JPC Environmental Services
(A division of JP Chick & Partners Ltd)

Consulting Civil & Structural Engineers
7 Museum Street Ipswich Suffolk IP1 1HQ
T 01473 280699 F 01473 280701
E. ipswich@chick.co.uk www.chick.co.uk

02 June 2020
IE19/040/HP/RMC (rev1)

Mr Ian Burnett,
Maltings House,
Mill Road
Cotton,
Stowmarket, IP14 4QL

SUPPLEMENTARY INVESTIGATION TO INFORM REMEDIATION STRATEGY
FLAX FARM, STANSFIELD ROAD, POSLINGFORD, SUDBURY, CO10 8RD

1.0 INTRODUCTION / BRIEF

1.01 JPC Environmental Services Ltd were appointed by Ian Burnett to undertake a further intrusive site investigation, to:

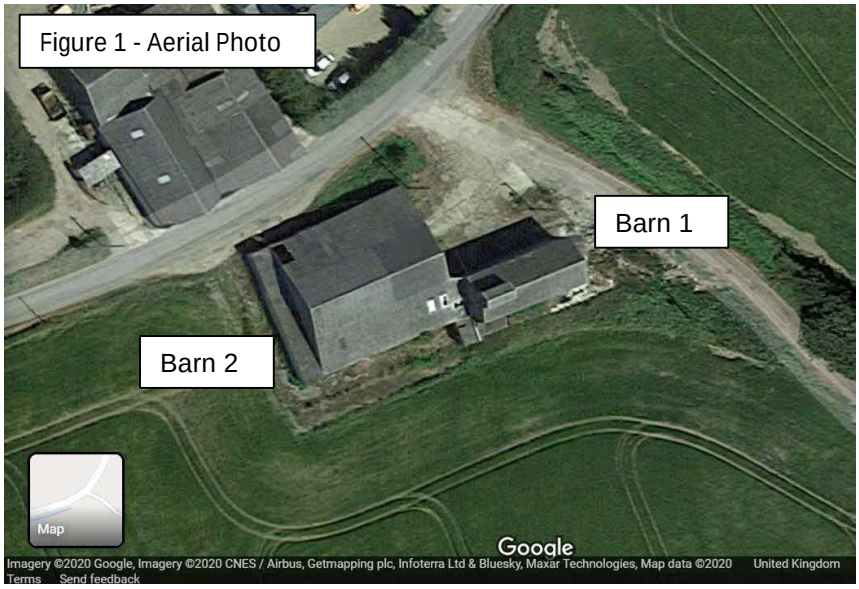
explore previously identified incidents of heavy metal contamination, with the aim of refining the extent of the remediation strategy, to

secure a fixed fee proposal from a specialist contractor (SRC Group).

1.02 This supplementary site investigation report should be read in conjunction with the JPC Environmental Services Phase II Intrusive Investigation Report.

2.0 BACKGROUND

2.1 The site comprises a pair of barns, with lean-too additions, used for agricultural purposes. It is our understanding that the on-site structures may either be converted to form a single dwelling, or (subject to planning) will be demolished to facilitate the construction of a single new build residential dwelling.



2.2 An intrusive Phase II ground investigation was undertaken in April 2020, comprising a series of 10No.machine excavated trial pits. The trial pits, which were extending to a maximum depth of 1.2m below existing surfacing / external ground level, enabled the collection of near surface and sub-surface soil samples for off-site chemical testing. The trial pits were randomly located across the site, and included areas of concrete hardstanding as well as areas of open ground.

2.3 The ground investigation identified a variable but relatively shallow depth of Made Ground, containing a variety of anthropogenic inclusions such as brick, concrete and roofing materials. The underlying natural geology comprised soft light brown Clay.

2.4 Chemical testing revealed that the deposits of made ground contained elevated concentrations of toxic metals including Lead and Arsenic, as well as organic contamination in the form of Total Petroleum Hydrocarbons (TPHs), and Polycyclic Aromatic Hydrocarbons (PAHs). Fragments of asbestos cement sheeting were also noted within the made ground and spread across the surface of the site.

3.0 SUPPLEMENTARY SITE INVESTIGATION

3.1 The additional ground investigation was undertaken by Robin Crowther on Tuesday 12th May on behalf of JPC Environmental Services Ltd. Also in attendance was Craig Chaplin of SRC Group, who supplied and operated a small tracked excavator with breaker attachment. The positions of the additional trial pits were selected based on:

the location of previously identified contamination

the margin between the existing hard standing and the adjacent field, and

changes in surface construction, which might have an impact on future demolition / remediation

3.2 The trial pits were excavated as follows:

TP201 & TP202 – position in the north east courtyard, these trail pits were excavated either side of TP103 to establish the extent of Lead contamination previously found in soils from TP103

TP203 – excavated adjacent to Barn 1, to establish the depth of foundation (by SRC to inform their demolition quotation)

TP204 – positioned close to the intersection between the two barns, to identify any changes in construction

TP205-207 – located within the central and northern bays of Barn 2, to explore the extent of the Asbestos and PAH contamination reported in TP109 and TP110

TP208 – located within a lean-too structure at the end of Barn 2

TP209 & TP210 – located within the southern bat of Barn 2

TP211 – excavated close to the position of TP104 to further investigate what appears to have been a more concentrated cache of buried asbestos

TP212-219 - a series of shallow surface scrapes to establish the presence of Asbestos fragments within the exposed soils / field margin immediately adjacent the farm buildings and adj. hard standing.

TP220-TP222 - a series of shallow surface scrapes to establish the presence of Asbestos fragments within the exposed soils / field margin immediately west of Barn 2 and nearby TP102

3.3 A copy of the trial pit location plan is shown in figure 2 below.

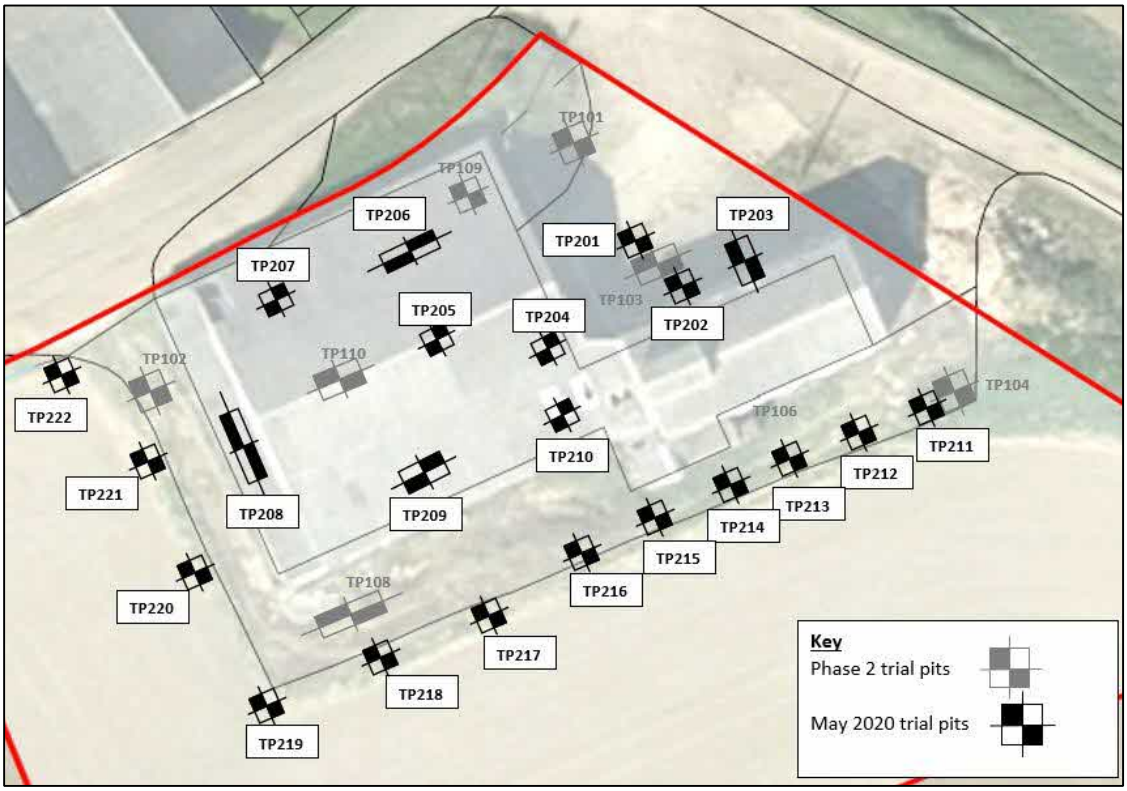


Figure 2 - Trial Pit Location Plan

4.0 CHEMICAL TESTING – SOILS

4.1 Soil samples were only collected from trial pit locations TP201 – TP211. Trial pits TP212 – TP222 were for observational use only.

4.2 The soil samples from TP201 – TP211 were all submitted to i2 Analytical, an MCerts accredited laboratory. Most of soil samples were tested for location specific suites, rather than a broad spectrum of toxic metals, speciated polycyclic aromatic hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPHs). A full copy of the laboratory test results is enclosed.

4.3 Soil screening values used in this risk assessment have been drawn from the Category 4 Screening Levels (C4SL's) and Suitable for Use Levels (S4ULs). This screening assessment will therefore utilise the most recent C4SL's and LQM/CIEH S4UL's to evaluate the potential risk to human health.

4.4 As the potential 'availability' of contaminants can be affected by the proportion of organic matter in the soil (SOM). The C4SL's are based on a SOM of 6%, however some of the LQM/CIEH S4UL's have calculated screening values based on 1%, 2.5% and 6% SOM.

4.5 Where an LQM/ CIEH S4UL has been utilised, this has been selected based on a SOM of 1%. Any on-site contaminant concentrations, which exceed these values will be interrogated further using the specific SOM of the relevant sample.

4.6 The soil-based screening criteria (SC) utilised for this assessment, have been selected based on the current 'Residential with Home Grown Produce' Land use. The screening criterion used in this assessment are shown in the Table below and overleaf, along with a summary of the laboratory test results:

Table 1 - Laboratory Test Results

Screening Criteria: Residential (with home grown produce)			
Contaminant of Concern	Range of concentrations (mg/kg)	Risk Assessment Screening Value (mg/kg)	No. of samples exceeding criteria
Heavy Metals			
Arsenic	11-34	37	0
Cadmium	<0.2-0.4	11	0
Chromium Hexavalent	<4.0	6	0
Copper	15-91	2400	0
Mercury	<0.3-2.7	1.2	1 sample TP204A (0.30-0.35m)
Nickel	19-55	180	0
Lead	39-4600	200	1 sample TP202A (0.30-0.35m)
Selenium	<1.0	250	0
Zinc	96-160	3700	0
PAHs			
Naphthalene	<0.05	13	0
Acenaphthylene	<0.05-0.24	920	0
Acenaphthene	<0.05-0.42	1100	0
Flourene	<0.05-0.47	860	0
Phenanthrene	0.59-6.4	440	0
Anthracene	0.25-1.8	11000	0
Fluoranthene	0.68-16	890	0
Pyrene	0.7-14	2000	0

Benz(a)anthracene	0.4-9.4	13	0
Chrysene	0.39-7.2	27	0
Benzo(b)fluoranthene	0.6-9.2	3.7	4 samples TP203B (0.30-0.35m) TP207A (0.20-0.25m) TP208A (0.30-0.35m) TP210A (0.35-0.40m)
Benzo(k)fluoranthene	0.3-6.2	100	0
Benzo(a)pyrene	0.39-8.1	3.0	5 samples TP203B (0.30-0.35m) TP204A (0.30-0.35m) TP207A (0.20-0.25m) TP208A (0.30-0.35m) TP210A (0.35-0.40m)
Indeno(123-cd)pyrene	0.29-5.0	41	0
Dibenz(ah)anthracene	<0.05-1.2	0.30	5 samples TP203B (0.30-0.35m) TP204A (0.30-0.35m) TP207A (0.20-0.25m) TP208A (0.30-0.35m) TP210A (0.35-0.40m)
Benzo(ghi)perylene	0.25-5.5	340	0
TPHs			
TPH Combined EC8-10	<0.1	65	0
TPH Combined EC10-21	<10-110	180	0
TPH Combined EC21-40	<10-130	1500	0
Asbestos			
Asbestos	Non-detected – Chrysotile - Loose Fibres, Chrysotile Hard Cement, Amosite – Loose Fibrous Debris, Crocidolite – Loose Fibres	Positive ID	6 samples TP202B (0.20m) TP203C (0.10m) TP204A (0.30-0.35m) TP205A (0.25-0.30m) TP211A (0.15-0.20m) TP211B (0.20-0.25m)

5.0 DISCUSSION OF SOIL CONCENTRATIONS

i) Lead

5.1 Soil collected from TP202, close to TP103 where evidence of lead contamination was previously encountered, were found to contain a lead concentration of 4,600mg/kg. This confirms that the original reading is likely to be correct, and that the investigations have identified a localised area of lead impacted soils. We consider it likely that this contamination is localised i.e. a 'hotspot' isolated to an area including TP103 and TP202 at surface level only (i.e. 0.0m to 0.35m bgl). The absence of any significant lead concentrations within soils from TP201 and TP203 indicate that this does not extend

significantly in either an easterly or northerly direction. Elevated concentrations were also not identified within the sample from TP204, to the west.

ii) Mercury

5.2 Whilst no elevated concentrations of Mercury where identified by the initial site investigation, the supplementary investigation identified a single incident (TP204) where Mercury exceeded the selected screening criteria. Again, the concentration of Mercury was much lower in the surrounding trial pits, indicating that this is very localised. The concentration of Mercury was also only marginally above the screening criteria and therefore not indicative of a significant risk.

iii) PAHs

5.3 A selection of PAH compounds including Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenz(ah)anthracene, were found to be above their respective screening criteria within samples of made ground retrieved from trial pits TP203, TP204, TP207, TP208 and TP210. The elevated levels of PAHs were mainly encountered within soils immediately beneath the concrete hardstanding in and around the main structure. It is therefore likely that these are associated with the underlying sub-base material brought on to site, rather than due to any on-site activities.

iv) Asbestos

5.4 Asbestos was positively identified by the laboratory within soils or materials collected from TP202, TP203, TP204, TP205, TP211 and TP211. In addition to the laboratory findings, asbestos fragments were visually identified in trial pits undertaken to the south side on the two barns and in several trial pits within the entrance and beneath areas of concrete hardstanding.

5.5 It appears that there are two separate sources for the asbestos detected on site. The most prevalent is the incident of surface fragments arising from the existing corrugated sheet, used in the construction of the two barns. This is in a poor condition, which enables full and partial sheets to become detached and break up once on the ground. Wind and animal activity have then resulted in this become dispersed over a wide area.

5.6 The second source is actively buried pieces of cement sheet, typically larger than the surface deposits and in better condition, which has been laid down beneath areas of newer construction. This was readily apparent in the sides of TP103, where pieces of corrugated sheet were found within a layer of sand & gravel immediately under the concrete hard standing. See image overleaf.

5.7 While the fragments / pieces asbestos sheet, encountered on site, were all ‘loose’ rather than bonded to the concrete slab, we cannot dismiss the possibility that some of the concrete hard standing or foundations may have asbestos bonded to it. In such cases the asbestos cannot me removed manual

or by machine, due to the risk of fibre release. The section of impacted concrete would be deemed to be asbestos waste and disposed of accordingly.

6.0 FINDINGS THAT DIFFER FROM PHASE II INVESTIGATION

6.1 While ground conditions were broadly similar to those encountered during the earlier investigation, and previous encountered incidents of contamination were verified, the depth and breadth of excavation and screening activities is likely to be more extensive than originally anticipated.

6.2 Within the immediate environs of the two barns and associated hard standing, and where soft landscaped / garden land is proposed, the depth of excavation is likely to increase from the 0.30m bgl (as recommended in the JPC Phase II Investigation Report) to between 0.35m and 0.4m bgl, to ensure all the contamination has been captured.

6.3 It will also be necessary to undertake a thorough inspection and hand pick of the near surface soils within the edges of the adjacent field. Trial pits TP211 to TP219 indicate that the first 5.0m or so of field has been impacted by wind blown asbestos fragments.

6.4 All other recommendations remain applicable and are reiterated below for clarity.

7.0 WAY FORWARD

7.1 Based on our observations, and subsequent laboratory soils data, JPC Environmental Services would advise the following:

A program of remedial works will be required to make the site safe for residential occupation, to address the risk posed by Lead, TPH, PAHs and Asbestos within the near surface soils.

The level of the Lead contamination at TP103 and TP202, will require targeted removal as the concentration would make the impacted soils 'hazardous waste'.

The less significantly elevated concentrations of Arsenic (40mg/kg in TP109) and Mercury (2.7mg/kg in TP204) are likely to be dealt with as a result of the works employed to address the asbestos contamination, rather than requiring separate management.

The remediation strategy is likely to be based on the excavation and removal of contaminated soils from future garden and landscaped areas to a depth of 0.35-0.4m bgl. Where hardstanding, driveways or parking areas are to be provided the soils need only be removed to the depth of construction.

Material segregation (screening) should be considered, to minimise the volume of more expensive 'hazardous waste' generated by the remediation works.

Due to the wide-spread presence of Asbestos fragments on the surface, we recommend a through hand pick of the site prior to any demolition works or preparatory plant activity. The fragments must be put into UN approved bags, double bagged and disposed of at a suitably permitted waste site, with copies of all waste tickets retained as evidence.

Where on-site soils are removed, replacement soils must comply with BS3882:2015 and be sourced from a reputable supplier.

Based on the waste classification undertaken as part of the Phase II assessment, most of the contaminated soils removed from site are likely to be classified as 'Non-Hazardous' waste.

Soils from areas surrounding TP102, TP103 & TP202 will need to be segregated and disposed of 'Hazardous' Waste.

We trust the above and attached are self-explanatory however if you have any queries or require any further information please do not hesitate to contact us.

Yours sincerely,

H C Purkis BSc. (Hons) GradCIWEM
Senior Environmental Engineer

On behalf of JPC Environmental Services
a division of J P Chick & Partners Limited

R M Crowther PIEMA
Divisional Director

On behalf of JPC Environmental Services
a division of J P Chick & Partners Limited

Enc. Laboratory Test Report – 20-99607
Trial Pit Contaminant Exceedances Plan
Asbestos Exceedances Plan
Site Photographs

Robin Crowther
JP Chick & Partners Ltd
7 Museum Street
Suffolk
Ipswich
IP1 1HQ

e: robin.crowther@chick.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-99607

Project / Site name:	Flax Barn, Poslingford	**Samples received on:**	14/05/2020
Your job number:	IE20-040	**Samples instructed on:**	14/05/2020
Your order number:		**Analysis completed by:**	20/05/2020
Report Issue Number:	1	**Report issued on:**	20/05/2020
Samples Analysed:	3 bulk samples - 12 soil samples		

Signed: [redacted]

Karolina Marek
Head of Reporting Section

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-99607

Project / Site name: Flax Barn, Poslingford

Lab Sample Number				1510420	1510421	1510422	1510423	1510426
Sample Reference				TP201	TP202	TP203	TP203	TP204
Sample Number				A	A	A	B	A
Depth (m)				0.40-0.45	0.30-0.35	0.07-0.15	0.30-0.35	0.30-0.35
Date Sampled				12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Time Taken				1258	1235	1140	1140	1320
Analytical Parameter (Soil Analysis)								
Stone Content	%	0.1	NONE	< 0.1	< 0.1	-	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	21	14	-	26	44
Total mass of sample received	kg	0.001	NONE	1.2	1.2	-	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile - Loose Fibres
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	-	-	-	8.2	8.2
Total Cyanide	mg/kg	1	MCERTS	-	-	-	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	-	-	-	< 1	< 1
Thiocyanate as SCN	mg/kg	5	NONE	-	-	-	< 5.0	< 5.0
Total Sulphate as SO_4	mg/kg	50	MCERTS	-	-	-	860	1200
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	200	200
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	0.099	0.10
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	98.9	101
Sulphide	mg/kg	1	MCERTS	-	-	-	26	1.4
Organic Matter	%	0.1	MCERTS	-	-	-	4.4	7.3
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	0.24	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	0.42	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	-	0.47	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	6.4	2.3
Anthracene	mg/kg	0.05	MCERTS	-	-	-	1.8	0.67
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	16	5.3
Pyrene	mg/kg	0.05	MCERTS	-	-	-	14	5.0
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	9.4	3.3
Chrysene	mg/kg	0.05	MCERTS	-	-	-	7.2	2.6
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	9.2	3.4
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	6.2	2.0
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	8.1	3.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	5.0	1.6
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	1.2	0.54
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	5.5	2.0
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	-	90.6	31.8

Analytical Report Number: 20-99607

Project / Site name: Flax Barn, Poslingford

Lab Sample Number				1510420	1510421	1510422	1510423	1510426
Sample Reference				TP201	TP202	TP203	TP203	TP204
Sample Number				A	A	A	B	A
Depth (m)				0.40-0.45	0.30-0.35	0.07-0.15	0.30-0.35	0.30-0.35
Date Sampled				12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Time Taken				1258	1235	1140	1140	1320
Analytical Parameter (Soil Analysis)								
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	15	11
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	2.3	3.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	-	0.3	0.4
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	22	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	15	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	140	4600	-	190	60
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	-	0.5	2.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	21	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	120	160
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
TPH (C10 - C25)	mg/kg	10	MCERTS	-	-	-	110	58
TPH (C25 - C40)	mg/kg	10	MCERTS	-	-	-	97	67

Analytical Report Number: 20-99607

Project / Site name: Flax Barn, Poslingford

Lab Sample Number				1510427	1510428	1510429	1510430	1510431
Sample Reference				TP205	TP206	TP207	TP208	TP209
Sample Number				A	A	A	A	A
Depth (m)				0.25-0.30	0.20-0.25	0.20-0.25	0.30-0.35	0.25-0.30
Date Sampled				12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Time Taken				1328	1338	1454	1440	1420
Analytical Parameter (Soil Analysis)								
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	22	32	35	34	35
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile, Amosite, Crocidolite - Loose Fibres; Chrysotile, Amosite - Loose Fibrous Debris	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	10.7	8.2	8.3	8.4	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Thiocyanate as SCN	mg/kg	5	NONE	< 5.0	7.4	7.8	< 5.0	7.4
Total Sulphate as SO_4	mg/kg	50	MCERTS	1500	830	990	1300	890
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	240	240	650	470	140
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.12	0.12	0.33	0.23	0.069
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	122	122	326	233	69.2
Sulphide	mg/kg	1	MCERTS	4.3	19	23	< 1.0	10
Organic Matter	%	0.1	MCERTS	1.3	6.5	8.3	5.7	7.2
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.36	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.43	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.59	1.3	5.1	2.7	0.86
Anthracene	mg/kg	0.05	MCERTS	0.19	0.40	0.92	0.75	0.25
Fluoranthene	mg/kg	0.05	MCERTS	0.68	2.1	8.5	6.6	1.5
Pyrene	mg/kg	0.05	MCERTS	0.70	2.0	7.5	5.9	1.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.40	1.3	5.3	4.1	0.93
Chrysene	mg/kg	0.05	MCERTS	0.39	1.1	3.7	3.2	0.78
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.60	1.4	5.2	4.3	0.95
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.30	0.88	3.4	2.4	0.60
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.39	1.4	4.7	3.6	0.88
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.29	0.72	2.7	2.3	0.47
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.90	0.64	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.25	0.78	2.9	2.5	0.54
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	4.78	13.4	51.6	38.9	9.17

Analytical Report Number: 20-99607

Project / Site name: Flax Barn, Poslingford

Lab Sample Number				1510427	1510428	1510429	1510430	1510431
Sample Reference				TP205	TP206	TP207	TP208	TP209
Sample Number				A	A	A	A	A
Depth (m)				0.25-0.30	0.20-0.25	0.20-0.25	0.30-0.35	0.25-0.30
Date Sampled				12/05/2020	12/05/2020	12/05/2020	12/05/2020	12/05/2020
Time Taken				1328	1338	1454	1440	1420
Analytical Parameter (Soil Analysis)								
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	34	12	12	12	12
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	4.4	1.8	3.1	4.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	0.2	0.2	0.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	37	21	22	22	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	91	18	24	20	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	39	60	74	55	45
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.6	0.7	0.4	0.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	55	23	25	25	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	120	150	99	98	100
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C25)	mg/kg	10	MCERTS	< 10	71	42	40	11
TPH (C25 - C40)	mg/kg	10	MCERTS	< 10	57	22	25	< 10

Analytical Report Number: 20-99607

Project / Site name: Flax Barn, Poslingford

Lab Sample Number				1510432	1510433			
Sample Reference				TP210	TP211			
Sample Number				A	A			
Depth (m)				0.35-0.40	0.15-0.20			
Date Sampled				12/05/2020	12/05/2020			
Time Taken				1358	1530			
Analytical Parameter (Soil Analysis)								
Stone Content	%	0.1	NONE	< 0.1	-			
Moisture Content	%	N/A	NONE	43	-			
Total mass of sample received	kg	0.001	NONE	1.2	-			
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile- Loose Fibrous Debris, Hard/Cement Type Material, Loose Fibres			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.1	-			
Total Cyanide	mg/kg	1	MCERTS	< 1	-			
Free Cyanide	mg/kg	1	MCERTS	< 1	-			
Thiocyanate as SCN	mg/kg	5	NONE	< 5.0	-			
Total Sulphate as SO_4	mg/kg	50	MCERTS	1000	-			
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	290	-			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.14	-			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	145	-			
Sulphide	mg/kg	1	MCERTS	45	-			
Organic Matter	%	0.1	MCERTS	9.1	-			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-			
Acenaphthene	mg/kg	0.05	MCERTS	0.36	-			
Fluorene	mg/kg	0.05	MCERTS	0.37	-			
Phenanthrene	mg/kg	0.05	MCERTS	4.9	-			
Anthracene	mg/kg	0.05	MCERTS	0.99	-			
Fluoranthene	mg/kg	0.05	MCERTS	8.8	-			
Pyrene	mg/kg	0.05	MCERTS	7.8	-			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	5.0	-			
Chrysene	mg/kg	0.05	MCERTS	4.0	-			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	4.8	-			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.3	-			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.0	-			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.4	-			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.61	-			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.8	-			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	50.0	-			

Analytical Report Number: 20-99607

Project / Site name: Flax Barn, Poslingford

Lab Sample Number				1510432	1510433			
Sample Reference				TP210	TP211			
Sample Number				A	A			
Depth (m)				0.35-0.40	0.15-0.20			
Date Sampled				12/05/2020	12/05/2020			
Time Taken				1358	1530			
Analytical Parameter (Soil Analysis)								
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	-			
Boron (water soluble)	mg/kg	0.2	MCERTS	6.9	-			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	-			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	-			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	-			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	56	-			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	-			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	-			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	96	-			
Petroleum Hydrocarbons								
Petroleum Range Organics (C6 - C10)	mg/kg	0.1	MCERTS	< 0.1	-			
TPH (C10 - C25)	mg/kg	10	MCERTS	94	-			
TPH (C25 - C40)	mg/kg	10	MCERTS	130	-			

Analytical Report Number: 20-99607

Project / Site name: Flax Barn, Poslingford

Lab Sample Number				1510424	1510425	1510434		
Sample Reference				TP203	TP202	TP211		
Sample Number				C	B	B		
Depth (m)				0.10	0.20	0.20-0.25		
Date Sampled				12/05/2020	12/05/2020	12/05/2020		
Time Taken				1140	1218	1527		
Analytical Parameter (Bulk Analysis)								
Asbestos Identification	Type	N/A	ISO 17025	Chrysotile-Hard/Cement Type Material	Chrysotile - Hard/Cement Type Material	Chrysotile-Hard/Cement Type Material		

Analytical Report Number : 20-99607

Project / Site name: Flax Barn, Poslingford

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1510420	TP201	A	0.40-0.45	Brown clay and sand with gravel.
1510421	TP202	A	0.30-0.35	Brown clay and sand with gravel.
1510422	TP203	A	0.07-0.15	-
1510423	TP203	B	0.30-0.35	Brown clay and sand with gravel.
1510426	TP204	A	0.30-0.35	Brown clay and sand with gravel.
1510427	TP205	A	0.25-0.30	Brown loam and clay with gravel.
1510428	TP206	A	0.20-0.25	Brown clay and sand with gravel.
1510429	TP207	A	0.20-0.25	Black clay and sand with gravel.
1510430	TP208	A	0.30-0.35	Brown clay and sand with gravel.
1510431	TP209	A	0.25-0.30	Brown clay and sand with gravel.
1510432	TP210	A	0.35-0.40	Brown clay and sand with gravel.
1510433	TP211	A	0.15-0.20	-

Analytical Report Number : 20-99607

Project / Site name: Flax Barn, Poslingford

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Bulks	Asbestos Identification in bulk material with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	W	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
PRO (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Thiocyanate in soil	Determination of thiocyanate in soil by extraction in water followed by acidification followed by addition of ferric nitrate followed by discrete analyser (spectrophotometer).	In-house method	L082-PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS

Analytical Report Number : 20-99607

Project / Site name: Flax Barn, Poslingford

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

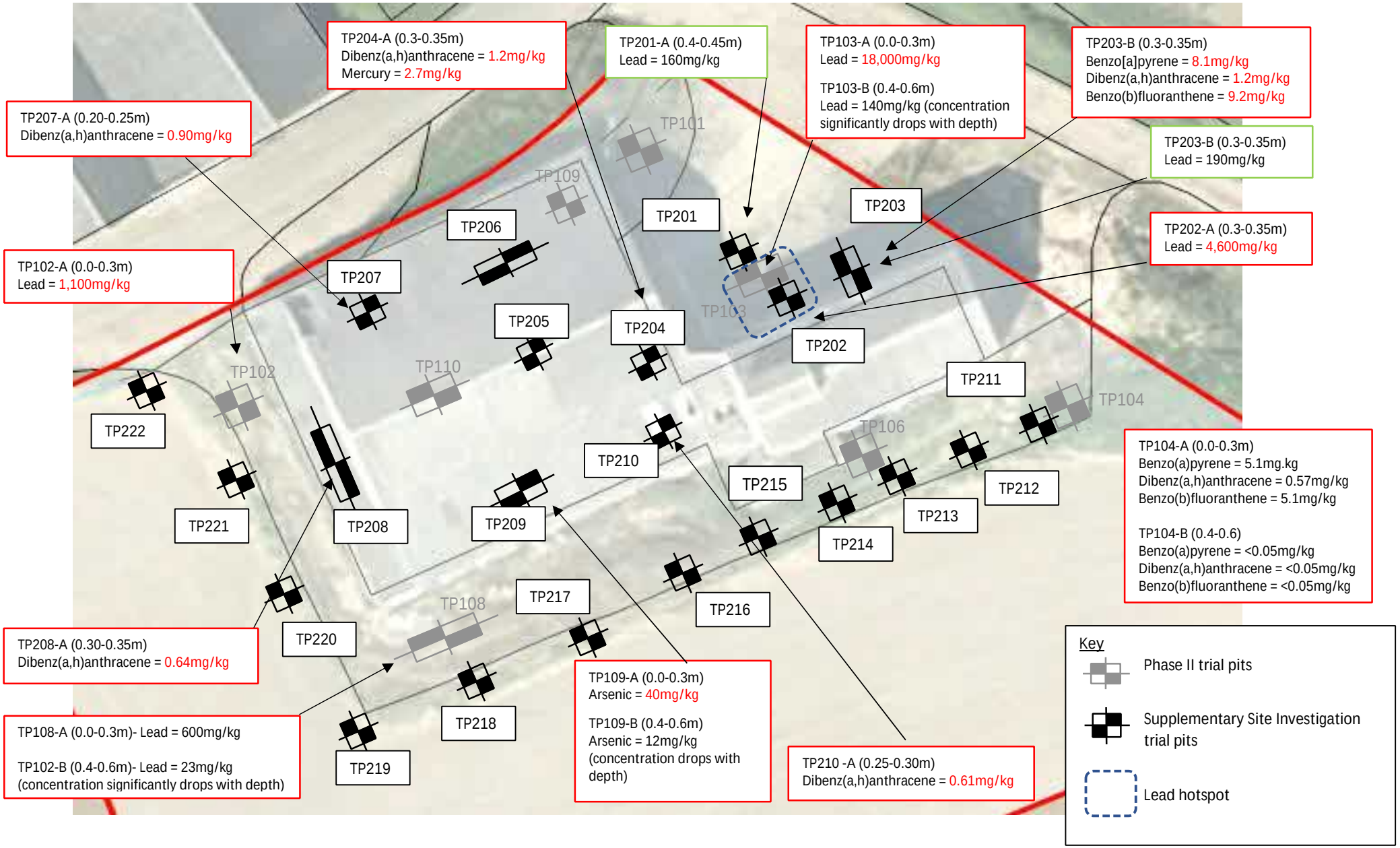
Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH Oils (Soils)	Determination of extractable hydrocarbons in soil by GC-MS/FID.	In-house method with silica gel split/clean up.	L076-PL	D	MCERTS

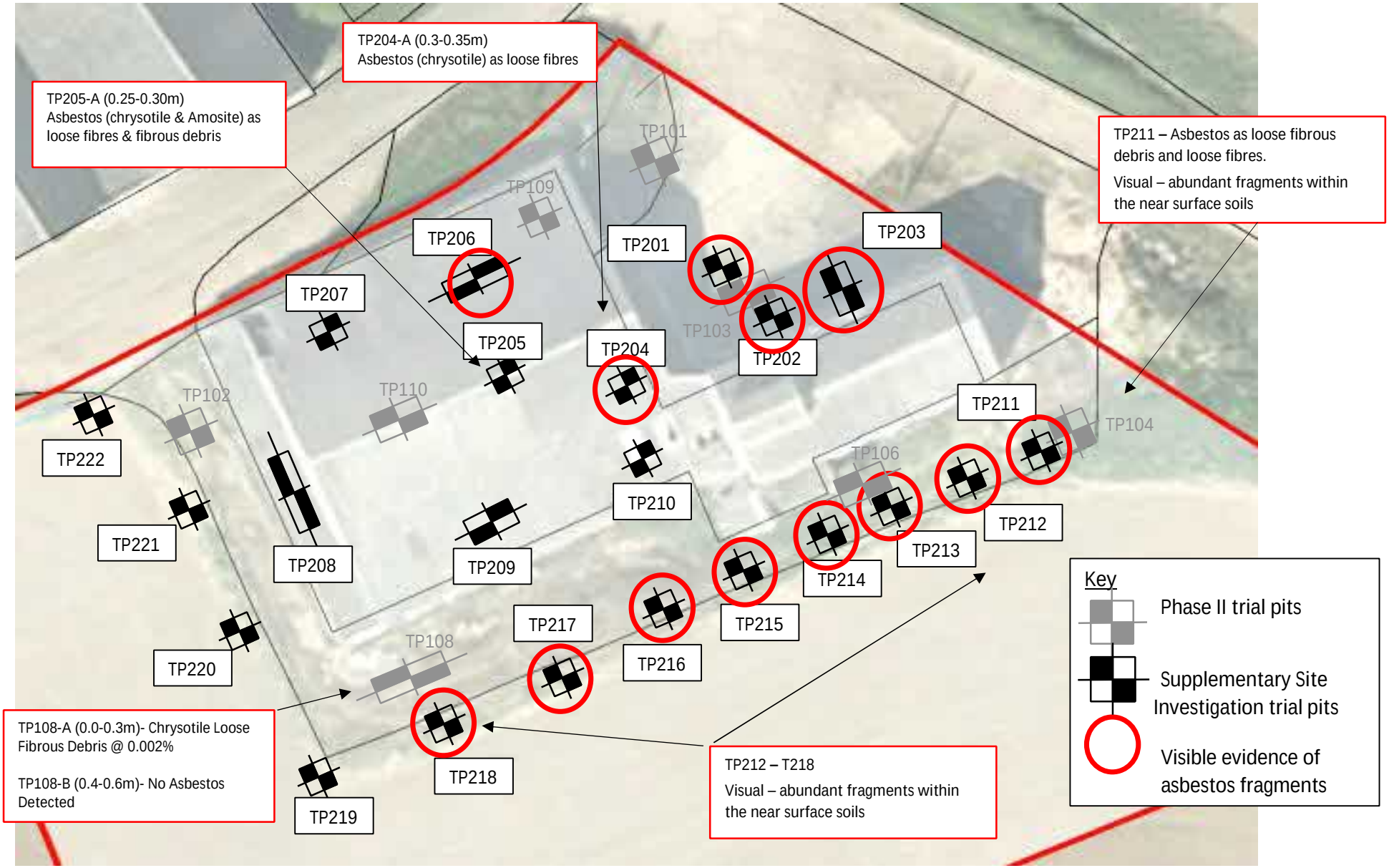
For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
TP203	B	S	20-99607	1510423	b	PRO (Soil)	L088-PL	b
TP204	A	S	20-99607	1510426	b	PRO (Soil)	L088-PL	b
TP205	A	S	20-99607	1510427	b	PRO (Soil)	L088-PL	b
TP206	A	S	20-99607	1510428	b	PRO (Soil)	L088-PL	b
TP207	A	S	20-99607	1510429	b	PRO (Soil)	L088-PL	b
TP208	A	S	20-99607	1510430	b	PRO (Soil)	L088-PL	b
TP209	A	S	20-99607	1510431	b	PRO (Soil)	L088-PL	b
TP210	A	S	20-99607	1510432	b	PRO (Soil)	L088-PL	b

Key: a - No sampling date b - Incorrect container
c - Holding time d - Headspace e - Temperature

Flax Barn, Poslingford, Sudbury – JPC Supplementary Investigation Plan 1 – All Contaminants except Asbestos (detailed on Plan 2) IE20/040





NB. Fragments of asbestos cement sheet were noted across the surface of the site, but notably on the areas of external hard standing. The asbestos cement roof is in a very poor condition and has fallen into the building in more than one location.

Photograph 1 – TP201 excavated adj. to TP103 to explore lead contamination

Photograph 2 – TP202

Photograph 3 – TP203

Photograph 4 – Fragments of asbestos cement taken from the side of TP203

Photograph 5 – TP204 very soft silty CLAY

Photograph 6 – TP205 within the central bay

Photograph 7 – TP206 within the narrow northern bay

Photograph 8 – TP207 at the western end of the narrow northern bay

Photograph 9 – TP208 within the western bay

Photograph 10 – TP209

Photograph 11 – TP210

Photograph 12 – TP211 at the edge of the external hard standing / field

Photograph 13 – TP212 A surface scrape to explore wind-blown fragmented roofing sheet

Photograph 14 – TP213 A surface scrape to explore wind-blown fragmented roofing sheet

Photograph 15 – TP214 A surface scrape to explore wind-blown fragmented roofing sheet

Photograph 16 – TP215 A surface scrape to explore wind-blown fragmented roofing sheet

Photograph 17 – TP216 A surface scrape to explore wind-blown fragmented roofing sheet

Photograph 18 – Shallow trial pitting along field boundary for evidence of asbestos fragments