Benzo(a)anthracene	0.11	0.12	<0.04	**4.52**	**8.54**	-
Benzo(a)pyrene	0.14	0.15	<0.04	**1.51**	**2.05**	**4.95**
Benzo(b)fluoranthene	0.18	0.19	<0.05	**7.72**	**9.86**	-
Benzo(ghi)perylene	0.08	0.09	<0.05	**96.2**	**103**	-
Benzo(k)fluoranthene	0.07	<0.07	<0.07	**84.4**	**100**	-
Chrysene	0.15	0.17	<0.06	**585**	**927**	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	**0.838**	**1**	-
Fluoranthene	0.25	0.28	<0.08	**983**	**2980**	-
Fluorene	0.01	<0.01	<0.01	**735**	**2610**	-
Indeno(123-cd)pyrene	0.09	0.10	<0.03	**7.31**	**9.75**	-
Naphthalene	0.03	<0.03	<0.03	**0.829**	**12.2**	-
Phenanthrene	0.10	0.11	<0.03			-
Pyrene	0.24	0.26	<0.07	**668**	**2120**	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/02554
Issue Number: 1 **Date:** 12 April, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab
Project Name: Miles Platting Area 5
Project Ref: N/A
Order No: TBC
Date Samples Received: 06/04/18
Date Instructions Received: 06/04/18
Date Analysis Completed: 12/04/18

Prepared by:

[redacted]

Holly Neary-King
Administrative Assistant

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 18/02554

Client Project Name: Miles Platting Area 5

Client Project Ref: N/A

Lab Sample ID	18/02554/1	18/02554/2	18/02554/3	18/02554/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P2	P2	P4	P4						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	06-Apr-18	06-Apr-18	06-Apr-18	06-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6AE	5	5E	5						
% Stones >10mm$_A$	4.8	<0.1	<0.1	<0.1					% w/w	A-T-044
pH$_D^{M\#}$	7.66	8.03	7.60	7.40					pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	0.02	<0.01	0.16					g/l	A-T-026s
Organic matter$_D^{M\#}$	4.0	0.5	<0.1	4.2					% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	5	<1	6	1					mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	0.7	0.7	0.8					mg/kg	A-T-024s
Copper$_D^{M\#}$	16	4	14	12					mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1					mg/kg	A-T-040s
Lead$_D^{M\#}$	30	13	28	36					mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17					mg/kg	A-T-024s
Nickel$_D^{M\#}$	7	14	8	16					mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-024s
Zinc$_D^{M\#}$	30	40	29	53					mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

Envirolab Job Number: 18/02554

Client Project Name: Miles Platting Area 5

Client Project Ref: N/A

Lab Sample ID	18/02554/1	18/02554/2	18/02554/3	18/02554/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P2	P2	P4	P4						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	06-Apr-18	06-Apr-18	06-Apr-18	06-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6AE	5	5E	5						
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A$ #	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A						

Envirolab Job Number: 18/02554

Client Project Name: Miles Platting Area 5

Client Project Ref: N/A

Lab Sample ID	18/02554/1	18/02554/2	18/02554/3	18/02554/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P2	P2	P4	P4						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	06-Apr-18	06-Apr-18	06-Apr-18	06-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6AE	5	5E	5						
PAH-16MS										
Acenaphthene$_{A}^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Acenaphthylene$_{A}^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene$_{A}^{M\#}$	0.02	<0.02	<0.02	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene$_{A}^{M\#}$	0.12	<0.04	0.06	<0.04					mg/kg	A-T-019s
Benzo(a)pyrene$_{A}^{M\#}$	0.15	<0.04	0.07	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene$_{A}^{M\#}$	0.19	<0.05	0.10	<0.05					mg/kg	A-T-019s
Benzo(ghi)perylene$_{A}^{M\#}$	0.09	<0.05	<0.05	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene$_{A}^{M\#}$	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene$_{A}^{M\#}$	0.17	<0.06	0.08	<0.06					mg/kg	A-T-019s
Dibenzo(ah)anthracene$_{A}^{M\#}$	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene$_{A}^{M\#}$	0.28	<0.08	0.13	<0.08					mg/kg	A-T-019s
Fluorene$_{A}^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene$_{A}^{M\#}$	0.10	<0.03	0.05	<0.03					mg/kg	A-T-019s
Naphthalene$_{A}^{M\#}$	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene$_{A}^{M\#}$	0.11	<0.03	0.05	<0.03					mg/kg	A-T-019s
Pyrene$_{A}^{M\#}$	0.26	<0.07	0.13	<0.07					mg/kg	A-T-019s
PAH (total 16)$_{A}^{M\#}$	1.49	<0.08	0.65	<0.08					mg/kg	A-T-019s

Envirolab Job Number: 18/02554

Client Project Name: Miles Platting Area 5

Client Project Ref: N/A

Lab Sample ID	18/02554/1	18/02554/2	18/02554/3	18/02554/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P2	P2	P4	P4						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	06-Apr-18	06-Apr-18	06-Apr-18	06-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	6AE	5	5E	5						
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,
E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Our Ref: 16LPL040/PH/SV/10

3rd May 2018

FAO Richard Seddon @ Lovell
(Via Email: [redacted]

Dear Richard,

Miles Platting, Area 5 – Soil Cover System Assessment – Plots 6 - 7 & 35 - 36

Please find below our clean-cover system validation data at the above-mentioned site / plots.

Overview

Betts Geo-Environmental Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Ground Investigation Report undertaken by Betts Geo-Environmental in August 2016 (Ref. 16LPL040/GI/Rev1).

- A minimum clean cover system of 600mm (150mm clean topsoil/450mm subsoil) with a no dig layer within garden areas will be required as per NHBC guidance; this is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of this material on site was visually inspected on 20th April 2018, inspection confirmed that the topsoil is generally debris free and subsoil material is natural sand and is physically suitable for the end use.

Topsoil – Brown clayey SAND – Source – Salterforth Gardens
Subsoil – Light yellowish-brown SAND – Source – Scout Moor Quarry

Cover System Depth Validation

Trial holes were undertaken on 20th April 2018, in the garden of the plots and confirmed that the topsoil thicknesses were 150mm or greater, the subsoil was to a typical thickness of 450mm and a no-dig geotextile membrane was present underneath.

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Directors: R.M. Frimston, M Fawcett.
Betts Geo Environmental Ltd trading as Betts Geo Environmental Registered in England and Wales No. 5927295

Chemical Validation of Topsoil and Subsoil

Soil samples were collected from the topsoil and subsoil within plots 7 and 36 on 20th April 2018 at a rate of 1 sample per strata within every 3 plots.

Analysis has been scheduled for the standard 'CLEA' Metals (including Chromium VI), speciated TPH to CWG, speciated PAH's.

These results were screened against the same criteria i.e. EA/CIEH/LQM residential guidance for suitability. No visual or olfactory evidence of contamination was noted within any of the samples.

All results fall below relevant standard guidance levels.

Based on this evidence, all the plots are deemed chemically suitable for their intended residential garden end use.

Summary

Betts Geo Ltd confirms that the soil is acceptable for use within gardens as such the capping requirements for the above-mentioned plots are complete.

We trust that this information is satisfactory for your further assessment to release the conditions.

Should you require any further clarification please do not hesitate in giving me a call.

Yours Sincerely,

[redacted]

Paul Harrison
BETTS GEO ENVIRONMENTAL LIMITED

Encl –
Evidentiary Photographs
Chemical Validation Test Results





Plot 6





Plot 7





Plot 35





Plot 36

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Miles Platting Area 5, Mancheter
Project No 16LPL040
Date 20-Apr-18

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P7	P7	P36	P36
DEPTH (m)	0.10	0.40	0.10	0.40
pH	7.31	7.55	7.37	7.94
Sulphate (water sol 2:1)	<0.01	<0.01	<0.01	<0.01
Organic matter	3	0.6	3.1	0.2
Arsenic	4	<1	6	<1
Cadmium	<0.5	0.8	0.6	0.6
Copper	15	5	17	2
Chromium (hexavalent)	<1	<1	<1	<1
Lead	32	14	56	9
Mercury	<0.17	<0.17	<0.17	<0.17
Nickel	8	16	8	14
Selenium	2	<1	<1	<1
Zinc	31	47	33	40
Asbestos in Soil	NAD	NAD	NAD	NAD
Asbestos Matrix	N/A	N/A	N/A	N/A
Quantification	N/A	N/A	N/A	N/A
Organic matter	3	0.6	3.1	0.2

Metals	Range		AtRisk 2017 (mg/kg)	AtRisk 2017 (mg/kg)	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)	
pH	7.94	7.31			-
Sulphate (water sol 2:1)	<0.01	<0.01			-
Organic matter	3.10	0.20			
Arsenic	6.00	<1	32	32	37
Cadmium	0.80	<0.5	10	10	22.1
Copper	17.00	2.00	4730	4790	-
Chromium (hexavalent)	<1	<1	3.62	3.63	20.5
Lead	56.00	9.00			200
Mercury	<0.17	<0.17	8.81	15.8	-
Nickel	16.00	8.00	EA/ATRisk withdrawn Aug 2015		
Selenium	2.00	<1	375	375	-
Zinc	47.00	31.00	20000	20300	-

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

SGVs are derived from the EA 2009 SGV's which are taken from AtRisk 2015. Category 4 screening levels have been adopted by the EA and have been included as new guidance.
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 /Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content….'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used
NAD - NO ASBESTOS DETECTED

TS - Topsoil, MG - Made Ground and N - Natural Ground

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Miles Platting Area 5, Mancheter
Project No 16LPL040
Date 20-Apr-18

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P7	P7	P36	P36
DEPTH (m)	0.10	0.40	0.10	0.40
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aliphatics	<0.1	<0.1	<0.1	<0.1
Aro >C5-C7	<0.01	<0.01	<0.01	0.03
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1
Aro >C12-C16	<0.1	<0.1	<0.1	<0.1
Aro >C16-C21	<0.1	<0.1	<0.1	<0.1
Aro >C21-C35	<0.1	<0.1	<0.1	<0.1
Total Aromatics	<0.1	<0.1	<0.1	<0.1
TPH (Ali & Aro)	<0.1	<0.1	<0.1	<0.1
BTEX - Benzene	<0.01	<0.01	<0.01	0.03
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01
Organic Matter	3	0.6	3.1	0.2

TPH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	<0.01	<0.01	42.7	369	-
Ali >C6-C8	<0.01	<0.01	99.3	1240	-
Ali >C8-C10	<0.01	<0.01	13.9	204	-
Ali >C10-C12	<0.1	<0.1	81.7	1180	-
Ali >C12-C16	<0.1	<0.1	385	4130	-
Ali >C16-C21	<0.1	<0.1	210000	210100	-
Ali >C21-C35	<0.1	<0.1			
Total Aliphatics	<0.1	<0.1			
Aro >C5-C7	0.03	<0.01	0.137	0.871	-
Aro >C7-C8	<0.01	<0.01	113	780	-
Aro >C8-C9	<0.01	<0.01	20.5	232	-
Aro >C9-C10	<0.01	<0.01	20.5	232	-
Aro >C10-C12	<0.1	<0.1	70	468	-
Aro >C12-C16	<0.1	<0.1	165	830	-
Aro >C16-C21	<0.1	<0.1	319	1040	-
Aro >C21-C35	<0.1	<0.1	1120	1710	-
Total Aromatics	<0.1	<0.1			
TPH (Ali & Aro)	<0.1	<0.1			
BTEX - Benzene	0.03	<0.01	0.0493	0.33	0.871
BTEX - Toluene	<0.01	<0.01	113	780	-
BTEX - Ethyl Benzene	<0.01	<0.01	50.7	453	-
BTEX - m & p Xylene	<0.01	<0.01	24	312	-
BTEX - o Xylene	<0.01	<0.01	26.4	336	-
MTBE	<0.01	<0.01	27.6	220	

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed against RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Miles Platting Area 5, Mancheter
Project No 16LPL040
Date 20-Apr-18

SOIL TYPE	TS	SS	TS	SS
SAMPLE LOCATION	P7	P7	P36	P36
DEPTH (m)	0.10	0.40	0.10	0.40
Acenaphthene	<0.01	<0.01	0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01
Anthracene	0.02	<0.02	0.03	<0.02
Benzo(a)anthracene	0.14	<0.04	0.13	<0.04
Benzo(a)pyrene	0.16	<0.04	0.15	<0.04
Benzo(b)fluoranthene	0.22	<0.05	0.21	<0.05
Benzo(ghi)perylene	0.1	<0.05	0.09	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07
Chrysene	0.17	<0.06	0.17	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.29	<0.08	0.29	<0.08
Fluorene	<0.01	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	0.11	<0.03	0.1	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.1	<0.03	0.13	<0.03
Pyrene	0.25	<0.07	0.27	<0.07
Organic Matter	3	0.6	3.1	0.2

PAH	Range		AtRisk 2017 (mg/kg) Residential with Home Grown Produce	AtRisk 2017 (mg/kg) Residential with Home Grown Produce	DEFRA's C4SL 2017
	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	0.01	<0.01	608	2760	-
Acenaphthylene	<0.01	<0.01			-
Anthracene	0.03	<0.02	10200	26200	-
Benzo(a)anthracene	0.14	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.16	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.22	<0.05	7.72	9.86	-
Benzo(ghi)perylene	0.10	<0.05	96.2	103	-
Benzo(k)fluoranthene	<0.07	<0.07	84.4	100	-
Chrysene	0.17	<0.06	585	927	-
Dibenzo(ah)anthracene	<0.04	<0.04	0.838	1	-
Fluoranthene	0.29	<0.08	983	2980	-
Fluorene	<0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.11	<0.03	7.31	9.75	-
Naphthalene	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.13	<0.03			-
Pyrene	0.27	<0.07	668	2120	-

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING NO FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT
SUPPLEMENT TO TEST REPORT 18/03056/1

Envirolab Job Number: 18/03056
Issue Number: 2 **Date:** 01 May, 2018

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Betts Geolab/Paul Harrison
Project Name: Miles Platting Area 5, Mancheter
Project Ref: 16LPL040
Order No: BG2746
Date Samples Received: 23/04/18
Date Instructions Received: 24/04/18
Date Analysis Completed: 30/04/18

Prepared by:

[redacted]

Holly Neary-King
Administrative Assistant

Approved by:

Georgia King
Admin & Client Services Supervisor

Envirolab Job Number: 18/03056

Client Project Name: Miles Platting Area 5, Mancheter

Client Project Ref: 16LPL040

Lab Sample ID	18/03056/1	18/03056/2	18/03056/3	18/03056/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P7	P7	P36	P36						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	20-Apr-18	20-Apr-18	20-Apr-18	20-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4AE	4A	4	1A						
% Stones >10mm$_A$	1.3	0.6	<0.1	<0.1					% w/w	A-T-044
pH$_D^{M\#}$	7.31	7.55	7.37	7.94					pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	<0.01	<0.01	<0.01					g/l	A-T-026s
Organic matter$_D^{M\#}$	3.0	0.6	3.1	0.2					% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	4	<1	6	<1					mg/kg	A-T-024s
Cadmium$_D^{M\#}$	<0.5	0.8	0.6	0.6					mg/kg	A-T-024s
Copper$_D^{M\#}$	15	5	17	2					mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1					mg/kg	A-T-040s
Lead$_D^{M\#}$	32	14	56	9					mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17					mg/kg	A-T-024s
Nickel$_D^{M\#}$	8	16	8	14					mg/kg	A-T-024s
Selenium$_D^{M\#}$	2	<1	<1	<1					mg/kg	A-T-024s
Zinc$_D^{M\#}$	31	47	33	40					mg/kg	A-T-024s
VPH total (>C5-C10)$_A^{\#}$	<0.01	<0.01	<0.01	0.03					mg/kg	A-T-022s

Envirolab Job Number: 18/03056

Client Project Name: Miles Platting Area 5, Mancheter

Client Project Ref: 16LPL040

Lab Sample ID	18/03056/1	18/03056/2	18/03056/3	18/03056/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P7	P7	P36	P36						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	20-Apr-18	20-Apr-18	20-Apr-18	20-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4AE	4A	4	1A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A						

Envirolab Job Number: 18/03056

Client Project Name: Miles Platting Area 5, Mancheter

Client Project Ref: 16LPL040

Lab Sample ID	18/03056/1	18/03056/2	18/03056/3	18/03056/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P7	P7	P36	P36						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	20-Apr-18	20-Apr-18	20-Apr-18	20-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4AE	4A	4	1A						
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	0.01	<0.01					mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene$_A^{M\#}$	0.02	<0.02	0.03	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.14	<0.04	0.13	<0.04					mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.16	<0.04	0.15	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.22	<0.05	0.21	<0.05					mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.10	<0.05	0.09	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene$_A^{M\#}$	0.17	<0.06	0.17	<0.06					mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.29	<0.08	0.29	<0.08					mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.11	<0.03	0.10	<0.03					mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.10	<0.03	0.13	<0.03					mg/kg	A-T-019s
Pyrene$_A^{M\#}$	0.25	<0.07	0.27	<0.07					mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	1.56	<0.08	1.58	<0.08					mg/kg	A-T-019s

Envirolab Job Number: 18/03056

Client Project Name: Miles Platting Area 5, Mancheter

Client Project Ref: 16LPL040

Lab Sample ID	18/03056/1	18/03056/2	18/03056/3	18/03056/4					Units	Method ref
Client Sample No	TS	SS	TS	SS						
Client Sample ID	P7	P7	P36	P36						
Depth to Top	0.10	0.40	0.10	0.40						
Depth To Bottom										
Date Sampled	20-Apr-18	20-Apr-18	20-Apr-18	20-Apr-18						
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES						
Sample Matrix Code	4AE	4A	4	1A						
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	0.03					mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	0.03					mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.