21LPL083/SV/GC/21

13th November 2023

FAO Richard Sedden @ Lovell
(Via Email: richard.sedden@Lovell.co.uk)

BETTS GEO
CONSULTING ENGINEERS

Dear Richard,

**Edge Lane, Openshaw – Soil Cover System Assessment – Plots 180 & 182-183**

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

Overview

Betts Geo Ltd were instructed to validate the clean cover system applied within residential gardens at the above site as per the recommendations within the Remediation Statement undertaken by Betts Geo Ltd in May 2020 (Ref; 19YHG001/RS/REVD) and the Verification Report undertaken by Betts Geo Ltd in April 2021 (19YHG001/VR).

The report recommends;

- A 600mm cover system with no dig layer is required. This will comprise of:

| |
|---|
| **150mm Topsoil (anticipated to be imported)** |
| **450mm Subsoil (anticipated to be imported)** |
| **Geotextile membrane** |

The cover system is likely to be made up using imported topsoil and subsoil.

Physical Suitability of the Topsoil and Subsoil

The composition of the topsoil and subsoil materials on site were visually inspected in-situ during sampling on 30th October 2023. Inspection confirms that the topsoil is debris free dark brown slightly sandy CLAY and subsoil material is brown slightly sandy CLAY, both topsoil and subsoil are physically suitable for their proposed end use.

Topsoil Source – Handley Hill, Winsford CW7 1EW.

Subsoil Source – Goldfinch Close, Congleton CW12 3FB.

Cover System Depth Validation

Trial hole undertaken in the rear gardens of plots 180,182 & 183 on 30th October 2023 confirmed that the topsoil thickness was greater than 150mm; the subsoil was a typical thickness greater than 450mm and a geotextile membrane was in place at the base completing the required 600mm clean cover system.



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Chemical Validation of Topsoil and Subsoil

The topsoil and subsoil were chemically tested in-situ (0.10mbgl topsoil and 0.40mbgl subsoil) in the rear garden area of adjacent plots 174 on 28th September 2023 and 181 on 30th October 2023 on a sample ratio of 1:3 garden basis in accordance with NHBC guidance.

Samples were taken in-situ at a sample rate of 1:3 garden areas per strata i.e. 2 samples were taken.

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.

All results fall below relevant standard guidance levels.

Summary

Betts Geo Environmental confirms that the soil is acceptable for use within gardens as such the capping requirements for plots 180 & 182-183 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,

**Graham Clark**
**BETTS GEO ENVIRONMENTAL LIMITED**

Encl –
Evidentiary Photographs
Topsoil & Subsoil testing data

QMS OHSAS 18001 REGISTERED
QMS ISO 14001 REGISTERED
QMS ISO 9001 REGISTERED
smas worksafe contractor www.smasltd.com as recognised by SSIP SAFETY SCHEMES IN PROCUREMENT
CHAS Accredited Contractor CHAS.co.uk
Constructionline

Plot 180

QMS OHSAS 18001 REGISTERED
QMS ISO 14001 REGISTERED
QMS ISO 9001 REGISTERED
smas worksafe contractor www.smasltd.com as recognised by SSIP SAFETY SCHEMES IN PROCUREMENT
CHAS Accredited Contractor CHAS.co.uk
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Plot 182

Plot 183

## SUMMARY OF CONTAMINATION ANALYSIS: METALS

**Project Name** Edge Lane
**Project No** 21LPL083
**Date** 28/09/2023

| SOIL TYPE | TS | SS | TS | SS | TS | SS |
|---|---|---|---|---|---|---|
| SAMPLE LOCATION | Plot 168 | Plot 168 | Plot 171 | Plot 171 | Plot 174 | Plot 174 |
| DEPTH (m) | 0.10 | 0.40 | 0.10 | 0.40 | 0.10 | 0.40 |
| pH | 6.53 | 8.63 | 8.28 | 8.28 | 8.5 | 8.36 |
| Sulphate (water sol 2:1) | 0.07 | 0.18 | 0.48 | 0.08 | 0.2 | 0.05 |
| Organic matter | 16.4 | 1.5 | 5.7 | 1.1 | 4.6 | 1.1 |
| Arsenic | 18 | 4 | 26 | 3 | 10 | 3 |
| Cadmium | 0.7 | 0.6 | 1.2 | <0.5 | 0.9 | <0.5 |
| Copper | 72 | 45 | 89 | 28 | 57 | 18 |
| Chromium (hexavalent) | <1 | <1 | <1 | <1 | <1 | <1 |
| Lead | 101 | 24 | 148 | 20 | 100 | 14 |
| Mercury | <0.17 | <0.17 | 0.59 | <0.17 | 0.32 | <0.17 |
| Nickel | 20 | 26 | 23 | 30 | 19 | 24 |
| Selenium | 1 | <1 | <1 | <1 | <1 | <1 |
| Zinc | 93 | 70 | 346 | 57 | 233 | 46 |
| Asbestos in Soil | NAD | NAD | NAD | NAD | NAD | NAD |
| Asbestos Matrix | - | - | - | - | - | - |
| Quantification | - | - | - | - | - | - |
| Organic matter | 16.4 | 1.5 | 5.7 | 1.1 | 4.6 | 1.1 |

| 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 | 8.74 | 8.63 | 6.53 | | | - |
| Sulphate (water sol 2:1) | 0.31 | 0.48 | 0.05 | | | - |
| Organic matter | 9.91 | 16.40 | 1.10 | | | |
| Arsenic | 18.48 | 26.00 | 3.00 | **32** | **32** | **37** |
| Cadmium | 0.96 | 1.20 | <0.05 | **10** | **10** | **22.1** |
| Copper | 73.49 | 89.00 | 18.00 | **4730** | **4790** | - |
| Chromium (hexavalent) | 1.00 | <1 | <1 | **3.62** | **3.63** | **20.5** |
| Lead | 113.88 | 148.00 | 14.00 | | | **200** |
| Mercury | 0.40 | 0.59 | <0.17 | **8.81** | **15.8** | - |
| Nickel | 26.98 | 30.00 | 19.00 | **EA/ATRisk withdrawn Aug 2015** | | |
| Selenium | 1.00 | 1.00 | <1 | **375** | **375** | - |
| Zinc | 240.85 | 346.00 | 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** Edge Lane
**Project No** 21LPL083
**Date** 28/09/2023

| SOIL TYPE | TS | SS | TS | SS | TS | SS |
|---|---|---|---|---|---|---|
| SAMPLE LOCATION | Plot 168 | Plot 168 | Plot 171 | Plot 171 | Plot 174 | Plot 174 |
| 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 | 3 | 2 | 2 | <1 | 3 | <1 |
| Ali >C21-C35 | 43 | 38 | 47 | 4 | 54 | 6 |
| Total Aliphatics | 46 | 41 | 50 | 4 | 58 | 6 |
| 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 | <2 | <2 | <2 | <2 | <2 | <2 |
| Aro >C10-C12 | <1 | <1 | 1 | <1 | <1 | <1 |
| Aro >C12-C16 | 4 | 2 | 19 | <1 | 4 | 1 |
| Aro >C16-C21 | 16 | 5 | 43 | <1 | 21 | 2 |
| Aro >C21-C35 | 39 | 13 | 109 | 4 | 89 | 8 |
| Total Aromatics | 59 | 20 | 172 | 4 | 114 | 12 |
| TPH (Ali & Aro) | 105 | 61 | 222 | 7 | 172 | 17 |
| 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 | 16.4 | 1.5 | 5.7 | 1.1 | 4.6 | 1.1 |

| 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 | 0.00 | <1 | 81.7 | 1180 | - |
| Ali >C12-C16 | 1.00 | 1.00 | <1 | 385 | 4130 | - |
| Ali >C16-C21 | 2.74 | 3.00 | <1 | 210000 | 210100 | - |
| Ali >C21-C35 | 49.74 | 54.00 | 4.00 | | | |
| Total Aliphatics | 53.31 | 58.00 | 4.00 | | | |
| 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 | 2.00 | <2 | <2 | 20.5 | 232 | - |
| Aro >C10-C12 | 1.00 | 1.00 | <1 | 70 | 468 | - |
| Aro >C12-C16 | 10.85 | 19.00 | <1 | 165 | 830 | - |
| Aro >C16-C21 | 27.86 | 43.00 | <1 | 319 | 1040 | - |
| Aro >C21-C35 | 80.70 | 109.00 | 4.00 | 1120 | 1710 | - |
| Total Aromatics | 118.60 | 172.00 | 4.00 | | | |
| TPH (Ali & Aro) | 168.20 | 222.00 | 7.00 | | | |
| 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** Edge Lane
**Project No** 21LPL083
**Date** 28/09/23

| SOIL TYPE | TS | SS | TS | SS | TS | SS |
|---|---|---|---|---|---|---|
| SAMPLE LOCATION | Plot 168 | Plot 168 | Plot 171 | Plot 171 | Plot 174 | Plot 174 |
| DEPTH (m) | 0.10 | 0.40 | 0.10 | 0.40 | 0.10 | 0.40 |
| Acenaphthene | 0.27 | <0.01 | 0.14 | <0.01 | 0.18 | <0.01 |
| Acenaphthylene | <0.01 | <0.01 | 0.02 | <0.01 | 0.02 | <0.01 |
| Anthracene | 0.27 | <0.02 | 0.33 | <0.02 | 0.56 | <0.02 |
| Benzo(a)anthracene | 0.43 | <0.04 | 1.54 | <0.04 | 1.79 | 0.06 |
| Benzo(a)pyrene | 0.33 | <0.04 | 1.75 | <0.04 | 1.81 | 0.06 |
| Benzo(b)fluoranthene | 0.49 | <0.05 | 2.27 | <0.05 | 2.56 | 0.08 |
| Benzo(ghi)perylene | 0.2 | <0.05 | 0.9 | <0.05 | 1.1 | <0.05 |
| Benzo(k)fluoranthene | 0.16 | <0.07 | 0.79 | <0.07 | 0.81 | <0.07 |
| Chrysene | 0.45 | <0.06 | 1.6 | <0.06 | 1.91 | <0.06 |
| Dibenzo(ah)anthracene | <0.04 | <0.04 | 0.2 | <0.04 | 0.22 | <0.04 |
| Fluoranthene | 1.02 | <0.08 | 3.04 | <0.08 | 3.59 | 0.1 |
| Fluorene | 0.2 | <0.01 | 0.1 | <0.01 | 0.13 | 0.01 |
| Indeno(123-cd)pyrene | 0.25 | <0.03 | 1.11 | <0.03 | 1.31 | 0.05 |
| Naphthalene | 0.19 | <0.03 | 0.12 | <0.03 | 0.05 | <0.03 |
| Phenanthrene | 1.18 | 0.05 | 1.23 | <0.03 | 1.65 | 0.08 |
| Pyrene | 0.85 | <0.07 | 2.78 | <0.07 | 3.15 | 0.09 |
| Organic Matter | 16.4 | 1.5 | 5.7 | 1.1 | 4.6 | 1.1 |

| 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 | 0.19 | 0.27 | <0.01 | **608** | **2760** | - |
| Acenaphthylene | 0.02 | 0.02 | <0.01 | | | - |
| Anthracene | 0.39 | 0.56 | <0.02 | **10200** | **26200** | - |
| Benzo(a)anthracene | 1.31 | 1.79 | <0.04 | **4.52** | **8.54** | - |
| Benzo(a)pyrene | 1.38 | 1.81 | <0.04 | **1.51** | **2.05** | **4.95** |
| Benzo(b)fluoranthene | 1.88 | 2.56 | <0.05 | **7.72** | **9.86** | - |
| Benzo(ghi)perylene | 0.79 | 1.10 | <0.05 | **96.2** | **103** | - |
| Benzo(k)fluoranthene | 0.63 | 0.81 | <0.07 | **84.4** | **100** | - |
| Chrysene | 1.38 | 1.91 | <0.06 | **585** | **927** | - |
| Dibenzo(ah)anthracene | 0.17 | 0.22 | <0.04 | **0.838** | **1** | - |
| Fluoranthene | 2.63 | 3.59 | <0.08 | **983** | **2980** | - |
| Fluorene | 0.14 | 0.20 | <0.01 | **735** | **2610** | - |
| Indeno(123-cd)pyrene | 0.95 | 1.31 | <0.03 | **7.31** | **9.75** | - |
| Naphthalene | 0.13 | 0.19 | <0.03 | **0.829** | **12.2** | - |
| Phenanthrene | 1.30 | 1.65 | <0.03 | | | - |
| Pyrene | 2.34 | 3.15 | <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.**

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# FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 23/09674
**Issue Number:** 1 **Date:** 05 October, 2023

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

**Project Manager:** Betts Geolab
**Project Name:** Edge Lane
**Project Ref:** 21LPL083
**Order No:** BG5153
**Date Samples Received:** 29/09/23
**Date Instructions Received:** 29/09/23
**Date Analysis Completed:** 05/10/23

**Approved by:**

Gemma Berrisford
Deputy Client Services Supervisor

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

**Envirolab Job Number: 23/09674**

**Client Project Name: Edge Lane**

**Client Project Ref: 21LPL083**

| Lab Sample ID | 23/09674/1 | 23/09674/2 | 23/09674/3 | 23/09674/4 | 23/09674/5 | 23/09674/6 | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | TS | SS | TS | SS | | | | |
| Client Sample ID | Plot 168 | Plot 168 | Plot 171 | Plot 171 | Plot 174 | Plot 174 | | | | |
| Depth to Top | 0.10 | 0.40 | 0.10 | 0.40 | 0.10 | 0.40 | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | | | | |
| Sample Type | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | | | | |
| Sample Matrix Code | 6AE | 3 | 4ABE | 6AE | 4AE | 3 | | | | |
| % Stones >10mm$_{A}$ | <0.1 | <0.1 | 6.1 | <0.1 | 7.3 | 3.6 | | % w/w | 0.1 | A-T-044 |
| pH$_{D}^{M\#}$ | 6.53 | 8.63 | 8.28 | 8.28 | 8.50 | 8.36 | | pH | 0.01 | A-T-031s |
| Sulphate (water sol 2:1)$_{D}^{M\#}$ | 0.07 | 0.18 | 0.48 | 0.08 | 0.20 | 0.05 | | g/l | 0.01 | A-T-026s |
| Organic Matter$_{D}^{M\#}$ | 16.4 | 1.5 | 5.7 | 1.1 | 4.6 | 1.1 | | % w/w | 0.1 | A-T-032s |
| Arsenic$_{D}^{M\#}$ | 18 | 4 | 26 | 3 | 10 | 3 | | mg/kg | 1 | A-T-024s |
| Cadmium$_{D}^{M\#}$ | 0.7 | 0.6 | 1.2 | <0.5 | 0.9 | <0.5 | | mg/kg | 0.5 | A-T-024s |
| Copper$_{D}^{M\#}$ | 72 | 45 | 89 | 28 | 57 | 18 | | mg/kg | 1 | A-T-024s |
| Chromium (hexavalent)$_{D}$ | <1 | <1 | <1 | <1 | <1 | <1 | | mg/kg | 1 | A-T-040s |
| Lead$_{D}^{M\#}$ | 101 | 24 | 148 | 20 | 100 | 14 | | mg/kg | 1 | A-T-024s |
| Mercury$_{D}$ | <0.17 | <0.17 | 0.59 | <0.17 | 0.32 | <0.17 | | mg/kg | 0.17 | A-T-024s |
| Nickel$_{D}^{M\#}$ | 20 | 26 | 23 | 30 | 19 | 24 | | mg/kg | 1 | A-T-024s |
| Selenium$_{D}^{M\#}$ | 1 | <1 | <1 | <1 | <1 | <1 | | mg/kg | 1 | A-T-024s |
| Zinc$_{D}^{M\#}$ | 93 | 70 | 346 | 57 | 233 | 46 | | mg/kg | 5 | A-T-024s |
| VPH total (>C5-C10) | <2.00 | <2.00 | <2.00 | <2.00 | <2.00 | <2.00 | | mg/kg | 1 | Calc-stone+moi s |

**Envirolab Job Number: 23/09674**

**Client Project Name: Edge Lane**

**Client Project Ref: 21LPL083**

| Lab Sample ID | 23/09674/1 | 23/09674/2 | 23/09674/3 | 23/09674/4 | 23/09674/5 | 23/09674/6 | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | TS | SS | TS | SS | | | | |
| Client Sample ID | Plot 168 | Plot 168 | Plot 171 | Plot 171 | Plot 174 | Plot 174 | | | | |
| Depth to Top | 0.10 | 0.40 | 0.10 | 0.40 | 0.10 | 0.40 | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | | | | |
| Sample Type | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | | | | |
| Sample Matrix Code | 6AE | 3 | 4ABE | 6AE | 4AE | 3 | | | | |
| **Asbestos in Soil (inc. matrix)** | | | | | | | | | | |
| Asbestos in soil$_{D}^{\#}$ | 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 | | | | A-T-045 |

Envirolab Job Number: 23/09674

Client Project Name: Edge Lane

Client Project Ref: 21LPL083

| Lab Sample ID | 23/09674/1 | 23/09674/2 | 23/09674/3 | 23/09674/4 | 23/09674/5 | 23/09674/6 | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | TS | SS | TS | SS | | | | |
| Client Sample ID | Plot 168 | Plot 168 | Plot 171 | Plot 171 | Plot 174 | Plot 174 | | | | |
| Depth to Top | 0.10 | 0.40 | 0.10 | 0.40 | 0.10 | 0.40 | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | | | | |
| Sample Type | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | | | | |
| Sample Matrix Code | 6AE | 3 | 4ABE | 6AE | 4AE | 3 | | | | |
| **PAH-16MS** | | | | | | | | | | |
| Acenaphthene$_{A}^{M\#}$ | 0.27 | <0.01 | 0.14 | <0.01 | 0.18 | <0.01 | | mg/kg | 0.01 | A-T-019s |
| Acenaphthylene$_{A}^{M\#}$ | <0.01 | <0.01 | 0.02 | <0.01 | 0.02 | <0.01 | | mg/kg | 0.01 | A-T-019s |
| Anthracene$_{A}^{M\#}$ | 0.27 | <0.02 | 0.33 | <0.02 | 0.56 | <0.02 | | mg/kg | 0.02 | A-T-019s |
| Benzo(a)anthracene$_{A}^{M\#}$ | 0.43 | <0.04 | 1.54 | <0.04 | 1.79 | 0.06 | | mg/kg | 0.04 | A-T-019s |
| Benzo(a)pyrene$_{A}^{M\#}$ | 0.33 | <0.04 | 1.75 | <0.04 | 1.81 | 0.06 | | mg/kg | 0.04 | A-T-019s |
| Benzo(b)fluoranthene$_{A}^{M\#}$ | 0.49 | <0.05 | 2.27 | <0.05 | 2.56 | 0.08 | | mg/kg | 0.05 | A-T-019s |
| Benzo(ghi)perylene$_{A}^{M\#}$ | 0.20 | <0.05 | 0.90 | <0.05 | 1.10 | <0.05 | | mg/kg | 0.05 | A-T-019s |
| Benzo(k)fluoranthene$_{A}^{M\#}$ | 0.16 | <0.07 | 0.79 | <0.07 | 0.81 | <0.07 | | mg/kg | 0.07 | A-T-019s |
| Chrysene$_{A}^{M\#}$ | 0.45 | <0.06 | 1.60 | <0.06 | 1.91 | <0.06 | | mg/kg | 0.06 | A-T-019s |
| Dibenzo(ah)anthracene$_{A}$ | <0.04 | <0.04 | 0.20 | <0.04 | 0.22 | <0.04 | | mg/kg | 0.04 | A-T-019s |
| Fluoranthene$_{A}^{M\#}$ | 1.02 | <0.08 | 3.04 | <0.08 | 3.59 | 0.10 | | mg/kg | 0.08 | A-T-019s |
| Fluorene$_{A}^{M\#}$ | 0.20 | <0.01 | 0.10 | <0.01 | 0.13 | 0.01 | | mg/kg | 0.01 | A-T-019s |
| Indeno(123-cd)pyrene$_{A}^{M\#}$ | 0.25 | <0.03 | 1.11 | <0.03 | 1.31 | 0.05 | | mg/kg | 0.03 | A-T-019s |
| Naphthalene $_{A}^{M\#}$ | 0.19 | <0.03 | 0.12 | <0.03 | 0.05 | <0.03 | | mg/kg | 0.03 | A-T-019s |
| Phenanthrene$_{A}^{M\#}$ | 1.18 | 0.05 | 1.23 | <0.03 | 1.65 | 0.08 | | mg/kg | 0.03 | A-T-019s |
| Pyrene$_{A}^{M\#}$ | 0.85 | <0.07 | 2.78 | <0.07 | 3.15 | 0.09 | | mg/kg | 0.07 | A-T-019s |
| Total PAH-16MS$_{A}$ | 6.29 | <0.08 | 17.9 | <0.08 | 20.8 | 0.53 | | mg/kg | 0.01 | A-T-019s |

Envirolab Job Number: 23/09674

Client Project Name: Edge Lane

Client Project Ref: 21LPL083

| Lab Sample ID | 23/09674/1 | 23/09674/2 | 23/09674/3 | 23/09674/4 | 23/09674/5 | 23/09674/6 | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | TS | SS | TS | SS | | | | |
| Client Sample ID | Plot 168 | Plot 168 | Plot 171 | Plot 171 | Plot 174 | Plot 174 | | | | |
| Depth to Top | 0.10 | 0.40 | 0.10 | 0.40 | 0.10 | 0.40 | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | 28-Sep-23 | | | | |
| Sample Type | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | SOIL - ES | | | | |
| Sample Matrix Code | 6AE | 3 | 4ABE | 6AE | 4AE | 3 | | | | |
| **TPH CWG with Clean Up** | | | | | | | | | | |
| Ali >C5-C6$_{A}$ | <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 | | mg/kg | 0.01 | A-T-022s |
| Ali >C8-C10$_{A}$ | <1 | <1 | <1 | <1 | <1 | <1 | | mg/kg | 1 | A-T-055s |
| Ali >C10-C12$_{A}^{M\#}$ | <1 | <1 | <1 | <1 | <1 | <1 | | mg/kg | 1 | A-T-055s |
| Ali >C12-C16$_{A}^{M\#}$ | <1 | <1 | 1 | <1 | <1 | <1 | | mg/kg | 1 | A-T-055s |
| Ali >C16-C21$_{A}^{M\#}$ | 3 | 2 | 2 | <1 | 3 | <1 | | mg/kg | 1 | A-T-055s |
| Ali >C21-C35$_{A}^{M\#}$ | 43 | 38 | 47 | 4 | 54 | 6 | | mg/kg | 1 | A-T-055s |
| Total Aliphatics$_{A}$ | 46 | 41 | 50 | 4 | 58 | 6 | | mg/kg | 1 | Calc-As Recd |
| Aro >C5-C7$_{A}^{\#}$ | <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 | | mg/kg | 0.01 | A-T-022s |
| Aro >C8-C10$_{A}$ | <2 | <2 | <2 | <2 | <2 | <2 | | mg/kg | 1 | A-T-055s |
| Aro >C10-C12$_{A}$ | <1 | <1 | 1 | <1 | <1 | <1 | | mg/kg | 1 | A-T-055s |
| Aro >C12-C16$_{A}^{M\#}$ | 4 | 2 | 19 | <1 | 4 | 1 | | mg/kg | 1 | A-T-055s |
| Aro >C16-C21$_{A}^{M\#}$ | 16 | 5 | 43 | <1 | 21 | 2 | | mg/kg | 1 | A-T-055s |
| Aro >C21-C35$_{A}^{M\#}$ | 39 | 13 | 109 | 4 | 89 | 8 | | mg/kg | 1 | A-T-055s |
| Total Aromatics$_{A}$ | 59 | 20 | 172 | 4 | 114 | 12 | | mg/kg | 1 | Calc-As Recd |
| TPH (Ali & Aro >C5-C35)$_{A}$ | 105 | 61 | 222 | 7 | 172 | 17 | | mg/kg | 1 | Calc-As Recd |
| BTEX - Benzene$_{A}^{\#}$ | <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 | | mg/kg | 0.01 | A-T-022s |
| BTEX - Ethyl Benzene$_{A}^{\#}$ | <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 | | mg/kg | 0.01 | A-T-022s |
| BTEX - o Xylene$_{A}^{\#}$ | <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 | | 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 "^" | 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$^{o}$C / 11550µS/cm @ 20$^{o}$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

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:** Edge Lane

**Clients Project No:** 21LPL083

**Project No:** 23/09674

**Date Received:** 29/09/2023 (am)

**Cool Box Temperatures (°C):** 15.5

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 | 23/09674/1 | 23/09674/2 | 23/09674/3 | 23/09674/4 | 23/09674/5 | 23/09674/6 |
|---|---|---|---|---|---|---|
| **Client Sample No** | TS | SS | TS | SS | TS | SS |
| **Client Sample ID/Depth** | Plot 168 0.10m | Plot 168 0.40m | Plot 171 0.10m | Plot 171 0.40m | Plot 174 0.10m | Plot 174 0.40m |
| **Date Sampled** | 28/09/23 | 28/09/23 | 28/09/23 | 28/09/23 | 28/09/23 | 28/09/23 |
| A-T-019s | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 |
| A-T-022s | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 |
| A-T-024s | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 |
| A-T-026s | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 |
| A-T-031s | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 |
| A-T-032s | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 |
| A-T-040s | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 | 05/10/2023 |
| A-T-044 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 |
| A-T-045 | 02/10/2023 | 02/10/2023 | 02/10/2023 | 02/10/2023 | 02/10/2023 | 02/10/2023 |
| A-T-055s | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 |
| Calc-As Recd | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 |
| Calc-stone+mois | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 | 04/10/2023 |

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**

## SUMMARY OF CONTAMINATION ANALYSIS: METALS

**Project Name** Edge Lane
**Project No** 21LPL083
**Date** 30/10/2023

| SOIL TYPE | TS | SS |
|---|---|---|
| SAMPLE LOCATION | Plot 181 | Plot 181 |
| DEPTH (m) | 0.1 | 0.4 |
| pH | 8.08 | 8.29 |
| Sulphate (water sol 2:1) | 0.42 | 0.05 |
| Organic matter | 3.4 | 1 |
| Arsenic | 8 | 3 |
| Cadmium | <0.5 | <0.5 |
| Copper | 30 | 20 |
| Chromium (hexavalent) | <1 | <1 |
| Lead | 92 | 13 |
| Mercury | <0.17 | <0.17 |
| Nickel | 13 | 27 |
| Selenium | <1 | <1 |
| Zinc | 89 | 46 |
| Asbestos in Soil | NAD | NAD |
| Asbestos Matrix | - | - |
| Quantification | - | - |
| Organic matter | 3.4 | 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 | - | 8.29 | 8.08 | | | - |
| Sulphate (water sol 2:1) | - | 0.42 | 0.05 | | | - |
| Organic matter | - | 3.40 | 1.00 | | | |
| Arsenic | - | 8.00 | 3.00 | 32 | 32 | 37 |
| Cadmium | - | <0.05 | <0.05 | 10 | 10 | 22.1 |
| Copper | - | 30.00 | 20.00 | 4730 | 4790 | - |
| Chromium (hexavalent) | - | <1 | <1 | 3.62 | 3.63 | 20.5 |
| Lead | - | 92.00 | 13.00 | | | 200 |
| Mercury | - | <0.17 | <0.17 | 8.81 | 15.8 | - |
| Nickel | - | 27.00 | 13.00 | EA/ATRisk withdrawn Aug 2015 | | |
| Selenium | - | <1 | <1 | 375 | 375 | - |
| Zinc | - | 89.00 | 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** Edge Lane
**Project No** 21LPL083
**Date** 30/10/2023

| SOIL TYPE | TS | SS |
|---|---|---|
| SAMPLE LOCATION | Plot 181 | Plot 181 |
| DEPTH (m) | 0.1 | 0.4 |
| 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 | 26 | 2 |
| Total Aliphatics | 27 | 2 |
| Aro >C5-C7 | <0.01 | <0.01 |
| Aro >C7-C8 | <0.01 | <0.01 |
| Aro >C8-C10 | <2 | <2 |
| Aro >C10-C12 | <1 | <1 |
| Aro >C12-C16 | 5 | <1 |
| Aro >C16-C21 | 19 | 1 |
| Aro >C21-C35 | 78 | 4 |
| Total Aromatics | 102 | 5 |
| TPH (Ali & Aro) | 129 | 7 |
| 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 | 3.4 | 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 | 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 | 210000 | 210100 | - |
| Ali >C21-C35 | - | 26.00 | 2.00 | | | |
| Total Aliphatics | - | 27.00 | 2.00 | | | |
| Aro >C5-C7 | - | <0.01 | <0.01 | 0.137 | 0.871 | - |
| Aro >C7-C8 | - | <0.01 | <0.01 | 113 | 780 | - |
| Aro >C8-C10 | - | <2 | <2 | 20.5 | 232 | - |
| Aro >C10-C12 | - | <1 | <1 | 70 | 468 | - |
| Aro >C12-C16 | - | 5.00 | <1 | 165 | 830 | - |
| Aro >C16-C21 | - | 19.00 | 1.00 | 319 | 1040 | - |
| Aro >C21-C35 | - | 78.00 | 4.00 | 1120 | 1710 | - |
| Total Aromatics | - | 102.00 | 5.00 | | | |
| TPH (Ali & Aro) | - | 129.00 | 7.00 | | | |
| 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 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** Edge Lane
**Project No** 21LPL083
**Date** 30/10/23

| SOIL TYPE | TS | SS |
|---|---|---|
| SAMPLE LOCATION | Plot 181 | Plot 181 |
| DEPTH (m) | 0.1 | 0.4 |
| Acenaphthene | 0.11 | <0.01 |
| Acenaphthylene | 0.07 | <0.01 |
| Anthracene | 0.31 | <0.02 |
| Benzo(a)anthracene | 1.51 | <0.04 |
| Benzo(a)pyrene | 1.47 | <0.04 |
| Benzo(b)fluoranthene | 1.76 | <0.05 |
| Benzo(ghi)perylene | 0.85 | <0.05 |
| Benzo(k)fluoranthene | 0.68 | <0.07 |
| Chrysene | 1.6 | <0.06 |
| Dibenzo(ah)anthracene | 0.17 | <0.04 |
| Fluoranthene | 2.85 | <0.08 |
| Fluorene | 0.09 | <0.01 |
| Indeno(123-cd)pyrene | 1 | <0.03 |
| Naphthalene | 0.03 | <0.03 |
| Phenanthrene | 1.12 | <0.03 |
| Pyrene | 2.75 | <0.07 |
| Organic Matter | 3.4 | 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 | - | 0.11 | <0.01 | 608 | 2760 | - |
| Acenaphthylene | - | 0.07 | <0.01 | | | - |
| Anthracene | - | 0.31 | <0.02 | 10200 | 26200 | - |
| Benzo(a)anthracene | - | 1.51 | <0.04 | 4.52 | 8.54 | - |
| Benzo(a)pyrene | - | 1.47 | <0.04 | 1.51 | 2.05 | 4.95 |
| Benzo(b)fluoranthene | - | 1.76 | <0.05 | 7.72 | 9.86 | - |
| Benzo(ghi)perylene | - | 0.85 | <0.05 | 96.2 | 103 | - |
| Benzo(k)fluoranthene | - | 0.68 | <0.07 | 84.4 | 100 | - |
| Chrysene | - | 1.60 | <0.06 | 585 | 927 | - |
| Dibenzo(ah)anthracene | - | 0.17 | <0.04 | 0.838 | 1 | - |
| Fluoranthene | - | 2.85 | <0.08 | 983 | 2980 | - |
| Fluorene | - | 0.09 | <0.01 | 735 | 2610 | - |
| Indeno(123-cd)pyrene | - | 1.00 | <0.03 | 7.31 | 9.75 | - |
| Naphthalene | - | 0.03 | <0.03 | 0.829 | 12.2 | - |
| Phenanthrene | - | 1.12 | <0.03 | | | - |
| Pyrene | - | 2.75 | <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:** 23/10773
**Issue Number:** 1 **Date:** 10 November, 2023

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

**Project Manager:** Betts Geolab/Graham Clark
**Project Name:** Edge Lane
**Project Ref:** 21LPL083
**Order No:** BG5181
**Date Samples Received:** 31/10/23
**Date Instructions Received:** 01/11/23
**Date Analysis Completed:** 10/11/23

**Approved by:**

Gemma Berrisford
Deputy Client Services Supervisor

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

**Envirolab Job Number: 23/10773**

**Client Project Name: Edge Lane**

**Client Project Ref: 21LPL083**

| Lab Sample ID | 23/10773/1 | 23/10773/2 | | | | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | | | | | | | | |
| Client Sample ID | Plot 181 | Plot 181 | | | | | | | | |
| Depth to Top | 0.1 | 0.4 | | | | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 30-Oct-23 | 30-Oct-23 | | | | | | | | |
| Sample Type | SOIL - ES | SOIL - ES | | | | | | | | |
| Sample Matrix Code | 5ABE | 3 | | | | | | | | |
| % Stones >10mm$_{A}$ | 6.2 | <0.1 | | | | | | % w/w | 0.1 | A-T-044 |
| pH$_{D}^{M\#}$ | 8.08 | 8.29 | | | | | | pH | 0.01 | A-T-031s |
| Sulphate (water sol 2:1)$_{D}^{M\#}$ | 0.42 | 0.05 | | | | | | g/l | 0.01 | A-T-026s |
| Organic Matter$_{D}^{M\#}$ | 3.4 | 1.0 | | | | | | % w/w | 0.1 | A-T-032s |
| Arsenic$_{D}^{M\#}$ | 8 | 3 | | | | | | mg/kg | 1 | A-T-024s |
| Cadmium$_{D}^{M\#}$ | <0.5 | <0.5 | | | | | | mg/kg | 0.5 | A-T-024s |
| Copper$_{D}^{M\#}$ | 30 | 20 | | | | | | mg/kg | 1 | A-T-024s |
| Chromium (hexavalent)$_{D}$ | <1 | <1 | | | | | | mg/kg | 1 | A-T-040s |
| Lead$_{D}^{M\#}$ | 92 | 13 | | | | | | mg/kg | 1 | A-T-024s |
| Mercury$_{D}$ | <0.17 | <0.17 | | | | | | mg/kg | 0.17 | A-T-024s |
| Nickel$_{D}^{M\#}$ | 13 | 27 | | | | | | mg/kg | 1 | A-T-024s |
| Selenium$_{D}^{M\#}$ | <1 | <1 | | | | | | mg/kg | 1 | A-T-024s |
| Zinc$_{D}^{M\#}$ | 89 | 46 | | | | | | mg/kg | 5 | A-T-024s |
| VPH total (>C5-C10) | <2.00 | <2.00 | | | | | | mg/kg | 1 | Calc-stone+mois |

Envirolab Job Number: 23/10773

Client Project Name: Edge Lane

Client Project Ref: 21LPL083

| Lab Sample ID | 23/10773/1 | 23/10773/2 | | | | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | | | | | | | | |
| Client Sample ID | Plot 181 | Plot 181 | | | | | | | | |
| Depth to Top | 0.1 | 0.4 | | | | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 30-Oct-23 | 30-Oct-23 | | | | | | | | |
| Sample Type | SOIL - ES | SOIL - ES | | | | | | | | |
| Sample Matrix Code | 5ABE | 3 | | | | | | | | |
| **Asbestos in Soil (inc. matrix)** | | | | | | | | | | |
| Asbestos in soil$_{D}^{\#}$ | 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 | | | | | | | | A-T-045 |

Envirolab Job Number: 23/10773

Client Project Name: Edge Lane

Client Project Ref: 21LPL083

| Lab Sample ID | 23/10773/1 | 23/10773/2 | | | | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | | | | | | | | |
| Client Sample ID | Plot 181 | Plot 181 | | | | | | | | |
| Depth to Top | 0.1 | 0.4 | | | | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 30-Oct-23 | 30-Oct-23 | | | | | | | | |
| Sample Type | SOIL - ES | SOIL - ES | | | | | | | | |
| Sample Matrix Code | 5ABE | 3 | | | | | | | | |
| **PAH-16MS** | | | | | | | | | | |
| Acenaphthene$_{A}^{M\#}$ | 0.11$^{U}$ | <0.01$^{U}$ | | | | | | mg/kg | 0.01 | A-T-019s |
| Acenaphthylene$_{A}^{M\#}$ | 0.07 | <0.01 | | | | | | mg/kg | 0.01 | A-T-019s |
| Anthracene$_{A}^{M\#}$ | 0.31 | <0.02 | | | | | | mg/kg | 0.02 | A-T-019s |
| Benzo(a)anthracene$_{A}^{M\#}$ | 1.51 | <0.04 | | | | | | mg/kg | 0.04 | A-T-019s |
| Benzo(a)pyrene$_{A}^{M\#}$ | 1.47 | <0.04 | | | | | | mg/kg | 0.04 | A-T-019s |
| Benzo(b)fluoranthene$_{A}^{M\#}$ | 1.76 | <0.05 | | | | | | mg/kg | 0.05 | A-T-019s |
| Benzo(ghi)perylene$_{A}^{M\#}$ | 0.85 | <0.05 | | | | | | mg/kg | 0.05 | A-T-019s |
| Benzo(k)fluoranthene$_{A}^{M\#}$ | 0.68 | <0.07 | | | | | | mg/kg | 0.07 | A-T-019s |
| Chrysene$_{A}^{M\#}$ | 1.60 | <0.06 | | | | | | mg/kg | 0.06 | A-T-019s |
| Dibenzo(ah)anthracene$_{A}$ | 0.17 | <0.04 | | | | | | mg/kg | 0.04 | A-T-019s |
| Fluoranthene$_{A}^{M\#}$ | 2.85 | <0.08 | | | | | | mg/kg | 0.08 | A-T-019s |
| Fluorene$_{A}^{M\#}$ | 0.09 | <0.01 | | | | | | mg/kg | 0.01 | A-T-019s |
| Indeno(123-cd)pyrene$_{A}^{M\#}$ | 1.00 | <0.03 | | | | | | mg/kg | 0.03 | A-T-019s |
| Naphthalene $_{A}^{M\#}$ | 0.03$^{U}$ | <0.03$^{U}$ | | | | | | mg/kg | 0.03 | A-T-019s |
| Phenanthrene$_{A}^{M\#}$ | 1.12 | <0.03 | | | | | | mg/kg | 0.03 | A-T-019s |
| Pyrene$_{A}^{M\#}$ | 2.75 | <0.07 | | | | | | mg/kg | 0.07 | A-T-019s |
| Total PAH-16MS$_{A}$ | 16.4 | <0.08 | | | | | | mg/kg | 0.01 | A-T-019s |

Envirolab Job Number: 23/10773

Client Project Name: Edge Lane

Client Project Ref: 21LPL083

| Lab Sample ID | 23/10773/1 | 23/10773/2 | | | | | | Units | Limit of Detection | Method ref |
|---|---|---|---|---|---|---|---|---|---|---|
| Client Sample No | TS | SS | | | | | | | | |
| Client Sample ID | Plot 181 | Plot 181 | | | | | | | | |
| Depth to Top | 0.1 | 0.4 | | | | | | | | |
| Depth To Bottom | | | | | | | | | | |
| Date Sampled | 30-Oct-23 | 30-Oct-23 | | | | | | | | |
| Sample Type | SOIL - ES | SOIL - ES | | | | | | | | |
| Sample Matrix Code | 5ABE | 3 | | | | | | | | |
| **TPH CWG with Clean Up** | | | | | | | | | | |
| 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$_{A}$ | <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$_{A}^{M\#}$ | 26 | 2 | | | | | | mg/kg | 1 | A-T-055s |
| Total Aliphatics$_{A}$ | 27 | 2 | | | | | | mg/kg | 1 | Calc-As Recd |
| 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$_{A}$ | <2 | <2 | | | | | | mg/kg | 1 | A-T-055s |
| Aro >C10-C12$_{A}$ | <1 | <1 | | | | | | mg/kg | 1 | A-T-055s |
| Aro >C12-C16$_{A}$ | 5 | <1 | | | | | | mg/kg | 1 | A-T-055s |
| Aro >C16-C21$_{A}^{M\#}$ | 19 | 1 | | | | | | mg/kg | 1 | A-T-055s |
| Aro >C21-C35$_{A}^{M\#}$ | 78 | 4 | | | | | | mg/kg | 1 | A-T-055s |
| Total Aromatics$_{A}$ | 102 | 5 | | | | | | mg/kg | 1 | Calc-As Recd |
| TPH (Ali & Aro >C5-C35)$_{A}$ | 129 | 7 | | | | | | mg/kg | 1 | Calc-As Recd |
| 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 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 "^" | 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$^{o}$C / 11550µS/cm @ 20$^{o}$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

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:** Edge Lane

**Clients Project No:** 21LPL083

**Project No:** 23/10773

**Date Received:** 01/11/2023 (am)

**Cool Box Temperatures (°C):** 13.1

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 Analysis Dates

| Lab Sample ID | 23/10773/1 | 23/10773/2 |
|---|---|---|
| Client Sample No | TS | SS |
| Client Sample ID/Depth | Plot 181 0.1m | Plot 181 0.4m |
| Date Sampled | 30/10/23 | 30/10/23 |
| A-T-019s | 09/11/2023 | 09/11/2023 |
| A-T-022s | 10/11/2023 | 10/11/2023 |
| A-T-024s | 09/11/2023 | 09/11/2023 |
| A-T-026s | 09/11/2023 | 09/11/2023 |
| A-T-031s | 09/11/2023 | 09/11/2023 |
| A-T-032s | 10/11/2023 | 10/11/2023 |
| A-T-040s | 09/11/2023 | 09/11/2023 |
| A-T-044 | 09/11/2023 | 09/11/2023 |
| A-T-045 | 03/11/2023 | 03/11/2023 |
| A-T-055s | 07/11/2023 | 07/11/2023 |
| Calc-As Recd | 10/11/2023 | 10/11/2023 |
| Calc-stone+mois | 10/11/2023 | 10/11/2023 |

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**