

GEO-ENVIRONMENTAL AUDIT

PHASE 2 Site Investigation & Risk Assessment

PHASE 3 Remediation Statement

Proposed Residential Development

Site adjacent to 2 Tanners Street

Ramsbottom

Bury

BL0 9ES

Author: Daniel Slattery
Client: Mr Dave Blakeman
Reference: rep-tjba-blakeman-2 tanners st-phs 2 & 3
env-220223.docx

Revision	Date	Reason
0	Feb 2022	Original.

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1. PHASE 2 - SITE INVESTIGATION & RISK ASSESSMENT

1.1. Introduction.

T. J. Booth Associates have been appointed by Mr Dave Blakeman to undertake a Phase 2 & 3 Geo-environmental Audit & associated Site investigations to a vacant plot of land adjacent to No. 2 Tanners Street, Ramsbottom, to support a Town & Country Planning permission for a residential end use.

The Site is located to the west side of Tanners Street, west of Ramsbottom centre. It is approximately 0.14 hectares in area, and was formerly part of the gardens to Prospect House (to the west side) from c1893. The Site is currently vacant, awaiting development.

Planning approval for the Site was granted in April 2022, application ref No: 67553, for the 'Erection of one dwelling with associated garage, parking/manoeuvring space and garden curtilage, to be accessed via Tanners Street'. The permission notice contained an environmental condition (No.4), and is detailed below

NOTICE OF PLANNING PERMISSION

Town and Country Planning Act 1990
Town and Country Planning (Development Management Procedure) (England)
Order 2015

To:
 Mr Richard Gee
 Roman Summer Associates Ltd
 Haweswater House
 Waterfold Business Park
 Bury
 Lancashire
 BL9 7BR

On Behalf Of:
 Blakeman Design and Build
 38 Irk Vale
 Chadderton
 Oldham
 Lancashire
 OL1 2TW

PART 1 - Particulars of Application

Application Number: 67553

Date of Registration: 17/09/2021

Proposal:
 Erection of one dwelling with associated garage, parking/manoeuvring space and garden curtilage, to be accessed via Tanners Street

Location:
 Land adjacent 2 Tanners Street, Ramsbottom, BL0 9ES

PART 2 - Particulars of Decision

- 4 No development shall commence unless and until:-
- A contaminated land Preliminary Risk Assessment report to assess the actual/potential contamination and/or ground gas/landfill gas risks at the site shall be submitted to, and approved in writing by, the Local Planning Authority;
 - Where actual/potential contamination and/or ground gas/landfill gas risks have been identified, detailed site investigation and suitable risk assessment shall be submitted to, and approved in writing by the Local Planning Authority;
 - Where remediation/protection measures is/are required, a detailed Remediation Strategy shall be submitted to, and approved in writing by, the Local Planning Authority.

As part of the planning application package for the Site, a Phase 1 Preliminary Risk Assessment (PRA) was undertaken by Ian Farmer Associates Ltd, report No. 2230098, dated February 2020.

TJ Booth Associates have since been employed to undertake the Phase 2 Site Investigations & Phase 3 Remediation Statements for the Site as appropriate & based on the findings.

This report provides a desk-based study & intrusive ground investigation based on current UK guidance for environmental investigation within the construction industry. Principal to the assessment is the potential for contamination pollutant linkages via the CLR-11 source-pathway-receptor methodology. Assessment of potential pollution linkages is primarily undertaken in strict accordance with BS5930:2015, BS 10175:2011+A2:2017, CIRIA C665 and BS 8485:2015+A1:2019 et al.

1.2. Proposed Development.

The Site is on a hillside, sloping from approximately 179.00mAOD at the west boundary to approximately 168.00m aOD at the driveway entrance with Tanners Street.

The proposed development is for a single detached residential dwelling. Access will be via Tanners Street to a private driveway and underground garage built into the hillside.

The remainder of the Site will comprise soft landscaping.

1.3. Detailed Site History.

For corresponding mapping, information & supporting documentation, refer to Appendix C under 'Historic Maps & Supporting Documentation' which is in the order of this timeline.

1850. The Site was unoccupied, and part of a larger curtilage. Tanners Street was in existence to the east side, and with the area surrounding the Site comprising mainly agricultural land uses with 'Grants Nursery' immediately upslope to the east and suspected to be a plantation. There are some small local quarries to the northwest of the Site and within 250m, but these are significantly higher in elevation.

1893. Site remains vacant but is part of the garden area to an offsite residential dwelling named later as 'Prospect House'. The south boundary of the Site is lined with trees & pathways, which provides access to the dwelling. No. 2 Tanners Street to the north boundary is now shown, as is other residential development in the wider area.

1810-present. Further urban infill to present day but no note of any particular contaminative uses on or in close proximity to the Site.

1.4. Ian Farmer Associates Phase 1 PRA Recommendations.

The Ian Farmer Associates conceptual model identified the following potential pollutant linkages & recommendations with regards to general ground contamination:

5.1 Conceptual Site Model

5.1.1 The research has therefore identified the following pollutant linkages that require further consideration and have been used to formulate the Conceptual Site Model.

Potential Contamination Sources	Potential Contaminants of Concern	Potential Pathways	Receptor Group
Possible contamination associated with former fireplace and mantelpiece suppliers to the southwest and former allotments to the northwest.	Inorganic Compounds - Metals - Cyanide	- Soil ingestion - Vegetable uptake - Dermal contact - Inhalation of contaminated dust - Vapour inhalation	Human Health - Site occupants - Site users - Construction workers - Maintenance workers
	Organic Compounds - TPH - PAH	Plant uptake and accumulation of contaminants	Ecology - Landscaped areas - Sensitive or protected habitats
		Direct contact of contaminants with building materials	Building Materials or Services - Concrete - Plastic pipes and services - Structural iron & steel work

5.2 Conclusions of Geoenvironmental Risk Assessment

5.2.1 The research has identified evidence of potential sources of contamination on or which may impact on the site, with plausible pathways to the likely receptors, and therefore potential pollutant linkages have been suggested.

5.2.2 The risks associated with these potential sources are considered to be low.

5.2.3 Intrusive investigation would confirm the presence, nature or extent of any contamination which may potentially impact on the site.

6.0 RECOMMENDATIONS

6.1 Further Work

6.1.1 A limited intrusive investigation may be undertaken to address the issues raised in Chapter 4.0 and Chapter 5.0.

6.1.2 The following scope of works is suggested in order to collect the required data:

- Exploratory holes to confirm ground conditions and for the recovery of samples for geotechnical and chemical contamination analysis.

1.5. TJBA Site Reconnaissance – May 2021.

1.5.1. Summary & Discussion.

Risks from ground gas were discounted in the Ian Farmer Associates PRA. The only credible sources within a 250m radius of the Site were relatively small areas, and at significantly higher elevation.

The Ian Farmer Associates PRA indicated that although it was unlikely, there was the potential for local ground contamination due to former businesses in the area, particularly relating to allotment land to the west.

Recommendations were for a limited soil survey to assess the on-Site ground conditions.

The additional environmental factors also relate to the Site:

- the Site is classed as a lower probability radon area,
- coal mining legacy is not an issue locally.

1.6. TJBA Site Reconnaissance – May 2021.

Details of Existing Structures:	The only structures noted on the Site reconnaissance were the retaining walls to the east side adjacent Tanners Street, and to the north side adjacent No.2 Tanners Street. There was a drainage manhole noted nominally to the centre west side of the plot. The Site was vegetated and was in the process of having minor trees and shrubbery removed. The remainder of the Site comprised a grass surface.
Adjacent Properties:	The Site was surrounded on all sides by residential development.
Water Levels, Directions of Flow and Rates in Rivers:	None noted.
Areas of Discoloured Soil, Polluted Water, Vegetation, and Significant Odours:	None noted.

1.7. Site Investigations.

1.7.1. Summary.

All TJBA Soil analysis will use the LQM/CIEH S4ULs, and the DEFRA C4ULs. The LQM/CIEH S4UL data is the most current and comprehensive list of contaminant exposure level based on proposed end use, however, contaminant levels within S4ULs are considered 'low risk' and exceedance of S4ULs may warrant further analysis to ensure suitability for the specified end use.

The C4SL data relates to updated DEFRA Statutory Guidance under Part 2A of the Environmental Protection Act 1990 (Part 2A). The guidance introduces a 4 category system in which Category 4 is of the least concern and levels falling within this risk category are considered as 'acceptably low'.

As the S4ULs are considered more conservative than C4SLs, any contaminant levels exceeding a S4UL although not considered 'low risk' can still be considered 'acceptably low' for use within the planning regime as long as it is still within the C4SL risk category. Thus, soil sampling results are firstly held to C4SLs where available and then to S4ULs thereafter to define suitability with respect to specified proposed end uses within the planning regime.

1.7.2. Site Investigations 15.02.2023.

Site Investigations were undertaken by T J Booth Associates on the 15.02.2023. The investigations comprised 2No. machine excavated trial holes (THs 1-2), undertaken with a 5t back acting excavator.

Trial holes were located nominally to the front and rear of the proposed plot, to gain an understanding of the geology for foundation design. Refer to site investigation logs in the appendix for full consideration of levels & descriptions of soils.

4No. soil samples (S1-4) were also taken around the Site. Potential contamination from the PRA was noted to be metals, cyanide, PAH & TPH. As no specific area of risk was noted in the PRA, the samples were taken in a grid format.

Soil samples were sealed in 1kg white plastic snap top containers & amber jars & vials and sent to Eurofins Chemtest Ltd to be tested for a range of common contaminants.

Samples were tested for metals, speciated PAH, inorganics & sulphates, SOM, & asbestos screening in accordance with the conceptual model. No visual or olfactory evidence of contamination was noted on Site, and thus no TPH/hydrocarbon testing was undertaken.

On return the samples were assessed by TJ Booth Associates to common threshold comparison data, specifically the Defra Category 4 Screening Levels (C4SLs), then to LQM/CIEH (S4ULs).

Testing of upper site soils revealed no elevated contaminants of concern above threshold values for a residential end use.

1.8. Final Conceptual Model.

CURRENT SOURCE/S		ORIGINAL ASSOCIATED USAGE / LOCATION	CONTAMINANT TYPE	PATHWAY	RECEPTOR	POLLUTION LINKAGE	CONSEQUENCE	PROBABILITY	RISK	MITIGATION
CHEMICAL (SOLID)	Existing upper site soil.	Original Site soil.	Metals, sulphates, asbestos, PAHs,	Direct ingestion, aerial ingestion, dermal contact, drinking water.	Site construction operatives & future occupants. Site buildings.	Site soils have been investigated and found to be virgin topsoil approximately 250mm thick upon virgin glaciofluvial subsoil. Subsequent testing of Site soil has revealed all contaminants of concern to be below threshold levels for a residential end use.	Medium.	Unlikely.	Low risk.	NO ACTION
	Existing made ground - surface/ sub-soil.	Original Site soil.	Metals, sulphates, asbestos, hydrocarbons, PAHs,	Permeation through soil into ground water, local watercourses, or aquatic habitats.	Contaminated ground / surface water. Controlled Waters such as watercourses, canal, aquatic habitats & associated wildlife.	Testing of Site soil has revealed all contaminants of concern to be below threshold levels for a residential end use. No hydrocarbon risk noted on Site. Site is not within a source protection zone.	Medium.	Unlikely.	Low risk.	NO ACTION

2. PHASE 3 – REMEDIATION STATEMENT

2.1. Basic Site Details

Full details included in the Phase 2 Site Investigation Introduction & subsequent sections.

2.2. Conceptual Model (Final) & Relevant Pollution Linkages

Refer to Phase 2 Site Investigation and Assessment section of the report for Final Conceptual Model.

Potential risk was noted in the PRA with regard to shallow contamination of Site soil.

The subsequent Phase 2 Site investigation included trial hole and soil sampling, and identified virgin topsoil over virgin subsoil. No contaminants of concern were noted in testing, and no pollutant linkages were identified in the Final Conceptual Model.

2.3. Site & Remedial Objectives

No ground gas risk was noted in the PRA.

No radon risk was noted in the PRA.

No ground/soil contamination was noted in the Phase 2 Site investigation.

2.4. Recommended Remediation:

Not required.

2.5. Verification (Phase 4 requirements)

Site soil is suitable for the proposed end use, and there will be enough for reuse .

If any soil import is required however, verification may be required for Planning or Building Control/Building Regulations submission. If so, it will need to be undertaken by suitably qualified consultants and comprise the following:

- Import source material.
- Characterisation & suitability of material.
- Soil sampling should be undertaken as per YALPAG Guidelines as per the following ratios:

Virgin quarried materials, 1-2 samples to confirm inert nature.

Crushed hardcore, stone, brick, min 1 sample per 500cum.

Greenfield/manufactured, generally 1 sample per 250cum (min 3 samples).

Brownfield, generally 1 sample per 50cum (min 6 samples).

Samples should be tested for the following contamination suites: metals, inorganics, PAH USEPA16 speciated, and asbestos screening. Results will be analysed against Defra Category 4 Screening Levels (C4SLs) where available, and then to the LQM/CIEH (S4ULs), for use in a residential end use setting.

- Reporting (including photographic evidence).

2.6. Additional Notes

Before any further work is undertaken, this report should be submitted to and agreed by the Local Planning Authority Contaminated Land Department/Building Control Department as necessary.

We trust that the above clear, but should you require further advice please contact the undersigned.

Signed.....



D.S. Slattery BSc (Hons).

T J Booth Associates.

Authorised...



T J Booth BSc (Hons), C. Eng. C. Env. MICE.

T J Booth Associates.

3. REFERENCES.

BS 8485:2015+A1:2019. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.

BS 10175:2011+A2:2017. Investigation of potentially contaminated sites. Code of practice.

BS5930:2015. Code of practice for site investigations.

CL:AIRE. 2012. Research Bulletin-RB17-A Pragmatic Approach to Ground Gas Risk Assessment.

CIRIA. Report C665.

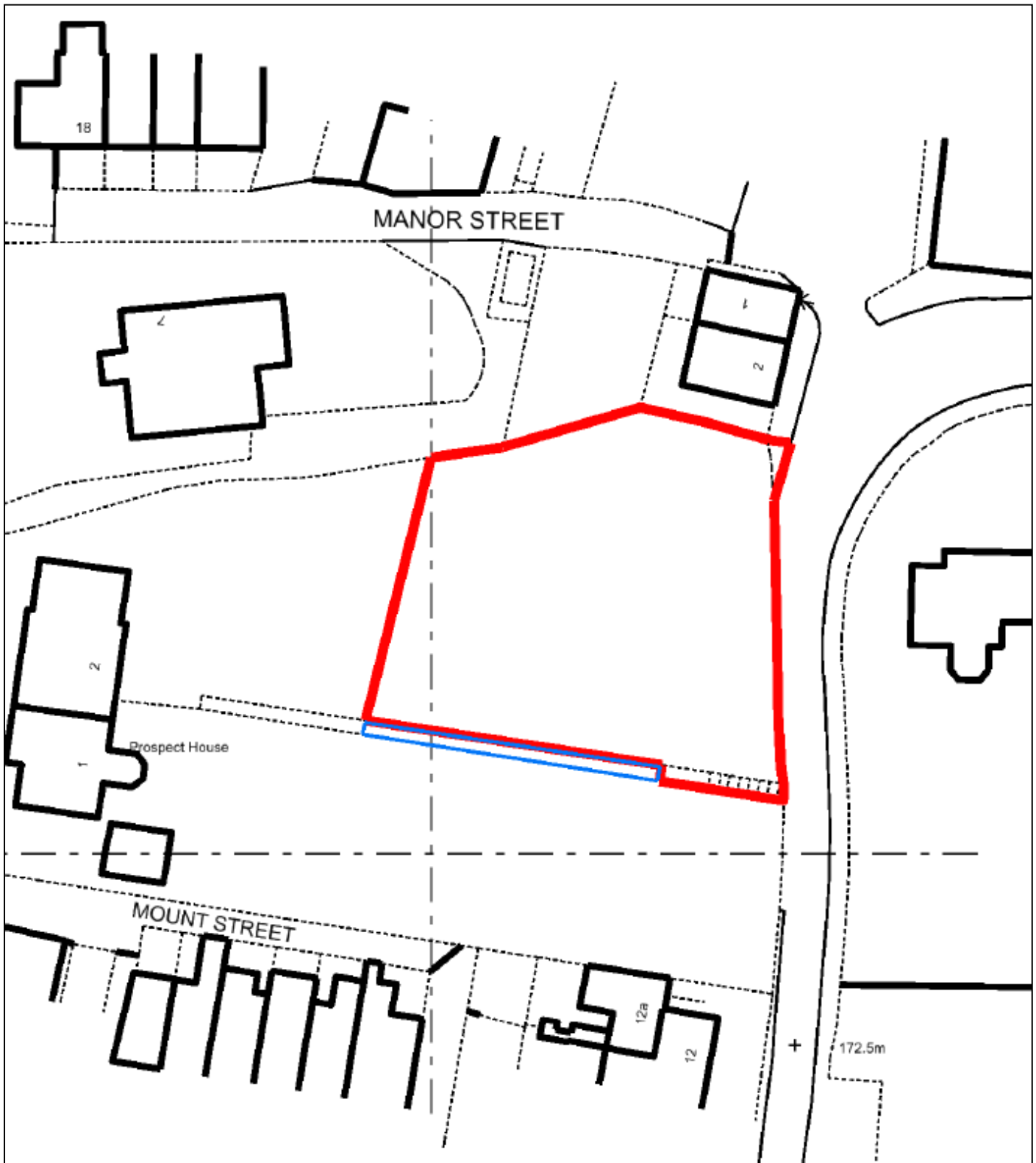
Environment Agency. 2005. Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination. R&D Technical Report P5-066/TR.

ICE Manual of Geotechnical Engineering Volume I. 2012.

CIRIA. Report SP32.

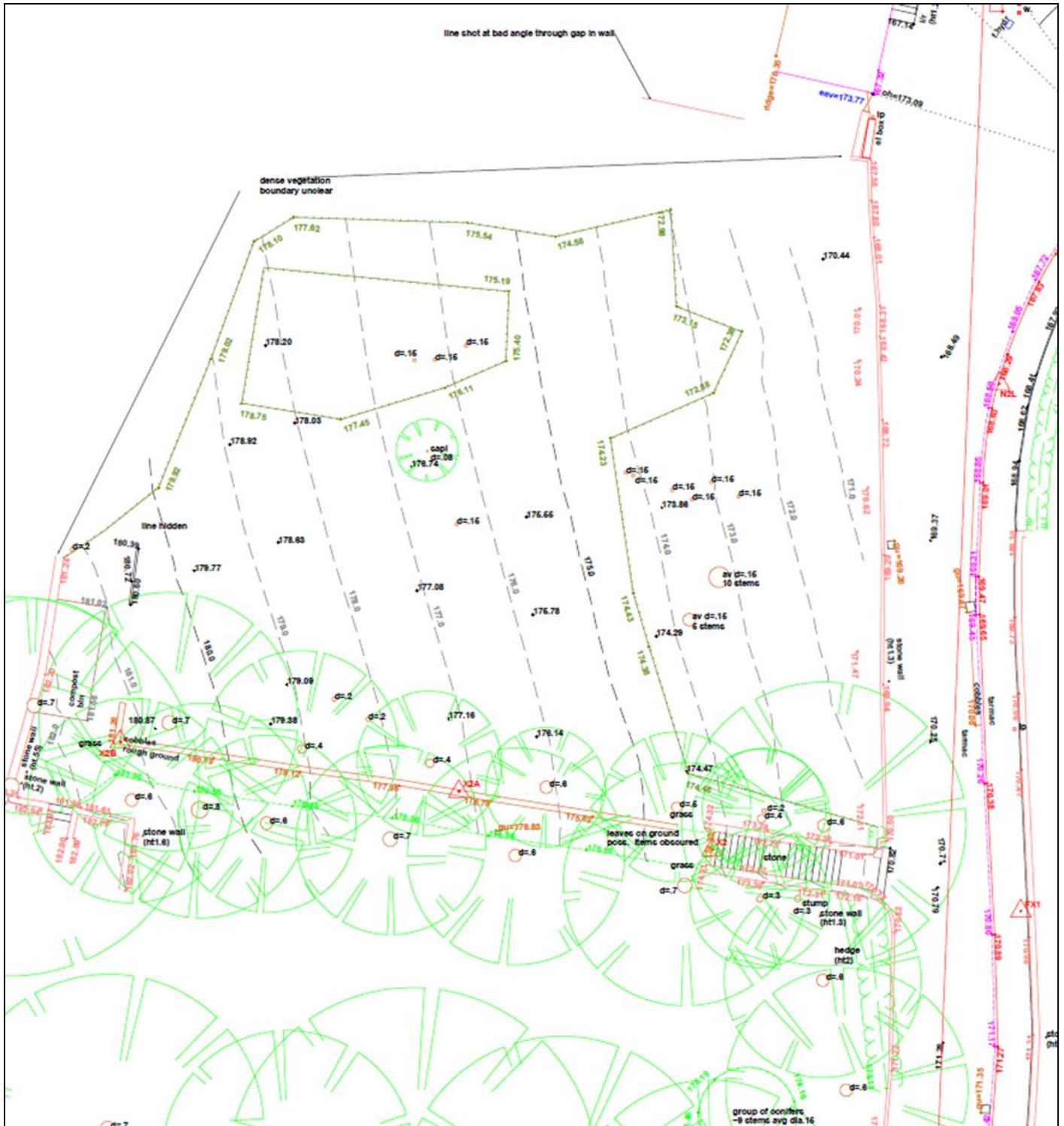
4. APPENDIX A: PLANS, FIGURES, ASSESSMENTS & CERTIFICATION.

4.1. Location Plan.

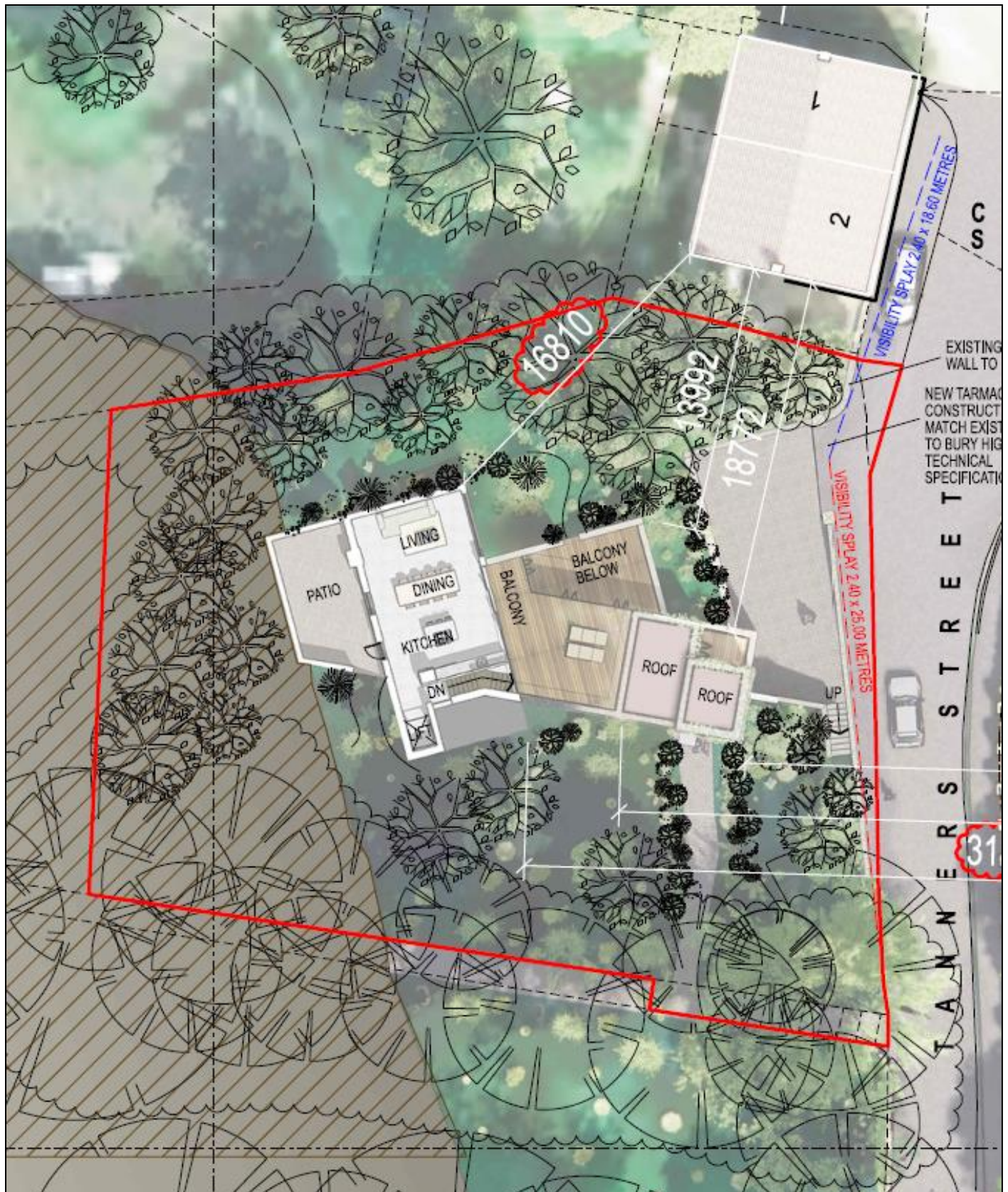




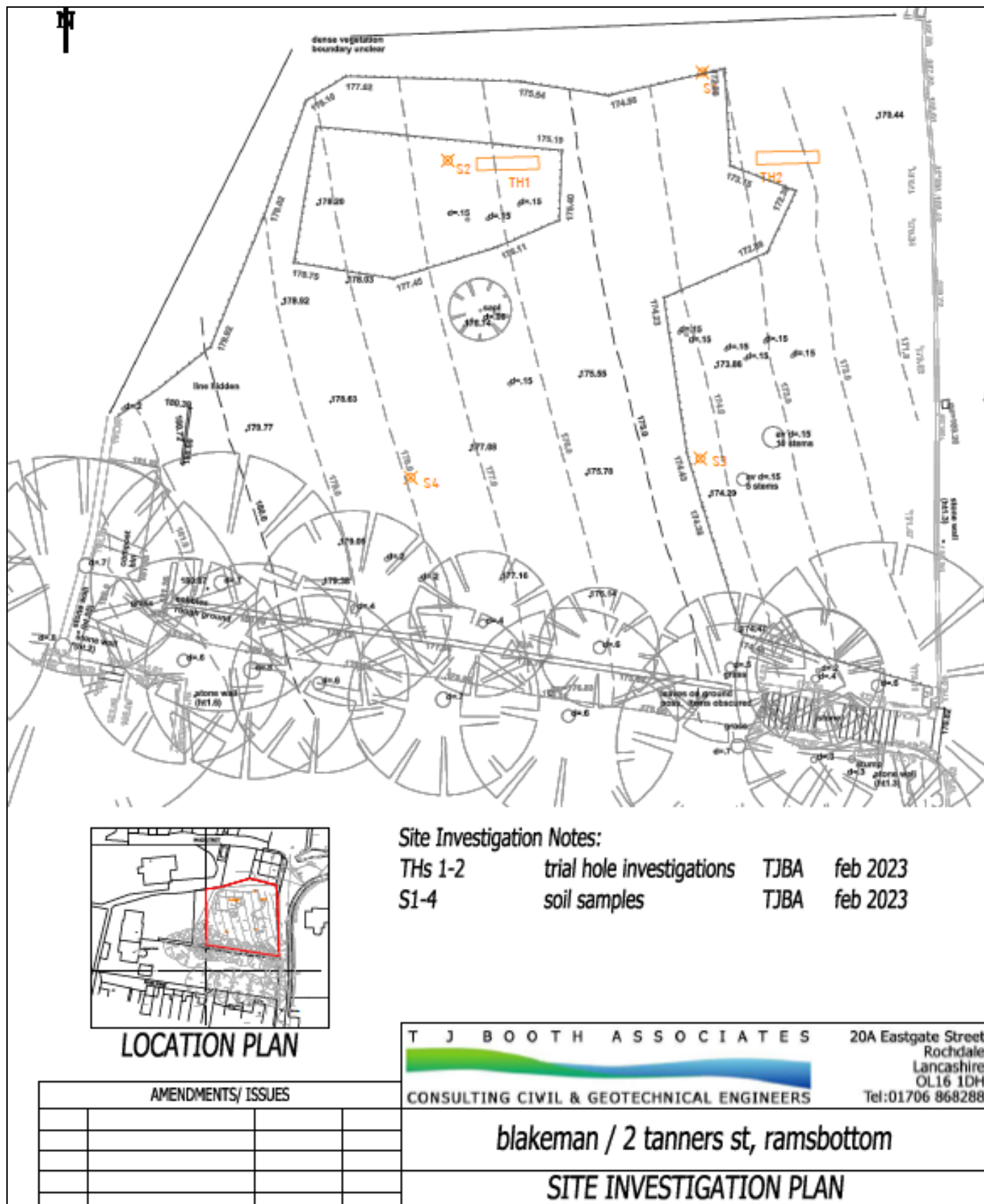
4.2. Existing Site Plan & Topographic Survey.



4.3. Proposed Development.



4.4. Site Investigation Plan.



4.5. Soil Sampling Analysis.

Client / Site:		Blakeman - 2 Tanner's St, Ramsbottom					
Sample Type:		Soil Samples					
Sampling Date:		15.02.2023					
Contaminant		No	Max	Mean	t 95	RESIDENTIAL (with or without plant uptake)	
						Pass/Fail	Comment
METALS	Arsenic as As, dry weight	4	24	20	23.55	37	PASS
	Boron as B, hot water sol dw	4	0.76	0.625	0.759	290	PASS
	Cadmium as Cd, dry weight	4	0.24	0.2125	0.239	22	PASS
	chromium as Cr(III) dry weight	4	18	14.00	17.55	910	PASS
	Chromium as Cr(VI), dry weight	4	0.5	0.5	0.5	21	PASS
	Copper, as Dry Weight	4	63	46	61.2	2400	PASS
	Lead, as Dry Weight	4	120	112.5	118.5	200	PASS
	Mercury as Hg, dry weight	4	0.23	0.2	0.227	1.2	PASS
	Nickel as Ni, dry weight	4	15	13.25	14.85	130	PASS
	Selenium as Se, dry weight	4	1.1	0.985	1.085	250	PASS
	Zinc as Zn, dry weight	4	57	56	56.85	3700	PASS
INORGANIC	Cyanide (Total)	4	2.7	1.075	2.385	34	PASS
	Sulphate (Total) as SO ₄	4	0.087	0.064	0.084	0.24	PASS
	Sulphide	3	2	1.48	1.98	250	PASS
	pH	4	5.2	5	5.17	6 to 8	ACIDIC
	Sulphur (Elemental)	4	1.5	1.325	1.5	100	PASS
	Asbestos Identification	4	0	0	0	0	PASS
ORGANIC	SOM	4	6	6	6		
	PAH acenaphthene	4	0.1	0.1	0.1	1100	PASS
	PAH acenaphthylene	4	0.1	0.1	0.1	920	PASS
	PAH anthracene	4	0.1	0.1	0.1	11000	PASS
	PAH benzo[a]anthracene	4	0.25	0.1925	0.244	13	PASS
	PAH benzo[a]pyrene	4	0.1	0.1	0.1	5	PASS
	PAH benzo[b]fluoranthene	4	0.1	0.1	0.1	3.7	PASS
	PAH benzo[g,h,i]perylene	4	0.1	0.1	0.1	350	PASS
	PAH benzo[k]fluoranthene	4	0.1	0.1	0.1	100	PASS
	PAH chrysene	4	0.91	0.775	0.909	27	PASS
	PAH dibenz[ah]anthracene	4	0.1	0.1	0.1	0.3	PASS
	PAH fluoranthene	4	0.73	0.56	0.711	890	PASS
	PAH fluorene	4	0.1	0.1	0.1	860	PASS
	PAH indeno[123-cd]pyrene	4	0.1	0.1	0.1	41	PASS
	PAH naphthalene	4	0.1	0.1	0.1	13	PASS
	PAH phenanthrene	4	0.1	0.1	0.1	440	PASS
	PAH pyrene	4	0.83	0.63	0.8	2000	PASS
	PAH PAH (Total - SUM EPA16)	4	2.7	2.25	2.64	1	comment
SVOC	phenol	4	0.1	0.1	0.1	380	PASS

4.6. Eurofins Chemtest – Soil Testing Certificates.



Chemtest

Eurofins Chemtest Ltd

Depot Road

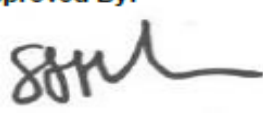
Newmarket

CB8 0AL

Tel: 01638 606070

Email: info@chemtest.com

Final Report

Report No.:	23-05488-1		
Initial Date of Issue:	01-Mar-2023		
Client	TJ Booth Associates		
Client Address:	20a Eastgate Street Rochdale Lancs OL16 1DH		
Contact(s):	Daniel Slattery		
Project	Blakeman - Tanners St, Ramsbottom, Bury BL0 9ES		
Quotation No.:	Q19-18321	Date Received:	17-Feb-2023
Order No.:		Date Instructed:	17-Feb-2023
No. of Samples:	4		
Turnaround (Wkdays):	10	Results Due:	02-Mar-2023
Date Approved:	01-Mar-2023		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: Blakeman - Tanners St, Ramsbottom, Bury BL0 9ES

Client: TJ Booth Associates		Chemtest Job No.:		23-05488	23-05488	23-05488	23-05488
Quotation No.: Q19-18321		Chemtest Sample ID.:		1592333	1592334	1592335	1592336
Order No.:		Client Sample Ref.:		S1	S2	S3	S4
		Client Sample ID.:		S1	S2	S3	S4
		Sample Location:		TH1	TH1	TH1	TH1
		Sample Type:		SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.00	0.00	0.00	0.00
		Bottom Depth (m):		0.20	0.25	0.15	0.20
		Date Sampled:		15-Feb-2023	15-Feb-2023	15-Feb-2023	15-Feb-2023
		Time Sampled:		11:00	11:15	11:30	11:45
		Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Type	U	2192		N/A			
Asbestos Identification	U	2192		N/A			
Moisture	N	2030	%	0.020	20	20	22
pH	U	2010		4.0	5.2	4.9	4.9
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.57	0.42	0.76
Sulphur (Elemental)	U	2180	mg/kg	1.0	1.5	1.1	1.2
Cyanide (Total)	U	2300	mg/kg	0.50	0.50	0.50	2.7
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	0.64	1.8	< 0.50
Sulphate (Total)	U	2430	mg/kg	100	470	540	870
Arsenic	U	2455	mg/kg	0.5	16	19	24
Cadmium	U	2455	mg/kg	0.10	0.23	0.19	0.19
Chromium	U	2455	mg/kg	0.5	12	11	15
Copper	U	2455	mg/kg	0.50	32	51	63
Mercury	U	2455	mg/kg	0.05	0.23	0.21	0.21
Nickel	U	2455	mg/kg	0.50	13	11	14
Lead	U	2455	mg/kg	0.50	110	110	110
Selenium	U	2455	mg/kg	0.25	0.94	0.90	1.1
Zinc	U	2455	mg/kg	0.50	55	57	56
Chromium (Hexavalent)	N	2460	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	6.0	7.0	7.9
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.52	0.73	0.60
Pyrene	U	2700	mg/kg	0.10	0.60	0.83	0.63
Benzofluoranthene	U	2700	mg/kg	0.10	0.21	0.25	0.18
Chrysene	U	2700	mg/kg	0.10	0.47	0.90	0.91
Benzobenzofluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Benzokjfluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: Blakeman - Tanners St, Ramsbottom, Bury BL0 9ES

Client: TJ Booth Associates		Chemtest Job No.:	23-05488	23-05488	23-05488	23-05488
Quotation No.:	Q19-18321	Chemtest Sample ID.:	1592333	1592334	1592335	1592336
Order No.:		Client Sample Ref.:	S1	S2	S3	S4
		Client Sample ID.:	S1	S2	S3	S4
		Sample Location:	TH1	TH1	TH1	TH1
		Sample Type:	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):	0.00	0.00	0.00	0.00
		Bottom Depth (m):	0.20	0.25	0.15	0.20
		Date Sampled:	15-Feb-2023	15-Feb-2023	15-Feb-2023	15-Feb-2023
		Time Sampled:	11:00	11:15	11:30	11:45
		Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
Benzolaprene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzofg,h,iperylene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	2.3
Total Phenols	U	2820	mg/kg	0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2182	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easily liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and Trimethylphenols>Note: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report InformationKey

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

-
- A - Date of sampling not supplied
 - B - Sample age exceeds stability time (sampling to extraction)
 - C - Sample not received in appropriate containers
 - D - Broken Container
 - E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

5. APPENDIX B: SITE INVESTIGATION PHOTOS.



General Site photo viewed north along Tanners St.



Trial Hole 1.



Trial Hole 2/Soil Sample 2.



Soil Sample S1.



Soil Sample S3.



Soil Sample S4.

6. APPENDIX C: LANDMARK ENVIROSEARCH DOCUMENTATION.