

20MIL039/BL/L5

2nd February 2024

FAO Spencer Lamb @ Miller Homes
(Via Email; spencerlamb@miller.co.uk)

Dear Spencer,



NORTHENDEN – Phase 2 Cover Systems

Additional Chemical Assessment Rationale

Following demolition of the existing buildings in Phase 2. Betts Geo were asked to assess the cover system requirements for the Phase 2 area. The original Remediation Strategy by Smith Grant reference R3186-R01-v1 Dated 13.03.23

Cover systems were assumed to be 600mm with a geo-textile membrane at the base due to ashy made ground in the vicinity which was deemed to be potentially contaminated.

Given that the majority of the extents of the site have not been developed (fields and landscaped areas only) this may be over conservative in some areas. Likewise post demolition of the buildings on site, further characterization of the soils remaining should be undertaken.

The former buildings have been removed and the car park has been stripped to below the sub base showing natural sand material over the majority of the site. Though along the western site boundary there is a tree preservation order in place.

Samples Tested

7 No Samples were undertaken from around the Phase 2 area using External Works Drawing: 40-15 External Works Bound dated 29.08.23 and Foundation Assessment Plan reference MHL99 DWG 1000 rev. P10.

Samples were taken in the top 200mm of soils targeted to former buildings as well as a general spread. Sample locations were rear garden areas of plots 3, 33, 39, 42, 67 & 74.

Chemical Assessment

The soils were chemically tested in-situ in the rear garden areas on 8th January 2024 at a rate of roughly 1:5 Plots (35 plots in total)

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.

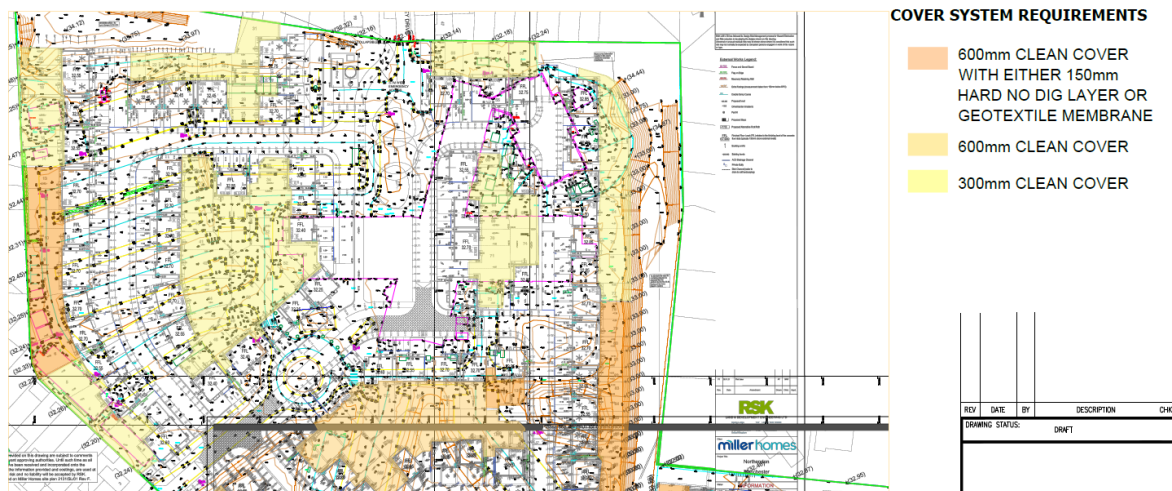


Old Marsh Farm Barns
Welsh Road, Sealand
Flintshire CH5 2LY
Telephone: 01244 288179
www.betts-associates.co.uk

All results fall below relevant standard guidance levels.

Proposed Cover System

See below drawing showing cover system requirements:



Cover system for the plots assessed is as follows.

Made Ground but no significant contamination encountered during SI- 300mm clean cover within. This will comprise of minimum 150mm topsoil and 150mm subsoil.

Given that only reworked natural sand was encountered on site, no significant ongoing risk from made ground/ashy soils is anticipated in these areas.

Chemical and Physical Validation of the soils will be required.

The above recommendations differ from the original Remediation Statement and as such should be agreed by the Local Authority and NHBC prior to implementation.

We trust that this information is satisfactory, and should you require any further clarification, please do not hesitate to contact us.



Yours sincerely,

A handwritten signature in dark ink, appearing to read "B Lewis".

Beverley Lewis
Director
BETTS GEO ENVIRONMENTAL

Encl. –
Chemical samples of Topsoil



SUMMARY OF CONTAMINATION ANALYSIS: SOIL

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Northenden
Project No 20MIL039
Date 08/01/2024

SOIL TYPE	SS	SS	SS	SS	SS	SS	SS
SAMPLE LOCATION	Plot 3	Plot 33	Plot 39	Plot 42	Plot 45	Plot 67	Plot 74
DEPTH (m)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
pH	7.76	8.23	8.21	8.92	12.18	12.21	12.22
Sulphate (water sol 2:1)	0.02	0.06	0.03	0.07	0.04	0.04	0.05
Organic matter	1.3	1.7	1.6	1.6	<0.1	0.2	0.4
Arsenic	5	7	8	9	1	1	<1
Cadmium	0.7	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	11	12	10	13	14	15	15
Chromium (hexavalent)	<1	<1	<1	<1	<1	<1	<1
Lead	23	26	23	30	8	9	9
Mercury	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Nickel	13	13	11	14	5	5	6
Selenium	<1	<1	<1	<1	<1	<1	<1
Zinc	27	34	26	36	43	44	46
Asbestos in Soil	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Asbestos Matrix	-	-	-	-	-	-	-
Quantification	-	-	-	-	-	-	-
Organic matter	1.3	1.7	1.6	1.6	<0.1	0.2	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	11.52	12.22	7.76			-
Sulphate (water sol 2:1)	0.06	0.07	0.02			-
Organic matter	1.51	1.70	<0.1			
Arsenic	7.18	9.00	<1	32	32	37
Cadmium	0.60	0.70	<0.5	10	10	22.1
Copper	14.29	15.00	10.00	4730	4790	-
Chromium (hexavalent)	1.00	<1	<1	3.62	3.63	20.5
Lead	25.12	30.00	8.00			200
Mercury	0.17	<0.17	<0.17	8.81	15.8	-
Nickel	12.57	14.00	5.00	EA/AtRisk withdrawn Aug 2015		
Selenium	1.00	<1	<1	375	375	-
Zinc	42.54	46.00	26.00	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: SOIL

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Northenden
 Project No 20MIL039
 Date 08/01/2024

SOIL TYPE	SS	SS	SS	SS	SS	SS	SS
SAMPLE LOCATION	Plot 3	Plot 33	Plot 39	Plot 42	Plot 45	Plot 67	Plot 74
DEPTH (m)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Ali >C5-C6	<0.01	<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	<0.01
Ali >C8-C10	<1	<1	<1	<1	<1	<1	<1
Ali >C10-C12	<1	<1	<1	<1	<1	<1	<1
Ali >C12-C16	<1	<1	<1	<1	<1	2	1
Ali >C16-C21	<1	<1	<1	<1	<1	<1	<1
Ali >C21-C35	7	7	2	5	2	<1	1
Total Aliphatics	7	7	2	5	2	2	2
Aro >C5-C7	<0.01	<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	<0.01
Aro >C8-C10	<1	<1	<1	<1	<1	<1	<1
Aro >C10-C12	<1	<1	<1	<1	1	1	1
Aro >C12-C16	2	1	<1	1	1	2	1
Aro >C16-C21	7	2	1	2	<1	<1	<1
Aro >C21-C35	23	7	3	7	1	1	2
Total Aromatics	32	11	4	11	3	5	5
TPH (Ali & Aro)	39	18	6	16	6	7	7
BTEX - Benzene	<0.01	<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	<0.01
BTEX - Ethyl Benzene	<0.01	<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	<0.01
BTEX - o Xylene	<0.01	<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	<0.01
Organic Matter	1.3	1.7	1.6	1.6	<0.1	0.2	0.4

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	<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	1.42	2.00	1.00	385	4130	-
Ali >C16-C21	1.00	<1	<1	210000	210100	-
Ali >C21-C35	5.55	7.00	<1			
Total Aliphatics	5.63	7.00	2.00			
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	1.00	<1	70	468	-
Aro >C12-C16	1.64	2.00	<1	165	830	-
Aro >C16-C21	3.75	7.00	<1	319	1040	-
Aro >C21-C35	12.02	23.00	1.00	1120	1710	-
Total Aromatics	17.61	32.00	3.00			
TPH (Ali & Aro)	22.99	39.00	6.00			
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	

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.

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

SUMMARY OF CONTAMINATION ANALYSIS: SOIL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Northenden
 Project No 20MIL039
 Date 08/01/2024

SOIL TYPE	SS	SS	SS	SS	SS	SS	SS
SAMPLE LOCATION	Plot 3	Plot 33	Plot 39	Plot 42	Plot 45	Plot 67	Plot 74
DEPTH (m)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Acenaphthene	0.01	<0.01	0.01	0.02	<0.01	<0.01	<0.01
Acenaphthylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.02	0.02	0.03	0.04	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.11	0.13	0.16	0.17	<0.04	<0.04	<0.04
Benzo(a)pyrene	0.1	0.12	0.13	0.14	<0.04	<0.04	<0.04
Benzo(b)fluoranthene	0.13	0.14	0.17	0.18	<0.05	<0.05	<0.05
Benzo(ghi)perylene	0.07	0.08	0.08	0.08	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
Chrysene	0.15	0.15	0.19	0.2	<0.06	<0.06	<0.06
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluoranthene	0.21	0.21	0.29	0.31	<0.08	<0.08	<0.08
Fluorene	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01
Indeno(123-cd)pyrene	0.07	0.07	0.08	0.08	<0.03	<0.03	<0.03
Naphthalene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.11	0.11	0.15	0.17	<0.03	<0.03	<0.03
Pyrene	0.18	0.19	0.25	0.28	<0.07	<0.07	<0.07
Organic Matter	1.3	1.7	1.6	1.6	<0.1	0.2	0.4

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	0.01	0.02	<0.01	608	2760	-
Acenaphthylene	0.01	<0.01	<0.01			-
Anthracene	0.03	0.04	<0.02	10200	26200	-
Benzo(a)anthracene	0.14	0.17	<0.04	4.52	8.54	-
Benzo(a)pyrene	0.12	0.14	<0.04	1.51	2.05	4.95
Benzo(b)fluoranthene	0.15	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	0.17	0.20	<0.06	585	927	-
Dibenzo(ah)anthracene	0.04	<0.04	<0.04	0.838	1	-
Fluoranthene	0.25	0.31	<0.08	983	2980	-
Fluorene	0.01	0.01	<0.01	735	2610	-
Indeno(123-cd)pyrene	0.07	0.08	<0.03	7.31	9.75	-
Naphthalene	0.03	<0.03	<0.03	0.829	12.2	-
Phenanthrene	0.13	0.17	<0.03			-
Pyrene	0.22	0.28	<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.**

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 24/00136
Issue Number: 1

Date: 15 January, 2024

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

Project Manager: Andy Gerrard/Betts Geolab/Graham Clark
Project Name: Varsity
Project Ref: 20MIL039
Order No: BG5237
Date Samples Received: 08/01/24
Date Instructions Received: 08/01/24
Date Analysis Completed: 15/01/24

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 24/00136

Client Project Name: Varsity

Client Project Ref: 20MIL039

Lab Sample ID	24/00136/1	24/00136/2	24/00136/3	24/00136/4	24/00136/5	24/00136/6	24/00136/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 3	Plot 33	Plot 39	Plot 42	Plot 45	Plot 67	Plot 74			
Depth to Top	0.20	0.20	0.20	0.20	0.20	0.20	0.20			
Depth To Bottom										
Date Sampled	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES			
Sample Matrix Code	5A	5A	5B	5A	1	1	1			
% Stones >10mm _A	6.2	<0.1	16.1	<0.1	<0.1	<0.1	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	7.76	8.23	8.21	8.92	12.18	12.21	12.22	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.02	0.06	0.03	0.07	0.04	0.04	0.05	g/l	0.01	A-T-026s
Organic Matter _D ^{M#}	1.3	1.7	1.6	1.6	<0.1	0.2	0.4	% w/w	0.1	A-T-032s
Arsenic _D ^{M#}	5	7	8	9	1	1	<1	mg/kg	1	A-T-024s
Cadmium _D ^{M#}	0.7	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	11	12	10	13	14	15	15	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Lead _D ^{M#}	23	26	23	30	8	9	9	mg/kg	1	A-T-024s
Mercury _D	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	13	13	11	14	5	5	6	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc _D ^{M#}	27	34	26	36	43	44	46	mg/kg	5	A-T-024s
VPH total (>C5-C10)	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	mg/kg	1	Calc-stone+mols

Envirolab Job Number: 24/00136

Client Project Name: Varsity

Client Project Ref: 20MIL039

Lab Sample ID	24/00136/1	24/00136/2	24/00136/3	24/00136/4	24/00136/5	24/00136/6	24/00136/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 3	Plot 33	Plot 39	Plot 42	Plot 45	Plot 67	Plot 74			
Depth to Top	0.20	0.20	0.20	0.20	0.20	0.20	0.20			
Depth To Bottom										
Date Sampled	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES			
Sample Matrix Code	5A	5A	5B	5A	1	1	1			
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	NAD	NAD	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos Matrix (visual) _D	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope) _D	-	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045

Envirolab Job Number: 24/00136

Client Project Name: Varsity

Client Project Ref: 20MIL039

Lab Sample ID	24/00136/1	24/00136/2	24/00136/3	24/00136/4	24/00136/5	24/00136/6	24/00136/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 3	Plot 33	Plot 39	Plot 42	Plot 45	Plot 67	Plot 74			
Depth to Top	0.20	0.20	0.20	0.20	0.20	0.20	0.20			
Depth To Bottom										
Date Sampled	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES			
Sample Matrix Code	5A	5A	5B	5A	1	1	1			
PAH-16MS										
Acenaphthene _A ^{M#}	0.01	<0.01	0.01	0.02	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.02	0.02	0.03	0.04	<0.02	<0.02	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.11	0.13	0.16	0.17	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.10	0.12	0.13	0.14	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.13	0.14	0.17	0.18	<0.05	<0.05	<0.05	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.07	0.08	0.08	0.08	<0.05	<0.05	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.15	0.15	0.19	0.20	<0.06	<0.06	<0.06	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.21	0.21	0.29	0.31	<0.08	<0.08	<0.08	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.07	0.07	0.08	0.08	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.11	0.11	0.15	0.17	<0.03	<0.03	<0.03	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.18	0.19	0.25	0.28	<0.07	<0.07	<0.07	mg/kg	0.07	A-T-019s
Total PAH-16MS _A	1.16	1.22	1.55	1.68	<0.08	<0.08	<0.08	mg/kg	0.01	A-T-019s

Envirolab Job Number: 24/00136

Client Project Name: Varsity

Client Project Ref: 20MIL039

Lab Sample ID	24/00136/1	24/00136/2	24/00136/3	24/00136/4	24/00136/5	24/00136/6	24/00136/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	Plot 3	Plot 33	Plot 39	Plot 42	Plot 45	Plot 67	Plot 74			
Depth to Top	0.20	0.20	0.20	0.20	0.20	0.20	0.20			
Depth To Bottom										
Date Sampled	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24	08-Jan-24			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES			
Sample Matrix Code	5A	5A	5B	5A	1	1	1			
TPH CWG with Clean Up										
Ali >C5-C6 _A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	<1	<1	<1	<1	2	1	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	7	7	2	5	2	<1	1	mg/kg	1	A-T-055s
Total Aliphatics _A	7	7	2	5	2	2	2	mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1	<1	<1	<1	1	1	1	mg/kg	1	A-T-055s
Aro >C12-C16 _A	2	1	<1	1	1	2	1	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	7	2	1	2	<1	<1	<1	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	23	7	3	7	1	1	2	mg/kg	1	A-T-055s
Total Aromatics _A	32	11	4	11	3	5	5	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	39	18	6	16	6	7	7	mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<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 within the same delivery, will be disposed of **six weeks** after the 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 our scope of accreditation.
 The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.
 A deviating sample 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.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "A"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
N/A	Not applicable

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.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.

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 by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
 Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.
 Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the accreditation range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
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: Varsity
Clients Project No: 20MIL039

Project No: 24/00136
Date Received: 08/01/2024 (pm)
Cool Box Temperatures (°C): 6.5

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 Analysis Dates

Lab Sample ID	24/00136/1	24/00136/2	24/00136/3	24/00136/4	24/00136/5	24/00136/6	24/00136/7
Client Sample No							
Client Sample ID/Depth	Plot 3 0.20m	Plot 33 0.20m	Plot 39 0.20m	Plot 42 0.20m	Plot 45 0.20m	Plot 67 0.20m	Plot 74 0.20m
Date Sampled	08/01/24	08/01/24	08/01/24	08/01/24	08/01/24	08/01/24	08/01/24
A-T-019s	12/01/2024	12/01/2024	12/01/2024	12/01/2024	12/01/2024	12/01/2024	12/01/2024
A-T-022s	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024
A-T-024s	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024
A-T-026s	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024
A-T-031s	10/01/2024	10/01/2024	10/01/2024	10/01/2024	10/01/2024	10/01/2024	10/01/2024
A-T-032s	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024
A-T-040s	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024	11/01/2024
A-T-044	10/01/2024	10/01/2024	10/01/2024	10/01/2024	10/01/2024	10/01/2024	10/01/2024
A-T-045	09/01/2024	09/01/2024	09/01/2024	09/01/2024	09/01/2024	09/01/2024	09/01/2024
A-T-055s	12/01/2024	12/01/2024	12/01/2024	12/01/2024	15/01/2024	15/01/2024	15/01/2024
Calc-As Recd	12/01/2024	12/01/2024	12/01/2024	12/01/2024	15/01/2024	15/01/2024	15/01/2024
Calc-stone+mois	12/01/2024	12/01/2024	12/01/2024	12/01/2024	15/01/2024	15/01/2024	15/01/2024

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report